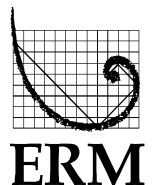


BRUCEJACK GOLD MINE PROJECT
Application for an Environmental Assessment Certificate /
Environmental Impact Statement

Appendix 5-H

**Brucejack Project: Preliminary Avalanche Hazard
Management Plan for Mine Construction and Operations**



Pretivm Resources Brucejack Project

Preliminary Avalanche Hazard Management Plan for Mine Construction and Operations

Date: August 22, 2013

Prepared by:

Alpine Solutions Avalanche Services

P.O. Box 417

Squamish, BC, V8B 0A4

www.avalancheservices.ca





August 22, 2013
Project No: 1204-001

Mr. Ian Chang, M.Sc., P. Eng., VP Project Development
Pretium Resources Inc.
570 Granville Street
Suite 1600
Vancouver, BC, V6C 3P1

Dear Mr. Chang,

Re: Brucejack Preliminary Avalanche Hazard Management Plan

Please find attached our preliminary Avalanche Hazard Management Plan for the Brucejack Project. This plan is expected to be further developed once further details are known regarding construction and operations activities and scheduling.

Thank you for the opportunity to complete this work.

Yours sincerely,

Alpine Solutions Avalanche Services
per:

Brian Gould, P.Eng.

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1.0 Introduction

Pretivm Resources Inc. (Pretivm) is proposing to develop a mine in the Coast Range of northwestern British Columbia, approximately 60 km north of Stewart, BC (Figure 1-1). The project includes several mine site facilities, a transmission line, and an access road. The project is expected to commence in 2013, and continue for several years into the future.

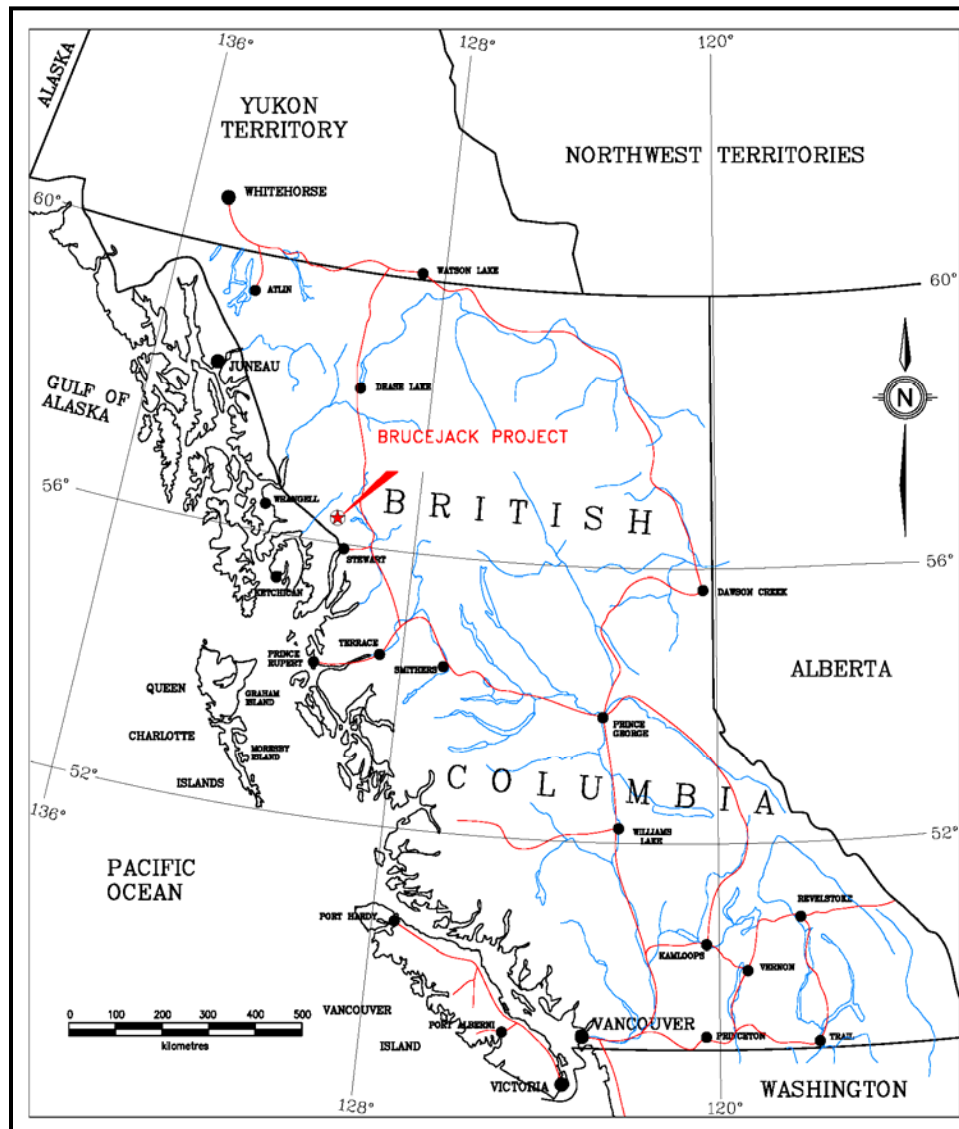


Figure 1-1 – Location of Brucejack Project

An avalanche hazard assessment was completed in the spring of 2013 (Alpine Solutions, 2013). This assessment identified numerous avalanche paths that affect proposed facilities and roads, and as a result recommendations were made for the development of an Avalanche Hazard Management Plan (AHMP) for the construction and operations phases.

This document provides a base outline of an AHMP that will be used by the project. Specific procedures are expected to be documented in greater detail than provided in this preliminary AHMP and modified as necessary throughout the construction and operations phase. Depending on the project requirements, an Avalanche Technician or team of technicians may be required to provide oversight and daily monitoring and control during avalanche season. The AHMP is intended to provide a structured risk reduction strategy, which reduces avalanche risk while minimizing disruption to work activities. Included are protocols for staff training, daily avalanche risk determination, worker safety training, equipment, and emergency response. Risk management measures contained within the plan reflect Pretium's priority to conduct mine operations safely and efficiently.

2.0 Physiography

2.1 Location and Terrain

The Brucejack Project is located in the northern Coast Range Mountains of British Columbia. The proposed mine site is located at the head of the Knipple Glacier, approximately 60 km north of Stewart and 38 km southwest of Bell 2. The proposed transmission line alignment extends from the Long Lake Hydroelectric Project north of Stewart, to the mine site via a route along the Salmon and Knipple Glacier valleys. The access road begins at the intersection of Highway 37 and Wildfire Creek, approximately 30 km south of Bell 2, and extends to the mine site via the Wildfire Creek, Scott Creek, Bowser River, and Knipple Glacier valleys.

The terrain in the project area is rugged, and several large glaciers descend alpine valleys to well below treeline elevation. The mine site area is located in an exposed alpine pass area surrounded by a glaciated landscape. The access road and transmission line are primarily located near valley bottom below treeline elevations, except where they ascend to the mine site area.

2.2 Snow Climate

The project area is located in a transition zone between maritime and continental climate zones in northern BC. As a result, there can be significant variations in snowfall and temperatures throughout the project area. Typical winter storm patterns can produce high intensity snowfall with strong winds depositing increased amounts of snow on lee (the side of slopes away from the principal wind direction) aspects. Average snowpack depths in the region range from 300 cm to 600 cm, although lee slope snowpacks are often much deeper. Temperature increases associated with some storms can produce rain-on-snow conditions up to ridge top elevations (1200 m to 1500 m). An average winter will include 10-20 large storm events, most of which can produce widespread avalanche conditions.

Avalanche season is defined as the time when avalanche hazards are expected to affect the project. The start of avalanche season varies from year to year, and is based on the time when the snowpack depth for avalanche threshold is reached. Typically this is determined annually by an Avalanche Technician. Avalanche season for the project normally begins in October at the higher elevations (above 1400 m), and often extends until late June or early July. At valley bottom elevations, avalanches can be expected from November to late May though can occur earlier or end later in extreme years.

3.0 Operational Objectives and Priorities

The objective of this Avalanche Hazard Management Plan is to ensure avalanche risk is low to personnel and facilities associated with the project while minimizing disruption to construction and operations activities. Avalanche risk reduction is accomplished primarily through the control of several avalanche hazard zones in the project area combined with the use of worker safety training /awareness. Avalanche explosive control may be undertaken to reduce risk when necessary, and structural mitigation may be required for permanent facilities located in avalanche risk zones. This AHMP outlines risk control measures that do not involve structural mitigation.

4.0 Roles and Responsibilities

Roles and responsibilities for personnel must be clearly determined at the beginning of the project. The success of the AHMP is contingent on mutual efforts by all personnel associated with the project. Table 4-1 outlines the suggested roles and responsibilities related to avalanche safety for the project.

Table 4-1 Roles and Responsibilities related to avalanche safety

Role	Responsibilities
Avalanche Planner	<ul style="list-style-type: none"> Professional member of the Canadian Avalanche Association (CAA) and meets scope of practice guidelines for the development of Avalanche Safety Plans Develop or review the active avalanche safety program, and provide approval of acceptable programs. Amend active avalanche safety program if necessary.
Qualified Registered Professional (QRP)	<ul style="list-style-type: none"> Hold a license in British Columbia as a professional engineer or professional geoscientist. Develop and approve any passive and/or fixed avalanche protection measures (zoning of buildings, earthworks and structural protection).
Supervisors/Foremen/ Crew Leaders	<ul style="list-style-type: none"> Review the avalanche assessments of a workplace before commencing work. Ensure workers in avalanche hazard areas are aware of, and comply with the AHMP. Ensure workers receive training and are qualified to perform rescue procedures.
Workers and Technicians	<ul style="list-style-type: none"> Participate in training. Understand the avalanche safety plan related to a workplace, if applicable. Ensure an appropriate risk assessment is done as part of the site safe work plan.

If an Avalanche Technician or team of technicians is contracted, the responsibilities indicated in Table 4-2 apply.

Table 4-2 Avalanche Technician Role and Responsibility

Role	Responsibilities
Avalanche Technician or Assistant Avalanche Technician	<ul style="list-style-type: none">• Meets CAA Scope of Practice requirements for specific role• Determines and provides daily hazard and risk assessments (Hazard Bulletins).• Provide on-site avalanche risk management and safety in order to ensure greatest possible opportunity for access to risk zones.• Conducts avalanche control blasting operations if required.• Conducts training sessions as required.

5.0 Equipment, Infrastructure Requirements

5.1 Snow and Weather

Snowpack and weather monitoring stations used for assessing avalanche conditions should be established at select locations within the project area. There are two types of stations that may be considered, and they include manual stations (basic or electronic equipment, typically accessed adjacent to roads), and remote telemetry stations (electronic equipment, typically accessed by helicopter only). Remote telemetry stations can provide real-time observations over radio or satellite link. The number, locations, and type (remote telemetry or manual) of these will depend on the requirements for avalanche conditions monitoring, as well as the location and extent of work being conducted in avalanche hazard areas. This would normally be determined in consultation with an Avalanche Technician, or technician team.

Weather and snowpack measuring instruments for each site should include thermometers with ability to log maximum and minimum values. Other equipment and instrumentation may include:

- Snow Boards or electronic equipment for measuring accumulated snowfall amounts at specified time intervals.
- Snowpack depth stakes (or equivalent electronic measuring device).
- Rain and/or precipitation gauges.
- Anemometer and wind vane (for wind speed and direction).
- Humidity Gauge.

5.2 Communications

VHF radio communication devices are important for communicating updates to avalanche hazard and for emergency response. During the construction phase ridge top repeaters may be useful for communication between valleys in which construction is taking place, or to the main office. Satellite phones may also be incorporated, depending on the communication requirements.

5.3 Avalanche Explosive Control

Typically avalanche risk control incorporates road or worksite closures during periods of high avalanche hazard. An avalanche explosive control plan may be required to reduce closures times and maintain construction schedule. This plan would normally be included as an appendix to the AHMP, and include documentation regarding the storage, transportation, and type of explosives, as well as detailed procedures for avalanche explosive control. A list of the regulations, protocols, acts, and standards is provided in Table 5-1.

Table 5-1 Avalanche Explosive Regulatory Agencies

Application	Agency/Regulation	Source
Worker Safety	Worksafe BC – Occupational Health and Safety Regulations***	http://www2.worksafebc.com/publications/OHSRegulation/Home.asp Part 11 – Fall Protection (for cornice control procedures) http://www2.worksafebc.com/publications/OHSRegulation/Part11.asp
		Part 21 – Blasting Operations http://www2.worksafebc.com/publications/OHSRegulation/Part21.asp
Transportation of Explosives	Transport Canada	Transport Canada Part V – Airworthiness Manual Requirements for helicopter control procedures in addition to WSBC Regulations http://www.tc.gc.ca/eng/civilaviation/regserv/cars/part5-standards-527-menu-1747.htm
	Transport Canada Transport Dangerous Goods Directorate	http://www.tc.gc.ca/eng/tdg/menu.htm Emergency Response Assistance Plan (ERAP) for transportation of explosives on public roads (TDG Regulations Part 7) http://www.tc.gc.ca/eng/tdg/erap-menu-72.htm Sample ERAP plan and application http://www.tc.gc.ca/eng/tdg/erap-example1-395.htm http://www.tc.gc.ca/eng/tdg/erap-application-109.htm TDG training requirements, TDG Regulations Part 6 http://www.tc.gc.ca/eng/tdg/clear-part6-121.htm
Storage of Explosives	Explosives Regulatory Division, Natural Resources Canada	http://www.nrcan.gc.ca/mms-smm/expl-expl/erd-dre-eng.htm Explosives storage and licensing http://www.nrcan.gc.ca/mms-smm/expl-expl/license-eng.htm Directive #60 – Quantity/Distance amendments Directive #61 – Explosives Magazine Security Surveillance Program Request from ERD NRC contact

*** Note – although Worksafe BC may not have authority with mining projects, the explosive use procedures required by the OH&S regulations are considered best practices.

5.4 Signage

Avalanche Area Indicator Signage

'Avalanche Area' indicator signage should be located at all access points to an avalanche hazard area. For access road hazard areas, they normally indicate not to stop as indicated in Photograph 5-1.



Photograph 5-1 – Avalanche Area sign

Avalanche Rescue Equipment

Signs indicating the locations of the avalanche rescue caches should be in plain view. They may be located at remote sites near avalanche areas (Photograph 5-2), or at site offices.



Photograph 5-2 – Avalanche Rescue Equipment location

5.5 Avalanche Safety Equipment

Transceivers - Workers that are working in avalanche risk zones are normally required to wear avalanche transceivers. They must be worn around the upper torso as suggested by the manufacturer and under any outer layers of clothing. Transceivers need to be turned on and in 'send' mode for the entire time they are worn. In addition, transceivers need to be tested for proper functioning before each use (usually at the start of a work shift).

Avalanche Rescue Equipment – Equipment includes items listed in Appendix A, and is normally located at sites designated by the Avalanche Technician, or technician team. All equipment should be stored in portable packs (with the exception of those items which will not fit in packs, e.g., long-handled shovels and one piece probes). Equipment should be located in a clean, dry environment either at the site office, or in unlocked weatherproof boxes at specified worksites. Boxes should be on an adjustable height pedestal to ensure they do not get buried with snow (Photograph 5-2).

Tags listing the pack contents are normally attached to the outside of each pack. Contents of packs are found in Appendix A. The equipment may be sealed with an easily removable seal. The seal must not restrict use during a rescue operation but it will allow for easy checking for cache tampering and equipment replenishment.

6.0 Training

Personnel working in avalanche hazard areas during avalanche season are required to attend avalanche awareness training prior to starting work. Training sessions range from a few hours to a full day depending on the nature of the exposure to each worker. Topics would be focused on providing a basic understanding of avalanche hazard, locations of potential avalanche hazard for the project, the avalanche forecasting program, and avalanche search and rescue procedures.

Training sessions should be conducted by an Avalanche Technician and should be made available anytime new personnel may be expected on site. The following topics would normally be covered:

- Information on the formation and nature of avalanches and recognition of avalanche terrain.
- Locations of all avalanche areas within their work region (review of the avalanche atlas).
- Daily avalanche bulletins and the project Avalanche Hazard Scale (Appendix B and C).
- Potential site access restrictions associated with the commencement of avalanche season.
- Safe travel procedures through avalanche areas.
- Avalanche rescue procedures including avalanche transceiver practice

7.0 Avalanche Areas and Avalanche Atlases

Preliminary avalanche atlas mapping has been prepared for the project (Alpine Solutions, 2013). Typically a more comprehensive atlas that includes oblique path photographs and detailed path

attributes would be completed in order to facilitate effective communication of avalanche hazard areas amongst project personnel and Avalanche Technicians.

8.0 Operational Procedures

8.1 Pre-Season Tasks Checklist

The following procedures will be completed annually, in the fall prior to the commencement of avalanche season:

- Avalanche training sessions should be scheduled with all personnel that may be working in avalanche hazard areas attending
- All contacts in the **Emergency Callout List** in the Rescue Plan must be updated.
- Avalanche transceivers should undergo an annual maintenance check, as indicated by the manufacturer. Normally this would include testing sending and receiving functions. In addition fresh new batteries should be installed.
- Check and replenish contents of rescue packs, as required.
- Any new worksite locations not previously assessed should be identified and an avalanche hazard assessment completed by a qualified Avalanche Planner.

8.2 Data Collection

Weather, snowpack, and avalanche information will be gathered by Avalanche Technicians for analysis from several different sources:

- On site observations by an Avalanche Technician or designate at the site
- Available internet-access remote weather stations (BC Ministry of Transportation and BC Ministry of Environment snow pillows)
- CAA Infoex® reports from local heli-ski and highway avalanche operations
- Other sources identified by an Avalanche Technician

Normally this will be compiled once per day for the Avalanche Hazard Bulletin, or more often when hazard is changing rapidly.

It is often necessary to conduct field studies and advanced snowpack observations in avalanche start zones, or on nearby slopes. In times of increasing hazard, this may be required on a daily or hourly basis to allow for increased forecast accuracy, and to help minimize disruption to operations.

8.3 Avalanche Hazard Bulletins

Daily avalanche hazard will be communicated to personnel in the form of an Avalanche Hazard Bulletin (sample format given in Appendix C). The bulletin should be posted, and relayed to daily work crews in the morning safety briefing, and anytime it may be updated throughout the day.

9.0 Emergency Response

In the event of an avalanche involvement, a rescue will need to be initiated immediately. TIME IS OF THE ESSENCE. If people are buried in a vehicle, they may have several hours of available oxygen if they are not injured. If they are buried on foot, then they may only have 10-15 minutes, or less.

Rescuer safety is of paramount importance in an avalanche rescue. Under no circumstance should a rescue party enter an avalanche area unless it is certain that the area is safe. If in doubt, consult with an Avalanche Technician.

There are 3 separate documents that make up the overall avalanche rescue plan

1. **Immediate Action Plan** – for those involved in, or witnessing an avalanche
2. **Incident Commander Plan** – for the site rescue leader
3. **Base Rescue Leader Plan** – for base/office personnel

The **Immediate Action Plan** is a one-page (two sided) card format that should be in every vehicle, and at worksites available for crews working in avalanche areas. It should be given to all workers entering the area.

The **Incident Commander Plan** should be available to safety personnel (in vehicle and office), and in first party rescue packs

The **Base Rescue Leader Plan** should be at the base office and used by personnel with access to outside phone lines.

Each of these plans is presented separately in Appendix D so they can be copied or printed out, and made easily available.

10.0 Closure

This document was prepared by Alpine Solutions Avalanche Services (Alpine Solutions) for the account of Pretium Resources Inc. The material in it reflects Alpine Solutions' best judgment in light of the information available to Alpine Solutions at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Alpine Solutions accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions, based on this report.

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References

Alpine Solutions Avalanche Services, 2013. Brucejack Project Avalanche Hazard Assessment. Report prepared for Pretium Resources Inc., submitted June 5, 2013.

Canadian Avalanche Association (CAA). 2002. Guidelines for Snow Avalanche Risk Determination and Mapping in Canada. McClung, D.M., Stethem, P. A. Schaerer, and J.B. Jamieson (eds.), Canadian Avalanche Association, 23 pp.

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Canadian Avalanche Association (CAA). 2006. Observational Guidelines and Recording Standards for Weather, Snowpack, and Avalanches.

Canadian Avalanche Association (CAA), 2011; Rescue Resource Directory. Avalanche Contact information directory updated annually by the CAA.

List of Appendices

Appendix A – Avalanche Rescue Equipment (Sample)

Appendix B – Avalanche Hazard Scale (Sample)

Appendix C – Avalanche Bulletin Template (Sample)

Appendix D – Avalanche Rescue Plan (Sample)

Other potential Appendices include:

- *Avalanche Atlas including Risk Zoning*
- *Explosive Use Procedures*
- *Staff Training Records*
- *Equipment, materials inventories*
- *Compendium of all legal, regulatory, contractual, or other references*

Appendix A –Avalanche Rescue Equipment

The following is a sample listing of requirements for avalanche rescue equipment. The actual numbers of each piece of equipment would be determined based on requirements for the worksite or operation.

Normally each worksite would have 2 avalanche rescue packs, and one set of 'additional items'.

Avalanche Rescue equipment may also be located in Safety Personnel vehicles.

Avalanche Rescue Pack Contents:

- **6 X 3.2 m collapsible probes**
- **2 Short - handled Rescue shovels - "D" handle preferred**
- **Basic first aid kit in weatherproof case**
- **6 Headlamps - new batteries each winter - remove each spring**
- **Tarp**
- **Blanket**
- **4 Chemical heat packs**
- **25 marker wands**
- **1 roll of flagging tape**
- **6 spare Avalanche Transceivers**
- **Fox 40 whistle or Air horn.**

Additional Items:

The following additional items are located outside of the packs, and in an unheated environment to limit the buildup of ice during a rescue:

- **10 Solid section probes – 3.2 m X ½" rigid conduit**
- **4 Steel spade shovels**

Appendix B –Avalanche Hazard Scale (Sample)

Hazard	Definition	Safety Measures	Closures
LOW	Avalanches are unlikely	<ul style="list-style-type: none"> No special safety procedures required Stationary work may occur in avalanche zones 	None
MODERATE	<p>Small avalanches are likely, but are expected to terminate above access roads and worksites</p> <p>Large avalanches are possible, but are expected to terminate far above access roads and worksites</p>	<ul style="list-style-type: none"> No personnel working outside of vehicles within avalanche zones Stationary work in avalanche zones only on approval from Avalanche Technician NOTIFY Safety Officer and/or Avalanche Technician immediately if you observe any new avalanche occurrences 	None
CONSIDERABLE	<p>Small avalanches may affect access roads and worksites</p> <p>Large avalanches are possible, but expected to terminate above access roads and worksites</p> <p>Snow dust events may affect access roads</p>	<ul style="list-style-type: none"> No personnel working outside of vehicles within avalanche zones No stationary vehicles within avalanche zones NOTIFY Safety Officer and/or Avalanche Technician immediately if you observe any new avalanche occurrences Safe Travel Procedures employed for travel through avalanche zones (minimum 300 m spacing) 	<p>All worksites in avalanche zones closed, unless approved by Avalanche Technician</p> <p>All access road avalanche zones on standby for closure</p>
HIGH	<p>Numerous small avalanches are expected to affect access roads and worksites</p> <p>One or more large avalanches may affect access roads and worksites</p>	<ul style="list-style-type: none"> Close and sweep the avalanche zones using Standard Closure Procedures Under no circumstance should there be workers in, or any travel through avalanche zones. 	All access road and worksite avalanche zones closed
EXTREME	<p>A widespread avalanche cycle is occurring</p> <p>Numerous large avalanches are expected to occur in all avalanche paths, all areas</p>	<ul style="list-style-type: none"> Close and sweep the avalanche zones using Standard Closure Procedures. Under no circumstance should there be workers in, or any travel through avalanche zones 	All access road and worksite avalanche zones closed

Appendix C – Avalanche Bulletin (Sample)

AVALANCHE HAZARD BULLETIN		
BRUCEJACK PROJECT		
Issued On:		
Valid Until:		
HAZARD RATING:	Zone A:	
	Zone B:	
	Zone C:	
CLOSURES:		
Weather Observations:		
Weather Forecast:		
Avalanche Occurrences:		
Snowpack Discussion:		
Avalanche Activity Forecast:		
Avalanche Control Planned:		
Avalanche Technician:		

Appendix D – Avalanche Rescue Plan (Sample)

The following rescue plan is designed to assist personnel who are involved in, or witness an avalanche incident.

This Rescue Plan contains the following documents:

1. Avalanche Rescue CARD

This is a quick reference card (2-sided) for use if you are involved in, or witness an avalanche incident

2. Incident Commander Plan

Actions to be taken by the on sight Incident Commander (IC) to initiate the rescue response at the accident site

3. Base Rescue Leader Plan

Actions to be taken by the Base Rescue Leader in coordination with the Incident Commander

Keep this rescue package in your vehicle or with you during line patrols for quick reference during an emergency response.

AVALANCHE RESCUE CARD

Immediate Action (for VEHICLE or WORKSITE)

If you are in an avalanche in a vehicle, do the following:

1. Shut off the engine and lights
2. DO NOT smoke
3. NOTIFY others on the radio;
4. If you are wearing an avalanche transceiver, check to make sure it is on
5. Turn your four way flashers on
6. Honk briefly 2-3 times/minute
7. If you are completely buried, try pushing a probe out of the snow
8. Stay calm and wait to be rescued

DO NOT GET OUT OF VEHICLE TO DIG YOURSELF OUT, AS ANOTHER AVALANCHE COULD COME DOWN. WAIT FOR INSTRUCTIONS FROM AVALANCHE PERSONNEL

If you witness an avalanche accident, do the following:

1. WATCH as victims are carried along by the avalanche and note the last seen point. Do not lose track of this point. If possible, establish number of people in avalanche.
2. NOTIFY a safety officer and/or on site avalanche personnel and inform them of details (radio, cell phone, satellite phone). **Do not leave to get help.**
3. ENSURE SAFETY to yourself and others by not entering avalanche area until site is deemed safe (this may involve contacting avalanche personnel)
4. Once site is deemed safe and/or sentry is in position, switch your transceiver (if you have) to 'Search' mode, and PERFORM an INITIAL SEARCH looking for clues in the snow, and signals on your transceiver.
5. Once you are close to victim, begin probing until you strike victim. Leave probe in.
6. Shovel to victim, and ensure they have a clear airway and begin first aid.

AVALANCHE RESCUE CARD

STAY CALM

CALL FOR HELP – DO NOT GO FOR OUTSIDE HELP

- 1) Choose/assign a **LEADER**
- 2) **CALL FOR HELP:** use phone or radio if possible
- 3) **ASSESS SAFETY** and use appropriate measures:

- Risk of further avalanche
- Route safety
- Avalanche guard/signal

- 4) Head count: **HOW MANY MISSING**

- 5) Identify/mark **LAST SEEN POINT**

- 6) Turn all **TRANSCIVERS TO RECEIVE**

IF YOU ARE BURIED IN A VEHICLE, do the following:

1. Shut off the engine and lights
2. DO NOT smoke
3. NOTIFY others on the radio
4. If you are wearing an avalanche transceiver, check to make sure it is on
5. Turn your four way flashers on
6. Honk briefly 2-3 times/minute
7. If you are completely buried, try pushing a probe out of the snow
8. Stay calm and wait to be rescued

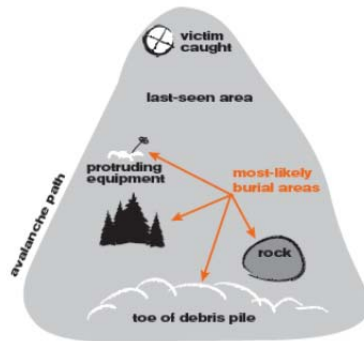
DO NOT GET OUT OF VEHICLE TO DIG YOURSELF OUT, AS ANOTHER AVALANCHE COULD COME DOWN. WAIT FOR INSTRUCTIONS FROM SAFETY OFFICER OR AVALANCHE PERSONNEL

- 7) Determine the **SEARCH AREA:**

- Below last seen point
- In deposition areas

- 8) **Prioritize search area if necessary:**

- Fall line below last seen point
- In line with clues
- In terrain traps



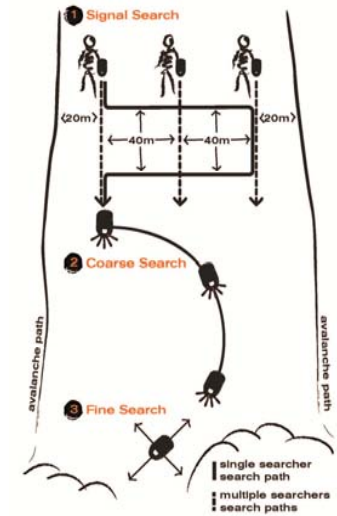
Likely Burial Areas

- 9) **SIGNAL SEARCH:**

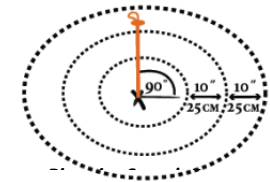
- 40 m search strip width
- Look/listen to transceiver
- Investigate visual clues
- Probe/shovel/first aid accessible

- 10) **Transceiver signal: start coarse search, MOVE FAST**

- 11) **Fine search: MOVE SLOW and bracket**

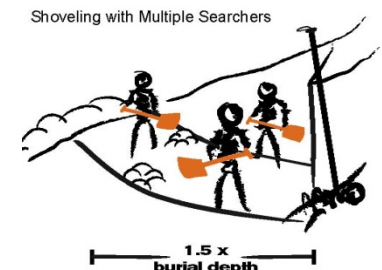
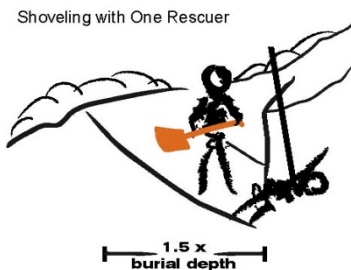


- 12) **Pinpoint search:** systematic probing pattern. Remove probe only if necessary



- 13) **SHOVEL: AS FAST AS POSSIBLE:**

- Dig from below and towards tip of probe
- Change shovelers often
- Be careful near the end of probe



- 14) **PATIENT CARE,** treat for hypothermia/shock/injuries, and **GROUP SAFETY** watch for hypothermia/fatigue

KEEP LOOKING!

Images courtesy of BACKCOUNTRY ACCESS

INCIDENT COMMANDER (IC) PLAN

Avalanche Rescue Guide IMMEDIATE ACTION – IC

AS INCIDENT COMMANDER YOU LEAD THE ON-SITE RESCUE RESPONSE

Step 1 Retain witness(es) and establish communications

Reported by/Witness: _____ **Time:** _____

Step 2 Notify base; appoint Base Rescue Leader; Initiate Rescue Plan

Base Rescue Leader: _____

Step 3 Initiate closure of avalanche area and select safe assembly site. Assemble and dispatch first party with rescue packs. Have rescue equipment sent to assembly site.

First Party Leader: _____

Step 4 Identify and contact required outside resources

Step 5 Maintain communications: log “in/out” personnel and equipment. Record details in Initial Party Personnel Log Sheet.

INCIDENT COMMANDER CONFIRMED ACCIDENT PARTICULARS

1. Date:	
2. Time Accident Reported:	
3. Reported by:	
4. Location of Accident: (Avalanche Path / Zone Number)	
5. Time Accident Occurred:	
6. # of Vehicles Caught:	
7. # of People Caught:	
Names	1.
(indicate whether transceivers are worn, if known)	2.
	3.
	4.
	5.
	6.

FIRST PARTY LEADER OR INCIDENT COMMANDER AT ACCIDENT SITE

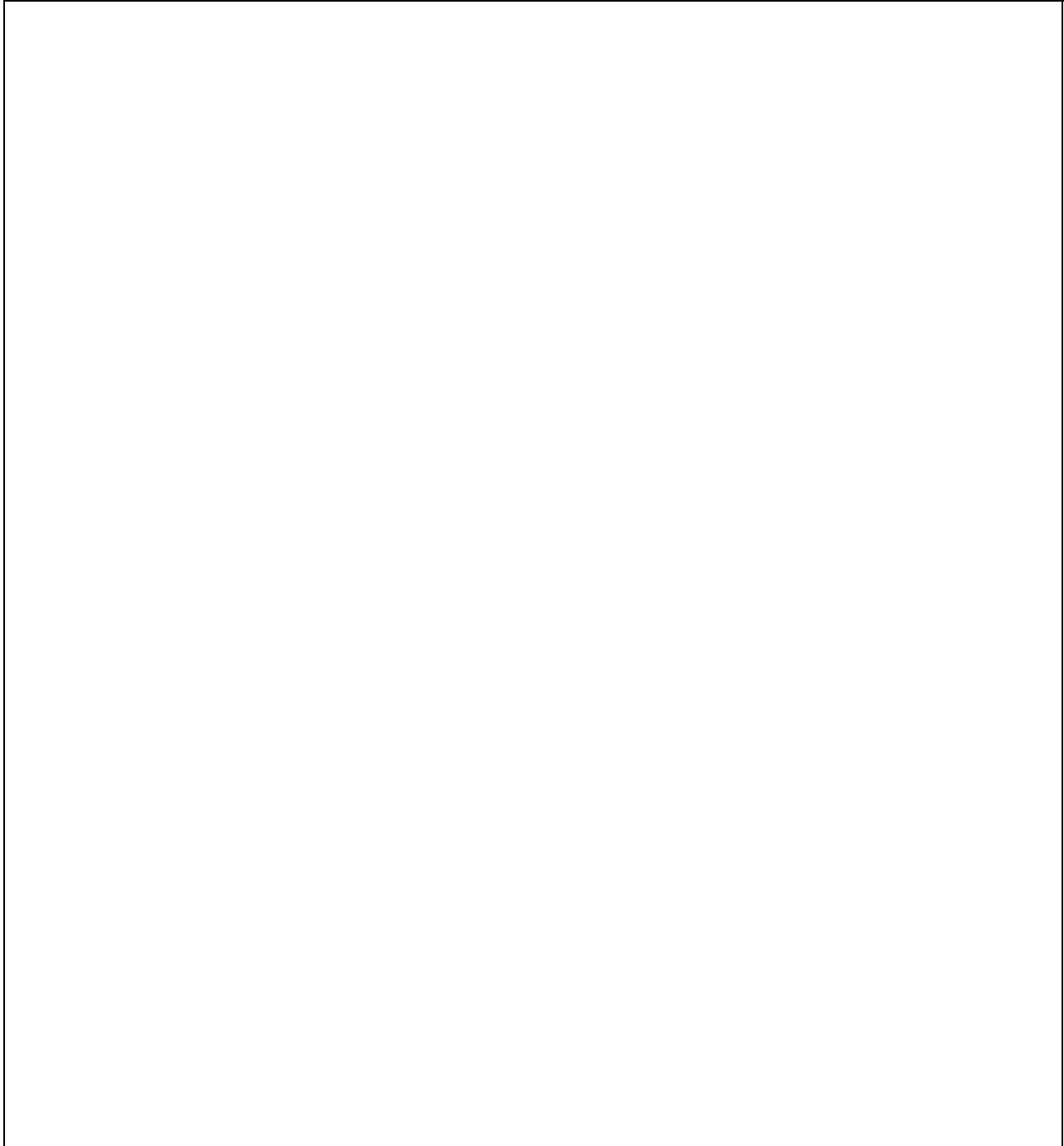
- | | Time Completed |
|---|----------------|
| 1. First Party arrival time recorded: | _____ |
| 2. Move all Personnel to Safe Location | _____ |
| 3. Hold and question Witness | _____ |
| 4. Re-Evaluate Avalanche Hazard (consult Avalanche Technician) | _____ |
| 5. Establish a Watchman with a Warning Signal (Whistle) | _____ |
| 6. Establish Escape Routes | _____ |
| 7. Establish and Mark the Last Seen Point . (If witness available) | _____ |
| 7. Conduct an Initial Search spot probing likely areas
(if not already initiated) | _____ |
| 9. Use Avalanche Rescue Beacons, Probes, and Shovels | _____ |
| 9. Once beacon search is completed, Return Beacons to Transmit
for Coarse Probe of Likely Areas . Repeat if necessary. | _____ |
| 11. Proceed with systematic Coarse Probe of the
entire avalanche. Repeat if necessary. | _____ |
| a) for Vehicles: 1.2 m by 1.2 m
(one hole per large step) | |
| b) for People: 75 cm by 70 cm
(three holes per step, probe left, right and center before stepping forward) | |
| 12. Mark outline of avalanche deposit and all probed areas
with flagged wands . | _____ |
| 13. Draw a Map of the avalanche, marking all areas as they
are probed and any other pertinent details. (On page 7) | _____ |
| 14. Prepare to direct Dog search on arrival. Keep site uncontaminated. | _____ |

INITIAL PARTIES - PERSONNEL LOG SHEET

<u>Name / Affiliation</u>	<u>Arrival Time</u>	<u>Departure Time</u>
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____
9. _____	_____	_____
10. _____	_____	_____
11. _____	_____	_____
12. _____	_____	_____
13. _____	_____	_____
14. _____	_____	_____
15. _____	_____	_____
16. _____	_____	_____
17. _____	_____	_____
18. _____	_____	_____

MAP SKETCH

Use this sheet to sketch the accident site. Indicate the avalanche boundaries including the starting zone and run out zone. Mark the last seen point and the location where the victim came to rest or was buried. If possible,
TAKE PHOTOS.

A large, empty rectangular box with a thin black border, occupying the central portion of the page. It is intended for a hand-drawn map sketch of an accident site, as indicated by the text above it. The box is completely blank, with no lines or markings inside.

VICTIM PARTICULARS

A. VEHICLES FOUND		
Vehicle:	Damage (Y/N):	Time Found:
1.		
2.		
3.		
4.		
5.		

B. PEOPLE FOUND				
Name:	Address:	Age:	Gender:	Nature of Injury:
1.				
2.				
3.				
4.				
5.				

INCIDENT COMMANDER SECURING OPERATIONS

- | | <u>Time Completed</u> |
|--|-----------------------|
| 1. Commencement of securing operations (time): | _____ |
| 2. All Personnel safely returned: | _____ |
| 3. All equipment accounted for: | _____ |
| 4. Time of arrival at Camp: | _____ |
| 5. Check all equipment and restore, replace, or repair immediately: | _____ |
| 6. Work with avalanche contractor to prepare final report on accident and rescue | _____ |
| 7. Notes: | |

Avalanche Rescue Plan

BASE RESCUE LEADER

This is a quick-reference guide to help you (Base Rescue Leader) coordinate the rescue response with the Incident Commander by ensuring that resources are dispatched and tracked, incident details are recorded, and communications are maintained.

1. INCIDENT REPORTING INFORMATION
--

- Retain witness(es) and maintain communication (radio/cell)

1. Date:	
2. Time Accident Reported:	
3. Reported by:	
4. Location of Accident: (Avalanche Path / Zone Number/ Structure or Site)	
5. Time Accident Occurred:	
6. # of Vehicles Caught:	
7. # of People Caught:	
Names	1.
(indicate whether transceivers are worn, if known)	2.
	3.
	4.
	5.
	6.

2. HAZARDS

Confirm the following from Incident Commander:

Is there further avalanche hazard? YES / NO / UNKNOWN

Is the hazard assessment reliable? YES / NO

Can the witness see the slopes above? YES / NO / UNKNOWN

Is the witness knowledgeable? YES / NO / UNKNOWN

WEATHER: SNOWING: Light / Moderate / Heavy

RAINING: Light / Moderate / Heavy / Mixed rain and snow

VISIBILITY: Unlimited / Limited / Variable

Approximate ceiling elevation: _____

TIME: Hours of daylight remaining: _____

OTHER: Difficult terrain (Creek gully, cliffs, etc)

3. INITIAL RESOURCES REQUIRED

Resources presently available at the Incident Site:

Number of Rescuers: _____

Number of Shovels: _____

Number of Probes: _____

Number of Vehicles: _____

First Party Rescue Team: LEADER: 1. _____

TEAM: 2. _____

3. _____

4. _____

5. _____

6. _____

Number of vehicles dispatched to site: _____

4. ADDITIONAL RESOURCES REQUIRED

Additional Personnel:

Name:	1. _____	Time Dispatched:	_____	ETA:	_____
	2. _____		_____		_____
	3. _____		_____		_____

First Aid Supplies: O2, Blankets, Spine Board & Collars, Hypothermia Kits, etc.

Other Equipment: Snow Removal, Snowmobiles, Lighting, etc.

5. OUTSIDE RESOURCES REQUIRED

The following table should be used to contact outside resources as necessary. Depending on the seasonal availability of outside resources, they should be prioritized and sequenced in order of most helpful to least helpful.

BRUCEJACK PROJECT– AVALANCHE Emergency Contact Information (SAMPLE)				
Organization	Name	Location	Phone	Alternate Phone
Brucejack Emergency Contact				
Avalanche Technician #1				
Avalanche Technician #2				
Brucejack Contact #1				
Brucejack Contact #2				
Emergency Response Organizations				
RCMP		Provincial	911	Federal OCC 604-264-2470
BC Ambulance		Provincial	911	Air Ambulance 1-800-561-8011
Provincial Emergency Program (PEP)	Emergency Coordination Centre	Provincial	1-800-663-3456	1-888-344-5888
Avalanche Response Assistance				
Avalanche Rescue Dog - CARDA				
RCMP dog handlers/heli				
BC Ministry of Highways/Infrastructure Avalanche Programs		Stewart Terrace		
Helicopter Companies				
Heli-Ski Operators				
Last Frontier		Bell 2		
		Stewart		
Other Organizations				
Canadian Avalanche Centre	Incident reporting	Revelstoke	250-837-2141	

6. DEMOBILIZATION

TASK	Time Complete	Initial
1. Inform management of completed rescue operation		
2. Demobilize agencies alerted (Avalanche Rescue Log)		
3. Account for local rescue personnel (Base Rescue Record and Log Sheet)		
4. Track patients transported (Patient Log Sheet)		
5. Photograph the accident site: Sketch map of key locations – avalanche path and deposit; location(s) worker(s) caught, last seen point, point of rest or burial location.		
6. Record witness statement(s)		
7. Account for rescue equipment		
8. Clean, repair, and restore equipment		
9. Prepare accident reports as required		

