Appendix 11-A

Brucejack Project – Preliminary Identification of Geohazards for the Proposed Transmission Line

ERM

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Suite 500 - 1045 Howe Street, Vancouver, British Columbia, Canada. V6Z 2A9
Telephone (604) 684-5900 Fax (604) 684-5909

BGC Project Memorandum

To:	**Pretium Resources Inc.**	**Doc. no:**	**BJ-2012-26**
Attention:	**Ian Chang**	**cc:**	**Mike Wise**
From:	**Betsy Waddington**	**Date:**	**24 September 2012**
Subject:	**Brucejack Project – Preliminary Identification of Geohazards for the Proposed Transmission Line**		
Project no:	**1008-007-013-02**		

1.0 INTRODUCTION

BGC Engineering Inc. (BGC) was retained by Pretium Resources Inc. (Pretium) to complete a preliminary identification of geohazards for a proposed 65 km long transmission line to their Brucejack project, located in northwestern British Columbia (Figure 1-1). The transmission line is to be constructed by Valard Construction Ltd. (Valard) and this study was requested by Valard to identify geohazards that may impact the transmission line.

The Brucejack deposit is located about 65 km north of Stewart BC, and the proposed transmission line would travel north from Stewart up Bowser River to Knipple Glacier then west to the proposed mine near the south side of Brucejack Lake, (Figure 1-1). The terrain surrounding the transmission line was viewed during a helicopter overview flight to identify signs of geohazard potential including mass movement processes such as rock fall, debris flow, debris or rock avalanches, as well as fluvial processes (debris floods and floods). No airphotos of the route were available at this time.

Evaluation of geohazards is usually required as part of an Environmental Assessment Application (EAA), and as part of Special Use Permit applications for road construction. As of the date of this memorandum it is unknown if a geohazard assessment will be required by regulators for this project. This memorandum provides the first step for such an assessment. It can be used as the starting point for more detailed assessments of geohazards and associated risks, should they be required in the future by Pretium or regulators.

1.1. Scope of Work

The scope of work includes identification of existing landslide and fluvial geohazards with the potential to impact the proposed transmission line shown on Figure 1-1. This work was requested by Mike Wise of Valard Construction Ltd via email on March 13, 2012 and approved by Ian Chang of Pretium. In particular Valard wanted to determine if there were any geohazards which could not be spanned and would require re-routing of the transmission line.

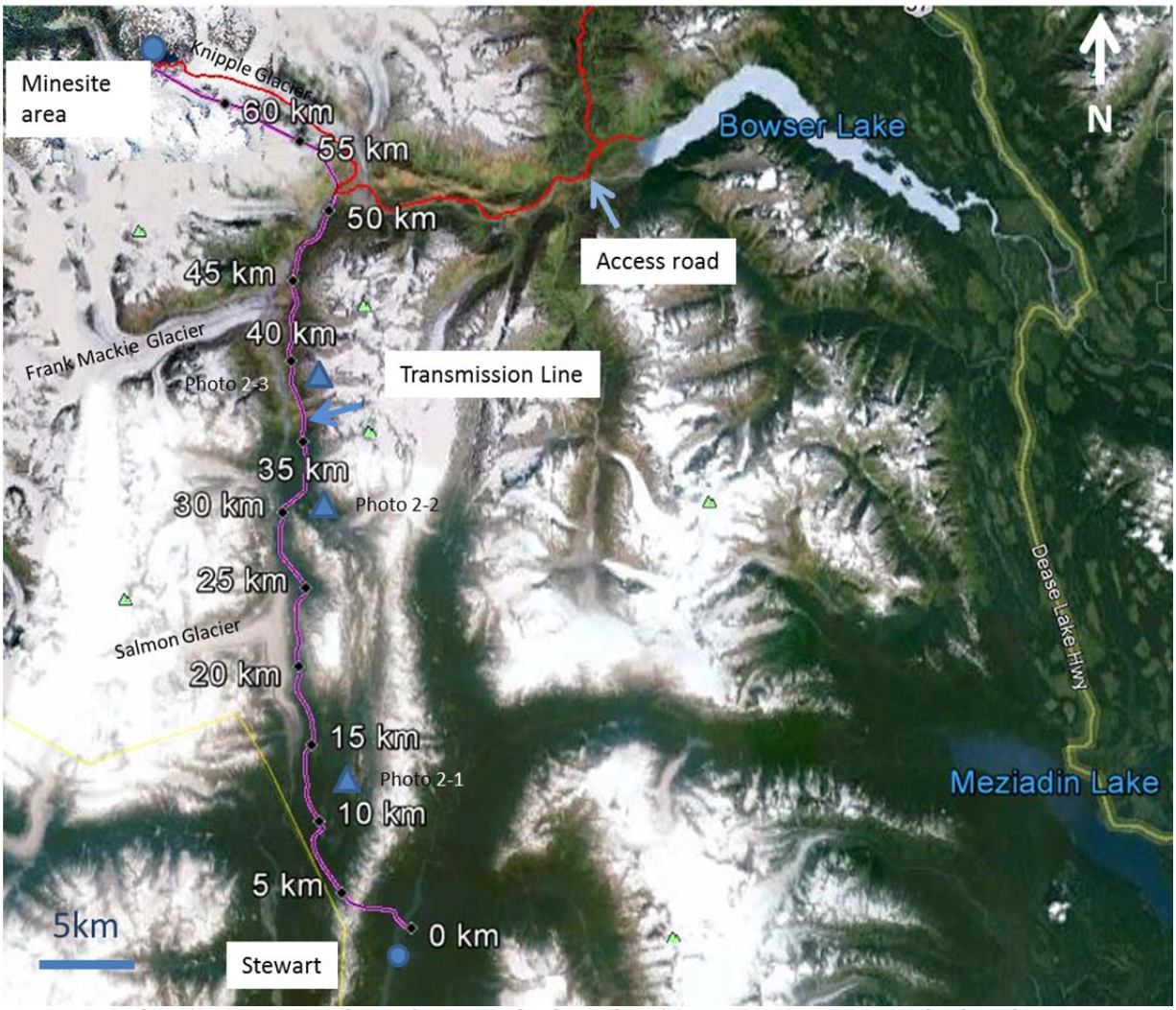


Figure 1-1. Overview of Transmission Line from Stewart to Brucejack Lake

This work is based on a half day helicopter overview flight of the transmission line by BGC's senior geoscientist, B. Waddington with M. Wise of Valard completed on July 31st, 2012. Low cloud and rain were present during the flight; visibility along the route was adequate, although some higher ridges were obscured. Potential hazards were identified visually and are tabulated within this memo, no terrain or geohazard maps were produced.

This report does *not* include the following assessments related to geohazards:

- terrain stability or landslide inventory mapping;
- identification or mapping of snow avalanche geohazards;
- analysis of landslide frequencies or magnitudes;
- analysis of design flood discharges at channel crossings;
- assessment of geohazard risks; or
- identification of mitigation options.

The above assessments are likely to be required if the project is required to undergo a Federal Environmental Assessment which at the time of this memorandum is unresolved. BGC understands that snow avalanche geohazards will be addressed separately by Alpine Solutions Avalanche Services. All interpretations of geohazards in this memorandum are subject to air photo and field confirmation.

1.2. Sources of Data

At the request of Valard, Alpine Solutions provided BGC with Drawings 1 to 11 of the transmission line route dated July 22, 2012, and a GPX track of the route. These drawings have not been included in this document.

1.3. Physiography, Geology and Climate

Bowser River is located within the northwestern Coast Mountains of B.C. It flows in a typical glacially carved valley with gentle upper slopes which drop into steeper valley walls that grade into gently sloping valley floors. The transmission line route, which follows the Bowser valley from km 0 to km 50, then runs west along the south side of Knipple Glacier to Brucejack Lake, is largely underlain by Lower to Middle Jurassic Hazelton Group bedrock, comprised of folded and faulted sedimentary and volcanic rocks. Small gabbro intrusions and basaltic dykes underlie the route along the Knipple Glacier (Britton and Alldrick, 1987). The area receives about 1,600 to 2,000 mm of precipitation annually, most of which falls during the fall and winter months (Rescan 2011).

2.0 GEOHAZARD IDENTIFICATION

This section identifies geohazards with the potential to affect the proposed transmission line. The proposed line is expected to be constructed with a mix of wood and steel poles which will allow longer spans where necessary. Many of the hazards can be spanned as they are narrow features but the actual tower and pole locations will be needed as the next step to confirm this. Geohazards identified during the helicopter overview flight include debris flows, rock fall and flooding.

Much of the first 53 km of the route traverses rocky ridge tops and bench areas where no geohazards were identified. Where the transmission line traverses steeper side slopes it will cross channels that are subject to debris flows, floods and channel avulsion. Rock fall is

possible from several rock slopes near the proposed alignment. Examples of several potential hazards are shown in photographs 2-1 to 2-3.

From approximately Km 53 to 65, the proposed transmission line crosses steep rock slopes south of Knipple Glacier. Four tributary glaciers cross the proposed route along this section. BGC understands that they will be spanned and no poles will be placed on ice. Rock fall is possible from steep rock slopes in this area.

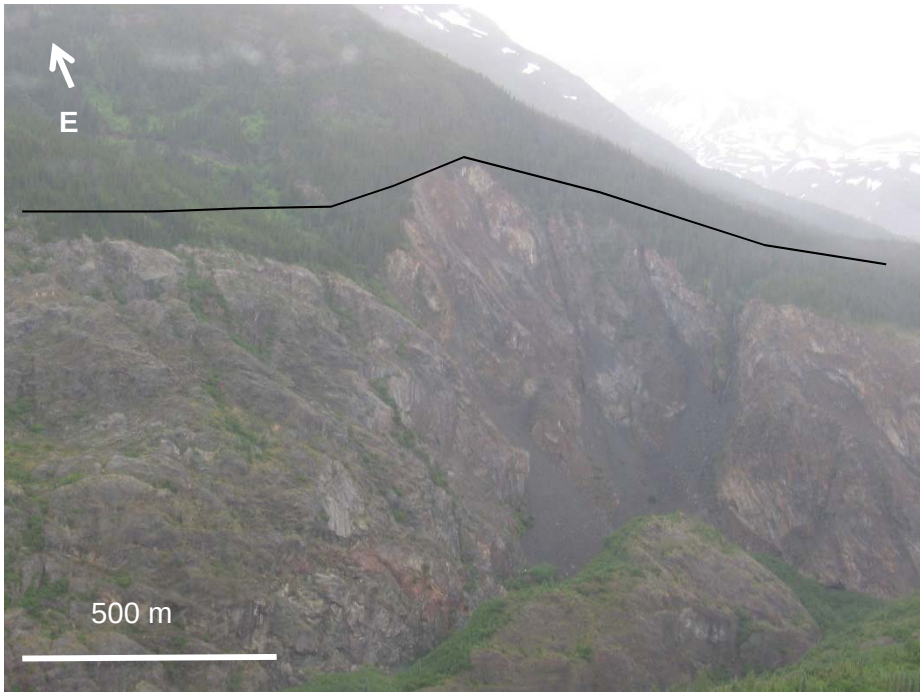
Identified geohazards are summarized in Table 2-1.

Table 2-1. Identified Geohazards along the Proposed Transmission Line

Kilometer from Stewart	Potential Hazard
12.5 (<50m wide)	debris flow (Photo 2-1)
20.2 (<50m wide)	debris flow
21.5 (<50m wide)	debris flow
33.7 (<50m wide)	flood, channel avulsion, scour (Photo 2-2)
36.5 (50-150m wide)	flood, channel avulsion, scour
37.2 (50-150m wide)	flood, channel avulsion, scour
39.5 (200m wide)	rock fall
43.5 (350m wide)	rock fall (Photo 2-3)
50.3 (<50m wide)	rock fall
51 (200m wide)	Cross Bowser River, flood, channel avulsion, scour
54-64	rock fall

Photograph 2-1. Looking upslope at a debris flow gully at approximately 12.5 km, transmission line crosses below photo. Gullies of this type can be spanned. Locating towers above the gully side-slopes will avoid any marginally stable slopes on gully sidewalls.

Photograph 2-2. Active channel draining a glacier at approximately 33.5 km, approximate route of transmission line shown by black line. Crossing above the fan eliminates certain fluvial hazards.



Photograph 2-3. Area of active rock fall at approximately 43 km, approximate route of proposed transmission line shown in black. Retrogression of the rock face is possible at this location through progressive rock fall.

3.0 LIMITATIONS

This study is a preliminary overview of geohazards present along the proposed Brucejack transmission line. It is based solely on a helicopter overview flight. It does not provide mapping of terrain or geohazards, or an assessment of geohazard risks. No on-the-ground fieldwork was conducted and thus no rock structural measurements were undertaken, nor any quantification of geohazard magnitude or frequency attempted. Airphotos of the route should be viewed to confirm the observations made during this study.

4.0 CONCLUSION AND RECOMMENDATIONS

This memo provides an overview of geohazards with the potential to impact the Brucejack transmission line. It is likely that all identified geohazards can be spanned. No geohazards were identified that would require re-routing of the transmission line. It is not yet known what level of geohazard assessment will be required for this project. A federal environmental assessment typically requires terrain mapping and geohazard risk assessment. This study can be used as a starting point for more detailed assessments of geohazards and associated risks, should they be required. No terrain mapping or assessment of hazard magnitude and frequency has been completed. Geohazards identified along the proposed transmission line during the half day helicopter overview flight included rock fall, debris flows, and floods.

BGC recommends the following proactive steps should a federal environmental assessment be required:

- Terrain stability and landslide inventory mapping should be completed for the transmission line route.
- The locations of each of the towers and poles should be assessed for geohazards and terrain stability.
- The types of geohazards listed in Section 1.1 that are not included in this memorandum (e.g. snow avalanches) should be assessed.
- The remaining steps in a geohazard risk assessment should be considered for the proposed transmission line. This work would include the assessment of geohazard risks in the categories of safety, the environment, economic and reputation loss. Such an assessment would provide a defensible way to reduce geohazard risks to levels considered tolerable by Pretium. This work could be phased to include geohazard mapping and preliminary analysis of hazards, followed by risk estimation and evaluation of mitigation options.

5.0 CLOSURE

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

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Yours sincerely,

BGC ENGINEERING INC.
per:

Betsy Waddington, M.Sc., P.Geo
Senior Geoscientist

Reviewed by:

Matthias Jakob, Ph.D., P.Geo
Senior Geoscientist

Iain Bruce, Ph.D., P.Eng.
Senior Geotechnical Engineer

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