

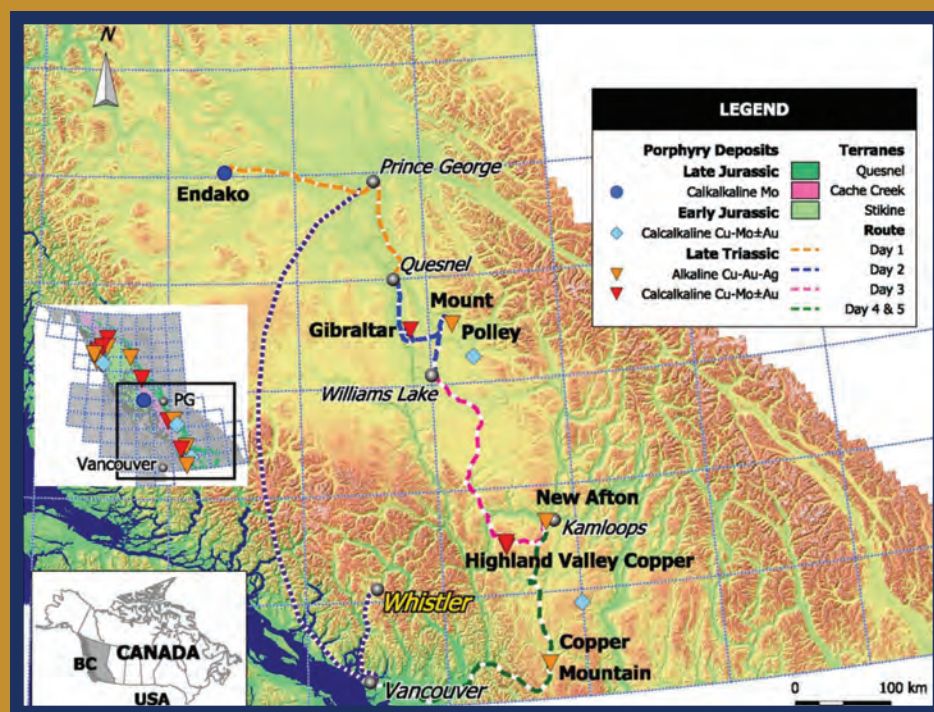


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GUIDEBOOK SERIES

Volume 44

Porphyry Systems of Central and Southern BC: Tour of Central BC Porphyry Deposits from Prince George to Princeton



Prepared for the Society of Economic Geologists Field Trip
September 27 - October 2, 2013

Field Trip Leaders
J. Logan and T. Schroeter

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Cover image: Area map showing field trip route.

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PREFACE

British Columbia is remarkably well-endowed with porphyry deposits. Associated with episodes of arc magmatism, these deposits include porphyry Cu-Mo \pm Au (calc-alkaline) and porphyry Cu-Au deposits (alkaline). The deposits formed in island-arc settings, represented by Quesnel and Stikine terranes, on the fringes of ancestral North America in Late Triassic - Early Jurassic time. A second, protracted episode of porphyry formation in the Late Mesozoic to Cenozoic followed accretion of the island-arc terranes and porphyry deposits onto the western margin of North America. The Late Mesozoic to Cenozoic porphyry Cu-Mo, Cu-Au, and Mo deposits developed in an intracontinental arc setting after east-dipping subduction was re-established. In central and southern British Columbia, Mesozoic arc magmatism and related porphyry mineralization migrated eastward through time, beginning in the west at ca. 212 Ma with calc-alkaline Cu-Mo \pm Au deposits at Highland Valley. East of the Guichon batholith, arc volcanic rocks are predominantly Na and K rich, and Cu-Au porphyry deposits center on comagmatic, 205 Ma alkalic intrusions. Nicola arc magmatism culminated with intrusion of 195 Ma calc-alkaline batholiths in the eastern part of the Quesnel terrane prior to terrane accretion in late Early Jurassic.

This trip presents the geological setting and structural history of the central Intermontane belt, a composite of Late Triassic to Early Jurassic volcanic and plutonic arc rocks and porphyry-related mineral deposits that developed on the fringes of ancestral North America before terrane accretion in late Early Jurassic. The trip comprises transects of southern Stikine, Cache Creek, and Quesnel terranes, with visits to six operating mines: Endako (Thompson Creek Metals Company Inc.), Gibraltar (Taseko Mines Limited), Mount Polley (Imperial Metals Corporation), Highland Valley (Teck Resources Limited), New Afton (New Gold Incorporated), and Copper Mountain (Copper Mountain Mining Corporation).

We start the trip at the Endako Mine (Stikine terrane), the oldest and largest low-fluorine granodiorite-hosted porphyry Mo deposit in the Cordillera. It formed in the Late Jurassic following amalgamation of Stikine, Cache Creek, and Quesnel terranes and their accretion to the continental margin. In contrast, Cu-Mo mineralization at Gibraltar Mine is in ductile shear zones cutting the Late Triassic Granite Mountain batholith, defining a deformed porphyry system. Highland Valley, Canada's largest porphyry copper open-pit operation, and showcases classic alteration and mineralization assemblages of a calc-alkalic porphyry deposit. At the Mount Polley, New Afton, and Copper Mountain open pit operations Cu \pm Au-Ag porphyry mineralization is associated with alkalic intrusions. Field visits will focus on the distinct potassic, sodic, and calc-potassic alteration assemblages, and breccias in these deposits. The architecture of the Nicola arc, its calc-alkaline and alkaline mineral deposits, and the relationship between co-spatial early calc-alkaline and later alkaline volcanism, plutonism and mineralization (Cu-Mo \pm Au vs. Cu-Au \pm Ag) will be highlighted by mine geologists through deposit overviews and on-site tours over the course of this 5-day post-conference trip.

This excursion would not have been possible without the co-operation of the mining companies who are allowing us to visit their properties. For their generosity and help we thank: John Hollow, Vice President and General Manager, and Michael Pond, Geologist (Thompson Creek Metals Company Inc.); Ross Maclean, Mine Manager (Taseko Mines Limited); Mark Rebagliati, Vice President Exploration and Bram van Straaten, Geologist (Hunter Dickinson Inc.); Tim Fisch, General Manager, Steve Robertson, Vice President Corporate Affairs, and Chris Rees, Senior Project Geologist (Imperial Metals Corporation); Chris Dechert, General Manager, Jacqui Schneider, Senior Community Affairs Officer and Kevin Byrne, Senior Project Geologist (Teck Resources Limited-Highland Valley Copper); Mark Peterson, Vice President Exploration, Kurt Keskimaki, Mine Manager, and Joanna Lipske (New Gold Inc.); and Peter Holbek, Vice President Exploration (Copper Mountain Mining Corporation). We also thank our authors for preparing manuscripts on demanding timelines and organizing the property visits.

James M. Logan
Tom G. Schroeter
September, 2013

ITINERARY

FRIDAY, SEPT. 27

9:30 p.m. Registration in Prince George;
Ice breaker
10:00 p.m. Overview of Excursion (Logan)
Overnight: Travelodge, Prince George
(250) 563-0666

SATURDAY, SEPT. 28

6:30 a.m. Breakfast
7:30 a.m. Depart PG for Endako Mine
10:00 a.m. Endako geology, pit and mill tour
1:00 p.m. Box lunch
4:00 p.m. Road log Endako back to PG
7:00 p.m. Dinner Prince George
8:30 p.m. Prince George to Quesnel
9:30 p.m. Overnight, Quality Inn & Suites
(250) 992-7247

SUNDAY, SEPT. 29

6:30 a.m. Breakfast
7:30 a.m. Depart Quesnel for Gibraltar Mine
8:30 a.m. Gibraltar geology, pit, and mill tour
1:00 p.m. Box lunch en route McLesse Lake
2:00 p.m. Road log Beaver Lake Road to
Mount Polley
2:00 p.m. Mount Polley geology, core and site
tour
7:30 p.m. Road log Mount Polley to
Williams Lake
8:30 p.m. Overnight, Coast Fraser Inn
(250) 398-7055

MONDAY, SEPT. 30

7:00 a.m. Breakfast
8:00 a.m. Depart Williams Lake for Highland
Valley Copper Mine
8:30 a.m. Road log to Highland Valley Copper
11:00 a.m. Box lunch en route
1:00 p.m. Highland Valley Copper geology,
pit and mill tour
5:00 p.m. Road log Highland Valley Copper to
Kamloops
7:30 p.m. Dinner
Overnight, Coast Kamloops Hotel
(250) 828-6660

TUESDAY, OCT. 01

6:30 a.m. Breakfast
7:30 a.m. Depart Kamloops for New Afton
Mine, road log to New Afton Mine
8:00 a.m. New Afton underground/surface
geology tour
12:00 p.m. Lunch
1:00 p.m. New Afton surface geology tour/
underground
5:30 p.m. Road log New Afton Mine to
Kamloops
6:00 p.m. Group dinner
8:30 p.m. Geology overviews (Holbek)
Overnight Coast Kamloops Hotel
(250) 828-6660

WEDNESDAY, OCT. 02

6:00 a.m. Breakfast
7:00 a.m. Depart Kamloops for Copper
Mountain Mine, Road log to Copper
Mountain Mine
10:00 a.m. Copper Mountain Mine geology and
surface tour
1:00 p.m. Box lunch on outcrop
3:00 p.m. Depart Copper Mountain for
Vancouver
7:00 p.m. Arrive and disperse at Vancouver
airport.