



Annual Report of the Chief Inspector of Mines 2008



Ministry of
Energy, Mines and
Petroleum Resources



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1 Principal Mining Functions

1.1 Mining Health and Safety Function

1.1.1 MANDATE/ACTIVITIES

The Mining Health and Safety 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, which comprises representatives from labour, industry and government. The Chief Inspector of Mines chairs this committee, which ensures that the Code remains current as new technology, mining practices and health and safety concerns emerge. The Committee convened in Vancouver in the fall of 2007 to review recommendations for amending the Code. A new version of the Code was released in December 2008.

With respect to health and safety, the key mandate of the Mining and Minerals Division is to ensure the health and safety of workers and the public. In order to accomplish this mandate, Division functions include the following:

- review of aspects of mining and exploration proposals related to health and safety;
- mine inspections and the monitoring of mining activity for compliance with the Mines Act and the Code;
- the approval of mine plans with regard to health and safety concerns;
- the completion of audits to evaluate how well a health and safety 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 relevant research and development projects to enhance procedures, technology, and practices in mine health and safety.

Additional guidance for Division activities is derived from the British Columbia Mining Plan, which is based on four Cornerstones:

- Focus on Communities and First Nations;
- Protecting Workers, Protecting the Environment;
- Global Competitiveness; and
- Access to Land.

1.1.2 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. This station is under the supervision of the Inspector of Mines, and the Director of Health and Safety in Victoria.

1.2 Mining Administration Function

1.2.1 MANDATE/ACTIVITIES

The Mining and Minerals Division 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 located in British Columbia. This mandate includes the following:

- the review of applications and issuance of permits under Section 10 of the Mines Act for all mining activities taking place in B.C., including major mining projects subject to the Environmental Assessment Act;
- the 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.

Division 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.

2008 was another extremely busy year for the B.C. mining industry and the Mining and Minerals Division. The total value of mineral production in B.C. rose to \$6.6 billion, and mineral exploration investment hit \$435 million (according to Natural Resources Canada). 2008 was also a busy year for mine development, with anywhere between 20 and 30 large projects moving through the permitting process at any given time.

In addition to health and safety functions, Inspectors of Mines address the 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.



2 Health & Safety

2.1 Occupational Health Section

2.1.1 ROLES AND RESPONSIBILITIES

The Occupational Health Section assists the anticipation, recognition, evaluation and control of health hazards. The section provides materials for health and safety education and training, and sets standards for the inspection and enforcement of occupational health issues at mines in British Columbia.

The Health, Safety and Reclamation Code for Mines in British Columbia requires that mine managers develop and implement 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 are exposed in the workplace. These hazard could include, among others, dusts, silica, respirable combustible dust, noise, gases and fumes, radiation (ionizing and non-ionizing) and heat/cold stress. The Occupational Health (OH) section also makes comparative measurements to ensure companies follow proper methodology and obtain accurate results.

Medical Surveillance and Workplace Hazardous Materials Information System (WHMIS) programs are also included in the OH section's responsibilities. OH staff provide assistance in program development and also periodically schedule audiometric technician training as needed.

A written, preventative training program to educate mines' Occupational Health and Safety Committee 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 lower back injury, repetitive strain, overexertion or vibration-induced injuries. Training must include a practical component using tools to identify and objectively evaluate risks and develop practical solutions. The OH group assists mines in supplying this training by providing information and assistance as needed.

2.1.2 STRUCTURE AND ORGANIZATION

During 2008, there were three people in the OH group with specialties in industrial hygiene and human factors/ergonomics.

2.1.3 SUMMARY OF ACTIVITIES

In 2008, the OH group

- conducted frequent on-site inspections of mines to fulfill their mandate to monitor workplace conditions;
- led and organized health and safety audits and mines;
- responded to worker concerns regarding exposures to gases and respirable silica;
- delivered MSD Prevention training to safety representatives from B.C. mines; and
- organized the Open Pit and Small Underground Awards Competition and Awards Dinner.

2.2 Mechanical and Electrical Engineering

2.2.1 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 and operated in acceptable condition so that its operation causes no hazard to people or property.

2.2.2 STRUCTURE AND ORGANIZATION

There was a single Inspector of Mines, Mechanical, based in Fernie until a second was hired in April 2008. The new Inspector of Mines, Mechanical is stationed in Prince George.

Once again in 2008, there was a great deal of activity with new and reopened mines, and there was a large demand on the Mechanical and Electrical Engineering section to keep up with the design, approval and construction plans of the new mines, as well as rehabilitation and improvement plans of existing operations. The section also worked with the provincial audit group and participated in or provided input for five new audits and six follow-up audits in 2008.

2.2.3 SUMMARY OF ACTIVITIES

Mechanical Engineering

Delivery of new machinery and equipment to mines, together with the steady upgrading of the existing items, enables mines in British Columbia to maintain their competitive capabilities. At the same time, safety systems of 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 new equipment demands a high level of skill from those who operate and maintain the equipment. Ministry staff are involved in reviewing engineering drawings associated with the safety systems on such equipment, as a precursor to installation and field inspections on the items. The Ministry 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, maintenance and supervisors understand the consequences of failures occurring in installed control or sensing systems.

Electrical Engineering

The inspectors performed electrical inspections at major mines, including the larger sand and gravel operations as well as some of the smaller sand and gravel/quarry operations. Several new operations required extra inspections and review of engineering specifications and drawings, and a number of new projects were reviewed initially for compliance. All of these operations also required considerable time in the review of their new equipment and installations to ensure compliance with the necessary B.C. and Canadian code requirements. A number of changes are anticipated to be made to the Canadian Electrical Code and the Canadian Standards Association's CSA M421-00 (Use of Electricity in Mines) in 2009, and potential changes are being studied by the Ministry to determine what impact they will have on the industry in British Columbia.

2.3 Competitions and Awards

2.3.1 ROLES AND RESPONSIBILITIES

The primary mandate of the Mining Health and Safety Function is to ensure worker health and safety, public safety and suitable reclamation and protection of the land and watercourses affected by mining and exploration in B.C.

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, Mines and Petroleum Resources, mining is one of B.C.'s safest heavy industries.

Mine rescue competitions, first aid competitions and safety awards all serve as a means to promote safety at B.C. mines. 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.

2.3.2 MINE RESCUE COMPETITIONS

The Provincial Mine Rescue competitions are judged by mines inspectors and industry personnel who are responsible for all aspects of worker and public safety in B.C.'s mining industry. The 53rd annual Provincial Mine Rescue and First Aid competition was held in Smithers on June 7, 2008.

Underground Mine Rescue – Overall Winner

The overall winner of the Underground Mine Rescue trophy was Myra Falls (NVI Mining). The team consisted of Murray Markle (Coach), Greg Palmer (Captain), Gary Boutilier (Vice-Captain), Pat Langlois (Co-ordinator), Paul Bresson, Al Butler and Keith Notter.

Surface Mine Rescue – Overall Winner

The team from Highland Valley Copper won the overall Surface Mine Rescue trophy. Team members included Dale Konowalchuk (Captain), Neal Rideout (Vice-Captain), John Brennan, Steve Hippisley, Pete Lapointe and David Potter.

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. This competition is held in memory of Maurice Boisse, Mine Rescue Team Coach, Island Copper Mine. The mine rescue team from Highland Valley Copper won the award in 2008.

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, who won the Canadian Championship in 1976. In 2008, the award was won by the team from Quinsam Coal Corporation.

Obstacle and Recovery

Quinsam Coal Mine provides this award in recognition of the contribution made by Keith Bracewell to the underground mine rescue competition. This award recognizes the winning team in obstacle and recovery, the largest task in the underground competition,

an area that Keith worked hard to develop and improve. In 2008, Myra Falls won the Keith Bracewell Memorial Award.

2.3.3 FIRST AID COMPETITIONS

There are two separate competitions in the first aid category: the three-person first aid competition, and the first aid component of the underground and surface mine rescue competition. The first aid component is judged in conjunction with the provincial surface and underground mine rescue competitions.

Underground First Aid

This award was originally 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 the Myra Falls mine rescue team at the 2008 competition.

Three- Person Miners' First Aid

The first provincial miners' 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 Ambulance standard-level first aid course is the training standard, and only those who work at a mine are permitted to enter this competition. The three-person first aid competition is designed to be an extension of training in basic first aid skills and is a unique way for teams to prepare to assist their fellow workers in the event of an injury or medical emergency.

The 2008 Three-Person First Aid winning team was from Fording River Operations. Joel Letourneau of Fording River Operations won the Kathy Lofstrom Memorial Trophy for Best Coach of a First Aid Team.

2.3.4 47TH ANNUAL MINE SAFETY AWARDS

The 47th Annual Mine Safety Awards were handed out to 14 mines and quarries that accumulated 15,000 or more worker or contractor hours and had no fatalities between the period of January 1 and December 31, 2008. Recipients were celebrated at a banquet in Squamish, B.C. on June 6, 2009. Awards were presented in five categories

Small Underground Mine Safety Award

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 B.C. The award is given to the mine having the lowest compensable accident rate after logging between 20,000

and 240,000 worker hours, 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 2008 winner was Quinsam Coal Corporation's Quinsam Mine.

John Ash Award (Open- Pit Mines and Quarries)

This award is presented to the mine that has worked a minimum of 1,000,000 hours in a year and attained the lowest compensable injury-frequency rate. The 2008 recipient was Teck Coal's Green Hills Operations.

Edward Prior Award (Open- Pit Mines and Quarries)

This award is presented to operations that logged between 200,000 and 1,000,000 worker hours and had the lowest compensable injury-frequency rate. The 2008 recipient was Teck Coal's Line Creek Operations.

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

This award is presented to operations that logged between 35,000 and 200,000 worker hours and had the lowest compensable injury-frequency rate. The 2008 award was shared by seven mines:

- Central Aggregates (Lafarge Canada Inc.)
- Coquitlam Sand and Gravel (Lafarge Canada Inc.)
- Jervis Inlet (Jack Cewe Ltd.)
- Orca Quarry, (Orca Sand and Gravel Ltd.)
- Pit D (Allard Contractors Ltd.)
- Willow Creek (Western Canadian Coal Partnership)
- Windermere Mining Operation (CertainTeed Gypsum Canada Inc.)

2.3.5 CERTIFICATES OF ACHIEVEMENT

Certificates of achievement are presented to mines with a minimum of 15,000 worker hours and a compensable injury-frequency rate of zero. There were a total of four mines that qualified for certificates for work conducted in 2008:

- Butler Brothers Duncan (Butler Brothers Supplies Ltd.)
- Butler Brothers Keating (Butler Brothers Supplies Ltd.)
- Harper Ranch Quarry (Plateau Construction Ltd.)
- Steelhead Skway (Lehigh Hanson)

2.3.6 NATIONAL SAFETY AWARDS – JOHN T. RYAN TROPHIES

John T. Ryan trophies are provided by Mine Safety Appliances Canada Limited as a memorial to the founder of the company. The trophies are 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, experienced the lowest reportable injury frequency per 200,000 employee hours in all of Canada. There are two trophy categories: Canada and Regional. Western Canadian Coal Corporation's Brule Mine, located in Tumbler Ridge, won a national trophy for coal mines in 2008. The 2008 regional metal mine trophy for British Columbia and the Yukon went to Barrick Gold Corporation's Eskay Creek Mine.

2.4 Examinations and Certifications

Section 26 of the Mines Act states that every person employed at a mine must, if required by the regulations or the Code, be under the daily supervision of a person who holds a valid and appropriate certificate as required by the regulations or 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 to ensure that their knowledge of the Code remains current.

2.4.1 BOARD OF EXAMINERS

The Board of Examiners comprises the Chief Inspector of Mines as chair and other inspectors appointed by the Chief Inspector. Douglas E. Sweeney chaired the board until Al Hoffman took over as Acting Chief Inspector in June. Board members were A. Hoffman, E. Taje and D. Howe. The Board is responsible for the following:

- examination of applicants for shiftboss certificates and certificates of competency;
- issuing certificates;
- conducting a review of all suspended certificates; and
- administering blasting certificates.

2.4.2 SHIFTBOSS CERTIFICATES

The following table summarizes shiftboss certification activity in 2008:

Activity	New Certificates
Examinations written (surface)	38
Examinations written (underground)	17
Number passed (surface)	38
Number passed (underground)	17
Total permanent certificates issued	55

2.4.3 TOTAL UNDERGROUND COAL FIREBOSS CERTIFICATIONS

There were no applications for underground Coal Fireboss Certifications in 2008.

2.4.4 BLASTING CERTIFICATES

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

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

In 2003, all blasting certificates in the province became valid for five years. (Provisional certificates can be issued for a period not exceeding 90 days.) Because of this change to the Code, many blasting certificates needed to be renewed in 2008. This resulted in a notable increase in administration activity for the Ministry in this area—a total of 211 blasting tickets were issued in 2008.

2.4.5 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 Ministry is responsible for certifying miners in several categories of mine rescue, as listed below. The following mine rescue certificates were issued in 2008:

Type	Number Issued
Underground mine rescue	49
Surface (open-pit) mine rescue	212
Gravel pit mine rescue	37
Total certificates issued	298

2.5 Accidents and Incidents

2.5.1 DANGEROUS OR UNUSUAL OCCURRENCES

Ministry inspectors are responsible for determining which incidents should be included in the Mines Management System (MMS). These decisions are influenced by workload and staffing levels. In the past few years, the Occupational Health and Safety Committees at the mines have been the primary incident investigation tool, requiring less involvement from Ministry inspectors and consequently fewer incidents entered into MMS. There were 145 dangerous occurrences entered into MMS in 2008, compared to 161 dangerous occurrences entered in 2007.

Location of Incident	Number of Incidents Reported	% of Total Incidents Reported
Pit	36	50
Plant/Mill	9	12.5
Maintenance (Shop)	3	4.2
Underground General)	5	6.9
Maintenance (Field)	6	8.3
Tailings Pond	2	2.8
Underground Outbye/Haulage Drift	2	2.8
Highwall	-	-
Dump	6	8.3
Office	-	-
Dry	-	-
Underground Face	1	1.4

Work Practice Contributing to Incident	Number of Incidents Reported	% of Total Incidents Reported
Operator Error	37	51
Poor Work Standards	41	57
Not Following Work Procedures	20	28
Equipment Failure	13	18
Inadequate Management	5	7
Inadequate Planning	10	14
Training	4	6
Inadequate Equipment	6	8
Abuse Or Misuse	0	-

Equipment Involved	Number of Incidents Reported	% of Total Incidents Reported
Haul Truck	20	27.8
Service Truck	3	4.2
Loader	4	5.6
Shovel	7	9.7
Drill, Surface	5	6.9
Dozer	7	9.7
Pickup	1	1.4
Explosives	6	8.3
Electrical	3	4.2
Grader	3	4.2
Conveyor	0	-
Crane	6	8.3
Water Truck	3	4.2
Drill, Underground	1	1.4
LHD	1	1.4
Excavator/Backhoe	4	5.6
Forklift	3	4.2
Scraper	0	-

Note: The numbers in the tables shown above are not intended to add up to 100% as there may be several preventative actions, locations, work practices or equipment involved for a single incident.

General Incident Information	Number of Incidents Reported	% of Total Incidents Reported
Number of Persons Involved	100	n/a
Average Time Into Shift (minutes)	57	n/a
Number of Persons Injured	19	n/a
Near Miss	0	-
Fire	0	-
Geotechnical	4	6
Fatality (Mining Related)	1	-
Fatality (Non-Mining)	1	-

2.5.2 FATALITIES

There were two fatalities at mining operations in B.C. in 2008.

- On February 28, 2008, a fatality occurred at an industrial mineral mine when the operator of a backhoe drowned after the vehicle rolled into a depression containing water.
- On July 21, 2008, a forestry worker was fatally injured as a result of being struck by forestry timber moving at great speed down a slope upon which he was working to clear trees for the purpose of rehabilitating access trails to exploration drill sites.

In late 2007, the Aggregate Producers Association of British Columbia, in collaboration with the Construction Safety Network, began to develop a safety training program to address concerns related to the four fatalities that occurred in the Lower Mainland in May, June, July and September of 2007, respectively. In response to these concerns and increased activity at aggregate mining operations across B.C., the Ministry compiled a best practices guidebook entitled *Health & Safety: A Practical Guide for Aggregate Operations*. The guidebook was released in 2008 and is designed to enhance the health and safety of workers at B.C.'s many aggregate mining operations.

In July 2007, Ministry staff testified at the coroner's inquest into the Sullivan tragedy of May 15–17, 2006, in which four people died at the decommissioned Sullivan Mine site near Kimberley, B.C. The jury in the inquest ruled the deaths accidental and made 16 recommendations, six applied to the Ministry of Energy, Mines and Petroleum Resources, eight to the BC Ambulance Service (BCAS) and two to Teck. A Code review committee, chaired by the Chief Inspector of Mines, was formed in the fall of 2007 to review the recommendations of the Sullivan inquest jury and to incorporate them into the Health, Safety and Reclamation Code for Mines in British Columbia. As a result of the work of this committee, a new version of the Code was released in December 2008.

2.5.3 INJURY RATES FOR OPEN PIT COAL, OPEN PIT METAL AND UNDERGROUND MINES

According to WorkSafeBC data, the 2008 estimated injury rate (weighted average) at open pit coal, open pit metal and underground mines in British Columbia was 1.7. This is a slight increase from 2007's estimated injury rate of 1.5. The unit for the injury rate statistic is the "number of claims per 100 estimated person-years of employment", where the number of claims are those that received standard, limited or survivor benefits in the year of injury or in the first quarter of the year following the year of injury.

The estimated injury rate for open pit metal mines was 1.9 in 2008, up from 1.8 in 2007. The estimated injury rate for open pit coal mines also increased (from 0.6 in 2007 to 1.0 in 2008), as did the rate for underground mines (from 3.1 in 2007 to 3.6 in 2008).

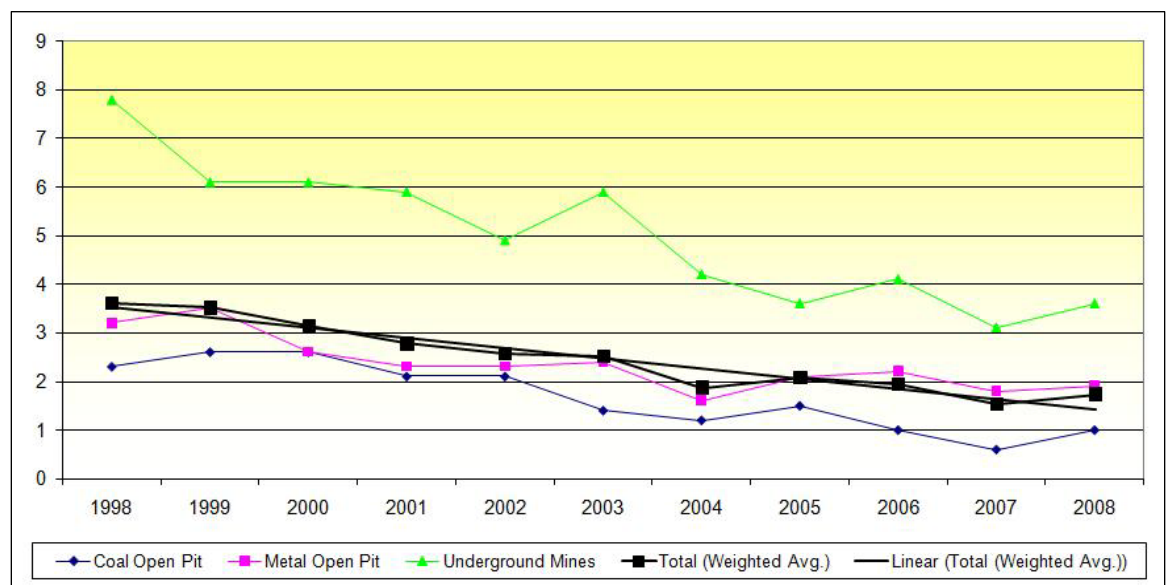


Figure 1: Injury Rates for Open Pit Coal, Open Pit Metal and Underground Mines in British Columbia, 1998–2008

WorkSafeBC has accepted a total of 160 short-term disability, long-term disability and fatal claims for 2008, up from 143 for 2007. 5,978 worker days were lost in 2008, compared to 3,863 in 2007.



3 Administration

3.1 Summary of Mine Production

The tables below summarize production and average employment at major British Columbia mine sites in 2008.

2008 Production: Coal Mines	Annual Rated Plant Capacity (Tonnes)	Actual Tonnes Produced	% of Capacity	Days Mill Operated	Average Employment ¹	Contract Employment
Coal Mountain	3,500,000	2,522,000	72%	219	213	-
Elkview	7,000,000	4,665,000	67%	239	837	-
Fording River	10,416,000	8,093,000	78%	322	979	-
Greenhills	5,300,000	4,625,000	87%	320	506	-
Line Creek	3,600,000	2,366,000	66%	231	328	-
Quinsam Coal	1,560,000	730,000	47%	345	133	20

2008 Production: Metal & Precious Metal Mines	Annual Rated Mill Capacity (Tonnes)	Actual Tonnes Milled	% of Capacity	Days Mill Operated	Average Employment ¹	Contract Employment
Endako	10,980,000	10,767,000	88%	365	278	-
Gibraltar	16,698,000	13,906,000	83%	365	405	-
Highland Valley Copper	49,640,000	44,888,000	90%	366	1,100	138
Huckleberry	7,000,000	6,031,600	86%	365	N/R	N/R
Kemess South	18,650,000	16,924,000	91%	366	373	-
Mount Polley	7,017,000	6,849,000	98%	365	396	35
Myra Falls	1,460,000	592,000	41%	282	284	-

Source: PricewaterhouseCoopers, The Mining Industry in British Columbia 2008 (Mining Industry Survey)

1. Average number of employees actually working during fiscal year.

N/R Information not reported by survey participant

3.2 Mine Visits

The Mines Management System (MMS) allows for the tracking of mine visits and issuances of orders at mines. When an inspector visits a mine, he or she passes on information on issues to which staff from other branches of the Ministry may need to attend.

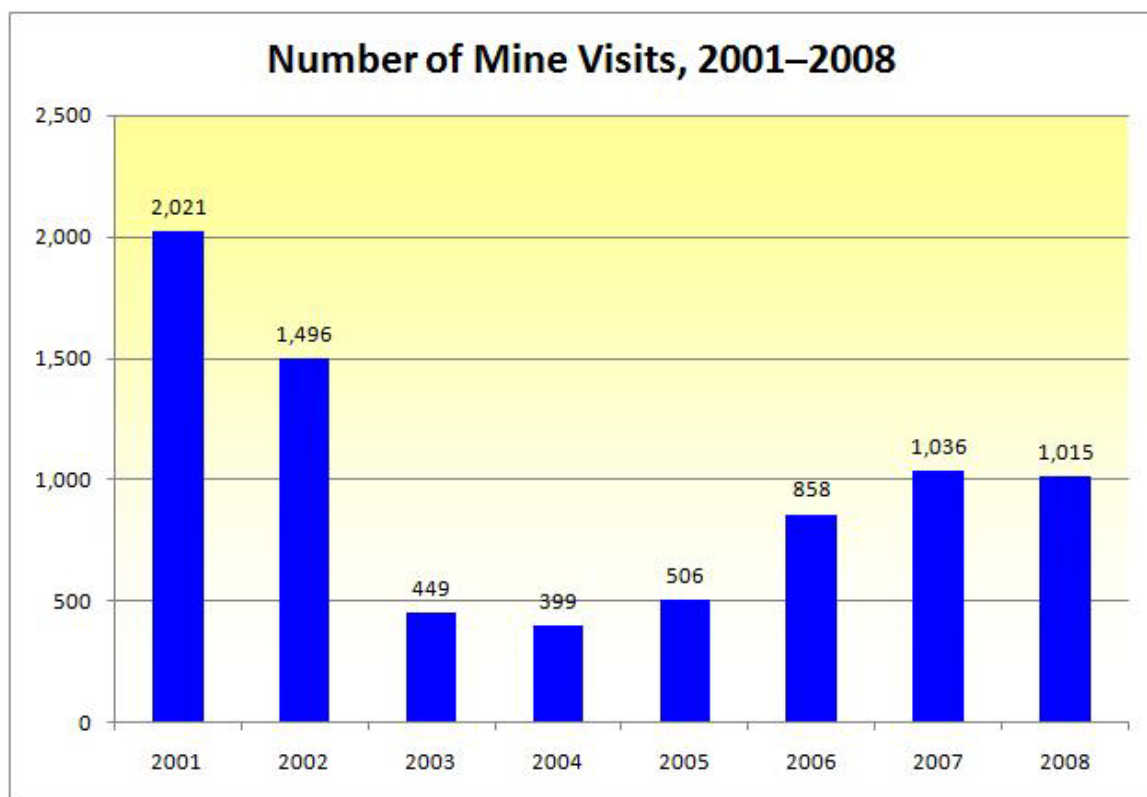


Figure 2: Number of Mine Visits, 2001–2008

In 2008, Ministry inspectors made 1,015 visits to mines, conducted 664 inspections, issued 2,655 health and safety orders, and shut down 107 pieces of equipment. Inspectors also issued 64 environmental orders during the year. The following table provides a summary of 2008 MMS data on mine visits by mine type.

Mine Type	Inspections	H&S Orders	Equipment Shutdowns	Environmental Orders	Dangerous Occurrence	Investigations	Training	Other
Custom Mill	11	84	0	0	1	0	0	0
Coal - Surface	50	241	12	0	71	0	0	3
Coal - Underground	3	17	0	0	1	0	0	0
Coal - Exploration	4	24	2	1	4	0	0	0
Exploration - Surface	57	161	3	6	16	1	0	1
Exploration - Underground	35	256	4	6	1	0	0	4
Industrial Minerals - Surface	36	230	8	0	6	2	0	2
Industrial Minerals - Underground	1	3	0	0	0	0	0	0
Metal Leach - Surface	5	0	0	0	0	0	0	1
Metal Mine - Surface	52	270	4	1	26	0	1	3
Metal Mine - Underground	23	145	1	3	12	2	0	10
Non- Assignable/ Unidentified	5	7	0	4	0	0	0	0
Placer - Surface	28	28	0	4	0	0	0	0
Placer - Underground	1	1	0	0	0	0	0	0
Rock Quarry	47	175	5	7	2	1	0	3
Sand/Gravel Pit	306	1,013	65	32	5	1	0	8
TOTALS	664	2,655	107	64	145	7	1	35

3.3 Audit Program

The health and safety audit program is designed to investigate how well a health and safety program has been implemented at a mine and its compliance with the Health, Safety and Reclamation Code for Mines in British Columbia. The audit program has been revised to reflect the 2003 version of the Code and to put more emphasis on the findings of Ministry staff. Audit reports reflect the findings of Ministry staff, who base their conclusions on field observations, interviews with mine management and staff, and research of mine records.

In 2008, the Ministry conducted four initial audits at Mainland Sand and Gravel – Cox Station, Gibraltar Mines, QR Project and Roca Mines – Max Moly, and seven follow-up audits at the following mines: Myra Falls, Moberly Silica, Peace River Coal, Gibraltar Mines, QR Project, Roca Mines – Max Moly and Texada Quarrying. In a single week, a series of health and safety inspections were carried out at three Kelowna-area and eight Taylor-area sand and gravel quarry operations. These directed inspections looked at policy and procedures, training records and the quality of implementation of safety programs at the work site.

3.4 Notices of Work

The following Notices of Work and permit information were entered into MMS in 2008.

Type	Notice of Work Applications	Permits Issued	Average # of Days To Issue
Mineral/Coal (Exploration)	533	387	57
Mineral/Coal (other)	94	73	49
Placer	268	164	44
Sand & Gravel	176	126	94
Total	1,071	750	61

The breakdown of the 2008 Notices of Work by area is as follows:

Region	Placer	Sand & Gravel	Mineral & Coal	Total
Central/Northeast	152	30	170	352
Northwest	74	19	174	267
South Central	27	60	127	214
Southeast	24	29	124	177
Southwest	2	45	41	88
Total	279	183	636	1,179

The breakdown of the 2008 Notices of Work by month is as follows:

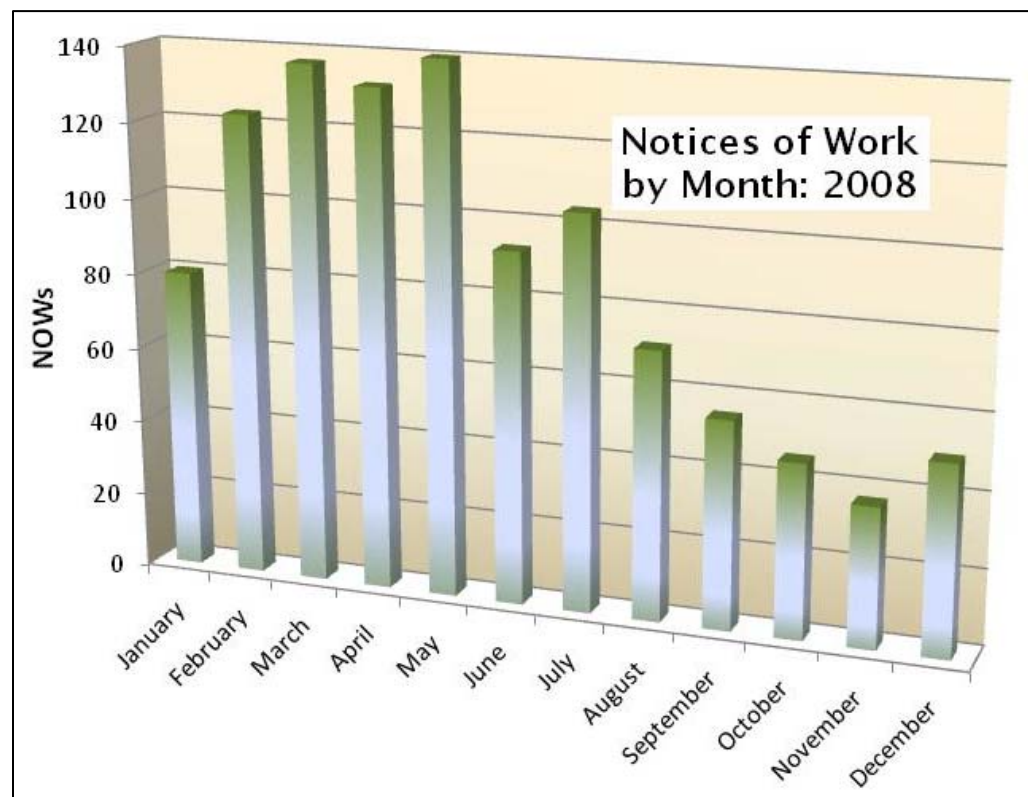


Figure 3: 2008 Notices of Work by Month

The areas covered by the regions are as follows:

- Central/Northeast = Kamloops, Okanagan and Thompson areas
- Northeast = Prince George, Omineca, Horsefly and Valemont areas
- Northwest = Smithers, Skeena and Queen Charlotte Islands areas
- Southeast = Cranbrook, Fernie and Elk Valley (Kootenay) areas
- Southwest = Lower Mainland and Vancouver Island areas



4 Reclamation

4.1 Roles and Responsibilities

Reclamation and environmental protection are a major component of all mineral exploration and mine development activities in British Columbia. 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. Reclamation and environmental protection are the responsibility of each mining company. Prior to starting any work, 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 obligations are completed.

The environmental protection and reclamation objectives of the Mines Act and the Health, Safety and Reclamation Code for Mines in British Columbia are to ensure the following:

- land and watercourses on mine sites in B.C. are reclaimed to a level equal to that which existed prior to mining;
- disturbed lands and watercourses are re-integrated into the surrounding landscape; and
- 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 Code;
- inspects mine reclamation activity;
- administers reclamation security deposits on behalf of the Province of British Columbia;
- organizes and participates in 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 Mine Reclamation Symposium, the Selenium Task Force and the Annual ML/ARD Workshop; and

- participates in national and international committees conducting research and technology transfer, including the national Mine Environment Neutral Drainage (MEND) Committee and the National Orphaned and Abandoned Mines Initiative (NOAMI) committee.

4.1.1 STRUCTURE AND ORGANIZATION

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 Environment (MOE) on biological and effluent discharge, offsite requirements.

4.2 Summary of Activities

4.2.1 PERMITTING

The reclamation 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 2008, permitting activity remained high. A total of four new permits for major projects were issued: The Merit – Zip Mill and Merit- Lexington Mine received permits, and permits were also issued for pre-construction activities at the Redfern - Tulsequah Mine and the Adanac - Ruby Creek . In addition, 38 amendments were made to existing permits.

Type	Permits	Amendments	Total
Metal	4	28	32
Coal	0	11	11
Quarries/Sand & Gravel	0	0	0
Total	4	39	43

Permit amendments were made at Gibraltar, Myra Falls, Highland Valley Copper, Sullivan, Mount Polley, Equity, Kemess South, Endako, Kitsault, Island Copper, New Afton, Table Mountain, Afton, Coal Mountain, Elkview, Fording River, Greenhills, Line Creek, Wolverine and Willow Creek Mines.

Under the Environmental Assessment Act, reviews were conducted for the Davidson, Harper Creek, Kerr-Sulphurets-Mitchell, Kutcho Creek, Morrison, Prosperity, Mount Milligan, Mount Klappan, Horizon, Prosperity, Roman Coal, Kutcho Creek, Gething, Giscome and Schaft Creek projects. The reclamation section also organized and/or participated on public committees reviewing activities at the Brenda, Quinsam, Equity Silver and Sullivan mines.

4.2.2 COOPERATION AND CONSULTATION WITH STAKEHOLDERS

The reclamation 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 mine applications involving mechanical disturbance of the land surface and/or watercourses, applications are referred to other government agencies, the public, and First Nations where their interests are affected. Additionally, the reclamation section provides regular information and assistance to MOE, Ministry of Transportation (MOT), Environment Canada, First Nations and the public on technical issues involving reclamation.

Cooperation facilitated by the reclamation section between industry, the public, government, and the academic community continues to result in a constructive climate for exchanging and disseminating new technology.

4.2.3 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.

4.2.4 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 \$282 million by the end of 2008.

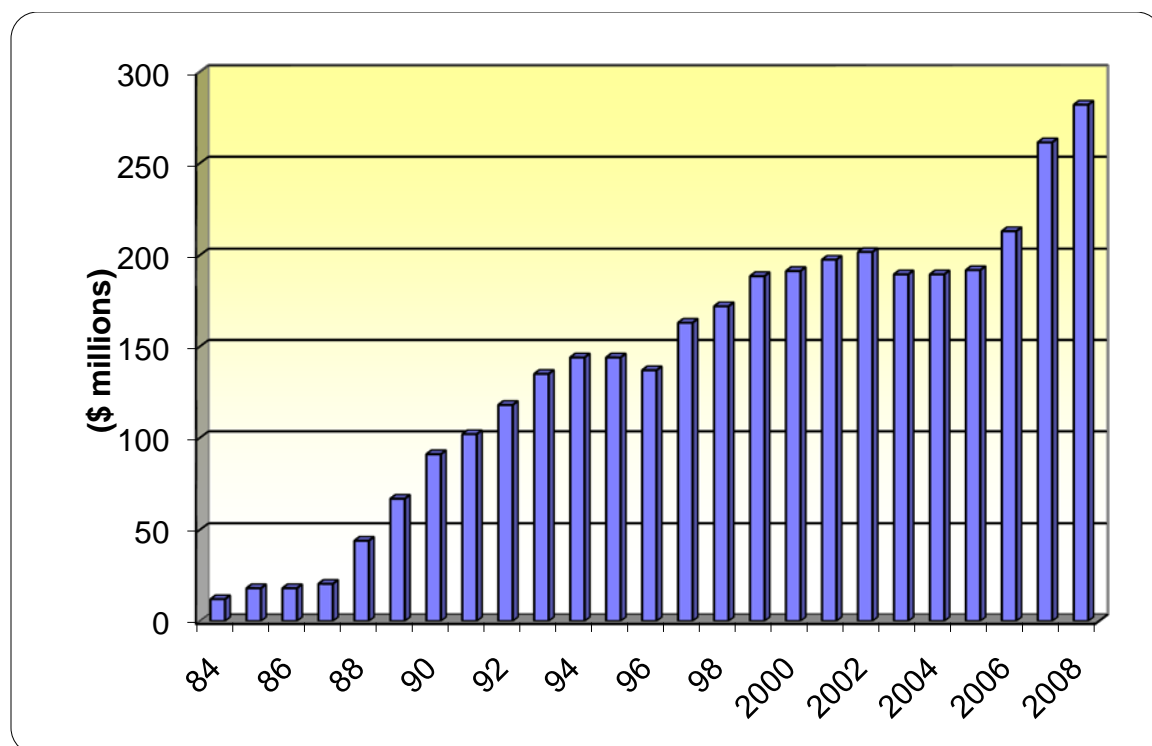


Figure 4: Reclamation Security Deposits Held by the Province (Initiation to 2008)

4.2.5 TECHNICAL AND RESEARCH COMMITTEE ON RECLAMATION

This committee has been actively promoting and fostering reclamation research and information exchange for more than three decades. Members are drawn from the Ministry of Energy, Mines and Petroleum Resources, the Ministry of Environment, the Environmental Assessment Office, mining companies, the Mining Association of B.C., Natural Resources Canada, the University of British Columbia and Thompson Rivers University. This committee has been responsible for the organization of the annual B.C. Mine Reclamation Symposium since 1977.

4.2.6 NATIONAL ORPHANED/ABANDONED MINE INITIATIVE (NOAMI)

The National Orphaned/Abandoned Mines Advisory Committee was formed 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 them through the Intergovernmental Working Group on the Mineral Industry (IGWG). 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, Mines and Petroleum Resources represents the Province of British Columbia on this Advisory Committee.

4.2.7 MINE RECLAMATION SYMPOSIUM

The 32nd Annual Mine Reclamation Symposium was held from September 15 to 28, 2008 in Kamloops, B.C. This year's theme was "Mine Reclamation, Biodiversity and Integrated Land Use". Delegates had the opportunity to tour the Highland Valley Copper mine.

4.2.8 THE ANNUAL BRITISH COLUMBIA MINE RECLAMATION AWARDS

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

The 2007 British Columbia Jake McDonald Mine Reclamation Award was presented at the 32nd Annual Mine Reclamation Symposium in September 2008 to Inmet Mining Corporation for their outstanding reclamation achievements at the Samatosum Mine.

The Samatosum Mine is located 60 kilometres north of Kamloops, near the town of Barriere. Samatosum is an open pit massive sulphide mine that produced silver, gold, zinc, lead, copper and antimony from 1989 to 1992. Disturbance at the site includes a small open pit, a 32-hectare waste rock dump, a flooded tailings impoundment, several borrow pits and a plantsite area.

The Samatosum site has the legacy of being a producer of acid rock drainage. Since 1996 and the issuance of a pollution abatement order, Samatosum and Inmet Mining have come a long way in taking their responsibilities for environmental stewardship seriously. This began with the installation of a drainage collection and water treatment system. These systems were later upgraded to include an expanded surge pond to increase storage capacity, installation of an HDS lime treatment system, improvements to water management, and equipment automation and remote monitoring to reduce environmental risks and ensure that permitted water quality objectives are consistently met.

Inmet Mining has truly embraced a culture of proactive management, risk reduction and continuous site improvement, and this culture is applied to worker safety, the community and the environment. A large number of management systems have been put in place for the Samatosum Mine, including an Environmental Management and Procedures Manual, an Operations and Surveillance Manual for the tailings dam, an Emergency Preparedness and Response Plan, a daily safety risk identification system, a

Contractor Management checklist, and other corporate-wide standards initiatives. Samatosum has also achieved excellence in the areas of crisis management planning, tailings management and external outreach, as evidenced by three recent performance awards from the Mining Association of Canada.

As part of a company-wide risk assessment and risk reduction process, Inmet identified that a steep section of the dump at Samatosum had the potential to be a long-term stability risk. As a result, Inmet voluntarily chose to proactively re-slope the lower waste rock dump, even though it was already successfully reclaimed. A total of 3.4 hectares of the dump was re-sloped in 2007, and this area has recently been completely re-seeded.

In the 16 years since the Samatosum Mine closed, revegetation efforts at the site have been hugely successful. Native soils were salvaged and replaced after mining, and a variety of species were planted, including cottonwood, Douglas-fir, spruce, aspen, sitka alder, buffaloberry, prickly rose and red-osier dogwood. Fertilization was last conducted on the site in 1997, and today the majority of it is covered by re-established native plant species, diverse wildlife habitats, and clearly self-sustaining plant communities. Reforestation corridors have been established on the main waste rock dump. These consist of native tree and shrub species which have been augmented with rock and woody debris piles in order to provide habitat and structural diversity. Colonizing species of grasses, forbs and shrubs are evident throughout the planted corridors.

Overall, the reclamation activities and ongoing environmental management programs at the Samatosum Mine are exemplary and set a high standard for the mining industry.

Three citations were also handed out at the 2008 Mine Reclamation Symposium:

- the Mineral Exploration Citation was awarded to Sego Resources Inc. for their work on the Miner Mountain property;
- the Sand and Gravel Citation went to Emil Anderson Construction in recognition for their reclamation work at the Norm Ross Pit; and
- the Coal Mining Citation was awarded to Elk Valley Coal Corporation for their work at Line Creek Operations.

4.2.9 METAL LEACHING AND ACID ROCK DRAINAGE WORKSHOP

The 15th annual Metal Leaching and Acid Rock Drainage Workshop was held in Vancouver on December 3 and 4, 2008. This year, the workshop's theme was "The Management of Tailings and Tailings Impoundments". The workshop was organized by the Ministry, Natural Resources Canada and the Mine Environment Neutral Drainage (MEND) Program in association with TRCR and the International Network for Acid Prevention (INAP).

4.2.10 LAKEVIEW DIVIDEND MINE SITE

The Lakeview Dividend Mine (LVDM) operated intermittently from 1907 to 1964. The mine property, which is located just west of Osoyoos, was issued to Granby Mining in 1900 as a Mineral Grant. Subsurface rights were held by the company, and surface rights remained with the Crown. The gold mine closed before reclamation legislation was introduced in 1969. In 1999, a court order reverted the mine site to the Province.

In 2007, the Ministry of Energy, Mines and Petroleum Resources prioritized the LVDM site for reclamation. Prior to this, the Ministry had been managing the LVDM site by restricting access with fencing and signs, but ongoing residential development adjacent to the mine site and relatively open access to the site posed significant safety concerns.

The LVDM site contained extensive underground workings, a portion of which had broken through to the surface, and a large "glory hole". In addition, large overhangs were associated with mined-out pockets of ore and a hanging wall supported by slender, 10 m pillars of weak rock. Ore passes within the glory hole extended down to haulage drifts below and were open or partially blocked and the underground workings contained caved areas, unmarked open shafts, and areas supported with deteriorated timber.

The LVDM site was a unique and complex project for a number of reasons:

- A residential neighbourhood is located at the base of the mountain on which the site is located.
- The site is within the fragile Great Basin Desert Ecosystem.
- Blue-listed endangered bat species (Townsend's Big-Eared Bat and Western Small-Footed Myotis) inhabited the adits, as did a red-listed endangered species called the Palid bat.
- The mine has historic importance to the community of Osoyoos.

The Ministry hired EBA Engineering Consultants Ltd. to stabilize and reclaim the LVDM site, and a team led by local contractor Bob Knight did most of the construction work. The project scope included the following:

- preserving the bat habitat in the adits (EBA installed bat gates and a one-of-a-kind ventilation cover);
- filling in the glory hole (which required 30,000 cubic metres of rock fill from an adjacent residential development; the fill was hauled to the LVDM site without the use of public roads);
- stabilizing and scaling the loose rock above the homes;
- sloping and contouring the area to match the surrounding topography;
- revegetating the site using native species; and
- conducting a comprehensive public relations program to keep local residents and stakeholders informed about the project.

The LVDM remediation project had a tight seven-month winter construction schedule but was completed on time in the spring of 2008 without any safety incidents. The project also cost \$200,000 less than the \$1.5 million that was budgeted.

4.3 Industry Reclamation Record

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 2008, expanded to cover 46,148 hectares. Reclamation (where revegetation has been successfully established for one year or more) has occurred on over 35% or 16,413 hectares (Figure 5).

Metal mines have disturbed 24,503 hectares, and 7,945 hectares (or 32%) have been reclaimed (Figure 5).

Coal mines have disturbed 21,645 hectares, and 8,468 hectares (or 39%) have been reclaimed (Figure 7). The sharp increase in disturbance and reclamation at metal mines during the late 1990s 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 5, 6 and 7 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 four decades. The decrease in area reclaimed by metal mines in 2008 is caused by the re-disturbance of previously reclaimed lands, primarily at the Highland Valley Copper Mine.

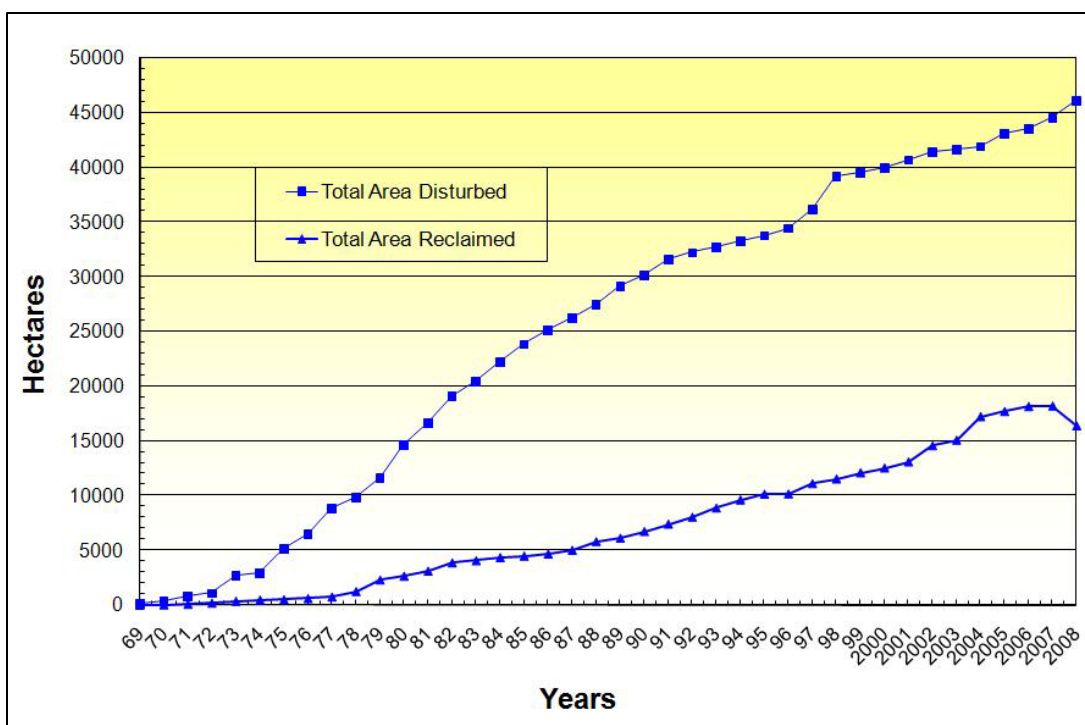


Figure 5: Area Disturbed and Reclaimed by Metal and Coal Mines in B.C., 1969–2008

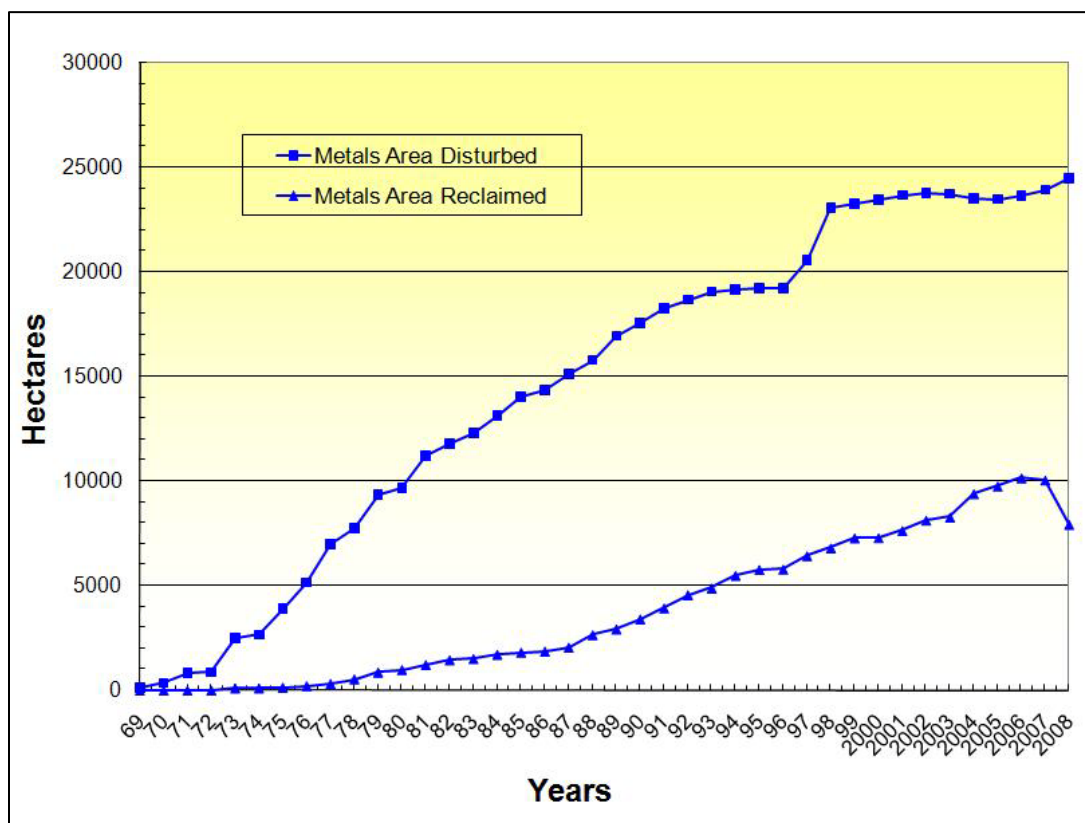


Figure 6: Area Disturbed and Reclaimed by Metal Mines in B.C., 1969–2008

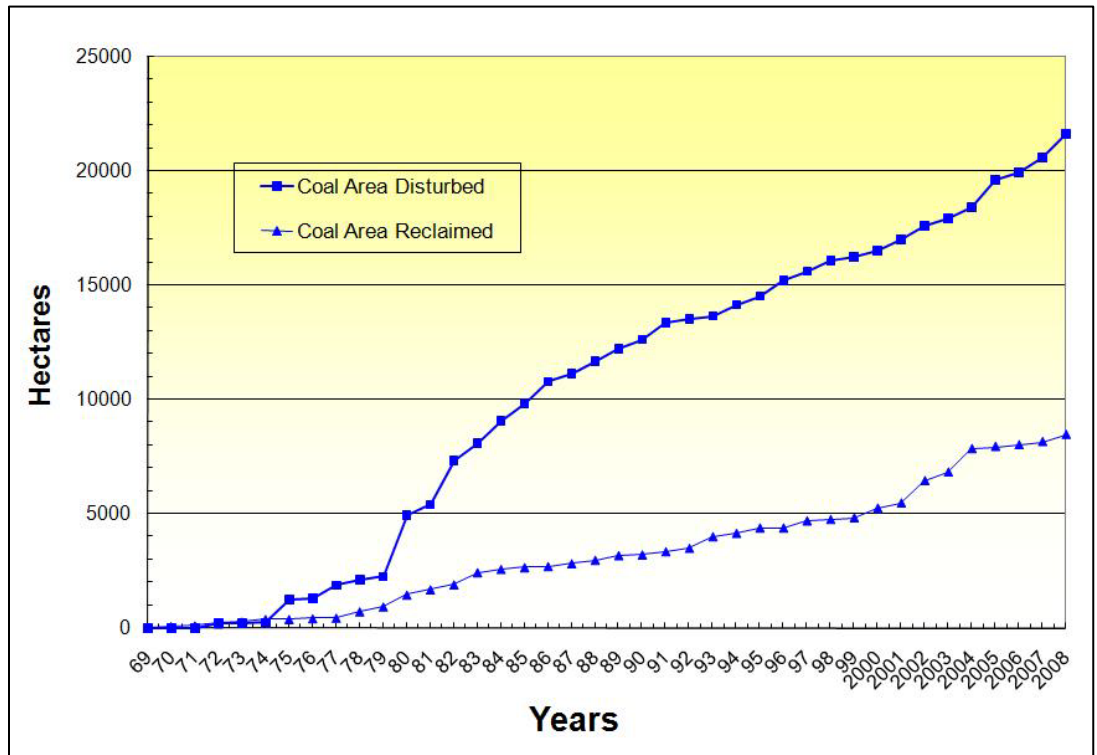


Figure 7: Area Disturbed and Reclaimed by Coal Mines in B.C., 1969–2008

4.4 Geotechnical/Mining Roads

4.4.1 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 B.C. 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 the following:

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

4.4.2 SUMMARY OF ACTIVITIES

In 2008, the geotechnical section:

- Co-ordinated inspections by Ministry staff and contractors;
- Issued permits or permit amendments for construction and operation of major structures associated with tailings impoundments and waste rock dumps;
- Undertook environmental assessment reviews for several new mine projects; and
- Provided input and data for the Audit Teams to follow up at the mines audited.



5 For More Information

Ministry Resources

Information about the Ministry of Energy, Mines and Petroleum Resources and copies of Ministry publications are available via the following:

MINISTRY WEBSITE

www.gov.bc.ca/empr

QUEEN'S PRINTER PUBLICATIONS INDEX WEBSITE

www.crownpub.bc.ca

Enquiry BC

Enquiry BC is a provincial call centre that provides services to all British Columbia residents, on behalf of provincial government ministries, Crown corporations and public agencies. Hours of operation for Enquiry BC are 7:30 a.m. to 5 p.m., Monday through Friday.

- In Victoria: 250-387-6121
- In Vancouver: 604-660-2421
- Elsewhere in British Columbia: 1-800-663-7867
- Outside British Columbia: 1-604-660-2421
- Email address: EnquiryBC@gov.bc.ca

Mining Operations

Further information on the activities of the various mining companies can be found in the Canadian and American Mines Handbook, which is published annually by Northern Miner Press at www.northernminer.com, or from individual mining operations.

In addition, you can contact the Mining Association of British Columbia (www.mining.bc.ca) and/or the Coal Association of Canada (www.coal.ca) for annual reports on the status of those sectors.