

### Location/Identification

<b>MINFILE Number:</b>	104G 090	<b>National Mineral Inventory Number:</b>	104G3 Cu1
<b>Name(s):</b>	<b><u>GALORE CREEK (CENTRAL ZONE)</u></b> CENTRAL ZONE, STIKINE COPPER, GC, HAB, BUY, JUNCTION, NORTH JUNCTION, WEST RIM, BUTTE, SOUTHWEST, SADDLE, WEST FORK GLACIER, SOUTH BUTTE, SOUTH 110, MIDDLE CREEK, LEGACY		
<b>Status:</b>	Developed Prospect	<b>Mining Division:</b>	Liard
		<b>Electoral District:</b>	Stikine
<b>Regions:</b>	British Columbia	<b>Resource District:</b>	Skeena Stikine Natural Resource District
<b>BCGS Map:</b>	104G013		
<b>NTS Map:</b>	104G03W	<b>UTM Zone:</b>	09 (NAD 83)
<b>Latitude:</b>	57 08 09 N	<b>Northing:</b>	6335182
<b>Longitude:</b>	131 27 20 W	<b>Easting:</b>	351393
<b>Elevation:</b>	726 metres		
<b>Location Accuracy:</b>	Within 500M		
<b>Comments:</b>	Centre of the ore zone.		

### Mineral Occurrence

<b>Commodities:</b>	Copper, Gold, Silver, Zinc, Molybdenum, Lead		
<b>Minerals</b>	<b>Significant:</b>	Chalcopyrite, Bornite, Chalcocite, Sphalerite, Molybdenite, Galena, Scheelite, Gold, Silver, Pyrite, Tetrahedrite, Tennantite	
	<b>Significant Comments:</b>	Minor galena, chalcocite and molybdenite. Trace tennantite, native silver, native gold, tetrahedrite and scheelite.	
	<b>Associated:</b>	Pyrite, Magnetite, Hematite, Garnet, Gypsum, Sericite, Chlorite, Albite	
	<b>Associated Comments:</b>	Also apatite, calcite and anhydrite. Less commonly analcite, natrolite, sodalite, sphene, fluorite, barite, actinolite, vesuvia	
	<b>Alteration:</b>	K-Feldspar, Biotite, Magnetite, Garnet, Diopside, Chlorite, Calcite, Epidote	
	<b>Alteration Comments:</b>	Propylitic alteration also may include albite. Calc-silicate alteration may include albite and anhydrite.	
	<b>Alteration Type:</b>	Potassic, Skarn, Propylitic	
	<b>Mineralization Age:</b>	Unknown	
<b>Deposit</b>	<b>Character:</b>	Disseminated, Stockwork	
	<b>Classification:</b>	Porphyry, Hydrothermal	
	<b>Type:</b>	L03: Alkalic porphyry Cu-Au	
	<b>Shape:</b>	Tabular	<b>Modifier:</b> Faulted
	<b>Dimension:</b>	1700x500x450 metres	
	<b>Comments:</b>	Central zone	

### Host Rock

**Dominant Host Rock:** Metavolcanic

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Upper Triassic	Stuhini	Undefined Formation	-----
Triassic-Jurassic	-----	-----	Unnamed/Unknown Informal
Triassic-Jurassic	-----	-----	Galore Creek Intrusions

Isotopic Age	Dating Method	Material Dated
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094), Southwest (104G 095), Saddle (104G 096), West Fork Glacier (104G 097), South Butte (104G 098), South 110 (104G 099), Middle Creek (104G 156) and North Rim (104G 157). A gold showing called Steep Creek (104G 158) is also within the complex and controlled by Stikine Copper Ltd.

The deposits are hosted primarily by highly altered potassium- enriched volcanic rocks and pipe-like breccias adjacent to syenite dikes and stocks. Typically, the deposits are manto-shaped and have a north to northeast trend related to the syenite contacts and zones of structural weakness.

The syenite complex is made up of four intrusive phases that are most closely associated with the copper deposits. Six other phases are recognized but are peripheral to the Central zone deposit. The copper-bearing rocks near the syenite intrusion are extensively metasomatized, recrystallized and locally brecciated. These may include pyroclastic and intrusive breccia, trachyte, phonolite, lithic tuff, crystal tuff, pyroxene basalt, pyroxene andesite and minor sediments. These rocks have been converted to skarns and fenitic porphyroids so that original rock types are unclear. The term "hornfels" was frequently applied to these metavolcanic rocks in the early stages of exploration.

Alteration and mineralization are contemporaneous and spatially overlap. The hydrothermal system was extensive, and the resultant alteration led to the formation of large gossans. Potassic alteration consisting of potassium feldspar, titanium biotite and magnetite have converted the syenites and volcanic rocks to pink, white, and orange rocks composed mostly of orthoclase. Alteration of pyroxene, hornblende, and biotite to assemblages of chlorite and calcite plus/minus albite and epidote characterizes the propylitic zone, best developed in the syenitic rocks. Calc-silicate alteration consisting of abundant garnet, diopside, epidote, albite, and anhydrite is an unusual feature of the complex. Garnet replaces up to 50 per cent of the metavolcanic rocks and infills breccias near the northern end of the Central zone breccia pipe but is generally absent from the other deposits. However unusual this metasomatic overprint is, the distribution of sulphides, precious metal and magnetite is considered consistent with the expected zoning pattern for alkalic porphyry deposits.

The Central zone is by far the largest of the Galore Creek deposits, measuring greater than 1700 metres in length along a strike of 015 degrees. The zone is up to 500 metres wide and dips steeply to the west to a depth of at least 450 metres. The deposit is centred on an elongate, steeply dipping breccia pipe, the long axis of which is parallel to the trend of the deposit. The deposit is roughly tabular in shape and is composed of several parallel echelon copper zones. Abundant post-mineral faulting has occurred, but displacement appears small.

A weak to intense, pervasive biotite-potash feldspar alteration facies is observed in the host rocks, the bulk of which are metavolcanics. Many of the rocks appear to have originally been orthoclase-rich trachyte and phonolite. Other metavolcanic hosts include volcanic breccia, bedded and crystal tuff and pyroxene basalt. Lesser amounts of mineralization occur in the syenite.

The ore minerals are chalcopyrite and bornite which occur in a ratio of 10:1. They occur mainly as disseminations but also as replacements associated with mafic minerals, coarse masses in vein structures with garnet and gypsum, matrix replacement about breccia fragments, and as coarse veinlets or fracture-fillings. Other main minerals include pyrite, magnetite, and hematite with lesser amounts of sphalerite. Minor amounts of galena, chalcocite and molybdenite are present, and traces of tennantite, native silver, native gold, tetrahedrite and scheelite have also been reported. The metavolcanics also contain 10 per cent or greater anhydrite, except where dissolved by groundwater or converted to gypsum near surface (Canadian Institute of Mining and Metallurgy Special Volume 15).

Other common gangue minerals found in the metavolcanics of the Central zone include sericite, chlorite, albite, apatite, and calcite. Less common minerals include analcite, natrolite, sodalite, sphene, fluorite, barite, actinolite, vesuvianite and crocidolite (Minister of Mines Annual Report 1965, page 26).

Unclassified reserves in the Central zone are 125 million tonnes grading 1.06 per cent copper (CIM Special Volume 15 (1976), page 402). This includes 27,232,000 tonnes at 0.97 per cent copper, 7.5 grams per tonne silver and 0.37 gram per tonne gold (diluted) of open pit material (Canadian Mines Handbook 1985-86, page 381).

Galore Creek resources as of 1992 are as follows (CIM Special Volume 46, page 642):

Deposit (zone)	Tonnes	Cu (%)	Au (g/t)	Ag (g/t)	Cut-off
Central (104G 090)	233,900,000	0.67	0.35	7 (estimate)	0.27% Cu equivalent
Southwest (104G 095)	42,400,000	0.55	1.03	7 (estimate)	0.27% Cu equivalent
North Junction (104G 092)	7,700,000	1.50			0.40% Cu
Total	284,000,000	0.67			

## WORK HISTORY

Mineralization was first discovered in the Galore Creek valley in 1955. The claims that cover the property are wholly owned by Stikine Copper Ltd. which is controlled by Kennecott Canada Inc., Hudson Bay Mining and Smelting Co. Ltd. and Cominco Ltd. Until 1968, the property was operated by Kennco and work included 53,164 metres of diamond drilling in 235 holes and 807 metres of tunnelling in two adits. The Central zone was the focus of most of this work. No work was done from 1968 to 1972. In 1972, Hudson Bay Mining and Smelting became operator and in 1972 and 1973 an additional 25,352 metres of diamond drilling was completed in 111 holes. This work focused exclusively on blocking out reserves on the Central and North Junction zones. A further 5,310 metres of diamond drilling was completed in 24 holes in 1976. In 1989, Mingold Resources Inc. (an affiliated company of Hudson Bay's) operated the property in order to investigate its gold potential. A further 1225 metres of diamond drilling in 18 holes was done by Mingold in 1990. Kennecott resumed operatorship of the project in 1991 and completed 13,830 metres of diamond drilling in 49 holes. An airborne geophysics survey and over 90 line-kilometres in an induced polarization (IP) survey were also completed.

In August 2003, Spectrum Gold Inc (an affiliate of NovaGold Resources Inc) signed an agreement with Rio Tinto plc and Anglo American plc to buy the Galore Creek alkalic porphyry gold-copper property. In 2003, new drilling in 8 holes totaling 2947 metres confirmed previous grades and revised understanding of ore controls. Characteristics of mineralization are considered intermediate between those of skarn and porphyry deposits. Unlike a typical porphyry deposit, there is very little stockwork veining. Chalcopyrite occurs as massive zones and disseminations and pyrite content is low. As in many skarn deposits, copper and gold are concentrated as replacement zones in limy horizons and accompanied by abundant garnet. As in most porphyry deposits, alteration includes potassium-feldspar flooding, hydrothermal biotite and magnetite, and there are cross-cutting anhydrite veins.

In 2004, NovaGold Inc. conducted a major exploration drilling program to augment copper-gold reserves and performed engineering and baseline environmental studies to consider development of a large open-pit mine. Drilling, totaling nearly 26,000 metres in 84 holes tested the southeast margin of the 2 kilometre-long Central (Main) deposit and the 0.5 kilometre 'Gap zone' between the Main and Southwest deposits. Other targets include the Junction, West Fork, Grace, and Copper Canyon zones (104G 017) and geophysical targets. Drilling in 2003 through a barren sill discovered disseminated chalcopyrite and pyrite, the Bountiful zone, below and to the east of the Main deposit. Step-out holes in 2004 extended the zone but did not find its limits, either to depth or to the east. NovaGold submitted a pre-application report to the Environmental Assessment office, to begin the mine development approval process. Engineering work at Galore Creek focused on consideration of mill and tailings sites and two possible road routes to Highway 37.

In 2004, drilling in the Central Zone was targeted at, and was successful in extending known mineralization that had not been limited to the west, by previous drilling in both the North and South Gold lenses. Drill holes such as GC04-475 and GC04-453 indicate down-dip and westward potential, while providing additional tonnes and grade to the Central Zone resource. Drilling in the Central Replacement Zone to test the southward extension of mineralization in the footwall and to test the East Fault, was very successful; as indicated with the results of holes like GC04-0488. Additional drilling at depth, below the South Gold Lens, targeted the "Bountiful Zone". This zone, discovered with one hole (GC03-441) in 2003, was confirmed early in the 2004 program with the results from holes GC04-0448, GC04-0449, GC04-0450, and GC04-0451. The 2004 ground-based resistivity and IP surveys show a 30-millisecond chargeability anomaly that correlates well with the Bountiful Zone mineralization at depth. Corresponding pseudo-sections indicate the potential for un-drilled mineralization in the Bountiful Zone is quite extensive. The Southwest Zone saw the addition of six holes in 2004, targeting the east-west and down-dip trends of mineralization in the zone. The discovery of two new zones (the West Fork and Opulent Vein zones) during the 2004 program required the attention of many holes during the year. The Opulent Vein is part of the West Fork which appears to be the same as, or at least part of, the previously known West Fork Glacier zone (104G 097).

The following resource estimates are reported by NovaGold to have been prepared in accordance with National Instrument 43-101 standards (Press Release, Novagold Resources Inc. April 19, 2005). The overall Galore Creek project Measured and Indicated resource totals 516.7 million tonnes grading 0.59 per cent copper, 0.36 gram per tonne gold, 4.54 grams per tonne silver and containing over 5.9 million ounces of gold, 75 million ounces of silver and 6.8 billion pounds of copper at a 0.35 per cent copper equivalent cut-off grade. The overall project Inferred resource now totals 578.3 million tonnes grading 0.41 per cent copper, 0.42 gram per tonne gold, 4.35 grams per tonne silver and containing over 7.8 million ounces of gold, 81 million ounces of silver and 5.2 billion pounds of copper at a 0.35 per cent copper equivalent cut-off.

In 2005, NovaGold completed a 260-hole, 63,190 metre diamond drill program on the Galore Creek property. The aim of the 2005 exploration program was to test for extensions of known mineralization and to explore for new targets within the Galore Creek valley. Additional drilling was utilized for engineering and environmental testing. Mapping focused on defining drill targets, major structures, and alteration assemblages, as well as recognizing sedimentary facies transitions. The geophysical program included a wide-spaced Vector IP reconnaissance program and IP surveys, conducted both south of the Central Zone and along the East Fork of Galore Creek.

In 2006, NovaGold completed 33,575 metres of NQ and HQ-sized diamond drilling in 57 holes. The 2006 drilling tested new exploration targets based on geophysical anomalies and new geologic interpretations. The goal of the program was to upgrade the resource estimation categories through step-out drilling of known mineralization, delineation drilling of proposed pit boundaries, and infill drilling of areas of known mineralization. One hole, totalling 526 metres, had as its main objective to further extend the presence of high-grade copper and gold within the West Fork Area.

In 2007, NovaGold completed 13 holes, totalling 5402.37 metres on the Galore Creek property for the Galore Creek Mining Corporation (GCMC).

Drilling focussed on the Southwest Zone, Central Replacement Zone, Butte Zone, and reconnaissance targets for the purpose of extending and upgrading known mineralization, identifying grade controls, and collecting geotechnical information for engineering studies. GC06-0751 and GC07-0757 extended the West Fork deposit to the northwest and the mineralization is still open in that direction. Five out of six proposed drill sites in Central Zone were completed in the 2007 drill program. The Galore Creek copper-gold mine began construction on June 5 and up to 700 people were employed, chiefly building the access road and related construction camps. On November 26 Galore Creek construction was suspended by the operating partners due to escalating costs.

In 2007, the Little Creek prospect was generated from geophysical and drill core data. The location has similar geophysical properties as Southwest and West Fork zones, and it is on a low resistivity trend with the N

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<b>Date Coded:</b> 1985/07/24	<b>Coded By:</b> BC Geological Survey (BCGS)	<b>Field Check:</b> N
<b>Date Revised:</b> 2020/07/21	<b>Revised By:</b> Garry J. Payie (GJP)	<b>Field Check:</b> N