

INTERNATIONAL TOWER HILL MINES LTD  
Form 6-K  
February 22, 2005

**UNITED STATES**  
**SECURITIES AND EXCHANGE COMMISSION**  
**Washington, DC 20549**

**FORM 6 - K**

**REPORT OF FOREIGN PRIVATE ISSUER**

**Pursuant to Rule 13a-16 or 15d-16 of the *Securities Exchange Act of 1934***

**For the month of February 2005**

Commission File No. 0-31096

**INTERNATIONAL TOWER HILL MINES LTD.**

*Registrant's Name*

**#507, 837 West Hastings Street, Vancouver, British Columbia, Canada, V6C 3N6**

*Address of principal executive office*

Indicate by check mark whether the registrant files or will file annual reports under the cover Form 20-F or Form 40-F

Form 20-F  \_\_\_\_\_

Form 40-F \_\_\_\_\_

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7): \_\_\_\_\_

Indicate by check mark whether the registrant by furnishing the information contained in this Form is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the *Securities Exchange Act of 1934*

Yes \_\_\_\_\_ No  X

If "Yes" is marked, indicate below the file number assigned to the registrant in connection with Rule 12g3-2(b):

\_\_\_\_\_

Documents Included as Part of this Report

Exhibit No.

Document

99.1

Technical Report on the Precious and Base Metal potential of the Siwash Creek Property, Similkameen Mining Division, NTS 092H, British Columbia, Canada dated November 29<sup>th</sup>, 2004.

#

**SIGNATURES**

Pursuant to the requirements of the *Securities Exchange Act of 1934*, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

**INTERNATIONAL TOWER HILL MINES LTD.**

(Registrant)

By

/s/ Anton J. Drescher

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Anton J. Drescher,

President

Date February 21<sup>st</sup>, 2005

#

**Exhibit 99.1**

NTS 092H

**Technical report on the Precious and Base Metal potential of the Siwash Creek Property, Similkameen Mining Division, NTS 092H, British Columbia, Canada**

**Prepared For:**

**International Tower Hill Mines Ltd.**

#507 - 837 West Hastings St.

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Nov. 29, 2004

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#

**Technical report on the Precious and Base Metal potential of the Siwash Creek Property, Similkameen Mining Division, NTS 092H, British Columbia, Canada**

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Drill Hole Locations

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5a

Siwash Property Au Anomaly Summary 1:20 000

in pocket

5b

Siwash Property Cu Anomaly Summary 1:20 000

in pocket

5c

Siwash Property Ag Anomaly Summary 1:20 000

in pocket

5d

Siwash Property Pb Anomaly Summary 1:20 000

in pocket

5e

Siwash Property Zn Anomaly Summary 1:20 000

in pocket

6a

Siwash Property Au Anomaly Summary 1:7 000

in pocket

6b

Siwash Property Cu Anomaly Summary 1:7 000

in pocket

6c

Siwash Property Ag Anomaly Summary 1:7 000

in pocket

6d

Siwash Property Pb Anomaly Summary 1:7 000

in pocket

6e

Siwash Property Zn Anomaly Summary 1:7 000

in pocket

8

Property Geology

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#



**Technical report on the Precious and Base Metal potential of the Siwash Creek Property, Similkameen Mining Division, NTS 092H, British Columbia, Canada**

**SUMMARY**

The Siwash Creek Property is comprised of 102 mineral claims, owned 100% by International Tower Hill Mines Ltd., located in southeastern British Columbia within the Similkameen Mining Division. The area encompassed by the Siwash Creek Property has experienced exploration for precious and base metals for almost 100 years. This report is a technical summary of available geological and geochemical information for the Siwash Creek Property.

Previous sampling programs have resulted in the collection of more than 5,500 samples on 6 separate grids and 87 drill holes (both percussion and core) with a combined meterage of 8,679 metres. Underground workings were developed on a series of narrow, polymetallic gold-silver-lead-copper-zinc quartz veins and shear zones between 1917 and 1952. No production figures are available for this work and workings are no longer accessible. There has been limited modern exploration along these structures. In conjunction with soil sampling, ground geophysical surveys (magnetics, electromagnetics, and induced polarization) were conducted and successfully outlined alteration and mineralized domains. Since 1996 drilling has primarily focused on an anomalous zone of precious and base metals (Brenda-porphyry model). This zone trends northwesterly and has a strike extent of greater than 750 metres.

A five hole drill program (1,013 metres) was conducted in 2004 in an area of previously tested low grade to anomalous base and precious metal concentrations. A total of \$103,024.56 was spent on the 2004 drilling program, this cost included drilling and assay costs. This program successfully extended the area of known alteration and mineralization approximately 150 metres to the east.

Alteration and mineralization identified in quartz veins and shear zones on the Siwash Creek Property are similar to that described at the adjacent Elk Property, six kilometers to the northwest, currently held by Almaden Minerals Ltd. The area that has been the focus of recent drill programs at the Siwash Creek Property shares similarities in host rock, alteration, and structure with mineralization at the Brenda Copper+/- Molybdenum (Cu+/-Mo) porphyry deposit and past-producer.

The Siwash Creek Property, given the bedrock geology, alteration, structural setting, and known mineralization, has the potential to host economic polymetallic quartz veins and potentially low grade, high tonnage Cu+/-Mo porphyry mineralization.

A multi-phased exploration program is warranted and recommended for the Siwash Creek Property. The exploration should comprise but not be limited to:

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**Phase 1:**

A helicopter borne, high-resolution magnetic and electromagnetic survey over the entire property at 200 metre line spacing (approximately 500 line kilometers at \$175/line km = \$87,500). The airborne should be overseen by a geophysicist to ensure proper quality control and quality assurance is met (\$5,000). As well, an interpretation of the newly acquired geophysical data in conjunction with a re-interpretation/compilation of all existing geochemical, geological and drill core data may help to identify new target areas (\$20,000).

**Phase 2:**

**The phase 2 exploration would not be contingent on the results of the Phase 1 exploration.** The exploration would comprise (a) a field based program with the establishment of a property wide grid and the collection of soil samples at 100 metre spacing over areas with pre-existing data and at a spacing of 150 metres for the new portion of property. In total, about 5000 samples should be collected. As well, as part of a standard quality control/quality assurance program, fifteen percent (15%) of all samples should be collected in duplicate (750 samples)(approximately \$60/ sample all inclusive = \$307,500); (b) Ground-proofing of geophysical anomalies returned from the airborne survey and the acquisition of ground magnetic and electromagnetic geophysical data on selected targets. In total, the cost to complete five grids (43 line kilometers each) where lines would need to be cut, with magnetics and electromagnetics surveys will cost approximately \$100,000; and (c) Property scale geological mapping in conjunction with the mapping and sampling of old trenches. All workings, trenches, and significant rock samples should be re-located and checked assayed. (\$5,000 to complete mapping and assaying approximately 200 rock samples at \$20/sample = \$9,000).

Phase 3:

**Phase 3 is contingent on the results of Phases 1 and 2,** would involve one or more of the collection of infill soil samples, ground geophysics and/or a diamond drill program to test historic targets and new targets developed during phases 1 and 2.

The total cost to complete the recommended phase 1 and 2 exploration is \$530,000Cnd. A cost for Phase 3 cannot be determined at this time.

**INTRODUCTION AND TERMS OF REFERENCE**

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This report is written as a Technical Report for the Siwash Creek Property which is 100% held by International Tower Hill Mines Ltd. The report is written to comply with standards set out in National Instrument 43-101 for the Canadian Securities Administration.

APEX Geoscience Ltd. (APEX), Edmonton, Alberta was retained during 2004 as consultants to aid in project management, compile existing data and to complete an independent technical report on behalf of International Tower Hill Mines Ltd.

Dean Besserer, a Principal of APEX Geoscience Ltd. conducted a site visit at the Siwash Creek Property on June 12, 2004. Drilling was underway at that time and

Mr. Besserer was able to visit the property. Specific showings were not visited during the property visit.

## **DISCLAIMER**

The authors, in writing this report, use sources of information as listed in the references. This report is a compilation of proprietary and publicly available information as well as information obtained during the property visit. The government reports, some Assessment filings, and geological reports were prepared by a person (or persons) holding post secondary geology or a related university degree(s), prior to the implementation of the standards relating to National Instrument 43-101. The information in those reports is, therefore, assumed to be accurate. Those reports written by other geologists are also assumed to be accurate based on the property visit and data review conducted by the authors, however are not the basis for this report.

## **PROPERTY DESCRIPTION AND LOCATION**

The Siwash Creek Property is located in southeastern British Columbia (Figure 1), Canada within the 1:250,000 scale National Topographic System (NTS) map area of 092H and British Columbia Energy and Minerals Branch Mineral Titles reference map M092H079 within the Similkameen Mining Division.

The property is comprised of 102 contiguous mineral claims encompassing 219 individual claim units (Figure 2).

The Siwash Creek Property and mineral claims are held 100% by International Tower Hills Mines Ltd. (Table 1). In 2004, 17 new mineral claims encompassing 99 claim units were added to the eastern portion of the property, these claims have not been subjected to any exploration to date. The mineral claims have various anniversary dates by which work must be filed in order to maintain the claims in good standing and the anniversary dates are detailed in Table 1.

In British Columbia, the owner of a mineral claim acquires the right to the minerals which were available at the time of claim location and as defined in the Mineral Tenure Act of British Columbia. Surface rights are not included. Claims are valid for one year and the anniversary date is the annual occurrence of the date of record (the staking completion date of the claim). To maintain a claim in good standing the claim holder must, on or before the anniversary date of the claim, pay the prescribed recording fee and either: (a) record the exploration and development work carried out on that claim during the current anniversary year; or (b) pay cash in lieu of work. The amount of work required in the first 3 years is \$100 per claim unit per year and \$200 per claim unit per year in years 4 and forward. Only work and associated costs for the current anniversary year of the mineral claim may be applied toward

that claim unit. If the value of work performed in a year exceeds the required minimum the value of the excess work, in full year multiples can be applied to cover work requirements on the claim for



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Figure 1. Figure too large for document. Paper copy available upon request or can be viewed at [www.sedar.com](http://www.sedar.com) (see profile for International Tower Hill Mines Ltd.).











additional years (subject to the regulations). A report detailing work done and expenditures must be filed with, and approved by, the B.C. Ministry of Energy and Mines.

All work carried out on a claim that disturbs the surface by mechanical means (includes drilling, trenching, excavating, blasting, construction or demolition of a camp or access, induced polarization surveys using exposed electrodes and site reclamation) requires a Notice of Work under the Mines Act and the owner must receive written approval from the District Inspector of Mines prior undertaking the work. The Notice of Work must include: the pertinent information as outlined in the Mines Act; additional information as required by the Inspector; maps and schedules for the proposed work; applicable land use designation; up to date tenure information; and, details of actions that will minimize and adverse impacts of the proposed activity. The claim owner must outline the scope and type of work to be conducted, and approval generally takes about one month.

Exploration activities that do not require a Notice of Work include: prospecting with hand tools; geological/geochemical surveys; airborne geophysical surveys; ground geophysics without exposed electrodes; hand trenching (no explosives); and, the establishment of grids (no tree cutting). These activities and those that require Permits are outlined and governed by the Mines Act of British Columbia.

The Chief Inspector of Mines makes the decision whether or not land access will be permitted. Other agencies, principally the Ministry of Forests, determine where and how the access may be constructed and used. With the Chief Inspector's authorization, a mineral tenure holder must be issued the appropriate "special use permit" by the Ministry of Forests, subject to specified terms and conditions. The Ministry of Energy and Mines makes the decision whether land access is appropriate and the Ministry of Forests must issue a special use permit. However, three ministries, namely the Ministry of Energy and Mines; Forests; and Environment, Lands and Parks, jointly determine the location, design and maintenance provisions of the approved road.

The authors have not seen or are aware of any applicable terms and/or conditions for access or the conditions/terms for current Work permits required or issued to International Tower Hill Mines Ltd. for the Siwash Creek Property.

The Siwash Creek Property claims have not been legally surveyed.

**ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE  
AND PHYSIOGRAPHY**

The Siwash Creek Property is located in the Okanagan region of British Columbia midway between Merritt and Okanagan Lake, south of Highway 97C. The property is located approximately 45 kilometres southeast of Merritt and 35 kilometres northeast of Princeton B.C. Access to the property is via road on the Loon Lake



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turnoff from Highway 97C. After a twenty kilometer drive along the Loon Lake turnoff access is gained to the property via the Shrimpton network of logging roads. The centre of the property lies at approximately 120°20' W longitude, 49°46' latitude.

The Siwash Creek Property straddles the junction of the Siwash and Galena creeks within the Thompson Plateau. Elevations over the property range from 1,200 to 1,580 metres above sea level (a.s.l.). Vegetation cover consists primarily of pine trees with lesser fir and spruce trees. Several areas of the property have undergone clear-cut logging and the resulting road networks are utilized for access to the property.

Climate is moderate with temperatures ranging to -30°C during winter months and to +30°C during the summer. Snow cover usually is established by early November.

## **HISTORY**

The Siwash Creek Property has seen sporadic exploration for precious metals since the early 1900 s. Details regarding early exploration efforts are sketchy and limited to Annual Report of Minister of Mines for the Province of British Columbia. More concerted exploration has been conducted through the 1980 s/90 s to present. The earliest records of work date back to 1917 when the first claims were recorded in the Siwash Creek area. Limited placer mining was done within the Siwash drainage, mainly on benches above the creek. Table 2 lists a summary of work conducted on the property, Table 3 outlines a summary of drilling programs, Table 4 lists highlights of previous rock sampling programs and Table 5 lists some significant drill core intersections and assay results.

### **Pre 1980 s**

Records for drifting (Figure 3) and surface work on claims that are encompassed by the present day Siwash Creek Property during the first half of the 20<sup>th</sup> century (1917-1960) are sketchy and best summarized by reports in the Annual Report of Minister of Mines for the Province of British Columbia (B.C. Minister of Mines Annual Reports, 1917, 25, 27, 28, 29, 51, 52).

The Three Adit gap area is comprised of the 3 separate adits (#1,#2, #3), straddling the Siwash Creek, that were developed in the period of 1917 to the late 1920 s (Figure 3). Historically, this development was referred to as the Renfrew Adits. In total, approximately 120-150 metres of drifting was completed: #1 Adit (east bank of Siwash creek) 9-15 metres; #2 adit- (west bank across from #1) 91 metres; #3 adit (west bank 18 metres south of #2) 38

metres of development. Old reports indicate quartz veins with thicknesses ranging from 5-10cm to 1.8 metres. Assay information is not available for this development. Twenty seven tons of hand-cobbed material, collected in 1926 were processed and a total of 3 ounces of gold (Au), 3.379 ounces silver (Ag), and 1.578 pounds lead (Pb) were recovered (Annual Report of Mines, B.C., 1928).







































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The Monty adit is located approximately 150 metres downstream from the Three Adit Gap and is comprised of a short 9 metre long adit driven into the east bank of Siwash Creek.

The Claremont Adit is located on the east side of the Siwash Creek, 100 metres downstream from the Monty adit. Historical records indicate approximately 150 metres of development with 3 adits and crosscuts to chase a 10-30 cm wide vein, which is reported to have returned an assay of 0.10 ounces per ton (opt) Au, and 269.8 opt Ag. There are discrepancies in the published literature between development on the Claremont adit versus development at Three Adit Gap, in that the two locations have been confused during transcription.

The Fissure (aka Fisher or Fissure) Maiden Adit is a 15 m long adit on the east side Siwash Creek, south of the Claremont and Monty adits. Veining has been exposed in trenches and open cuts on the west side of the creek.

During the 1960 s and 1970 s various groups conducted preliminary exploration programs for porphyry copper deposits in and around the area that comprises the current property. These groups included Phelps Dodge Corporation of Canada Ltd., Utah Mines Ltd., Great Plains Development Co. of Canada Ltd., Pan Arctic Exploration Ltd., Diana Explorations Ltd., and others. Brenda Mines Ltd. conducted exploration over the Siwash Creek Property coincident with initiation of production from the Brenda copper-molybdenum deposit which is located approximately 25 kilometres northeast of the Siwash Creek Property.

Brenda Mines Ltd. conducted Induced Polarization (I.P.) geophysical surveys, soil geochemistry surveys, and drilled 26 diamond drill holes (1979, 80, 81) within what is now the Siwash Creek Property in search of a copper porphyry system. Alteration and geophysical responses suggested a porphyry system, but no economic mineralization was discovered.

#### 1980-1990

Brenda Mines Ltd. conducted soil surveys, diamond drilling, prospecting and geophysical surveys in the early part of the 1980 s. International Tower Hill Mines Ltd. acquired the Siwash Creek Property in 1988. Work in 1988 included a soil sample geochemical survey on a grid established over the historic Siwash workings (1,200 x 1,800m), in conjunction with minor rock (grab) sampling. In 1989, 26 holes drilled by Brenda Mines Ltd. were re-logged and sampled for gold (not assayed for by Brenda Mines). This work was carried out in conjunction with geological mapping, petrography, limited rock sampling, and limited soil sampling in the northeast portion of the property. This work was conducted by Inel Resources as part of an agreement with International Tower Hill Mines Ltd.

#### 1990-95

In 1991, the adits at Three Adit Gap and Fissure Maiden were rehabilitated and re-sampled. Records and results of this work were not available to the authors of



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this report. Infill soil sampling was conducted on the grid over the historic Siwash Creek showings. In 1992, a LandSat Imagery program was carried out over the property to aid in the delineation of suspected fault zones and to aid in identification of alteration zones (see references in Montgomery, 1994).

Figure 5 and Figure 6 represent the distribution of soil samples (1993, 1994 programs) and geochemical results for Au, Ag, Cu, Pb, and Zn. During 1993, two grids were established on the property: the Property and Siwash grids (Figure 2). Infill sampling was done on the Property Grid in an area known as the Northeast Grid. A total of 1,161 soil samples were collected within the Property Grid and 781 samples were collected within the Siwash grid. Multi-element anomalies (results of up to 2,950 parts per million (ppm) Cu, up to 3510 ppm Zinc (Zn), and 245 parts per billion (ppb) Au) were found on the Northeastern Grid (2 anomalies) and Siwash Grid (2 anomalies). The Northeastern Grid anomaly corresponds to an anomaly identified by Brenda Mines Ltd. sampling in 1988. The 1993 Siwash soil sampling identified an 800 metre long east-west trending anomaly that encompassed the area of historic development(s). Anomalous values ranged up to 2,820 ppb Au, 54 ppm Ag, and 4,130 ppm Pb. Lead and silver appear to correlate within this area (Montgomery, 1994). Figure 5 and Figure 6 represent the distribution of soil samples (1993, 1994 programs) and geochemical results for Au, Ag, Cu, Pb, and Zn.

In 1994, an aggressive soil sampling (see Table 2), percussion drilling (33 holes; Figure 4), and prospecting and mapping program were carried out across the property. Geological mapping was carried out at the Siwash, Property, and Big Boy Grids (Figure 6,7). Property Grid soil sampling in 1994 consisted of infill sampling on the Northwest portion of the grid where anomalous Zn, Pb, and Ag values do not have an identified bedrock source. The 1994 soil sampling at the Siwash Grid confirmed the 1993 interpretation of an 800 metre long east-west anomaly over the region of historic underground development. Gold values range up to 2,820 ppb Au (Todoruk and Falls, 1995). In 1994, the Chicago Grid was established to the east of the Siwash Grid (Figure 3). Several two station multi-element anomalies were noted. In general, gold values were low (Up to 270 ppb Au) but elevated silver (7.8 ppm Ag) with coincident Cu and Zn values were noted. The Big Boy Grid was established to the west of the Siwash Grid and 211 samples were collected. Several multi-element Cu-Ag-Zn anomalies were noted, but in general values were low.

Rock sampling in 1994 (Table 4, Samples 623451-455) returned significant results from float material sampled in Siwash Creek south of the Chicago Grid. Other anomalous samples were returned from the 3 Adit Gap area and the regions around and within the 1993 trenches. Several samples taken from the area to the southeast of the Big Boy Grid returned anomalous base and precious metal assays (Sample 540051; 95 ppb Au, 10.9 opt Ag, 2.98 per cent (%) Cu, 1100 ppm Pb, and 692 ppm Zn) from altered granite (Todoruk and Falls, 1995).

A total of 33 overburden percussion holes were drilled in 1994 by Pamicon Consulting on behalf of International Tower Hill Mines Ltd. (Figure 4). The







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purpose of the program was to determine what influence thick overburden was having on the geochemical anomalies noted in soil sample programs. Holes were drilled on the Northeastern Grid in the area of known copper, zinc, gold and silver anomalies. Samples of overburden from this area corresponded to previous soil sample results and it was determined that surface sampling results are valid in areas of thin overburden. Drilling also successfully tested a magnetic low, 300 metres north of the Fissure Maiden adit; this was referred to as the Chicago Zone and lies in the area of the Monty Adit. A total of three holes were drilled into the target (94-19, 30, 31; Table 3, Table 5). Drill hole 20 was drilled to test a northeast trending Very Low Frequency ElectroMagnetic (VLF-EM) conductor. This hole intersected a silicified mineralized zone with pyrite, galena, sphalerite, and fluorite. Low geochemical values were returned from this zone.

Reconnaissance geophysical surveys were conducted in 1994 and focused on the Siwash and Chicago grids. Information from these surveys indicated that both magnetic and electromagnetic surveys could assist in identification of areas of interest (Todoruk and Falls, 1995) and geophysical anomalies that were drill tested did intersect mineralization (example: Chicago Zone). Following the reconnaissance surveys, detailed grids were established at the Big Boy, Chicago, Siwash, Property and Northeast grid areas. East-west trending coincident magnetic and VLF anomalies were encountered on the Siwash and Chicago grids in areas along the interpreted strike extent of known mineralization. One such feature was successfully drill tested (Chicago Zone). Results from the grid in the southwestern portion of the Big Boy Grid indicated a mixed magnetic response but several VLF conductors with significant strike length were identified (Todoruk and Falls, 1995). Several high magnetic responses associated with east-west, strong VLF conductors, were identified in the northern portion of the Property Grid, and follow-up work was recommended. Geophysics on the Northeastern Grid consisted of an Induced Polarization survey in the area of a previously identified copper anomaly from soil samples (1988 and 1993 sampling). A near surface chargeability anomaly with low resistivity was identified. This area was identified as a high priority drill target.

The 1993 and 1994 programs (Montgomery, 1994; Todoruk and Falls, 1995) outlined a base and precious metal anomaly in the northeastern portion of the property (Northeastern Detail Grid) coincident with an IP chargeability and resistivity anomaly that was tested with a percussion drill program in 1995 (6 holes, 378 metres). Chip-logging indicated that the Northeastern Detailed grid area is underlain in part by the Pennask Batholith, however the presence of fault gouge and volcanic material indicate that subsurface geology is poorly understood. Although no obvious Cu-Mo mineralization was intersected, anomalous base metal intervals were intersected (Holes 95-1,2,5,6; Table 3 and 5) and follow-up work was recommended (Friesen, 1996).

#### 1996-2001 Drilling

In 1996, five drill holes (808 metres; Figure 4, Table 3 and 5) were completed. Three holes tested geophysical and geochemical anomalies on the Northeastern



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Grid and two holes tested mineralization south of the Fissure Maiden adit. Holes 94-5 and 94-6 intersected anomalous Au ( up to 10 g/t; Tables 3 and 5) and Ag (up to 100 ppm Ag, Table 5) associated with chalcopyrite, pyrite, galena bearing quartz veins in brecciated and altered granodiorite (Weeks, 1996). Drill hole 96-2 and 96-3 intersected anomalous Cu and Ag values in mineralized sections that correspond to sulphides intersected in 1995 percussion holes.

In 1997, a series of five drill holes (829 metres; Figure 4, Table 3 and 5) were drilled on the Northeastern Grid. Drill holes 97-3, 97-4, 97-5 succeeded in extending a sulphide-bearing alteration within the Pennask granodiorite. The zone has a SE-NW trend and a strike length of approximately 700 metres. Anomalous gold, silver and copper values are associated with areas of quartz flooding and/or narrow sulphide-bearing quartz veins and veinlets (Weeks, 1997, 1998).

In 2001, six drill holes (1,055 metres; Figure 4, Table 3 and 5) were drilled on the Northeastern grid area to further test and extend anomalous zone identified

in previous drilling. Anomalous gold and base metal values are associated with narrow domains of quartz veining in altered granodiorite (Weeks, 2001a,b)

## **GEOLOGICAL SETTING**

The Siwash Creek Property is located along the eastern edge the Intermontane tectonic belt of south-central British Columbia, and is underlain by Middle Jurassic granites and granodiorites of the Osprey Lake Batholith. Early Tertiary quartz feldspar porphyry dykes and stocks form part of the Otter Intrusive Suite and subordinate amounts of Upper Triassic volcanics and sediments of the Nicola Group (Figure 7). Upper Paleozoic sedimentary and volcanic rocks of the Cache Creek Group lie to eastern portion of the property.

### Property Geology

The claim group lies at the western edge of the late Jurassic Osprey Lake Batholith comprised of granite and granodiorite. Mafic volcanic rocks of the Nicola Group lie to the west and north of the property, however, core logging has identified some units of volcanic rock, presumed to be the Nicola Group. The Osprey Lake Batholith is described as a pinkish to cream coloured coarse grained granite. The north and east portion of the claims are underlain by the Jurassic composite Pennask Batholith. Within the claim group the Pennask Batholith is manifested

by weakly foliated, grey colored quartz diorite (Grove, 1989).

Early Tertiary, felsic to intermediate stocks and dykes of the Otter Intrusive Suite cut older rocks and locally contact zones are brecciated and the locus of diatreme development. The central portion of the property is underlain by ovoid Otter Intrusive Suite quartz feldspar porphyry and is a significant host to mineralization. The intrusion has been mapped as a 5 kilometer long ovoid



intrusion (Rice, 1960) centred on the junction of the Siwash and Galena creeks. More detailed mapping by Inel Resources (Montgomery and Toduruk, 1980) indicates that the Otter Intrusion is likely smaller than previously believed, and is comprised of quartz-eye porphyry. Three other intrusions that lie east and west of the Otter Intrusion are comprised of syenite (megacrystic and a coarse grained variety). Four distinct rock types have been described for the Otter Intrusive Suite, these include, megacrystic potassium feldspar porphyry, quartz feldspar to quartz eye porphyry, quartz syenite and biotite quartz feldspar porphyry. The megacrystic quartz feldspar porphyry is the most extensive rock type and the biotite quartz feldspar porphyry mainly occurs as late crosscutting dykes (Montgomery and Toduruk, 1980) The quartz feldspar porphyry and the quartz eye porphyry host the bulk of mineralization identified prior to the 1990 s (Montgomery and Toduruk, 1980; Grove, 1989a,b). The Otter Intrusive Suite is described as weakly to moderately altered, alteration intensity increase in sheared or faulted domains.

Breccia zones are identified in both the Tertiary Otter suite and older Pennask and Osprey plutons. The scale of this brecciation varies from less than 10 metres to greater than 100 metres. In some instances the breccias are heterolithic, indicating reflecting deep sourcing for the breccias (Grove, 1989a,b; Montgomery and Toduruk, 1989).

The Otter Intrusive Suite contains abundant fractures and joints, more than the surrounding Pennask and Osprey plutons. The fracture pattern is comprised of close-spaced, steep, conjugate NW, NE and east-west fractures (Grove, 1989). Faults and shear zones are observed in drill core.

The Siwash Creek topographic feature is interpreted to be underlain by a major NW trending fault zone that bisects the property along which the Otter Intrusive Suite has intruded. Mineralized features occur as a series of conjugate systems trending northeasterly to easterly.

## **DEPOSIT TYPES**

Two types of mineral deposits have been the focus of exploration at the Siwash Creek Property which are, low grade-high tonnage Cu-Mo porphyries, and high grade-low tonnage polymetallic veins.

The other deposit type targeted for exploration at the Siwash Creek Property are Classic Cu-Mo+/-Au porphyries. Classic porphyries are described by (Panteleyev <http://www.em.gov.bc.ca/mining/Geosurv/MetallicMinerals/MineralDepositProfiles/PROFILES/L04.htm>) as Classic

deposits that are *stock related with multiple emplacements at shallow depth (1 to 2 km) of generally equant, cylindrical porphyritic intrusions. Numerous dikes and breccias of pre, intra, and post-mineralization age modify the stock geometry. Orebodies occur along margins and adjacent to intrusions as annular ore shells. Lateral outward zoning of alteration and*

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*sulphide minerals from a weakly mineralized potassic/propylitic core is usual. Surrounding ore zones with potassic (commonly biotite-rich) or phyllic alteration contain molybdenite \* chalcopyrite, then chalcopyrite and a generally widespread propylitic, barren pyritic aureole or 'halo'.*

The BC Minfile description for the Brenda deposit states: *The Brenda copper-molybdenum deposit is hosted within the "Brenda stock", a composite quartz diorite/granodiorite body which forms part of the Pennask Batholith. The Brenda orebody forms part of a belt of copper-molybdenum mineralization that extends north-northeast from the Nicola Group-Brenda stock contact. Mineralization of economic grade (0.3 per cent copper equivalent) is confined to a somewhat irregular zone approximately 720 metres long and 360 metres wide. Ore-grade mineralization extends more than 300 metres below the original surface. Lateral boundaries of ore-grade mineralization are gradational and appear to be nearly vertical. Primary mineralization is confined almost entirely to veins, except in altered dike rocks and in local areas of intense hydrothermal alteration which may contain minor disseminations. The grade of the orebody is a function of fracture (vein) density and of the thickness and mineralogy of the filling material. The average total sulphide content within the orebody is 1 per cent or less. Chalcopyrite and molybdenite, the principal sulphides, generally are accompanied by minor, but variable, quantities of pyrite and magnetite. Bornite, specular hematite, sphalerite and galena are rare constituents of the ore.*

*Pyrite is most abundant in altered andesite dikes and in quartz-molybdenite veins. The ratio of pyrite to chalcopyrite in the orebody is about 1:10, with the chalcopyrite content diminishing beyond the ore boundaries. Because mineralization is confined almost entirely to veins in relatively fresh homogeneous rock, the veins are divided into separate stages, based on crosscutting relations and their mineralogy and alteration effects on the hostrock. The vein density within the orebody is not uniform. Ranges are recorded from less than 9 per metre near the periphery of the orebody to 63 per metre and occasionally 90 per metre near the centre of the orebody. Some veins have very sharp contacts with wallrocks, but most contacts are irregular in detail where gangue and sulphide minerals replace the wallrock. A vein may show features characteristic of fracture- filling in one part and of replacement in another. Mineralized solutions were introduced into fractures and, during development of the resultant veins, minor replacement of the wallrock ensued.*

*The chronological stages of mineralization are as follows: (1) biotite-chalcopyrite (oldest); (2) quartz-potassium feldspar- sulphide; (3) quartz-molybdenite-pyrite; (4) epidote-sulphide- magnetite; and (5) biotite, calcite and quartz. Stages 1 through 4 are all genetically related to a single mineralizing episode, which was responsible for the orebody. Stage 5 represents a later, probably unrelated, event(s) (Canadian Institute of Mining and Metallurgy Special Volume 15). Stage 2 veins form the bulk of the mineralization in the deposit, and are the most important source of ore.*

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*Hydrothermal alteration at the Brenda deposit generally is confined to narrow envelopes bordering veins. These alteration envelopes commonly grade outward into unaltered or weakly propylitic-altered rock. Where veins are closely spaced, alteration envelopes on adjacent veins may coalesce to produce local areas of pervasive alteration. For the most part, hydrothermal alteration at the Brenda deposit is exceptionally weak for a porphyry copper system.*

*Four types of alteration are recognized in the Brenda deposit, three of which are related to the mineralizing process. Two of these are potassic (potassium feldspar) and biotite, and the other is propylitic. Later argillic alteration has been superimposed on the system along post-mineral faults.*

Polymetallic sulphide-rich veins containing sphalerite, galena, silver and sulphosalt minerals occur in a gangue of carbonate and quartz. These veins may be hosted by metasediments, volcanic or intrusive rocks. Veining associated with intrusive rocks are typically contemporaneous with emplacement of a nearby intrusion. In the case of the Siwash Creek Property, veining is coincident with/ immediately post-Otter Intrusive suite. Veins typically occur in country rock marginal to intrusive stocks. Typically veins crosscut stratigraphy and follow pre-existing structures or faults associated with the emplacement of the intrusion. In some cases the veins cut older intrusions (Lefebure and Church, <http://www.em.gov.bc.ca/mining/Geolsurv/MetallicMinerals/MineralDepositProfiles/PROFILES/I05.htm>).

Veins occur as steeply dipping, narrow, tabular or splayed structures that may form a set of parallel or offset vein systems. Vein continuity is variable. Individual veins vary from centimetre scale up to more than 3 metres wide. Strike length is also variable from 100 s to a 1000 metres and dip extent is on the order of strike extent. Texturally, the polymetallic veins may have complex paragenetic history representing multiple mineralizing pulses and/or deformation events. Open space textures (colloform banding) may be present. Wallrock hydrothermal breccias, stockworks and breccias are also common. Sulphides occur as disseminations, patches, or coarse grained domains. Ore mineralogy is comprised of galena, argentiferous galena, sphalerite, tetrahedrite- tennantite, other sulphosalts including pyrargyrite, stephanite, bournonite, acanthite, native silver, chalcopyrite, pyrite, arsenopyrite, and stibnite. Silver minerals often occur as inclusions in galena. Native gold and electrum occur in some deposits.

Exploration for each deposit type entails geological mapping, structural interpretation (both remote and from filed work), geochemical sampling (soil, stream, rock) and geophysics.

## **MINERALIZATION**

As previously noted, mineralization at the Siwash Creek Property is comprised of polymetallic veins and weak Cu-Mo-Au-Ag +/-Pb-Zn porphyry mineralization.

The polymetallic veins were the subject of underground exploration in the first half the 20<sup>th</sup> century. The veins are described as being hosted in silicified shear zones

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and mineralization is associated with pyrite, chalcopyrite, hematite (weathering feature?), sphalerite, and galena. Sulphides may occur as disseminations or in a semi-massive form. Mineralization hosted within the shears trends north-northeast to northeast and dips variably to the southeast. Shear zone attitude does appear to be somewhat variable with both moderate southeast and northwest dips described for the various zones. Locally, alteration includes fluorite and arsenopyrite and wallrock alteration is comprised of sericite, carbonate with local silicification and chlorite alteration.

There are at least four distinct shear/vein systems described for the Siwash Creek Property, and these formed the focus of the historic underground developments. These structures have been traced by the underground development for up to 100 metres. Strike extensions across Siwash Creek suggest that the strike continuity of the structures is greater than 100 metres. Dip continuity has not been adequately tested by diamond drilling and is therefore not known. The presence of other polymetallic vein systems is suggested by the sporadic, but nonetheless significant, Au-Ag values returned from narrow quartz stringers encountered during drill programs at the Northeast Grid.

The Brenda Porphyry model has been tested at the Northeast Grid by several drill campaigns (1995, 1996, 1997, 2001, 2004). Mineralization has, in general, been low grade. Drilling and geophysics suggest that the mineralization strikes in a northwest manner with a steep dip (variable steep north and steep south). Mineralization is comprised of weakly disseminated pyrite, chalcopyrite, hematite, magnetite and is associated with brecciated, sheared intrusive rocks of the Pennask Batholith (Friesen, 1995; Weeks, 1996a,b; 1997a,b; 1998a,b; 2001a,b).

## **2004 EXPLORATION**

In 2004, 17 new claims were staked at the Siwash Creek Property. The 17 claims comprise 99 units and extend the property eastward for approximately 8 kilometers. This area is underlain by the Pennask Batholith, and no detailed mapping or sampling was done within the new claims during 2004. A set of five NQ drill holes were completed (1,013 metres) in the Northeastern Grid area to further test anomalous Au, Cu, Ag, Pb, Zn values from the 1996 to 2001 drill campaigns. Drilling intersected what is interpreted to be metavolcanics, Pennask granodiorite, and quartz-eye porphyry (Weeks, 2004a,b). Several units are referred to by Weeks (2004a) as mill rock and are identified in drill hole DDH04-03. Silicified shear zone material is logged in the upper portion of DDH04-01. Shearing and alteration are manifested by closely spaced fractures infilled with magnetite, hematite and carbonate. Veinlets and fractures are enveloped by chlorite alteration. As fracture density increases the host rock takes on a greenish colour due to pervasive chloritisation (Weeks, 2004a). No quartz veins greater than 10 centimetres were encountered (Weeks, 2004a). Significant intersections are highlighted in Table 5. Elevated gold assays are commonly associated with quartz veinlets with minor amounts of sulphide are variable core axis angles. A total of \$103,024.56 was



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spent during the 2004 drilling program, which included both drilling and assay costs.

Results from the 2004 drilling are similar to those of previous drill campaigns. Low grade to anomalous gold, silver, copper, lead, and zinc are associated with brecciated and altered Pennask granodiorite. Metal concentrations increase as alteration and fracture density increase. Anomalous gold values are restricted to narrow quartz veinlets with sulphides. Locally quartz veinlets are associated with increased base metal sulphide content, shearing, silicification, and more rarely fluorite. The 2004 drilling was successful in increasing the strike extent of the alteration zone to the east (Weeks, 2004a,b). Core logging indicates the presence of breccia zones and quartz feldspar porphyry that are known to host the polymetallic veins found previously on the Siwash grid.

## **DRILLING**

The Siwash Creek Property has seen nine separate drill programs since 1979, a total of 8,679 metres in 87 drillholes (39 percussion for 909.5 metres; 48 core holes for 7,769 metres, Table 3). Drilling results have been summarized by Bankes (1980), Pollmar (1988a); Montgomery and Todoruk (1989), Grove (1989b), Todoruk and Falls (1995), Friesen (1996); and Weeks (1996, 1997, 1998, 2001a,b; 2004a,b). It is not known by the authors if core is still available for examination for the holes drilled in 1979,80, or 81. Core from the drill campaigns during the period 1995-2004 was logged and sampled on site. As stated in Weeks (2004a,b), whole core samples were taken and submitted for assay (multi-element ICP and fire assay Au). Not all samples were submitted for gold analysis, and samples did not cross geological boundaries. Descriptions for individual sample intervals are not present with drill logs. Samples of mineralized material were bracketed by barren samples. Core not sent to the laboratory for analysis was discarded in the field, at the drill site (Weeks, 2004a,b).

A summary of significant assays is listed in Table 5 and sample intervals were calculated as the sampled interval. Due to the lack of detailed descriptions for individual samples it is not possible to comment on the true thickness of the intervals reported. The orientation of mineralization on the Northeastern Grid appears to strike in a NW-SE manner, but the exact attitude and thickness is unknown. No attempt has been made to correlate specific alteration zones between holes and no work has been done on drill interpretation around old workings (last drill tested in 1996).

## **SAMPLING METHOD AND APPROACH**

Soil and rock sampling programs were conducted prior to the implementation of National Instrument 43-101. Soil samples were collected at depths of 10 to 30 cm in the B soil horizon. Sample locations were marked with flagging tape and notes were taken pertaining to the soil colour, texture, sample depth and the nature of the

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ground slope (Toduruk and Falls, 1995; Montgomery, 1994). Drill core sampling procedures are covered in the Drilling section.

### **SAMPLE PREPARATION, ANALYSES AND SECURITY**

Drill core samples from the 2004 drill program were selected following the procedure outlined in Weeks (2004a,b). This procedure involved geological logging of the drillcore and then selection of core for assaying. No core was split and all selected samples were preceded and followed by a barren sample. No sample crossed geologic boundaries (Weeks, 2004a, b). Samples were submitted to ALS Chemex for a 34 element aqua regia ICP-AES analysis and only selected samples were submitted for fire assay gold. Specific drill core intervals that were sampled were sampled in their entirety, described and placed in a plastic bag which was tied with twine. The bags were provided by Weeks to a representative from International Tower Hill Mines Ltd. and were dropped off at ALS Chemex in Vancouver.

Soil sampling results are not considered in this section since this work was completed prior to the implementation of National Instrument 43-101 procedures.

### **DATA VERIFICATION**

In the reports and material provided to the authors of this report no information was provided regarding the implementation or execution of a quality control/ quality assurance program.

During the 2004 site visit, no samples were taken of drillcore or outcrop for data verification. Future work at the property requires a more regimented quality control/ quality assurance program to meet with current industry standards.

### **ADJACENT PROPERTIES**

Gold-silver mineralization is located on Almaden Minerals Ltd.'s Elk property, approximately 6 kilometres to the north of the Siwash Creek Property. The Property is hosted primarily by pyritic quartz veins and stringers within altered granite, and in some cases volcanic rocks of the Nicola Group. Cross cutting relationships have indicated the veins are Tertiary in age and quite possibly related to the Tertiary Otter Intrusions. Eight mineralized vein systems have been identified by either drilling, trenching or prospecting on the Elk Property. Gold occurs primarily as fine grained native gold (less than 50 microns) in fine flakes within quartz, in quartz-pyrite stockworks and in fractures within veins. Giroux (2004) describes the gold mineralization and alteration in the following statement, *Gold is closely associated with pyrite with minor minerals such as chalcopyrite, sphalerite, galena, tetrahedrite and pyrrhotite sometimes present. Gangue mineralogy consists of quartz and altered wall rock clasts with minor amounts of ankerite, calcite, barite and fluorite occurring locally*.

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The Siwash North B Vein (Elk Property) is the most significant vein and has been drill tested and mined by both open pit and underground methods. The vein has a strike length of over 950 m along a north-easterly direction and ranges in width from 0.1 to 3 m in true width. The vein has a shallow dip, averaging about 20° near surface, steepening with depth. The vein occurs near the contact between the Pennask Granodiorite and Nicola volcanics, striking eastward into the granodiorite. As the vein penetrates into a quartz monzonite unit it splays into a series of subparallel veins. A number of individual ore shoots have been delineated by extensive diamond drilling, both from surface and underground (Giroux, 2004).

From 1992 to 1994 a total of 14,720 tonnes have been mined from the Siwash North open pit (ELK Property) on the B vein recovering a total of 1,481,000 gms (47,600 ozs) of gold. A decline 985 m in length was developed on the Siwash B vein (ELK Property) and several areas were test mined between 1993 and 1995 producing an additional 120,000 gms (3,860 ozs) of gold from 1,780 tonnes of material mined (Giroux, 2004). An ore reserve estimate has been published for the Elk property (Giroux, 2004).

The Brenda Cu-Mo-Au past-producer is located approximately 25 kilometres to the northeast of the Siwash Creek Property. The Brenda Mine produced approximately 180 million tons of very low grade copper and molybdenum between 1970 and 1990 from an open pit mine. The Brenda deposit is hosted within the "Brenda stock", a composite quartz diorite/granodiorite body which forms part of the Pennask Batholith. The Brenda stock is a composite, zoned quartz diorite to granodiorite body. Several ages and compositions of pre-and post-ore dikes cut the stock. The deposit is approximately 390 metres from the contact with Nicola Group rocks to the west. The Brenda orebody is part of a belt of copper-molybdenum mineralization that extends north-northeast from the Nicola Group-Brenda stock contact. Mineralization of economic grade (0.3 per cent copper equivalent) is confined to a somewhat irregular zone approximately 720 metres long and 360 metres wide. Ore-grade mineralization extends more than 300 metres below the original surface. Lateral boundaries of ore-grade mineralization are gradational and appear to be nearly vertical. Primary mineralization is confined almost entirely to veins, the grade of the orebody is a function of fracture (vein) density and of the thickness and mineralogy of the filling material. The average total sulphide content within the orebody is 1 per cent or less. Chalcopyrite and molybdenite, the principal sulphides, generally are accompanied by minor, but variable quantities of pyrite and magnetite. The chronological stages of mineralization are as follows: (1) biotite-chalcopyrite (oldest); (2) quartz-potassium feldspar-sulphide; (3) quartz-molybdenite-pyrite; (4) epidote-sulphide-magnetite; and (5) biotite, calcite and quartz. Stages 1 through 4 are all genetically related to a

single mineralizing episode, which was responsible for the orebody. Hydrothermal alteration at the Brenda deposit generally is confined to narrow envelopes bordering veins. These alteration envelopes commonly grade outward into unaltered or weakly propylitic-altered rock. Where veins are closely spaced, alteration envelopes on adjacent veins may coalesce to produce local areas of pervasive alteration. For the most



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part, hydrothermal alteration at the Brenda deposit is exceptionally weak for a porphyry copper system. (B.C. Minfile description for the Brenda Deposit).

The authors of this report acknowledge that presence of mineralization and ore deposits on the Elk Property and the Brenda Mine is not necessarily indicative of similar mineralization or deposits existing on the Siwash Creek Property that is the subject of this technical report.

### **MINERAL PROCESSING AND METALLURGICAL TESTING**

To the authors' knowledge no metallurgical testing has been performed on material from the Siwash Creek Property.

### **INTERPRETATION AND CONCLUSIONS**

On the Siwash Creek Property several anomalous base and precious metal anomalies have been outlined by soil sampling programs during 1993 and 1994. Historic development on mineralized shear zones has occurred on four separate shear zones and drilling has identified anomalous base and precious metal abundances. Base and precious metal anomalies occur in the northwestern and northeastern portions of the Property Grid, the northeastern portion of the Big Boy Grid, and on the Siwash and Chicago grids. Anomalies are coincident with magnetic and electromagnetic anomalies. Mineralization and alteration are associated with shear/fault zones that are associated with and transect units of the Tertiary Otter Intrusive suite. Alteration and mineralization are also associated with intrusive breccias developed at or near the contact between the Otter Intrusive and the Pennask Batholith. Porphyry-style mineralization and alteration occurs as brecciated and fractured zones within the Pennask Batholith in the northeastern portion of the Property Grid. The main focus of exploration since 1997 has been low grade to anomalous base and precious metal anomalies on the Northeastern Grid. Narrow quartz veinlet zones have returned encouraging gold and silver values and these domains have not been subjected to follow-up drilling or interpretation.

Shear zone related polymetallic quartz veins with elevated gold, silver, lead, zinc, and copper occur within the Siwash Grid area and were the focus of underground development in the early 1900 s. These shear/vein systems share mineralogical, geological, and structural similarities with the nearby Elk Property where underground and open pit mining has exploited narrow high grade, polymetallic quartz veins. Soil sampling and geophysical surveys have been successful in outlining alteration and mineralization within the Siwash Grid area and along the strike of known

mineralization. Since 1996 no drilling has tested the shear zone features of the Siwash Grid.

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The Siwash Creek Property, based on known geology, alteration, structural geology and mineralization has the potential to host economic polymetallic, narrow, low tonnage high grade quartz vein systems. The presence of a Brenda style porphyry deposit is also possible given the degree of alteration observed and the favorable geologic setting and host rocks.

### **RECOMMENDATIONS**

A multi-phased exploration program is warranted and recommended for the Siwash Creek Property. The exploration should comprise but not be limited to:

**Phase 1:** A helicopter borne, high-resolution magnetic and electromagnetic survey over the entire property at 200 metre line spacing (approximately 500 line kilometers at \$175/line km = \$87,500). The airborne should be overseen by a geophysicist to ensure proper quality control and quality assurance are met (\$5,000). As well, an Interpretation of the newly acquired geophysical data in conjunction with a re-interpretation/compilation of all existing geochemical, geological and drill core data may help to identify new target areas (\$20,000).

**Phase 2: The phase 2 exploration would not be contingent on the results of the Phase 1 exploration. The exploration** would comprise (a) A field based program with the establishment of a property wide grid and the collection of soil samples at 100 metre spacing over areas with pre-existing data and at a spacing of 150 metres for the new portion of property. In total, about 5000 samples should be collected. As well, as part of a standard quality control/quality assurance program, fifteen percent (15%) of all samples should be collected in duplicate (750 samples)(approximately \$60/ sample all-up = \$307,500); (b) Ground-proofing of geophysical anomalies returned from the airborne survey and the acquisition of ground magnetic and electromagnetic geophysical data on selected targets. In total, the cost to complete five grids (43 line kilometers each) where lines would need to be cut, with both magnetics and electromagnetics is about \$100,000; and (c) Property scale geological mapping in conjunction with the mapping and sampling of old trenches. All workings, trenches, and significant rock samples should be re-located and checked assayed. (\$5,000 to complete mapping and assaying approximately 200 rock samples at \$20/sample = \$9,000).

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**Phase 3 is contingent on the results of Phases 1 and 2,** would involve one or more of the collection of infill soil samples, ground geophysics and/or a diamond drill program to test historic targets and new targets developed during phases 1 and 2.

The total cost to complete the recommended phase 1 and 2 exploration is \$530,000Cnd. A cost for Phase 3 cannot be determined at this time.

**APEX Geoscience Ltd.**

/s/ Dean Besserer

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