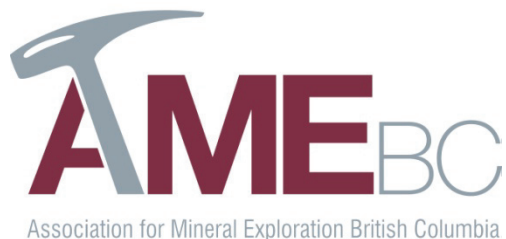




CANADIAN MINERAL EXPLORATION HEALTH & SAFETY

Annual Report 2009





CANADIAN MINERAL EXPLORATION HEALTH & SAFETY

Annual Report 2009

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Health & Safety Policy Guidelines for Junior Mineral Exploration Companies

These guidelines are designed to assist boards of junior exploration companies in setting up effective health and safety policies and protocols within the company. The guidelines are not standards and are not exhaustive. AME BC and PDAC have set the targets of zero fatalities and lowered lost time accidents for the exploration industry. Companies that have health and safety programs are more likely to help industry achieve those targets.

1. DUTIES OF BOARD OF DIRECTORS

- The Board of Directors should ensure that a health and safety program is in place.
- It may be preferable to appoint one director who will monitor and report to the Board on health and safety implementation.
- Alternatively the company could strike a health and safety committee of the Board.
- The Chairman of the Board should initiate education for all Directors as to their responsibilities and liabilities with respect to health and safety in the workplace. This would include all of the following:
 - Understanding of federal Bill C-45, which contains Amendments to the Criminal Code affecting the criminal liability of organizations
 - Understanding of regulations for the area(s) in which the company operates, and those specific to mineral exploration and mining
 - Understanding of the policies of appropriate professional associations with respect to health and safety in the workplace
 - Training on response to serious accident at worksite, including emergency response, but also response to media questions
- The Directors of the company should have a high level understanding of the health and safety risks in company workplaces.
- The Board should be notified as soon as possible on all serious accidents in the workplace (medical aids, lost time injuries, fatalities).
- The Board should allot resources towards health and safety program in the company.
- The Board should ensure that the organization has a Health and Safety mission statement, policy, and plan that implements health and safety protocols and checks periodically that they are appropriate. There should be health and safety targets within the plan.
- The policy should be signed at least by the chairman and preferably the whole Board.

- Any mission statement or policy could be incorporated within a general corporate mission statement and/or policy with respect to sustainable development.
- Consider an external review of health and safety policies and procedures.
- Make sure all work places, irrespective of jurisdiction, have the same levels of health and safety standards.

2. REPORTING

- Board meetings should include a report on health and safety performance prior to technical reviews.
- The Board of Directors, the director, or committee appointed to monitor health and safety procedures, should review with the COO or equivalent the records of statistics.
- Statistics should include hours worked, near misses, first aids, medical aids as well as workdays lost, and fatalities.
- Statistics should be maintained with monthly or quarterly reports.
- Accident records should be detailed and signed. Actions taken subsequent to accidents should be recorded.
- The annual report of the company, any interim reports (quarterly reports) and the website should include a summary of health and safety performance, along with the health and safety policy statement.
- In case of serious accident, if the company does not have the capacity to investigate the causes itself, external auditing should be completed.
- Operating groups or project teams should be encouraged to have safety meetings as follows:
 - Prior to project reports;
 - Once a month; **and**
 - Short “Toolbox” or “tailgate” meetings each day at the worksite.Minutes should be kept for safety meetings.
- Documentation should exist at three levels – office, management and field.

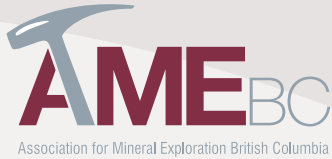
3. TRAINING

- Train the Board in field health and safety risks and procedures (as well as social, community and environment).
- Put a training plan in place to ensure that all workers have appropriate training for the tasks to be completed.
- Have safety leadership training as well as task specific training.
- Do not allow work to start without training.
- Have workers sign that they have received training and safety manuals. Insist on signatures that manuals have been read.
- All workplaces must comply with federal and provincial regulations with respect to health and safety.

4. DUE DILIGENCE CHECKLIST

Questions the Board of Directors should ask the Chief Operating Officer, Vice President-Exploration, or equivalent.

- | | |
|---|--|
| <ul style="list-style-type: none"> ☐ Do you have a corporate health and safety policy? ☐ Do you have a corporate health and safety plan? ☐ Does the Board understand its responsibilities and liabilities? ☐ Does the Board have appropriate insurance in place? ☐ Does the Board request a health and safety report from the COO or equivalent prior to other discussions? ☐ Does the Board of Directors annually audit the plan with the COO or equivalent? ☐ Is the audit documented in writing, signed and dated? | <ul style="list-style-type: none"> ☐ Does the Board audit the plan in addition to the annual audit in cases of serious accident? ☐ Do all projects have a designated health and safety leader, manager or monitor (not necessarily a job title)? Is the person told to shut down work if it is unacceptably unsafe? ☐ Does the designated health and safety leader know who to report to in case of accident? ☐ Do all worksites (camps, drills, etc) and regional offices have a valid, tested emergency response plan? ☐ Does the response plan include immediate 24/7 communication with COO or equivalent? ☐ Are all contractors required to include health and safety to at least the company standards in contracts? ☐ Before work starts, has there been an assessment and documentation of the health and safety risks? ☐ Are workers inducted for health and safety prior to starting work and supplied with necessary personal protective equipment? ☐ Are all employees given the appropriate training for the tasks required? ☐ Who documents training, including names, dates and course topics? ☐ Are training records kept? ☐ Are employees and contractors given an appropriate health and safety manual? ☐ Do employees sign that they have read the manual? ☐ Is there auditing of the contractor's worksite and action taken if required? ☐ Are health and safety statistics kept? ☐ Are the statistics publicly released (minimum: annual report)? |
|---|--|



Health & Safety Guiding Principles

The Association for Mineral Exploration British Columbia (AME BC) recognizes that health and safety are fundamental cornerstones of the mineral exploration and mining sector. In pursuit of preventing incidents among its members, AME BC encourages the promotion of sound and responsible business practices to ensure everyone's right to a healthy and safe workplace.

In conducting their activities, AME BC members should strive to:

1. Communicate these guiding principles about health and safety to our members, communities of interest, aboriginal peoples, relevant regulatory agencies and international stakeholders.
2. Manage their activities to ensure accountability and compliance with applicable permits, laws and regulations. In the absence of regulation, best management practices will be applied to reduce health and safety risks.
3. Implement health and safety codes of practice, policies, programs, guidelines and procedures established jointly by industry and government to ensure identification of health and safety risks and the implementation of reasonable mitigation, monitoring, emergency planning, transparent auditing and reporting.
4. Identify and manage health and safety hazards and risks during all phases of the mineral exploration and mining cycle and will actively encourage all employees to consider their own safety as well as the safety of others.
5. Allocate the appropriate resources to meet health and safety goals and will support and conduct appropriate research to improve health and safety performance.
6. Actively investigate health and safety incidents to ensure that the rights of the employer and the rights of the employee are upheld in the pursuit of zero incidents occurring in the workplace.
7. Continuously seek opportunities to improve health and safety performance through adherence to these principles and will regularly report progress to other members, communities of interest, aboriginal peoples, relevant regulatory agencies and international stakeholders.
8. Support the joint AME BC-PDAC Canadian Mineral Exploration Health and Safety Award program to recognize commitment, innovation and leadership in the industry.

"Have a safe day, everyday."

Approved by the Board of Directors, Association for Mineral Exploration British Columbia, June 16, 2009

Canadian Mineral Exploration Health & Safety Annual Report 2009

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Message from the AME BC and PDAC Health & Safety Committee Chairs

January 2011

The Association for Mineral Exploration British Columbia (AME BC) and the Prospectors & Developers Association of Canada (PDAC) are pleased to present the fifth *Canadian Mineral Exploration Health & Safety Annual Report*. The objectives of the report are to track health and safety trends and lay the foundation for increasing health and safety awareness and improving standards of practice in the mineral exploration industry. Although 2009 had reduced exploration activity when compared with previous years, we are pleased to report that survey participation was the highest it has been in the five-year history of the national survey.

AME BC and PDAC received information on the health and safety practices of 349 mineral exploration and mining companies active throughout Canada, up from 237 in 2008. Of these, 113 companies active in mineral exploration in Canada took the time to analyze their health and safety performance and submit their results through a voluntary questionnaire. We congratulate the 98 companies who reported lost workday free records, up from 72 the previous year. In particular, we congratulate FNX Mining Company Inc. for recording 99,792 hours of exploration work without a lost workday incident. We also thank all survey participants for their commitment to the health and safety of their workers.

Unfortunately, there were four fatalities in the latter part of 2009. Three miners died in a flooded mine shaft that was being rehabilitated for exploration, and a field assistant died in an automobile collision. However, this was the lowest number of fatalities since 2005, and a significant improvement from 8 fatalities in 2008. Slips and falls and drilling machinery continue to be the greatest causes of incidents; AME BC and PDAC encourage companies to learn from the experiences of others and to adopt best practices.

Survey participants in 2009 reported 27 lost workday incidents resulting in 24,559 lost workdays (including 6,000 days for each fatality reported). This compares to 45 lost workday incidents in 2008 and 60 lost workday incidents in 2007. Overall, the year 2009 was the safest year since 2005 in the mineral exploration industry, with 1.5 incidents per 200,000 hours. In BC and Yukon, where AME BC has conducted the survey since 1982, the incident frequency was 2.5 incidents per 200,000 hours, the lowest since 2002.

AME BC and PDAC encourage all companies to set a target of zero incidents, every day. All companies should follow the guidelines contained in this report to help achieve this record.

We encourage all companies active in mineral exploration in Canada to participate in the 2010 Canadian Mineral Exploration Health & Safety Survey. A copy of the survey is included in this report and is also available online.

We thank participants for their support and hope that you find the report of interest and value. If you have any suggestions for improvement of future reports please contact Jonathan Buchanan, Director, Communications & Public Affairs, at AME BC, at 604.630.3923 or jbuchanan@amebc.ca.

Yours truly,



Rob Pease
Chair, Health & Safety Committee
AME BC



Bill Mercer
Chair, Health & Safety Committee
PDAC

Message des présidents des comités de la santé et de la sécurité de l'AME BC et de PDAC

Janvier 2011

L'Association for Mineral Exploration British Columbia (AME BC) et l'Association canadienne des prospecteurs et entrepreneurs (PDAC) ont le plaisir de présenter le cinquième *Rapport annuel sur la santé et la sécurité dans le secteur canadien de la prospection minérale*. Ce rapport fait le suivi des tendances en matière de santé et de sécurité et jette les bases nécessaires à une plus grande sensibilisation en ce domaine et à l'amélioration des normes de pratique dans le secteur de la prospection minérale. Bien que l'activité exploratoire ait connu un déclin en 2009 par rapport aux années précédentes, nous avons le plaisir d'annoncer que le taux de participation au sondage de cette année a été le plus élevé des cinq éditions du sondage national.

L'AME BC et PDAC ont reçu des données sur les pratiques en santé et en sécurité de 349 compagnies de prospection et sociétés minières actives au Canada, par rapport à 237 en 2008. De ce nombre, 113 compagnies de prospection minérale actives au Canada ont pris le temps d'analyser leur rendement en matière de santé et de sécurité et de présenter leurs résultats dans un questionnaire facultatif. Nous félicitons les 98 compagnies qui n'ont signalé aucune perte de journée de travail, alors que ce nombre était de 72 l'an dernier. Nous tenons à féliciter tout particulièrement FNX Mining Company Inc., qui a déclaré 99 792 heures de travail de prospection sans incident occasionnant la perte d'une journée de travail. Nous remercions aussi tous les participants au sondage, pour l'importance qu'ils accordent à la santé et à la sécurité de leurs employés.

Malheureusement, quatre décès sont survenus vers la fin de 2009. Trois mineurs sont morts dans un puits de mine inondé en cours de remise en état à des fins de prospection et un assistant local est décédé dans une collision automobile. Ce nombre de décès est toutefois le plus faible depuis 2005 et représente une amélioration importante par rapport aux huit décès survenus en 2008. Les glissades et les chutes ainsi que les machines de forage demeurent les principales causes d'incidents. L'AME BC et PDAC encouragent les compagnies à apprendre de l'expérience des autres et à adopter les meilleures pratiques.

Les participants au sondage de 2009 ont signalé 27 incidents qui ont occasionné la perte de 24 559 journées de travail (dont 6 000 jours par décès signalé), alors que le nombre d'incidents occasionnant la perte de journées de travail a été de 45 en 2008 et de 60 en 2007. Globalement, l'année 2009 présente le meilleur dossier de sécurité depuis 2005 dans le secteur de la prospection minérale, avec 1,5 incident par tranche de 200 000 heures. En Colombie-Britannique et au Yukon, où l'AME BC effectue le sondage depuis 1982, la fréquence d'incidents a été de 2,5 incidents par tranche de 200 000 heures, soit le taux le plus faible depuis 2002.

L'AME BC et PDAC encouragent toutes les compagnies à se donner comme objectif d'éviter totalement les incidents, chaque jour. Pour y parvenir, toutes les compagnies devraient observer les lignes directrices énoncées dans le présent rapport.

Nous invitons toutes les compagnies actives dans le secteur de la prospection minérale au Canada à participer au Sondage sur la santé et la sécurité dans le secteur canadien de la prospection minérale 2010. On trouvera copie du sondage dans le présent rapport et en ligne.

Nous remercions les participants pour leur appui et espérons que le rapport vous sera utile. Si vous désirez proposer des améliorations aux prochains rapports, veuillez communiquer avec Jonathan Buchanan, Directeur, Communications et affaires publiques, à l'AME BC, au 604-630-3923 ou à jbuchanan@amebc.ca.

Veuillez agréer nos salutations distinguées.



Rob Pease
président, Comité de la santé et de la sécurité, AME BC



Bill Mercer
président, Comité de la santé et de la sécurité, PDAC

Acknowledgements

Survey Participants

We thank the following companies for reporting on their 2009 safety performance in the 2009 Canadian Mineral Exploration Health & Safety Survey. We also thank those who answered the questionnaire regarding safety programs; their names are on pages 42-43.

Advanced Explorations Inc.	IAMGOLD Corporation
Altius Resources Inc.	Imperial Metals Corporation
Amarc Resources Ltd.	Inmet Mining Corp
Anglo American Exploration (Canada) Ltd.	Kiska Metals Corporation
AREVA Resources Canada Inc.	Klondike Silver Corp
Astral Mining Corporation	Kodiak Exploration Limited
Avalon Rare Metals Inc.	Kria Resources Ltd.
Baffinland Iron Mines Corporation	Lakehead Helicopters Inc.
Barrick Gold Corporation	Laurion Mineral Exploration Inc.
BCGold Corp	MacDonald Mines Exploration Ltd
Bell Copper Corporation	Manitoba Geological Survey
BHP Billiton	Mann, William, P.Geo.
Bitterroot Resources Ltd.	Mega Precious Metals Inc.
Bootleg Exploration Inc.	Mega Uranium Ltd.
Bralorne Gold Mines Ltd.	Messina Minerals Inc
Bureau de l'Exploration géologique du Québec	Metalex Ventures Ltd
Burton Consulting Inc.	Metanor Resources Inc
Bushmaster Exploration Ltd.	New Millennium Capital Corp.
Canadian Zinc Corporation	Newfoundland and Labrador Geological Survey
CanAlaska Uranium Ltd	Noront Resources Ltd.
Capstone Mining Corp.	Northern Abitibi Mining Corp
Cariboo Rose Resources Ltd.	Northern Tiger Resources Inc
Castle Resources Inc	Northgate Minerals Corporation
Cayenne Gold Mines Ltd.	Nuna Group of Companies
Christopher James Gold Corp	Ontario Geological Survey
Columbia Yukon Explorations Inc.	Pacific Bay Minerals Ltd.
Commander Resources Ltd.	Pacific Booker Minerals Inc.
Cornerstone Resources Inc.	Pacific Geological Services
Dajin Resources Corp	Pacific Ridge Exploration Ltd
De Beers Canada Inc. - Exploration Division	Pitchstone Exploration Ltd
Delta Uranium Inc.	Pro Minerals Inc.
Detour Gold Corp.	Probe Mines Limited
Durfeld Geological Management Ltd.	Pure Nickel Inc
Eagle Hill Exploration Corporation	Purepoint Uranium Group Inc.
Eastfield Resources Ltd.	Queenston Mining Inc.
Equity Exploration Consultants Ltd.	Rainy River Resources Ltd
Excalibur Resources Ltd.	Rambler Metals & Mining Canada Ltd.
FB Drilling	Richfield Ventures Corp.
Fjordland Exploration Inc.	Richmond Minerals Inc.
Fladgate Exploration Consulting Corporation	Sabina Gold & Silver Corp.
FNX Mining Company Inc.	Selwyn Resources Ltd.
Fronteer Gold	Serengeti Resources
Geodex Minerals Ltd.	Sherritt Coal - Paintearth Mine
Geological Services Division, Mineral Resources Branch,	SLAM Exploration Ltd
Nova Scotia Department of Natural Resources	Sultan Minerals Inc
Geological Survey, BC Ministry of Energy, Mines and Petroleum	Teck Resources Ltd.
Resources	Terrane Metals Corp.
Goldcorp	TerraNotes Ltd.
Golden Goose Resources	Threegold Resources Inc.
Gossan Resources Limited	Titan Uranium Inc.
Halo Resources Ltd.	Treasury Metals Inc.
Hard Creek Nickel Corporation	Tri Origin Exploration Ltd.
Hathor Exploration	TTM Resources Inc.
Hawthorne Gold Corp.	Vale Inco
Hy-Tech Drilling	Vancouver Island Exploration Inc.

Virginia Mines Inc.
Vismand Exploration Inc.
Votorantim Metals Canada Inc.
Wallbridge Mining Company Limited

Watts, Griffis and McOuat Limited
Western Copper Corporation
Wildcat Exploration Ltd
Yukon Zinc Corporation

AME BC and PDAC thank the following for making the fifth annual *Canadian Mineral Exploration Health & Safety Survey* and *Annual Report* possible.

AME BC Health & Safety Committee

Rob Pease, Consultant, Chair
Henry Awmack, Equity Exploration Consultants Ltd.
Rob Brown, Calibre Mining
Greg Dawson, Copper Ridge Explorations
Bryan Lundale
Ian Paterson, Consulting Geologist
Harvey Tremblay, Hy-Tech Drilling
Ron Caldwell, Advisor
Zoë Carlson, Mining Association of British Columbia, Advisor
Jonathan Buchanan, AME BC, Staff Support
Gavin C. Dirom, AME BC, Staff Support

PDAC Health & Safety Committee

Bill Mercer, Avalon Rare Metals Inc., Chair
Matthew Bliss, Inmet Mining Corporation
Lena Brommeland, HDI
Jonathan Buchanan, AME BC
Lorne Burden, Royal Nickel Corporation
Rory Clark, Teck
Brent Czornobay, Vale Inco
Craig Johnson, Barrick Gold Corporation
Bill Krasnozon, Boart Longyear

Martin Lenters, BHP Billiton
Mike MacDonald, Government of Nova Scotia
Courtney Mitchell, CSM Consulting
Ian Paterson, Consulting Geologist
Rob Pease, Consultant
Marc Perron, ExpAir International
Matthew Pickard, Baffinland Iron Mines Corporation
Steve Roberts, Watts, Griffis & McOuat Ltd.
Robert Schafer, HDI
Brand Stewart, Freeport-McMoRan Exploration Corporation
Karen Sutherland, Barrick Gold Corporation
Lise Tompson, 1984 Enterprises Inc.
Ed Yarrow, Anglo American Exploration (Canada) Ltd.
Bernarda Elizalde, PDAC, Staff Support
Lesley Williams, PDAC, Staff Support

Survey Support

Anabel Associates
Morgen Andoff, AME BC
Mary Hughes, AME BC
Ed Kimura
Greenfield Services Inc.
IdeaLever Solutions

2009 in Review

Surface Exploration and Geological Work: A Summary

Respondents reported 194,582 person days of activity, up from 142,022 person days of activity in 2008.

There was one fatality in 2009, recorded when a field assistant driving home from a project in northern Quebec collided with another vehicle on December 7.

There were 11 lost workday incidents in 2009. Considering the increased reporting by companies, this compares very favourably with 23 lost workday incidents in 2008, and 28 lost workday incidents in 2007. These resulted in 6,161 lost workdays (including 6,000 workdays attributed to the fatality). The frequency rate per 200,000 workdays was 1.2, down significantly from 3.3 in 2008. The severity rate (lost workdays per 200,000 workdays) was 666.2, up from 36.2 in 2008.

No lost workdays were reported for geologists; this is the first lost-workday free record for geologists since 2005. As in other years, however, lost-time incidents were centered on the support services required for exploration. A field assistant died in an automobile collision. Lost workday incidents that did not result in fatalities were attributed to a mine welder involved in exploration work (50 days), field assistants (35 days, not including the fatality), geophysicists (26 days), and other support (50 days).

As in 2008, slips and falls were a leading cause of lost workday incidents in 2009. Three of these involved winter conditions; and one involved slipping while stepping over a log. Improper lifting was also a leading cause of lost workday incidents; improperly lifting core boxes alone led to 38 lost workdays. Tool use and vehicles were other causes of lost workdays.

The lost workday incident frequency rate (number of lost workdays per 200,000 exposure hours) was 1.2 in 2009, compared to 3.3 in 2008, up from 2.3 in 2007, 1.7 in 2006, and 0.5 in 2005.

Severity of injury rate was 666.2 in 2009. This number has fluctuated greatly depending on reporting of fatalities in the survey. The number was 36.2 in 2008, 523.5 in 2007, 1,356.9 in 2006, and 4.7 in 2005.

Surface Drilling: A Summary

Respondents reported 150,276 days in 2009, down from 211,770 person days of activity in 2008 and 205,431 person days in 2007. A direct comparison with previous years is impossible as surface drilling, underground exploration, and other activities were lumped together.

There were 15 lost workday incidents, down from 21 lost workday incidents in 2008 and 31 lost workday incidents in 2007. These, however, resulted in 398 lost workdays, up from 268 lost workdays in 2008, and 172 workdays in 2007.

The leading cause of lost workday incidents continues to be drilling machinery and equipment related. The use of drilling equipment requires the proper use of equipment and vigilance on the part of the operator. The number of incidents continues to decline; there were only 5 in 2009, compared with 7 in 2008, and 12 in 2007. However, these incidents resulted in 146 lost workdays, compared to 100 lost workdays in 2008, and 44 in 2007. A driller lost 60 workdays from sore wrists from HQ rod handling in the most serious incident. Other incidents were attributed to not following proper procedures or wearing the proper equipment.

The second greatest cause was slips and falls, resulting in four lost workday incidents, the same as in 2007 and 2008. These incidents only resulted in 9 lost workdays, down from 76 in 2008 and 66 in 2007. Although these incidents were relatively minor in nature, two incidents could have been avoided by either getting assistance while

carrying heavy or awkward objects, and two could have been avoided by increased attentiveness. Improper lifting, which resulted in five lost workday incidents in 2008, resulted in only one lost workday incident in 2009. One driller with a pre-existing condition lifted beyond capability, resulting in an operation and 69 lost workdays. Although there were only two ATV incidents with lost workdays, one rollover resulted in 120 lost workdays, prompting a company to replace the ATV by a utility vehicle with a rollover protective structure and seat belts. Another vehicle related incident resulted in 47 lost workdays when a worker jumped off a snowmobile in order to avoid a collision with a truck. In another incident, which resulted in two lost workdays, a mechanic resigned after cutting his thumb almost to the bone on an aluminum rail in a pickup truck. The use of gloves would have prevented this injury.

The lost workday incident frequency rate per 200,000 exposure hours in 2009 was 2.1, up slightly from 2.0 in 2008, but significantly better than 3.0 in 2007. The severity rate was 55.9, up from 25.4 in 2008, and 16.8 in 2007.

Underground Exploration: A Summary

Respondents reported 31,134 person days of activity in 2009, down from 40,030 person days in 2008, and 86,202 person days in 2007. A direct comparison with previous years is impossible as surface drilling, underground exploration, and other activities were lumped together.

As in previous years, there was only one lost workday incident where three workers drowned while working to rehabilitate a mineshaft. Failure to inspect a mineshaft where the water pump had broken at the bottom before descent led to three fatalities. The alarm device on the pump was subsequently changed, and a new probe was installed to measure the presence of water.

Although the incident frequency in mineral exploration remains very low at 0.8 in 2009, although up from 0.5 in 2008 and 0.2 in 2007, the severity of incidents when they do occur underscores the importance of having and following procedures that reflect the hazards of the workplace.

Statistically, the severity rate was 13,638.0 in 2009. In comparison, it was 3.4 in 2008, and 18.2 in 2007.

Preventive Measures and Recommendations

Although some incidents are specific to a particular line of work, most can occur in a variety of environments. Slips and falls are routinely the leading cause of incidents, and cuts are the leading nature of injuries, followed closely by bruises and muscular injuries.

The leading preventive measures that could be taken to eliminate the incidents of 2009 can be summarized as follows:

- 1) Check that proper equipment and procedures are in place, are functioning properly, and are used in *all* operations;
- 2) Check that employees use appropriate personal protective equipment (PPE) and caution in all situations;
- 3) Eliminate unnecessary driving or use extreme caution while driving in hazardous conditions;
- 4) Use extra caution in slippery environments;
- 5) Do not lift or carry heavy objects without assistance;
- 6) Use ergonomic lifting techniques; *and*
- 7) Do not rush any aspect of a program. Train employees fully in all of their duties.

It is also important to note that employers are legally responsible to ensure that all employees and contractors:

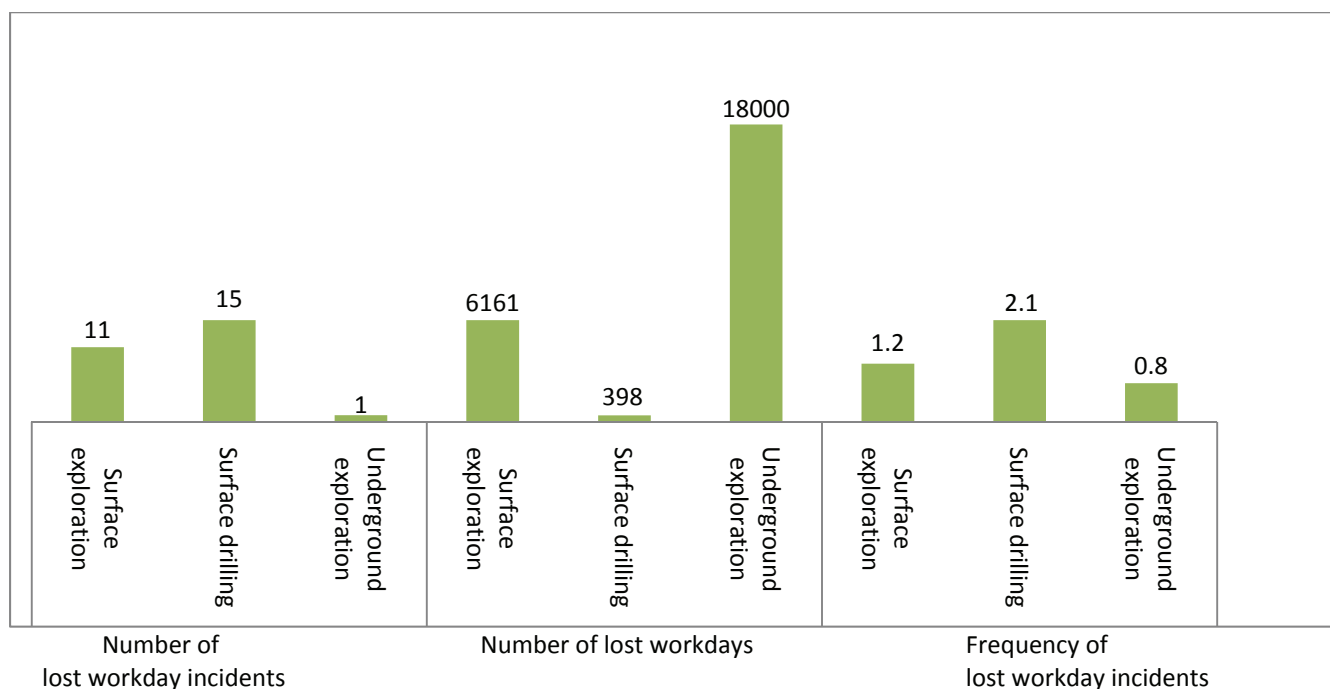
- have safety programs in place;
- provide personal protective and safety equipment;
- adequately train and supervise personnel; *and*
- ensure employees and contractors follow safe work guidelines.

Employers are criminally liable under the *Criminal Code of Canada* for criminal acts or negligence in the workplace. For further information, visit the Bill C-45 page of the Canadian Centre for Occupational Health and Safety website at www.ccohs.ca/oshanswers/legisl/billc45.html.

Standardized drilling training such as the Ontario Common Core Training surface drilling training can improve the safety of drilling programs. For more information visit the Canadian Diamond Drilling Association website at www.canadiandrilling.com/training.html.

Incidents without lost workdays provide opportunities for companies to develop and improve their health and safety programs.

Figure 1: Mineral Exploration Safety Statistics Summary 2009



Discussion of Questionnaire Results

Results of the survey for each province and territory are available in Table 1, and have been summarized in Figure 1 above.

AME BC and PDAC received information on the health and safety practices and performance of organizations active in every province and territory with active mineral exploration programs in 2009 (i.e. with the exception of Prince Edward Island). A record 349 organizations answered questions regarding their health and safety practices, up from 237 in 2008. A total of 113 organizations provided information on their safety performance, up from 94 in 2008. These organizations included companies that were exploring for metals (including uranium), coal, and potash as well as government geological surveys, drilling companies, and consultants. In this respect, this survey is reflective of the mineral exploration sector at large throughout Canada (see Figure 2a and 2b for a breakdown of reporting by province and territory when compared to exploration expenditures).

Table 1: Canadian Mineral Exploration Safety Statistics by Province and Territory 2009

Province	Category	NL	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU	N/A	Canada
Questionnaires returned from active companies		11	2	6	11	26	7	13	2	37	14	4	5	1	113
Person days of activity	Surface exploration	12,313	4,655	12,073	38,888	36,647	13,328	21,960	4,773	18,486	13,552	1,967	6,768	9,172	194,582
	Surface drilling	10,963	100	585	16,553	56,077	4,494	41,371	0	8,363	5,901	2,528	3,341	0	150,276
	Underground exploration	60	0	0	4,910	10,786	12,900	0	0	2,478	0	0	0	0	31,134
	Total	23,336	4,755	12,658	60,351	103,510	30,722	63,331	4,773	29,327	19,453	4,495	10,109	9,172	375,992
Equivalent no. of exposure hours	Surface exploration	113,930	46,550	100,250	388,880	324,046	109,155	219,600	47,730	184,864	135,520	19,670	67,682	91,719	1,849,596
	Surface drilling	92,630	1,000	5,850	165,530	507,038	36,140	413,710	0	83,630	59,010	25,280	33,414	0	1,423,232
	Underground exploration	600	0	0	49,100	86,288	103,200	0	0	24,780	0	0	0	0	263,968
	Total	207,160	47,550	106,100	603,510	917,372	248,495	633,310	47,730	293,274	194,530	44,950	101,096	91,719	3,536,796
Number of Fatalities	Surface exploration	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	Surface drilling	0	0	0	0	0	0	0	-	0	0	0	0	-	0
	Underground exploration	0	-	-	3	0	-	-	-	0	-	-	-	-	3
	Total	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Number of Lost Workday Incidents	Surface exploration	1	0	0	1	1	1	2	1	2	0	2	0	0	11
	Surface drilling	1	0	0	0	2	1	7	-	2	2	0	0	-	15
	Underground exploration	0	-	-	1	0	-	-	-	0	-	-	-	-	1
	Total	2	0	0	2	3	2	9	1	4	2	2	0	0	27
Number of Lost Workdays	Surface exploration	10	0	0	6000	24	1	26	50	16	0	34	0	0	6161
	Surface drilling	2	0	0	0	122	47	147	-	72	8	0	0	-	398
	Underground exploration	0	-	-	18000	0	-	-	-	0	-	-	-	-	18000
	Total	12	0	0	24000	146	48	173	50	88	8	34	0	0	24559
Frequency of Lost Workday Incidents	Surface exploration	1.8	0.0	0.0	0.5	0.6	1.8	1.8	4.2	2.2	0.0	20.3	0.0	0.0	1.2
	Surface drilling	2.2	0	0.0	0.0	0.8	5.5	3.4	-	4.8	6.8	0.0	0.0	-	2.1
	Underground exploration	0.0	-	-	4.1	0.0	-	-	-	0.0	-	-	-	-	0.8
	Total	1.9	0.0	0.0	0.7	0.7	1.6	2.8	4.2	2.7	2.1	8.9	0.0	0.0	1.5
Severity of Injury Rate	Surface exploration	17.6	0.0	0.0	3085.8	14.8	1.8	23.7	209.5	17.3	0.0	345.7	0.0	0.0	666.2
	Surface drilling	4.3	0.0	0.0	0.0	48.1	260.1	71.1	-	172.2	27.1	0.0	0.0	-	55.9
	Underground exploration	0.0	-	-	73319.8	0.0	-	-	-	0.0	-	-	-	-	13638.0
	Total	11.6	0.0	0.0	7953.5	31.8	38.6	54.6	209.5	60.0	8.2	151.3	0.0	0.0	1388.8

Definitions and notes for Table 1:

-**Frequency of lost workday incidents:** Number of lost workday incidents per 200,000 exposure hours.

-**Severity of injury rate:** Number of lost workdays per 200,000 exposure hours.

-Number of hours per day worked is 10 unless otherwise reported by participants.

-Abbreviations: NL – Newfoundland & Labrador; NS – Nova Scotia; NB – New Brunswick; QC – Quebec; ON – Ontario; MB – Manitoba; SK – Saskatchewan; AB – Alberta; BC – British Columbia; YT – Yukon; NT – Northwest Territories; NU – Nunavut; N/A – not available; national data not separated according to province worked.

-Number of questionnaires per province/territory does not add up to Canadian total as many companies worked in multiple jurisdictions.

Figure 2: Canadian Mineral Exploration Health and Safety Participation Overview

Figure 2a: 2009 Canadian Mineral Exploration Expenditures by Province and Territory

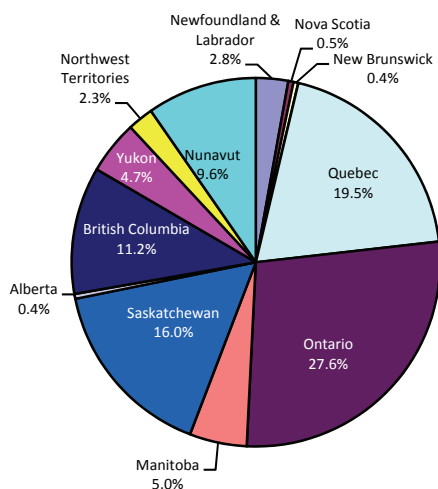


Figure 2b: 2009 Exposure Hours Reported to AME BC/PDAC

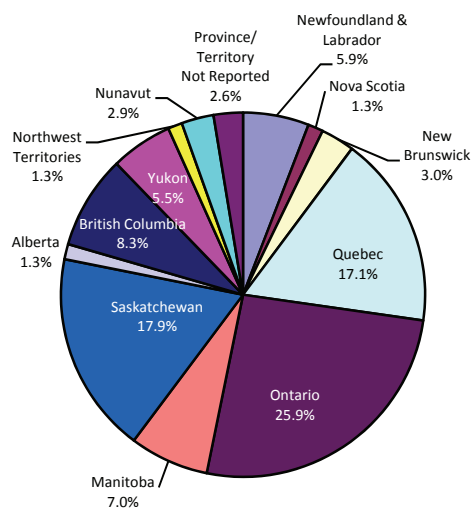


Figure 2c: Reporting Summary 2005-2009

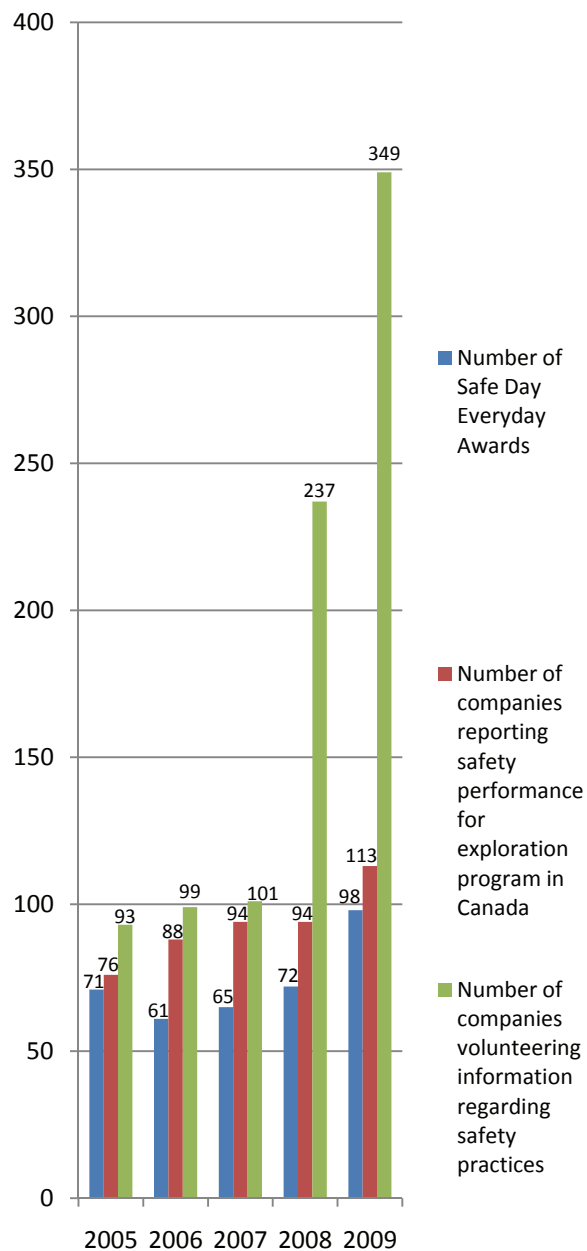
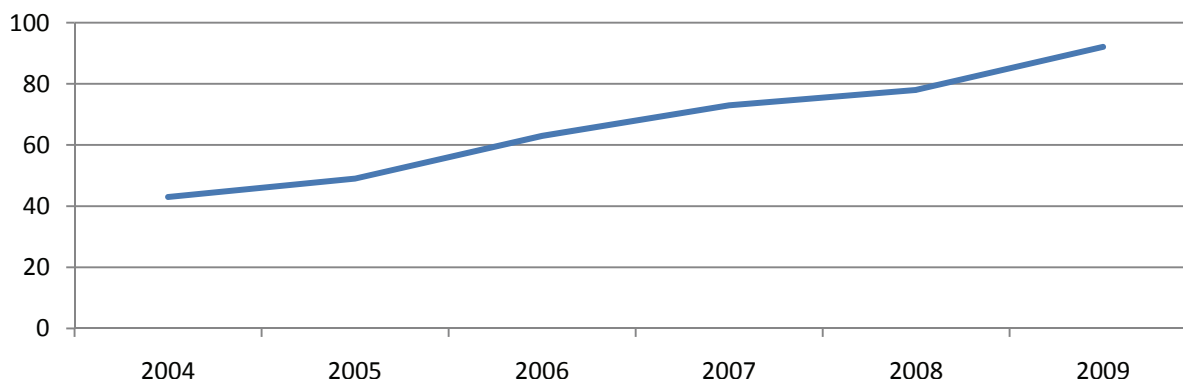


Figure 2d:
Percentage of companies with safety program



There has been a gradual increase in the proportion of companies with a health and safety program over the past five years (see Figure 2d). Currently 92% of respondents declare that they have a health and safety program up from 49% in the initial year of the national survey in 2005, and 43% in the 2004 survey of companies active in BC & Yukon. Furthermore, 86% of respondents reported discussing safety issues at staff meetings (compared to 85% in 2008). Only 69% of companies reported discussing near misses at staff meetings (although this compares to 85% in 2008, only companies reporting on their safety performance responded to this question in the 2008 survey).

The ultimate objective is a sincere “Yes” in 100% of replies to all three of these questions.

Cause of Incidents

The causes of lost workday incidents are illustrated in Figure 3; the causes of all incidents are illustrated in Figure 4.

Slips and falls are consistently the single leading cause of incidents. Mineral exploration activity presents a number of slippery surfaces (e.g. ice, wet drill decks, boulders, logs) and opportunities for falls (e.g. uneven terrain including steep slopes, muskeg, and snow). The use of tools and equipment through various causes (drilling machinery, tool use, improper operation, vehicle related incidents, and camp equipment) combined, however, accounted for 73 incidents – nearly half of 165 incidents.

Personnel should always use the required equipment properly – many cuts and other injuries are caused by using improper equipment or by not using caution when handling sharp objects or machinery.

Figure 3: Cause of Lost Workday Incidents

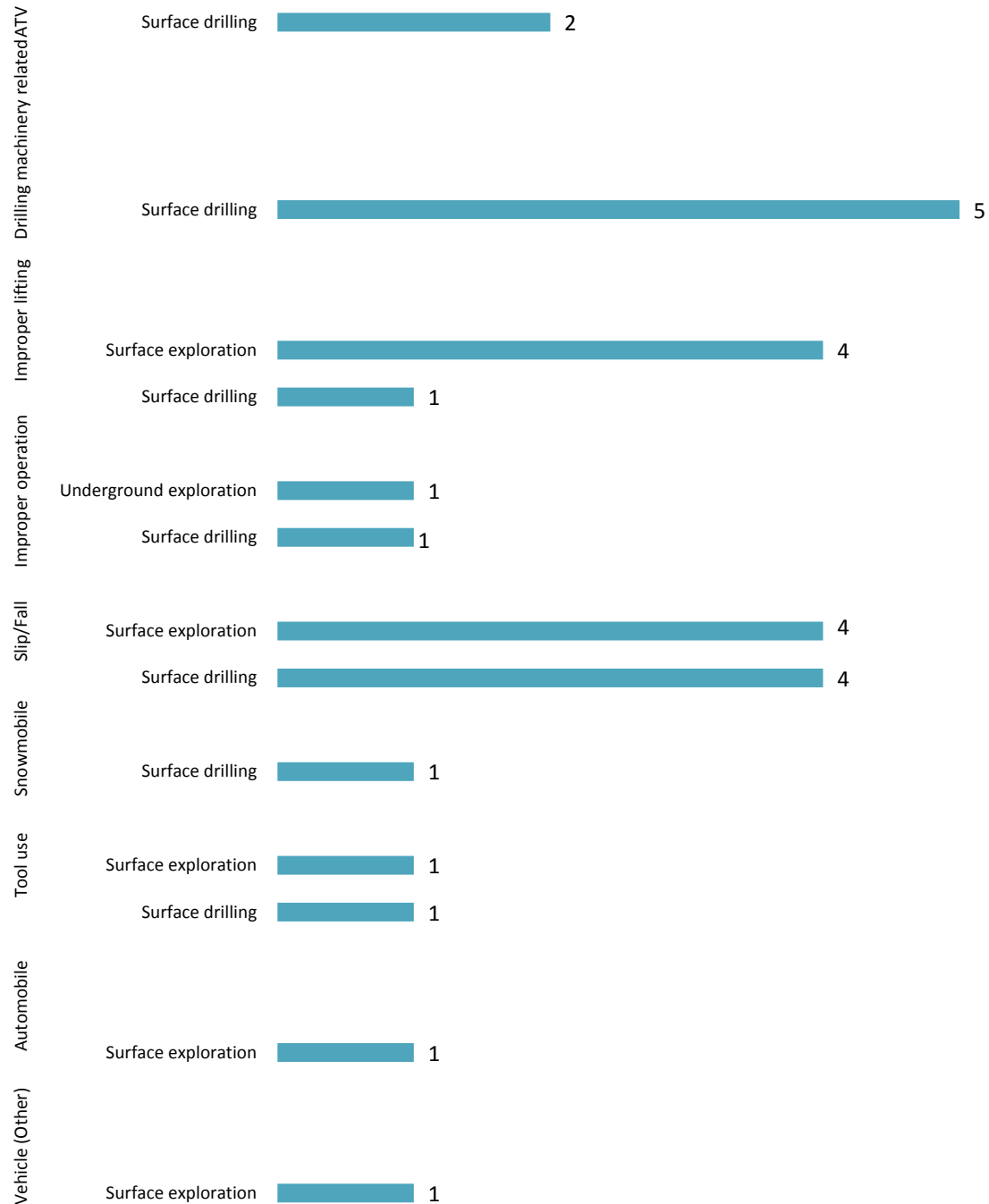


Figure 4: Cause of Incidents

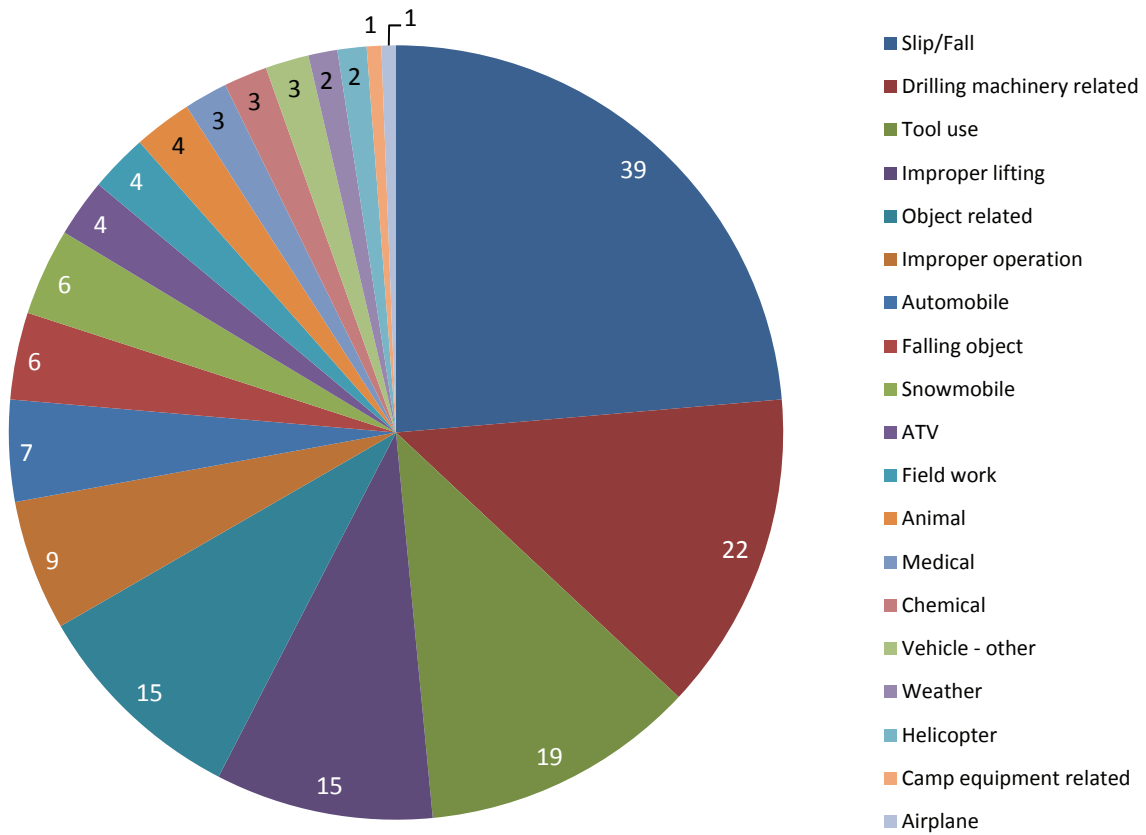


Figure 5: Nature of Lost Workday Incidents

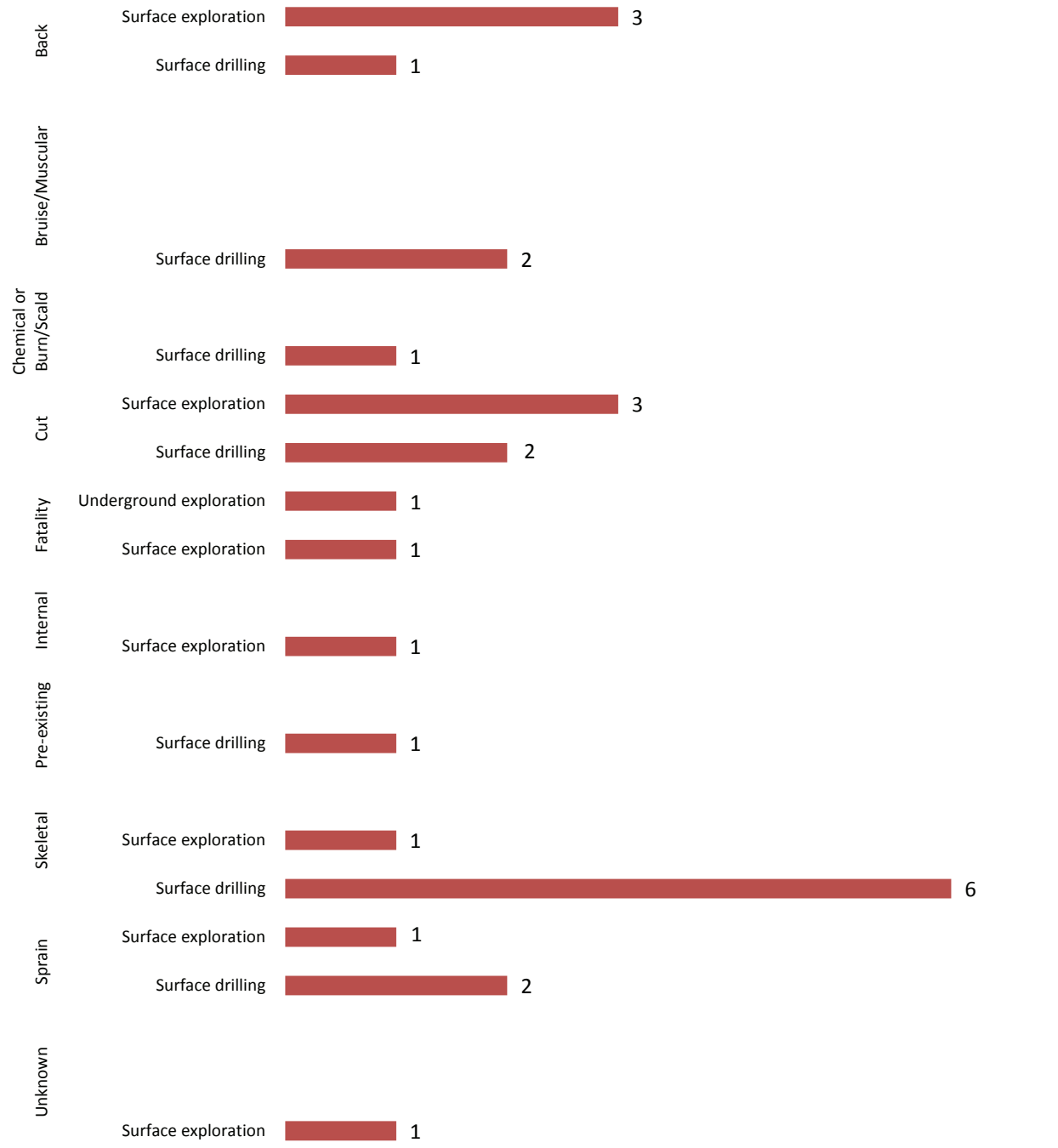
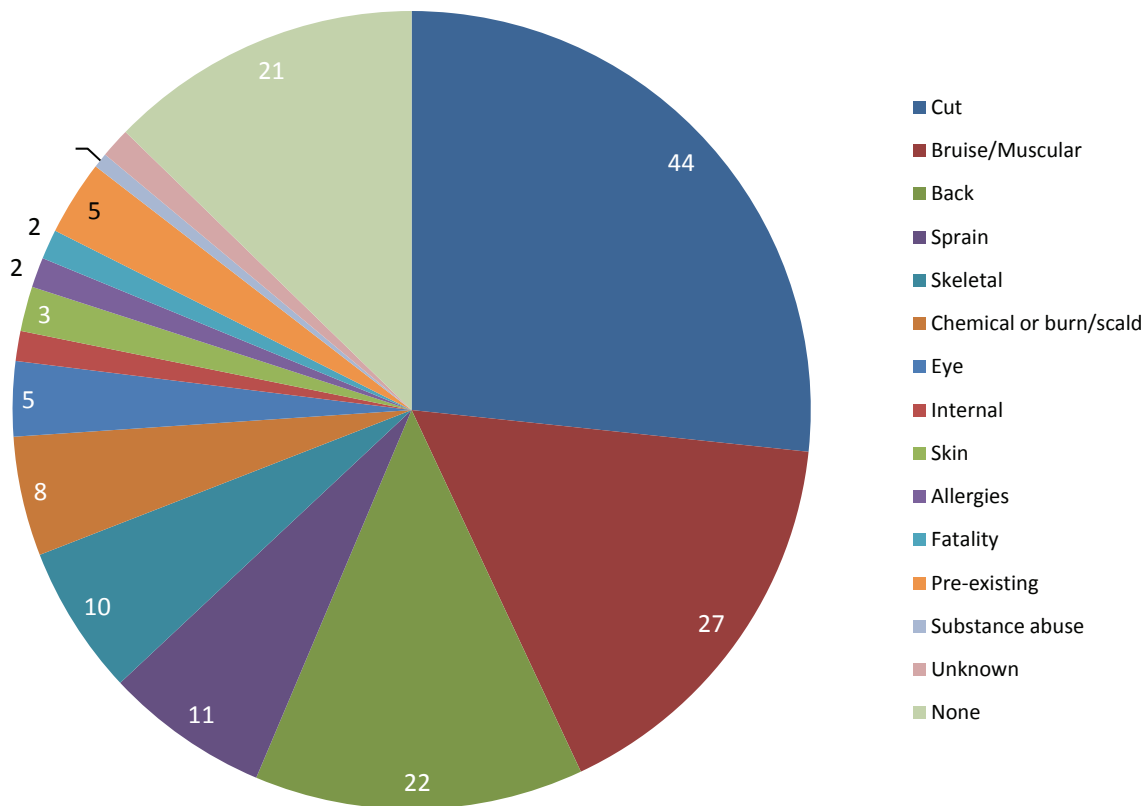


Figure 6: Nature of Injuries



Nature of incidents

The nature of lost workday incidents is illustrated in Figure 5; the nature of all incidents is illustrated in Figure 6.

Cuts continued to be the leading type of injuries in 2009, and are almost always related to several of the leading causes of injuries: slips and falls, and misuse of tools and equipment. Bruises and muscular injuries continued to be the second highest cause, and tend to result from the same causes.

Details of lost workday incidents for surface exploration and geological work are tabulated in Table 2, and details for lost workday incidents for diamond drilling and underground work are tabulated in Table 3. These tables clearly indicate the range of situations in which incidents arise, and provide anecdotal evidence of the importance of personal protective equipment, health and safety training, and due diligence.

**Table 2: Lost Workday Incidents
in Surface Exploration and Geological Work
2009 Summary Report**

Date	Prov /Terr	Occupation	Type	No. of Lost Workdays	Nature of Injury	Cause of Incident	Description	Action Taken/Notes
Dec	QC	Field Assistant	FA	6000	Fatality	Automobile	Traffic accident/collision with another vehicle	Everybody else in the company was reminded of vehicle operation procedures.
Feb	AB	Miner	MA	50	Unknown	Slip/Fall	At 8:15 a.m. welder walking outside slipped on ice that was covered with snow. The welder was a 35 year employee.	Employee transported to hospital. Discussed incident at crew safety meetings, and sent a safety alert to other sites to identify hazard. Ice was covered with sand, and a complete investigation was done.
Aug	NT	Field Assistant	MA	31	Cut	Tool Use	Cutting open plastic sample bags. Box cutters are inherently dangerous. Cut was right to bone.	Person sent to hospital for treatment then home. Instructions to workers to never use box cutter towards body - always cut away from you.
Jan	ON	Other	MA	24	Back	Improper Lifting	Pinched nerve in back. Cause of injury was improper lifting and placing of core boxes.	Platforms built to reduce lifting distance. Employee training changes made. There was more emphasis on ergonomic lifting techniques.
Apr	SK	Geophysicist	MA	17	Back	Improper Lifting	Improper lifting of a geophysical instrument. Improper lifting and time in field may have led to complacency.	Reviewed lifting procedure.
Dec	BC	Other	MA	14	Internal	Improper Lifting	Hernia caused by lifting core boxes	Two weeks of rest
Jul	NL	Other	MA	10	Skeletal	Slip/Fall	While traversing a wooded but open area, the student slipped while stepping over a log and struck knee on the ground. Knee cap was dislocated.	Senior assistant contacted expediter by satellite phone. He called RCMP who called hospital and eventually a search and rescue helicopter was sent in to hoist the victim from the woods and then transported the victim to hospital.

Jan	SK	Geophysicist	MA	9	Sprain	Slip/Fall	A recording crew worker was walking through the snow picking up cable when the worker fell into an unmarked ditch and twisted his knee. He reported it to his crew boss immediately and they decided he did not need to be brought to the medic.	Individual took time off to address the sprained knee.
Apr	NT	Field Assistant	FA	3	Back	Improper Lifting	Inexperience with handling snowmobiles. Incident resulted from lifting back of snowmobile.	Person went on break. Did not return to work.
Mar	BC	Other	FA	2	Cut	Slip/Fall	Geotechnician slipped on ice and cut knee.	First aid and two days of rest
Jan	MB	Field Assistant	MA	1	Cut	Snowmobile Trailer	Worker pinched left pinky finger between the tongue of a trailer and the bumper of a vehicle while he was unhooking a snowmobile trailer.	Treated at the local hospital and required one day to recover before returning to work.
TOTAL LOST WORKDAYS				6161				

**Table 3: Lost Workday Incidents in Surface Drilling and Underground Exploration
2009 Summary Report**

SURFACE DRILLING								
Date	Prov/ Terr	Occupation	Type	No. of Lost Workdays	Nature of Injury	Cause of Incident	Description	Action Taken/Notes
Sep	ON	Driller Helper	MA	120	Back	ATV	A drilling contractor employee was returning from the pump shack driving an ATV. He lost control of the ATV while he was trying to recover a spot light dropped on the footstep causing it to flip over him.	Replacement of the ATV by a two-passenger side-by-side vehicle with seat belt and rollover protective structure (ROPS). Review the SOP with employees.
Aug	BC	Driller	MA	69	Pre-existing Illness/Seizure	Improper Lifting	Worker lifted beyond capability.	Referral to doctor followed by operation and workers' compensation
Jan	SK	Driller Helper	MA	60	Sprain	Drilling Machinery Related	Sore wrists from handling HQ rods	Review of proper body positioning and hazard alert regarding stretching/heavy rod lifting. Rod handling prototype has been tested.
Mar	MB	Driller Helper	MA	47	Skeletal	Snowmobile	Worker dislocated hip as a result of jumping off snowmobile and striking the road bank in order to avoid colliding with a contractor truck near the crest of a hill on a contractor drill road.	Treated at the local hospital and required 47 days to recover before returning to work.
Jun	SK	Driller Helper	MA	28	Skeletal	Drilling Machinery Related	While lowering overshot inside the rods, the wireline was free spooling down as the driller had put his wrench to lock the lever in the lower position. At some point the wireline got looped and started rewinding making the overshot coming out. The overshot got hung up either on the roller or the sheave wheel which made the cable tighten and then snap. The injured, who had his back to the drill as he had just finished was screwing on the water swivel to the rod, got hit by the wireline. The overshot hit him in the back which threw him off balance and made him fall sideways on his right hand side. He fell on his right hand side on a rod that was suspended 6 inches off the ground. While falling he could not prevent or keep himself from absorbing any shock from the fall.	Driller was immediately removed from the site. Job safety analysis reviewed and safety meeting held.

Jul	SK	Driller Helper	MA	28	Skeletal	Drilling Machinery Related	While drilling casing with a casing advancer, the casing broke just below the foot clamp due to poor hole alignment when the hole was collared. The broken piece of casing was removed and the crew attempted to remove the core barrel with the drill head but it could not be put back through the drill head because of hole collar misalignment. The barrel could still be moved with a pipe wrench but would get stuck when close to the broken joint on the casing. The core barrel was pulled out as it could. It was secured with a water swivel and attached to the rod winch. A manual clamp was installed above the foot clamp to keep the guide bushing out of the way during the removal of the plate. The crew first tried to cut the casing with a hacksaw but after about 15 minutes the driller decided to try to remove the jaws instead. Thinking it would be easier and faster, the driller proceeded to isolate the clamp in closed position with no pressure on the device and shut down the drill. (continued on next column)	The driller then proceeded to remove the bolts on the top plate of the foot clamp, all except for 3. The driller stood up to re-position himself, during which time the helper went to look at what was left. At that time the plate was projected due to failure of the bolts and plate, and struck the helper's hand. The hand was caught between the projected plate and mechanical clamp causing the injury. Basic underlying causes of mishaps are the result of lack of control: the result of a combination of mechanical problems, followed by improper tool use and not using proper procedures. ACTION: Ensure proper procedures are followed.
Oct	SK	Driller Helper	MA	23	Chemical or Burn/Scald	Drilling Machinery Related	During the cementing of a drill hole there must have been a blockage and when the joint was broken cement splashed up and sprayed the drill helper with cement. He changed his coveralls, but did not shower. He continued to work until he realized that pain was increasing in his legs. He received alkali burns to his legs, some which required skin grafts. Proper PPE, rain slickers in this case, was not worn on his legs and the helper was not aware of the potential risk.	Review of Job safety analysis with all employees and supervisors.
Sep	YT	Driller Helper	MA	7	Skeletal	Drilling Machinery Related	Dislocated joints on back of hand - hit by winch handle.	First aid, referred for medical aid.

Feb	SK	Driller Helper	MA	3	Bruise/ Muscular	Slip/Fall	Slipped while carrying core barrel in drill shack. Core barrel fell on helper's arm.	If possible, either get help while moving core barrel and/or ensure drill shack floor not wet or icy.
Aug	SK	Driller Helper	FA	3	Sprain	Slip/Fall	Tripped over pail while moving out of the way of a helicopter sling load.	Make sure sling area is clear of equipment.
Aug	BC	Driller Helper	MA	3	Cut	Tool Use	Pinched finger; worker had one year of experience.	Referred to doctor; bandage was applied.
Jun	NL	Driller Helper	MA	2	Skeletal	ATV	Lost control of ATV. Not following proper safety procedures.	ATV Training.
Aug	ON	Other	MA	2	Cut	Improper Operation	A mechanic (working for the drilling contractor) cut his thumb almost to the bone while pulling a rubber hose from the back of the pick-up truck. He cut his thumb on the aluminum rail on the side box of the pickup truck. Contractor employee resigned after this event.	Use appropriate gloves. Grinding the aluminum side rail.
Jul	SK	Driller Helper	MA	2	Bruise/ Muscular	Slip/Fall	Helper tripped while carrying two 50-pound bags of bentonite clay on shoulder. Slipped and fell; bags landed on helper.	Only carry one bag at a time.
Sep	YT	Driller	MA	1	Skeletal	Slip/Fall	Fell on slippery rock, landed on knee cap.	First aid, referred for medical aid.

TOTAL LOST WORKDAYS 398

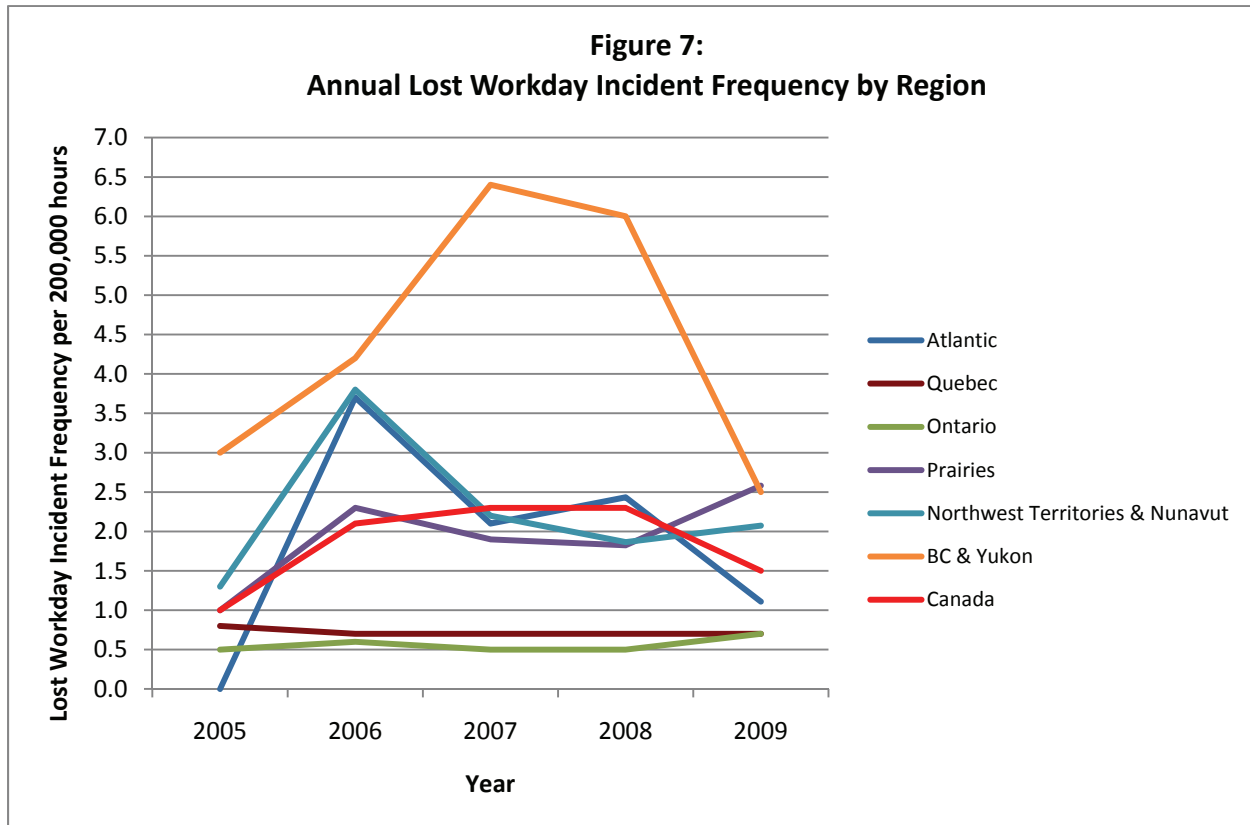
UNDERGROUND EXPLORATION

Date	Prov/ Terr	Occupation	Type	No. of Lost Workdays	Nature of Injury	Cause	Description	Action Taken
Oct	QC	Miner	MA	18000	Fatality	Improper Operation	Miners did not inspect shaft before getting down. They were working to rehabilitate the shaft. A water pump was broken in the bottom of the shaft. The three miners hit the water in the bottom and drowned.	The alarm device on the pump was changed, and a new probe was installed to measure the presence of water.

TOTAL LOST WORKDAYS 18000

Trends

Figure 7 shows trends over the last five years in lost workday incident frequency. Ontario and Quebec have consistently had incident rates of less than one lost workday incident per 200,000 hours. The Prairies and Far North saw their rate edge up in 2009, while the Atlantic Provinces and Cordilleran region of British Columbia and Alberta saw dramatic decreases in their injury rates. The year 2009 marks the first year that the injury rate was consistently below 3.0 incidents per 200,000 hours in all regions of Canada.

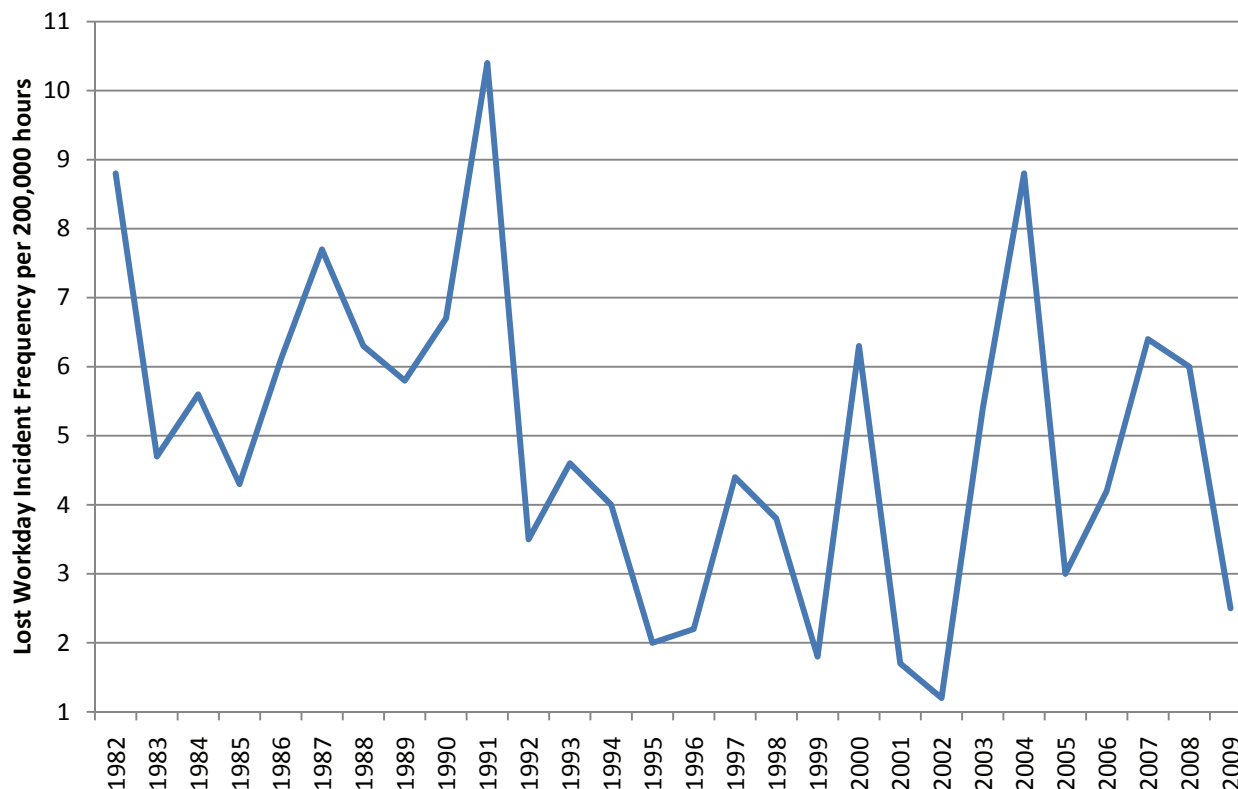


It appears that there are four main factors that can be attributed to the differences between geographic regions. Incident rates are:

- 1) Higher in areas requiring helicopter access with cliffs, fast-flowing streams, snow and ice
- 2) Higher in areas with wild animals such as bears and wolves
- 3) Higher when helicopter evacuation from remote areas is required for medical access
- 4) Lower in areas of brownfield exploration
- 5) Lower as variables are removed (e.g. weather, easily accessible infrastructure)

Figure 8 shows trends in lost workday incident frequency in British Columbia and Yukon since the British Columbia & Yukon Chamber of Mines (now AME BC) began its *Annual Report: Safety in Mineral Exploration in Western Canada*. Generally, incident rates have been higher in times of high activity in the mineral exploration sector, although there is a subtle downward trend. Higher activity generally means that there is a greater number of inexperienced employees working in exploration. The incident rate peaked at 10.4 in 1991 and hit a low of 1.2 in 2002.

**Figure 8: Annual Lost Workday Incident Frequency in BC & Yukon
1982-2009**



The overall injury frequency nationwide of 1.5 in 2009 is well below the injury rate for all industries, although the rate of 2.3 in 2007 and 2008 is similar to the overall injury rate. In June 2009, the Association of Workers' Compensation Boards of Canada reported that the injury rate across all industries, based on 84% of the workforce, was 2.12 in 2008, down from 2.26 in 2007¹. (This rate is based on 100 person years, which is equivalent to 200,000 hours, the measure used in the mineral exploration survey.) On a jurisdiction-by-jurisdiction basis, the injury rate for mineral explorers appears to be lower than the rate for industry-at-large, although Alberta and the Northwest Territories/Nunavut were exceptions in 2009.

Fatalities 1980-2009: An Overview

AME BC and PDAC have compiled information on fatal incidents in mineral exploration by seeking information from exploration companies working in Canada (Table 4) and the rest of the world (Table 5). The data is not complete, and input is sought from members of the industry to update the data.

The analysis given below on exploration fatalities in Canada should be taken in the context that the database is not complete; however, the basic trends are still instructive.

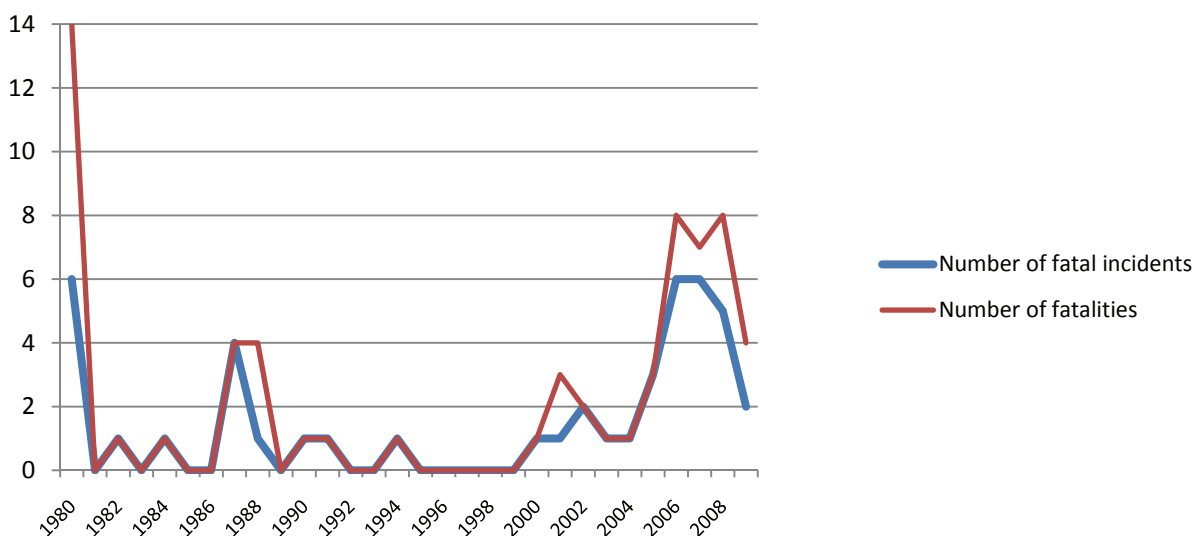
¹ Association of Workers' Compensation Boards of Canada. 2007 and 2008 *Key Statistical Measures*.
<http://www.awcbc.org/common/assets/ksms/2007ksms.pdf> and <http://www.awcbc.org/common/assets/ksms/2008ksms.pdf>

The objective of a fatality listing in mineral exploration activities is to highlight the principal events that can result in fatalities. The industry itself can then develop protocols and methodologies to prevent reoccurrence of these events. The reader should note that the data includes various categories of workers who may have been employed by contractors, rather than directly by an exploration company. Thus, pilots of aircraft and employees of drilling companies are included. Aircraft accidents are only included if directly connected with exploration. People are listed as *Geologist* (where the profession is known), *Field* (all employees in field, but not geologist, pilot or driller), *Pilot*, or *Driller* (all drill company employees).

Fatalities in Mineral Exploration

Figure 9 illustrates the trend in fatalities in mineral exploration in Canada over time from 1980 to the present. The data prior to 1980 is clearly incomplete and would be misleading. There were fewer fatalities in 2009 than in any year since 2005, and at the time of writing, no fatalities in Canada had been reported for the year 2010. This reduction in fatalities is probably due in part to reduced exploration activities because of the global economic downturn, but we hope also attributable to increased vigilance by mineral exploration companies and helicopter companies in the wake of eight fatalities over less than three months in 2008.

**Figure 9: Fatalities in Mineral Exploration in Canada
1980-2009**



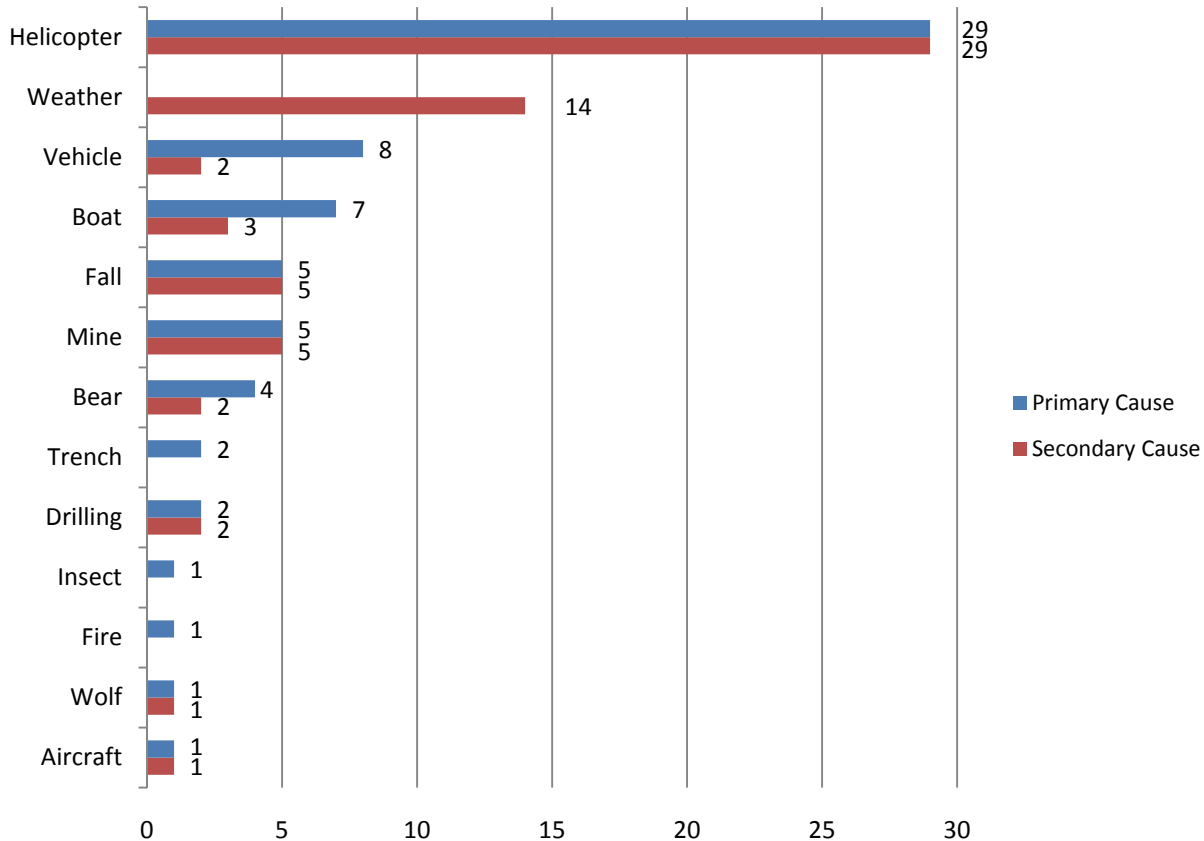
The graph shows the following points:

- There have been 65 fatalities involved in mineral exploration in Canada since 1980. Note that these include fatalities for ancillary activities such as helicopter services, geophysical surveys, and logging.
- There is no clear indication of a trend over time. Years with high exploration activity, however, tend to have higher numbers of fatalities.
- The average number fatal incidents in a year is 1.5 and the average number of fatalities is 2.2.
- Only 11 of the past 30 years had zero fatalities.
- For the past ten years, there have been no years with zero fatalities.
- The year 2008 tied with 2006 in having the second highest number of fatalities in 30 years.

Despite increased safety awareness over the past 30 years, the data suggests that industry has not managed to make exploration significantly safer in relation to fatalities. This fact is clearly a challenge for all concerned to take action.

The fatalities have been classified by primary and secondary cause as outlined in Figure 10.

Figure 10: Fatalities in Mineral Exploration in Canada by Primary and Secondary Cause 1980-2009



The main cause of each fatality is listed as the primary cause. A different secondary cause is listed in cases where the secondary cause contributed significantly to the fatality. In cases where few details are available, or where there was not secondary aggravating cause, then the secondary cause is listed as the same as the primary. Thus, for a helicopter accident where no details are available then the secondary cause is listed as *Helicopter*. However, for a helicopter accident where the people involved survived the crash, but died due to exposure in poor weather, *Weather* is listed as the secondary cause. Where a vehicle accident related to icy roads, then the secondary cause is listed as *Weather*.

The data shows that helicopters are the prime cause of fatalities in exploration. This is exacerbated by the fact that helicopter accidents often cause multiple fatalities. It is interesting that fixed wing accidents, here noted as *Aircraft*, have only caused one exploration fatality in the period.

For the second highest primary category, boats, it should be observed that all the fatalities occurred in the 1980s, and this likely relates to the fact that boats have since been used less in exploration over time.

Although weather is not prime cause of any of the fatalities, weather is the most important factor in the secondary category. This indicates that preexisting issues – such as helicopter or vehicle problems – have been aggravated by weather. In Canada this usually relates to winter but also relates to sudden changes in the weather, such as wind that was a contributing factor to four boating fatalities in 1988.

Transportation overseas continues to be a major contributor to fatalities overseas. In 2010, eleven personnel including the directors of a mining company perished when their plane crashed en route from Cameroon to an iron ore project in the Republic of Congo.

It is suggested that exploration field crews need to be cognizant of these underlying factors and that any exploration safety manuals, training, and protocols take into account these statistics.

If you have any information to add to this database, please contact AME BC or the PDAC.

Table 4: Fatalities in Mineral Exploration in Canada 1980-2009

Company	Year	Prov/ Terr	Cause	Category 1	Category 2	No. of Deaths	Personnel
Government	1980	NS	Trench collapse/rainstorm	Trench	Weather	2	Geologist/Field
Major	1980	MB	Geologist drowning trying to swim to shore	Boat	Boat	1	Geologist/Field
Other	1980	ON	Prospector died from carbon monoxide in mine shaft	Mine	Gas	1	Geologist/Field
Other	1980	BC	Walked into tail rotor of helicopter	Helicopter	Helicopter	1	Geologist/Field
Other	1980	BC	Helicopter accidents (2)	Helicopter	Helicopter	9	Pilot/Geologist/Field
Other	1982	BC	Canoe related drownings	Boat	Boat	1	
Major	1984	ON	Truck rolled on ice road	Vehicle	Weather	1	Driller
Major	1987	BC	Bear mauling	Bear	Bear	1	Driller
Other	1987	BC	Fall from box of pick-up truck	Vehicle	Fall	1	Geologist/Field
Other	1987	BC	Fall from cliff	Fall	Fall	1	Geologist/Field
Other	1987	BC	Fall into crevasse while glissading	Fall	Fall	1	Geologist/Field
Other	1988	BC	Canoe related drownings	Boat	Weather	4	Geologist/Field
Other	1990	BC	ATV turnover	Vehicle	ATV	1	Geologist/Field
Other	1991	BC	Wasp sting, allergic reaction	Insect	Wasp	1	Geologist/Field
Major	1994	ON	Vehicle on ice	Vehicle	Weather	1	Geologist/Field
Major	2000	NT	Tower dropped while slinging	Drilling	Helicopter	1	Driller
Major	2001	NT	Helicopter crash - cause uncertain	Helicopter	Helicopter	3	Pilot/Geologist/Field
Major	2002	ON	Geophysicist killed in fall on cliff/wet weather	Fall	Weather	1	Geologist/Field
Other	2002	BC	Bear mauling/oil drilling site	Bear	Drilling	1	Driller
Other	2003	ON	Small plane crash	Aircraft	Aircraft	1	Geologist/Field
Other	2004	BC	Rock fall at exploration project	Mine	Fall	1	Miner
Major	2005	QC	Driller: bulldozer through ice	Drilling	Weather	1	Driller
Other	2005	BC	Bear mauling	Bear	Vehicle	1	Field
Other	2005	SK	Wolf mauling	Wolf	Wolf	1	Field
Government	2006	YT	Geologist struck by rotor of helicopter during toe-in pickup	Helicopter	Helicopter	1	Geologist
Other	2006	YT	Bear mauling	Bear	Bear	1	Field
Other	2006	BC	Helicopter crash - broken transmission mount	Helicopter	Helicopter	3	Pilot/Driller/Helper
Other	2006	QC	Boat related drowning	Boat	Boat	1	Field
Other	2006	SK	Helicopter crash into lake	Helicopter	Helicopter	1	Field
Other	2006	SK	Helicopter crash during slinging operation	Helicopter	Helicopter	1	Pilot
Other	2007	SK	Helicopter crash into lake	Helicopter	Helicopter	2	Pilot/Geologist/Field

Junior	2007	NL	Helicopter crash during slinging operation	Helicopter	Helicopter	1	Pilot
Other	2007	NU	Drowning	?	Weather	1	Driller
Junior	2007	NT	Worker drowned when truck fell through ice	Vehicle	Weather	1	Field
Junior	2007	BC	Helper died in tent fire at end of season	Fire	Weather	1	Driller
Other	2007	ON	Road builder fell through ice when plowing ice to build winter road	Vehicle	Weather	1	Roadbuilder
Other	2008	BC	Helicopter plunged into river	Helicopter	Helicopter	4	Pilot/Geologist/Field/Driller
Major	2008	BC	Logger killed on exploration project	Fall	Fall	1	Logger
Other	2008	BC	Pilot killed in slinging incident	Helicopter	Drilling	1	Pilot
Other	2008	YT	Helicopter crashed in river	Helicopter	Helicopter	1	Pilot
Other	2008	NT	Helicopter crashed near lake	Helicopter	Helicopter	1	Driller
Junior	2009	QC	Field technician died in crash	Vehicle	Vehicle	1	Field
Junior	2009	QC	Miners drowned in underground shaft.	Mine	Mine	3	Miner

Table 5: Fatalities Abroad in Mineral Exploration 1990-2010

Company	Year	Country	Cause	Category 1	Category 2	No. of Deaths	Personnel
Major	1990	Chile	Aircraft crash/hypothermia	Aircraft	Weather	4	Pilot/Geologist/Field
Major	1991	Chile	Boat capsized in squall	Boat	Boat	1	Geologist/Field
Other	1992	Australia	Driller was caught between mast and truck when moving drill mast	Drilling	Drilling	1	Driller
Major	1994	Chile	Vehicle accident/sleeping/alcohol	Vehicle	Alcohol	1	Geologist/Field
Other	1994	Ecuador	Helicopter crash - weather/pilot error	Helicopter	Weather	5	Pilot/Geologist/Field
Other	1995	Australia	Driller caught between rotating rods and mast	Drilling	Drilling	1	Driller
Major	1996	Philippines	Shot by guerrillas	Security	Security	1	Geologist
Major	1996	Turkey	Truck rolled	Vehicle	Vehicle	1	Driller
Other	1997	Australia	Helicopter crash, blade hit geologist standing by	Helicopter	Helicopter	1	Geologist/Field
Other	1997	Australia	Vomiting, unconscious due to heat exhaustion	Weather	Weather	1	Geologist/Field
Major	2000	Chile	Snowstorm	Weather	Weather	2	Driller
Major	2000	Argentina	Truck driven off the road	Vehicle	Vehicle	1	Driller
Major	2002	Chile	Murder of two geologists by thieves	Security	Security	2	Geologist
Major	2003	Chile	Vehicle accident/sleeping	Vehicle	Vehicle	1	Geologist
Other	2003	Mexico	Geologist swarmed by bees	Insects	Bees	1	Geologist
Junior	2004	Eritrea	Murdered	Security	Security	1	Geologist/Field
Midsized	2005	Chile	Aircraft crash/hypothermia	Aircraft	Weather	6	Pilot/Geologist/Field
Junior	2008	Chile	Helicopter crash	Helicopter	Helicopter	1	Field
Major	2008	Papua New Guinea	Mudslide onto exploration camp	Weather	Weather	10	Geologist/Field/Other
Junior	2010	Republic of Congo	Aircraft crash en route to executive site visit of exploration project	Aircraft	Aircraft	11	Pilot/Geologist/Other
Junior	2010	United States	Driller helper's clothing caught in moving drill equipment	Drilling	Drilling	1	Driller

General Safety Guidelines for Mineral Exploration

Introduction

Safety is prevention of injury when exposed to danger. Most serious incidents are caused by failure to recognize a potentially dangerous situation and to take the necessary preventive measures. Promotion of safe working practices is the responsibility of all workers, management, and contractors in the mineral exploration industry. Employers and supervisors must provide information, instruction, supervision, and enforcement, when necessary, to protect employees' health and safety. It is also the responsibility of each and every employee to do their work in a safe manner and watch out for the safety of co-workers. It is in the best interests of all individuals to become as knowledgeable and self-reliant as possible regarding safety awareness.

Field supervisors, party chiefs, and crew chiefs should be thoroughly familiar with safe working procedures. Particular attention must be directed to workers entering the mineral exploration industry, specifically workers new to the labour force. It must neither be assumed that any hazard is obvious nor that any safety procedure is necessarily self-evident. Appropriate safety and first aid equipment and suitably trained personnel should be available at all worksites. Implementing onsite safety orientation followed by regular safety meetings and training in the safe use of equipment will lead to safe work practices.

Workplace and Workforce

There are few occupations which expose individuals to such a variety of hazards as mineral exploration. Several characteristics of Canadian mineral exploration are probably unique to the industry and affect safety considerations and monitoring. The workplace ranges from alpine to near desert and arctic to temperate environments. It is often located in remote areas, far from hospitals or other medical facilities. The unwary could succumb to any one of 20 or more potentially fatal hazards including falls in crevasses or on rough to precipitous ground, avalanches or falling rock, hypothermia, hyperthermia, asphyxiation, exposure, drowning, lightning strikes, tree falls, animal attacks, wasp stings, and especially a variety of transportation and travel-related causes including aircraft, vehicles, and boats. Mineral exploration is a global industry, and exploration outside Canada presents additional risks, some of which are covered in "Travel and Transportation" below.

The statistics include a large number of students and other temporary personnel with little previous wilderness experience who often work alone or in small isolated groups. However, recent fatalities include a number of experienced pilots, drillers, and geologists – demonstrating that experience can lead to an increased tolerance of risks associated with mineral exploration, particularly helicopter travel.

Incident Alerts

Travel and Transportation

The majority of fatalities in mineral exploration has resulted from travel and transportation related incidents, including traverses. Helicopters have resulted in 29 fatalities since 1980, and boat-related incidents have resulted in six fatalities, caused by hypothermia and drowning. Vehicle-related incidents (both automobile and ATV) are often life threatening and account for six fatal incidents.

Helicopter fatalities occur both in Canada and abroad. In 2008, one Canadian was killed in a helicopter crash during reconnaissance work on an exploration project in Chile. Additional risks occur in politically unstable countries; Colin Spence was shot and killed by ground fire while airborne in a helicopter in June 1996 in the Philippines.

All explorers have a responsibility not only for their own safety, but for that of their co-workers and those working under their supervision. In travel-related situations, would-be or actual passengers must be prepared to express

their concerns in support of aborting any travel by air, land or water, whether planned or in progress, for safety reasons with the expectation that their concerns will be given unbiased consideration by management.

Four falls into crevasses in the last 40 years by exploration personnel not adequately equipped or trained in glacier travel have resulted in four fatalities. By contrast, a well-equipped and trained mountaineering expedition into the Mount McKinley area in Alaska experienced 70 falls into crevasses without loss of life.

Helicopters

Helicopters were involved in four fatal incidents in Canada that killed seven people in 2008. Since 1980, 29 people have been killed in such incidents throughout Canada including 16 over a three-year period from 2006 to 2008. Two incidents without lost time were reported in 2009, down from 4 in 2008, 16 in 2007, and 4 in 2006.

For detailed safety guidelines, refer to the AME BC *Safety Guidelines for Western Canada*, and the Helicopter safety sticker. The guidelines and sticker are available online at www.amebc.ca/policy/health-and-safety/health-and-safety-resources.aspx; hard copies are available from the AME BC office.

A variety of publications including brochures, educational packages, posters, newsletters, and videos for helicopter safety is available from Transport Canada at <http://www.tc.gc.ca/eng/civilaviation/publications/tp4263-tp4263-4455.htm>.

Toe-in Pick-up Guidelines

Shortly after a fatality during a toe-in pick-up in July 2006, AME BC issued the following guidelines for toe-in pick-ups:

- Toe-in pick-ups carry a higher degree of risk and should be avoided if at all practical. In the past, especially towards the end of the field season, field crews sometimes became less energetic and as a consequence progressively less consideration is given in looking for flat spots for conventional landings. More and more they expect the pilot to pluck them off almost any slope, regardless of risk. Crews should get in the habit of finding the best possible pick-up spot on flat ground with good approaches throughout the field season.
- The pick-up locations must be approved by the pilot – by radio if you have one. If you are not in radio contact with the pilot and if the helicopter does not land, it is because he or she does not like your choice of pick-up point. The pilot will go and find a good landing spot and you will have to walk.
- Toe-in pick-ups should only be done with experienced crews that have built up a solid working relationship with the pilot. If the pilot expects to do toe-in pick-ups he or she will have talked about it in advance at the safety briefing as well as prior to embarkation and disembarkation. If the pilot doesn't mention any preferences regarding toe-in disciplines then you should ask.
- If there are two or more people expecting to be picked up at a toe-in site, it is important that they are in a cluster in such a position that they can be in eye contact with the pilot. Remember - **"See the pilot see you."** In most cases of toe-in pick-ups, the crew will be at right angles to the length of the machine and on the opposite side of the pilot. The pilot may prefer that all crew enter and exit on the opposite side from the pilot, to preserve weight balance.
- The crew will be crouched, hats removed, equipment stowed in pack and ready to move slowly and confidently one at a time into the machine with their packsacks when they get the nod from the pilot.
- Never walk upslope at a helicopter landing site – the reason is obvious. You should always be in a position to step up on the skid – never stepping down on the skid.
- A passenger who is present in the aircraft at a toe-in site can help those who are climbing aboard by arranging seat belts at readiness and lifting and stowing packsacks in the cabin.
- All movements around the helicopter should be done slowly and efficiently. Weight transfer onto a skid that is not grounded should not be sudden.

- Sometimes it may be necessary to move around to the other side of the machine to access a cargo door or get in at a door on the other side. This can be awkward and time consuming especially if the machine has an antenna at the front or the terrain is steep. Never duck under the tail boom – you will be well out of sight of the pilot and may get a hot exhaust blast if the machine is a 500D. Avoid going around to the other side of the helicopter if this is possible.
- **THE PILOT IS THE PERSON TO MAKE ALL DECISIONS WHEN IT COMES TO THE HELICOPTER AND ITS CAPABILITIES – NO EXCEPTIONS**

All-Terrain Vehicles (ATVs) and Utility Vehicles (UTVs)

All-terrain vehicles continue to be a perennial cause of lost workday incidents. There were 2 in 2009, down from 4 in 2008, 6 in 2007, and 4 in 2005. In contrast, there was only one in 2006. These 17 incidents accounted for 436 lost workdays. The most severe incident in 2009 was a rollover caused when the driver was retrieving a spotlight while driving. The resulting back injury caused four months of lost time. Also in 2009, a driller helper received a minor skeletal injury after losing control of an ATV, which resulted in two lost workdays. In 2008 was when a worker fell off an ATV and cracked a vertebra; the worker was subsequently in a cast for three months. Throughout 2009, there were 2 reported incidents without lost workdays. The following guidelines have been adapted from AME BC's *Safety Guidelines*.

- **Use four-wheeled ATVs only.** Three-wheeled ATVs have not been available in Canada and the USA for many years, but are often available in developing countries. Three-wheeled ATVs should not be used under any circumstances, as they have been responsible for many serious incidents.
- Vehicles with rollover protection are strongly recommended.
- Consider using utility vehicles such as Mules, Bobcat UTVs or Argos, as these are more stable, and carry more people and cargo than ATVs.
- If ATVs or UTVs are used in the field, we highly recommend taking a training program from Canada Safety Council certified instructors. For information, see <http://safety-council.org/training/>.
- Always make a pre-ride inspection before you start the engine.
- Do not ride fast on unfamiliar terrain or when visibility is limited. Never ride headlong past your limit of visibility. It is sometimes impossible to see obstructions, holes, and depressions. Always exercise caution.
- If carrying loads or towing a trailer, follow the manufacturer's rated vehicle capacity for loads and speeds.
- Most ATVs are designed to be ridden only by the operator. Their design does not permit carrying a passenger safely, as attested by the many injuries experienced by passengers.
- In particular, avoid the more obvious pitfalls, i.e. steep, rocky or irregular slopes, unsafe speeds, and exceeding your physical capability in righting an overturned ATV.
- Wear a government-certified crash helmet, scuff-resistant clothing, gloves, and goggles or face shields.
- Insure all ATVs. Check the insurance requirements in each province or territory - \$1,000,000 (minimum) in insurance is recommended.
- Ensure that all ATVs and personnel meet the current provincial or territorial legislation. British Columbia is the only jurisdiction in North America that does not license ATVs.
- No horse play or racing should be permitted – too many incidents have resulted.
- Loading and unloading ATVs from flatbed or pickup trucks can be hazardous. Make sure ramps provide good traction and are securely attached to the truck. ATVs may slide off when ramps are wet, muddy, or icy. Winch them on and off, if possible.
- Special hazards include the following:
 - Sprains or back injuries may occur when picking up a fallen ATV.
 - Burns may result from contact with exposed exhaust pipes.
 - Blind corners on narrow trails or roads may cause collisions with other vehicles or persons unless particular care is exercised – slow down!
 - Unless goggles are worn, overhanging branches may lead to serious eye injuries.
 - When crossing small streams, the depth of water and the type and condition of the banks and stream bed should be checked as they can cause spills.

- Be aware of the possibility of fallen trees across your trail.
- Be aware that ATV country is usually bear country – be bear aware.
- The ATV is a valuable aid to the prospector or geologist, and its limitations should be respected.

Slips and Falls

Slips and falls have caused over 40% of lost workday incidents reported in the AME BC and AME BC/PDAC safety reports. Two fatalities have occurred over the years, one from a fall on precipitous terrain and the other from a fall into a crevasse. Two other fatalities were directly related to vehicles: one to a fall from the back of a pick-up truck and another from crushing by an overturned ATV. Other fatalities not generally attributed to falls, but directly related, include falls into cold or fast-moving water from boats, which resulted in death from hypothermia and/or drowning. In 2008, slips and falls continued to be the leading cause of lost workday incidents.

The principal preventive strategies are:

- Development and implementation of a safety-awareness attitude with a constant effort to recognize and avoid potentially hazardous conditions.
- Adequate footwear with an emphasis on traction and support for most exploration work and hard-toe cover, as required.
- Special precaution in winter conditions, particularly on drill sites.

West Nile Virus and Sun Protection

Exploration personnel commonly work in environments where sunscreen and insect repellents have to be applied to avoid exposure to sunburn, skin cancer, and West Nile virus. In this type of environment, experienced workers generally wear long pants, long sleeved shirts, and a hat with a big floppy brim. This means that exposure to the sun and mosquito bites is limited to the neck and face and the backs of hands: lotion application is thus minimized.

Recent research (2007) has demonstrated that it is not advisable to apply insect repellent (DEET products) and sunscreen at the same time as, the repellent penetrates the skin in far greater amounts and the sunscreen loses some of its protective ability. High absorption of DEET by the body can lead to toxic effects leading to dizziness, rashes and headaches. If both sunscreen and repellent must be applied, it is recommended that the sunscreen be applied first and the repellent 30 minutes later. Use a product with 35% DEET or less.

Eye Injuries

Eye injuries seldom receive the attention they deserve – they are not fatal, and are not generally reported by the media. However, they are very serious in nature and are easily preventable. One company active in the United States noted that eye injuries and flushes were the most common injury on their drilling team, attributable to improper use of personal protection equipment, mainly using glasses instead of goggles.

The year 2008 was the worst year for eye injuries in the history of the national survey. A heavy duty mechanic rubbed grease and a metal sliver into an eye, resulting in 16 lost workdays. A twig scratched the cornea of a snowmobile operator who was not wearing eye protection. Both these incidents could have been averted by wearing the proper equipment. In 2009, there were five incidents without lost time; all could have been prevented by wearing proper eye protection.

The following are guidelines from AME BC's *Safety Guidelines*. The guidelines can be summarized as, "Always wear the appropriate personal protective equipment."

- Wear safety glasses at all times while breaking or hammering rock, core splitting, blasting, using a chainsaw, or when visiting mining operations.
- Wear goggles or a face shield attached to a hard hat when hooking up helicopter sling loads.
- Wear safety glasses with wide shields or goggles when handling chemicals (e.g. battery acid) or corrosive materials (e.g. grout), boosting batteries, or using ultraviolet lamps for extended periods.
- Wear high quality polarizing sunglasses when working at high altitude, or on glaciers, snowfields, and water.

Animals

Bears

On the first day of the field season in 2006, a worker in Yukon was mauled and killed by a grizzly bear as he passed within five metres of two bear cubs. Bears also killed mineral exploration workers in 1987 and 2005.

The principal preventive remedies and recommended procedures in the event of encounters with bears include the following:

- Avoid encounters by awareness of areas where bears are present in large numbers.
- Conceal food odours at camps and incinerate garbage.
- Make noise while traversing (use cans of rocks, air horns, etc.).
- Be alert for bear signs.
- Be prepared for an encounter by taking training courses and reading relevant literature.
- Carry bear bangers or a canister of the bear repellent Counter Assault or an equivalent bear spray in a readily accessible location. (See **CAUTIONARY NOTE** below.)
- Have a firearm available at camp and knowledge where to shoot to kill or disable a bear in the event of an emergency. Experience in the safe use of firearms is essential. Note that in Canada, only people who hold a PAL (Possession and Acquisition Licence) or POL (Possession Only Licence) can carry firearms.
- If an attack is unavoidable, be prepared to follow the recommended procedure to survive mauling. This may involve fighting off an aggressive predatory bear with anything at hand.

The use of bear spray is recommended in the event of an attack by a bear. In both 1993 and 1994, two individuals credited the use of bear spray in saving their lives, one of them being seriously injured during the encounter. Employees must practice with bear spray at the beginning of each season and be conscious of wind direction and the optimum distance for spray use. Also recommended is Gary Shelton's *Bear Encounter Survival Guide*, available in bookstores. Mr. Shelton also advocates the use of a firearm, which federal and provincial government agencies actively discourage field employees from carrying.

Further procedures are included in AME BC's *Safety Guidelines*. Two highly recommended videos entitled "Staying Safe in Bear Country" and "Working in Bear Country" were produced by Magic Lantern and are available through <http://www.macecanada.com/canada/video1.htm> or www.yukonbooks.com. The government of Yukon bear safety website at <http://www.environmentyukon.gov.yk.ca/camping/bearsafety.php> and the University of Alberta Earth & Atmospheric Sciences bear safety website at <http://safety.eas.ualberta.ca/node/13> are also excellent sources of information.

CAUTIONARY NOTE: BEAR BANGERS MAY BE DEFECTIVE

Bear bangers, which are devices used to scare away bears, may explode prematurely during use, causing injury to the operator. These are small explosive cartridges which are screwed to the end of a pencil-sized launcher and activated by a trigger. Once activated, the bear banger is launched about 40 metres by a propellant, at which point the main explosive charge explodes with a loud noise.

Failed bear bangers have exploded within several feet of the launch tube, temporarily deafening the operator and presenting dangers of burns and shrapnel.

The bear banger is normally white coloured, sold in packages of six stored inside a clear plastic pouch, and has a shelf life of about two years. **All** of the devices that failed during use and testing had a **grey discolouration**, probably caused by the propellant leaking from within the cartridge. Any bear bangers showing evidence of discolouration should be safely discarded and replaced with new devices in a sealed package. The devices that failed were only one and a half years old, so it is important to inspect and test-fire all bear bangers.

It is also important to check the compatibility of cartridge and firing mechanism. A rim-firing cartridge will not be fired by a centre firing mechanism or vice versa. Always test fire in a safe place before use.

Please note that bear bangers are considered dangerous goods, and are subject to Transport Canada regulations. See <http://www.tc.gc.ca/CivilAviation/commerce/DangerousGoods/news/notices/15.htm>.

Wolves

In November 2005, a geological engineering student at the University of Waterloo was killed by wolves while walking near a remote exploration camp at Points North Landing near Wollaston Lake, Saskatchewan. A coroner's inquest in 2007 confirmed that this was the first documented case of a fatal wolf attack in North America.

Like other animals, wolves are attracted to garbage. It is recommended that camps incinerate garbage daily and remove the remains to a legal dump or bury them in a suitable pit that, when full, is at least one metre deep, and is allowed in the land use permit. The British Columbia Ministry of Environment recommends the following measures if a wolf is encountered (available at www.env.gov.bc.ca/bcparks/explore/misc/wolves/wolfsaf.html):

- Do not allow the wolf to approach any closer than 100 metres.
- Raise your arms and wave them in the air to make yourself appear larger.
- When in a group, act in unison to send a clear message to the wolves they are not welcome.
- Back away slowly. Do not turn your back on the wolf.
- Make noise. Throw sticks, rocks, and sand at the wolf.

Wasps

A geologist died suddenly in 1991 from a massive allergic reaction (anaphylactic shock) following a single wasp sting in a remote area. It is possible that the fatality could have been avoided had epinephrine been available for an immediate emergency injection. Other potentially fatal allergic reactions, some of which are extremely rare, can be caused by drugs (penicillin, codeine, aspirin, sulpha antibiotics, etc.), certain foods and plants, or other insect bites.

The principal preventive measure is an awareness of possible susceptibility to specific allergic reactions and the immediate availability of epinephrine (usually available as an auto-injector such as an EpiPen). Concerned individuals should consult a physician to determine whether they are allergic to epinephrine or other antihistamines. People with auto-injectors should carry them at all times and make sure that they have not expired. If they have a very serious allergy, they should carry more than one EpiPen, as one dose may not be sufficient. An EpiPen should also be included in first aid and survival kits. Co-workers should be instructed how to use the EpiPen in case the victim is unable to do so.

Resources

Safety Guidelines and Manuals

A comprehensive source of safety information for mineral exploration is AME BC's *Safety Guidelines for Mineral Exploration in Western Canada*. Although the booklet has a western Canadian focus, it is generally applicable throughout Canada, and copies of the manual have been provided to companies operating in the USA and Latin America. A fourth edition of *Safety Guidelines* was released in 2006, and over 26,000 copies have been distributed over the past 28 years. The guidelines are available online at <http://www.amebc.ca/policy/health-and-safety/safety-guidelines/safety-mineral-exploration-western-canada.aspx> and from the AME BC office. AME BC members are entitled to one free copy. Additional copies can be purchased at a cost of \$5.00 each (plus shipping and GST).

More detailed information is available in the new e3 Plus Health & Safety in Exploration Toolkit developed by the Health & Safety Committee of the PDAC. This toolkit is available online at www.pdac.ca/e3plus. A pocket guidelines book is also under development.

Safety Checklists, Stickers, and Cards

AME BC has prepared safety checklists, stickers, and cards to assist in preparedness in the field. A general safety checklist, survival kit checklists, and procedures in the event of a serious incident or fatality are on pages 180 to 182 and 184 of the *Safety Guidelines*. Waterproof stickers covering transportation safety, field work and traversing safety, communication, helicopter safety, and environmental considerations for drilling are available from the AME BC office or in Adobe Acrobat .pdf format at <http://www.amebc.ca/policy/health-and-safety/health-and-safety-resources.aspx>.

Workshops & Courses

Introduction to Exploration Safety Workshop

The AME BC Health & Safety Committee holds an annual Introduction to Exploration Safety Workshop in Vancouver. The workshops have been held since 1984, and annually since 2004. Topics covered have included the following:

- | | |
|-----------------------|---|
| Presentations: | <ul style="list-style-type: none"> - Introduction, Background, Statistics - Health & Safety Regulatory Environment - Mountain & Glacier Travel - Aircraft Safety - Driving and Vehicle Safety - Bear Hazard Safety - Emergency Response - Hypothermia |
| Interactive Sessions: | <ul style="list-style-type: none"> - First Aid Equipment - Traversing Equipment |

The next Introduction to Exploration Safety Workshop is scheduled for Saturday, March 26, 2011, at the Segal Graduate School of Business at Simon Fraser University, 500 Granville Street, Vancouver. Visit www.amebc.ca to register. AME BC is also developing an Exploration Safety for Project Managers workshop.

First Aid Training

All personnel involved in mineral exploration should have current First Aid training that is applicable to their work. This usually includes Level 1 or Standard First Aid and a transportation endorsement. In general, first aid training within a crew or camp must meet, and should exceed, local Workers Compensation Board requirements.

Highly recommended for all exploration personnel is a course on Wilderness First Aid designed to provide participants with the confidence and knowledge required to deal with basic emergencies in wilderness settings.

Wilderness First Aid Training

The PDAC Health & Safety Committee and the Ontario Prospectors Association jointly organize courses in wilderness first aid. A certification validated for three years, recognized and sanctioned by federal and provincial government regulations, the American Academy of Emergency Physicians, the American Academy of Orthopaedic Surgeons, and the Wilderness Medical Society is provided after the course completion. The next course is tentatively scheduled for April 2011. Please contact Bernarda Elizalde at 416.362.1969 ext 289 or belizalde@pdac.ca for further information; the course can be offered in locations throughout Canada depending on demand.

In Vancouver, a 40-hour course is offered by Wilderness Alert (1.800.298.9919; www.wildernessalert.com).

For courses on Occupational Health & Safety, please consult the following websites:

- Mines and Aggregates Safety and Health Association – www.masha.on.ca/links.aspx
- Canadian Centre for Occupational Health and Safety – www.ccohs.ca
- CanOSH – www.canoshweb.org/Training/training.html
- websites of local postsecondary institutions

Information on additional resources is welcome; please contact AME BC or the PDAC.

Basic Emergency Response Plan Guidelines for British Columbia

AME BC has worked with the British Columbia government to develop a set of *Basic Emergency Response Guidelines*. The guidelines were released in May 2007. Please note that these guidelines are designed to complement the standards of the *Health, Safety and Reclamation Code for Mines in British Columbia* (HSRC). The guidelines are not exhaustive and may require adaptation for use in other jurisdictions.

Introduction:

In developing an Emergency Response Plan for your operation in accordance with the *Health, Safety and Reclamation Code for Mines in British Columbia* some basic factors must be considered. This guide, although not all-inclusive, is designed to assist the Mine Manager or person in charge of the exploration site in developing a workable plan for an operation. Although operations may be similar, each operation is unique, and may have a different plan in place to accommodate the site, the type of operation, the personnel, the level of training available, transportation, climate, and equipment available on site.

The plan once completed must be filed with the Chief Inspector as per the HSRC.

Components of the Plan:

I: Mine/Operation Information:

The following list identifies basic information that should be in the plan as it applies to a mining operation:

Note: A Mine is a place as defined under the Mines Act [RSBC 1996] Chapter 293. Sites where mechanical disturbance of ground and/or exploration drilling occur and any place defined as a mine by the Chief Inspector are included in this definition.

- Name of the Mine and the company with a mailing address and contact telephone numbers; (fax and e-mail if applicable)
- Name of the Mine Manager as appointed under the Mines Act
- Mine number and permit number
- Type of operation, i.e. underground, surface, quarry, exploration, sand and gravel, placer
- Location of the property (UTM or Latitude/Longitude)
- Number of employees on site, including management and contractors
- Accurate mine plans showing and identifying areas should be maintained on site and made available to responding teams, personnel, or agencies.

II: Hazard Analysis of Operation:

This section should identify all potential emergencies that could occur on the site. These emergencies may be broadly broken into five basic types. Each operation may choose to include more detail; others may break the five types into fewer or more than five types.

1. Fire/Explosion
2. Injury to workers
3. Environmental
4. Climate
5. Equipment failure

III: Emergency Equipment

In this section, list the emergency equipment available on site to deal with identified potential emergencies/hazard. Also include other sources of equipment that may be necessary. Some examples are:

- Fire pumps and extinguishers
- First Aid supplies

- Forest fire fighting supplies
- Rescue equipment (e.g. stretcher that can be fitted in helicopter or vehicle)
- Equipment that can be assigned to an emergency task (e.g. a dozer or excavator used to build roads and trails can be pressed into service to dam or dyke a flood).
- Industrial ambulance or emergency transport vehicle.
- Outside sources of specific equipment

IV: Trained Personnel

In this section, list the availability on site of trained personnel capable of dealing with the identified potential emergencies/hazards.

- Contact information for on site First Aid
- Identify other sources of trained personnel (i.e. back-up teams, other agencies such as local fire department, local search and rescue, and provincial ambulance)

V: Implementation of the Plan and Incident Command

Clearly define how persons involved in an emergency are to access and implement the plan: (*Preplan basic response guidelines based on hazard assessment*)

- First steps, including who to call and how to call, and when to call
- Identify who will be responsible for implementing the emergency plan.
- Identify who will be in charge of conducting the emergency operation.
- Define all communication systems to be used (i.e. two-way radio, cell phone, satellite phone).
- Assign tasks by function and how the function will be filled. Examples include:
 - call-outs and communication with other access road users including logging companies
 - arranging assistance from other agencies or operations
 - required notification (e.g. Mines Inspectors (Health and Safety), Provincial Emergency Plan personnel, etc.)
- Include an Emergency Notification and Mobilization Chart.

VI: Directions to Site:

Provide clear written directions to the site; include maps that can be used for navigation. This is particularly important in remote areas. If using a radio controlled logging road, include radio frequencies and call-out procedures.

For exploration sites, marshalling points should be established. Coordinates of such points should be provided, and helicopter landings areas should be identified or established

- Clearly define how these directions will be communicated to those who may not be familiar with the area or roads and are called in to assist.
- Identify who has been given copies of the directions in advance.
- On long road transport of injured workers, identify and mark on the map possible transfer sites for Provincial Ambulance.

VII: Contact Lists:

Set a stand alone page with all contact information for all agencies listed, in addition to Company contacts. The following is not all-inclusive.

- Mine Manager
- Corporate Head Office
- First Aid, phone, or radio channel
- Emergency personnel
- Outside agencies (Federal, Provincial, or Local Government contacts)
- Equipment suppliers
- Transport companies, including air service (float plane or helicopter)
- Back-up rescue team if applicable

VIII: Training

Include a provision for training all persons on site in the application of the plan.

IX: Records:

Supplementary to the plan are all the records associated with it. Therefore, the following records should be maintained on site.

- Training
- Equipment checks
- Implementation if applicable.
- Incident debriefing if applicable.

Conclusion:

This guide is not all inclusive, and must be adapted to each site according to the risk assessment. It is imperative that the Mine Manager update the plan as may be required, from time to time due to changes in personnel, equipment, mine plan changes, or locations. It is also good practice to test the emergency preparedness plan with all affected persons. In some cases, evacuation drills are required, and **if the site requires the evacuation drill, the evacuation procedure must be posted and communicated to all affected personnel.**

References:

Mines Act. http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96293_01

Health, Safety and Reclamation Code for Mines in British Columbia. *[Revised in 2008]*.
<http://www.empr.gov.bc.ca/Mining/HealthandSafety/Pages/HSRC.aspx>

Canadian Mineral Exploration Health & Safety Awards

The Canadian Mineral Exploration Health & Safety Awards trace their roots to 1983 when the BC & Yukon Chamber of Mines (now AME BC) first recognized the commitment of mineral exploration companies active in British Columbia and Yukon to health and safety. The awards program was expanded nationwide for the year 2005 in cooperation with PDAC.

David Barr Award

In 2005, the AME BC Health & Safety Committee initiated the **David Barr Award in recognition of Excellence in Leadership and Innovation in Mineral Exploration Health and Safety**.

Imperial Metals Corporation was the first recipient in 2006. Imperial Metals had also reported the largest number of lost workday incident free hours in British Columbia in 2005, and had previously won two Five-Year Safety Awards in 1992 and 2002.

Ian Paterson, Chair of the AME BC Health & Safety Committee from 2003 to 2007, received the award in 2007. As an exploration geologist with Cominco, Ian had a reputation as a leader in embracing health and safety awareness and procedures. From 2003 to 2007, while he was Chair of the AME BC Health & Safety Committee, the profile of Health & Safety in the mineral exploration sector in British Columbia increased dramatically through initiatives such as annual safety workshops and the fourth edition of *Safety Guidelines for Mineral Exploration in Western Canada*.

Bill Mercer, Chair of the PDAC Health & Safety Committee from 2006 to the present, received the award in 2008. As Chair of the Health & Safety Committee of the Prospectors & Developers Association of Canada (PDAC), Bill has drawn on over 30 years of experience in Canada and abroad, including his current role as Vice President of Exploration at Avalon Ventures Ltd., and previous ones as Chief Geologist for Noranda-Falconbridge and President of the PDAC. Working closely with the Health & Safety Committee of AME BC, he expanded the regional safety survey and report of mineral exploration in western Canada to a national level and spearheaded the development of the e3 plus Health & Safety Toolkit.

Doug Flynn, Senior Mines Inspector for the Northwest region of British Columbia, was the 2009 recipient of the award. He was commended for his leadership and tireless commitment as Senior Mines Inspector for the Northwest region of British Columbia. Doug has developed strong partnerships between industry and government to work together, find solutions, and ensure everyone has a safe day, every day.

Safe Day Everyday Gold Award

The 2009 recipient of the **Safe Day Everyday Gold Award** (formerly the Annual Safety Award) for the highest number of hours worked without a lost workday incident is FNX Mining Company Inc. for attaining 99,792 hours without a lost workday incident. FNX Mining Company Inc., since merged into Quadra FNX Mining Ltd., was previously the recipient in 2005, the first year the award was extended nationwide.

Runners up included the Exploration Division of De Beers Canada Inc., which recorded 16,229 days without a lost workday incident, SLAM Exploration Ltd. at 13,930 days, and VMS Ventures Inc. at 13,680 days.

The Exploration Division of De Beers Canada Inc. received the award in 2006 and 2007, and Northgate Minerals Corporation received the award in 2008.

Safe Day Everyday Award

The **Safe Day Everyday Award** (formerly the Exploration Safety Award) is presented to 98 companies for operating throughout 2009 without a lost workday, compared to 72 companies in 2008, 65 companies in 2007, 61 in 2006, and 71 in 2005. The number of repeat recipients, went up from 27 in 2007/2008 to 33 in 2009 (there were 17 in 2006). There are 16 three-year plus recipients, 9 four-year plus recipients, and 2 five-year recipients: Bootleg Exploration Inc. and Vismand Exploration Inc.

Advanced Explorations Inc.
 Altius Resources Inc. (2)
 Amarc Resources Ltd. (4)
 Anglo American Exploration (Canada) Ltd.
 Astral Mining Corporation (2)
 Baffinland Iron Mines Corporation
 Barrick Gold Corporation (2)
 BCGold Corp. (2)
 Bell Copper Corporation (3)
 Bitterroot Resources Ltd. (2)
 Bootleg Exploration Inc.
 Bralorne Gold Mines Ltd.
 Bureau de l'Exploration géologique du Québec
 Burton Consulting Inc.
 Bushmaster Exploration Ltd.
 Canadian Zinc Corporation
 CanAlaska Uranium Ltd
 Capstone Mining Corp.
 Cariboo Rose Resources Ltd.
 Castle Resources
 Cayenne Gold Mines Ltd.
 Christopher James Gold Corp (2)
 Columbia Yukon Explorations Inc. (4)
 Commander Resources Ltd.
 Dajin Resources Corp (3)
 De Beers Canada Inc. - Exploration Division (4)
 Delta Uranium Inc. (2)
 Durfeld Geological Management Ltd.
 Eagle Hill Exploration Corporation
 Eastfield Resources Ltd.
 Equity Exploration Consultants Ltd.
 Excalibur Resources Ltd.
 FB Drilling
 Fjordland Exploration Inc. (3)
 Fladgate Exploration Consulting Corporation (2)
 FNX Mining Company Inc. (+)
 Fronteer Gold
 Geodex Minerals Ltd.
 Geological Services Division, Mineral Resources Branch, Nova Scotia Department of Natural Resources (3)
 Geological Survey, BC Ministry of Energy, Mines and Petroleum Resources (4)
 Goldcorp
 Golden Goose Resources
 Gossan Resources Limited (3)
 Halo Resources Ltd.
 Hard Creek Nickel Corporation
 Hawthorne Gold Corp. (2)
 IAMGOLD Corporation
 Kiska Metals Corporation (2*)
 Kodiak Exploration Limited
 Kria Resources Ltd.
 Lakehead Helicopters Inc.
 Laurion Mineral Exploration Inc.
 MacDonald Mines Exploration Ltd.
 Manitoba Geological Survey

Mann, William, P.Geo.
 Mega Precious Metals Inc.
 Mega Uranium Ltd.
 Messina Minerals Inc
 Metalex Ventures Limited
 New Millennium Capital Corp. (3)
 Northern Abitibi Mining Corp
 Northern Tiger Resources Inc
 Northgate Minerals Corporation (4)
 Nuna Group of Companies
 Ontario Geological Survey (2)
 Pacific Bay Minerals Ltd.
 Pacific Geological Services
 Pacific Ridge Exploration Ltd.
 Pitchstone Exploration Ltd. (2)
 Pro Minerals Inc.
 Probe Mines Limited
 Pure Nickel Inc. (2)
 Purepoint Uranium Group Inc.
 Queenston Mining Inc.
 Rainy River Resources Ltd.
 Rambler Metals & Mining Canada Ltd. (3)
 Richfield Ventures Corp.
 Richmond Minerals Inc.
 Sabina Gold & Silver Corp.
 Selwyn Resources Ltd. (2)
 Serengeti Resources Inc.
 SLAM Exploration Ltd
 Sultan Minerals Inc
 Teck Resources Ltd. (2)
 Terrane Metals Corp. (#)
 TerraNotes Ltd.
 Threegold Resources Inc.
 Titan Uranium Inc.
 Treasury Metals Inc.
 Tri Origin Exploration Ltd. (4)
 TTM Resources Inc. (2)
 Vancouver Island Exploration Inc.
 Vismand Exploration Inc. (5)
 Votorantim Metals Canada Inc.
 Wallbridge Mining Company Limited
 Watts, Griffis and McQuat Limited (4)
 Wildcat Exploration Ltd
 Yukon Zinc Corporation

(2) represents 2 years without a lost workday incident.

(2*) represents 2008 lost-time free record of Rimfire Minerals Corporation (lost-time free since inaugural national survey in 2005; and Geoinformatics Exploration Inc., which merged in 2009).

(3) represents 3 years without a lost workday incident.

(4) represents 4 years without a lost workday incident.

(5) represents 5 years without a lost workday incident.

(+) Safe Day Everyday Gold Award recipient; now combined into Quadra FNX Mining Ltd.

(#) now combined into Thompson Creek Metals Company Inc.

Appendix: Canadian Mineral Exploration Health & Safety Survey 2009 Participants

We thank companies who reported on their safety programs either through the online or paper questionnaire and/or through a telephone survey. Companies who also reported on their safety performance are listed on pages 6 and 7.

Abacus Mining & Exploration Corp	Cayenne Gold Mines Ltd.	Fladgate Exploration Consulting Corporation
Abitibi Mining Corp	Centerra Gold Inc	FNX Mining Company Inc.
Advanced Explorations Inc.	Central Resources Corp	Formation Metals Inc
Agnico-Eagle Mines Ltd	Chalice Diamond Corp	Forum Uranium Corp
Alexandria Minerals Corp	Champion Bear Resources Ltd	Fronteer Gold
Alexis Minerals Corp	Christopher James Gold Corp	Geodex Minerals Ltd.
Allana Resources Inc	Claude Resources Inc	Geological Services Division, Mineral Resources Branch, Nova Scotia
Almaden Minerals Ltd	Clifton Star Resources Inc	Department of Natural Resources
Altair Ventures Inc	Cloudbreak Resources Ltd	Geological Survey, BC Ministry of Energy, Mines and Petroleum Resources
Altius Resources Inc.	CMC Metals Ltd	GGL Resources Corp
Amador Gold Corp	Cogitore Resources Inc	Ginguro Exploration Inc
Amarc Resources Ltd.	Columbia Yukon Explorations Inc.	Globex Mining Enterprises Inc
American Creek Resources Ltd	Columbus Gold Corp	GMV Minerals Inc
American Manganese Inc	Columbus Silver Corp	Gold Reach Resources Ltd
Anglo American Exploration (Canada) Ltd.	Commander Resources Ltd.	Goldbrook Ventures Inc
Apella Resources Inc	Concopper Enterprises Inc	Goldcorp
AREVA Resources Canada Inc.	Conquest Resources Ltd	Golden Goose Resources
Astral Mining Corporation	Consolidated Abaddon Resources Inc	Golden Predator Royalty & Development Corp
Aurion Resources Ltd	Constantine Metal Resources Inc	Goldrea Resources Corp
Avalon Rare Metals Inc.	Conway Resources Inc	Goldsource Mines Inc
Baffinland Iron Mines Corporation	Copper Mountain Mining Corp	Gossan Resources Limited
Bard Ventures Ltd	Copper Reef Mining Corp	Greencastle Resources Ltd
Barker Minerals Ltd	Cornerstone Resources Inc.	Halo Resources Ltd.
Barrick Gold Corporation	Cougar Minerals Corp	Hard Creek Nickel Corporation
Bayfield Ventures Corp	Cream Minerals Ltd	Hathor Exploration
Bayswater Uranium Corp	Creston Moly Corp	Hawk Uranium Inc
BCGold Corp.	Crowflight Minerals Inc	Hawthorne Gold Corp.
Bear Lake Gold Ltd	Cypress Development Corp	Highvale Mine
Bell Copper Corporation	D'Arianne Resources Inc	Hinterland Metals Inc
Benton Resources Corp	Dajin Resources Corp	Houston Lake Mining Inc
BHP Billiton	De Beers Canada Inc. - Exploration Division	Hy-Tech Drilling
Bison Gold Exploration Inc	Delta Uranium Inc.	IAMGOLD Corporation
Bitterroot Resources Ltd.	Dentonia Resources Ltd	Imperial Metals Corporation
Black Panther Mining Corp	Detour Gold Corp.	Indicator Minerals Inc
Blue Note Mining Inc	Diamond Frank Exploration Inc	Inmet Mining Corp
Bootleg Exploration Inc.	Dianor Resources Inc	Inspiration Mining Corp
Bralorne Gold Mines Ltd.	Diavik Diamond Mines Inc	International Barytex Resources Ltd
Breakwater Resources Ltd	Ditem Explorations Inc	International Bethlehem Mining Corp
Brett Resources Inc	Donner Metals Ltd	International Enxco Ltd
Brigadier Gold Ltd	Dumont Nickel Inc	Iron Ore Company of Canada
Britannica Resources Corp	Duran Ventures Inc	JNR Resources Inc
Bureau de l'Exploration géologique du Québec	Durfeld Geological Management Ltd.	Jourdan Resources Inc
Burton Consulting Inc.	Eagle Hill Exploration Corporation	Kalahari Resources Inc
Bushmaster Exploration Ltd.	Eastfield Resources Ltd.	Kalimantan Gold Corp Ltd
Callinan Mines Ltd	Empire Mining Corp	Kirkland Lake Gold Inc
Cameco Corp	Encore Renaissance Resources Corp	Kiska Metals Corporation
Canada Zinc Metals Corp	Energizer Resources Inc	Klondike Gold Corp
Canadian International Minerals Inc	Equinox Minerals Ltd	Klondike Silver Corp
Canadian Orebodies Inc	Equity Exploration Consultants Ltd.	Knight Resources Ltd
Canadian Zinc Corporation	Erdene Resource Development Corp	Kodiak Exploration Limited
CanAlaska Uranium Ltd	Evolving Gold Corp	Kootenay Gold Inc
Canstar Resources Inc	Excalibur Resources Ltd	Kria Resources Ltd.
Capstone Mining Corp.	Excalibur Resources Ltd.	Lakehead Helicopters Inc.
Cariboo Rose Resources Ltd.	FB Drilling	Lateegra Gold Corp
Cartier Resources Inc	First Point Minerals Corp	
Castle Resources	Fission Energy Corp	
	Fjordland Exploration Inc.	

Laurentian Goldfields Ltd	Pacific Wildcat Resources Corp	Starfire Minerals Inc
Laurion Mineral Exploration Inc.	Panorama Resources Ltd	Stellar Pacific Ventures Inc
Legion Resources Corp	Peat Resources Ltd	Stikine Gold Corp
Linux Gold Corp	Peregrine Diamonds Ltd	Strike Minerals Inc
Lions Gate Energy Inc	Pitchstone Exploration Ltd.	Sultan Minerals Inc
Lions Gate Metals Inc	Platinex Inc	Swift Resources Inc
Logan Resources Ltd	Platoro West Holdings Inc	Talmora Diamond Inc
MacDonald Mines Exploration Ltd.	PolyMet Mining Corp	Tarsis Capital Corp
MacMillan Gold Corp	PotashCorp	Tearlach Resources Ltd
MAG Silver Corp	Prize Mining Corp	Teck Resources Ltd.
MagIndustries Corp	Pro Minerals Inc.	Terra Ventures Inc
Manicouagan Minerals Inc	Probe Mines Limited	Terrane Metals Corp.
Manitoba Geological Survey	Puget Ventures Inc	TerraNotes Ltd.
Mann, William, P.Geo.	Pure Nickel Inc.	Teuton Resources Corp
Marathon PGM Corp	Purepoint Uranium Group Inc.	Threegold Resources Inc.
Matamec Exploration Inc	Queenston Mining Inc.	Thundermin Resources Inc
Maximus Ventures Ltd	Rainy Mountain Royalty Corp	TintinaGold Resources Inc
Mega Precious Metals Inc.	Rainy River Resources Ltd	Titan Uranium Inc.
Mega Uranium Ltd.	Rambler Metals & Mining Canada Ltd.	Total E&P Canada Ltd
MegaMoly Inc	Red Rock Energy Inc	Trade Winds Ventures Inc
Melkior Resources Inc	Redstar Gold Corp	Treasury Metals Inc.
Merrex Gold Inc	Regency Gold Corp	Tres-Or Resources Ltd
Messina Minerals Inc	Remington Resources Inc	Tri Origin Exploration Ltd.
Metalex Ventures Limited	Resolve Ventures Inc	Troymet Exploration Corp
Metanor Resources Inc	Richfield Ventures Corp.	TTM Resources Inc.
Mineral Mines Group	Richmond Minerals Inc.	Tyhee Development Corp
Molycor Gold Corp	Roca Mines Inc	Typhoon Exploration Inc
Moneta Porcupine Mines Inc	Rocktech Resources Inc	Ucore Uranium Inc
MPH Ventures Corp	Romios Gold Resources Inc	UEX Corp
Murgor Resources Inc	Royal Roads Corp	Underworld Resources Inc
Mustang Minerals Corp	Rubicon Minerals Corp	Union Gold Inc
Nanika Resources Inc	Ruby Red Resources Inc	Uranium North Resources Corp
Navasota Resources Ltd	Sabina Gold & Silver Corp.	URSA Major Minerals Inc
New Millennium Capital Corp.	Sable Resources Ltd	Vale Inco
New Oropu Resources Inc	Sage Gold Inc	ValGold Resources Ltd
New Shoshoni Ventures Ltd	Sanatana Diamonds Inc	Valley High Ventures Ltd
Newfoundland and Labrador Geological Survey	Scorpio Mining Corp	Vancouver Island Exploration Inc.
	Seabridge Gold Inc	Vault Minerals Inc
	Sedex Mining Corp	Victoria Gold Corp
	Selwyn Resources Ltd.	Victory Nickel Inc
	SEMAFO Inc	Victory Resources Corp
	Serengeti Resources Inc.	Vior Mining Exploration Co Inc
	Sherritt Coal - Paintearth Mine	Virginia Mines Inc.
	Shore Gold Inc	Vismand Exploration Inc.
	Shoreham Resources Ltd	Votorantim Metals Canada Inc.
	Silver Quest Resources Ltd	Vulcan Minerals Inc
	Silver Standard Resources Inc	Wallbridge Mining Co Ltd
	SilverCrest Mines Inc	Wallbridge Mining Company Limited
	Sirios Resources Inc	Watts, Griffis and McQuat Limited
	Skybridge Development Corp	Wesdome Gold Mines Ltd
	Skyharbour Resources Ltd	Western Canadian Coal Corp
	Skyline Gold Corp	Western Copper Corporation
	SLAM Exploration Ltd	Western Troy Capital Resources Inc
	Snowfield Development Corp	White Pine Resources Inc
	Spanish Mountain Gold Ltd	White Tiger Mining Corp
	Sparton Resources Inc	Wildcat Exploration Ltd
	Spider Resources Inc	Windarra Minerals Ltd
	Sprott Resource Corp	Yankee Hat Minerals Ltd
	Spruce Ridge Resources Ltd	Yukon Zinc Corporation
	St Andrew Goldfields Ltd	Zinccorp Resources Inc
	St. Elias Mines Ltd	
	Starfield Resources Inc	



Canadian Mineral Exploration Health & Safety Survey 2010

In completing this form please note the following:

- The form should be completed by junior companies, major companies, government geological surveys, diamond drilling contractors, geophysical contractors, and any other companies or contractors carrying out exploration related activities in Canada.
- We ask companies to submit in the spaces below a close estimate of the number of person days worked in 2010 by company employees and contractors for the following:

- Surface exploration and geological field work** which includes line-cutting, geophysical, geochemical, trenching, etc.
- Surface drilling**
- Underground exploration** including underground drilling, mining, and geological work

Please include the names of contractors so that we do not duplicate information. These names will not be published.

- Complete all the required fields; (*) indicates required fields.
- If you have any questions about the form please contact Jonathan Buchanan at 604-630-3923 or jbuchanan@amebc.ca.
- All information will be kept confidential, and Personal Information Protection and Electronic Documents Act mandates will be maintained.

Name of Person & Company Responsible for Safety **(*Required Fields)**

*Name:			
*Title:			
*Company Name:			
E-mail:			
<u>Address Information</u>			
Phone:			
*Street Address:			
Street Address 2:			
*City:			
*Province/Territory:		Postal Code:	
*Does your organization have a Health and Safety Program: Yes___ No___ *Does your organization discuss safety at staff meetings or hold safety meetings? Yes___ No___ *Do you discuss recent near misses at staff meetings? Yes___ No___			
*Reporting Period:	2010		

Please complete and return by fax **by May 20, 2011**, to Jonathan Buchanan, AME BC at 604-681-2363 or by mail to AME BC, Suite 800, 889 West Pender Street, Vancouver BC V6C 3B2

Company:											
Names of Contractors:											
Provide total Person – Days worked (e.g. number of employees multiplied by number of days worked) in each province or territory for both employees and contractors											
Worksite Location 1:	Prov./Terr. _____	Days worked: a) Surface exploration and geological work: _____ b) Surface drilling: _____ c) Underground exploration: _____ Length of workday in hours (e.g. 8, 10, 12): _____	PERSON DAYS WORKED <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">EMPLOYEES</th> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">CONTRACTORS</th> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> </table>	EMPLOYEES	CONTRACTORS						
EMPLOYEES	CONTRACTORS										
Worksite Location 2:	Prov./Terr. _____	Days worked: a) Surface exploration and geological work: _____ b) Surface drilling: _____ c) Underground exploration: _____ Length of workday in hours (e.g. 8, 10, 12): _____	PERSON DAYS WORKED <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">EMPLOYEES</th> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">CONTRACTORS</th> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> </table>	EMPLOYEES	CONTRACTORS						
EMPLOYEES	CONTRACTORS										
Worksite Location 3:	Prov./Terr. _____	Days worked: a) Surface exploration and geological work: _____ b) Surface drilling: _____ c) Underground exploration: _____ Length of workday in hours (e.g. 8, 10, 12): _____	PERSON DAYS WORKED <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">EMPLOYEES</th> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">CONTRACTORS</th> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> </table>	EMPLOYEES	CONTRACTORS						
EMPLOYEES	CONTRACTORS										
Worksite Location 4:	Prov./Terr. _____	Days worked: a) Surface exploration and geological work: _____ b) Surface drilling: _____ c) Underground exploration: _____ Length of workday in hours (e.g. 8, 10, 12): _____	PERSON DAYS WORKED <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">EMPLOYEES</th> <th style="width: 50%; text-align: center; border-bottom: 1px solid black;">CONTRACTORS</th> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black;"></td> </tr> </table>	EMPLOYEES	CONTRACTORS						
EMPLOYEES	CONTRACTORS										

If additional space is required attach additional copies

Did you experience any incidents (either lost-time or without lost-time)?

*Yes__ No__

*If YES, please complete the following form.

Corporate and personal information will not be published

If additional space is required attach additional copies.

Date (month-day- year)	Location	Prov/Terr	Occupation	Employee or Contractor (please specify)	Type	Lost Time (in days)	Nature of Injury	Cause of Injury	Description of Incident (include factors such as experience, training, time of day that may have contributed)	Action Taken

Occupation: 1-Driller 2-Driller Helper 3-Miner 4-Geologist 5-Field Assistant 6-Geophysicist 7-Line Cutter 8-Surveyor 9-Cook 10-Other	Type: 1-NM (near miss) 2-FA (first aid) 3-MA (medical aid)	Nature of Injury: 1-Sprain 2-Cut 3-Skeletal 4-Bruise/Muscular 5-Allergies 6-Substance Abuse 7-Frostbite 8-Eye 9-Chemical or Burn/Scald	10-Pre-existing Illness/Seizure 11-Back 12-Hyperthermia 13-Skin 14-Internal 15-Fatality 16-Other 17-None	Cause of Injury: 1-Slip/Fall 2-Airplane 3-Helicopter 4-Snowmobile 5-Automobile 6-ATV 7-Vehicle (Other) 8-Boat 9-Improper Lifting 10-Falling Object 11-Other Object Related 12-Drilling Machinery Related	13-Camp Equipment Related 14-Tool Use 15-Weather 16-Field Work 17-Animal 18-Chemicals 19-Improper operation (e.g. did not follow procedures) 20-Drowning 21-Medical Condition 22-Other 23-None

Date: _____

Company: _____



“Have a safe day, everyday.”