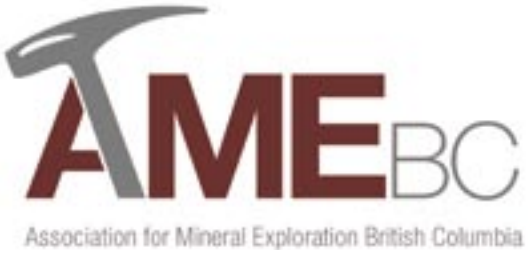
# Canadian Mineral Exploration Health & Safety

AMEBC
Association for Mineral Exploration British Columbia

PDAC

## ANNUAL REPORT 2005

*Cover Photo: Drilling in the Pemberton Valley, British Columbia*
*Kirstie Simpson, Natural Resources Canada*





# Canadian Mineral Exploration Health & Safety

# Annual Report 2005

**September 2006**

## Re: Canadian Mineral Exploration Health & Safety Annual Report 2005

In early 2006, the Prospectors & Developers Association of Canada (PDAC) formally approached the Association for Mineral Exploration British Columbia (AME BC - formerly the British Columbia & Yukon Chamber of Mines) to discuss opportunities to initiate a *Canadian Mineral Exploration Health & Safety Program*.

We developed the *Canadian Mineral Exploration Health & Safety Survey* based on the AME BC survey carried out in BC and Yukon from 1982 to 2004. The goals of the *Canadian Mineral Exploration Health & Safety Annual Report* are to track health and safety trends and lay the foundation for increasing health and safety awareness.

This is the first national survey of health and safety among mineral exploration companies throughout Canada, although AME BC has conducted such a survey since 1982. A total of 557 companies were contacted, of which 76 reported exploration work in Canada in 2005.

Health and safety are critical to the mineral exploration and mining sector. It is our aim that this annual survey will track trends nationwide, promote health and safety awareness, and lead to continual improvement in accident prevention.

We thank the participants for their support, and hope you find the report of interest and value. If you have any suggestions for future reports, please contact Jonathan Buchanan, Coordinator, Research & Publications, at AME BC at 604.689.5271 ext. 225 or jbuchanan@amebc.ca.

Yours truly,

Ian A. Paterson
Chair, Health & Safety Committee
AME BC

Bill Mercer
Chair, Health & Safety Committee
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# Canadian Mineral Exploration Health & Safety Annual Report 2005

## Summary - 2005 Highlights

This is the first national survey of health and safety among mineral exploration companies throughout Canada. A total of 557 companies were contacted, of which 93 responded, and 76 reported exploration work in Canada in 2005. AME BC has conducted survey on health and safety among mineral exploration companies since 1982.

A key question asked in the survey is "Do you have a safety program?" Out of 89 companies who responded to this particular question, 44 companies (49%) responded "Yes". In 2004, 43% of the organizations in the AME BC survey of companies active in British Columbia and Yukon answered "Yes." This question will in the future act as a barometer of safety awareness with the ultimate objective of getting a sincere "Yes" in 100% of replies.

Sadly, one fatality was reported. On March 6, 2005, a driller in Quebec was driving a bulldozer on ice to search for water to supply the drill rig. The driller had not checked the thickness of the ice and while crossing over an ice covered lake, the bulldozer broke through the ice and submerged. The driller died from drowning while still in the bulldozer.

In addition, two fatalities not reported in the survey occurred. On September 20, 2005, Arthur Louie, a prospector, was killed by a bear along the Bowron Forest Service Road in British Columbia. This was the first bear fatality in British Columbia since 2002. On November 8, 2005, Kenton Joel Carnegie, a geological engineering student at the University of Waterloo, was likely killed by wolves near a camp at Points North Landing near Wollaston Lake, Saskatchewan during his co-op placement with a geophysics firm.

For 2005, 342 accidents, incidents, and near misses were reported. Of these, 49% were near misses, 29% required first aid, and 21% required medical aid. There were 29 lost workday accidents (8%), resulting in 6,571 lost workdays (including the equivalent of 6,000 lost workdays for one fatality). The frequency of lost workday accidents per 200,000 workday hours was 0.5 for surface exploration and geological work and 1.6 for drilling and underground mining directed at exploration.

### Surface Exploration and Geological Work vs. Diamond Drilling and Underground Mining Directed at Exploration

Results are divided into two categories: a) surface exploration and geological work, and b) diamond drilling and underground mining directed at exploration (as opposed to production). These categories have different sets of risks associated with the work and require different sets of skills to work safely and effectively. Figure 1 is a summary graph comparing the two categories.

Figure 1 shows a great discrepancy between the safety records of drilling and underground work compared with surface exploration and geological work. Diamond drilling and underground work (represented as *Drillers*) have a higher number of lost workday accidents and lost workdays, higher lost workday accident frequency, and higher injury severity rate than surface exploration and geological work (represented as Geos).

### Surface Exploration and Geological Work

1. Respondents reported 337,556 person days of activity.

2. There were 8 lost workday accidents (3 requiring first aid, 4 requiring medical aid, and 1 near miss) resulting in 80 lost workdays.

3. The leading cause of lost workday accidents was slips and falls (see Figure 2). These accidents resulted in twisted ankles and torn cartilage. A jump out of a pick-up truck led to a 30-lost-workday accident. In another case, an employee tripped on a hazard buried in the snow. All workers should take their time when getting out of vehicles or traversing - slips and falls can often be avoided by recognizing hazards and taking one's time.

4. Despite the low number of lost workday accidents, 209 "incidents" were recorded. Incidents, which did not result in a lost workday, included 137 near misses, 46 accidents requiring first aid, and 26 accidents requiring medical aid. Incidents can be looked upon as a "lead" indicator - if incidents can be eliminated, accidents and fatalities will be minimized or eliminated.

5. The lost workday accident frequency rate (number of lost workday accidents per 200,000 exposure hours) was 0.5. In British Columbia and Yukon, the rate was 2.7, which compares with 2.6 in 2004, 3.6 in 2003, and 1.2 in 2002.

6. Severity of injury rate (number of lost workdays per 200,000 exposure hours) was 4.7. In British Columbia and Yukon, the rate was 38.2, an improvement over 41.6 in 2004 and 74 in 2003.

7. The comparatively high lost workday accident frequency and severity rates for British Columbia and Yukon may reflect the mountainous topography of the Cordillera.

### Diamond Drilling and Underground Mining Directed at Exploration

1. One fatality was recorded - a driller in Quebec was driving a D6 bulldozer on ice to search for water to supply the drill rig. The driller had not checked the thickness of the ice and while crossing over an ice covered lake, the bulldozer broke through the ice and submerged. The driller died from drowning while still in the bulldozer.

2. Respondents reported 254,557 person days of drilling and mining work.

3. There were 21 lost workday accidents (8 requiring first aid and 13 requiring medical aid), resulting in 6,491 lost workdays (the fatality reflects an equivalent of 6,000 lost workdays; the other accidents resulted in 491 lost workdays).

4. The leading cause of lost workday accidents was falling objects (see Figure 2). Three of six of injuries were caused by falling rock in underground mining. Proper scaling methods and equipment are crucial in preventing these accidents. In another accident, a driller's helper was using a pipe wrench when it slipped, and then hit the leg above the ankle, leading to a fractured ankle and 56 lost workdays. Even when wearing all required personal protective equipment, care must be taken at all times to avoid injury. Transportation accidents and heavy lifting were also responsible for 5 lost workday accidents each (please see discussion on ATV-related accidents on page 5).

5. A high number of 104 incidents was recorded, including 31 near misses, 43 accidents requiring first aid, and 30 accidents requiring medical aid that did not result in lost workdays. While the number of incidents is lower than that reported for surface exploration and geological work, the number and severity of lost workday accidents suggest that many incidents were not reported by drilling companies. Possibly the most alarming example of an incident occurred in April when a helper was lost in the tundra in Quebec for approximately four days.

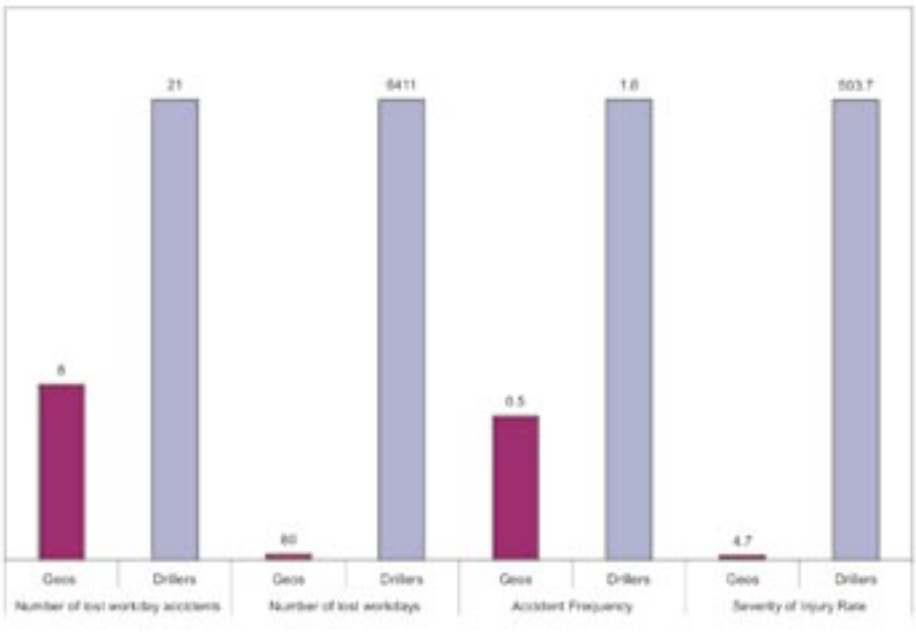
6. The lost workday accident frequency rate per 200,000 exposure hours was 1.6. In British Columbia and Yukon, the rate was 3.6, a great improvement over 16.4 in 2004 (compared with 8.9 in 2003).

7. The severity rate was unacceptably high at 503.7, which includes an allowance of 6,000 days for the fatality. Excluding the fatality, the rate would have been 32.3. In British Columbia and Yukon, the severity rate was 110.4, a great improvement over the 2004 rate of 3938, but higher than 98 in 2003. (The 2004 figure includes an allowance for 6,000 man days for an underground fatality. Excluding the fatality the rate would have been 541.)

8. By comparison, the Mines and Aggregates Safety and Health Association has reported a lost time frequency of 0.9 (8.2 for medical injuries) and severity rate of 80 for 2005 for underground mines, mine contractors, and diamond drill firms in Ontario. In 2005, one Vancouver based major mining company reported accident frequency rates for worldwide operations of 0.92 and a severity rate of 120.0, including contractors.

Lost workday accidents reported in our questionnaire for 2005 are given in Table 2 (Surface exploration and geological work) and Table 3 (Drilling and underground mining directed at exploration). It is important that these tables be made available to anyone working with exploration companies in bush situations so that they can develop an awareness of the types of accidents that happen and take the necessary prevention steps. Tables 2 and 3 are incomplete as they only contain accidents reported by companies voluntarily responding to the survey. The quality of the information in them is dependent on the diligence and accuracy of the replies. This is highly variable, with some exploration and drilling companies giving fully transparent excellent replies in writing. (Previous surveys of British Columbia and Yukon included verbal replies from companies citing the excuse that they are far too busy to deal with written safety forms, adding to the variability of responses from previous years.)

**Figure 1: MINERAL EXPLORATION SAFETY STATISTICS SUMMARY: 2005**




***Note:*** ***Drillers - Diamond Drilling and Underground Mining Directed at Exploration***
***Geos - Surface Exploration and Geological Work***

## Figure 2: CAUSES OF LOST WORKDAY ACCIDENTS


***Note:*** ***Drillers - Diamond Drilling and Underground Mining Directed at Exploration***
***Geos - Surface Exploration and Geological Work***

If you notice mistakes or misinterpretations of the data, please submit corrections to either AME BC or PDAC.

### Conclusions and Recommendations

- Lost workday accident frequency rates for surface exploration work are favourable. However, there was a large number of injury-causing accidents, incidents, and near misses that did not cause lost time.
- Drilling injury frequency and severity rates have improved over the 2004 survey of British Columbia and Yukon, but the rates are still high, and efforts to improve this record must be made.
- One of the best ways of decreasing accident rates is to improve the training of drill helpers and to increase risk awareness in health and safety programs.
- Employers should aim to ensure that drill contractors have safety programs in place and ensure that their personnel are adequately trained and follow safe work guidelines.
- The reporting of incidents (near misses and accidents not resulting in lost workdays) should be mandatory. As the ratio of incidents to lost workday accidents is 11:1, incidents should provide learning opportunities for companies to develop and improve their health and safety programs.

## ACCIDENT ALERTS

### ATVs

All-terrain vehicles (ATVs) were responsible for four lost workday accidents, representing 149 lost workdays - three occurred in Yukon, and one occurred in Ontario. Three of the four lost workday accidents involved rollovers, and one occurred on loose bridge planking. We highly recommend that ATV drivers take a training program by Canada Safety Council certified instructors. Please visit www.safety-council.org/training/ATV/atv.htm. The following guidelines have been adapted from AME BC's *Safety Guidelines for Mineral Exploration in Western Canada*.

- Three-wheeled ATVs are illegal and should not be used under any circumstances. They have been responsible for many accidents and are no longer manufactured.
- If ATVs are used in the field, we recommend taking a training program from Canada Safety Council certified instructors. For information and a free CD, see www.safety-council.org/training/ATV/atv.htm.
- 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 crash helmet, scuff-resistant clothing, gloves, and goggles or face shields.
- Ensure that all ATVs are insured. Check the insurance requirements in each province - $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 accidents 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.
- 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.

- The ATV is a valuable aid to the prospector or geologist, and its limitations should be respected.

### Low Oxygen Content in Old Mines and Enclosed Spaces

In May 2006, environmental consultant Doug Erickson, Teck Cominco employee Robert Newcombe, and paramedics Kim Weitzel and Shawn Currier died from a severe lack of oxygen at an above-ground water sampling shed at the decommissioned Sullivan mine site near Kimberley, British Columbia. There was a distinct layering with respect to oxygen content in the shed where the four persons died. Oxygen content at various levels was as follows: mouth level, 18 %; chest level, 12 %; and knee level, 2 %. Normal oxygen content is 21%; oxygen level below 19.5% is hazardous to human health.

A lack of ventilation in any shack where a heater or engine is operating can also lead to low oxygen content.

When working underground or in a decommissioned mine site, do not go into an old mine unless accompanied by an experienced miner. Have an expert ensure that oxygen is sufficient - conditions can change from day to day and over distance. Underground, oxygen content can drop to zero in a horizontal distance of 10 metres; above ground, oxygen can be absent or depleted in buildings. There is specific equipment designed to measure the oxygen content of air in such places.

### 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.

In May 2005, a geophysical assistant in Nunavut removed his sunglasses throughout the day, leading to impaired vision resulting in two lost workdays. Also in 2005, a driller helper got a small splinter in the eye by using an improper tool, also resulting in two lost workdays.

Eye injuries that did not involve lost workdays included the following:

- Splash of diesel fuel in the eye
- Contact with chemical substance in the eye
- Foreign object in eye from cutting empty drums
- Mechanic got rust particles in an eye - the injury was not reported, and scarring occurred within three days.
- Geologist had branch hit his eye when walking out of the woods.
- Branch-serrated eye.
- Scratch in eye by a twig.

The following are guidelines from AME BC's *Safety Guidelines for Mineral Exploration in Western Canada*.

* 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 or goggles when handling chemicals (e.g., battery acid), 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.

### Transportation of Equipment over Ice

On March 6, 2005, a driller in Quebec was driving a bulldozer on ice to search for water to supply the drill rig. The driller had not checked the thickness of the ice and while crossing over an ice covered lake, the bulldozer broke through the ice and submerged. The driller died from drowning while still in the b•lldozer.

No vehicle travel across ice should be undertaken without the ice thickness having been checked and certified to be sufficient for the weight of the vehicle. This is especially an issue for drilling on ice, when heavy equipment is likely used. Detailed protocols exist for travel over ice.

The following guidelines should be considered for transportation of equipment over ice.

#### Risks

- Falling through ice (drowning or hypothermia)
- Slipping (fall injury)

#### Prevention & Preparation

- Safety on ice is a specialized subject - do not travel over ice without expert assistance.
- Do not walk on the ice unless you have performed the steps to evaluate the thickness of the ice; the ice thickness must be tested before any workers, or vehicles, are allowed on the surface.
- In order to determine the safety of travel over ice, it is necessary to understand the different types of ice; there are required thicknesses for each type of ice for each particular weight load.
- Ice thickness must be tested on a regular basis.
- No one should travel alone.
- Safety harnesses and polypropylene rescue ropes are necessary.
- Have available special emergency ice pick-type safety equipment to allow pulling yourself over the ice and out of the water.
- Flotation jackets are essential and should be supplied by the company.
- Know Red Cross water safety techniques for getting out if you fall through ice and how to help others who have gone through ice.

- To prevent ice melting, do not lay a heat source directly on the ice - allow sufficient room underneath to circulate cold air.
- Do not travel on untested areas.
- Beware of slushy areas and thin ice over upwelling springs; upwelling springs appear as dark, clear round patches.
- Avoid areas with protruding rocks.
- Stream entry/exit point and shores represent high risk areas for thin ice.
- If by accident you pass through the ice, you risk suffering hypothermia; you must be prepared to face this eventuality - know how to recognize, prevent, and fight hypothermia. Excellent resources are videos produced for the Discovery Chanel Canada featuring Dr. Gordon Giesbrecht of the University of Manitoba on "Ice Water Immersion", "Cold & Wet Survival", and "Cold Swim Failure", and are available at www.yukonman.com/cold_water.asp.
- Transportation of heavy equipment over water is regulated by Transport Canada.
- Rigorous ice thickness requirement calculations must be performed well in advance of undertaking any diamond drilling program on ice.

## Discussion of Questionnaire Results

A total of 557 companies were contacted, of which 93 responded, and 76 reported exploration work in Canada in 2005. The responses represent approximately 20% of the $1.3 billion spent in 2005 on mineral exploration and deposit appraisal, as reported by Natural Resources Canada (Figure 3a).

### Figure 3: CANADIAN MINERAL EXPLORATION EXPENDITURES AND EXPOSURE HOURS REPORTED TO AME BC/PDAC

Figure 3a

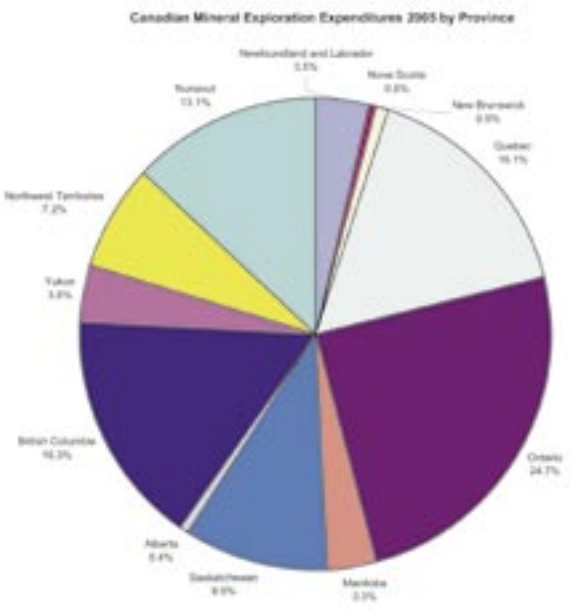
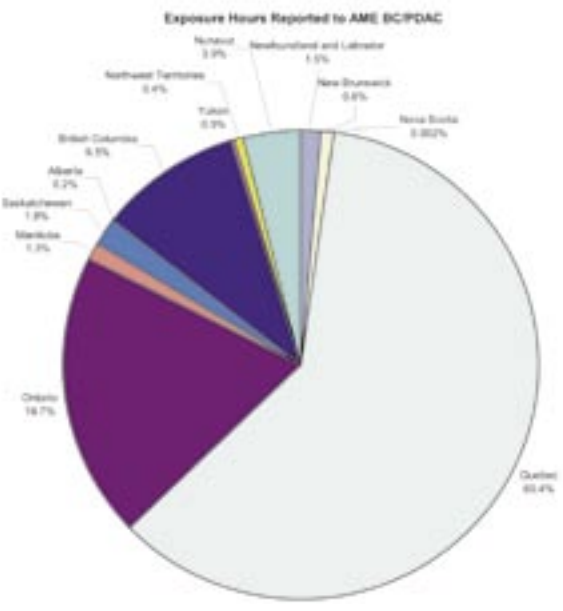



Figure 3b



***Source for Mineral Exploration Expenditures: Natural Resources Canada, from the federal-provincial-territorial Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures. http://mmsd1.mms.nrcan.gc.ca/mmsd/exploration/byprov_e.htm***

Responses to the survey (Figure 3b) showed a disproportionately large amount of mineral exploration reported in Quebec, while reflecting a small proportion of mineral exploration in many other jurisdictions. Respondents reported work in all territories and all provinces except Prince Edward Island. In future surveys, our aim is to have a large proportion of mineral exploration companies respond, and as a result, survey results that are more representative of the mineral exploration community.

As discussed in the summary, the ratio of incidents to lost workday accidents is 11:1. There were 168 near misses and 145 accidents that did not result in lost workdays, compared to 29 lost workday accidents. A total of 100 incidents required first aid, and 73 required medical aid.

Injuries (including both accidents resulting in lost workdays and incidents) were classified as follows:

| | Number | Percentage |
|---|---|---|
| Cut | 41 | 12.0% |
| Muscular injuries | 46 | 13.5% |
| Sprain | 25 | 7.3% |
| Skeletal | 17 | 5.0% |
| Substance abuse | 1 | 0.3% |
| Allergies | 0 | 0.0% |
| Fatalities | 1 | 0.3% |
| Other* | 49 | 14.3% |
| No injury | 162 | 47.4% |
| **Total** | **342** | **100.0%** |

• Examples include burns, eye injuries, seizures, bruises, pre-existing illness (angina, diabetes), chipped teeth, irritation, tendonitis, panic attack, and frostbite.

The results of the first Canadian Mineral Exploration Health & Safety Survey for each province and territory are tabulated in Table 1, and have been summarized in Figure 1 (for comparable figures for British Columbia and Yukon from 1982 to 2005, please see Table 5 in Appendix 2).

Details of lost workday accidents for surface exploration and geological work are tabulated in Table 2, and details of lost workday accidents for diamond drilling and underground work are tabulated in Table 3. These tables clearly indicate the range of situations in which accidents arise, and provide anecdotal evidence of the importance of personal protective equipment, safety training, and due diligence. The data in these tables can also be compared with reports incidents that did not result in lost workdays in Appendix 3.

## Table 1: 2005 RESULTS
## CANADIAN MINERAL EXPLORATION HEALTH AND SAFETY

| Province | | NL | NS | NB | QC | ON | MB | SK | AL | BC | YT | NT | NU | Canada |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Category | | | | | | | | | | | | | |
| Questionnaires returned from active companies | | 7 | 1 | 3 | 17 | 27 | 5 | 2 | 1 | 31 | 6 | 7 | 4 | 76 |
| Person days of activity | Geos (5) | 6,749 | 14 | 2,364 | 208,072 | 63,221 | 4,553 | 4,160 | 240 | 34,902 | 1,747 | 1,472 | 10,062 | 337,556 |
| | Drillers (6) | 1,880 | 0 | 2,089 | 149,787 | 53,686 | 3,350 | 6,221 | 801 | 21,424 | 1,043 | 1,052 | 13,224 | 254,557 |
| | Total | 8,629 | 14 | 4,453 | 357,859 | 116,907 | 7,903 | 10,381 | 1,041 | 56,326 | 2,790 | 2,524 | 23,286 | 592,112 |
| Equivalent no. of exposure hours (1) | Geos (5) | 67,490 | 140 | 23,640 | 2,080,720 | 632,210 | 45,530 | 41,600 | 2,400 | 349,017 | 17,470 | 14,720 | 100,618 | 3,375,555 |
| | Drillers (6) | 18,800 | 0 | 20,890 | 1,497,870 | 536,860 | 33,500 | 62,210 | 8,010 | 214,240 | 10,430 | 10,520 | 132,236 | 2,545,566 |
| | Total | 86,290 | 140 | 44,530 | 3,578,590 | 1,169,070 | 79,030 | 103,810 | 10,410 | 563,257 | 27,900 | 25,240 | 232,854 | 5,921,121 |
| Number of Fatalities | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Number of lost workday accidents | Geos (5) | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 2 | 0 | 1 | 8 |
| | Drillers (6) | 0 | 0 | 0 | 14 | 2 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 21 |
| | Total | 0 | 0 | 0 | 14 | 3 | 0 | 1 | 0 | 4 | 5 | 0 | 2 | 29 |
| Number of lost workdays (2) | Geos (5) | 0 | 0 | 0 | 0 | 2 | 0 | 6 | 0 | 33 | 37 | 0 | 2 | 80 |
| | Drillers (6) | 0 | 0 | 0 | 6183 | 48 | 0 | 0 | 0 | 6 | 118 | 0 | 56 | 6411 |
| | Total | 0 | 0 | 0 | 6183 | 50 | 0 | 6 | 0 | 39 | 155 | 0 | 58 | 6491 |
| Lost workday accident frequency (3) | Geos (5) | 0 | 0 | 0 | 0 | 0.3 | 0 | 4.8 | 0 | 1.7 | 22.9 | 0 | 2.0 | 0.5 |
| | Drillers (6) | 0 | 0 | 0 | 1.9 | 0.7 | 0 | 0 | 0 | 0.9 | 57.5 | 0 | 1.5 | 1.6 |
| | Total | 0 | 0 | 0 | 0.8 | 0.5 | 0 | 1.9 | 0 | 1.4 | 35.8 | 0 | 1.7 | 1.0 |
| Severity of injury rate (4) | Geos (5) | 0 | 0 | 0 | 0 | 0.6 | 0 | 28.8 | 0 | 18.9 | 423.6 | 0 | 4.0 | 4.7 |
| | Drillers (6) | 0 | 0 | 0 | 825.6 | 17.9 | 0 | 0 | 0 | 5.6 | 2262.7 | 0 | 84.7 | 503.7 |
| | Total | 0 | 0 | 0 | 345.6 | 8.6 | 0 | 11.6 | 0 | 13.8 | 1111.1 | 0 | 49.8 | 219.2 |

(1) Number of hours per day worked is 10 for both drillers/underground workers and geological field workers
(2) Reflects time charge of 6,000 person days per fatality (American national Standard)
(3) Number of lost workday accidents per 200,000 exposure hours
(4) Number of lost workdays per 200,000 exposure hours
(5) Geological field workers
(6) Drillers and Underground workers

## Table 2:
## LOST WORKDAY ACCIDENTS IN SURFACE EXPLORATION AND GEOLOGICAL WORK
## 2005 SUMMARY REPORT

| Date | Prov/Terr | Occupation | Type | Lost Time | Nature of Injury | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| Jun | BC | Field Assistant | FA | 30 | Sprain | Twisted ankle when jumping from back of pickup truck just prior to getting to job site | First aid attendant assessed injury and applied cold to elevated foot. Flown out of camp to Vancouver for treatment the following day |
| Aug | YT | Field Assistant | MA | 30 | Sprain | Helpers rolled ATV. One helper sprained shoulder | First Aid - shoulder immobilized, medevac by helicopter to Mayo nursing station |
| Aug | YT | Field Assistant | MA | 7 | Cut | Cut to back of head | Bandage and medevac to nursing station |
| 8-Oct | SK | Chain Saw Operator | MA | 6 | Cut | Chain saw operator cut his right index finger | It was discussed with the foreman that the workers need to engage the brake when not cutting. The foreman confirmed that the workers are aware of engaing the brake when not cutting. He discussed the fact again with his crew after the accident. The factor of positioning safely would be discussed with the slashing crew members. Boot spikes have been ordered and brought to site for the crew to use in order to avoid slipping. Discussed the revision of PPE for chain saw use. Reviewed if Teflon gloves would help to prevent similar accidents. Need to review safety procedures and use of brakes while working with chain saws during the next meeting. First aid was rapidly and very well aplied by co-workers. Employee was offered to return to job site on light duty. He refused the offer. |
| 6-Mar | ON | Field Assistant | MA | 2 | Muscular Injury | Torn cartilage (originally thought to be pulled or torn ligament) | Made employees aware of possible trip hazards underneath snow and instruct personnel to be careful and take their time. |
| May | NU | Geophysical Assistant | NM | 2 | Other | Removal of sunglasses throughout the day resulting in impaired vision | Attended to and monitored by camp paramedic |
| 12-Mar | BC | Line Cutter | FA | 2 | Sprain | Twisted ankle | Tension bandage put on |
| 18-Apr | BC | Line Cutter | FA | 1 | Other | Piece of wood in eye | Inspected and cleaned eye |

**Table 3:**
**LOST WORKDAY ACCIDENTS AND INCIDENTS IN DRILLING AND UNDERGROUND MINING DIRECTED AT EXPLORATION**
**2005 SUMMARY REPORT**

| Date | Prov/Terr | Occupation | Type | Lost Time | Nature of Injury | Incident Description | Action Taken/Notes |
|---|---|---|---|---|---|---|---|
| 6-Mar | QC | Driller | MA | 6000 | Fatality | Driller was driving a D6 bulldozer to search for water for drill rig. While crossing over an ice covered lake, the bulldozer broke through the ice and submerged. Driller died from drowning while still in the bulldozer. | Drove equipment on ice that could not support its weight. Did not check ice thickness prior to proceeding onto ice. Contractor and company submitted reports. |
| Jul | YT | Driller | MA | 90 | Skeletal Injury | ATV rollover, broken foot | First aid splint, medevac to Whitehorse |
| June | NU | Helper | MA | 56 | Skeletal Injury | Pipe wrench slipped hitting leg above ankle - fracturing ankle; was wearing all required protective gear | Attended to by camp paramedic. Flown to nearest hospital facility. Returned home to see family doctor. |
| 8-Aug | ON | Driller | MA | 38 | Skeletal Injury | Lost control of ATV on bridge, planking loose | Repaired planking on bridge |
| | QC | Raiseman | FA | 37 | Muscular Injury | 10-foot fall after being hit by loose rock | Reviewed proper scaling methods |
| 24-Aug | QC | Driller | MA | 30 | Skeletal Injury | Dislocated shoulder when moving hose from one side of drill to other | None - pre-existing injury that was not revealed to company |
| | QC | Mucker | MA | 27 | Muscular Injury | Head struck by rock | Proper handling of equipment |
| Aug | YT | Driller | MA | 21 | | Driller rolled ATV and seriously sprained foot | First aid splint, medevac to Whitehorse |
| 7-Dec | QC | Driller | MA | 20 | Cut | Drill runner was working with the rod footclamp while lowering the rods in the hole. His right index finger got caught between the head of the drill that was lowering the rods and the lever for the footclamp. The finger was later amputated. | Inattention of runner; poorly functioning footclamp |
| | QC | Miner | FA | 14 | Muscular Injury | Back pain after lifting heavy bag | Proper lifting techniques reviewed |
| | QC | Driftman | FA | 11 | Muscular Injury | Banged his ribs | |
| 21-May | ON | Driller | MA | 10 | Cut | Amputation of finger by pump chain | Redesigned the guard; contractor transferred to Quebec on light duty |
| 17-Nov | QC | Helper | MA | 10 | Skeletal Injury | Drill helper when going to drain the pumps tripped on a tree stump and fell with all his weight onto his right hand. He broke a bone at the tip of his middle finger. | Presence of stumps on trail; inattention |
| 17-Apr | QC | Helper | MA | 9 | Muscular Injury | Pulled back when trying to move stuck snow machine | Get help to lift heavy/awkward objects |
| 22-Nov | QC | Helper | FA | 9 | Muscular Injury | Drill helper while trying to get core out of the core barrel (which was raised in the air) suffered a pain in his back | Stuck core in core tube |
| Jun | YT | Helper | MA | 7 | Cut | Truck rollover | First aid, neck brace; medevac to nursing station |
| | QC | Drfitman | FA | 7 | Muscular Injury | Struck by loose rock while scaling | Reviewed proper scaling methods |
| Jan | BC | Miner | MA | 6 | Skeletal Injury | Dislocated previously injured shoulder, causing long rehab | Went To hospital and doctor |
| | QC | Helper | FA | 6 | Sprain | Sprained knee while carrying a load | Proper carrying technique reviewed |
| | QC | Helper | FA | 2 | Other | Small splinter in the eye | Encouraged use of proper tool |
| | QC | Timberman | FA | 1 | Sprain | Ankle sprain after being hit by heavy load | Reviewed handling of heavy loads |

## General Safety Guidelines for Mineral Exploration

### Introduction

Safety is prevention of injury when exposed to danger. Most accidents 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 working locations. Implementing onsite safety orientation followed by regular safety meetings and training in the safe use of equipment will help ensure 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. 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 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 in the questionnaire-related safety statistics do not include many individuals, small companies, and drilling and mine development contractors.

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. Of 19 fatalities recorded by the exploration sector in British Columbia in the 1980s through 1991, 10 involved individuals of less than 26 years of age, of which 9 were students. This statistic, although depressing, is not surprising considering the large number of students employed in summer programs. However, the fatality statistics are not acceptable and point to the need for all workers, irrespective of age and supervisory position, to develop a common sense and self-reliant attitude to safety awareness and for the more experienced individuals to develop a sense of responsibility for their less experienced co-workers.

## Fatalities and Serious Injuries

### Travel and Transportation

Many potential hazards are more life-threatening than others, particularly those of a travel-related nature. This relationship, although not widely known, has been recognized by several explorationists and is very evident from questionnaire-related safety statistics. As shown in Appendix 4, the majority of fatalities have resulted from travel and transportation related accidents, including traverses. Helicopters have resulted in 13 fatalities since 1980, and two canoe-related accidents in western Canada resulted in the deaths of five of the six occupants, caused by hypothermia and drowning. Many vehicle-related accidents (both automobile and ATV) are life threatening and account for five fatal accidents.

The increased involvement by Canadian geoscientists in foreign exploration projects presents additional risks. A tragic helicopter accident on March 24, 1994, took the lives of three prominent Canadian explorationists and two military pilots involved in an exploration project in Ecuador. This accident may be indicative of the different safety standards existing in developing countries which could affect the lives of Canadians. Guerrilla activity in the Philippines, during which Colin Spence was shot and killed while airborne in a helicopter from ground fire in June 1996, reveals the unanticipated risks of exploration work in politically unstable countries.

All explorationists 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.

### Slips and Falls

Slips and falls have caused 46% of lost workday accidents and 19% of lost workdays reported in the AME BC and AME BC/PDAC safety reports. Two fatalities have occurred, 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 canoes which resulted in death from hypothermia and/or drowning.

In 2005, 3 of the 8 lost workday accidents were attributed to slips or falls in surface exploration and geological work. In the drilling and mining directed at exploration, there was one lost workday accident attributed directly to a fall.

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.

## Animals

### Bears

In 1987 and 2002, diamond drill helpers were mauled to death in northern British Columbia. Both individuals were working alone, without radio communication, a rifle, repellent, noisemaker, or bear scares. In 2005, a prospector was killed by a bear on the Bowron Lakes Forest Service Road when his car broke down, and he walked to get help.

The principal preventive remedies and recommended procedures in the event of encounters are described in the AME BC *Safety Guidelines*. These include the following:

- Avoid encounters by awareness of heavy use areas.
- Conceal food odours at camps and incinerate garbage.
- Make noise while traversing (use bells, air horns, etc.).
- Be alert for bear signs.
- Be prepared for an encounter and for appropriate action.
- Carry bear bangers or a canister of the bear repellent Counter Assault or an equivalent product in a readily accessible location. (See CAUTIONARY NOTE on page 16)
- Have a firearm available at camp, knowledge where to shoot to kill or disable in an emergency, and experience with its use.
- 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 pepper spray is recommended in the event of an attack by a bear. In both 1993 and 1994, two individuals credited the use of pepper spray in saving their lives, one of them being seriously injured. 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.

Two videos entitled "Staying Safe in Bear Country" and "Working Safe in Bear Country" are available through Magic Lantern (Eastern Canada: 1.800.263.1717 or email lmitchell@magiclantern.ca; Western Canada 1.800.263.1818 or email gary@lanternimages.com). The video "Bear Aware" was produced for the BC Ministry of Forests. The Government of Yukon bear safety website at www.environmentyukon.gov.yk.ca/fishwild/bearsafety.html is also an excellent source 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 compatability 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.

### Wolves

In November 2005, a geological engineering student at the University of Waterloo was likely killed by wolves while walking near a remote exploration camp at Points North Landing near Wollaston Lake, Saskatchewan. This may have been the first fatal attack by a non-rabid wolf in 100 years. A coroner's report has not yet been issued as of press time. It is recommended that camps incinerate garbage daily and remove the remains to a legal dump or buried 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 an Anakit 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, sulphur 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 antihistamines, particularly Anakit. Concerned individuals should consult a physician to determine whether they are allergic to Epinephrine or other antihistamines. In addition, should the need to use an Anakit arise which involves an intramuscular or subcutaneous injection, care should be taken to avoid injection into an artery.

## Resources

### Safety Guidelines

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 20,000 copies have been distributed over the past 25 years. The guidelines are available online at www.amebc.ca/healthsafety.htm 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).

### Safety Checklists and Stickers

AME BC has prepared safety checklists and stickers to assist in preparedness in the field. A general safety checklist, survival kit checklists, and procedures in the event of a serious accident or fatality are on pages 180 to 182 and 184 of the *Safety Guidelines*.

In 2006, AME BC prepared safety stickers, which have been sent to over 500 active mineral exploration companies. The 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 www.amebc.ca/healthsafety.htm.

### Workshops & Courses

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

Presentations:
- Introduction, Background, Statistics
- Health & Safety Regulatory Environment
- Mountain & Glacier Travel
- Aircraft Safety
- Bear Hazard Safety
- Driving Safety

Videos:
- Hypothermia - Outdoor Enemy #1
- Kick Backs & Safe Use of Chainsaws
- Bear Aware

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. In Vancouver, the 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/en/training.html

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

## 2005 Canadian Mineral Exploration Health & Safety Awards

In 1983, AME BC began its Safety Awards program to recognize the commitment of mineral exploration companies to health and safety. AME BC has since awarded Exploration Safety Awards to companies who operate without a lost workday accident throughout a calendar year. The record year was 1989, in which 69 companies received awards, including 30 repeat winners.

In 2005, the Health & Safety Committee initiated the David Barr Award in recognition of Excellence in Leadership and Innovation in Mineral Exploration Health and Safety. David Barr, an active volunteer of AME BC since 1972, formed the Safety Committee in October 1980 following a particularly tragic year in exploration in western Canada when nine individuals, including two pilots, lost their lives in separate helicopter accidents. The following year, AME BC released the first version of its *Safety Guidelines* and has since worked with mineral exploration companies to promote safety and accident prevention. Dave and the Committee started an annual report based on surveys with mineral exploration companies as well as safety workshops and other initiatives to promote due diligence in the field.

The Annual Safety Award is presented to the company judged to have had the most outstanding safety record following a minimum of 10,000 person hours in mineral exploration activity in the preceding year without a lost workday accident (Table 6). This year, the Annual Safety Award has been expanded from British Columbia and Yukon to nationwide.

The winner of the 2005 Annual Safety Award is FNX Mining Company Inc., which logged 305,330 hours without a lost workday accident.

The organizations with the highest numbers of lost-workday-free hours in 2005 are as follows:

| Company | Lost Day Accident Free Hours |
|---|---|
| FNX Mining Company Inc. | 305,330 |
| Inco Exploration | 164,000 |
| Wolfden Resources Inc. | 135,330 |
| Imperial Metals Corporation | 125,000 |

In 2005, Imperial Metals Corporation reported the largest number of lost day accident free hours in British Columbia and Yukon since 1983, when Noranda Exploration Company Limited logged 148,800 hours. Imperial Metals Corporation is also the past recipient of Five-Year Safety Awards in 1992 and 2002.

A total of 71 companies are 2005 award recipients for operating without a lost workday accident throughout the year. Of these companies, 54 reported not having any accidents, incidents, or near misses throughout the year, of which Wolfden Resources Inc. reported 135,330 hours without incident through 2005. Winners of 2005 Safety Awards are listed in Appendix 1.

## Appendix 1: 2005 Award Recipients

Adanac Moly Corp. (2)
Aggressive Diamond Drilling Ltd.
Almaden Minerals Ltd. (3)
AntOro Resources Inc.
Aur Resources Inc.
Auramex Resource Corp.
Azimut Exploration Inc.
Barrick Gold Corporation
Benton Resources Corp.
Better Resources Limited (2) (now Bluerock Resources Ltd.)
Bitterroot Resources Ltd. (2)
Bootleg Exploration Inc.
Campbell Resources Inc.
Canadian Golden Dragon Resources Ltd.
Canadian Zinc Corporation
Caracle Creek International Consulting Inc
Contact Diamond Corporation
Cypress Development Corp.
Ditem Explorations Inc.
Dressler Geological Consulting
Eastfield Resouces Ltd. / Wildrose Resources Ltd.
Everton Resources
Flag Resources (1985) Limited
FNX Mining Company Inc. (Annual Safety Award Winner)
Fortune Minerals Limited
Geodex Minerals Ltd.
Goldrush Resources Ltd.
Gossan Resources Limited
Grayd Resource Corporation (2)
Hard Creek Nickel Corporation (3) (*)
Harvest Gold Corporation
Inco Exploration
Landore Resources Canada Inc.
Laurion Gold Inc.
LMC Management Services Ltd.
Majescor Resources
Marathon PGM Corporation
Markland Resource Development Inc.
Merit Mining Corp. (2)
MetalCORP Limited
Miramar Hope Bay Limited
Moneta Porcupine Mines Inc.
Namex Explorations Inc.
NEMI Northern Energy & Mining Inc.
North American Tungsten Corporation Ltd.
Orphan Boy Resources Inc. (2)
Pacific Booker Minerals Inc. (4)
Probe Mines Limited
Quinsam Coal Corp. (2)
Redcorp Ventures Ltd. (2)
Rimfire Minerals Corporation (2)
Rocmec Mining Inc.
Sage Gold Inc.
Santoy Resources Ltd.
SLAM Exploration Ltd.
Sydney Resource Corporation
Tamerlane Ventures, Inc.
Tenajon Resources Corp. (2)
Typhoon Exploration Inc.
Vault Minerals Inc.
Vedron Gold Inc.
Virginia Mines Inc.
Vismand Exploration Inc.
Waseco Resources Inc.
Western Canadian Coal Corp.
Western Keltic Mines Inc. (2)
Western Troy Capital Resources Inc.
Winterbourne Explorations Ltd.
Wolfden Resources Inc.
Young-Shannon Gold Mines, Limited
Yukon Geological Survey (2)

**Notes for previous winners of AME BC Safety Awards:**

(2) Has operated 2 consecutive years lost-workday-accident-free in British Columbia and Yukon.
(3) Has operated 3 consecutive years lost-workday-accident-free in British Columbia and Yukon.
(4) Has operated 4 consecutive years lost-workday-accident-free in British Columbia and Yukon.
(*) Won 2003 Award as Canadian Metals Exploration Limited

## Appendix 2: Historical Trends in British Columbia & Yukon

*The following is an update of the Annual Report on Safety in Mineral Exploration in Western Canada produced by AME BC (formerly the British Columbia & Yukon Chamber of Mines) annually from 1982 to 2004.*

Exploration activity in 2004 and 2005 approached levels last seen in the period 1987-1991. The lost workday accident frequency rate for surface exploration and geological work in 2004 at 2.6 per 200,000 exposure hours and 2.7 per 200,000 exposure hours in 2005 was much lower than it was in the period 1982-1991 when the frequency rate averaged 6.5. The fact that the rate has stayed considerably lower despite the increase in activity strongly suggests that the various improvements in safety in exploration have indeed had an effect on lowering the frequency rate - permanently, we hope.

On the other hand, the statistics from drilling and mining exploration projects collected in the last few years are greater cause for concern, despite a drop in 2005. In 2003 the lost workday accident frequency rate for the drilling/mining section was 8.9. With the doubling of exploration expenditure in 2004, this rate shot up to 16.4 accidents per 200,000 person hours. Similarly, the severity rate in 2003 was 98 and in 2004 it was 611. In 2005, the record of companies improved, and the frequency rate decreased to 3.6 and the severity rate dropped to 110.

One of the Safety Committee's objectives in 1992 was to provide both verbal and written notice to certain companies of unacceptable safety performance and the need for significant improvement. This objective was accomplished verbally with gratifying results. No such criticism about companies' safety procedures has been required since then.

**Table 4:**
**LOST WORKDAY ACCIDENTS IN BRITISH COLUMBIA & YUKON (1982-2005) (1)**

| Cause/Relationship | Number of Accidents | Percent of Total Accidents | Lost Workdays | Percent of Total Lost Workdays |
|---|---|---|---|---|
| Canoes | 2 | 0.5 | 30,000 (1) | 38.5 |
| Slips, Falls | 172 | 45.7 | 14,904 (1) | 19.1 |
| Vehicles | 45 | 12 | 13,409 (1) | 17.0 |
| Aircraft | 6 | 1.6 | 12,150 (1) | 15.6 |
| Allergic Reactions | 2 | 0.5 | 6,031 (1) | 7.8 |
| Improper Lifting | 43 | 11.4 | 352 | 0.5 |
| Cuts | 34 | 9 | 308 | 0.4 |
| Falling Objects | 11 | 2.9 | 245 | 0.3 |
| Eyes | 20 | 5.3 | 125 | 0.2 |
| Animal Attacks | 1 | 0.3 | 94 | 0.1 |
| Tendonitis | 12 | 3.2 | 78 | 0.1 |
| Infections | 8 | 2.1 | 73 | 0.1 |
| Burns | 7 | 1.9 | 59 | 0.1 |
| Tree Falls | 2 | 0.5 | 46 | 0.1 |
| Frozen Feet | 2 | 0.5 | 18 | 0.0 |
| Drill Compressor Explosions | 2 | 0.5 | 15 | 0.0 |
| Fingers | 4 | 1.1 | 45 | 0.0 |
| Other | 3 | 0.8 | 54 | 0.1 |
| Total | 376 | 100 | 78,006 | 100 |

(1) Reflects time charge of 6,000 person days per fatality (American National Standard

The following table summarizes statistical data for British Columbia and Yukon for the 1982-2005 period:

**Table 5:**
**BRITISH COLUMBIA AND YUKON MINERAL EXPLORATION HEALTH & SAFETY**

| | | 2005[4,5] | 2004[4,5] | 2003[4,5] | 2002[5] | 1997-2001 | 1992-1996 | 1987-1991 | 1982-1986 |
|---|---|---|---|---|---|---|---|---|---|
| Questionnaires returned from active companies | | 37 | 74 | 57 | 31 | 190 | 324 | 438 | 354 |
| Person days of exploration activity | | 59,116 | 88,376 | 40,968 | 20,828 | 116,551 | 290,071 | 616,529 | 488,767 |
| Equivalent no. of exposure hours | Geos [6] | 366,487 | 534,120 | 274,840 | | | | | |
| | Drillers | 224,670 | 353,240 | 134,840 | | | | | |
| | Total | 591,157 | 883,760 | 409,680 | 166,624 | 932,408 | 2,320,560 | 4,932,232 | 3,846,136 |
| Number of fatalities | | 0 | 1 | 0 | 0 | 0 | 0 | 9 | 3 |
| Number of lost workday accidents | Geos [6] | 5 | 7 | 5 | | | | | |
| | Drillers | 4 | 29 | 6 | | | | | |
| | Total | 9 | 36 | 11 | 1 | 18 | 39 | 178 | 112 |
| Number of lost workdays [1] | Geos [6] | 70 | 111 | | | | | | |
| | Drillers | 124 | 6,956 [7] | | | | | | |
| | Total | 194 | 7,067 [7] | 165 | 4 | 451 | 778 | 57,174 [7] | 19,230 [7] |
| Lost workday accident frequency [2] | Geos [6] | 2.7 | 2.6 | 3.6 | | | | | |
| | Drillers | 3.6 | 16.4 | 8.9 | | | | | |
| | Total | 3 | 8.1 | 5.4 | 1.2 | 3.9 | 3.4 | 7.2 | 5.8 |
| Severity of injury rate [3] | Geos [6] | 38.2 | 41.6 | 73.9 | | | | | |
| | Drillers | 110.4 | 541 [8]<br>3,938 [7] | 98 | | | | | |
| | Total | 65.6 | 1,599 [7] | 81 | 4.8 | 96.7 | 67.1 | 2318.5[7] | 1000.0[7] |

(1) Reflects time charge of 6,000 person days per fatality (American National Standard)
(2) Number of lost workday accidents per 200,000 exposure hours
(3) Number of lost workdays per 200,000 exposure hours
(4) In 2003, 2004, and 2005, number of hours per day worked is 10 for both drillers and geological field workers. Previous years have used an 8 x multiplier. This has the effect of slightly lowering accident and severity rates from 2003 onward compared with previous years.
(5) Includes drilling contractors, excluded in previous years
(6) Geological field workers
(7) Includes 6,000 lost workdays per fatality
(8) Excludes fatality

## Table 6:
## ANNUAL SAFETY AWARD WINNERS (1982 - 2004)

| Year | Company | No Lost Workday Accidents (Person Hours) |
|---|---|---|
| 1982 | Crows Nest Resources Ltd. | 48,000 |
| 1983 | Noranda Exploration Company Limited | 148,800 |
| 1984 | Chevron Canada Resources Limited | 54,800 |
| 1985 | Chevron Canada Resources Limited | 50,200 |
| 1986 | Energex Minerals Ltd. | 25,720 |
| 1987 | Mascot Gold Mines Inc.(Expl. Division) | 30,000 |
| 1988 | Total Energold Corporation | 48,736 |
| 1989 | Westmin Mines Limited | 52,976 |
| 1990 | Minnova Inc. | 31,200 |
| 1991 | Cominco Ltd. | 36,384 |
| 1992 | Taseko Mines Ltd. | 27,608 |
| 1993 | La Rock Mining Corp. | 14,920 |
| 1994 | North American Metals Corp. | 21,920 |
| 1995 | American Bullion Minerals Ltd. | 24,400 |
| 1996 | Archer, Cathro & Associates (1981) Limited | 39,664 |
| 1997 | Archer, Cathro & Associates (1981) Limited | 48,000 |
| 1998 | Homestake Canada Inc. | 32,200 |
| 1999 | Kennecott Canada Exploration Inc. | 17,260 |
| 2000 | Homestake Canada Inc. | 16,115 |
| 2001 | Kennecott Canada Exploration Inc. | 25,400 |
| 2002 | Hy-Tech Drilling Ltd. | 21,600 |
| 2003 | Geological Survey of Canada | 38,000 |
| 2004 | Redfern Resources | 56,000 |

## Table 7:
## EXPLORATION SAFETY DIPLOMAS & DECALS AWARDED (1982-2004)

| Year | Number of Diplomas | Number of Decals |
|---|---|---|
| 1982 | 43 | - |
| 1983 | 47 | 13 |
| 1984 | 19 | 30 |
| 1985 | 21 | 32 |
| 1986 | 26 | 39 |
| 1987 | 22 | 31 |
| 1988 | 30 | 39 |
| 1989 | 22 | 45 |
| 1990 | 10 | 46 |
| 1991 | 21 | 39 |
| 1992 | 7 | 39 |
| 1993 | 5 | 38 |
| 1994 | 10 | 26 |
| 1995 | 22 | 35 |
| 1996 | 16 | 44 |
| 1997 | 7 | 31 |
| 1998 | 3 | 22 |
| 1999 | 6 | 14 |
| 2000 | 5 | 20 |
| 2001 | 6 | 12 |
| 2002 | 6 | 12 |
| 2003 | 21 | 11 |
| 2004 | 34 | 16 |
| Total | 408 | 634 |

## Recipients of Five-Year Safety Awards

**1986**
Archer, Cathro & Associates (1981) Ltd.
Beau Pre Explorations Ltd.
Canadian Nickel Company Limited
Crows Nest Resources Ltd.

**1987**
BHP-Utah Mines
Placer Dome Inc.
Teck Exploration Ltd.
United Keno Hill Mines Ltd.

**1988**
Bema Industries Ltd.
Northair Mines Limited
Welcome North Mines Limited

**1989**
Canasil Resources Inc.

**1990**
BP Resources Canada Limited
Equinox Resources Ltd.
Granges Inc.

**1991**
Equity Silver Mines Ltd.

**1992**
Aurum Geological Consultants Inc.
Imperial Metals Corp.
Minequest Exploration Assoc. Ltd.
Orvana Minerals Inc.

**1993**
Fox Geological Consultants Ltd.
New Global Resources Ltd.
Rio Algom Exploration Inc.
Westmin Resources Limited

**1994**
Pamicon Developments Ltd.

**1995**
Gibraltar Mines Ltd.
Homestake Canada Inc.
Taseko Mines Limited
Teck Exploration Ltd.

**1996**
Kennecott Canada Inc.
La Rock Mining Corp.
Nicholson & Associates

**1997**
Reliance Geological Services Inc.

**1998**
Boliden Westmin (Canada) Limited
Fox Geological Services Inc.
North American Metals Corp.

**1999**
Equity Engineering Ltd.
Fairfield Minerals Ltd.

**2000**
Atna Resources Ltd.
Geological Survey of Canada
Natural Resources Canada

**2002**
Homestake Canada Inc.
Imperial Metals Corp.

**2003**
BC Geological Survey Branch
Kennecott Canada Exploration Inc

## Ten Year Safety Award Winners

| Company | No Lost Workday Accidents (Person Hours) |
|---|---|
| **1998** | |
| Boliden Westmin (Canada) Limited | 161,648 |
| Fox Geological Services Inc. | 132,088 |

# Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| Apr | NU | Geologist | FA | Sprain | | Riding snowmobile | Treated by site medic |
| May | NU | Field Assistant | FA | Other | | Foreign body In eye | Treated by site medic |
| Aug | YT | Geologist | NM | None | | Defective bear banger did not eject from pen when fired and exploded in hand | Disposed of expired bear bangers |
| Jul | YT | Field Assistant | MA | Skeletal Injury | | Broke left ring finger while carrying sample bag and crushed hand upon slipping | Visited nursing station clinic |
| Dec | NL | Pilot Mill Tech | FA | Other | | Bruised foot | Examined at hospital and back on next scheduled shift (four days later) |
| Feb | NL | Pilot Mill Tech | FA | Muscular Injury | | Strained back | Examined at hospital and released; no serious injury |
| Dec | NL | Geologist | MA | Skeletal Injury | | Slipped on ice, fracturing ribs | Sanding increased |
| Sep | NL | Geologist | NM | None | Vehicle Accident | Vehicle collided with light pole while driving in reverse. Damage to truck but no injuries to occupants. | More care given when driving, especially in reverse |
| Nov | NL | Geologist | NM | None | Vehicle Accident | Truck spun out of control and left paved road due to black ice. No injuries. | More care taken when driving when ice and freezing may occur |
| Jun | NL | Geologist | FA | Cut | | Cut hand on piece of quartz | Gloves will be worn in the future where necessary. |
| Jul | NL | Prospector | NM | Other | | Strained shoulder while soil sampling. | Additional prospector collected the remainder of the soil samples. |
| 8-Apr | BC | RQD | MA | Muscular Injury | Sore Wrist | Pulled tendon | n/a |
| 10-Apr | BC | RQD | MA | Muscular Injury | Sore Back | Pulled muscles in back | n/a |
| 17-Apr | BC | Field Assistant | MA | Cut | | Cut hand | n/a |
| 16-May | NU | Cook | NM | None | | Bucket in rear doorway of dry a tripping hazard | Maintain good housekeeping inside and outside of entranceways |
| 23-May | NU | Field Assistant | MA | Muscular Injury | Back Injury | Persistent back pain due to excessive labour in shovelling snow, moving equipment. | Ordering proper snow shovels. Consulting to find a better plow system for the skidoo. Hire more people to be assigned to this task. Briefing on the important of incident reports and discussion on why they cannot be seen as negative forms. Employee will not be allowed to perform labour intensive tasks until his back has improved. Will continue to perform modified work. Employees briefed on the seriousness of working safely. They must notify managers immediately if they feel a situation is unsafe, and we rely on this open and honest communication. Ensure double handling of the plow when moving it or when it is at the end of the runway filled with snow. |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 23-May | NU | Cook | NM | None | | Propane element left burning while unattended. Propane oven switch on low while unattended. | A conversation was had with employee in regards to the element being left on. A notice will be placed in the kitchen as a reminder to shut off elements. Other camp personnel are also asked to monitor the stove if in the kitchen after meals are cooked. |
| 28-May | NU | Field Assistant | NM | Cut | | Small cut on right knuckle | An understanding was made clear by their supervisor that PPE must be worn while using the auger. There is no ice auger procedure in the current SHMS. Pt forth a request to add to SHMS. We are currently using an old procedure. |
| 11-Jun | NU | Field Assistant | NM | None | | Possible hypothermia and frost bite | Employee was wrapped in jacket after the water spray incident and got the back to camp to camp within 5 min. Warm drink and dinner at camp. Project Manager spoke to Inuit camp workers and asked them to pass on dangerous conditions to less experienced personnel in the camp when doing field work. |
| 6-Jun | NU | Helper | MA | Muscular Injury | | Inflammation of right knee below knee cap | Field personnel will be advised not to walk on boulder fields during wet weather conditions. Provide field workers with proper non-slip footwear prior to working in wet weather. The people that are working in the field have been cautioned to walk carefully in wet weather conditions. |
| 5-Aug | NU | Other | NM | Sprain | | Lump on back of head followed by headache | Provide field workers with proper non-slip footwear prior to working in wet weather. The people that are working in the field have been cautioned to walk carefully in wet weather conditions. |
| 15-Jun | NU | Field Assistant | FA | Other | Eye Injury | Splash of diesel fuel to right eye. | He was taken to the dry where the eyewash station was used to flush it out. Clear safety glasses were given to employee. Camp manager spoke with employee the same day about following procedure when refueling and that he must wear the proper protective equipment. If this situation happens more than 3 times (not wearing proper PPE) the task will be removed from any individual. |
| 12-Jul | NU | Other | NM | Cut | | Small cut on forehead | Hose clamps and water lines were secured with tie straps to make the area clear of exposed clamps. Hose clamps were covered with duct tape to cover up sharp edges on exposed ring clamps. At the next safety meeting, people will be reminded to be aware of water lines and crouch over if necessary when entering or exiting shower area. |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 15-Jul | NU | Cook | NM | None | | Pilot Light on oven was not lit | From now on the cook will check to ensure the pilot light is on prior to turning on the oven. Ensure that new cooks are briefed on hazards associated with propane stoves and request that they check pilot light operation before using the stove. |
| 3-Jun | NU | Field Assistant | NM | Cut | | Split index finger nail on left hand | During a safety meeting the next day, this issue was brought up by the pilot reinforcing to all camp personnel that if there is any doubt about what needs to be removed or left on the chopper when it is idling, ask so this confusion can be avoided. Due to the high pitch noise when this transfer is carrying on, it is sometimes doubtful to ask questions or complete a task. |
| 15-Jan | SK | Geologist | FA | Cut | | Pinching of index finger tip | Supervisor spoke to workers about communications on the job. Employee will make sure lever is clear before use and will communicate with co-workers in the future to avoid misunderstandings. |
| 21-Jan | SK | Other | NM | Muscular Injury | Back Injury | Strained muscles in back due to slipping | Employee was reminded to take care when walking on rough terrain |
| 30-Nov | SK | Other | FA | Sprain | | Pulled Calf Muscle | Employee was told to rest for awhile and then went back to work |
| 19-Apr | SK | Geologist | NM | None | Vehicle Accident | Pick up truck stuck in soft sand up to bottom of door | Blocked off the access to drill pad with some logs |
| 28-Apr | SK | Other | NM | None | | Collapse in road due to washout | The installation of the culvert on the road by another party was examined and it was determined to have been improperly installed being placed to high in the road bed which is allowed water to wash around the bottom and sides of the culvert and eventually erode the bed of the road itself. The road was temporarily closed by barriers on either side of the hazard, the culvert was pulled out and reinstalled at a greater depth in the road be to avoid future washouts. |
| 26-Apr | SK | Other | NM | None | Vehicle Accident | Skidder tried to drive around a truck that was stuck on the road and slid into the trailer the truck was pulling. | We were putting some drill mud on the road were there is soft spots to help stabilize the sand. |
| 13-May | SK | Other | NM | None | Vehicle Accident | Possible motor vehicle accident | Road signs have been posted to inform drivers of a 50 kph speed limit in the area. Temporary speed bumps have been placed in front of the drilling area with signs warning approaching vehicles to slow down. |
| 10-May | SK | Other | FA | Sprain | | Twisted ankle | Stress the importance of wearing proper footwear and keeping an eye on the terrain at all times |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 4-Jun | SK | Field Assistant | FA | Sprain | | Employee wrenched his back in the core shack while moving core boxes | Bring up safe handling core procedures at morning safety meeting of site geologists and geological assistants |
| 5-May | SK | Geophysicist | MA | Other | Irritation | Sore left ear. Red in color, warm to the touch, numb, no bleeding present. | It has been recommended to all staff that bug spray be worn if staff is working in field. Bug nets should be worn when mosquito population increases and tasks allow wearing of loose clothing. |
| 21-Jun | SK | Field Assistant | NM | Substance Abuse | Vehicle Accident | No Injury - Car Accident | Camp staff is aware of zero alcohol tolerance for driving (in all camp inductions). This will be addressed in a meeting with all staff on June 23. Car keys which have been left in trucks for emergency reasons during the night will be taken by the site/camp manager and kept in the office which is locked during the night. Camp staff is aware of the speed limits; this will be addressed in the meeting with all the staff. Tracking methods of keeping track of speed. Review/establish written policy on drinking and driving. |
| 29-Jun | SK | Other | FA | Cut | | A 2mm piece of metal wire wrap on a water hose lodged itself in a water truck operators left finger | The wound was cleaned and bandaged and the employee was told to change the bandage daily and report to a doctor if infection set in. |
| 26-Jun | SK | Other | NM | None | Vehicle Accident | Truck driving too fast on Division Road | The foreman immediately dismissed the worker who will no longer work on site. |
| 6-Jul | SK | Other | MA | Other | | Tree branch whipped eye may have left particle in eye. Heat stress symptoms present. | The archeologist was assessed by a physician at the Victoria Hospital in Prince Albert. She was cleared to return to regular work activities. Reviewed the potential dangers of walking through dead trees. Reviewed safe work practice for working under hot conditions. Some form of eye protection should be worn while in dense bush. |
| 29-Jun | SK | Other | NM | None | Vehicle Accident | Damage to passenger door and mirror | Lights should be added to the back of the trucks to allow better vision while backing up at night |
| 10-Jul | SK | Other | NM | None | | Air blow - out at core drill | regular gas monitoring is now party of the daily inspections performed at the drills. |
| 12-Jul | SK | Other | NM | None | | Air blow - out at core drill | Due to this incident being the second of its nature in the past two days, I recommend that we get monitors to be permanently placed at each drill while drilling operations are being performed. Drillers were informed to pay attention while drilling for any abnormal situations. Monitors will be put in place as soon as possible. |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 6-Jul | SK | Other | NM | None | Vehicle Accident | Broken mirror on driver's side of truck | All of the people traveling back and forth were informed of the time schedule of the other companies and everybody is more aware of their presence. |
| 29-Jul | SK | Geologist | FA | Other | Burn or Scald | First degree burns to dorsal side of left hand | Burn treated by camp medic. Proper protective mitts or gloves should always be worn when removing core from the drying oven. |
| 9-Jun | SK | Geologist | FA | Other | Burn or Scald | Second degree burn to right hand by exhaust pipe | Gloves should always be worn when working on any equipment. Employee was advised of this policy and agrees with it. The incident occurred because employee was not wearing gloves and tried to shorten work time by leaning over the truck box instead of getting into the back of the box where he would have had more room to maneuver. Employee stated that he was wrong to reach over the side of the truck and that the incident occurred because he was trying to cut corners by working from outside the truck instead of climbing into the back of the truck. Gloves should be worn while working on equipment; approach if possible in order to shorten reach distance. |
| 8-Aug | SK | Other | FA | Other | | Heat cramps, progression to miner heat exhaustion | First aid provided by EMR. Remind supervisors/staff of increased fluid intake and enough rest during hot weather periods. EMR will explain danger/risks to management of incurring injury during a dehydrated state. |
| 2-Aug | SK | Other | NM | None | | Stick hit side window and broke window | Inform workers to cut non-salvageable wood into shorter pieces so that the sticks cannot reach windows. |
| 18-Aug | SK | Other | MA | Muscular Injury | Vehicle Accident | Bruished shoulder | Employee was assessed by the camp medical attendant and was taken to hospital for further assessment. Employee was diagnosed with a bruised left shoulder. No other injuries were sustained. Formal reports have been made to the RCMP in attempt to get traffic speeds in the forest monitored and reduced. Have proper authorities establish and enforce an appropriate speed limit. |
| 19-Aug | SK | Other | NM | None | Vehicle Accident | Vehicle near miss | All contractors and employees have been alerted of the dangers and briefed on the policies governing safe driving. Supervisors for all contractors on site have repeatedly warned workers of other road users who do not drive on the roads in a responsible manner. The employee's good defensive driving attitude likely avoided a serious accident. |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 17-Aug | SK | Other | FA | Cut | | Right index finger was cut, 1cm long | Employee cut his finger on August 17. It got infected and he reported discomfort on August 23. At this stage it looked clean as if it was healing. On August 25 employee complained that the finger was still painful, so he was taken to the clinic, and antibiotics were prescribed. All employees are responsible to ensure that no screws or other metal parts are protruding when lids are screwed on or when boxes are moved by hand. |
| 26-Aug | SK | Other | FA | Other | Burn or Scald | First degree burn to fingers of right hand | The camp medic examined the injury and dressed the wounds with burn cream. Employee was placed on light office duties the following day so as not to aggravate his hand. Workers are repeatedly told to wear the proper PPE for the task they are performing. |
| 31-Aug | SK | Other | NM | None | | Blow out while pulling casing | Thicker mud can be mixed to help seal the hole and prevent possible future blow outs |
| 4-Sep | SK | Other | NM | None | | Blow out while pulling casing | Barite drill weight will be sent up to camp which will increase the weight of the mud static head pressure holding the water back down the hole |
| 5-Sep | SK | Other | NM | None | Vehicle Accident | Truck backed into hand rail of mud | Move any mobile equipment that is not essential out of the way |
| 16-Jul | SK | Other | NM | None | Vehicle Accident | Near miss on division road between a civilian vehicle and a contractor vehicle | Ask the RCMP to monitor the activities in the forest on a closer level |
| 5-Oct | SK | Other | NM | None | Vehicle Accident | Near-miss between black truck with trail and pick-up truck | Spoke to other foremen about all vehicles having radio contact, or if not, a pilot car especially if regularly transporting loads in the Fort a la Corne area. |
| 10-Oct | SK | Other | NM | None | | Methane gas showing at rig | Waiting for accumulator bottles for the shut down BOP. |
| 13-Oct | SK | Other | NM | None | | Gas blow out at rig | BOPs have been installed on all drills; drill rigs have SCBAs and SABAs on site; gas detectors are used on all drills; training in the use of all the above has been undertaken. |
| 13-Oct | SK | Other | FA | Muscular Injury | | Stiff left arm | The worker was asked to try to ensure that he gets into the most comfortable position to carry out the work in the future. The medic applied first aid and monitored the patient |
| 8-Nov | SK | Other | NM | None | | Broken front window on grader | Check into different window material |
| 9-Nov | SK | Surveyor | NM | None | | Not wearing hard hats at drill site | All involved have been spoken to about the importance of wearing full PPE including hard hat at drill sites. Ensure that full safety equipment is always on hand for unexpected occurrences. Highlight the observe me campaign and live up to this credo. |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 17-Nov | SK | Other | NM | None | | Possible fire in propane truck | Double check all connections before lighting any torch |
| 28-Jul | SK | Other | NM | None | | Tree broke window of grader while pushing to make site bigger | Ensure all dead trees and trees that have been knocked loose are pushed down before you work around them or let anybody else onto the site. |
| 12-Sep | SK | Other | NM | None | | Air blow with H2S presence | Conduct further studies on overburden to gain better understanding of glacial deposits. Gas detectors have been placed at each rig, and are worn by drillers. Detectors definitely helped to identify H2S on drill site but did not allow identification of any other substances. Safe monitoring of site requires a combusitble gas monitor. Local fire departments were called; however neither department had maintained their monitors, rendering the devices useless. Train all drilling personnel and site ERT in H2S. Proper training in monitoring and testing for toxic and combustible gas should be given to site management to manage proper monitoring and declaring of safe zones. Self-contained breathing apparatuses (SCBA) are needed on site so that rescue or recovery operation could be managed from site instantly. Monitor PH of mud while drilling (PH of H2S is 3.4, regular mud should be kept at PH 10). Barite is used to stabilize walls of hole while pulling casing and create heavier mud. Information about gas occurrences in area had been collected from various sources; no H2S occurrences |
| 14-Sep | SK | Other | NM | None | | Near collision on road | Communicate, with all parties, the importance of watching speed and other vehicles |
| 24-Sep | SK | Other | NM | None | | A grader operator backed into a skidder operator while working on a wet spot on road | remove snow arm when not needed to ensure clear view |
| 3-Oct | SK | Other | FA | Cut | | Chain saw operator slipped and cut his left elbow | Revise need of spike on rubber boots in order to avoid slipping while working in wet areas with muskeg and deadfall |
| 28-Oct | SK | Other | NM | None | | Potential gas kick in DH | Supervisor to ensure all employees bump test every shift |
| 21-Mar | NT | Other | NM | None | | Grey water shack door; grey water tank, and fibreglass top damaged by wolverine. Gables to pump motor high water alarm, float & pump starter float chewed through. | The existing door is to be removed and a new, more secure front door is to be attached. |
| 13-Apr | NT | Other | NM | None | Vehicle Accident | Collision between a rental pick up truck and another vehicle while en route to a meeting. | Reiterate driving hazards and safe driving procedures to project employees. |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 28-Apr | NT | Other | NM | None | | Snow survey crew did not call into the contractor Safety team at the pre-determined time. A helicopter was sent out after 2 hours to confirm their location and well being. | Remind all field crews of the call process. Comply with the call process. |
| 27-Apr | NT | Other | FA | Cut | | Cut on left hand little finger whilst washing hands in kitchen sink. Wound was cleaned and a band aid was applied. No further incident. | Always check the kitchen sink for contents before placing hands inside it. Advise crew to leave all cutlery, plates and utensils aside for the cook to clear up. |
| 27-Apr | NT | Other | NM | None | Vehicle Accident | Snowmobile tipped quickly to one side nearly rolling over | The safe work procedures for snowmobile operation have been amended to better cover visibility issues. Crews have been instructed not to operate snowmobiles in low visibility situations. Reduce speed as necessary and err on the side of caution. Do not travel if conditions/visibility unsafe. Include/emphasize new changes and policies regarding snowmobiles and limited visibility to field crews in the form of safety alerts. |
| 25-Apr | NT | Other | NM | None | Vehicle Accident | Rolled snowmobile upside down and cracked the windshield and whip. No injury. | The safe work procedures for snowmobile operation have been amended to better cover visibility issues. Crews have been instructed not to operate snowmobiles in low visibility situations. Include/emphasize new changes and policies regarding snowmobiles and limited visibility to field crews in the form of safety alerts. |
| 17-Apr | NT | Other | NM | None | Vehicle Accident | Almost drove snowmobile down steep slope | The safe work procedures for snowmobile operation have been amended to better cover visibility issues. Crews have been instructed not to operate snowmobiles in low visibility situations. Include/emphasize new changes and policies regarding snowmobiles and limited visibility to field crews in the form of safety alerts. |
| 5-Mar | ON | Other | FA | Other | Frostbite | Frost bite sustained to the right foot toes | Proper foot wear will have to be worn for extreme field work where conditions are extremely cold. |
| 25-May | ON | Other | NM | None | | Pop container thrown over fence and landed on staff member's foot | It was suggested that a call be placed to an official at the local school to ask students to keep off our property but as we could not identify which school or students were involved it was decided to let the matter rest. |
| 27-Jul | ON | Other | FA | Other | Panic Attack | Panic Attack/shortness of breath | Oxygen was administered to correct the problem |
| 19-Sep | ON | Other | FA | Cut | | Laceration/pinch injury to middle finger left hand | Safety talk about recognition of pinch points and power tool safety. Advised to slow down and keep body exposure to a minimum - PPE |
| 31-Jul | ON | Other | NM | None | Vehicle Accident | Damage to driver's side door on 2002 Suburban | Avoid tight maneuvers when driving large vehicles |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 28-Mar | ON | Geologist | NM | None | | Person fell through thin ice, potential for hypothermia | Caution needs to be taken when working near open water. It was a good thing that more than one person went down to the water pump in case it was more serious issue. |
| 18-Mar | ON | Other | NM | None | Vehicle Accident | Driving too fast and going into the ditch | Speed limits are to be observed while driving in the community. Staff has been advised that a secondary person should be called upon for assistance with heavy loads. Alleviate future accident potential by prepping area (i.e. applying gravel) for better control of footing. |
| 1-Dec | ON | Other | FA | Sprain | Back Injury | Strained back | Ice pack applied, medical attention refused. Remind about correct lifting procedures. |
| 27-Nov | ON | Other | NM | None | | Pallet inside quarantine oven ignited when oven door was opened | When cooking pallets in the quarantine oven ensure that the temperature is at a setting that is not higher than 125 Celsius |
| 8-Dec | ON | Other | NM | None | | Employee almost hit by flying rock | The operator should walk a safe distance from the forklift, not directly in front or behind |
| 12-Jan | ON | Other | NM | Other | | Hurt smallest finger on left hand | Spoke with employee regarding reporting an incident ASAP to their supervisor and to always be safety conscious at all times. |
| 5-Oct | ON | Other | FA | Other | | Operator fainted | Advise the operator to drink 16 ounces of water as this may help reduce/prevent healthy people from fainting due to standing for long periods of time |
| July | NL | Field Assistant | NM | None | Vehicle Accident | To avoid hitting a bear, driver lost control of vehicle while braking on a gravel road and hit a boulder | Driving privileges suspended until evaluated |
| July | NU | Field Assistant | FA | Muscular Injury | Sore Shoulders | Moving a lot of lumber in camp resulted in sore shoulder | Received anti-inflamatories |
| July | NU | Geophysical Assistant | FA | Other | Tendonitis | Tendonitis in Achilles from walking | Received anti-inflamatories |
| July | NU | Helicopter Pilot | FA | Cut | | Helicopter pilot working around the aircraft banged his head. Minor cut | Cut was cleaned |
| 19-Mar | QC | Cook | FA | Sprain | | Snow machine rolled onto leg | Avoid riders on machines where possible |
| 19-Apr | QC | Geophysicist | MA | Sprain | | Throttle stuck when starting snow machine resulting in rider hitting snow bank and falling off | Start machines from standing position |
| 2-Jul | QC | Geologist | MA | Cut | | Cut thumb when pulling off metal strapping | Review requirement to wear applicable PPE (i.e. gloves) |
| 29-Aug | QC | Helper | MA | Other | Eye Injury | Foreign object in eye when cutting empty drums | Wear full face shield and eye goggles when cutting drums |
| 15-Aug | BC | Helper | FA | Muscular Injury | | Sore arm | Replaced helper |
| 20-Aug | BC | Helper | NM | None | Vehicle Accident | Drove ATV off road | Verbal reprimand |
| 7-Sep | BC | Helper | FA | Muscular Injury | Bruise | Fell on drill pad | Iced Injury |
| 5-Jan | MB | Line Cutter | MA | Cut | | Axe cut to leg | Review procedure |
| 3-Feb | MB | Geophysicist | MA | Other | Eye Injury | Scratch in eye by a twig | Remind use of safety glasses |
| 27-May | ON | Geophysicist | FA | Cut | | Rock fragment cut in face | Review sampling procedure |
| 23-Jun | ON | Field Assistant | FA | Sprain | | Sprained knee, carrying samples | Review load weight |

# Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 1-Jun | ON | Geologist | FA | Sprain | | Sprained wrist while using drill | Design new handles for drill |
| 5-Jul | ON | Geophysicist | MA | Muscular Injury | | Hit by a tree on ribs | Review procedure |
| 9-Aug | ON | Field Assistant | MA | Sprain | Vehicle Accident | Rolled ATV, cuts and bruises | Review driving and handling |
| 1-Sep | ON | Field Assistant | MA | Other | Eye Injury | Branch serrated the eye | Review use of safety glasses |
| 12-Oct | ON | Field Assistant | FA | Cut | | Slip, fall, cut shin | Review footwear and weather |
| 12-Oct | ON | Field Assistant | FA | Cut | | Slip, fall, cut shin | Review footwear and weather |
| 27-Oct | NL | Field Assistant | FA | Cut | | Rock chips cut finger | Reviewed use of gloves |
| 1-Jan | MB | Geophysicist | MA | Muscular Injury | | Geophysical contractor sprained back. Saw nurse, no report filed. | n/a |
| 12-Jan | MB | Other | MA | Muscular Injury | Vehicle Accident | Skidder driver pulled back muscles while driving 450 John Deere Timberjack. Timberjack blade striking rock causing jarring of his back. | Inattention to road conditions |
| 20-Jan | MB | Geologist | NM | None | Vehicle Accident | Project Geologist struck a vehicle located behind his truck while backing up causing minor damage to the other vehicle | Obscured rear vision due to snowmobile in rear of pickup truck |
| 24-Jan | MB | Field Assistant | NM | None | Vehicle Accident | Survey technician while doing DGPS surveying fell through the ice while using a snowmobile on lake. Lake depth was waist deep with only the rear end of snowmobile fell through ice. | Unfamiliarity with area - inattention. Warning markers placed around danger spot on lake. |
| 28-Jan | MB | Line Cutter | MA | Cut | | Linecutter cut finger while sharpening chainsaw. Required 6 stitches to mend wound. | No gloves worn; improper PPE |
| 1-Feb | MB | Line Cutter | FA | None | | Geophysical contractor's foot broke through ice. No report filed. | n/a |
| 1-Feb | MB | Line Cutter | FA | Cut | | Linecutter while linecutting tripped using snowshoes and fell on chainsaw blade using his hand to stop himself. Suffered cut to palm of hand. Gloves were worn reducing the severity of injury. | Walking with snowshoes with chainsaw - occupational hazard |
| 1-Mar | QC | Geologist | NM | None | Vehicle Accident | Geologist while driving to a drill took evasive action to avoid collision on an icy road. No report filed. | n/a |
| 10-Mar | MB | Field Assistant | FA | Cut | | Core technician cut tip of right thumb with rock saw. | n/a |
| 24-Mar | QC | Geologist | MA | Muscular Injury | | Suffered strong elbow and forearm pain in his right arm due to repetitive lifting of boxes of core in the core shack. He attended physiotherapy, and continued to work in the core shack in a supervisory role. | Repetitive lifting of boxes of core. Physiotherapy. |
| 19-May | ON | Geophysicist | FA | Cut | | Working tried to tighten screw with knife, slipped, cut finger | Use of proper tool for the job |
| 31-May | ON | Field Assistant | FA | Cut | | While riding ATV after rain, small branch punctured calf | Be careful riding in field, especially after rain |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 1-Jun | QC | Geologist | FA | Cut | | Geologist while putting his hands on the arm rest of a chair got his left ring finger stuck under the arm rest causing a light cut. | Defective and broken chair. |
| 5-Aug | BC | Other | NM | None | | One of the helicopter sling load straps holding drill core boxes gave way and boxes ended up dangling from straps. Only top two boxes had covers. Lower boxes started dropping core - about 6m of core were dropped out of helicopter sling load. No one was close when this happened so there were no injury consequences. | Specific action: helicopter sling straps need to be twisted in order to avoid creating an aerofoil. General action: Company is instituting protocols for helicopter slinging. Putting training in place for geologists and drillers for slinging operations. Implementing a system of certification for slinging operations. |
| 4-Aug | QC | Other | NM | None | | Unsecured metal clipboard fell from side basket of helicopter shortly after take-off. Mandatory check of all blades was conducted to ensure there was no damage to blade. | Loose equipment. |
| 8-Aug | QC | Other | NM | None | | Helicopter arriving to camp slinging 3 full drums of diesel fuel landed at camp. It picked up a passenger and took off but still had its load attached and bounced the drums along the ground. Two drums fell out of the net, but the last drum struck the generator shack on the ground and denting it's door. After striking the shack, the drum fell out of the net and the helicopter gained altitude with the empty net. The long line was then released and the helicopter immediately returned to the helicopter pad. | Long line released after the helicopter had landed. Pilot did not verify long-line was released prior to take-off. |
| 19-Aug | QC | Geologist | NM | None | | Geologist when going to check a print of the plotter, nearly tripped when he stepped backward from plotter. He caught his balance by hitting the table on the left of the plotter. | Power cord too short and creating trip hazard |
| 20-Aug | QC | Other | MA | Other | | Employee geologist was evacuated to Juujjuaq for stomach pains. She was then sent to Rouyn-Noranda for medical care. | n/a |
| 30-Aug | QC | Cook | FA | Cut | | Cook while chopping fruit cut his right thumb below the nail after knife slipped | Inattention |
| 1-Sep | YT | Line Cutter | MA | Skeletal Injury | | Member of contractor staking crew slipped, fell, and broke leg while staking in Yukon. He required medevac. | n/a |

## Appendix 3a: Incidents (Near Misses and Accidents) with No Lost Workdays - Surface Exploration and Geological Work

| Date | Prov/Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 3-Sep | QC | Cook | FA | Muscular Injury | | Cook was walking from his tent to the kitchen and slipped on a pallet twisting his right ankle. | Slippery uneven pallet surface. |
| 26-Sep | ON | Geologist | NM | None | Vehicle Accident | Lost braking power to wheels, puncture in brake line | Coasted to stop, maintenance schedule followed |
| 6-Oct | QC | Geologist | FA | Other | | Geologist suffered mild chemical burns in 2 places caused by a leaking bottle of diluted HCl acid | Acid bottle cap was loose |
| 12-Oct | QC | Geologist | FA | Cut | Eye Injury | Geologist when leaving the woods had a branch hit his eye. | Dense woods |
| 24-Oct | QC | Geologist | NM | None | Vehicle Accident | Geologist when visiting the Home Smelter was entering a van. The vehicle slowly started to move as he was half inside the vehicle | n/a |
| 8-Sep | ON | Line Cutter | MA | Cut | Vehicle Accident | While line cutter was travelling in back of pick up, machete slipped and cut arm | n/a |
| 12-Aug | ON | Field Assistant | MA | Other | | Chipped tooth | n/a |
| One company | ON,NL,MB | Various | NM | Various | | 73 incidents, conditions, and near misses | |

# Appendix 3b: Incidents (Near Misses and Accidents) with No Lost Workdays - Drilling and Underground Mining Directed at Exploration

| Date | Prov/ Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| Feb | ON | Driller | NM | None | | Rolled skidder | |
| 8-Oct | SK | Helper | NM | None | Substance Abuse | Presence of illegal substance on site and removal of employee off site | Supervisors reminded employees about the consequences of illegal drug possession in camp. The employee was removed from site immediately. |
| Dec | BC | Helper | NM | None | | Component fell off drill mast, almost hitting crew | Stop work, safety meeting, equipment check |
| 1-Mar | MB | Driller | NM | None | | Driller slipped on icy floor | n/a |
| 1-May | QC | Driller | NM | None | Vehicle Accident | Pick up truck burned and is a total write-off. No fire extinguisher in vehicle. | Electrical short |
| 3-Jun | QC | Driller | NM | None | | While slinging drill equipment, helicopter lost its load consisting of plywood, corrugated plastic sheets, styrofoam. | Lack of adequate straps and poor planning |
| 10-Jun | QC | Driller | NM | None | | While slinging drill core from drill to camp, one core box was lost and broken. Damaged box and core was recovered. | Improper loading and failure to secure load. |
| 28-Oct | NL | Driller | NM | None | | Helicopter lost 39 BQ rods while slinging. Rods have not been found. | Improper rod sling preparation. Helicopter company issued safety alert; drilling contractor submits report |
| 8-Jul | ON | Helper | NM | None | Vehicle Accident | ATV rollover | ATV course |
| May | NU | Helper | MA | Other | | Pipe broke, striking worker on head | Sent to hospital for observation |
| Aug | NU | Helper | MA | Muscular Injury | | Fell from height, straining ankle | Sent to hospital for treatment |
| Aug | NU | Driller | MA | Muscular Injury | | Strain to back from handling drill rod | Sent to hospital for treatment |
| Aug | NU | Helper | MA | Muscular Injury | | Strain to back while lifing core boxes | Treated by site medic |
| Aug | NU | Helper | MA | Cut | | Struck by object to face | Treated by site medic |
| May | NU | Helper | MA | Skeletal Injury | | Slipped and struck hand on object | Sent to medical facility to have X-ray |
| Sep | ON | Driller | MA | Other | | Jack-All slipped, striking the worker in the mouth and injuring teeth | Because of this and other problems with Jack-Alls, contractor has removed all Jack-Alls from their drill sites. |
| Oct | ON | Driller | MA | Skeletal Injury | | Stepped on uneven ground while unloading drill rods from the tractor and twisted left ankle | All crews notified that rods are to be unloaded from the rear of the vehicle while standing on ground level |
| Mar | ON | Driller | MA | Muscular Injury | | Worker pulled his inner groin when moving a rod from the sloop to the head | Crews informed and reminded of proper lifting techniques |
| Mar | ON | Driller | MA | Skeletal Injury | | When using a jack to level the drill, the bar slipped out and struck worker on hand | crews informed and made aware of the risk of using this type of jack |
| 29-Apr | BC | Core Cutter | MA | Other | Seizure | Personal illness/blacked out | n/a |
| 31-Jul | NU | Helper | MA | Other | Pre-existing illness | Angina attack | This was a medical problem that as not related at all to the job. Medical testing prior to remote fieldwork may prevent this from happening again. |

# Appendix 3b: Incidents (Near Misses and Accidents) with No Lost Workdays - Drilling and Underground Mining Directed at Exploration

| Date | Prov/ Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 10-Jun | SK | Helper | MA | Cut | | Injury to shin on right leg. Bruising and minor laceration. | The use of timber slats on which to la core boxes was revied and their use in the warehouse was suspended as they provided both a tripping hazard (the reason the employee was adjusting them) and could also lead to falls as the core boxes were not sufficiently stable for people to wlak on when they placed on the slats. The use of a hammer to knock the timber slats rather than lift them and place them manually was pointed out as an unsafe act and therefore should no longer be practiced. |
| 19-Aug | SK | Driller | MA | Cut | | 1"x1/4" laceration to right middle knuckle | Proper care and attention should be maintained at all times while working in and around the drill shack. Drilling is a dangerous occupation and this incident shows the need for all personnel on the rigs to be alert at all times. Had the driller been wearing gloves this incident may have been avoided. |
| 30-Jun | SK | Helper | MA | Skeletal Injury | | Fractured left pinkie finger | An injury like this should have been reported prior to starting the job |
| 17-Oct | SK | Driller | MA | Other | Pre-existing illness | Diabetic emergency (diabetes mellitus - hypoglycemia) | Glucose was given orally to patient and then transported to hospital. Supervisor wlil have to assess the worker's ability to work in settings where he can not be directly supervised by individuals with medical training who are familiar with Type I diabetics. |
| 7-Nov | SK | Helper | MA | None | | Chest and arm pain/numbness | Supervisors to review with employees proper lifting techniques |
| 2-Apr | QC | Helper | MA | Other | | Lost in tundra for ~4 days | Several corrective actions taken |
| 26-Aug | NL | Driller | MA | Cut | | Conetube fell on finger | Review tube handling |
| 23-Jan | MB | Driller | MA | Cut | | Drill foreman cut right hand requiring 12-15 stitches when exiting trailer | Dislodged step |
| 29-Jan | ON | Helper | MA | Skeletal Injury | | Helper broke finger after it caught in running block of drill | Keep hands away from moving parts |
| 11-Feb | ON | Driller | MA | Muscular Injury | Bruise | Driller had a bruised face after a snipe hit him in the head | Not allowed to use any longer |
| 13-Mar | ON | Driller | MA | Sprain | | Driller reported pain in shoulder after snowmobile went in hole | Keep speed low and pay attention to trail |
| 18-Mar | MB | Driller | MA | Muscular Injury | | Drill tower collapsed with 685m of rods resting against tower during bit change operation. Drill engine/transmission and chuck dislodged from skid assembly resting at a 45 degree angle. Helper No. 1 was on the tower, and suffered soft tissue injury to back. Helper No. 2 suffered bruise to his legs. Accident was not described using Incident Investigation report form. Reporting document is detailed, but not complete. | Inadequate tower support |
| 20-Mar | ON | Driller | MA | Skeletal Injury | | Rod fell 3 m through chuck on drill, hit helpers left wrist | n/a |
| 1-Jun | QC | Driller | MA | Other | Eye Injury | Mechanic got rust particle in eye. He waited 3 days before reporting to nurse, but by then eye began to scar. He had to be sent home to see doctor. | n/a |

# Appendix 3b: Incidents (Near Misses and Accidents) with No Lost Workdays - Drilling and Underground Mining Directed at Exploration

| Date | Prov/ Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 1-Jul | QC | Driller | MA | Cut | | Drill runner got one of his left fingers stuck between pipe wrench and drill head as he was screwing the rods together resulting in stiches needing to repair wound. Safety gloves were worn. | Rods unexpectedly slipped. |
| 17-Aug | ON | Driller | MA | Sprain | | Tightening rods, driller slipped twisting ankle | Grease rod ends to prevent rust build-up |
| 3-Aug | BC | Helper | MA | Cut | | Rod slipped in chuck and cut helper's finger | First aid then transported helper to Watson Lake for 3-4 stiches; no lost days |
| Jul | NU | Helper | FA | Other | | Thermal burn to arm | Treated by site medic |
| Jul | NU | Driller | FA | Other | | Drill rod broke off and struck worker in back | Treated by site medic |
| Jul | NU | Helper | FA | Other | | Finger caught between two barrels | Treated by site medic |
| Aug | NU | Helper | FA | Other | | Struck elbow against drill - contusion | Treated by site medic |
| Sep | NU | Helper | FA | Sprain | | Slip and fall | Treated by site medic |
| Sep | NU | Helper | FA | Sprain | | Gradual pain to back from mopping floor | Treated by site medic |
| Sep | NU | Helper | FA | Cut | | Punctured hand on nail | Treated by site medic |
| May | NU | Helper | FA | Skeletal Injury | | Contact with core boxes with hand | Treated by site medic |
| Mar | NU | Driller | FA | Other | | Splashed with linseed soap | Treated by site medic |
| Mar | NU | Driller | FA | Other | | Contact with hot surface | Treated by site medic |
| Apr | NU | Driller | FA | Sprain | | Slip and fall | Treated by site medic |
| Apr | NU | Driller | FA | Other | | Contact with chemical to face | Treated by site medic |
| Apr | NU | Helper | FA | Other | | Contact with chemical to feet | Treated by site medic |
| May | NU | Helper | FA | Sprain | | Slipped on ice, injuring knee | Treated by site medic |
| May | NU | Helper | FA | Other | | Slip and fall, injuring ribs | Treated by site medic |
| May | ON | Driller | FA | Muscular Injury | | Worker fell Into the water box and hurt knee and shoulder | Crews were instructed the water box is not to be used as a step as it is not intended for that purpose |
| Feb | ON | Driller | FA | Skeletal Injury | | Worker struck on the knee with a water swivel from the drill | Water swivel was relocated and incident reviewed with all crews |
| 15-Jan | BC | Core Cutter | FA | Other | FB in eye | n/a | n/a |
| 23-Mar | BC | Driller | FA | Other | Fall | n/a | n/a |
| 21-Apr | BC | Helper | FA | Other | Eye Injury | Core hit him in the face | n/a |
| 7-May | BC | Core Cutter | FA | Other | Fall | Sore leg | n/a |

# Appendix 3b: Incidents (Near Misses and Accidents) with No Lost Workdays - Drilling and Underground Mining Directed at Exploration

| Date | Prov/ Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 14-Jan | SK | Helper | FA | Other | Vehicle Accident | Head-on collision of two vehicles. Spill of about 3 litres of anti freeze | Crews have been informed several times about speed limit and road conditions. Meeting with entire camp personnel and discussion about driving in winter conditions, ways of improvement and warning of driving cautiously. Suggest installation of radios in all vehicles; ask all contractors to also install radios in all vehicles in order to be able to monitor the traffic as well as to be able to clal for help in emergencies. Get grader to grade road with serrated blades and put sand on the roads. Inquire about possibility of using a sand/gravel sprinkler for future programs. Meeting with the local RCMP officer to express concerns regarding management of traffic on the road, and if possible devise a road management plan. Spoke with entire camp, and stressed the need to travel at a speed appropriate to hte road conditions. Will discuss the issue of road safety with relevant government authority and suggest improving road conditions via straightening the road and improving visibility on corners by removing forest growth. |
| | | | | | | | Make driving in ciy wintry conditions a topic for toolbox discussion at safety meetings to educate drillers to adopt better driving habits. |
| 16-May | SK | Driller | FA | Cut | | The driller was tripping in using a figure either to lower the HDS pipes. The pipe slipped on the figure either and caused the cable to break. The break occurred at the weight on the cable. The cable whipped up and struck the driller in the lower right abdomen. | Use 2" clamp to hold the pipe during connections instead of the pipe wrench. |
| 22-May | SK | Helper | FA | Other | Burn or Scald | 1st deg burn to the right posterior hand, proximal to the thumb | Helper told to wear gloves when working in the drill shack |
| 5-May | SK | Helper | FA | Sprain | Back Injury | Sore lower back | The employee was placed on light duty until he fely well enough to return to his regular duties |
| 1-Jul | SK | Helper | FA | Sprain | | Stiff shoulder | Bring up taking it easier when starting helping as you need some time to get used to work and make sure you watch out for each other. |
| 27-Jun | SK | Helper | FA | Muscular Injury | | Bruise on left leg below knee | Make sure boots are clean on smooth surfaces to minimize slips as painted plywood on roof of drill can be slippery. The helped received first aid for his injuries and was instruced on safe work procedures while working on the drill roof. |
| 26-Jul | SK | Helper | FA | Muscular Injury | | Welt on side of neck | Make sure your hands are clean as if they are slippery you can drop things. Incident to be revisited at next Safety Meeting. |
| 13-Jun | SK | Helper | FA | Muscular Injury | | Bruising of finger | The injury occurred because he was trying to "strong arm" the equipment. Employee stated that if they lowered the casing into the sloop using the dirll's hoist instead of carrying the pipe the injury could have been avoided. Carrying and lifting procedures should be reviewed by foreman. Reporting if incidents/accidents should be mentioned again in tool box meeting. |

# Appendix 3b: Incidents (Near Misses and Accidents) with No Lost Workdays - Drilling and Underground Mining Directed at Exploration

| Date | Prov/ Terr | Occupation | Type | Nature of Injury | Notes | Incident Description | Action Taken |
|---|---|---|---|---|---|---|---|
| 8-Jun | SK | Helper | FA | Sprain | | Strain of elbow | This injury occurred becaues he was trying to "strong arm" the equipment. Emploee stated that if they lowered the casing into the sloop using the drill's hoist instead of carrying the pipe the injury could have been avoided. Carrying and lifting procedures should be reviewed by foreman. reporting of incidents/accidents should be mentioned again in told box meeting. |
| 2-Aug | SK | Helper | FA | Muscular Injury | Back Injury | Pain in lower back right side | Helper instructed to buy back brace and bend knees when lifting. He was also instructed to ask for assistance when carrying heavy loads. |
| 1-May | NL | Driller | FA | Cut | | Crushed finger between pop bottles | Review handling of bottles |
| 7-Aug | NL | Driller | FA | Muscular Injury | Back Injury | Pulled back muscle | Review lifting |
| 10-Jan | MB | Driller | FA | Other | | Driller had seizure at drill shack prior to doing any work | Physical |
| 19-Mar | MB | Helper | FA | Muscular Injury | | Drill helper got arm squeezed by 500# propane cylinder while moving it. Individual put on light duty. | Did not wait for help. |
| 5-Apr | QC | Driller | FA | Muscular Injury | Back Injury | While using a "Foot Clamp" the person injured his upper back and neck. No lost time. | n/a |
| 12-Apr | QC | Helper | FA | Muscular Injury | | During a bit change, helper suffered injury to right index finger when rod fell on his finger while attaching crown bit to the rod. | Worn controls for winch. Sensitibity for control was impossible to adjust. |
| 26-May | ON | Driller | FA | Muscular Injury | Back Injury | Mechanic complained of sore back | n/a |
| 1-Jul | QC | Helper | FA | Muscular Injury | | Helper got his finger stuck between a rock and a the drill wall as he was adjusting tarp at back of drill | Misjudgement of distance between tarp and drill wall |
| 1-Jul | QC | Helper | FA | Muscular Injury | | Drill helper twisted his left arm/wrist as he was unloading rods from truck | n/a |
| 5-Oct | QC | Helper | FA | Muscular Injury | | Drill helped injured left hand when core slid out of core tube and struck his hand | |
| 7-Dec | ON | Driller | FA | Muscular Injury | | Worker slipped on ice, fell on arm | Remind worker to be careul on slippery surfaces |
| 3-Sep | BC | Helper | FA | Muscular Injury | | Stretched shoulder lifting rods | Time off |
| Sep | NU | Supervisor | | Other | Eye Injury | Contact with chemical susbstance to eyes | Treated By Site Medic |
| One company | ON,NL,MB | Various | NM | | | contractors: 22 incidents, conditions, and near misses | |

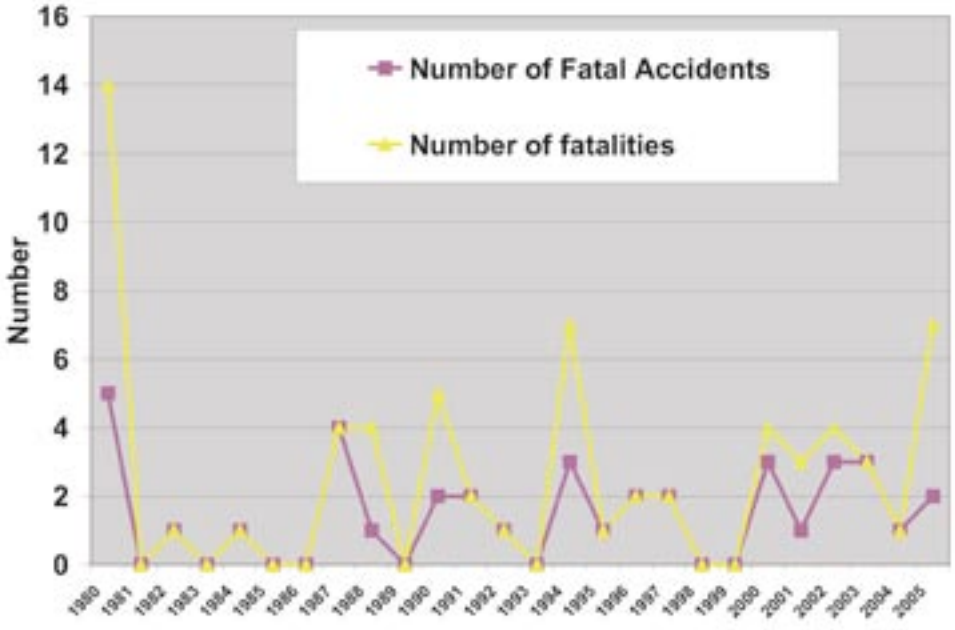
## Appendix 4: Fatalities in Mineral Exploration (1980-2005)

A compilation of fatal accidents in mineral exploration activities has been prepared by seeking information from practitioners in the area (see tables at end of this section). The data is not complete, and input is sought from members of the industry to update the database. A limited number of cases of fatalities during exploration in other countries is also tabulated. 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.

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 in Canada (1980-2005)

The graph below illustrates the trend in fatalities over time from 1980 to the present. The data prior to 1980 is clearly incomplete and would be misleading.



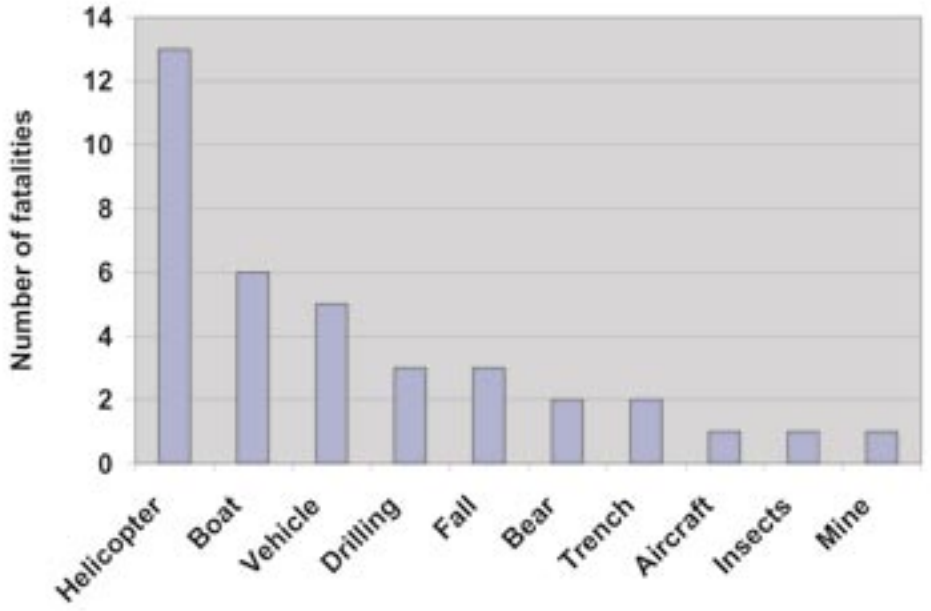

The graph shows the following points:

- There is no indication of a trend over time.
- The average number of accidents in a year is 2 and the average number of fatalities is about 3.
- Only 8 of the past 26 years (about one in three) had zero accidents.

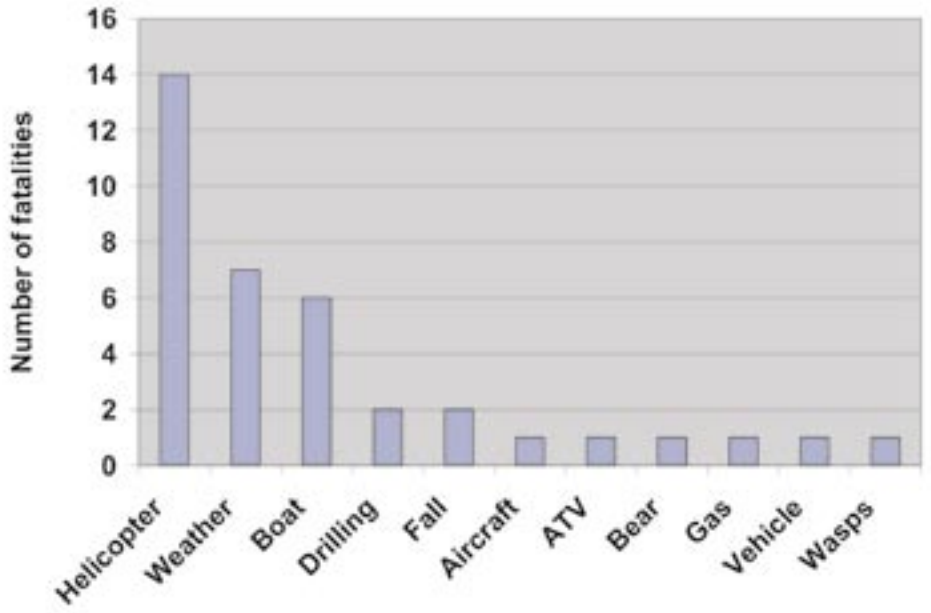
- For the past five years, there have been no years with zero fatalities.
- The year 2005 had the equal second highest level of fatalities in the 26 year period.

The data suggests that industry has not managed to make exploration significantly safer in relation to fatalities in the past 26 years, especially in the past six years. This is clearly a challenge for all concerned to take action.

The fatalities have been classified by first and second cause. The classification of prime **cause of Canadian fatalities** is plotted below.




The data for the **secondary cause** of fatalities in Canada shows the following:



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 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. The third and fourth equal categories - vehicles, drilling and falls - are major issues, and appear lower on this plot because accidents involve one fatality in each case. In fact there were 5 vehicle accidents each with 1 fatality each, 3 helicopter accidents with 13 fatalities in total (about 4 each), and 2 drilling related accidents with two fatalities. In addition, there was one more fatal accident classified as drilling, making up a third drilling one, where the secondary cause is classified as the helicopter dropping the drill mast.

Although weather is not prime cause of any of the fatalities, weather is the second 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.

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.

### Fatalities in Mineral Exploration

| Company | Year | Location | Cause | Category 1 | Category 2 | Involved | Personnel |
|---|---|---|---|---|---|---|---|
| Government | 1980 | NS | Trench collapse/rainstorm | Trench | Weather | 2 | Geologist/Field |
| Major | 1980 | Manitoba | Geologist drowning trying to swim to shore | Boat | Boat | 1 | Geologist/Field |
| Other | 1980 | Ontario | 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 | Ontario | Truck rolled on ice road | Vehicle | Weather | 1 | Driller |
| Major | 1987 | BC | Bear mauling | Bear | Bear | 1 | Driller |
| Other | 1987 | BC | Fell from box of pick-up truck | Vehicle | Vehicle | 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 | Boat | 4 | Geologist/Field |
| Other | 1990 | BC | ATV turnover | Vehicle | ATV | 1 | Geologist/Field |
| Other | 1991 | BC | Wasp sting, allergic reaction | Insects | Wasps | 1 | Geologist/Field |
| Major | 1994 | Ontario | Vehicle on ice | Vehicle | Weather | 1 | Geologist/Field |
| Major | 2000 | NWT | Tower dropped while slinging | Drilling | Helicopter | 1 | Driller |
| Major | 2001 | NWT | Helicopter crash - cause uncertain | Helicopter | Helicopter | 3 | Pilot/Geologist/Field |
| Major | 2002 | Ontario | 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 |

| Company | Year | Location | Cause | Category 1 | Category 2 | Involved | Personnel |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Other | 2003 | Ontario | Small plane crash | Aircraft | Aircraft | 1 | Geologist/Field |
| Major | 2005 | Quebec | Driller: bulldozer through ice | Drilling | Weather | 1 | Driller |
| 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/Field |
| 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/Field |
| Major | 2003 | Chile | Vehicle accident/sleeping | Vehicle | Vehicle | 1 | Geologist/Field |
| Other | 2003 | Mexico | Geologist swarmed by bees | Insects | Bees | 1 | Geologist/Field |
| Junior | 2004 | Eritrea | Murdered | Security | Security | 1 | Geologist/Field |
| Midsize | 2005 | Chile | Aircraft crash/hypothermia | Aircraft | Weather | 6 | Pilot/Geologist/Field |
| | | | | | | | |

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

# Appendix 5: Canadian Mineral Exploration Health & Safety Questionnaire



## Canadian Mineral Exploration Health & Safety Questionnaire

**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 2005 by:

a) "Company personnel" which includes employees and line-cutting, geophysical, geochemical, trenching etc. contractors
and
b) "Contractors engaged in drilling and underground work" for exploration and development. Please indicate the names of diamond drilling and underground contractors so that we do not duplicate information.
• Complete all the required fields, (*) indicates required fields
• If you have any questions about the form please contact Jonathan Buchanan at 604-689-5271 ext 225.
• 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: | | |
| **Address Information** | | |
| Phone: | | |
| *Street Address: | | |
| Street Address 2: | | |
| *City: | | |
| *Province/Territory: | | Postal Code: |
| **Additional required information** | | |
| *Does your organization have a Health and Safety Program: Yes___ No___ | | |
| *Reporting Period: | **2005** | |

*Please complete and return by fax 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*

# Appendix 5: Canadian Mineral Exploration Health & Safety Questionnaire

*Canadian Mineral Exploration Health & Safety Questionnaire* 2

| | |
|---|---|
| Company: | |
| Name of Drilling / Underground Contractors: | |
| **For companies and contractors working in different areas in Canada please provide Person - Days worked in each province or territory** | |
| *Worksite Location 1: | **Prov./Terr.** **Company Person- Days Worked**<br>_____ _____<br>**Contractor Person- Days Worked**<br>_____ |
| *Worksite Location 2: | **Prov./Terr.** **Company Person- Days Worked**<br>_____ _____<br>**Contractor Person- Days Worked**<br>_____ |
| *Worksite Location 3: | **Prov./Terr.** **Company Person- Days Worked**<br>_____ _____<br>**Contractor Person- Days Worked**<br>_____ |
| *Worksite Location 4: | **Prov./Terr.** **Company Person- Days Worked**<br>_____ _____<br>**Contractor Person- Days Worked**<br>_____ |

If additional space is required attach additional copies

**Did you experience any accidents, incident and/or near misses?**

***Yes__ No__**

**If YES, please complete the following form.**

*Please complete and return by fax 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*

# Appendix 5: Canadian Mineral Exploration Health & Safety Questionnaire



*Canadian Mineral Exploration Health & Safety Questionnaire*

***Corporate and personal information will not be published***

| Date (m/d/y) | Location | Prov/Terr | Occupation | Type | Lost Time | Nature of Injury | Accident Description | Action Taken |
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**Occupation:**
1-Cook
2-Driller
3-Field Assistant
4-Geologist
5-Geophysicist
6-Helper
7-Line Cutter
8-Miner
9-Surveyor
10-Other

**Type:**
1-NM (near miss)
2-FA (first aid)
3-MA (medical aid)

**Nature of Injury:**
1-Sprain
2-Cut
3-Skeletal Injury
4-Muscular Injury
5-Fatality
6-Allergies
7-Substance Abuse
8-Other

Date: _____, 2006 Signature: _____

*Please complete and return by fax 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*

## Acknowledgements

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We thank the following companies, including companies not active in mineral exploration in Canada, for responding to the *Canadian Mineral Exploration Health & Safety Survey.*

Adanac Moly Corp.
Aggressive Diamond Drilling Ltd.
Almaden Minerals Ltd.
Amarc Resources Ltd./Hunter Dickinson Inc.
Anglo American Exploration (Canada) Ltd.
AntOro Resources Inc.
Atna Resources Ltd.
Aur Resources Inc.
Auramex Resource Corp.
Aurum Geological Consultants Inc
Azimut Exploration Inc.
Barrick Gold Corporation
bcMetals Corporation
Bell Resources Corporation
Benton Resources Corp.
Bitterroot Resources Ltd.
Bluerock Resources Ltd.
(formerly Better Resources Limited)
Bootleg Exploration Inc.
Bralorne Gold Mines Ltd.
Cambior Inc.
Campbell Resources Inc.
Canadian Golden Dragon Resources Ltd.
Canadian Zinc Corporation
Caracle Creek International Consulting Inc.
Columbia Yukon Explorations Inc.
Contact Diamond Corporation
Cornerstone Capital Resources Inc.
Cypress Development Corp.
De Beers Canada Inc. Exploration Division
Ditem Explorations Inc.
Dressler Geological Consulting

Eastfield Resouces Ltd
Emgold Mining Corporation
Entrée Gold Inc.
Everton Resources
Falconbridge Limited
Finlay Minerals Ltd.
Flag Resources (1985) Limited
FNX Mining Company Inc.
Fortune Minerals Limited
Geodex Minerals Ltd.
Goldbrook Ventures
Goldrush Resources Ltd.
Gossan Resources Limited
Grayd Resource Corporation
Hard Creek Nickel Corporation
Harvest Gold Corporation
Inco Exploration
International Barytex Resources Ltd.
Landore Resources Canada Inc.
Laurion Gold Inc.
LMC Management Services Ltd./Sultan Minerals Inc.
Majescor Resources
Marathon PGM Corporation
Markland Resource Development Inc.
Merit Mining Corp.
MetalCORP Limited
Miramar Hope Bay Limited
Moneta Porcupine Mines Inc.
Namex Explorations Inc.
NEMI Northern Energy & Mining Inc.
North American Tungsten Corporation Ltd.
NVI Mining Ltd.
Orphan Boy Resources Inc.
Pacific Booker Minerals Inc.
Park Ambulance Services Ltd.
Probe Mines Limited
Quinsam Coal Corp.
Redcorp Ventures Ltd.
Rimfire Minerals Corporation
Rocmec Mining Inc.
Sage Gold Inc.
Santoy Resources Ltd.
SLAM Exploration Ltd.
Sydney Resource Corporation
Tamerlane Ventures, Inc.
Teck Cominco Limited
Tenajon Resources Corp.
Typhoon Exploration Inc.
Ursa Major Minerals Incorporated
Vault Minerals Inc.
Vedron Gold Inc.
Virginia Mines Inc.
Vismand Exploration Inc.
Waseco Resources Inc.
Western Canadian Coal Corp.
Western Keltic Mines Inc.
Western Troy Capital Resources Inc.
Wildrose Resources Ltd.
Winterbourne Explorations Ltd.
Wolfden Resources Inc.
Young-Shannon Gold Mines, Limited
Yukon Geological Survey

# ANNUAL REPORT 2005

# Canadian Mineral Exploration Health & Safety

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