GEOLOGY AND RESOURCE POTENTIAL OF THE COPPER CANYON PROPERTY

Liard Mining Division
British Columbia, Canada

NTS map sheet 104G/03
57° 07′ N latitude
131° 20′ 56″ W Longitude

Under Option To
NovaGold Resources Inc.
Suite 3454, 1055 Dunsmuir Street
Vancouver, B.C. V7X 1K8

Owned by
Eagle Plains Resources Ltd.
2720-17th Street South
Cranbrook, BC V1C 6Y6

Prepared by

Hatch Ltd.
GR Technical Services Ltd.
Giroux Consultants Ltd.

9 February 2005

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3. SUMMARY

NovaGold Resources Inc. (NovaGold) retained Hatch Ltd. (Hatch), GR Technical Services Ltd. (GR Tech), and Giroux Consultants Limited (Giroux) to complete a mineral resource estimate for the Copper Canyon project and complete a Technical Report summarizing the findings to meet the requirements of National Instrument 43-101 (the Instrument) and Form 43-101F1. The mineral resource study was a collaborative effort by NovaGold, GR Tech, and Giroux, with Mr. James H Gray, and Mr. Robert J. Morris of GR Tech and Mr. Gary H. Giroux acting as independent Qualified Persons as defined by the Instrument. Mr. Gray and Mr. Morris conducted a site examination of the project area during the week of October 10, 2004.

NovaGold is exploring the Copper Canyon property in British Columbia, Canada. NovaGold may acquire up to an 80% interest in the Copper Canyon property under an option from Eagle Plains Resources. The property directly adjoins the main Galore Creek property and NovaGold is exploring Copper Canyon as part of its overall Galore Creek project.

Copper Canyon is located in northwestern British Columbia west of the Cassiar Highway and 150 kilometers northeast of the tidewater shipping port of Stewart, B.C. The property covers approximately 1574 hectares and comprises 79 units. Current access to the property is by helicopter. Cool summers and cold humid winters are typical of the northwest coastal areas of British Columbia.

Historically, the Copper Canyon claims were staked in 1956 by American Metal Co. Ltd. The first drilling was conducted in 1957 and included seven holes totaling 1009 meters of core. In 1962 an airborne magnetometer survey was flown and in 1964 and 1966 IP surveys followed. The property exploration was limited until 1990 when Consolidated Rhodes Resources Ltd. carried out a two-phase program of mapping and drilling. The drilling included thirteen holes totaling 3785m of core. Work in 2004 included geological mapping and drilling eight holes totaling 3024m of core.

The Copper Canyon property hosts an alkaline porphyry-style copper-gold-silver occurrence. Disseminated chalcopyrite mineralization occurs in surface exposures of syenite porphyry in Copper Canyon and Doghouse creeks. The 2004 exploration program focused on surface geologic mapping and drilling. This work confirmed results from past exploration and advanced the geological understanding of the system. Mineralization remains open to the north, northwest, south, southeast, east and down dip.

The mineral resource estimate for the Copper Canyon property incorporates the 2004 drill results and has benefited from a revised geological interpretation. The model integrates the 1990 and the 2004 drilling, a total of 6,834 meters in 21 core holes with a total of 4,749 assays. Data from the 1957 holes were not used in the estimate because most holes were redrilled during the 1990 program. The estimates are based on a 3-dimensional computer block model with grades interpolated into individual 25m by 25m by 12m high blocks. The grade interpolation used ordinary kriging procedures and mineralization was composited on 6m intervals with high-grade samples capped based on lognormal probability plots. Because of the wide spacing of the drilling on the property all resources are classified as Inferred. Table 3.1 summarizes the estimate.

Table 3.1
Mineral Resource Estimate

Cutoff	Tonnes	Grade			
CuEq (%)	**(Mt)**	**Cu (%)**	**Au (g/t)**	**Ag (g/t)**	**CuEq (%)**
0.35	164.8	0.35	0.54	7.15	0.74
0.50	116.1	0.41	0.64	8.30	0.87
0.70	63.0	0.50	0.86	10.21	1.11
1.00	29.2	0.65	1.14	13.03	1.45
1.30	15.6	0.83	1.32	15.70	1.72

The copper equivalent (CuEq%) calculations use metal prices of US$375/oz for gold, US$5.50/oz for silver and US$0.90/lb for copper. Copper equivalent calculations reflect gross metal content that have been adjusted for metallurgical recoveries based on the following criteria: copper recovery = (%Cu - 0.06)/%Cu with a minimum of 50% and maximum of 95%; gold recovery = (Au g/t – 0.14)/Au g/t with a minimum of 30% and maximum of 80%; and silver recovery = 80%. The metallurgical relationship assumes similar characteristics to those of the Central and SW zones of Galore Creek, testwork is currently underway on Copper Canyon ore.

We have concluded that the Copper Canyon property hosts a significant inferred resource of gold, silver and copper. The property could be an important contributor to the resources of the Galore Creek deposit.

We have recommended that further drilling be conducted on the property to define and expand the known resource. The near surface potential between the mineralized outcrop and the deeper drill holes are a primary target.

4. INTRODUCTION AND TERMS OF REFERENCE

NovaGold Resources Inc. (NovaGold) is engaged in the exploration and advancement of the Galore Creek Project in British Columbia, Canada. The nearby Copper Canyon Property is potentially an important component of the development of Galore Creek.

Hatch Ltd. (Hatch), with G.R. Technical Services Ltd. (GR Tech) and Giroux Consultants Limited (Giroux) as contractors, was retained by Novagold to assist with the mineral resource modeling and engineering aspects of a preliminary study of the Copper Canyon property, and to prepare a Technical Report compliant with NI 43-101 (the Instrument) and Form 43-101F1.

NovaGold has consolidated the exploration information for the property from previous owners and participants, which includes American Metals (Canamax) from 1956 to 1990, Canadian Tungsten in 2001, Eagle Plains Resources Ltd. 2002-2004. NovaGold completed their first drill program on the property in 2004.

Mr. Robert J. Morris of GR Tech. conducted a site visit and detailed examination of the property on October 9 through to October 15, 2004. During the site visit, sufficient opportunity was available to examine logging procedures and drill core from the 2004 program as well as conduct a general overview of the property, including selected drill sites and historic core, and the condition of existing project infrastructure. Based on his experience, qualifications and review of the site and resulting data, the author, Mr. Morris, is of the opinion that the programs have been conducted in a professional manner and the quality of data and information produced from the efforts meet acceptable industry standards. Mr. Morris also believes that for the most part, the work has been directed or supervised by individuals who would fit the definition of a Qualified Person in their particular areas of responsibility as set out by the Instrument.

Mr. Gary Giroux of Giroux Consultants Limited completed the resource estimate. While actively involved in the preparation of the resource estimate, Mr. Giroux, Hatch and GR Technical Services Ltd. had no direct involvement or responsibility in the collection of the data and information or any role in the execution or direction of the work programs conducted for the project on the property or elsewhere. The resource estimate is based on the most recent interpretations by project staff coupled with other data and reports provided by NovaGold. Much of the data, including the drill hole assay and geological database upon which the estimate is based, has undergone thorough scrutiny by project staff as well as certain data verification procedures by Mr. Morris.

5. DISCLAIMER

This report was prepared for NovaGold Resources Inc. by Hatch Ltd., GR Technical Services Ltd., and Giroux Consultants Limited. The quality of information, conclusions and estimates contained herein are based on industry standards for engineering and evaluation of a mineral project. The report is based on: i) information available at the time of preparation, ii) data supplied by outside sources, iii) engineering, evaluation, and costing by other technical specialists and iv) the assumptions, conditions and qualifications set forth in this report. No warranty should be implied as to the accuracy, especially with longer term estimates of forward looking economic assumptions for the future operations such as but not limited to, metal prices, exchange rates, labour costs, and energy, equipment, and supply costs.

6. PROPERTY DESCRIPTION AND LOCATION

The Copper Canyon property, located approximately 150 kilometers northwest of the town of Stewart, British Columbia, lies north of the East fork of Galore Creek. Galore Creek flows to the Scud River which in turn flows into the Stikine River. The property lies within the Liard Mining Division at latitude 57° 07′ N and longitude 131° 20′ 56″ W, on NTS map sheet 104G/03, Figure 6.1.

The town of Smithers located 370 kilometers to the southeast is the nearest major supply center. Access to the property is presently by a 75km helicopter flight from the Bob Quinn airstrip on the Stewart-Cassiar Highway to the east.

The Copper Canyon property consists of 4 four-post claims comprising 71 units and 8 two-post claims comprising 8 units, totaling approximately 1574 hectares, Figure 6.2. Claim status is shown in Table 6.1.

The four-post claims are under the name of Eagle Plains Resources Ltd. In 2004, SpectrumGold Inc. (now NovaGold Canada, Inc.) entered into an option agreement to earn up to 80% interest in these claims from Eagle Plains Resources Ltd. NovaGold must make payments to the owners of 296,296 shares, and expenditures of $3.0 million (C$) to earn 60% interest. To earn another 20%, NovaGold must make a payment of $1.0 million and complete a feasibility study. NovaGold also assumed the commitments of the underlying agreement with Bernard Kreft which include payments totaling $250,000, and an underlying 2% NSR held by Kreft. Fifty percent of the royalty interest can be purchased for $1.0 million, and a further 25% of the royalty interest for $1.0 million once a commercial production decision is made.

Exploration work was carried out under ministry mine permit number MX-1-622.

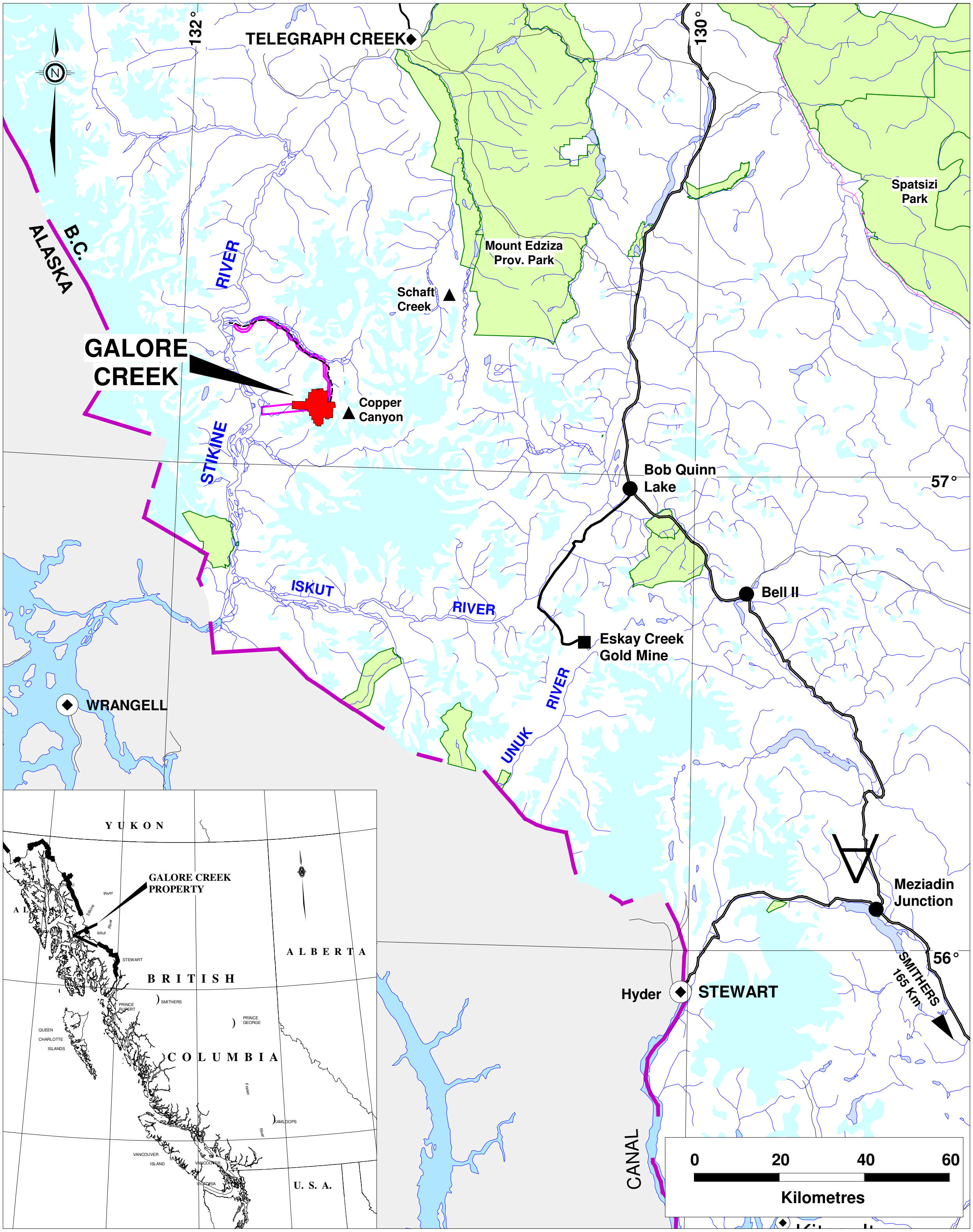


Figure 6.1: Location map of the Copper Canyon property

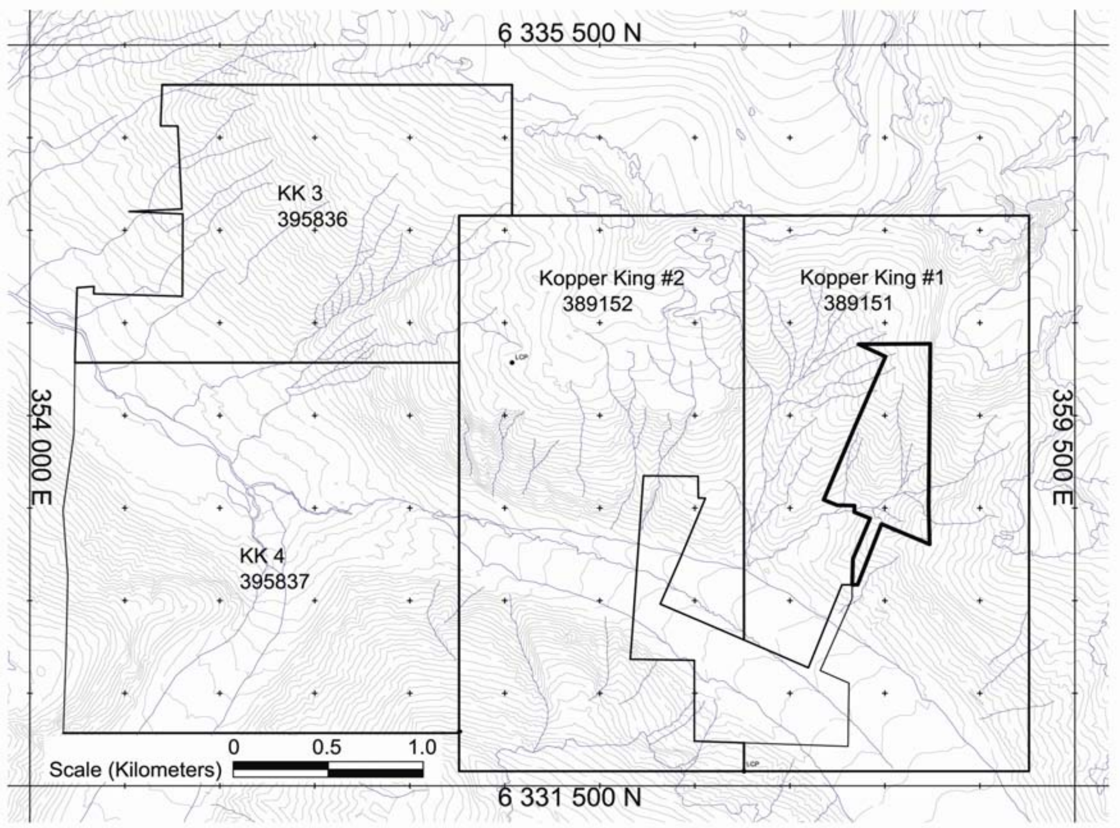


Figure 6.2: Map showing the Copper Canyon claims (UTM NAD83-9)

Table 6.1
Tenure Summary

Claim Name	Tenure Number	Expiry Date
KK 3	395836	Dec. 1, 2014
KK 4	395837	Dec. 1, 2014
Kopper King #1	389151	Dec. 1, 2014
Kopper King #2	389152	Dec. 1, 2014
Bik #1	226458	Dec. 1, 2014
Bik #2	226459	Dec. 1, 2014
Bik #3	226460	Dec. 1, 2014
Penny # 8	226461	Dec. 1, 2014
Penny # 10	226462	Dec. 1, 2014
Penny # 24	226463	Dec. 1, 2014
Penny # 25	226464	Dec. 1, 2014
Penny # 26	226465	Dec. 1, 2014
Penny # 29	226466	Dec. 1, 2014
Penny # 30	226467	Dec. 1, 2014
Penny # 31	226468	Dec. 1, 2014

7. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The Copper Canyon property is located approximately 150km north of Stewart, B.C. and 96km northeast of Wrangell, Alaska. The town of Smithers, 370km to the southeast, is the nearest major supply centre and has an airport with regular scheduled flights to and from Vancouver. Helicopter is the present means of access to the property.

The Galore Creek camp was used as the primary logistical station for the Copper Canyon work. A 500-meter gravel airstrip at Galore was cleared of brush this year but not used. A second airstrip at the mouth of the Scud River has been utilized in the past for aircraft up to the size of a DC-3, but was not upgraded in 2004. During the 2004 program most personnel, supplies, and equipment were staged from the Bob Quinn airstrip and transported via helicopter to the Galore Creek camp.

Galore Creek and the Scud River are part of the tributary system of the Stikine River, an international waterway that drains an area of 49,000 square kilometers. Historically, the river was used by shallow draft barges and riverboats to transport goods from Wrangell, Alaska to Telegraph Creek, B.C., a distance of 302km. The river is navigable for this type of watercraft from mid May to October. The nearest point on the Stikine River to the property is the mouth of the Anuk River, which lies 16km west of the camp.

In the 1960’s Kennecott constructed 48km of road from the mouth of the Scud River to the Galore Creek camp. This road would require repair along the Scud River and portions of the Galore Creek Valley for use by the project.

Physiographically, rugged mountains, active alpine glaciation, and deep U-shaped valleys characterize the Stikine-Iskut area, with elevations ranging between 500 to 2080 meters above sea level. Relief on the claims is generally extreme. Trees do not populate the property; vegetation generally includes grass and small brush.

Copper Canyon is located in the humid continental climate zone of coastal BC. Summers are generally cool, and winters cold, with substantial snowfall. Temperatures on the property range from 20° C in the summer to well below -20° C in the winter. Annual precipitation is 76 centimeters with the majority (70%) falling as snow between September and February.

8. HISTORY

This section has been adopted from Termuende (2002).

> "The C. C. claims were staked in August, 1956 by the American Metal Co. Ltd., (which through several corporate restructurings become Canamax Resources Inc. (and most recently, North American Tungsten Corp.)) to cover prominent gossans and malachite staining. Geological mapping, chip sampling and diamond drilling were carried out in 1957 (Oobell, 1957). Seven holes totalling 1,009 metres of BQ and AQ core were drilled on the C.C.#2 through #5 claims in 1957; Hole 57-2 was drilled across the claim gap between C.C. #2 and #4 (Oobell et al, 1967). Based on this drill program, Oobell and Spencer (1958) estimated reserves on the C.C.#2,4, 5 and 6 claims of 27 million tonnes grading 0.72% copper, 0.43 grams per tonne (0.012 oz/ton) gold and 10.3 grams per tonne (0.30 oz/ton) silver. It should be noted that these reserves were based on four drill holes (57-1, 57-2, 57-5 and 57-7) and poor core recovery and the unreliability of surface data due to surface weathering makes these reserves an estimate at best. In addition, this calculation does not take into account the claim gap between the C.C. #2 and #4 claims.
>
> In 1962, an airborne magnetometer survey was flown over Copper Canyon by Newmont Mining Corporation of Canada on behalf of Southwest Potash Corporation (Norman, 1962). A magnetic high was found to be associated with the Copper Canyon syenite and Norman further concluded that the syenite is a steep, easterly dipping body as the western margin of the anomaly is abrupt.
>
> Induced polarization surveys were carried out in 1964 and 1966 over the Copper Canyon property, defining anomalous chargeability over an area of 450 metres by 500 metres (Bell and Hallof, 1966). At this same time, a total of 151 soil samples were collected and analyzed for copper and molybdenum. The sample results were very anomalous as the samples were mostly taken in areas of known copper mineralization (Snively, 1966). In 1964, Ridgeway W. Hilson and Associates conducted exploration on the adjoining Penny claims on behalf of the Racicot Syndicate. This work consisted of geological mapping, contour soil sampling, and trench sampling (Naylor, 1964), a petrographic study (Carswell, 1964) and a ground magnetometer survey (Falconer, 1965). In 1965, a survey of existing claims was completed by Underhill and Underhill.
>
> The property remained dormant until 1988 when Canamax Resources Inc. re-examined the Copper Canyon property for its gold potential (Hitchins, 1988). Twenty-seven rock samples were collected during this survey, five of which returned gold assays in excess of 1.0g/t. During the summer of 1988, five rock samples from the Copper Canyon property were submitted for analysis by the Ministry of Mines, Energy and Petroleum Resources as part of a regional mapping program in the Galore Creek area; two of these samples contained gold values in excess of 1,800 parts per billion (Logan et al, 1989).
>
> In 1989, an airborne geophysical survey was conducted over the neighbouring Trophy project. It covered the entire Copper Canyon property with VLF-EM, magnetometer and resistivity surveys on 100-metre line spacing (Aerodat, 1990).

> During 1990-1991, Consolidated Rhodes Resources Ltd. entered into option agreements with both Canamax and Silver Standard. Rhodes carried out a 2-Phase program consisting of detailed geological mapping of the property, 12,415' (3785m) of NQ-core diamond drilling in 13 holes (many of which twinned 1957 holes), and trenching along extensions of the Western (Central) and Eastern Copper zones. Throughout the 1990 drilling program, drillhole collars were tied-in to previously surveyed claims and all drill core was split in 1.0 metre intervals and assayed for gold, silver and copper.
>
> 1990-1991 work was completed under the supervision of G.M. Leary, and provides most of the geological background information presented in this report."

There has been one documented historical resource estimate for the Copper Canyon property, by American Metals Co. Ltd. in 1957. The company reported 27Mt @ 0.72%Cu, 0.43g/t Au, 10.3g/t Ag. This estimate does not conform to NI 43-101 standards and is reported as a historical estimate only.

There has not been any production from the property.

Table 8-1
Summary of Exploration Work

Period	Company	Work Completed
1956	American Metal Co. Ltd. (Becoming Canamax Resources Ltd. then North American Tungsten Corp.)	Claims first staked
1957	Canamax Resources Ltd.	Geological mapping, chip sampling and diamond drilling, 7 holes, 1,009m
1962	Newmont Mining Corporation of Canada (on behalf of Southwest Potash Corporation)	Airborne magnetometer survey was flown over Copper Canyon
1964 and 1966	Amax Exploration, Inc. (Ridgeway W. Hilson Assoc. for Racicot Syndicate)	Induced polarization surveys, 151 contour soil samples, geological mapping and trench sampling, a petrographic study, and a ground magnetometer survey
1965	Amax Exploration, Inc.	Survey of existing claims was completed by Underhill and Underhill
1988	Amax Exploration, Inc.	Twenty-seven rock samples, assess gold potential
1988	BC Ministry of Mines, Energy and Petroleum Resources (Logan, 1989)	Regional mapping program
1989	Amax Exploration, Inc.	Airborne geophysical survey was conducted over the neighboring Trophy project. It covered the entire Copper Canyon property with VLF-EM, magnetometer and resistivity surveys on 100 metre line spacing
1990-1991	Consolidated Rhodes Resources (option agreements with both Canamax and Silver Standard	Detailed geological mapping, 3785m of NQ-core diamond drilling in 13 holes, and trenching

	Ltd.)	
2001	Canadian Tungsten	Original claims lapsed
2001	Bernie Kreft	Kopper King 1 and 2 claims staked
2002	Eagle Plains Resources Ltd.	Kopper King 1 and 2 claims optioned
2002	Eagle Plains Resources Ltd.	KK-3 and KK-4 claims staked
2002	Eagle Plains Resources Ltd.	Samples collected from 1990 drill core and analyzed for Pt, Pd
2004	NovaGold	Geological mapping, diamond drilling

9. GEOLOGICAL SETTING

9.1 Regional Geology

The following is excerpted from Termuende (2002):

> "The Copper Canyon property contains an alkalic porphyry-type Cu-Au-Ag deposit that is located in the Galore Creek area along the south flank of the Stikine Arch within the Intermountain Belt east of the Coast Range batholithic complex. The property region is dominated by deformed Mississippian to Middle (?) Jurassic island arc volcanic and sedimentary strata intruded by co-eval subvolcanic plutons, Jurassic to Tertiary satellitic Coast Range batholithic plugs and Tertiary acid to intermediate stocks and dykes.
>
> In particular, the Copper Canyon property is situated within and associated with a curvilinear belt of bi-modal calc-alkaline and alkaline Upper Triassic-lower Jurassic Nicola-Takla-Stuhini volcanic assemblages and comagmatic plutons and associated porphyry Cu-Mo and Cu-Au-Ag deposits respectively that extends along the Intermountain Belt from south of the British Columbia-Washington border along Quesnel Trough through the Stikine region and into the Whitehorse Trough, Yukon Territory. Several major alkalic porphyry deposits ranging in age from 175 to 201 million years associated with alkalic stocks, dykes and intrusive breccias controlled by north to northwest trending major fault structures are known along this belt including Copper Mountain-Ingerbelle, Afton, Cariboo Bell, Lorraine, Gnat lake and Galore Creek deposits (Barr, D. A., et. al., CIM Spec. Vol. 15, 1976).
>
> These deposits tend to occur in regions of fault intersections and are controlled by fractured and/or brecciated zones. Deposits typically show extensive alteration products and sulphides and often lack the classic zoning of calc-alkaline porphyries due to the absence or poorly developed nature of phyllic and argillic zones. Also, alteration-zoning patterns tend to be asymmetric as opposed to symmetrical and concentric typical of calc-alkaline deposits. Potassic flooded (i.e. K-feldspar and biotite) core zones and propyllitic altered (i.e. chlorite, epidote and albite) peripheral zones are typical of the alkalic deposits. Copper zones (i.e. chalcopyrite and minor bornite with gold and silver values) usually occur central to the alteration systems although in some cases they occur within the propylitic zone. Sulphides typically occur as fracture fillings, disseminated grains, massive lenses and pods and in breccias. Magnetite is commonly associated with these systems and may either coincide with sulphide zones or occur peripheral to the copper zones. Calc-silicate alteration products, including andradite to grossularite garnets with associated gypsum and anhydrite, occur within the potassic zones at Galore Creek, whereas, scapolite is commonly in the propylitic altered copper zones at Ingerbelle. Of the Cordilleran alkaline deposits known, Galore Creek and Ingerbelle are the largest, respectively containing 234mT grading .57% Cu, .35g/T Au, and 7.0g/T Ag (estimated), with an additional gold-rich zone reportedly containing 42.4 mT grading .55% Cu and 1.03 g/T Au, and 97,000,000 metric tons (i.e. past production and current reserves) grading 0.71% copper, 0.05 ounces silver per ton and 0.005 ounces gold per ton.

In the Stikine River area, a north-north-westerly trending belt of Early to Middle Jurassic alkalic plutons has been traced for about 250 kilometers along the east flank of the Coast plutonic complex (Barr, D. A., et. al., 1976; CIM Spec. Vol. 15). Centered within this belt is the alkalic Galore Creek Intrusions, clustered from Copper Canyon westerly to west of Galore Creek over a distance of 10 kilometers, and the associated Upper Triassic Stuhini Group comprising alkalic volcanic flows and fragmentals and distal volcaniclastic and sedimentary turbidites which define a volcanic edifice centered on the Galore Creek area (Monger, 1977).

Structures in the Galore Creek area are dominated by upright north-south to northwest-southeast and locally east-west trending, open to tight folds in stratified rocks and by a complex system of faulting involving major generally north-south trending normal to reverse faults, respectively associated with the Galore Creek and Copper Canyon deposits, and other associated east-west, northwest-southeast and northeast-southwest trending fault structures. According to Caulfield (1990):

"North-striking faults are vertical to steeply east-dipping and parallel to the Mess Creek Fault (Souther, 1971), which was active from Early Jurassic to recent times (Souther and Symons, 1974). Northwest-striking faults are probably coeval with the north-striking faults, but locally pre-date them. East-west trending faults are vertical or steeply dipping to the north and have normal-type motion on them (i .e. north-side down), whereas northeast-striking faults are the loci of left lateral strike-slip motion (Brown and Gunning, 1989a)."

The Galore Creek and Copper Canyon deposits and several other smaller porphyry-type prospects and peripheral base-precious metal mineralized veins, shear zones and skarns are associated with the Galore Creek Intrusions. The Galore Creek deposit (i.e. Central Zone) is a NNE-SSW trending elongate copper mineralized zone measuring 1,950 metres (6,398 feet) long and up to 518 metres (1,699 feet) wide. The Western (Central) Zone is dominantly hosted in alkalic volcanic rocks and breccia and comprises a series of better grade, parallel, en-echelon, longitudinal copper zones. It is spatially associated with a series of gently north to north-easterly dipping syenite porphyry and megaporphyry dykes along the east contact of a NNE-SSW trending syenite porphyry body, longitudinal steep to moderately west dipping fault structures focused along the margins of the deposit and a central, probable intrusive-related hydrothermal, steeply dipping breccia pipe characterized by volcanic and minor syenite fragments in a garnet-biotite-anhydrite matrix. Widespread pervasive hydrothermal K-feldspar, biotite and garnet and fracture controlled anhydrite and associated gypsum are spatially associated with the copper mineralized zone. Also, extensive pyrite and magnetite zones partly overlap the copper mineralized zone, although they tend to occur respectively mainly to the east and west of the deposit.”

9.2 Property Geology

The following is excerpted from Otto (2004):

“Past work (Leary, 1990; Bottomer and Leary, 1995; Tremuende, 2002) suggests that a horseshoe-shaped multiphase intrusive complex hosts Cu-Au-Ag mineralization. Surface mapping and results from drilling confirm the presence of a multiphase intrusive complex but do not confirm their geometry. Results indicate that mineralization occurs within and adjacent to a multi-phase, stock-shaped syenite intrusion which we have named the Copper Canyon Porphyry. The porphyry intrudes its own eruptive carapace of alkalic-composition lava flows, and minor interbedded epiclastic sediments. The following sections discuss these lithologic units from oldest to youngest.

Approximately 150 hectares of the Copper Canyon property was mapped during the 2004 field season. The mapping resulted in some differences from earlier efforts. A greater number of dike lithologies were recognized and mapped with greater resolution. The new work tends to show a larger volume of rocks that are hypabyssal intrusions rather than volcanic. The volcanic rocks are located mostly at higher elevations and west of the Dog House Creek fault. Field evidence demonstrates that the Copper Canyon intrusive complex vented, so distinguishing eruptive rocks of identical provenance to underlying hypabyssal intrusions by hand-specimen and outcrop textures can be inconclusive."

9.3 Stratigraphy

The following is excerpted from Otto (2004):

"The volcanic section at Copper Canyon progresses from a basal sequence of alkaline lavas upward to an extensive pyroclastic section, thence to epiclastic sediments. The basal lavas and their reworked equivalents, named the pre-eruption sequence, accumulated during non-pyroclastic eruptions. Overlying pyroclastic rocks, the eruptive sequence, include abundant lithic lapilli fragments mineralogically identical to the Copper Canyon intrusive suite. Overlying epiclastic strata of the post-eruptive sequence formed by reworking of the volcanic strata.

Age relationships derived from intrusive contacts with the Copper Canyon porphyry show that the oldest exposed rocks include alkalic lavas, minor accumulations of epiclastic sediments, and local calc-turbidite beds. The exclusive presence of locally derived volcanic epiclastic sediments and calc-turbidites indicate deposition in, an environment removed from a land mass with diverse rock types (seamount or isolated island arc), and at low latitude.

Massive trachyte lavas occur in Copper Canyon and along the upper reaches of the Dog House Creek basin. The lavas generally show no internal textural variation and individual flows are continuous through the area of outcrop. The lavas generally have an aphanitic to very-fine-grained texture and are locally orthoclase porphyritic. The orthoclase generally forms euhedral phenocrysts up to 3mm long.

Interbedded volcanoclastic sediments consist entirely of material compositionally and texturally identical to the lavas. Local poorly sorted conglomerates suggest a laharic mode of sedimentation. One 2-meter-thick bed of limestone occurs interbedded with the lavas. This probable calc-turbidite suggests that some of the lavas were deposited in a sub aqueous environment.

The Copper Canyon multiphase porphyry intrusion contains two primary textural varieties. The pseudoleucite-dominant phase (CCPp) forms most of the complex while the orthoclase-bearing variety (CCPo) forms the interior. This geometric

> relationship suggests that the CCPp is older and intruded by CCPo. Though this is probably true in general, intrusive relationships visible in core suggest that the two units are in large part contemporaneous. The lithologies grade imperceptibly from one to the other as the ratio of pseudoleucite to K-feldspar grades fluidly between end-member compositions. Alteration and Cu-Au-Ag mineralization occurs within both varieties but has a preference to the K-feldspar dominant phase.
>
> The pseudoleucite phase of the Copper Canyon porphyry underlies much of lower Copper Canyon and most of the lower Dog House Creek drainage. It contains on average about 30 percent phenocrysts of euhedral to rounded pseudoleucite with subordinate tabular euhedral K-feldspar in a fine-grained equigranular groundmass consisting primarily of K-feldspar and biotite. The pseudoleucite ranges in size from a few millimeters to 1cm but is characteristically about 0.5cm. Phenocrystic K-feldspar occurs as lath-shaped euhedra up to 2cm long. The groundmass consists of a fine-grained aggregate of K-feldspar and biotite. The rock is generally so altered that it is difficult to distinguish protolith mineralogy from alteration.
>
> The K-feldspar phase contains on average 30 percent phenocrysts of acicular euhedral K-feldspar phenocrysts with subordinate subhedral to euhedral pseudoleucite. The K-feldspar phenocrysts commonly align to form a strong trachytic texture. Groundmass mineralogy generally includes fine- to medium-grained crystalline K-feldspar and subordinate biotite. K-feldspar phenocrysts range in size up to 2cm and are typically lath shaped. Where abundant they form a distinctive densely packed texture. The unit contains miarolitic cavities up to 25cm in long dimension. The cavities contain euhedral lath-shaped K-feldspar crystals up to 2cm long growing inward from the walls. The cavities are generally filled with clay. No diagnostic crosscutting relationships were noted between unit CCPo and CCPp. Where they occur together in core they are generally intermingled and texturally gradational. The occurrence of CCPo centrally located within a larger mass of CCPp suggests that CCPo is generally younger."

9.4 Dikes

The following is excerpted from Otto (2004):

> "Several North 45° West trending i4 crowded syenite porphyry dikes occur in the Dog House drainage. They contain somewhat equant, zoned K-feldspar phenocrysts up to 3cm long that form up to 15% of the rock. Hornblende occurs locally as subhedral and euhedral lath-shaped phenocrysts up to 0.5cm long which are commonly replaced by biotite. The phenocrysts are set in a fine- to medium-grained grey- to pale-brown or pink K-feldspar-chlorite (after biotite) groundmass. In drill core the i4 dikes are generally strongly altered and mineralized.
>
> Pale to medium brown, porphyritic syenite dikes similar to the mineralogy and texture of i5 dikes at Galore occur at Copper Canyon. These steeply dipping dikes generally strike ± north 15 east. They consist of 10-15% 0.4-1.0cm and rarely >3cm sub- to euhedral orthoclase phenocrysts, and 5-7% 2-3mm plagioclase phenocrysts. Important minor phenocrysts, including euhedral 1-2mm, and rarely 7-10mm hornblende, form 3-5% of the rock. One notable difference in mineralogy distinguishes these dikes at Copper Canyon; sub- to euhedral pseudoleucite

phenocrysts up to 2cm form up to 10% of the rock. Pyrite generally occurs as fine-grained disseminations in the fine-grained to aphanitic groundmass, chalcopyrite where present occur as disseminations in the groundmass. The i5p dikes occur in six of the eight 2004 holes. They do not occur in high volume but form a ubiquitous network within the drill pattern. The i5p and i4 may be in part contemporaneous though i5p was observed cutting an i4 dike in CC04-25. Clasts of i5p were noted in the B1b breccia pipe in the bottom of drill hole CC04-29.

Dikes and sills of i6 and i8 form a volumetrically important part of the Copper Canyon intrusive complex. They are generally unaltered and unmineralized. An i6 dike with chill margins cuts the unmineralized B1b diatreme breccia in drill hole 29 (395m), demonstrating a late temporal relationship to mineralization. The i6-i8 intrusions consist of a fine- to medium-grained equigranular aggregate of orthoclase, plagioclase, and biotite. The biotite is commonly replaced by chlorite.

Dikes of i9 are rare at Copper Canyon. Only one i9 is exposed at surface, near the collar of drill hole CC90-2. Several occurrences were drilled; none were mineralized. The i9 dikes contain up to 30% megacrystic K-feldspar in a medium-grained orthoclase-rich groundmass. Many of the K-feldspar megacrysts are intergrown at a 90 degree angle, forming squatty "T" shapes. Chlorite and biotite commonly replace hornblende and form about 3% of the rock. Subhedral plagioclase occurs in the matrix and forms 5-10% of the rock.

Drill holes CC04-23 and 29 penetrated a diatreme breccia that intrudes the Copper Canyon porphyry. The breccia is composed of highly milled lithic fragments as young as i9 in a very-fine-grained, welded rock-flour matrix. It shows locally strong secondary K-feldspar but the alteration is generally dominated by fluorite, anhydrite, Fe-carbonate, and it is locally silica flooded. The unit contains abundant pyrite with lesser hematite. Traces of chalcopyrite occur locally but the unit contains very little significant mineralization."

9.5 Eruption Sequence

The following is excerpted from Otto (2004):

"The thick mass of chaotic lithic tuff composing the eruption sequence probably formed during cataclysmic plinean eruptions. Plinean eruptions are particularly violent. In the vicinity of the western Dog House drainage the tuffs lie above B3b orthomagmatic breccias and intrusive rocks of the Copper Canyon porphyry. The contact relationship between these rocks is unclear. The lack of the older alkalic lavas below the tuff and the presence of these lavas as lithic fragments in the tuff suggest that the eruption removed the older strata and formed a volcano-tectonic depression. The pyroclastic section is thickest in the area immediately west of Dog House Creek. It thins to the west and grades into reworked epiclastic sediments.

Plinean tuff that overlies the orthomagmatic breccia consists of lapilli to bomb-sized, polylithic, unsorted, clast-supported fragments in a pseudoleucite – K-feldspar-bearing groundmass. Clast lithologies include the pre-eruption alkalic lavas and abundant porphyry fragments derived from CCPp. The groundmass is generally very fine-grained to aphanitic and appears to have crystallized from liquid magma rather than representing ash. This texture may have resulted from remelting of superheated ash upon accumulation and compaction. Dikes of the CCPo, the K-feldspar phase of the Copper Canyon porphyry, intrude the tuff pile. Isolated intervals of reworked ashy epiclastic sediments and accretionary lapilli demonstrate subareal eruption. Crystal-rich and clast-deficient subtypes of the tuff sequence (unit Trxt) occur locally.

The B3b breccia hosts a great deal of the known Cu-Au-Ag mineralization. It is an enigmatic rock that spans a large spectrum of clast concentrations, clast sizes, and groundmass texture. The orthomagmatic breccia consists of variable quantities of lithic fragments in an aphanitic to medium-grained pseudoleucite-bearing syenite porphyry groundmass. The clast composition suggests at least two sources; CCPp, and the alkalic lavas that CCPp intruded. The unit varies vertically in groundmass texture and grain size, and clast density. Deeper portions contain small widely separated, sparsely scattered clasts floating in a groundmass of CCPp. This lithology grades downward into clast-deficient CCPp, though some clasts occur locally throughout the CCPp unit. The sparse-clast orthomagmatic breccia grades systematically upward to a clast-abundant variety that generally shows clast support. The groundmass texture changes from medium-grained and equigranular at depth upward to aphanitic. Pseudoleucite and K-feldspar phenocrysts occur in both textural types but range widely in quantity. End member lithologies of the breccia look like completely different rocks, but relationships from core show such a complete gradation from one to the other that it has so far proven difficult to define sub types.

Textural relationships in and compositions of the orthomagmatic breccia are consistent with the CCPp providing the source magma for the eruption by venting the uppermost portion of the chamber. Clast compositions indicate that some of the CCPp had crystallized; lesser CCPo clasts indicate that this unit was less crystallized. Dikes of CCPo that intrude the plinean tuff of Unit Trlt indicate that intrusion of this lithology occurred during and after the eruption.

One possible way that the upper, clast-abundant orthomagmatic breccia could have formed is for it to have resided above fluid magma in the zone of volatile-driven vesiculation but below the level of airborne pyroclastic ejecta. Vesiculation textures and other evidence of pyroclastic processes may have been eliminated because enough latent heat was available to re-melt the magma during consolidation after the eruption. This process could create textures consistent with volcanic processes at a high level while forming sub volcanic textures at progressively deeper levels."

9.6 Post Eruption Sequence

The following is excerpted from Otto (2004):

"Epiclastic sedimentary strata apparently derived from the Plinean tuffs of unit Trlt represent the youngest volcanic-related strata present in the Copper Canyon area.

Epiclastic sediments and reworked crystal tuffs of unit Trs lie stratigraphically above unit Trlt west of the Dog House Creek drainage. They include silty lacustrine

> beds, fluvial sands and conglomerates, and abundant reworked lapilli tuffs. These strata are similar to Trlt in composition so probably represent their reworked equivalent. Dikes of CCP-related porphyries, common in the pyroclastic section, are distinctly lacking in these strata.
>
> The sediment pile grades quickly from coarse-grained, thick-bedded and conglomeratic in easterly exposures to finer-grained and thinner bedded equivalents to the west. The presence of lacustrine beds suggests that the depositional environment included water impoundment, possibly within a caldera formed during the Plinean eruption. Exposures of these strata provide only a two dimensional view of a 3-dimensional depositional system, but from data at hand, it appears that sediments shed westerly from the Copper Canyon area. The diminished quantity of primary pyroclastic material above the Plinean tuff and the lack of CCP-related dikes indicate that the Plinean eruption terminated the main phase of volcanic activity at Copper Canyon. Alteration and mineralization in the sediment pile, however, suggests that hydrothermal activity continued long afterward."

9.7 Late Dikes

The following is excerpted from Otto (2004):

> "Post-mineral andesite dikes composed of euhedral hornblende laths in a very-fine-grained to aphanitic groundmass occur in the upper Dog House creek drainage. They show no alteration, and cut the thrust faults. They are generally high-angle features with either northeast or west-northwest strikes.
>
> Fine-grained aplitic D4 dikes form a striking visual component to the Copper Canyon area. They are resistant so form high-relief outcrops that cut all younger strata. They range in thickness from a few meters up to 20m, but generally average less than 10m. The dikes are vertically extensive. They penetrate through to the highest ridges and have been intersected in the deepest drill holes, a vertical range of over one kilometer. The dikes cut through the master thrust fault and show no offset so are clearly post mineral, and probably post Triassic age."

9.8 Allochthonous Hangingwall Sequence

The following is excerpted from Otto (2004):

> "A structurally complicated sequence of lower and middle Triassic phyllite and Permian limestone lies structurally above the middle Triassic igneous rocks of the Copper Canyon area. Paleontological samples from the limestone and phyllite confirm that this section is overturned (Jim Logan, personal comm., 2004). The Permian limestone is relatively intact and forms the cliffs exposed at the highest elevations above Dog House and Copper creeks. According to Logan, the contact between the limestone and phyllite represents an upper Permian-lower-Triassic disconformity; our observations of this contact confirm that it is bedding parallel and not faulted.

> The younger, structurally underlying carbonaceous phyllite section shows pervasive bedding-parallel isoclinal and tight similar-style folds whose axial planes generally parallel the thrust fault. Fine-grained to aphanitic intermediate alkalic sills that show a similar style of deformation occur abundantly in the phyllite section. The sills typically contain disseminated pyrite and Fe-carbonate. Logan (personal comm., 2004) suggests that the phyllite is a local unit only found in the vicinity of Copper Canyon."

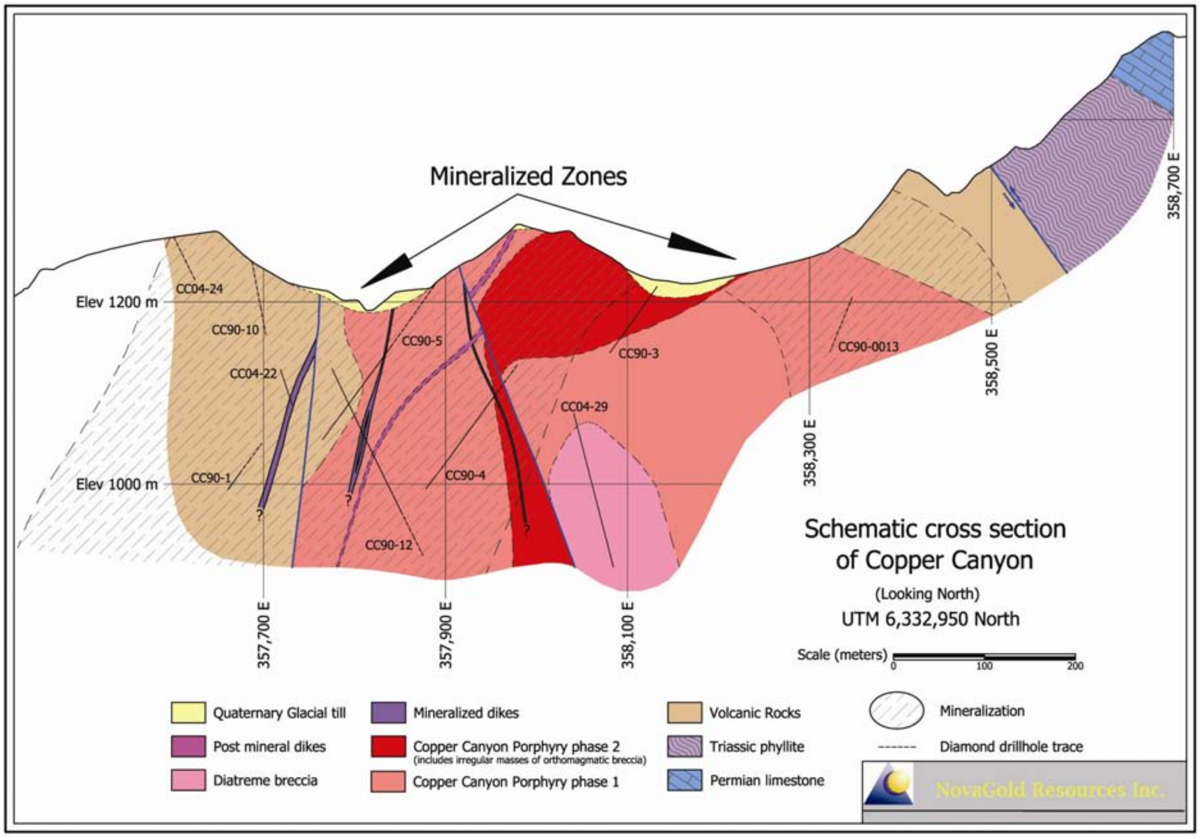


Figure 9.1: Schematic cross section through Copper Canyon.

The geological descriptions presented in Section 9 conform and are consistent with published material for the Galore Creek area and for porphyry type mineral deposits. Section 10 contains more general information about porphyry systems, while Section 11 has more details on the mineralization at Copper Canyon.

10. DEPOSIT TYPE

The Copper Canyon occurrence is an alkalic porphyry copper-gold-silver system located near the Galore Creek Deposit in northwestern British Columbia.

This section has been adopted from Termuende (2002).

> "The Copper Canyon property is situated within and associated with a curvilinear belt of bi-modal calc-alkaline and alkaline Upper Triassic-lower Jurassic Nicola-Takla-Stuhini volcanic assemblages and comagmatic plutons and associated porphyry Cu-Mo and Cu-Au-Ag deposits respectively that extends along the Intermountain Belt from south of the British Columbia-Washington border along Quesnel Trough through the Stikine region and into the Whitehorse Trough, Yukon Territory. Several major alkalic porphyry deposits ranging in age from 175 to 201 million years associated with alkalic stocks, dykes and intrusive breccias controlled by north to northwest trending major fault structures are known along this belt including Copper Mountain-Ingerbelle, Afton, Cariboo Bell, Lorraine, Gnat lake and Galore Creek deposits (Barr, D. A., et. al., CIM Spec. Vol. 15, 1976).
>
> These deposits tend to occur in regions of fault intersections and are controlled by fractured and/or brecciated zones. Deposits typically show extensive alteration products and sulphides and often lack the classic zoning of calc-alkaline porphyries due to the absence or poorly developed nature of phyllic and argillic zones. Also, alteration zoning patterns tend to be assymetric as opposed to symmetrical and concentric typical of calc-alkaline deposits. Potassic flooded (i.e. K-feldspar and biotite) core zones and propylitic altered (i.e. chlorite, epidote and albite) peripheral zones are typical of the alkalic deposits. Copper zones (i.e. chalcopyrite and minor bornite with gold and silver values) usually occur central to the alteration systems although in some cases they occur within the propylitic zone. Sulphides typically occur as fracture fillings, disseminated grains, massive lenses and pods and in breccias. Magnetite is commonly associated with these systems and may either coincide with sulphide zones or occur peripheral to the copper zones. Calc-silicate alteration products, including andradite to grossularite garnets with associated gypsum and anhydrite, occur within the potassic zones at Galore Creek, whereas, scapolite is commonly in the propylitic altered copper zones at Ingerbelle. Of the Cordilleran alkaline deposits known, Galore Creek and Ingerbelle are the largest."

The geology model used to determine resources carried five general lithology codes. In detail, rock types are numerous and varied (up to 132 possible lithology codes) and have been grouped together into the five main lithologies. Three of the lithologies represent potential ore material, while the fourth lithology, dykes, may be mineralized, and the fifth lithology, fault zones, is represented by only three samples. More detail about the model is included in Section 19.

The deposit type and model is considered appropriate for a porphyry copper-gold-silver deposit.

11. MINERALIZATION

This section has been adopted from Otto (2004).

> "Hydrothermal alteration and sulfide mineralization modified the texture and composition of the Copper Canyon porphyry and the adjacent pre-eruptive rocks. The mineral system is centered on the porphyry and shows the strongest development within the CCPo phase. The B1b diatreme breccia drilled by holes CC90-3, CC04-23, and CC04-25 appears to lie near the core of the system within mostly CCPo. Adjacent CCPp shows strongly disseminated mineralization associated with the pervasive development of secondary biotite and K-feldspar. This style of alteration and mineralization diminishes outward. Superjacent eruptive rocks show the least alteration. These crude geometries appear to form concentric shells around the diatreme breccia, though additional holes will be required to confirm this."

The following paragraphs discuss alteration in the context of host rocks. Temporal relationships are discussed in the section titled Sulfide mineralogy and paragenesis.

11.1 Pre-Eruptive Sequence

This section has been adopted from Otto (2004).

> "The pre-eruptive alkalic lavas of unit Trv contain pervasively disseminated pyrite, local accumulations of clotty and finely disseminated chalcopyrite, and extensive iron-carbonate replacement. The strongest alteration and mineralization in these strata occur in the vicinity of Copper Canyon and upper northeast Dog House Creek; correlative strata along strike to the northwest show progressively diminished levels. The 1990 assessment report (Leary, 1990) refers to these altered pre-eruptive lavas as the "North Zone". The following discussion applies primarily to the exposures of these strata in Copper Canyon.
>
> Discontinuous coarse-grained veins up to 5cm thick of biotite, K-feldspar, pyrite, magnetite, and chalcopyrite represent the earliest veining noted. These veins occur primarily within exposures of the alkalic lavas and in sills of CCPp. They generally lie parallel at an outcrop scale but vary in attitude over broader areas; they generally do not form stockworks. The veins commonly display zoning where coarse-grained biotite forms the margins and K-feldspar, magnetite and pyrite form the interior. Chalcopyrite occurs as anhedral clots within the pyritic interior. Biotite in the thicker veins commonly forms aggregates of large euhedral books. I refer to these veins as EDM, with reference to the pre-main-stage early dark micaceous (or EDM) veins at Butte, Montana.
>
> The alkalic lavas that crop out in Copper Canyon show pervasive and patchy K-feldspar flooding with locally abundant secondary biotite. The K-feldspar flooding destroyed the original aphanitic texture, and it now occurs as diffuse pink bands within a very fine-grained brownish groundmass. Sulfide mineralogy consists primarily of disseminated pyrite and locally chalcopyrite. Both pyrite and chalcopyrite commonly occur disseminated within clotty blebs of secondary biotite and K-feldspar.

Late, barren, coarse-grained K-feldspar veins, or "K veins", commonly crosscut the pervasively disseminated K-feldspar-biotite-sulfide assemblage and the EDM veins. Orthoclase in the K veins occurs as coarse-grained, sub- to euhedral aggregates within a fine-grained anhedral K-feldspar-rich groundmass. They are generally devoid of sulfide though disseminated pyrite and, locally, chalcopyrite occur along vein margins. The K veins range in thickness from a few centimeters up to one meter.

Veinlets and pervasive replacements of Fe-carbonate cut all earlier assemblages. The veinlets commonly form intricate millimeter-scale stockworks that pervades large areas.

Oxidation of these veinlets imparts a brownish red color to outcrops. This style of alteration may not be entirely related to main stage mineralization. Several occurrences of strong Fe-carbonate veining were observed cutting D4 aplite dikes. Because the D4 dikes cut the post-mineral thrust fault and the Fe-carbonate cuts the D4 dikes it is unclear if the Fe-carbonate is entirely younger than the mineral system or if there are two or more phases of Fe-carbonate introduction.

Late, discordant, breccia dikes locally cut the lavas. Clasts within the dikes range in size from a few millimeters up to 15cm and are entirely angular. Gypsum (after anhydrite?) coats the open interstitial vugs; it occurs as banded colloform coatings that cement the fragments. The breccia dikes are deformed by faults related to the thrust-fault system, which indicates a temporal relationship consistent with the ore system; this relationship however, is not definitive."

11.2 Copper Canyon Intrusive Complex

This section has been adopted from Otto (2004).

The Copper Canyon intrusive complex shows geographically variable degrees and differing styles of alteration. In general the strongest alteration occurs near the center of the Copper Canyon porphyry within the CCPo phase, along the western side of Copper Canyon.

The outcrop of CCPp at the collar of drill hole 90-2 displays a strongly mineralized hydrothermal breccia. Clasts in the breccia range in diameter from a few centimeters to nearly a meter and average about 30 centimeters. The breccia matrix consists primarily of very coarse-grained euhedral biotite with subordinate amounts of chalcopyrite, magnetite, and pyrite. Clasts show pervasive replacement by secondary biotite and K-feldspar. Sulfides occur less frequently within the clasts. The alteration mineral assemblage and the coarse euhedral habit of biotite in the matrix of the breccia indicate an association with the EDM veins. Drill holes 90-1, 90-2, and 90-7 penetrated the exposed breccia and produced Cu grades of between 1 and 2% near the collar, in the outcrop exposed at surface. Drill hole 90-2 shows that this style and tenor of mineralization continues to a depth of over 270 meters below surface. The near-collar distribution of mineralization in the adjacent angle holes indicates that the zone has a near vertical geometry. Due to thick glacial cover surrounding the outcrop we could not determine the primary strike direction. Drill holes CC04-22 and 24 were designed to resolve this geometry but were lost prior to reaching their design depth.

Outcrops of CCPp and the B3b orthomagmatic breccia in lower Dog House Creek lie adjacent to the EDM breccia. These outcrops display evenly disseminated chalcopyrite and pyrite in an alteration assemblage of fine-grained secondary biotite and medium-grained anhedral K-feldspar. The sulfides are very fine grained and generally show no recognizable concentration within or along incipient veins or stockworks. Drill hole 90-4 penetrated this section and demonstrates that this style of mineralization continues to a depth of at least 300 meters below surface.

Copper-cemented colluvium and a subjacent cupriferous gossan lie at the southern end of the large outcrop of unit CCPo along the western side of lower Copper Canyon. The southern portion of this exposure shows pervasively disseminated pyrite and chalcopyrite within a package of intense potassic alteration. Secondary K-feldspar and biotite occur pervasively and as selvages adjacent to veins of K-feldspar, specular hematite, pyrite, and chalcopyrite. K-feldspar also occurs associated with veins composed of biotite, K-feldspar, carbonate, pyrite ± chalcopyrite. Where pervasive, secondary K-feldspar selectively replaced orthoclase, biotite, and amphibole. Locally pervasive K-feldspar alteration resulted in complete destruction of the primary mineralogy and imparts a bleached appearance. Veins of garnet, sericite, and pyrite ± chalcopyrite and veins of late iron-carbonate locally overprint the earlier K-feldspar-biotite veins.

The northern end of the outcrop discussed above remains strongly pyritic and potassic but shows diminished levels of chalcopyrite. It lies directly above the lower portion of drill hole CC04-29, which was extremely altered but barren of significant Cu-Au-Ag mineralization. The bottom 105m of drill hole CC04-29, the bottom 100 meters of CC04-23, and the entire CC90-3 drilled a barren diatreme breccia that cuts the CCPp and CCPo porphyries. The diatreme consists of highly milled fragments in a rock-flour matrix. It contains abundant pyrite but is essentially devoid of copper sulfide. Well-developed fluorite and anhydrite veins and stockworks overprint pervasively developed secondary K-feldspar; the intensely developed alteration generally destroys all original rock textures. The breccia has not been penetrated by enough holes to accurately determine its overall size and shape. It occurs in proximity to the dip extension of the DH splay fault. Drill hole CC04-23 penetrated a 11.2m void above the diatreme which I have interpreted as a dissolved anhydrite vein that emanated from the diatreme and followed the fault. These interpretations indicate that the DH splay fault may have controlled the location of the diatreme, so it may be elongated along this structure. The diatreme contains locally abundant clasts of i9 porphyry, which demonstrates a late- to post-mineral time of emplacement.

Anhydrite occurs as a ubiquitous component superimposed on all alteration styles. The strongly fractured upper levels of bedrock, similar to Galore, probably

> resulted from hydration of anhydrite to gypsum, and then dissolution of gypsum. Core from below the zone of dissolution shows abundant anhydrite-filled fractures that lie at a similar orientation to core axis as the fractures higher up. Some holes intersected anhydrite veins several meters thick (down-hole)."

11.3 Dikes

This section has been adopted from Otto (2004).

> "Dikes that cut the eruptive sequence provide important temporal and geometric information about the relative timing of alteration and mineralization. The i9 dikes show little alteration or mineralization so, as at Galore, probably intruded largely after the main phase of mineralization. Clasts of i9 were identified in the very-weakly-mineralized B1b diatreme breccia. The i4 and i5p dikes show significant variations in their degree of alteration.
>
> The i4 dikes show the greatest amount of alteration, and host much of the mineralization in holes CC04-23 and 25. They show extreme brecciation and some intervals have been altered nearly beyond recognition, suggesting that they were emplaced largely before mineralization. Alteration of the i4 dikes includes pervasive secondary K-feldspar which commonly shows a sericite-chlorite overprint. Drill hole CC04-25 contains a thick interval of i4 that shows a strong garnet overprint.
>
> The i5p dikes show a broad spectrum of alteration from incipient to strong. Weakly altered zones indicate emplacement subsequent to main stage mineralization. Disseminated chalcopyrite and pyrite within a matrix of locally strong secondary K-feldspar that has been overprinted by fluorite shows that some were present during the main phase of sulfide precipitation. These relationships indicate that i5p dikes may have been emplaced along dilatent zones within the hydrothermal system."

11.4 Eruptive and Post-Eruptive Sequence

This section has been adopted from Otto (2004).

> "Pyroclastic rocks of the post-eruptive sequence contain finely disseminated pyrite, pervasive iron carbonate, and calcite. Siderite (?) and pyrite occur as very-fine-grained disseminations; siderite also occurs in sub-millimeter-scale veinlets. Shear-hosted pyritic K-feldspar-rich veins locally cut the pyroclastic section. Bedding-controlled specular hematite, bedding-parallel and discordant K-feldspar veins, and disseminated pyrite within epiclastic strata above the pyroclastic section indicate an epithermal-style of alteration. No chalcopyrite was noted within these strata."

11.5 Sulfide Mineralogy and Paragenesis

This section has been adopted from Otto (2004).

> "Much of the mineralization at Copper Canyon occurs as even disseminations; stockwork veining does not appear to represent a significant volume of the mineralized zones. A number of structural features, including hydrothermal and magmatic breccias, veins, and shear zones, also carry copper, gold, and silver values. The majority of mineralization appears to be related to exsolution of auriferous fluids from the CCP intrusive suite."

11.6 Sulfide mineralogy

This section has been adopted from Otto (2004).

> "Chalcopyrite, the major copper-bearing mineral, occurs most commonly as evenly distributed fine disseminations. In higher-grade zones, such as drill hole CC04-23, chalcopyrite occurs as coarse blebs intergrown with coarsely crystalline specular hematite, sub- to euhedral pyrite and anhedral magnetite. Mineral morphologies and intergrowths indicate that this assemblage formed contemporaneously. Chalcopyrite generally grows in association with biotite and to a lesser degree, K-feldspar. Perhaps the best example of this is the EDM breccia. Here, chalcopyrite occurs as blebs up to 1 centimeter across in a matrix of coarse, euhedral biotite forming a texture reminiscent of pegmatite.
>
> Free gold was not recognized. The only sulfide species noted in elevated Au intervals was pyrite. Perhaps gold occurs as elemental or blebby concentrations in the pyrite crystal lattice. Silver sulfosalts or sulfides were not recognized either. An obvious possibility for silver is tennantite-tetrahedrite in which Ag can substitute for up to 15% of copper. If these minerals were present elevated levels of arsenic and/or antimony should also be present; they are not. Bornite was not positively recognized in the 2004 drill core. Several occurrences of supergene bornite rimming chalcopyrite were noted in the 1990 core."

11.7 Paragenesis

This section has been adopted from Otto (2004).

> "A crude paragenetic model can be constructed using a combination of relative rock age, alteration mineralogy, and copper sulfide occurrence. Due to overlap of progressive or non-contemporaneous alteration assemblages, variations in rock types, and post alteration intrusions it is difficult to create map patterns showing the distribution of specific alteration assemblages. In general, barren potassic alteration dominates the core of the hydrothermal system. Pervasive cupriferous secondary biotite and K-feldspar occur outward, and this gives way to an auriferous pyritic halo. Fluorite and anhydrite overprint all of these phases of alteration. Temporally, the EDM breccia and EDM veins are the earliest cupriferous alteration phase. They were followed by development of pervasive biotite – K-feldspar. Potassic alteration and related K veins generally overprint these earlier assemblages and then are overprinted by fluorite and anhydrite.

The anhydrite-cemented breccia dikes were probably one of the last things to form, and represent gaseous fluids escaping to the atmosphere. Alteration and mineralization of the B3b orthomagmatic breccia and bornite-chalcopyrite-mineralized clasts noted in the plinian tuff suggest that the mineral system started before, and continued during and after the eruptive cycle. The following paragraphs discuss the geometric characteristics of these assemblages:

Potassic alteration dominates the core of the hydrothermal system. It is exposed at surface in Copper Canyon and was drilled by portions of CC04-23, 27, 28, and 29. This style of alteration is best developed within and peripheral to the B1b diatreme breccia where it is barren of Cu sulfides but contains abundant coarse-grained pyrite. Exposures in Copper Canyon show that the K veins form peripheral to the pervasive K-feldspar zone and cut the biotite K-feldspar zone.

The pervasive biotite — K-feldspar zone occurs peripheral to pervasive potassic alteration. This zone was drilled by holes CC04-23 and 25, and several of the 1990 holes, including 90-1, 2, 4, and 5. A similar style of alteration was noted in outcrop north and east of the plan projection of the B1b diatreme breccia in Copper Canyon, near the base of the cliffs and along the east side of the drainage. The EDM breccia and the EDM veins occur within and outboard of this style of alteration. Combined, these occurrences appear to describe an annular feature peripheral to the potassic core.

Pervasive replacement by garnet and epidote commonly overprints the biotite – K-feldspar assemblage. Though important, we do not have enough intercepts of this alteration style to fully understand its geometry. Where seen it generally overprints all alteration styles except fluorite and anhydrite, suggesting that it may have formed as a retrograde assemblage during hydrothermal system collapse.

A poorly defined pyritic halo located peripheral to the pervasive biotite – K-feldspar zone forms the exterior of the hydrothermal system. The inner portion of this zone is deficient in copper but shows significant gold enrichment. This zone was drilled by holes CC04-22 and 24, and 90-1."

11.8 Structure

This section has been adopted from Otto (2004).

"Dilatent structural zones appear to have controlled hydrothermal fluid flow. These zones, represented by the i5p dike system, are the oldest recognizable structures. Younger structures include both compressional and normal faults. The Master thrust fault, the largest compressional structure in the area, terminates the volcanic section to the east and places older siliciclastic and carbonate strata above the mineralized section. Several normal faults occur but generally show small displacement."

11.9 Structural Controls on Mineralization

This section has been adopted from Otto (2004).

> "Dikes that cut the copper Canyon porphyry provide an important and perhaps the best indication available, except grade, to the potential geometry of a structurally influenced plumbing system utilized by ore-forming fluids. The i5p dike set was emplaced during and shortly after ore formation so may closely parallel the ore-fluid plumbing system. Most of the i5p dikes strike approximately N15°E and dip vertically to steeply east. The earlier i4 dikes intruded largely along a N45°W trend with a steep northeasterly dip. These dikes were apparently emplaced before the ore event, but may proxy for an important structural orientation as well."

11.10 Thrust Faults

This section has been adopted from Otto (2004).

> "Two faults show compressional duplication of the section, the Master thrust, and a parallel structure below called the sub thrust fault. The master thrust fault shows by far the greater amount of displacement.
>
> The master thrust fault crops out in Copper Canyon and along the upper reaches of the Dog House Creek drainage. The fault places lower Triassic phyllite and Permian limestone above the middle Triassic volcanic section. It has an unknown amount of displacement, but based on the combined topographic extent of exposure and the exposed thickness of the allochthonous section it is probably measured in kilometers. The fault strikes generally north-south. It dips variably east; lower topographic exposures in Copper Canyon dip 60° or more. The upper exposures dip progressively less; its uppermost reaches northwest of Dog House Creek dip about 30°. The minimum age of faulting is unknown. Based on the age of displaced strata the fault can be no older than upper middle Triassic.
>
> A fault parallel to the master thrust lies below it a distance of approximately 100 to 200 meters. The fault is well exposed on the cliffs in Copper Canyon where it tracks along a striking color difference in the alkaline lavas. It duplicates the alkaline lava section and juxtaposes two different alteration styles in the lavas. The upper plate shows pervasive K-feldspar flooding with disseminated pyrite and local chalcopyrite. The lower plate shows similar but weaker levels of K-feldspar flooding and less sulfide. The difference in sulfide content explains the variation in color of the lavas across the fault.
>
> Early compressional movement on the sub thrust fault was later partially restored by normal movement; the normal movement is based on offset of a D4 dike. Where the dike cuts the sub thrust fault it shows 100m of relative right-slip displacement. No offset occurs where the same dike cuts the master thrust fault. Apparently the D4 dike system intruded after thrust faulting and was later displaced by normal faulting.

> A penetrative fracture cleavage occurs in all rocks at Copper Canyon except the D3 and D4 dikes sets. The cleavage has been disharmonically folded and at outcrop scale shows 30° – 40° fluctuations in attitude. The lack of occurrence of this cleavage in dike rocks younger than thrust faulting indicates that the cleavage may be related to the compressional structures. Anhydrite veins attenuated along cleavage were noted in core. Hydration of the anhydrite to gypsum and then dissolution could have significantly enhanced development of cleavage-parallel fractures which distinguish the upper part of all drill holes."

11.11 Normal Faults

This section has been adopted from Otto (2004).

> "The Dog House fault strikes approximately north 15° east and dips near vertically. Rock-type juxtapositions, drill intercepts in 6 holes, and a magnetic anomaly define its position, which follows the bottom of Dog House Creek. Displacement across the structure is variable depending on the age of rocks. Older rocks are displaced farther than younger, suggesting that it is an old structure with a colorful history. The dominant offset direction across the structure shows relative left-slip displacement. This fault roughly defines the western boundary of the CCP and the eastern margin of the B3b orthomagmatic breccia. This relationship suggests that the fault may have been instrumental in controlling the eruptive geometry during venting of CCP, an interpretation furthered by the parallel orientation of contemporaneous i5p dikes.
>
> The DH splay fault strikes approximately north 30 west and dips steeply northeast. Offset of the D4 dike and intercepts in two drill holes define its position. The name derives from its position relative to the Dog House fault. Displacement across the structure is not known but it appears to be small; perhaps as little as 50 meters. The B1b diatreme breccia occurs along the down-dip extension of the fault, indicating that it may have localized the diatreme. If so, the fault may have been present during the main phase of mineralization as well. If the DH splay and the Dog House faults are truly related, the splay direction indicates left-slip movement in a strike-slip system."

The description of the mineralization presented here conforms to published information on the deposit as well as information on typical porphyry copper-gold deposits.

12. EXPLORATION

The Copper Canyon property represents an advanced project. The early exploration work in the area located copper mineralization on surface and the potential of a significant copper-gold- -silver porphyry target. Exploration work in 1990 and again in 2004 has been directed at gaining knowledge about the geology of the area and expanding the resource base of the mineralized zones.

12.1 Extent of All Relevant Exploration

Geological mapping, surface geochemical, and geophysical techniques have added considerable value to the project. There has been no new soil or rock sampling on the property, nor has there been any trenching. Table 12.1 lists the relevant exploration work on the property along with contractor name and supervisor.

Table 12.1
Exploration Employees / Contractors

Job Function / Year	Supervisor	Contractors	Work Performed
A. Geology			
1957	J.P. Dobell		Mapping, Petrology
1962			
1964	Snively	Ridgeway W. Hilson & Assoc.	
1965	H.H.F. Naylor	H.T. Carswell	
1966	N. Shepherd	J.P. Dobell	
1988	A.C. Hitchins		
1989			
1990	D.A. Caulfield	G.M. Leary	
1991			
2003	Scott Petsel		
2004	Scott Petsel		
B. Laboratory			
1957			
1962			
1964			
1965			
1966			
1988			
1989			
1990		TSL Laboratories	
1991			
2003		Chemex Laboratories	
2004		Chemex Laboratories	
C. Geophysics			
1962	Norman		Airborne Mag

Job Function / Year	Supervisor	Contractors	Work Performed
1964	R.A. Bell & P.G. Hallof		IP
1966	R.D. Falconer		IP, Ground Mag
1989	A.D. Ettlinger, et al.	Aerodat	Airborne EM
2004	Lou O'Connor	Fugro	Airborne Mag/Radiometrics
D. Drilling			
1957			
1990			Diamond Drill Program
2004	Bruce Otto (NovaGold)	Britton Brothers	Diamond Drill Program

12.2 Results of Surveys, Procedures and Parameters

The following has been adapted from Otto (2004):

> "The rock and soil geochemical samples collected by Consolidated Rhodes Resources Ltd. during their 1990 work program were transcribed into a database and locations digitized.
>
> The sample locations were digitized from scanned sample location maps, from Consolidated Rhodes Resources Ltd. 1990 summary report. As the report and maps did not state whether the map base was in North American Datum 1927 (NAD27) or NAD83, the plotted property grid was used to georeference the maps. The origin of the property grid is located at the collar of drill hole CC90-0001, with the other collar locations being given in property grid coordinates. The 1990 collars were located and surveyed using Ashtec differential GPS equipment. The holes were plotted using the GPS coordinates and the property grid overlaid, with the UTM Zone 9, NAD83 datum giving the best correlation. The scanned images were then georeferenced to UTM Zone 9, NAD83 using the property grid as reference in AutoCAD Map v4.0 and Raster Design v3.0. The sample locations were then digitized in UTM Zone 9 meters, NAD83 and stored in an Excel Spreadsheet. All locations of samples listed in the analytical results have been identified, except for rock sample 90-CSF-02 (sample site not located on map) and the locations for rock samples 90-CLR-12 to 17 (locations mapped, but not digitized).
>
> The analytical results were transcribed using an Optical Character Recognition (OCR) program from a scanned version of the Consolidated Rhodes Resources Ltd. 1990 summary report. The gold results have been transcribed and visually checked and entered into an Excel Spreadsheet (CC_1990_Soils_Rocks.xls) along with their locations, sampler, descriptions (for the rock samples), analytical lab, and analytical procedure. The multi-element results are in the process of being transcribed and checked."

12.3 Interpretation of Exploration Information

The following has been adapted from Otto (2004):

> "Eagle Plains Resources collected 62 rock chip samples from the 1990 core primarily to analyze for Platinum group elements. These data were presented in their year 2002 summary report (Tremuende, 2002). Table 12.2 show these data with respect to Galore rock codes. The Galore rock codes resulted from our relogging of all available 1990 core."

Table 12.2
Summary of assay data from Eagle Plains sampling in year-2002. The column containing Galore lithologic codes is from year 2004 core relogging

Drill hole	Depth (m)	Galore Lithology	Cu (ppm)	Ag (ppm)	Au (ppb)	Au Assay (g/t)	Pt (ppb)	Pd (ppb)
DDH 90-01	29.88	CCPo	14498	40.6	1595	1.68	<2	11
DDH 90-01	47.26	CCPp	13419	49.8	354		<2	7
DDH 90-01	94.82	CCPp	5293	10.2	6345	4.95	<2	5
DDH 90-01	101.83	CCPp	4259	7.4	4431	3.55	<2	8
DDH 90-01	121.95	CCPo	199	<.3	543		<2	3
DDH 90-01	140.85	CCPo	143	<.3	125		4	4
DDH 90-01	170.73	CCPo	59	<.3	159		3	4
DDH 90-02	22.87	CCPp	21900	45.3	1390	1.32	3	7
DDH 90-02	52.74	CCPp	19450	49.6	983	0.94	4	16
DDH 90-02	76.83	CCPp	61436	88.5	6602	7	6	27
DDH 90-02	99.7	i8	267	1.1	50		3	10
DDH 90-02	128.96	CCPp	59220	105.6	12601	9.83	7	65
DDH 90-02	151.52	CCPp	4130	21.5	1624	2.06	<2	19
DDH 90-02	185.06	i4	2163	8.2	1157	0.96	4	15
DDH 90-02	215.55	i4	17012	24.5	6768	3.91	<2	7
DDH 90-02	247.26	CCPp	16839	25	3724	3.54	6	19
DDH 90-02	273.48	i4	106	0.6	2306	2.12	<2	4
DDH 90-03	14.94	B1b	8991	0.4	106		2	8
DDH 90-03	72.26	B1b	686	0.4	71		5	5
DDH 90-03	102.13	D4	58	2.3	9		<2	<2
DDH 90-03	148.48	i4	38	<.3	16		<2	4
DDH 90-03	162.5	D4	17	2.8	6		<2	2
DDH 90-04	36.28	CCPo	101	<.3	39		5	13
DDH 90-04	71.65	i7	567	0.3	65		<2	10
DDH 90-04	114.33	i6	310	7.6	489		<2	11
DDH 90-04	153.05	CCPp	16992	16.5	1563	1.44	4	9
DDH 90-04	182.93	CCPp	8810	13.5	1088	1.29	<2	8
DDH 90-04	233.84	CCPp	1280	2	221		<2	5
DDH 90-04	265.55		55122	85.1	15623	13.56	<2	30
DDH 90-04	299.7		6075	11.4	577		2	27
DDH 90-04	324.7		4609	45.8	333		<2	7
DDH 90-05	22.87	CCPp	260	0.4	15		5	9
DDH 90-05	68.6	CCPp	51	<.3	14		4	<2
DDH 90-05	93.6	CCPp	1571	2.3	54		6	11
DDH 90-05	115.85	i6	30	<.3	46		<2	4
DDH 90-06	63.72	CCPp	1054	3	220		5	12
DDH 90-06	87.5	CCPo	1401	1.4	159		3	5
DDH 90-06	92.68	CCPo	2217	2.9	361		3	11

Drill hole	Depth (m)	Galore Lithology	Cu (ppm)	Ag (ppm)	Au (ppb)	Au Assay (g/t)	Pt (ppb)	Pd (ppb)
DDH 90-06	220.12		2737	0.4	174		6	10
DDH 90-07	45.12	CCPp	8413	21.7	1252	1.14	4	9
DDH 90-07	65.55	i4	262	2.2	130		2	3
DDH 90-07	146.04	CCPp	1291	0.4	146		4	10
DDH 90-07	158.54	i5p	482	0.3	38		4	7
DDH 90-07	181.4	CCPe	177	0.4	93		3	8
DDH 90-07	202.44	CCPe	979	3.3	190		4	11
DDH 90-07	236.28	CCPe	209	<.3	21		7	11
DDH 90-07	315.24	CCPe	91	<.3	21		3	11
DDH 90-09	45.73	V3a	121	0.3	18		7	9
DDH 90-09	122.56	V3h	77	0.4	141		5	10
DDH 90-09	137.5	V3h	117	0.3	688		5	9
DDH 90-09	237.8	i4	77	<.3	8		4	2
DDH 90-11	94.82	V3h	643	2.9	147		8	8
DDH 90-11	125	V3h	943	5.9	182		3	4
DDH 90-11	136.28	V3h	1410	2.3	42		5	6
DDH 90-12	423.78	i6	146	<.3	111		7	8
DDH 90-12	446.95	CCPp	590	1.8	756		3	20
DDH 90-12	463.41	CCPe	295	1.3	338		4	3
DDH 90-13	62.8	V3a	731	0.9	632		4	<2
DDH 90-13	136.28	V3a	1393	0.4	248		5	9
DDH 90-13	145.43	V3a	2981	0.4	279		2	8
DDH 90-13	186.59	CCPe	486	<.3	236		3	2
DDH 90-13	264.33	CCPe	327	<.3	5		3	3

12.4 Reliability of Data

The procedures followed in the field and through the interpretation stage of exploration have been professional. Various crews under the supervision of professional geologists carried out the exploration work. It is considered that the reliability of the data obtained with exploration is very high.

13. DRILLING

Drilling in 2004 confirmed results of the 1990 work and extended the limits of known mineralization.

Britton Bothers Diamond Drilling of Smithers B.C completed the 2004 work using a helicopter portable drill rig. The 2004 program consisted of 8 core holes totaling 3,024.09m. In total 21 holes have been completed on the property for a cumulative of 6,833.59m of drilling, (see Table 13.1). All of the more recent drilling on the property has been continuous-core diamond drilling, using NQ size core, approximately 47.6mm. Core drilling in 1957 was not used in the resource modeling.

13.1 2004 Procedures

The procedures used to locate exploration drill holes includes; the proposed drill site is located in the field by a geologist using a hand-held GPS unit; a pad is built and the drill rig is placed on the site by helicopter. The orientation of the drill hole is set by the geologist. Upon completion, the holes were surveyed by differential GPS using an Ashtech receiver. Down hole surveys were completed using an Icefield MI3 Autoshot Digital borehole tool.

Upon completion of the hole, the drill pipe is removed from the hole, though the surface casing is left to mark the hole location.

All drill core was transported to the Galore camp for logging and sampling. The Galore nomenclature was used where lithologies matched existing codes; new rock codes were created to accommodate lithologies not present in the current dictionary. The 2004 core was logged by two geologists, Melanie Coward and Dave Smithson.

Logging included coded and textual descriptions of lithologies and a detailed geotechnical description of fracture styles and densities. Data were entered in an Access database using DDH Explore, an in-house front-end data entry program. Once logged, the core was sawed; half was sent to Chemex Labs for analysis and the other half stored at the Galore camp.

Problems were encountered with some of the surveys. The most problematic issue with the surveys was the exterior diameter of the camera assembly relative to the interior diameter of the rods. The tolerance was so small that the camera became stuck at slightly bent rod joints. This problem was undetectable until the rods were pulled, with the consequence that the camera remained inside of the rods for the entire duration of the survey and provided useless azimuth readings. A summary of the drill hole surveys is given in Table 13.2.

Table 13.1
Drill Hole Collars and Orientation

Hole ID	Program	UTM East[1]	UTM North[1]	Elevation[1]	Azimuth	Dip	Actual depth
CC57-0001[2]	1957	358024.10	6332854.50	1194.10	315	-30	166.00
CC57-0002[2]	1957	358290.70	6332957.90	1246.50	105	-30	187.00
CC57-0003[2]	1957	358134.20	6332947.20	1222.40	315	-45	127.70
CC57-0004[2]	1957	358226.20	6333050.60	1260.50	315	-45	309.00
CC57-0005[2]	1957	357777.50	6332819.60	1154.20	315	-45	144.00
CC57-0006[2]	1957	358282.30	6333167.00	1313.50	315	-45	67.00
CC57-0007[2]	1957	357778.20	6332820.50	1153.90	105	-75	9.00
CC90-0001	1990	357777.10	6332820.90	1154.50	315	-45	229.80
CC90-0002	1990	357778.00	6332820.00	1154.00	0	-90	276.30
CC90-0003	1990	358132.57	6332948.15	1216.79	315	-45	167.90
CC90-0004	1990	358023.90	6332854.70	1194.30	315	-45	398.50
CC90-0005	1990	357896.30	6332868.70	1230.00	315	-45	308.80
CC90-0006	1990	357897.00	6332868.00	1230.50	0	-90	179.50
CC90-0007	1990	357778.90	6332819.10	1153.30	135	-65	333.80
CC90-0008	1990	357647.40	6332768.00	1136.00	0	-90	158.50
CC90-0009	1990	357648.00	6332767.30	1135.50	135	-60	312.50
CC90-0010	1990	357691.50	6332910.90	1222.10	135	-75	468.50
CC90-0011	1990	357691.20	6333084.10	1303.50	135	-58	182.00
CC90-0012	1990	357692.30	6333083.00	1302.40	135	-57	516.90
CC90-0013	1990	358418.89	6332827.88	1385.63	315	-61	276.50
CC04-0022	2004	357661.13	6333057.66	1300.45	135	-65	235.14
CC04-0023	2004	357858.15	6333150.64	1258.78	135	-60	384.05
CC04-0024	2004	357616.89	6332907.75	1239.81	135	-55	323.17
CC04-0025	2004	357856.86	6333153.62	1259.09	0	-90	371.86
CC04-0026	2004	358017.07	6333188.06	1349.77	0	-90	423.61
CC04-0027	2004	358052.91	6333123.92	1336.24	0	-90	371.86
CC04-0028	2004	358109.42	6333198.17	1376.29	0	-90	515.11
CC04-0029	2004	357987.91	6333053.17	1283.97	135	-70	399.29

Note: 1) NAD83, zone 9.

2) The assay results from the 1957 drill program have not been used in the present day database because the core was not continuously sampled, therefore there are assay gaps between higher-grade intervals, and the 1990 drilling duplicated the 1957 drill holes very closely.

Table 13.2
Down Hole Survey Information

DH	Remarks; Down Hole Survey
CC04-0022	Hole abandoned due to lost circulation, not surveyed
CC04-0023	Tool stuck in rods, not surveyed
CC04-0024	Drill rods became stuck and had to be cut off, the hole could not be surveyed
CC04-0025	No survey problems
CC04-0026	Tool stuck in rods, not surveyed
CC04-0027	No survey problems
CC04-0028	No survey problems
CC04-0029	No survey problems

13.2 1990 Drill Core

Core drilled in 1990 and stored since then at Copper Canyon was re-boxed and transported to the Galore camp in September, 2004. Some of the original boxes had deteriorated beyond repair so the core could not be archived accurately. Approximately 946 meters of core is missing, representing 25% of the original total. Table 13.3 lists the intervals of core that could not be recovered. The preserved core was relogged using Galore nomenclature and data appended to the database.

Table 13.3
Missing intervals from 1990 core

Hole Id	From (m)	To (m)	Remarks
CC90-001	53.96	80.79	Core missing
CC90-001	80.79	86.89	Core missing
CC90-001	86.89	94.51	Core missing
CC90-001	157.62	157.93	Core missing
CC90-001	157.93	160.37	Core missing
CC90-001	168.90	172.87	Core missing
CC90-001	178.05	187.50	Core missing
CC90-0002	5.49	19.21	Core missing
CC90-0002	24.39	50.30	Core missing
CC90-0002	54.57	59.15	Core missing
CC90-0002	64.02	73.78	Core missing
CC90-0002	78.96	83.84	Core missing
CC90-0002	101.83	105.79	Core missing
CC90-0002	118.90	125.61	Core missing
CC90-0002	142.07	150.30	Core missing
CC90-0002	153.96	162.80	Core missing
CC90-0002	225.61	228.66	Core missing
CC90-003	12.20	40.55	Core missing
CC90-004	236.89	398.48	Core missing
CC90-005	130.49	135.06	Core missing
CC90-005	153.35	158.84	Core missing
CC90-005	163.11	164.63	Core missing
CC90-005	164.63	167.99	Core missing
CC90-005	175.91	187.20	Core missing
CC90-005	191.16	196.04	Core missing

Hole Id	From (m)	To (m)	Remarks
CC90-005	200.00	202.13	Core missing
CC90-005	212.50	222.26	Core missing
CC90-005	239.94	244.82	Core missing
CC90-006	177.1341	179.5732	Core missing
CC90-007	158.54	160.67	Core missing
CC90-009	0.00	22.26	Core missing
CC90-009	30.79	34.76	Core missing
CC90-009	40.24	47.26	Core missing
CC90-009	60.67	83.84	Core missing
CC90-010	0.00	468.60	Entire hole missing
CC90-011	47.87	52.44	Core missing
CC90-012	81.40	87.50	Core missing
CC90-012	93.29	96.95	Core missing
CC90-012	222.56	235.06	Core missing
CC90-013	97.87	103.05	Core missing

13.3 Sample Length/True Thickness

Sample length was determined by the geology of the deposit, an attempt was made not to allow samples to cross-lithological boundaries. Sample lengths were generally 1.0m (76%, 3,615 of the total 4,749 samples) with 8.8% of the samples representing 3.0 to 3.1m intervals (416 samples). The average assay interval is 1.46m.

There are 11 holes drilled at dips between 65º and 90º degrees, while the remaining 10 holes have been drilled at angles between 45º and 61º. Azimuth orientations of the holes are either vertical, or directed toward 135º or 315º. The rugged topography limits the potential drill sites.

The term "true thickness" is not generally applicable to porphyry deposits as the entire rock mass is potentially ore grade material and there is often no preferred orientation to the mineralization. Because of the potential of ore grade material through the entire length of the hole, sampling was generally continuous from the top to the bottom. The mineralization is generally confined to three main lithologies, volcanics, intrusives, and breccias. These lithologies form large massive bodies underlying Dog House Creek and the ridge east of the creek.

No condemnation drilling has been completed to date.

14. SAMPLING METHOD AND APPROACH

Samples from the Copper Canyon project are totally drill core based, there are no trench or grab samples in the database. Drill hole sample intervals were determined by a geologist, according to lithology, and ranged from 0.3 to 12.2m, with the average length of samples being 1.46m. Core was split using a diamond saw. Because of the nature of the mineralization, and difficulty determining potential ore from non-ore material, the entire drill hole is sampled. Once in a uniform rock type, the sample spacing was generally 3.0m (the 1990 drill core was generally sampled on 1.0m increments). The 3.0m core length provides a representative sample weight for NQ core. The core recovery is very high with an average of ~80% in 2004.

The Copper Canyon project area is approximately 500m in an east/west direction, some 1,000m north/south and over 400m vertical. For the most part, the drill hole spacing is less than 100m.

The current database contains 21 drill holes with an average length of 325m; the shortest hole is 158.5m, while the deepest hole is 516.9m.

A test was conducted to compare assay results from holes with steep angles to holes with shallow angles. In total 10 holes were drilled at shallow angles (less than -61º), while 11 holes were drilled at angles greater than 65º. It was found that there are slightly higher copper and gold grades in the steep drill holes. This could be due to the limited data sets, or it may indicate a form of control on the mineralization. The drill holes that are vertical show significantly higher copper and gold grades than holes with azimuths 135º or 315º (non-vertical). Again, this may indicate a form of vertical control on the mineralization.

Significant assay composites from the 2004 drilling program follows in Table 14.1

Table 14.1
Composite Assay Results, 2004 Drilling

Hole ID	From	To	Assayed Length	CuEq_%	Cu_%	Au_ppm	Ag_ppm
CC04-0022	155.45	229	73.55	1.664	0.87	1.012	20.102
CC04-0023	44	79.25	35.25	0.913	0.574	0.334	15.331
CC04-0023	86	107	21	1.224	0.731	0.527	19.49
CC04-0023	114	228.6	102.37	1.85	1.095	1.033	14.337
CC04-0023	271	337	66	1.332	0.673	0.867	14.915
CC04-0024	146	166	20	0.79	0.041	1.217	1.065
CC04-0024	220	256.45	36.45	1.433	0.03	1.088	83.343
CC04-0024	277	323.17	46.17	0.516	0.014	0.82	0.496
CC04-0025	134.5	278	143.5	0.738	0.456	0.325	9.515
CC04-0026	261	300.6	39.6	0.63	0.342	0.435	2.647
CC04-0026	322.55	421.8	99.25	0.984	0.448	0.768	7.725
CC04-0027	0	371.86	341.74	0	0	0	0
CC04-0028	306	335.85	29.85	0.688	0.379	0.472	2.517
CC04-0028	356.35	441.4	85.05	0.442	0.193	0.376	2.278
CC04-0029	161.54	195.6	34.06	0.553	0.2	0.566	1.036

It is our opinion that the sampling program was carried out with the reasonable care and skill expected of the engineering profession.

15. SAMPLE PREPARATION, ANALYSIS AND SECURITY

The Copper Canyon project has seen four different sampling campaigns. The first drilling was in 1957 and very little is known about the sample preparation, analysis or security (none of the 1957 results are used in our estimates).

In 1990 the drill core was halved using a core splitter. Half of the core was retained in core boxes left on site, while the other half of the core was sampled in 1m intervals. The samples were shipped to TSL Laboratories in Saskatoon, Saskatchewan. No details are known concerning the preparation, analyses or security of these samples.

In 2002 Eagle Plains Resources completed a preliminary re-sampling program of the 1990 drill core that had been left on site. The following paragraph describes the sampling and analyses completed (Termuende, 2002):

> "It was decided to take random samples of various lithologies from as many different holes and depths as possible, noting the hole core interval. A single 10cm sample was taken from each interval. In stacks that had been disturbed, care was taken to extract a sample whose location was confirmed by still-present core marker blocks. A total of 62 samples were collected and shipped to Acme Analytical Laboratories in Vancouver B.C. where they were crushed to 150-mesh, and a 0.5g sample leached with 3 mL aqua-regia solution at 95°C for one hour, diluted to 10 mL, and analyzed by ICP-ES. Samples returning greater than 1000 ppb Au were further analyzed by fire assay."

In 2004 the drill core was logged by a small team of geologists and split using a rock saw. A professional geologist supervised all of the work. Half of the drill core is retained in core boxes at the Galore Camp for future reference and sampling. The other half of the core was sampled and shipped to ALS Chemex Laboratory in Vancouver. The half-core samples were placed in a plastic bag and tagged with a sample number. Groups of samples were placed in larger sacks and shipped by helicopter to the Bob Quinn airstrip. From the Bob Quinn storage area the samples were trucked directly to the lab in Vancouver. A submission sheet was sent along with each batch of samples so the lab could confirm receiving the samples.

NovaGold has begun organizing the core storage facility at Galore Creek, where ½ of the Copper Canyon drill core is still in core boxes and is available for geology reviews as well as check assays. None of the 1957 drill core could be located, while the 1990 core was organized and stored.

Work completed by employees of the company included core logging, sample layout, and sample splitting. A professional geologist oversaw all of the work from core logging, sample splitting, and shipping.

Chemex Labs carried all of the assay work in 2004, representing approximately 24% of the total assays. TSL Labs, of Saskatoon, completed the 1990 assay work. Both labs are widely used by the mining and exploration industry, and both are still in business today. Chemex carries the highest certification as registered assayers, including ISO 9002, ISO: 9001:2000, and they are working towards ISO 17025.

In total, excluding quality control samples, 1,179 samples from Copper Canyon were submitted to Chemex for analyses during the 2004 field season. The copper analyses were completed by atomic absorption spectrometry (AA), following a triple acid digestion. Gold analyses were completed by standard one assay ton fire assay with AA finish.

A comprehensive quality assurance/quality control (QA/QC) program was completed on samples from Copper Canyon. Duplicate samples were used to monitor and measure precision (reproducibility), blank samples represent material with very low concentrations of copper and gold and were used to test for contamination of the samples, while standard samples and assay checks were used to test the degree of accuracy. In total, 202 samples were sent for quality control purposes, as blind duplicates, blanks or standards, representing approximately one in every 6 samples or 17% of the samples collected during 2004.

We have concluded that results reported by ALS Chemex were within acceptable error limits with respect to accuracy and precision, while the contamination was deemed to be minimal.

It is our opinion that the sampling and assay program was carried out with the reasonable care and skill expected of the engineering profession.

16. DATA VERIFICATION

In total, six days were spent at the Galore Project site verifying the geological database, as well as at least five days doing verification in the office. The field check for the Copper Canyon project included walking down Dog House Creek and back up Copper Canyon Creek. Three drill holes were visited, the holes have been left with the surface casing in place; the collars are marked with survey pickets near the casing pipe and metal labels nailed to the pickets. Morris verified several drill hole collar locations by hand held GPS to confirm their coordinates.

The second step with the field verification was to visit the core storage area. All of the core was in racks, which are well built, and marked. All of the core is split with a diamond saw and weather resistant sample tags have been used to mark sample intervals. The tags are stapled to the edge of the core box at the beginning of the sample interval. Depth markers have been converted to metric. Sample numbers correspond with core logging sheets. Sample lengths are up to 3.0m.

The database verification process included comparing original, hand-written geology core logging sheets with the database, which is computer based. Items checked included drill hole number, hole orientation, lithologies, depths of lithologies and sample numbers. Sample numbers and assay results were checked against original lab reports. In total, the database was verified using 8 drill holes, representing approximately 38% of the total. It was determined that sample numbers and lithology depths on core-logging sheets correspond to the database. As well, assay results reported in the database correspond with hard copy assay sheets provided by the laboratory.

The verification program has been limited to a significant number of holes, but not all of them. In total 8 drill holes were checked out of a total of 21 holes in the area. The data verified was deemed to be representative of the database. It is believed that the work completed by the exploration group has been diligent and has been carried out with care and skill expected of the engineering profession.

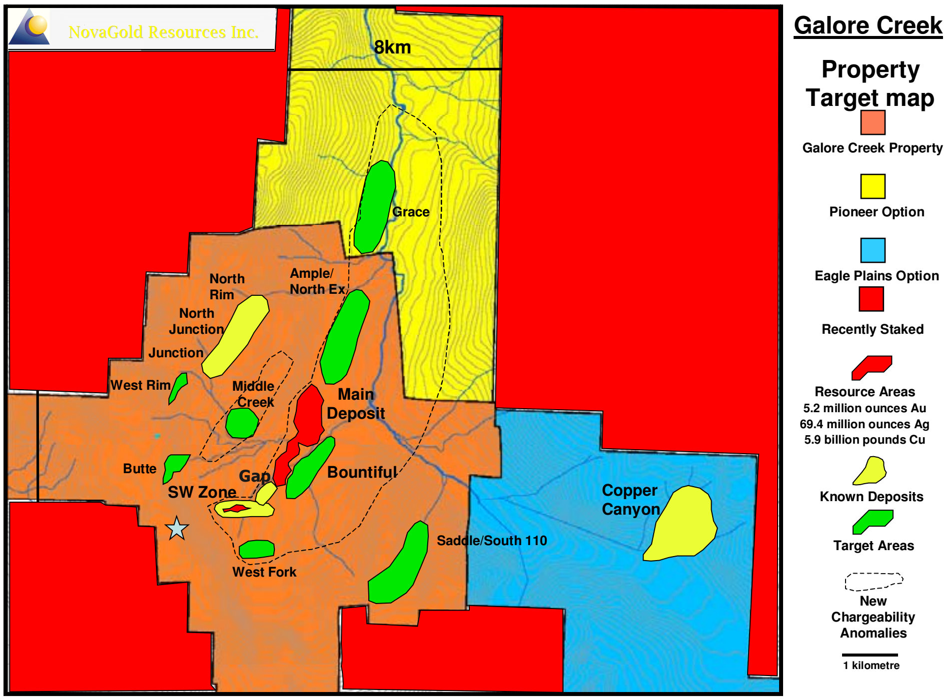
17. ADJACENT PROPERTIES

The Copper Canyon project is 6km east of the Galore Creek Deposit.

A technical report titled Update on Resources Galore Creek Project, British Columbia was completed in June 2004, and a pre-feasibility study is presently underway. An update on resource of Galore Creek was completed in June 2004 and reported 285.9Mt grading 0.73%Cu, 0.44g/tAu, and 5.7g/tAg in the indicated category and 98.8Mt grading 0.54%Cu, 0.37g/tAu, and 4.8g/tAg in the inferred category using a 0.50% Eq Cu cutoff value. The resource is reported using copper equivalent cutoff values that have been calculated by estimating the net smelter return for gold and silver and allocating the revenue as if it were generated from copper alone. The selected cutoff of 0.5% equivalent copper (CuEq) represents a net value of about US$10 per tonne based on the assumed prices, metallurgy and smelter terms. Copper, gold and silver prices used in calculations were US$0.90 per pound, US$375 and US$5.50 per ounce respectively. Significant quantities of higher grade resources exist within this inventory however in some cases this may not represent material which can be exploited without inclusion of some lower grade resources or internal waste. This report was followed by a report entitled Preliminary Economic Assessment for The Galore Creek Gold-Silver-Copper Project 05 August 2004 which used the same price assumptions as the June 2004 Technical Report but revised the cost estimates. This changed the cutoff graded to 0.334 % Eq Cu.

At least eleven mineralized zones have been identified on the Galore Creek property, with at least four of these zones having significant potential. The resource estimate noted above is for the Central and Southwest Zones. The Junction and North Junction Zones are northwest of the Central Zone and have been extensively explored. The West Fork Zone is immediately south of the Central Zone and was the focus of extensive drilling in 2004. The Gap Zone is a small area between the Central and Southwest Zones that was drilled in 2004. The Grace Zone adjoins the Central Zone directly to the north and is believed to have the potential to host gold-copper mineralization .

Other less explored zones in the Galore Creek area include, Butte, West Rim, North Rim, Middle Creek, and the Saddle Zone.


NovaGold Resources Inc.
8km
Grace
Ample/
North Ex
North
Rim
North
Junction
Junction
West Rim
Middle
Creek
Main
Deposit
Butte
Gap
SW Zone
Bountiful
West Fork
Saddle/South 110
Copper
Canyon
Galore Creek
Property
Target map
Galore Creek Property
Pioneer Option
Eagle Plains Option
Recently Staked
Resource Areas
5.2 million ounces Au
69.4 million ounces Ag
5.9 billion pounds Cu
Known Deposits
Target Areas
New
Chargeability
Anomalies
1 kilometre

18. MINERAL PROCESSING AND METALLURGICAL TESTING

This study has been carried out to estimate the extent of the resource in the Copper Canyon Property. Metallurgical testing is being conducted at G&L Laboratories in Kamloops, B.C. The metallurgical relationships assumed in this study (the metal recovery used in the Equivalent Copper calculation), are generally based on the significant test work that has been completed for the adjacent Galore Creek Deposit.

19. MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

A total of 21 drill holes were provided for analysis containing 141 down hole survey measurements, 4,793 assays and lithology codes for 438 records. Lithology codes were provided as shown in Appendix 1. A total of 132 possible lithology codes have been devised for the Galore Creek Project. These codes for lithologies present at Copper Canyon, have been simplified to the following list.

Table 19.1 Statistics from drill hole assays for Cu, Au and Ag sorted by Lithology

	Volcanics	Intrusives	Breccias	Dykes	Fault Zones
Number	382	3,605	635	86	3
Cu Mean (%)	0.214	0.291	0.183	0.029	0.020
Cu S.D.	0.273	0.561	0.331	0.116	0.008
Cu Minimum (%)	0.005	0.004	0.003	0.003	0.010
Cu Maximum (%)	2.150	6.990	2.780	0.850	0.030
Coef. of Variation	1.28	1.93	1.81	4.01	0.41

	Volcanics	Intrusives	Breccias	Dykes	Fault Zones
Number	382	3,607	625	86	3
Au Mean (g/t)	0.209	0.552	0.267	0.078	0.257
Au S.D.	0.624	1.299	0.446	0.238	0.179
Au Minimum (g/t)	0.006	0.002	0.002	0.002	0.017
Au Maximum (g/t)	9.737	27.566	4.380	2.091	0.446
Coef. of Variation	2.98	2.35	1.67	3.06	0.70

	Volcanics	Intrusives	Breccias	Dykes	Fault Zones
Number	382	3,607	635	86	3
Ag Mean (g/t)	6.717	6.661	7.465	1.602	2.514
Ag S.D.	6.744	16.868	41.022	2.441	0.428
Ag Minimum (g/t)	0.100	0.100	0.100	0.100	2.057
Ag Maximum (g/t)	51.429	720.0	1000.0	17.143	3.086
Coef. of Variation	1.00	2.53	5.49	1.52	0.17

19.1 Capping Procedure

Lognormal cumulative probability plots were produced for each of Cu, Au and Ag in each of the four main rock types present at Copper Canyon, namely: Intrusives (INTR), Volcanics (VOLC), Breccias (BREC) and Dykes (DYKE). The individual plots are shown in Appendix 2. For each rock type the distribution of each variable showed multiple overlapping lognormal populations. In each case the individual populations were partitioned out with the mean grade and proportion of the total population summarized in the following tables (individual populations shown on plots as open circles).

Table 19.2 Summary of Copper Populations present in each rock type

Population	INTRUSIVES			VOLCANICS			BRECCIA		
	MEAN Cu (%)	Prop. of Data	# Samps.	MEAN Cu (%)	Prop. of Data	# Samps.	MEAN Cu (%)	Prop. of Data	# Samps.
1	5.36	0.19%	7	1.53	1.46%	6	2.69	0.38%	2
2	3.14	1.06%	38	1.04	3.02%	11	1.66	0.72%	5
3	1.37	7.68%	277	0.35	29.97%	114	1.17	2.97%	19
4	0.47	19.1%	689	0.10	39.71%	152	0.38	25.7%	163
5	0.10	32.4%	1168	0.01	25.84%	99	0.03	42.7%	271
6	0.02	39.5%	1424				0.01	27.5%	175

Table 19.3 Summary of Gold Populations present in each rock type

Population	INTRUSIVES			VOLCANICS			BRECCIA		
	MEAN Au (g/t)	Prop. of Data	# Samps.	MEAN Au (g/t)	Prop. of Data	# Samps.	MEAN Au (g/t)	Prop. of Data	# Samps.
1	21.98	0.11%	4	8.84	0.56%	2	2.74	1.36%	9
2	12.98	0.22%	8	2.91	0.63%	2	1.37	4.77%	30
3	8.68	0.52%	19	1.50	1.24%	5	0.48	24.79%	157
4	3.72	3.08%	111	0.20	47.57%	182	0.12	29.55%	188
5	0.59	41.45%	1493	0.20	49.15%	188	0.02	39.53	251
6	0.08	33.35%	1202	0.07	0.85%	3			
7	0.01	21.28%	766						

Table 19.4 Summary of Silver Populations present in each rock type

Population	INTRUSIVES			VOLCANICS			BRECCIA		
	MEAN Ag (g/t)	Prop. of Data	# Samps.	MEAN Ag (g/t)	Prop. of Data	# Samps.	MEAN Ag (g/t)	Prop. of Data	# Samps.
1	301.4	0.12%	4	46.98	1.10%	4	280.1	0.55%	3
2	46.46	3.53%	127	31.52	1.10%	4	50.46	1.86%	12
3	14.17	19.1%	688	23.50	2.98%	11	22.20	6.26%	40
4	2.68	39.63%	1429	11.55	18.91%	72	3.80	62.71%	398
5	0.58	37.62%	1355	3.69	73.24%	281	0.33	28.62%	182
6				0.41	2.67%	10			

The multiple overlapping populations for each variable in each rock type result in different grade distributions and capping should be applied at different levels in each case. In most cases a small proportion of high grades are present and could, at this level of drill information, be considered erratic. Capping levels were chosen as shown in Table 19.5 .

Samples coded as Dyke required no capping.

Table 19.5 Capping levels sorted by rock type

Variable	INTRUSIVES			VOLCANICS			BRECCIAS		
	Cap	Level	# Capped	Cap	Level	# Capped	Cap	Level	# Capped
Cu %	2/2	4.6	7	2/2	1.24	5	2/3	1.58	7
Au (g/t)	2/3	10.4	12	2/3	2.52	4	2/2	2.33	6
Ag (g/t)	2/2	100.0	6	2/3	27.6	9	2/2	82.9	3

Where 2/2 – 2 Standard Deviations above the mean of population 2
2/3 – 2 Standard Deviations above the mean of population 3

19.2 Geologic Block Model

Although there appears to be statistical differences in grade distributions between the various lithologic units at Copper Canyon, there is insufficient data at present to allow for the modeling of these units. As a result NovaGold geologists developed a 3D solid around the mineralized zone as shown in the schematic drawing Figure 19.1 .

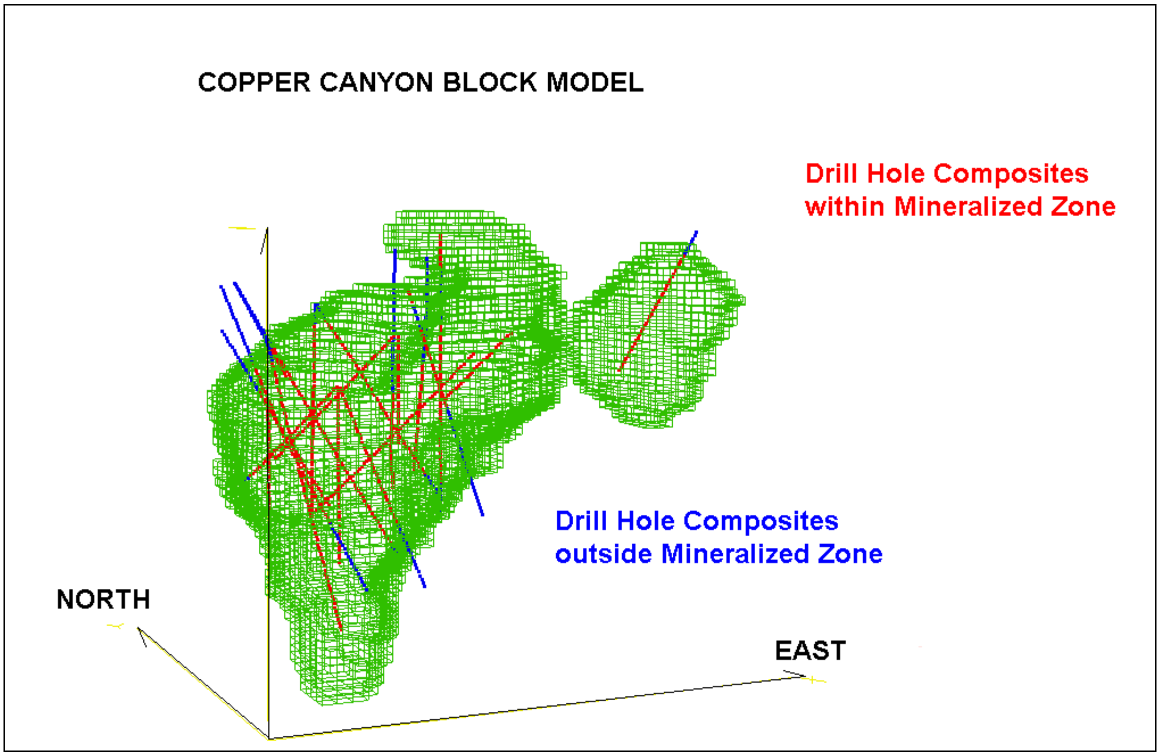


Figure 19.1 Schematic drawing for Copper Canyon Geologic Block Model

19.3 Composites

A reasonable mining bench at this stage of exploration would be 12 m. Assays were taken on various intervals with the most 76% (3,615 out of the 4,749 samples with assays) taken at 1.0 m intervals. The next most common interval was about 3.0 m with 416 or 8.8% sampled at 3 to 3.1 m. For this estimate a

6 m composite length was chosen to best reflect mining selection and minimize excess smoothing down the hole.

Drill holes were "passed through" the 3D geologic model shown in Figure 19.1 with the point the hole entered and left the solid recorded. Uniform down-hole 6 m composites were produced for Cu, Au and Ag that honoured the boundaries of the solid model. Composites less than 3 m found at the boundaries were joined to adjacent samples to produce a uniform support of 6 ± 3 m lengths.

Table 19.6 Summary of statistics for 6 m Composites within Mineralized Zone

	Cu (%)	Au (g/t)	Ag (g/t)
Number of Composites	820	820	820
Mean	0.314	0.517	6.90
Standard Deviation	0.453	0.785	9.66
Minimum	0.003	0.002	0.10
Maximum	4.230	6.834	74.78
Coefficient of Variation	1.44	1.52	1.39

Table 19.7 Summary of statistics for 6 m Composites outside Mineralized Zone

	Cu (%)	Au (g/t)	Ag (g/t)
Number of Composites	273	273	273
Mean	0.040	0.098	1.29
Standard Deviation	0.038	0.176	1.39
Minimum	0.004	0.002	0.10
Maximum	0.302	1.542	8.34
Coefficient of Variation	0.95	1.79	1.08

The coefficients of variation, which represents the standard deviation, divided by the mean for each variable, indicate a certain amount of skewness present (normal distribution should have CV of less than 0.5). This is undoubtedly caused by combining various lithologies with differing grade distributions, but at this stage of the exploration program these values are sufficiently low to allow for a reasonable estimation of resource present.

The differences between the mineralized and unmineralized zone shows the geologic block model has been effective in separating out the higher mineralization. The one exception is the 1.54 g/t Au value sitting in the unmineralized shell occurring in drill hole CC04-0023 from 368 to 374 m and lying below the mineralize shell.

19.4 Semivariograms

It is very difficult to model variograms with so little drill hole information. Particularly in the horizontal plane, where because of the scarcity of data there are virtually no sample pairs up to lags of 40 to 50 m. The procedure used was to produce pairwise relative semivariograms down the drill holes along azimuth 135° dip -55 ° and on vertical holes for each of the three variables. These are the only directions where close spaced data exists so the models were established here. For each variable a nested spherical model was fit to the vertical direction and to the direction Az 135 ° Dip -55 °. This model was then tested in the horizontal plane. In all cases and for all variables there was insufficient data in Az. 0, 90, 45 and 135 to disprove the assumption of isotropy in the horizontal plane. The horizontal range for this isotropic horizontal model was taken from the Az 135 ° Dip 0 ° direction. The results indicated an isotropic spherical model in the horizontal plane with a geometric anisotropy and longest range in the vertical direction. The parameters used are shown in Table 19.8 .

Table 19.8 Parameters for semivariogram models at Copper Canyon

Variable	**Direction**	**C0**	**C1**	**C2**	**Range a1 (m)**	**Range a2 (m)**
Cu	Az. 045° Dip 0	0.10	0.20	0.55	20	40
	Az. 135 ° Dip 0	0.10	0.20	0.55	20	40
	Az. 0 ° Dip -90 °	0.10	0.20	0.55	40	160
Au	Az. 045° Dip 0	0.20	0.20	0.40	20	40
	Az. 135 ° Dip 0	0.20	0.20	0.40	20	40
	Az. 0 ° Dip -90 °	0.20	0.20	0.40	60	150
Ag	Az. 045° Dip 0	0.10	0.22	0.30	30	40
	Az. 135 ° Dip 0	0.10	0.22	0.30	30	40
	Az. 0 ° Dip -90 °	0.10	0.22	0.30	80	160

19.5 Bulk Density

There have been no specific gravity measurements taken on the Copper Canyon property. On the adjacent Galore Creek property during the 1966-67 drill campaign a total of 563 specific gravity measurements were made by measuring the weight of the sample and dividing by the amount of water it displaced. In April 1992 a total of 96 specific gravity determinations were made from drill core. The SG determinations were made from small pieces of core at recorded distances down the hole. Using these distances the specific gravity values were joined to the assay from-to intervals that contained them. In a number of instances more than one SG determination was made on the same from-to interval. In these cases the SG values were averaged. As a result 631 assays had specific gravity determinations. The specific gravity information can be sorted a number of ways. Table 19.9 shows average values for the various lithologies coded.

Table 19.9 Summary of Specific Gravity measurements from Galore Creek Property

	VOLC	INTR	BREC	DYKE	SEDS	FAUL
Number	435	140	8	7	5	3
Mean S.G.	2.67	2.63	2.71	2.67	2.59	2.59
S.D.	0.182	0.156	0.095	0.077	0.066	0.114
Minimum	1.69	1.91	2.56	2.50	2.34	2.43
Maximum	3.40	3.30	2.86	2.76	3.04	2.69

At Copper Canyon the most prevalent lithology is intrusives (see Tables 19.1). As a result the average specific gravity of 2.63 was applied to all blocks at Copper Canyon. This is far from optimal and during subsequent drill programs bulk density tests should be preformed on drill core from varying lithological units and grade zones.

Preliminary test work on 21 samples from Copper Canyon show an average SG of 2.74, with a range from 2.58 to 3.17.

19.6 Grade Interpolation

A block model consisting of blocks 25 x 25 x 12 m in dimension was superimposed on the three dimensional solids model. Blocks were coded as inside or outside the solid model based on the centroids of the block. The block model had the following parameters:

Note. Coordinates used were UTM East – 300000 and UTM North – 6300000 to make more workable units.

Model Minimum	Model Maximum	Block Size	# of Blocks
57000 E	59000 E	25	80
32400 N	34000 N	25	64
500	2000	12	125

The model was not rotated.

Blocks were compared to the topographic surface and the percentage of each block in rock was recorded. Tonnage for each block was established by percentage of block below topography multiplied by block volume and specific gravity. A plan view showing the limits of the blocks within the mineralized solid is shown below.

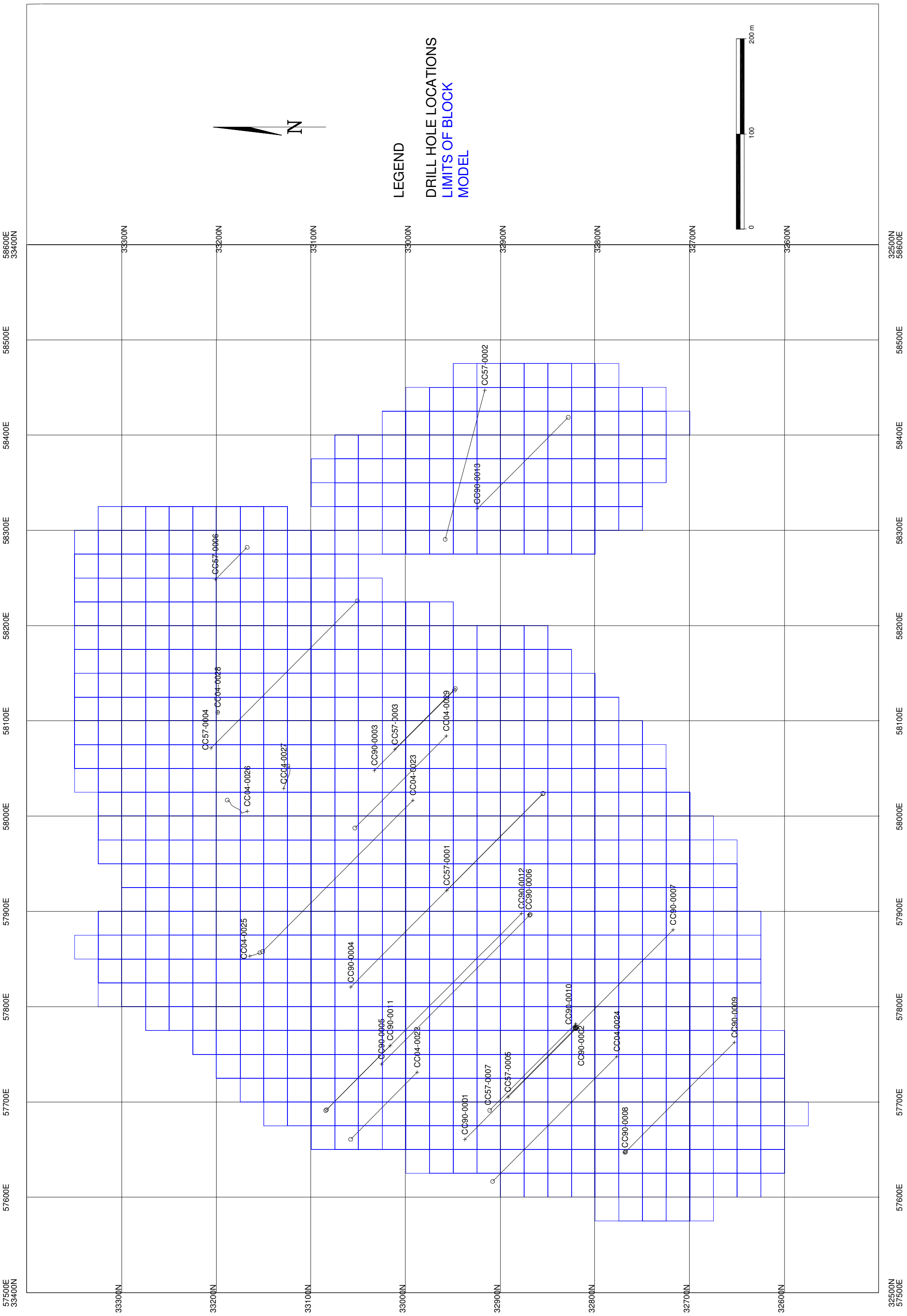


Figure 19.2 Plan view showing drill holes and limits of block model estimated

Grade was estimated into each block within the mineralized 3 dimensional solid using ordinary kriging. Blocks were estimated in a series of passes using larger and larger search ellipses. Pass one had search ellipse dimensions equal to ½ the semivariogram ranges in the horizontal plane and ¼ the vertical range or 40 m. Pass 2 used the full range of the semivariograms in the horizontal plane and ½ the range or 80 m in the vertical direction. Pass 3 doubled the semivariogram range and Pass 4 quadrupled it in the horizontal range while the vertical range was allowed to expand to the full 160 m in pass 4. In all cases if a minimum of 4 composites were not found the block was not estimated. Blocks not estimated after pass 4 were left without grade. For each block if more than 16 composites were found the closest 16 were used. The same search strategy was used for each of Cu, Au and Ag. The parameters are summarized below.

Table 19.10 Search Parameters used for Ordinary Kriging

Pass	Number Estimated	Major Axis	Semi.Maj. Axis	Minor Axis	Major Axis Dist. (m)	Semi. Major Axis Dist. (m)	Minor Axis Dist. (m)
1	880	Az. 45 Dip 0	Az. 135 Dip 0	Az 0 Dip -90	20	20	40
2	2864	Az. 45 Dip 0	Az. 135 Dip 0	Az 0 Dip -90	40	40	80
3	6134	Az. 45 Dip 0	Az. 135 Dip 0	Az 0 Dip -90	80	80	120
4	4916	Az. 45 Dip 0	Az. 135 Dip 0	Az 0 Dip -90	160	160	160

The kriged results for three levels are presented as Figures 19.3 to 19.5 . Blocks are colour coded by copper grades. Block values for copper and gold are shown but the scale may make them too small to read. The intent of these figures is to show the overall grade distribution on several different level plans and the relationship between the estimated blocks and the available drill hole composites used to make the estimate (composites are shown 18 m above and below block centroid).

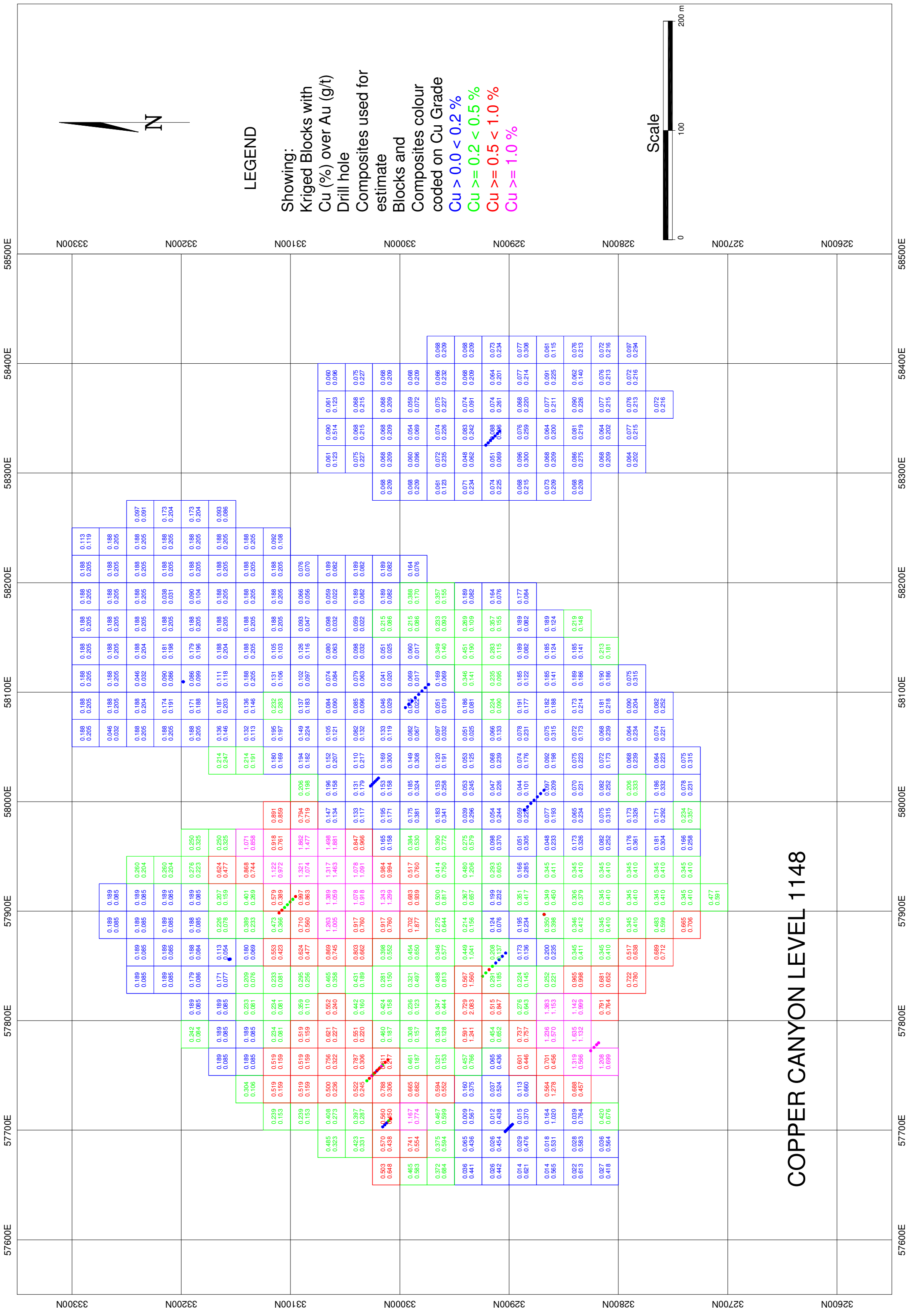


Figure 19.3 Kriged blocks on Level 1148 showing copper grades colour coded

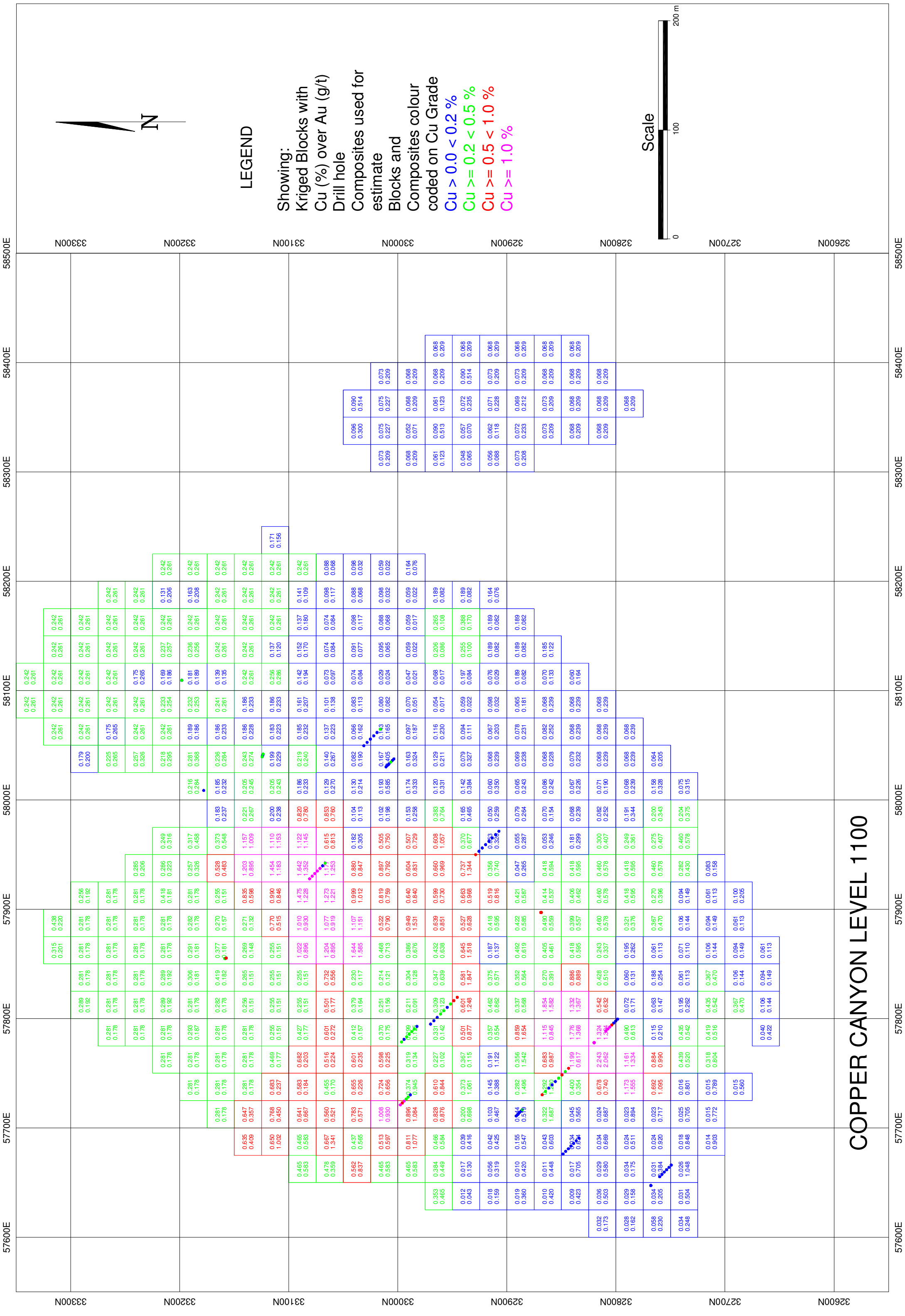


Figure 19.4 Kriged blocks on Level 1100 showing copper grades colour coded

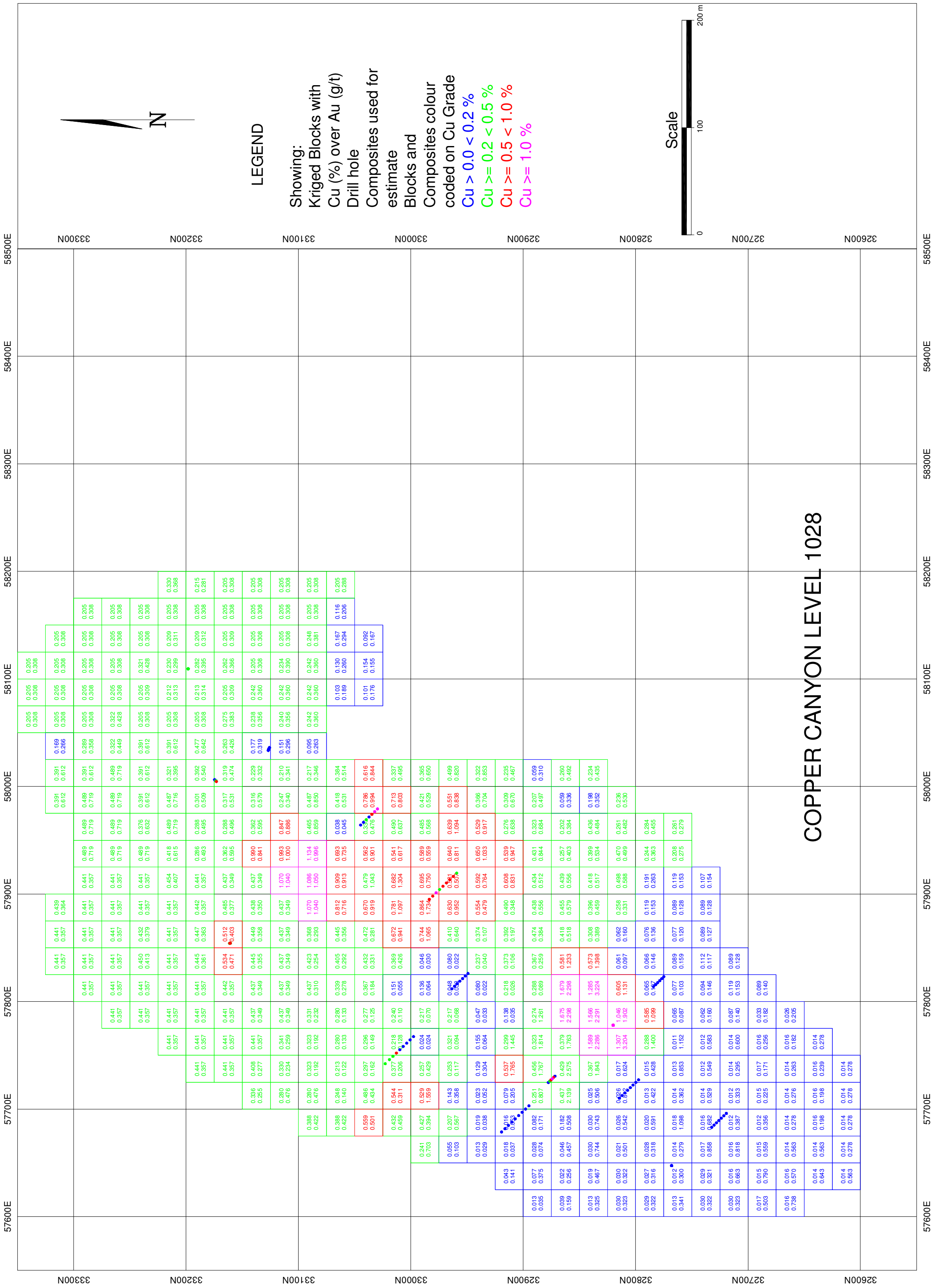


Figure 19.5 Kriged blocks on Level 1028 showing copper grades colour coded

19.7 Classification

19.7.1 Introduction

Based on the study herein reported, delineated mineralization of the Copper Canyon Property is classified as a resource according to the following definition from National Instrument 43-101.

> "In this Instrument, the terms "mineral resource", "inferred mineral resource", "indicated mineral resource" and "measured mineral resource" have the meanings ascribed to those terms by the Canadian Institute of Mining, Metallurgy and Petroleum, as the CIM Standards on Mineral Resources and Reserves Definitions and Guidelines adopted by CIM Council on August 20, 2000, as those definitions may be amended from time to time by the Canadian Institute of Mining, Metallurgy, and Petroleum."

> "A **Mineral Resource** is a concentration or occurrence of natural, solid, inorganic or fossilized organic material in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge."

The terms Measured, Indicated and Inferred are defined in NI 43-101 as follows:

> "A **'Measured Mineral Resource**' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity."

> "An '**Indicated Mineral Resource**' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed."

> "An '**Inferred Mineral Resource**' is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes."

19.7.2 Results

Due to the limited amount of data present at Copper Canyon at this time, the mineralization on the property has been classed as an inferred resource. No economic studies have been completed at Copper Canyon at this time to establish an economic cutoff. A Preliminary Economic Study completed by Hatch in 2004 for the Galore Creek deposits located 5 kilometers to the west suggest a project at Galore Creek based on a 30,000 tpd mill can support cut-off grades of 0.35% CuEq. In addition, the lack of specific gravity measurements at Copper Canyon make it impossible to classify any material as measured or indicated at this time. As a result a wide range of cutoffs are presented to show the scope of the project and its potential impact on the Galore Creek project due to it's proximity and common ownership.

Table 19.11 Copper Canyon - Inferred Resource Estimated By Ordinary Kriging

Cutoff Cu (%)	Tonnes > Cutoff (tonnes)	Grade>Cutoff		
		Cu (%)	Au (g/t)	Ag (g/t)
0.00	288,600,000	0.250	0.379	4.924
0.10	200,300,000	0.335	0.417	6.322
0.15	171,500,000	0.370	0.439	7.038
0.20	139,400,000	0.415	0.482	8.041
0.25	111,600,000	0.463	0.520	9.048
0.30	90,100,000	0.508	0.568	9.966
0.35	71,100,000	0.557	0.616	10.745
0.40	55,300,000	0.610	0.655	11.635
0.45	41,900,000	0.669	0.698	12.461
0.50	27,100,000	0.774	0.860	15.523
0.55	21,500,000	0.839	0.930	16.522
0.60	17,100,000	0.908	1.018	17.489
0.65	13,900,000	0.974	1.070	18.154
0.70	11,700,000	1.029	1.113	18.653
0.75	10,300,000	1.070	1.141	19.069
0.80	8,800,000	1.120	1.162	19.461
0.85	7,800,000	1.161	1.189	19.991
0.90	6,700,000	1.209	1.219	20.598

The blocks were sorted by a copper equivalent value to present the data as grade-tonnage tables. The tables are not meant to imply economic cutoff values but are simply a way of showing the results of a multi-element deposit for a wide variety of cutoffs. The copper equivalent calculation made the following assumptions:

- Copper price of US$ 0.90/lb.
- Copper Recovery = (%Cu-0.06)/%Cu with a minimum of 50% and Maximum of 95%
- Gold price of US$ 375/oz
- Gold Recovery = (Au g/t – 0.14)/Au g/t with a minimum of 30% and Maximum of 80%
- Silver price of US$ 5.50/oz
- Silver Recovery = 80%

No conclusions can be made at this time in regards to an economic cutoff, percentage recovery for the various metals or the mineability of each block. The metallurgical relationships assume similar characteristics to those of the Central and SW zones at Galore Creek. Metallurgical testing of Copper Canyon material is currently underway.

Table 19.12 COPPER CANYON - INFERRED RESOURCE
Estimated by Ordinary Kriging with Copper Equivalent Cutoff

Cutoff	Tonnes > Cutoff	Grade>Cutoff				Million lbs.	Million Ozs	Million Ozs
CuEq (%)	**(tonnes)**	**Cu (%)**	**Au (g/t)**	**Ag (g/t)**	**CuEq (%)**	**of Cu**	**of Au**	**of Ag**
0.00	288,600,000	0.250	0.379	4.924	0.512	1,447	3.52	45.69
0.10	280,100,000	0.256	0.390	5.040	0.525	1,438	3.51	45.39
0.15	262,400,000	0.268	0.409	5.282	0.551	1,410	3.45	44.56
0.20	230,500,000	0.294	0.444	5.779	0.604	1,359	3.29	42.83
0.25	208,400,000	0.311	0.473	6.191	0.644	1,299	3.17	41.48
0.30	186,900,000	0.329	0.503	6.640	0.686	1,233	3.02	39.90
0.35	164,800,000	0.351	0.539	7.154	0.735	1,160	2.86	37.91
0.40	143,100,000	0.373	0.581	7.684	0.790	1,070	2.67	35.35
0.45	128,600,000	0.391	0.612	8.017	0.832	1,008	2.53	33.15
0.50	116,100,000	0.408	0.641	8.300	0.870	950	2.39	30.98
0.55	95,400,000	0.427	0.712	9.011	0.944	817	2.18	27.64
0.60	83,000,000	0.452	0.758	9.454	1.000	752	2.02	25.23
0.65	74,000,000	0.471	0.797	9.776	1.046	699	1.90	23.26
0.70	63,000,000	0.495	0.856	10.209	1.110	625	1.73	20.68
0.75	55,000,000	0.519	0.902	10.717	1.166	572	1.59	18.95
0.80	46,700,000	0.546	0.964	11.280	1.236	511	1.45	16.94
0.85	41,600,000	0.570	1.006	11.702	1.286	475	1.35	15.65
0.90	35,300,000	0.605	1.066	12.296	1.360	428	1.21	13.95
0.95	31,800,000	0.630	1.106	12.711	1.408	402	1.13	13.00
1.00	29,200,000	0.651	1.136	13.030	1.446	381	1.07	12.23
1.10	24,100,000	0.695	1.203	13.714	1.531	336	0.93	10.63
1.20	19,500,000	0.760	1.266	14.751	1.625	297	0.79	9.25
1.30	15,600,000	0.825	1.323	15.701	1.716	258	0.66	7.87
1.40	12,100,000	0.904	1.389	16.905	1.822	219	0.54	6.58
1.50	9,300,000	1.004	1.450	18.599	1.936	187	0.43	5.56

As a check of the interpolation procedure a second estimate was completed using Inverse Distance Squared interpolation. A similar search strategy was used as explained above with the estimate completed in four passes. A similar number of blocks were estimated. The results were also classed as inferred and are shown below at the same range of cutoffs as the kriged estimate.

Table 19.13 Copper Canyon - Inferred Resource Estimated by Inverse Distance Squared

Cutoff Cu (%)	Tonnes > Cutoff (tonnes)	Grade>Cutoff		
		Cu (%)	Au (g/t)	Ag (g/t)
0.00	288,600,000	0.250	0.375	5.021
0.10	198,900,000	0.338	0.414	6.522
0.15	163,700,000	0.384	0.459	7.394
0.20	133,400,000	0.432	0.498	8.462
0.25	110,800,000	0.475	0.535	9.486
0.30	93,400,000	0.512	0.570	10.207
0.35	73,500,000	0.563	0.619	11.001
0.40	59,100,000	0.609	0.659	11.765
0.45	44,300,000	0.670	0.706	13.022
0.50	28,100,000	0.784	0.881	15.866
0.55	21,600,000	0.861	0.979	17.210
0.60	17,600,000	0.928	1.062	18.063
0.65	14,800,000	0.986	1.126	18.854
0.70	12,400,000	1.046	1.171	19.663
0.75	10,400,000	1.108	1.206	20.448
0.80	8,700,000	1.175	1.249	21.059
0.85	7,400,000	1.233	1.274	21.431
0.90	6,500,000	1.283	1.293	21.878

19.8 Model Check

Two test areas were selected to test the grade model. The areas selected surround one or more drill holes so that individual assay increments can be averaged and compared to the compositing and grade interpolation of the model. The following table (Table 19.14) summarizes the model checks. As shown the grade model and the manual checks are comparable.

Table 19.14
Model Checks (% Variation from Model)

Bench Level	Volume Comparison	Cu Comparison	Au Comparison	Ag Comparison
1028, a	0	+2.9	-12.1	-11.8
1148	+0.9	+24.5	+23.4	+23.1

20. OTHER RELEVANT DATA AND INFORMATION

Regulatory, Environmental, and Socio-economic aspects of a new mining operation in the area will need to be addressed in future property assessments.

21. INTERPRETATION AND CONCLUSIONS

The Copper Canyon porphyry and adjacent volcanic strata host a large mineralized body with evenly disseminated chalcopyrite. The geological work in 2004, mapping and drilling, has confirmed previous results. Drilling extended the known area of mineralization to the northeast, while the zone remains open to the north, northwest, south, southeast, east and down dip.

The mineral resource estimate for the Copper Canyon property incorporates the 2004 drill results and has benefited from a revised geological interpretation. The model integrates 6,843 meters of drilling in 21 core holes with a total of 4,749 assays. The estimates are based on a 3-dimensional computer block model with grades interpolated into individual 25m by 25m by 12m high blocks. The grade interpolation used ordinary kriging procedures and mineralization was composited on 6m intervals with high-grade samples capped based on lognormal probability plots. Because of the wide spacing of the drilling on the property all resources are classified as Inferred. Table 3.1 and 19.12 summarizes the estimate.

The copper equivalent (CuEq%) calculations use metal prices of US$375/oz for gold, US$5.50/oz for silver and US$0.90/lb for copper. Copper equivalent calculations reflect gross metal content that have been adjusted for metallurgical recoveries based on the following criteria: copper recovery = (%Cu - 0.06)/%Cu with a minimum of 50% and maximum of 95%; gold recovery = (Au g/t – 0.14)/Au g/t with a minimum of 30% and maximum of 80%; and silver recovery = 80%.

The authors have estimated an inferred mineral resource of 164.8 million tonnes grading 0.351 % copper, 0.539 g/t gold and 7.154 g/t silver per tonne at a 0.35% CuEq cutoff. Calculated as a copper equivalent this material has a grade of 0.735% copper. The 0.35% CuEq cutoff is the closest cutoff bin to the 0.334 % CuEq from the Preliminary Economic Assessment of August 2004.

Bulk density used for the tonnage estimate is 2.63, based on preliminary work from the Galore Creek deposit. During subsequent drill programs bulk density tests should be performed on drill core from varying lithological units and grade ranges.

Results from the mineral reserve estimate showed the following:

- The raw data shows different grade distributions in the various lithologies present at Copper Canyon and perhaps with additional drill programs this information can be integrated into the geologic model.
- With additional data and closer spaced drill holes, semivariograms in the horizontal plane will have more chance to determine anisotropic structures. The present data base does produce data pairs for distances less than 50 m in most horizontal directions.
- Future drill programs should take enough bulk density determinations to establish with confidence the bulk density of blocks.

Comparisons for the resource between ordinary kriging and inverse distance squared are very good with this level of data.

22. RECOMMENDATIONS

It is recommended that more drilling be completed on the Copper Canyon project. The geological interpretation indicates a mineralized zone that is open in many directions. As well as step-out drilling, in-fill drilling between surface mineralization and the deeper drill holes is also recommended.

With the drilling, a comprehensive program of determining the bulk density of the various lithological units and grade ranges is recommended.

More drill holes are required to increase the confidence and allow for the classification of measured and indicated resource. Drill holes should be spaced 25 m apart in areas of higher grade mineralization to allow for better semivariograms and confidence in classification.

More metallurgical testwork is recommended to verify the recovery and metal relationships of the mineralization.

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24. DATE AND SIGNATURE PAGES

24.1 James H. Gray PEng.

As the co-author of this Technical Report titled "*Geology And Resource Potential Of The Copper Canyon Property*", I hereby make the following statements:

My name is James H Gray and I am a Principal of GR Technical Services Ltd. My office address is 2767 Evercreek Bluffs Way SW Calgary Alberta T2Y 4P6.

I fulfill the requirements of a Qualified Person as specified in National Instrument 43-101 of the Canadian Securities Administrators. I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person".

I have received a degree in Mining Engineering - Bachelor of Applied Science from the University of British Columbia, Vancouver, 1975.

I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (11919) and the Association of Professional Engineers, Geologists and Geophysicists of Alberta (M47177).

I am a member of the Canadian Institute of Mining and Metallurgy.

The Technical Report is based on a site visit, information provided by the Project Geologist, historical reports, and from information available from public files.

I have been practicing as a Professional Engineer for over 25 years with relevant experience for the Technical Report including:

1978 to 1989, mine site engineering, operations and management positions, costing, evaluating new mineral projects and development properties. This includes operations experience at Fording River Operations.

1989 to present, mine engineering consultant work on assessment and feasibility studies of numerous coal, base metal, industrial mineral, and precious metal deposits in Canada, United States, Mexico, Chile, Argentina, Peru, Turkey, Iran, and Australia.

I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 9th day of February 2005, in Vancouver British Columbia.

JHGray P.Eng

J.H. Gray PEng

24.2 Robert J. Morris, M.Sc., P.Geo.

I, Robert J. Morris, M.Sc., P.Geo., do hereby certify that:

1. I graduated with a B.Sc. from the University of British Columbia in 1973.
2. I graduated with a M.Sc. from Queen's University in 1978.
3. I am a member of the Association of Professional Engineers and Geoscientists of B.C. (#18301).
4. I have worked as a geologist for a total of thirty-one years since my graduation from university.
5. I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person".
6. I am responsible for the preparation of most sections of the technical report titled *Geology And Resource Potential Of The Copper Canyon Property* dated 9 February 2005.
7. The Technical Report is based on a site visit, information provided by the Project Geologist, historical reports, and from information available from public files.
8. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose, which makes the Technical Report misleading.
9. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Date this 9th day of February 2005, in Fernie British Columbia.

Signature of Qualified Person

Robert J. Morris, M.Sc., P.Geo.
Print Name of Qualified Person

24.3 G.H. Giroux

I, G.H. Giroux, of 982 Broadview Drive, North Vancouver, British Columbia, do hereby certify that:

1) I am a consulting geological engineer with an office at #513 - 675 West Hastings Street, Vancouver, British Columbia.
2) I am a graduate of the University of British Columbia in 1970 with a B.A.Sc. and in 1984 with a M.A.Sc. both in Geological Engineering.
3) I have practised my profession continuously since 1970.
4) I am a member in good standing of the Association of Professional Engineers of the Province of British Columbia.
5) I have read the definition of “qualified person” set out in National Instrument 43-101 and certify that by reason of education, experience, independence and affiliation with a professional association, I meet the requirements of an Independent Qualified Person as defined in National Policy 43-101.5
6) This report is based on a study of the available data and literature provided by Nova Gold. I am responsible for the resource estimation section of this report. The work was completed in Vancouver during November 2004. I have not visited the property.
7) I have not worked previously on this project or property.
8) I am not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the Technical Report.
9) I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
10) I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11) I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public files on their websites accessible by the public.

Dated this 16th day of December 2005 in Vancouver British Columbia.

GIROUX CONSULTANTS LTD.

Per:

G.H. Giroux, MASc., PEng.

25. ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORTS ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES

There is no additional information of this type that is pertinent to the Copper Canyon Property. The property is not yet in production.

26. ILLUSTRATIONS

All relevant illustrations have been included in the preceding sections and Appendix 2.