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BC Geological Survey

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Heavy Indicator and Geochemical Surveys on CLY

TOTAL COST: $68,237.80

AUTHOR(S): William R Howard and Ewan Webster

SIGNATURE(S): (signed) WmRH & EW

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): N/A as no mechanical disturbance

YEAR OF WORK: 2013

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5481838 5481844 5481850 / on Dec. 19 2013

PROPERTY NAME: CLY

CLAIM NAME(S) (on which the work was done): 516584 (no name) 516587 (no name) 521453 BLUGO 556700 RALPHCON

COMMODITIES SOUGHT: Gold, Bismuth, Tungsten, Lead, Zinc

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 082FSW002 (Bunker Hill) and 082FSW159 (Columbia, Waneta)

MINING DIVISION: Nelson

NTS/BCGS: 82F03 W 1/2 / 082F.003, .004, .013, .014

LATITUDE: 49 ° 03 '39 " **LONGITUDE:** 117 ° 23 '19 " **(at centre of work)**

OWNER(S):
1) Clarke Gold Inc.
2)

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PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
Quesnel terrane, Kootenay, Laib formation, Upper Laib formation, Elise formation, Rossland Group, Wallack stock, Cs Unit, ophiolite, Bunker Hill sill, Bunker Hill mine, Lefevre skarn-hornfels, Bayonne Suite, alkali granite, Cambrian, upper Jurassic, mid Cretaceous, Intrusion-Related Gold 'RIRG' System, mesothermal, epithermal quartz veins, Tillicum fault, Waneta fault, olivine, grossular, garnet, corundum, red rutile, anatase, rutile, native gold, scheelite, pyrite, pyrrhotite, arsenopyrite, chalcopyrite

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: 03392, 11536, 12758, 13489, 26159, 27231, 27513A, 27513B, 27893, 28748, 28749, 29864, 30070, 30828, 31577, 32928

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TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil	15 B Horizon soils / 35 Basal tills	516584 / 516584	15777.15
Silt	10 Stream silts	516584 556700 521453	3155.43
Rock	4 rock petrochemistry / 75 lithogeochemistry	516584 / 516584 521453 556700	24927.90
Other	25 Moss mats	516584 521453 516587	7888.57
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying	14 Heavy Minerals in bulk silts	516584 521453 516587	
Petrographic			
Mineralographic	23 Visible Gold gns in bulk silts	516584 521453 516587 556700	(both) 10,263.75
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other	Report & office studies	516584 521453 516587 556700	6,225.00
		TOTAL COST:	68,237.80

Visible Gold grain & Heavy indicator mineral, Rock lithogeochemical, Moss mat, Basal till and other Geochemical surveys on CLY Gold + Tungsten Polymetallic Property in 2013, in Salmo area, Nelson Mining Division, West Kootenays, South British Columbia. 2014 Assessment Report

Work on claims # 516584 521453 516587 556700
Latitude 49° 03' 36'' Longitude 117° 23' 15"
NAD 83 Zone 11 UTM 471,652 mE / 5,434,400 mN
BGS 082F.003 & 082F.004 (1:20,000 scale) NTS 082F03 W1/2 (1:50,000)

Clear scheelite gns, the ore of tungsten, on abundant honey-colored grossular garnet and uncommon black spinel gns, likely hercynite spinel, in the medium sand-size Heavy Mineral fraction of bulk silt HM-18 from Bmin trib. The two light green grains may be apatite. The opaque metallic gns are hematite. See Fig. 30

April 19 2014

Owner; Operators
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Part I

"… the sulfide-rich gold-arsenic-bismuth-tellurium Au-As-Bi-Te mineralization in parts of the Emerald Tungsten deposits **and at the nearby Bunker Hill mine** (Ray and Webster, 1997) suggests that **other tungsten skarns … may contain Au-bearing orebodies** (G.E. Ray 2013)".

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1 Summary, with photos

1.1 General

- The region of the CLY claims is highly mineralized with significant historic production from several gold mining camps (Fig. 5, Fig. 8). Recently there are drill-measured reserves of gold (Kena-Gold Mtn project[1] of Altair Gold Inc. near Nelson, Giroux & Park, 2013) and tungsten (East Emerald and Emerald Mine Tungsten Zones[2] on the Jersey-Emerald Property near Salmo).

- The district is favourable for many types of economic mineral deposits with different metal associations or 'polymetallic' (section 'Mineral Deposit types' after Caron 2012). The CLY property hosts a Reduced Intrusion-Related Gold 'RIRG' system with varied types of Au-(Ag)-Bi-Te-As-W mineralization in zonal arrangements. Commercial mineable deposits could occur.

- Shallow (to about 1.5 m) glacial till covers more than about 99% of the land. The present geochemical surveys infer unfound mineral occurrences exist; shallow glacial drift and heavy forest cover has often eluded efforts to find them.

- The central part of the CLY claims near the Crown Grants was mis-drilled by the last operator Jaxon Minerals Ltd. in 2009 & 2010 (L. Caron, M.Sc., P.Eng. 2012). No intervals of at-surface gold-bearing quartz veins or mineralized tungsten + gold skarn-hornfels were obtained despite drilling ~4.2 km.

- As typical of the deposit type the quartz veins are structurally controlled features. Grades are good, rock 0625 re-sampling Quartz 'Vein 2' ran **13.5 g/t Au,** near ⅓ oz / ton. Some veins have widths to 2 meters. The veins often repeat in sets.

1.2 Re the Petrochemistry of the mineralizing granites

- Whole rock analyses affirm the Bunker Hill sill granitoids are weakly to strongly peraluminous, albite-potassium feldspar alkali granites with minor biotite and muscovite. They are 'S–type' with affinities to A-type granitoids (Whalen et al. 1987), as the alkali contents (Na & K) are high and Ca is low, and as Nb is high.

- Examination of new granite exposures counters an oft-repeated misconception that these gold-mineralizing granites are 'undeformed' or 'unaltered'.

[1] Estimated measured plus indicated (M+I) mineral resource is 25.28 million tonnes at 0.60 g/t Au, 490,000 oz Au (~0.5 million oz). This uses a base case cutoff grade 0.3 g/t. The estimated inferred mineral resource is 90.44 Million t at 0.48 g/t Au, for 1,399,000 oz Au.

[2] Sultan Minerals Inc.'s Emerald Tungsten Property has a NI-compliant measured and indicated resource of 19.46 million pounds of WO3 grading 0.358%, and an additional inferred resource 15.93 million pounds of WO3 at 0.341%, both at a cutoff grade 0.15% WO3 (Giroux and Grunenberg, 2009). "Sultan has extensively drill tested the deposits, completed three Resource Estimates, a Preliminary Economic Assessment, a Scoping Study, and a baseline Environmental Study" and has an "Option Agreement with Margaux Resources Ltd. (TSX-V: MRL "Margaux") for the disposition of 100% of the Jersey-Emerald Tungsten--Zinc Property" (Apr. 30 & Nov. 11 2013 Sultan Minerals Inc. News Releases).

1.3 Moss mat survey

- Generalizing the Moss mat anoms, Bmin trib is anom in gold & bismuth, hi in tellurium, and anom in arsenic lead zinc molybdenum and tungsten (Table 10). Proceeding south, Bogo trib and Hone Ck are mostly high in those elements. Polymetallic base metal-bearing Au + W skarn mineralization is indicated
-

Table Symbols: ✱ anomalous values * hi values

Creek, Moss mat & Silt Map	Recovered VG gns / anom Class	Calculated Au in bulk silt	Au S-02	Bi S-03	Te S-04	As S-05	W S-13	Mo S-12	S S-07	Pb S-08	Zn S-09	Fe S-06	Ni S-10	Cu S-11
LW Ridge ***inferred polymetallic Au + W skarn system, S-rich, extent ~2.5 km***														
645B0 Ck *no samples*														
upper Bzero Ck *no samples*														
Bmin trib	8 / II	low anom	✱	✱	*	✱	✱	✱	✱	✱	✱	-	-	-
Bogo trib	8 / II	*not anom*	*	-	✱	✱	*	-	*	*	-	-	-	-
Hone Ck	0 / -	*not anom*	*	*	✱	-	*	-	-	-	*	✱	✱	*
McCormick Highlands ***inferred Au-(Bi)-Te-Fe-Cu vein system, base metal & S-poor***														
Upper Clel Ck – Clel 770Q5 trib	5 / -	**high anom**	✱	slightly hi	*	-	-	-	-	-	-	✱	-	✱
BH mine ***a known Au-Bi-Te-As-W qtz vein system, S-poor. Two drill targets but little-anomalous!***														
BH Ck	5 / -	*not anom!*	✱	-	-	*	-	-	-	*	-	✱	*	-
Four tribs Ck *too few samples*														

Table 10 (repeated in the Report) Moss mat element anomalies symbolized in 5 creeks with MM and silt samples, comprising 4 separate drainages, these color-coded. Also listing VG gn anom Class: Class I ≥8 gns, Class II ≥11 gns and anomalies of Calculated Au in bulk silts.

- In Hone Ck and upper Clel Ck drainages anom Fe-Ni-Cu in Moss mats indicate an unmapped HCA ophiolite slice occurs

- Bi Te & W values are ***not anom*** in two Moss mats from Bunker Hill Ck draining known Au-Bi-Te-W-As bearing quartz veins. These are presently trench or drill targets

- Moss mats are an effective geochemical sample media for gold exploration even with little material analyzed 0.5 g of -230 mesh

- The Moss mat multi-element geochem anoms indicate **a gold source approx. 2.5 km long,** along the W side of the LW ridge (Map S-02). This aligns along a specific geologic setting: the W contact of the granitic Wallack Ck stock. This intrudes slices of ultramafic-bearing Paleozoic ophiolite rock. This contact zone extends along a major, crustal scale, *fault-shear zone*: the NNE trending *Waneta – Tillicum – MPT Shear Zone*. It is a permissive structural setting for gold deposits, likely structurally-controlled by secondary faults related to it (Fig. 9 map). It is a major structural 'break'

1.4 Lithogeochem survey

1.4.1 LW ridge area

- The best find was 0597 quartz, likely a vein, from LW ridge at the headwaters of Bogo trib. As & Sb are anom, Au is hi, and Fe hi 4.70%. It is "druzy quartz with limonite boxwork and iron staining" in meta-argillite with andalusite developed (photo fig. 9 in Part II by E. Webster)

- **Bmin trib basin has a marked cluster of higher tungsten-in-rock values** with 1 hi and 3 slightly hi (on Map R-13 the anom class is reserved for values >50 ppm W). About the LW ridge slightly higher ppb Au values in rock show potential for mineralized Au-Bi-Zn-Mo-W bearing skarns. It fits with anom Au-Bi-Te in silts and moss mats in Bmin trib. In rock Bi appears to be a gold pathfinder with several slightly hi and hi values (Map R-03)

1.4.2 BiWold Dome area

- A clay-altered granitoid boulder found on the N side (Map T-02) with hi As and Pb and low Bi & Te has **epithermal-style quartz veinlets**, a new mineralization style on the Property

- Not far uphill of the Timbered Shaft QV, on the W side of BiWold Dome, a rounded cobble of a mineralized milky-white qtz vein has common lemon-yellow Bi ochre (Fig. 13 photo, detail in 'Mineralized Sites' section). It ran **anom 0.57 g/t Au, anom Bi and hi Te As & Pb**. The Au-Bi-Te-As-Pb geochem signature matches that of the BH mine QVs. A multi-element till anomaly just west affirms the potential

1.4 Mineralized Sites

- Lefevre QV 'Vein 2' in the West pit of Section 4 (Williams 2010a) of the Lefevre tungsten + gold skarn-hornfels workings has **near ⅓ oz gold / ton.** Rock 0625 re-sampling quartz 'Vein 2' ran **13.5 g/t Au.** This is close to Jaxon's 0.5 m chip sample 945544 that ran **14.0 g/t Au** (Williams 2010a)**.** 0625 is anom in Bi Te & W (Table 3 & in Part II by E Webster figs. 13 & 15 photos). **'Vein 2' is quartz with massive pyrrhotite minor arsenopyrite and trace chalcopyrite, anom in Bi Te As & W** (Table 3), **a prime drill target.** It is mostly covered though with known geometric orientation (Howard 2012, Till Maps). **Crossing 'Vein 1' is 2.0 m thick** and similarly anom

- High-Sulphide Meta-argillite Boulder 918061 lies in the catchment basin of HM-14 mid Hort trib. This subrounded dark grey brown sulphidic meta-argillite or hornfels has abundant magnetic pyrrhotite and trace chalcopyrite & scheelite. It grades **2.7 g/t Au** with anom Ag Bi Te As Cu Fe (~21%) S (~8%) and W ~0.026% (from a 2008 analysis). Its source is likely local, and a target

- Clease 0446 Shear and environs remains a prime target. Part II by E. Webster has two photos, figs. 17 & 18, of subcropping sericite altered BH sill granite with lemon-yellow bismuth ochre patches in limonitic rust. New sample 0634 for 0.4 m ran 4.6 ppb Au, above the median value of 75 rocks with hi Bi hi As / slightly hi Sb / anom Mo and slightly hi W. The element association is Au-Bi-As-Sb-Mo-W

- Three Lady of Lake sites west of MG and Ckay tribs (Map R-08) are from **a mineralized W + Zn skarn system** with anom Mo & S, well obscured by glacial drift. Lady of Lake Wide Cut is an old sloughed working in garnet-pyroxene-tremolite?-sphalerite-scheelite skarn with very minor pyrrhotite (photo fig. 19 in Part II by E Webster). Zn W & Mo are anom. Nearby the Lady of Lake hydraulic cut exposes garnet-diopside calc-silicate with anom Zn and high W (0663). Lady of Lake road cut has anom Zn and hi W

- Galena bearing QVs in the re-found Iron Founder #2 trench are not a target but support G. Ray's observation of mineral and element zoning about the progenitor BH sill (2004). Finding it after two seasons prospecting by Jaxon personnel shows more mineralized showings remain to be found

- The Yankee Open Cut is MINFILE 082FSW159 'COLUMBIA, WANETA'. Thin QVs have a Au-As association but soil geochem results are poor and it has low priority for further work

1.5 Small soil survey

- 9 soils collected from BiWold Dome are too few to range their element values but several have anom gold. Au Bi As Fe Cu & Mo in tills have higher contents than in soils derived from the underlying tills. Pb & Zn are the reverse

1.6 Alpine glaciation

- Numerous field observations and landscape shapes outlined by the TRIM 1:20,000 scale topo contours show alpine glaciation formed the local geomorphology, after earlier continental glaciation. Dispersal patterns of minerals (and entrained rock fragments) in till are expected to parallel local ice-flow directions (Paulen 2009). These are generally southward but in Clel Ck cirque to the W. Glacial transport is from 100's of meters to at most a very few kms

1.7 Sources of the bulk silts and their entrained grains

- The sampled creeks undercut and expose bedrock. Most mineral grains and rock fragments in the bulk silts are locally derived from long-term surficial erosion since alpine glaciation. The bulk silts include some washed and re-transported till, this also mostly local

- Maps of the individual Heavy Minerals also show that the varied geologic settings present are permissive for local formation of the identified HM species, e.g. corundum and chromite / hercynite / or chrome spinel, especially the intrusive contacts

- The ultimate bedrock sources of the silts and the HMs are within their present watersheds

1.8 Basal till survey

Two multi-element, multi-sample gold anomalies are outlined:

- The '**NW BiWold Dome' till dispersal train is 470 m long, 740 m** if a Au-anomalous float rock is included, and minimum 70-80 m wide. It trends ~30°. Its source is undoubtedly local as quartz veining occurs close to BiWold Dome summit. Tills are anomalous and hi in Au As Fe Zn, lesser so Pb & Cu. This association differs from that of the BH mine QVs and the Lefevre skarn-hornfels & Lefevre QVs, Au Bi Te As W

- The **'W of Timbered Shaft QV'** till anom shows the local area of the Timbered Shaft QV has potential for Au Bi As Pb and W mineralization. The Timbered Shaft QV has a wide alteration halo and thick width, further evidence that the local area is gold-favourable regardless of no values in rock samples (Caron 2012)

1.9 Bulk silt survey for Visible Gold and Heavy Mineral grains

- The 23 bulk silt samples are from active, high gradient, high-energy tributary creeks naturally depleted in silt & clay size particles. Most VG gns are silt-sized and thus are also depleted in the samples. **The gold grain signals are low-level but interpretable** (Maps H-01 to H-05)

- Such comment like 'most all the creeks in the Kootenays have some placer gold' are subjective and not open to numerical interpretation, e.g. setting anom thresholds for exploration targeting

- **Combinations of these signals determine if a bulk silt and its watershed are anom** (Conclusion Table 18): counts of Visible Gold gns (two anom classes), Calculated Gold in bulk silt (questionable, low and high anomalies), counts of scheelite gns, ranks of anom Heavy Indicator Minerals notably ones that typify W + Au skarn systems, presence of accessory 'exotic' HM & metallic gns, and detrital HM assemblages

- The HM gn signals are difficult to interpret 'from lists', learned experience is best. Mapping is necessary before objective comment (Maps M01 to M-09). Many HM have varied formation environments, not always genetically related to mineralization

1.10 Examples of Composite anomalies in bulk silts, with photos

1.10.1 HM-18 Bmin trib

- Bmin trib is anom in all sampled geochem media (rocks, silts, MM, bulk silts) with multi-element anoms in multiple samples of each (tills were not sampled). HM-18 from Bmin trib is a goethite-hematite/grossular assemblage with (see Conclusion Table 18)
    - anom 1st rank '**blue sapphire' corundum** with 4% ~8,000 gns standardized {8,890} (Map M-04)
    - anom 1st rank **scheelite** {111} gns (Map M-05)
    - anom 1st rank **grossular-andradite Ca-Fe-Al garnet** {222,222} gns (Map M-02); typical of tungsten skarn mineralization
    - tied with 3 others for 3rd rank Chromite / Hercynite or Cr-spinels {44} (Map M-06)
    - Trace Fe-rich **hercynite** spinel $Fe^{++}Al2O4$. The SEM checks are "5 chromite versus hercynite candidates = 5 hercynite (gns)" thus many chromites may actually be spinels. It forms at higher temperatures expected at the nearby intrusive contact
    - Class II VG gn anomalous with 8 {9} gns (see Fig. 22 photos, Map H-02). Grain shapes 2+5+1 indicate some near-source gold, and
    - Calculated gold in bulk silt is 9.2 ppb, low anom (Map H-04). Median-MAD levelled (Map H-05) this is 5 times bkgd

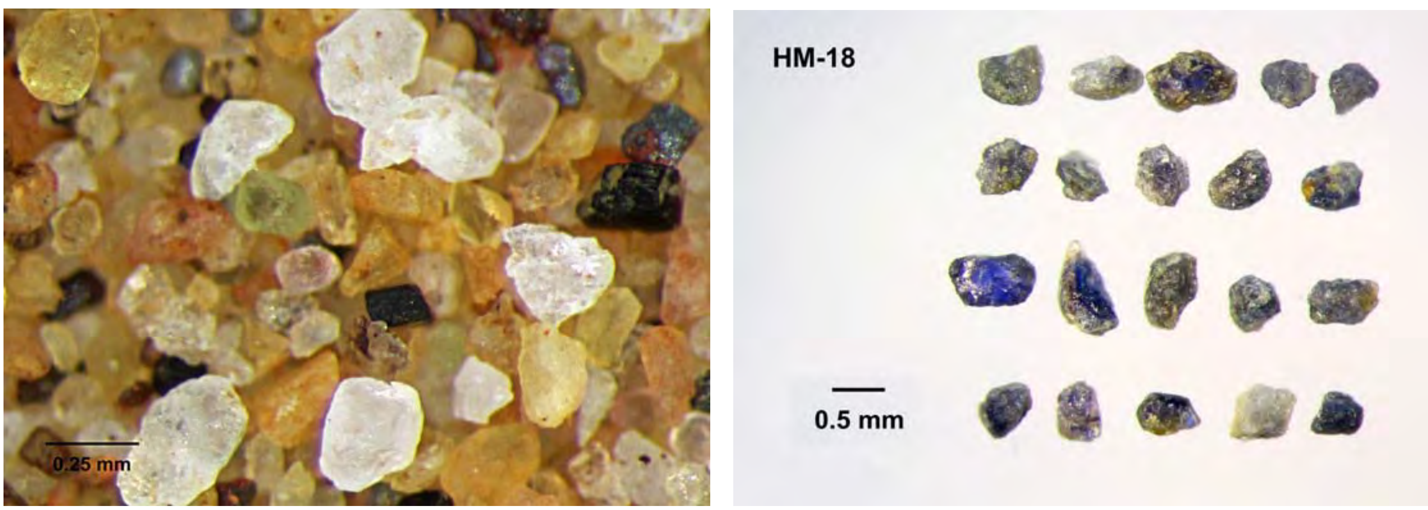
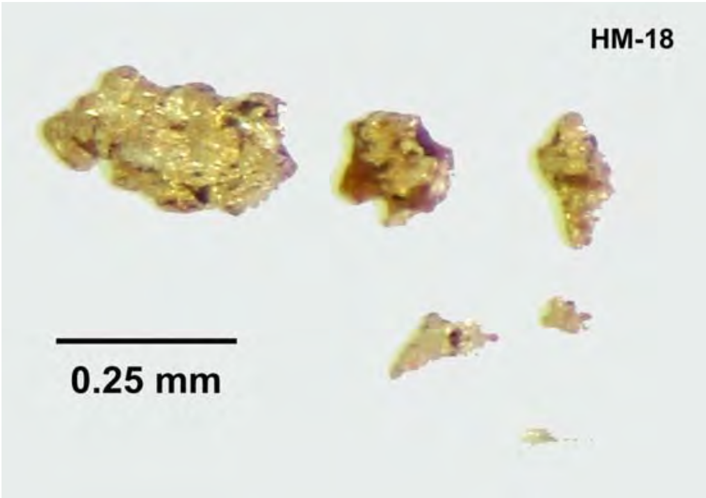


Fig. 30 Photos of scheelite on HM-18 from Bmin trib concentrate and corundum. To lt white scheelite gns placed on other HM gns, mostly abundant honey-colored grossular garnet and uncommon black spinel gns, likely hercynite. The opaque metallic gns are hematite, the two light green grains may be apatite. HM-18 is a goethite (not present in this fraction)/grossular assemblage. In right photo 20 gns of well-included, gritty, 'blue sapphire' corundum



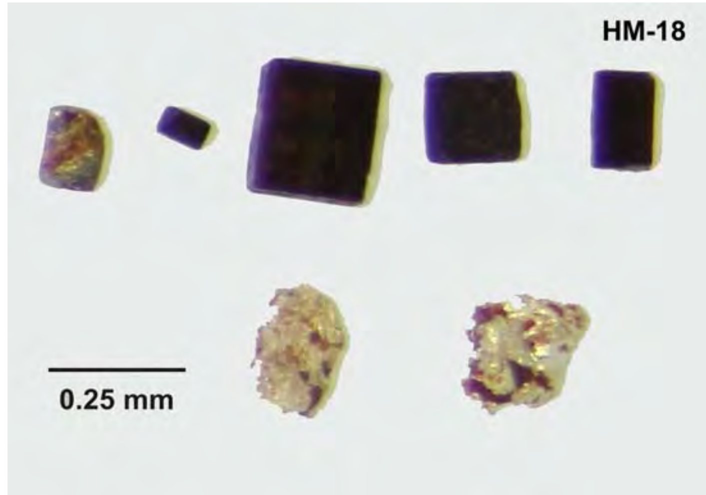


Fig. 22 Photos of HM-18 Bmin trib with 8 VG gns shaped 2+5+1, and pyrite. In left photo the two second-largest gns are the Reshaped ones, the Pristine gn is the smallest one at bottom. The other 3 including the largest are Modified gns. Right photo has 2 other Modified gns with inward-curved sides and 5 oxidized pyrites.

1.10.2 HM-19 upper Bzero Ck

- Neighbouring HM-19 upper Bzero Ck is a goethite-hematite/diopside-grossular assemblage. It is considered anom (Table 18) with
  - 4th rank **corundum** {118} gns, **low c.f. HM-18 but anom** (Map M-04)
  - anom 3rd rank **scheelite** {59} gns (Map M-05)
  - **grossular-andradite** >15%
  - tied for 3rd rank with 3 others in '**spinel'** gns {59} (Map M-06)
  - Class II VG gn anomalous with 7 {8} gns (Fig. 31 photo, Map H-02). Grain shapes 3+2+2 indicate some near-source gold, and
  - Calculated gold in bulk silt *questionably anom 3.14 ppb* (Map H-04).

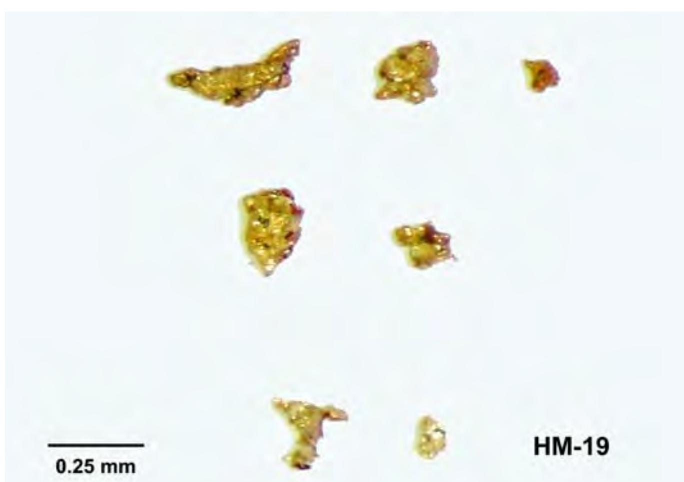


Fig. 31 Photo of VG gns from HM-19 upper Bzero Ck. At top 3 Reshaped gns, in middle 2 Modified, at bottom 2 Pristine. Total is 7 {8} gns shaped 3+2+2.

1.10.3 HM-03 upper Clel Ck

- HM-03 upper Clel Ck is a Goethite/diopside-grossular assemblage with (see Conclusion Table 18)
    - o 2nd rank **scheelite** {67} gns (Fig. 29 photo below, Map M-05).
    - o 2nd rank **Low-Cr diopside-hedenbergite** highly anom, {3,333} gns (Fig. 29 photo, Map M-07)
    - o 3rd rank **spessartine garnet** {1,667} gns (Map M-03).
    - o tie for 3rd rank **chromite / hercynite or Cr-spinels** (Map M-06)
    - o 11 of 15 of these gns checked by SEM are **hercynite**, 73% (hercynite section, Map M-08)
    - o Rock 0613D is an argillic-altered granitoid boulder found not far above the HM-03 site. It has dispersed ~0.2% microcrystalline pyrite and 1-5 mm sized blue-grey epithermal-style quartz veinlets with common sub-mm sized vugs (Fig. 14 photos). **Gold is anom 305.1 ppb**, bismuth & tellurium are above their median values and arsenic is high 59.7 ppm. Lead is slightly hi 28 ppm; see the R Map series
    - o VG gns are Class II anom (Map H-01) with low anom Calculated gold in bulk silt, 9.91 ppb (Map H-04).

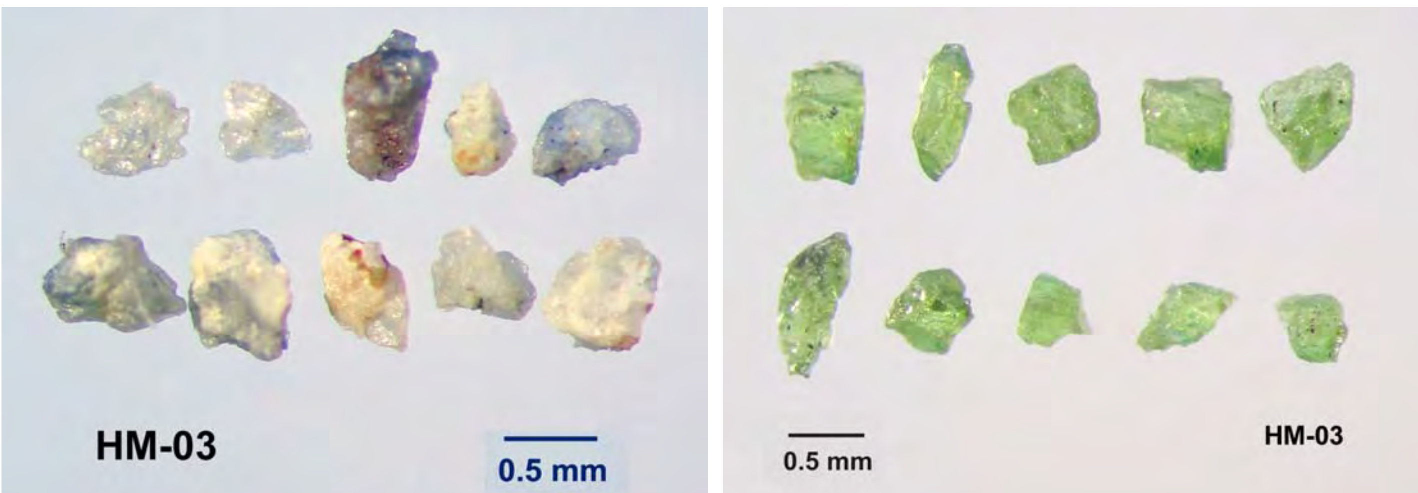


Fig. 29 Photos of scheelites & Low-Cr diopsides in HM-03 upper Clel Ck HM fractions. Scheelite gns to lt, off-white with yellow cast, water clear or with tiny bluish grey inclusions. Lower middle gn has small honey brown & red garnets? To right Low-Cr Diopside-hedenbergite with rare minute opaque inclusions

1.10.4 HM-04 upr Hort trib

- HM-04 from upr Hort trib draining the S side of BiWold Dome is a goethite/grossular assemblage with 90% goethite. It is anom with (Conclusion Table 18)
  - 2nd rank 0.5% **corundum** {291} (Map M-04)
  - background scheelite {23} gns (Map M-05)
  - 4th rank spessartine garnet {1,163} gns (Map M-03)
  - 2nd rank **chromite / hercynite or Cr-spinel** {70} gns (Map M-06)
  - Class II VG gn anomalous with 8 {9} gns with shapes 6+2+0 (Map H-01), see Fig. 23 photos below. One gn is larger-sized, 450 µm long, 400 µm wide and 250 µm thick with attached sericite
  - **hi anom** Calculated gold in bulk silt, 41.3 ppb (Map H-04). Median-MAD levelled (Map H-05) this is 27 times bkgd
  - 2 pyrite + 1 red rutile + 1 anatase + trace (unpicked) apatite (Map M-09)
  - downstream is the subrounded High-Sulphide Meta-argillite Boulder 918061 with **2.7 g/ t Au** (Table 5); this may have moved downhill and formerly been in the HM-04 watershed
  - Au-anom rock 0613D from the N side of BiWold Dome is argillic-altered granitoid (Fig. 14 photos). That alteration style, if it extends S-ward into Four tribs Ck drainage, may be responsible for HM-04's **corundum**.

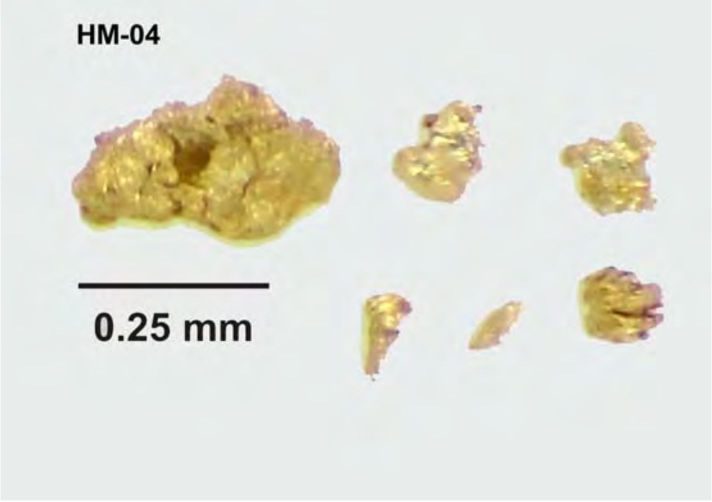
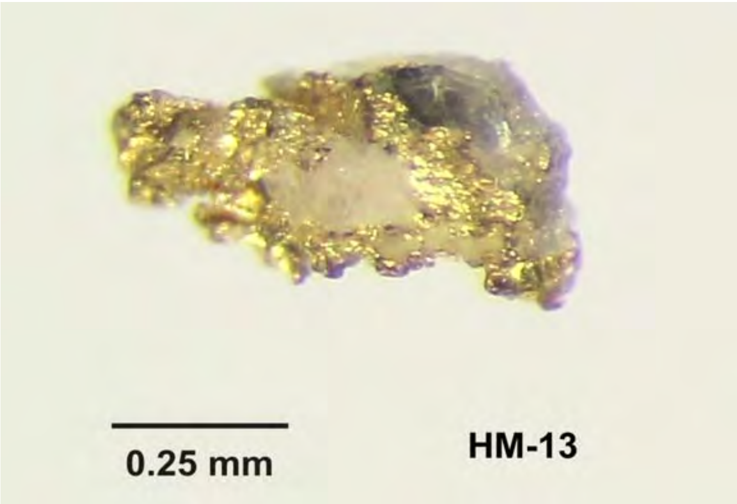


Fig. 23 Photos of 7 of the 8 VG gns shaped 6+2+0 recovered from HM-04 upper Hort trib. In left photo are 4 Reshaped + 2 Modified gns. The latter are 20 x 100 x 100 micron sized, the two medium-size gns at the top rt. Right photo is a large Reshaped gn found while picking the HM gns, measured 250 µm thick, 400 µm wide and 450 µm long. The medium grey mica on its left side is confirmed by SEM as sericite. This large gn well contributes to the Calculated gold in bulk silt value, this survey's second-highest at 41 ppb. It is infolded but has features of a near-source Modified gn

1.10.5 HM-13 mid Ckay trib

- HM-13 from mid Ckay trib is a goethite/grossular assemblage with (Table 18):
    - anom 2nd rank **grossular-andradite garnet** with 100,000 {114,943} gns (Map M-02)
    - **Calculated gold** in bulk silt is 17.79 ppb, classed **hi anom** (Map H-04)
    - ***Not*** VG gn anom with 5 {6} recovered VG gns 3+2+0 including a larger-sized gold gn 650 microns long, 250 microns wide with attached quartz and sericite (Fig. 24 photos below).
    - *no other anoms*



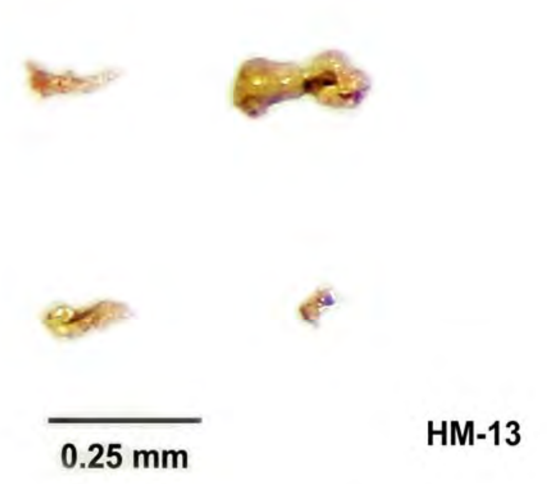


Fig. 24 Photos of the 5 VG gns from HM-13 mid Ckay trib. Left photo is the large Reshaped gn with attached white quartz in middle and flakey grey sericite at its top rt. Measured 650 microns long, 250 microns wide & 100 microns thick. Right photo are 2 Reshaped gns (top row) and 2 Modified (bottom) on white background, this digitally enhanced for clarity of the almost off-focus microphoto

- Results of the 2013 lithogeochem, basal till, moss mat, and gold grain & heavy mineral surveys successfully indicate **widespread gold and gold + tungsten mineralization** in the **CLY area** (Table 18). Thin till covers the land thus deposits remain to be found. They are **km-plus long** vein systems likely associated with contact-related, stratabound skarn ore bodies of uncertain dimensions

- The bulk silt HM survey gave more signals of mineralization than first thought, several-in-one-pass. It shows the watersheds of 4 Creeks prospective for Gold deposits, and another 5 for Gold + Tungsten deposits. These form parts of 6 different stream networks (Table 18)

- The survey was very successful in objectively evaluating the central CLY area about the Bunker Hill mine with outcropping Au-Bi-Te-W bearing quartz veins, *downgrading* the mineral potential of that 'historic' target w.r.t. several other more promising targets under shallow till cover. This has been a revealing study of a small area with high mineral potential; now well demonstrated by findings of actual 'pieces' of possibly economic gold and gold + tungsten mineralizations and their related alterations, as HM gns

A multi-survey approach is an objective, conclusive and definitive means to further early-stage exploration. For more information, comments or queries please contact the writer at wm.howard@shaw.ca or at his address.

2 Introduction

2.1 Purpose of Surveys

Exploration is at an early stage on the CLY claims. Past production in the vicinity has been from numerous deposits of varying types (Höy & Dunne 2001). There are wide-ranging multi-element geochemical surveys of stream sediments / till / soil / Soil Gas Hydrocarbons / grab rocks and channel-cut measured sample interval rocks. Despite these, the extents of the Bunker Hill [BH] mine gold quartz vein system and the Lefevre tungsten + gold bearing skarn-hornfels with its crossing Lefevre gold-quartz vein system are still unknown. They are part of a Reduced Intrusion-Related Gold 'RIRG' system, with varied types of Au-(Ag)-Bi-Te-As-W deposits, its size unknown:

"… **the sulfide-rich Au-As-Bi-Te mineralization** in parts of the Emerald Tungsten deposits and **at the nearby Bunker Hill mine** (Ray and Webster, 1997) **suggests that other W skarns … may contain Au-bearing orebodies** (Ray 2013)".

Disadvantaging the property, the last operator Jaxon Minerals Ltd. mis-drilled the central part of the CLY claims, near the Crown Grants, in 2009 & 2010:

- 2,714 m in 10 holes in 2009, NQ-sized core; 1,225 core samples
- 1,582 m in 6 holes in 2010, same; 525 core samples.

No intervals of *at-surface* quartz veins or mineralized skarn-hornfels were obtained despite drilling ~4.2 km[3]. See section '2009 drilling – the Chances taken' and following for a 'forensic analysis' of some of the drill holes. L. Caron, M.Sc., P.Eng. (2012) provides further comment in her NI report.

Shallow (to about 1.5 m) glacial till covers more than about 99% of the land. Geochemical surveys infer unfound mineral occurrences exist but shallow glacial drift and heavy forest cover eludes efforts to find them. The district is favourable for many types of economic mineral deposits (section 'Mineral Deposit types' after Caron 2012) some with current NI-compliant mineral resources. Economic, mineable deposits could occur. Thus several surveys were undertaken in 2013.

[3] Evidently the two drill programs did not consider a previous report on the geometry of the gold-bearing Quartz Veins (Howard 2006, pp. 45, 53 & 98). This reflects that they are disposed in at least two oriented sets; example one set has a consistent mean orientation 039 40 SE from 10 measurements. As typical of vein systems these QVs are structurally controlled. Grades are good, to ⅓ oz / ton or ~11 g/t gold, with vein widths to 2 m and some small-scale historic mining on several QVs.

Fig. 1 Location of CLY Property in the West Kootenays in southern BC, south of Nelson city and southwest of the town of Salmo.

Fig. 1 Map of BC with CLY Property site

2.2 The exploration approach

Lett & Jackaman (2001) note

"There is presently limited published information about the geology or the application of geochemistry for [RIRG system] gold deposits in British Columbia. These deposits may be difficult to find by traditional stream sediment surveys because the gold and associated pathfinder elements such as … bismuth and tungsten are relatively immobile and tend to be erratically distributed in the sediment. Drainage sediments in British Columbia are also prone to dilution by barren glacial material (unlike the non-glaciated area in Alaska where the Pogo property is located) and therefore gold anomaly contrast may be more subdued. In general, gold anomaly contrast can be improved using more appropriate sample media such as moss mat sediment or a heavy mineral fraction (Matysek and Day, 1987)."

Thus to systematically re-evaluate the central part of the property five local surveys were undertaken:

1) Rocks 75 for lithogeochem
2) Basal tills 35 in a smaller area about BiWold Dome
3) Moss mats 25
4) Recovered Visible Gold gns in 23 bulk silts
5) Heavy Indicator Minerals in fractions of 14 bulk silts, these selected after the results of 4)

10 silts were also analyzed; these few are mapped with the moss mats. 15 soils were also collected in two areas. To understand the igneous petrogenesis of the Bunker Hill sill granite 4 hand samples were analyzed for whole-rock petrochemistry. This granite body is the 'ultimate' causative mineralizing source in the RIRG system deposit model that is applicable to the property.

The mineral potential of a small watersheds are evaluated by considering if gold, or gold pathfinder elements, are geochemically anomalous for that survey. Practically the results of one of the surveys detailed herein often agrees with others. Combined, these survey results objectively establish that specific, small areas have potential for gold deposits. This multi-survey approach provides objective, conclusive and definitive results furthering early-stage exploration on CLY. It has been successful in demonstrating that *other watersheds are considerably more prospective for economic gold deposits than Bunker Hill creek* that drains the historic Bunker Hill mine QV mineralization. This had minor 'hard-scrabble' production in the 1900's and 1930's.

Bulk silts were collected and a state-of-the-art lab, Overburden Drilling Management Ltd. 'ODM' in Nepean (Ottawa) Ont., processed them for gold, scheelite and heavy indicator mineral grains. These have Specific Gravity S.G. greater than 3.2 g/cm^3. ODM's faxed report 'S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA' is in Appendix 7.

2.2.1 Re this Report

This report is lengthy as it comprehensively details a Heavy indicator Mineral and gold grain survey and other surveys targeting gold and tungsten deposits. It is about the third HM survey in B.C. (?) and the first in the West and East Kootenays. Graphs, photos and illustrations are numbered as Figures. Tables, Maps & Charts are numbered separately. Quotes from references before 1972 are in Times New Roman font, refs. in 1972 and after are in Calibri font. Text within square brackets [ ] are comments by the writer. Brackets { } enclose a grain count standardized to 10 kg of -12 mesh silt. If the word 'fig.' is lower case it refers to a figure in a reference, not in this document. For ease of identifying drainages, esp. when referring to HM sample sites, creek names are color-coded. All geographic co-ordinates are NAD 83 UTM Zone 11.

2.2.2 List of abbreviations

{ } means a grain count standardized to 10 kg of -12 mesh bulk silt (stream sediment)
μm micron(s) = micrometer(s)
AAS Atomic Absorption Spectrometry
anom anomaly or anomalous
BH Bunker Hill
bkgd background
con concentrate
gn grain
HM Heavy Mineral
HMC Heavy Mineral Concentrate
ICP-MS Induction-Coupled Plasma - Mass Spectrometry
INA Instrumental Neutron Activation
LCFS Rd Limpid Creek Forest Service Rd
LLD Lower Limit of Detection
Median-MAD Median-Median Absolute Deviation
MM Moss Mat
QV Quartz Vein
SEM Scanning Electron Microscope
VG Visible Gold

2.2.3 Software used

Software used to prepare this Report includes MapInfo Professional Version 9.5.1 (2008) with the add-on Discover V 11.1 (2009), ioGAS V. 5.0 by ioglobal (ioAnalytics) Australia (2011), NCSS 2000 (Hintze 2000), Microsoft Word (2002 & 2010), Microsoft Excel (2002) and Adobe Photoshop Elements V 5.02 (2006). To generate the PDF version of this Report as submitted Adobe Acrobat Professional X was used.

All units of measurement are metric unless otherwise noted. All maps and drawings are North American Datum 1983 [NAD83] with Universal Transverse Mercator [UTM] Zone 11 coordinates.

3 The 2013 Survey Work

3.1 Area of the 2013 Survey Work

CLY project is in the Nelson Mining District, West Kootenays, Southernmost British Columbia (Fig. 1).
The geochemical surveys described herein are N of the Pend d'Oreille Reservoir (River) in parts of the Limpid Ck, Wallack Ck & McCormick Ck watersheds (Fig. 2) and N and S of the Bunker Hill mine site MINFILE 082FSW002.

The surveys were on unsurveyed Crown land, the central white block, and on the following adjoining District Lots that are also Crown Land (in yellow), listed N to S on Fig. 2: DL 9418, DL 8648, DL 9422 and DL 9426.

As survey work was solely on Crown land notification to the B.C. government, the registered land owner as per Section 19 of the Mineral Tenure Act, was not required. A Notice of Work was not submitted as only hand tools were used. There are no National or Provincial Parks, Indian Reserves, First Nation treaty lands, or related lands, within or adjacent to the property (Caron 2012).

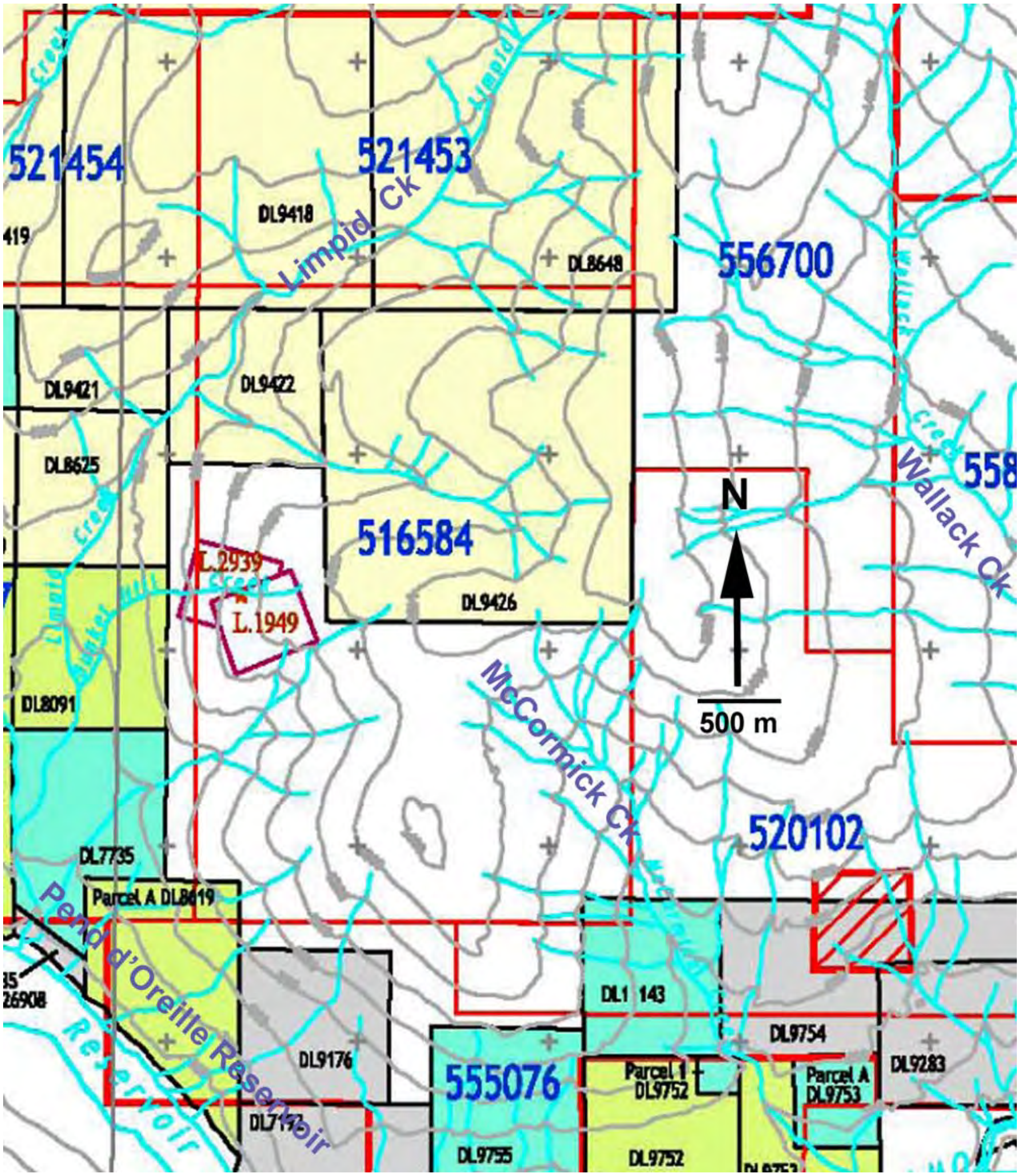


Fig. 2 Map of work program area, all on unsurveyed Crown land (in white) and surveyed parcels of Crown land as District Lots (in yellow). These are numbered in black labels north of the two Crown Grants, these outlined as the two small, red-outlined, overlapping rectangles in red. The grey cross marks are UTM NAD83 Zone 11 crossing gridlines at 1,000 m intervals. Other coloured parcels are not relevant to this work program.

3.2 Claims of the 2013 Survey Work

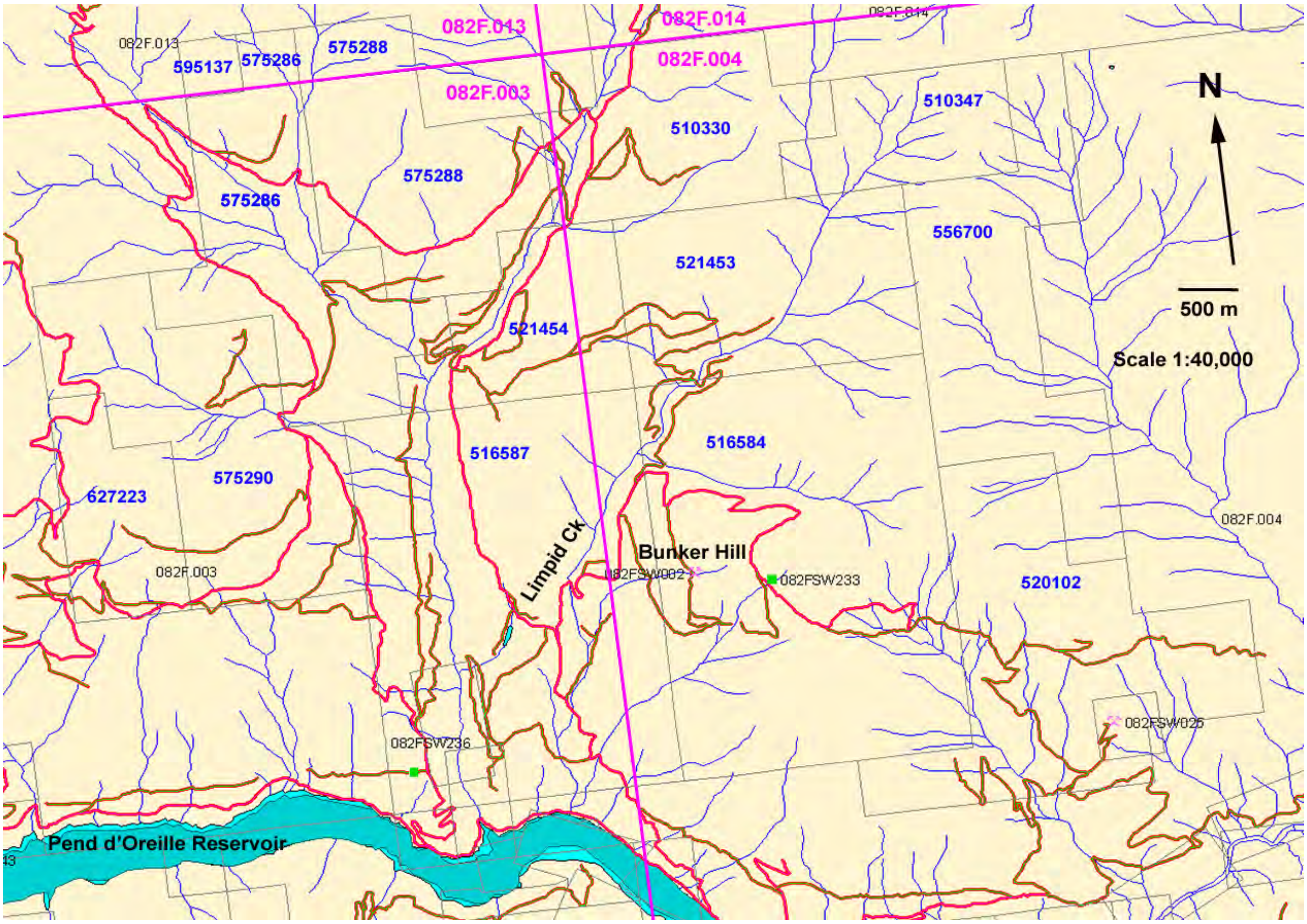


Fig. 3 Map of CLY mineral tenures at 1:40,000 scale. Tenure numbers in blue, claim outlines are the fine grey lines. The four claims with 2013 survey work listed beginning to the N are 521453, 556700 516587 & 516584. Access is by turning right at the junction of the Pend d'Oreille River Road and the LCFS Rd to proceed uphill northwesterly. The junction is at bottom of map at centre, just right of the purple N-S line marking the 082F.003 / 082F.004 boundary, this just N of the Pend d'Oreille Reservoir. (Map is a B.C. Albers projection, not NAD 83)

The 11 tenures labeled in blue on the map above, on which work has been filed MTO event #'s 5481838 5481844 & 5481850, are:

Schedule 1 List of CLY Project Mineral Claims Feb. 2014									
all situate in Nelson Mining Division, British Columbia Canada.									
Comprising 11 Mineral tenures and 2 Crown Grant Lots									
Tenure Number	**Claim Name**	**Owner's FMC license**	**Tenure Type**	**Map Number**	**Issue Date**	***Good To Date**	**Cells**	**Area Hectares**	**Ha/Cell**
Lot 2939	Bunker Hill	210814 (100%)	Crown Grant	082F	1897	—	nil		
Lot 1949	Mormon Girl	210814 (100%)	Crown Grant	082F	1897	—	nil		
516584	_	210814 (100%)	Mineral	082F	2005/jul/10	2017/nov/29	35	740.853	21.17
516587	_	210814 (100%)	Mineral	082F	2005/jul/10	2017/nov/29	35	740.880	21.17
520102	REDBOW	210814 (100%)	Mineral	082F	2005/sep/17	2017/nov/29	22	465.750	21.17
556700	RALPHCON	210814 (100%)	Mineral	082F	2007/apr/19	2017/aug/05	16	338.559	21.16
575290	TENLA	210814 (100%)	Mineral	082F	2008/feb/04	2016/may/12	18	380.934	21.16
575286	CLERVAL	210814 (100%)	Mineral	082F	2008/feb/04	2016/may/12	16	338.514	21.16
575288	LISAY	210814 (100%)	Mineral	082F	2008/feb/04	2016/may/12	14	296.159	21.15
595137	KAMPI	210814 (100%)	Mineral	082F	2008/nov/30	2016/may/12	1	21.1508	21.15
627223	CEDARWIND	210814 (100%)	Mineral	082F	2009/sep/01	2016/may/12	7	148.156	21.17
521453	BLUGO	210814 (100%)	Mineral	082F	2005/oct/23	2016/may/12	15	317.378	21.16
521454	GREENLY	210814 (100%)	Mineral	082F	2005/oct/23	2016/may/12	9	190.434	21.16
*on approval of this assessment report									

Fig. 4 Schedule 1 List of CLY Project Mineral Claims as of Feb. 2014

The work is subject to approval of this Report. As there was no mechanical disturbance no Work Permit was applied for. To record this work the MTO Event numbers are 5481838 5481844 & 5481850, see the forms at the start of this Report.

The adjoining Crown Grant claims Bunker Hill Lot 2939 and Mormon Girl Lot 1949 together comprise ~30 hectares [ha]. They are on Fig. 2 and many of the geochem series maps. Details are: Bunker Hill Lot 2939 12.08 ha Mormon Girl Lot 1949 17.65 ha both in Kootenay Land district, in BCGS map sheet 082F.004. Both are administered from Kamloops, B.C. The Crown Grants state, in so many words, that one quarter of each claim's surface area can be used for road building for mining purposes, e.g. switchback road cuts.

The following is revised from Caron (2012):

"As opposed to mineral claims, assessment work is not required on Crown Grants; however taxes must be paid annually to maintain valid title. Failure to pay annual taxes results in the loss of crown grant status (i.e. the crown grant becomes 'reverted'), and eventually the surveyed lot is cancelled. The Bunker Hill and Mormon Girl Crown Grants are undersurface titles, which include the rights to all minerals, except coal and petroleum, as well as the right to use the surface and timber for mining purposes. Taxes of $37.16 ($1.25 per hectare) are due annually on July 2, and have been paid through 2013."

3.3 Costs of the 2013 Survey Work

Appendix 3 has the Exploration Expenditures, detail of Costs of exploration work on the CLY claims in 2013. On the title pages the cost per geochemical sample is prorated as: total program costs less report & office costs, and less the ODM lab costs, gives a residual figure. This is multiplied by the proportion of that geochemical survey medium to obtain the program costs for that survey. Ex. residual costs of $51,749.05 x 25 Moss mats / 164 samples collected = $7,888.57. To calculate an all-in (except reporting & office costs) per sample, divide that by the # of samples, so $ $7,888.57 / 25 = $315.54 / moss mat.

Overburden Drilling Management ‘ODM’ costs for the heavy mineral separation from sieved -12 mesh bulk silt samples were an order of magnitude greater relative to Acme Analytical’s costs for the moss mat, conventional stream silt, soil and rock samples herein. R. Lett also finds this (2008, p. 17). All monetary figures are Canadian dollars.

3.3.1 Less Expenses incurred on the Crown Grants

Expenses incurred on Crown Grants, not allowable for assessment credit, are excluded.

On Sept. 18 J Denny & WH investigated the Iron Founder #2 trench QVs on the Lefevre Crown Grant. Their day rates are reduced by ¼ and the cost of geochemical analysis of 2 rock samples 0626 & 0627 is not included.

On Sept. 30 E. Webster & WH examined select sites of the Lefevre workings on the Lefevre C.G. during a Sept. 29 to Oct. 01 2013 field trip, thus both their per diem rates are reduced that day by ¼ [2 hrs], or $300 less $75 and $450 less $112.50, and the cost of geochemical analysis of 2 rock samples 0625 & 0564 is not included.

Also, to defer the costs of reporting on such, E.W.’s Report writing costs are reduced 1/4 of a day’s rate, $300, for his 2 days of report writing, thus $600 less $75 is $525 accreditable.

Two invoices for the cost of geochem analysis of 57 rocks are expensed, 39 on VAN13003232.1 & 18 on VAN13003709.1. A Certificate of Analysis for 18 rocks (invoice VAN13005000.1) is also included, and the full 75 are presented, discussed and mapped herein. As that Certificate was only received Jan. 28 2014 the cost of those analyses are not expensed as costs for assessment credit, for this report.

3.4 Items of the 2013 Survey Work Program

Survey Activity	Number of Samples	Map Series	Sampled Tenures
BH sill granitoid rock petrochemistry samples	4	W-01 to W-03	516584
Rock lithogeochem samples	75, 4 are on the Crown Grants	R-01 to R-14	516584 521453 556700
B Horizon soils	15	SY-01 & SB-01	516584
Tills	35	T-01 to T-11	516584
Stream silts	10; 3 are ‘mixed media’ silt and soil	S-01 to S-13	516584 556700 521453 (two samples are very close to the E boundary)
Moss mats	25	S-01 to S-13	516584 521453 516587
Recovered VG gns in bulk silts	23	H-01 to H-05	516584 521453 516587 556700
HM gn recovery in bulk silts	14	M-01 to M-09	516584 521453 516587

Table 1 Survey Activity with number of samples, the Map series and list of the sampled tenures

All geochemical analyses reported are by Acme Analytical Labs Ltd. (Vancouver) ‘Acme’ using methods detailed in Appendix 5. The exception is the HM work by ODM Ltd. On January 31, 2014 Bureau Veritas acquired Acme Analytical Labs (Maxxam Analytics).

3.4.1 Recovered Visible Gold gns and heavy indicator minerals in bulk silts by ODM

Much of the work documented herein is a ‘mineralographic’ survey counting recovered Visible Gold gns (native gold) in HM concentrate fractions of 23 bulk stream silts (Map H-01). Twenty-five [25] bulk silts were collected; two were subsequently supplanted by collecting two others higher up the same drainages and thus not processed. Gold and a few metallic mineral gns were recovered from 23 these by Overburden Drilling Management of Nepean (Ottawa) Ont. by tabling and micropanning. Nil to a maximum 16 gold gns were recovered.

14 of these bulk silts were selected for lab preparation of variably magnetic HM concentrate fractions using a heavy liquid with Specific Gravity ‘SG’ 3.2 (flowchart). Scheelite and calc-silicate heavy indicator minerals were counted. See section ‘Bulk silt sampling for HM Concentrate preparation’ and following. Appendix 6 has the ‘generic’ ODM flow chart and Appendix 7 has ODM’s results.

3.4.2 Examining old workings & sampling anom rocks

Three undocumented old workings were found during the geochemical survey traverses, named herein the Steel Cable QV, Iron Founder #2 trench QVs and Lady of Lake Wide Cut. Each excavates a mineral showing. Two poorly known showings FC-64 Old Limpid Ck adit in altered granitoid and Yankee Open Cut were re-examined and sampled. Four sites with anom rock samples were re-sampled: the Lefevre QV ‘Vein 1’ in the West pit of Section 4 (rock 0625), the Lady of Lake hydraulic cut W + Zn skarn and the High-Sulphide Meta-argillite Boulder 918061 and Clease 0446 Shear Zone (0634). A quartz segregation in a roadside exposure of HCA argillaceous metaquartzite is barren (0564). Two new ‘Rock Cuts in the BH sill for Hydro Tower platform fill’ were examined and sampled. See the ‘Mineralized Sites’ section for sample results and detail.

Following, corrections are suggested for 1) the MINFILE 082FSW159 entry ‘COLUMBIA, WANETA’ with a record of a lot of trial production; it is actually the Yankee Open Cut, and 2) the ‘NESS’ showing MINFILE 082FSW233 (Tully 1971 AR 03392) is rather a Lefevre QV on the Lefevre Crown Grant.

4 Location & Industrial Infrastructure

The following is slightly revised from Caron (2012):

"The property is located in an Integrated Resource Management Zone, as defined by the 1997 Kootenay-Boundary Land Resource Management Plan (LRMP). [This is the most industrialized category – WRH]. There are no known environmental liabilities on the property. Permits from the Ministry of Energy and Mines are required for any exploration work involving mechanized ground disturbance. At present, no permits have been applied for. Permits for previous work on the property, including a 2009-10 diamond drill program by Jaxon Minerals, were granted without any onerous conditions attached.
The CLY property is N of the Pend d'Oreille River. Neither the Pend d'Oreille River nor any of the creeks draining the property, are designated community watersheds. Two large hydroelectric dams are located on the Canadian portion of the Pend d'Oreille. The Seven Mile Dam, owned by BC Hydro, is located near Seven Mile Ck downstream from the Tillicum Ck. The Waneta dam, which supplies power to the Trail lead-zinc smelter, is operated under a partnership between Teck Corp. and BC Hydro and is situated a further 9 kilometres downstream, near the confluence of the Pend d'Oreille and Columbia Rivers. A BC Hydro powerline and associated right-of-way exists over the property, as shown on figure 3 [therein].

All maps and drawings containing Universal Transverse Mercator [UTM] coordinates are Zone 11 and use the North American Datum 1983 [NAD83]. Money is in Canadian dollars. Several geographic names are informal, e.g. Clel Ck a W-flowing tributary to Limpid Ck, these used for convenience since 1999 (Howard 2000). Creeks in some drainage networks are color-coded. A large forest fire burned part of the area W of the Property, the large 'Pend d'Oreille Fire' of 2007.

4.1 Access & Services

Fig. 3 Map of CLY mineral claims shows the local access route. The following is from Caron (2012):

"From Salmo, access is south along Highway 6 for 25 kilometres to the US border crossing at Nelway, then west on the paved, then gravel, Pend d'Oreille road north of the Reservoir. The Bunker Hill mine and other key showings in the central part of the property are reached by following the Limpid Creek Forest Service 'LCFS' road, which leads NW from the Pend d'Oreille road approximately 10 kilometres west of Highway 6.

Basic services, including room, board, fuel and limited supplies are available in Salmo, which also has a good supply of experienced contractors for many aspects of the exploration industry. Other services are available in Castlegar, including a full service airport with daily flights to Vancouver and Calgary. Trail is another nearby community with services and supplies to support mining and exploration projects. This includes Teck's world class Trail Operations lead-zinc smelter. Other important infrastructure includes a railway branch from Trail, which connects to the main CPR line in Cranbrook."

Numerous logging and powerline service roads provide good access. LCFS Rd is deeply water-barred and in fair condition. Numerous roads branching off this are in poor to fair driveable condition, esp. those reaching the steel-towered BC Hydro transmission line pylons. Lower Clel Ck rd, a former logging rd, with deep water bars is in very poor condition.

4.2 Physiography

Slopes on the property steepen away from the plateau-like BiTel Knoll area. Foot access is no more than two hours one-way to any desired site. Hiking old level road beds, even if well overgrown, is easier than in dense sloping forest.

4.3 Vegetation

"Vegetation, in general, consists of mature second growth fir, pine, hemlock and cedar forest, with moderate to thick undergrowth. Locally areas of dense alder brush occur" (Caron 2012). Small areas of the property were clear-cut logged in 2007 and burned by the major Pend d'Oreille forest fire in 2009.

4.4 Rock exposure

Percentage of outcrop exposed is generally very low, in forested areas less than ¼% by area. More, but still sparse exposures < 1-2%, are found on steeper terrain including breaks-in-slope or on steeper land. It is useful to note that southerly facing slopes experience warmer micro-climates throughout the year, are generally drier and have pronounced freeze-thaw cycles, c.f. N-facing slopes. For these reasons better natural exposures usually face about south. Locating small targets such as quartz veins or mineralized skarn horizons is a challenge.

Enough exposure exists to map the bedrock geology, but this has not been attempted in the area outside G. Ray's fine structural-geologic map (2004) of the small central area of CLY from 9 days field mapping.

4.5 Climate

The following is from Caron (2012):

"The property sits within the Interior Cedar-Hemlock biogeoclimatic zone, a moist region which receives ~600 millimetres of annual precipitation. With the exception of May and June, which tend to be slightly wetter months than average, precipitation is roughly equally distributed throughout the year. The mean annual precipitation is 911 mm with 310 mm falling from May through September (Climate BC 2009). Average summer temperatures are 15-20°C. Winter temperatures average about -5°C, although temperatures as low as -20° are not uncommon. Most of the property is snow covered from early November until late April each year."

4.6 Brief Economic Assessment

Exploration is at an early stage on the property. There are no NI, or historic, mineral resourcers or reserves. The target is primarily gold. There has been significant historic work, mostly recently by Jaxon Minerals Inc. and previously by Bis-Gold Resources Inc. and Clarke Gold Inc. Most of that was surface geochemical surveys. The region has several old mining camps that have produced Au Ag Pb Zn Cd W and Mo:

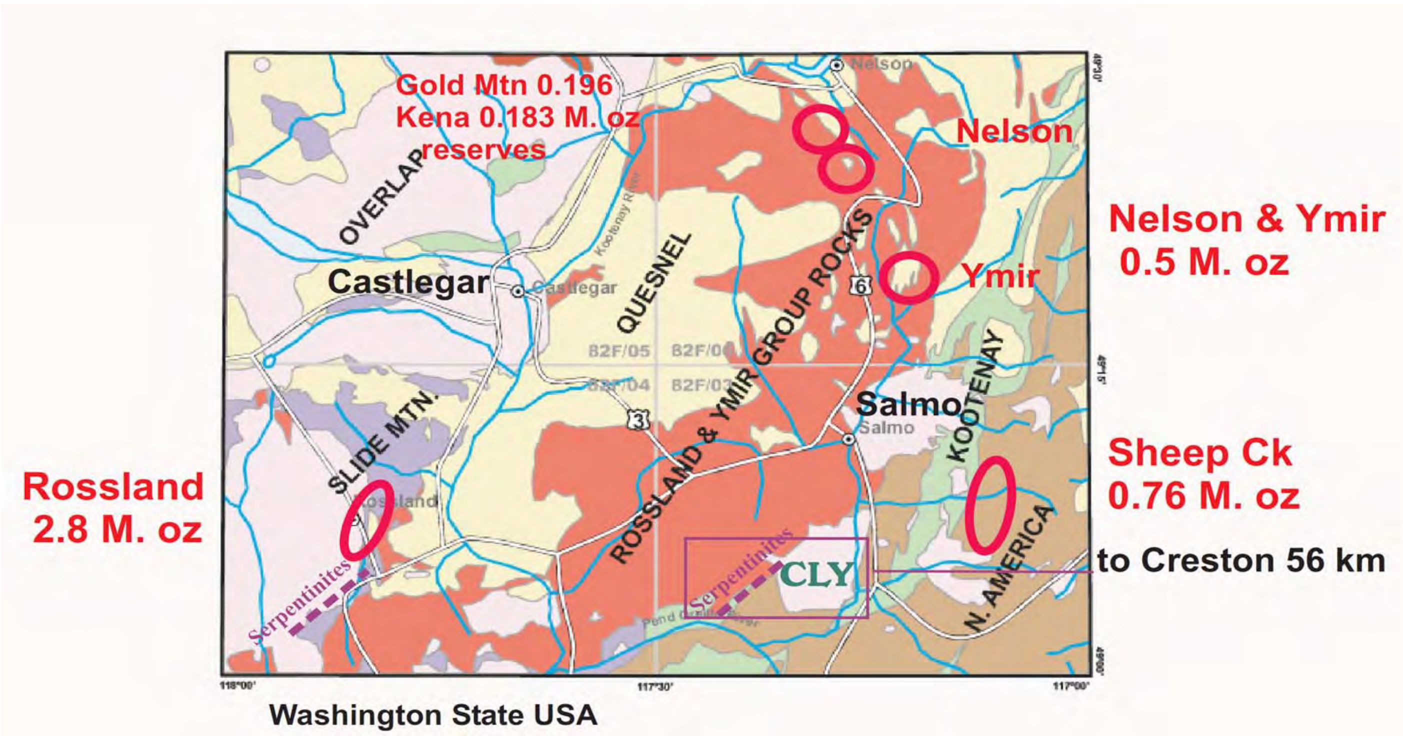


Fig. 5 Regional map of tectonic units about CLY with historic gold fields outlined. Four of the five goldfields are along major tectonic structures. Serpentinites and other ultramafic rocks marking these, purple dashed lines, occur at Rossland and in the CLY area. Granite bodies in pink, enigmatic HCA ophiolite occurs in green in the area of the purple rectangle, otherwise labelled KOOTENAY terrane. Hiway 3 to Creston is at bottom right.

The CLY area is also prospective for tungsten as

“Cretaceous plutons, such as the Wallack Creek and Hidden Creek stocks near Salmo, are typically highly evolved S-type leucogranites and granodiorites. Many are associated with tungsten and minor copper, zinc mineralization; the Invincible, Dodger, Emerald and Feeney mines near Salmo are in skarn deposits along the contact of a small Cretaceous stock with Lower Cambrian limestone (Höy & Dunne 2001)”.

5 Property history

The following is edited from L. Caron (2012) with some additional relevant info. Comments by the writer are [in brackets]. The present area of the CLY claims is smaller than the area with exploration surveys which J.D. Williams (2010a, 2010b, 2012) summarizes. Those are at the regional or district scale and the results not directly relevant to the present 2013 work so that summary is not repeated. Some inevitable errors are corrected; example AR # 03392 by Tully (1971) mis-locates the Ness 2-post claims and all its exploration work. See 'Inactivity until the 1971 surveys…' in the Property History section detailing that.

The Mormon Girl was the first claim staked, it was located April 28 1897 and recorded April 29 1897; the Bunker Hill was located May 25 1897 and recorded June 5 1897 (from Crown Grant survey notes by F.A. Wilkin, P.L.S., Dec. 1897). The claim surveys were gazetted Mar. 8 1898 and both claims became Crown Grants on June 18 1898.

Contrary to Williams (2010a & 2010b AR's) staking the Crown grants in 1897 is *not* the earliest activity in the recorded history of the Property. Some early prospecting about the Pend d'Oreille on the periphery of the booming Rossland Camp in the 1880's - 1890's is noted in the non-fiction book 'Roaring Days: Rossland's Mines and the History of British Columbia' by J. Mouat, UBC Press (1995).

L. Caron (2012) summarizes

"Exploration in the area dates to the 1850's with the discovery of placer gold near the confluence of the Pend d'Oreille and Columbia rivers, near the Hudson's Bay settlement of Fort Sheppard. In 1865, the Dewdney Trail was completed, to provide access from Hope to the placer mines on Wild Horse Creek in the East Kootenays. The trail passed near Rossland, through Fort Sheppard, and then east somewhere along the N shore of the Pend d'Oreille River [note: the actual site of the trail is unknown on CLY]. The first placer and mineral claims were recorded in the Pend d'Oreille area in <u>1886:</u> "Those who recorded mineral claims on the Pend d'Oreilles near the United States boundary spoke well of them as prospects, but there being no steamboat on the Columbia [River] I shall probably not know this winter how they are getting on." by G.M. Sproat, Report of the Minister of Mines 1886, p. 205. Active placer mining continued on the Pend d'Oreille and its tributaries through the mid-late 1890's."

5.1 Placer mining efforts 1893-1894

"In 1893 and 1894, the Kootenai Hydraulic Company reportedly spent a considerable amount of money on flumes, road building and erecting pumping equipment to work ground on the N side of the Pend d'Oreille River, but the project failed and was later abandoned due to difficulties handling heavy boulders. By the early-mid 1890's hard rock prospecting, in follow-up to placer discoveries, had led to the discovery of the important mineralized districts at Rossland, Sheep Creek, Ymir-Nelson, and Salmo (Walker 1934; Drysdale 1915) (Caron 2012)."

5.2 Hardrock claims to 1897

"Prospecting spread to surrounding areas when key ground was no longer available in the major districts. The first record of exploration activity on the CLY property is the discovery of gold-bearing quartz veins and subsequent staking of the Columbia claim in <u>1896</u> and the Bunker Hill, Mormon Girl and other claims in 1897 (Caron 2012)."

5.3 Limited Mining 1900-1901

L. Caron (2012) summarizes:

"In about May 1899 the property was acquired from J.R. Reavis & partners by the Bunker Hill Mining Co., Ltd., N.P.L. incorporated Oct. 10, 1899 with an office in Rossland. They operated it until sometime in 1900. Several hundred feet of development work was completed, including 2 adits and several surface cuts. By 1900, a 10 stamp mill had been installed on Limpid Creek, about 1,000 feet lower in elevation than the mine, and a tram line installed. Production from this time is unknown, but it is reported that the mill operated only briefly as "the ore was not amenable to straight amalgamation, the gold values being chiefly associated with pyrite (AR 1934, p. E24)." The stamp mill was then removed (Minister of Mines Annual Reports, 1898, 1900, 1934; Walker 1934)."

1900 from Henderson's British Columbia Gazetteer and Directory and Mining Companies … For 1900-1901 pub. in Victoria July 1900:
"Bunker Hill Mining Co., Ltd., N.P.L. incorporated Oct. 10, 1899; capital stock $110,000, in 10 cent shares; office Rossland. Property BUNKER HILL and MORMON GIRL situated on Proctor Mountain, Pend D'Oreille District."

1901 Report of the Minister of Mines 1900, pub. Mar. 11 1901. Report of Gold Commissioner J.A. Turner p. 846:
"The Bunker Hill mine, situated about fifteen miles from Waneta, on Fifteen-Mile creek, a tributary of the Pend d'Oreille river, is controlled by the Bunker Hill Mining Company, of Toronto, Ont. Several hundred feet of development work have been done, and a 10-stamp mill has been erected. Ten men are employed."

5.4 R.A. Daly's inspection 1912

1912 R.A. Daly while mapping the international boundary observed
"At Bunker Hill Mine the andalusite schist is enormously crumpled and is cut by veins of gold bearing quartz.… The Bunker Hill granite has been much more strained and crushed than the easterly bodies [the Bayonne Batholith and Lost Ck stock]. A distinct schistosity has been thus produced... (Daly 1912, p. 303)."

5.5 Restart by Bunker Hill Gold Mines Ltd. in 1933

1933 – 1935 J. Walker (1934) from field work in 1928, 1929 & 1931 noted the workings "have been abandoned for over thirty years". Inspecting the vein in adit 2, 170 feet in from the portal, he notes it
"strikes about 30 degrees, dips 45 degrees southeast, and closely follows the strike and dip of the impure quartzites".
He correlated the rock section with the Reno formation. That vein
"is faulted 35 feet to the north [minimal right-handed displacement]. On Limpid Ck "1,000 feet below the workings … a stamp mill was constructed and connected by tram to the workings".

Before 1933 the Crown-granted claims reverted to the Crown (1936 AR, p. E18). There was no further recorded activity at the Bunker Hill mine until 1933, when the former Bunker Hill and Mormon Girl crown grants were acquired (and subsequently re-crown granted) and additional claims staked. On Sept. 18 1933 Lillian Crossley, wife of A.H. Crossley, purchased the Mormon Girl claim for $99.50 under the Taxation Act, document No. 3593 / 606.

In **1933** B.T. O'Grady, official for Eastern Mineral Survey District (No. 5) reported "At the Bunker Hill, on the Pend d'Oreille river, A.H. Crossley and associates made test shipments of ore" (Galloway 1934, p. 32). A fair description by B.T. O'Grady is in the 1933 Annual Report of the Minister of Mines, see p. A238-A239.

Bunker Hill Gold Mines Ltd. worked the property **from 1933 to 1935**, during which time the old workings were rehabilitated, considerable prospecting and surface work was done, and limited production was achieved. Work was conducted on the two upper adits, the upper adit the oldest Adit 1 or 'Level 1' and the lower one Adit 2 or 'Level 2'. Several trenches were dug including those on the Moly and Blue Quartz veins (BC Minister of Mines Annual Report 1933, p. A239). In 1934 the workings were mapped by H.V. Warren & A.G. Langley (BC Minister of Mines Annual Report 1934). In 1937 results of microscopic research on the ore was published (BC Minister of Mines Annual Report 1936; Warren and Cummings, 1937, 2 papers). Maps on pages E25 & E19 of those Annual Reports have a short 4th adit close to the BH mine road. Named Adit 2a, it has not been located (Map T-01 till sites).

5.6 New Operator Waneta Gold Mines Ltd. 1935

In **1935** Waneta Gold Mines Ltd. took over the operation. The company drove a long third adit, lower in elevation than the earlier ones, and drifted and raised some veins encountered. Level 3 was tunneled for about 318 meters. There were two crosscuts driven for 23 meters total length on mineralized quartz veins, and a 15 meter-long raise. Inside Adit 3 four short diamond drill holes were drilled underground in 1936; results are unknown. Minor production is reported for 1938.

The till map series, T-01 for one, outlines the surface and underground workings in purple. Howard (2012) provides further details, deciphering the veining scenario and structural architecture.

5.7 Lease of claims 1939–1942

From **1939–1942** the property was leased from Waneta Gold Mines Ltd. with several renters (leasees) conducting small operations. Ore was trucked to Trail for processing.

5.8 Total recorded production and grade

Total recorded production from the Bunker Hill mine for the period 1933-1942 is 375 tons at 0.28 oz / t Au and 0.83 oz / t Ag. Production of 1 ton of ore that returned 1 oz of Au and 3 oz of Ag is reported from the Columbia claim in 1937 (Minister of Mines Annual Report 1937). Its recent name is Yankee Open Cut (Howard 2000). It was re-visited in 2013 as no recent AR's comment on it, and a small soil survey ran, the 'Mineralized Sites' section.

5.9 Tungsten as scheelite discovered in older pits at the Lefevre workings, 1942

In 1942 likely encouraged by the War effort H. Lefevre, then mayor of Rossland, found tungsten as scheelite S of the BH mine using a recently-available ultraviolet light:

"The property was under lease during the latter part of 1942 to Harry Lefevre and associates, of Rossland, who made a discovery of scheelite in two old pits some distance from the main [mine] workings (Hedley 1943)".

In 1997 D. Wehrle concluded the pits were blasted out, presumably in the late 19^{th} C, on outcropping gold-bearing QV's (p.c. to Howard). Consider that they are meters deeper than the 1940's trenches and would not have been trenched out in winter snow then. M. Hedley (1943) sketches and numbers "five pits from 5 to 11 feet deep".

The property was then optioned to Jason Mines Ltd. of Toronto Ont. They conducted mechanized trenching

"about 700 feet [~213 m] … during the winter months [of 1942]. Scheelite … related to the sulphide mineralization is most abundant about the four southern pits. It occurs for the most part as disseminated grains in the rock, locally in quartz stringers [rather, in QVs] and the best concentrations occur in local pods of relatively massive pyrrhotite (Hedley 1943)."

That is found in Vein 2 in the W pit of Section 2 (Jaxon's numbering of the trenches in Williams 2010a). The best value reported was 0.29% WO_3.

5.10 Inactivity until the 1971 surveys on the mis-located Ness claims

The Bunker Hill area remained dormant until 1971 when Abella Resources completed a soil survey and geological mapping on their Ness 1 to Ness 8 claims (Tully 1971 AR 03392) MINFILE 082FSW233.

Contrary to information in former Assessment Reports (e.g. Williams 2010a) parts of the western Ness claims were located *over* the Crown Grants, *not* "adjoining the Bunker Hill and Mormon Girl Crown grants." This is certainly correct as K. Murray in 1999 found the site of the initial claim post No. 1 of the Ness 3 and Ness 4 claims and showed this to the writer. It has since fallen. Thus the following corrects former A.R.'s. **There is no NESS MINFILE 'Cu' showing and for clarity that data file entry could be deleted.**

Tully (1971) notes numerous old trenches on Ness 2 claim on the W side of those claims. These are certainly the Lefevre pits & trenches on the Lefevre Crown Grant. Tully (1971) mis-plots the Ness claims on Map #1 the 'B.C.D. Mines Map 82-F-3W' claim map – they are sketched too far E. On Map #3, the large colour 1:50,000 topo map of Salmo, they are drawn about 400 ft too far E. Descriptions are:

"Old trenches on Ness 2 claim show quartz veins sparsely mineralized with pyrite and chalcopyrite over an area 200 x 150 feet. A grab sample from one of the trenches showed on spectrographic analysis … Mo 0.004%, Cu 0.06% (p. 3-4)".

"A quartz vein running across the face of the [granodiorite - argillite] contact with a strike of 315° [properly 135° azimuth or NW-SE] dipping 35° southerly was noticed in old trenching along [crossline] NTL 4S (p. 5). Chalcopyrite was observed (Strato Geological Report by U. Leis, p. 3 in Tully 1971)".

The single grab rock sample ran 0.06% Cu. This would be typical for samples of the copper-poor Lefevre skarn-hornfels and QVs. Simply U. Leis did not notice the pyrite, pyrrhotite and arsenopyrite present in greater amounts in the examined Lefevre QV, nor did he identify the skarn host rock. Gold and other elements were not analyzed.

285 B-horizon soil samples were taken at 61 m (200') intervals along 17 N-S oriented grid lines nominally spaced 122 m (400') apart. Grid lines were surveyed by compass, blazed and flagged. Soil samples were taken at 200 ft station intervals along each crossline (Tully 1971). The 285 'B horizon' soil samples were screened to -80 mesh, digested in hot perchloric + nitric acid and then analyzed by atomic absorption for ppm copper and molybdenum by Core Laboratories, Vancouver. Assays for molybdenum were negligible but there are two weak anomalies in copper with values greater than 50 ppm. One is at the far east of the claim block over the headwaters of McCormick Creek. The other is over the Lefevre C.G. and derived from known mineralizations.

Tully (p. 1) recommended additional claim staking, a magnetometer survey and mechanized trenching. M. Kaufman (1984) supervised the next surveys.

6 Former work

D. Williams (2010a, 2010b) extensively reviews numerous past exploration activities in the region and this not repeated herein. The following reviews gold panning by C. Kennedy (2004) and work by Jaxon Minerals Inc. (2008-2010) that may be relevant to this Report's results.

6.1 Results of Gold panning by C. Kennedy for Kootenay Gold Inc.

In 2004 C. Kennedy assisted by his daughter (p.c.) panned gold from Four tribs Ck at approx. 471,170 mE 5,433,437 mN, this location within about 100 m of the site:

"The small tributary [to Limpid Ck] stream south of the Crown Grants provided colours in the two pans [tried] (Kennedy 2004)".

G. Ray records C. Kennedy's site about the same, at 471,050 mE 5,433,400 mN (2004, p. 24). Importantly that panned site is south-southwest of the Crown Grants but **not in Hort trib** as D. Williams (2010a) records: *Hort trib is 260 m further upstream of Four tribs Ck, uphill*.

HM-16 from lower Four tribs Ck of the present bulk silt survey resamples that site, but lower in the creek. ODM recovered 4 VG gns, 2 Reshaped + 2 Modified + nil Pristine, not anom but with 'colours'. Calculated gold in bulk silt is 3.6 ppb, questionably anomalous and Calculated gold in the non-mag con is 634 ppb Au, this Low to Questionably anom (Table 12). Aside from silicates the metallics picked are a single chalcopyrite gn, 4 pyrites and 3 pyrolusite. Upstream HM-04 from upper Hort trib has 41.30 ppb Au, highly anom and 2nd rank of the 23 sample survey. Its 8 {9} VG gns are 6 Reshaped + 2 Modified + 0 Pristine. See Fig. 23 'Photos of 7 of the 8 VG gns shaped 6+2+0 recovered..' including a large gn.

The present survey finds Clel Ck basin Au anom (H Map series, Tables 10-12 & 18). HM-25 from lower Clel Ck is distinctly anom with 10 VG gns recovered 6 Reshaped + 3 Modified + 1 Pristine. Upstream HM-03 from upr Clel Ck at the logging road has 7 Au recovered gns: 5 Reshaped + 2 Modified + nil Pristine. Further upstream HM-09 from Clel Pawprint Corner trib has 2 Reshaped gns, one 1.250 mm long is the largest recovered.

C. Kennedy panned in lower Clel Ck, N of the Crown Grants near HM-25. He noted the "pans … had no visible gold (2004, p. 2)". Such are the vagaries of hand-panning; it concentrates

"coarse heavy minerals … Because small heavy mineral gns less than 50 microns (<0.050 mm) in diameter behave much like small light gns gold panning is useless for finding deposits where the gold is very fine grained (silt sized or smaller) (Gravel & Lett 1997)."

6.2 Jaxon Minerals Inc. 2008 – 2010

Jaxon Minerals Inc. renamed CLY Project 'Nox Fort', operating from 2008 – 2010. L. Caron, M.Sc. P. Eng. (2012) reviews that work. Summarizing, "quartz veining and skarn alteration [carries] economically significant grades (Williams 2010a)."

There were two efforts; in the first two years property-scale geochemical surveys of till, stream silt, soil, rock and Soil Gas Hydrocarbons. Results of the latter 'new' method had poor spatial definition but were used to spot drill holes, see Section 'SGH Survey results about the BH mine site'. Some showings were channel-sampled by saw-cuts in 2008. A few were chip sampled by hand; 355 chip & channel rock samples were collected at 17 named sites. In 2010 a small area, the bedrock geology along the W contact of the BH sill from N of the BH mine to Clel Ck was mapped, 17.5 hectares (Williams 2011).

The second effort was two drill programs:

- 2009 2,714 m in 10 holes, NQ-sized core; 1,225 core samples
- 2010 1,582 m in 6 holes, same; 525 core samples

Results were very poor. About the BH mine in the central CLY area the holes were widely spaced (section '2009 drilling – the Chances taken' below). No drill holes intersected *any* quartz veining; two at the BH mine were drilled *parallel* to the QVs. Simply, a QV as a tabular body will never be intersected by drilling along its surface, neither above nor below it.

A brief "forensic analysis" of the drilling is below. L. Caron provides a thorough critique of the drilling in her NI Technical Report (2012). She recommends mechanical trenching of the veins followed by intensive sampling and mapping to guide local, site-specific, shallow drilling. There was a previous report that discussed the geometric orientations of some veins, noting they occur in sets (Howard 2006).

Several results of the 2008 channel samples are favourable, notably the BH mine QVs and the three Lefevre QVs, these hosted by the Lefevre skarn-hornfels (see section 'Lefevre QVs 'Vein 1' and 'Vein 2' in the West pit of Section 4'). The Lefevre QVs host the highest gold values in all of the Lefevre workings but 2009 or 2010 drilling did not specifically target them (Williams 2010b, 2012). They were not re-sampled or re-trenched. From structural studies the geometry of the BH mine QVs is now well known. This is a useful guide to assist drilling (Howard 2012). Two known ore shoots are in red on the till T Map series.

These sites have good road access. The opportunity remains to trench and properly drill veins grading to ~⅓ oz / ton and outline a gold resource in an accessible area, in a region amenable to mining development. The extensive infrastructure allows for lessened exploration and production costs. Concluding, the central CLY area remains underexplored.

6.2.2 Chip & channel rock sampling on known showings & rocks

In 2008 Jaxon Minerals Inc. collected 355 chip & channel rock samples at "17 named sites in the BH mine area and vicinity (Williams 2010a)". Most of these were cut with a rock saw. The 17 sites include many old showings; see the Assay Plan series of 12 maps, Appendix H in that report.

Fieldwork in 2008 brushed out and cleaned these, removing thin obscuring overburden and enlarging the area of exposed bedrock. There was no channel sampled of 'new' showings found by 2008 prospecting.

The 17 sites included some interesting but barren rocks: 70 samples from 5 barren serpentinite exposures and 6 from one unmineralized argillite outcrop. 76 of the 355 chip & channel rock samples were visually barren, 21% of that work effort. Including 10 samples from the petrologically-interesting, but sulphide-barren, Clel plug granite–ultramafic exposure along LCFS Road 86 or 24% of the saw-cut rock samples were visually unmineralized.

6.2.3 Detail of the SGH technique

"SGH is a geochemical analytical technique that is essentially a weak leach that only extracts the surficial-bound hydrocarbon compounds that are mobile and have moved upwards from depth. The laboratory procedure detects 162 specific organic compounds in the C5-C17 carbon series at the parts per trillion [ppt] range by gas chromatography – mass spectrometry. … SGH are not gaseous compounds at room temperature but may migrate to the surface by various processes and may be in a vapor form at depth. Actlabs promotes SHG as a dual purpose tool that can be used to vector to the location of a target through geochromatography and also to confirm the identity of a target through the specific mix of SGH classes found (Actlabs, undated, p. 3) (Williams 2010a, p. 50)."

6.2.4 SGH Survey results about the BH mine site

"The SGH sampling in the BH mine area was expected to increase the fidelity [meaning the spatial definition] of anomalies identified in the 2008 survey. Instead, the combined 2008 and 2009 [surveys] elicited a chain of very large anomalies that embraced most of those outlined in the earlier survey. A selection of both the 2008 and 2009 anomalies was tested with drilling (Williams 2010b, p. 3)"

Williams in (2010b) maps the combined SGH survey results on fig. 15 after p. 49. At the top the yellow ellipse with the *magenta* SGH anom rating '5 out of 6', this on the color-shaded and contoured 'Primary Gold Pathfinder Class Map', is displaced from the BH mine area veins. The three historic adits that intersected the veins are located at the ends of the three violet lines drawn on fig. 15, beginning at the label '9' (to the left). SGH anoms overlying these veins are *orange to red shades, not magenta* the highest class; the adits lie on the edges of contoured highs.

In the same fig. 15 the 'Secondary Gold Pathfinder Class Map' at the bottom has a NNE-trending dashed yellow ellipse. This is rated '3 out of 6' and includes an area between Adits 1, 2 & 3. Overlying SGH anoms are *orange to red shades* on the edges of contoured highs. These are disposed much like the contours on the Primary Gold Pathfinder Class Map.

Williams further notes the survey was an 'experiment' (p. 50). The drilling based on it was unsuccessful. The 'very large anomalies' did not spatially isolate either of the two known clusters of quartz-gold veins, or other unknown ones. Reflect that the veins are m-scale targets, *thin tabular bodies* to 2.2 m-thick, with significant strike extent. They are small volumes of rock.

Concluding, the low spatial definition of the SGH survey was insufficient to spot drill holes to intersect the known QVs. Results were poor; there were "some sections of strong alteration (Williams 2010b, p. 64)."

6.2.5 The failed targeting principle allowing (Mis)-orientation of the 2009 & 2010 drill holes

The guiding rational of Jaxon's exploratory diamond drilling in both years was clearly to target the 'BH intrusive contact zone':

"The Bunker Hill intrusive [the BH sill] appears to be a crucial controlling feature of the distribution of mineralization in the Bunker Hill mine area. …Much of the best known mineralization is associated with the N-S trending W contact. [A] 2,714 m drill program of 10 holes of NQ-sized core … targeted depth extensions of **quartz structures** and mineralization exposed on surface that are **controlled by the W contact of the Bunker Hill intrusive** (Williams 2010b p. 2)". As in 2008, the principal target was reduced intrusion related [gold] in the area of the former BH mine and along the contact of plutonic rocks associated with the Wallack Creek stock [includes the BH sill and Culvert plug] (p. 4). [In 2008] numerous targets were identified, dominated by an appreciation of mineralization localized at granite contacts of the Wallack Creek stock and its satellite bodies, wherever they may fall (p. 25). The … intrusive contact in … places is the locus of quartz veins of variable thickness up to more than a meter wide *at inconsistent orientations* **[this supposition is incorrect]** that extend into both the intrusive and the hosting sediments. [Veins have] significant gold grades along with bismuth and tellurium (Williams 2010b, p. 33)."

The above confidently speculates that the intrusive contact is the *local* spatial control of the qtz-gold veining, 'quartz structures'. This is correct but *only at the district scale.* For specific drill-hole targeting the veins are best considered local extensional features of larger structurally-controlled *shear zones*. This explains why they occur in geometrically-oriented sets (Howard 2006). The *shear zones* affect both the country rocks and the BH sill, thus are younger than its mid Cretaceous age date. This age is favourable for gold mineralization in the Cordillera.

Nearness of an intrusive contact is not the 'crucial controlling feature' of veining. It did influence development *shear zones* at the west BH intrusive contact, due to differences in rock-mechanical competency or rock 'brittleness'. **In summary the drill programs failed because the operator misunderstood the geometry of larger structures that locate, and control, the quartz-gold veins: *shear zones.* The BH intrusive contact is not the 'crucial controlling feature' of mineralization.** Further discussion and detail of the Bunker Hill mine QVs is in Howard (2012). This deciphers the vein geometry and the structural architecture.

6.2.6 Drilling in 2009 – the Chances (Mis)taken

This program of 2,714 m in 10 NQ-sized holes

"targeted depth extensions of quartz structures and mineralization exposed on surface that are controlled by the W contact of the Bunker Hill intrusive [the incorrect targeting principle discussed above], and mineralized quartz structures mapped ... underground [which are quartz veins, all missed[4]]. Several holes were designed to test Soil Gas Hydrocarbon 'SGH' anomalies (Williams 2010b)" [those also failed to intersect any mineralization]. "The drill program intersected several lengths of strongly altered intrusives and metasediments but did not encounter intervals of mineralization [occurring] in outcrop. The west contact of the Bunker Hill intrusive was intersected in several holes [with] moderate to steep west-dip. Holes dedicated to SGH anomalies also often encountered strong alteration but without mineralization that would account for that anomalous response."

[4] Quoting an official at the BC Ministry of EMPR at that time: "It takes good effort to drill so many meters in so many holes and not even intersect one QV."

Fig. 20a in Williams (2010b) plots the ten holes. Seven were drilled near-perpendicular to two hypothesized controlling structures: the W intrusive contact of the BH sill (5) and the E contact (2). Chance was that the "continuing influence of a nearby granite intrusive could generate a significant intersection (comment on Hole NF09-04, p. 60)".

"Holes 7 and 8 that intersected the east contact of the Bunker Hill intrusive demonstrate that it is strongly disrupted … compared to the much better tectonic condition of the west contact is exposed in numerous places."
The writing may mean the west contact is less fractured; if that is a 'better tectonic condition' the phrasing is quizzical.

"Follow up of SGH anomalies in Holes 5 and 7, and to some extent Holes 6 and 8, did not intersect mineralization. … Interpretation of SGH does not intrinsically carry a depth estimate to the anomalous response. It may be that mineralization at depths other than where the hole was cored [deeper or shallower depths] is responsible for the positive SGH assessment."

That comment dismisses the poor spatial targeting of the SGH method as a reason for the failed drilling.

6.2.7 Drilling for the Bunker Hill mine QVs, above and below them, and along their tabular trend

"Drilling for the veins exposed in the workings of the Bunker Hill mine also failed to locate those or any other structures. Holes 4, 9 and 10, that extended into those workings may have eliminated the immediate area of the mine as a target for an economic gold-bismuth-tellurium deposit."

This is incorrect; the immediate area of the mine remains a good target for such (Howard 2012). Reflect that if any of those holes ever extended into the mine workings circulating drilling fluid would have been lost in open, excavated ground and the drill string jammed. That did not happen. Section 4300N on the upper left of fig. 20a (Williams 2010b) shows neither the gold-quartz veins nor the historic ore shoot (connect the mined areas in red) were targeted.

Simply, drill holes directed under or over a tabular body *will never intersect it*. Two holes targeting the BH veins were drilled near parallel to their vein surfaces and were clear misses. Thus the option-for sale of the property was not continued.

6.2.8 2010 drilling

"In 2010, Jaxon drilled an additional 6 holes, totalling 1,582 metres, in the Bunker Hill mine area. Drilling in 2010 was focused on the area west of the Bunker Hill intrusive, and again targeting a bulk tonnage gold system. There were no results of significance from the drill holes. None of the 2009 or 2010 drill holes specifically targeted the historic Bunker Hill mine veins (Jaxon Minerals, 2012). Jaxon Minerals dropped their option on the property late in 2011 (from Caron 2012)".

6.2.9 Correcting a misreport on the 'Ness' and Hand Steel showings

Contrary to D. William's assertion (2010b, p. 36) that G. Ray "admitted he could not find the Hand Steel showing (Ray 2004, p.12)" rather it was the **Ness** Cu-Pb showing (BC MINFILE 082FSW233) which he tried to visit but could not find (Ray 2004, p. 12). Simply, **there is no mineral showing named Ness and the entry might best be deleted from MINFILE.** Ness is simply a former claim group name.

Ray did examine the Hand Steel showing and classed it 'distal' Pb-Zn mineralization (2004).

7 Property Scale Geology (1) the Layered rocks

7.1 Regional Scale Tectonic Divisions

The study area lies within the Omineca Belt. It includes major crustal-scale structures, notably the *Waneta and Tillicum faults* Einarsen (1994)*.* These were active during tectonic accretion in the Jurassic and are now tectonic boundaries (Fig. 5). They are important as four of the five goldfields lie along major tectonic structures.

Tectonic divisions of the layered country rocks on the property are, from NW to SE:

1] Quesnel [Quesnellia] terrane
2] Slide Mountain [Mtn] terrane
3] Kootenay terrane
4] ancestral North America

Thus proceeding NW the tectonic divisions, rock litho-units and formations are generally younger aged.

7.2 Property-scale mapping is incomplete

The local central CLY area is mostly till-covered with scarce rock exposure, ~0.5%. It is insufficiently mapped even at 1:50,000 scale.

H. Little's GSC map 1145A (1965) at 1:63,360 scale compiles J.F. Walker's mapping to 1929 (Walker 1934). Little's map credibly outlines areas of glacial drift with unknown bedrock and structure in white and remains a useful regional-scale map.

Paradis et al. (2009) re-compiled and re-scaled that as GSC Open File 6048 'Bedrock Geology, Salmo, British Columbia' at 1:50,000 scale. A part of this is used as the semi-transparent base for this report's 1:6,000 scale maps. This map is problematic re the extent of formations in CLY area. N of Salmo River about McCormick Ck the Laib Formation, in light blue on Open File 6048, has an unknown extent due to drift cover. The area of the Upper Laib Formation is likely smaller. Inexplicably the two Cs Unit structural assemblages, the Charbonneau Creek Assemblage 'CCA' and the Harcourt Creek Assemblage 'HCA' of Einarsen (1994), are not continued to the NE past Limpid Ck in CLY area. Placement of the major faults on this map is diagrammatic and uncertain.

B.C. Geoscience Map 1998-1 'Geological Compilation of the Trail map area' by Höy & Dunne (1999) is a smaller scale 1:100,000 map over Salmo and CLY map areas. Underlying central CLY between the *Waneta fault* and the *Tillicum fault* is the 'Carboniferous Cs Unit: argillite, silty argillite, siltstone; minor limestone' in blue grey. This includes the LW Ridge area. Note the HCA of the Cs Unit also includes Kaslo Group-like MORB metavolcanics, dark grey argillites and meta-cherts. These metavolcanics form the roadbed of lower LCFS rd; *they are not* Elise Formation volcanics. The HCA is a dismembered ophiolite also with meta-quartzites and ultramafics, not a stratigraphic formation.

Geoscience Map 1998-1 maps only the Laib Formation though Fyles & Hewlett's Upper Laib Formation (1959) must occur between it and the Cs Unit. SE of the *Tillicum fault* the Early Cambrian Laib Formation 'phyllite, argillite, schist, micaceous quartzite; Reeves (Badshot) limestone Member' is in lt blue. In summary Geoscience Map 1998-1 is diagrammatic; note the Cs Unit has more lithologies than listed.

G.E. Ray (2004) compiled two structural-geologic maps about the BH mine after nine days of trail & roadside mapping in Oct. 2003 and June 2004. This was about the known showings and hindered by rainy weather (p.c.). He concludes "The precise age and grouping of the metasediments at Bunker Hill are uncertain but for this report they are considered to belong to the Cambrian-age Laib Formation..." (p. 8).

Ray describes the metasediments as micaceous quartzites, gray to black phyllitic to schistose argillites with organic carbon, graphitic phyllites, siliceous argillites, very minor siltstone, and thinly layered gray to black limestone "with abundant organic carbon, as well as some disseminated pyrite-pyrrhotite (p. 15)". Many have transposed compositional bedding as the foliation planes.

In the 2004 report the BH sill granite is named the BH stock. He describes it as

"medium to very coarse grained, massive and generally equigranular… Locally, it is very quartz-rich and leucocratic. Mafic minerals generally range from nil to 5%, and are mostly biotite with sporadic sericite and hornblende. The granite carries trace amounts of disseminated pyrite and lesser pyrrhotite [?]".

Ray's 1:2,000 scale Map 2 covers the central BH mine area and its numerous showings. Map 1 at 1:5,000 scale includes field observations in a larger area. A generalization of Ray's Map 2 (2004) is overlain on part of GSC Open File 6048 at 1:50,000 scale and used as a base for this report's 1:6,000 scale maps. Ray's map alone is used as the base of the 1:4,000 scale till Series Maps T-01 to T-11 and the three W series Whole rock analyses maps.

7.3 Structural Geology is Complicated

The geology of the region is quite complex as it is part of a compressional fold and thrust belt. After that Jurassic deformation it has been multiply faulted and intruded by at least three plutonic suites. Four periods of faulting are recognized by Höy & Andrew (1998). The country rocks are poly-deformed and poly-metamorphosed, both regionally-metamorphosed and then contact-metamorphosed by intruding Cretaceous Bayonne-suite granitoids and then Tertiary Coryell-suite mafic alkaline rocks. Jurassic Nelson-suite intrusions are likely.

Practically understanding the complicated, multi-phase structural deformation about sites of economic interest would advantage drill programs though "Structures north and south of the Salmo River anticline are not well known (Fyles and Hewlett 1959, p. 66)."

7.4 The Tectonic Divisions and their corresponding Formations or Litho-units

The following describes the layered country rocks on the property from NW to SE. The rock units are not necessarily stratigraphic Formations:

7.4.1 1] Quesnel terrane

Lower Jurassic Rossland Group Elise Formation: High-potassium metabasalts and meta-andesites. Overlying Hall Formation metasediments including black argillite and conglomerate (Höy & Andrew 1990a, Höy & Dunne 1997 & 1998; Höy & Dunne 2001)[5].
H. Little (1965) maps the Elise Formation along mid to N Limpid Ck in the lower reaches of creeks draining the LW ridge to the W. This is uncertain as Elise volcanics have not been found in that area.

--*Waneta fault*--

7.4.2 2] Slide Mtn terrane

Enigmatic Cs Unit (Little 1965, 1982, 1985), likely an ophiolite. J. Einarsen (1994) divides the Cs Unit into two assemblages bounded by the *Tillicum fault.* West-most is
Charbonneau Ck Assemblage 'CCA'. upper Paleozoic, probably Permian-Carboniferous (p. 30).
"Shallow water carbonates and siliciclastic rocks, unit B1 and B2 of Fyles and Hewlett (1959) … Generally "siliceous argillite, fine-grained sandstone, slate, black limestone (p. 26)".
The CCA comprises "A calcareous member between two siliciclastic members…. The siliciclastic members are composed primarily of black siliceous slate and very fine-grained sandstone, with lesser argillite, black pyrite-bearing limestone and calcareous slate. The calcareous member consists of white to dark grey generally featureless limestone (p. 28)".

--*Tillicum fault*--

Cs Unit Harcourt Ck Assemblage 'HCA': mafic tuff & volcaniclastic breccia, chert, banded marble and quartzite, unit B3 of Fyles and Hewlett (1959). In Harcourt Ck this is ~180 ft thick. Rock types listed in order closest to the *Tillicum fault* are:

Banded marble
Green slate and green chert
Meta-basite, meta-tuff
Black marble
Quartzite, banded quartzite-phyllite, black marble, chert, slate
Calcareous phyllite (Einarsen 1994, p. 47)

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[5] T. Höy and K. Dunne (nee Andrew) thematically mapped the Rossland Group from 1987 - 2001, the B.C. Geological Survey Branch Rossland Group Project. N of CLY, in the Mount Kelly - Hellroaring Creek map area, they mapped S to the headwaters of Swift Ck at about latitude 49° 05' (Höy & Andrew 1990a, 1990b). Part of the Rossland Group to the International border was not mapped (see OF 1990-8 for the south limit, Höy & Andrew 1990a). Central CLY area is at latitude 49° 03' 36'' and S of their 1990 mapping.

The HCA is an enigmatic ophiolite bounded by the *Tillicum fault*. Lithologies also include serpentinites, pyroxenites and werhlites (Ash 1999) and MORB meta-basites. Based on their similar petrochemistry the latter correlate with Permian age Kaslo Group meta-basalts mapped on-trend, a few 10's of km to the NE (Leclair 1983, 1988).

Howard (2000, 2005) subdivides the HCA into three recognizable lithologic assemblages or units, Fig. 6 and section 'Useful subdivision of the HCA' both below. J. Einarsen has the HCA unconformably overlying the Lower Paleozoic Lardeau Group upper Index Formation (1994, p. 47).

~~~~~~unconformity~~~~~~
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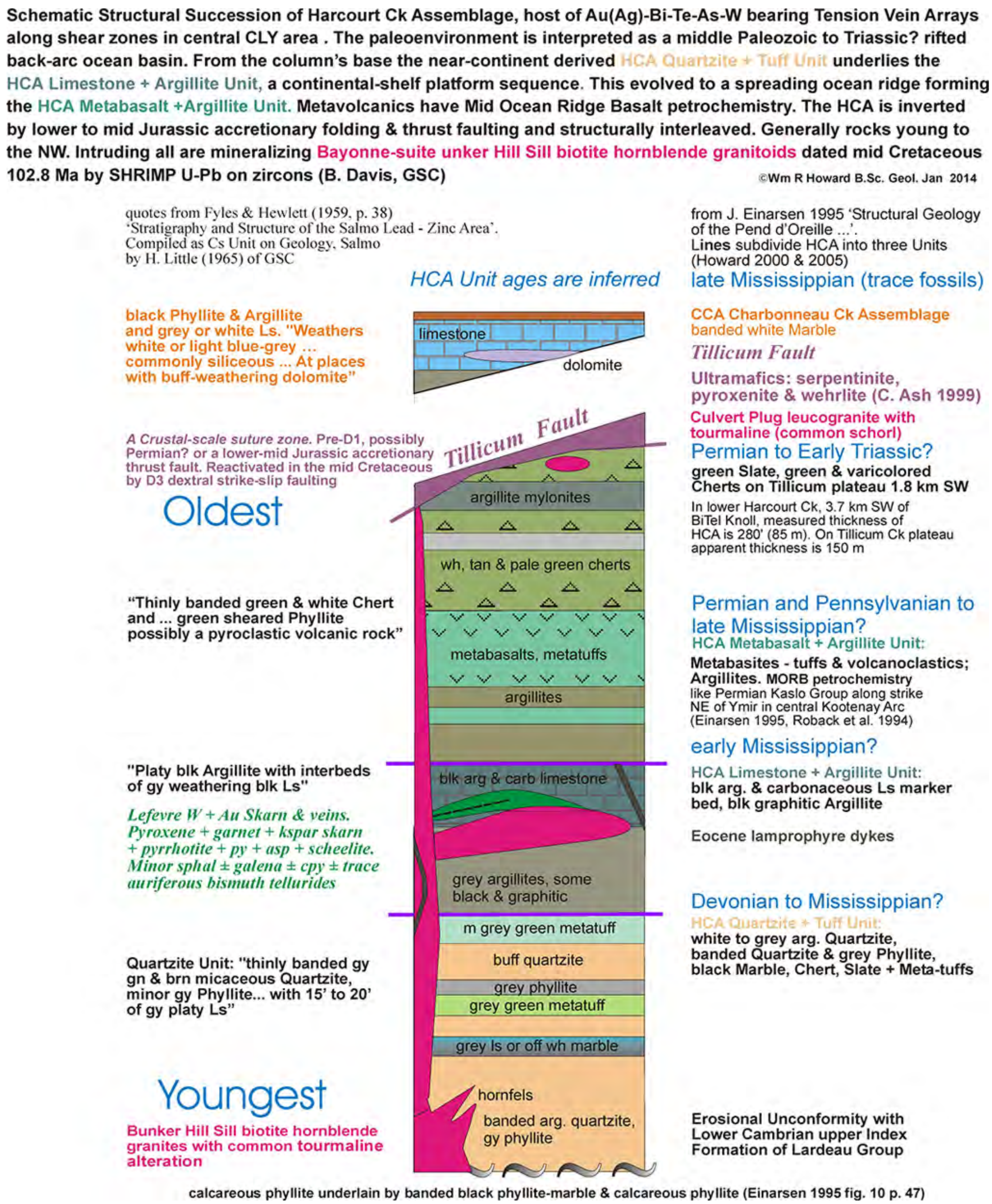

Fig. 6 Schematic Structural Succession of the 'HCA' Harcourt Ck Assemblage in central CLY area. The HCA is part of a Paleozoic ophiolite structurally emplaced and sliced in the Jurassic by tectonic accretion. Possibly it is uncorrelatable. *To correct the ages exchange the 'Oldest' & 'Youngest' labels.

7.4.3 3] Kootenay terrane

Unconformably underlying the Cs Unit is the Lower Paleozoic Lardeau Group Index Formation (Einarsen 1994, p. 47):
Upper Index: banded black phyllite and marble, calcareous phyllite
Lower Index: banded black phyllite and quartzite

The Lower Index Formation is partly equivalent to, and partly correlative with, the Lower Cambrian to Ordovician age Upper Laib Formation. This is

"mainly phyllite and schist coloured dull green, brown, and grey. Locally, brownish quartzitic beds and **lenses of blue-grey limestone** are present. Some of the grey phyllites are calcareous, but the sequence in general is not calcareous. Most of the rocks are well foliated and display complex attenuated minor folds and less commonly a pronounced lineation (Fyles & Hewlett 1959, p. 28)."

Below the Upper Laib Formation the Laib Formation comprises three Members (Fig. 7), listed youngest to oldest:

a] Emerald Member: mainly phyllite and mica schist coloured dull green, brown, and grey, brownish micaceous quartzite, grey calcareous phyllite, minor blue-grey limestone (Fyles & Hewlett 1959, p. 28). Green phyllites and micaceous quartzites are distinctive (MacDonald 1973).

b] Reeves Member: grey & white 'Reeves' limestone (or calc-silicate marble) with minor dolomite or dolostone marble (MacDonald 1973) this often **with stratiform Pb-Zn-Ag deposits** (Fig. 10 photo). The Reeves is "…banded grey and white or black and white, and fine- to medium-grained. It generally weathers blue-grey, and the banding is more easily seen on fresh than on weathered surfaces (Fyles & Hewlett 1959)."

c] Truman Member: green and brown schist and phyllite interbanded with white limestone. It is a minimum 30 to 50 feet thick, 60 ft at the Reeves-MacDonald mine (Fyles and Hewlett 1959, p. 19). Lithologies vary (MacDonald 1973).

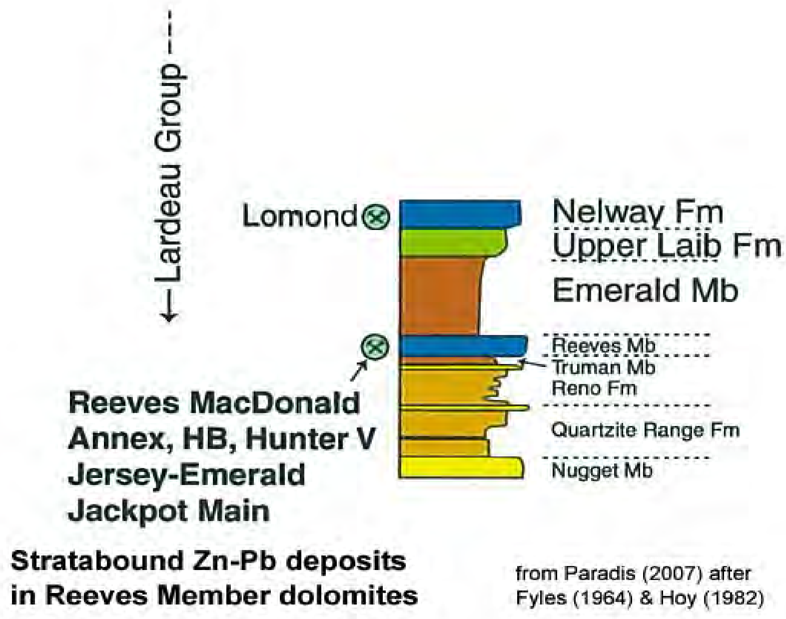

Fig. 7 Schematic Stratigraphic Succession of Paleozoic rocks at Reeves MacDonald minesite 4.5 km SE of central CLY. Truman, Reeves & Emerald Members comprise the Laib Formation. The Emerald Member of the Laib Formation & the Upper Laib Formation correlate with part of the Lower Index Formation of the lower Lardeau Group.

7.4.4 4] ancestral North America

Lower Cambrian Reno Formation: quartzite, quartz phyllite, mica schist
Lower Cambrian Quartzite Range Formation: massive white quartzite, upwards phyllite interbeds increase (MacDonald 1973). Nugget and Navada Members.

7.5 Summary of arrangement of the Formations and Litho-units

Like the tectonic divisions the above litho-units generally young to the NW in the CLY area. Two NE-trending thrust faults, the *Waneta Fault* and the *Tillicum fault,* are terrane boundaries. Proceeding from a point NW in the district to the SE Quesnel terrane Rossland Group volcanics are separated by the *Waneta fault* from Slide Mountain terrane Cs Unit Paleozoic oceanic rocks. The ultramafic-carrying *Tillicum fault* divides the Cs Unit into the CCA & HCA. Unconformably underlying the HCA is the lower Paleozoic Lardeau Group Index Formation that partly correlates with the Upper Laib and Laib Formations. The Laib Formation is subdivided from youngest to oldest the Emerald, Reeves and Truman Members. Further SE the bedrocks are the Reno and Quartzite Range Formations of ancestral North America.

7.5.1 Useful subdivision of the HCA into three sub-assemblages or Units

The Harcourt Ck Assemblage ‘HCA’ includes mafic volcanics and tuffs [with MORB petrochemistry], chert, marble, quartzite and argillite. Howard (2000, 2005) subdivides it into three recognizable lithologic sub-assemblages or Units. These are only defined W of the BH sill. Fig. 6 above revises a figure in Howard (2000).

Along the BH mine road, proceeding about across its width, the three HCA Units are:

HCA Metabasalt + Argillite Unit:
dark green, schistose fine-grained metabasalt; dark grey argillites including very carbonaceous, graphitic lustrous argillite; meta-chert

HCA Limestone + Argillite Unit:
distinctive medium to dark grey, very argillaceous limestone with decimeter-sized black, carbonaceous, very argillaceous limestone interbeds - the ‘black Limestone’ marker bed. Also minor buff, sandy, argillaceous limestone. This Unit might be repeated to the SE where it hosts the Lefevre W + Au bearing skarn-hornfels and crossing Lefevre QVs; but this is uncertain.

HCA Metaquartzite + Tuff Unit:
argillaceous meta-quartzite, medium grey green meta-tuff, light brown or buff quartzite, soft siliceous argillite; biotite-bearing argillite and biotite schist in the contact aureole of the BH sill below Adit 2 of the BH mine. At that site E. Webster observed metamorphic andalusite in pieces of float. A roadside outcrop of argillaceous meta-quartzite has an aplite dyke and blue grey quartz segregations without geochem values; see ‘Quartz segregation in HCA argillaceous metaquartzite’ in ‘Mineralized Sites’ section.

These lithologic sub-assemblages are thought to be *fault-bounded* and discontinuous along trend. The Howard (2000) reference describes exposures of these along the BH mine road. The HCA Units are thought to young proceeding to the NW, as do the Formations and the terranes (barring any structural complications).

Geologic observations in 2013 show the HCA subdivision is consistent. For example, two cuts in the banks of lower LCFS road, newly excavated for fill, expose meta-chert and very siliceous meta-argillite. These are part of the HCA Metabasalt + Argillite Unit.

8 Property Scale Geology (2) the Intrusive rocks

8.1 Mid-Cretaceous age Bayonne suite granitoids

Granites intrude older rocks on the CLY property.

"Intrusives of the Bayonne Suite are significant because of their similarities to intrusives of the Tombstone Plutonic Suite, which host and are genetically related to important Reduced-Intrusion Related Gold (RIRG) deposits in the Tintina Gold Belt in Alaska and the Yukon (Caron 2012)."

Logan classes the largest body, the Wallack Ck stock, as part of the mid Cretaceous 115 - 90 Ma Bayonne magmatic suite (2002a & 2002b). These "are mostly peraluminous, subalkalic granodiorite and highly fractionated 2-mica granites, aplites and pegmatites (2002b)."The Wallack Ck stock is biotite ± hornblende granite to quartz monzonite (Logan 2002a, 2002b). The granites are often deformed near their intrusive contacts by faulting, *shearing* and cataclasis (Einarsen 1990 & 1994; Höy and Andrew 1998; Ray 2004).

In the central CLY area they are **not** the Middle to Late Jurassic Nelson suite granites as the MINFILE entry for Bunker Hill 082FSW002 states (last edit 2003).

An unpublished U-Pb zircon date by the SHRIMP Geochron lab, GSC Ottawa of 102.8 ± 1 Ma is interpreted as the crystallization age (p.c. to R. Anderson & W. Howard by B. Davis, 2008 & 2012) confirming it a Bayonne-suite granite. This date is within error of a $^{206}Pb/^{238}U$ age of 101.7 ± 2.2 Ma obtained by Webster and Pattison (2014) for the Emerald stock, 10km to the northeast.

8.1.1 Naming the granite bodies

Names of the **BH stock** and **BH sill** are clarified herein. The **BH stock** is N of the mine site. It is irregular in shape, extending about 1.5 km by 1.5 km (Map R-01 and others), intruding Cs Unit & Upper Laib Formation (?) rocks.

The name **BH sill** is retained for the elongate dike- or sill-like granite extending S of the BH stock. It is at least 1,200 m long and 200 - 400 m wide (Ray 2004); its southern limit is not far S of upper Horticulturalist trib. Williams (2010a, 2010b, 2011) calls it the 'BH stock'; this usage is not continued in this report. The stock and sill are likely satellite bodies or outliers of the much larger Wallack stock about 2 km NE, or E.

8.1.2 BH sill description

BH sill outcrops are off white to pale brown due to minor rust from weathered pyrite. The granitoids are felsic or leucocratic, medium to very coarse crystalline with biotite ± hornblende (Ray 2004). They are generally equigranular, minor parts are slightly porphyritic. Locally they are quartz-rich and leucocratic. Mafic minerals are trace to 5%, mostly biotite with sporadic sericite and hornblende with trace disseminated pyrite and lesser pyrrhotite (Ray 2004). That pyrrhotite occurs is unknown by the writer. In some outcrops primary muscovite may occur (Webster 2013). There are no thin section petrographic descriptions.

R.G. Anderson described the site dated, along LCFS rd, as 'biotite granite'. There its magnetic susceptibility was very low, measured by a hand held Kappa meter (manufactured by ZH Instruments, Brno, Czech Republic; R.G. Anderson, p.c. Sept. 19 2006). This corresponds with the BH sill being a gold-favourable 'reduced' granitoid, ilmenite- or titanite-bearing.

8.1.3 Aplite dykes

These are uncommon. They are considered offshoots or minor intrusions of the BH sill (or stock) thus also Bayonne. At 471,347 mE 5,434,415 mN along the BH mine road a 10 cm-thick buff or very light tan aplite dyke intrudes HCA argillaceous quartzite. It is slightly irregular oriented about 135 47 NE. Its contacts are finer crystalline, 'chilled' against the quartzite. A sample of a quartz segregation 0564 cms away is barren (section 'Mineralized Sites').

Early mappers noted two 'granite dykes' 2 and 4 feet thick underground in Adits 1 and 3 of the mine (Minister of Mines Annual Reports 1934 p. E24, 1936 p. E18). Rather these are aplite dykes.

8.1.4 Tourmaline alteration of the granites

Clots, veinlets and breccias of dull, black cryptocrystalline tourmaline are common in parts of the Culvert plug, BH sill and Wallack Ck stock granites (Howard, 2000 & 2005). These are not "rare" (Ray 2004). Two well-accessible Culvert plug exposures of breccia & vein material is schorl, common Fe^{++} tourmaline, identified by X-Ray Diffraction 'XRD' (N. Ball, p.c. 1997). Its general formula is $NaFe^{++}{}_3Al_6(BO_3)_3Si_6O_{18}(OH)_4$, a hydrous mineral with 'fluxing' boron. **Tourmalinization is a type of Al-Fe-Mg-B alteration** (Thompson and Thompson 1996). The habit of the schorl is mm to cm-sized veinlets or breccia. Uncommonly the granite is completely replaced. In hand specimens if tourmaline is the dominant rock-forming mineral the rock is properly named tourmalinite.

The Culvert plug site is at 470,910 mE 5,434,776 mN along LCFS rd, just S of its junction with the 9-1 / 9-2 (lower) Hydro Tower Road. Here many intersecting tourmaline veinlets to cm-size often brecciate the granite. Veins are sub-mm to 1 cm thick. The schorl has microscopic intergrowths of potassium feldspar and quartz. In places for 10's of meters the tourmaline alteration can be intense forming masses of dull black tourmaline + quartz ± minor pyrite rock. Ten-centimeter sized areas of tourmaline breccia may have the original mafic and felsic minerals completely replaced with only relict 'floating' quartz crystals. The tourmaline is certainly not 'very siliceous chlorite' as one P.Eng. has described it, relying solely on his visual examination.

Limpid Roadside Veining has sparse tourmaline (Howard 2005). At 471,710 mE 5,434,348 mN the trenched Moly Quartz Vein is partly monolithic 'jigsaw'-textured tourmaline + quartz breccia with trace pyrite (Howard 2006).

8.2 Eocene age Coryell suite minor intrusions

Tertiary period Eocene age 53.3 – 50.6 Ma lamprophyre dykes & sills, and mafic, alkaline Coryell olivine-biotite-syenite plugs intrude all (Parrish et al. 1988, Wingate & Irving 1994). Small exposures are often found on CLY; in 2013 a lamprophyre was found at the Yankee Open cut.

Apparently this suite it is not related any known mineralization. Unlike the larger Cretaceous Bayonne–suite granites the intruded country rock are little affected by contact metamorphism.

"Coryell plutonic rocks that are exposed in several batholiths and smaller bodies in south-central British Columbia are coarse grained syenites, granites, quartz monzonites, and monzonites, the quartz monzonite [variety] being the most widespread…. Hypabyssal phases of the Coryell are numerous. Most are medium-grained and porphyritic, with phenocrysts of white to pink feldspar. Most of the rocks are pink to red, but many are white or green, the latter being due to chloritization of abundant mafic minerals ((Little 1982)."

In an unspecified area, likely in the N part of the claims, Williams (2010a) noted "a large amount of float as both rounded and angular boulders …composed of a distinctive bladed texture probably derived from alkaline rocks of a Coryell intrusive [like that] mapped just north of the Property boundary." This is a small body at the head of Tillicum Ck of augite-biotite-olivine syenite with feldspars and minor quartz (?), apatite and magnetite (Little, 1960). Its freshly-broken outcrops are characterized by large, very thin shining biotite crystals. The "thin biotite lamellae have grown along small joint planes, giving freshly-broken rock a distinctive facetted appearance (Little 1982, p. 32)." H. Little describes a similar rock in a Hiway 3B road cut near Rossland as porphyritic augite biotite monzonite, more basic than the normal porphyritic syenite (p. 32).

9 Mineral Deposit types

The following is updated and slightly edited from L. Caron (2012).

The number and diversity of mineral occurrences in the region is a reflection of the area's complex tectonic and magmatic history. Four historically important mining camps occur in the vicinity of the CLY property, as shown on Fig. 8, with a variety of deposit types represented. Höy and Dunne (2001) review most all these. Distances are km from the Bunker Hill & Lefevre crown grants, on which the main showings occur, at CLY property centre.

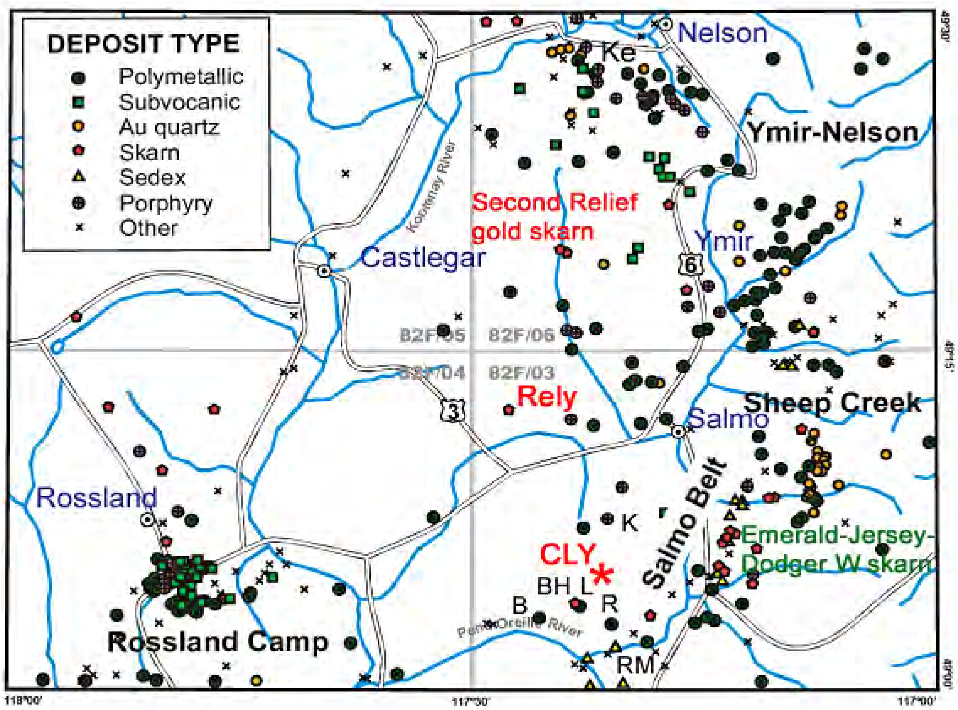

Fig. 8 Occurrences of the many mineral deposit types in the Rossland-Salmo-Ymir-Nelson Region, deposit types symbolized. LW Ridge on CLY is at the red star. Several have significant historic production; note Second Relief & Rely gold skarns, Emerald-Jersey Pb + Zn deposits & Emerald-Dodger W skarn in green. B=Bluestar BH = Bunker Hill L= Lefevre skarn-hornfels R=Red Rock RM = ReMac K=Katie E-J=Emerald-Jersey Ke = Kena. after fig. 3 of Jackaman & Hoy (2004).

At Rossland, 30 km west, 2.8 million ounces of gold at an average grade of over 17 g/t Au was mined from massive pyrrhotite-pyrite-chalcopyrite veins. Veins are hosted by the mid Jurassic Elise Formation volcanics of the Rossland Group and by the Rossland monzonite, of later Nelson-suite age.

About 20 km northeast over 760,000 ounces of gold and over 9 million ounces of silver were produced from the mesothermal (orogenic-style) quartz veins in the Sheep Creek camp (Matthews, 1953; Höy and Dunne, 2001). The veins are hosted in quartzites of the Lower Cambrian Reno and Quartzite Range Formations.

The district is also well known for Kootenay Arc-type carbonate-hosted lead-zinc-silver deposits and for tungsten (± gold) skarns (Fig. 9). Kootenay Arc-type deposits, such as the Jersey and the Reeves MacDonald 'ReMac' mines, are hosted by dolomite of the Reeves Member of the Laib Formation. The Reeves MacDonald mine is located 4.5 km southeast and the Jersey Zn-Pb mine 12.5 km northeast.

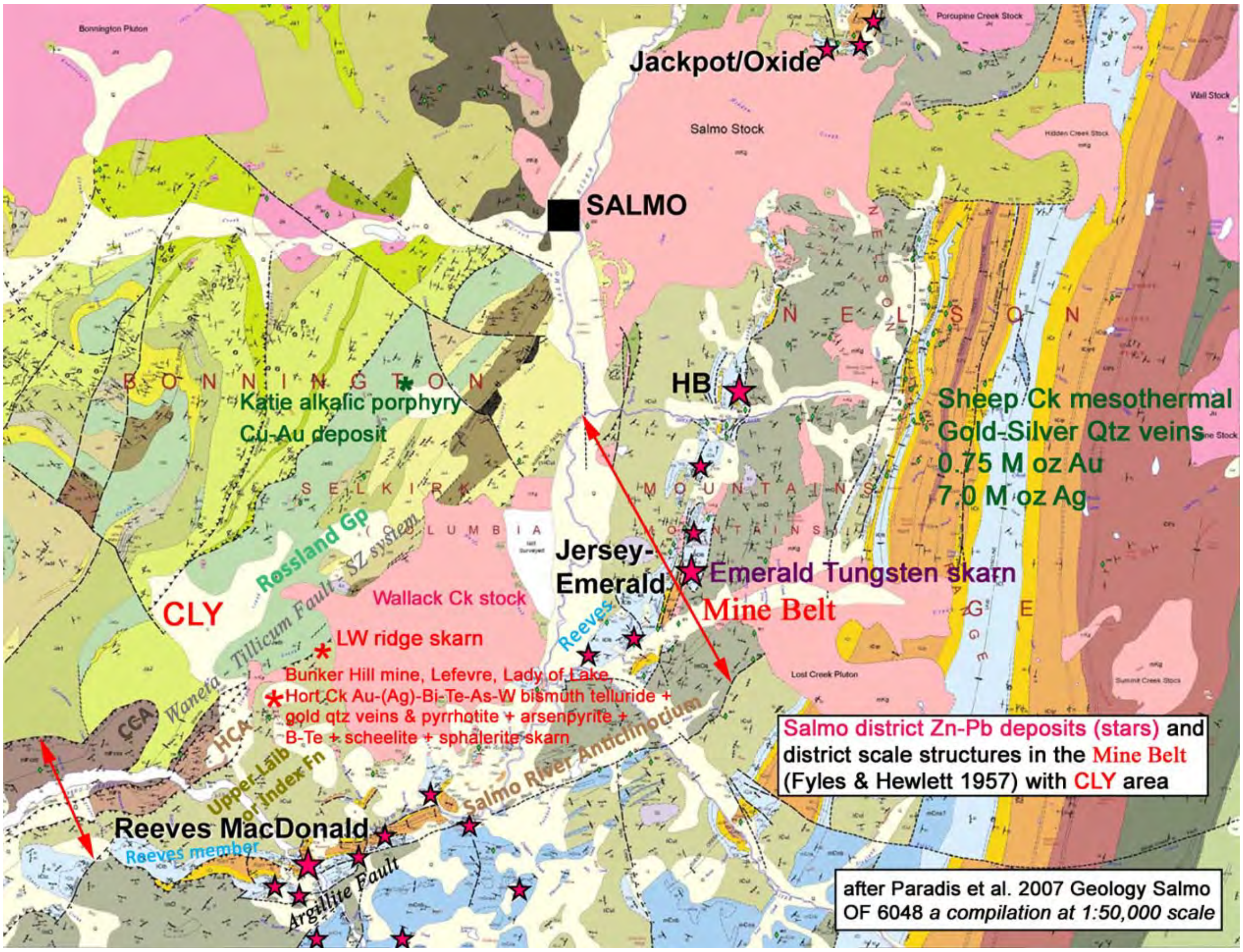

Fig. 9 Map of District scale structures in the CLY prospect area, with the site of the N [or LW] ridge. Plots the numerous Salmo carbonate-hosted Zn-Pb deposits as stars in magenta, the site of the past-producing Sheep Ck mesothermal-style gold-silver quartz vein camp, the historic Emerald Tungsten skarn and also the location of the Katie alkalic porphyry Cu-Au deposit and the Wallack Ck stock. Note the Upper Laib or Index Formation is undivided. The Argillite Fault and the Waneta – Tillicum Fault SZ system bounds the Mine Belt of Fyles & Hewlett (1957). After S. Paradis et al. (2007) & Paradis & Simandl (2009). The 2007 map is used as the transparent base for many of this Reports' maps.

The largest and best known of the skarn deposits is the Emerald tungsten skarn, located 13 km northeast. Some 600,000 tonnes of tungsten ore was mined from the Emerald deposit, hosted by Laib Formation Reeves & Truman Member dolomites & limestones, close to intrusive contacts of mid-Cretaceous Bayonne-suite granitoids (Mulligan, 1984; Giroux and Grunenberg, 2009; Ray, 2013 in Appendix 9, Appendix 10). Sultan Minerals Inc.'s Emerald Tungsten Property has a NI-compliant measured and indicated resource of 19.46 million pounds of WO3 grading 0.358%, and an additional inferred resource 15.93 million pounds of WO3 at 0.341%, both at a cutoff grade 0.15% WO3 (Giroux and Grunenberg, 2009).

“Sultan has extensively drill tested the deposits, completed three Resource Estimates, a Preliminary Economic Assessment, a Scoping Study, and a baseline Environmental Study” and has an “Option Agreement with Margaux Resources Ltd. (TSX-V: MRL "Margaux") for the disposition of 100% of the Jersey-Emerald Tungsten--Zinc Property” (Apr. 30 & Nov. 11 2013 Sultan Minerals Inc. News Releases).

In the Ymir-Nelson area beginning 20 km north-northeast in excess of 500,000 ounces of gold and 6 million ounces of silver was mined primarily from polymetallic veins hosted within rocks of the Ymir (and Rossland) Groups and within Nelson-suite granitoids of upper Jurassic age (Drysdale, 1917). The Ymir camp is situated in a similar tectonic setting to CLY property, along the tectonic accretionary boundary of Quesnellia and ancestral North America (Vogl and Simony, 1992).

Another style of mineralization known to occur in the area is alkalic porphyry copper-gold mineralization on the Katie property. This adjoins CLY property to the north (Makepeace and Price, 2007; Höy and Dunne, 2001).

Each of the above styles of mineralization is described below. Discussion is also included for Reduced Intrusion Related Gold systems, occurring in the local BH mine area, for volcanogenic massive sulfide and for Carlin-style deposits. The region has no definitive examples of either of these two latter-mentioned styles; however the geological and structural setting suggests potential for these deposit types. Höy and Dunne (2001) and Terry (2002) propose the Silver Lynx prospect near Nelson at the contact of Elise Formation in Ymir Group rocks is VMS-style.

A number of placer gold occurrences are known in the area.

9.1 Metamorphosed Carbonate-hosted Lead-Zinc Deposits

The Kootenay Arc contains a number of past producing lead-zinc-silver deposits commonly referred to as 'Salmo-type' or 'Kootenay Arc-type' deposits. Most of the important known deposits are south of Salmo, in the southern portion of the Kootenay Arc (Fig. 9 above). The Kootenay Arc-type deposits were intensely folded in the mid Jurassic during terrane accretion. Because of this intense deformation most of the original features of these deposits have been modified, and thus it is difficult to determine their original depositional model with certainty. However recently pyrites from the stratabound pyrite-sphalerite-galena O'Donnell orebody of the Reeves MacDonald mine are dated by Re-Os as Ordovician to Devonian age (Paradis & Simandl 2009), younger than their Cambrian (?) age host rocks. This infers they are Mississippi Valley-type.

They belong to a larger grouping of deposits "Carbonate-hosted lead-zinc deposits" which include a variety of deposit styles, including Irish-type, mantos and Mississippi Valley-type. Numerous authors describe the Kootenay Arc deposits, including Fyles and Hewlett (1959), Fyles (1970), Höy (1996), Nelson (1996), Höy and Dunne (2001) and Paradis (2007). The following is adapted from those sources, to which the reader is referred for further detail.

Fig. 10 Banded and doubly-folded lead-zinc-silver ore from the Reeves MacDonald deposit, photo card has cm divisions. Photo from Paradis & Simandl (2007).

In Kootenay Arc-type lead-zinc-silver deposits the mineralization is hosted by chert or fine grained dolomite, this within highly deformed limestone of the Reeves Member of the Lower Cambrian age Laib Formation. They have been metamorphosed to greenschist facies in the lower to mid Jurassic. The dolomite is poorly banded, with irregular black streaks, crackles and flecks, and differs in texture from its host, well-banded limestone. Sulfides include pyrite, sphalerite and galena, as lenses, irregular bands, disseminated grains or massive zones. Breccia zones, with dolomite fragments and sulfide matrix, are also present in many deposits.

Mineralized zones have either sharp or gradational contacts with the country rock. Sulphides are typically folded along with the host rocks, and zones of mineralization are frequently elongated parallel to the structural grain.

Two important deposits in the vicinity of the CLY property are the Reeves MacDonald MINFILE 082FSW026 and Jersey – Emerald mines (Fyles and Hewlett, 1959; Fyles, 1970; MacDonald, 1970 & 1973; Paradis and Simandl, 2008). The Reeves MacDonald mine is located 4.5 km southeast. It produced 5.8 million tonnes from 1949 to 1971 grading 0.98% Pb, 3.5% Zn and 3.4 g/t Ag.

12.5 km east the Jersey MINFILE 082FSW009 and Emerald MINFILE 082FSW010 mines are BC's second largest past-producing lead-zinc deposit:

"The historic Jersey Zn-Pb deposit was mined from 1906 to 1925. Production then was 25,850 tonne grading 705,292 g of Ag, 6,788,936 kg of Pb and 19,771 kg of Zn. In 1948 during production from the Emerald tungsten mine Pb-Zn ore was discovered. From 1949 – 1973 it produced 8.1 million t grading 1.95% Pb, 3.83% Zn and 2.6 g/t Ag from the Jersey and Emerald orebodies.

The Jersey and Emerald Zn-Pb mineralization occurs within a dolomitized zone, near the base of the Reeves Member and varies from 8 to 30 m in thickness. The Truman Member formed the footwall of the mine (Fyles and Hewlett, 1959). The galena-sphalerite-pyrite-pyrrhotite + minor arsenopyrite ores are banded and similar to HB deposit ores except that galena dominates. Cd is associated with sphalerite and Ag with galena.

In 1995 during exploration drilling for tungsten the Lower Jersey Pb-Zn horizon was discovered 55-60 m below the Jersey mine (Sultan Minerals Inc., 2008). The widest mineralized intercept was 9 m with the best single intersection 8.1% Zn and 3.8% Pb across 1 m (George Cross News Letter, 1997) (ed. from Paradis & Simandl 2008)."

9.2 Mesothermal or Orogenic style Quartz Veins with Gold (+ Silver, Lead, Zinc)

Mesothermal quartz veins are an economically significant source of gold, both globally and within British Columbia. Deposits commonly occur along major fault structures, including continental collision suture zones. On a more detailed scale, veins often occur along steep fault zones and many are associated with intrusive rocks. Veins can be hosted within the intrusion, or within adjacent country rock.

Mineralization consists of native gold, with variable (but often minor) sulfides (including pyrite, arsenopyrite, galena, sphalerite and chalcopyrite) in a quartz-carbonate gangue. In general, veins have sharp contacts, with only limited wallrock alteration. In the immediate few metres surrounding veins, alteration consists of silicification, pyritization, and sericitization. Carbonate alteration can extend for several tens of metres from vein contacts (Ash and Alldrick, 1996).

In the vicinity of the CLY property, the Sheep Creek camp is an important example of this deposit style (Matthews, 1953; Höy and Dunne, 2001; Fig. 9 map above). Over 760,000 ounces of gold and over 9 million ounces of silver has been produced from mesothermal quartz veins in the Sheep Creek area. The veins are hosted within overturned, isoclinally folded rocks of the Lower Cambrian Reno and Quartzite Range Formations. Most of the veins are on the west limb of the main eastern anticline and in the core and limbs of the western anticline. Although four veins sets are recognized all the significant gold-bearing veins occur within a group of northeast-trending, generally southeast-dipping faults (Höy and Dunne, 2001). Veins vary in width from tight joints to in excess of 6 metres, but generally average less than the historic mining width. Where the host structures cut softer rocks (limestone or argillite), the fissures are narrow and uneconomic. Where they cut more brittle quartzites, vein widths reach (historically) economic widths. The gold ore occurs in structurally-controlled shoots with a specific geometry. These shoots rarely exceed a few tens of metres in length. Within veins economic mineralization occurs over a vertical range up to 500 metres.

Polymetallic (silver-lead-zinc +/- gold) veins are also common in the general vicinity of the CLY property, such as a cluster in the Ymir camp (Drysdale, 1917; Höy and Dunne, 2001). There a north to northeast trending zone hosts numerous veins in Ymir Group metasediments, at the contact of the elongate “tail” of the Nelson batholith. This belt of rocks marks the tectonic boundary between accreted Quesnellia terrane and rocks of ancestral North American continent affinity (Vogl & Simony, 1992). The geological setting of CLY is analogous. The Ymir veins have a strong structural control. Many of the main control structures have strike lengths exceeding 1 km, with multiple zones of veining and mineralization along them. Veins form along the *main shears*, as well as on smaller cross faults between *shears*. Within veins ore was mined in well-defined shoots (or ore chutes). The main producer in the Ymir camp was the Yankee Girl, with average vein width 1.5 metres. Past production from the Yankee Girl mine is 370,000 tonnes at average grade 59.5 g/t Ag, 10.4 g/t Au, 1.7% Pb and 1.7% Zn. The age of veining is not known.

9.3 Rossland-type Copper-Gold Veins (Intrusion-related Au pyrrhotite veins)

Rossland-type copper-gold veins, more generally known as intrusion-related Au pyrrhotite veins, are a subset of mesothermal quartz veins. Deposits consist of parallel, tabular or cymoid veins that are emplaced in en echelon fractures around the margins of a subvolcanic intrusion. The mineralization is both syn-intrusive and syn-volcanic, the veins hosted by early intrusive phases or by volcanic rocks adjacent to the intrusion. A requirement for this deposit style is that host rocks were "hot" at the time of mineral deposition. Two vein types are recognized, massive fine-grained pyrrhotite and/or pyrite, and massive bull-type quartz with only minor sulfides. Individual veins may grade from one type to the other, or separate but nearby veins may differ (Alldrick, 1996).

The **Rossland** camp, 25 km west of the CLY property, has past production of 2.8 million ounces of gold at an average grade of over 17 g/t Au and ranks as **the second largest gold producing camp in British Columbia.** Parallel, en echelon, gold-bearing massive pyrrhotite-chalcopyrite and quartz veins are related to the intrusion of the Rossland monzonite, a multi-phase, mid Jurassic, Nelson-suite alkalic body intrusive into lower Jurassic Rossland Group (Elise Formation) volcanics (Drysdale, 1915). Most of the historic mining was from veins in the Main Belt with more than 20 veins in an area about 1200 by 600 metres. The Main Belt veins form a continuous well-defined fracture system trending east-northeast and dipping steeply north. Individual veins are up to 15 metres wide, with past mining near continuous over a strike length of almost 1 km. The veins were mined down dip greater than 350 metres.

The veins are hosted primarily by the Rossland monzonite and by augite porphyry of the Early Jurassic Rossland sill. Controls to veining include the Rossland monzonite contact, shear zones within the Rossland monzonite or the Rossland sill, or contacts of diorite porphyry dykes (related to the Rossland monzonite) into the Rossland sill (Höy and Dunne, 2001; Fyles, 1974).

9.4 Skarn Deposits of gold / tungsten / lead-zinc & other commodities

Skarn deposits are metasomatic deposits in which metals are hosted in a gangue of calc-silicate minerals that formed near the contact zone between granitic intrusions and adjacent carbonate-bearing sedimentary rocks (or to a lesser extent calcareous volcanics) (Meinert et al. 2005; Theodore et al. 1991; Ray, 2004 & 2013). A wide variety of mineral and metal assemblages are possible, depending largely on the purity and composition of carbonate host rocks, and on the composition of magmatic fluids. Skarn deposits are generally coarse grained, and alteration is often so intense that the original protolith is unrecognizable. A typical alteration pattern includes coarse grained garnet, proximal to the intrusion, with finer grained pyroxene, amphibole or epidote developed further from the intrusive contact.

Deposits are classified either on the basis of metal content as copper skarn, gold skarn, tungsten skarn, lead-zinc skarn, etc., or on the calc-silicate minerals present (i.e. pyroxene skarn, garnet skarn, magnesian olivine-diopside skarn). Recognizing mineral assemblages and zonation in skarn deposits is important since the different skarn types have different characteristics. For example, in gold skarns, the mineralization is in the outer part of the skarn envelope, while copper and tungsten skarns are proximal (close) to the source pluton (Ray and Webster, 1997; Ray, 2013).

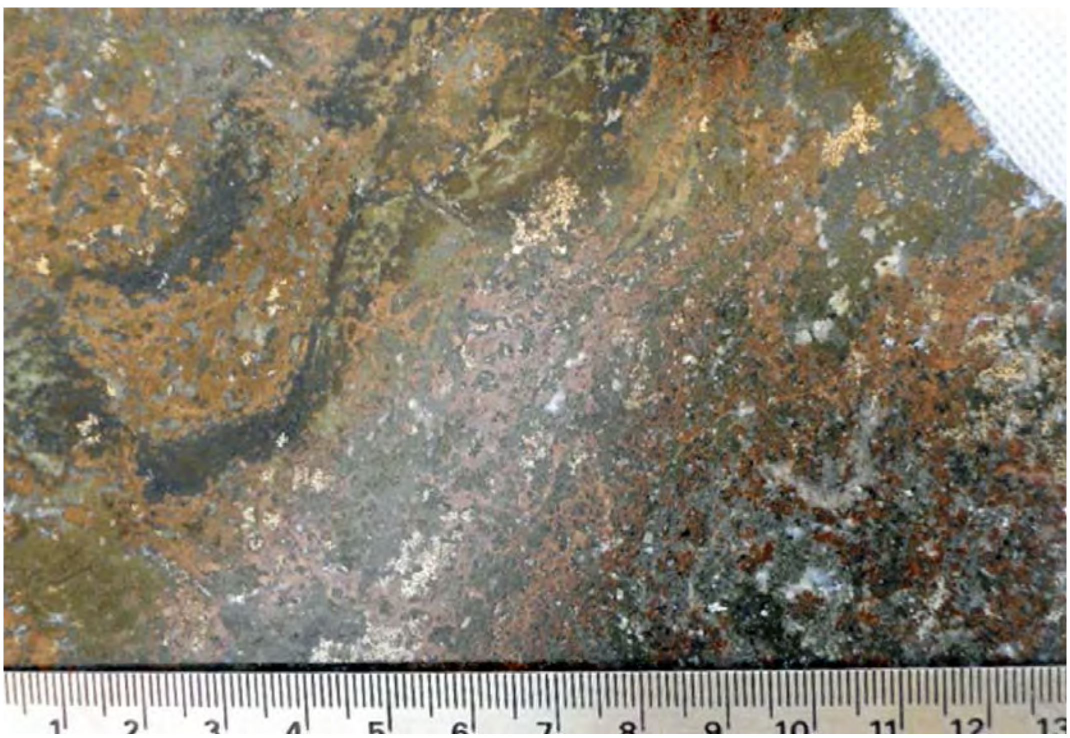

Fig. 11 Photo of a polished slice of the Emerald tungsten skarn, with a cm-scale ruler. Dark red garnet + pyrrhotite skarn has scattered white scheelite at lower rt. Also with pyroxene (diopside-hedenbergite) + amphibole, both light to medium grey-green. Chlorite is very dark grey to black. From Ray (2013).

A variety of skarn deposits are recognized in the district. The Emerald tungsten skarn, 13 km northeast of the CLY property, is the largest and best known example (Fig. 9, Mulligan, 1984; Giroux and Grunenberg, 2009; Ray, 2013). Mineralization is within Laib Formation carbonates near intrusive contacts with mid-Cretaceous granitic rocks.

Sultan Minerals Inc.'s Emerald Tungsten Property has a NI-compliant measured and indicated resource of 19.46 million pounds of WO3 grading 0.358%, and an additional inferred resource 15.93 million pounds of WO3 at 0.341%, both at a cutoff grade 0.15% WO3 (Giroux and Grunenberg, 2009). "Sultan has extensively drill tested the deposits, completed three Resource Estimates, a Preliminary Economic Assessment, a Scoping Study, and a baseline Environmental Study" and has an "Option Agreement with Margaux Resources Ltd. (TSX-V: MRL "Margaux") for the disposition of 100% of the Jersey-Emerald Tungsten--Zinc Property" (Apr. 30 & Nov. 11 2013 Sultan Minerals Inc. News Releases).

Gold skarn mineralization also occurs on the Jersey-Emerald property. The 'Bismuth Gold Zone' is two discrete zones of stratabound gold mineralization with pyrrhotite, pyrite and variable amounts of arsenopyrite and bismuth in quartz-rich gangue. The eastern mineralized zone averages 10 m wide and can be traced for almost 2 km. The western zone is a 1 m wide band 600 m long. Its average grade is 2.5 g/t Au (www.sultanminerals.com).

Gold skarns also occur within either Mid Jurassic Rossland Group rocks or late Paleozoic rocks adjacent to Nelson-suite Middle Jurassic granitic intrusions (Höy and Dunne, 2001). The Second Relief, Inez and Rand are past-producing vein/skarn deposits approximately 20 km south-southwest of Nelson. The veins are in Rossland Group Elise Formation lapilli tuffs with plagioclase and/or augite-phyric clasts. The Second Relief was the main past producer. It is a polymetallic vein, also classed as a gold skarn as it has well-developed skarn envelopes. The Second Relief has many similarities with the intrusion-related gold-sulphide veins at Rossland as the chalcopyrite + pyrrhotite mineralization is massive and quartz-poor like there. Intermittent production from 1900 to 1948 recovered 3,118 kg of Au, 858 kg of Ag, 20,210 kg of Pb and 1,057 kg of Zn from 205,316 tonnes of ore. It follows the hanging wall contact of a diorite porphyry dike for a strike length of 300 m and was mined to 400 m depth.

9.5 Alkalic Porphyry Copper-Gold Deposits

Porphyry deposits are large bulk-mineable deposits that are genetically related to, and occur within or adjacent to, porphyritic intrusions. Mineralization occurs as stockwork veins, veinlets and closely spaced fractures or as disseminations. The mineralization occurs within large zones of hydrothermally altered rock (to 10 square kms in size), with characteristic, large-scale, zoned metal and alteration mineral assemblages. Higher grade zones of mineralization occur within larger areas of lower grade mineralization and economic factors determine the deposit boundaries.

Porphyry deposits are classified as alkalic or calc-alkalic based on host rock chemistry. Alkalic deposits can be further subdivided on the basis of silica content, as silica-saturated or silica-undersaturated systems. Intrusive rocks in silica saturated systems include diorite, monzodiorite and monzonite, while silica-undersaturated systems have more strongly alkalic intrusives (i.e. syenite porphyry) with high magnetite contents. Alterations within these systems include albite and potassic alteration. More distal propylitic alteration is common (Sinclair, 2007; Höy and Dunne, 2001; Sillitoe 2010).

Alkalic porphyry copper-gold deposits are an important deposit type within B.C. All known B.C. examples of this type occur within the Quesnellia or Stikinia terranes, and all occur within island arc settings in which subaerial volcanic rocks are present. Examples of significant alkalic copper-gold porphyry deposits in B.C. include Copper Mountain, Ajax, Mt. Polley, Mt. Milligan and Galore Creek. Typical B.C. deposits range in size from less than 10 million tonnes to greater than 300 million tonnes, with grades in the range 0.2-1.5% Cu, 0.2-0.6 g/t Au and >2 g/t Ag. Mo content is negligible.

The Katie occurrence, 6 km north on Valterra Resource Corp.'s Swift-Katie property, is a classic alkalic copper-gold porphyry deposit. The host is intermediate to mafic volcanics of the Elise Formation of the Rossland Group which have been intruded by numerous subvolcanic mafic dykes and sills. Mineralization is pyrite, with lesser chalcopyrite and traces of other sulfides. Sulfide content averages 2%, locally to as much as 10%. At least two stages of mineralization are recognized, the more important alkalic porphyry copper-gold phase, and a later shear-hosted gold-silver-copper-antimony-arsenic phase. Sulfides occur as disseminations within the volcanics or intrusives, or in narrow quartz (+/- calcite, epidote, Kspar, chlorite) veinlets. At Katie drilling has outlined a zone of copper-gold mineralization, open in several directions, over a two square km area to a depth of up to 300 metres (Naciuk & Hawkins, 1995; Makepeace and Price, 2007; Höy and Dunne, 2001; www.valterraresourcecorp.com).

The Kena deposit, 35 km north of the CLY property, is a gold porphyry occurrence hosted by the Silver King intrusive (Logan, 2003). This is a deformed, early-mid Jurassic age, feldspar porphyry intruding Elise Formation volcanics. Mineralization consists of high-grade, narrow, structurally controlled gold mineralization within broad zones of low-grade porphyry style mineralization. The Kena – Gold Mtn property of Altair Gold Inc. has an estimated measured plus indicated (M+I) mineral resource of 25.28 million tonnes at 0.60 g/t Au, that is 490,000 oz Au (~0.5 million ounces). This uses a base case cutoff grade 0.3 g/t. The estimated inferred mineral resource is 90.44 MMt at 0.48 g/t Au, for 1,399,000 oz Au (Giroux & Park, 2013).

9.6 Reduced Intrusion-Related Gold Deposits (RIRG)

Reduced Intrusion-Related Gold (RIRG) systems are a relatively recent deposit classification. Lang et al. (2000), Lang and Baker (2001) and Hart (2005 & 2007) provide detailed descriptions. They are large, bulk-tonnage, low-grade gold deposits characterized by widespread sheeted, narrow, low-sulfide, gold-bearing quartz veins generally within otherwise barren granitoid intrusives. Grades of individual veins are commonly range from 5-50 g/t Au, but generally the vein density is no more than 3 to 5 veins per metre. Economic viability of a deposit depends on the size and grade of individual veins, the veining density, and the deposit size.

Smaller stocks and apophyses are more favourable hosts for deposits than larger plutons. Veining is concentrated within the brittle upper carapace of intrusions; as such, barely unroofed plutons are the most favourable exploration targets. Deposits have a characteristic Au-Bi-Te-W metal assemblage. Gold commonly occurs as free gold or as electrum, adjacent to or within native bismuth and/or a variety of relatively rare Bi-bearing minerals (tellurides, sulphosalts, etc.) (Howard, 2006 & 2007; Howard & Cook, 2009).

Within the North American cordillera, causative plutons formed in a post tectonic collision extensional environment, outboard from the thickened North American continental margin. The most favourable time for formation of these plutons was during the mid-Cretaceous. RIRG systems are associated with a range of other mineralization styles, including veins and skarns (W, Sn), these resulting from the same source pluton The deposits often occur in regions of tungsten or tin mineralization, or placer gold (Lang et al., 2000).

RIRG systems are well known and well-studied in the Tintina Gold Belt of Alaska and the Yukon. There the deposits are genetically related to mid-Cretaceous intrusives of the Tombstone Plutonic Suite. Important examples include the Fort Knox and Pogo mines and the Dublin Gulch Eagle zone deposit. The Fort Knox deposit has a resource about 7 million ounces of gold within a 1,000 metre by 600 metre area. Near the surface the limits of this deposit are defined by the limits of the intrusive host, while at depth, the cut-off grade is controlled by a decrease in the veining density. Mineable grade at both the Fort Knox mine and Dublin Gulch deposit is approximately 0.9 g/t Au, with a cut-off grade (for milling) in the range 0.4 - 0.5 g/t Au. Lower grade ores might be economically processed by heap leach methods. At the Pogo mine a resource (as of 2007) of 5.6 million ounces of gold is contained within 2 large quartz veins mined by underground methods. The grade is 0.41 oz/t Au, near ½ oz/t.

The geological environment in the southern Kootenay Arc is favourable for RIRG mineralization, and several examples of such mineralization are known (Logan 2000, 2001, 2002a, 2002b; Cathro and Lefebure, 2000). Cathro and Lefebure (2000) identify the Wallack Creek stock as one of the more promising targets for RIRG mineralization in the Nelson-Salmo area and classify Bunker Hill MINFILE 082FSW002 as a possible 'plutonic-related' gold occurrence (their table 2, p. 214). Mineralization in the central CLY area (BH mine Adit 2 UH Stope vein, BiTel Knoll veins, Lefevre skarn-hornfels and Lefevre QVs, & etc.) is definitively RIRG style. This is supported by extensive ore microscopy and laser ablation studies of the gold–related bismuth telluride mineralogy by noted experts (N. Cook & C. Ciobanu, in Howard et al. 2006, 2007, 2008; N. Cook in Howard & Cook 2009).

9.7 Volcanogenic Massive Sulfide Deposits (VMS)

Volcanogenic massive sulfide (VMS) deposits are layered sulfide deposits which formed by the precipitation of metals from volcanic-related hydrothermal activity on or below the seafloor. The majority of VMS deposits formed in volcanic-dominant extensional environments (Galley et al., 2007).

Historical nomenclature has classified deposits based on similarity to important type examples (i.e. Noranda or Kuroko-type, Besshi-type, Cyprus-type). More current classification is on the basis of the district-scale volcano-sedimentary sequence which hosts the deposits (i.e. bimodal-mafic, mafic, pelitic-mafic, bimodal-felsic and siliciclastic-felsic). Mineralization can contain all or any of copper, lead and zinc, in various proportions, as well as appreciable silver and gold (i.e. Eskay Creek). Deposits range in size from relatively small deposits, often less than 1 million tonnes in size, to extremely large deposits that contain more than 100 million tonnes (i.e. Windy Craggy).

Many VMS deposits are spatially and temporally associated with felsic volcanics, these in the immediate footwall of the deposit. Volcanogenic tuffaceous and chemical sediments (including chert ± manganiferous sediments) are associated with most deposits. Many VMS camps are characterized by the presence of a thin, laterally extensive ferruginous chert, interpreted as an exhalative horizon. Within a district multiple prospective exhalative horizons can exist. Although a range of deposit shapes are possible the classic form includes a cone shaped feeder zone of highly altered volcanic rocks cut by sulfide stockwork mineralization, this overlain by a mound-like body of massive laminated or brecciated sulfides and flanked by a thin apron of stratiform laminated sulphidic sediments.

Dominant sulfides include pyrite, chalcopyrite, sphalerite and galena. Most deposits have a well-developed metal zonation with a core of massive pyrite and chalcopyrite that grades outwards through chalcopyrite-sphalerite-pyrite, sphalerite-galena, galena-manganese sediments and finally to chert-manganese sediments-hematite. Alteration is generally well zoned and most intense in the footwall stringer zone, directly below the main massive sulfide body (Franklin et al., 2005; Galley et al., 2007; Höy, 1995a, b, c).

Höy and Dunne (2001, p. 12) tentatively classify several mineral occurrences in the Nelson-Rossland map area as volcanogenic massive sulphide deposits. They are in mixed sediment-volcanic successions in the eastern, basal part of the Elise Formation or in the upper part of the underlying Ymir Group or Archibald Formation. Elsewhere some felsic volcanics, e.g. rhyolite, dacite and highly sheared sericite schist (similar in appearance to sheared felsic volcanics) occur in the Rossland Group, but these are not widely recognized. “There are some reported felsic volcanic rocks in the Elise, such as at the Silver King deposit, which may be evidence of local bimodal volcanism [that indicates] potential for additional discoveries of volcanogenic massive sulphide deposits (op. cit., p. 13).”

Three showings interpreted as VMS-type are: 1) the Silver 1 deposit in Elise chloritic and biotitic schists 5 km southeast of Nelson 2) the Hungary Man, either in the Ymir Group or within the basal part of the Elise Formation, 16 km southwest of Nelson and 3) the Silver Lynx property 20 km west of Nelson (Höy and Dunne 2001). At the Silver Lynx Middle Jurassic age Ymir Group argillites and siltstones overlie phyllitic felsic tuffs. Pb-Zn-Ag mineralization occurs, apparently stratabound as it is within 20 metres of the volcanic-sediment contact. Two distinct mineralized zones with disseminated to semi-massive sphalerite, galena, chalcopyrite, and arsenopyrite, with widely distributed sphalerite stringers, were cut in 3 of 4 drill holes. Assays were to 6.87% Zn, 1.13% Pb, and 42.5 g/t Ag over 0.6 metres (Terry 2002).

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9.8 Sediment-hosted Disseminated Gold Mineralization (Carlin-type)

Carlin-type deposits are sediment-hosted disseminated gold deposits, which represent some of the largest hydrothermal gold deposits in the world. They are best known in Nevada although new districts are emerging elsewhere in the Cordillera - mineralization of this style is recognized in Central Yukon, the Rau and Osiris deposits of Atac Resources. Carlin-type deposits are characterized by micron-sized gold within very fine grained disseminated sulfides (chiefly pyrite or arsenical pyrite). Most commonly the host rocks are silty carbonates.

Mineralization occurs in irregular, tabular, stratabound bodies or in discordant breccia bodies. There are strong structural or stratigraphic controls. Mineralization is often localized and may straddle the contact of contrasting lithologies. Alteration consists of intense silicification, including silica veins and jasperoids close to mineralized zones, with peripheral argillic alteration and also decalcification of carbonate rocks. Commonly silver, arsenic, mercury and antimony are geochemically anomalous. Realgar, orpiment ± stibnite occur in many deposits.

Since the gold is micron-sized, these deposits are not usually associated with placer gold in nearby streams. Carlin-type deposits are difficult to explore for, particularly in new or emerging districts, because of the very fine grained nature of the mineralization and inconspicuous associated alteration (Schroeter and Poulsen, 1996; Lefebure et al., 1999).

Although examples of this style of mineralization are not recognized in the vicinity of CLY property, based on the geological and structural setting, the area has potential for this style of deposit. The favourable setting includes these features: carbonate-bearing host rocks, prominent regional scale thrust *faults*, the presence of regional antiformal traps, and the setting along the ancient North American continental margin.

10 Whole rock analyses of 4 samples of BH Sill granitoids

To identify the petrochemical signature of the granites 4 ‘fresh’ hand samples of BH sill granitoids were collected, the GW series. Slabs were cut by a rock saw with any signs of surface weathering trimmed off. Specimen label GW-04 was not used. The samples were analyzed by Acme Analytical Labs by several methods including

‘4A-4B’ (new Veritas code G806) H_2SO_4 and HF digestion determining ferrous iron Fe^{+++} as Fe_2O^3
‘2A Leco’ (new Veritas code TC000) combustion for total carbon & sulphur
‘1DX’ (new Veritas code AQ200) Geochemical aqua regia digestion and ICP-MS for Mo Cu Pb Zn Ni As Cd Sb Bi Ag Au Hg Tl, and
‘G806’ (new Veritas code G806) H2SO4 and HF digestion for ferric iron Fe^{++} by titration.

Chart 1 in Appendix 8 has the granitoid sites, UTM co-ords and 10 select siderophile & chalcogen elements. Full assay results are on Certificate VAN13004485 in Appendix 4. Appendix 5 has the lab methods.

10.1 Results of Whole rock analyses

Rock	Name	SiO2_pc	Al2O3_pc	Fe2O3_pc	FeO_pc	MgO_pc	CaO_pc	Na2O_pc	K2O_pc	MnO_pc
GW01	YANKEE CORNER	74.48	13.67	1.44	0.75	0.28	0.71	3.79	4.31	0.06
GW02	BITEL KNOLL	76.66	13.02	0.53	0.30	0.07	0.22	3.60	5.16	0.04
GW03	LADY OF LAKE I	75.99	13.36	0.73	0.32	0.08	0.37	3.75	4.95	0.04
GW05	LADY OF LAKE II	75.56	13.49	1.04	0.48	0.10	0.20	3.71	4.88	0.08

Rock	Name	Sc_ppm	Ba_ppm	Nb_ppm	Rb_ppm	Sr_ppm	Ta_ppm	Th_ppm	V_ppm	W_ppm	Zr_ppm	Y_ppm	La_ppm
GW01	YANKEE CORNER	1.6	1329	27.0	114.2	247.9	1.7	14.4	16	0.25	91.9	8.8	31.5
GW02	BITEL KNOLL	1.9	581	23.0	131.1	120.4	2.2	9.2	10	0.90	46.4	11.8	6.5
GW03	LADY OF LAKE I	1.6	368	33.4	132.2	95.5	2.6	10.7	4	0.80	53.4	16.6	14.9
GW05	LADY OF LAKE II	1.7	278	30.9	156.0	63.3	2.4	11.5	21	1.20	50.6	17.7	15.5

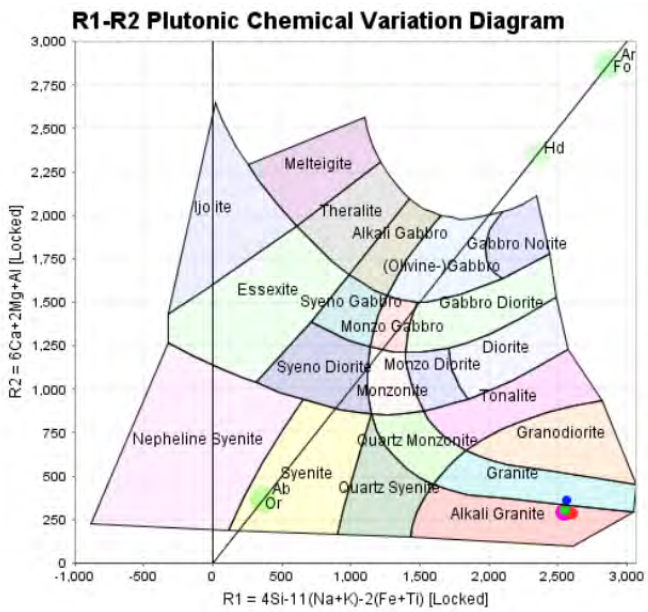
Rock	Name	Mo_ppm	Cu_ppm	Pb_ppm	Zn_ppm	Ni_ppm	As_ppm	Cd_ppm	Sb_ppm below LLD	Bi_ppm below LLD	Ag_ppm below LLD	Au_ppb
GW01	YANKEE CORNER	0.3	6.2	8.0	13	0.8	0.25	0.05	0.05	0.05	0.05	1.40
GW02	BITEL KNOLL	0.7	1.4	2.9	6	1.0	0.70	0.05	0.05	0.05	0.05	0.70
GW03	LADY OF LAKE I	0.4	2.7	4.3	30	0.7	2.00	0.40	0.05	0.05	0.05	0.25
GW05	LADY OF LAKE II	0.5	2.3	7.6	19	0.8	1.30	0.05	0.05	0.05	0.05	0.70

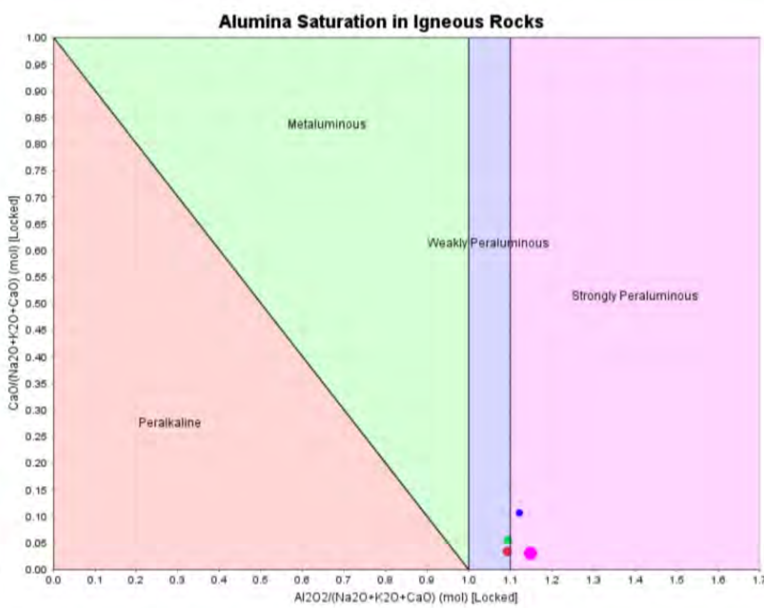
Table 2 Three tables of Whole rock analyses of 4 hand samples of BH Sill granitoid

The W Map series plots this data. Map W-01 has % Major elements. Both total Carbon & Sulphur results are extremely low & not plotted. Map W-02 has ppm Minor elements including W - Be & Sn are below, or at, their LLD and not listed. Map W-03 plots ore & pathfinder elements, not S Sb Bi Ag Hg & Tl as they are below the detection limits. **Note Au_ppb results are above the LLD and the granites are slightly auriferous.**

10.2 Diagrams Interpreting the Petrochemistry of the BH Sill granitoids

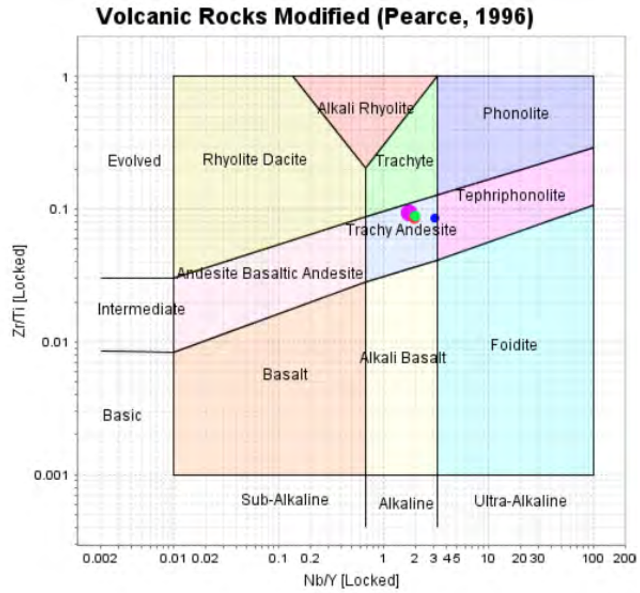
The several figures below objectively show the petrochemistry of the BH sill allowing it be classed using several chemical parameters; conclusions are in bold.



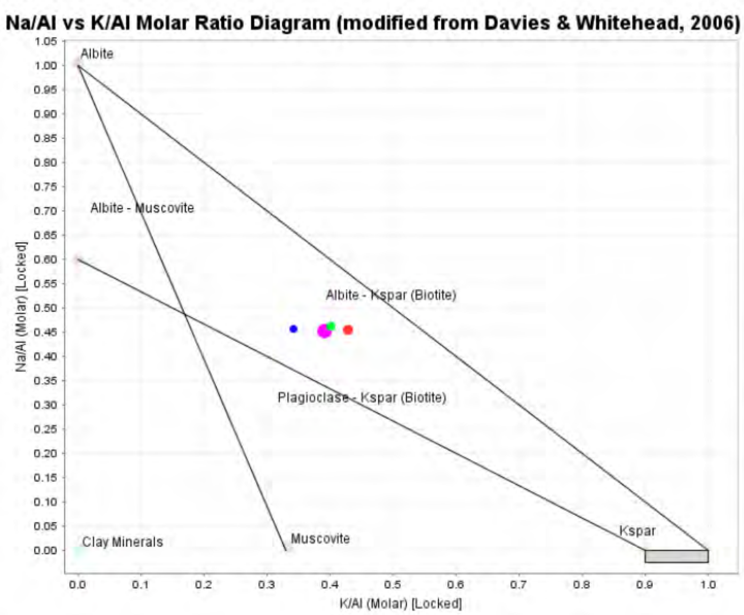


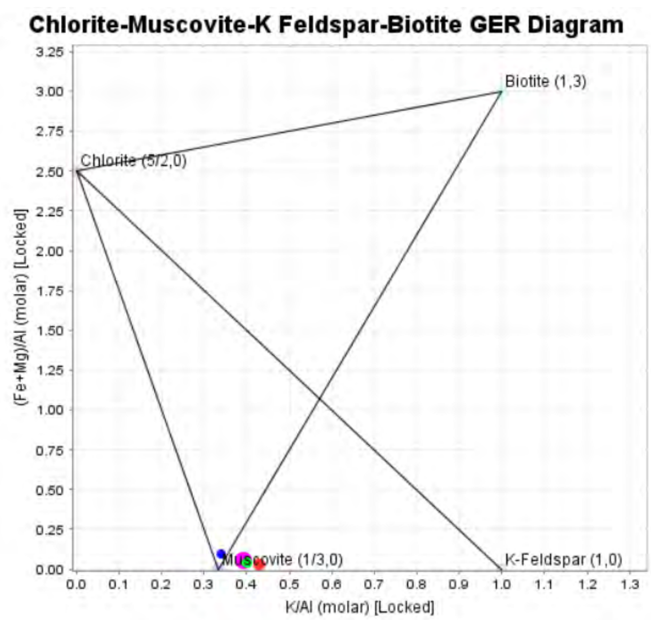
R1-R2 Chemical variation diagram of plutonic igneous rocks by De la Roche et al. (1980). This considers all of the major cations & Ti, a mineralogical network, the degree of silica saturation and combined changes in the ratios Fe/(Fe + Mg) and (albite + orthoclase)/anorthite in igneous rocks. It uses total iron as FeO. **The BH sill granitoids plot as alkali granite.**

Alumina saturation in igneous rocks considers CaO Na2O K2O & Al2O3 (Barton & Young 2002). It classes the BH sill granitoids weakly to strongly peraluminous. Miller & Barton (1990) in the U.S. interior Cordillera find Al saturation relates to primary mineralogy: weakly peraluminous rocks are 'biotite only' without hornblende and clinopyroxene. Strongly peraluminous granitoids have muscovite, cordierite or Ca-poor garnet. Brandon & Smith (1994) find hi-silica two-mica granites have ASI >1.1, e.g. the Fry and White Ck batholiths; the BH sill granites are such. The granitoids sampled are biotite-muscovite granites.



The log Zr/Ti vs. log Nb/Y diagram by Pearce (1996) uses these immobile elements as proxies for the Total Alkali Silica diagram (Winchester and Floyd, 1977). If the granites are considered as volcanics they class as **trachy andesites.**





The Na/Al vs K/Al molar ratio diagram is after Davies & Whitehead (2006, 2011). The three feldspars, biotite and muscovite follow known trend lines. Clay minerals and other aluminous non-alkali-bearing minerals including many chlorites, epidote and topaz plot at the origin (0,0); alunite plots at muscovite.

"Alkali/alumina binary molar ratio plots, unlike separate ternary chemical and ternary mineralogical diagrams, portray both chemical and mineralogical trends on the same diagram, thus facilitating interpretation of alteration data. K2O/A2O3 versus Na2O/Al2O3 diagrams are particularly useful for rocks consisting dominantly of quartz, feldspars, and micas. Examples are altered rhyolites hosting VHMS deposits (Davies and Whitehead, 2006) and granites, quartz monzonites, and granodiorites hosting porphyry deposits (Davies & Whitehead 2011)".

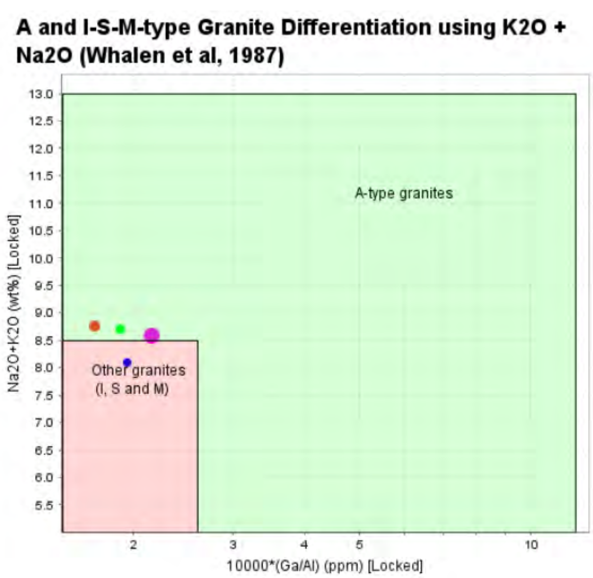
The BH granitoids are **albite-Kspar alkali granites with minor muscovite.**

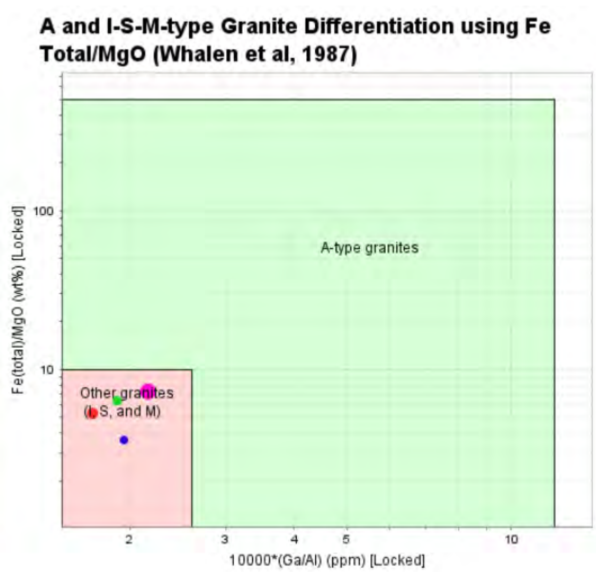
The Chlorite-Muscovite-K Feldspar-Biotite diagram, a Pearce Element Ratio diagram, considers molar ratios (Stanley & Madeisky, 1994). The BH granitoids have minor muscovite rather than biotite (scarce) and are **albite-Kspar-muscovite alkali granites.**

10.2.1 Affinities with Anorogenic A-type granitoids

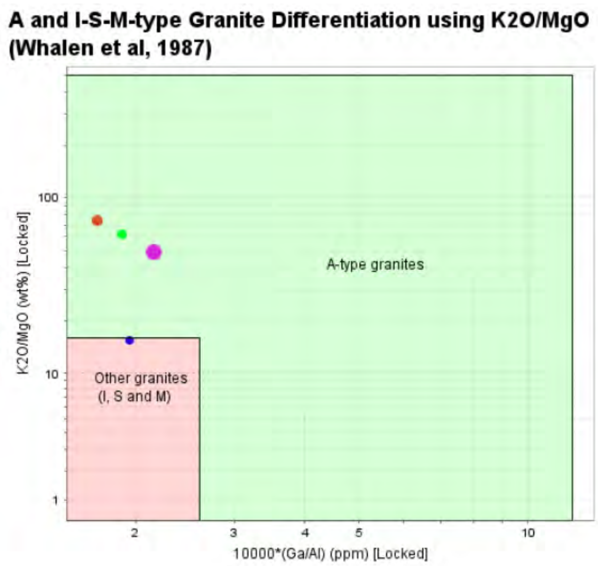
Whalen et al. (1987) find A-type granites plot in different fields than other types on diagrams of 10,000*(Ga/Al), in ppm, versus:

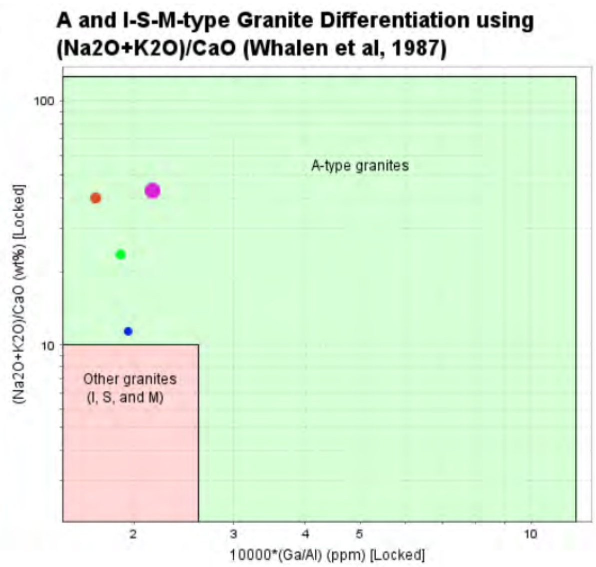
1] K2O+Na2O, wt %
2] Fe Total/MgO, wt %
3] K2O/MgO, wt %
4] (Na2O+K2O)/CaO, wt %
5] Ce ppm
6] Nb ppm
7] Y ppm
8] Zn ppm
9] Zr ppm
10] agpaitic Index - (Na + K) / Al molar



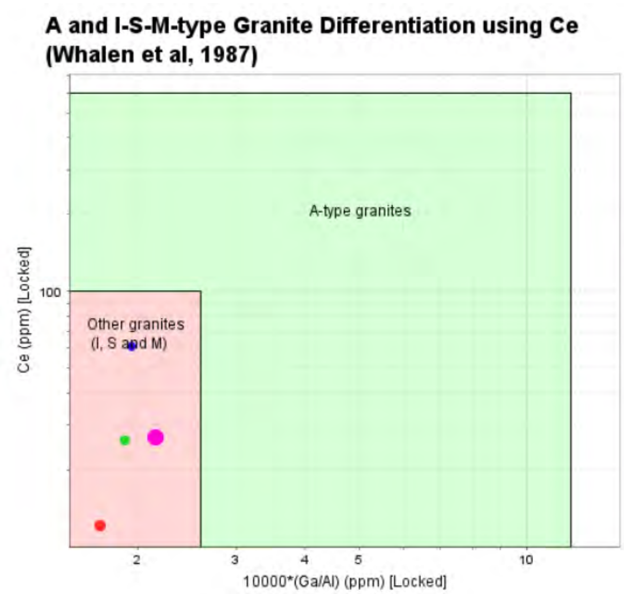


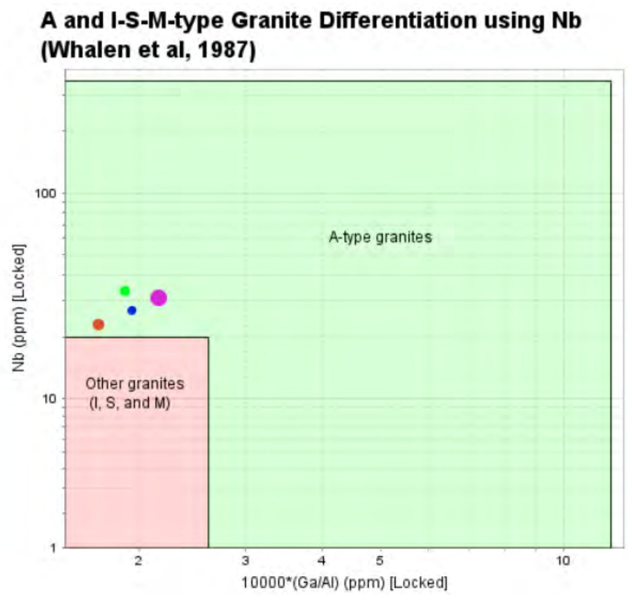
To the lt the whole rocks plot on the borderline with their high alkali contents; to rt they are not 'A' type as Fe (total) is low and /or MgO is high.



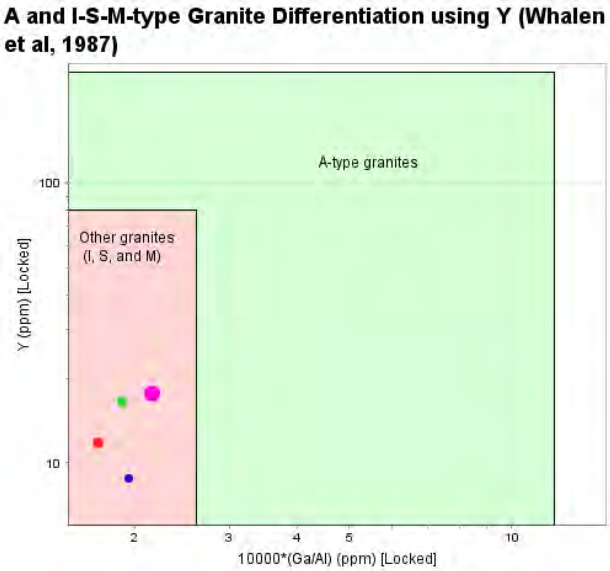


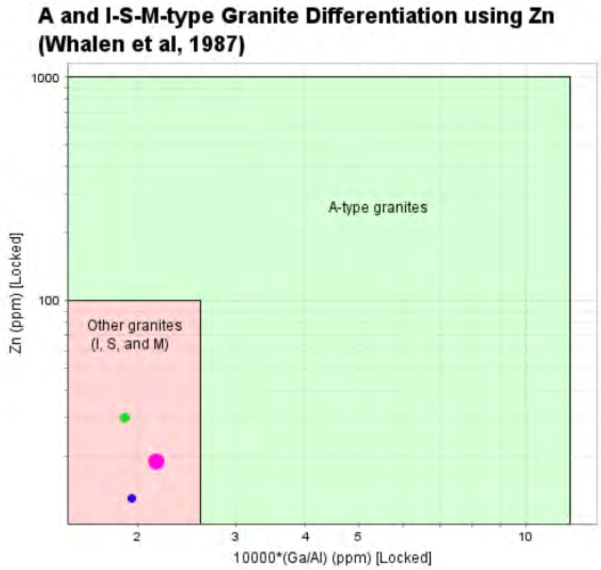
Plot as A-type with high K2O and/or low MgO; to rt plot as A-type as alkalis are high and/or CaO is low



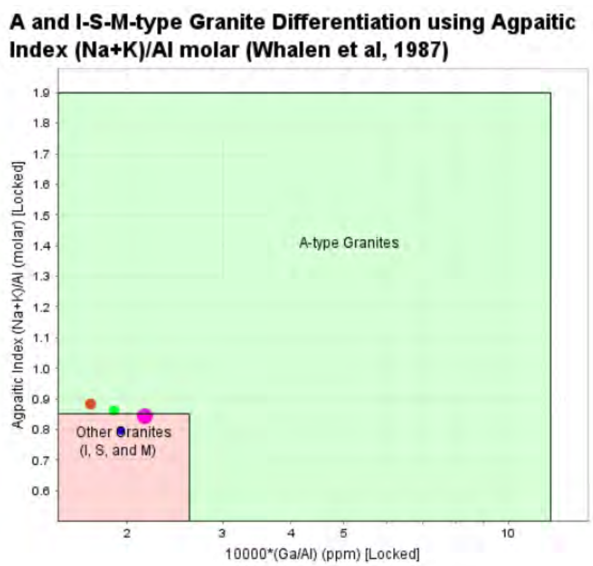


Ce is low suggesting they are other granites but to right plotting Nb the BH granitoids are A-type





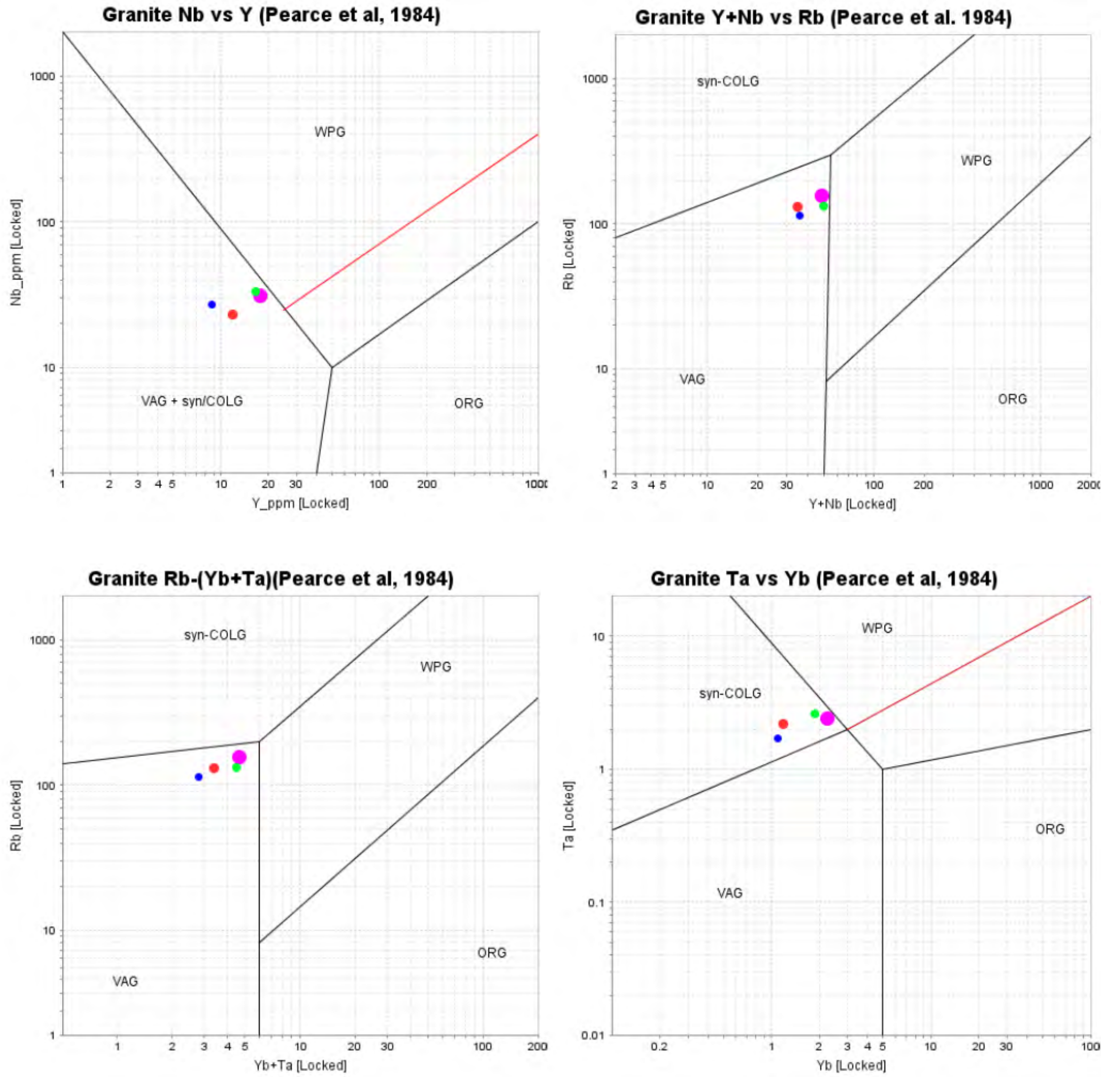
both suggest the BH granitoids are *not* A-type



Agpaitic Index shows borderline affinities with A-type granites. This is because the alkalis Na + K are hi, and/or Al is low

10.3 Characterizing the BH sill granitoids

Summarizing the BH Sill granitoids are weakly to strongly peraluminous albite-Kspar alkali granites with minor biotite and muscovite. They have affinities with A-type granitoids (Whalen et al. 1987) as alkali contents (Na & K) are high with low Ca, and as Nb is high. The parameter 10,000*(Ga/Al), in ppm, definitively characterizes them as S-type as it plots in the field of ‘other granites’. Low Ba and high Rb & Nb indicate a within-plate and collisional tectonic setting (Brandon & Smith 1994).



Granite discrimination diagram of Pearce et al. (1984) with fields of volcanic arc (VAG) syn-collisional (syn-COLG) within plate (WPG) and ocean ridge (ORG) granitoids. Red line is the boundary for ORG from anomalous ridges. BH sill is syn-COLlisional granitoid; in contrast Brandon & Smith (fig. 2, 1994) plot 3 samples of Wallack stock granitoids in the WPG field close to the BH sill data points. On the Rb vs. Yb + Ta diagram (lower lt) the BH sill data plots in the VAG field, same as the metaluminous Tombstone-tungsten suite plutons and dikes in Tintina Gold Belt, Yukon (of Murphy 1997, the fig. 12 graph in Logan 2001).

Concluding **BH sill is a volcanic arc or syn-collisional albite-Kspar-muscovite alkali granite with A-type affinities.**

11 Lithogeochemical (Rock) Survey

11.1 Theory

Hydrothermal alteration zones about deposits are areally larger than the possibly economic deposits themselves. Diffuse 'leakage haloes' give a larger footprint than the deposit itself. This develops in the many fissures, fractures and faults generally present at hand specimen cm-scale to microscopic sub-mm scale in the bedrocks. Thus slightly higher contents of ppm values, or for gold ppb values, of associated pathfinder elements serve as indicators pointing to localized areas with unfound mineral occurrences. The signals are well interpretable due to many practical studies.

For gold deposits in metamorphic terranes, as on CLY,

"Rock, stream sediment, and soil geochemical surveys [are] a very consistent group of pathfinder elements. Trace elements consistently enriched include Ag, As, Au, B, Bi, Hg, Sb, Te, and W … Lithogeochemical surveys are generally variable as to which trace elements give the broadest halos, but Sb and As appear to be most consistently effective (Goldfarb et al. 2005)."

Hoffman (1990) developed a geochemical model to explain multi-element soil and lithogeochemical survey results about the Cat Mountain Ag-Cu porphyry deposit in B.C. For that he proposed

"concentric lithogeochemical zones radiating outwards from a W-Ag-Mo core through a predominantly Au mineralized zone, a Cu-Co-Fe-V-enriched zone and finally into a peripheral zone where there is elevated As, Al and Mn. Not all of the zones may exist or they may be truncated in other deposits … A model developed by interpreting all of the geochemical data displays the most likely relationship between the bedrock, drainage and soil geochemistry in areas where bedrock is concealed beneath a till veneer (Lett 2010)."

11.2 Rock Field Collection

75 rocks were collected for a lithogeochemical survey (Chart 2 in Appendix 8, Map R-01). These were sampled along traverses to, and from, sites selected for sampling other geochem media as many locales were distant from access roads. This was to best use field time. Rock exposure is generally less than half a percent with the extensive till cover, quite poor, and if only rocks were collected the survey would be quite inefficient.

Pyritic and altered sites are included as well as QV float. This survey is not areally comprehensive and collected sites are as random as the exposures. It is additional to the other surveys.

The rocks were most all grab samples of fresher material; if intervals were sampled Chart 2 records the width. Pre-labelled plastic bags were used with flagging. Concrete nails often secure a numbered aluminum tag at the sites. These are 4 digit numbers prefixed '0' to identify the sample as rock. Three duplicate pairs returned similar analyses.

Highlights were finding 0613D a boulder of intensely argillic-altered granitoid with 'epithermal-style' thin quartz veins, indicating a new style of mineralization and D. Bridge finding 0588, a cobble of a QV, anom in Au with secondary Bi-Te staining. Both were found about BiWold Dome (Map R-01).

11.3 Rock Analysis

Acme Analytical Labs analyzed the rocks by code ‘1F06’ Ultra Trace Geochemical aqua regia digestion (new Veritas code AQ250) ICP-MS. 500 g was crushed, split and pulverized to 30 g of -200 mesh powder then this digested in 1:1:1 aqua regia acid. Appendix 4 has Certificate of Analysis VAN13003232.1 for n=39 & VAN13003709.1 for n=18. A Certificate for VAN13005000.1 n=18 rocks is also included, but it was only received Jan. 28 2014 the cost of those results are not tallied in the expense items for assessment credit.

11.4 Interpretation of the Lithogeochem Survey

The Map series R-01 to R-11 maps 75 rock sample sites plotting the analytical results of 13 selected elements Au Bi Te As Fe Pb Zn Ni Cu Sb Mo W & S on uni-element maps. The population of 75 allows the analytical values to be ranged as bubble plots using MapInfo (2008)–Discover (2009) software. Each element’s values are first log-transformed then 5 ranges selected. These are based on ad-hoc examination of combined box plots and probability plots (or quantile plots) created by NCSS 2000 software (Hintze 2000).

On the R Map series the legends have the numbers of samples in the 5 interval ranges in brackets. Their percentiles can be calculated by dividing that number (cumulative for the lower ranges) by 75 and multiplying by 100. The first range is deemed anom, the second high and the third slightly high.

Thus the R map series highlight individual anomalies, hi values and slightly hi values of an element and also clusters of moderate values. This assists estimating an element’s mineral potential. For a good example see Map R-13 tungsten about Bmin Ck.

The background is the geologic map of Paradis et al. (2009), slightly transparent. It is only a rough guide to the underlying geology. More accurate 1:20,000 B.C. TRIM topo contours overlie the NTS 1:50,000 contour lines of that. Previously known showings have black labels, new ones gray blue.

Chart 2 of the rock data in Appendix 8 has anomalies of the tabled elements in **bold red**, highs in red and slightly high values in *red italics*.

11.4.1 Gold Map R-02

Map R-02 at 1:6,000 scale shows the LW Ridge area over the Wallack stock granitic contact is slightly enriched, and the S part - comprising BiWold Dome, E of the known showings on central CLY - is well enriched in gold. Higher values listed N to S are:

LW Ridge area

0598 from upper Bzero Ck is *slightly hi at 6.1 ppb*. It is very siliceous quartzite or hornfels with unidentified sulphides ~5% at the contact of the Wallack stock granite. Fe is slightly hi at 3.55%.

0605 an undescribed grab sample from upper Hone Ck collected at the silt S989102 site ran hi 30.4 ppb Au / anom 23 Bi / hi 1.0 Te / hi 79 Cu (ppm) & hi 4.3% Fe.

0597 from the North Ridge at the headwaters of Bogo trib has hi 28.1 ppb Au / anom 1,112.2 As / anom 5.0 Sb (ppm) and hi 4.70% Fe. Part II by E. Webster has a photo, see that fig. 9. It is “Druzy quartz with limonite boxwork and iron staining” weathering dark brown due to limonite. Its host is pelite (meta-argillite) with andalusite developed.

Higher ppb Au values show the LW Ridge has potential for mineralized Au-Bi-Zn-Pb-W bearing skarns.

S part - BiWold Dome

Four rocks from BiWold Dome area are of interest:

0607D from the N side of BiWold Dome a limonite stained, off white, clay-altered granitoid boulder with an epithermal-style veinlet ran **anom 207.6 ppb Au** / 0.35 Bi / 0.17 Te / hi 63.7 As and hi 55.94 ppm Pb.

Its duplicate 0613D ran **anom 305.1 ppb Au** / 0.52 ppm Bi above the median value / 0.31 Te also above its median value / hi 59.7 As and slightly hi 28 Pb (ppm).

0588 from the W side is a rounded cobble of a mineralized 20 x 8 cm sized qtz vein found uphill of the Timbered Shaft QV (Fig. 13 photo, detail in ‘Mineralized Sites’ section). Milky white medium - coarse crystalline qtz has mm sized vugs. One cm-thick veinlet of medium - dark grey-blue quartz has common lemon-yellow Bi ochre. Dark red-brown limonite boxwork infills another fracture that is slightly open. Geochem ran **anom 573.1 ppb Au**, 34.65 Bi an anom outlier / hi 1.48 Te / hi 30.1 As / hi 95.44 Pb / slightly hi 3 Mo and bkgd 0.2 W (ppm).

0594 from near the summit of BiWold Dome is a grab sample of 3 pieces of 20 cm thick QVs with minor vugs and Fe staining, not in place but local, collected by D. Bridge. It has hi 29 ppb Au with hi 28.6 As / slightly hi 0.31 Sb & hi 49.95 Pb (ppm).

0593 from near BiWold Dome summit, a grab sample of 8 pieces of local-sourced 10-25cm thick QVs, ran *slightly hi 7.7 ppb Au* / 0.84 Bi above the median value / slightly hi 0.45 ppm Te / hi 58.78 Pb (ppm).

S part - central CLY

See the respective sections in the mineralized sites section for further detail on:

0507 a thin QV in the Yankee Open Cut, the best of four rocks ran **anom 428 ppb Au** / bkgd Bi & Te, anom 1,166 As / anom 1.85 Sb / slightly hi 3.62 Mo (ppm) and slightly hi 0.53% S. See that section for detail.

0654 of the FC-64 adit sampled ~1% disseminated fine crystalline pyrite in altered granitoid. It ran *slightly anom 17 ppb Au* hi 65 Pb & hi 146 Zn (ppm). See that section for detail.

0625 re-samples a drill target, Lefevre ‘Vein 2’ an **anom 13.54 g/t Au** sulphidic pyrrhotite + arsenopyrite bearing QV in the W pit of Section 4. See ‘Mineralized Sites’ section for detail; Part II by E. Webster has photos.

0651D with **anom 2.7 g/t Au** and its duplicate 06531D with **anom 2.3 g/t Au** re-sample the High-Sulphide Meta-argillite Boulder 918061 of Jaxon (Williams 2010a). This dark grey brown sulphidic meta-argillite or hornfels has abundant magnetic micro – very fine crystalline pyrrhotite, sparse chalcopyrite and trace scheelite with 0.026% W. It is multi-element anom. See the Mineralized sites section for detail.

11.4.2 Bismuth Map R-03

LW Ridge area
Bmin trib basin

0492 Light green diopside & red garnet **calc-silicate skarn**, from a subcrop in flowing Bmin trib, has hi 3.3 Bi / hi 92.3 Zn / slightly hi 53.73 Cu / hi 5.44 Mo & hi 6.8 W (ppm).

0614 from a small ridge above Bmin trib has Bi 0.89 above the median value and anom Mo 178.16 (ppm). It is undescribed angular skarn float.

0615 Off white to pale skarn float, many angular pieces in a small area, with tr garnet & epidote, has hi 4.76 ppm Bi / hi 102.6 Zn and slightly hi W 2.3 (ppm). From a small ridge in Bmin trib basin.

Fig. 12 Close-up photo of 0228D hand specimen, dark green and maroon-purple banded calc-silicate skarn with sparse sulphides.

Duplicates 0228D (photo) & 0684D of calc-silicate skarn, contorted & polyfolded with red garnet, abundant vugs & pores and some sulphide stringers ran hi Bi 2.60 & 2.34 / hi 7.63 & 7.11 Mo / slightly hi 2.2 & 3.4 ppm W.

0620 “bluish grey quartz from a cliff face, trace pyrite, with an undetermined dark mineral” from Bogo trib has slightly hi 1.91 ppm Bi. No other elements are hi.

In upr Bzero Ck 0622 banded siliceous contact metamorphic rock with quartz layers & trace pyrite has 0.54 Bi above the median value / hi 0.74 Sb (ppm) & slightly hi 3.2% Fe.

0604 float from upper Hone Ck, a cobble sized v ang piece of skarn at moss mat MM989102 site has hi 6.68 Bi / slightly hi 0.44 Te (ppm) slightly hi 3.22% Fe & hi 1.53% S.

0605 an undescribed grab sample from upper Hone Ck collected at the silt S989102 site ran hi 30 ppb Au / **anomalous 23 Bi** / hi 1.0 Te / hi 79 Cu (ppm) & hi 4.3% Fe.

Anom and hi Bi values suggests potential for mineralized Au-Bi-Zn-Mo-W bearing skarns.

S part - BiWold Dome

Several rocks are of interest:

0588, from the W side, a rounded cobble of mineralized qtz vein found uphill of the Timbered Shaft QV ran 573.1 ppb Au, **34.65 ppm Bi an anom outlier** / hi 1.48 Te / high 30.1 As / hi 95.44 Pb / slightly hi 3 Mo and bkgd 0.2 W (ppm).

0593 from near BiWold Dome summit, a grab sample of 8 pieces of local-sourced 10-25cm thick QVs, ran slightly hi 7.7 ppb Au / *0.84 Bi above the median value* / slightly hi 0.45 Te / hi 58.78 Pb (ppm).

0607D from the N side of BiWold Dome the limonite stained off white, clay-altered granitoid boulder with an epithermal-style veinlet ran anom 207.6 ppb Au / *0.35 Bi above the median value* / 0.17 Te / hi 63.7 As and hi 55.94 Pb (ppm).

Its duplicate 0613D ran anom 305.1 ppb Au / *0.52 ppm Bi above the median value* / 0.31 Te also above its median value / hi 59.7 As and slightly hi 28 Pb (ppm).

S part - central CLY

0663 from the Lady of Lake hydraulic cut garnet-diopside calc-silicate, moderately siliceous with abundant qtz veining ran *1.25 ppm Bi above the median value* / **anom 2,864 Zn** / high 20.1 W (ppm). See the Mineralized Sites entry for detail and a photo.

0507 a thin QV in the Yankee Open Cut, the best of four rocks ran anom 428 ppb Au / bkgd Bi &Te, anom 1,166 As / anom 1.85 Sb / slightly hi 3.62 Mo (ppm) and slightly hi 0.53% S. See that section for detail.

11.4.3 Tellurium Map R-04

LW Ridge area

0604 float from upper Hone Ck, a cobble sized v ang piece of skarn at moss mat MM989102 site has hi 6.68 Bi / *slightly hi 0.44 Te* (ppm) slightly hi 3.22% Fe & hi 1.53% S.

0605 an undescribed grab sample from upper Hone Ck collected at the silt S989102 site ran hi 30 ppb Au / anomalous 23 Bi / hi 1.0 ppm Te / hi 79 Cu (ppm) & hi 4.3% Fe.

S part - BiWold Dome

0588 from the W side uphill of the Timbered Shaft QV, the mineralized QV cobble ran 573.1 ppb Au, 34.65 ppm Bi an anom outlier / hi 1.48 ppm Te / high 30.1 As / hi 95.44 Pb / slightly hi 3 Mo and bkgd 0.2 W (ppm).

0607D from the N side of BiWold Dome the limonite stained off white, clay-altered granitoid boulder with an epithermal-style veinlet ran anom 207.6 ppb Au / 0.35 Bi / 0.17 Te near bkgd / hi 63.7 As and hi 55.94 Pb (ppm).

Its duplicate 0613D ran anom 305.1 ppb Au / 0.52 ppm Bi above the median value / *0.31 Te above its median value* / hi 59.7 As and slightly hi 28 Pb (ppm).

0593 from near BiWold Dome summit, a grab sample of 8 pieces of local-sourced 10-25cm thick QVs, ran slightly hi 7.7 ppb Au / 0.84 Bi above the median value / *slightly hi 0.45 ppm Te* / hi 58.78 Pb (ppm).

0627 a QV in the lowest part of Iron Founder #2 trench hi 3.93 ppm Te – but with nil Au. This showing is further discussed in the 'Mineralized Sites' section.

0507 a thin QV in the Yankee Open Cut, the best of four rocks ran anom 428 ppb Au / bkgd Bi & Te, anom 1,166 As / anom 1.85 Sb / slightly hi 3.62 Mo (ppm) and slightly hi 0.53% S. See that section for detail.

Te is subdued in rocks not from known showings.

11.4.4 Arsenic Map R-05

LW Ridge area

from upr Bzero Ck 0650 in argillite (?) with an unidentified mineral has hi 77.3 As & hi 0.65 Sb (ppm).

0612 has hi 78.2 ppm As in quartzite skarn with disseminated sulphides. Both have no other anom elements.

0597 from the North Ridge at the headwaters of Bogo trib has hi 28.1 ppb Au / **anom 1,112.2 As** / anom 5.0 Sb (ppm) and hi 4.70% Fe. It is "Druzy quartz with limonite boxwork and iron staining" hosted in pelite with andalusite developed. There are two slightly hi values in both Bogo trib and Hone Ck.

S part - BiWold Dome

0607D from the N side of BiWold Dome the limonite stained off white, clay-altered granitoid boulder with an epithermal-style veinlet ran anom 207.6 ppb Au / 0.35 Bi / 0.17 Te near bkgd / hi 63.7 As and hi 55.94 Pb (ppm).

Its duplicate 0613D ran anom 305.1 ppb Au / 0.52 ppm Bi above the median value / 0.31 Te also above its median value / hi 59.7 As and slightly hi 28 Pb (ppm).

0588 from the W side uphill of the Timbered Shaft QV, the mineralized QV cobble ran 573.1 ppb Au, 34.65 ppm Bi an anom outlier / hi 1.48 Te / hi 30.1 As / hi 95.44 Pb / slightly hi 3 Mo and bkgd 0.2 W (ppm).

0594 from near the summit of BiWold Dome is a grab sample of 3 pieces of 20 cm thick QVs with minor vugs and Fe staining, not in place but local, collected by D. Bridge. It has hi 29 ppb Au with hi 28.6 As / slightly hi 0.31 Sb & hi 49.95 Pb (ppm).

0645 from the (upper) Hydro tower rock cut, a channel sample of fault gouge along a very rusty fault in the BH sill ran **anom 243.1 As** / 370.9 Ni / 2.78 Sb & 5.95 Mo (ppm).

For 0634 from Clease 0446 Shear Zone with hi 30.9 ppm As, see that mineralized site sxn.

0507 a thin QV in the Yankee Open Cut, the best of four rocks ran anom 428 ppb Au / bkgd Bi & Te, **anom 1,166 As** / anom 1.85 Sb / slightly hi 3.62 Mo (ppm) and slightly hi 0.53% S. See that section for detail.

11.4.5 Iron Map R-06

LW Ridge area

Upper Bzero Ck has 3 slightly hi Fe values, ex. 0598 from very siliceous quartzite or hornfels with unidentified sulphides ~5%; at the contact of a Wallack stock granite Fe is *slightly hi at 3.55%* with hi Au 6.1 ppb.

Also in upr Bzero Ck 0622 banded siliceous contact metamorphic rock with quartz layers & trace pyrite has 0.54 Bi (above median values) / hi 0.74 Sb (ppm) & *slightly hi 3.2% Fe*.

Values in Bogo & Hone Ck are prominent:
0597 from the North Ridge at the headwaters of Bogo trib has hi 28.1 ppb Au / anom 1,112.2 As / anom 5.0 Sb (ppm) and hi 4.70% Fe. It is “Druzy quartz with limonite boxwork and iron staining” hosted in pelite with andalusite.

0604 float from upper Hone Ck, a cobble sized v ang piece of skarn at moss mat MM989102 site has hi 6.68 Bi / slightly hi 0.44 Te (ppm) *slightly hi 3.22% Fe* & hi 1.53% S.

0643 from Hone Ck hornblende (actinolite?) skarn with unidentified sulphides has **anom 7.33% Fe**, hi 100.6 Zn & hi 88.47 Cu (ppm).

See Chart 2 for Fe highs in 0644 & 0619 from Bogo trib and 0604, 0605, 0685, 0624 from upr Hone Ck.

Ex. 0605 an undescribed grab sample from upper Hone Ck collected at the site of silt S989102 ran hi 30 ppb Au / anom 23 Bi / hi 1.0 Te / hi 79 Cu (ppm) & hi 4.3% Fe.

Higher Fe suggests potential for varied mineralization types.

S part - BiWold Dome

0642 a very rusty skarn cobble from Clel 780V3 trib with trace pyrite, altered, with minor dark grey very fine grained sulphides along fissures. Found beside red-flagged rk 0608 on the Quad Trail, 0642 has hi 91.9 ppm Zn *slightly hi 3.32% Fe* and slightly hi 0.56% S.

0658 altered black argillite, several pieces from small ridge about 2.5 m above HM-24 Ridge trib, ran *slightly hi 3.47% Fe* and slightly hi 0.64% S.

See the mineralized sites sxn for discussion of 0625 of 'Vein 2' a Lefevre QV drill target, and 0651D & 0653D from the High Sulphide Meta-argillite boulder 918061.

11.4.6 Lead Map R-07

LW Ridge area

Overall this area has little Pb with no anoms nor highs. Four slightly hi values >12.1 ppm are 0631 / 0601 / 0602 & 0603.

0631 from Wallack 710K0 trib has *slightly hi 20.55* ppm Pb and no other elements of interest.

S part - BiWold Dome

Five rocks from BiWold Dome are Pb-enriched:

0588 from the W side, uphill of the Timbered Shaft QV, the mineralized QV cobble ran anom 573.1 ppb Au, 34.65 Bi an anom outlier / hi 1.48 Te / hi 30.1 As / hi 95.44 Pb / slightly hi 3 Mo and bkgd 0.2 W (all ppm).

0607D from the N side of BiWold Dome the limonite stained off white, clay-altered granitoid boulder with an epithermal-style veinlet ran anom 207.6 ppb Au / 0.35 Bi / 0.17 Te / hi 63.7 As and hi 55.94 ppm Pb.

Its duplicate 0613D ran anom 305.1 ppb Au / 0.52 ppm Bi above the median value / 0.31 Te also above its median value / hi 59.7 As and *slightly hi 28 Pb* (ppm).

0593 from near BiWold Dome summit, a grab sample of 8 pieces of local-sourced 10-25cm thick QVs, ran slightly hi 7.7 ppb Au / 0.84 Bi above the median value / slightly hi 0.45 ppm Te / hi 58.78 Pb (ppm).

0594 from near the summit of BiWold Dome is a grab sample of 3 pieces of 20 cm thick QVs with minor vugs and Fe staining, not in place but local, collected by D. Bridge. It has hi 29 ppb Au with hi 28.6 As / slightly hi 0.31 Sb & hi 49.95 Pb (ppm).

0640 Pyritic argillite float just below Quad Trail ran *slightly hi 24.53 Pb* / hi 6.02 Mo (ppm) & slightly hi 0.58% S.

For Iron Founder #2 trench QVs see that mineralized site sxn.

0654 of the FC-64 adit sampled ~1% disseminated fine crystalline pyrite in altered granitoid. It ran slightly anom 17 ppb Au hi 65 Pb & hi 146 Zn (ppm). See that section for detail.

11.4.7 Zinc Map R-08

LW Ridge area

In contrast to Pb there are several highs, notably in Bmin trib. For one:

0492 Light green diopside & red garnet **calc-silicate skarn**, from a subcrop in flowing Bmin trib, has hi 3.3 Bi / hi 92.3 Zn / slightly hi 53.73 Cu / hi 5.44 Mo & hi 6.8 W (ppm).

0615 Off white to pale skarn float, many angular pieces in a small area, with tr garnet & epidote, has hi 4.76 Bi / hi 102.6 Zn and slightly hi W 2.3 (ppm). From a small ridge in Bmin trib basin.

0643 from Hone Ck, hornblende (actinolite?) skarn with unidentified sulphides has anom 7.33% Fe, hi 100.6 ppm Zn & hi 88.47 ppm Cu.

Higher Zn suggests potential for mineralized Zn-Bi-Mo-W bearing skarns.

S part - BiWold Dome

0642 a very rusty skarn cobble from Clel 780V3 trib with trace pyrite, altered, with minor dark grey very fine grained sulphides along fissures. Found beside red-flagged rk 0608 on the Quad Trail, 0642 has hi 91.9 ppm Zn slightly hi 3.32% Fe and slightly hi 0.56% S.

0663 from the Lady of Lake hydraulic cut garnet-diopside calc-silicate, moderately siliceous with abundant qtz veining ran 1.25 ppm Bi above the median value / **anom 2,864 Zn** / hi 20.1 W (ppm). See the Mineralized Sites entry for detail and a photo.

0654 of the FC-64 adit sampled ~1% disseminated fine crystalline pyrite in altered granitoid. It ran slightly anom 17 ppb Au hi 65 Pb & hi 146 Zn (ppm). See that section for detail.

11.4.8 Nickel Map R-09

LW Ridge area

Rocks from these creeks returned four of five high Ni values and many slightly high values. Chromite or Hercynite or Cr-spinel gn counts in Bzero Ck & Bmin trib (Map M-06) infers the HCA ophiolite is present. The low-level nickel is likely derived from that.

S part - BiWold Dome

The single **anom 370.9 ppm Ni** is along a rusty fault in the upper hydro tower BH sill cut is somewhat unusual. There are high values in the High-Sulphide Meta-argillite Boulder 918061 in the duplicate samples.

11.4.9 Copper Map R-10

LW Ridge area

There is a slight Cu concentration c.f. BiWold Dome.

0492 Light green diopside & red garnet calc-silicate skarn, from a subcrop in flowing Bmin trib, with hi 3.3 Bi / 92.3 Zn / *slightly hi 53.73 Cu* / hi 5.44 Mo & hi 6.8 W (ppm).

In Bogo trib 0619 a boulder of diopside skarn has **anom 150.57 ppm Cu** & hi 1.61% S. Pyrite is possible with trace magnetite and 10-15% sulfides. 0617 & 0618 are bkgd (Chart 2).

0605 an undescribed grab sample from upper Hone Ck collected at the site of silt S989102 ran hi 30 ppb Au / anom 23 Bi / hi 1.0 Te / hi 79 Cu (ppm) & hi 4.3% Fe.

0643 from Hone Ck, hornblende (actinolite?) skarn with unidentified sulphides has anom 7.33% Fe, hi 100.6 ppm Zn & hi 88.47 Cu (ppm).

S part - BiWold Dome

Only two showings are anom: 0625 the Lefevre 'Vein 2' drill target, and 0651D & 0653D a duplicate pair of the High-Sulphide Meta-argillite Boulder 918061 with visible chalcopyrite; see the showing section for details.

11.4.10 Antimony Map R-11

LW Ridge area

Antimony has low ppm ranges.

0612 in upper Bzero Ck massive quartzite skarn with disseminated sulphides has hi 78.2 As and **anom 0.99 Sb** (ppm).

0622 in same, banded siliceous contact metamorphic rock with quartz layers & trace pyrite has 0.54 Bi / hi 0.74 Sb (ppm) & slightly hi 3.2% Fe.

0650 in same, argillite (?) has hi 0.65 ppm Sb.

0597 from the North Ridge at the headwaters of Bogo trib has anom 28.1 ppb Au anom 1,112.2 ppm As high 4.70% Fe & **anom 5.0 ppm Sb**. It is "druzy quartz with limonite boxwork and iron staining" hosted in pelite with andalusite.

S part - BiWold Dome

0594 from near the summit of BiWold Dome is a grab sample of 3 pieces of 20 cm thick QVs with minor vugs and Fe staining, not in place but local, collected by D. Bridge. It has hi 29 ppb Au with hi 28.6 As / *slightly hi 0.31 Sb* & hi 49.95 Pb (ppm).

0610 a cobble of blue-grey QV from Clel 780V3 trib has *slightly hi 0.26 Sb* and no other elements of interest.

Sb has hi or slightly hi values in the showings; see those sections.

11.4.11 Molybdenum Map R-12

LW Ridge area

On CLY molybdenum generally has a very low ppm range. In Bmin trib basin an anom and two highs suggest mineralization:

0614 has **anom Mo 178.16** and Bi 0.89 above the median value (ppm). It is undescribed angular skarn float from a small ridge above Bmin.

Duplicates 0228D & 0684D of calc-silicate skarn, contorted & polyfolded with red garnet, abundant vugs & pores and common sulphide stringers ran hi Bi 2.60 & 2.34 / hi 7.63 & 7.11 Mo / slightly hi 2.2 & 3.4 ppm W.

0492 Light green diopside & red garnet calc-silicate skarn, from a subcrop in flowing Bmin trib, with hi 3.3 ppm Bi / 92.3 Zn / slightly hi 53.73 Cu / hi 5.44 Mo & hi 6.8 W (ppm).

Higher Mo suggests potential for Au-Bi-Zn-Mo-W bearing skarns.

S part - BiWold Dome

0578 QV float, well fractured with very limonitized boxwork from possible pyrite ran hi 5.97 ppm Mo.

0640 Pyritic argillite float just below Quad Trail ran slightly hi 24.53 Pb / hi 6.02 Mo (ppm) & slightly hi 0.58% S.

For Mo in the showings see those sections.

11.4.12 Tungsten Map R-13

LW Ridge area
Bmin trib basin

Bmin trib basin has a marked cluster of higher W-in-rocks with 1 hi and 3 slightly hi values (the anom class is reserved for values >50 ppm W) **a prime result of the lithogeochem survey.**

0591 Pale green diopside skarn with ~1% disseminated pyrite, from a small ridge scarp, *slightly hi 3.4 ppm W*; highs in no other elements.

0492 Light green diopside & red garnet calc-silicate skarn, from a subcrop in flowing Bmin trib, with hi 3.3 Bi / 92.3 Zn / slightly hi 53.73 Cu / hi 5.44 Mo & hi 6.8 W (ppm).

Duplicates 0228D & 0684D of calc-silicate skarn, contorted & polyfolded with red garnet, abundant vugs & pores and common sulphide stringers ran hi 2.60 & 2.34 Bi / hi 7.63 & 7.11 Mo / *slightly hi 2.2 & 3.4 ppm W.*

0615 Off white to pale skarn float, many angular pieces in a small area, with tr garnet & epidote, has hi 4.76 Bi / hi 102.6 Zn and *slightly hi 2.3 ppm W*. From a small ridge in Bmin trib basin.

S part - BiWold Dome

0663 from the Lady of Lake hydraulic cut garnet-diopside calc-silicate, moderately siliceous with abundant qtz veining ran 1.25 ppm Bi above the median value / **anom 2,864 Zn** / high 20.1 W (ppm). See the Mineralized Sites entry for detail and a photo.

11.4.13 Sulphur Map R-14

LW Ridge area

Bogo-Hone Ck drainage has 2 highs

from Bogo trib 0619 a boulder of diopside skarn has anom 150.57 ppm Cu & hi 1.61% S. “Pyrite is possible with trace magnetite and 10-15% sulfides”.

0604 float from upper Hone Ck, a cobble sized v ang piece of skarn at moss mat MM989102 site has hi 6.68 Bi slightly hi 0.44 Te (ppm) slightly hi 3.22% Fe & hi 1.53% S.

S part - BiWold Dome

0640 Pyritic argillite float just below Quad Trail ran slightly hi 24.53 Pb / hi 6.02 Mo (ppm) & *slightly hi 0.58% S*.

0642 a very rusty skarn cobble from Clel 780V3 trib with trace pyrite, altered, with minor dark grey very fine grained sulphides along fissures. Found beside red-flagged rk 0608 on the Quad Trail, 0642 has hi 91.9 ppm Zn slightly hi 3.32% Fe and *slightly hi 0.56% S.*

0658 altered black argillite, several pieces from small ridge about 2.5 m above HM-24 Ridge trib, ran slightly hi 3.47% Fe and *slightly hi 0.64% S.*

0507 a thin QV in the Yankee Open Cut, the best of four rocks ran **anom 428 ppb** Au / bkgd Bi & Te, anom 1,166 As / anom 1.85 Sb / slightly hi 3.62 Mo (ppm) and *slightly hi 0.53% S*. See that section for detail.

11.5 Summary - Interpretation of the Lithogeochem Survey

11.5.1 LW Ridge area

The best find was 0597 quartz (likely a vein) from the LW ridge at the headwaters of Bogo trib. As & Sb are anom, Au is hi, and Fe hi 4.70% (see Part II by E. Webster, fig. 9 photo). 0597 is “druzy quartz with limonite boxwork and iron staining” in meta-argillite with andalusite developed.

About the LW ridge slightly higher ppb Au values show potential for mineralized Au-Bi-Zn-Mo-W bearing skarns. That fits with anom in Au-Bi-Te in silts and moss mats in Bmin trib. In rock Bi appears to be a gold pathfinder with several slightly hi and hi values (Map R-03). Bmin trib basin has a marked cluster of higher W-in-rocks with 1 hi and 3 slightly hi values (on Map R-13 the anom class is reserved for values >50 ppm W).

Bmin trib is anom in all sampled geochem media (rocks, silts, MM, bulk silts) with multi-element anoms in multiple samples of each. Tills were not sampled. It is Class II VG gn anomalous (Map H-01)Bmin trib is clearly the best target for *currently eroding but likely well-covered* possibly economic Au mineralization in the LW ridge area. Other associated elements are typical of productive Au deposits. Mineralization appears to be related to the N-trending granitic intrusive contact of the Wallack Ck stock. Very significantly highly anomalous amounts of ‘**blue sapphire’ Corundum occur** in Bmin trib, also **Grossular-andradite garnet** (Map M-02) and scheelite (Map M-05). **Chromite or Hercynite or Cr-spinels** is anom (Map M-06); 5 of 5 SEM-identified gns of **hercynite** (Map M-08) show a peculiar higher-T environment.

Au mineralization is likely structurally-controlled by secondary faults related to the *Waneta–Tillicum–MPT Fault-Shear Zone system* (Fig. 9 map). This is major structural ‘break’ that has emplaced (and sliced) the carbonate-bearing upper Laib and Laib Formation country rocks. Unmapped occurrences of HCA ophiolite with chromite-bearing ultramafics are indicated. Further favouring contact-related Au mineralization is evidence that the granitoids are also sheared and faulted (Einarsen 1994, section ‘Rock Cuts in BH sill…’ has photos). This allows siting of Au-bearing hydrothermal fluids in active structures, post granite emplacement.

11.5.2 BiWold Dome area

On the N side a clay-altered granitoid boulder has 1-5 mm sized blue-grey epithermal-style qtz veinlets along scarce fractures, with common sub-mm sized vugs. Duplicate samples 0613D is Au-anom 305 ppb with hi 60 As and slightly hi 28 Pb (ppm). Bi & Te are above their median values. 0607D is Au-anom 208 ppb with hi 64 As and hi 56 Pb (ppm). Bi & Te are low.

From near BiWold Dome summit grab sample 0594 of 3 pieces of locally-sourced 20 cm thick QVs, with minor vugs and Fe staining, has hi 29 ppb Au, hi 28.6 ppm As & hi 49.95 ppm Pb.

This mineralization style differs from the mesothermal (orogenic) style, thick and ‘compact’ QVs with Au-Bi-Te-As about the BH mine site. These two float rocks are Au-As-Pb bearing and indicate a different target style– formed at higher levels? Importantly they substantiate a major multi-element, multi-sample Au-in-till anom (which see).

0588 uphill of the Timbered Shaft QV from the W side of BiWold Dome is a rounded cobble of a mineralized milky-white qtz vein with common lemon-yellow Bi ochre (Fig. 13 photo, detail in ‘Mineralized Sites’ section). The geochem signature is Au-Bi-Te-As-Pb like the BH mine area veins. Specifically it has anom 573.1 ppb Au / 34.65 Bi an anom outlier / hi 1.48 Te / hi 30.1 As / hi 95.44 Pb / slightly hi 3 Mo and bkgd 0.2 W (all ppm). The local area has good potential with a till anomaly just W.

12 Mineralized Sites

12.1 Lefevre QVs 'Vein 1' and 'Vein 2' in the West pit of Section 4

12.1.1 Mesothermal or Orogenic gold veins are expected in skarns

QVs are expected in skarns;

"Au skarns in metamorphic environments overlap with the general class of orogenic Au deposits (Goldfarb et al., 2005), a deposit type which typically exhibits a strong structural control on gold distribution along shear zones and in conjugate vein sets (Meinert et al. 2005)".

See Appendix 11.

12.1.2 Lefevre QVs

Three known QVs cross cut the Lefevre skarn-hornfels, two in the W pit of Section 4 'Vein 1' and 'Vein 2'. They were saw-cut and channel sampled by hand by Jaxon (Williams 2010a). H. Little's (1959) name for Section 4 is trench #5. Depending on the season it is often water-filled. There is another third QV in the W pit of Section 3E.

See Part II of this report by E. Webster, section '7.2.4 Workings in the Lefevre tungsten + gold skarn' for detail with several photos. In the W pit of Section 4, in the upper N wall on the N side, E. Webster measured Lefevre QV 'Vein 1' as 1.8 m thick. Its 90 cm thickness reported in Howard (2006) is incorrect - that was the width of rock sample LS-02.

12.1.3 Lefevre 'Vein 2'

Lefevre QV 'Vein 2' is a thinner vein exposed on the S & E sides in the same West pit. Jaxon sample 945544, a 0.5 m chip, ran 14.0 g/t gold, near ⅓ oz / ton. It is anom in Bi, Te, As & W (Table 3). P. Williams describes 945544 as

"fine grained biotitic quartzite with trace of massive and disseminated pyrite; crosscut by medium to coarse grained bull quartz vein up to 70 cm thick [Vein 2] with heavy mineralization of massive pyrite, pyrrhotite and trace of massive arsenopyrite + chalcopyrite. There is 2% scheelite under UV; about half is disseminated fine grains ranging to 8%".

0625 re-sampled 'Vein 2', it is pyrrhotite + arsenopyrite + quartz collected just above 0545 with the Al sample tag still present, close to Jaxon's 945544 chip sample. It ran anom 13.5 g/t Au. Arsenopyrite is not present as arsenic in the geochem. The geochem cost is not included as an expense for assessment credit.

Vein 2 orients 040 52 SE (A. Koffyberg Oct. 22 '07) or 000 54 E (E. Webster Sept. 30 '13); the mean of these is 020 51 SE. It runs about ⅓ oz. / ton and is a prime drill target with known orientation (Howard 2012).

Sample	Width, m	Vein No. Sampled	Au g/t	Bi ppm	Te ppm	As ppm	Sb ppm	Mo ppm	W ppm	Cu ppm	S %
Vein 1											
945530	1.1	1	**3.57**	**355**	**10**	**6,687**	**2.42**	26.61	**970**	96	2.3
*LS-02	0.5	1	***5.80**	**637**	**20**	**133**	**3.23**	11.4	**>100**	*45*	0.2
945531	1.3	1 & 2	**1.71**	**170**	4.8	28	*0.32*	12.76	**3,010**	**135**	**3.6**
945533	1.4	1	**2.27**	**194**	5.1	**338**	0.52	**31.16**	**1,090**	**167**	**4.0**
Vein 2											
945532	1.1	2	**2.03**	**161**	6.3	28.4	0.21	17.28	**1,980**	**214**	**4.9**
945544	0.5	2	**14.03**	**1,248**	**34**	**8,820**	**5.79**	**51.86**	**990**	98	3.0
0625	0.4	2	**13.5**	**83**	1.6	2	0.58	**60.38**	**>100**	**172**	**3.9**

Table 3 Lefevre QVs in Section 4, select geochem results of rock samples with Vein No. sampled and sample width. *LS-02 (Kennedy, 2003; Howard, 2005) re-assayed 8.84 g/t Au from a metallic screen procedure on 500 g. Classed from the population distribution of 75 rocks collected in 2013: anom in **bold red**, hi in red, slightly hi in *red italics.*

12.2 High-Sulphide Meta-argillite Boulder 918061

The best find in 2008 of Jaxon's 461 rock samples from prospecting was 918061, a rusty boulder from Hort trib drainage at 471,962 mE 5,433,508 mN. It is south of the steel-towered hydro line and BH sill outcrops in the catchment basin of HM-14 mid Hort trib but **below that of** HM-04 upr Hort trib.

Access is by foot from the end of the upper Hydro Tower road to logging trails. The rusty boulder is under a large fallen cedar tree beside a streamlet, in a small copse of birch trees left in a clear cut:

"A large very rusty and very silicic boulder of banded argillite containing at least 20% medium and fine grained ~~pyrite~~ was found on the south bank of Horticulturalist ~~Creek~~ trib, south of the BH mine area (sample 918061, 5,433,508N 471,966E) … there may be mineralization … upslope in geology that has not been closely mapped (Williams 2010a)."

A memo by Jaxon dated April 28 2009 describes 918061 as 'Silicified argillite, banded, boudinaged & brecciated texture; >5% sulfides (predominantly fine & medium grained ~~pyrite?~~), heavy limonite weathering; has UV response of scheelite & powellite.'

2008 analysis of a 1.83 kg grab sample ran anom 2.19 g/t gold, 1.0 g/t Ag, 145 Bi / 5.7 Te / 11.8 Mo / 497 Cu (ppm) and **0.026% W** (Table 5). Ni & Co are moderately high at 47 and 36 ppm. **Fe is very high at 16.0% as there is abundant magnetic pyrrhotite; S corresponds at 9.22%.** As 0.9 Sb 0.3 Pb 4 & Zn 42.3 (ppm) are very low (Williams 2010a). Jaxon did not re-sample it.

918061 is a glacially-modified subrounded boulder 32 cm long, 30 cm wide and 23 cm thick. It is sulphidic meta-argillite, heavy and very hard. The boulder has a mm-thick, orange-brown, flakey rind of limonite (from post-glacial weathering?). Rock 0651D re-samples the 918061 boulder as a representative, complete broken piece 17 x 14 x 6 cm in size. The lithology is **dark grey brown sulphidic meta-argillite or hornfels with abundant magnetic micro to very fine crystalline pyrrhotite and trace chalcopyrite & scheelite**. *No pyrite* was observed. Chalcopyrite occurs in sparse 3 mm-sized blebs. There is no reaction with acid. The sub-mm sized bedding laminations are quite contorted; some 5 cm scale beds are evident. Brecciation is common. The boulder is very hard and fractures with sharp, irregular conchoidal surfaces. White, vitreous, siliceous (?) cm-sized ovoid-like segregations are partly scheelite. 06531D is a duplicate sample collected from most all the boulder's broken chips.

Rock Sample ID	Au ppb	Bi ppm	Te ppm	Ag ppb	Fe %	Cu ppm	Ni ppm	Co ppm	Mo ppm	W %	S %	Rb ppm
918061	2,190	145	5.7	1,054	16.0	497	47	36	12	**0.026%**	9.2	100
0651D	2,708	159	7.1	1,658	22.0	616	59	48	7.8	>100.00 ppm	7.3	92
0653D	2,642	164	6.9	1,792	20.3	795	56	42	3.8	>100.00 ppm	8.6	42
Anomaly Class	**anom**	**anom**	**anom**	**anom**	**anom**	**anom**	high	?	*Slightly hi to hi*	**anom**	**anom**	*Relatively high*

Table 5 High-Sulphide Meta-argillite Boulder 918061, selected elements of three geochemical analyses. Anomaly class considers the element's distribution in 75 rocks (lithogeochem section above).

12.2.1 Conclusion re High-Sulphide Meta-argillite Boulder 918061

The glacially modified boulder is from some unknown bedrock mineralization. It runs **anom 2.7 g/ t Au** (Table 5, 0653D) and is multi-element anom and either VMS or skarn mineralization. With low As Ni & Co the latter is more likely. The meta-argillite has little carbonate content and is not typical skarn.

The 918061 boulder lies in the watershed of HM-14 mid Hort trib, not particularly prospective for scheelite + gold mineralization (Table 18). Discussed latter, from that silt 9 VG gns were recovered, classed 6+2+1. Standardized to 10 kg this is {9.8} gns, 4th rank for the 23 bulk silts. However the recovered gns are small with low weights contributing low Calculated Gold in the bulk silt, 0.61 ppb and not anom.

It may require considerable effort to find the likely covered bedrock source.

12.3 Quartz vein Cobble 0588 near Timbered Shaft

Fig. 13 Photo of 0588, a cobble of a mineralized QV found near the Timbered Shaft QV (Map T-01) with 0.57 g/t Au, anom Bi and hi Te As & Pb. Medium to dark gray-blue qtz and lemon-yellow Bi ochre signals gold mineralization

0588 is a glacially-modified rounded 20 x 8 cm sized cobble of a mineralized QV found at 472,056 mE 5,434,301 mN in a clear cut uphill of the Timbered Shaft QV (Map T-01) about BiWold Dome (Fig. 13). Milky white medium - coarse crystalline qtz has mm sized vugs. One cm-thick veinlet of medium to dark gray-blue qtz has common lemon-yellow Bi ochre. Dark red-brown limonite boxwork infills another fracture that is slightly open. Geochem ran anom 573.1 ppb Au, 34.65 Bi an anom outlier / hi 1.48 Te / hi 30.1 As / hi 95.44 Pb and slightly hi 3 Mo (ppm). Sb is bkgd. The combined anomalies indicate **qtz-gold vein mineralization occurs *along the E contact of the BH sill, not solely the W contact.***

12.4 Quartz-veined Granitoid boulder 0607D - 0613D

0607D and its duplicate 0613D sample an angular off white granitoid? boulder found along the Quad trail on the N side of BiWold Dome at 472,617 mE 5,434,496 mN (Map T-01, Fig. 14). Most all feldspars are altered to clay minerals with common sub-mm to mm sized vugs developed. A 0.5 - 1.0 cm thick blue-grey QV occupies an open fracture. ~0.2% well dispersed microcrystalline pyrite weathers light brown.

0613D ran anom 305 ppb Au, 0.5 Bi & 0.3 Te (above their median rock values) / hi 60 As / moderately low 28 Pb (ppm). Comparing 0588 with 0613D, the associated elements differ: Au-Bi-Te-As-Pb vs. Au-As. The boulder may be from **epithermal QV mineralization with argillic alteration,** a new deposit type about BiWold Dome. The area is prospective for gold.

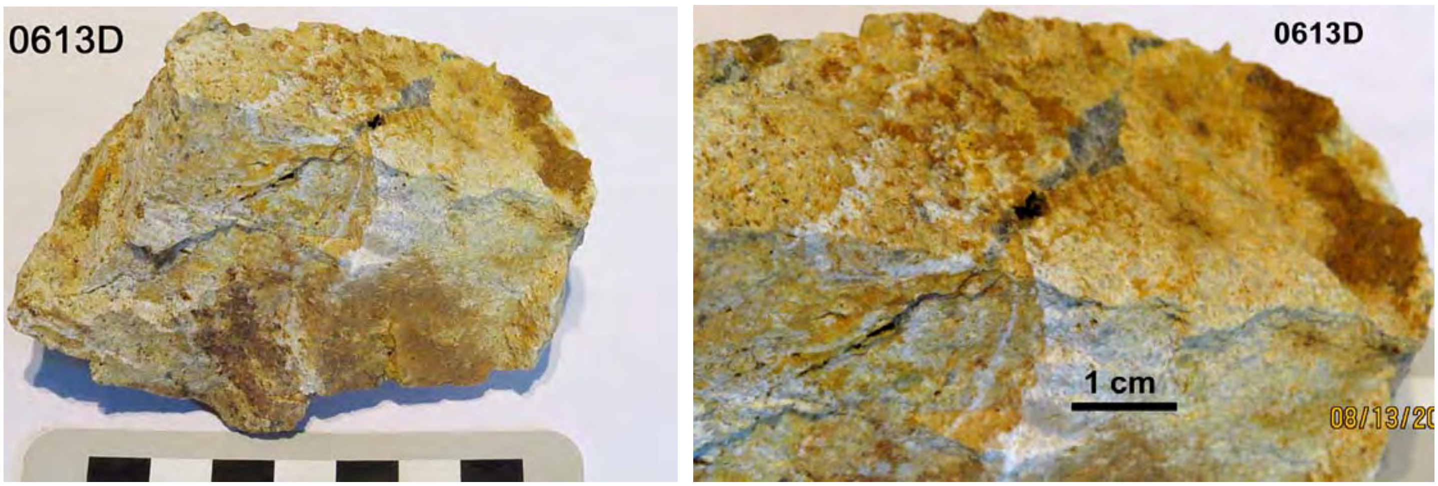


Fig. 14 Two photos of 0613D an angular boulder with an epithermal-style QV with anom 305 ppb Au and hi As, found along the Quad trail on the N side of BiWold Dome

12.5 Lady of Lake Wide Cut working and local environs

This working at 471,544 mE 5,433,764 mN ±3 m at elevation 1015 m (Map R-01) was found Sept. 18 2013 by a well-observant J. Denny. After collecting bulk silt sample HM-23 from lwr Ckay trib with W. Howard on hiking uphill he noted a large pile of moved earth and rock. On the bank above is a level opening, a considerable man-made cut trending 008° into the moderately step hillside. It likely led to what was **once a portal to small underground workings.** It is now well obscured by dense brush, fallen trees, and sloughed till & soil cover from land slips. The working is named Lady of Lake Wide Cut as it is located on that former 2-post claim (Bunker Hill Gold Mines map plan, no date, 1933-1935 vintage), and as the level cut is 6 m wide. It may originally have been a 19th C working. There was no flagging or evidence of recent sampling.

This showing and the two discussed below are close to the unmapped southward continuation of the W contact of the BH sill. The country rocks are possibly HCA. That hosts the Lefevre W + Au skarn-hornfels with the crossing Lefevre QVs grading ~⅓ oz / ton (Lefevre QVs… section).

In front to the left (W) of the Wide Cut is a ~1 x 2 m dump pile of very angular excavated rock. From examination and the geochem there is **a garnet-pyroxene-tremolite?-sphalerite-scheelite skarn with very minor pyrrhotite** (see Part II by E Webster, fig. 17a). One piece sample 0632 from the dump pile has a clot of magnetic pyrrhotite with a streak of an apple-green secondary mineral along a fracture. Trace brilliantly shining very fine grained specks (sphalerite?) lie along this same fracture (Part II by E. Webster has a photo). This 'best' sample (Table 6) ran Au background, Bi slightly hi 2.7, Zn anom >10,000 (>1%), W anom >100.00 ppm (>0.01%), Mo anom 39 (ppm), and S hi 1.3%, referring to element ranges in the R series Maps.

0633 is a grab of 4 pieces of mineralized pyrrhotite skarn, without any secondary minerals observed. A hand sample with coarse euhedral red garnet crystals was also found in the dump.

0636 is a grab of chips broken from 2 subrounded cobbles of light blue-grey, very hard, non-porous quartz found in front of the Wide Cut, about 3m to the E (to the rt) of the pile. The coloration is *not* due to dispersed Bi-Te minerals; Au was bkgd.

0637 is a 20 cm long grab sample of calcsilicate that subcrops in the W sidewall of the Wide Cut 4 m N (uphill) of the dump pile. Transposed compositional layering dips strikes NE and steeply SE, ex. measured on the W sidewall 2m N of the pile it orients 034° 82° SE.

Rock ID	Au ppb	Bi ppm	Ni ppm	Zn ppm	Mo ppm	W ppm	S %
0632 *from dump*	0.9	*2.66*	15.9	**>10,000 (>1%)**	**38.96**	**>100 ppm (>0.01%)**	1.27
0633 *from dump*	–	0.80	*30.7*	**1,843.0**	*2.58*	**55.26**	1.17
0636 *from dump*	–	0.05	0.7	2.6	0.13	0.36	–
0637 *in place*	–	0.24	11.8	**1,314.6**	7.31	**>100 ppm (>0.01%)**	0.04
0663 *in place* (photo)	1.8	1.25	10.8	**2,864**	0.63	20.1	–
0664 *in place, Road cut Calc-silicate*	2.7	0.34	*29.0*	207.9	*3.15*	9.11	–

Table 6 Lady of Lake Wide Cut and Road Cut Calc-silicate, rock sample geochem. Classed from the population distribution of 75 rocks collected in 2013: anom in **bold red**, hi in red, slightly hi in *red italics.*

Te is not tabled as it is below detection. Low Pb values are not anom and not listed. There are several small outcrops of garnet-pyroxene skarn and calc-silicate skarn with minor pyrite (~1-5%) SSW of the Wide Cut. Sample 0635, a 30 cm channel sample of very fine grained argillaceous calcsilicate with trace pyrite, is not listed above as it is not anom in any elements.

A very rusty can uphill in the deep ditch a few m to the W is evidence the Lady of Lake Wide Cut is a 1930's working. This man-made 'hydraulic cut', about 200 m wide and a rather unnatural depression, extends uphill to the old road bed and downhill to the W of the Wide Cut. It was likely made from frequent release of dammed snow melt. An automatic machine could have been used, this repeatedly activated in the spring thaw when enough water was collected. Fast water flow washed some ground away (J. Denny, p.c.).

12.6 Lady of Lake Road cut Calc-silicate

Old, narrow roadbeds occur uphill but curiously not in the immediate vicinity of the Lady of Lake Wide Cut. The Lady of Lake road cut is on a turn-about at the road's end. 0664 was hand-trenched to collect a 95cm chip sample of v rusty limonitic recessive calc-silicate. The compositional layering orients 034° 54° SE. A very soft, medium olive-brown lamprophyre dyke subcrops just E (to the right). 2.7 ppm Bi is slightly hi, 208 ppm Zn is anom and 9 ppm W is hi (Table 6).

12.7 Lady of Lake hydraulic cut W + Zn skarn

Nearby in 2009 P. Williams of Minconsult Mineral Exploration Services Ltd. collected a few grab rock samples: "Along the same west contact of the Bunker Hill intrusive that appears to localize the quartz [veins and also shears] at the Clease Showing [rather Showings, there are 5], and about 200m to the south, a new skarn exposure was located that returned only a single sample only slightly elevated in bismuth (Williams 2010b, p. 47)".

That sample was 973574, a 0.3m chip sample by P. Williams. Geochem ran low Au 3.3 ppb and high 2.94 ppm Bi (considering the interval ranges on Map R-03). Zn 157.7 ppm and W 41.9 ppm are anom (W is just below the anom threshold of 75 rocks 50.1 ppm, see Map R-13). 973574 was from

"a small outcrop; moderately pitted, moderately siliceous with abundant sheeted quartz veining. Up to 2cm thick stringers; locally moderately calcareous; strongly banded, deformed & crenulated with diopside-calcite blebs; garnet-diopside calc-silicate; local moderate alteration with micas common; ankerite abundant & minor black manganese in qtz vugs… (P. Williams)."

Fig. 17 Photo of subcropping garnet-diopside calc-silicate in Lady of Lake hydraulic cut. Sample 0663 ran anom Zn and hi W, values in Table 6. Resamples Jaxon's 973574 site, bottom of tape is metric scale.

0663 resamples the 973574 site. It is moderately siliceous garnet-diopside calc-silicate with abundant qtz veining, moderately calcareous, banded, deformed & crenulated (Table 6). The continuous 65 cm chip sample ran **anom 2,864 ppm Zn** (Map R-08) and hi 20.1 ppm W (Map R-13). Bi is near bkgd 1.25 ppm (Map R-03).

Light grey-brown qtz veining lies along the compositional layering oriented 038 56 SE. 0663 outcrop may be the exposed part of a tungsten + zinc skarn, named herein the Lady of Lake hydraulic cut W + Zn skarn.

12.7.1 Conclusion re the three Lady of Lake showings

The Lady of Lake showings are from a mineralized W + Zn skarn system with anom Zn Mo W & S. Bi is slightly hi in one sample but associated Au-Bi-Te is not present. Subrounded cobbles indicate some local quartz veining, but this was not found. The area about the Lady of Lake showings could be further surveyed, but the area is well obscured by glacial drift.

12.7.2 Comparing tungsten skarns in B.C.

B.C. tungsten skarns have high zinc concentrations: the mean of 12 is 8,421 ppm, the range 33–97,000 ppm Zn. For 75 rock samples the anom Zn threshold is 158 ppm. Pb is low in tungsten skarns (Ray & Webster 1995). Mo is anom in one skarn deposit, hi in another.

Here as at the Jersey W mine

"Skarn-type tungsten mineralization occurs where intrusions contact either of the calcareous Truman or Reeves Members, resulting in complex superimposed mineralization (MacDonald 1973)".

12.8 Clease 0446 Shear zone

12.8.1 Former description and analyses

The five Clease showings are thoroughly detailed in Howard (2006, p. 58); re the shearing:

"At the Clease showings two sericite + pyrite + auriferous bismuth telluride-bearing shears overprint feldspar-altered granitoid. Au(Ag)–Bi–Te–Mo–W–As are anomalous. One Clease shear (Clease 0446 Shear) grades 6.4 g/t Au over 1.52 m. These well compare to later stage gold-bearing sericitic shears at Fort Knox AK (Howard 2006, p. 12)."

Clease 0446 Shear zone is at 471,636 mE 5,433,947 mN ± 20 m, 240 m S of the Lefevre workings (Howard 2006, p. 58). C. Kennedy first sampled it as undescribed grab sample BHCK-13 (Kennedy 2004) found near some historic 'scratchings'. Its host is BH sill granite, not far from its W contact. An exposure dug out on the steeply sloping hill side shows the shear is ~3m wide. It could be wider as it only subcrops. It trends 128° up hill. Clease 0446 shear has no sulfide mineralization evident but a former analysis of a 1.52 m interval chip sample ran 6.8 g/t Au by ICP-MS. A repeat analysis of this by 2 assay ton FA ran 6.4 g/t. Also anomalous are 462 Bi / 16.7 Te / 48 Mo / 123 As (ppm), in Howard (2006). Three samples of Clease 0446 Shear range from 1.48 - 6.411 g/t Au, the mean 4.16 g/t (op. cit.). Repeat geochemical sampling confirms auriferous bismuth telluride minerals occur.

12.8.2 Jaxon's 2009 sampling

Despite higher gold concentrations in altered, softer shears - more amenable to hand tool sampling - <u>only the QVs were channel sampled by Jaxon personnel.</u> The best value of 12 samples from 3 QVs was 1.5 g/t Au in sample 869485, a 'Clease South' QV (J.D. Williams 2010a).

P. Williams collected that, 'medium to coarse grained white to grey quartz vein with a trace of sulphide' at 471,649 mE 5,433,974 mN. It ran 0.571 g/t Au and resampled 869485 (from 2008). Another sample 973562 'quartz in granite' also collected by him at 471,633 mE 5,433,965 mN ran 11.165 g/t Ag and 0.14 g/t Au. That was a "medium to coarse grained white bull quartz veinlet within granite outcrop with minor pyrite; resampling 869496 (from J.D. Williams 2010b)."

12.8.3 Exposure is Poor

At Clease rock exposure is better than usual about 5% due to the steep topography and the resistance of the granitoids to erosion. Clease is rather well drained and comparatively open, though outcrops are still uncommon. Prospecting and mapping is disadvantaged by shallow glacial till and the overlying soil sloughing downhill. Like other slopes there is the usual cover of dense alder underbrush. The intruded country rocks to the W are brush covered. Hand trenching is necessary for sampling.

12.8.4 Description

At the 5 Clease showings (Howard 2006) the BH sill granite hosts abundant, sheeted, slightly vuggy, white extensional quartz veins up to 30 cm wide (Figure 11b). These may be bluish grey often with secondary limonitic staining and pale yellow bismuth ochre indicating auriferous Bi-Te minerals. E. Webster (2013) measured one QV approx. 150 28 NE. The principal mean orientation of 4 QVs is 146 41 NE (Howard 2006). They QVs grouped in a vein set (Howard 2012).

12.8.5 New sample 0634

Part II by E. Webster has a photo of Clease 0446 Shear Zone subcropping, sericite (and clay?) altered BH sill granite with lemon-yellow bismuth ochre patches in limonitic rust. New sample 0634 for 0.4 m ran 4.6 ppb Au, above the median value of 75 rocks / hi Bi 3.37 / hi As 30.9 / slightly hi Sb 0.42 / anom Mo 58.78 and slightly hi W 2.3 (ppm). The element association is Au-Bi-As-Sb-Mo-W, same as found in 2006. Clease 0446 Shear Zone remains a prime target.

12.9 Iron Founder #2 trench QVs and Steel Cable QV, *Shear Zone* hosted

These showings were found Sept. 18 2013 by happenstance rather than by a planned search. J. Denny and the writer noted several loose angular quartz pieces while walking the lower Hydro Tower access road. The plan was to hike steeply downhill to collect a bulk silt from Mormon Girl 'MG' trib. Sample HM-23 from Ckay trib was collected later that day (but as MG trib was dry, after its confluence with Ckay trib). First a southern showing named 'Steel Cable QV' was found close to the road at 471,315 mE 5,433,831 mN ± 3m. There schistosity in argillite orients 010 63 NW.

The locale is a curving hill sloping about SW, open and dry with light brush cover. A prominent shear zone trending 017° is discontinuously mineralized with QVs. This was tracked uphill and a second old working found at 471,347 mE 5,433,938 mN ± 3m. It is named Iron Founder #2 trench QVs as it was likely excavated by dynamite on that former 2-post claim (Bunker Hill Gold Mines map, no date but 1933-1935 vintage). It is just N of the cleared area beneath the steel-towered Hydro Lines, on the Lefevre Crown Grant close to its SW corner (Map R-01). As it is on the Crown Grant the cost of geochem analysis of the 2 rock samples and the day rates for JD & WH are reduced by ¼ in the expenses for assessment credit.

Iron Founder #2 trench is 3.5m long, 1.5m wide and ~1.0m deep. It excavated two QVs, one to the W and one E closer to its headwall. To excavate 'hand steel' was used, that iron tool left on the trench's S side. The trench crosses hard dark gray sheared argillite. It is partly altered to softer, sericitized light - medium gray phyllite by hydrothermal alteration spatially associated with the veining.

Sample 0626 was the most mineralized piece found, a loose QV piece 15 cm thick with yellow secondary minerals. It is from the top of the trench. It ran nil Au 6.9 ppm Bi 1.4 ppm Te 5,200 ppm Pb & 14.3 ppm Zn. Sample 0627 was an in-place QV 33 cm thick in the lowest part of the trench. It ran nil Au 3.9 ppm Bi 0.3 ppm Te 1,015 ppm Pb & 13.6 ppm Zn.

Only galena is abundant. Mineralization is like that of the Hand Steel trench 96 m downhill. There "sparse sulphides (pyrite, galena, and sphalerite) are disseminated in altered and bleached argillaceous quartzites. … Siliceous hornfelsing occurs (Ray 2004)." The host is buff, massive quartzite of the same HCA Quartzite + Tuff Unit (Howard 2000). Some intensely sheared, greyish, slightly vuggy QVs with bordering yellow sericitic alteration occur. Values are low.

Further N at 471,351 mE 5,433,947 mN m grey schist is slightly mineralized with qtz along foliation oriented 050 52 SE or 044 54 SE; sample 0511 was collected but for economy not analyzed. Two meters uphill quartz again occurs in argillite along foliation 055 48 SE.

All these occurrences are in argillite of the favourable HCA Quartzite + Tuff Unit (Howard 2000). Iron Founder #2 trench is in the SW corner of Ray's 2004 geology map. Finding it after 2 seasons of prospecting by Jaxon personnel shows more mineralized showings remain to be found.

With only galena present the results are poor and the Iron Founder #2 trench and Steel Cable showings have no economic potential.

12.10 FC-64 Old Limpid Ck adit in altered granitoid

Prompting a site visit "A sample collected from an old adit located on the Waneta 10 claim from narrow quartz veining within Sheppard granite returned slightly anomalous Au and As (FC-64 = 46 ppb Au, 42 ppm As) (Aussant 1984 p. 11)".

'Sheppard granite' is not known on the CLY claims or nearby but

"Small masses of granite along the lower Pend d'Oreille River are similar to the Sheppard intrusions west of the Columbia River (see Little, 1950, p. 31, and 1956), which are probably Tertiary. …Granitic rocks along the lower Pend d'Oreille River are mainly light-coloured medium-grained granite and syenite (Fyles & Hewlett 1957)."

H. Little maps the latter intrusives, ones W of Charbonneau Ck, as 'Tertiary Unit 19. Sheppard intrusions: leucocratic granite and syenite (1965).'

The FC-64 adit site is in a granitoid body mapped by H. Little (1965) that Limpid Ck crosses. This report names it the BH *stock*. The position of its W boundary is uncertain as there Little maps a drift covered area. This field visit finds it similar to a mid-Cretaceous Bayonne suite granitoid and thus it is most likely not Sheppard granite.

Proceeding from a point to the NE a traverse along the S bank of Limpid Ck finds many ridges of tectonized granitoid. These parallel the valley; one is 12 m high by 50 m long, another 3 m x 20 m. They are strongly deformed with common, multiply oriented, curving very dark grey mafic seams. The deformation is likely due to a NE-trending branch of the *Waneta fault* experiencing significant strike-slip movement, this after the solidification of the granite.

A shallow adit ~2m deep driven into the side of Limpid Ck canyon at stream level is close to the recorded FC-64 site. It was blasted out to intersect a thin quartz vein. The site is at 470,828 mE 5,434,982 mN ± 7 m at approx. 920m elevation. It is a very old working, likely 19^{th} C, found by hiking up the creek. The host is altered, very hard, cataclastic granitoid with tourmaline, epidote and pink K-feldspar. The side-cut adit has ~1% disseminated fine crystalline pyrite in altered granitoid on the left (N) wall. 0654 samples this for 1.5 m. The strongest fracture set orients 120 56 NE. 0654 ran slightly anom 17 ppb Au, hi 65 Pb & hi 146 Zn (ppm).

The 'narrow quartz vein' of C. Aussant (1984) is 2 cm thick in the S wall. It is white without Fe-staining. In one place euhedral, coarse-sized quartz crystals grew inward leaving open vugs – evidence of a tensional (extensional) QV. In the N wall, in the middle of the side-cut, the vein orients 002 68 SE. In the back of the side-cut, close to the S side at the top corner, it orients 008 74NW. The vein then curves to a near vertical orientation at waist-level.

The same QV is visible 6 m N of the FC-64 side-cut, also at the creek level. There it orients 008 73 NW. 0655 over 1.0 m sampled it but was not geochemed. Another near-parallel vein with the same tensional features occurs about 15 m S of the adit, along trend. No sulphides aside from disseminated pyrite occur.

Values are poor, the structures are small-scale and very local and FC-64 site has very low priority for follow-up.

12.11 Rock Cuts in BH sill for Hydro Tower Platform fill

Two near-vertical cuts in the BH sill were constructed in 2012 to excavate rock to stabilize a Hydro Tower platform just below (H. Huser of Salmo, p. c.). The site is along the end of the upper Hydro Tower rd at 471,943 mN 5,433,812 mE. The cuts provide some of the best exposures of this 'gold progenitor' granite, aside from those along LCFS roadside. The lower cut exposes a fault with gouge, a thin white QV, hematized shear planes and 4-5 tourmaline-bearing veinlets 4-6 cm wide (0648). The fault zone is anomalous in As and Ni. Though barren these counter an oft-repeated misconception that the BH sill (or Wallack Ck stock) granites are 'undeformed' or 'unaltered'.

Fig. 15 Overview photo to about N of BH sill granite excavated for fill, the lower cut. Note abundant low angle fractures are younger than age of magmatic crystallization, as is the QV and brittle fault with gouge, at far rt sample 0645. Photo illustrates 4 samples collected left to right on varied structures: 0648, 0647, 0646, 0645; three are described below. Leftmost sample beside hammer is 0648. 0646 above the '08' of date stamp sampled hematized shear planes oriented 171 32 W. As the fault displaces them it is younger.

Fig. 16 Two photos detailing 3 of 4 measured samples collected along structures in the BH sill. Left photo has 0648 left of hammer, 0647 to right is a cm-sized white quartz vein with trace limonite. Rt photo is a brittle fault viewed about along strike; channel sample 0645 sampled reddish limonitic fault gouge. The fault orients 018 46 SE.

12.12 Quartz segregation in HCA argillaceous metaquartzite

Rock 0564 is a grab sample of an irregular segregation of dark grey blue quartz, well exposed in a road cut of argillaceous metaquartzite HCA Quartzite + Tuff Unit at 471,347 mE 5,434,415 mN (Map R-01). An aplite dyke is cms away. The site is along the BH mine rd, in a curving shear of the *MPT Shear Zone* (Howard 2012). 0564 was collected Oct. 24 2007. No pathfinder elements are even slightly hi (Chart 3 Rock lithogeochem). With similar results for Iron Founder #2 trench QVs and Lady of Lake Wide Cut 0636 from the QV cobbles, *not all gray blue qtz is Au-Bi-Te bearing.*

The cost of collecting and the geochem cost are not included in the expenses for assessment credit.

12.13 Yankee Open Cut, suggesting corrections to the MINFILE 082FSW159 entry

This old working was re-visited May 21 2013 as recent Reports have no comment. Yankee Open Cut is a fair sized working 1.7m wide and 4m deep with a ~2m high back wall. See Howard (2000) for detail additional to that below. Arsenic is anom and a pathfinder for low, but anom, Au in thin QVs (Table 4).

The Minister of Mines Annual Report for 1937 records 1 ton of production from ‘Columbia claim at Waneta’ grading 1 oz/t Au and 3 oz/t Ag (p. E49). Evidently hand-selected material was excavated and trucked to Rossland. This lot is almost certainly from the ‘Yankee Open Cut’ described in Howard (2000). Its revised location is 471,606 mE 5,434,749 mN ± 5 m.

The Yankee Open Cut is **MINFILE 082FSW159 ‘COLUMBIA, WANETA’** though it is **not** at ‘455,226 mE 5,428,254mN’. MINFILE with ‘Last Edit 17-May-91’ lists several refs. e.g. GSC Memoir 308, Paper 79-26 & OF 1195, all by H. Little, but none provide any detail. Same for the GSC maps 1090A, 1091A & 1504A.

MINFILE is incorrect that ‘The area is underlain by volcanic and/or sedimentary rocks of the Lower Jurassic Elise Formation, Rossland Group’; rather the showing is underlain by slightly argillaceous tan quartzites of the HCA Quartzite + Tuff Unit (Howard 2000) of the HCA assemblage (Einarsen 1994) of the Cs Unit (Little 1982). Thus “~~No~~ further information is available”. It isn’t on G. Ray’s 2004 map as he did not see it. It is very close to the W contact of the BH sill but is hosted by country rock, not granite.

6 soils were collected with a soil auger in a line about W-E slightly uphill of the working, the PCY series PCY012013 to PCY062013, see Chart 3, Map SY-01 and the discussion below in the Soil survey section. Au, Bi, W and base metal values are uniformly bkgd. The highest gold pathfinder values were 25.0 ppm As in PCY052013, 0.9 ppm Te in PCY052013, both low.

Four rocks were collected. Two, about 2.4 Kg each, 0506 (to the rt) & 0507 (to lt) are from the thickest cm-sized QVs in the working. Other, thinner, discontinuous QVs are only just visible on the algae-coated back wall. The best rock 0506 (Table 4) is a chipped panel sample 6 cm thick, 12 cm long x 7 cm wide of a massive QV with internal mm sized limonite rust seams. It orients 146 82 SE; adjacent is BH029 with a nail (from 2000). 0507 from the lt wall is a chip sample of a 6-9 cm thick massive QV at 143 87 SW. Lineations on that vein plane trend 307 and plunge 52. A well-weathered **lamprophyre dyke** is poorly exposed at the bottom right front of the working. Correcting Howard (2000) compositional ‘bedding’ of the host quartzite oriented 039 44 SE is rather transposed foliation.

Two rock samples were collected from the dump. 0508 is an angular QV piece with pyrite, 0509 a piece of vuggy QV in mica schist with mm-thick laminations and higher Rb 24.9 ppm & Li 10.9 ppm. The anhedral qtz is off white with common 2-4 mm sized vugs. Most all the minor pyrite content has weathered to light to dark yellow brown limonite.

Rock Sample ID	Au ppb	Bi ppm	Te ppm	As ppm	Sb ppm	S pc
0506	172.4	1.0 above the median	*0.56*	**1165.6**	**0.89**	0.35
0507	**428**	0.24	0.24	**1197.6**	**1.85**	0.53 above the median
0508	37.5	0.15	0.05	**652.3**	**1.03**	0.55 above the median
0509	10.8	0.04	0.03	5.5	0.08	<0.02

Table 4 Yankee Open Cut rock samples. Analyses of gold and select gold pathfinders, rating the (rather poor) results. Classed from the population distribution of 75 rocks (above) also collected: anom in **bold red**, hi in red, slightly hi in *red italics.*

Ag is low in the rocks ~100 ppb. The Au/Ag ratio is likely not 1:3 as was test production from the ‘Columbia claim at Waneta’. Concluding a Au-As association occurs in thin QVs in the Yankee Open Cut but geochem results are poor and it has low priority for further exploration work.

13 Soil Survey at Yankee Open Cut & NW side of BiWold Dome

13.1 Field Collection

Of the 15 'B' Horizon soils collected 6 are in the immediate area of the Yankee Open cut, the PCY series labelled PCY012013 to PCY062013. These are in a line about W-E, slightly uphill of the working. Au- and As-in-soil were tested. Map SY-01 and Chart 3 in Appendix 8 lists results.

The other 9 soils are from the NW side of BiWold Dome, the series P0219 to P0227 collected by D. Bridge & W.H. The purpose was to test for Au and Au pathfinder elements.

Between samples the shovel and hand trowel used were well washed to avoid contamination. The soils were placed in pre-labelled wet-strength Kraft paper bags. They were not sieved on site. No duplicates were taken. They were sent to Acme Analytical Labs, Vancouver for analysis.

13.2 Soil Analyses

The Acme lab procedure used was '1F05' Ultratrace ICP-MS analysis (new Veritas code AQ250). The soils were first dried at 60 °C, then 100 g dry sieved to -80 mesh and 15 g of this digested with 1:1:1 Aqua Regia. A coarser mesh size was used as it was thought some detrital Au gns might be present. Chart 3 in Appendix 8 lists field data & select elements. Certificate of Analyses VAN13003241.1 has results for 19 'soil' samples but 3 are 'mixed media' silt + soil samples P0229, P0230 & P0231 described in the silt section, and P0228 is actually a silt. Thus that Certificate in Appendix 4 details 15 soil results.

13.3 Interpretation – Yankee Open Cut soils

The 6 soils collected are too few to range their element values. The soil sites are the black dots within the northern dashed rectangle on the Till map series. Analytical values of elements of interest are on 1:1,000 scale Map SY-01 Yankee Open Cut Soils. Au, Bi, W and base metal values are uniformly bkgd, all very low and not anom. As for gold pathfinders the highest arsenic value 25 ppm is in PCY052013, the southernmost soil sample. The highest Te value is 0.9 ppm in PCY052013. The Yankee Open Cut QV mineralization has a very muted geochemical signal in soils; that sample medium may not be the best to collect. The site has low priority for additional work.

See section above 'Yankee Open Cut, suggesting corrections to the MINFILE 082FSW159 entry'.

13.4 Interpretation – BiWold Dome soils

The 9 soils collected are too few to range their element values. The sites are the black dots within the dashed rectangle on BiWold Dome in the Till map series. Analytical values of elements of interest are on 1:800 scale Map SB-01 BiWold Dome Soils. The two easternmost soils P0221 with 38.6 ppb Au and P022 with 11.2 ppb are gold-anom. Pb is also anom in P022, 57 ppm. Compare the nearby till T065 with 55.6 ppb Au (Table 7 below). The single low, censored Te value <0.02 ppm for P0219 was replaced by 0.01 ppm.

Near till T066 the westernmost soil P0227 has low 3.8 ppb Au, higher Bi 0.7 ppm, higher As 24 ppm, anom W 1.3 ppm and higher Fe 2.6%. With till T065 the nearby till T066 forms part of the 'NW BiWold Dome' till anom dispersal train. T066 ran anom 38.6 ppb Au, 52.5 ppm As (the single As-in-till outlier of the till survey) and hi Mo (see the T-map series).

In the other soils the gold pathfinders Bi, As, W and base metal values are low or very low.

Soil and nearby Till Sample	Au ppb	Bi ppm	Te ppm	As ppm	Fe %	Pb ppm	Zn ppm	Cu ppm	Mo ppm	W ppm
Easternmost site										
P0221 soil	38.6	0.41	0.07	14.5	2.15	57.31	170.7	17.82	0.65	0.3
T065 till	**55.6**	0.5	_	**36.1**	2.90	34.9	57	31.7	**1.9**	0.2
Westernmost site										
P0226 soil	3.8	0.65	0.05	23.6	2.55	29.10	133.6	21.74	1.21	1.3
T066 till	**38.6**	*0.8*	_	**52.5**	**4.21**	25.3	*107*	*58.7*	1.5	1.0

Table 7 Comparing gold and gold pathfinder elements in two 'hi' BiWold Dome soils with nearby tills of the 'NW BiWold Dome' till anom dispersal train (see that section). For the two tills anom values are in **red bold**, hi in red, slly hi in *red italics.* For the soils higher values are in red, they are not ranged.

Nearby soil P0220 has higher 131.6 ppb Au but lower pathfinders, so it is not used for this comparison. In this small test Au Bi As Fe Cu & Mo in tills have higher contents than in soils derived from the underlying tills. Pb & Zn are the reverse; with low values the case for W is not discernable. These findings agree with the following:

"In the Canadian Cordillera, soil sampling is still used by some exploration companies instead of till sampling …
The formation of soil through weathering processes destroys labile minerals such as sulphides, and, therefore, the geochemical signatures in soils formed on till are the result of a combination of clastic glacial dispersal **and** dispersal by aqueous and gaseous processes. As a result, **base metal contents and indicator mineral abundances may be lower in soil (i.e. weathered till) versus C-horizon till,** and the dispersal train geometry may be more difficult to interpret and follow-up (McClenaghan 2013)."

13.5 Conclusion – favouring till surveys over soils

In a local mineralized area, ex. BiWold Dome, tills give a higher anom contrast than the B horizon soils developed on, and from, them. Tills are the preferred geochemical media.

14 Local Geomorphology of the HM survey area

After periods of continental glaciation deglaciation processes were active. That alpine glaciation affected the CLY area is well evident from numerous field observations, and landscape shapes outlined by the TRIM 1:20,000 scale topographic contours. Arcing head-walls of the valleys of Clel Ck, Wallack Ck and McCormick Ck are **cirques** formed by alpine glaciation. They have been slightly eroded since. In Nelson Map area 082F W1/2 H. Little (1960) found “no evidence of more than one major ice advance in Pleistocene time”. The glacial morphology formed during the last phase of de-glaciation. **In short alpine glaciation sculpted the land.**

Limpid Ck is a **U-shaped glacial channel** presently ‘underfed’ for its dimensions. A thick **glaciofluvial deposit** with indistinct bedding occurs high up the SE valley side of Limpid Ck, well exposed in a 4 m high cut bank along LCFS Rd at the junction of Clel Ck logging road. It is a remnant terrace of valley infill above an unsorted till layer. Glaciolacustrine sediments were not observed. Small land slips of glaciofluvial sediments were seen just above the HM-03 site in upper Clel Ck, on the N bank. R.W. Brock notes on his 1902 map that there are “terraces … of silts, sand, gravel and other resorted glacial material” in the larger valleys.

Ice flow directions are dominantly SSE:

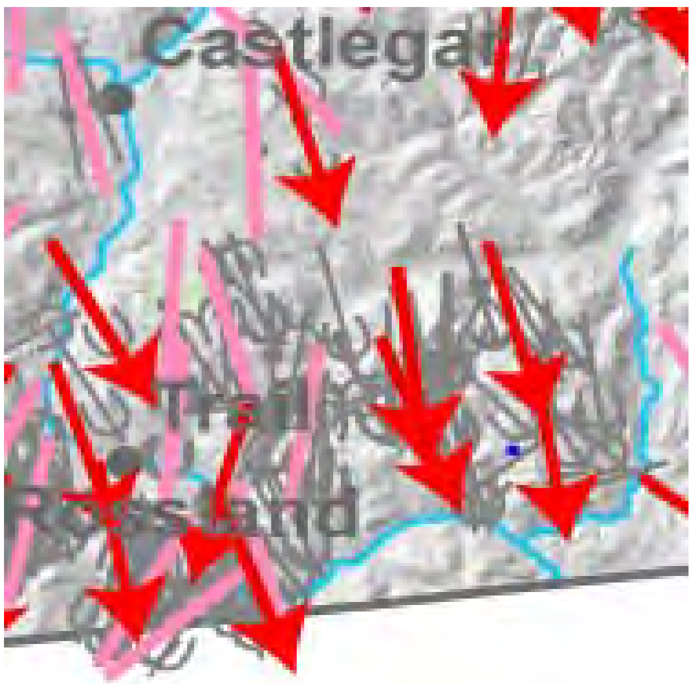


Fig. 18 Part of Open File 2013-06, Ice-Flow Indicator Compilation, British Columbia; Sheet 1 by T. Ferbey et al. (2013). Red arrows - ice-flow direction derived from unidirectional indicators; pink lines - same from bidirectional indicators; grey arrows - striations. Blue dot marks a site in upper Limpid Ck with a striation to the SW, down-valley. The Pend d’Oreille Reservoir and the Salmo River are in light blue. The Ice-Flow Indicators are outcrop- to landform-scale, generally from old mapping (Brock 1902).

14.1 Till on CLY

BiWold Dome is mantled by a thin layer of matrix-supported lodgment or basal till 0.5 – max 2 m thick. Tills are varicolored brown due to surficial oxidation. The upland plateau area about BiTel Knoll has similar till, this often observed while collecting till samples.

14.2 BiWold Dome as a Roche Moutonneé

BiWold Dome is aptly named as it is smoothly rounded glacial landform. It is elongated W-E west of McCormick Highland summit (Map M-01 or others). Consider the distinctive shape of its topographic contours: in upper Ckay & Hort tribs it steepens to its SW limit. BiWold Dome is a **roche moutonneé** with its steep, abraded and plucked SW side in the headwaters of uppermost Four tribs Ck. This is the lee or down-ice side. There glacial 'quarrying' of jointed granite formed steep, near-vertical, cliffs. Traversing is difficult there.

Roche moutonneé are meso-scale landforms formed by glacial erosion several meters to 10s or 100s of meters in size. Their long dimension parallels the paleo ice flow.

"They form where high effective normal pressures occur on the stoss side of a bedrock hummock (BiWold Dome summit area), but the pressure is sufficiently low on the down-ice (lee) side to allow a cavity to form. Consequently the up-ice side is abraded and the down-ice side is glacially plucked. Roche moutonneés therefore form preferentially in areas of thin and fast flowing ice. …the properties of the parent bedrock determine the detailed morphology … (Bennett & Glaser 2009)".

Assisting its formation in uppermost Four tribs Ck the layered country rocks slope to the W & SW at moderate dip angles. This assists glacial quarrying of the bedrock there, on the lee side.

Aussant (1983) notes a few roche moutonneé in the district, with "in all cases, the direction of ice movement southerly" as fits upper Four tribs Ck.

14.3 Are the mineral gns and rock fragments in the sampled bulk stream silts far-travelled, or near-source?

The geomorphology formed by alpine glaciation, *after* earlier continental glaciation. Older 1980's research focusing on continental glaciation, e.g. by J. Clague (1989) may not apply. The stream network is rather recent and the particulate minerals and rock fragments in the bulk silts are dominantly *locally derived*. Maps of the individual HMs also show that the varied geologic settings present are permissive for local formation of the identified HM species, e.g. corundum and chromite, especially the intrusive contacts.

Dispersal patterns of minerals (and entrained rock fragments) in till are expected to parallel local ice-flow directions (Paulen 2009). For interpreting the sources of the detrital HM no complicating 'secondary hydromorphic dispersion' is apparent.

As shallow till blankets the survey area some re-mobilized, re-transported and re-sorted till is included in the bulk silts. However the sampled creeks undercut and expose bedrock; they are torrential watercourses. Thus many mineral grains and rock fragments in the silts are locally derived from long-term surficial erosion since alpine glaciation. Consider the re-eroded till is also locally derived, alpine glaciation transporting it from 100's of meters to at most a very few kms.

Three conventional stream sediment surveys, covering the same area, have found repeatable geochem anomalies in certain creeks. The results indicate the stream silts, including their light and heavy mineral grains, are locally derived.

Concluding it is fully incorrect to propose the HM anom sources are off-property 10's or 100's of kms away; the record of alpine glaciation from the geomorphology, repeatable stream silt geochem anoms, maps of the HM's and the presence of the formative geologic settings of the HMs all argue against that. The ultimate bedrock sources of the silts and their HM gns are within their present watersheds. Summarizing the HM sources are local and on the claims. Some may have weathered in-place with the long period of Tertiary weathering.

14.4 Glacial striae

H. Little (1965) mapped glacial striae on the property. A site just N of BiWold Dome summit (T series maps, Map T-01) has striae directed 145 – 325° (Fig. 19). The site is high on the S slope of Clel Ck cirque; the NW direction matches the inferred flow trend of the alpine glacier once there. That direction also matches the trend of the present secondary creeks in the cirque headwall; clearly alpine glaciation has influenced development of the modern stream network.

Fig. 19 Photo of striae oriented 145 – 325° on banded argillite just N of BiWold Dome summit. At 5,434,241 mN 472,657 mE, elevation 1469 m. Photo by M. Mankowske Sept. 14 2008.

15 Basal Till Survey

15.1 Background

Basal tills are deposited in areas directly down-ice from their sources. Thus dispersed mineral and rock fragments can be more readily traced back to their source(s) than anomalies in other sediment types, e.g. soils or stream silts (Levson 2001). Basal till is a first-order or primary derivative of glacially-ground bedrock.

"Basal till anomalies usually can be traced to source along linear transport paths reflecting topographically controlled valley-glacier flow in mountainous areas [alpine glaciation] and unidirectional ice-sheet flow in many plateau areas, chiefly representative of the last glacial event (Levson 2001)."

Areas of dispersal trains may be hundreds of times larger than the mineralized bedrock sources. They are narrow, elongated parallel to the ice flow direction. Formation is by glacial erosion, transportation and re-deposition of comminuted (crushed) rock comprising the till, this including rock from any mineral occurrences and re-worked glaciogenic sediments, e.g. older tills.

15.2 Local Geomorphology of the Till Survey area

BiWold Dome {**Bi**smuth **W** g**old}** is the singular feature of the till survey area (Map T-01). W of McCormick Highlands summit this well-rounded roche moutonneé is elongated W to E. Five streams drain it: to the N Clel Ck; W, BH Ck; SW, Ckay trib; ESW, Hort trib; and SE, McCormick Ck. BiWold Dome is a roche moutonneé with glacially 'plucked' or 'quarried' granite cliffs in its lee, down-ice side in the headwaters of Ckay and Hort tribs.

Viewing the topography at smaller map scales, and in the field, it is quite evident that **the headwaters of Clel Ck and McCormick Ck are slightly eroded cirques**. The 'dome' shape of BiWold Dome is proposed to have formed by overriding alpine glaciers. Till flow lines are thought to be disposed in an approx. radial pattern away from BiWold Dome summit. The movement trends down-ice of the two cirques are obvious.

15.3 Basal Till Field Collection

35 till samples were collected mostly from the uphill sides of logging roads or trails. In a few cases they are from sections near mounded pits in re-planted clear-cuts. First slices of the soil + till profile were obtained by hand-shoveling and examined. The tills were sampled at depths below any soil development. They were disaggregated by slicing with a shovel / grub hoe or hammer as most often they are compact and very hard. The samples are basal lodgement tills collected from the *lowermost* part of till profiles, often just above bedrock. They are lodgement tills, not ablation tills. The latter have not been observed in the project area.

A double-screen method was used for collection, similar to the bulk silt procedure. First till was dry-screened through a round dark green Keene© classifier screen with ASTM 4 mesh, 0.25 inch opening. This was used as it fits well on a black plastic gold pan. This classifier is 14" in diameter at the top opening, 11" for the bottom screen and 4.75" high. It is made of tough high-impact plastic with four plastic ribs supporting the stainless-steel 4 mesh screen.

Sifting with this -4 mesh classifier removed cobbles and pebbles. The material on the collection gold pan was then dry-screened through a smaller 7.5" diameter, 12 mesh white plastic sieve, sold by Petrocraft© Products Ltd. of Calgary, into the sample bag. The gold pan was simply used as a wide collection bowl; no panning was attempted. The site was tape-measured and photographed. About 5 kg of -12 mesh till was placed in pre-labeled, high-strength, white woven-plastic 'ore bags'. The tills were usually shades of grey brown and oxidized. Two sample number series were used: the T###### six number series are ~2 kg samples collected in forested areas, the T0## series are ~8 kg samples collected near roads. To avoid cross-contamination of samples between sites all the sampling equipment was well-washed with potable water from 1 litre recyclable plastic bottles, those carried specifically for that purpose.

Chart 4 in Appendix 8 has sample co-ords, field data and select elements. The samples are typical basal tills: unsorted, matrix-supported, silt and clay rich with common coarse subrounded pebble to cobble size clasts. They are dense and very hard or over-consolidated. All are oxidized by surficial weathering; no blue-grey unoxidized till occurs. Minor displacement of the profiles by gravity creep downhill is very common, its extent depending on the slope. No hummocky topography or very angular boulder-sized clasts were observed that might be supraglacial ablation till. This is further-travelled and more difficult to interpret. Even though some of the area has been logged the possibility of man-made contamination introducing metallic elements is thought to be nil.

15.4 Till analyses

From the bulk tills 35 sub-samples in wet-strength Kraft paper bags were sent to Acme Analytical Labs, Vancouver for analysis. The lab procedure was '1DX3' ICP-ES analysis (new Veritas code AQ200) after 1:1:1 Aqua Regia digestion of 30 g of -230 mesh fraction. Chart 4 in Appendix 8 lists field data & 10 select elements; anomalies are in **bold red**, highs in red and slightly high values in *red italics*. Appendix 4 has the Certificate of Analysis VAN13004484.1. That lists 36 samples but there are 35 as till T084 was not sent and not received: on the sample submittal sheet it was listed in error. Thus Acme notes it as Lab Not Received 'L.N.R.' on the certificate.

15.4.1 Selection of the -230 mesh till fraction for analysis

"The [-230 mesh] <0.063 mm fraction of till is the most commonly analyzed size fraction for regional geochemical surveys and base metal exploration because

1) it is readily and quickly recovered by sieving, especially in till samples with only minor (<2%) clay;
2) it provides reasonable contrast between background and anomalous metal contents;
3) it is less susceptible to hydromorphic dispersion effects (Pronk, 1987).

Geochemical analyses of coarser fractions of till, such as -80 mesh (<0.177 mm), is not recommended because [for example, this] fraction consists mainly of fine sand. It contains abundant quartz and feldspar (Dreimanis and Vagners, 1972; Klassen, 2003) that will dilute metal contents and thus decrease geochemical indications of a nearby … deposit (McClenaghan 2013 and refs. therein)."

15.4.2 Till dispersal trains of another survey

In the Shuswap area in south central British Columbia Paulen (2001) reports till dispersal trains 250 to 2,500 m long and 100 to 500 m wide. “In simple situations where only one till sheet occurs, indicator and geochemical concentrations are typically greatest at the base of the sheet, directly over, and down-ice of the source (Paulen 2009).”

Only one thin till layer ~0.5 – 2 m thick has been observed on the sampled CLY uplands. This lodgment till is thought to be dispersed by glacial ice flow approx. radially outward from BiWold Dome summit.

15.5 Interpretation – Till Map series T-01 to T-11

The 1:4,000 scale till Map series T-01 to T-11 plots the 35 till sample sites and analytical results of the 10 selected elements Au Bi As Fe Pb Zn Ni Cu Mo & W. Low tellurium results of the ‘1DX3’ analytical method precludes mapping Te. Anomalies or hi values are easy to discern from the interval-based symbols. Five bubble-plot ranges are selected for each element based on an ad-hoc examination of a combined box plot and probability plot (or quantile plot) of the analyses, these created by NCSS 2000 software (Hintze 2000). Element values are not transformed. In the legends the numbers in brackets are numbers of samples in that interval range. Percentiles can be calculated by dividing that number (cumulative if considering the lower ranges) by 35 and multiplying by 100.

A generalization of the 1:2,000 scale geologic map by G. Ray ‘Map 2 Geology of Part of the Bunker Hill claims’ (2004) is used as the base on the till Maps. The two dashed rectangles enclose small areas with minimal numbers of soils collected. The soil sites are black dots, see that section for discussion.

On the maps very fine lines outline very small areas with known showings (Williams 2010a). In 2008 Jaxon saw-cut channel sampled these. Showings known then have black labels, listing in order Au Bi Te As Fe Pb Mo W only if that element is hi or anom. Four gold-anomalous float samples occur about BiWold Dome: BH-30 with 2 g/t from Howard (2005), 778R010 with 15.2 g/t from Koffyberg & Howard (2008) and from this report 0588 with anom 0.57 g/t and 0594 with 29 ppb Au. New showings have gray blue labels. The historic BH mine surface and underground workings are outlined in purple. There small hand-cobbed production from large quartz veins graded ~⅓ oz gold per ton.

For details of the two ore shoot linears in red see Howard (2012). It has long been known that in the West Kootenays

“Most of the ores occur in composite shear-zone or replacement veins … The ore usually occurs in the veins in the form of [ore] shoots (McConnell & Brock 1904)”.

For orientation the following sections by element begin by detailing glacial dispersion in till T917885. This is from the Clease Sheeted Quartz Veins & Shears (there are five showings, see Howard (2006) p. 58 and following) and possibly also from the Lefevre skarn-hornfels and QV mineralizations (‘Lefevre QVs…’ in Mineralized Sites section). Next discussed is the multi-till, multi-element anom 1] ‘**NW BiWold Dome’** first in importance, and 2] **‘W of Timbered Shaft QV’ a**nom just W of that showing, also serving as orientation. *Those tills suggest the immediate area is mineralized unlike the barren Timbered Shaft QV itself.*

Note “A vein just below the collar of the Timbered Shaft contained bands and streaks of locally massive medium to coarse grained sulfides (Williams 2010a)” but this material was not sampled. Some lies in the fore-dump and on casual examination Pb-Zn-Ag-As-Sb sulphosalts may occur. Despite its impressive width and alteration halo numerous rock samples of the large Timbered Shaft QV have no gold.

15.5.1 Gold Map T-02

The Clease Au(Ag)–Bi–Te–Mo–W–As bearing showings are 180m due N, of T917885, and 250 m NNE of T917893 (Map T-02). Clease is up-valley and up elevation, thus is considered the likely the source of the anom 31.7 ppb & 19.1 ppb (slightly hi) values, respectively. The sloping valley between MG and Ckay tribs favours this interpretation. Two groupings of Au-in-till anoms and hi values are significant:

1] A prominent SW-NE trend of Au-in-tills lies on the NW side of BiWold Dome. It is 470 m long and minimum 70-80 m wide. Tills to the SE need collection to determine its width. Named the ‘**NW BiWold Dome’ glacial dispersal train** it is defined by three Au-in-till anomalies T065 55.6 ppb T066 38.6 ppb & T917882 53.9 ppb, all outliers, and three highs (Map T-02). Its source is evidently local, within a few hundred m, as

- it is near the height of land
- 0594, a grab sample of 3 pieces of 20 cm thick QVs with minor vugs and Fe staining, not in place but ‘local’ (D. Bridge), was collected upslope near the summit. It is Au-anomalous 29 ppb and slightly high in As 28.6 ppm with hi Pb 49.95 ppm.
- Au-anom float rock 0613D is on trend to the NE. This argillic-altered granitoid boulder has a cm-sized, vuggy epithermal-style QV. It ran anom 305 ppb Au / 0.52 Bi & 0.15 Te, both above their median values / slightly hi 28 Pb / hi 60 As (ppm).

If boulder 0613D is close to the dispersal train’s head the ‘**NW BiWold Dome’** SW-NE trending anom **extends a minimum 740 m.** Tills could be collected further NE.

2] W of the above is the **‘W of Timbered Shaft QV’** till cluster with Au anomalous T061 and highs T070 & T071. Its bedrock source may be like 0588 cobble, a float rock found nearby with significantly anom 573 ppb Au / 35 ppm Bi an anom outlier / hi 1.48 Te / hi 95 Pb / hi 30 As / slightly hi 3 Mo and bkgd 0.2 W (ppm). This anom is smaller than 1]. Or the source of 0588 may be the ‘NW BiWold Dome’ anom train. A source *uphill* to the E from the Lefevre W + Au skarn-hornfels is considered unlikely; rather the evidence suggests the immediate area of the Timbered Shaft is gold-mineralized.

The sources of float rocks 778R010, a QV piece with 15 g/t Au (Koffyberg & Howard 2008) and BH-10 with 2 g/t (Howard 2005), are not picked up by the Au-in-tills.

The 30 ppb Au anomaly threshold is at the 84 %ile for this small 35-till survey. Compare the regional Eagle Bay till survey (1996-1998) of 1,300 tills with the Au threshold 36 ppb at the 90 %ile (Paulen & Lett 2005) – 30 ppb is a reasonable threshold.

15.5.2 Bismuth Map T-03

The Clease Au(Ag)–Bi–Te–Mo–W–As showings 200m uphill, due N, are the likely source of anom Bi 2.1 ppm in T917885 (Map T-03). That result is one of the survey's three Bi outliers. Re the two groupings of Bi-in-till anoms and hi values:

1] The **'NW BiWold Dome' dispersal train has little bismuth.** To the NE there are two higher values. T081 with slightly high 0.8 ppm Bi may relate to float rock 0613D with 0.52 ppm Bi, above the median value for 75 rocks. 28 Pb is slightly hi. If that float is from the anomaly train's head, Bi may not correlate well with Au in the indicated gold mineralization. Rock 0594, pieces of local QVs, suggests this: it is not Bi-anom.

2] The **'W of Timbered Shaft QV'** Au-in till anom has a cluster of two Bi anoms and 3 hi values. Those two anoms are the other Bi-in-till outliers. This anomaly is most likely from sulphides and Bi-bearing sulphosalts in small veins known at the Timbered Shaft QV site. Glacial dispersion from this due W to form the **'W of Timbered Shaft QV'** anom well fits the inferred ice-flow as evidenced by the topography. This Bi anom is larger than 1].

The source of 778R010 QV float with 881 ppm Bi, very hi, is not indicated by the tills – close by T082 is bkgd.

15.5.3 Arsenic Map T-04

The Clease Au(Ag)–Bi–Te–Mo–W–As bearing showings are the inferred source of the 29 ppm As, a hi value, in till T917885 (Map T-04). The adjacent till to the E is bkgd. Re the two unexplained groupings of Bi-in-till anoms and hi values:

1] The **'NW BiWold Dome' dispersal train is evident, but inexplicably not in its midsection.** To the SW T076 is anom with 33 ppm and neighbouring till T075 is slightly high with 23 ppm As. To the NE T065 & T066 are strongly anomalous including T066 with 52.5 ppm As, the single As-in-till outlier of the survey. Float rock 0613D the argillic-altered granitoid boulder with hi 60 ppm As and slightly hi 28 Pb substantiates this Au + Bi + Te etc. anomaly. Some arsenic may be from 0594, a grab sample of 'local' 20 cm-thick QVs with hi 29 ppm As and hi 50 ppm Pb.

2] **'W of Timbered Shaft QV'** the grouping of 2 anoms and several hi to slightly high As values is likely derived from the sulphosalts, as discussed above. Sources of QV cobble 0588, with slightly high 30 ppm As, and 778R010, the auriferous QV piece with low 11 ppm As, are thought uphill.

The 32 ppm As anomaly threshold is at the 84 %ile for this small survey. Compare the regional Eagle Bay till survey (1996-1998) of 1,300 tills with the As threshold 33.4 ppm at the 90 %ile (Paulen & Lett 2005).

15.5.4 Iron Map T-05

The Clease Au(Ag)–Bi–Te–Mo–W–As showings contribute very little Fe in till T917885 (Map T-05) as the mineralization is iron-poor. The more Fe-bearing Lefevre skarn-hornfels is not indicated either. Re the two groupings of anomalous and hi till values:

1] The **'NW BiWold Dome' dispersal train is evident** with 2 anoms and several highs though two tills close to BiWold Dome summit are bkgd. The single Fe outlier with 5.3 % T076 is at the SW.

2] The **'W of Timbered Shaft QV'** cluster of one anom and 4 hi values extends further to the W, about 210 m. Iron appears more mobile.

Upper Ckay trib valley has a cluster of 4 enhanced Fe-in-tills: anom T917879 , two hi values T067 & T074 and one slightly high till. The source is unknown. High Fe in T083 from upper Clel Pawprint Corner trib valley and 4.31% Fe in anom till T917879, along the Timbered Shaft Road, are also unexplained.

15.5.5 Lead Map T-06

High Pb in T917885 is also thought sourced from the Clease Au(Ag)–Bi–Te–Mo–W–As showings (Map T-06). Two Pb anoms SW of the Lady of Lake W + Zn skarn, along an old road, might be from the Iron Founder #2 trench QVs. Re the groupings of anoms tills and hi values:

1] The **'NW BiWold Dome' dispersal train is hardly apparent** as it only comprises two tills: a hi value of 34.9 ppm in T065, this just W of 0588 cobble with hi 95.4 ppm Pb, and T076 slightly high along the Timbered Shaft rd. Some Pb may derive from 0594 a grab sample of 'local' 20 cm-thick QVs with hi 50 ppm Pb.

2] The **'W of Timbered Shaft QV'** cluster is small in area, comprised of the two anomalies T070 & T071 and slightly high T069. These indicate Pb-in-till is dispersed further to the W than the other elements, like Fe is.

The Pb-in-till outlier T072 along the upper Hydro rd is unexplained. It is significantly offset from the 'Dome' train.

15.5.6 Zinc Map T-07

High Zn in T917885 is likely from the Clease Au(Ag)–Bi–Te–Mo–W–As showings (Map T-07). Two Zn anoms SW of the Lady of Lake W + Zn skarn, along an old road, could be from that or the Iron Founder #2 trench showing. Re the groupings:

1] The **'NW BiWold Dome' dispersal train is quite strong,** like for Au Bi & As. It comprises two anoms and 2 hi values including one outlier T208 with 208 ppm Zn. Two tills NW of BiWold Dome summit near 0588 QV cobble have minimal Zn.

2] The **'W of Timbered Shaft QV'** cluster is limited to two hi values T069 & T071, these again further to the W, like Pb & Fe.

15.5.7 Nickel Map T-08

S of the Clease Au(Ag)–Bi–Te–Mo–W–As showings T917885 has bkgd Ni (Map T-08). The single Ni outlier SW of the Lady of Lake W + Zn skarn, along an old road, is thought to be from alteration about the Iron Founder #2 trench QVs. Re the usual groupings:

1] The **'NW BiWold Dome' dispersal train is very weak but apparent.** It has one hi and one slightly high Ni-in-till value to the SW. Tills near the mineralized float rocks are not Ni enhanced.

2] The **'W of Timbered Shaft QV'** cluster is pronounced with 5 enhanced Ni-in-till values. An explanation is elusive.

15.5.8 Copper Map T-09

Cu is low in the known mineralizations. S of the Clease Au(Ag)–Bi–Te–Mo–W–As showings T917885 is bkgd (Map T-09). The hi value SW of the Lady of Lake W + Zn skarn along an old road is thought to be from that showing or from the Iron Founder #2 trench QVs. Re the anom groupings:

1] The **'NW BiWold Dome' dispersal train is weakly developed.** To the SW T076 is anom with 79.6 ppm, the highest till value, lies along LCFS rd. A hi and a slightly hi Cu-in-till value are in the train's midsection. Presence of an anom Cu-in-till train is surprising as Cu is low in the known gold-quartz veining. Tills near the mineralized float rocks are bkgd.

2] The **'W of Timbered Shaft QV'** cluster is apparent.

15.5.9 Molybdenum Map T-10

Mo has very low contents in all the tills; still the range of values on Map T-10 allows interpretation. S of the Clease Au(Ag)–Bi–Te–Mo–W–As showings T917885 is hi as befits this granophile mineralization. Other tills about the Lady of Lake W + Zn skarn are bkgd. Re the anom groupings:

1] The **'NW BiWold Dome' dispersal train is not apparent.** One till T065 is 'anom' and T066 adjacent is hi, these W of the summit. *Mo is not expected in any gold-quartz veining.*

2] The **'W of Timbered Shaft QV'** cluster is apparent as 2 'anoms' and 3 'hi' Mo values.

15.5.10 Tungsten Map T-11

T917885 is one of two W-in-till outliers– it could be from the granitophile Clease Au(Ag)–Bi–Te–Mo–W–As showings or from mineralization like the Lady of Lake W + Zn skarn (Map T-11). Re the anom groupings:

1] The **'NW BiWold Dome' dispersal train is absent.** W is not expected in 'high-level' epithermal-style gold-quartz veining.

2] The **'W of Timbered Shaft QV' cluster is well developed** suggesting an unknown skarn source to the E, uphill of T917878 with 2.7 ppm W. T071 the second outlier *uphill* of the Lefevre skarn-hornfels with 5.5 ppm, is unexplained.

15.6 Summary - Interpretation of Basal Till survey

The small survey of basal tills successfully outlined two multi-element, multi-sample gold anomalies, both substantiated by Au values in locally sourced glacial float rocks.

Highest in importance is the '**NW BiWold Dome' till dispersal train.** It is 470 m long, 740 m if including a Au-anomalous float rock, and a minimum 70-80 m wide. Connecting anomalies its trend is ~30°. Its source is undoubtedly local as quartz veining occurs close to BiWold Dome summit. Tills with anomalous and hi values in Au As Fe Zn outline it, lesser so Pb & Cu. Note the indicated mineralization differs in associated elements c.f. Au Bi Te As W in the BH mine and Lefevre skarn-hornfels & Lefevre QVs.

Of second importance is the **'W of Timbered Shaft QV'** till anom. The immediate local area of the Timbered Shaft has potential for Au Bi As Pb and W mineralization and uncertainly Zn. Fe Ni & Cu are anom likely due to significant hydrothermal alteration of the host rocks. The alteration about the Timbered Shaft QV combined with its thick width shows the local area is Au-favourable (Caron 2012) regardless of no gold values in QV samples.

16 'Conventional' Stream Silt & Moss mat Survey

16.1 Stream Silt Field Collection

Where convenient 10 'Conventional' stream silts were collected, though 3 of these are 'mixed media' samples, this explained below. For collection active stream sediment was sieved through a 4" white plastic -20 mesh screen with a fitted catch basin, this sold by Petrocraft© Products Ltd. of Calgary. Wet-strength Kraft paper bags were used. The 10 samples are plotted at the labelled sites in green on Map S-01. This also has MM sites (brown).

D. Bridge collected two silt samples S239 from the headwaters of upper Hone Ck, above HM-01, and P0228 from the headwaters of upper Bzero Ck, about 320 m NE of HM-19. He also collected 3 admixed samples of active silt and underlying wet soil labelled P0229, P0230 & P023 from upper Bzero Ck, at similar locales. These 3 'mixed media' samples were submitted and analyzed as soils. For convenience they are mapped with the other silts in green on the S Map series, with the ranged MMs in brown.

W. Howard collected the other 5 silts. The 7 Conventional' Stream Silts are listed below:

Silt_ID	Location	Bulk silt_ID
S989101	Clel 770Q5 trib	HM-15
S989111	upper Clel Ck	HM-03
S989102	upper Hone Ck	HM-01 & HM-02
S239 (D. Bridge)	upper Hone Ck	above HM-01 & HM-02
P0228 (D. Bridge)	upper Bzero Ck	above HM-19
S989112	Clel Pawprint Corner trib	240 m above HM-09
S989113	Hort trib	upstream of HM-04 along LCFS road

Table 8 List of 7 of 10 'conventional' Stream Silts at, or near, bulk silt sites

16.2 Silt analyses

Acme analyzed the 7 'actual' silts by the '1F05' Ultratrace ICP-MS analysis (new Veritas code AQ250) lab procedure after 1:1:1 Aqua Regia digestion of 15 g of -230 mesh fraction. Certificate of Analyses VAN13003240.1 has results of 6 silts. The other silt P0228 is on Certificate of Analyses VAN13003241.1.

Acme analyzed the 3 mixed media samples P0229, P0230 & P0231 by the same procedure, except 15 g of -80 mesh fraction was analyzed. These are mapped as silts. Certificate of Analyses VAN13003241.1 has results for 19 'soil' samples but 3 are the above mixed media samples and P0229 is a silt. Thus 15 soils are on that Certificate. Appendix 4 has both.

Chart 5 in Appendix 8 lists field data and results of 12 select elements. Some highs are picked out in red.

16.3 Moss mat sampling – theory

This small orientation survey was undertaken as MMs may be a more effective sample media for surficial geochem surveys in B.C. than stream silts (Lett & Jackaman 2000):

"Tungsten, iron and tantalum are … enhanced in moss mat samples relative to the stream sediments suggesting that the moss preferentially captures heavier minerals (Matysek et al., 1988). Other elements such as antimony, arsenic and cobalt have almost identical mean, median and maximum concentrations in both sample types or in the case of rubidium and sodium are lower in the moss mats. This difference could be explained by the different hydraulic behaviour of individual minerals (e.g. gold, scheelite) as opposed to rock grains (containing varying sodium and rubidium) when transported by stream water."

Lett & Jackaman (2000) surveyed two areas, about Adams Lake in the Shuswap Highlands and east of Kootenay Lake within the watersheds of Akokli, Sanca and Skelly Creeks in the granitic Bayonne batholith. To obtain databases with 68 each of MMs and silts they combined the survey areas and found

"The majority of elements demonstrate higher mean, median and maximum concentrations in moss mats compared to stream sediments. Most notable is gold that exceeds 1,000 ppb in moss mats from two sites, but only reaches 59 ppb in stream sediments".

Moss mat field duplicates give variable analyses, 1,140 ppb and 159 ppb Au at one showing. Bedrock gold occurrences may give muted, low geochemical signals. An example is 35 ppb Au in a MM from a small stream about the auriferous Cam-Gloria QV with no gold in the companion stream sediment.

16.4 Moss mat Field Collection

The CLY survey collected 25 moss mat samples in active stream channels. The dark brown organic root substrate of live sphagnum moss from above the water line was scraped off wet cobbles, boulders and branches. This moss root substrate collects mostly clay and silt and very fine to fine sized heavy mineral gns. Moss was abundant at most all of the stream sites. The sample is from several points within 15 m of the recorded site.

Pre-labelled wet-strength Kraft paper bags were filled, the samples prefixed 'MM'. Time necessary for sampling is about a third less than if collecting field-sieved 'conventional' silts. The MM locations are in brown on Map S-01 and the 7 silts and 3 'mixed media' samples in green.

16.5 Moss mat Analyses

After air drying Acme analyzed the MMs by procedure '1F04' Ultratrace ICP-MS analysis (new Veritas code AQ250). 0.5 g of lab-sieved -230 mesh material was digested with 1:1:1 Aqua Regia. The method has a cautionary note "Aqua regia digestion is considered a partial digestion. Solubility of some elements will be limited by mineral species present. Larger splits (15 or 30 g) give a more representative analysis of elements subject to nugget effect (e.g. Au). Au solubility can be limited in refractory and graphitic samples (Acme Analytical website)." Tungsten in scheelite gns may also have a nugget effect.

13 of the 25 MMs analyzed were collected close to bulk silt sample sites. The Calculated Au in bulk silt values, calculated by ODM from the numbers and wts of recovered Visible Gold gns, are considered more accurate as more material was lab-processed. 10 of these are labelled MMHM## with the number suffix the same as the corresponding bulk silt sample. MM989101, MM989111 and MM238 are from other bulk silt sample sites.

Appendix 8 has Chart 6 'Moss Mats with 12 select elements'. Anomalies are in **bold red**, highs in red and *slightly high values in red italics*. Appendix 4 has Certificate of Analysis VAN13003239.1.

16.6 Ranging & mapping the Moss mats & Silts

This survey's 25 MM is a low number but sufficient to range their analytical values and plot these as bubble plots. Map S-01 has sites of the MMs in brown, the few silt sites in green. Maps S-02 to S-13 plot the ranged analytical values of select elements in the MM as bubble plots, in brown.

Five bubble-plot ranges of elements in MMs are on the twelve S Map series. The range limits of each element is from an ad-hoc examination of a combined box plot and probability plot (or quantile plot) of the analytical data, created by NCSS 2000 software (Hintze 2000, not shown). The analytical values are not transformed. The legend on each element map has the range of the data intervals and no. of values within, in parentheses. For the highest ranges percentiles '%iles' of the total samples are given.

Seven, about ¼ of the MMs, were collected along uppermost upper Hone Ck as it is possibly mineralized (Map S-01). 5 MMs were collected from Bogo trib, these spaced further apart with 3 at low elevations. The 3 MMs from Bmin trib are critical samples as silts are anomalies for Au, W and many gold pathfinder elements (Williams 2010a, 2010b).

The few 'conventional' silts, 7 in number, are not ranged. Their analytical values in green are plotted adjacent to the labelled sites. The 4 silts from upper Clel Ck are too few to interpret, likewise the pair from BH Ck and the single Four tribs Ck silt. Some high values have comments on the maps in green. Same for the 3 'mixed media' samples.

16.7 Anom threshold values of Kootenay Lake Moss mat survey are generally *lower*

Lett et al. (2000) discuss the survey mentioned above of 26 MMs collected SE of Boswell, E of Kootenay Lake in NTS 82F/7. That area is mostly underlain by the Bayonne granitoid batholith. It includes RIRG system polymetallic mineralization as "gold-silver-lead-zinc-tungsten veins and mineralized quartz vein stockworks hosted by granite and quartz monzonite". It is revealing to compare its results with the CLY survey:

Element by AAS, *by INA	*Au ppb	*Au ppb	Bi	Bi	As	As	Fe%	Fe%	Pb	Pb	Zn	Zn	Ni	Ni	Cu	Cu	*W	*W
Kootenay Lake Moss mat Survey n=28																		
%ile	90	95	90	95	90	95	90	95	90	95	90	95	90	95	90	95	90	95
Value	6	8	8.9	9.8	3.9	10.0	1.55	1.60	27	28	75	84	6	8	25	54	66	105
CLY Moss mat Survey n=25																		
%ile	72	84	84	92	84	92	84	88	80	92	84	92	80	89	76	92	76	84
Value	**6.5**	**7.5**	0.63	0.85	**23**	**28**	**3.2**	**3.3**	**50**	**67**	**230**	**280**	**72**	**84**	**48**	**56**	1.15	2.0

Table 9 Comparing anom results of the Kootenay Lake Moss mat survey (Lett et al. 2000) with the CLY survey, at two percentiles %iles. In contrast to ICP-MS analysis INA analysis gives near-complete concentrations that for Au should be significantly higher than the CLY ICP-MS values. Anom threshold values are higher for CLY MMs if in **bold.**

Discussing the analytical methods used most of the Kootenay Lake values are by atomic absorption spectroscopy. The analytical method used for Au, W and some other elements was Instrumental Neutron Activation 'INA' that gives near-total concentrations. The CLY Acme are 'partial' as W is refractory in wet-chemical digestion of scheelite. The same creeks have anom scheelite gn counts in bulk silts (Map M-05, Fig. 29 & 30 photos).

The Kootenay Lake survey bismuth values are by 'AAS-H', aqua regia digestion then hydride generation and atomic absorption spectroscopy of that. They are considerably higher than the CLY ICP-MS values approaching values in rock by ICP-MS. The different analytical methods do not allow direct comparison of bismuth anom thresholds.

Concluding anom threshold values in MMs for gold and most all gold-pathfinder elements are higher in the CLY survey than for Kootenay Lake. This demonstrates CLY area's unrealized mineral potential.

16.8 Interpretation – Moss mat & Silt Map series S-01 to S-13

16.8.1 Gold Map S-02

Map S-02 Gold in Silts & Moss Mats displays a **prominent Au anom in Bmin trib, and lower in Bzero Ck, in all collected MMs.** Two MMs have >7.5 ppb >84 %ile, two higher up >6 ppb. From **upper Bzero Ck to the N** mixed media sample P0229 **has hi 45 ppb,** no MMs were collected there. **Au is high** to 6.6 ppb in MM MM0685 in **upper Hone Ck.** Bogo trib has a low signal except at its lower stretch.

These gold results at high elevations contradict an interpretation of the 2009 silt survey that

"…anomalous gold assays favor the lower elevations while other elements, especially silver, lead and zinc, appear to point closer to the source of the potential mineralization, at higher elevations in the headwaters of the drainage basin[s] (Williams 2010b, p. 64)."

Silt S989111 with 5.8 ppb indicates Upper Clel Ck is gold anomalous - it is also anom in Visible Gold gn count, see section 'Interpretation - Recovered Visible Gold gns in Bulk Silts' & Table 10. MM989111 with 9.9 ppb further supports the **Upper Clel Ck** gold anom. MMHM10 with 8 ppb shows BH Ck is gold anom.

Compare the anom threshold of gold-in-MMs with Calculated gold in bulk silts

The reader might consider 7.5 ppb, >84 %ile in this small survey of 25, a rather 'low' anom threshold for the MMs, but this is close to the 'low' anom threshold of Calculated gold values in 23 -12 mesh bulk silts, 5 ppb. See the latter section 'Interpretation – ppb Calculated Gold in the bulk silts' (Fig. 20). Reflect that the -230 mesh MM fines appear to well sample the typically very small 10-20 micron sized Au gns.

The map pattern with all 4 anoms occurring in Bmin trib, and lower in Bzero Ck, substantiates the 'low' anom threshold 7.5 ppb. Analyzing only 0.5 g of -230 mesh MM fines appears sufficient to detect gold anoms.

16.8.2 Bismuth Map S-03

Bmin trib has a prominent Bi anom the outlier MM236 with 0.94 ppm, the highest value. **MMs above are high >0.63 ppm**. The three mixed media P- samples from upper Bzero Ck to the N are all hi with ~0.7 ppm.

Upper Hone Ck has a remarkably consistent run of 5 hi and slightly high Bi values. 2 silts collected there are also high 0.61 & 0.82 ppm. The single MM from lower Four tribs Ck is anom at 0.86 ppm Bi. Upper Clel Ck has slightly hi Bi values in both media. Two BH Ck MMs are not even slightly hi.

16.8.3 Tellurium Map S-04

Te is a gold pathfinder though 10 to 100 times scarcer than Au in nature (Boyle 1979). With low concentrations it has even less analytical precision than Au in the MMs. Thus realistically the mapped values are only approximate; they could be about double or about half. In practice groups with higher values support an interpretation.

Map S-04 Tellurium in Silts & Moss Mats shows **anom Te in mid Bmin trib and highs** in the three mixed media P- samples **to the N from upper Bzero Ck**. **Bogo trib has an anom, the highest value 0.11 ppm Te. Upper Hone Ck has a Te anom bordered by highs**. Three hi values in Clel Ck drainage indicate Au potential there. In contrast BH Ck draining known mineralization has low bkgd Te.

16.8.4 Arsenic Map S-05

2 anoms >92 %ile may indicate a **~500 m anom extending from Bogo trib to Bmin trib** along a SW-NE trend. Upper Hone Ck has low to moderate MM values but the 2 silts are moderately hi. Of the other drainages only BH Ck has hi As-in-MM values.

16.8.5 Iron Map S-06

Iron is curiously low in MMs from creeks draining the LW Ridge, though the mid part of upper Hone Ck is slightly hi. Silt 989102 with 5.24% supports this. **Clel 770Q5 trib** is **anom** 3.42% Fe, >88 %ile in MMs and 4.92% in silt S989101. All 3 silts from Clel Ck drainage have hi Fe >4.2%. **BH Ck & upr Hort trib** have single anom MMs, both 3.33% Fe.

16.8.6 Sulphur Map S-07

The two highest values are at the **top of Bmin trib**, both >92 %ile. To the south **Bogo trib has 3 hi values** 0.15% S, >76%ile, on the map 'moderate S'. Sulphur anoms have low contrast w.r.t. background. Te is a more useful gold pathfinder.

16.8.7 Lead Map S-08

Bmin trib has a prominent Pb anom in MM with the 2 highest values, 71 & 67 ppm, both >92 %ile. To the N from upper Bzero Ck one of three mixed media P- samples has higher Pb, 81 ppm. To the S one MM from Bogo trib is anom. Upper Hone Ck silts are hi, the MM low. 2 MM from BH Ck are hi.

16.8.8 Zinc Map S-09

Like for Pb, **Bmin trib has a prominent Zn anom in MM with the 2 highest values, 283 & 380 ppm, both >92 %ile**. To the N from upper Bzero Ck one of three mixed media P- samples has hi Zn, 123 ppm. To the S Bogo trib is not anom. Upper Hone Ck silts are hi, 182 & ppm and the MM hi. The other creeks are near bkgd.

16.8.9 Nickel Map S-10

All four highest Ni values are from **upper Hone Ck**, a consistent run of anomalies >84 %ile. The two silts are also hi in Ni and support the upper Hone Ck nickel anom. The nickel may be from an unknown ultramafic ophiolite slice in this multiply-anom drainage - a *major fault* is indicated like the *Tillicum fault*. The two MM from BH Ck draining the *Tillicum fault* have less Ni than the four from upper Hone Ck MMs. In the other MMs Ni is highest in lower Four tribs Ck, 65.5 ppm in MMHM06.

16.8.10 Copper Map S-11

Bmin trib has low MM values though downstream **lower Bzero Ck is anom with 67 ppm, a >92 %ile value.** A MM from upper Hone Ck is hi. A MM from Clel 750D1 trib has the other >92 %ile anom at 58 ppm. MM Cu values are generally low, like that of most all other geochemical sample types in CLY prospect area.

16.8.11 Molybdenum Map S-12

Mo has extremely low contents. **Bmin trib** has two highest values at its top, both >92%ile. Downstream a MM from **lower Bzero Ck** is hi 1.78 ppm, a >84%ile value. The silts are low. Like Cu low Mo concentrations in other sample media are characteristic of the area.

16.8.12 Tungsten Map S-13

Bmin trib has a strong and consistent MM anom in all 3 MMs, >84%ile of the survey. These are also outliers with >2.8 ppm W. To the S the two highest MMs from **Bogo trib** are hi and slightly hi, 1.1 & 1.2 ppm. ***Upper Hone Ck has a consistent run of 5 higher values,*** this supported by the two W-in-silt values 1.0 & 1.8 ppm.

Combining two surveys of 68 MMs Lett & Jackaman (2001) set the anom tungsten threshold at 43 ppm, the 90 %ile W. Their 70 %ile is 12 ppm (fig. 8). These INA analyses give near-total W concentrations. The W signals in the present survey are expectedly less as Acme Analytical's ICP-MS method does not fully determine 'refractory' W. The anom threshold is lower, 2.8 ppm. For interpretation the signal is important, even if low-level.

The Bmin trib tungsten-in-moss mat anom is confirmed by the 100 scheelite gns, {111} standardized to 10 kg, counted in bulk silt HM-18, photo Fig. 30. Anom counts of corundum and grossular, heavy indicator minerals, confirm a tungsten-mineralizing environment (conclusion Table 18). All together indicate polymetallic W + Au skarn mineralization near the Wallack Ck intrusive contact in the watershed of Bmin trib.

The lower Four tribs Ck MM is an anom outlier with 2.5 ppm W from the scheelite-bearing Lefevre skarn-hornfels with Au-Bi-Te mineralization, and other unknown W + Au skarns.

16.9 Summary - Interpretation of the Moss mat & Silt Surveys

The MM survey effectively shows small streams draining the LW ridge granite contact area have coincident anoms in Au, W and other gold-pathfinders of RIRG system deposits (Hart 2007). Notably Bi Te & As are anom.

Bmin trib has a prominent Au anom in all collected MMs. Bzero Ck downstream is also anom. To the N mixed media sample P0229 from upper Bzero Ck has hi 45 ppb Au. To the south Bogo trib has two MM with anom Au but inexplicably three upstream are not. Further south middle upper Hone Ck has one MM hi in Au.

16.9.1 Inferred lengths of the gold source

MMs infer the Au source is a minimum **1.4 km** long SW-NE, if mid-Bogo trib is Au-anom: two MMs collected downstream signal that. Bogo trib is Class II VG gn anomalous with 8 {10} gns recovered, 5 Reshaped and 3 Modified (section 'Interpretation - Recovered Visible Gold gns in Bulk Silts', Table 10 & Conclusion Table 18).

Proceeding SW upper Clel Ck is also Au anom. HM-15 from its upper stream Clel 770Q5 trib is anom in Calculated Gold, 17.79 ppb in the 'total' bulk silt (Map H-04). Tungsten is also anom in HM-15 Clel 770Q5 trib with {35} scheelite gns (Conclusion Table 18, Map M-05). Thus if the gold source continues SW-ward from upper Bzero Ck to Clel 770Q5 trib its geochemically inferred extent is **1.9 km.**

The gold source is longer, **2.5 km,** if 645B0 Ck is included as it is Class II VG gn anom with 7 gns VG recovered {8 standardized to 10 Kg of silt}. Calculated gold is questionably anom in its bulk silt 3.83 ppb; though consider only one sample was collected.

As expected BH Ck is anom with 8 ppb Au in MMHM10; yet three other streams draining the LW ridge, named & discussed above, have slightly higher MM values. BH Ck is not anom in Calculated gold in the bulk silt nor its HM concentrate. **Tellingly more VG gns were recovered from several other creeks.**

16.9.2 A previous interpretation Contradicted

The MM results contradict a previous interpretation of the 2009 silt survey that

"The pattern [is] anomalous gold assays favor the lower elevations while other elements, especially silver, lead and zinc, appear to point closer to the source of the potential mineralization, at higher elevations in the headwaters of the drainage basin[s of LW Ridge] (Williams 2010b, p. 64)."

16.9.3 Moss mat anomalies symbolized

For brevity Table 10 symbolizes anom and hi values of gold and several gold-pathfinders in Moss mats. Creeks are listed N to S; 645B0 Ck, upper Bzero Ck and Four tribs Ck are not tabled as there are too few MM samples. Other survey results, using different geochemical media, affirm they too are gold-prospective.

Table Symbols: * anomalous values * hi values

Creek, Moss mat & Silt Map	Recovered VG gns / anom Class	Calculated Au in bulk silt	Au S-02	Bi S-03	Te S-04	As S-05	W S-13	Mo S-12	S S-07	Pb S-08	Zn S-09	Fe S-06	Ni S-10	Cu S-11
LW Ridge ***inferred polymetallic Au + W skarn system, S-rich, extent ~2.5 km***														
645B0 Ck *no samples*														
upper Bzero Ck *no samples*														
Bmin trib	8 / II	low anom	*	*	*	*	*	*	*	*	*	-	-	-
Bogo trib	8 / II	*not anom*	*	-	*	*	*	-	*	*	-	-	-	-
Hone Ck	0 / -	*not anom*	*	*	*	-	*	-	-	-	*	*	*	*
McCormick Highlands ***inferred Au-(Bi)-Te-Fe-Cu vein system, base metal & S-poor***														
Upper Clel Ck – Clel 770Q5 trib	5 / -	**high anom**	*	slightly hi	*	-	-	-	-	-	-	*	-	*
BH mine ***a known Au-Bi-Te-As-W qtz vein system, S-poor. Two drill targets but little-anomalous!***														
BH Ck	5 / -	*not anom!*	*	-	-	*	-	-	-	*	-	*	*	-
Four tribs Ck *too few samples*														

Table 10 Moss mat element anomalies symbolized in 5 creeks with MM and silt samples, comprising 4 separate drainages, these color-coded. Also listing VG gn anom Class: Class I ≥8 gns, Class II ≥11 gns and anomalies of Calculated Au in bulk silts.

The order of the elements in Table 10's columns is in their approximate order of geochemical utility as gold-pathfinders for RIRG system mineralization. This multiple-deposit style model by C. Hart (2005, 2007) can be useful in exploring the property. Note mineralization of other deposit styles (types) certainly occurs, e.g. gold-bearing mesothermal or orogenic-style QV systems (L. Caron 2012, see section 'Mineral Deposit types').

Mo generally has little response in MMs. Anom Pb & Zn in Bmin trib and Bogo trib indicates a ***polymetallic*** base metal-bearing ***Au + W skarn system*** there. Combinations of anom Fe-Ni-Cu indicate HCA ophiolite occurs in Hone Ck and upper Clel Ck drainages, like the response of those elements in BH Ck. This drains known Au-Bi-Te-W-As bearing quartz veins, with present drill targets, but note **Bi Te & W values are *not anom* in two BH Ck MMs.**

Preceding discussion in latter sections, Calculated Au in the bulk silt from Clel 770Q5 trib is **highly anom.** All together infer a Au-(Bi)-Te-Fe-Cu bearing system, base metal and S-poor, occurs in the McCormick Highlands area.

16.9.4 Moss mat Summary

Summarizing the Moss mat multi-element geochem anoms indicate a gold source **approx. 2.5 km** long along the W side of the LW ridge. This aligns along a specific geologic setting: the W contact of the granitic Wallack Ck stock. **This contact zone extends along a major, crustal scale, *fault-shear zone*: the NNE trending *Waneta – Tillicum – MPT Shear Zone*** (Howard 2012). Its structural setting is analogous to an Archean crustal 'break' in a greenstone belt with economic gold-bearing QVs.

Concluding MMs are an effective geochemical sample media for Au exploration even analyzing only 0.5 g of -230 mesh material.

17 Bulk silt sampling for HM Concentrate preparation

17.1 Theory – using heavy minerals in prospecting

Gold and tungsten occur in heavy detrital minerals, ex. native gold, electrum and scheelite. "The conceptual basis for the use of heavy minerals in prospecting is that most ore minerals have high densities which permit them to be separated by gravity techniques from … rocks, soils, or alluvium. …Results of the mineralogical examinations of the concentrates, when quantified, plotted on maps, and interpreted in the context of regional geology and geomorphology, will identify mineralized areas and areas with positive anomalies for indicator minerals of ore deposits. Also defined will be major lithologic units, zones of regional metamorphism, and geochemical provinces … In 'mineralometric' surveys for lode deposits, the sought minerals, for example native gold, cassiterite, scheelite, or cinnabar, are recognized to have come by mechanical dispersion from primary sources more or less complicated by metamorphic events (Overstreet & Day 1985)".

If gold is present preparation of HM concentrates will likely detect it (Day 1988) with an enhanced signature (signal). Field panning or sluicing is not used – their results are fully dependent on the field skills of individual samplers and are not reproducible.

Heavy indicator minerals generally occur at very low concentrations, a few gns to 100's per sample. Practically gns coarser than 0.25 mm are viewed, counted and picked with a binocular microscope. Gold, tellurides and PGMs mostly occur as silt sized gns in finer fractions.

"Base metal indicator minerals … are present in large alteration and reaction zones associated with certain types of deposits including:
1) metamorphosed volcanogenic massive sulphides (VMS); also includes Sedex and Mississippi Valley deposits subtypes in medium to high grade regional metamorphic terrains [e.g. the metamorphosed Reeves-MacDonald Pb-Zn-Ag deposit];
2) skarn and greisen deposits;
3) magmatic Ni-Cu sulphides (Averill 2001)."

17.2 Utility of recovering Visible Gold gns from bulk silts

Even if a creek's conventional stream sediments are not geochemically anom it may be anom in VG gns and prospective. For example about the Eskay Creek Au-Ag mine, northwestern B.C., one stream with <21 ppb Au in silt has many VG gns recovered by tabling bulk silt (Lett 2007). Another example is a gold-bearing bar on Sombrio River, west of Victoria on Vancouver Island. Samples of three geochem media: -12 mesh bulk silts, -80 mesh stream sediments & -80 mesh moss mats were collected from three sites spaced 10 to 15 m apart. Only VG counts in bulk silts are consistently anom with 6, 10 & 15 gns recovered (Lett 2007).

Bulk silts have a direct relationship with bedrock in the watersheds (catchment basins) as rock erosion and sediment transport is by local, active fluvial processes. Till is re-worked and re-sedimented above collection sites with some granted to be sourced from other watersheds, but for this survey these are sufficiently large to include much local-sourced till. This is from alpine 'valley' glaciation and not far travelled. Practically in the survey area fewer bulk silts need be collected than if tills were collected, about 10 times less.

17.3 Collection of Bulk silts lessens the 'Nugget effect'

An advantage of a bulk silt HM concentrate survey is that the 'nugget effect' is less pronounced because the amount (mass) of the analyzed sample is reduced twice; first by nature, than in the lab. The sampled CLY sites are active, high gradient, high-energy tributary creeks naturally depleted in silt & clay size particles. Most of the VG gns are silt-sized and thus also depleted. Lab concentration of a HM concentrate follows this first sorting. Summarizing sampling bulk silts in high energy environments and preparing HM concentrates provides good contrast between anomalous and background areas. The method can detect weak anomalies and is well suited to evaluate gold potential upstream (Lett 2008). Concluding, the nugget effect is only minimal in the present survey.

In several CLY mineral showings from petrographic microscopic studies (Cook & Ciobanu Part II in Howard 2009) the average Au gn size is less than ~10-20 µm (microns). Many of the recovered VG gns are comparably small or slightly larger. Their likely sources are similar occurrences, buried under cover.

17.4 Recovery of Visible Gold grains depends on their size

"ODM's processing is optimized for the recovery of heavy mineral grains (including gold grains) in the size range 50 to 500 microns but we constantly recover gold grains having a width down to ~5 microns. Our gold grain recovery rate at 20 microns is 20% and at 10 microns is at best no better than 10% [see Appendix 6 Rate of Au grain recovery in ODM lab… an ODM chart] but the number of fine grains we recover from equally anomalous samples (by assay) is much higher for finer-grained gold because far more [fine-sized] grains are present...

All of the CLY samples are stream sand and gravel deficient of fine silt to clay size particles. **1 to 10 micron gold is not expected to be present** as they would have been flushed out with the fine silt to clay. The specific gravity has very little effect (Stoke's law) for such fine grains, thus any [1 to 10 micron-sized gold grains present] would behave the same as the fine silt and clay size minerals (R. Huneault email Nov. 11 2013)."

"[Abundant] concentrations of fine gold grains were not found in the samples but this is expected because >90% of gold grains, both in bedrock and surficial sediments, are silt-sized — i.e. <0.063 mm in diameter, or finer than human hair — and such small grains are expelled rather than concentrated by the high-energy stream flow of the type that generated the sampled gravels ... **Sulphide, arsenide and telluride minerals including the sought bismuth tellurides are similarly rare to absent because the gravel is highly oxidized** as evidenced by the ochre colour of the samples (Dec. 03 2013 letter by R. Huneault)."

See Appendix. 6 ODM chart 'Rate of Au grain recovery in ODM lab showing effects of grain size on number of Au grains recovered'.

17.5 Central CLY mineral occurrences have micron-sized Au gns

Concurring with the above, in the central CLY area the native Au (or electrum) gns in several occurrences are often very small, 1 to 10 µm (micron) size. **The 'average' gn size is less than 5 – 10 µm.** This is known from microscopic study of polished mounts (thick sections) by N. J. Cook & C. Ciobanu; see Part II in Howard (2009):

- In sample BH UHS-4 from Adit 2 Underhand Stope Vein of the BH mine "More than 20 individual grains of electrum were counted … The majority of these are less than 10 µm in diameter (p. 33)"
- In sample EL-05 from Eloise Vein North [near 0424] "Of 29 gold grains (!) …most are isolated grains less than 10 µm in size within the quartz matrix (p. 76)"
- In sample EL-07 also from Eloise Vein North within about a meter of EL-05 "Gold (electrum) occurs as tiny (<20 µm) grains … (p. 85)".

With their tiny silt size, generally <10 (or <20) µm, not all the Au gns in the bulk silts have been visually identified and counted (Appendix 6 ODM chart). The low gold signals do not reflect on its amounts possibly present.

17.6 Bulk Silt Survey Collection sites

For convenience some bulk silt sample locations were near roads and trails. Samples are from active, high-energy torrential creeks, some at the highest possible elevations. Water flow was moderate to very slow after the spring freshet in Aug. and Sept. The creek channel often exposed bedrock. Ideal sampling sites were sought:
"clast (boulder, cobble, & pebble) supported, tightly packed and poorly sorted gravel in a well formed bedrock depression, pothole or crevice. A good site is on bedrock [with abundant well-rounded boulders] (Lett 2007)".

Meter-long flatter creek runs were preferred sampling sites. HM-09 Clel Pawprint Corner trib was the most poorly developed drainage sampled. HM-22 from 710K0 Ck, a Wallack Ck trib 0.5-0.8 m wide, was dry clayey sediment successfully dry-sieved by J. & B. Denny.

17.7 Sample Density

The 23 samples were collected in a 7.5 - 8.5 sq. km area, if 8.0 sq. km = 2.9 ~3 samples per sq. km. This is about 3 times the sampling density for heavy minerals recommended by Lett et al. (2000) one per 10 sq. km.

17.8 Field Procedure

Logistically it is necessary to reduce the sample weight by field sieving the sediment, removing oversized gravel, cobble and boulder clasts. Lett (2007) recommends using a 12 mesh screen to obtain ~10 kg of sample. This is the standard GSC procedure (p.c. B. McClenaghan 2014) and this survey used that screen size. The collected -12 mesh bulk silts weighed slightly less, 5.9 - 9.7 kg, average 8.4 kg. Total gravel weights shoveled and field-sieved to obtain these are unknown, but considerable. P. Matysek of the GSB finds a 16 mesh screen practical.

A double-screen method was used to process the stream gravel. First cobbles, pebbles and wood were removed by wet-screening shovelled gravel through a round, dark green, Keene© classifier screen. This has an ASTM stainless-steel 4 mesh with 0.25 inch openings. Its diameters are 14" at the top opening, 11" for the screen and its height 4.75". The classifier is made of tough high-impact plastic with four plastic ribs supporting the screen. It closely fits on a 12" plastic gold pan used as a wide collection bowl. The pan is convenient tool with a light weight; no panning was attempted.

Pre-screened sediment was then wet-sieved through a 12 mesh screen on top of a fitted catch basin. These are white plastic 7.5" in diameter, sold by Petrocraft© Products Ltd. of Calgary. An average 8.4 kg of sand and fines was collected by repeated screening. This was placed in a new, pre-labeled, 3.7 litre (1 gallon) volume Rubbermaid® TakeAlongs® 'large-size' rectangular plastic tub, product #7A96. This has rounded corners and a Quik Clik Seal™ snapping lid. Its dimensions are 9.63" wide, 14.5" long and 4" high (24.4 x 36.8 x 10.1 cm).

The tub was jiggled often to settle the bulk silt and excess pore water poured off to lessen sample's volume and weight. Most often more sieved silt was added to top-up the sample. After snapping the lid the tub was wrapped with flagging tape and placed in a new pre-labeled Ziploc® 'Big Bag'. These transparent, flexible, heavy-duty plastic bags are sized 38 x 38 cm. A 'Double Zipper Seal' closure retained any silt that escaped from the tub while backpacking it, an effective 'fail safe' procedure.

After silt collection all sampling equipment was thoroughly cleaned with stream water to avoid contaminating the next sample (Plouffe et al. 2013). None of the samplers wore hand jewellery or gloves. The site was flagged, described and photographed. Moss mats and oversize +12 mesh rock chips were collected at each site in new, pre-labelled, wet-strength Kraft paper bags. For economy only some of these were analyzed.

Wet-sieving through the 12 mesh screen obtained mostly sand with some silt-size grains, all less than 1.680 mm = 1,680 μm (<0.0661 inches). This procedure allowed the largest visible gold grain recovered to pass the screen, 1,250 μm (1.25 mm) long, 250 μm wide and 150 μm thick. That was picked from a prepared fraction of HM-09 Clel Pawprint Corner trib (Appendix 7). At 1,250 μm it would only have passed through a 20 mesh screen with smaller 0.842 μm sized openings lengthwise – an unrealistic scenario.

Mention follows of the difficulty collecting & transporting the bulk silts. An experienced person (WH or B. Denny or J. Denny) surveyed the local area of a creek for the best site for ready collection of a good quality representative sample. One field hand shoveled cobble to clay sized active sediment. Another wet-sifted this through two screens. Collection time was a minimum 1 hour to maximum 1 ¾ hrs depending on the amount of sand and water at the collection site. On average the bulk silts weighed ~8.4 kg. The most collected in a day were four, with two of those from near roads.

HM-01 and HM-02 are field duplicates from lower Hone Ck. No VG gns were recovered in either indicating some consistency in that creek, and the ODM lab procedure. There were no duplicate sample pairs for the heavy indicator mineral gn picking procedure.

17.9 Lab processing of the bulk silts by ODM

Appendix 6 has a flowchart of Overburden Drilling Management's general lab procedure. The following specifically details that for the present survey.

The collected bulk silts were sieved to -12 mesh or <1.680 mm in the field, this size less than the -2.0 mm size specified in the 'generic' flowchart. Modifying that slightly this was ODM's lab procedure:

1] Retain a representative 200 g split of each sample, a 'Character Sample' [not ~500 g]. Average silt wt table was 8.2 kg.

2] Prepare the <1.680 mm heavy mineral fraction by shaking table concentration. Refine by heavy liquid (methylene iodide) separation at SG 3.2.

3] Micropan the <1.680 table concentrate for fine <0.25 mm sized gold grains and fine scheelite and metallic mineral grains.

4] Ferromagnetically separate the table concentrate, store the ferromagnetic fraction. This is mostly all small magnetite grains and larger magnetite-bearing lithic grains. Wash with oxalic acid to remove Fe coatings.

5] Dry sieve the 0.25 to 1.680 mm nonferromagnetic HM fraction to obtain:

- -0.25 mm fine fraction, stored
- +0.25 to -0.5 mm [+60 to -35 mesh] medium fraction
- +0.5 to -1.0 mm [+35 to -18 mesh] coarse fraction
- >1.0 mm to - 1.680 mm [+18 to -12 mesh, the field seive] very coarse fraction

6] Electromagnetically separate the +0.25 to -0.5 mm nonferromagnetic HM fraction using a Carpco drum magnetic separator. These fractions are obtained at progressively lower amperages:

- nonparamagnetic (>1.0 amp)
- weakly paramagnetic (0.8-1.0 amp)
- moderately paramagnetic (0.6-0.8 amp)
- strongly paramagnetic (<0.6 amp)

7] Manually pick the indicator mineral grains examining the electromagnetically separated +0.25 to -0.5 mm sized fractions and the coarser 0.5 to 1.0 and 1 to 2 mm sized fractions under a binocular microscope. Store picked grains in labeled vials according to size and species. Identify difficult or ambiguous grains by qualitative SEM (Scanning Electron Microscope) analysis. The spectra are not kept.

8] Record the major background detrital heavy mineral suite of each sample to monitor any significant change in the overall sediment provenance.

9] Photograph concentrates and examples of the heavy minerals.

10] Store the -0.25 mm fraction for possible geochemical analysis.

11] Report results in an Excel spreadsheet.

12] Provide a detailed description of processing procedures in Word format.

"All of our indicator mineral logging is done by experienced exploration geologists/mineralogists, not by technicians. The mineralogists are familiar with all minerals in the concentrates and therefore are able to recognize minerals indicative of any type of deposit (R. Huneault email Aug. 28 2013)".

The prepared 0.25 – 0.5 mm heavy fractions weigh minimum 7.4 g (HM-07) to maximum 37.5 g (HM-02), generally 15 – 30 g. Each gram contains ~10,000 mineral gns. Roughly half is nonparamagnetic, half comprise the three paramagnetic fractions.

17.10 Quality Control by ODM Lab

These are some of the controls listed on the ODM website:

- "Incoming samples are immediately catalogued and organized *(Appendix 7 sample reception log sheet).*
- In every circuit, the sample processing sequence and operator is recorded.
- The quality of the mineral separation is visible at every concentration stage (shaking table, heavy liquid, magnetic, electromagnetic) as well as during final indicator mineral logging; no blind (enclosed) concentrators are used.
- All shaking tables are customized to eliminate indicator mineral carryover.
- Blank samples are inserted and processed between projects.
- Gold grains are observed immediately in the initial tabling circuit and extra blank samples are inserted after anomalous samples.
- Sieves are meticulously cleaned after each concentrate.
- All sample fractions and subfractions obtained during processing are weighed and tallied *(Appendix 7 data file HEAVY MINERAL PROCESSING WEIGHTS sheet)* to identify potential sample mix-ups. Any unreconcilable weight imbalances are assessed and immediately reported to the client in writing.
- Regular heavy mineral recovery tests are conducted on all shaking tables.
- Unusual mineral grains or other suspect particles observed during gold micropanning or indicator mineral logging are immediately resolved by SEM analysis (as reported).
- Indicator minerals are meticulously organized by species and grain size in separate vials."

18 Interpretation - Recovered Visible Gold gns in the Bulk Silts

18.1 Recognizing two Anomaly Classes

18.1.1 Histogram of Recovered VG gns

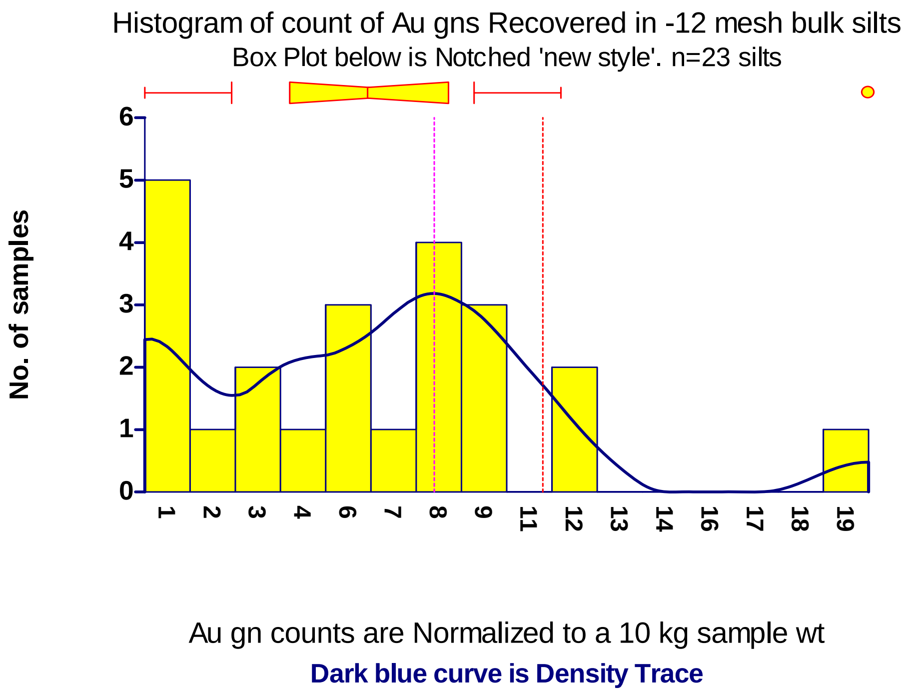


Fig. 20 Histogram of Gold gn counts of the -12 mesh bulk silts, standardized to 10 kg. Labels on the horizontal axis are in the middle of the histogram bars; these are unit (one gn) ranges.

This equation standardizes (normalizes) the Visible Gold gn counts to a standard 10 kg bulk silt weight:

Gold gns in 10 kg silt = 10 kg x (No. of Gold gns / Total wt of bulk silt tabled, in kg)

The most common value is *nil* gns, none in 5 samples (histogram). The median 50th %ile is 7 gns. **The Class II gn anomalous threshold, possibly anomalous, is set at 8 gns.** This is the dashed purple line at about Q3 the 75th %ile. **The Class I gn anomalous threshold is set at 11 gns, the red dashed line, a gap in the histogram just below the box plot outer fence.**

Consider a Normal Probability plot of the Visible Gold gn counts:

18.1.2 Setting Anomaly Thresholds on a Normal Probability plot of Recovered VG gns

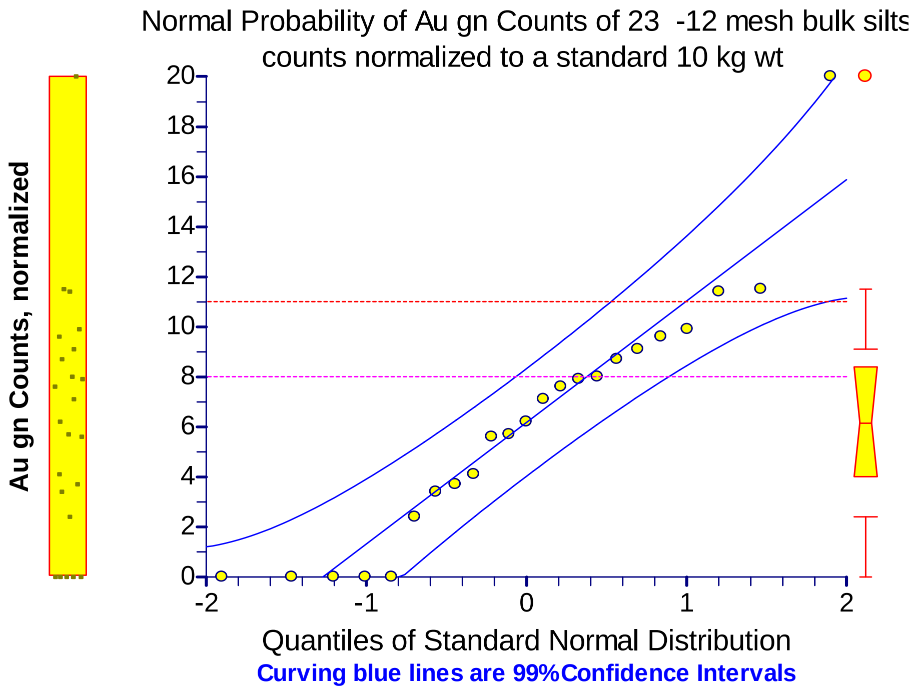


Fig. 21 Normal Probability plot of Visible Gold gn counts, standardized to 10 kg sample wt. The 5 nil values form a long tail to the left of the sample population distribution; otherwise the count data is normally distributed. Conservatively 8 gns is set as the Class II gn anomalous threshold. The 90^{th} %ile is 9.6 gns. The Class I gn anomalous threshold is set at 11 gns, the red dashed line just below the box plot upper fence.

18.2 Table 11 Creeks with Class I and Class II Visible Gold gn anomalies

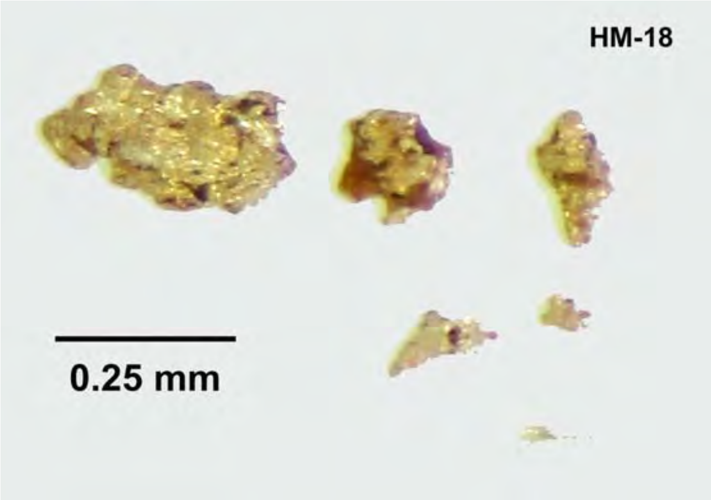
≥ 11 gns Class I VG gn anomalous 3 silts	*Cks listed from N to S*	Drainage basin	Total Visible Gold gn Count	Counts of Reshaped + Modified + Pristine VG gns	Total VG Count Standardized to 10 kg	Calculated gold in bulk silt, ppb
HM-25	lwr Clel Ck	Clel Ck	10	6+3+1	12	*3.37*
HM-24	Ridge trib	Four tribs Ck	9	3+5+1	12	1.47
HM-07	E of Ckay trib	Four tribs Ck	16	6+9+1	21	1.58
≥ 8 gns Class II VG gn anomalous 7 silts	*Cks listed from N to S*					
HM-17	645B0 Ck	645B0 Ck	7	3+4+0	8	*3.83*
HM-19	upr Bzero Ck	Bzero Ck	7	3+2+2	8	*3.14*
HM-18	Bmin trib	Bzero Ck	8	2+5+1	9	9.19
HM-11	lwr Bogo trib	Hone–Bogo Ck	8	5+3+0	10	1.16
HM-03	upr Clel Ck	Clel Ck	7	5+2+0	8	9.91
^HM-04	upr Hort trib	Four tribs Ck	^8	^6+2+0	9	**41.30**
HM-14	mid Hort trib	Four tribs Ck	9	6+2+1	10	0.61

^HM-04 has a single large Reshaped gn found while picking the HM gns, 450 µm long, 400 µm wide and 250 µm thick with medium grey sericite (Fig. 23 photos)

Table 11 Creeks with Class I and Class II Visible Gold gn anomalies. Cks are listed from N to S with the drainage basins are color-coded. Tabled are counts of Visible Gold gns, shape counts, and Calculated gold in bulk silt: if above 17 ppb **highly anom in red bold,** above 5 ppb (both are >9 ppb) low anom in red, *questionably anom >3 ppb red italics.* Those thresholds are determined in section 'Setting High and Low anom thresholds' below.

The above Table classes 10 of 23 of the collected bulk silts as anom, 43% of the survey. Five drainage basins are anom. This is realistic as the creeks drain a known gold-mineralized area; the area surveyed was based on previous drainage surveys that show it gold-anomalous. Note BH Ck is *not anom*. Map H-01 plots the Gold gn Anomaly Classes and the background silts. Four tribs Ck is the most-sampled drainage with a clear pattern of anomalies.

18.3 Photos of HM-18 Bmin trib VG gns & pyrite, and HM-04 upper Hort trib VG gns



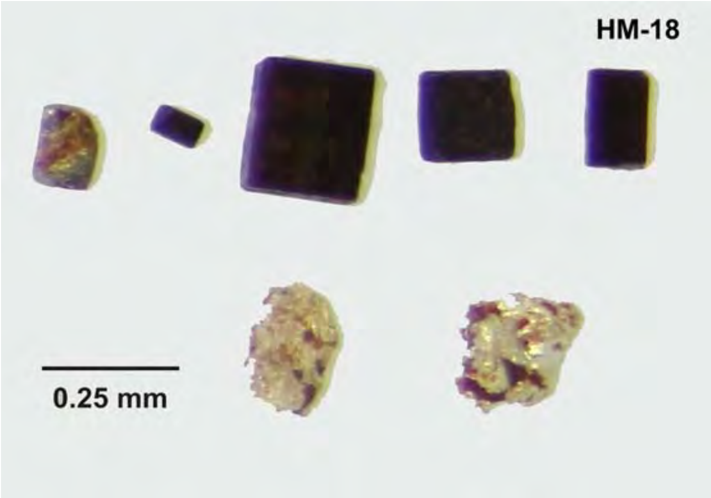
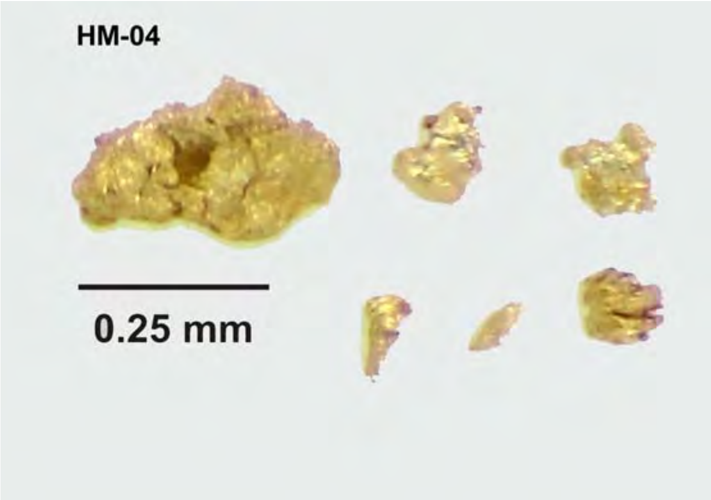


Fig. 22 Photos of HM-18 Bmin trib with 8 VG gns shaped 2+5+1, and pyrite. In left photo the two second-largest gns are the Reshaped ones, the Pristine gn is the smallest one at bottom. The other 3 including the largest are Modified gns. Right photo has 2 other Modified gns with inward-curved sides and 5 oxidized pyrites.



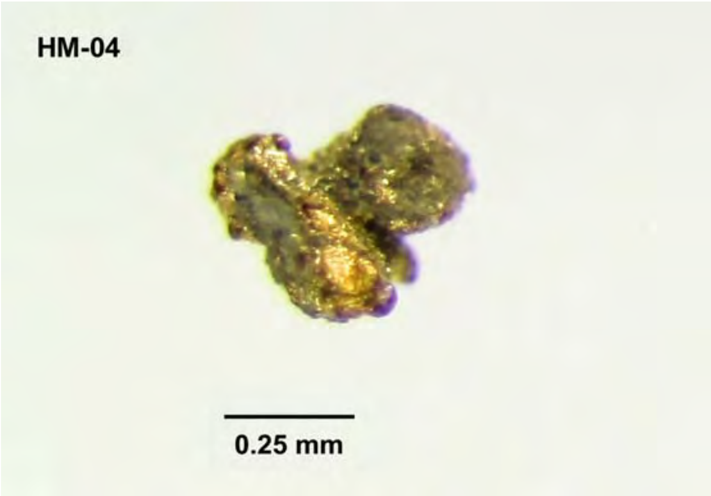


Fig. 23 Photos of 7 of the 8 VG gns shaped 6+2+0 recovered from HM-04 upper Hort trib. In left photo are 4 Reshaped + 2 Modified gns. The latter are 20 x 100 x 100 micron sized, the two medium-size gns at the top rt. Right photo is a large Reshaped gn found while picking the HM gns, measured 250 µm thick, 400 µm wide and 450 µm long. The medium grey mica on its left side is confirmed by SEM as sericite. This large gn well contributes to the Calculated gold in bulk silt value, this survey's second-highest at 41 ppb. It is infolded but has features of a near-source Modified gn.

18.4 Summary – Interpretation of Gold gn counts: five anomalous drainage basins

Listed N to S five drainage basins have potential for economic gold deposits (with other elements): 645B0 Ck, Bzero Ck, Hone–Bogo Ck, Clel Ck & Four tribs Ck (comprising Hort trib, Ckay trib & Ridge trib), see Map H-01 and Conclusion Table 18.

18.4.1 BH Ck is *not anom* in VG gn count

****Surprisingly HM-10 from BH Ck with 5 recovered VG gns is *not anom* in VG gn count, even with the native-gold bearing Au-Bi-Te-As-W qtz vein system upstream. This infers other areas have higher potential for economic gold deposits than the BH mine–Lefevre workings area.** That unfound mineralization is likely under cover.

18.4.2 Compare background VG gn counts in bulk silts with <u>tills</u>

In the well-mineralized Abitibi Greenstone Belt in the Canadian Shield background VG gn counts in <u>tills</u> are 5-10 gold gns in <2.0 mm HM concentrate fractions, these standardized to a 10 kg of sample (Averill 1988; Averill & Huneault 1991 quoted by McClenaghan 2001).

The present survey sets 8 gns as the (low) Class II gn anomalous threshold and 11 for the higher Class I threshold for the silts. The collected bulk silts are well-washed and depleted of fine silt-sized gns. This is the typical VG gn size in the central CLY Au-Bi-Te-As-W bearing quartz vein showings, thus these gns would also be depleted in the bulk silts. A credible deduction is that VG gn courts, both backgrounds & thresholds, in CLY <u>tills</u> would be higher than in the silts – on other words anom geochem signals would be stronger with more contrast.

18.5 Computing Calculated ppb gold in the HM concentrates

The number and size of the recovered VG gns allows ODM to compute gold concentrations:

"The concentration of Visible Gold in HM concentrates can be estimated by using the number and dimensions of Au grains recovered. ... Estimated concentrations are generally a good proxy (their fig. 8) for actual values determined by geochemical analysis of the HM concentrates (Averill 1988; McClenaghan et al. 1998, in McClenaghan 2001)".

ODM calculates weights of recovered VG gns by empirical formulae:

"Our gold grain calculation assumes the gold grains have a disc shape. We measure the length and width of the gold grains and have a formula calculating the third dimension (thickness of the grain). We have determined by analysis of concentrates containing gold grains that a gold grain having an average diameter of 100 micron when placed in a 15 gram sample will give 100 ppb gold.

The formula for the thickness t is as follows: $t= (0.2-0.01\ (d-100)/100)d$ where d is the average diameter of the grain. This formula takes into account the fact that the ratio of the thickness to the diameter diminishes as the diameter increases. The formula is relatively accurate for till gold grains up to 500 micron but becomes useless as you approach 1,000 micron as at that size the thickness becomes 0.

Therefore we measure the thickness of grains having an average diameter >500 micron. On the data sheet this is shown by "C" for calculated or "M" for measured after the thickness in the detailed gold grain data.

The volume of the gold grain is obtained using a standard disk formula (pi times r (square) times t where r is the average radius and t the thickness of the gold grain). Then the ppb gold contribution for a given grain in a given weight of concentrate can be calculated by a simple ratio calculation (R. Huneault email Nov. 08 2013)."

ODM lists gold concentrations of the HM concentrates in the data sheet, Appendix 7.

18.5.1 Finding two large VG gns

Preliminary gold grain counts were provided from tabling and micropanning the bulk silts. After microscopic examination any increased counts were changed on the data sheet. For example two >250µm wide gold grains were found during indicator mineral picking of the 0.25-0.5 mm fractions of HM-04 from upr Hort trib and HM-13 from mid Ckay trib (Fig. 23 Photos of 7 of the 8 VG gns shaped 6+2+0 recovered from HM-04 upper Hort trib… & Fig. 24 Photos of the 5 VG gns from HM-13 mid Ckay trib…).

"…We will confirm the quartz and sericite that is attached to the two large gold grains and will keep the spectrums. We will also see at the same time if anything else is attached to the gold (R. Huneault email Dec. 04 2013)."

The micas were confirmed by SEM as sericite.

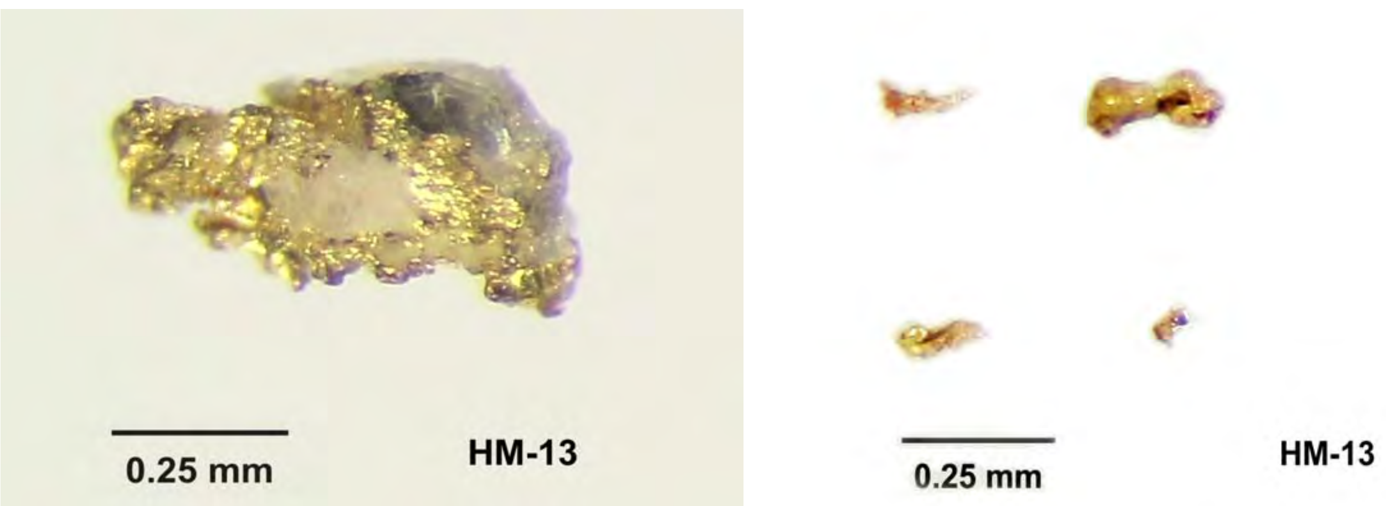


Fig. 24 Photos of the 5 VG gns from HM-13 mid Ckay trib. Left photo is the large Reshaped gn with attached white quartz in middle and flakey grey sericite at its top rt. Measured 650 microns long, 250 microns wide & 100 microns thick. Right photo are 2 Reshaped gns (top row) and 2 Modified (bottom) on white background.

Map H-02 has Calculated ppb Gold in non-magnetic HM fractions, this computed by ODM from the wts & numbers of the recovered VG gns. 6 values are deemed anom >830 ppb Au at the 74 %ile. Map H-03 levels ppb Gold in non-magnetic HM fractions using a Median-MAD data transform (Discover software V 11.1 2009). This shows 6 silts with values greater than twice the 'bkgd' (of 1 in this data transformation).

18.5.2 Calculated gold concentrations are minimums

However the Calculated gold concentrations, ppb values, in the non-mag HM fractions (and Calculated gold in bulk silt values, below) reported herein will *generally always be lower than actual results from geochemical assays.*

Consider that not all the VG grains will have been identified and counted: see the figure in Appendix 6 'Rate of Au grain recovery in ODM lab showing effects of grain size on number of Au grains recovered'. Au grains will be missed when very small (<10 μm), present in sulphide minerals, or covered with secondary minerals such as goethite or hematite, very common in the HM detrital assemblages. **Concluding, Calculated gold concentrations in both the HM fractions and bulk silts (Tables 10 & 11, Chart 7) are minimum values.**

18.6 Interpretation – Calculated ppb Gold in the bulk silts

The number and size of the recovered VG gns allows for the computation of gold in HM cons and the bulk silts:

"The concentration of visible gold in HM concentrates can be estimated by using the number and dimensions of Au grains recovered. ... Estimated concentrations are generally a good proxy (their fig. 8) for actual values determined by geochemical analysis of the HM concentrates (Averill 1988; McClenaghan et al. 1998)".

18.6.1 Computation

To compute Calculated ppb gold in the bulk silts the ppb Au value in its non-magnetic HM fraction is multiplied by its weight, in grams, and divided by the bulk silt weight, in grams. Using the non-magnetic HM fraction corrects for the expected varying abundances of the associated common, rock-forming, heavy minerals in the HM concentrates, e.g. magnetite and ferromagnesian silicates. Amounts of those depend on the amounts of the varied country rock types in individual stream drainages, each differing in their rock-forming mineralogy (Lett 2008). The formula is:

Calc Au in bulk silt, ppb = Calc VG in non-mag HM Con, ppb x Wt of non-mag HM Con, g / (Total Wt of silt, in kg x 1,000 g/kg)

18.6.2 Scatter plot of Calculated gold in bulk silts vs. Calculated VG in non-magnetic HM Concentrates

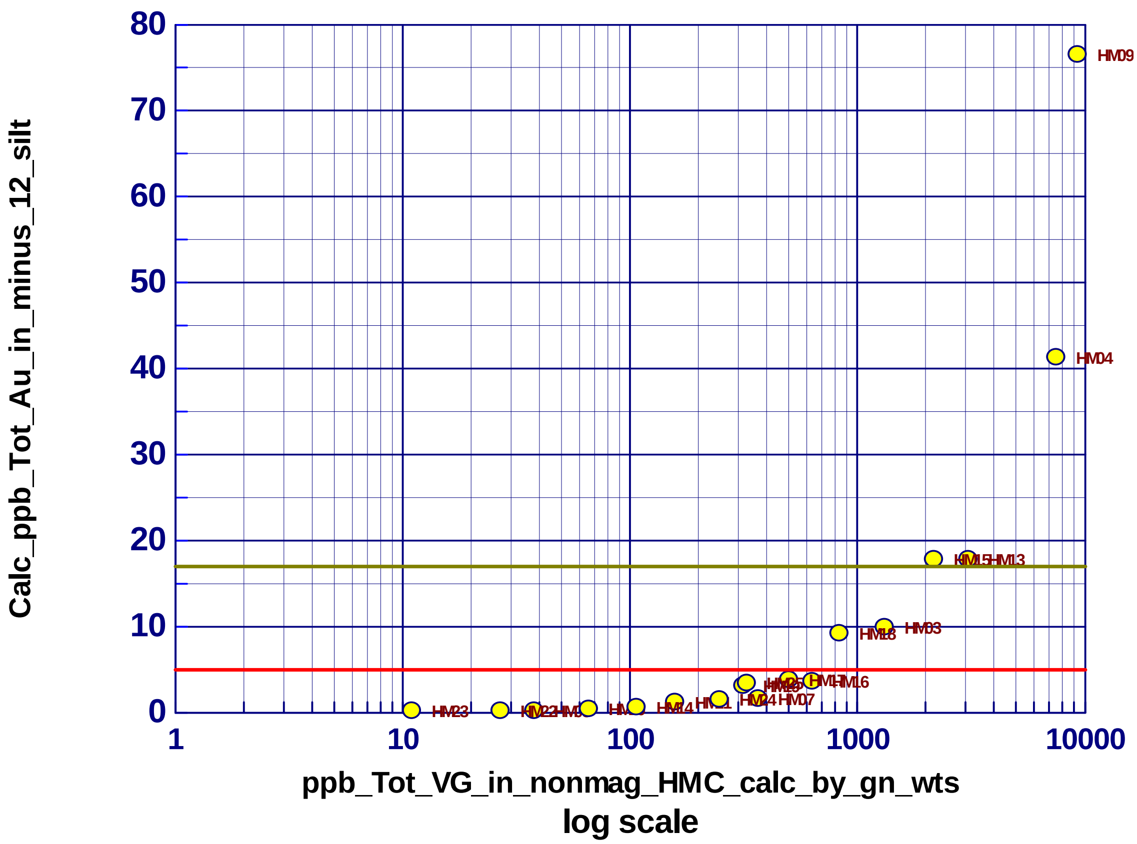


Fig. 25 Scatter plot of Calculated gold in the bulk silts, vertical axis vs. Calculated gold in non-mag HM Concentrates on the horizontal axis, this log scaled

ODM calculates gold in the (weighed) non-mag HM Concentrates based on the calculated weights of the recovered Visible Gold gns. This considers their measured dimensions and the HM Concentrate weights. As the non-mag HM Concentrates have wide-ranging ppb Au values the scatter plot log-scales these along the X axis. Chemical analyses of the -0.25 mm fractions (not done) might give higher ppb Au values. 830 ppb is the anom threshold set for the Calculated gold in non-mag HM Concentrates values, at the 74 %ile (above).

In a HM con survey of the Kootenay Lake area NTS 82F17 (Lett et al. 2000)

“There was only one sample site from Station 53 [#999023] with anomalous heavy mineral gold (7,240 ppb) in the Kootenay Lake area (Appendix A-Map 37). Although there were no moss sediment or stream sediment gold anomalies at this station, the stream drains the headwaters of Sanca Creek covering an estimated area of 30-40 sq km.”

18.6.3 Setting High & Low anom thresholds of Calculated gold in bulk silts

The **high anom threshold is set at 17 ppb Au**, the olive line in the scatter plot. Practically this defines 4 of 23 bulk silts highly anom. The red line is an ad hoc low anomalous threshold 5 ppb classifying two silts as low anomalous. With both >9 ppb, the low anom threshold could be set at that, but 5 ppb is chosen since *not all ~10 to 20 μm sized Visible Gold gns are recovered and counted to contribute to the Calculated gold values* (Appendix 6 figure ‘Rate of Au grain recovery in ODM lab…’). Both these thresholds are deemed ‘conservative’ minimum thresholds. They usefully identify bulk silts with anomalous Calculated gold values.

18.6.4 Comparing the set Hi anom threshold of Calculated gold in bulk silts with other surveys

Compare the hi anomalous threshold ~17 ppb Au for Calculated gold in bulk silts with 127 Jaxon silts, Acme ppb gold in -230 mesh fractions. 16 ppb is the value at the beginning of the second population in the red histogram plotted at upper right on the Gold in Silts map, the fig. 'silts-Au' in Appendix C of Williams (2010a). **Within small error these are the same.**

A normal probability plot of ppb gold in 263 'conventional' -230 mesh (<63 μm) stream silts, including the Jaxon data, was constructed using NCSS 2000 software by Hintze (2000), in Howard (2014). All silts were analyzed by the same procedure by Acme Analytical Labs. This plot shows the Au-in-silt data comprises several overlapping populations. There are gaps – intervals of ppb values without samples, and clusters of data – groups with about the same ppb value. The distribution is long-tailed to the right, meaning more silts have higher ppb gold values than expected in the population, if the data was normally distributed (Gaussian-distributed).

A gap in the distribution on the normal probability plot at 22.5 ppb Au can be set as a Conditionally Anomalous Threshold CAT. Slightly higher at another break 28.5 ppb Au can be set as an Expected Anomalous Threshold EAT. Above this all the silts are anom and outliers, except one.

Reflect that as the Au gns in the microscopically-examined veins (Cook & Ciobanu Part II in Howard 2009) are micron sized more will be included in -230 mesh stream silts then in the -12 mesh bulk silts. Thus the former has slightly higher anom thresholds.

Concluding, investigating other stream silts surveys shows 17 ppb Au a realistic hi anom threshold for -12 mesh bulk silts. In these the Au mostly occurs as fine, silt-sized VG gns amongst the diluting medium, coarse and very coarse sand-size material that was also collected.

Map H-04 plots ppb Calculated gold in the bulk silts, from the recovered Visible Gold gn data. 6 silts are greater than the low anom threshold 5 ppb, 4 are greater than **the hi anom threshold 17 ppb**. Map H-05 levels this using a Median-MAD transform (Discover software V 11.1 2009). The levelled values of Calculated gold include 6 silts greater than twice the bkgd (1 for this data transformation). This map has the same bubble plots for anom Calculated gold values as Map H-04's unlevelled data.

19 Summary Table of Four Gold results for the 23 bulk silts

Bulk Silt HM-	Creek	Drainage Basin	Y if heavy indicator minerals picked	Total Recovered VG gn Counts = Reshaped + Modified + Pristine {stand.}	VG gn Anomaly Class	#Calculated Gold in -12 mesh silt, ppb	#^Calc. VG in non-mag HM fraction ppb	Metallic Minerals in Pan Concentrate
17	645B0 Ck	645B0 Ck	Y	7=3+4+0 {8}	II	*3.83*	501	—
19	upr Bzero Ck	Bzero Ck	Y	7=3+2+2 {8}	II	*3.14*	315	—
18	Bmin trib	Bzero Ck	Y	8=2+5+1 {9}	II	**9.19**	834	—
12	lwr Bzero Ck	Bzero Ck	N	—	—	0.00	0	—
20	upr Bogo trib	Hone–Bogo Ck	N	—	—	0.00	0	—
11	lwr Bogo trib	Hone–Bogo Ck	N	8=5+3+0 {10}	II	1.16	158	—
01	mid Hone Ck	Hone–Bogo Ck	N	—	—	0.00	0	~15 pyrite 25µm
02	mid Hone Ck	Hone–Bogo Ck	N	—	—	0.00	0	5 pyrite 25-50µm ~10 marcasite 25-50µm
15	Clel 770Q5 trib	Clel Ck	Y	5=0+3+2 {6}	—	**17.79**	2,174	—
08	Clel 750D1 trib	Clel Ck	N	6=5+1+0 {7}	—	0.24	38	—
03	upr Clel Ck	Clel Ck	Y	7=5+2+0 {8}	II	9.91	1,320	**0.5% marcasite 15-75µm**
09	Clel Pawprint Corner trib	Clel Ck	Y	2=2+0+0 {2}	—	**76.50**	9,310	—
25	lwr Clel Ck	Clel Ck	Y	10=6+3+1 {12}	**I**	*3.37*	327	—
10	BH Ck	BH Ck	Y	5=4/1/0 {6}	— not anom!	0.40 not anom!	66 not anom!	3 pyrite 25-50µm
07	E of Ckay trib	Ckay trib	Y	16=6+9+1 {21}	**I**	1.58	367	—
13	mid Ckay trib	Ckay trib	Y	5=3+2+0 {6}	—	**17.79**	3,080	—
23	lwr Ckay trib	Ckay trib	N	3=1+1+1 {4}	—	0.15	11	—
04	upr Hort trib	Hort trib	Y	8=6+2+0 {9}	II	**41.30**	7,493	1 sperrylite 25µm 2 pyrite 25µm
14	mid Hort trib	Hort trib	Y	9=6+2+1 {10}	II	0.61	107	—
24	Ridge trib	Four tribs Ck	Y	9=3+5+1 {12}	**I**	1.47	248	—
16	lwr Four tribs Ck	Four tribs Ck	Y	4=2+2+0 {4}	—	*3.61*	634	—
21	W Wall Fork	Wallack Ck	N	—	—	0.00	0	—
22	Wallack 710K0 Ck	Wallack Ck	N	2=2+0+0 {4}	—	0.23	27	—

^ from Recovered Visible Gold gn wts, these calculated by their size dimensions & numbers by ODM

both are minimum values as ODM's lab procedure does not recover all VG gns but known proportions (see Appendix 6)

Table 12 Gold results of 23 CLY bulk silts listed in geographic order N to S. If anom the row is color-coded by the color-code of the drainage basin. Also tables Recovered VG gn counts and counts standardized {stand.} to 10 Kg of -12 mesh silt. VG gn Anomaly Class I threshold is ≥ 11 gns **in red bold**, Class II ≥ 8 gns in red. Calculated Gold in -12 mesh silt if above 17 ppb is **highly anom in red bold,** if above 5 ppb Au (both are >9 ppb) low anom in red. *Questionably anom >3 ppb in italics.*

On micropanning HM-03 from upr Clel Ck 0.5% marcasite as fine sized 15-75µm gns was observed. This is more iron sulphide than found in the other silts:

"The crystal shape and brittleness of pyrite and marcasite grains is very different. Marcasite is often present only in the fine panned fraction as coarser [sized] grains are not present (R. Huneault Apr. 07 2014 email)."

HM-10 from BH Ck is not anom in all three gold results.

20 Interpretation – Table 13 Anomalous Calculated gold in bulk silts, ppb, and three other gold signals

Bulk silt HM-	Creek	Calculated gold in bulk silt, ppb	Calculated VG in non-mag HM fraction, ppb	Total No. of VG gns = Reshaped + Modified + Pristine gns	VG gn anomaly, **Class I in bold** or Class II
Highly anom above 17 ppb:					
09	Clel Pawprint Corner trib	**76.5**	**9,310**	2=2+0+0	*not anom*
04	upr Hort trib	**41.3**	**7,493**	8=6+2+0	Class II
13	mid Ckay trib	**17.8**	**3,080**	5=3+2+0	*not anom*
15	Clel Ck 770Q5 trib	**17.8**	**2,174**	5=0+3+2	*not anom*
Low anom above 5 ppb Au, both bulk silts have >9 ppb:					
03	upr Clel Ck	9.9	1,320	7=5+2+0	Class II
18	Bmin trib	9.2	834	8=2+5+1	Class II
Questionably anom above 3 ppb:					
17	645B0 Ck	*3.83*	501	7=3+4+0	Class II
16	lwr Four tribs Ck	*3.61*	634	4=2+2+0	*not anom*
25	lwr Clel Ck	*3.37*	327	10=6+3+1	**Class I**
19	upr Bzero Ck	*3.14*	315	7=3+2+2	Class II

Table 13 Anomalous Calculated gold in bulk silts, ppb, in decreasing order, and two other gold signals. **High**, low and *questionably anom* thresholds identify 4, 2 and 4 silts. The creeks are from three color-coded drainage basins, four if including questionably anom 645B0 Ck. For comparison Calculated VG in non-mag HM fractions, Total No. of VG gns & shape counts and VG gn anomaly classes in red also tabled.

In the silts Calculated gold in bulk silt and Calculated VG in non-mag HM fraction values track each other, excepting the questionably anom pair HM-17 645B0 Ck and HM-16 lwr Four tribs Ck.

Curiously the high 76.5 ppb anom in HM-09 from Clel Pawprint Corner trib is uncertain as one of its two VG gns is the largest recovered in this survey. Its weight over-contributes gold to the values of Calculated gold in non-mag HM fraction and Calculated gold in bulk silt. With two gns it is not anom in VG gn count. That both are Reshaped downgrades the potential upstream. Note

***if only Calculated gold values are considered 2 of 3 'Class I VG gn anomalous' bulk silts, HM-07 E of Ckay trib (1.6 ppb) & HM-24 Ridge trib (1.5 ppb), *are not anom* and the third Class I anom HM-25 from lower Clel Ck (3.37 ppb) is questionably anom.** HM-07 E of Ckay trib has most recovered VG gns 16. HM-24 Ridge Ck has the second highest, 12 the same as HM-25 lwr Clel Ck.

The maximum size of the recovered VG gns in these three Class I anom HM are small (C- calculated thickness, M- measured):

- HM-07 E of Ckay trib 29 C x 150 x 150 microns
- HM-24 Ridge trib 50 M x 125 x 200 microns
- HM-25 from lower Clel Ck 46 C x 250 x 250 microns

and ODM computes that they contribute little gold to the non-mag HM fraction and the bulk silt. Same for HM-11 from lwr Bogo trib, Class II VG gn anomalous with 5 Reshaped + 3 Modified + nil Pristine gns, but bulk silt value 1.2 ppb, questionably anom.

HM-10 from BH Ck with known mineralization has very low 0.40 ppb Calculated gold in its silt. 5 VG gns with shapes 4 + 1 + 0 contribute quite low, bkgd 66 ppb to its non-mag HM fraction.

Concluding, three drainage basins are anomalous in Calculated gold in bulk silts: Clel Ck, Four tribs Ck, & Bzero Ck. 645B0 Ck is questionably anom. Map H-04 (or H-05) plots the anoms. Additional information is necessary to determine gold prospectivity upstream of a bulk silt site, this report's other surveys provides some.

21 Indicator minerals in bulk silt HM fractions

21.1 Procedure picking the Heavy indicator minerals

The 0.25 to 1.68 mm nonferromagnetic HM fraction is sieved dry to prepare the sand fractions for microscopic examination. 0.25, 0.5 and 1.0 mm size sieves are used to prepare the medium (0.25 to 0.5 mm), coarse (0.5 to 1.0 mm) and very coarse (1.0 to 2.0 mm) sand fractions of the HMC. These are Wentworth (1922) class grain size boundaries.

Gn size range, mm	Gn size class	
<0.25	fine	*stored*
0.25 to 0.5	medium	*magnetically separated into 3 fractions, then gns counted under microscope*
0.5 to 1.0	coarse	
1.0 to 2.0* (1.68)	very coarse	

Table 14 Gn size fractions and classes of the picked HM gn fractions. *As a -12 mesh screen was used in the field all very coarse sized gns are max. 1.68 mm in diameter.

21.2 W (or Au) Skarn indicator minerals

The heavy indicator minerals picked are the “S.G. >3.2 MMSIM (SKARN SUBTYPE)”. Anomalies of the following, selected from Averill (2001, his table 3), possibly indicate additional gold and/or tungsten + gold skarn mineralization on CLY:

- grossular garnet **Ca**3Al2Si3012
- spessartine garnet **Mn**3Al2Si3012
- scheelite Ca**W**O4
- chalcopyrite **CuFe**S2
- native **Au**
- axinite (Ca,**Mn,Fe**)3Al2**B**O3Si4O12(OH); if yellow-orange to brown **Mn** bearing (not listed in table 3).

Chart 8 has counts of the medium-sand size 0.25-0.5 mm HM indicator gns in 14 bulk silts with standardized gn counts, ranks and lists of the exotic HM indicator gns. Appendix 7 has the ODM data sheet ‘MMSIMs Filename: 20136432 - Clarke Gold - Howard –’. This lists the detrital HM assemblage under ‘Remarks’.

“In addition to processing the samples for MMSIMs … we systematically recorded the major background heavy mineral suite or [detrital] "assemblage" in the 0.25-0.5 mm S.G. >3.2 heavy mineral fraction as a guide to the overall provenance of the gravel. In order of prominence minerals comprising >15% of the 0.25-0.5 mm paramagnetic (<0.8 amp) fraction follow minerals comprising >15% of the corresponding nonparamagnetic (>1.0 amp) fraction. For example, the assemblage goethite-hematite/grossular in sample HM-14 indicates that goethite exceeds hematite in the paramagnetic fraction and grossular is the dominant mineral in the nonparamagnetic fraction (Dec. 03 2013 letter by R. Huneault).”

“We don’t generally document common rock-forming diopside, or other minerals such as epidote, unless they constitute a significant (≥ 15%) proportion of the 0.25-0.5 non-paramagnetic (>1 amp) fraction of the HM Con (Mar. 19 2017 email by R. Huneault)”.

21.3 Classifying the Heavy indicator minerals

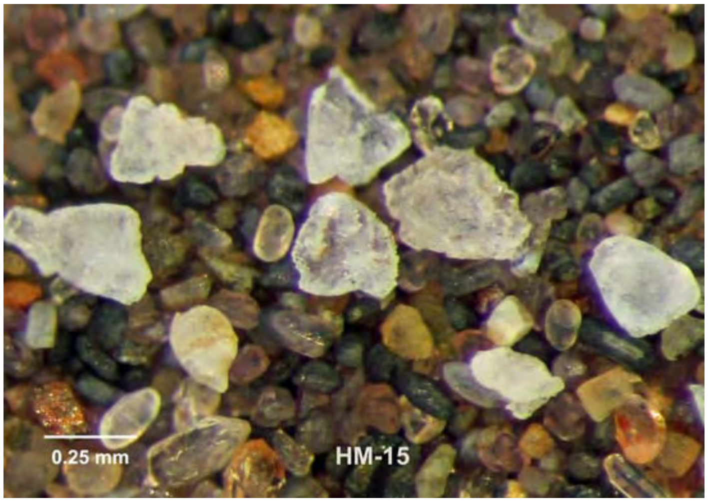
These can be classed as rock forming, present in major, minor or accessory amounts defining certain lithologic environments, or as alteration-related characteristic of hydrothermal alteration zones larger than the associated mineral zones, or as sulphide / ore minerals:

Rock-forming
Major
Augite pyroxene
'normal' diopside-hedenbergite pyroxene
forsterite olivine
(these three typically not counted by ODM)
Minor
corundum (?)
Accessory or trace
rutile, red Cr-rutile & anatase
chromite or hercynite or Cr-spinel
Hydrothermal Alteration-related
corundum (?)
low-Cr diopside-hedenbergite pyroxene
axinite (trace mineral)
Garnets:
uvarovite (trace mineral)
grossular-andradite
spessartine
andradite
Sulphides & Ore minerals
pyrite
marcasite
(altered to goethite)
gold
scheelite

Table 15 HM Classification: rock-forming, alteration-related or sulphide & ore minerals

The alteration-related HMs and corundum are useful pathfinders for targeting as they constitute larger volumes of hydrothermally-altered rock than any related ore deposit, if present. Red Cr-rutile & anatase are trace minerals that form in peculiar environments favourable to mineralization. Chromite or hercynite or Cr-spinel form in specific rock-forming environments that assist interpreting the metamorphic geology. If the spinel is chromite it may be from a HCA ophiolite slice. Mange & Maurer (1992) is a good photographic atlas of diverse HMs.

Fig. 26 Overview of the many gns of HM-15 Clel 770Q5 trib HM concentrate, a goethite-forsterite/diopside mineral assemblage. A close-up of the scheelite gns is below. In the medium size sand fractions HM-15 is 1st rank in spessartine with 5,000 {5,883} gns, 5th rank in scheelite 30 {35} gns and 4th rank in Chromite or Hercynite or Cr-spinels 40 {47} gns. It is anom in Calculated Gold in the 'total' bulk silt 17.79 ppb (Map H-04) though it is not anomalous in VG gns with 5 recovered = 0 Reshaped + 3 Modified + 2 Pristine, a total of {6} if standardized to 10 kg. Clel 770Q5 trib basin is a target for a spessartine + scheelite + native Au bearing skarn system.



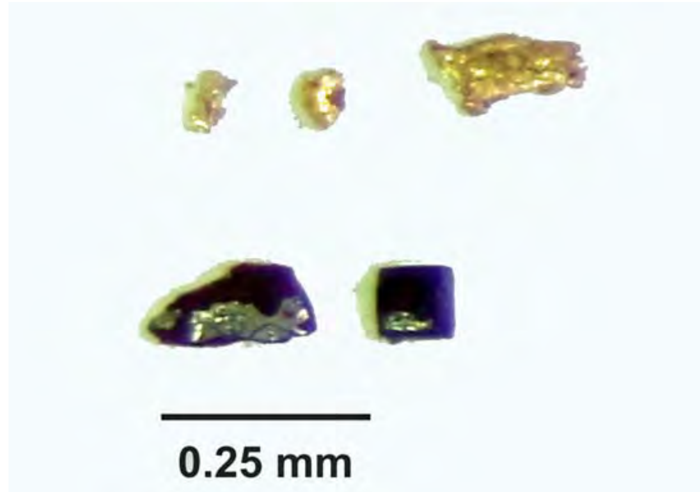


Fig. 27 Close up photo of HM-15 Clel 770Q5 trib concentrate, VG and pyrite gns. Left is close-up of above concentrate photo with scheelite overlying a HM assemblage of forsterite/diopside that obviously differs from the similar photo below of HM-18 Bmin trib con. At right is a microphoto of 3 of the 5 recovered VG gns; 2 Pristine gns to the left, 1 larger Modified gn at the right. The two pyrite gns are black with oxidation (present though not counted as 'trace pyrite' in the ODM HM gn list)

22 Results and Interpretation of the Heavy indicator minerals

22.1 Major Background HM assemblages of the bulk silts and gold anoms

Drainage (no. of silts)	Silt and creek	VG gn count Class I or Class II anomalous	Calculated gold anom hi, low or questionable?	Major background HM assemblage in 0.25-0.5 mm fraction
645B0 Ck (1)	HM-17 645B0 Ck	II	?	Goethite/diopside
Bzero Ck (2)	HM-18 Bmin trib	II	low	Goethite/grossular
	HM-19 upr Bzero Ck	II	?	Goethite-hematite/ diopside-grossular
Clel Ck (4)	HM-15 Clel 770Q5 trib	–	hi	Goethite-forsterite/diopside
	HM-09 Clel Pawprint Corner trib	–	hi	Augite-goethite-forsterite/ diopside
	@HM-03 upr Clel Ck	II	low	@Goethite/diopside-grossular
	HM-25 lwr Clel Ck	I	?	Goethite-forsterite/ diopside-grossular
BH Ck (1)	HM-10 BH Ck	–	–	Goethite-augite/ diopside-grossular
Four tribs Ck (6)	HM-07 E of Ckay trib	I	–	Goethite/grossular
	&HM-13 mid Ckay trib	&–	hi	Goethite/grossular
	^HM-04 upr Hort trib	^II	hi	Goethite/grossular
	HM-14 mid Hort trib	II	–	Goethite-hematite/grossular
	HM-24 Ridge trib	I	–	Goethite-augite/diopside
	^HM-16 lwr Four tribs Ck	–	?	^Goethite-hematite/grossular and 4% diopside

@in HM-03 upr Clel Ck five picked gns were identified as Ti-augites by SEM check

&HM-13 has a larger-sized Au gn 650 microns long, 250 microns wide with attached quartz and sericite (see Fig. 24 Photos of the 5 VG gns from HM-13 mid Ckay trib), one of the 5 {6} VG gns recovered, shaped 3+2+0.

^HM-04 has a larger-sized Au gn 450 µm long, 400 µm wide and 250 µm thick with attached sericite (see Fig. 23 Photos of 7 of the 8 VG gns shaped 6+2+0 recovered from HM-04…)

Table 16 Major Background HM assemblages of bulk silts, creeks grouped into their color-coded drainages. Creeks listed in geographic order N to S. No indicator minerals were picked from Hone-Bogo Ck silts so it is not tabled. The 14 Sites are on Map M-01 of the M series. See Chart 8 and ODM's report in Appendix 7.

Table 16 shows four of the five sampled drainages are gold-prospective. BH Ck is not, despite known, past producing Au-Bi-Te bearing QVs with good grades and two sites ready to drill.

Major background HM assemblages differ in the two most-sampled drainages: Clel Ck silts (4) have forsterite olivine + diopside in two upper streams, one creek also has augite. The lower silt HM-25 has forsterite olivine + diopside with grossular. Symbol @in HM-03 upr Clel Ck five picked gns were identified as Ti-augites by SEM check. Upstream HM-09 Clel Pawprint Corner trib has >15% augite.

Four tribs Ck silts (6) have grossular except HM-24 Ridge trib to the E; instead it has >15% augite. That silt has augite/diopside, possibly glacially dispersed from the BiWold Dome area to the N. Symbol ^'Common' diopside, approx. 4% (~3,000 gns), carries into HM-16 lwr Four tribs Ck from HM-24 Ridge trib. HM-16 also has a low gn count {211} of low-Cr Diopside-hedenbergite (D. Holmes of ODM, p.c. Mar. 19 2014).

Four tribs Ck (6) and Bzero Ck (2) silts do not have the forsterite olivine + diopside pair in the major background HM assemblages. Instead they have grossular.

Previous to interpreting the bulk silt HMs the indicator minerals are discussed.

22.2 Augite

Augite is a common rock-forming mineral in mafic and ultramafic rocks, e.g. in the Elise Formation andesitic volcanics on CLY. It does not indicate a potentially mineralized environment.

"**Augite is recorded in the mineral assemblage if it is >15%** in the 0.25 to 0.5 mm paramagnetic (<0.8 amp) HMC fraction [this is the case for HM-09 Clel Pawprint Corner trib, HM-10 BH Ck & HM-24 Ridge trib]. Augite is not an indicator mineral [and] thus not picked nor quantified in the data table. If less than 15% of the paramagnetic fraction it [is not in] the data.

The five Ti-augites in sample HM-03 [from upper Clel Ck] were picked because we checked the grains by SEM to confirm that they were indeed augite and not another mineral. Augite is not [listed] in the mineral assemblage of this sample [Table 15] because it amounts to less than 15% of the paramagnetic fraction (Dec. 23 2013 email by R. Huneault)".

22.3 Forsterite Olivine (Mg,Fe)2SiO4

The common rock-forming mineral Forsterite is Mg-dominant olivine with minor Fe^{++} fayalite component. Olivine gns weather easily in the surficial environment and is unstable in glacial or fluvial sediments (Ehlers and Blatt, 1982). This suggests the sources are local in the bulk silts as they erode bedrock in the creek drainages.

As the Dec. 2013 data file has percentages these are not mapped. Clel Ck drainage has about ~10 times as much as Four tribs Ck basin. It may be from ultramafic or mafic rocks in the HCA metabasalt-containing ophiolite along the *Tillicum fault* or along other indicated crustal-scale faults in the *Waneta–Tillicum–MPT Fault-Shear Zone system.*

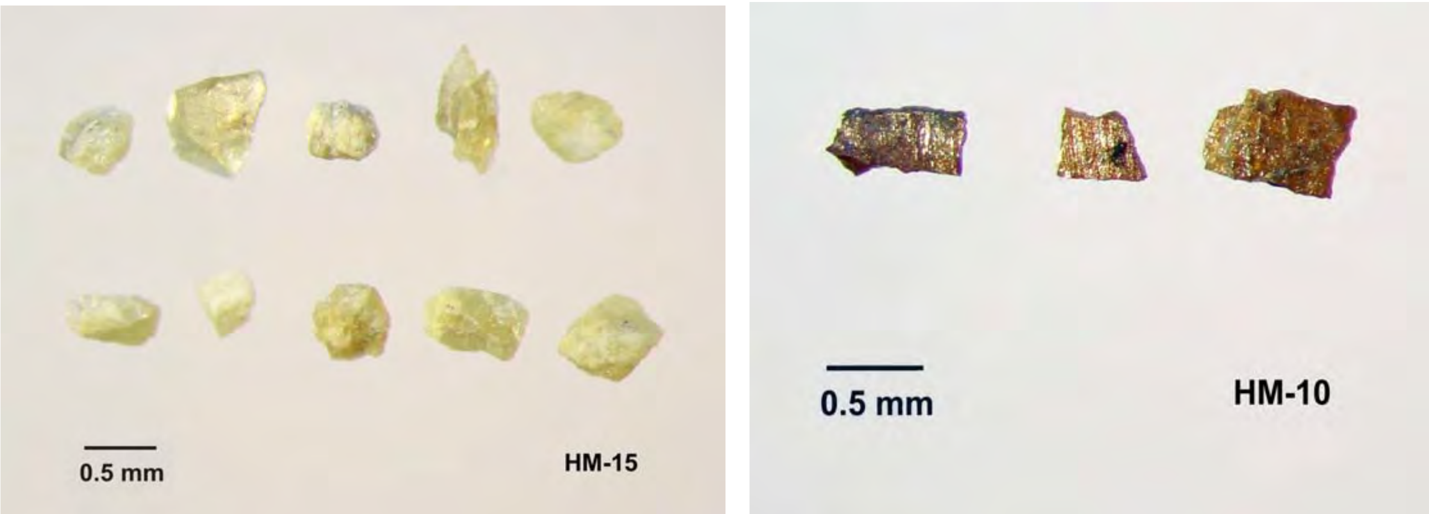


Fig. 28 Photos of HM-15 Clel 770Q5 trib forsterite and HM-10 BH Ck red Cr-rutile. Semi-translucent forsterite olivine to the left; some gns with crystal terminations are hardly abraded. 3 gns of rare chromium-bearing red rutile.

22.4 Scheelite

Scheelite CaWO4 is the main tungsten ore mineral. In reduced W skarns early mineral assemblages have disseminated fine-grained, Mo-rich scheelite (powellite). Later assemblages have re-deposited, coarse-grained, commonly vein-controlled, low-Mo scheelite ... and introduced sulfide minerals (Meinert et al 2005). ODM personnel picked and counted it under UV light.

22.4.1 Scheelite in medium size sand fractions Map M-05

Map M-05 maps counts of medium-sized scheelite gns. Three HMs with >56 gns are deemed anomalous; surprisingly with this threshold Four tribs Ck drainage is not anom.

For orientation HM-24 Ridge Ck, collected well downstream of the scheelite-bearing Lefevre skarn-hornfels / QV system, has 15 {19} gns. HM-04 from mid Hort trib is a goethite/grossular assemblage with 20 {23 gns}. Both scheelite gn counts are 'bkgd'. See Fig. 23 'Photos of 7 of the 8 VG gns shaped 6+2+0 recovered from HM-04 upper Hort trib...'

Two pairs of bulk silts, collected quite close to each other, have anom medium sand-size scheelite gn counts (Map M-05):

HM-18 from Bmin trib is 1st rank with 100 {111} scheelite gns. This also has **4% ~8,000 corundum gns;** see discussion in next section 'corundum' with photos of both, Map M-04 and Table 18. **HM-19 from upr Bzero Ck, just north, is 3rd rank** with 50 {59} gns. Clearly the source is local – very likely about the intrusive contact of the Wallack stock upstream, the LW ridge area. Supporting this **Bmin trib basin has a marked cluster of higher W-in-rock values** (Map R-13) with 1 hi and 3 slightly hi. (Rocks are termed anom if >50 ppm W).

HM-03 from upper Clel Ck ranks 2nd in scheelite 60 {67} gns (Fig. 29 photo). The evident source is the Clel cirque area. Above HM-03 site HM-15 from Clel 770Q5 trib is 4th rank with 30 {35} gns. This 2nd source may be from McCormick Highlands or the N side of BiWold Dome (Map M-05).

22.4.2 Scheelite in HM-03 upper Clel Ck Map M-05

HM-03 upper Clel Ck is a Goethite/diopside-grossular assemblage with (see Conclusion Table 18)

- 2nd rank scheelite 60 {67} gns (Fig. 29 photo, Map M-05)
- 2nd rank Low-Cr Diopside-hedenbergite highly anom with {3,333} gns (Fig. 29 photo, Map M-07)
- 3rd rank spessartine garnet {1,667} gns (Map M-03)
- tie for 3rd rank Chromite / Hercynite or Cr-spinels (Map M-06)
- 11 of 15 of these gns checked by SEM are hercynite, 73% (hercynite section, Map M-08)
- Rock 0613D is an argillic-altered granitoid boulder found not far above the HM-03 site. It has dispersed ~0.2% microcrystalline pyrite and 1-5 mm sized blue-grey epithermal-style quartz veinlets with common sub-mm sized vugs. **Gold is anom 305.1 ppb**, bismuth & tellurium are above their median values and arsenic is high 59.7 ppm. Lead is slightly hi 28 ppm; see the R Map series
- VG gns are Class II anom (Map H-01) with low anom Calculated gold, 9.91 ppb (Map H-02)

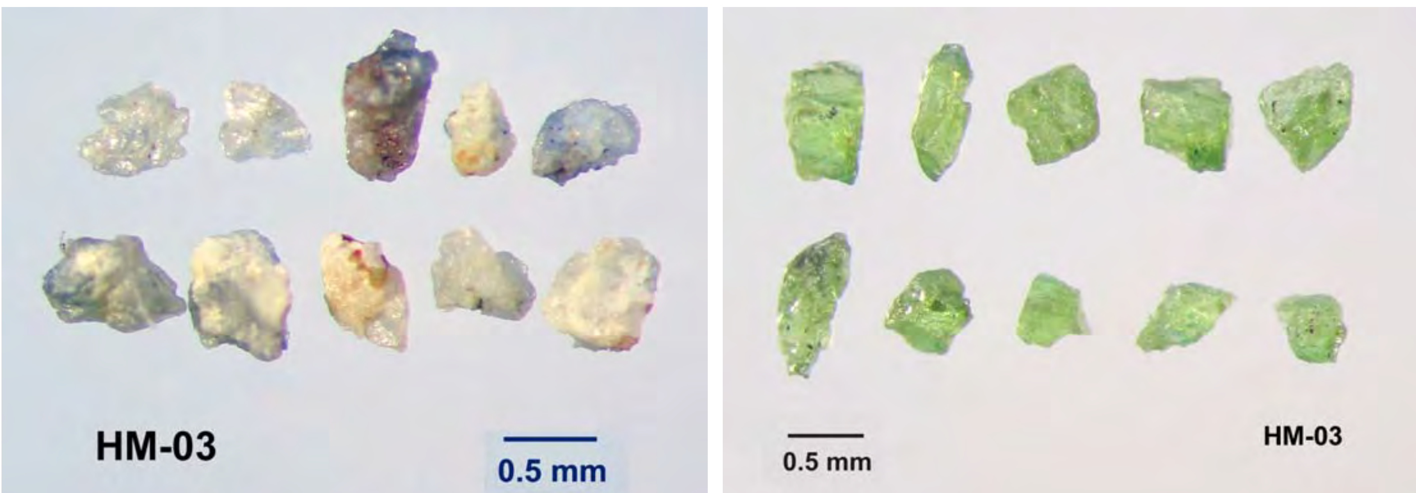


Fig. 29 Photos of scheelites & Low-Cr diopsides in HM-03 upper Clel Ck HM fractions. Scheelite gns to lt, off-white with yellow cast, water clear or with tiny bluish grey inclusions. Lower middle gn has small honey brown & red garnets? To right Low-Cr Diopside-hedenbergite with rare minute opaque inclusions

22.5 Corundum

Corundum is aluminum oxide **Al**203. ODM names the picked gns 'blue sapphire' corundum simply noting the blue-grey color. It is granted that corundum is only rarely gem quality.

HM-18 from Bmin trib has 4% ~8,000 gns, standardized {8,889}, in the medium size sand 0.25-0.5 mm fraction. HM-04 from upr Hort trib has 0.5% corundum ~250 gns {291} in same. Discussion is below.

22.5.1 Environment of formation of Corundum is equivocal

Corundum can form in several environments and which is applicable is uncertain for either HM con source.

It can form by prograde metamorphism of iron-rich argillaceous rocks, with about 16 volume % quartz, at pressure 600 MPa at temperatures above ~670 °C (~640°C if the rocks are Mg-rich). With quartz-consuming reactions the rocks loose free quartz and quartz-free assemblages form, e.g. garnet + cordierite + corundum + chlorite. Bucher & Grapes (2011, p. 287) model this FMASH Fe-Mg-Al-Si-H2O system. These qtz-deficient gneisses and schists form under upper amphibolite facies P, T conditions. However paleo-pressures are thought about a third less, ~200 MPa, in contact aureoles of granites in the CLY area.

Corundum can also form "in recrystallized limestones as the result of metasomatism associated with thermal [contact] metamorphism (Bowles et al. 2011)". It occurs with hercynite and ilmenite in contact metamorphic rock in Bavaria Germany.

At granitic intrusive contacts along the LW Ridge corundum may have formed due to advanced argillic alteration. In acidic environments intense hydrogen ion (H^+) metasomatism can leach the alkali cations K^+ Na^+ in the rock-forming feldspars and mafic silicates and completely destroy them. This is common in mineralized porphyry systems and about Au-Ag bearing epithermal veins (Pirajno 1992).

In porphyry systems transitional potassic-advanced argillic alteration comprises K-feldspar, biotite, andalusite and albite, possibly with minor topaz, tourmaline √, cordierite √ and corundum √. Principal sulphide-oxide minerals are chalcopyrite, molybdenite, magnetite and ilmenite (Pirajno 2010, p. 112). Advanced argillic alteration "refers to more or less complete acid attack with the formation of kaolinite-dickite and varying amounts of diaspore, alunite, amorphous silica, **more rarely corundum** and pyrophyllite (p. 116)." This can form by meteoric (surface) water infiltrating a cooling granitic system at temperatures ~510–320 °C (his fig. 2.7A).

In B.C. porphyry deposits corundum occurs in some advanced argillic and potassic hydrothermal alteration zones, i.e. at the Empress porphyry Cu-Au-Mo deposit. There it is an accessory mineral in light grey or pink, coarse-grained quartz-free feldspathic rocks. These comprise mostly albite and orthoclase with andalusite-pyrophyllite-sericite and accessory magnetite, chlorite and corundum (Simandl et al. 1997).

Corundum may also form by contact metamorphism of pre-existing aluminous hydrothermal alteration zones with clays, alunite and/or diaspore.

22.5.2 Corundum and other HMs in HM-18 from Bmin trib (Map 04)

HM-18 from Bmin trib is a goethite-hematite/grossular assemblage with

- anom 1st rank **corundum** with 4% ~8,000 gns standardized {8,890} (Map M-04)
- anom 1st rank **scheelite** 100 {111} gns (Map M-05, Fig. 30 photos)
- anom 1st rank **grossular-andradite Ca-Fe-Al garnet** 200,000 {222,222} gns (Map M-02)
- Chromite or Hercynite or Cr-spinels 40 {44} tied with 3 others for 3rd rank (Map M-06)
- **Trace Fe-rich hercynite** spinel $Fe^{++}Al2O4$. The SEM checks are "5 chromite versus hercynite candidates = 5 hercynite (gns)" thus many chromites may actually be spinels
- **Class II VG gn anomalous** with 8 {9} gns (see Fig. 22 photos, Map H-02). Grain shapes 2+5+1 indicate some near-source gold, and
- Calculated gold in bulk silt is 9.2 ppb, **low anom** (Map H-04). Median-MAD levelled (Map H-05) this is **5 times bkgd**

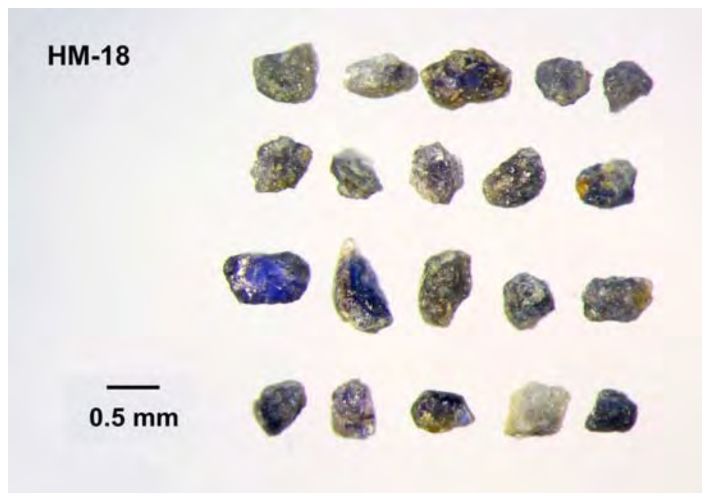


Fig. 30 Photos of scheelite on HM-18 from Bmin trib concentrate and corundum. To lt white scheelite gns placed on other HM gns, mostly abundant honey-colored grossular garnet and uncommon black spinel gns, likely hercynite. The opaque metallic gns are hematite, the two light green grains may be apatite. HM-18 is a goethite (not present in this fraction)/grossular assemblage. In right photo 20 gns of well-included, gritty, 'blue sapphire' corundum.

22.5.3 Corundum and other HMs in HM-19 upper Bzero Ck (Map 04)

Neighbouring HM-19 upper Bzero Ck is a goethite-hematite/diopside-grossular assemblage. It is considered anom (Table 18) with

- 4th rank corundum {118} gns, **low c.f. HM-18 but anom** (Map M-04)
- anom 3rd rank scheelite {59} gns (Map M-05)
- grossular-andradite >15%
- tied for 3rd rank with 3 others in 'spinel' gns {59} (Map M-06)
- Class II VG gn anomalous with 7 {8} gns (Fig. 31 photo, Map H-02). Grain shapes 3+2+2 indicate some near-source gold, and
- Calculated gold in bulk silt is *questionably anom 3.14 ppb* (Map H-04)

See Table 18. The intrusive contact of the Wallack Ck stock is upstream of HM-18 from Bmin trib; corundum's formation is likely related. Bmin trib has a marked cluster of higher W-in-rocks (Map R-13). Rock 0492 light green diopside + red garnet skarn subcrops in Bmin trib. It ran hi 3.3 Bi / hi 92.3 Zn / slightly hi 53.73 Cu / hi 5.44 Mo & hi 6.8 W (ppm).

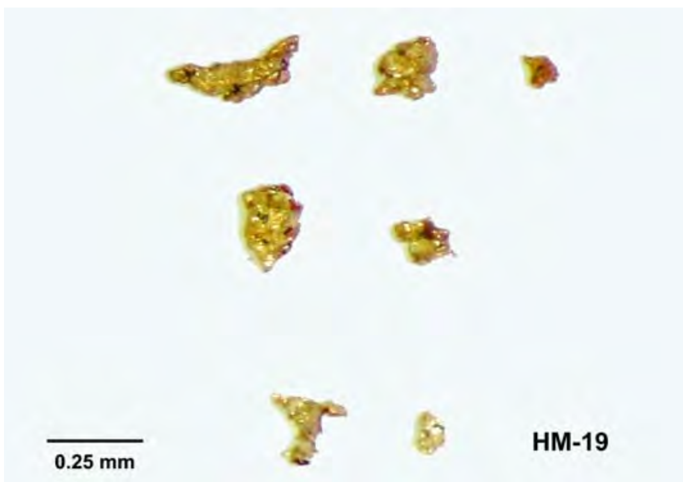


Fig. 31 Photo of VG gns from HM-19 upper Bzero Ck. At top 3 Reshaped gns, in middle 2 Modified, at bottom 2 Pristine. Total is 7 {8} gns shaped 3+2+2.

***Summarizing a polymetallic, scheelite-bearing, grossular-andradite W + Au skarn with a Au-Bi signature (Maps R-03, R-13) in quartz-poor corundum-bearing rocks, is indicated upstream of HM-18 Bmin trib. It has trace hercynite spinel.** Bmin trib is anom in all sampled geochem media (rocks, silts, MM, bulk silts) with multiple gold-pathfinder element anoms, in multiple samples of each. Tills were not sampled.

22.5.4 Corundum and other HMs in HM-04 from upr Hort trib (Map 04)

HM-04 from upr Hort trib draining the S side of BiWold Dome is a goethite/grossular assemblage with 90% goethite. It is anom with (Conclusion Table 18)

- 2nd rank 0.5% corundum ~250 gns {291} (Map M-04)
- background scheelite 20 {23} gns (Map M-05)
- high spessartine garnet, 4th rank with 1,000 {1,163} gns (Map M-03)
- 2nd rank chromite or hercynite or Cr-spinel gns 60 {70}
- Class II VG gn anomalous with 8 {9} gns with shapes 6+2+0 (Map H-01) see Fig. 23 'Photos of 7 of the 8 VG gns shaped 6+2+0 recovered from HM-04 upper Hort trib...' One gn is larger-sized, 450 µm long, 400 µm wide and 250 µm thick with attached sericite
- hi anom Calculated gold in bulk silt, 41.3 ppb (Map H-04). Median-MAD levelled (Map H-05) this is 27 times bkgd
- 2 pyrite + 1 red rutile + 1 anatase + trace (unpicked) apatite (Map M-09)
- downstream is the High-Sulphide Meta-argillite Boulder 918061; might this have moved downhill and formerly been in the HM-04 watershed?
- Au-anom rock 0613D from the N side of BiWold Dome is argillic-altered granitoid. That alteration style, if it extends S-ward into Four tribs Ck drainage, may be responsible for HM-04's **corundum**.

*Concluding, a polymetallic **gold skarn or vein system with corundum and spessartine garnet is indicated upstream of HM-04 upr Hort trib.** Corundum is a minor component of the rocks; scheelite may be above the bkgd indicated in the HM concentrate as the High-Sulphide Meta-argillite Boulder 918061 is anom in W.

22.5.5 Curious corundum - aluminous alteration *favourable for gold*

The nature of the bedrock sources of anom corundum in two HM cons, HM-18 from Bmin trib and HM-04 from upr Hort trib, are equivocal. It may have formed by advanced argillic alteration of Wallack stock granites, or by contact metamorphism of aluminous rocks in inner aureoles, or in skarned HCA / Laib Formation Reeves / Laib Formation Truman Member argillites or calcareous argillites. Silica would have been deficient in any of these settings. *It is sufficient to know that corundum denotes aluminous alteration, favourable for gold deposition.*

22.6 Low-Cr Diopside-hedenbergite

Low-Cr diopside-hedenbergite Ca(Mg,Fe,Cr)Si2O6 is found in every HM sample (Map M-07 low-Cr diopside-hedenbergite), in ten HM fractions below 400 gns.

Its genesis is peculiar: its ultimate source is from the mantle. The gns are proposed to be inclusions in nodules or xenoliths of mantle-derived spinel peridotite, ultramafic rocks mostly of olivine and orthopyroxene – lherzolite, harzburgite or dunite (Best 2003). The low-Cr diopside-hedenbergite is essentially diopside with only small amounts of Al and Fe though “because of a few tenths of wt % of Cr2O3 it is a characteristic emerald green color”. ODM names it low-Cr diopside-hedenbergite as it is

“Non-kimberlitic Cr-diopside (his fig. 2c) with less Cr2O3, generally <1.25 wt %, than the kimberlitic variety (Averill 2011, his fig. 2d).”

Generally the microscopically-identified low-Cr Diopside-hedenbergite gns in the HMs may have equivocal sources. Anom amounts could be from mafic/ultramafic intrusions in unknown occurrences of HCA ophiolite. In a possible orientation sample, HM-10 from BH Ck collected below ophiolite-sourced ultramafics that outcrop along the LCFS rd, low-Cr Diopside-hedenbergite is bkgd {17 gns}. This HCA ophiolite is a ‘slice’ along the *Tillicum fault.* Occurrence of other ultramafics in the district with that distinct mineral is likely.

Low-Cr Diopside-hedenbergite is abundant in 3 of the 14 silts: HM-03 from upr Clel Ck, downstream of this HM-25 from lwr Clel Ck and HM-17 from 645B0 Ck to the N.

22.6.1 Low-Cr Diopside-hedenbergite in medium size sand fractions Map M-07

HM-03 from upr Clel Ck is 2nd rank, highly anom with {3,333} gns (Map M-07, Table 18). This signal is undiluted downstream in HM-25. Scheelite is also 2nd rank in HM-03 medium sand-sized gns, 60 {67}. Its spessartine gn count is 3rd rank {1,667} gns. HM-03 is discussed in the scheelite section.

Rock 0613D the argillic-altered granitoid boulder is in its drainage, uphill about 300 m S. It has dispersed ~0.2% microcrystalline pyrite and 1-5 mm sized blue-grey epithermal-style quartz veinlets with common sub-mm sized vugs. Gold is anom 305.1 ppb. Bismuth & tellurium are above their median values, arsenic high 59.7 and lead slightly hi 28 (ppm); see the R Map series.

HM-17 from 645B0 Ck to the N has anom 3rd rank {1,724} low-Cr Diopside-hedenbergite gns; with three others it ties for chromite or hercynite or Cr-spinel, and it has 50 gns of axinite (both discussed below). The geology is poorly known there. 50 gns of axinite, a hydrous borosilicate, occur (Map M-08, Table 18).

22.7 (Common) diopside-hedenbergite

G. Ray (2004) observed variably developed siliceous hornfelsing in the contact-metamorphic thermal aureole of the BH sill. It "is best developed in the argillites where it is marked by very fine-grained brown to purple-brown biotite, pervasive fine-grained silica-quartz and sporadic pale green **clinopyroxene** [diopside-hedenbergite]."

This is 'common' diopside-hedenbergite, a rock-forming, early-stage, high temperature metamorphic mineral formed in dolomite-rich rocks. It has a restricted occurrence in a narrow temperature interval near 540° C at 100 MPa (Bucher & Grapes 2011). Any associated scheelite present may thereafter be upgraded to a W skarn deposit, with possible economic status, by a retrograde hydrothermal mineralizing event (Meinert et al 2005).

Table 16 'Major Background HM assemblages of bulk silts shows >15% 'common' diopside-hedenbergite in HM-10 BH Ck, HM-24 Ridge trib, all 4 silts from Clel Ck drainage, HM-19 upr Bzero Ck, and in HM-17 645B0 Ck to the N.

HM-16 lwr Four tribs Ck has a low number {211} gns of low-Cr Diopside-hedenbergite though approx. 4% (~3,000 grains) of common diopside (D. Holmes of ODM, p.c. Mar. 19 2014).

In these the 'common' diopside-hedenbergite source is likely mineralized skarn formed by contact metamorphism of carbonates in the inner aureoles of granitic intrusions.

22.8 Titanium oxide minerals Rutile, red Cr-Rutile & Anatase

"Rutile is essentially TiO2. It may contain considerable Fe^{++} and Fe^{+++} iron and major niobium and tantalum. High tantalum rutile may also be tin rich; chromium, vanadium, zirconium and hafnium may also occur… colour from red to deep red is due to Fe^{++} iron, tantalum and niobium content (Deer et al. 1992)".

"Rutile is a stable accessory mineral in almost all metamorphic facies and is a widespread in many igneous rocks (Elsner no date)." Many trace elements may be present including Si, Al, Ca Sc, Rb, Sr, Y, Zr, Mo, Sb, Cs, Ba, U, Th, Sb, Pb, W, Hf, Mn and REE (Zack et al 2002). Red Rutile may contain chromium (Ti,Cr)O2 and is a good indicator for metamorphosed VMS deposits; the Cr in chromite is transferred to rutile.

Anatase is the low-temperature polymorph of TiO2. It is an accessory mineral in metamorphic and igneous rocks and also an alteration product of other Ti-minerals, e.g. sphene & ilmenite (Deer et al. 1992).

22.8.1 Titanium oxide minerals in medium size sand fractions Map M-09

In medium sand size fractions ODM picked 4 rutile, 4 red rutile & 14 anatase grains (Fig. 32 photo, Map M-09). Other HM indicators are often associates. There is a slight TiO2 anomaly in the three southern drainages (Map M-09); the HMs are much alike in titanium oxide minerals. *None were picked in creeks draining the LW ridge.*

9 anatase (Fig. 32 photo below) and 3 red rutile gns (Fig. 28 photo) in HM-10 from BH Ck may relate to the BH mine gold-qtz veining. Four tribs Ck drainage has consistent traces of anatase. That single gns were picked in 3 out of 6 different HM fractions from that drainage shows the high sensitivity of ODM's lab procedures. Both creeks have comparable TiO2 phases.

22.9 The Garnet series - Pyralspite & Ugrandite garnets

Garnets in the HM fractions are solid solutions of several components (or molecules) (Table 17). Some of the defining end-members are: grossular – Ca Al; andradite – Ca Fe; uvarovite – Ca Cr and spessartine – Mn Al. It formed in varied contact metamorphic environments about the granites on CLY.

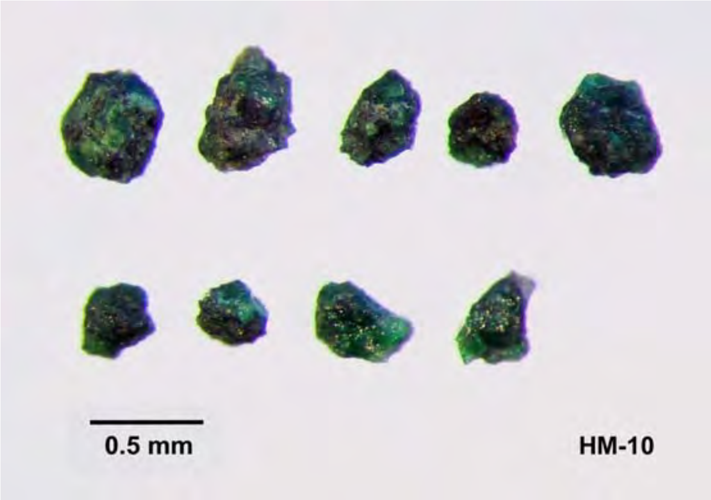
"Garnet is especially characteristic of metamorphic rocks of a wide variety of types … and some granites and pegmatites, acid volcanic rocks and kimberlites (Deer 1997, Orthosilicates)."

Series	End-member	Ideal Formula of Component	Specific gravity
Pyralspite or sub-calcic garnets	Pyrope	**Mg**3Al2Si3O12	3.58
	Almandine	**Fe**3Al2Si3O12	4.32
	Spessartine	**Mn**3**Al**2Si3O12	4.19
Ugrandite or grandite garnets	**Uvarovite**	Ca3**Cr**2Si3O12	3.90
	Grossular	Ca3**Al**2Si3O12	3.59
	Andradite	Ca3**Fe**2Si3O12	3.86

Table 17 Garnet end-members of the two common garnet series

22.10 Uvarovite Cr garnet

Uvarovite is calcium chromium garnet end-member component Ca3**Cr**2Si3012. Uvarovite occurs on CLY at two sites; of the 9 gns in HM-10 from BH Ck 3 were checked by SEM to confirm its identity (ODM fax sheet). It is brilliant dark green (Fig. 32 photo). 1 gn was found in HM-17 from 645B0 Ck.



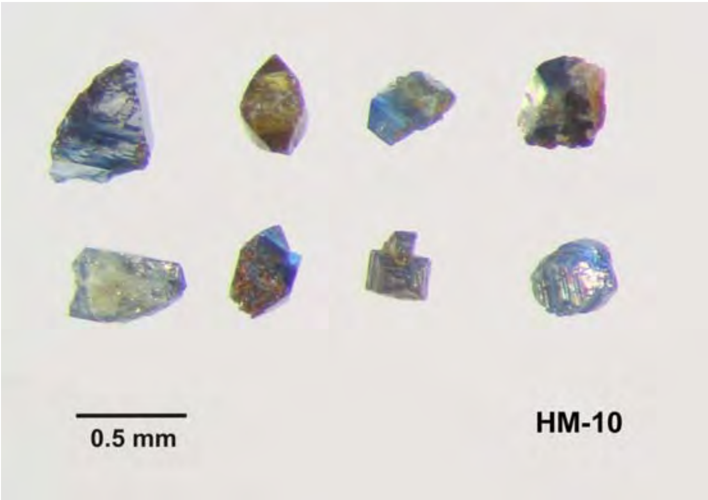


Fig. 32 Photos of uvarovite & anatase gns in HM-10 from BH Ck. 9 uvarovite Cr garnet gns are visually distinct with their intense coloration. To rt 8 gns of anatase TiO_2 display crystal 'steps'

"Uvarovite is the rarest of the six common (anhydrous) species of the garnet group. Although… green [Cr-bearing] garnets with uvarovite as a subordinate molecule are also known, garnets with uvarovite as the dominant molecule are of restricted occurrence and **found chiefly in serpentinite, often in association with chromite, and in metamorphosed limestones and skarn orebodies.** The best known occurrences are in N Karelia, Finland … [where it] typically occurs associated with pyrrhotite in a complex of serpentinites, quartzites, phyllites, dolomites, and diopside-tremolite rocks, together with granites, aplites and pegmatites. At the Outokumpu locality [there is a] close relationship between the **uvarovite** skarn and the dolomites; some of the latter contain chromite. …the ultimate source of the Cr may be the associated serpentinite intrusions … (Deer et al. 1997 Orthosilicates)."

22.10.1 Uvarovite in B.C.

Uvarovite in HM-10 from BH Ck **is its third occurrence in B.C.** Uvarovite occurs in **Mount Ogden nephrite jade**, N of Prince George near Takla Landing (MINFILE No. 093N165). The jade is deep green, aphanitic, compact, vitreous and moderately schistose, mainly 48-52% tremolite, 48-50% serpentine and lesser limonite, chromite and locally 1.5-2% uvarovite as bright green rims around chromite gns (Simandl et al. 2000).

Uvarovite also occurs in **the Turnagain ultramafics at Dease Lake**, north-central British Columbia. There "The dunite is mainly composed of cumulus olivine, minor amounts of chromite and intercumulus olivine and pyroxene, and trace amounts of primary phlogopite. One exposure contains secondary euhedral uvarovite associated with multiple parallel black serpentine veinlets over a ~50 cm thickness (Scheel et al. 2005)."

22.10.2 Uvarovite in medium size sand fractions Map M-08

The 9 gns of uvarovite in HM-10's medium sand fraction are doubtless sourced from ultramafic rocks (serpentinites, pyroxenites, werhlites; C. Ash 1999) in the HCA ophiolite along the *Tillicum fault.* Tourmaline-bearing granites like the roadside Clel plug intrudes all and the nearby HCA Limestone + Argillite Unit. Metasomatized HCA black limestone may be its Ca source.

HM-10 from BH Ck is a goethite-augite/diopside-grossular assemblage (Table 18). Its >15% augite is likely from the mafic or ultramafic rocks of the ophiolite. 5 VG gns in HM-10, with shapes 4/1/0, contribute Calculated 66 ppb to the HM fraction, low, and very low 0.40 ppb to the bulk silt.

***Values of the three gold parameters are *not anom*. The Visible Gold gn count in HM-10 is 5. This low count is surprising as the historic BH mine gold-qtz veining occurs upstream. This attracts attention and is the assumed 'first target', but both the gold gn survey and the HM survey show many other watersheds are more prospective. *There may be more mineralized areas above the other bulk silt sites* (Conclusion Table 18).**

There is no comment on the 1 gn in HM-17 645B0 Ck.

22.11 Grossular-Andradite Ca-Fe-Al garnet

Grossular-rich garnet, the end-member component Ca3**Al**2(SiO4)3, is widespread in metamorphic rocks: "Grossular is characteristic of thermally and regionally metamorphosed carbonate-bearing rocks. Fe-bearing andradite is the dominant substitutional molecule (Deer et al. 1997, Orthosilicates)".

In the HM fractions

The reported grossular Ca3Al2(SiO4)3 may include grains of visually indistinguishable andradite Ca3Fe2(SiO4)3 [garnets of the ugrandite or grandite solid solution series] (Dec. 03 2013 letter by R. Huneault)." This "Andradite Ca3Fe2Si3O12-rich garnet commonly occurs in contact or thermally metamorphosed impure calcareous sediments, as well as in metasomatic skarn deposits that are often associated with thermal metamorphism (Deer et al. 1997)."

22.11.1 Grossular-andradite in medium size sand fractions Map M-02

HM-18 from Bmin trib is a goethite-hematite/grossular assemblage with

- anom 1st rank **corundum** with 4% ~8,000 gns standardized {8,890} (Map M-04)
- anom 1st rank **scheelite** 100 {111} gns (Map M-05)
- anom 1st rank **grossular-andradite Ca-Fe-Al garnet** 200,000 {222,222} gns (Map M-02)
- Chromite or Hercynite or Cr-spinels 40 {44} tied with 3 others for 3rd rank (Map M-06)
- **Trace Fe-rich hercynite** spinel Fe^{++}Al2O4. The SEM checks are "5 chromite versus hercynite candidates = 5 hercynite (gns)" thus many chromites may actually be spinels
- **Class II VG gn anomalous** with 8 {9} gns (see Fig. 22 photos, Map H-02). Grain shapes 2+5+1 indicate some near-source gold, and
- Calculated gold in bulk silt is 9.2 ppb, **low anom** (Map H-04). Median-MAD levelled (Map H-05) this is **5 times bkgd**

22.11.2 Grossular-andradite in HM-13 from mid Ckay trib Map M-02

HM-13 from mid Ckay trib is a goethite/grossular assemblage with (Table 18):

- anom 2nd rank **grossular-andradite garnet** with 100,000 {114,943} gns (Map M-02)
- **Calculated gold** in bulk silt is 17.79 ppb, classed **hi anom** (Map H-04)
- ***Not*** VG gn anom with 5 {6} recovered VG gns 3+2+0 including a larger-sized gold gn 650 microns long, 250 microns wide with attached quartz and sericite (Fig. 24 Photos of the 5 VG gns in HM-13 mid Ckay trib)
- *No other anoms*

HM-16 from lwr Four Tribs Ck is 3rd rank in grossular-andradite but this may be fluvially dispersed from the from HM-13 source. Calculated gold in bulk silt is 3.61 ppb, classed questionably anomalous (Map H-04). At 4 the VG gn count is not anom.

HM-07 E of Ckay trib is 4th rank a goethite/grossular assemblage Class I VG gn anomalous with the most gns recovered, 16 = 6 Reshaped + 9 Modified +1 Pristine.

22.12 Spessartine Mn garnet

Spessartine **Mn**3Al2Si3O12 garnet has high amounts of the manganese end-member component. It is a pyralspite series or 'sub-calcic' garnet. Most often the other components are the pyralspite series end-members pyrope, in low amounts, and almandine, significant.

"Spessartine is rather less common than many of the garnet species. … Garnets in which spessartine is the principal molecule are found in some skarn deposits … and frequently in Mn-rich assemblages, with rhodonite, pyroxmangite, tephroite, etc., of metasomatic origin associated either with adjacent igneous intrusions or a more widespread regional metasomatism … it has complete solid solution with grossular … (Deer et al. 1997, Orthosilicates)".

22.12.1 Spessartine in medium size sand fractions Map M-03

For orientation HM-10 from BH Ck, downstream of the BH Au-(Ag)-Bi-Te-W bearing qtz veins, is a tie for 2nd rank spessartine gn count {1,899} (Fig. 33 photo) with HM-24 Ridge trib {1,948} gns. Presumably it developed from hydrothermal alteration related to that QV system. Nine gns of uvarovite Cr garnet is the only other anom (which see). The mean bkgd gn count of spessartine is 16.8 ~17 gns, from nil to {64} gns (Chart 8).

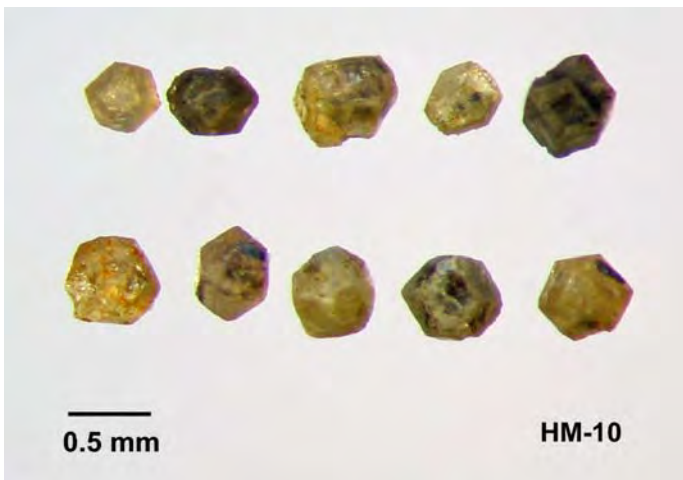


Fig. 33 Photo of spessartine from HM-10 BH Ck, a tie for 2nd rank gn count {1,899}. Note only one color type c.f. next photo spessartine from HM-03 upr Clel Ck.

HM-15 Clel 770Q5 trib is 1st rank with {5,883} spessartine gns and anom scheelite. Downstream HM-03 from upr Clel Ck is 3rd rank with spessartine {1,667} gns. Clel 770Q5 trib basin is a target for a spessartine + scheelite + native gold bearing skarn system.

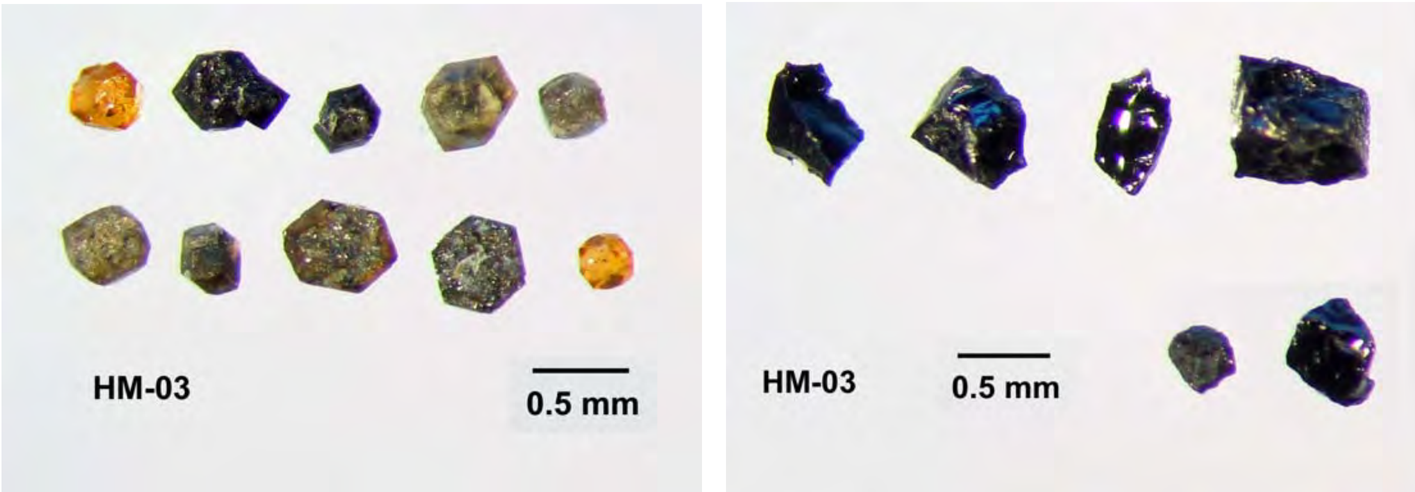


Fig. 34 Photos of spessartine & hercynite from HM-03 upr Clel Ck. Three color types of hexagonal-shaped spessartine, some gn surfaces are cleanly fractured. Black Fe-rich hercynite spinel has conchoidal fractures.

HM-24 Ridge trib with {1,948} gns ties with HM-10 from BH Ck for 2nd rank spessartine gn count. It is a goethite-augite/diopside assemblage (Table 16) Class I anom in VG gn count: total of 9 = 3 Reshaped + 5 Modified +1 Pristine. It is not anom in Calculated Gold, 1.5 ppb.

HM-04 from upr Hort trib in Four tribs Ck drainage ranks 4th with {1,163} spessartine gns. It is difficult to propose the Lefevre skarn-hornfels or the Clease QVs is the source when two closer HMs, HM-13 {69} & HM-07 {64}, have bkgd spessartine. Some of the HM-04 spessartine may be from re-worked transported tills derived from anom HM-15 Clel 770Q5 trib up-elevation, but that is doubtful.

22.13 Axinite

Axinite is a varicolored hydrous Ca, Fe, Mn and Mg aluminium boro-silicate. It is a group of 4 minerals with general formula (Ca,Mn,Fe,Mg)6Al4B2Si8O30(OH)2 (Grew 1996) or (Ca,Mn,Fe)3Al2BO3Si4O12(OH).

"The three Ca dominant axinites (with mole Ca >3) are end-members in a solid solution series named for the second-most abundant cations … ferroaxinite, magnesioaxinite and manganaxinite … (Grew 1996)".

Colours reflect the composition:

Ferroaxinite (Fe)-rich — violet brown to black
Magnesioaxinite (Mg)-rich — pale blue to gray or violet
Manganaxinite (Mn)-rich — yellow-orange to brown (see photo below)
(Tinzenite Ca + Mn rich — yellow; *rare and not present* in the HMs)

Axinite is found chiefly in contact metamorphic aureoles where boron has been metasomatically introduced into calcareous rocks (Deer et al. 1997)". It occurs "with diopside and andradite [garnet] in contact metamorphic hornfels and with quartz and calcite in veins (Chesterman 1978)." Axinite is common in skarn deposits, often with calcite in veins and segregations.

"Some skarns replacing basaltic or pelitic rocks can have a distinctive silicate mineralogy, often due to a high Al/Si ratio in the altered host rock … [including] tourmaline, **axinite** and vesuvianite (Ray & Webster 1997)."

Axinite occurs in the Nickel Plate and French Mine / Oregon MINFILE 092HSE059 gold skarns with Au-Bi-Te minerals (p. 214). Theodore et al. (1991) find 5 of 39 gold skarns worldwide report **axinite**. It may also occur in Pb-Zn skarns as a late-stage mineral.

22.13.1 Axinite in medium size sand fractions Map M-08

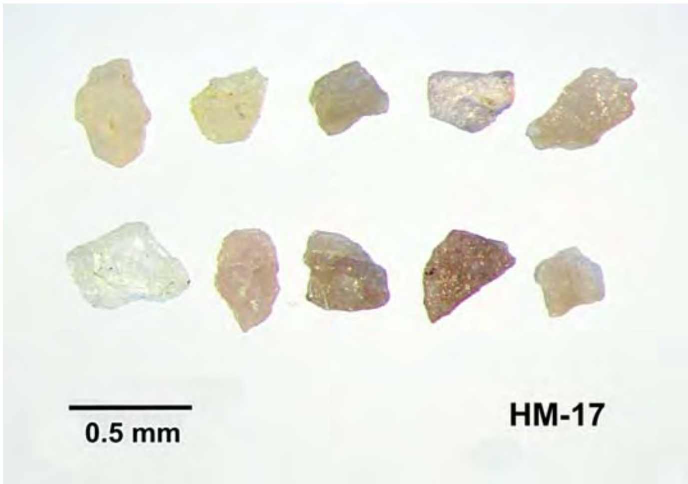


Fig. 35 Photo of varicolored axinite gns in HM-17 645B0 Ck; the pale yellow and pinkish colors suggest the mineral is Mn-rich manganaxinite as it is "yellow-orange to brown"

HM-17 645B0 Ck has 50 gns of axinite. 5 were checked by SEM that they were not apatite (ODM report). The specific axinite group mineral is unknown. HM-17 is Class II VG gn anom with questionably anom Calculated gold in bulk silt, 3.83 ppb. It has anom 3rd rank {1,724} low-Cr Diopside-hedenbergite gns and ties for 3rd rank with three others for chromite / hercynite or Cr-spinel (below and Table 18). The geology is poorly known there; the axinite may indicate skarn mineralization.

22.14 Chromite or Hercynite or Cr-spinel

'Unspecified' spinels ODM names 'chromite' are found in all 14 picked HMs. The Cr column is ** asterisked in the data with the footnote "unchecked (by SEM) – chromite may include hercynite or Cr-spinel." This is because

"Chromite and hercynite are visually very similar and can appear identical under the microscope, thus unless we SEM check every grain we cannot determine the proportion present. That is why the footnote in the data states chromite may include hercynite and Cr-spinel (April 07 2014 email by R. Huneault)."

Chromite $Fe^{++}Cr2O4$ is an end-member mineral of the spinel group with general formula AB2O4 (Elsner no date). Elements in order of frequency of occurrence in the A & B structural sites are:

A = Mg Fe^{++} Zn Mn
B = Al Fe^{+++} Cr Mn^{+++} V Ti

Considering the most common element in the B site, the spinels are subdivided into aluminum spinels, iron Fe^{+++} spinels, and chrome spinels. Rarer are spinels with dominant elements manganese Mn^{+++}, vanadium and titanium. Some spinel end-member mineral formulae are:

aluminum spinels:
spinel *sensu stricto* MgAl2O4
hercynite $Fe^{++}Al2O4$

iron Fe^{+++} and chrome spinels:
magnesiochromite MgCr2O4
chromite $Fe^{++}Cr2O4$

Chromian spinel is $(Mg,Fe^{++})Cr2O4$, a solid solution of magnesiochromite-chromite. Magnesiochromite (a.k.a. picrochromite) is uncommon. Gahnite ZnAl2O4 is rare zincian spinel.

Chromite "occurs as disseminated grains in mafic and ultramafic rocks and ophiolites ... or as nearly massive layers as chromitite rock (Bowles et al. 2011)".

22.14.1 Chromite or Hercynite or Cr-spinels in medium size sand fractions Map M-06

These 'unspecified' spinels occur in all the HM fraction gn counts. The gn count range is low, from {128} 1st rank to background {13} gns {means standardized to 10 kg}.

HM-07 E of Ckay trib has the most spinel 1st rank {128}. The indicated source is the SW side of BiWold Dome.

HM-04 upr Hort trib ranks 2nd with {70}. The source may be the same, or it may be from glacial dispersion.

Four HM cons about tie for 3rd rank in medium-sized sand spinel gn counts:
HM-19 upr Bzero Ck {59} HM-17 645B0 Ck {57} HM-03 upr Clel Ck {56} and HM-24 Ridge trib {52}.

HM-15 from Cel 770Q5 trib has {47} gns 4th rank. Possibly the local source is McCormick Ck Highlands.

HM-18 has {44} gns below 4th rank; however "SEM checks from the 0.5-1.0 mm fraction 5 chromite versus hercynite candidates = 5 hercynite gns" suggests many gns are hercynite, this discussed below.

HM-13 mid Ckay trib is 'bkgd' with the least spinel {13} gns.

Some spinel is undoubtedly chromite from ultramafic or mafic rocks in HCA ophiolite slices aligned along major faults; some could be distal and off-property. Some of the spinel is likely chromian spinel, common in metamorphic rocks. The fluvial dispersion patterns show much is local.

22.15 Hercynite

Hercynite $Fe^{++}Al_2O_4$ is an end-member Fe-Al spinel group mineral. It forms solid solution series with other spinels, spinel *sensu stricto* $MgAl_2O_4$ and chromite $FeCr_2O_4$. Magnesium spinel is most common, followed by hercynite. It is dark green to black and common in metamorphosed Fe-rich argillaceous sediments, in mafic and ultramafic rocks, and in some high-grade metamorphosed rocks. It is stable with silica (quartz) (Deer et al. 1992). Associates are magnetite, **corundum**, ilmenite, sillimanite & andalusite.

If chromite is *asterisked in the data file ODM's ID is "unchecked (by SEM) – chromite may include hercynite or Cr-spinel." With few gns SEM-checked the reported hercynite counts are imprecise.

Hercynite "forms at high temperatures and pressures, generally above 700° C, 400 mPa … so it is typically found in highly metamorphosed rocks such as granulite, eclogites or metapelitic hornfelses [contact metamorphic rocks]. It is often associated with **corundum** and it can be produced by the breakdown of staurolite (Bowles et al. 2010)."

"Hercynite is a typical mineral of both quartz-bearing and quartz-free metapelitic rocks … under low-pressure high-temperature conditions in … upper-amphibolite facies of regional … and contact metamorphism (Pattison & Tracey 1991) (in Cesare 1994)."

In quartz-poor argillaceous rocks with about 16 volume % quartz, and medium mole fractions of iron, hercynite may form at temperatures above ~710 °C at 600 MPa. These are upper amphibolite facies conditions. Bucher & Grapes (2011, fig. 7.17 p. 287) model the FMASH system at 600 MPa. For low molar fractions of iron X_{Fe} 0.30 – 0.55 assemblages like hercynite + almandine Fe – pyrope Mg garnet + cordierite form above ~710 to 810 °C. If X_{Fe} is higher, 0.55 – 0.70, hercynite + almandine Fe – pyrope Mg garnet + cordierite + corundum form above ~810 °C. However paleo-pressures P in the granitic contact aureoles on CLY are thought to have been about a third less, ~200 MPa. This will change the model's temperature estimates. Note this model does not include Ca in the grossular garnet component.

Hercynite may also form at a lower P, T from the breakdown of Fe-cordierite. This is a "de-silication reaction during cooling from 770 – 340 °C of late-stage hydrous fluids at 100 MPa at Cadillac Mtn, Maine (Nichols & Wiebe 1998 in Bowles et al. 2010)."

22.15.1 SEM-identified Hercynite in medium size sand fractions Map M-08

Note the Cr column is ** asterisked in the data. The footnote reads "unchecked (by SEM) – ***chromite may include hercynite or Cr-spinel."***

Thus hercynite's occurrence and its gn counts in the HMs are fully uncertain. Two HMs in which it has been identified by SEM are:

> HM-18 from Bmin trib "SEM checks from 0.5-1.0 mm fraction **5 chromite versus hercynite candidates = 5 hercynite gns"**
> HM-03 upr Clel Ck "SEM checks from 0.5-1.0 mm fraction: **5 hercynite versus chromite candidates = 5 hercynite** … and from 0.25-0.5 mm fraction: **10 chromite versus hercynite candidates = 4 chromite and 6 hercynite".**

Thus of 15 chromite-hercynite or Cr-spinel gns in HM-03 SEM checks determine 11 as hercynite, 73%. Summarizing HM-03 upr Clel Ck appears to have a high proportion of hercynite.

The spinel in HM-18 from Bmin trib may also be mostly hercynite, not chromite. That inference fits with the abundant corundum found there.

23 Transport distance of the bulk silts, from actively eroding streams

For this bulk silt sediment survey many of the sample sites are at high elevations draining small, mineral-favourable areas. Many of the silts could not have been collected higher – at some sites 'torrential' streams continue to scour and expose bedrock. With active erosion it is quite apparent that only a minor proportion of the mineral gns and rock fragments in the collected silts are derived from re-worked tills or soils. If this was not the case three former (conventional) stream silt geochem surveys would not show repeatable multi-sample, multi-element anoms from the LW ridge (Koffyberg & Howard 2008, Williams 2010a, 2010b) and be at all useful.

23.1 Two methods to estimate the transport distance of HMs in the silts, with examples

To assist interpreting the survey, the transport distance of the bulk silts is estimated by two means. Some HMs like augite or common diopside occur as rock-forming minerals not indicative of mineralizing environments or mineralization; however some of the picked HMs form in very specific environments of contact metamorphism, e.g. the three garnet species. **Generally the heavy indicator minerals do not occur in the regionally metamorphosed country rocks.** An exception is chromite in the HCA ophiolite, if part of the chromite / hercynite or Cr-spinel gns. Estimates of the transport distance of the bulk silts, and the HMs within, are from the

1. Distance of the likely source(s) of particular HMs, considering any unusual geologic settings of their formation required. Consider the 9 gns of uvarovite Cr garnet in HM-10 from BH Ck (Map H-08). They are doubtless sourced from HCA ophiolite ultramafic rocks (serpentinites, pyroxenites, werhlites; C. Ash 1999) intruded by Clel plug tourmaline-bearing granites along the *Tillicum fault*. Incorporated HCA black carbonaceous limestone could the Ca source for this ugrandite series garnet. All the named rock types are well exposed along LCFS road**. Concluding the uvarovite Cr garnet source is within 450 m.** With the unique geologic-structural setting required for its formation it is definitely local-sourced.

   As a second example HM-13 from Ckay trib has undoubtedly picked up significant grossular (Map M-02) from either, or both, the Clease showings and the Lefevre W + Au skarn-hornfels upstream, the later **250 m N**.

2. Map patterns of dispersion of a HM species. Consider blue sapphire corundum: two local bedrock sources are evident (Map M-04). One contributes 4% or {8,889} gns {standardized to 10 kg of silt} to HM-18 Bmin trib, the other 0.5% {291 gns} to HM-04 upr Hort trib. **No other corundum sources are evident:* to the south HM-15 from Clel 770Q5 trib has nil gns and HM-09 from Clel Pawprint Corner trib has {20}. Thus within 1.7 km corundum diminishes from {8,889} gns to background nil or {20} gns. The indicated sources upstream are **within 470 m** for HM-18 from Bmin trib and **within 300 m** for HM-04 from upr Hort trib, both on the present claims.

   Reflect that near these sources tills will have glacially dispersed corundum. If this corundum-bearing till traveled several km to be then re-cycled by the creeks, the HM suite would have significant counts. *That this is not the case infers the tills have travelled a km or less.* Sources for the sampled silts are within local catchment basins.

23.2 Conclusion: bedrock sources for the HMs in the bulk silts are within 250 - 600 m

Concluding, the unusual geologic settings required for the formation of several individual heavy indicator minerals and the map patterns of their distributions are consistent with local glacial and fluvial dispersion within 250 - 600 m. This shows **the silts and their contained *heavy indicator mineral gns* are local-sourced. *They are not far-travelled.***

24 Summary of Gold, scheelite and Heavy Indicator Mineral anoms in six stream networks

Considering multiple geochemical signals the watersheds of 4 Creeks are prospective for Gold deposits and 5 others for Gold + Tungsten deposits. These form parts of 6 different stream networks (separating Four tribs Ck network into Hort trib and Ckay trib networks).

P means a photo in this report

Bulk silt	**Creek**	**Class I ≥ 11 VG gns or Class II ≥ 8 gns anomalous**	Calculated gold in bulk silts, ppb **anom in red**	**Scheelite gns standardized** with [rank], [1] to [3] **in bold**	HM in detrital Assemblage >15% & **Prime HM Indicator(s), if 1st or 2nd rank**	Secondary HM Indicator(s), **3rd rank in bold**, 4th rank not bold	Accessory HMs & Metallics
645B0 Ck network							
HM-17	645B0 Ck Gold	II	*3.83*	17 -	common Diopside	**low Cr Di-Hed [3]** **'Spinels' [tie 3]** P **axinite**	Tr 50 gns P axinite + 1 uvarovite + 5 andradite + tr [unpicked] apatite
Bzero Ck network							
HM-18	**Bmin trib Gold + Tungsten**	P II	9.19	P **111 [1]**	P **Grossular [1]** P **Corundum [1]**		P 4 pyrite + 5 hercynite + tr [unpicked] apatite
HM-19	upr Bzero Ck Gold + Tungsten	II	*3.14*	**59 [3]**	common Diopside Grossular	**'Spinels' [tie 3]** Corundum [4]	1 zircon
Hone–Bogo Ck network							
HM-11	**lwr Bogo trib Gold**	II	1.16	?	--- not picked ---	?	?
Clel Ck network							
HM-15	**Clel Ck 770Q5 trib**	P - NOT ANOM	**17.79**	P 35 [5]	P Forsterite common Diopside **Spessartine [1]**	P 'Spinels' [4]	1 anatase + tr [unpicked] apatite (+ 2 pyrite)
HM-09	Clel Pawprint Corner trib ≈	- NOT ANOM	**76.50**	12 -	Augite Forsterite common Diopside	low Cr Di-Hed [4]	>15% [unpicked] augite + tr [unpicked] apatite
HM-03	**upr Clel Ck Gold + Tungsten**	II	9.91	P **67 [2]**	common Diopside Grossular P **low Cr Di-Hed [2]**	P **Spessartine [3]** **'Spinels' [tie 3]**	2 pyrite + 0.5% marcasite 15-75µm **+** P 11 hercynite + 5 apatite + 1 red rutile + 2 rutile + 5 Ti-augite
HM-25	lwr Clel Ck ≈	I	*3.37*	24 -	Forsterite common Diopside Grossular **low Cr Di-Hed [1]**	Spessartine [tie 4] 'Spinels' [4]	4 anatase + 1 pyrolusite + 2 zircon + tr [unpicked] apatite
Bunker Hill Ck							
HM-10	Bunker Hill Ck ***≈ but Gold present with drill targets***	- NOT ANOM	0.40	19 -	Augite common Diopside Grossular P **Spessartine [tie 2]**	P **uvarovite**	3 pyrite 25-50µm + P **9 uvarovite** + 1 Mn-epidote + 3 red rutile + P 9 anatase + 1 epidote + 18 zircon + tr [unpicked] apatite

(continued)

Bulk silt	Creek	Class I ≥ 11 VG gns or Class II ≥ 8 gns anomalous	Calculated gold in bulk silts, ppb anom in red	Scheelite gns standardized with [rank], anom in bold	HM in detrital Assemblage >15% & Prime HM Indicator(s), if 1st or 2nd rank	Secondary HM Indicator(s), 3rd rank bold, 4th rank not bold	Accessory HMs & Metallics
Hort trib (Four tribs) network							
¯HM-04	upr Hort trib Gold + Tungsten	P¬ II	41.30	23 -	Grossular **Corundum [2]** **'Spinels' [2]**	Spessartine [tie 4]	1 sperrylite 25µm + 2 pyrite 25µm + 1 red rutile + 1 anatase + tr [unpicked] apatite
HM-14	mid Hort trib ≈	II	0.61	22 -	Grossular		20 pyrite 2 rutile + 1 zircon
Ckay trib (Four tribs) network							
HM-07	E of Ckay trib Gold + Tungsten	I	1.58	38 [4]	**'Spinels' [1]**	Grossular [4]	2 pyrolusite + 1 zircon + tr [unpicked] apatite
&HM-13	mid Ckay trib Gold	P - NOT ANOM	&17.79	23 -	**Grossular [2]**		1 anatase + 1 zircon
Four tribs Ck network (lower part)							
HM-24	Ridge trib ≈	I	1.47	19 -	Augite common Diopside **Spessartine [tie 2]**	**'Spinels' [tie 3]**	tr [unpicked] apatite
*HM-16	lwr Four tribs Ck ≈	- NOT ANOM	*3.61*	^8 -	4% common Diopside	**Grossular [3]** **Corundum [3]**	1 anatase + 1 chalcopyrite + 3 pyrolusite + 1 zircon

¯HM-04 has a larger-sized Au gn 450 microns long, 400 microns wide and 250 microns thick with attached sericite (Fig. 23 Photos) one of the 8 {9} VG gns recovered shaped 6+2+0

&HM-13 has a larger-sized Au gn 650 microns long, 250 microns wide and 100 microns thick with attached quartz and sericite (Fig. 24 Photos) one of the 5 {6} VG gns recovered shaped 3+2+0

^ in HM-16 count revised Mar. 18 2014 from 0 (nil) gns

*HM-16 has approx. 4% (~3,000 grains) common diopside (D. Holmes of ODM, Mar. 19 2014) and a low count {211} of low-Cr Diopside-hed.

Table 18 (in two parts) Summary of Gold, scheelite and Heavy Indicator Mineral anoms in eight stream networks. Creeks in 6 are prospective: 4 for Gold and 5 for Gold + Tungsten. If the composite HM & geochemical signals are high the creek names are in bold. The stream networks are color coded and sub-section the table. **All anoms have higher composite mineralogical & geochemical signals than Bunker Hill Ck with its drill-ready Au-Bi-Te-W bearing QV mineralization up stream.**

The table lists the bulk silt sites from N to S, not in order of prospectivity. Symbol ≈ means not anomalous or equivocal. Consider these signals together to determine if a bulk silt is anom: VG gn counts, Calculated Gold in bulk silts, counts of medium-sand sized Scheelite gns, detrital HM assemblages, high ranks of anom Heavy Indicator Minerals that typify W+ Au skarn systems, and accessory HMs & Metallics.

The above 14 were selected for picking heavy indicator minerals from the 23 bulk silts based on counts of recovered Visible Gold gns. A Class I anom has ≥ 11 VG gns, sample **red in bold;** a lesser Class II anom has ≥ 8 VG gns, in red. Calculated Gold in bulk silts if above 17 ppb, the high anom threshold, in **bold red**; above the low anom threshold 5 ppb in red, above 3 ppb a questionable anom in *red italics.* Gold prospective creeks in red; Gold + Tungsten prospective creeks in mauve. If the composite HM & geochemical signals are high the creek names are in **bold**.

Note Bunker Hill Ck is anom only in spessartine [2nd rank] & 9 gns of rare uvarovite garnet. Its lack of other HM signals and low VG gn count suggests **other sites have more extensive mineralized sources.** More tills and rocks could be sampled. **Clel Ck basin is more anom in W than Four tribs Ck drainage.**

Summarizing the results **as well as gold the commodity tungsten, as scheelite, can be a sought on CLY.** Anom amounts of **spessartine** and **grossular-andradite** garnets, and **corundum,** accompany it in some bulk silt fractions and likely in the unfound mineralized sources.

25 Conclusion

Results of the 2013 lithogeochem, basal till, moss mat, and gold grain & heavy mineral surveys successfully indicate **widespread gold and gold + tungsten mineralization** in the **CLY area** (Table 18). Thin till covers the land thus deposits remain to be found. They are **km-plus long** vein systems likely associated with contact-related, stratabound skarn ore bodies of uncertain dimensions.

The bulk silt HM survey shows the watersheds of 4 Creeks are prospective for Gold deposits, and another 5 for Gold + Tungsten deposits. These form parts of 6 different stream networks (Table 18). Mineralization is likely shallowly buried at the till-bedrock interface. As specific target areas are small further surveys can be at local sites. Additional drill targets for polymetallic gold mineralization could be found economically.

Many of the HMs are associates of the indicated mineralization, having formed in larger hydrothermal alteration haloes or shells. These constitute larger areas of rock. Streams eroding these give definitive signals in the bulk silts. They were collected as far as practical up stream; at several sites shallow glacial till is undercut and bedrock is washed. This shows most of the bulk silt material is derived from the currently eroding bedrock and the HM signals are locally-derived. The HM gns in the bulk silts are not from far-travelled, re-worked till 'off property'.

Counts of recovered visible gold grains in the bulk silts and their weights give three interpretable numerical signals, each with anomalies. Any 'nugget effect' is minimal in the present survey as microscopic studies of several CLY mineral showings determine the average gold gn size is less than ~10-20 microns (Cook & Ciobanu Part II in Howard 2009). In the bulk silts many of the recovered gns are comparably small or slightly larger.

Two at-surface gold-quartz veins are **drill-ready** in the central area, on the Crown Grants:

- Bunker Hill mine QVs – in three oriented sets; *never trenched*
- Lefevre QVs crosscutting the southern Lefevre skarn-hornfels in the W pit of Section 4

These were found by surface prospecting in the 19th C as they outcrop (Map T-02). Quartz veins to two meters thick host Au-Bi-Te-W bearing mineralization with grades to ⅓ oz / ton. Formerly mined ore shoots are structurally controlled (McConnell & Brock 1904, AR of the Minister of Mines 1934, 1936) with a geometric pattern (Howard 2012).

Bunker Hill Ck is anom only in spessartine garnet and 9 gns of uvarovite garnet (Table 18). It lacks other HM signals and has a low, non-anomalous count of visible gold gns. **Most all the other sampled creeks have more recovered visible gold and scheelite grains, and more abundant Heavy indicator Minerals.** This infers they are more extensively mineralized.

Occurrence of rare 'exotic' HM species in the bulk silts (including the uncommon hydrous boro-silicate axinite, rare red chromium–bearing rutile, and the very rare chromium garnet uvarovite) confirm the conditions of hydrothermal mineral deposition were unusual and permissive of skarn-related gold + tungsten mineralization. These and other recovered HMs occur in economic mineral deposits, in the Salmo region and worldwide.

The bulk silt HM survey gave more signals of mineralization than first thought, several-in-one-pass. It was very successful in objectively evaluating the central CLY area about the Bunker Hill mine with outcropping Au-Bi-Te-W bearing quartz veins, *downgrading* the mineral potential of that 'historic' target w.r.t. several other more promising targets under shallow till cover. The watersheds of 4 Creeks are prospective for Gold deposits, and another 5 for Gold + Tungsten deposits, parts of 6 different stream networks (Table 18). This has been a revealing study of a small area with high mineral potential; now well demonstrated by findings of actual 'pieces' of possibly economic gold and gold + tungsten mineralizations and their related alterations, as HM gns.

A multi-survey approach is an objective, conclusive and definitive means to assist early-stage exploration. For more information, comments or queries please contact the writer wm.howard@shaw.ca

Submitted April 19 2014,
(signed) William R Howard

Appendix 1 Statement of Qualifications for William R. Howard, B.Sc. Honours

Wm. R. Howard graduated in 1978 from the University of Alberta, Edmonton with a B.Sc. Honours with distinction in Geology. For Canada Tungsten Mining Corp. In 1980 I prospected about the Ray Gulch tungsten skarn, at Dublin Gulch, Yukon during its exploratory drilling. This was before the discovery of the M. oz Eagle Zone gold deposit (by Strata Gold Corp.). Later I worked briefly for Noranda Exploration Co. at the intrusion-related Marn gold skarn, NE of Dawson City in Yukon.

I have been involved in prospecting in the Canadian Cordillera since 1976 and in the Nelson Mining Division since 1988. In 1997 I purchased the Bunker Hill and Mormon Girl Crown Grants. In 1999 the Bunker Hill project on the present central CLY area was awarded a $10,000 BC Prospectors Assistance Program grant (Howard 2000). I have attended numerous conferences, field trips and courses on mineral exploration including

- 2004 Short Course 'Gold Vein Deposits: Turning Geology into Discovery' by D. Rhys & P. Lewis. Cordilleran Exploration Round-up Vancouver, BC Jan. 24 - 25
- 2005 Short Course 'Orogenic vs. Intrusion-Related gold' with emphasis on Yukon and Alaska deposits by C. Hart & R. Goldfarb at Minerals South Conference, Cranbrook BC, Oct. 25 - 27
- 2006 Private field trip to two Intrusion-Related gold deposits in the Czech Republic near Prague, Mokrsko [3.08 M. oz] and Petráčkova hora [1.03 M. oz] with Dr. J. Zachariáš
- 2007 attended 'IGCP-486 Field Workshop on Au-Ag telluride selenide deposits' at Geological Survey of Finland 'GTK', Espoo, Finland, Aug. 26-31. Field trip in Finland & Symposium; presented paper 'Structural setting and geochemical correlations in bismuth (sulfo)telluride – native gold – bearing veins, CLY group, British Columbia, Canada: A reduced intrusion-related gold system.' Published by GTK in the Proceedings Volume; available online http://arkisto.gtk.fi/op/op53/op53_pages_45_50.pdf
- 2007 Oct. 28-31 attended the Geological Society of America Denver Annual Meeting, with co-author N.J. Cook presenting an abstract; also Field trip to the Cripple Creek gold mine, led by E. Jensen & P. Spry, in conjunction with IGCP-486
- 2008 attended Mineral Exploration Round-up Vancouver BC and Short Course Feb. 1-2 'Understanding Mineralization Controls: Applied Structural Geology to 3D Modelling and Mining'
- 2014 attended Mineral Exploration Round-up Vancouver BC and Short Course Jan. 24 'Surficial Geology and Exploration Geochemistry Indicator Mineral Methods in Mineral Exploration– Know What You Are Sampling & Why'.

Appendix 2 Statement of Qualifications for Ewan Webster, B.Sc. in Earth Science

Ewan Webster from 2010 to the present is a Ph.D. Candidate at the University of Calgary. His focus is on aspects of the structure, metamorphism, geochronology, mineralization and tectonics within a region of southeastern British Columbia. That geologically complex region includes parts of the southern Kootenay Arc, Purcell anticlinorium, and north end of the Priest River complex, and lies at the tectonic interface between the accreted, arc-related rocks of the pericratonic Quesnellia terrain, and sedimentary and volcanic rocks that accumulated on the western margin of the rifted North American craton. It is just E of CLY area with similar country rocks.

From Sept. 2010 to the present Ewan is a Teaching Assistant at the University of Calgary of undergraduate students. Classes taught have included Ore deposits, mineralogy, igneous and metamorphic petrology, and advanced field school.

From 2006 to 2010 he obtained a BSc in Earth Science, 1st Class Honours at the University of Glasgow U.K. His final year lab project (in-press) concerns the origin of micro-zircon. Recently abundant micro-zircons were discovered preserved in biotite porphyroblasts. That finding raises the question of what triggers its growth and formation under lower temperature conditions. His study investigated micro-zircon crystallisation associated with biotite porphyroblasts in a classic metamorphic site, the Ballachulish thermal aureole, Scotland.

From June – Aug. 2009 he was a Research Assistant at the Hunterian Museum, Glasgow. This involved the curation and photomicrography of the Alex Herriot thin-section collection. Work included database entry of detailed field notes, preparing thin sections for cataloguing, photomicrography and writing short captions to accompany each image.

He was awarded a Gem and Mineral Foundation of Canada scholarship in 2011 and the 2010 Shields Prize for mapping. Ewan presented at Round-up, Vancouver the poster

Tectonic setting of mineralization in the southern Kootenay Arc and Purcell Anticlinorium, southeastern British Columbia; Webster, E.R. & Pattison, D.R.M., 2013.
http://www.geosciencebc.com/i/pdf/Roundup2013/Webster_Roundup13.pdf

and published with GeoScience B.C.:

Webster, E.R. & Pattison, D.R.M., 2013. Metamorphism and Structure of the southern Kootenay Arc and Purcell Anticlinorium, Southeastern British Columbia (parts of NTS 082F/02, /03, /06, /07). *in* Geoscience BC Summary of Activities 2012, Geoscience BC Report 2013-1.
http://www.geosciencebc.com/i/pdf/SummaryofActivities2012/SoA2012_Webster.pdf

Webster, E.R. & Pattison, D.R.M., 2014. U-Pb ages of the Nelson and Bayonne magmatic suites in the Salmo-Creston area, southeastern British Columbia: tectonic implications for the southern Kootenay Arc. *in* Geoscience BC Summary of Activities 2013, Geoscience BC Report 2014-1.

Appendix 3 Exploration Expenditures, detail of Costs of exploration work on the CLY claims in 2013

Appendix 3 Exploration Expenditures, detail of Costs of work on CLY Group claims in 2013				April 16 2014	
Exploration Work type	**Comment**	**Days**			**Totals**
Personnel (Name)* / Position	**Field Days**	**Days**	**Rate**	**Subtotal***	
W Howard / Geologist	May 21	1.00	450.00	450.00	
E Howard / Assistant	May 21 & May 22	1.50	160.00	240.00	
C Howard / Assistant	May 21 & May 22	1.50	160.00	240.00	
E Webster/ Geologist	July 9 - 12	4.00	250.00	1,000.00	
W Howard / Geologist	July 9 - 12	4.00	450.00	1,800.00	
D Bridge / Geologist	July 9 - 12	4.00	472.50	1,890.00	
W Howard / Geologist	July 25, 27, 28 & July 26 0.5 day	3.50	450.00	1,575.00	
B Doyle / Assistant	July 25, 27, 28	3.00	325.00	975.00	
W Howard / Geologist	Aug 8 -11	4.00	450.00	1,800.00	
Bryn Horne / Assistant	Aug 8 -11	4.00	150.00	600.00	
C Howard / Assistant	Aug 8 -11	4.00	190.00	760.00	
B Denny / Assistant	Aug 10 & 14	2.00	315.00	630.00	
B Denny / Assistant	Aug 21 & 24	2.00	315.00	630.00	
J Denny / Assistant	Aug 22 & 27	2.00	367.50	735.00	
W Howard / Geologist	Aug 21 - 24	4.00	450.00	1,800.00	
B Denny / Assistant	Aug 27	1.00	315.00	315.00	
J Denny / Assistant	Aug 16 & 17	2.00	367.50	735.00	
W Howard / Geologist	Sept 16 - 19 less 1/4 day Sept 18	3.75	450.00	1,687.50	
B Denny / Assistant	Sept 16 17 & 19	3.00	315.00	945.00	
W Howard / Geologist	Sept 30 & Oct 1 less 1/4 day Sept 30	1.75	450.00	787.50	
E Webster/ Geologist	Sept 30 & Oct 1 less 1/4 day Sept 30	1.75	300.00	525.00	
B Denny / Assistant	Sept 30	1.00	315.00	315.00	
J Denny / Assistant	Sept 18 & Oct 01	2.00	367.50	735.00	
	less 1/4 day Sept 18			-87.50	
				21,082.50	**21,082.50**
Transportation	**Personnel travel**				
Personnel (Name)* / Position	**Days**	**Days**	**Rate**	**Subtotal***	
W Howard	May 20, May 22	2.00	450.00	900.00	
E Howard	May 20	1.00	160.00	160.00	
C Howard	May 20	1.00	160.00	160.00	
W Howard	July 8 & July 13	2.00	400.00	800.00	
W Howard	July 24 & July 29	2.00	400.00	800.00	
D Bridge	July 8 & July 13	2.00	420.00	840.00	
E Webster	July 8 & July 13	2.00	250.00	500.00	
W Howard	Aug 7 & 12	2.00	400.00	800.00	
W Howard	Aug 20 & 25	2.00	400.00	800.00	
B Horne	Aug 7 & 12	2.00	75.00	150.00	
C Howard	Aug 7 & 13	2.00	95.00	190.00	
W Howard	Sept 15 & 20	2.00	400.00	800.00	
W Howard	Sept 29	1.00	400.00	400.00	
E Webster	Sept 29	1.00	300.00	300.00	
				7,600.00	**7,600.00**
Office Studies	**Personnel (Office only, not field days)**				
Literature search	W Howard	1.00	400.00	400.00	
Database compilation	W Howard - data Charts	2.00	400.00	800.00	
Computer modelling	W Howard - GIS Maps	4.00	400.00	1,600.00	
Reprocessing of data	W Howard - ODM heavy mineral data	1.00	400.00	400.00	
General research			0.00	0.00	
Report preparation	W Howard	5.00	400.00	2,000.00	
Report preparation	E Webster - interim report on July Field trip	2.00	250.00	500.00	
Report preparation	E Webster - final report	1.75	300.00	525.00	
				6,225.00	**6,225.00**
Airborne Exploration Surveys	***nil***		0.00	0.00	
Remote Sensing	***nil***		0.00	0.00	
Ground Exploration Surveys	**Area in Hectares/List Personnel**				
Geological mapping	***nil***		0.00	0.00	
Ground geophysics	***nil***		0.00	0.00	

Geochemical Surveying	Acme Analytical Invoice No. (except ODM)	No.	Rate	Subtotal	
Drill (cuttings, core, etc.)	***nil***		0.00	0.00	
Bulk Stream sediment	ODM Ltd. Ottawa for gold & HM gns	23	446.25	10,263.75	
conventional Stream sediment	on VANI 175457			164.87	
Soil	on VANI 175459			508.53	
Rock	VANI 178476	18	35.41	637.32	
Rock	VANI 176343 Sept 10	39	35.13	1370.19	
Water	*nil*		0.00	0.00	
Till	VANI 184615	35	24.40	854.07	
Moss Mat	VANI 176375	25	23.73	593.25	
Biogeochemistry	*nil*		0.00	0.00	
Whole rock	VANI 184262 4 granitoids	4	79.55	318.22	
Petrology	*nil*		0.00	0.00	
				14,710.20	**14,710.20**
Drilling	***nil***			0.00	
Other Operations	***nil***			0.00	
Reclamation	***nil***			0.00	
Transportation		**No.**	**Rate**	**Subtotal**	
Airfare			0.00	0.00	
Taxi			0.00	0.00	
truck rental			0.00	0.00	
Kilometerage in BC	Km	8174	0.35	2,891.47	
ATV			0.00	0.00	
fuel	gas		0.00	1,522.09	
Helicopter (hours)			0.00	0.00	
Fuel (litres/hour)			0.00	0.00	
				4,413.56	**4,413.56**
Accommodation & Food					
Motel	varied day rates, Reno Motel Salmo or Selkirk Motel in Erie		0.00	3,694.30	
Camp	***nil***		0.00	0.00	
Meals	actual costs, meals & on-site groceries		0.00	1,227.82	
				4,922.12	**4,922.12**
Other					
Telephone				7.65	
Bank Charges				75.11	
Post				0.09	
Accounting	221 items	2.00	400.00	800.00	
Small Equipment	rk, silt & soil bags, sample storage totes, plastic sieves, plastic pails & lids etc			947.16	
Management overhead	of Clarke Gold Inc. portion			4,460.15	
Repairs	sharpening hammers & chisels			94.50	
Management meetings				22.17	
Office printing & supplies	including color field maps			485.79	
Misc.				35.52	
				6,928.14	**6,928.14**
Equipment Rentals					
Radio rental	2 GPS field radios	17.50	43.00	752.50	
ATV	J Denny of Salmo	3.00	52.50	157.50	
Truck rental	B & J Denny of Salmo	5.00	78.75	393.75	
Truck rental	B Doyle of Nelson	2.00	75.00	150.00	
				1,453.75	**1,453.75**
Freight, geochem samples					
	Greyhound bus shipments 9 waybills			902.53	**902.53**
TOTAL Expenditures					**68,237.80**

Appendix 4 Certificates of Analyses by Acme Analytical Labs Ltd. (Vancouver)

Eight pdf files

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Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client:	**Clarke Gold Inc.** 215 Silver Mead Cres. NW Calgary AB T3B 3W4 Canada
Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	October 23, 2013
Report Date:	November 29, 2013
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN13004485.1

CLIENT JOB INFORMATION

Project:	CLY
Shipment ID:	CLY-3
P.O. Number	
Number of Samples:	4

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT	Dispose of Reject After 90 days

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
R200-250	4	Crush, split and pulverize 250 g rock to 200 mesh			VAN
4AB1	4	Whole Rock Analysis Majors and Trace Elements	0.2	Completed	VAN
G806	4	FeO by titration	0.5	Completed	VAN

ADDITIONAL COMMENTS

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

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Acme Analytical Laboratories (Vancouver) Ltd.

9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

CERTIFICATE OF ANALYSIS VAN13004485.1

	Method	WGHT	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B
	Analyte	Wgt	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO	Cr2O3	Ni	Sc	LOI	Sum	Ba	Be	Co	Cs
	Unit	kg	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	%	%	ppm	ppm	ppm	ppm
	MDL	0.01	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.002	20	1	-5.1	0.01	1	1	0.2	0.1
GW01	Rock	0.26	74.48	13.67	1.44	0.28	0.71	3.79	4.31	0.18	0.07	0.06	0.004	<20	4	0.7	99.73	1329	<1	1.0	1.6
GW02	Rock	0.33	76.66	13.02	0.53	0.07	0.22	3.60	5.16	0.09	0.01	0.04	0.004	<20	3	0.5	99.86	581	<1	1.0	1.9
GW03	Rock	0.27	75.99	13.36	0.73	0.08	0.37	3.75	4.95	0.10	0.04	0.04	0.002	<20	3	0.5	99.88	368	<1	<0.2	1.6
GW05	Rock	0.21	75.56	13.49	1.04	0.10	0.20	3.71	4.88	0.09	0.05	0.08	<0.002	<20	4	0.7	99.88	278	1	1.6	1.7

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

CERTIFICATE OF ANALYSIS   VAN13004485.1

	Method	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B
	Analyte	Ga	Hf	Nb	Rb	Sn	Sr	Ta	Th	U	V	W	Zr	Y	La	Ce	Pr	Nd	Sm	Eu	Gd
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.1	0.1	0.1	1	0.5	0.1	0.2	0.1	8	0.5	0.1	0.1	0.1	0.1	0.02	0.3	0.05	0.02	0.05
GW01	Rock	14.1	2.3	27.0	114.2	2	247.9	1.7	14.4	3.6	16	<0.5	91.9	8.8	31.5	61.3	4.72	16.1	2.53	0.56	1.91
GW02	Rock	11.8	1.9	23.0	131.1	<1	120.4	2.2	9.2	2.6	10	0.9	46.4	11.8	6.5	12.1	1.18	4.7	0.93	0.25	1.17
GW03	Rock	13.4	2.3	33.4	132.2	<1	95.5	2.6	10.7	3.5	<8	0.8	53.4	16.6	14.9	26.2	2.77	9.4	2.08	0.29	2.29
GW05	Rock	15.4	2.7	30.9	156.0	2	63.3	2.4	11.5	2.3	21	1.2	50.6	17.7	15.5	26.9	3.00	9.7	2.40	0.33	2.05

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

CERTIFICATE OF ANALYSIS VAN13004485.1

	Method	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	2A Leco	2A Leco	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX
	Analyte	Tb	Dy	Ho	Er	Tm	Yb	Lu	TOT/C	TOT/S	Mo	Cu	Pb	Zn	Ni	As	Cd	Sb	Bi	Ag	Au
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
	MDL	0.01	0.05	0.02	0.03	0.01	0.05	0.01	0.02	0.02	0.1	0.1	0.1	1	0.1	0.5	0.1	0.1	0.1	0.1	0.5
GW01	Rock	0.26	1.69	0.26	0.77	0.15	1.10	0.18	<0.02	<0.02	0.3	6.2	8.0	13	0.8	<0.5	<0.1	<0.1	<0.1	<0.1	1.4
GW02	Rock	0.25	1.65	0.36	0.99	0.16	1.18	0.17	0.03	<0.02	0.7	1.4	2.9	6	1.0	0.7	<0.1	<0.1	<0.1	<0.1	0.7
GW03	Rock	0.39	2.48	0.51	1.72	0.26	1.87	0.29	<0.02	<0.02	0.4	2.7	4.3	30	0.7	2.0	0.4	<0.1	<0.1	<0.1	<0.5
GW05	Rock	0.46	2.94	0.56	1.84	0.28	2.24	0.30	<0.02	<0.02	0.5	2.3	7.6	19	0.8	1.3	<0.1	<0.1	<0.1	<0.1	0.7

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215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

CERTIFICATE OF ANALYSIS   VAN13004485.1

	Method	1DX	1DX	1DX	G806
	Analyte	Hg	Tl	Se	FeO
	Unit	ppm	ppm	ppm	%
	MDL	0.01	0.1	0.5	0.01
GW01	Rock	<0.01	<0.1	<0.5	0.75
GW02	Rock	<0.01	<0.1	<0.5	0.30
GW03	Rock	<0.01	<0.1	<0.5	0.32
GW05	Rock	<0.01	<0.1	<0.5	0.48

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

QUALITY CONTROL REPORT VAN13004485.1

	Method	WGHT	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B
	Analyte	Wgt	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO	Cr2O3	Ni	Sc	LOI	Sum	Ba	Be	Co	Cs
	Unit	kg	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	%	%	ppm	ppm	ppm	ppm
	MDL	0.01	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.002	20	1	-5.1	0.01	1	1	0.2	0.1
Pulp Duplicates																					
GW03	Rock	0.27	75.99	13.36	0.73	0.08	0.37	3.75	4.95	0.10	0.04	0.04	0.002	<20	3	0.5	99.88	368	<1	<0.2	1.6
REP GW03	QC																				
GW05	Rock	0.21	75.56	13.49	1.04	0.10	0.20	3.71	4.88	0.09	0.05	0.08	<0.002	<20	4	0.7	99.88	278	1	1.6	1.7
REP GW05	QC		75.67	13.27	1.05	0.11	0.19	3.79	4.92	0.09	0.03	0.08	0.005	<20	4	0.7	99.89	265	<1	0.7	1.3
Reference Materials																					
STD DS10	Standard																				
STD FER-2	Standard																				
STD GS311-1	Standard																				
STD GS910-4	Standard																				
STD OREAS45EA	Standard																				
STD SO-18	Standard		57.95	14.24	7.59	3.42	6.42	3.63	2.11	0.70	0.84	0.40	0.544	42	24	1.9	99.75	533	<1	26.0	5.9
STD SY-4	Standard																				
STD FER-2 Expected																					
STD SY-4 Expected																					
STD DS10 Expected																					
STD OREAS45EA Expected																					
STD GS311-1 Expected																					
STD GS910-4 Expected																					
STD SO-18 Expected			58.47	14.23	7.67	3.35	6.42	3.71	2.17	0.69	0.83	0.39	0.55	44	25			514		26.2	7.1
BLK	Blank																				
BLK	Blank																				
BLK	Blank		0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<20	<1	0.0	0.03	<1	<1	<0.2	<0.1
Prep Wash																					
G1	Prep Blank		66.97	15.92	3.39	1.04	3.50	3.84	3.75	0.39	0.17	0.10	0.004	<20	6	0.6	99.69	995	2	4.1	4.9

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Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

QUALITY CONTROL REPORT VAN13004485.1

	Method	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B
	Analyte	Ga	Hf	Nb	Rb	Sn	Sr	Ta	Th	U	V	W	Zr	Y	La	Ce	Pr	Nd	Sm	Eu	Gd
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.1	0.1	0.1	1	0.5	0.1	0.2	0.1	8	0.5	0.1	0.1	0.1	0.1	0.02	0.3	0.05	0.02	0.05
Pulp Duplicates																					
GW03	Rock	13.4	2.3	33.4	132.2	<1	95.5	2.6	10.7	3.5	<8	0.8	53.4	16.6	14.9	26.2	2.77	9.4	2.08	0.29	2.29
REP GW03	QC																				
GW05	Rock	15.4	2.7	30.9	156.0	2	63.3	2.4	11.5	2.3	21	1.2	50.6	17.7	15.5	26.9	3.00	9.7	2.40	0.33	2.05
REP GW05	QC	14.8	2.3	29.7	159.8	1	67.2	2.0	10.7	2.1	<8	0.9	53.9	16.3	13.2	24.9	2.43	9.0	1.76	0.30	2.00
Reference Materials																					
STD DS10	Standard																				
STD FER-2	Standard																				
STD GS311-1	Standard																				
STD GS910-4	Standard																				
STD OREAS45EA	Standard																				
STD SO-18	Standard	15.8	8.3	18.8	25.3	15	425.4	5.3	9.2	15.9	200	13.0	283.6	27.8	13.8	27.7	3.24	12.0	2.58	0.82	2.85
STD SY-4	Standard																				
STD FER-2 Expected																					
STD SY-4 Expected																					
STD DS10 Expected																					
STD OREAS45EA Expected																					
STD GS311-1 Expected																					
STD GS910-4 Expected																					
STD SO-18 Expected		17.6	9.8	21.3	28.7	15	407.4	7.4	9.9	16.4	200	14.8	280	31	12.3	27.1	3.45	14	3	0.89	2.93
BLK	Blank																				
BLK	Blank																				
BLK	Blank	<0.5	<0.1	<0.1	<0.1	<1	<0.5	<0.1	<0.2	<0.1	<8	<0.5	<0.1	<0.1	<0.1	<0.1	<0.02	<0.3	<0.05	<0.02	<0.05
Prep Wash																					
G1	Prep Blank	16.1	4.0	24.2	132.8	2	761.3	1.3	10.1	3.8	57	<0.5	149.0	15.6	36.2	68.7	6.63	22.7	4.12	0.98	3.13

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

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Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Project: CLY
Report Date: November 29, 2013

QUALITY CONTROL REPORT VAN13004485.1

	Method	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	4A-4B	2A Leco	2A Leco	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX	1DX
	Analyte	Tb	Dy	Ho	Er	Tm	Yb	Lu	TOT/C	TOT/S	Mo	Cu	Pb	Zn	Ni	As	Cd	Sb	Bi	Ag	Au
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
	MDL	0.01	0.05	0.02	0.03	0.01	0.05	0.01	0.02	0.02	0.1	0.1	0.1	1	0.1	0.5	0.1	0.1	0.1	0.1	0.5
Pulp Duplicates																					
GW03	Rock	0.39	2.48	0.51	1.72	0.26	1.87	0.29	<0.02	<0.02	0.4	2.7	4.3	30	0.7	2.0	0.4	<0.1	<0.1	<0.1	<0.5
REP GW03	QC										0.3	2.3	4.2	30	0.7	1.7	0.6	<0.1	<0.1	<0.1	<0.5
GW05	Rock	0.46	2.94	0.56	1.84	0.28	2.24	0.30	<0.02	<0.02	0.5	2.3	7.6	19	0.8	1.3	<0.1	<0.1	<0.1	<0.1	0.7
REP GW05	QC	0.40	2.59	0.61	1.84	0.27	1.64	0.24	0.02	<0.02											
Reference Materials																					
STD DS10	Standard										14.0	152.0	156.4	363	74.6	43.2	2.6	6.6	11.3	1.9	85.1
STD FER-2	Standard																				
STD GS311-1	Standard								0.95	2.37											
STD GS910-4	Standard								2.51	8.24											
STD OREAS45EA	Standard										1.6	679.9	14.1	29	380.0	8.6	<0.1	0.2	0.3	0.3	56.5
STD SO-18	Standard	0.45	2.94	0.67	1.93	0.25	1.73	0.28													
STD SY-4	Standard																				
STD FER-2 Expected																					
STD SY-4 Expected																					
STD DS10 Expected											14.69	154.61	150.55	352.9	74.6	43.7	2.48	9.51	11.65	1.96	91.9
STD OREAS45EA Expected											1.39	709	14.3	28.9	381	9.1	0.02	0.2	0.26	0.26	53
STD GS311-1 Expected									1.02	2.35											
STD GS910-4 Expected									2.65	8.27											
STD SO-18 Expected		0.53	3	0.62	1.84	0.27	1.79	0.27													
BLK	Blank										<0.1	<0.1	<0.1	<1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.5
BLK	Blank								<0.02	<0.02											
BLK	Blank	<0.01	<0.05	<0.02	<0.03	<0.01	<0.05	<0.01													
Prep Wash																					
G1	Prep Blank	0.45	2.58	0.50	1.46	0.23	1.72	0.26	0.02	<0.02	0.3	4.0	3.0	47	2.4	<0.5	<0.1	<0.1	0.1	<0.1	4.5

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Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: November 29, 2013

QUALITY CONTROL REPORT VAN13004485.1

	Method	1DX	1DX	1DX	G806
	Analyte	Hg	Tl	Se	FeO
	Unit	ppm	ppm	ppm	%
	MDL	0.01	0.1	0.5	0.01
Pulp Duplicates					
GW03	Rock	<0.01	<0.1	<0.5	0.32
REP GW03	QC	<0.01	<0.1	<0.5	
GW05	Rock	<0.01	<0.1	<0.5	0.48
REP GW05	QC				
Reference Materials					
STD DS10	Standard	0.28	5.0	1.9	
STD FER-2	Standard				15.37
STD GS311-1	Standard				
STD GS910-4	Standard				
STD OREAS45EA	Standard	<0.01	<0.1	1.0	
STD SO-18	Standard				
STD SY-4	Standard				2.78
STD FER-2 Expected					15.24
STD SY-4 Expected					2.86
STD DS10 Expected		0.289	4.79	2.3	
STD OREAS45EA Expected			0.072	0.6	
STD GS311-1 Expected					
STD GS910-4 Expected					
STD SO-18 Expected					
BLK	Blank	<0.01	<0.1	<0.5	
BLK	Blank				
BLK	Blank				
Prep Wash					
G1	Prep Blank	<0.01	0.3	<0.5	1.77

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Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	August 19, 2013
Report Date:	September 10, 2013
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN13003240.1

CLIENT JOB INFORMATION

Project:	CLY 2013
Shipment ID:	CLY 2013-02
P.O. Number	
Number of Samples:	6

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT-SOIL	Immediate Disposal of Soil Reject

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
S230	6	Sieve soil to 230 mesh			VAN
1F05	6	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	15	Completed	VAN
DISP2	6	Heat treatment of Soils and Sediments			VAN

ADDITIONAL COMMENTS

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

BRITISH COLUMBIA CERTIFIED ASSAYER
RAYMOND CHAN
CHIEF ASSAYER

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

Acme Analytical Laboratories (Vancouver) Ltd.
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PHONE (604) 253-3158

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003240.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
	Unit	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
	MDL	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01	0.001
S989101	Silt	0.62	45.93	23.94	105.9	101	52.1	22.1	1096	4.92	11.9	1.4	2.9	12.0	88.1	0.23	0.30	0.56	48	0.69	0.062
S989102	Silt	1.08	51.62	41.32	269.1	353	99.6	25.2	1399	5.24	31.1	2.2	2.3	8.1	84.1	0.92	0.41	0.82	49	0.92	0.115
S989111	Silt	1.23	53.94	29.28	121.8	187	66.4	29.5	1214	4.47	16.9	1.7	5.8	9.5	52.2	0.59	0.52	0.52	55	0.64	0.123
S989112	Silt	1.29	51.10	32.54	87.4	76	61.4	28.6	1132	4.24	18.7	1.7	10.9	12.1	33.5	0.14	0.49	0.46	47	0.27	0.089
S989113	Silt	1.00	50.77	30.18	75.7	96	47.4	18.3	706	3.79	19.4	2.0	7.7	15.4	24.7	0.11	0.45	0.49	32	0.27	0.054
S239	Silt	1.08	54.23	32.46	182.9	650	81.9	21.9	1274	3.66	22.9	4.1	5.0	3.4	95.3	0.97	0.56	0.61	42	1.73	0.116

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003240.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge	Hf
	Unit	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
S989101	Silt	24.3	54.1	1.06	85.4	0.116	2	3.49	0.069	0.36	0.4	5.2	0.35	<0.02	11	0.3	0.09	9.9	7.60	0.1	0.09
S989102	Silt	23.9	60.9	1.05	178.2	0.096	3	2.95	0.042	0.21	1.8	4.3	0.18	0.03	38	1.0	0.10	8.3	8.01	0.1	0.04
S989111	Silt	27.4	62.0	1.07	158.9	0.102	3	2.64	0.012	0.34	1.8	5.0	0.30	0.03	22	0.9	0.05	7.4	4.07	<0.1	0.03
S989112	Silt	31.9	62.8	0.99	120.8	0.072	1	2.11	0.006	0.16	1.1	4.4	0.16	<0.02	10	0.5	0.09	6.0	2.28	<0.1	0.02
S989113	Silt	45.1	50.2	0.80	88.0	0.042	<1	2.22	0.003	0.17	0.8	4.5	0.13	<0.02	19	0.2	0.02	5.6	2.00	<0.1	0.05
S239	Silt	19.6	60.8	0.74	135.5	0.067	5	2.79	0.019	0.18	1.0	4.9	0.16	0.08	60	2.3	0.09	6.7	5.65	<0.1	0.06

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003240.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
S989101	Silt	1.05	69.8	0.7	<0.05	4.5	8.14	49.7	0.04	<1	1.4	102.4	<10	<2
S989102	Silt	2.70	26.9	0.6	<0.05	2.5	11.51	51.8	0.05	2	1.6	71.0	<10	<2
S989111	Silt	1.53	40.0	0.9	<0.05	2.2	9.61	56.8	0.04	<1	1.3	45.5	<10	<2
S989112	Silt	0.74	21.8	0.4	<0.05	2.4	9.13	68.5	0.03	<1	0.9	35.2	<10	<2
S989113	Silt	0.44	18.3	0.3	<0.05	3.1	10.28	90.8	<0.02	<1	1.0	34.4	<10	<2
S239	Silt	2.83	21.6	0.5	<0.05	2.0	17.01	43.9	0.06	<1	1.7	50.1	<10	<2

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Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003240.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
	Unit	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
	MDL	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01	0.001
Reference Materials																					
STD DS9	Standard	12.70	111.2	134.2	306.3	1776	41.9	7.6	558	2.32	24.4	2.9	111.4	6.4	61.6	2.37	5.42	6.19	39	0.69	0.081
STD DS9 Expected		12.84	108	126	317	1830	40.3	7.6	575	2.33	25.5	2.69	118	6.38	69.6	2.4	4.94	6.32	40	0.7201	0.0819
BLK	Blank	<0.01	<0.01	<0.01	<0.1	3	<0.1	<0.1	2	<0.01	0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01	<0.001

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215 Silver Mead Cres. NW
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Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003240.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge	Hf
	Unit	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
Reference Materials																					
STD DS9	Standard	12.6	115.8	0.61	278.2	0.111	2	0.92	0.079	0.39	3.0	2.2	5.12	0.16	186	5.1	5.11	4.2	2.34	<0.1	0.07
STD DS9 Expected		13.3	121	0.6165	295	0.1108		0.9577	0.0853	0.395	2.89	2.5	5.3	0.1615	200	5.2	5.02	4.59	2.37	0.1	0.08
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02

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Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003240.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
Reference Materials														
STD DS9	Standard	1.43	31.7	6.5	<0.05	1.6	5.59	24.8	2.15	66	5.4	25.1	122	338
STD DS9 Expected		1.33	33.8	6.4	0.004	2	5.97	25.4	2.2	61	5.4	25.2	120	350
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	August 19, 2013
Report Date:	September 10, 2013
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN13003241.1

CLIENT JOB INFORMATION

Project:	CLY 2013
Shipment ID:	CLY 2013-02
P.O. Number	
Number of Samples:	19

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT-SOIL	Immediate Disposal of Soil Reject

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
Dry at 60C	19	Dry at 60C			VAN
SS80	19	Dry at 60C sieve 100g to -80 mesh			VAN
1F05	19	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	15	Completed	VAN
DISP2	19	Heat treatment of Soils and Sediments			VAN

ADDITIONAL COMMENTS

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

BRITISH COLUMBIA CERTIFIED ASSAYER
CLARENCE LEONG
Country Manager - Canada

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003241.1

Method		1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
Analyte		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
Unit		ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
MDL		0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01	0.001
P0219	Soil	0.66	16.72	20.35	136.4	516	21.4	19.7	1538	2.43	12.8	0.6	23.1	2.6	20.5	0.42	0.67	0.34	31	0.12	0.407
P0220	Soil	0.86	16.45	23.46	161.1	662	24.1	20.3	1659	2.31	14.1	0.7	131.6	2.1	16.4	0.51	0.71	0.35	29	0.12	0.306
P0221	Soil	0.65	17.82	57.31	170.7	389	24.8	17.2	1614	2.15	14.5	0.6	38.6	2.5	37.0	0.94	1.25	0.41	28	0.34	0.331
P0222	Soil	0.89	21.68	20.03	144.6	688	25.9	15.3	688	2.67	17.2	1.0	11.1	4.6	15.6	0.40	0.70	0.33	35	0.10	0.197
P0223	Soil	0.80	18.35	49.28	165.4	916	26.4	19.3	1556	2.28	9.1	0.7	5.4	1.5	15.3	0.87	1.08	0.45	30	0.10	0.268
P0224	Soil	0.85	18.88	26.28	112.3	464	37.0	16.4	1032	2.13	12.2	0.7	2.7	3.7	23.0	0.59	0.74	0.36	29	0.19	0.136
P0225	Soil	1.08	24.39	21.16	120.4	327	29.0	12.6	1173	2.64	20.7	1.0	4.6	4.3	14.9	0.41	0.87	0.44	34	0.10	0.232
P0226	Soil	1.21	21.94	29.10	133.6	347	26.8	12.3	1234	2.55	23.6	0.8	3.8	3.4	18.6	0.60	0.69	0.65	34	0.17	0.203
P0227	Soil	0.94	21.74	34.31	123.2	329	40.4	19.5	952	2.90	20.7	0.7	1.9	4.3	15.4	0.40	1.01	0.62	38	0.13	0.097
P0228	Soil	0.76	50.60	27.35	105.6	220	32.1	20.7	974	3.57	15.8	2.2	3.4	5.0	18.3	0.56	1.08	0.34	66	0.19	0.180
P0229	Soil	0.98	32.92	31.65	52.6	102	19.2	14.6	635	2.34	15.2	2.3	45.4	9.9	27.3	0.55	0.63	0.68	50	0.23	0.060
P0230	Soil	1.06	53.69	30.24	66.5	164	33.9	18.5	857	3.31	16.0	2.8	8.1	9.4	37.3	0.34	0.80	0.70	66	0.34	0.091
P0231	Soil	0.69	46.08	81.06	123.1	224	36.1	19.1	1307	3.35	15.0	12.0	6.0	5.6	50.6	1.43	1.22	0.71	65	0.48	0.084
PCY012013	Soil	0.73	21.82	18.10	134.0	302	71.4	13.5	674	2.46	11.7	0.8	4.6	3.0	34.9	0.67	0.60	0.22	41	0.40	0.237
PCY022013	Soil	0.91	29.66	19.69	119.5	152	75.0	18.3	969	3.16	10.1	0.7	0.8	2.8	25.6	0.46	0.66	0.21	56	0.26	0.139
PCY032013	Soil	1.41	32.98	35.97	124.0	251	58.0	20.1	1079	3.32	14.5	1.1	0.6	2.5	11.6	0.52	0.84	0.31	60	0.12	0.128
PCY042013	Soil	1.40	36.24	33.30	121.2	138	78.3	21.3	1138	3.42	15.2	1.0	3.9	2.5	18.3	0.59	0.99	0.30	62	0.17	0.162
PCY052013	Soil	1.09	32.70	23.03	117.1	157	74.2	21.5	1849	3.36	25.0	0.9	0.9	2.7	24.3	0.73	1.04	0.28	59	0.23	0.197
PCY062013	Soil	1.18	34.35	22.45	104.3	175	79.8	21.0	1261	3.42	17.6	1.2	1.5	3.6	29.4	0.46	0.83	0.27	63	0.32	0.140

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003241.1

Method		1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
Analyte		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge	Hf
Unit		ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
MDL		0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
P0219	Soil	12.3	17.9	0.30	259.8	0.074	2	2.48	0.007	0.08	0.2	1.8	0.12	<0.02	47	0.1	<0.02	7.8	1.82	<0.1	0.04
P0220	Soil	11.3	15.6	0.22	256.2	0.081	2	2.70	0.009	0.07	0.2	1.9	0.11	0.02	69	0.2	0.05	8.0	1.73	<0.1	0.06
P0221	Soil	10.2	15.7	0.25	270.0	0.077	3	2.53	0.009	0.08	0.3	1.9	0.15	0.04	109	0.2	0.07	6.5	1.66	<0.1	0.12
P0222	Soil	15.7	20.5	0.35	186.0	0.098	2	3.41	0.009	0.08	0.4	2.7	0.13	0.02	58	0.2	0.04	8.3	1.97	<0.1	0.16
P0223	Soil	11.6	18.1	0.26	213.0	0.080	2	2.52	0.010	0.07	0.2	1.7	0.13	0.03	64	0.2	0.03	7.4	1.76	<0.1	0.05
P0224	Soil	10.4	16.7	0.20	220.6	0.117	2	3.11	0.012	0.07	0.5	2.2	0.12	<0.02	55	0.3	0.03	7.9	1.79	<0.1	0.15
P0225	Soil	15.2	23.1	0.32	210.8	0.095	2	3.08	0.008	0.09	0.6	2.6	0.15	<0.02	61	0.2	0.04	7.9	1.97	<0.1	0.14
P0226	Soil	12.2	22.2	0.30	219.9	0.105	2	2.79	0.009	0.08	1.3	2.2	0.14	0.02	47	0.4	0.05	8.0	2.13	<0.1	0.09
P0227	Soil	16.7	26.5	0.41	218.7	0.091	2	2.49	0.006	0.08	0.9	2.1	0.15	<0.02	64	0.4	0.07	7.9	2.27	<0.1	0.06
P0228	Soil	13.8	39.9	0.81	196.5	0.112	2	3.15	0.003	0.11	0.4	4.4	0.16	<0.02	48	0.3	0.11	7.9	2.33	<0.1	0.09
P0229	Soil	24.1	32.4	0.52	100.5	0.070	2	1.28	0.005	0.10	0.5	3.2	0.10	<0.02	10	<0.1	0.09	3.8	1.34	<0.1	0.02
P0230	Soil	28.8	48.1	0.96	133.5	0.085	2	2.12	0.006	0.15	0.6	5.9	0.13	<0.02	32	0.2	0.11	5.7	1.84	0.1	0.02
P0231	Soil	24.8	50.0	0.84	204.5	0.087	2	2.61	0.006	0.14	0.4	4.9	0.19	<0.02	45	<0.1	0.09	6.5	2.06	<0.1	0.04
PCY012013	Soil	9.6	33.1	0.48	263.2	0.124	2	3.06	0.015	0.10	0.2	3.3	0.13	<0.02	29	0.1	0.03	7.5	1.99	<0.1	0.15
PCY022013	Soil	11.0	51.8	0.79	240.1	0.123	2	3.02	0.008	0.13	0.3	3.5	0.17	<0.02	33	0.2	0.03	8.2	2.27	<0.1	0.08
PCY032013	Soil	11.0	49.1	0.70	142.1	0.157	2	3.94	0.006	0.13	0.4	4.2	0.22	0.03	59	0.3	0.04	10.9	3.12	<0.1	0.15
PCY042013	Soil	12.1	62.5	0.86	176.2	0.140	2	3.48	0.005	0.14	0.3	4.0	0.22	0.02	47	0.3	0.09	9.4	3.03	<0.1	0.08
PCY052013	Soil	11.6	54.8	0.76	246.6	0.126	2	3.37	0.006	0.12	0.3	3.8	0.20	0.02	50	0.3	0.07	9.3	2.70	<0.1	0.06
PCY062013	Soil	13.7	58.1	0.82	220.8	0.147	3	3.71	0.006	0.14	0.3	4.4	0.21	<0.02	50	0.3	0.05	9.4	2.81	<0.1	0.12

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Acme Analytical Laboratories (Vancouver) Ltd.
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PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003241.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
P0219	Soil	1.18	17.8	0.8	<0.05	3.0	2.62	30.5	0.04	<1	0.7	16.4	<10	<2
P0220	Soil	1.30	15.7	0.7	<0.05	3.3	3.14	29.1	0.02	<1	0.6	15.7	<10	<2
P0221	Soil	1.67	18.5	0.9	<0.05	5.9	2.68	26.5	0.10	<1	0.7	14.7	<10	<2
P0222	Soil	1.78	16.9	0.7	<0.05	10.7	4.74	42.7	0.03	<1	0.7	21.1	<10	<2
P0223	Soil	1.32	14.2	0.8	<0.05	2.6	3.32	29.0	0.07	<1	0.7	15.2	<10	<2
P0224	Soil	1.80	16.5	0.9	<0.05	10.5	2.98	30.5	0.04	<1	0.9	18.7	<10	<2
P0225	Soil	1.64	19.1	0.7	<0.05	7.4	4.94	36.6	0.05	<1	1.0	19.4	<10	<2
P0226	Soil	1.70	17.8	0.9	<0.05	5.9	3.06	30.8	0.04	<1	0.9	20.0	<10	<2
P0227	Soil	1.72	18.8	0.9	<0.05	3.3	2.90	38.7	0.05	<1	0.8	26.3	<10	<2
P0228	Soil	1.65	24.0	0.6	<0.05	5.8	6.59	38.4	0.06	<1	1.0	18.9	<10	<2
P0229	Soil	1.73	16.8	0.4	<0.05	1.3	6.13	46.2	0.06	<1	0.6	11.6	<10	<2
P0230	Soil	1.27	19.3	0.7	<0.05	1.4	14.97	51.9	0.06	<1	0.7	16.9	<10	<2
P0231	Soil	2.19	23.1	0.9	<0.05	1.8	20.63	45.7	0.14	<1	1.6	21.3	<10	<2
PCY012013	Soil	1.48	19.2	0.7	<0.05	9.4	4.96	34.5	0.03	<1	0.6	17.0	<10	<2
PCY022013	Soil	1.64	23.5	0.7	<0.05	4.7	4.41	32.2	0.04	<1	0.8	19.8	<10	<2
PCY032013	Soil	2.77	24.5	1.0	<0.05	8.3	5.99	27.8	0.05	<1	0.9	21.7	<10	<2
PCY042013	Soil	2.36	27.2	0.8	<0.05	4.6	5.32	31.4	0.05	<1	0.8	21.7	<10	<2
PCY052013	Soil	2.23	23.6	0.7	<0.05	4.4	5.15	30.4	0.05	<1	0.8	20.1	<10	2
PCY062013	Soil	2.39	26.8	0.8	<0.05	7.6	6.59	35.6	0.05	<1	0.9	22.1	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003241.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
	Unit	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
	MDL	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01	0.001
Pulp Duplicates																					
P0229	Soil	0.98	32.92	31.65	52.6	102	19.2	14.6	635	2.34	15.2	2.3	45.4	9.9	27.3	0.55	0.63	0.68	50	0.23	0.060
REP P0229	QC	0.97	34.04	33.33	56.3	94	20.2	15.1	649	2.36	15.4	2.4	17.0	9.9	28.8	0.51	0.68	0.68	50	0.24	0.061
PCY062013	Soil	1.18	34.35	22.45	104.3	175	79.8	21.0	1261	3.42	17.6	1.2	1.5	3.6	29.4	0.46	0.83	0.27	63	0.32	0.140
REP PCY062013	QC	1.14	33.84	22.38	105.9	173	78.5	21.0	1251	3.43	18.1	1.1	2.0	3.7	28.9	0.44	0.86	0.27	63	0.33	0.139
Reference Materials																					
STD DS9	Standard	12.70	111.2	134.2	306.3	1776	41.9	7.6	558	2.32	24.4	2.9	111.4	6.4	61.6	2.37	5.42	6.19	39	0.69	0.081
STD DS9 Expected		12.84	108	126	317	1830	40.3	7.6	575	2.33	25.5	2.69	118	6.38	69.6	2.4	4.94	6.32	40	0.7201	0.0819
BLK	Blank	<0.01	<0.01	<0.01	<0.1	3	<0.1	<0.1	2	<0.01	0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01	<0.001

Client: **Clarke Gold Inc.**
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Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003241.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge	Hf
	Unit	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
Pulp Duplicates																					
P0229	Soil	24.1	32.4	0.52	100.5	0.070	2	1.28	0.005	0.10	0.5	3.2	0.10	<0.02	10	<0.1	0.09	3.8	1.34	<0.1	0.02
REP P0229	QC	24.8	32.8	0.53	106.7	0.072	1	1.31	0.005	0.10	0.5	3.4	0.11	<0.02	18	0.2	0.05	4.1	1.45	<0.1	0.03
PCY062013	Soil	13.7	58.1	0.82	220.8	0.147	3	3.71	0.006	0.14	0.3	4.4	0.21	<0.02	50	0.3	0.05	9.4	2.81	<0.1	0.12
REP PCY062013	QC	13.5	57.2	0.81	220.5	0.145	3	3.69	0.006	0.14	0.4	4.5	0.22	<0.02	59	0.4	0.05	9.4	2.76	<0.1	0.09
Reference Materials																					
STD DS9	Standard	12.6	115.8	0.61	278.2	0.111	2	0.92	0.079	0.39	3.0	2.2	5.12	0.16	186	5.1	5.11	4.2	2.34	<0.1	0.07
STD DS9 Expected		13.3	121	0.6165	295	0.1108		0.9577	0.0853	0.395	2.89	2.5	5.3	0.1615	200	5.2	5.02	4.59	2.37	0.1	0.08
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003241.1

	Method	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15	1F15
	Analyte	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
Pulp Duplicates														
P0229	Soil	1.73	16.8	0.4	<0.05	1.3	6.13	46.2	0.06	<1	0.6	11.6	<10	<2
REP P0229	QC	1.70	17.5	0.4	<0.05	1.3	6.30	48.3	0.07	<1	0.7	11.6	<10	<2
PCY062013	Soil	2.39	26.8	0.8	<0.05	7.6	6.59	35.6	0.05	<1	0.9	22.1	<10	<2
REP PCY062013	QC	2.38	25.1	0.8	<0.05	8.5	6.54	35.3	0.03	<1	0.9	21.2	<10	<2
Reference Materials														
STD DS9	Standard	1.43	31.7	6.5	<0.05	1.6	5.59	24.8	2.15	66	5.4	25.1	122	338
STD DS9 Expected		1.33	33.8	6.4	0.004	2	5.97	25.4	2.2	61	5.4	25.2	120	350
BLK	Blank	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	September 16, 2013
Report Date:	October 01, 2013
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN13003709.1

CLIENT JOB INFORMATION

Project:	CLY
Shipment ID:	CLY-02-2013
P.O. Number	
Number of Samples:	18

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
R200-500	18	Crush, split and pulverize 500 g rock to 200 mesh			VAN
1F06	18	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	30	Completed	VAN

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT	Dispose of Reject After 90 days

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

ADDITIONAL COMMENTS

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: October 01, 2013

CERTIFICATE OF ANALYSIS VAN13003709.1

Method		WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
Analyte		Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
Unit		kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
MDL		0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
0609	Rock	1.55	0.90	2.30	6.30	13.3	31	2.6	1.9	354	0.77	3.3	1.6	<0.2	7.6	4.5	0.03	0.17	<0.02	<2	0.02
0615	Rock	2.07	0.36	9.37	2.60	102.6	13	6.0	3.5	931	0.60	0.4	2.4	1.4	10.2	253.6	0.85	0.34	4.76	14	10.47
0616	Rock	1.11	0.16	34.84	2.93	49.5	49	7.2	15.3	728	3.52	4.9	0.2	<0.2	1.5	109.2	0.14	0.64	0.09	33	2.82
0621	Rock	0.73	0.32	6.81	3.01	9.5	17	5.0	1.8	167	0.87	6.4	0.3	<0.2	5.5	1.5	0.03	0.14	0.05	3	0.02
0622	Rock	0.68	4.25	32.00	8.16	47.1	72	4.3	1.7	277	3.20	8.9	1.1	2.1	12.1	14.2	0.11	0.74	0.54	74	0.05
0623	Rock	0.60	0.35	6.10	1.44	6.1	21	2.4	0.5	50	0.65	4.9	<0.1	1.1	1.3	1.0	<0.01	0.13	0.05	<2	<0.01
0624	Rock	0.39	0.13	15.21	4.12	71.8	58	19.7	15.1	865	4.65	16.3	0.1	0.9	0.7	172.3	0.12	0.23	0.06	79	2.99
0631	Rock	1.03	0.94	34.85	20.55	14.0	124	5.0	1.9	215	2.83	1.5	1.5	0.6	10.5	15.7	0.02	0.06	0.13	23	0.05
0640	Rock	1.72	6.02	44.83	24.53	40.2	206	7.3	6.3	257	2.58	1.1	1.0	0.5	9.0	13.2	0.05	0.12	0.46	42	0.17
0641	Rock	1.03	0.28	13.35	1.62	8.3	25	5.3	2.1	92	1.03	1.6	0.1	<0.2	0.6	3.4	0.02	0.03	0.07	5	0.02
0642	Rock	1.13	0.22	19.27	19.31	91.9	64	32.4	9.2	676	3.32	2.1	1.1	1.6	15.9	15.6	0.02	0.13	0.06	27	0.17
0643	Rock	0.69	1.31	88.47	8.45	100.6	77	26.5	38.5	1515	7.33	7.3	0.3	0.4	1.7	28.6	0.18	0.09	0.07	202	1.87
0644	Rock	1.54	0.81	25.81	4.25	72.9	41	41.8	19.6	529	4.23	13.6	1.3	<0.2	13.8	9.8	0.05	0.05	0.06	40	0.10
0645	Rock	1.70	5.95	35.69	25.55	94.0	79	370.9	37.1	2517	4.29	243.1	4.1	3.4	11.1	19.9	0.24	2.78	0.07	34	0.18
0646	Rock	1.68	0.49	7.35	6.97	6.0	42	3.1	0.8	138	0.56	2.4	0.7	1.1	13.3	3.0	0.01	0.17	<0.02	<2	0.03
0647	Rock	1.70	0.58	2.71	3.19	1.8	21	1.9	0.6	131	0.50	1.4	0.6	1.0	5.9	1.4	<0.01	0.05	<0.02	<2	<0.01
0648	Rock	1.18	1.07	12.57	9.33	8.4	80	1.5	0.6	644	0.70	1.5	1.5	1.1	14.2	4.6	0.05	0.09	0.02	<2	0.03
0650	Rock	1.63	0.56	17.19	5.97	44.2	56	32.4	12.6	310	2.88	77.3	2.0	2.8	9.7	7.1	0.08	0.65	0.08	21	0.10

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
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Project: CLY
Report Date: October 01, 2013

CERTIFICATE OF ANALYSIS VAN13003709.1

Method		1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
Analyte		P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
Unit		%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
MDL		0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
0609	Rock	0.015	12.9	7.5	0.01	55.4	<0.001	<1	0.20	0.014	0.09	<0.1	0.6	<0.02	<0.02	<5	<0.1	<0.02	0.5	0.36	<0.1
0615	Rock	0.046	20.5	18.6	0.17	56.4	0.114	4	1.80	0.157	0.08	2.3	1.6	0.07	0.03	<5	<0.1	<0.02	4.6	1.02	0.2
0616	Rock	0.066	7.6	4.7	0.83	171.9	0.003	3	1.82	0.020	0.29	<0.1	3.7	0.04	0.26	18	<0.1	0.02	4.4	0.69	<0.1
0621	Rock	0.006	11.4	8.4	0.06	30.5	0.001	1	0.30	0.005	0.11	0.6	0.4	0.03	<0.02	<5	<0.1	<0.02	0.7	0.70	<0.1
0622	Rock	0.036	29.1	45.1	1.54	124.1	0.019	1	2.29	0.020	0.50	<0.1	3.5	0.21	0.05	6	0.4	0.04	7.8	2.76	<0.1
0623	Rock	0.004	3.1	15.0	0.05	7.6	<0.001	<1	0.15	0.002	0.04	<0.1	0.2	<0.02	<0.02	<5	<0.1	<0.02	0.5	0.17	<0.1
0624	Rock	0.071	6.5	22.9	1.34	149.0	0.005	2	2.56	0.046	0.17	<0.1	4.1	<0.02	0.07	5	<0.1	<0.02	7.8	0.24	<0.1
0631	Rock	0.042	29.7	33.9	0.56	83.2	0.030	<1	1.34	0.030	0.58	<0.1	3.0	0.24	0.15	<5	1.3	0.11	5.0	3.02	<0.1
0640	Rock	0.034	17.5	29.0	0.99	76.9	0.067	<1	1.79	0.035	0.88	<0.1	3.3	0.41	0.58	<5	0.6	0.07	5.9	2.30	<0.1
0641	Rock	0.012	1.6	14.5	0.09	6.5	0.004	<1	0.27	0.005	0.03	<0.1	1.4	0.02	<0.02	<5	0.2	<0.02	1.1	0.29	<0.1
0642	Rock	0.073	15.5	33.8	1.16	16.9	0.009	<1	1.61	0.061	0.06	<0.1	3.2	<0.02	0.56	<5	0.2	<0.02	6.1	0.21	<0.1
0643	Rock	0.135	6.9	99.2	3.60	66.8	0.121	2	4.30	0.019	0.11	<0.1	12.8	<0.02	0.08	<5	<0.1	<0.02	12.5	0.25	<0.1
0644	Rock	0.029	30.3	51.6	1.01	171.3	0.156	<1	2.60	0.019	1.12	<0.1	4.3	0.50	<0.02	<5	<0.1	<0.02	7.6	3.99	<0.1
0645	Rock	0.051	25.7	220.2	1.33	87.6	0.003	<1	2.18	0.016	0.17	0.2	7.7	0.12	<0.02	5	<0.1	<0.02	8.2	0.88	<0.1
0646	Rock	0.005	12.0	6.3	0.03	14.8	<0.001	<1	0.24	0.035	0.10	<0.1	0.7	0.03	<0.02	<5	<0.1	<0.02	0.8	0.26	<0.1
0647	Rock	0.002	8.7	9.9	<0.01	9.6	<0.001	1	0.10	0.017	0.06	<0.1	0.2	<0.02	<0.02	<5	<0.1	<0.02	0.3	0.14	<0.1
0648	Rock	0.005	12.6	6.6	0.03	23.2	<0.001	<1	0.23	0.040	0.10	<0.1	0.6	0.02	<0.02	<5	<0.1	<0.02	1.0	0.38	<0.1
0650	Rock	0.027	23.1	27.8	0.61	110.1	0.044	3	1.56	0.024	0.55	<0.1	2.7	0.22	0.09	<5	<0.1	<0.02	4.7	2.26	<0.1

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Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: October 01, 2013

CERTIFICATE OF ANALYSIS VAN13003709.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
0609	Rock	0.02	0.07	5.6	<0.1	<0.05	0.6	2.10	20.3	<0.02	<1	0.4	0.9	<10	<2
0615	Rock	0.11	0.39	13.2	0.9	<0.05	3.5	11.05	36.5	<0.02	<1	1.4	16.7	<10	<2
0616	Rock	0.05	<0.02	9.8	<0.1	<0.05	2.0	6.39	12.4	<0.02	<1	0.2	13.9	<10	<2
0621	Rock	<0.02	0.05	7.7	<0.1	<0.05	0.3	1.01	21.4	<0.02	<1	<0.1	2.5	<10	<2
0622	Rock	0.07	0.06	30.5	0.3	<0.05	0.5	3.03	57.0	<0.02	<1	0.9	46.6	<10	<2
0623	Rock	<0.02	0.03	2.8	<0.1	<0.05	0.1	0.29	5.8	<0.02	<1	<0.1	2.0	<10	<2
0624	Rock	<0.02	<0.02	5.0	<0.1	<0.05	1.3	6.31	12.4	<0.02	<1	0.2	28.9	<10	<2
0631	Rock	<0.02	0.08	38.6	<0.1	<0.05	0.3	4.88	50.3	<0.02	<1	0.4	16.5	<10	3
0640	Rock	0.03	0.06	63.2	0.6	<0.05	1.3	3.88	32.2	0.02	12	0.5	24.7	<10	<2
0641	Rock	<0.02	0.06	2.9	<0.1	<0.05	0.1	0.93	2.8	<0.02	<1	<0.1	6.4	<10	<2
0642	Rock	<0.02	0.02	3.4	<0.1	<0.05	0.7	3.72	30.3	<0.02	<1	0.2	60.0	<10	<2
0643	Rock	0.08	0.05	4.8	0.3	<0.05	2.3	7.62	14.2	0.02	<1	0.4	29.0	<10	5
0644	Rock	0.04	0.15	74.4	0.5	<0.05	1.4	4.04	59.7	<0.02	<1	0.7	34.9	<10	<2
0645	Rock	0.13	0.10	10.8	0.3	<0.05	4.5	10.32	48.8	0.03	<1	1.7	39.2	<10	5
0646	Rock	0.07	0.57	4.9	<0.1	<0.05	1.9	2.81	25.2	<0.02	<1	0.2	1.8	<10	<2
0647	Rock	0.03	0.66	2.8	<0.1	<0.05	0.8	1.99	18.3	<0.02	<1	0.2	0.6	<10	<2
0648	Rock	0.07	0.25	4.8	<0.1	<0.05	1.8	3.79	23.7	<0.02	<1	0.2	2.2	<10	<2
0650	Rock	0.02	0.09	30.4	0.3	<0.05	0.6	4.38	42.6	<0.02	<1	0.4	23.3	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: October 01, 2013

QUALITY CONTROL REPORT VAN13003709.1

		WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
Pulp Duplicates																					
0624	Rock	0.39	0.13	15.21	4.12	71.8	58	19.7	15.1	865	4.65	16.3	0.1	0.9	0.7	172.3	0.12	0.23	0.06	79	2.99
REP 0624	QC		0.14	15.58	4.21	68.9	61	19.4	14.1	861	4.70	16.0	0.1	1.5	0.7	173.6	0.14	0.20	0.05	80	3.03
Reference Materials																					
STD DS9	Standard		13.97	114.2	123.4	298.1	1725	41.2	7.5	565	2.40	24.0	2.7	104.8	7.0	67.3	2.22	5.05	6.00	42	0.77
STD DS9 Expected			12.84	108	126	317	1830	40.3	7.6	575	2.33	25.5	2.69	118	6.38	69.6	2.4	4.94	6.32	40	0.7201
BLK	Blank		<0.01	<0.01	<0.01	<0.1	4	<0.1	<0.1	<1	<0.01	0.3	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01
Prep Wash																					
G1	Prep Blank		0.21	2.41	3.09	46.2	36	3.6	4.3	546	1.92	0.1	1.3	0.6	5.2	59.8	0.02	<0.02	0.02	35	0.49
G1	Prep Blank		0.25	2.83	3.05	45.8	18	4.4	4.4	566	1.92	0.5	1.3	<0.2	5.2	56.0	<0.01	<0.02	0.02	35	0.55

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: October 01, 2013

QUALITY CONTROL REPORT VAN13003709.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
	Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
	MDL	0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
Pulp Duplicates																					
0624	Rock	0.071	6.5	22.9	1.34	149.0	0.005	2	2.56	0.046	0.17	<0.1	4.1	<0.02	0.07	5	<0.1	<0.02	7.8	0.24	<0.1
REP 0624	QC	0.075	6.1	23.4	1.35	153.6	0.005	2	2.60	0.048	0.17	<0.1	4.1	<0.02	0.07	6	0.1	0.05	7.9	0.25	<0.1
Reference Materials																					
STD DS9	Standard	0.075	14.6	113.4	0.64	277.0	0.122	3	0.99	0.090	0.41	2.9	2.3	5.14	0.17	211	4.9	4.81	4.6	2.24	0.1
STD DS9 Expected		0.0819	13.3	121	0.6165	295	0.1108		0.9577	0.0853	0.395	2.89	2.5	5.3	0.1615	200	5.2	5.02	4.59	2.37	0.1
BLK	Blank	<0.001	<0.5	<0.5	<0.01	<0.5	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1
Prep Wash																					
G1	Prep Blank	0.073	10.3	13.3	0.56	215.7	0.114	1	0.89	0.074	0.47	<0.1	2.2	0.28	<0.02	5	<0.1	<0.02	4.5	2.36	0.1
G1	Prep Blank	0.069	10.8	12.6	0.58	223.6	0.119	1	0.90	0.075	0.48	<0.1	2.0	0.27	<0.02	8	<0.1	<0.02	4.9	2.31	0.1

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: October 01, 2013

QUALITY CONTROL REPORT VAN13003709.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
Pulp Duplicates															
0624	Rock	<0.02	<0.02	5.0	<0.1	<0.05	1.3	6.31	12.4	<0.02	<1	0.2	28.9	<10	<2
REP 0624	QC	0.03	<0.02	4.6	<0.1	<0.05	1.0	6.37	11.9	0.02	<1	<0.1	29.8	<10	<2
Reference Materials															
STD DS9	Standard	0.07	1.49	32.4	6.6	<0.05	1.9	6.22	25.5	1.95	60	5.3	25.7	104	333
STD DS9 Expected		0.08	1.33	33.8	6.4	0.004	2	5.97	25.4	2.2	61	5.4	25.2	120	350
BLK	Blank	<0.02	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<10	<2
Prep Wash															
G1	Prep Blank	0.08	0.54	36.8	0.4	<0.05	1.3	5.02	18.9	<0.02	<1	0.2	28.3	<10	<2
G1	Prep Blank	0.08	0.70	38.1	0.4	<0.05	1.3	5.18	19.1	<0.02	<1	0.2	29.7	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	November 22, 2013
Report Date:	January 28, 2014
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN13005000.1

CLIENT JOB INFORMATION

Project:	CLY
Shipment ID:	CLY-04
P.O. Number	
Number of Samples:	18

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
R200-500	18	Crush, split and pulverize 500 g rock to 200 mesh			VAN
1F06	18	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	30	Completed	VAN

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT	Dispose of Reject After 90 days

ADDITIONAL COMMENTS

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

BRITISH COLUMBIA CERTIFIED ASSAYER
MARCUS LAU
Geochemical Laboratory Manager

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: January 28, 2014

CERTIFICATE OF ANALYSIS VAN13005000.1

	Method	WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.05	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
0564	Rock	1.92	0.38	6.29	8.99	14.7	112	6.3	2.3	273	1.11	8.1	0.19	2.0	2.6	4.6	0.04	0.11	0.14	4	0.03
0625	Rock	1.07	60.38	171.87	5.13	33.5	802	30.7	18.8	7399	8.38	2.1	3.28	1354.5	8.7	7.5	0.07	0.58	82.67	31	1.30
0626	Rock	2.64	14.34	9.30	5200.49	14.6	4705	0.7	0.4	180	0.89	0.6	1.10	<0.2	11.5	17.8	0.50	1.11	6.88	7	0.14
0627	Rock	2.50	13.63	15.91	1015.42	44.4	1561	2.4	0.7	148	1.88	1.3	1.19	0.7	9.0	27.0	0.50	0.23	3.93	10	0.04
0632	Rock	2.20	38.96	22.59	8.95	>10000	1027	15.9	28.2	8815	2.99	2.9	11.11	0.9	7.3	245.5	298.04	0.14	2.66	13	15.56
0633	Rock	2.30	2.58	73.66	4.48	1843.0	250	30.7	13.8	3160	2.65	0.7	4.44	<0.2	11.9	225.3	29.75	0.05	0.80	13	7.85
0634	Rock	2.27	58.78	12.95	6.81	19.8	118	0.6	0.2	57	1.11	30.9	4.47	4.6	12.0	7.8	0.30	0.42	3.37	<2	0.07
0635	Rock	1.07	0.78	33.86	10.35	32.4	84	27.2	12.8	927	1.92	1.1	1.24	1.1	8.0	575.4	0.11	<0.02	0.48	16	16.71
0636	Rock	0.65	0.13	0.80	1.32	2.6	33	0.7	0.2	42	0.37	0.1	<0.05	<0.2	<0.1	3.3	0.04	<0.02	0.05	<2	0.07
0637	Rock	1.22	7.31	16.84	1.28	1314.6	110	11.8	4.4	7187	1.71	1.1	2.48	<0.2	4.5	86.8	21.24	0.04	0.24	15	5.80
0638	Rock	1.07	0.41	25.93	16.12	56.1	30	22.0	11.1	771	2.44	5.9	1.70	0.7	10.2	669.4	0.13	0.03	0.34	22	17.36
0651	Rock	1.46	7.79	615.60	5.57	40.7	1658	58.6	47.5	687	22.03	0.5	2.08	2708.5	8.4	78.8	0.06	0.19	159.40	23	0.61
0653	Rock	2.27	3.79	794.64	5.20	30.9	1792	55.7	42.5	485	20.34	0.5	1.29	2641.6	6.3	64.1	0.07	0.18	164.41	14	0.52
0654	Rock	1.57	0.25	8.45	64.63	145.8	245	0.9	1.8	808	1.07	8.8	6.47	16.8	14.5	56.6	1.72	0.12	0.32	<2	0.85
0658	Rock	0.85	0.61	23.94	15.22	76.1	77	27.3	8.7	536	3.47	2.3	1.14	<0.2	10.8	10.0	0.08	0.04	0.31	21	0.11
0659	Rock	1.82	0.39	23.39	15.33	50.7	50	21.3	10.3	703	2.30	2.6	1.53	1.5	10.2	773.9	0.08	<0.02	0.27	25	17.81
0663	Rock	1.48	0.63	6.00	1.05	2864.0	44	10.8	9.4	5712	1.57	1.8	3.86	1.8	6.2	42.4	29.27	0.08	1.25	14	4.51
0664	Rock	1.55	3.15	30.99	8.20	207.9	201	29.0	18.5	1109	3.01	15.2	4.23	2.7	13.9	125.7	0.92	0.21	0.34	33	1.64

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Project: CLY
Report Date: January 28, 2014

CERTIFICATE OF ANALYSIS VAN13005000.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
	Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
	MDL	0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.05	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
0564	Rock	0.006	5.7	6.9	0.19	13.7	0.001	<1	0.38	0.006	0.04	0.08	0.7	0.04	<0.02	<5	<0.1	<0.02	1.6	0.13	<0.1
0625	Rock	0.084	21.2	22.6	0.75	21.7	0.085	<1	1.67	0.021	0.62	>100	5.3	0.53	3.93	<5	1.4	1.56	12.8	9.85	2.0
0626	Rock	0.060	16.0	14.3	0.19	21.5	0.064	<1	0.43	0.072	0.09	1.39	1.3	0.06	0.26	<5	1.5	1.44	2.0	0.18	0.1
0627	Rock	0.047	11.1	17.1	0.14	20.1	0.038	<1	0.40	0.048	0.08	0.93	2.0	0.06	0.16	<5	0.4	0.29	1.8	0.14	<0.1
0632	Rock	0.035	22.8	18.5	0.48	5.9	0.070	<1	1.89	0.034	0.01	>100	7.4	<0.02	1.27	<5	0.7	<0.02	10.9	0.12	6.0
0633	Rock	0.075	23.0	18.4	0.24	22.5	0.100	<1	1.67	0.125	0.09	55.26	2.4	0.08	1.17	<5	0.2	<0.02	7.1	1.03	1.0
0634	Rock	0.013	6.2	2.2	<0.01	15.8	0.001	1	0.31	0.059	0.07	2.30	0.5	<0.02	<0.02	<5	<0.1	0.15	1.6	0.27	<0.1
0635	Rock	0.034	8.0	19.3	0.32	27.2	0.063	5	3.63	0.246	0.19	0.31	2.7	0.13	0.23	5	<0.1	<0.02	9.6	1.37	<0.1
0636	Rock	<0.001	<0.5	5.0	<0.01	1.3	<0.001	<1	0.01	0.002	<0.01	0.36	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	0.03	<0.1
0637	Rock	0.043	10.9	12.9	0.07	9.2	0.078	<1	1.68	0.042	<0.01	>100	1.9	<0.02	0.04	<5	0.1	<0.02	9.8	0.09	2.0
0638	Rock	0.054	12.7	27.7	0.66	15.6	0.067	<1	3.41	0.264	0.09	0.88	2.9	0.05	0.44	<5	<0.1	<0.02	8.2	0.71	<0.1
0651	Rock	0.037	17.4	33.7	0.73	39.2	0.093	<1	2.13	0.126	0.55	>100	5.8	0.54	7.28	<5	4.7	7.12	11.2	9.16	0.2
0653	Rock	0.024	11.5	23.9	0.42	25.8	0.059	<1	1.58	0.098	0.24	>100	3.6	0.26	8.58	<5	4.3	6.86	7.6	4.15	0.2
0654	Rock	0.027	9.2	2.7	0.09	23.3	0.001	2	0.37	0.027	0.16	0.49	0.7	0.05	0.28	<5	<0.1	0.03	1.1	0.70	<0.1
0658	Rock	0.037	15.9	22.0	0.89	46.5	0.027	<1	1.58	0.031	0.33	0.21	2.6	0.18	0.64	<5	0.1	<0.02	4.4	1.51	0.2
0659	Rock	0.042	12.8	26.5	0.58	72.6	0.077	<1	3.84	0.256	0.53	0.28	4.4	0.30	0.48	<5	<0.1	<0.02	9.5	2.29	0.1
0663	Rock	0.067	14.4	15.3	0.09	29.3	0.064	<1	1.51	0.003	<0.01	20.10	2.9	<0.02	<0.02	8	<0.1	<0.02	9.0	0.07	1.8
0664	Rock	0.050	24.8	45.5	0.31	95.5	0.103	<1	1.58	0.027	0.13	9.11	6.8	0.06	<0.02	8	<0.1	<0.02	4.0	0.52	0.2

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PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: January 28, 2014

CERTIFICATE OF ANALYSIS VAN13005000.1

Method		1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
Analyte		Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
MDL		0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
0564	Rock	<0.02	<0.02	2.1	<0.1	<0.05	0.6	1.26	11.1	<0.02	<1	0.3	5.1	<10	<2
0625	Rock	0.08	1.01	99.3	2.4	<0.05	2.7	11.02	41.5	0.07	6	0.4	61.0	10	<2
0626	Rock	0.03	0.41	5.1	1.4	<0.05	0.7	5.12	30.9	0.03	2	0.2	3.0	<10	<2
0627	Rock	<0.02	0.51	3.1	0.8	<0.05	0.5	2.78	22.8	0.08	<1	0.3	2.3	<10	<2
0632	Rock	0.35	5.35	0.8	26.9	<0.05	13.7	5.94	42.6	6.67	10	32.5	1.4	<10	5
0633	Rock	0.22	3.21	11.3	5.9	<0.05	5.0	8.08	46.4	0.71	1	12.5	12.6	<10	<2
0634	Rock	0.07	2.32	3.4	<0.1	<0.05	1.5	6.33	11.5	<0.02	<1	0.8	0.8	<10	3
0635	Rock	0.03	0.33	21.3	0.4	<0.05	0.7	6.71	15.6	<0.02	<1	1.0	24.3	<10	<2
0636	Rock	<0.02	0.04	0.1	<0.1	<0.05	<0.1	0.04	0.2	<0.02	<1	<0.1	0.2	<10	<2
0637	Rock	0.33	1.12	0.2	9.1	<0.05	10.0	5.61	21.9	0.59	<1	51.1	0.7	<10	2
0638	Rock	0.02	0.24	8.4	0.4	<0.05	0.6	6.56	24.0	<0.02	2	1.5	50.3	<10	<2
0651	Rock	0.04	0.63	91.6	0.9	<0.05	1.2	7.35	35.5	<0.02	<1	1.4	41.4	<10	<2
0653	Rock	0.04	0.67	41.9	0.6	<0.05	0.7	4.99	22.2	<0.02	<1	0.8	24.9	<10	<2
0654	Rock	0.06	0.65	10.4	0.1	<0.05	1.8	7.21	17.3	0.03	<1	0.4	3.4	<10	<2
0658	Rock	<0.02	0.15	19.4	0.2	<0.05	1.0	4.29	36.8	<0.02	<1	0.4	23.7	<10	<2
0659	Rock	0.03	0.27	48.0	0.5	<0.05	0.8	8.81	23.2	<0.02	<1	0.6	52.3	<10	<2
0663	Rock	0.20	1.37	0.3	8.0	<0.05	8.2	6.64	26.1	0.82	2	9.3	1.6	<10	<2
0664	Rock	0.15	0.31	8.8	1.0	<0.05	5.5	11.58	47.1	0.06	2	2.4	11.7	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: January 28, 2014

QUALITY CONTROL REPORT VAN13005000.1

	Method	WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.05	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
Pulp Duplicates																					
0658	Rock	0.85	0.61	23.94	15.22	76.1	77	27.3	8.7	536	3.47	2.3	1.14	<0.2	10.8	10.0	0.08	0.04	0.31	21	0.11
REP 0658	QC		0.59	23.61	15.98	73.5	72	26.0	9.9	538	3.46	2.2	1.06	<0.2	10.6	9.8	0.08	0.05	0.29	21	0.11
Core Reject Duplicates																					
0634	Rock	2.27	58.78	12.95	6.81	19.8	118	0.6	0.2	57	1.11	30.9	4.47	4.6	12.0	7.8	0.30	0.42	3.37	<2	0.07
DUP 0634	QC		57.57	12.02	6.53	12.3	115	0.5	0.2	52	1.11	29.9	4.06	4.4	11.6	7.2	0.20	0.29	3.40	<2	0.04
Reference Materials																					
STD DS10	Standard		15.16	148.64	164.13	398.6	2194	73.7	12.6	965	2.74	46.3	2.96	94.6	8.5	77.9	2.63	9.93	12.03	42	1.07
STD OXC109	Standard		1.50	35.59	12.26	38.7	42	70.0	19.8	437	2.84	1.2	0.69	203.9	1.7	160.4	0.04	0.04	0.04	46	0.61
STD DS10 Expected			14.69	154.61	150.55	352.9	1960	74.6	12.9	861	2.7188	43.7	2.59	91.9	7.5	67.1	2.48	7.8	11.65	43	1.0355
STD OXC109 Expected														201							
BLK	Blank		<0.01	<0.01	<0.01	0.2	<2	<0.1	<0.1	1	<0.01	0.4	<0.05	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01
Prep Wash																					
G1	Prep Blank		0.07	3.78	4.27	43.0	361	2.7	3.6	544	1.98	0.7	2.83	0.4	5.9	63.8	<0.01	<0.02	0.11	35	0.44
G1	Prep Blank		0.07	2.13	3.56	41.3	127	2.8	3.4	558	1.84	<0.1	2.05	2.0	6.5	56.8	<0.01	<0.02	0.31	31	0.42

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215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: January 28, 2014

QUALITY CONTROL REPORT VAN13005000.1

Method		1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
Analyte		P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
Unit		%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
MDL		0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.05	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
Pulp Duplicates																					
0658	Rock	0.037	15.9	22.0	0.89	46.5	0.027	<1	1.58	0.031	0.33	0.21	2.6	0.18	0.64	<5	0.1	<0.02	4.4	1.51	0.2
REP 0658	QC	0.031	16.0	19.2	0.88	45.6	0.026	<1	1.56	0.031	0.33	0.21	2.5	0.16	0.63	<5	<0.1	<0.02	4.4	1.42	<0.1
Core Reject Duplicates																					
0634	Rock	0.013	6.2	2.2	<0.01	15.8	0.001	1	0.31	0.059	0.07	2.30	0.5	<0.02	<0.02	<5	<0.1	0.15	1.6	0.27	<0.1
DUP 0634	QC	0.011	5.9	2.0	<0.01	14.4	0.001	<1	0.27	0.050	0.06	0.98	0.5	<0.02	<0.02	<5	<0.1	0.10	1.3	0.24	<0.1
Reference Materials																					
STD DS10	Standard	0.076	17.1	56.2	0.78	371.0	0.077	7	1.05	0.070	0.33	3.29	3.0	5.46	0.29	333	2.3	5.17	4.8	2.73	<0.1
STD OXC109	Standard	0.101	12.4	57.0	1.45	55.7	0.368	<1	1.48	0.677	0.41	0.47	1.0	0.03	<0.02	<5	<0.1	<0.02	5.3	0.17	<0.1
STD DS10 Expected		0.073	17.5	54.6	0.7651	349	0.0817		1.0259	0.0638	0.3245	3.34	2.8	4.79	0.2743	289	2.3	4.89	4.3	2.63	0.08
STD OXC109 Expected																					
BLK	Blank	<0.001	<0.5	<0.5	<0.01	<0.5	<0.001	<1	<0.01	<0.001	<0.01	0.06	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1
Prep Wash																					
G1	Prep Blank	0.085	11.5	5.8	0.47	173.8	0.104	1	0.87	0.089	0.46	0.07	2.4	0.32	<0.02	<5	<0.1	<0.02	5.0	3.32	0.2
G1	Prep Blank	0.073	11.8	4.7	0.50	144.4	0.095	2	0.80	0.084	0.44	<0.05	2.1	0.32	<0.02	<5	<0.1	<0.02	4.4	3.16	<0.1

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: January 28, 2014

QUALITY CONTROL REPORT VAN13005000.1

Method		1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
Analyte		Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
MDL		0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
Pulp Duplicates															
0658	Rock	<0.02	0.15	19.4	0.2	<0.05	1.0	4.29	36.8	<0.02	<1	0.4	23.7	<10	<2
REP 0658	QC	0.02	0.11	21.0	0.3	<0.05	0.9	4.06	34.2	<0.02	<1	0.4	23.2	<10	<2
Core Reject Duplicates															
0634	Rock	0.07	2.32	3.4	<0.1	<0.05	1.5	6.33	11.5	<0.02	<1	0.8	0.8	<10	3
DUP 0634	QC	0.04	2.56	2.9	<0.1	<0.05	1.4	5.69	10.7	<0.02	<1	0.5	0.7	<10	<2
Reference Materials															
STD DS10	Standard	0.05	1.50	30.5	1.6	<0.05	2.6	8.13	34.3	0.20	53	0.8	21.4	96	198
STD OXC109	Standard	0.30	1.45	14.4	1.3	<0.05	23.6	3.92	24.6	<0.02	<1	0.9	2.1	<10	<2
STD DS10 Expected		0.05	1.33	27.7	1.6		2.3	7.77	36	0.22	50	0.6	19.1	110	188
STD OXC109 Expected															
BLK	Blank	<0.02	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<10	<2
Prep Wash															
G1	Prep Blank	0.05	0.62	44.4	0.6	<0.05	1.1	5.30	22.5	<0.02	1	0.4	30.1	<10	<2
G1	Prep Blank	0.04	0.63	41.2	0.4	<0.05	0.9	4.64	21.7	<0.02	<1	0.2	31.5	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	August 19, 2013
Report Date:	September 10, 2013
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN13003239.1

CLIENT JOB INFORMATION

Project:	CLY 2013
Shipment ID:	CLY 2013-02
P.O. Number	
Number of Samples:	25

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT-SOIL	Immediate Disposal of Soil Reject

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
S230	25	Sieve soil to 230 mesh			VAN
1F04	25	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	0.5	Completed	VAN
DISP2	25	Heat treatment of Soils and Sediments			VAN

ADDITIONAL COMMENTS

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

BRITISH COLUMBIA CERTIFIED ASSAYER
RAYMOND CHAN
CHIEF ASSAYER

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS   VAN13003239.1

	Method	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
	Unit	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
	MDL	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01	0.001
MM989101	Moss	0.67	41.75	23.06	104.8	226	41.9	17.3	1462	3.42	9.0	1.3	4.2	3.5	93.7	0.43	0.34	0.50	39	1.43	0.085
MM989102	Moss	0.81	42.37	34.35	217.2	872	85.1	13.9	906	2.40	15.1	4.3	3.5	0.9	98.3	1.03	0.56	0.59	29	1.89	0.115
MM989103	Moss	0.83	45.22	48.50	135.2	809	45.8	12.3	1127	2.30	17.8	3.2	4.1	0.8	104.9	1.54	0.87	0.54	35	2.51	0.115
MM989104	Moss	0.80	43.70	36.84	116.7	687	45.2	12.3	1197	2.36	18.6	3.8	5.5	0.9	103.2	1.38	0.80	0.54	36	2.40	0.121
MM989111	Moss	0.69	47.68	22.41	106.1	327	47.5	17.0	869	3.16	12.5	1.8	9.9	3.1	56.7	0.61	0.46	0.42	41	0.98	0.117
MM989112	Moss	0.92	46.45	19.95	85.5	218	52.4	16.4	737	3.11	11.7	1.4	5.6	3.0	61.0	0.27	0.47	0.36	44	0.46	0.094
MM239	Moss	0.99	45.45	31.16	181.7	777	66.8	14.9	986	2.66	15.2	2.9	4.1	1.0	105.8	1.04	0.64	0.57	33	2.06	0.114
MM0685	Moss	0.82	49.82	34.59	207.0	939	88.7	16.2	1038	2.97	18.4	4.0	6.6	1.3	94.8	1.05	0.64	0.67	35	1.84	0.113
MM0685D	Moss	0.86	49.35	33.94	216.7	900	84.0	16.6	1071	3.15	19.0	3.4	6.1	1.4	90.7	1.04	0.58	0.65	37	1.65	0.113
MMHM01	Moss	0.77	51.11	40.27	169.3	825	69.0	15.8	1054	3.12	17.3	3.7	5.8	1.3	94.4	1.21	0.63	0.57	44	1.71	0.116
MMHM02	Moss	0.57	36.55	27.82	134.7	627	37.8	15.2	958	2.85	14.6	1.2	3.0	1.5	49.0	0.86	0.45	0.38	48	0.82	0.165
MMHM04	Moss	0.48	40.84	24.69	78.0	154	45.3	19.7	1280	3.33	13.6	1.4	2.7	8.0	45.6	0.34	0.31	0.44	26	0.76	0.080
MMHM05	Moss	0.64	40.28	53.92	115.4	511	64.4	16.6	638	3.11	22.6	1.8	4.3	4.2	48.3	0.69	0.34	0.49	43	0.75	0.086
MMHM06	Moss	0.87	38.88	39.38	126.6	367	65.5	15.3	960	3.05	14.5	4.0	5.8	6.3	60.3	0.80	0.48	0.86	37	1.00	0.105
MMHM08	Moss	0.72	58.16	30.87	104.8	732	60.6	13.7	985	3.02	10.4	4.7	4.8	1.7	109.6	1.32	0.82	0.55	40	1.88	0.125
MMHM09	Moss	0.64	39.00	17.97	98.3	145	41.4	14.9	729	2.89	11.8	1.4	3.6	5.0	52.9	0.22	0.40	0.28	43	0.87	0.136
MMHM10	Moss	0.62	45.59	54.89	132.5	526	76.6	17.1	558	3.33	24.4	2.7	8.0	3.7	51.9	0.80	0.38	0.52	45	0.82	0.089
MMHM11	Moss	0.77	53.11	38.63	103.8	822	48.2	12.9	1122	2.86	19.8	3.5	6.9	1.1	104.4	1.51	0.69	0.53	43	2.32	0.116
MMHM12	Moss	1.78	67.31	43.68	135.4	953	46.4	15.7	978	3.26	23.0	40.1	11.1	2.0	85.4	1.80	0.85	0.55	62	1.58	0.127
MM234	Moss	3.97	25.82	67.13	380.8	1261	58.4	4.4	474	0.72	5.3	8.1	6.0	0.1	138.5	2.24	1.40	0.60	12	2.68	0.109
MM235	Moss	1.83	22.62	46.36	283.1	1183	37.4	6.4	689	1.13	16.7	21.3	6.7	0.1	144.8	3.12	0.89	0.58	18	2.13	0.117
MM236	Moss	2.48	41.79	71.62	240.1	1340	41.9	10.7	916	2.04	28.8	28.3	7.7	0.5	109.3	3.16	0.98	0.94	31	2.28	0.117
MM237	Moss	1.15	39.10	26.07	76.3	661	42.5	14.8	826	3.04	40.5	6.2	1.7	1.4	100.8	0.73	0.54	0.46	47	2.39	0.076
MM238	Moss	0.77	45.88	52.37	75.9	1094	41.3	9.6	940	2.04	19.2	6.1	4.7	1.1	138.5	0.84	0.95	0.56	34	3.51	0.105
MM240	Moss	0.82	43.37	40.17	234.2	998	84.2	13.4	1024	2.39	14.8	4.9	3.5	0.8	114.2	1.30	0.61	0.58	28	2.21	0.106

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003239.1

	Method	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F
	Analyte	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge	Hf
	Unit	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
MM989101	Moss	14.5	39.6	0.71	78.0	0.074	<20	2.78	0.042	0.27	0.2	4.4	0.26	0.08	48	1.5	0.07	7.1	5.35	<0.1	0.09
MM989102	Moss	13.4	40.4	0.49	106.6	0.046	<20	1.88	0.020	0.14	0.9	2.6	0.14	0.11	116	3.4	0.08	4.8	5.11	<0.1	0.04
MM989103	Moss	15.3	70.1	0.58	121.4	0.043	<20	1.89	0.014	0.17	0.9	3.9	0.19	0.14	158	2.8	0.02	4.7	4.33	<0.1	0.03
MM989104	Moss	15.7	68.0	0.59	116.9	0.044	<20	1.83	0.017	0.17	0.9	3.8	0.19	0.14	164	2.7	0.02	4.7	4.54	<0.1	0.04
MM989111	Moss	17.4	43.3	0.68	121.8	0.056	<20	1.97	0.012	0.25	0.6	3.6	0.20	0.07	54	1.8	0.02	5.8	2.88	0.1	<0.02
MM989112	Moss	24.9	52.7	0.90	153.8	0.066	<20	1.98	0.013	0.27	0.4	4.3	0.18	0.05	26	1.8	0.07	5.8	2.61	<0.1	<0.02
MM239	Moss	14.7	43.7	0.59	114.1	0.045	<20	1.95	0.015	0.19	0.9	3.2	0.14	0.13	102	3.3	<0.02	5.2	4.78	<0.1	0.05
MM0685	Moss	15.5	47.3	0.61	112.3	0.050	<20	2.24	0.020	0.16	1.7	3.3	0.15	0.11	108	2.9	0.05	5.5	5.99	<0.1	0.04
MM0685D	Moss	15.3	49.5	0.64	116.7	0.055	<20	2.33	0.018	0.17	1.0	3.6	0.17	0.10	80	2.5	0.04	5.9	6.23	<0.1	0.03
MMHM01	Moss	17.9	59.4	0.74	131.0	0.058	<20	2.50	0.017	0.19	0.6	4.3	0.20	0.11	122	3.0	0.04	6.3	5.59	<0.1	<0.02
MMHM02	Moss	11.8	45.9	0.66	199.0	0.079	<20	2.23	0.011	0.15	0.3	3.1	0.16	0.04	89	0.6	0.03	7.5	2.57	<0.1	0.05
MMHM04	Moss	28.6	42.0	0.66	89.8	0.023	<20	1.81	0.010	0.18	0.4	3.3	0.11	0.05	45	0.9	0.03	5.0	1.52	<0.1	0.02
MMHM05	Moss	17.2	55.1	0.75	113.0	0.068	<20	2.05	0.011	0.33	0.4	4.5	0.21	0.04	26	0.7	0.03	6.1	2.01	<0.1	0.04
MMHM06	Moss	24.3	51.4	0.65	120.0	0.046	<20	1.82	0.015	0.23	2.5	3.8	0.11	0.07	57	1.0	0.07	5.3	1.74	<0.1	0.05
MMHM08	Moss	23.3	54.9	0.67	230.6	0.058	<20	2.75	0.015	0.32	0.3	4.1	0.22	0.12	117	2.5	0.04	6.8	2.97	<0.1	0.05
MMHM09	Moss	20.7	53.5	0.78	117.7	0.061	<20	1.62	0.016	0.21	0.3	3.8	0.14	0.05	21	0.4	0.07	4.8	1.97	<0.1	0.04
MMHM10	Moss	15.7	57.6	0.84	119.3	0.065	<20	2.30	0.011	0.35	0.4	4.6	0.21	0.04	66	0.6	<0.02	6.5	2.03	0.1	0.03
MMHM11	Moss	15.2	76.6	0.73	129.8	0.049	<20	2.37	0.012	0.18	0.7	4.6	0.18	0.15	141	2.8	<0.02	5.9	3.65	<0.1	0.03
MMHM12	Moss	22.7	74.4	0.93	210.1	0.068	<20	2.45	0.013	0.18	0.9	6.6	0.17	0.09	133	2.1	<0.02	6.2	3.13	<0.1	0.06
MM234	Moss	16.2	21.4	0.25	26.0	0.012	<20	0.53	0.015	0.05	5.3	0.9	0.08	0.23	126	5.7	<0.02	1.7	1.56	1.5	0.02
MM235	Moss	16.5	25.6	0.32	106.8	0.019	<20	0.82	0.013	0.06	3.2	1.1	0.08	0.16	100	3.3	<0.02	2.5	1.68	0.1	0.03
MM236	Moss	21.7	47.9	0.50	129.8	0.036	<20	1.61	0.014	0.09	2.8	2.7	0.12	0.15	151	3.4	0.07	3.9	3.31	0.2	0.04
MM237	Moss	12.1	119.9	0.60	97.0	0.061	<20	2.12	0.016	0.13	1.1	4.3	0.12	0.15	67	3.9	<0.02	5.8	5.94	<0.1	0.09
MM238	Moss	16.9	85.2	0.47	70.2	0.042	<20	1.79	0.010	0.13	1.2	4.2	0.12	0.15	139	3.7	0.11	4.7	6.31	0.2	0.05
MM240	Moss	14.0	43.4	0.49	119.9	0.046	<20	1.90	0.016	0.12	1.1	2.9	0.13	0.12	106	4.1	0.05	5.0	5.53	<0.1	0.05

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Client: **Clarke Gold Inc.**
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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003239.1

	Method	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F
	Analyte	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
MM989101	Moss	1.99	45.1	0.6	<0.05	2.8	12.30	30.6	0.06	2	1.2	75.7	<10	<2
MM989102	Moss	2.66	17.7	0.4	<0.05	2.2	16.51	32.1	0.07	<1	1.4	36.5	<10	<2
MM989103	Moss	2.33	18.5	0.5	<0.05	2.5	19.08	33.7	0.10	<1	0.9	27.7	<10	9
MM989104	Moss	2.49	19.5	0.5	<0.05	2.3	18.11	33.6	0.10	2	1.1	28.5	<10	<2
MM989111	Moss	1.43	28.0	0.3	<0.05	1.1	10.27	31.4	0.04	4	1.1	32.0	<10	3
MM989112	Moss	1.44	26.5	0.4	<0.05	1.2	14.39	57.9	0.02	<1	0.7	31.2	<10	<2
MM239	Moss	2.24	19.0	0.6	<0.05	2.1	16.26	34.1	0.06	4	1.1	35.5	<10	3
MM0685	Moss	2.62	20.7	0.5	<0.05	2.0	18.19	36.8	0.07	<1	1.3	41.5	<10	<2
MM0685D	Moss	2.53	22.8	0.5	<0.05	2.0	16.78	38.7	0.07	<1	1.5	44.1	<10	3
MMHM01	Moss	2.74	23.6	0.5	<0.05	2.4	20.41	42.0	0.06	<1	1.3	39.4	<10	6
MMHM02	Moss	2.19	25.0	0.7	<0.05	2.3	5.69	28.1	0.05	<1	0.8	23.3	<10	3
MMHM04	Moss	0.67	14.1	0.2	<0.05	1.2	11.30	56.0	0.04	2	0.7	32.0	<10	4
MMHM05	Moss	1.28	25.5	0.3	<0.05	2.1	9.70	35.1	0.04	<1	1.0	28.8	<10	<2
MMHM06	Moss	1.67	17.4	0.4	<0.05	1.8	13.91	49.1	0.05	<1	0.9	32.6	<10	<2
MMHM08	Moss	2.60	26.5	0.5	<0.05	2.7	18.40	38.5	0.06	3	1.3	37.1	<10	3
MMHM09	Moss	1.52	23.8	0.3	<0.05	1.8	9.53	43.0	<0.02	<1	0.6	20.3	<10	<2
MMHM10	Moss	1.44	26.8	0.4	<0.05	2.1	10.27	34.2	0.06	<1	1.0	30.6	<10	<2
MMHM11	Moss	2.30	21.1	0.6	<0.05	2.4	17.67	36.3	0.10	<1	1.3	35.5	<10	3
MMHM12	Moss	2.69	20.0	0.5	<0.05	2.6	27.82	40.7	0.09	<1	1.5	27.3	23	5
MM234	Moss	0.61	4.7	0.4	<0.05	1.3	25.25	7.6	0.13	<1	5.6	8.0	<10	3
MM235	Moss	1.04	7.5	0.3	<0.05	1.2	24.04	15.8	0.07	<1	2.2	12.0	<10	<2
MM236	Moss	2.49	12.9	0.6	<0.05	1.9	30.06	26.2	0.13	<1	1.8	25.2	<10	<2
MM237	Moss	2.56	20.2	1.3	<0.05	3.9	15.53	31.5	0.04	7	1.1	45.6	14	3
MM238	Moss	2.56	17.9	0.5	<0.05	3.5	77.76	36.3	0.09	<1	1.8	23.7	<10	<2
MM240	Moss	3.16	17.1	0.4	<0.05	2.3	17.16	33.5	0.08	<1	1.5	35.1	<10	3

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215 Silver Mead Cres. NW
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Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003239.1

	Method	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
	Unit	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
	MDL	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01	0.001
Pulp Duplicates																					
MMHM02	Moss	0.57	36.55	27.82	134.7	627	37.8	15.2	958	2.85	14.6	1.2	3.0	1.5	49.0	0.86	0.45	0.38	48	0.82	0.165
REP MMHM02	QC	0.57	35.29	27.73	125.9	684	37.7	15.1	968	2.76	13.7	1.1	2.6	1.5	47.2	0.86	0.43	0.38	47	0.80	0.162
Reference Materials																					
STD DS9	Standard	12.98	114.1	130.9	346.3	1861	42.3	7.8	625	2.42	26.6	2.7	108.8	6.2	68.3	2.49	4.64	6.82	41	0.73	0.084
STD DS9	Standard	11.68	107.1	127.2	316.3	1711	38.6	7.6	572	2.25	25.8	2.8	102.0	6.0	61.8	2.28	4.67	5.66	37	0.67	0.087
STD OREAS45EA	Standard	1.36	684.5	14.90	28.7	257	371.3	52.7	387	23.59	7.7	1.8	55.9	10.7	3.6	0.03	0.24	0.29	297	0.03	0.027
STD OREAS45EA	Standard	1.43	641.3	14.49	26.9	277	343.8	49.7	383	22.14	9.8	1.6	59.7	9.8	3.1	0.02	0.26	0.30	280	0.03	0.027
STD DS9 Expected		12.84	108	126	317	1830	40.3	7.6	575	2.33	25.5	2.69	118	6.38	69.6	2.4	4.94	6.32	40	0.7201	0.0819
STD OREAS45EA Expected		1.78	709	14.3	30.6	311	357	52	400	22.65	11.4	1.73	53	10.7	4.05	0.03	0.64	0.26	295	0.032	0.029
BLK	Blank	<0.01	0.07	<0.01	<0.1	4	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01	<0.001
BLK	Blank	<0.01	<0.01	<0.01	<0.1	7	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01	<0.001

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QUALITY CONTROL REPORT VAN13003239.1

	Method	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F
	Analyte	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge	Hf
	Unit	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm	ppm
	MDL	0.5	0.5	0.01	0.5	0.001	20	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1	0.02
Pulp Duplicates																					
MMHM02	Moss	11.8	45.9	0.66	199.0	0.079	<20	2.23	0.011	0.15	0.3	3.1	0.16	0.04	89	0.6	0.03	7.5	2.57	<0.1	0.05
REP MMHM02	QC	11.9	46.4	0.65	185.0	0.077	<20	2.16	0.011	0.15	0.2	3.0	0.18	0.04	105	0.7	0.11	7.2	2.53	<0.1	0.06
Reference Materials																					
STD DS9	Standard	12.6	120.0	0.64	326.8	0.112	<20	0.95	0.082	0.40	2.6	2.4	5.49	0.18	240	5.7	4.92	4.5	2.41	0.1	0.05
STD DS9	Standard	10.6	113.0	0.59	317.6	0.098	<20	0.87	0.075	0.38	2.9	2.1	5.30	0.17	218	5.2	5.09	4.4	2.46	0.2	0.05
STD OREAS45EA	Standard	6.9	813.8	0.09	149.8	0.093	<20	2.98	0.023	0.05	<0.1	77.8	0.05	0.04	23	0.4	0.07	12.6	0.65	0.3	0.68
STD OREAS45EA	Standard	6.1	816.9	0.09	141.7	0.079	<20	2.80	0.023	0.05	<0.1	76.2	<0.02	0.04	<5	0.8	0.02	11.3	0.66	0.3	0.42
STD DS9 Expected		13.3	121	0.6165	330	0.1108		0.9577	0.0853	0.395	2.89	2.5	5.3	0.1615	200	5.2	5.02	4.59	2.37	0.1	0.08
STD OREAS45EA Expected		8.19	849	0.095	148	0.106		3.32	0.027	0.053		78	0.072	0.044	340	2.09	0.11	11.7	0.77	0.26	0.82
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02
BLK	Blank	<0.5	<0.5	<0.01	<0.5	<0.001	<20	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02

Acme Analytical Laboratories (Vancouver) Ltd.
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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003239.1

	Method	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F
	Analyte	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
Pulp Duplicates														
MMHM02	Moss	2.19	25.0	0.7	<0.05	2.3	5.69	28.1	0.05	<1	0.8	23.3	<10	3
REP MMHM02	QC	2.06	23.2	0.7	<0.05	2.1	5.31	28.1	0.05	<1	0.8	22.5	<10	2
Reference Materials														
STD DS9	Standard	0.98	36.4	6.5	<0.05	1.8	5.62	25.7	2.17	50	6.3	28.3	132	380
STD DS9	Standard	0.94	35.1	6.7	<0.05	1.5	4.82	19.8	2.20	67	5.1	26.1	92	337
STD OREAS45EA	Standard	0.06	7.8	0.9	<0.05	23.1	5.32	18.9	0.09	<1	0.4	2.3	91	108
STD OREAS45EA	Standard	0.06	6.5	0.9	<0.05	14.5	4.68	15.4	0.07	<1	0.4	2.2	86	94
STD DS9 Expected		0.96	33.8	6.4	0.004	2	5.97	25.4	2.2	61	5.4	25.2	120	350
STD OREAS45EA Expected		0.43	7.93	0.97		26.6	5.74	17.7	0.1		0.47	7.63	66	108
BLK	Blank	<0.02	<0.1	<0.1	<0.05	0.2	<0.01	0.3	<0.02	<1	<0.1	<0.1	<10	2
BLK	Blank	<0.02	<0.1	<0.1	<0.05	0.1	<0.01	0.2	<0.02	<1	<0.1	<0.1	<10	<2

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
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Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	October 23, 2013
Report Date:	December 02, 2013
Page:	1 of 3

CERTIFICATE OF ANALYSIS VAN13004484.1

CLIENT JOB INFORMATION

Project:	CLY
Shipment ID:	CLY-3
P.O. Number	
Number of Samples:	36

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
S230	35	Sieve soil to 230 mesh			VAN
1DX3	35	1:1:1 Aqua Regia digestion ICP-MS analysis	30	Completed	VAN

SAMPLE DISPOSAL

DISP-PLP	Dispose of Pulp After 90 days
DISP-RJT-SOIL	Immediate Disposal of Soil Reject

ADDITIONAL COMMENTS

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: December 02, 2013

CERTIFICATE OF ANALYSIS VAN13004484.1

	Method	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
T917878	Till	0.9	51.5	29.7	101	0.1	61.8	19.6	1057	3.72	22.1	14.3	10.2	44	0.2	0.6	1.2	50	0.22	0.059	33
T917879	Till	0.8	46.6	28.7	96	0.1	70.1	23.4	684	4.31	12.7	6.3	9.7	36	0.1	0.4	0.5	79	0.24	0.092	32
T917880	Till	0.6	44.4	19.9	147	0.4	55.5	18.4	662	3.47	11.2	18.1	8.9	33	0.1	0.4	0.5	38	0.31	0.130	32
T917881	Till	0.9	63.1	25.6	113	0.3	51.1	19.1	1195	3.81	15.7	10.6	12.3	56	0.1	0.6	0.5	41	0.23	0.072	44
T917882	Till	0.7	40.5	27.8	208	0.3	60.1	23.8	715	3.45	15.8	53.9	7.9	27	0.2	0.5	0.7	43	0.20	0.107	25
T917884	Till	0.9	40.2	17.5	109	0.2	59.0	17.9	506	3.04	11.9	10.0	6.9	25	0.2	0.5	0.4	54	0.20	0.097	23
T917885	Till	2.0	47.4	34.7	135	0.7	38.2	14.9	734	3.39	29.0	31.7	10.9	41	0.6	0.4	2.1	44	0.37	0.045	25
T917893	Till	0.6	35.8	24.8	100	0.2	66.5	16.1	561	3.16	19.5	19.1	7.2	30	0.5	0.6	0.4	51	0.27	0.120	23
T917894	Till	0.7	33.5	17.0	87	0.2	26.8	8.9	369	2.01	9.6	6.0	5.4	48	0.4	0.2	0.5	26	0.32	0.148	14
T917895	Till	0.9	62.9	42.9	147	0.7	54.7	20.0	948	3.84	21.5	8.8	7.7	85	1.4	1.0	0.4	69	1.01	0.150	26
T917896	Till	0.9	56.9	42.1	159	0.3	88.9	23.7	1139	3.81	13.8	6.8	8.2	48	0.5	0.5	0.5	46	0.36	0.122	24
T060	Till	1.1	49.9	27.9	86	0.2	73.4	17.8	658	3.70	26.7	17.0	9.6	37	0.2	0.6	1.0	60	0.32	0.039	31
T061	Till	1.5	64.2	30.6	91	0.1	79.2	18.6	713	3.91	33.1	46.3	11.4	41	0.3	0.7	1.4	60	0.31	0.075	33
T062D	Till	1.2	46.6	19.3	77	<0.1	47.8	14.2	399	3.16	21.5	13.1	8.5	24	0.1	0.6	0.5	50	0.19	0.029	25
T063D	Till	1.9	62.9	28.3	97	0.1	60.6	18.4	947	3.93	30.3	18.3	11.7	30	0.2	0.7	0.7	53	0.23	0.045	37
T064	Till	1.3	59.9	22.3	87	0.2	63.4	19.5	472	3.69	21.7	10.0	8.0	25	0.2	0.6	0.5	65	0.20	0.101	22
T065	Till	1.9	31.7	34.9	57	0.4	15.6	7.6	105	2.90	36.1	55.6	10.7	12	0.1	0.6	0.5	17	0.03	0.060	43
T066	Till	1.5	58.7	25.3	107	0.4	50.5	15.0	355	4.21	52.5	38.6	11.6	27	0.2	0.6	0.8	44	0.11	0.106	42
T067	Till	1.4	51.4	32.0	106	0.3	60.5	25.7	405	3.96	21.3	8.1	12.4	27	0.1	0.4	0.5	53	0.17	0.054	40
T068	Till	0.7	48.0	18.4	75	<0.1	43.6	16.6	674	3.80	19.0	7.7	8.5	39	0.2	0.7	0.2	66	0.32	0.061	27
T069	Till	1.9	50.5	33.4	105	<0.1	66.1	18.3	541	3.78	22.3	9.5	7.5	33	0.3	0.7	0.8	71	0.20	0.110	21
T070	Till	1.6	70.7	41.3	84	0.3	78.2	21.7	1083	4.44	33.2	22.0	13.4	39	0.2	0.8	1.1	55	0.33	0.080	35
T071	Till	1.5	55.0	42.6	106	0.1	71.0	19.2	613	4.03	26.6	25.3	9.8	25	0.3	0.7	1.3	69	0.17	0.137	27
T072	Till	1.3	32.9	73.0	107	0.1	58.3	14.7	863	3.07	26.2	13.3	13.0	28	0.2	0.6	0.4	46	0.24	0.110	34
T073	Till	0.8	47.1	24.3	85	<0.1	42.0	12.1	389	3.72	16.6	7.5	11.0	26	0.1	0.6	0.4	44	0.14	0.047	40
T074	Till	0.7	45.7	23.2	78	0.1	60.3	16.8	765	3.96	14.3	7.5	16.7	36	<0.1	0.2	0.5	33	0.20	0.051	46
T075	Till	0.8	52.2	24.0	72	<0.1	51.9	16.1	637	3.96	23.0	24.6	11.2	24	<0.1	0.6	0.5	50	0.16	0.055	42
T076	Till	0.9	79.6	32.6	112	0.1	65.5	22.4	747	5.31	33.0	5.8	14.5	25	<0.1	1.0	0.8	53	0.14	0.077	43
T077	Till	0.9	41.9	25.3	70	<0.1	38.3	14.6	604	3.78	16.7	8.8	15.3	23	<0.1	0.3	0.5	27	0.18	0.044	50
T078	Till	0.8	49.6	26.2	97	0.2	74.2	19.4	821	3.93	20.5	17.5	9.4	27	0.2	0.6	0.5	53	0.20	0.100	33

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY
Report Date: December 02, 2013

CERTIFICATE OF ANALYSIS VAN13004484.1

	Method	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
T917878	Till	40	0.74	130	0.102	3	2.97	0.018	0.15	2.7	0.03	7.2	0.1	<0.05	7	<0.5	<0.2
T917879	Till	127	1.31	274	0.187	1	3.11	0.011	0.29	0.4	0.02	7.8	0.3	<0.05	10	<0.5	<0.2
T917880	Till	36	0.55	155	0.115	2	3.66	0.015	0.13	0.4	0.04	5.1	0.1	<0.05	8	0.7	<0.2
T917881	Till	34	0.70	103	0.089	2	3.19	0.009	0.17	0.4	0.03	6.3	0.1	<0.05	8	0.9	<0.2
T917882	Till	33	0.50	135	0.113	2	4.06	0.015	0.12	0.6	0.05	4.1	0.2	<0.05	10	0.8	<0.2
T917884	Till	35	0.71	226	0.094	3	2.43	0.023	0.15	1.0	0.03	5.0	0.2	<0.05	6	<0.5	<0.2
T917885	Till	50	0.70	83	0.088	2	1.82	0.023	0.37	7.8	0.01	5.3	0.2	<0.05	6	<0.5	<0.2
T917893	Till	56	0.75	132	0.093	1	2.08	0.016	0.24	0.6	0.02	5.0	0.2	<0.05	6	<0.5	<0.2
T917894	Till	21	0.38	140	0.098	2	2.97	0.046	0.18	1.0	<0.01	4.1	0.1	<0.05	7	<0.5	<0.2
T917895	Till	61	0.98	186	0.128	4	3.32	0.038	0.36	0.7	0.02	7.4	0.4	<0.05	9	<0.5	<0.2
T917896	Till	60	0.82	197	0.113	2	3.23	0.013	0.45	0.3	0.03	6.1	0.3	<0.05	9	<0.5	<0.2
T060	Till	69	0.91	159	0.124	1	2.52	0.019	0.22	2.4	0.02	9.5	0.2	<0.05	7	<0.5	<0.2
T061	Till	58	0.92	118	0.088	1	2.35	0.013	0.15	3.2	0.02	8.0	0.1	<0.05	6	0.5	<0.2
T062D	Till	42	0.70	75	0.091	<1	1.73	0.016	0.11	1.1	0.02	6.1	0.1	<0.05	5	<0.5	<0.2
T063D	Till	46	0.79	106	0.079	<1	2.10	0.016	0.13	1.2	0.04	8.5	0.1	<0.05	6	<0.5	<0.2
T064	Till	55	0.90	149	0.094	2	2.87	0.019	0.12	1.3	0.04	6.0	0.1	<0.05	7	0.5	<0.2
T065	Till	14	0.21	84	0.016	<1	1.25	0.004	0.06	0.2	0.01	1.7	<0.1	<0.05	5	1.5	<0.2
T066	Till	42	0.72	148	0.049	1	2.76	0.008	0.14	1.0	0.03	4.6	0.2	<0.05	7	1.0	<0.2
T067	Till	82	0.88	128	0.107	1	2.33	0.014	0.18	0.3	0.02	6.4	0.2	<0.05	7	1.1	<0.2
T068	Till	52	1.06	124	0.099	1	2.39	0.039	0.22	0.3	0.03	8.1	0.1	<0.05	6	<0.5	<0.2
T069	Till	63	0.93	183	0.116	8	3.39	0.029	0.16	2.0	0.03	8.7	0.2	<0.05	8	<0.5	<0.2
T070	Till	60	0.95	99	0.076	<1	2.11	0.011	0.19	3.5	0.05	9.5	0.1	<0.05	6	<0.5	<0.2
T071	Till	69	0.91	128	0.124	1	3.41	0.016	0.18	5.5	0.02	8.6	0.2	<0.05	9	<0.5	<0.2
T072	Till	56	0.83	118	0.066	2	1.97	0.023	0.21	0.8	0.02	5.9	0.1	<0.05	6	<0.5	<0.2
T073	Till	45	0.67	103	0.073	1	2.09	0.017	0.16	1.0	0.01	6.5	0.1	<0.05	6	<0.5	<0.2
T074	Till	61	0.99	125	0.052	<1	2.81	0.014	0.21	1.0	0.01	5.6	0.1	<0.05	8	<0.5	<0.2
T075	Till	63	0.84	93	0.065	2	2.15	0.023	0.18	1.3	0.01	6.5	0.1	<0.05	6	<0.5	<0.2
T076	Till	67	0.78	84	0.066	<1	2.40	0.010	0.16	0.7	0.02	7.5	0.1	<0.05	7	0.8	<0.2
T077	Till	44	0.72	83	0.032	<1	2.04	0.005	0.15	0.7	<0.01	4.0	0.1	<0.05	6	<0.5	<0.2
T078	Till	70	0.80	131	0.091	<1	2.59	0.010	0.16	0.8	0.02	6.7	0.1	<0.05	7	0.6	<0.2

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Project: CLY
Report Date: December 02, 2013

CERTIFICATE OF ANALYSIS VAN13004484.1

	Method	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
T079	Till	1.1	35.5	24.8	77	<0.1	43.1	16.0	595	3.63	21.0	10.8	10.3	23	0.1	0.6	0.6	48	0.16	0.059	32
T080	Till	1.2	44.7	25.7	86	0.2	46.3	22.1	502	3.78	24.2	15.4	13.5	29	0.1	0.5	0.5	43	0.16	0.049	28
T081	Till	1.0	39.8	23.7	73	<0.1	45.4	15.0	764	3.36	15.5	11.6	12.8	33	0.2	0.3	0.8	38	0.20	0.042	33
T082	Till	0.9	49.5	22.1	113	0.2	48.7	16.9	517	3.42	14.0	2.0	7.6	31	0.1	0.3	0.5	53	0.19	0.065	21
T083	Till	0.9	58.1	19.1	72	<0.1	56.3	18.9	581	3.97	21.3	7.1	8.9	31	0.1	0.6	0.4	60	0.25	0.082	31
T084	Till	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.

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Client: **Clarke Gold Inc.**
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Project: CLY
Report Date: December 02, 2013

CERTIFICATE OF ANALYSIS VAN13004484.1

	Method	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
T079	Till	48	0.72	79	0.071	1	2.00	0.017	0.17	1.8	0.01	5.6	0.1	<0.05	6	<0.5	<0.2
T080	Till	37	0.61	54	0.074	<1	2.28	0.009	0.14	0.6	0.01	5.2	0.2	<0.05	7	<0.5	<0.2
T081	Till	50	0.85	116	0.064	<1	1.97	0.007	0.15	2.7	<0.01	4.1	0.1	<0.05	6	0.8	<0.2
T082	Till	33	0.67	178	0.100	<1	2.93	0.012	0.08	0.4	0.03	5.7	0.2	<0.05	7	<0.5	<0.2
T083	Till	68	1.11	103	0.093	<1	2.06	0.009	0.16	0.4	0.03	6.8	0.2	0.07	5	<0.5	<0.2
T084	Till	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.

Client: **Clarke Gold Inc.**
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Project: CLY
Report Date: December 02, 2013

QUALITY CONTROL REPORT VAN13004484.1

	Method	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30
	Analyte	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm
	MDL	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1
Pulp Duplicates																					
T917879	Till	0.8	46.6	28.7	96	0.1	70.1	23.4	684	4.31	12.7	6.3	9.7	36	0.1	0.4	0.5	79	0.24	0.092	32
REP T917879	QC	0.8	46.3	28.5	91	0.1	67.2	22.7	666	4.30	12.6	5.6	10.0	36	0.2	0.4	0.5	77	0.24	0.094	32
T082	Till	0.9	49.5	22.1	113	0.2	48.7	16.9	517	3.42	14.0	2.0	7.6	31	0.1	0.3	0.5	53	0.19	0.065	21
REP T082	QC	0.8	49.9	21.5	112	0.2	46.3	17.1	556	3.56	13.9	3.3	7.4	29	<0.1	0.4	0.5	54	0.20	0.067	21
Reference Materials																					
STD DS10	Standard	15.4	156.2	144.6	356	2.1	74.1	12.7	881	2.82	44.3	94.4	7.9	70	2.7	8.8	12.2	44	1.06	0.077	18
STD DS10	Standard	14.5	151.6	145.6	341	1.9	70.3	12.2	859	2.70	43.5	83.6	7.2	68	2.5	8.7	12.2	43	0.97	0.072	17
STD OXC109	Standard	1.4	36.9	10.8	39	<0.1	74.9	19.0	411	2.78	0.7	200.2	1.5	140	<0.1	<0.1	<0.1	48	0.68	0.098	12
STD OXC109	Standard	1.4	34.7	10.0	38	<0.1	76.3	18.8	408	2.75	<0.5	173.0	1.4	141	<0.1	<0.1	0.1	46	0.67	0.101	12
STD DS10 Expected		14.69	154.61	150.55	352.9	1.96	74.6	12.9	861	2.7188	43.7	91.9	7.5	67.1	2.48	9.51	11.65	43	1.0355	0.073	17.5
STD OXC109 Expected												201									
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1
BLK	Blank	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.01	<0.5	<0.5	<0.1	<1	<0.1	<0.1	<0.1	<2	<0.01	<0.001	<1

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Project: CLY
Report Date: December 02, 2013

QUALITY CONTROL REPORT VAN13004484.1

	Method	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30	1DX30
	Analyte	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
	Unit	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	MDL	1	0.01	1	0.001	1	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2
Pulp Duplicates																	
T917879	Till	127	1.31	274	0.187	1	3.11	0.011	0.29	0.4	0.02	7.8	0.3	<0.05	10	<0.5	<0.2
REP T917879	QC	121	1.31	264	0.187	2	3.33	0.011	0.29	0.5	0.03	7.6	0.3	<0.05	9	<0.5	<0.2
T082	Till	33	0.67	178	0.100	<1	2.93	0.012	0.08	0.4	0.03	5.7	0.2	<0.05	7	<0.5	<0.2
REP T082	QC	35	0.69	178	0.102	<1	2.89	0.012	0.09	0.4	0.04	6.3	0.1	<0.05	7	<0.5	<0.2
Reference Materials																	
STD DS10	Standard	54	0.80	334	0.084	7	1.13	0.070	0.33	3.1	0.28	3.4	5.2	0.19	5	2.7	4.8
STD DS10	Standard	55	0.77	346	0.077	5	1.03	0.056	0.31	2.9	0.30	2.9	4.5	0.38	4	2.6	4.3
STD OXC109	Standard	56	1.48	53	0.363	2	1.55	0.661	0.39	0.2	<0.01	1.1	<0.1	<0.05	5	<0.5	<0.2
STD OXC109	Standard	59	1.32	53	0.360	<1	1.48	0.626	0.38	0.1	<0.01	0.9	<0.1	0.10	5	<0.5	<0.2
STD DS10 Expected		54.6	0.7651	349	0.0817		1.0259	0.0638	0.3245	3.34	0.289	2.8	4.79	0.2743	4.3	2.3	4.89
STD OXC109 Expected																	
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	<0.05	<1	<0.5	<0.2
BLK	Blank	<1	<0.01	<1	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.01	<0.1	<0.1	0.06	<1	<0.5	<0.2

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Client: **Clarke Gold Inc.**
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Submitted By:	Bill Howard
Receiving Lab:	Canada-Vancouver
Received:	August 19, 2013
Report Date:	September 10, 2013
Page:	1 of 3

CERTIFICATE OF ANALYSIS VAN13003232.1

CLIENT JOB INFORMATION

Project:	CLY 2013
Shipment ID:	CLY 2013-01-05
P.O. Number	
Number of Samples:	39

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
R200-500	39	Crush, split and pulverize 500 g rock to 200 mesh			VAN
1F06	39	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	30	Completed	VAN

SAMPLE DISPOSAL

RTRN-PLP	Return
DISP-RJT	Dispose of Reject After 90 days

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

ADDITIONAL COMMENTS

Invoice To: Clarke Gold Inc.
215 Silver Mead Cres. NW
Calgary AB T3B 3W4
Canada

CC:

BRITISH COLUMBIA CERTIFIED ASSAYER
CLARENCE LEONG

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003232.1

	Method	WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
0106	Rock	1.59	0.58	5.85	1.21	3.5	10	4.4	1.6	669	0.76	0.8	0.1	<0.2	0.8	29.0	0.04	0.06	0.06	<2	0.43
0228	Rock	0.79	7.63	39.56	4.75	85.2	55	26.4	10.5	435	2.37	1.1	1.8	3.5	12.0	562.0	0.17	<0.02	2.60	47	4.67
0492	Rock	1.29	5.44	53.73	4.64	92.3	84	25.1	10.8	425	2.27	1.0	1.9	4.0	11.9	515.9	0.21	0.02	3.39	38	4.95
0506	Rock	2.40	1.79	6.33	9.79	4.9	107	2.6	2.1	73	1.38	1166	0.2	172.4	1.7	3.6	0.02	0.89	1.00	3	0.02
0507	Rock	2.35	3.62	9.29	8.69	5.2	145	4.0	2.7	132	2.67	1198	0.2	428.0	2.5	7.4	0.02	1.85	0.24	5	0.03
0508	Rock	1.76	0.72	13.13	4.88	19.6	33	8.5	3.6	166	2.53	652.3	0.7	37.5	7.6	4.2	0.02	1.03	0.15	10	0.12
0509	Rock	0.25	0.49	8.84	1.48	4.2	14	3.1	0.9	98	1.17	5.5	0.3	10.8	0.8	2.3	<0.01	0.08	0.04	<2	<0.01
0578	Rock	1.38	5.97	7.58	2.01	4.4	16	2.0	0.8	76	1.04	3.9	0.1	3.2	2.0	4.7	<0.01	0.09	0.03	3	<0.01
0587	Rock	2.43	0.36	7.36	7.25	29.7	21	7.0	2.5	1077	2.30	1.5	1.6	4.2	2.1	4.5	0.02	0.07	0.07	4	0.03
0588	Rock	0.55	2.95	4.45	95.44	2.0	13200	1.8	0.8	61	0.88	30.1	0.2	573.1	0.2	2.8	0.02	0.13	34.65	<2	0.03
0589	Rock	0.85	0.52	8.21	2.20	14.5	49	4.9	1.2	94	1.89	4.6	0.2	3.1	2.4	4.5	0.02	0.13	0.24	6	0.03
0591	Rock	1.32	0.78	15.54	2.88	27.4	76	19.1	5.7	461	0.75	1.2	1.4	<0.2	6.7	244.8	0.34	0.04	0.23	9	15.78
0592	Rock	1.06	1.44	63.41	3.00	55.4	79	23.9	10.1	590	1.29	1.2	2.7	3.8	9.7	371.3	0.44	0.02	0.70	20	5.46
0593	Rock	0.79	0.38	6.21	58.78	4.0	132	1.6	0.4	55	0.90	8.2	<0.1	7.7	0.4	5.0	<0.01	0.11	0.84	<2	0.04
0594	Rock	0.43	0.50	8.62	49.95	14.1	269	2.9	0.7	75	1.26	28.6	0.1	29.0	0.5	3.8	0.03	0.31	0.44	<2	0.02
0596	Rock	0.59	0.82	18.45	6.45	30.8	55	9.0	2.1	566	1.92	2.4	0.6	4.6	5.2	34.8	<0.01	0.04	0.18	38	0.42
0597	Rock	0.80	2.76	46.66	10.46	60.0	77	25.4	7.7	260	4.70	1112	1.1	28.1	5.5	3.3	0.08	5.00	0.24	8	0.09
0598	Rock	0.96	0.91	30.73	6.90	60.0	116	29.2	11.8	403	3.55	8.5	2.6	6.1	13.0	8.2	0.05	0.16	0.16	34	0.20
0599	Rock	0.81	1.33	40.61	1.77	57.3	57	21.6	18.2	542	3.77	2.0	1.4	2.5	6.7	48.8	0.05	0.04	0.10	87	0.98
0600	Rock	2.14	0.25	24.55	7.36	34.6	42	17.8	6.0	161	2.30	6.8	0.6	1.4	8.2	6.1	0.02	0.25	0.11	11	0.02
0601	Rock	0.74	0.18	15.77	19.95	29.1	41	13.7	6.8	1244	1.62	2.5	0.7	1.7	6.0	606.7	0.14	0.05	0.19	20	19.98
0602	Rock	1.11	0.60	29.38	14.35	61.9	109	30.1	12.0	499	2.83	0.6	2.0	0.9	15.1	750.1	0.09	0.03	0.90	39	7.19
0603	Rock	0.97	0.93	40.68	13.53	38.2	137	32.8	14.4	453	2.61	1.2	1.5	2.0	12.7	673.3	0.09	0.04	1.26	30	4.60
0604	Rock	0.60	1.16	64.42	9.91	44.7	243	42.3	18.7	642	3.22	2.8	1.8	4.0	12.4	467.4	0.08	0.04	6.68	31	4.87
0605	Rock	0.17	0.81	79.25	6.07	36.2	252	35.7	17.9	1099	4.32	6.5	2.2	30.4	12.5	343.1	0.11	0.04	22.76	31	5.01
0606	Rock	1.90	0.40	18.68	6.43	32.3	80	21.1	7.2	290	2.20	16.3	0.5	3.8	7.6	6.9	0.07	0.07	0.31	13	0.12
0607	Rock	1.41	0.44	12.87	55.94	6.2	215	6.2	3.3	39	0.81	63.7	0.3	207.6	7.3	19.4	0.03	0.16	0.35	<2	<0.01
0608	Rock	1.42	0.38	14.96	12.97	22.2	57	8.9	2.3	209	1.49	1.6	0.5	3.6	8.0	25.3	0.02	0.08	0.13	8	0.20
0610	Rock	1.32	0.31	3.88	2.09	3.2	45	1.9	0.7	50	0.60	1.5	<0.1	2.3	0.1	1.0	0.01	0.26	0.04	<2	<0.01
0611	Rock	1.07	0.36	2.78	4.95	3.0	46	1.6	0.6	50	0.57	0.7	<0.1	1.8	0.1	0.7	0.01	0.23	0.06	<2	<0.01

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003232.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
	Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
	MDL	0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
0106	Rock	0.004	1.5	3.9	0.04	8.8	0.006	<1	0.18	0.013	0.03	<0.1	0.4	0.02	0.02	<5	<0.1	0.02	0.6	0.22	<0.1
0228	Rock	0.048	26.3	51.6	0.66	165.0	0.184	5	7.04	0.488	0.73	2.2	6.9	0.40	0.46	<5	<0.1	0.12	16.9	4.45	<0.1
0492	Rock	0.046	27.1	44.5	0.56	119.5	0.183	6	6.54	0.477	0.51	6.8	5.1	0.25	0.44	<5	<0.1	0.14	14.9	2.92	<0.1
0506	Rock	0.004	4.3	4.2	0.06	12.5	0.003	2	0.16	0.011	0.07	0.1	0.6	0.04	0.35	<5	<0.1	0.56	0.5	0.29	<0.1
0507	Rock	0.010	6.4	5.4	0.08	17.5	0.006	3	0.25	0.015	0.10	0.3	0.7	0.04	0.53	<5	0.2	0.24	0.8	0.36	<0.1
0508	Rock	0.015	13.7	12.3	0.30	53.0	0.029	3	0.75	0.022	0.38	0.1	1.3	0.16	0.55	<5	0.2	0.05	2.3	1.33	<0.1
0509	Rock	0.005	3.7	4.5	0.03	12.4	<0.001	2	0.15	0.016	0.05	<0.1	0.2	<0.02	<0.02	<5	0.4	0.03	0.6	0.14	<0.1
0578	Rock	0.009	7.8	4.9	0.05	19.7	<0.001	<1	0.17	0.011	0.08	<0.1	0.5	<0.02	<0.02	<5	<0.1	0.09	0.8	0.15	<0.1
0587	Rock	0.016	6.5	7.2	0.28	10.2	0.005	<1	0.41	0.007	0.05	<0.1	1.7	0.03	<0.02	<5	<0.1	<0.02	1.4	0.26	<0.1
0588	Rock	0.004	<0.5	2.8	<0.01	16.4	<0.001	1	0.03	0.003	0.02	0.2	<0.1	<0.02	0.08	<5	0.1	1.48	0.2	0.04	<0.1
0589	Rock	0.016	7.5	8.3	0.14	14.3	0.001	<1	0.36	0.008	0.06	<0.1	1.0	0.03	<0.02	<5	0.1	<0.02	1.8	0.37	<0.1
0591	Rock	0.044	15.1	7.4	0.03	19.3	0.081	3	1.43	0.158	0.08	3.4	3.0	<0.02	0.25	<5	<0.1	<0.02	3.5	0.09	0.1
0592	Rock	0.036	17.8	19.2	0.28	34.6	0.098	3	3.78	0.532	0.30	0.3	2.5	0.14	0.24	<5	0.3	0.03	9.7	1.55	0.1
0593	Rock	0.004	1.6	2.9	<0.01	2.8	<0.001	2	0.05	0.007	<0.01	<0.1	0.3	<0.02	<0.02	<5	<0.1	0.45	0.2	0.03	<0.1
0594	Rock	0.010	1.1	3.8	0.03	4.8	0.002	<1	0.09	0.011	0.02	<0.1	0.2	<0.02	<0.02	<5	0.2	0.28	0.4	0.09	<0.1
0596	Rock	0.020	17.6	26.3	0.50	60.1	0.097	2	2.10	0.057	0.57	<0.1	3.9	0.27	0.03	<5	<0.1	<0.02	5.9	2.10	<0.1
0597	Rock	0.068	15.6	10.1	0.11	62.7	0.001	2	0.73	0.003	0.26	<0.1	1.4	0.11	0.03	<5	1.8	0.03	1.4	1.65	<0.1
0598	Rock	0.020	18.3	34.7	1.00	95.0	0.048	2	1.99	0.031	0.60	<0.1	3.6	0.23	0.43	<5	<0.1	<0.02	5.9	3.11	<0.1
0599	Rock	0.232	28.3	14.6	1.51	191.6	0.170	8	1.11	0.197	0.72	0.5	2.2	0.27	<0.02	<5	<0.1	<0.02	4.6	4.80	<0.1
0600	Rock	0.022	23.4	23.8	0.39	22.3	0.002	<1	1.06	0.046	0.11	<0.1	2.3	0.04	<0.02	<5	<0.1	<0.02	2.7	0.41	<0.1
0601	Rock	0.025	8.2	20.3	0.45	21.3	0.069	2	2.34	0.221	0.26	0.1	5.1	0.12	<0.02	<5	<0.1	0.04	5.8	0.90	<0.1
0602	Rock	0.042	22.7	41.1	0.78	54.8	0.149	4	7.00	0.593	0.32	0.3	7.0	0.17	0.19	5	<0.1	0.06	15.8	1.78	<0.1
0603	Rock	0.041	18.2	31.0	0.43	32.2	0.113	3	6.53	0.614	0.13	0.3	3.4	0.07	0.47	<5	0.3	0.18	14.3	0.64	<0.1
0604	Rock	0.042	19.7	36.0	0.46	51.5	0.146	4	8.48	0.592	0.08	0.4	3.7	0.03	1.53	<5	0.6	0.44	17.6	5.40	<0.1
0605	Rock	0.047	22.1	33.6	0.27	27.3	0.221	5	7.62	0.330	0.06	1.1	3.8	0.03	1.30	<5	0.8	1.01	16.9	0.64	<0.1
0606	Rock	0.021	17.9	15.3	0.47	43.2	0.003	1	1.05	0.016	0.19	<0.1	1.2	0.06	0.02	<5	<0.1	<0.02	3.1	0.96	<0.1
0607	Rock	0.011	20.9	2.4	<0.01	55.0	0.002	2	0.32	0.072	0.03	<0.1	0.4	<0.02	<0.02	5	0.2	0.17	1.9	0.05	<0.1
0608	Rock	0.028	12.3	15.4	0.37	38.7	0.043	1	1.00	0.078	0.21	<0.1	1.4	0.10	0.07	<5	0.2	<0.02	2.3	0.79	<0.1
0610	Rock	0.003	2.3	2.7	<0.01	1.4	<0.001	<1	0.02	0.002	<0.01	<0.1	0.1	<0.02	<0.02	<5	<0.1	<0.02	0.2	0.03	<0.1
0611	Rock	0.002	1.9	2.3	<0.01	1.3	<0.001	<1	0.02	0.002	<0.01	<0.1	0.1	<0.02	<0.02	<5	<0.1	<0.02	0.2	0.03	<0.1

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003232.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
0106	Rock	<0.02	0.11	2.5	0.2	<0.05	0.2	3.76	2.8	<0.02	<1	<0.1	1.9	<10	<2
0228	Rock	0.04	0.17	74.7	0.9	<0.05	4.2	9.22	48.4	<0.02	4	1.4	30.8	<10	<2
0492	Rock	0.06	0.24	49.4	1.1	<0.05	1.5	10.50	49.3	0.02	<1	1.5	26.6	<10	<2
0506	Rock	<0.02	0.10	4.8	<0.1	<0.05	0.2	1.00	8.4	<0.02	<1	0.3	1.9	<10	<2
0507	Rock	<0.02	0.18	6.0	0.2	<0.05	0.4	1.23	12.7	<0.02	1	0.3	2.5	<10	<2
0508	Rock	0.02	0.16	24.9	0.3	<0.05	0.6	2.40	27.5	<0.02	<1	0.4	10.9	<10	<2
0509	Rock	<0.02	0.02	2.7	0.1	<0.05	0.2	0.36	7.2	<0.02	<1	<0.1	1.0	<10	<2
0578	Rock	<0.02	0.04	4.1	0.1	<0.05	0.3	0.45	15.4	<0.02	<1	<0.1	1.4	<10	<2
0587	Rock	<0.02	0.05	3.9	0.1	<0.05	0.2	3.57	13.6	<0.02	<1	0.4	5.2	<10	<2
0588	Rock	<0.02	0.34	0.7	0.1	<0.05	0.1	0.15	0.7	<0.02	<1	<0.1	0.2	<10	<2
0589	Rock	<0.02	0.03	5.2	<0.1	<0.05	0.4	2.39	14.3	<0.02	<1	0.1	7.8	<10	<2
0591	Rock	0.07	0.42	2.8	0.7	<0.05	2.0	9.76	32.1	<0.02	<1	0.9	1.7	<10	3
0592	Rock	0.11	0.23	34.9	1.0	<0.05	2.0	7.97	33.6	<0.02	<1	1.0	46.9	<10	<2
0593	Rock	<0.02	0.03	0.4	<0.1	<0.05	0.1	0.13	2.4	<0.02	<1	<0.1	0.2	<10	<2
0594	Rock	<0.02	0.05	1.9	<0.1	<0.05	0.2	0.39	2.0	<0.02	<1	<0.1	2.4	<10	<2
0596	Rock	<0.02	0.44	42.8	0.6	<0.05	1.0	2.66	34.0	<0.02	<1	1.1	18.9	<10	<2
0597	Rock	<0.02	0.03	13.9	0.1	<0.05	0.8	5.87	28.5	<0.02	<1	0.9	4.8	<10	<2
0598	Rock	<0.02	0.08	33.6	0.2	<0.05	0.5	4.42	37.3	<0.02	<1	0.8	41.1	<10	<2
0599	Rock	0.21	0.80	69.2	1.1	<0.05	8.6	9.40	58.5	<0.02	<1	0.4	14.6	<10	<2
0600	Rock	<0.02	0.02	4.7	<0.1	<0.05	0.7	2.78	47.0	0.02	<1	0.2	27.6	<10	<2
0601	Rock	<0.02	0.21	23.0	0.6	<0.05	0.6	11.52	15.1	0.03	<1	0.9	19.4	<10	<2
0602	Rock	0.06	0.25	30.0	1.1	<0.05	1.8	9.14	41.8	<0.02	<1	2.2	48.1	<10	2
0603	Rock	0.05	0.43	11.0	1.2	<0.05	1.7	6.78	32.3	<0.02	1	2.2	25.6	<10	<2
0604	Rock	0.06	0.10	6.2	1.6	<0.05	1.4	8.83	36.2	<0.02	2	2.0	20.7	<10	<2
0605	Rock	0.12	0.12	4.0	4.3	<0.05	2.6	13.88	41.7	0.05	2	1.7	10.5	<10	<2
0606	Rock	<0.02	0.03	11.2	<0.1	<0.05	0.7	2.83	35.0	<0.02	<1	0.5	24.8	<10	<2
0607	Rock	<0.02	0.63	1.4	0.1	<0.05	0.9	1.25	36.0	<0.02	<1	0.2	0.9	<10	<2
0608	Rock	<0.02	0.10	15.3	0.2	<0.05	0.5	2.03	23.7	<0.02	<1	0.2	11.5	<10	<2
0610	Rock	<0.02	0.03	0.4	<0.1	<0.05	<0.1	0.45	4.0	<0.02	<1	<0.1	0.2	<10	<2
0611	Rock	<0.02	0.03	0.4	0.1	<0.05	<0.1	0.46	3.4	<0.02	<1	<0.1	0.1	<10	<2

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003232.1

	Method	WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
0612	Rock	0.64	0.40	15.94	9.96	39.1	34	21.3	9.5	211	2.19	78.2	2.5	1.6	7.1	6.8	0.10	0.99	0.07	22	0.21
0613	Rock	1.20	0.97	13.41	28.05	7.3	325	5.5	3.5	39	0.81	59.7	0.3	305.1	7.8	16.2	0.02	0.15	0.52	<2	0.01
0614	Rock	0.34	178.2	33.73	1.23	58.1	71	27.1	13.8	191	1.75	1.5	2.0	0.7	14.1	253.9	0.22	0.06	0.89	25	1.85
0617	Rock	1.18	0.45	10.66	2.10	32.5	32	5.3	2.7	129	0.63	3.0	0.2	2.0	1.0	1.9	0.21	0.05	0.09	2	0.03
0618	Rock	1.42	1.27	6.66	7.02	34.4	67	15.7	6.9	379	2.15	6.0	0.4	0.7	6.3	8.6	0.13	0.09	0.50	17	0.09
0619	Rock	1.05	0.70	150.6	5.46	56.8	417	16.3	30.4	487	5.12	6.6	0.4	4.9	1.3	45.2	0.10	0.24	0.09	126	1.24
0620	Rock	0.87	0.96	16.49	5.82	2.3	457	3.0	1.9	54	1.20	11.9	<0.1	1.1	<0.1	0.6	<0.01	0.10	1.91	<2	<0.01
0684	Rock	1.52	7.11	35.48	4.23	77.8	53	23.7	9.9	494	2.12	0.2	1.5	0.4	10.4	652.2	0.34	<0.02	2.34	38	6.26
0685	Rock	0.80	1.48	31.92	2.15	57.3	67	52.0	23.5	989	5.06	3.1	0.9	<0.2	8.8	695.3	0.07	0.04	0.07	112	4.02

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003232.1

Method		1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
Analyte		P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
Unit		%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
MDL		0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
0612	Rock	0.111	15.5	25.8	0.50	104.2	0.041	12	1.37	0.035	0.59	<0.1	3.2	0.28	0.22	<5	<0.1	<0.02	5.6	2.33	<0.1
0613	Rock	0.009	20.9	3.0	<0.01	62.0	0.001	<1	0.33	0.061	0.06	0.1	0.3	0.02	<0.02	<5	0.3	0.31	2.4	0.08	<0.1
0614	Rock	0.043	36.9	27.1	0.45	78.8	0.177	5	2.06	0.080	0.43	0.7	4.2	0.29	0.26	<5	<0.1	<0.02	7.0	3.99	0.2
0617	Rock	0.013	3.4	4.1	0.02	12.2	<0.001	<1	0.10	0.002	0.06	<0.1	0.4	0.04	<0.02	<5	<0.1	<0.02	0.4	0.22	<0.1
0618	Rock	0.030	16.6	19.2	0.52	50.8	0.002	<1	0.89	0.024	0.13	<0.1	1.8	0.06	<0.02	<5	<0.1	0.06	3.6	0.68	<0.1
0619	Rock	0.159	6.1	28.4	1.71	40.5	0.172	1	2.08	0.117	0.16	0.3	5.1	0.05	1.61	<5	1.6	0.12	7.8	0.35	0.2
0620	Rock	0.004	<0.5	3.2	0.03	1.7	<0.001	<1	0.06	<0.001	<0.01	0.2	0.1	<0.02	<0.02	<5	<0.1	0.18	0.4	0.03	<0.1
0684	Rock	0.054	21.5	41.9	0.57	107.2	0.162	4	6.44	0.454	0.63	3.4	5.7	0.36	0.46	<5	0.3	0.03	16.7	4.16	0.2
0685	Rock	0.512	117.4	90.1	2.78	1200	0.106	<1	2.62	0.243	0.95	<0.1	10.5	0.30	0.12	<5	<0.1	<0.02	9.7	5.90	0.3

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Project: CLY 2013
Report Date: September 10, 2013

CERTIFICATE OF ANALYSIS VAN13003232.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
0612	Rock	<0.02	0.14	35.7	0.7	<0.05	0.7	8.12	33.1	<0.02	<1	0.5	20.6	<10	<2
0613	Rock	0.02	0.45	2.6	0.1	<0.05	1.5	1.21	38.0	<0.02	<1	0.2	0.9	<10	<2
0614	Rock	0.12	0.78	50.0	1.0	<0.05	2.7	10.22	69.6	0.04	11	0.5	39.1	<10	<2
0617	Rock	<0.02	0.03	4.4	0.1	<0.05	0.3	1.05	6.4	<0.02	<1	<0.1	1.2	<10	<2
0618	Rock	<0.02	<0.02	9.1	0.1	<0.05	0.6	4.58	33.8	<0.02	<1	0.3	22.8	<10	<2
0619	Rock	0.11	0.10	4.3	0.3	<0.05	2.1	6.43	13.5	<0.02	3	0.2	34.7	16	4
0620	Rock	<0.02	0.03	0.3	<0.1	<0.05	<0.1	0.26	0.4	<0.02	<1	<0.1	0.8	<10	<2
0684	Rock	0.06	0.16	71.5	0.9	<0.05	1.0	9.71	41.9	<0.02	2	1.5	26.5	<10	<2
0685	Rock	<0.02	0.24	50.2	0.8	<0.05	0.9	20.05	239.4	0.04	<1	1.1	50.6	<10	<2

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Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003232.1

	Method	WGHT	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
	Unit	kg	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	MDL	0.01	0.01	0.01	0.01	0.1	2	0.1	0.1	1	0.01	0.1	0.1	0.2	0.1	0.5	0.01	0.02	0.02	2	0.01
Pulp Duplicates																					
0604	Rock	0.60	1.16	64.42	9.91	44.7	243	42.3	18.7	642	3.22	2.8	1.8	4.0	12.4	467.4	0.08	0.04	6.68	31	4.87
REP 0604	QC		1.17	64.78	10.23	47.4	235	44.3	18.3	650	3.25	3.2	1.9	3.0	12.7	469.6	0.10	0.04	6.94	32	4.89
0608	Rock	1.42	0.38	14.96	12.97	22.2	57	8.9	2.3	209	1.49	1.6	0.5	3.6	8.0	25.3	0.02	0.08	0.13	8	0.20
REP 0608	QC		0.36	14.63	12.64	21.9	60	8.0	2.3	203	1.49	1.9	0.5	3.3	7.6	24.5	0.01	0.08	0.10	8	0.20
0685	Rock	0.80	1.48	31.92	2.15	57.3	67	52.0	23.5	989	5.06	3.1	0.9	<0.2	8.8	695.3	0.07	0.04	0.07	112	4.02
REP 0685	QC		1.45	33.55	2.22	59.6	61	58.0	26.1	1081	5.08	3.4	0.9	<0.2	8.1	676.0	0.07	0.04	0.06	112	4.00
Core Reject Duplicates																					
0605	Rock	0.17	0.81	79.25	6.07	36.2	252	35.7	17.9	1099	4.32	6.5	2.2	30.4	12.5	343.1	0.11	0.04	22.76	31	5.01
DUP 0605	QC		0.80	84.65	4.92	36.6	242	38.6	19.8	995	4.56	2.7	2.1	32.7	11.7	321.1	0.10	0.04	25.15	30	4.68
Reference Materials																					
STD DS9	Standard		12.94	106.7	136.5	311.4	1801	39.1	7.5	579	2.38	23.7	2.8	109.9	6.8	81.9	2.48	5.29	6.93	41	0.74
STD DS9	Standard		13.45	102.5	120.6	285.1	1690	38.8	7.2	567	2.34	25.0	2.7	110.2	6.8	77.6	2.10	5.15	6.21	42	0.78
STD DS9 Expected			12.84	108	126	317	1830	40.3	7.6	575	2.33	25.5	2.69	118	6.38	69.6	2.4	4.94	6.32	40	0.7201
BLK	Blank		<0.01	<0.01	<0.01	<0.1	<2	<0.1	<0.1	<1	<0.01	<0.1	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01
BLK	Blank		<0.01	0.02	0.04	<0.1	4	<0.1	<0.1	<1	<0.01	1.6	<0.1	<0.2	<0.1	<0.5	<0.01	<0.02	<0.02	<2	<0.01
Prep Wash																					
G1	Prep Blank		0.23	5.24	3.53	42.6	17	2.9	4.2	581	2.15	0.1	2.2	2.6	6.5	63.5	0.06	0.08	0.12	39	0.57
G1	Prep Blank		0.19	4.46	3.47	44.5	13	2.7	3.9	568	2.07	0.7	2.1	0.7	6.7	60.8	0.03	0.04	0.08	39	0.55

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Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

Project: CLY 2013
Report Date: September 10, 2013

QUALITY CONTROL REPORT VAN13003232.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Sc	Tl	S	Hg	Se	Te	Ga	Cs	Ge
	Unit	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	ppm	ppm
	MDL	0.001	0.5	0.5	0.01	0.5	0.001	1	0.01	0.001	0.01	0.1	0.1	0.02	0.02	5	0.1	0.02	0.1	0.02	0.1
Pulp Duplicates																					
0604	Rock	0.042	19.7	36.0	0.46	51.5	0.146	4	8.48	0.592	0.08	0.4	3.7	0.03	1.53	<5	0.6	0.44	17.6	5.40	<0.1
REP 0604	QC	0.042	20.0	36.0	0.47	52.6	0.146	4	8.64	0.590	0.08	0.4	3.7	0.03	1.54	<5	1.0	0.40	18.2	5.46	<0.1
0608	Rock	0.028	12.3	15.4	0.37	38.7	0.043	1	1.00	0.078	0.21	<0.1	1.4	0.10	0.07	<5	0.2	<0.02	2.3	0.79	<0.1
REP 0608	QC	0.027	11.6	15.3	0.36	36.7	0.041	2	0.98	0.073	0.21	<0.1	1.3	0.11	0.07	<5	0.4	<0.02	2.3	0.79	<0.1
0685	Rock	0.512	117.4	90.1	2.78	1200	0.106	<1	2.62	0.243	0.95	<0.1	10.5	0.30	0.12	<5	<0.1	<0.02	9.7	5.90	0.3
REP 0685	QC	0.475	119.9	97.0	2.78	1209	0.093	<1	2.63	0.245	0.96	<0.1	10.0	0.32	0.12	<5	<0.1	<0.02	9.9	6.35	0.4
Core Reject Duplicates																					
0605	Rock	0.047	22.1	33.6	0.27	27.3	0.221	5	7.62	0.330	0.06	1.1	3.8	0.03	1.30	<5	0.8	1.01	16.9	0.64	<0.1
DUP 0605	QC	0.044	21.3	32.3	0.27	25.3	0.211	6	7.13	0.303	0.06	1.2	3.6	0.02	1.42	<5	0.9	1.24	15.8	0.59	<0.1
Reference Materials																					
STD DS9	Standard	0.085	14.6	115.3	0.63	319.2	0.109	2	0.99	0.087	0.40	3.3	2.8	5.36	0.17	210	5.4	5.15	5.0	2.57	0.1
STD DS9	Standard	0.075	15.1	114.6	0.63	283.3	0.120	3	1.03	0.096	0.41	2.7	2.6	4.67	0.16	196	5.1	4.80	4.5	2.31	<0.1
STD DS9 Expected		0.0819	13.3	121	0.6165	295	0.1108		0.9577	0.0853	0.395	2.89	2.5	5.3	0.1615	200	5.2	5.02	4.59	2.37	0.1
BLK	Blank	<0.001	<0.5	<0.5	<0.01	<0.5	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1
BLK	Blank	<0.001	<0.5	<0.5	<0.01	<0.5	<0.001	<1	<0.01	<0.001	<0.01	<0.1	<0.1	<0.02	<0.02	<5	<0.1	<0.02	<0.1	<0.02	<0.1
Prep Wash																					
G1	Prep Blank	0.074	16.1	5.6	0.49	163.0	0.128	2	1.03	0.112	0.52	<0.1	2.5	0.30	<0.02	<5	<0.1	0.04	4.9	3.48	0.2
G1	Prep Blank	0.073	16.3	5.2	0.50	162.8	0.126	3	1.01	0.105	0.51	<0.1	2.4	0.32	<0.02	<5	<0.1	<0.02	4.6	3.53	0.1

AcmeLabs™
A Bureau Veritas Group Company

www.acmelab.com

Acme Analytical Laboratories (Vancouver) Ltd.
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA
PHONE (604) 253-3158

Client: **Clarke Gold Inc.**
215 Silver Mead Cres. NW
Calgary AB T3B 3W4 Canada

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QUALITY CONTROL REPORT VAN13003232.1

	Method	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30	1F30
	Analyte	Hf	Nb	Rb	Sn	Ta	Zr	Y	Ce	In	Re	Be	Li	Pd	Pt
	Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb	ppb
	MDL	0.02	0.02	0.1	0.1	0.05	0.1	0.01	0.1	0.02	1	0.1	0.1	10	2
Pulp Duplicates															
0604	Rock	0.06	0.10	6.2	1.6	<0.05	1.4	8.83	36.2	<0.02	2	2.0	20.7	<10	<2
REP 0604	QC	0.05	0.11	6.1	1.6	<0.05	1.3	8.63	36.0	0.02	<1	2.4	20.9	<10	<2
0608	Rock	<0.02	0.10	15.3	0.2	<0.05	0.5	2.03	23.7	<0.02	<1	0.2	11.5	<10	<2
REP 0608	QC	<0.02	0.12	15.7	0.2	<0.05	0.5	2.06	21.9	<0.02	<1	0.2	11.7	<10	<2
0685	Rock	<0.02	0.24	50.2	0.8	<0.05	0.9	20.05	239.4	0.04	<1	1.1	50.6	<10	<2
REP 0685	QC	<0.02	0.42	48.8	0.7	<0.05	0.6	19.30	248.7	0.03	<1	1.1	50.6	<10	<2
Core Reject Duplicates															
0605	Rock	0.12	0.12	4.0	4.3	<0.05	2.6	13.88	41.7	0.05	2	1.7	10.5	<10	<2
DUP 0605	QC	0.12	0.15	3.9	4.1	<0.05	2.7	13.94	39.2	0.04	<1	1.8	10.5	<10	<2
Reference Materials															
STD DS9	Standard	0.08	1.44	35.8	6.5	<0.05	2.0	6.36	28.6	2.22	66	5.6	26.8	118	374
STD DS9	Standard	0.09	1.42	32.3	6.4	<0.05	2.2	6.74	27.7	1.97	58	5.1	24.6	121	313
STD DS9 Expected		0.08	1.33	33.8	6.4	0.004	2	5.97	25.4	2.2	61	5.4	25.2	120	350
BLK	Blank	<0.02	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	0.02	<1	<0.1	<0.1	<10	<2
BLK	Blank	<0.02	<0.02	<0.1	<0.1	<0.05	<0.1	<0.01	<0.1	<0.02	<1	<0.1	<0.1	<10	<2
Prep Wash															
G1	Prep Blank	0.08	0.79	42.8	0.7	<0.05	1.2	6.30	30.6	0.05	<1	0.4	29.8	<10	<2
G1	Prep Blank	0.09	0.72	41.6	0.6	<0.05	1.2	5.89	28.7	0.02	<1	0.2	33.0	<10	<2

Appendix 5 Lab methods used by Acme Analytical Labs Ltd. (Vancouver)

Five pdf files, ‘Methods and Specification’ Sheets as supplied by Acme [now Bureau Veritas].

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AQ300, AQ200

Package Description	Geochemical aqua regia digestion
Sample Digestion	HNO3-HCl acid digestion
Instrumentation Method	ICP-ES (AQ300, AQ200), ICP-MS (AQ200)
Legacy Code	1D, 1DX
Applicability	Sediment, Soil, Non-mineralized Rock and Drill Core

METHOD DESCRIPTION:

Prepared sample is digested with a modified Aqua Regia solution of equal parts concentrated HCl, HNO3 and DI H2O for one hour in a heating block or hot water bath. Sample is made up to volume with dilute HCl. Sample splits of 0.5g are analyzed optional 15g or 30g digestion available for AQ200.

Element	AQ300 Detection	AQ200 Detection	Upper Limit
Ag	0.3 ppm	0.1 ppm	100 ppm
Al*	0.01 %	0.01 %	10 %
As	2 ppm	0.5 ppm	10000 ppm
Au	-	0.5 ppb	100 ppm
B*^	20 ppm	20 ppm	2000 ppm
Ba*	1 ppm	1 ppm	10000 ppm
Bi	3 ppm	0.1 ppm	2000 ppm
Ca*	0.01 %	0.01 %	40 %
Cd	0.5 ppm	0.1 ppm	2000 ppm
Co	1 ppm	0.1 ppm	2000 ppm
Cr*	1 ppm	1 ppm	10000 ppm
Cu	1 ppm	0.1 ppm	10000 ppm
Fe*	0.01 %	0.01 %	40 %
Ga*	-	1 ppm	1000 ppm
Hg	1 ppm	0.01 ppm	50 ppm
K*	0.01 %	0.01 %	10 %
La*	1 ppm	1 ppm	10000 ppm
Mg*	0.01 %	0.01 %	30 %
Mn*	2 ppm	1 ppm	10000 ppm
Mo	1 ppm	0.1 ppm	2000 ppm

Element	AQ300 Detection	AQ200 Detection	Upper Limit
Na*	0.01 %	0.001 %	5 %
Ni	1 ppm	0.1 ppm	10000 ppm
P*	0.001 %	0.001 %	5 %
Pb	3 ppm	0.1 ppm	10000 ppm
S	0.05 %	0.05 %	10 %
Sb	3 ppm	0.1 ppm	2000 ppm
Sc	-	0.1 ppm	100 ppm
Se	-	0.5 ppm	100 ppm
Sr*	1 ppm	1 ppm	10000 ppm
Te	-	0.2 ppm	1000 ppm
Th*	2 ppm	0.1 ppm	2000 ppm
Ti*	0.01 %	0.001 %	5 %
Tl	5 ppm	0.1 ppm	1000 ppm
U*	8 ppm	0.1 ppm	2000 ppm
V*	1 ppm	2 ppm	10000 ppm
W*	2 ppm	0.1 ppm	100 ppm
Zn	1 ppm	1 ppm	10000 ppm

* Solubility of some elements will be limited by mineral species present.   ^Detection limit = 1 ppm for 15g / 30g analysis.

Limitations:

Au solubility can be limited by refractory and graphitic samples.

AQ250

Package Description	Ultra Trace Geochemical aqua regia digestion
Sample Digestion	HNO3-HCl acid digestion
Instrumentation Method	ICP-ES and ICP-MS
Legacy Code	1F
Applicability	Sediment, Soil, Non-mineralized Rock and Drill Core

METHOD DESCRIPTION:

Prepared sample is digested with a modified Aqua Regia solution of equal parts concentrated HCl, HNO3 and DI H2O for one hour in a heating block or hot water bath. Sample is made up to volume with dilute HCl. Sample splits of 0.5g, 15g or 30g can be analyzed.
Lead isotope Add On (+ISO) Pb_{204}, Pb_{206}, Pb_{207}, Pb_{208} are suitable for geochemical exploration of U and other commodities where gross differences in natural to radiogenic Pb ratios, is a benefit. Isotope values can be reported in both concentrations and intensities. Sample splits of 0.5g, 15g or 30g can be analyzed.

Element	AQ250 Detection	Upper Limit
Ag	2 ppb	100 ppm
Al*	0.01%	10%
As	0.1 ppm	10000 ppm
Au	0.2 ppb	100 ppm
B*^	20 ppm	2000 ppm
Ba*	0.5 ppm	10000 ppm
Bi	0.02 ppm	2000 ppm
Ca*	0.01%	40%
Cd	0.01 ppm	2000 ppm
Co	0.1 ppm	2000 ppm
Cr*	0.5 ppm	10000 ppm
Cu	0.01 ppm	10000 ppm
Fe*	0.01%	40%
Ga*	0.1 ppm	1000 ppm
Hg	5 ppb	50 ppm
K*	0.01%	10%
La*	0.5 ppm	10000 ppm
Mg*	0.01%	30%
Mn*	1 ppm	10000 ppm
Mo	0.01 ppm	2000 ppm
Na*	0.001%	5%
Ni	0.1 ppm	10000 ppm
P*	0.001%	5%
Pb	0.01 ppm	10000 ppm
S	0.02%	10%

Element	Detection Limit	Upper Limit
Sb	0.02 ppm	2000 ppm
Sc	0.1 ppm	100 ppm
Se	0.1 ppm	100 ppm
Sr*	0.5 ppm	10000 ppm
Te	0.02 ppm	1000 ppm
Th*	0.1 ppm	2000 ppm
Ti*	0.001%	5%
Tl	0.02 ppm	1000 ppm
U*	0.05 ppm	2000 ppm
V*	2 ppm	10000 ppm
W*	0.05 ppm	100 ppm
Zn	0.1 ppm	10000 ppm
Extended Package		
Be*	0.1 ppm	1000 ppm
Ce*	0.1 ppm	2000 ppm
Cs*	0.02 ppm	2000 ppm
Ge*	0.1 ppm	100 ppm
Hf*	0.02 ppm	1000 ppm
In	0.02 ppm	1000 ppm
Li*	0.1 ppm	2000 ppm
Nb*	0.02 ppm	2000 ppm
Rb*	0.1 ppm	2000 ppm
Re	1 ppb	1000 ppb
Sn*	0.1 ppm	100 ppm
Ta*	0.05 ppm	2000 ppm

Element	Detection Limit	Upper Limit
Y*	0.01 ppm	2000 ppm
Zr*	0.1 ppm	2000 ppm
REE Add On		
Pr	0.02 ppm	2000 ppm
Nd	0.02 ppm	2000 ppm
Sm	0.02 ppm	10000 ppm
Eu	0.02 ppm	10000 ppm
Gd	0.02 ppm	10000 ppm
Tb	0.02 ppm	10000 ppm
Dy	0.02 ppm	10000 ppm
Ho	0.02 ppm	10000 ppm
Er	0.02 ppm	10000 ppm
Tm	0.02 ppm	10000 ppm
Yb	0.02 ppm	10000 ppm
Lu	0.02 ppm	10000 ppm
Lead Isotopes		
Pb_{204}	0.01 ppm	10000 ppm
Pb_{206}	0.01 ppm	10000 ppm
Pb_{207}	0.01 ppm	10000 ppm
Pb_{208}	0.01 ppm	10000 ppm
PGM Add on		
Pt*	2 ppb	100 ppm
Pd*	10 ppb	100 ppm

* Solubility of some elements will be limited by mineral species present. ^Detection limit = 1 ppm for 15g / 30g analysis.

TC000

Package Description	Carbon and Sulphur Analysis by Leco
Sample Digestion	Combustion
Instrumentation Method	LECO Carbon-Sulphur analyser
Legacy Codes	2A Leco
Applicability	Sediment, Soil, Rock and Drill Core

METHOD DESCRIPTION

TC001 Total C, TC002 Total S and TC003 C & S: Induction flux is added to the prepared sample then ignited in an induction furnace. A carrier gas sweeps up released carbon to be measured by adsorption in an infrared spectrometric cell. Results are total and attributed to the presence of carbon and sulphur in all forms.

TC005 Graphite C: Graphite carbon is determined by leaching samples with concentrated nitric acid followed by KOH and finally dilute HCl then analyzing the residue by Leco.

TC006 Inorganic C: Inorganic carbon is determined by directly measuring the CO2 gas evolved into the LECO analyzer when a prepared sample split is leached with perchloric acid.

TC008 Sulphate: Sulphate sulphur is determined by pre-igniting the prepared sample at 550^{o}C, then analyzing the residue by Leco.

By calculation the following are determined:

TC009 Sulphide: Sulphide Sulphur is determined by difference wherein: Sulphide S = Total Sulphur (TOT/S) – Sulphate Sulphur (IGN/S).

TC007 Organic C: Organic carbon content is determined by difference wherein: Organic Carbon = Total C – Inorganic (CO_2) Carbon – Graphite Carbon.

Code	Element	Detection Limit
TC001	Total C	0.02 %
TC005	Graphite C	0.02 %
TC007	Organic C	0.02 %
TC006	Inorganic C	0.02 %
TC002	Total S	0.02 %
TC008	Sulphate	0.05 %
TC009	Sulphide	0.05 %

Limitations:
The pyrolysis residual sulphur (2A14 - 550 ^{o}C) may be the best estimate of sulphate in the presence of minerals such as barite, alunite, and jarosite which are not dissolved in sodium carbonate and in the presence of orpiment and realgar, since these sulfide minerals are soluble in sodium carbonate.

Calculation determinations for the sulphide sulfur do not provide for the presence of elemental forms of sulphur.

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INSPECTORATE

LF100, LF200, LF300

Package Description	Lithogeochemical Whole Rock Fusion
Sample Digestion	Lithium metaborate/tetraborate fusion
Instrumentation Method	ICP-ES (LF300, LF200), ICP-MS (LF200, LF100)
Legacy Code	4A, 4B and 4A4B
Applicability	Non-mineralized Rock and Drill Core

METHOD DESCRIPTION

Prepared sample is mixed with $LiBO_2/Li_2B_4O_7$ flux. Crucibles are fused in a furnace. The cooled bead is dissolved in ACS grade nitric acid and analyzed by ICP and/or ICP-MS. Loss on ignition (LOI) is determined by igniting a sample split then measuring the weight loss. Total Carbon and Sulphur may be included and is determined by the Leco method (TC003). The LF202 package includes an additional 14 elements from an aqua regia digestion AQ200 to provide Au and volatile elements which do not report as part of the LF200 package.

Element	LF300/LF200 Detection	Upper Limit
SiO_2	0.01 %	100 %
Al_2O_3	0.01 %	100 %
Fe_2O_3	0.04 %	100 %
CaO	0.01 %	100 %
MgO	0.01 %	100 %
Na_2O	0.01 %	100 %
K_2O	0.04 %	100 %
MnO	0.01 %	100 %
TiO_2	0.01 %	100 %
P_2O_5	0.01 %	100 %
Cr_2O_3	0.002%	100 %
Ba	5 ppm	5 %
LOI	0.1 %	100%
	LF300-EXT	
Ce	30 ppm	50000 ppm
Co	20 ppm	10000 ppm
Cu	5 ppm	10000 ppm
Zn	5 ppm	10000 ppm

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LF100/LF200 Elements by ICPMS

Element	Detection Limit	Upper Limit
Be	1 ppm	10000 ppm
Ce	0.1 ppm	50000 ppm
Co	0.2 ppm	10000 ppm
Cs	0.1 ppm	10000 ppm
Dy	0.05 ppm	10000 ppm
Er	0.03 ppm	10000 ppm
Eu	0.02 ppm	10000 ppm
Ga	0.5 ppm	10000 ppm
Gd	0.05 ppm	10000 ppm
Hf	0.1 ppm	10000 ppm
Ho	0.02 ppm	10000 ppm
La	0.1 ppm	50000 ppm
Lu	0.01 ppm	10000 ppm
Nb	0.1 ppm	50000 ppm
Nd	0.3 ppm	10000 ppm
Ni	20 ppm	10000 ppm
Pr	0.02 ppm	10000 ppm
Rb	0.1 ppm	10000 ppm
Sc	1 ppm	10000 ppm
Sm	0.05 ppm	10000 ppm
Sn	1 ppm	10000 ppm
Sr	0.5 ppm	50000 ppm
Ta	0.1 ppm	50000 ppm
Tb	0.01 ppm	10000 ppm
Th	0.2 ppm	10000 ppm
Tm	0.01 ppm	10000 ppm
U	0.1 ppm	10000 ppm
V	8 ppm	10000 ppm
W	0.5 ppm	10000 ppm
Y	0.1 ppm	50000 ppm
Yb	0.05 ppm	10000 ppm
Zr	0.1 ppm	50000 ppm

AQ200 Add on Elements for LF202

Element	Detection Limit	Upper Limit
Ag	0.1 ppm	100 ppm
As	0.5 ppm	10000 ppm
Au	0.5 ppb	100000 ppb
Bi	0.1 ppm	2000 ppm
Cd	0.1 ppm	2000 ppm
Cu	0.1 ppm	10000 ppm
Hg	0.01 ppm	50 ppm
Mo	0.1 ppm	2000 ppm
Ni	0.1 ppm	10000 ppm
Pb	0.1 ppm	10000 ppm
Sb	0.1 ppm	2000 ppm
Se	0.5 ppm	100 ppm
Tl	0.1 ppm	1000 ppm
Zn	1 ppm	10000 ppm

G806

Package Description:	FeO Determination by Titration
Sample Digestion:	H_2SO_4 and HF digestion
Determination Method:	Titration
Applicability:	Rock and Drill Core

METHOD DESCRIPTION:

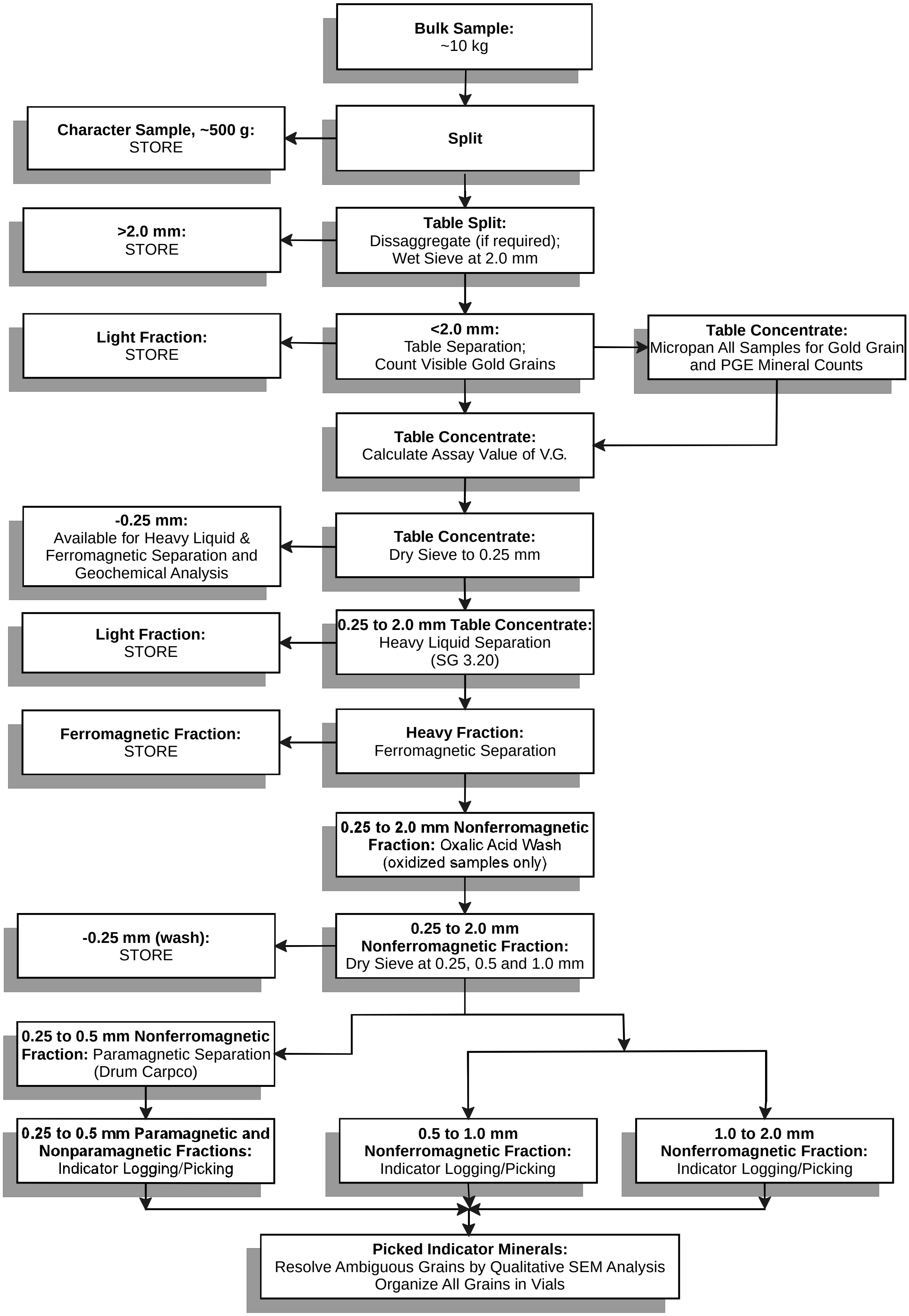
Samples are first digested with sulfuric acid. Solutions are allowed to cool and then digested with hydrofluoric acid. Indicator solution consisting of distilled water, sulfuric acid, phosphoric acid, boric acid and diphenylamine sulfonate is added to every sample solution. Solutions are then titrated using a standard dichromate ($K_2Cr_2O_7$) solution. The end point of the titration is determined when a purple color persists in the sample solution for 30 seconds.

Sample splits of 0.5g can be analyzed.

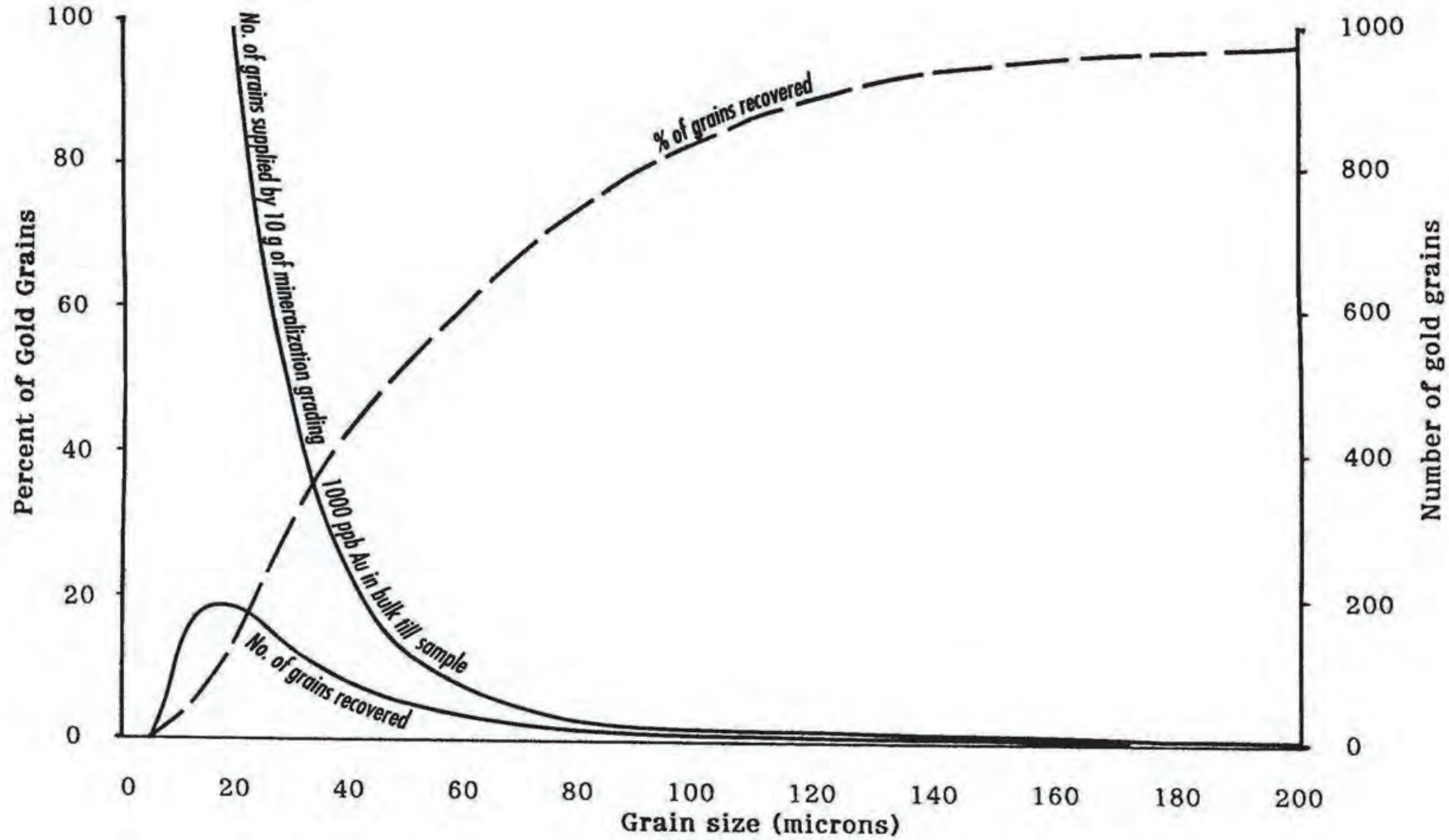
Appendix 6 Flowchart of the general lab procedure for Heavy Mineral separation from bulk silts by Overburden Drilling Management Ltd. and supplied Figure 'Rate of Au grain recovery in ODM lab showing effects of grain size on number of Au grains recovered'

2 pdf documents

OVERBURDEN DRILLING MANAGEMENT LIMITED



Processing Flowsheet for Gold Grains + MMSIMs + PGE Indicators



Rate of gold grain recovery in ODM laboratory showing effects of grain size on number of gold grains recovered. Dashed line shows percent recovery and solid lines show number of gold grains.

Appendix 7 Data Transmittal Report by ODM Ltd. for 23 bulk silts and 14 picked HM fractions, dated Dec. 19, 2013

One pdf File 20136432 14 p.
Includes 23 bulk silts processed for gold & metallic mineral gns, sample ID's HM-01 to HM-04 and HM-07 to HM-25.
Heavy liquid of S.G. 3.20 g/cc used
14 of these processed for 'Skarn-subtype' Heavy Indicator Minerals 'MMSIMs'

OVERBURDEN DRILLING MANAGEMENT LIMITED
107-15 CAPELLA COURT, NEPEAN, ONTARIO, K2E 7X1
TELEPHONE: (613) 226-1771
FAX NO.: (613) 226-8753
EMAIL: odm@storm.ca

DATA TRANSMITTAL REPORT

DATE: 19-Dec-2013

ATTENTION: **Mr. Bill Howard**

CLIENT: **Clarke Gold Inc.**
215 Silver Mead Cr. NW
Calgary, AB
T3B 3W4

E-Mail: **wm.howard@shaw.ca**

NO. OF PAGES: 14

PROJECT: **HM**

FILE NAME: **20136432 - Clarke Gold - Howard - MMSIMs - October**

SAMPLE NUMBERS: **HM-01 to 04 and 07 to 25**

BATCH NUMBER: **6460, 6470 and 6478**

NO. OF SAMPLES: **23**

THESE SAMPLES WERE PROCESSED FOR: **MMSIMs**
GOLD

SPECIFICATIONS:

1. Submitted by client: ±8 kg stream sediment samples prescreened to 1.7 mm in the field.
2. One ±200 g archival split taken.
3. All samples panned for gold and metallic minerals.
4. Heavy liquid separation specific gravity: 3.20.
5. 0.25-2.0 mm nonferromagnetic heavy mineral fraction picked for indicator minerals and lamped for scheelite.
6. Gold grains photographed and kept separate in small conical bottom vials.

REMARKS: Includes 14 selected samples for MMSIMs

Remy Huneault, P.Geo.
Laboratory Manager

OVERBURDEN DRILLING MANAGEMENT LIMITED
RAW SAMPLE DESCRIPTIONS AND PROCESSING WEIGHTS

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

Sample Number	Weight (kg)					Clasts >2.0 mm*					Matrix <2.0 mm							Class
						Size	Percentage				Distribution				Org	Colour		
	Bulk Rec'd	Archived Split	Table Split *	+2 mm Clasts	Table Feed		V/S	GR	LS	OT	S/U	SD	ST	CY		Sand	Clay	
HM-01	7.5	0.2	7.3	0.0	7.3		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-02	8.2	0.2	8.0	0.0	8.0		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-03	9.2	0.2	9.0	0.0	9.0		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-04	8.8	0.2	8.6	0.0	8.6		No Clasts				S	MC	N	N	N	GY	NA	SAND + GRAVEL
HM-07	8.0	0.2	7.8	0.0	7.8		No Clasts				S	MC	N	N	N	GY	NA	SAND + GRAVEL
HM-08	8.5	0.2	8.3	0.0	8.3		No Clasts				S	MC	N	N	N	DGY	NA	SAND + GRAVEL
HM-09	8.3	0.2	8.1	0.0	8.1		No Clasts				S	MC	N	N	N	DGY	NA	SAND + GRAVEL
HM-10	8.1	0.2	7.9	0.0	7.9		No Clasts				S	MC	N	N	N	DGY	NA	SAND + GRAVEL
HM-11	8.1	0.2	7.9	0.0	7.9		No Clasts				S	MC	N	N	N	GY	NA	SAND + GRAVEL
HM-12	8.6	0.2	8.4	0.0	8.4		No Clasts				S	MC	N	N	N	GY	NA	SAND + GRAVEL
HM-13	8.9	0.2	8.7	0.0	8.7		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-14	9.4	0.2	9.2	0.0	9.2		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-15	8.7	0.2	8.5	0.0	8.5		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-16	9.7	0.2	9.5	0.0	9.5		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-17	8.9	0.2	8.7	0.0	8.7		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-18	9.2	0.2	9.0	0.0	9.0		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-19	8.7	0.2	8.5	0.0	8.5		No Clasts				S	MC	N	N	N	DOC	NA	SAND + GRAVEL
HM-20	8.3	0.2	8.1	0.0	8.1		No Clasts				S	MC	N	N	N	DOC	NA	SAND + GRAVEL
HM-21	8.1	0.2	7.9	0.0	7.9		No Clasts				S	MC	N	N	N	DOC	NA	SAND + GRAVEL
HM-22	5.9	0.2	5.7	0.0	5.7		No Clasts				S	MC	N	N	N	DOC	NA	SAND + GRAVEL
HM-23	8.2	0.2	8.0	0.0	8.0		No Clasts				S	MC	N	N	N	OC	NA	SAND + GRAVEL
HM-24	7.9	0.2	7.7	0.0	7.7		No Clasts				S	MC	N	N	N	DOC	NA	SAND + GRAVEL
HM-25	8.7	0.2	8.5	0.0	8.5		No Clasts				S	MC	N	N	N	DOC	NA	SAND + GRAVEL

*Samples prescreened to 1.7 mm in the field.

OVERBURDEN DRILLING MANAGEMENT LIMITED
GOLD GRAIN SUMMARY

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

Sample Number	Number of Visible Gold Grains				Nonmag HMC Weight	Calculated PPB Visible Gold in HMC			
	Total	Reshaped	Modified	Pristine	(g)	Total	Reshaped	Modified	Pristine
HM-01	0	0	0	0	83.7	0	0	0	0
HM-02	0	0	0	0	95.6	0	0	0	0
HM-03	7	5	2	0	69.1	1320	1287	33	0
HM-04	8	6	2	0	48.5	7493	7431	62	0
HM-07	16	6	9	1	34.5	367	231	135	1
HM-08	6	5	1	0	54.5	38	10	28	0
HM-09	2	2	0	0	68.2	9310	9310	0	0
HM-10	5	4	1	0	49.4	66	36	30	0
HM-11	8	5	3	0	59.4	158	105	53	0
HM-12	0	0	0	0	79.1	0	0	0	0
HM-13	5	3	2	0	51.4	3080	3049	31	0
HM-14	9	6	2	1	53.4	107	102	4	2
HM-15	5	0	3	2	71.2	2174	0	2166	8
HM-16	4	2	2	0	55.2	634	629	5	0
HM-17	7	3	4	0	68.1	501	415	86	0
HM-18	8	2	5	1	101.4	834	440	393	1
HM-19	7	3	2	2	86.7	315	238	36	41
HM-20	0	0	0	0	87.9	0	0	0	0
HM-21	0	0	0	0	84.3	0	0	0	0
HM-22	2	2	0	0	51.1	27	27	0	0
HM-23	3	1	1	1	112.3	11	9	2	<1
HM-24	9	3	5	1	46.9	248	216	32	1
HM-25	10	6	3	1	89.6	327	64	259	4

OVERBURDEN DRILLING MANAGEMENT LIMITED
DETAILED GOLD GRAIN DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

Sample Number	Panned Yes/No	Dimensions (microns)			Number of Visible Gold Grains				Nonmag HMC Weight (g)	Calculated V.G. Assay in HMC (ppb)	Metallic Minerals in Pan Concentrate
		Thickness	Width	Length	Reshaped	Modified	Pristine	Total			
HM-01	Yes	NO VISIBLE GOLD									~15 grains pyrite (25µm).
HM-02	Yes	NO VISIBLE GOLD									5 grains pyrite (25-50µm). ~10 grains marcasite (25-50µm).
HM-03	Yes	5 C	25	25	1			1			0.5% marcasite (15-75µm).
		10 C	50	50		1		1			
		15 C	75	75	1			1			
		22 C	75	150		1		1			
		40 C	75	350	1			1			
		75 M	125	175	1			1			
		100 M	175	400	1			1			
								7	69.1	1320	
HM-04	Yes	8 C	25	50	1			1			SEM checks: 3 of ~10 scheelite candidates = 3 scheelite (150-400µm), 1 PGM candidate = 1 sperrylite (25µm); and 2 pyrite versus arsenopyrite candidates = 2 pyrite (25µm).
		10 C	25	75	1			1			
		15 C	50	100	1			1			
		20 C	100	100		2		2			
		22 C	100	125	1			1			
		44 C	175	300	1			1			
		250 M	400	450	1			1			
								8	48.5	7493	
HM-07	Yes	5 C	25	25		1	1	2			No sulphides. SEM checks: 2 scheelite candidates = 2 scheelite (200µm).
		8 C	25	50	2	5		7			
		10 C	25	75		1		1			
		13 C	25	100	1			1			
		10 C	50	50		1		1			
		18 C	50	125	1			1			
		20 C	75	125	1			1			
		27 C	100	175		1		1			
		29 C	150	150	1			1			
								16	34.5	367	
HM-08	Yes	3 C	15	15	1			1			No sulphides.
		8 C	25	50	2			2			
		10 C	50	50	2			2			
		20 C	100	100		1		1			
								6	54.5	38	
HM-09	Yes	22 C	75	150	1			1			No sulphides.
		150 M	250	1,250	1			1			
								2	68.2	9310	
HM-10	Yes	5 C	25	25	1			1			3 grains pyrite (25-50µm).
		8 C	25	50	1			1			
		15 C	75	75	1			1			
		18 C	75	100	1			1			
		20 C	75	125		1		1			
								5	49.4	66	
HM-11	Yes	8 C	25	50	1	1		2			
		10 C	50	50	1	1		2			
		15 C	50	100	1			1			
		20 C	75	125	1			1			
		25 C	100	150		1		1			
		27 C	100	175	1			1			
								8	59.4	158	
HM-12	Yes	NO VISIBLE GOLD									
HM-13	Yes	8 C	25	50		1		1			
		18 C	50	125	1			1			
		20 C	50	150		1		1			
		27 C	75	200	1			1			
		100 M	250	650	1			1			
								5	51.4	3080	

OVERBURDEN DRILLING MANAGEMENT LIMITED
DETAILED GOLD GRAIN DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

Sample Number	Panned Yes/No	Dimensions (microns)			Number of Visible Gold Grains				Nonmag HMC Weight	Calculated V.G. Assay in HMC	Metallic Minerals in Pan Concentrate
		Thickness	Width	Length	Reshaped	Modified	Pristine	Total	(g)	(ppb)	
HM-14	Yes	5 C	25	25		1		1			
		8 C	25	50			1	1			
		10 C	50	50		1		1			
		13 C	50	75	1			1			
		15 C	50	100	1			1			
		15 C	75	75	2			2			
		18 C	75	100	1			1			
		22 C	75	150	1			1			
								9	53.4	107	
HM-15	Yes	10 C	25	75		1	1	2			
		13 C	50	75			1	1			
		22 C	75	150		1		1			
		100 M	250	650		1		1			
								5	71.2	2174	
HM-16	Yes	8 C	25	50		1		1			
		10 C	25	75		1		1			
		44 C	125	350	1			1			
		42 C	200	250	1			1			
								4	55.2	634	
HM-17	Yes	10 C	50	50		1		1			
		13 C	50	75	1			1			
		15 C	50	100		1		1			
		22 C	75	150		1		1			
		25 C	125	125		1		1			
		31 C	125	200	1			1			
		46 C	250	250	1			1			
								7	68.1	501	
HM-18	Yes	8 C	25	50			1	1			
		18 C	75	100		2		2			
		29 C	100	200		1		1			
		25 C	125	125		1		1			
		36 C	125	250	1			1			
		75 M	150	350	1			1			
		100 M	200	200		1		1			
								8	101.4	834	
HM-19	Yes	15 C	75	75			1	1			
		18 C	75	100		1		1			
		25 C	75	175	1			1			
		22 C	100	125		1		1			
		25 C	125	125	1		1	2			
		75 M	125	200	1			1			
								7	86.7	315	
HM-20	Yes	NO VISIBLE GOLD									
HM-21	Yes	NO VISIBLE GOLD									
HM-22	Yes	13 C	50	75	1			1			
		18 C	50	125	1			1			
								2	51.1	27	
HM-23	Yes	5 C	25	25			1	1			
		10 C	50	50		1		1			
		18 C	75	100	1			1			
								3	112.3	11	
HM-24	Yes	3 C	15	15		1		1			
		5 C	25	25	1		1	2			
		8 C	25	50		1		1			
		10 C	25	75		2		2			
		10 C	50	50	1			1			
		18 C	50	125		1		1			
		50 M	125	200	1			1			
								9	46.9	248	

OVERBURDEN DRILLING MANAGEMENT LIMITED
DETAILED GOLD GRAIN DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

Sample Number	Panned Yes/No	Dimensions (microns)			Number of Visible Gold Grains				Nonmag HMC Weight	Calculated V.G. Assay in HMC	Metallic Minerals in Pan Concentrate
		Thickness	Width	Length	Reshaped	Modified	Pristine	Total	(g)	(ppb)	
HM-25	Yes	3 C	15	15	1			1			
		5 C	25	25		1		1			
		8 C	25	50	1			1			
		10 C	50	50	1			1			
		13 C	50	75			1	1			
		18 C	50	125	1			1			
		15 C	75	75	1			1			
		20 C	75	125		1		1			
		27 C	100	175	1			1			
		46 C	250	250		1		1			
								10	89.6	327	

OVERBURDEN DRILLING MANAGEMENT LIMITED
HEAVY MINERAL PROCESSING WEIGHTS

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

	Weight (g)										
	<2.0 mm Table Concentrate										
		Heavy Liquid Separation S.G 3.20									
				Nonferromagnetic HMC							
					Processed Split						
					Total						
Sample Number	Total	Heavy Liquid Lights	Mag HMC	Total	%	Weight	<0.25 mm (wash)	-0.25 mm	0.25 to 0.5 mm	0.5 to 1.0 mm	1.0 to 2.0 mm
HM-01	434.8	334.5	16.6	83.7	100	83.7	5.6	21.7	29.0	20.7	6.7
HM-02	586.7	472.7	18.4	95.6	100	95.6	5.5	26.2	37.5	24.4	2.0
HM-03	272.3	192.5	10.7	69.1	100	69.1	3.4	28.7	23.0	11.4	2.6
HM-04	253.3	199.1	5.7	48.5	100	48.5	2.0	22.5	12.0	8.6	3.4
HM-07	253.7	216.3	2.9	34.5	100	34.5	1.3	17.7	7.4	5.8	2.3
HM-08	301.4	237.5	9.4	54.5	100	54.5	3.1	21.2	16.0	10.6	3.6
HM-09	331.9	256.5	7.2	68.2	100	68.2	2.9	42.4	13.5	6.8	2.6
HM-10	222.2	156.6	16.2	49.4	100	49.4	2.3	26.9	12.2	6.7	1.3
HM-11	263.1	198.8	4.9	59.4	100	59.4	3.2	22.1	20.6	10.8	2.7
HM-12	277.5	189.2	9.2	79.1	100	79.1	3.1	32.4	20.4	14.5	8.7
HM-13	263.9	206.7	5.8	51.4	100	51.4	1.9	22.7	11.8	10.2	4.8
HM-14	306.0	243.5	9.1	53.4	100	53.4	2.8	24.2	13.0	9.8	3.6
HM-15	319.0	234.2	13.6	71.2	100	71.2	3.8	23.0	15.5	17.4	11.5
HM-16	299.3	234.5	9.6	55.2	100	55.2	3.0	17.5	15.9	12.1	6.7
HM-17	281.3	202.2	11.0	68.1	100	68.1	4.2	28.3	21.3	11.0	3.3
HM-18	236.0	122.2	12.4	101.4	100	101.4	4.9	34.8	32.3	19.2	10.2
HM-19	222.3	102.9	32.7	86.7	100	86.7	4.2	33.7	23.8	18.3	6.7
HM-20	301.8	193.9	20.0	87.9	100	87.9	5.7	21.7	27.8	22.6	10.1
HM-21	335.9	202.9	48.7	84.3	100	84.3	5.5	24.1	25.4	20.6	8.7
HM-22	222.9	139.9	31.9	51.1	100	51.1	3.6	18.9	15.4	11.5	1.7
HM-23	286.0	162.8	10.9	112.3	100	112.3	6.3	41.4	33.9	22.6	8.1
HM-24	234.8	174.7	13.2	46.9	100	46.9	2.2	27.7	9.4	5.5	2.1
HM-25	286.4	180.7	16.1	89.6	100	89.6	3.8	36.3	22.9	18.1	8.5

OVERBURDEN DRILLING MANAGEMENT LIMITED
S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

	Minerals 0.25-0.5 mm																						
	Sulphide/Arsenide + Related Minerals					Mg/Mn/Al/Cr/Ti Minerals														Phosphates			
Sample Number	>1.0 amp			<1.0 amp		>1.0 amp								>0.8 amp			<0.8 amp			>1.0 amp			
	% Cpy	Misc. Prime MMSIMs	% Py	% Gth	% Sp	% Gs*	Misc. Prime MMSIMs	% Mn-oxide	% Red Rutile	% Blond Ttn	% Ase	% Spi	% Ky/ Sil	% Tm	% Ax	% St	% Ol	% Opx	% Cr**	% Ap	% Mz	Remarks	Picked Grains
HM-04	0	Tr scheelite (~20 gr)	Tr (2 gr)	90	2 (~1000 gr)	90 (~50,000 gr)	0.5% sapphire corundum (~250 gr) 0.5% low-Cr diopside (~250 gr)	0	Tr (1 gr)	0	Tr (1 gr)	0	0	0	0	0	1 (Fo)	0	Tr (~60 gr)	Tr	0	Goethite/grossular assemblage. SEM checks from 0.25-0.5 mm fraction: 5 grey felted rutile versus monazite candidates = 5 grossular. Also picked 1 >250μm width gold grain from 0.25-0.5 mm fraction, see detailed gold grain data page. 0.5-1.0 mm fraction contains ~5 grains scheelite.	1.0-2.0 mm fraction: 1 low-Cr diopside 1 chromite** 0.5-1.0 mm fraction: 7 sapphire corundum 6 low-Cr diopside 2 chromite** 0.25-0.5 mm fraction: 1 gold 20 representative spessartine 20 representative grossular 40 representative sapphire corundum 20 representative low-Cr diopside 1 red rutile 1 anatase 30 representative chromite** 5 grossular resembling monazite
HM-07	0	Tr scheelite (~30 gr)	0	80	5 (~50 gr)	95 (~60,000 gr)	Tr sapphire corundum (~60 gr) Tr low-Cr diopside (~40 gr)	0		0	0	0	0	0	0	0	Tr (Fo)	0	10 (~100 gr)	Tr	0	Goethite/grossular assemblage. SEM check from 0.25-0.5 mm fraction: 1 zircon candidate = 1 zircon. 0.5-1.0 mm fraction contains ~5 grains scheelite.	1.0-2.0 mm fraction: 2 sapphire corundum 1 pyrolusite 0.5-1.0 mm fraction: 12 sapphire corundum 2 low-Cr diopside 1 pyrolusite 5 chromite** 0.25-0.5 mm fraction: 5 representative scheelite 20 representative spessartine 20 representative grossular 20 representative sapphire corundum 20 representative low-Cr diopside 25 representative chromite** 1 zircon

*Grossular may include andradite. **Unchecked chromite may include hercynite or Cr-spinel.

OVERBURDEN DRILLING MANAGEMENT LIMITED
S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

Sample Number	Minerals 0.25-0.5 mm																					Remarks	Picked Grains
	Sulphide/Arsenide + Related Minerals				Mg/Mn/Al/Cr/Ti Minerals															Phosphates			
	>1.0 amp			<1.0 amp		>1.0 amp								>0.8 amp			<0.8 amp			>1.0 amp			
	% Cpy	Misc. Prime MMSIMs	% Py	% Gth	% Sp	% Gs*	Misc. Prime MMSIMs	% Mn-oxide	% Red Rutile	% Blond Ttn	% Ase	% Spi	% Ky/ Sil	% Tm	% Ax	% St	% Ol	% Opx	% Cr**	% Ap	% Mz		
HM-13	0	Tr scheelite (~20 gr)	0	90	Tr (~60 gr)	95 (~100,000 gr)	Tr sapphire corundum (~60 gr) Tr low-Cr diopside (~40 gr)	0	0	0	Tr (1 gr)	0	0	0	0	0	0	0	Tr (11 gr)	0	0	Goethite/grossular assemblage. SEM check from 0.25-0.5 mm fraction: 1 zircon candidate = 1 zircon. Also picked 1 >250µm width gold grain from 0.25-0.5 mm fraction, see detailed gold grain data page. 0.5-1.0 mm fraction contains ~5 grains scheelite.	1.0-2.0 mm fraction: 2 sapphire corundum 0.5-1.0 mm fraction: 7 sapphire corundum 2 low-Cr diopside 0.25-0.5 mm fraction: 1 gold 5 representative scheelite 20 representative spessartine 20 representative grossular 20 representative sapphire corundum 20 representative low-Cr diopside 1 analase 11 chromite** 1 zircon
HM-14	0	Tr scheelite (~20 gr)	Tr (~20 gr)	80	Tr (4 gr)	95 (~70,000 gr)	Tr sapphire corundum (~100 gr) Tr low-Cr diopside (~60 gr)	0	0	0	0	0	0	0	0	0	3 (Fo)	0	Tr (24 gr)	0	0	Goethite-hematite/grossular assemblage. SEM checks from 0.25-0.5 mm fraction: 2 grey felted monazite versus rutile candidates = 2 rutile; and 1 zircon candidate = 1 zircon.	1.0-2.0 mm fraction: 1 sapphire corundum 0.5-1.0 mm fraction: 6 sapphire corundum 10 low-Cr diopside 0.25-0.5 mm fraction: 4 spessartine 20 representative grossular 20 representative sapphire corundum 20 representative low-Cr diopside 24 chromite** 2 rutile resembling monazite 1 zircon

*Grossular may include andradite. **Unchecked chromite may include hercynite or Cr-spinel.

OVERBURDEN DRILLING MANAGEMENT LIMITED
S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

	Minerals 0.25-0.5 mm																						
	Sulphide/Arsenide + Related Minerals					Mg/Mn/Al/Cr/Ti Minerals														Phosphates			
Sample Number	>1.0 amp			<1.0 amp		>1.0 amp								>0.8 amp			<0.8 amp			>1.0 amp			
	% Cpy	Misc. Prime MMSIMs	% Py	% Glh	% Sp	% Gs*	Misc. Prime MMSIMs	% Mn-oxide	% Red Rutile	% Blond Ttn	% Ase	% Spi	% Ky/ Sil	% Tm	% Ax	% St	% Ol	% Opx	% Cr**	% Ap	% Mz	Remarks	Picked Grains
HM-03	0	Tr scheelite (~60 gr)	Tr (2 gr)	80	1 ~1500 gr)	15 (~8000 gr)	Tr sapphire corundum (7 gr) 5% low-Cr diopside (~3000 gr)	0	Tr (1 gr)	0	0	0	0	0	0	0	10 (Fo)	0	Tr (~50 gr)	Tr	0	Goethite/diopside-grossular assemblage. SEM checks from 0.5-1.0 mm fraction: 5 hercynite versus chromite candidates = 5 hercynite. SEM checks from 0.25-0.5 mm fraction: 10 spessartine versus almandine candidates = 10 spessartine; 5 pale orange grossular (major nonparamagnetic assemblage mineral) versus spessartine candidates = 5 grossuler; 2 granular, grey corundum versus grossular candidates = 2 grossular; 5 axinite versus apatite candidates = 5 apatite; 10 chromite versus hercynite candidates = 4 chromite and 6 hercynite; 5 grey felted monazita verus rutile candidates = 2 rutile/leucoxene and 3 grossular; and 5 glassy brown augite candidates = 5 Ti-augite. 0.5-1.0 mm fraction contains ~10 grains scheelite.	1.0-2.0 mm fraction: 3 chromite** 0.5-1.0 mm fraction: 1 sapphire 10 low-Cr diopside 5 hercynite 9 chromite** 0.25-0.5 mm fraction: 10 representative scheelite 30 representative spessartine 25 representative grossular 7 sapphire corundum 2 grossular resembling corundum 20 representative low-Cr diopside 1 red rutile 6 hercynite 20 representative chromite** 5 apatite 2 rutile resembling monazite 3 grossular resembling monazite 5 Ti-augite
HM-10	0	Tr *scheelite* (~15 gr)	Tr (2 gr)	80	2 (~1500 gr)	30 (~10,000 gr)	Tr Mn-epidote (1 gr) Tr sapphire corundum (8 gr) Tr uvarovite (9 gr) Tr low-Cr diopside (13 gr)	0	Tr (3 gr)	0	Tr (9 gr)	0	0	0	0	0	0.5 (Fo)	0	Tr (~30 gr)	Tr	0	Goethite-augita/diopside-grossular assemblage. SEM checks from 0.25-0.5 mm fraction: 5 pale orange grossular (major nonparamagnetic assemblage mineral) candidatas = 5 grossular; 3 dark green Cr-garnet candidates = 3 uvarovite; 3 red rutile candidates = 3 red rutile; and 1 orange monazite candidate = 1 apidote (Fe-stained). 0.5-1.0 mm fraction contains ~3 grains scheelite.	0.5-1.0 mm fraction: 1 sapphire corundum 8 low-Cr diopside 1 chromite** 0.25-0.5 mm fraction: 20 representative spessartine 5 grossular 20 representative unchecked grossular* 1 Mn-epidote 8 sapphire corundum 9 uvarovite 13 low-Cr diopside 3 red rutile 9 anatase 20 representative chromite** 1 epidote resembling monazite 18 zircon

*Grossular may includa andradite. **Unchecked chromite may include hercynite or Cr-spinel.

OVERBURDEN DRILLING MANAGEMENT LIMITED
S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

	Minerals 0.25-0.5 mm																						
	Sulphide/Arsenide + Related Minerals					Mg/Mn/Al/Cr/Ti Minerals														Phosphates			
Sample Number	>1.0 amp			<1.0 amp		>1.0 amp								>0.8 amp			<0.8 amp			>1.0 amp			
	% Cpy	Misc. Prime MMSIMs	% Py	% Gth	% Sp	% Gs*	Misc. Prime MMSIMs	% Mn-oxide	% Red Rutile	% Blond Ttn	% Ase	% Spi	% Ky/Sil	% Tm	% Ax	% St	% Ol	% Opx	% Cr**	% Ap	% Mz	Remarks	Picked Grains
HM-24	0	Tr scheelite (~15 gr)	Tr (10 gr)	70	3 (~1500 gr)	1 (~500 gr)	Tr sapphire corundum (3 gr) Tr low-Cr diopside (~40 gr)	0	0	0	0	0	0	0	0	0	5 (Fo)	0	Tr (~40 gr)	Tr	0	Goethite-augite/diopside assemblage.	0.5-1.0 mm fraction: 4 low-Cr diopside 0.25-0.5 mm fraction: 20 representative spessartine 20 representative grossular* 3 sapphire corundum 20 representative low-Cr diopside 20 representative chromite**
HM-09	0	Tr scheelite (~10 gr)	0	30	Tr (13 gr)	5 (~2000 gr)	Tr sapphire corundum (16 gr) 1% low-Cr diopside (~400 gr)	0	0	0	0	0	0	0	0	0	30 (Fo)	0	Tr (16 gr)	Tr	0	Augite-goethite-forsterite/diopside assemblage. Also picked 1 >250 width gold grain from 0.25-0.5 mm fraction, see detailed gold grain data page.	0.5-1.0 mm fraction: 3 sapphire corundum 25 low-Cr diopside 0.25-0.5 mm fraction: 1 gold 13 spessartine 20 representative grossular* 16 sapphire corundum 20 representative low-Cr diopside 16 chromite**
HM-15	0	Tr scheelite (~30 gr)	0	60	5 (~5000 gr)	1 (~400 gr)	Tr low-Cr diopside (~40 gr)	0	0	0	Tr (1 gr)	0	0	0	0	0	20 (Fo)	0	Tr (~40 gr)	Tr	0	Goethite-forsterite/diopside assemblage. 0.5-1.0 mm fraction contains ~10 grains scheelite.	0.5-1.0 mm fraction: 17 low-Cr diopside 20 chromite** 0.25-0.5 mm fraction: 20 representative spessartine 20 representative grossular* 20 representative low-Cr diopside 1 anatase 20 representative chromite**
HM-25	0	Tr scheelite (~20 gr)	Tr (2 gr)	70	0.5 (~1000 gr)	25 (~15,000 gr)	Tr sapphire corundum (~40 gr) 5% low-Cr diopside (~3000 gr)	0	0	0	Tr (4 gr)	0	Tr	0	0	0	20 (Fo)	0	Tr (~40 gr)	Tr	0	Goethite-forsterite/diopside-grossular assemblage. 0.5-1.0 mm fraction contains ~3 grains scheelite.	0.5-1.0 mm fraction: 1 pyrolusite 4 sapphire corundum 18 low-Cr diopside 6 chromite** 0.25-0.5 mm fraction: 20 representative spessartine 20 representative grossular* 20 representative sapphire corundum 20 representative low-Cr diopside 4 anatase 20 representative chromite** 2 zircon

*Grossular may include andradite. **Unchecked chromite may include hercynite or Cr-spinel.

OVERBURDEN DRILLING MANAGEMENT LIMITED
S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

	Minerals 0.25-0.5 mm																						
	Sulphide/Arsenide + Related Minerals					Mg/Mn/Al/Cr/Ti Minerals														Phosphates			
	>1.0 amp			<1.0 amp		>1.0 amp								>0.8 amp			<0.8 amp			>1.0 amp			
Sample Number	% Cpy	Misc. Prime MMSIMs	% Py	% Gth	% Sp	% Gs*	Misc. Prime MMSIMs	% Mn-oxide	% Red Rutile	% Blond Ttn	% Ase	% Spi	% Ky/ Sil	% Tm	% Ax	% St	% Ol	% Opx	% Cr**	% Ap	% Mz	Remarks	Picked Grains
HM-016	Tr (1 gr)	0	Tr (4 gr)	80	0.5 (~300 gr)	95 (~80,000 gr)	Tr sapphire corundum (~200 gr) Tr low-Cr diopside (~200 gr)	0	0	0	Tr (1 gr)	0	0	0	0	0	5 (Fo)	0	Tr (~30 gr)	Tr	0	Goethite-hematite/grossular assemblage.	0.5-1.0 mm fraction: 3 pyrolusite 7 sapphire corundum 5 low-Cr diopside 0.25-0.5 mm fraction: 1 chalcopyrite 20 representative spessartine 20 representative grossular* 20 representative sapphire corundum 20 representative low-Cr diopside 1 anatase 20 representative chromite** 1 zircon
HM-017	0	Tr scheelite (~15 gr)	0	80	Tr (1 gr)	Tr (~50 gr)	Tr sapphire corundum (~30 gr) Tr uvarovite (1 gr) 2% low-Cr diopside (~1500 gr)	0	0	0	0	0	Tr	0	Tr (~50 gr)	0	Tr (Fo)	0	Tr (~50 gr)	Tr	0	Goethite/diopside assemblage. SEM checks from 0.25-0.5 mm fraction: 1 orange spessartine versus almandine candidate = 1 spessartine; 5 yellow andradite versus titanite candidates = 5 andradite; 1 green uvarovite candidate = 1 uvarovite; and 5 axinite versus apatite candidates = 5 axinite.	0.5-1.0 mm fraction: 1 low-Cr diopside 22 chromite** 0.25-0.5 mm fraction: 1 spessartine 20 representative grossular* 5 andradite 15 representative sapphire corundum 1 uvarovite 20 representative low-Cr diopside 35 representative axinite 30 representative chromite**

*Grossular may include andredite. **Unchecked chromite may include hercynite or Cr-spinel.

OVERBURDEN DRILLING MANAGEMENT LIMITED
S.G. >3.2 MMSIM (SKARN SUBTYPE) INDICATOR MINERAL DATA

Project: HM
Filename: 20136432 - Clarke Gold - Howard - MMSIMs - October
Total Number of Samples in this Report = 23

	Minerals 0.25-0.5 mm																						
	Sulphide/Arsenide + Related Minerals			Mg/Mn/Al/Cr/Ti Minerals																Phosphates			
Sample Number	>1.0 amp			<1.0 amp		>1.0 amp								>0.8 amp			<0.8 amp			>1.0 amp			
	% Cpy	Misc. Prime MMSIMs	% Py	% Gth	% Sp	% Gs*	Misc. Prime MMSIMs	% Mn-oxide	% Red Rutile	% Blond Ttn	% Ase	% Spi	% Ky/ Sil	% Tm	% Ax	% St	% Ol	% Opx	% Cr**	% Ap	% Mz	Remarks	Picked Grains
HM-018	0	Tr scheelite (~100 gr)	0	80	Tr (14 gr)	90 (~200,000 gr)	4% sapphire corundum (~8000 gr) Tr low-Cr diopside (~200 gr)	0	0	0	0	0	0	0	0	0	Tr (Fo)	0	Tr (~40 gr)	Tr	0	Goethite/grossular assemblage. SEM checks from 1.0-2.0 mm fraction: 5 granular grey-blue sapphire corundum candidates = 3 sapphire corundum end 2 grossular. SEM checks from 0.5-1.0 mm fraction: 1 diopside + chromite candidate = 1 diopside + chromite; and 5 chromite versus hercynite candidates = 5 hercynite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 2% (~70 grains) and 12% (~2000 grains) sapphire corundum respectively.	1.0-2.0 mm fraction: 53 representative sapphire corundum 2 grossular resembling sapphire corundum 7 chromite** 0.5-1.0 mm fraction: 3 scheelite 50 representative sapphire corundum 11 low-Cr diopside 5 hercynite 1 diopside + chromite 15 chromite** 0.25-0.5 mm fraction: 20 representative scheelite 14 spessartine 20 representative grossular* 20 representative sapphire corundum 20 representative low-Cr diopside 20 representative chromite**
HM-019	0	Tr scheelite (~50 gr)	Tr (1 gr)	80	0	40 (~30,000 gr)	Tr sapphire corundum (~100 gr) Tr low-Cr diopside (~40 gr)	0	0	0	0	0	0	0	0	0	Tr (Fo)	0	Tr (~50 gr)	Tr	0	Goethite-hematite/diopside-grossular assemblage.	1.0-2.0 mm fraction: 2 sapphire corundum 2 low-Cr diopside 6 chromite** 0.5-1.0 mm fraction: 5 scheelite 21 sapphire corundum 13 low-Cr diopside 26 chromite** 0.25-0.5 mm fraction: 5 representative scheelite 20 representative grossular* 20 representative sapphire corundum 20 representative low-Cr diopside 20 representative chromite** 1 zircon

*Grossular may include andradite. **Unchecked chromite may include hercynite or Cr-spinel.

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY ABBREVIATIONS

SEDIMENT LOG

Largest Clasts Present:
G: Granules
P: Pebbles
C: Cobbles

Clast Composition:
V/S: Volcanics and/or sediments
GR: Granitics
LS: Limestone, carbonates
OT: Other Lithologies (refer to footnotes)
TR: Only trace present
NA: Not applicable
OX: Very oxidized, undifferentiated

Matrix Grain Size Distribution:
S/U: Sorted or Unsorted
SD: Sand (F: Fine; M: Medium; C: Coarse)
ST: Silt
CY: Clay
Y: Fraction present
+: Fraction more abundant than normal
-: Fraction less abundant than normal
N: Fraction not present

Matrix Organics:
ORG: Y: Organics present in matrix
N: Organics absent or negligible in matrix
+: Matrix is mainly organic

Matrix Colour:
Primary:
BE: Beige
GY: Grey
GB: Grey-beige
GN: Green
GG: Grey-green
PP: Purple
PK: Pink
PB: Pink-Beige
Secondary (soil):
OC: Ochre
BN: Brown
BK: Black

Secondary Colour Modifier:
L: Light
M: Medium
D: Dark

GOLD GRAIN LOG

Thickness:
VG: Visible gold grains
M: Actual measured thickness of grain (microns)
C: Thickness of grain (microns) calculated from measured width and length

KIM (kimberlite indicator mineral) LOG

GP: Purple to red peridotitic garnet (G9/10 Cr-pyrope)
GO: Orange mantle garnet; includes both eclogitic pyrope-almandine (G3) and Cr-poor megacrystic pyrope (G1/G2) varieties; may include unchecked (by SEM) grains of common crustal garnet (G5) lacking diagnostic inclusions or crystal faces
DC: Cr-diopside; distinctly emerald green (paler emerald green low-Cr diopside picked separately)
IM: Mg-ilmenite; may include unchecked (by SEM) grains of common crustal ilmenite lacking diagnostic inclusions or crystal faces
CR: Chromite
FO: Forsterite

MMSIM (metamorphosed or magmatic massive sulphide indicator mineral) and PCIM (porphyry Cu indicator mineral) LOGS

Adr: Andradite	Cr: Chromite	Ky: Kyanite	Sil: Sillimanite	Ttn: Titanite
Ap: Apatite	Fay: Fayalite	Mz: Monazite	Spi: Spinel	
Ase: Anatase	Gh: Gahnite	Ol: Olivine	Sp: Spessartine	
Ax: Axinite	Gs: Grossular	Opx: Orthopyroxene	St: Staurolite	
Cpy: Chalcopyrite	Gth: Goethite	Py: Pyrite	Tm: Tourmaline	

Appendix 8 Charts of the different geochemical media. Field observations with analyses of select elements by Acme Analytical Labs, & same with VG gn counts in 23 bulk silts and Heavy indicator mineral gns in 14 prepared HM fractions by ODM Ltd. All as Excel data tables (8)

- Chart 1] 4 BH sill granitoid rocks for petrochemistry from central CLY area
- Chart 2] 75 Rocks for lithogeochem
- Chart 3] 15 'B' Horizon Soils, 6 in the immediate area of the Yankee Open cut, 9 from BiWold Dome
- Chart 4] 35 sub-samples of Tills from central CLY area
- Chart 5] 10 'conventional' Silts including 3 'mixed media' silt & soil samples
- Chart 6] 25 Moss Mats
- Chart 7] 23 Bulk Silts with gold parameters from VG gn counts
- Chart 8] Heavy indicator mineral gns in 14 prepared HM fractions of Bulk Silts. Counts of medium-sand size gns 0.25-0.5 mm with standardized gn counts, ranks and lists of the exotic HM indicator gns

Chart 1 BH sill granitoids 4 lithogeochem analyses

Rock_ID	E	N	Name	Site	Wt_g	Fe2O3_pc	FeO_pc	W_ppm	Mo_ppm	Cu_ppm	Pb_ppm	Zn_ppm
GW01	471,829	5,434,764	YANKEE CO	50 m uphill	0.26	1.44	0.75	0.25	0.3	6.2	8.0	13
GW02	471,664	5,434,405	BITEL KNOL	E of Eloise (	0.33	0.53	0.30	0.90	0.7	1.4	2.9	6
GW03	471,560	5,433,770	LADY OF LA	by EW colle	0.27	0.73	0.32	0.80	0.4	2.7	4.3	30
GW05	471,614	5,433,779	LADY OF LA	along upr c	0.21	1.04	0.48	1.20	0.5	2.3	7.6	19

Ni_ppm	As_ppm	Au_ppb
0.8	0.25	1.40
1.0	0.70	0.70
0.7	2.00	0.25
0.8	1.30	0.70

Chart 2 Rocks 75 thirteen elements

Sample_ID	Duplicate	Date	Sampler	Easting	Northing	Acme Labs Certificate	Elevation_m	Waypoint
0506	N	May 21 2013	WH	471,606	5,434,747	VAN13003232	1198	Yankee Open Cut rt wall
0507	N	May 21 2013	WH	471,607	5,434,747	VAN13003232	1198	Yankee Open Cut lt wall
0508	N	May 21 2013	WH	471,607	5,434,748	VAN13003232	1198	Yankee Open Cut dump
0509	N	May 21 2013	WH	471,607	5,434,749	VAN13003232	1198	Yankee Open Cut dump
0578	N	July 10 2013	WH	472,219	5,434,299	VAN13003232	1386	WYPT122 +- 3m
0587	N	July 10 2013	WH	472,241	5,434,312	VAN13003232	1388	EW13CL13
0588	N	July 10 2013	DB	472,056	5,434,301	VAN13003232	1342	0588 +/- 5 m
0593	N	July 10 2013	DB	472,653	5,434,186	VAN13003232	1472	0593
0594	N	July 9 2013	DB	472,638	5,434,190	VAN13003232	1473	0594
0600	N	July 12 2013	WH	472,178	5,433,865	VAN13003232	1328	WYPT138 +- 10m
0607D	0613D	July 28 2013	WH	472,617	5,434,496	VAN13003232	1347	005JUNCTION DITCH 0607
0613D	0607D	July 28 2013	WH	472,622	5,434,496	VAN13003232	1347	005JUNCTION DITCH 0607
0640	N	Aug 10 2013	WH	472,235	5,433,826	VAN13003709	1321	007_0640
0589	N	July 25 2013	WH	473,058	5,434,629	VAN13003232	1391	003RK0589QV
0641	N	Aug 20 2013	WH	472,990	5,434,545	VAN13003709	1373	010_QV0641
0642	N	Aug 20 2013	WH	472,731	5,434,491	VAN13003709	1351	010_QV0642_FLOAT
0610	N	July 28 2013	WH	472,604	5,434,491	VAN13003232	1348	005ATV TR XDITCH QVS
0611	N	July 28 2013	WH	472,604	5,434,491	VAN13003232	1348	005ATV TR XDITCH QVS
0608	N	July 28 2013	WH	472,733	5,434,494	VAN13003232	1356	005ALTD GRAN 0608
0106	N	July 27 2013	WH	472,717	5,435,211	VAN13003232	1397	04_RK_0106
0601	N	July 27 2013	WH	472,718	5,435,212	VAN13003232	1397	004_0601
0598	N	July 11 2013	EW	473,220	5,436,409	VAN13003232	1316	EW13CL30
0599	N	July 11 2013	EW	473,137	5,436,394	VAN13003232	1284	EW13CL31
0612	N	July 11 2013	EW	473,135	5,436,394	VAN13003232	1284	EW13CL31
0622	N	Aug 14 2013	JD	473,120	5,436,421	VAN13003709	1309	_
0650	N	Aug 24 2013	WH	473,146	5,436,370	VAN13003709	1280	013_RK0650_HM19>10
0591	N	July 25 2013	WH	473,438	5,436,158	VAN13003232	1450	003BMIN HDWATRS SKN0591
0592	N	July 25 2013	WH	473,446	5,436,167	VAN13003232	1450	003BMIN SKN0592
0492	N	July 25 2013	WH	473,264	5,436,180	VAN13003232	1375	003BMIN TRIB 0492
0228D	0684D	July 12 2013	EW	473,263	5,436,157	VAN13003232	1370	EW13CL36
0684D	0228D	July 12 2013	EW	473,263	5,436,157	VAN13003232	1370	EW13CL36
0614	N	July 25 2013	WH	473,328	5,436,044	VAN13003232	1440	0614
0615	N	Aug 14 2013	JD	473,309	5,436,060	VAN13003709	1428	_
0621	N	Aug 14 2013	JD	473,208	5,436,102	VAN13003709	1380	_
0596	N	July 11 2013	EW	473,434	5,435,546	VAN13003232	1570	EW13CL20
0597	N	July 11 2013	EW	473,428	5,435,627	VAN13003232	1560	EW13CL21
0631	N	Aug 27 2013	JD	473,568	5,435,616	VAN13003709	1504	_
0623	N	Aug 10 2013	JD	473,102	5,435,396	VAN13003709	1476	_
0624	N	Aug 10 2013	JD	473,209	5,435,546	VAN13003709	1480	_
0616	N	Aug 14 2013	JD	472,224	5,436,079	VAN13003709	1414	_
0602	N	July 27 2013	WH	472,947	5,435,270	VAN13003232	1455	004ARG SKARN 0602&0603SAMPS

0603	N	July 27 2013	WH	472,947	5,435,270	VAN13003232	1455	004ARG SKARN 0602&0603SAMPS
0604	N	July 27 2013	WH	472,910	5,435,610	VAN13003232	1326	004 HONE CK
0605	N	July 27 2013	WH	472,911	5,435,610	VAN13003232	1326	004 HONE CK
0606	N	July 27 2013	WH	472,868	5,435,641	VAN13003232	1316	004 HONE CK 0685
0685	N	July 12 2013	EW	472,866	5,435,634	VAN13003232	1307	EW13CL42
0643	N	Aug 22 2013	WH	472,775	5,435,756	VAN13003709	1285	011_RK_0643
0609	N	Aug 10 2013	WH	471,914	5,433,975	VAN13003709	1245	007_RK_0543_2007
0644	N	Aug 22 2013	WH	472,900	5,435,915	VAN13003709	1291	011_RK_0644
0617	N	July 28 2013	BD	472,954	5,435,846	VAN13003232	1319	0617
0618	N	July 28 2013	BD	472,956	5,435,851	VAN13003232	1319	0618
0619	N	July 28 2013	BD	472,976	5,435,870	VAN13003232	1323	0619
0620	N	July 28 2013	BD	472,862	5,435,941	VAN13003232	1260	0620
0645	N	Aug 23 2013	WH	471,944	5,433,812	VAN13003709	1224	012_RK_0645
0646	N	Aug 23 2013	WH	471,943	5,433,812	VAN13003709	1224	012_RK_0645
0647	N	Aug 23 2013	WH	471,936	5,433,814	VAN13003709	1224	012_RK_0648
0648	N	Aug 23 2013	WH	471,938	5,433,814	VAN13003709	1224	012_RK_0648
0564	N	Oct 24 2007	WH	471,347	5,434,415	VAN13005000	1132	_
0625	N	Sept 30 2013	WH	471,598	5,434,139	VAN13005000	1238	_Lefevre wkings W pit of Section 4 Qtz Vein #2
0634	N	Sept 30 2013	WH	471,631	5,433,946	VAN13005000	1154	RK 0634 AT CLEASE 0446 SZ
0626	N	Sept 18 2013	WH	471,351	5,433,940	VAN13005000	1122	_
0627	N	Sept 18 2013	WH	471,349	5,433,938	VAN13005000	1122	017Iron Founder #2 SZ TRENCH
0632	N	Sept 18 2013	WH	471,542	5,433,765	VAN13005000	1024	017LADY of LAKE OLD WIDE WKING
0633	N	Sept 18 2013	WH	471,542	5,433,765	VAN13005000	1024	017LADY of LAKE OLD WIDE WKING
0636	N	Sept 30 2013	WH	471,544	5,433,764	VAN13005000	1024	_
0637	N	Sept 30 2013	WH	471,544	5,433,764	VAN13005000	1026	_4 m above dump pile oc on lt side of the level
0635	N	Sept 30 2013	WH	471,539	5,433,769	VAN13005000	1032	RK 0635 above JAX rk site -30 of P Wms
0663	N	Oct 01 2013	WH	471,534	5,433,733	VAN13005000	1018	RK 0663 AT JAX 973574
0664	N	Oct 01 2013	WH	471,614	5,433,779	VAN13005000	1018	_
0638	N	Oct 01 2013	WH	471,459	5,433,654	VAN13005000	995	RK 0638 HORNFELS WITH TR PY ALONG RD
0659	N	Sept 19 2013	WH	471,393	5,433,635	VAN13005000	974	018W END OF BANDED CALCSILICATE SKN 0659
0651D	0653D	Sept 16 2013	WH	471,962	5,433,508	VAN13005000	1188	015RX 0651-0652-0653
0653D	0651D	Sept 16 2013	WH	471,962	5,433,508	VAN13005000	1188	015RX 0651-0652-0654
0654	N	Sept 17 2013	WH	470,818	5,434,990	VAN13005000	911	016 RK 0654 CKSIDE ADIT
0658	N	Sept 19 2013	WH	471,242	5,433,457	VAN13005000	875	018HM-24 from Ridge Trib and rk 0658 2.5 m abov

Wt_kg	Location	Type	Thickness_cm	Au_ppb	Bi_ppm	Te_ppm	As_ppm	Fe_pc	Pb_ppm	Zn_ppm
2.40	Yankee Open Cut	oc	12	172.4	1.00	*0.56*	**1165.6**	1.38	9.79	4.9
2.35	Yankee Open Cut	oc	9	**428.0**	0.24	0.24	**1197.6**	2.67	8.69	5.2
1.76	Yankee Open Cut	dump pile	grab	37.5	0.15	0.05	**652.3**	2.53	4.88	19.6
0.25	Yankee Open Cut	dump pile	grab	*10.8*	0.04	0.03	5.5	1.17	1.48	4.2
1.38	BiWold Dome	float	grab	3.2	0.03	0.09	3.9	1.04	2.01	4.4
2.43	BiWold Dome	oc	grab	4.2	0.07	<0.02	1.5	2.30	7.25	29.7
0.55	BiWold Dome	float	grab	**573.1**	**34.65**	1.48	30.1	0.88	95.44	2.0
0.79	BiWold Dome	float	grab	*7.7*	0.84	*0.45*	8.2	0.90	58.78	4.0
0.43	BiWold Dome	float	grab	29.0	0.44	0.28	28.6	1.26	49.95	14.1
2.14	BiWold Dome	oc	10	1.4	0.11	<0.02	6.8	2.30	7.36	34.6
1.41	BiWold Dome	float	grab	**207.6**	0.35	0.17	63.7	0.81	55.94	6.2
1.20	BiWold Dome	float	grab	**305.1**	0.52	0.31	59.7	0.81	*28.05*	7.3
1.72	BiWold Dome	float	grab	0.5	0.46	0.07	1.1	2.58	*24.53*	40.2
0.85	Clel 770Q5 trib	oc	20	3.1	0.24	<0.02	4.6	1.89	2.2	14.5
1.03	Clel 770Q5 trib	float	grab	<0.2	0.07	<0.02	1.6	1.03	1.62	8.3
1.13	Clel 780V3 trib	float	grab	1.6	0.06	<0.02	2.1	*3.32*	*19.31*	91.9
1.32	Clel 780V3 trib	float	15	2.3	0.04	<0.02	1.5	0.60	2.09	3.2
1.07	Clel 780V3 trib	float	15	1.8	0.06	<0.02	0.7	0.57	4.95	3.0
1.42	Clel 780V3 trib	float	grab	3.6	0.13	<0.02	1.6	1.49	*12.97*	22.2
1.59	mid Clel Ck	oc	grab	<0.2	0.06	0.02	0.8	0.76	1.21	3.5
0.74	mid Clel Ck	oc	grab	1.7	0.19	0.04	2.5	1.62	*19.95*	29.1
0.96	upr Bzero Ck	oc	grab	*6.1*	0.16	<0.02	8.5	*3.55*	6.9	*60.0*
0.81	upr Bzero Ck	oc	grab	2.5	0.10	<0.02	2	*3.77*	1.77	*57.3*
0.64	upr Bzero Ck	oc	grab	1.6	0.07	<0.02	78.2	2.19	9.96	39.1
0.68	upr Bzero Ck	oc	grab	2.1	0.54	0.04	8.9	*3.20*	8.16	47.1
1.63	upr Bzero Ck	oc	150	2.8	0.08	<0.02	77.3	2.88	5.97	44.2
1.32	Bmin trib	oc	grab	<0.2	0.23	<0.02	1.2	0.75	2.88	27.4
1.06	Bmin trib	oc	grab	3.8	0.70	0.03	1.2	1.29	3	55.4
1.29	Bmin trib	oc	200	4.0	3.39	0.14	1	2.27	4.64	92.3
0.79	Bmin trib	oc	grab	3.5	*2.60*	0.12	1.1	2.37	4.75	85.2
1.52	Bmin trib	oc	grab	0.4	*2.34*	0.03	0.2	2.12	4.23	*77.8*
0.34	upr Bmin trib	float	grab	0.7	0.89	<0.02	1.5	1.75	1.23	58.1
2.07	upr Bmin trib	float	grab	1.4	4.76	<0.02	0.4	0.60	2.60	102.6
0.73	Bmin trib	oc	grab	<0.2	0.05	<0.02	6.4	0.87	3.01	9.5
0.59	LW Ridge	oc	grab	4.6	0.18	<0.02	2.4	1.92	6.45	30.8
0.80	LW Ridge	oc	grab	28.1	0.24	0.03	**1112.2**	4.70	10.46	*60.0*
1.03	Wallack 710K0 Ck	oc	grab	0.6	0.13	0.11	1.5	2.83	*20.55*	14.0
0.60	upr Hone Ck	oc	150	1.1	0.05	<0.02	4.9	0.65	1.44	6.1
0.39	upr Hone Ck	oc	grab	0.9	0.06	<0.02	*16.3*	4.65	4.12	*71.8*
1.11	lwr Hone Ck	float	grab	<0.2	0.09	0.02	4.9	*3.52*	2.93	49.5
1.11	Hone 730H2 trib	oc	chip	0.9	0.90	0.06	0.6	2.83	*14.35*	*61.9*

0.97	Hone 730H2 trib	oc	chip	2.0	1.26	0.18	1.2	2.61	*13.53*	38.2
0.60	upr Hone Ck	float	grab	4.0	6.68	*0.44*	2.8	*3.22*	9.91	44.7
0.17	upr Hone Ck	float	grab	30.4	**22.76**	1.01	6.5	4.32	6.07	36.2
1.90	upr Hone Ck	oc	400	3.8	0.31	<0.02	*16.3*	2.20	6.43	32.3
0.80	upr Hone Ck	oc	grab	<0.2	0.07	<0.02	3.1	5.06	2.15	*57.3*
0.69	Hone Ck	float	grab	0.4	0.07	<0.02	7.3	**7.33**	8.45	100.6
1.55	Ckay trib	oc	14	<0.2	<0.02	<0.02	3.3	0.77	6.30	13.3
1.54	Bogo trib	float	30	<0.2	0.06	<0.02	*13.6*	4.23	4.25	*72.9*
1.18	Bogo trib	sc	grab	2.0	0.09	<0.02	3	0.63	2.1	32.5
1.42	Bogo trib	oc	grab	0.7	0.50	0.06	6	2.15	7.02	34.4
1.05	Bogo trib	float	grab	4.9	0.09	0.12	6.6	5.12	5.46	*56.8*
0.87	Bogo trib	oc	grab	1.1	*1.91*	0.18	*11.9*	1.20	5.82	2.3
1.70	Hydro tower BH sill cut	oc	20	3.4	0.07	<0.02	**4-5 veinlets**	4.29	*25.55*	94.0
1.68	Hydro tower BH sill cut	oc	90	1.1	<0.02	<0.02	2.4	0.56	6.97	6.0
1.70	Hydro tower BH sill cut	oc	95	1.0	<0.02	<0.02	1.4	0.50	3.19	1.8
1.18	Hydro tower BH sill cut	oc	45	1.1	0.02	<0.02	1.5	0.70	9.33	8.4
1.92	along BH mine rd	oc	grab	2.0	0.14	<0.02	8.1	1.11	9.0	14.7
1.07	Lefevre workings QV 'Vein 2'	oc	30	**1354.5**	**82.67**	1.56	2.1	**8.38**	5.1	33.5
2.27	Clease 0446 Shear Zone	oc	40	4.6	3.37	0.15	30.9	1.11	6.81	19.8
2.64	Iron Founder #2 trench QVs	trenched	15	<0.2	6.88	1.44	0.6	0.89	**5200.5**	14.6
2.5	Iron Founder #2 trench QVs	oc	33	0.7	3.93	0.29	1.3	1.88	**1015.4**	44.4
2.2	Lady of Lake dump pile	trenched	grab	0.9	*2.66*	<0.02	2.9	2.99	8.95	**>10000.0**
2.3	Lady of Lake dump pile	trenched	grab	<0.2	0.80	<0.02	0.7	2.65	4.48	**1843.0**
0.65	Lady of Lake dump pile	dump pile	grab	<0.2	0.05	<0.02	0.1	0.37	1.32	2.6
1.22	Lady of Lake Wide cut	oc	20	<0.2	0.24	<0.02	1.1	1.71	1.28	**1314.6**
1.07	Lady of Lake hydraulic cut on the E side	oc	grab	1.1	0.48	<0.02	1.1	1.92	10.35	32.4
1.48	Lady of Lake hydraulic cut on the E side	oc	65	1.8	1.25	<0.02	1.8	1.57	1.05	**2864.0**
1.55	Lady of Lake rd cut	oc	95	2.7	0.34	<0.02	*15.2*	*3.01*	8.2	**207.9**
1.07	old rd SW of Lady of Lake	oc	grab	0.7	0.34	<0.02	5.9	2.44	*16.12*	56.1
1.82	old rd SW of Lady of Lake	oc	249	1.5	0.27	<0.02	2.6	2.3	*15.33*	50.7
1.46	upr Hort trib	boulder	32	**2708.5**	**159.40**	**7.12**	0.5	**22.03**	5.57	40.7
2.27	upr Hort trib	boulder	32	**2641.6**	**164.41**	**6.86**	0.5	**20.34**	5.2	30.9
1.57	Limpid Ck side adit	oc	150	*16.8*	0.32	0.03	8.8	1.07	64.63	145.8
0.85	lwr Ridge trib	oc	140	<0.2	0.31	<0.02	2.3	*3.47*	*15.22*	*76.1*

Ni_ppm	Cu_ppm	Sb_ppm	Mo_ppm	W_ppm	S_pc
2.6	6.33	**0.89**	1.79	0.1	0.35
4.0	9.29	**1.85**	*3.62*	0.3	*0.53*
8.5	13.13	**1.03**	0.72	0.1	*0.55*
3.1	8.84	0.08	0.49	<0.1	<0.02
2.0	7.58	0.09	5.97	<0.1	<0.02
7.0	7.36	0.07	0.36	<0.1	<0.02
1.8	4.45	0.13	*2.95*	0.2	0.08
1.6	6.21	0.11	0.38	<0.1	<0.02
2.9	8.62	*0.31*	0.50	<0.1	<0.02
17.8	24.55	0.25	0.25	<0.1	<0.02
6.2	12.87	0.16	0.44	<0.1	<0.02
5.5	13.41	0.15	0.97	0.1	<0.02
7.3	*44.83*	0.12	6.02	<0.1	*0.58*
4.9	8.21	0.13	0.52	<0.1	<0.02
5.3	13.35	0.03	0.28	<0.1	<0.02
32.4	19.27	0.13	0.22	<0.1	*0.56*
1.9	3.88	*0.26*	0.31	<0.1	<0.02
1.6	2.78	0.23	0.36	<0.1	<0.02
8.9	14.96	0.08	0.38	<0.1	0.07
4.4	5.85	0.06	0.58	<0.1	0.02
13.7	15.77	0.05	0.18	0.1	<0.02
29.2	30.73	0.16	0.91	<0.1	0.43
21.6	*40.61*	0.04	1.33	0.5	<0.02
21.3	15.94	**0.99**	0.40	<0.1	0.22
4.3	32.00	0.74	4.25	<0.1	0.05
32.4	17.19	0.65	0.56	<0.1	0.09
19.1	15.54	0.04	0.78	*3.4*	0.25
23.9	63.41	0.02	1.44	0.3	0.24
25.1	*53.73*	0.02	5.44	6.8	0.44
26.4	*39.56*	<0.02	7.63	*2.2*	0.46
23.7	35.48	<0.02	7.11	*3.4*	0.46
27.1	33.73	0.06	**178.16**	0.7	0.26
6.0	9.37	*0.34*	0.36	*2.3*	0.03
5.0	6.81	0.14	0.32	0.6	<0.02
9.0	18.45	0.04	0.82	<0.1	0.03
25.4	*46.66*	**5.00**	*2.76*	<0.1	0.03
5.0	34.85	0.06	0.94	<0.1	0.15
2.4	6.10	0.13	0.35	<0.1	<0.02
19.7	15.21	0.23	0.13	<0.1	0.07
7.2	34.84	**0.64**	0.16	<0.1	0.26
30.1	29.38	0.03	0.60	0.3	0.19

32.8	*40.68*	0.04	0.93	0.3	0.47
42.3	64.42	0.04	1.16	0.4	*1.53*
35.7	79.25	0.04	0.81	1.1	1.3
21.1	18.68	0.07	0.40	<0.1	0.02
52.0	31.92	0.04	1.48	<0.1	0.12
26.5	88.47	0.09	1.31	<0.1	0.08
2.6	2.30	0.17	0.90	<0.1	<0.02
41.8	25.81	0.05	0.81	<0.1	<0.02
5.3	10.66	0.05	0.45	<0.1	<0.02
15.7	6.66	0.09	1.27	<0.1	<0.02
16.3	**150.57**	0.24	0.70	0.3	*1.61*
3.0	16.49	0.10	0.96	0.2	<0.02
370.9	*35.69*	**2.78**	5.95	0.2	<0.02
3.1	7.35	0.17	0.49	<0.1	<0.02
1.9	2.71	0.05	0.58	<0.1	<0.02
1.5	12.57	0.09	1.07	<0.1	<0.02
6.3	6.29	0.11	0.38	0.08	<0.02
30.7	**171.87**	0.58	**60.38**	**>100.00**	**3.93**
0.6	12.95	*0.42*	**58.78**	*2.3*	<0.02
0.7	9.3	**1.11**	14.34	1.39	0.26
2.4	15.91	0.23	13.63	0.93	0.16
15.9	22.59	0.14	**38.96**	**>100.00**	1.27
30.7	**73.66**	0.05	*2.58*	**55.26**	1.17
0.7	0.8	<0.02	0.13	0.36	<0.02
11.8	16.84	0.04	7.31	**>100.00**	0.04
27.2	33.86	<0.02	0.78	0.31	0.23
10.8	6	0.08	0.63	20.1	<0.02
29.0	30.99	0.21	3.15	9.11	<0.02
22.0	25.93	0.03	0.41	0.88	0.44
21.3	23.39	<0.02	0.39	0.28	0.48
58.6	**615.6**	0.19	7.79	**>100.00**	**7.28**
55.7	**794.64**	0.18	3.79	**>100.00**	**8.58**
0.9	8.45	0.12	0.25	0.49	0.28
27.3	23.94	0.04	0.61	0.21	*0.64*

Description
QV chipped panel sample 6 cm thick 12x7 cm, hard & massive, orients 146 82 SE with mm-sized limonitic rusty fractures. Adj to rk BH029 (2000)
QV chip sample 6-9 cm thick, massive, orients 143 87 SW. Lineations T 307 P 52 on the vein plane. From lt wall of open cut
angular piece of excavated QV from the dump pile, with pyrite
piece of vuggy QV in mica schist with mm-thick laminations. Off wh anhedral qtz, common 2-4 mm sized vugs. Mnr py weathers to lt-dk yel brn limonite
QV float well fractured with v limonitized boxwork, poss. py
QV from a W facing 10 x 1.5 m argillite ridge oc, a crushed brecciated piece with cm-sized rusty vugs. Common contorted phyllitic partings. M yel brn lim along closed fractures & from f xtalline py in vugs
Rounded cobble of a m-c xtalline QV, size 20 x 8 cm. One cm-thick veinlet of m-dk gy blue qtz and Bi ochre stain. Rare dk red brn lim boxwork after py along slly open fractures. From a clear cut
Grab of 8 pieces from 10-25cm thick QVs with wh to mnr gy patches, no vugs or sulphides. Not in outcrop but local
Grab of 3 pieces from 20cm thick QVs with mnr vugs and Fe oxides. Veins not in outcrop but local
10cm thick QV with dk orange brn limonite boxwork. Lim is along fractures, wk tr of Bi ochre. QV is foliation parallel. Site of till T076 on LCFS Rd
duplicate of 0613. Off wh lt brn lim stained granitoid boulder, nearly all feldspars clay-altered. Dispersed 0.2% microcx py. 1 mm - 0.5 cm sized blue-grey qtz veinlets along scarce fractures. Common sub-mm s
duplicate of 0607. Off wh lt brn lim stained granitoid boulder, nearly all feldspars clay-altered. Dispersed 0.2% microcx py. 1 mm - 0.5 cm sized blue-grey qtz veinlets along scarce fractures. Common sub-mm
Pyritic argillite float just below Quad Trail
QV with lim boxwork, 20 cm thick with microcx dk gy blue qtz xtals, in blk argillite host. 20m uphill of upper Clel Ck (cirque) rd
QV float, single piece on Quad Trail, past [Nward] of HM-15
Skarn cobble with tr py, v rusty, altered, mnr dk gy v f grd sulphides along fissures. On Quad Trail beside red-flagged rk 0608
Blue-gy QV, v ang broken cobble-size piece with cm-spaced fractures, along upper Clel (cirque) rd beside old rk samp flag partly legible -88-
Blue-gy QV, v ang broken cobble-size piece with cm-spaced fractures, along upper Clel (cirque) rd beside old rk samp flag partly legible -88-
V atered granitoid, m sized v ang boulder on upper Clel (cirque) rd
slly calc Argillite with Mn stained & infilled vugs. At clear cut edge, the likely site of a 2008 rk sample by A. Elder
calc Argillite with 2-3% of v f grd dess. py, poss. po. Contorted v finely laminated bedding. In forest near edge of clear cut
v siliceous Quartzite or Hornfels with fresh sulphides to 5%, at the contact of a Wallack Ck stock granite
dk gy Pyroxene (actinolite?) Skarn, extremely hard, f cryst. Speckled 60% dk gy gn, 40% dk gy, mnr magnetite, ptly magnetic. Common overgrowing dk gy hblde xtals, o/c found in stream
oc massive Quartzite Skarn with dess.sulphides. Chip sample from ck bed
banded siliceous Contact Metamorphic rk with quartz layers, weathered with gossan & tr py
Argillite (?) from near base of a 5 m high waterfall in Bzero Ck. With unidentified microcx dk gy mineral
Pale green Diopside Skarn with ~1% dess. Py. V mnr dk lamellae. Weathered, corrugated surface like marble. Along ridge scarp of the watershed
Thinly bedded, v lt gy or off wh and pale green Marble with scarce <1% sulphides. Folded cm-sized compositional laminations weather differently
Lt gn diopside & red garnet Calc-silicate Skarn, from a subcrop in flowing Bmin trib. Contorted & slly wavey foliation orients 167 61 SW. Re-samples 0684
Calc-silicate Skarn, contorted & polyfolded. With red garnet, abundant vugs & pores. Common sulphide stringers in dark layers, less common in lighter garnet + diopside layers. Sn fol'n 159 70; all sulphide str
Calc-silicate Skarn, contorted & polyfolded. With red garnet, abundant vugs & pores. Common sulphide stringers in dark layers, less common in lighter garnet + diopside layers. Sn fol'n 159 70; all sulphide str
ang Skarn float. from HS BMIN-01 hand sample
Skarn float of many ang pieces in a small area, off wh to pale color tr garnet & epidote
Siliceous Metased with mnr weathered dk brn py & blk Mn stain. O/c strikes 125, dips S
Vuggy QV with tr sulphides. In Pelite with small qtz stringers, weathers rusty brn. Sn fol'n is 030 84
Druzy qtz boxwork stained dk brn from limonite, 2 cm wide, hosted in pelite with andalusite. At end of outcropping ridge, granite is poss within 100m
Contact rock, v siliceous with abundant sericite. Prominent mutlicolored Fe gossan, tr blk Mn staining
Blueish qtz vein ~1.5 m wide in banded rock. Orients about 020 60 SE, partly with rusty vugs weathering m orange or dk red. Photo
Calc silicate v hard appearing like gabbro, calcite in nodules? Dessiminated & fracture controlled py
Carbonate breccia float with about 1% py, not o/c
chip sample of dk gy & blk banded arg Marble, m brn fine calcite xtals, tr py. Corrugated weathered m brn surface, collected perp. to the Sn fol'n 016 63NW

chip sample of dk gy v arg marble, with ~5% dess. micro - v f xlline py. Contorted folded bedding, weathers dk gy brn, collected along the Sn fol'n 016 63NW
cobble sized v ang piece of Skarn at Moss Mat MM989102 site, collected 5 m above WYPT004_HONE_CK
v ang piece of float collected at silt S989102 site at WYPT004_HONE_CK, above rk 0685 by EW
all altered Ls or Skarn, some wh scapolite or qtz veining. Fol'n 010, dip near vertical. Collected meters below 0685 from Hone Ck stream bed, site of moss mats MM0685 & MM0685D
Psammite or quartzite, m grained o/c in the stream, no py. Near a f grd dark massive rock with tr py
Hornblende (actinolite?) Skarn, a v angular cobble with microcx v dk gy unidentified sulphides
BH Sill Granite, v c grd, limonitic rusty & altered. From a scarp face, sample 14cm long x 4cm wide
Skarn, v angular 30 x 30 cm boulder with microcx v dk gy unidentified sulphides. Sheared, well foliated, slly arg, non-magnetic, no reaction with acid
Highly silicified Argillacous rock, tr py. Multiple 3-5mm thick stock work veins, vuggy. A subcropping boulder 2 x 1 m sized , near a fault
Quartz rich fault Breccia, some rounded clasts, trace of py with limonite staining
Diopside Skarn with poss. py, tr magnetite. Magnetic with 10-15% sulfides. from 0.6 m x 0.6 m boulder
bluish gy Quartz from a cliff face, tr pyrite, with an undetermined dark mineral
BH Sill Granitoid, channel sample 10 cm wide 20 cm long 7 cm deep along a v rusty fault with v clayey fault gouge. Orients 018 46 SE
BH Sill Granitoid, channel sample 90 cm long across rusty transverse shearing oiented 171 32 SW, slly curving
BH Sill Granitoid, channel sample of qtz vein 95 cm long max 4 cm thick, with tr limonite. Oients 016 23 SE crosscut by a shear 171 43 SW
Tourm in altered BH Sill Granitoid, about 4-5 veinlets 4-6 cm wide. Chip sample 45 cm long, rusty, orients 011 57 SE
Dk gy blue irregular Qtz Segregation in argillaceous metaquartzite of HCA Quartzite + Tuff Unit. In the exposed curving shear of the MPT Shear Zone
Lefevre pyrrhotite + asp Skarn from Vein 2 in West Pit of Section 4. Just above 0545 with Al tag, close to JAX 945544 chip sample. Orients 000 54 E. Also see photo of TS-04 Site in Report by EW, Part II
BH sill sericite– and clay?– altered granitoid of Clease 0446 Shear Zone
Trenched Qtz Vein, 15 cm thick piece with secondary yellow minerals at top of trench
Qtz vein in lowest part of trench, a 33 cm thick piece
Garnet pyrrhotite Skarn, a 17 x 11 x 9 cm piece from dump. Lt gy speckled dk gy & gy brn with f xtalline sphalerite, tr py. Clot of magnetic pyrrhotite with apple-green secondary Zn? mineral along a fracture. S
Pyrrhotite skarn, grab of 4 pieces from dump. Bands of garnet, no secondary minerals observed
Chips of a QV, broken from 2 angular cobbles of v dense, non-vuggy, lt blue gy, very hard, non-porous quartz
Calc-silicate from W sidewall of the Wide Cut, 4m N (uphill) of the dump pile. Transposed compositional layering orients 034 82 SE
Argillaceous Calc-silicate, v f grd with tr pyrite. White coating of limey efflorescence covers this small o/c. At JAX rk sample site -30 of P. Wms
Garnet-diopside Calc-silicate, mod siliceous, abundant qtz veining. Mod calcareous, banded, deformed & crenulated. JAX rk 973574 by P. Wms (Williams 2010b)
Calc-silicate , v rusty & limonitic, recessive. Fol'n a transposed bedding orients 034 54 SE
Hornfels with tr pyrite collected at till T-917894 site
Calc-silicate, mostly dk gn tremolite-actinolite with boudinaged m red calcite layers, tr py
many chips from breaking Heavy sulphide Meta-Argillite 918061 boulder, from JAXON, see 0651D below
Heavy sulphide Meta-Argillite 918061 boulder (JAXON). Complete piece 17 x 14 x 6 cm thick. Contorted dk gy brn sulphidic meta-argillite or hornfels, v hard, abundant microcx pyrrhotite, v magnetic, no acid
altered and pyritized Granitoid from N wall of short adit, fracturing orients 120 56 NE
altered blk Argillite, several pieces from small ridge about 2.5 m above HM-24

sized vugs; epithermal style QV mineralizatior
sized vugs; epithermal style QV mineralizatior

ingers fol'n paralle
ingers fol'n paralle

;cheelite indicated. Photo in EW Part I

rxn. Cm-sized conchoidal fractures,siliceous? ovoid-like segregation:

Chart 3 Soils 15 twelve elements

Sample_ID	Date	Sampler	Easting	Northing	Acme Labs Certificate	Location	Horizon	Au_ppb	Bi_ppm
P0219	July 10 2013	DB & WH	472,481	5,434,305	VAN13003241.1	BiWold Dome	B horizon	23.1	0.34
P0220	July 10 2013	DB & WH	472,476	5,434,308	VAN13003241.1	BiWold Dome	B horizon	131.6	0.35
P0221	July 10 2013	DB & WH	472,471	5,434,305	VAN13003241.1	BiWold Dome	B horizon	38.6	0.41
P0222	July 10 2013	DB & WH	472,466	5,434,308	VAN13003241.1	BiWold Dome	B horizon	11.1	0.33
P0223	July 10 2013	DB & WH	472,461	5,434,308	VAN13003241.1	BiWold Dome	B horizon	5.4	0.45
P0224	July 10 2013	DB & WH	472,397	5,434,303	VAN13003241.1	BiWold Dome	B horizon	2.7	0.36
P0225	July 10 2013	DB & WH	472,375	5,434,303	VAN13003241.1	BiWold Dome	B horizon	4.6	0.44
P0226	July 10 2013	DB & WH	472,351	5,434,278	VAN13003241.1	BiWold Dome	B horizon	3.8	0.65
P0227	July 10 2013	DB & WH	472,331	5,434,278	VAN13003241.1	BiWold Dome	B horizon	1.9	0.62
PCY012013	May 21 2013	WH	471,629	5,434,731	VAN13003241.1	Yankee Open cut	B horizon	4.6	0.22
PCY022013	May 21 2013	WH	471,610	5,434,728	VAN13003241.1	Yankee Open cut	B horizon	0.8	0.21
PCY032013	May 21 2013	WH	471,590	5,434,718	VAN13003241.1	Yankee Open cut	B horizon	0.6	0.31
PCY042013	May 21 2013	WH	471,572	5,434,708	VAN13003241.1	Yankee Open cut	B horizon	3.9	0.30
PCY052013	May 21 2013	WH	471,558	5,434,703	VAN13003241.1	Yankee Open cut	B horizon	0.9	0.28
PCY062013	May 21 2013	WH	471,557	5,434,698	VAN13003241.1	Yankee Open cut	B horizon	1.5	0.27

Te_ppm	As_ppm	Fe_pc	Pb_ppm	Zn_ppm	Ni_ppm	Cu_ppm	Sb_ppm	Mo_ppm	W_ppm
0.01	12.8	2.43	20.35	136.4	21.4	16.72	0.67	0.66	0.2
0.05	14.1	2.31	23.46	161.1	24.1	16.45	0.71	0.86	0.2
0.07	14.5	2.15	57.31	170.7	24.8	17.82	1.25	0.65	0.3
0.04	17.2	2.67	20.03	144.6	25.9	21.68	0.70	0.89	0.4
0.03	9.1	2.28	49.28	165.4	26.4	18.35	1.08	0.80	0.2
0.03	12.2	2.13	26.28	112.3	37.0	18.88	0.74	0.85	0.5
0.04	20.7	2.64	21.16	120.4	29.0	24.39	0.87	1.08	0.6
0.05	23.6	2.55	29.10	133.6	26.8	21.94	0.69	1.21	1.3
0.07	20.7	2.90	34.31	123.2	40.4	21.74	1.01	0.94	0.9
0.03	11.7	2.46	18.10	134.0	71.4	21.82	0.60	0.73	0.2
0.03	10.1	3.16	19.69	119.5	75.0	29.66	0.66	0.91	0.3
0.04	14.5	3.32	35.97	124.0	58.0	32.98	0.84	1.41	0.4
0.09	15.2	3.42	33.30	121.2	78.3	36.24	0.99	1.40	0.3
0.07	25.0	3.36	23.03	117.1	74.2	32.70	1.04	1.09	0.3
0.05	17.6	3.42	22.45	104.3	79.8	34.35	0.83	1.18	0.3

Description
10m E of soil sample 918802
5m E of soil sample 918802
5m S of soil sample 918802
5m W of soil sample 918802
10m W of soil sample 918802
between soil samples 918684 and 918685
between soil samples 918683 and 918684
10m W of soil sample 918683
30m W of soil sample 918683
m yel brn 20 cm depth book p. 55
dk yel brn 30-35 cm depth book p. 55
dk brn 20 cm depth book p. 57
m orange brn 25-30 cm depth book p. 57
dk brn 30-35 cm depth book p. 57
dk brn 30-35 cm depth book p. 57

Chart 4 Tills 35 ten elements

Sample_ID	Duplicate	Date	Sampler	Acme Labs Certificate	Easting	Northing	Elevation_m	GPS error_ m
T917878	N	9-Jul-13	WH	VAN13004484.1	472,007	5,434,302	1334	10
T917879	N	9-Jul-13	WH	VAN13004484.1	472,064	5,434,243	1319	3
T917880	N	16-Sep-13	WH & B Denny	VAN13004484.1	472,285	5,433,907	1354	3
T917881	N	16-Sep-13	WH & B Denny	VAN13004484.1	472,360	5,434,006	1395	3
T917882	N	16-Sep-13	WH & B Denny	VAN13004484.1	472,373	5,434,128	1404	3
T917884	N	16-Sep-13	WH & B Denny	VAN13004484.1	472,213	5,434,209	1372	3
T917885	N	1-Oct-13	WH & J Denny	VAN13004484.1	471,614	5,433,779	1048	_
T917893	N	30-Sep-13	B Denny	VAN13004484.1	471,712	5,433,718	1118	_
T917894	N	30-Sep-13	B Denny	VAN13004484.1	471,513	5,433,676	996	_
T917895	N	30-Sep-13	B Denny	VAN13004484.1	471,442	5,433,649	985	_
T917896	N	30-Sep-13	B Denny	VAN13004484.1	471,376	5,433,631	971	_
T060	N	9-Jul-13	WH	VAN13004484.1	471,896	5,434,329	1311	4
T061	N	9-Jul-13	WH	VAN13004484.1	471,889	5,434,359	1303	3
T062D	Y	9-Jul-13	WH	VAN13004484.1	471,902	5,434,421	1306	5
T063D	Y	9-Jul-13	WH	VAN13004484.1	471,907	5,434,419	1306	5
T064	N	9-Jul-13	WH	VAN13004484.1	471,973	5,434,511	1334	10
T065	N	10-Jul-13	WH	VAN13004484.1	472,441	5,434,291	1434	6
T066	N	10-Jul-13	WH	VAN13004484.1	472,363	5,434,287	1418	11
T067	N	10-Jul-13	WH	VAN13004484.1	472,129	5,434,179	1348	3
T068	N	11-Jul-13	WH	VAN13004484.1	472,047	5,434,523	1319	10
T069	N	11-Jul-13	WH	VAN13004484.1	471,778	5,434,382	1288	8
T070	N	11-Jul-13	WH	VAN13004484.1	471,902	5,434,317	1307	3
T071	N	11-Jul-13	WH	VAN13004484.1	471,787	5,434,217	1278	11
T072	N	11-Jul-13	WH	VAN13004484.1	471,969	5,434,028	1283	10
T073	N	11-Jul-13	WH	VAN13004484.1	472,156	5,433,927	1322	8
T074	N	11-Jul-13	WH	VAN13004484.1	472,018	5,434,118	1310	10
T075	N	12-Jul-13	WH	VAN13004484.1	472,205	5,433,888	1330	4
T076	N	12-Jul-13	WH	VAN13004484.1	472,178	5,433,865	1331	10
T077	N	12-Jul-13	WH	VAN13004484.1	472,240	5,433,831	1329	5
T078	N	12-Jul-13	WH	VAN13004484.1	472,249	5,433,956	1363	6
T079	N	12-Jul-13	WH	VAN13004484.1	472,107	5,433,983	1322	4
T080	N	12-Jul-13	WH	VAN13004484.1	471,960	5,434,183	1297	6
T081	N	20-Aug-13	WH	VAN13004484.1	472,500	5,434,517	1327	6
T082	N	28-Jul-13	WH	VAN13004484.1	472,128	5,434,524	1309	_
T083	N	28-Jul-13	WH	VAN13004484.1	472,233	5,434,504	1322	_

Site	Waypoint	Older_sample	Overlying_Soil_type	Depth_cm	Bedrk_depth_cm	Au_ppb
Timbered Shaft Rd	102	CT104	Brunizol	70-95	_	14.3
Timbered Shaft Rd	103	_	Podzol	70-90	_	6.3
on old logging rd	015BIWOLD DOME TILL T917880	_	Podzol	40-55	55	*18.1*
on old logging rd	015BIWOLD DOME TILL T917881	_	Brunizol	80-100	_	10.6
W BiWold Dome slope	_	_	Podzol	35-48	48	**53.9**
W BiWold Dome slope	015BIWOLD DOME TILL T917884	_	Podzol	30-64	64	10.0
along upr Lady of Lake rd	GW 05 - LADY OF LAKE GRANITOID	_	Brunizol	25-80	80	**31.7**
hill N of Hort trib	_	_	Podzol	29-57	_	*19.1*
nr Ckay trib below MG trib	_	_	Podzol	28-52	_	6.0
lwr Lady of Lake rd	BOB'S TILL T917895 & PHOTO	_	Regosol	29-60	_	8.8
lwr Lady of Lake rd	BOBS TILL T917896 along rd	_	Podzol	26-51	_	6.8
LCFS Rd, 5 m N of TS Rd	112	_	Podzol	45-85	130	*17.0*
LCFS Rd	113	_	Podzol	60-90	_	**46.3**
LCFS Rd	114	CT027	Podzol	40-60	_	13.1
LCFS Rd	114	CT027	Podzol	60-70	_	*18.3*
LCFS Rd	129	CT-109	Podzol	50-80	_	10.0
BiWold Dome slope	116	P918801	Podzol	30-60	70	**55.6**
BiWold Dome slope	117	P918683	Brunizol	60-80	85	**38.6**
Timbered Shaft Rd	127	_	Podzol	50-70	_	8.1
on LCFS Rd 30 m E of Quad Tr	130	CT003	Podzol	30-42	_	7.7
SE of BiTel Knoll	131	_	Podzol	28-38	38	9.5
LCFS Rd, 5 m S of TS Rd	132	_	Podzol	40-55	70	22.0
Lefevre rd network	133	_	Regosol ?	80-100	_	25.3
upr Hydro Tower Rd	134	CT011	slumped Podzol	100-130	_	13.3
LCFS Rd	135	CT148	Podzol	40-60	65	7.5
LCFS Rd	136	_	slumped Regosol	120-150	_	7.5
LCFS Rd & logging rd	137	_	slumped Podzol	115-152	_	24.6
LCFS Rd	138	rk 0600	slumped Podzol	11232	30	5.8
LCFS Rd	139	silt S989113	slumped Podzol	15-50	_	8.8
Timbered Shaft Rd	140	_	Podzol	15-30	40	*17.5*
LCFS Rd	142	_	Podzol	20-45	45	10.8
LCFS Rd	143	_	slumped Podzol	20-35	35	15.4
Quad Trail	T081>6M	_	Regosol	60-70	80	11.6
lwr Quad Trail	005TILL SAMP T082	_	Podzol	60-70	70	2.0
lwr Quad Trail	005BULK TILL T083	_	Podzol	40-70	_	7.1

Bi_ppm	As_ppm	Fe_pc	Pb_ppm	Zn_ppm	Ni_ppm	Cu_ppm	Mo_ppm	W_ppm
1.2	22.1	3.72	29.7	101	61.8	51.5	0.9	2.7
0.5	12.7	**4.31**	28.7	96	70.1	46.6	0.8	0.4
0.5	11.2	3.47	19.9	**147**	55.5	44.4	0.6	0.4
0.5	15.7	*3.81*	25.6	113	51.1	63.1	0.9	0.4
0.7	15.8	3.45	27.8	**208**	60.1	40.5	0.7	0.6
0.4	11.9	3.04	17.5	*109*	59.0	40.2	0.9	1.0
2.1	29.0	3.39	34.7	**135**	38.2	47.4	**2.0**	**7.8**
0.4	19.5	3.16	24.8	100	*66.5*	35.8	0.6	0.6
0.5	9.6	2.01	17.0	87	26.8	33.5	0.7	1.0
0.4	21.5	*3.84*	**42.9**	**147**	54.7	62.9	0.9	0.7
0.5	13.8	*3.81*	**42.1**	**159**	**88.9**	*56.9*	0.9	0.3
1.0	*26.7*	3.70	27.9	86	73.4	49.9	1.1	*2.4*
1.4	**33.1**	3.91	30.6	91	**79.2**	64.2	1.5	**3.2**
0.5	21.5	3.16	19.3	77	47.8	46.6	1.2	1.1
0.7	30.3	3.93	28.3	97	60.6	62.9	**1.9**	1.2
0.5	21.7	3.69	22.3	87	63.4	*59.9*	*1.3*	1.3
0.5	**36.1**	2.90	34.9	57	15.6	31.7	**1.9**	0.2
0.8	**52.5**	**4.21**	25.3	*107*	50.5	*58.7*	1.5	1.0
0.5	21.3	3.96	*32.0*	*106*	60.5	51.4	*1.4*	0.3
0.2	19.0	*3.80*	18.4	75	43.6	48.0	0.7	0.3
0.8	22.3	*3.78*	*33.4*	*105*	*66.1*	50.5	**1.9**	*2.0*
1.1	**33.2**	**4.44**	**41.3**	84	**78.2**	**70.7**	1.6	**3.5**
1.3	*26.6*	4.03	**42.6**	*106*	71.0	*55.0*	1.5	**5.5**
0.4	*26.2*	3.07	**73.0**	*107*	58.3	32.9	*1.3*	0.8
0.4	16.6	3.72	24.3	85	42.0	47.1	0.8	1.0
0.5	14.3	3.96	23.2	78	60.3	45.7	0.7	1.0
0.5	*23.0*	3.96	24.0	72	51.9	52.2	0.8	1.3
0.8	**33.0**	**5.31**	*32.6*	112	*65.5*	**79.6**	0.9	0.7
0.5	16.7	*3.78*	25.3	70	38.3	41.9	0.9	0.7
0.5	20.5	3.93	26.2	97	74.2	49.6	0.8	0.8
0.6	21.0	3.63	24.8	77	43.1	35.5	1.1	*1.8*
0.5	24.2	*3.78*	25.7	86	46.3	44.7	1.2	0.6
0.8	15.5	3.36	23.7	73	45.4	39.8	1.0	2.7
0.5	14.0	3.42	22.1	113	48.7	49.5	0.9	0.4
0.4	21.3	3.97	19.1	72	56.3	*58.1*	0.9	0.4

Description
lt - m brn v clayey common small rounded pebbles unoxidized [?]
oxidized lt yel brn v clayey with v ang metapelite cobbles, close to oc
oxidized lt yel brn on lt gy fractured argillite bedrk
oxidized m brn v compact with abundant v rounded cobbles, one boulder
oxidized dk orange brn
oxidized lt gy v clayey with common rounded pebbles
lt yel brn with some granitic clasts, v hard & undisturbed on bedrock, angled fabric is apparent
lt yel brn v clayey graveley
v lt gy hard clayey
dk gy blue v clayey gleysol? or regosol
m gy brn gravelly & pebbley
oxidized m yel brn v clayey v stoney with ang cobbles of schist
unoxidized? lt gy v clayey compact with subrounded cobbles
m brn sandy
m brn sandy
lt gy brn
lt gy v clayey v pebbley v compact with much phyllite, oc is v close, unoxidized [?]
m- dk gy v clayey subrounded coarse gravel and pebbles many v dk gy phyllite pieces
m gy brn sandy & clayey with small cobbles
lt gy brn clayey with v ang schist
m yel brn v stoney with rd granitoid pebbles & gravel on granitic bedrk
lt brn to m gy v sandy
m yel brn v clayey, v stoney with many granitic cobbles
v sandy v hard with ang pebbles
lt gy v stoney with local ang cobbles of wh fractured QV
v clayey, slly swelling with altered blk schist
lt yel brn v stoney v hard, clayey & sandy, common rd'd schist cobbles
m gy sandy on argilllite bedrock with 10cm thick QV
m yel brn v hard v clayet common schist fragments
m yel brn v cobbley sandy v hard on pelite schist bedrk
lt yel brn clayey v sdy v hard with schist fragments
m gy on dk gy argillite bedrk
brn compact lodgement till on schist o/c
m - dk gy brn on argillite bedrk orients 075 53 SE
m - gy brn with pebbles & cobbles

Chart 5 Silts 10 twelve elements

Sample_ID	Date	Sampler	Easting	Northing	Acme Labs Certificate	Elevation_m	Waypoint
S989101	July 25 2013	WH	472,977	5,434,510	VAN13003240.1	1374	003CLEL_CIRQUE_STREAM
S989102	July 27 2013	WH	472,910	5,435,610	VAN13003240.1	1319	004_HONE_CK
S989111	July 28 2013	WH	472,562	5,434,789	VAN13003240.1	1228	005_CLELCKSILT&MM989111
S989112	July 28 2013	WH	472,493	5,434,516	VAN13003240.1	1329	005_QUADTRDEEPXDITCH
S989113	July 12 2013	WH	472,240	5,433,831	VAN13003240.1	1329	139 +/- 5m
S239	July 12 2013	DB	472,838	5,435,639	VAN13003240.1	1299	EW13CL41
P0228	July 11 2013	DB	473,530	5,436,479	VAN13003241.1	1475	EW13CL23
P0229	July 11 2013	DB	473,463	5,436,456	VAN13003241.1	1438	EW13CL24
P0230	July 11 2013	DB	473,451	5,436,433	VAN13003241.1	1426	EW13CL25
P0231	July 11 2013	DB	473,451	5,436,424	VAN13003241.1	1424	EW13CL26

Stream	Width_cm	Bulk_silt_also_analyzed	Au_ppb	Bi_ppm	Te_ppm	As_ppm	Fe_pc	S_pc	Pb_ppm
Clel 770Q5 trib	20	HM-15	2.9	0.56	0.09	11.9	**4.92**	0.01	23.94
upr Hone Ck	150	HM-02	2.3	**0.82**	**0.10**	**31.1**	**5.24**	0.03	41.32
upr Clel Ck	250	HM-03	5.8	0.52	0.05	16.9	**4.47**	0.03	29.28
Clel above Pawprint Corner trib	10	HM-09	**10.9**	0.46	0.09	18.7	4.24	0.01	32.54
uprmost Hort Trib	50	HM-04	**7.7**	0.49	0.02	19.4	3.79	0.01	30.18
upr Hone Ck	_	HM-02	5.0	0.61	0.09	22.9	3.66	0.08	32.46
upr Bzero Ck	_	HM-19	3.4	0.34	0.11	15.8	3.57	0.01	27.35
upr Bzero Ck	_	HM-19	**45.4**	**0.68**	0.09	15.2	2.34	0.01	31.65
upr Bzero Ck	100	HM-19	**8.1**	**0.70**	**0.11**	16.0	3.31	0.01	30.24
upr Bzero Ck	_	HM-19	**6.0**	**0.71**	0.09	15.0	3.35	0.01	**81.06**

Zn_ppm	Ni_ppm	Cu_ppm	Mo_ppm	W_ppm	Description
105.9	52.1	45.93	0.62	0.4	good flow [at HM15]
269.1	**99.6**	51.62	1.08	**1.8**	v good flow
121.8	66.4	**53.94**	1.23	**1.8**	good flow [at HM03]
87.4	61.4	51.1	**1.29**	**1.1**	man-made ditch along Quad Tr, v slow flow
75.7	47.4	50.77	1.00	0.8	v slow flow, along LCFS Rd
182.9	**81.9**	**54.23**	1.08	1.0	silt with organic remains
105.6	32.1	50.60	0.76	0.4	silt with organic remains
52.6	19.2	32.92	0.98	0.5	soil, 'A' Horizon & clay rich till with minor cobbles
66.5	33.9	**53.69**	1.06	0.6	from 1 - 1.5m deep gulley, dry, sdy with abundant cobbles, C Hor. trends 245 deg.
123.1	36.1	46.08	0.69	0.4	dry, sdy with abundant cobbles, C with mixed B Hor.

Notes
with B Doyle, field sieved to -20 mesh. also moss mat MM989101. Site of anom HM-15
with B Doyle, field sieved to -20 mesh. also site of rk 0604, rk 0605 & moss mat MM989102. Collected above rk 0685 of DB & EW. Valley is deeply incised with 25-35 deg slopes
collected 20 m above culvert along Clel Ck Logging Rd, from main Clel Ck, field sieved to -20 mesh. Also MM989111.
fair sample only, from bottom of deep cross ditch along Quad Tr. Moss mat MM 989112 is 7 m above Trail's bank
from uphill side above blk plastic culvert along LCFS Rd. Site is a draw between two heights of land
nr silt 973831
silt, was analyzed as a soil, thus a P label prefix
mixed-media, was analyzed as a soil thus P label prefix
mixed-media, was analyzed as a soil thus P label prefix .V shallow gulley
mixed-media, was analyzed as a soil thus P label prefix. From a 0.5m deep gulley 1m wide trend 265 deg.

Chart 6 Moss Mats 25 twelve elements

Sample_ID	Date	Sampler	Easting	Northing	Acme Labs Certificate	Elevation_m	Waypoint	Stream	Width_cm	HM_analyzed_also
MM989101	July 25 2013	WH	472,977	5,434,510	VAN13003239.1	1,374	003CLEL_CIR(	Clel 770Q5 trib	20	HM-15
MM989102	July 27 2013	WH	472,910	5,435,610	VAN13003239.1	1,326	004_HONE_C	upr Hone Ck	150	HM-02
MM989103D	July 28 2013	B Doyle	472,800	5,435,980	VAN13003239.1	1,238	_	mid Bogo Trib	_	HM-11
MM989104D	July 28 2013	B Doyle	472,805	5,435,980	VAN13003239.1	1,238	_	mid Bogo Trib	_	HM-11
MM989111	July 28 2013	WH	472,562	5,434,789	VAN13003239.1	1,228	005_CLELCKS	upr Clel Ck	250	HM-03
MM989112	July 28 2013	WH	472,493	5,434,516	VAN13003239.1	1,329	005_QUADTR	Clel above Pawprin	10	HM-09
MM239	July 27 2013	B Doyle	472,823	5,435,651	VAN13003239.1	1,294	MM0239_HO	upr Hone Ck	_	HM-02
MM0685	July 27 2013	B Doyle	472,853	5,435,641	VAN13003239.1	1,303	004_HONE_C	upr Hone Ck	_	HM-02
MM0685D	July 27 2013	B Doyle	472,856	5,435,641	VAN13003239.1	1,303	004_HONE_C	upr Hone Ck	_	HM-02
MMHM01	Aug 8 2013	WH	472,733	5,435,702	VAN13003239.1	1,247	006HONE CK	mid Hone Ck	100	HM-01
MMHM02	Aug 8 2013	WH	472,775	5,435,681	VAN13003239.1	1,277	006HONE CK	mid Hone Ck	100	HM-02
MMHM04	Aug 9 2013	WH	472,111	5,433,665	VAN13003239.1	1,237	006SILT_HM(	upr Hort Trib	80	HM-04
MMHM05	Aug 9 2013	WH	470,878	5,434,284	VAN13003239.1	910	006_HM05	Bunker Hill Ck	40	HM-10
MMHM06	Aug 9 2013	WH	470,520	5,432,949	VAN13003239.1	710	006Silt_HM0(	lwr Four Tribs Ck	100	HM-06
MMHM08	Aug 10 2013	WH	472,693	5,434,755	VAN13003239.1	1258	007Silt_HM08	Clel 750D1 Trib	40	HM-08
MMHM09	Aug 10 2013	WH	472,324	5,434,694	VAN13003239.1	1260	007Silt_HM09	Clel Pawprint Corne	25	HM-09
MMHM10	Aug 10 2013	WH	470,932	5,434,301	VAN13003239.1	923	007Silt_HM1(	Bunker Hill Ck	45	HM-10
MMHM11	Aug 11 2013	WH	472,557	5,436,070	VAN13003239.1	1162	008Silt_HM11	lwr Bogo Trib	60	HM-11
MMHM12	Aug 11 2013	WH	472,610	5,436,279	VAN13003239.1	1159	008Silt_HM12	lwr Bzero Ck	160	HM-12
MM234	July 12 2013	DB	473,339	5,436,090	VAN13003239.1	1,412	EW13CL33	upr Bmin trib	200	HM-18
MM235	July 12 2013	DB	473,343	5,436,117	VAN13003239.1	1,398	EW13CL34	upr Bmin trib	70	HM-18
MM236	July 12 2013	DB	473,217	5,436,185	VAN13003239.1	1,346	EW13CL38	mid Bmin trib	70	HM-18
MM237	July 12 2013	DB	472,926	5,435,882	VAN13003239.1	1,403	EW13CL39	upr Bogo trib	60	HM-20
MM238	July 12 2013	DB	472,983	5,435,827	VAN13003239.1	1,330	EW13CL40	upr Bogo trib	50	HM-20
MM240	July 12 2013	DB	472,953	5,435,626	VAN13003239.1	1,338	EW13CL43	upr Hone Ck	200	HM-02

Description	Au_ppb	Bi_ppm	Te_ppm	As_ppm	Fe_pc	S_pc	Pb_ppm	Zn_ppm
good flow	4.2	0.50	0.07	9.0	**3.42**	0.08	23.06	104.8
v good flow	3.5	*0.59*	**0.08**	15.1	2.40	0.11	34.35	*217.2*
duplicate of below MM989104D	4.1	0.54	0.02	17.8	2.30	0.14	*48.50*	135.2
duplicate of above MM989103D	*5.5*	0.54	0.02	18.6	2.36	0.14	36.84	116.7
along Clel Ck logging Rd 20 m up from culvert	**9.9**	0.42	0.02	12.5	*3.16*	0.07	22.41	106.1
man-made ditch, v slow flow	*5.6*	0.36	0.07	11.7	*3.11*	0.05	19.95	85.5
at DB's stream silt site S239	4.1	*0.57*	0.01	15.2	2.66	*0.13*	31.16	181.7
good mossy material with good stream flow	6.6	0.67	*0.05*	18.4	2.97	0.11	34.59	*207.0*
duplicate of above MM0685	*6.1*	0.65	0.04	*19.0*	*3.15*	0.10	33.94	*216.7*
flowing in a gully	*5.8*	*0.57*	0.04	17.3	*3.12*	0.11	40.27	169.3
flowing in a gully, slope 25 deg	3.0	0.38	0.03	14.6	2.85	0.04	27.82	134.7
flowing ck v silty & clayey	2.7	0.44	0.03	13.6	**3.33**	0.05	24.69	78.0
flat area, stream trends 60 degees uphill	4.3	0.49	0.03	*22.6*	*3.11*	0.04	53.92	115.4
site is a flat below a series of waterfalls, access along LCFS Rd	*5.8*	**0.86**	0.07	14.5	3.05	0.07	39.38	126.6
flowing, 40 m SW is Clel Ck	4.8	0.55	0.04	10.4	3.02	*0.12*	30.87	104.8
flowing Ck, 4-6 cm of fluvium on till, 15 m above LCFS Rd culvert	3.6	0.28	0.07	11.8	2.89	0.05	17.97	98.3
flowing ck in a sloping gully	**8.0**	0.52	0.01	24.4	**3.33**	0.04	54.89	132.5
good flow, ~ 60 m below 780T006 site [of 2007]	6.9	0.53	0.01	*19.8*	2.86	0.15	38.63	103.8
v bouldery	**11.1**	0.55	0.01	23.0	3.26	0.09	*43.68*	135.4
side seep on S side of Ck	*6.0*	*0.60*	0.01	5.3	0.72	**0.23**	**67.13**	**380.8**
flowing	*6.7*	*0.58*	0.01	16.7	1.13	**0.16**	*46.36*	**283.1**
flowing	**7.7**	**0.94**	0.07	**28.8**	2.04	0.15	**71.62**	240.1
seep on N side of Ck, flowing	1.7	0.46	0.01	**40.5**	3.04	0.15	26.07	76.3
no banks, minor flow to a seepage	4.7	*0.56*	**0.11**	*19.2*	2.04	0.15	52.37	75.9
minor flow	3.5	*0.58*	*0.05*	14.8	2.39	*0.12*	40.17	234.2

Ni_ppm	Cu_ppm	Mo_ppm	W_ppm	Notes
41.9	41.75	0.67	0.2	with B Doyle. From 770Q5 trib along Clel Cirque Rd (after Quad Tr), field sieved to -20 mesh. Also silt S89101. Site of anomalous HM-15
85.1	42.37	0.81	*0.9*	with B Doyle, from Hone Ck sample field sieved to -20 mesh. also site of rk 0604, rk 0605 & silt S89102. Collected above rk 0685 of DB & EW.
45.8	*45.22*	0.83	*0.9*	by B Doyle from Bogo trib , standard moss mat no notes
45.2	43.70	0.80	*0.9*	duplicate moss mat sample by B Doyle from Bogo trib, no notes
47.5	*47.68*	0.69	0.6	collected 20 m above culvert along Clel Ck Logging Rd, from main Clel Ck, field sieved to -20 mesh. Also silt S89111.
52.4	*46.45*	*0.92*	0.4	7 m above Trail's bank, silt S989112 is from bottom of deep cross ditch along Quad Tr, a fair sample only
66.8	*45.45*	*0.99*	*0.9*	
88.7	49.82	0.82	1.7	about 15 m dnstream of rk 0685 flagging
84.0	49.35	0.86	*1.0*	
69.0	51.11	0.77	0.6	
37.8	36.55	0.57	0.3	
45.3	40.84	0.48	0.4	
64.4	40.28	0.64	0.4	Creek is ~ 0.4 m wide, good flow. Several mossy boulders sampled about 30 m upstream from this UTM locale
65.5	38.88	0.87	**2.5**	site is along LCFS Rd, up creek about 30 m. V good flow, from a flat below a series of small waterfalls
60.6	**58.16**	0.72	0.3	
41.4	39.00	0.64	0.3	
76.6	*45.59*	0.62	0.4	
48.2	53.11	0.77	0.7	
46.4	**67.31**	1.78	*0.9*	
58.4	25.82	**3.97**	**5.3**	with coarse sand & pebbles, abundant B soil & moss, Ck trends 315 deg.
37.4	22.62	1.83	**3.2**	coarse sand with cobbles, abundant B soil & moss, Ck trends 315 deg.
41.9	41.79	**2.48**	**2.8**	coarse sand with cobbles, abundant B soil & moss. Site is about 20m upstream from 937844
42.5	39.10	*1.15*	*1.1*	B horizon silt, creek trends 305 deg. About 20m downstream in main creek is silt sample site
41.3	*45.88*	0.77	1.2	abundant till cobbles, B soil & moss, Ck trends 307 deg
84.2	*43.37*	0.82	*1.1*	silt-sand & moss, Ck trends 308 deg

Valley is deeply incised with 25-35 degree slopes

Chart 7 Bulk Silts 23 Gold parmeters Feb 28 '14

Bulk_Silt_ID	If_Field_Duplicate_D	Easting	Northing	Elev_m	Creek	Drainage_Basin	Samplers	Date	Width_ m
HM-01	D	472733	5435702	1247	lwr Hone Ck	Hone Ck	WH CH BH	Aug 8 2013	1.0
HM-02	D	472775	5435681	1277	lwr Hone Ck	Hone Ck	WH CH BH	Aug 8 2013	1.0
HM-03		472564	5434788	1237	upr Clel Ck	Clel Ck	WH CH BH	Aug 8 2013	2.0
HM-04		472111	5433665	1237	upr Hort trib	Hort trib	WH CH BH	Aug 9 2013	0.8
HM-07		471873	5433950	1213	E of Ckay trib	Ckay trib	WH CH BH	Aug 10 2013	0.3
HM-08		472693	5434755	1258	Clel 750D1 trib	Clel Ck	WH CH BH	Aug 10 2013	0.4
HM-09		472324	5434694	1260	Clel Pawprint Corner trib	Clel Ck	WH CH BH	Aug 10 2013	0.2
HM-10		470932	5434301	923	Bunker Hill Ck	BH Ck	WH CH BH	Aug 10 2013	0.5
HM-11		472557	5436070	1162	lwr Bogo trib	Bogo trib	WH CH BH	Aug 11 2013	0.6
HM-12		472610	5436279	1159	lwr Bzero Ck	Bzero Ck	WH CH BH	Aug 11 2013	1.7
HM-13		471701	5433844	1096	mid Ckay trib	Ckay trib	WH BD	Aug 21 2013	0.5
HM-14		471801	5433578	1092	mid Hort trib	Hort trib	WH BD	Aug 21 2013	1.0
HM-15		472976	5434514	1370	Cel 770Q5 trib	Clel Ck	WH BD	Aug 21 2013	0.3
HM-16		470747	5433205	749	lwr Four tribs Ck	Four tribs Ck	WH BD	Aug 21 2013	1.1
HM-17		472895	5437027	1266	645B0 Ck	645B0 Ck	WH JD	Aug 22 2013	2.0
HM-18		473150	5436262	1288	Bmin Trib	Bzero Ck	WH BD	Aug 24 2013	1.2
HM-19		473136	5436370	1280	upr Bzero Ck	Bzero Ck	WH BD	Aug 24 2013	1.4
HM-20		472959	5435855	1308	upr Bogo Trib	Bogo trib	WH BD	Aug 24 2013	0.7
HM-21		473993	5435847	1383	W Wall Fork	Wallack Ck	JD BD	Aug 27 2013	1.0
HM-22		474023	5435615	1380	710K0 Ck	Wallack Ck	JD BD	Aug 27 2013	0.7
HM-23		471558	5433729	1017	lwr Ckay Trib	Ckay trib	WH JD	Sept 18 2013	1.5
HM-24		471242	5433457	875	Ridge Trib	Four tribs Ck	WH BD	Sept 19 2013	1.5
HM-25		471338	5435202	978	lwr Cel Ck	Clel Ck	WH BD	Sept 19 2013	3.5

Water_flow	Moss_Mat_analz	Silt_analyz	Wypt_name	if_HM_picked_Y	Au_gns_Total	Stand_Au_gns_in_10Kg	Reshaped_gns
fast	MMHM01	NO	006HONE CK HM01	N	0	0	0
fast	MMHM02	S239 & S989102	006HONE CK HM02	N	0	0	0
medium	NO	S989111	006CLEL CK HM03	Y	7	8	5
slow	MMHM04	S989113	006SILT_HM04	Y	8	9	6
slow	NO	NO	007Silt_HM07	Y	16	21	6
slow	MMHM08	NO	007Silt_HM08	N	6	7	5
v slow	MMHM09	NO	007Silt_HM09	Y	2	2	2
medium	MMHM10	NO	007Silt_HM10	Y	5	6	4
medium	MMHM11	NO	008Silt_HM11	N	8	10	5
medium	MMHM12	NO	008Silt_HM12	N	0	0	0
slow	NO	NO	010 HM013>5M	Y	5	6	3
fast	NO	NO	010HM14 EXCELLE	Y	9	10	6
slow	MM989101	S989101	010 HM15	Y	5	6	0
medium	NO	NO	010 HM16	Y	4	4	2
medium	NO	NO	011HM17	Y	7	8	3
slow	MM236	NO	013 HM18 JAX 97	Y	8	9	2
fast	NO	P0228 to P0231	013_Rk0650_HM19	Y	7	8	3
slow	MM238	NO	013 HM20 BOGO	N	0	0	0
slow	NO	NO	by J Denny	N	0	0	0
dry	NO	NO	by J Denny	N	2	4	2
medium	NO	NO	017HM23 nr MG	N	3	4	1
slow	YES	NO	018HM24	Y	9	12	3
medium	NO	NO	018HM25	Y	10	12	6

Modified_gns	Pristine_gns	g_Nonmag_HMC	Calc_Gold_in_minus_12_silt_ppb	Calc_VG_in_nonmag_HMC_ppb	Bulk_silt_kg	Archived_silt_kg
0	0	83.7	0.00	0	7.5	0.2
0	0	95.6	0.00	0	8.2	0.2
2	0	69.1	9.91	1,320	9.2	0.2
2	0	48.5	41.30	7,493	8.8	0.2
9	1	34.5	1.58	367	8	0.2
1	0	54.5	0.24	38	8.5	0.2
0	0	68.2	76.50	9,310	8.3	0.2
1	0	49.4	0.40	66	8.1	0.2
3	0	59.4	1.16	158	8.1	0.2
0	0	79.1	0.00	0	8.6	0.2
2	0	51.4	17.79	3,080	8.9	0.2
2	1	53.4	0.61	107	9.4	0.2
3	2	71.2	17.79	2,174	8.7	0.2
2	0	55.2	3.61	634	9.7	0.2
4	0	68.1	3.83	501	8.9	0.2
5	1	101.4	9.19	834	9.2	0.2
2	2	86.7	3.14	315	8.7	0.2
0	0	87.9	0.00	0	8.3	0.2
0	0	84.3	0.00	0	8.1	0.2
0	0	51.1	0.23	27	5.9	0.2
1	1	112.3	0.15	11	8.2	0.2
5	1	46.9	1.47	248	7.9	0.2
3	1	89.6	3.37	327	8.7	0.2

Tabled_Bulk_silt_kg
7.3
8
9
8.6
7.8
8.3
8.1
7.9
7.9
8.4
8.7
9.2
8.5
9.5
8.7
9
8.5
8.1
7.9
5.7
8
7.7
8.5

Chart 8 HM gns in 14 Bulk Silts Feb. 28 '14

Sample ID	Easting	Northing	Creek	Drainage_Basin	Prospectivity	Scheelite_0.25-0.5_mm_gns
HM-04	472111	5433665	upr Hort trib	Hort trib	Gold + Tungsten	20
HM-07	471873	5433950	E of Ckay trib	Ckay trib	Gold + Tungsten	30
HM-13	471701	5433844	mid Ckay trib	Ckay trib	Gold	20
HM-14	471801	5433578	mid Hort trib	Hort trib	≈	20
HM-03	472564	5434788	upr Clel Ck	Clel Ck	Gold + Tungsten	60
HM-10	470932	5434301	Bunker Hill Ck	BH Ck	≈	15
HM-24	471242	5433457	Ridge trib	Four tribs Ck	≈	15
HM-09	472324	5434694	Clel Pawprint Corner trib	Clel Ck	≈	10
HM-15	472976	5434514	Cel 770Q5 trib	Clel Ck	Gold	30
HM-25	471338	5435202	lwr Cel Ck	Clel Ck	Gold	20
HM-16	470747	5433205	lwr Four Tribs Ck	Four tribs Ck	≈	15
HM-17	472895	5437027	645B0 Ck	645B0 Ck	Gold	15
HM-18	473150	5436262	Bmin trib	Bzero Ck	Gold + Tungsten	100
HM-19	473136	5436370	upr Bzero Ck	Bzero Ck	Gold + Tungsten	50

Scheelite_N_0.25-0.5_mm_gns	Scheelite_N_Rank_0.25-0.5_mm_gns	Corundum_pc	Corundum_0.25-0.5 mm_gns	Corundum_N_0.25-0.5 mm_gns
23	_	0.5	250	291
38	4	tr	60	77
23	_	tr	60	69
22	_	tr	100	109
67	2	tr	7	8
19	_	tr	8	10
19	_	tr	3	4
12	_	tr	16	20
35	5	0	0	0
24	_	tr	40	47
16	_	tr	200	211
17	_	tr	30	34
111	1	4	8,000	8,889
59	3	tr	100	118

Corundum_Rank_gns	pc_Fo_Olivine_0.25-0.5 mm_gns	pc_Fo_Olivine_rank	Spessartine_pc	Spessartine_0.25-0.5 mm_gns	Spessartine_N_0.25-0.5 mm_g
2	500	6	2	1,000	1,163
_	20	8	5	50	64
_	20	9	tr	60	69
5	1500	5	tr	4	4
_	15000	3	1	1,500	1,667
_	400	7	2	1,500	1,899
_	2000	4	3	1,500	1,948
_	25000	1	tr	13	16
_	20000	2	5	5,000	5,882
_	30000	2	0.5	1,000	1,176
3	3000	4	0.5	300	316
_	100	8	tr	1	1
1	100	8	tr	14	16
4	200	8	0	0	0

Spessartine_N_Rank_gns	pc_Grossular	Grossular_0.25-0.5_mm_gns	Grossular_N_0.25-0.5_mm_gns	Grossular_N_Rank	pc_low-Cr_Diopside	low-Cr_Diopside_0.25-0.5 mm_gns
4	90	50,000	58,140	6	0.5	250
_	95	60,000	76,923	4	tr	40
_	95	100,000	114,943	2	tr	40
_	95	70,000	76,087	5	tr	60
3	15	8,000	8,889	_	5	3000
2	30	10,000	12,658	_	tr	13
2	1	500	649	_	tr	40
_	5	2,000	2,469	_	1	400
1	1	400	471	_	tr	40
4	25	15,000	17,647	_	5	3000
_	95	80,000	84,211	3	tr	200
_	tr	50	57	_	2	1500
_	90	200,000	222,222	1	tr	200
_	40	30,000	35,294	7	tr	40

low-Cr_Diopside_N_0.25-0.5 mm_gns	low-Cr_Diopside_Rank_0.25-0.5 mm_gns	Spinels_0.25-0.5 mm_gns	Spinels_N_0.25-0.5 mm_gns	Spinels_N_Rank_0.25-0.5 mm_gns
291	5	60	70	2
51	_	100	128	1
46	_	11	13	_
65	_	24	26	_
3,333	2	50	56	3
16	_	30	38	_
52	_	40	52	3
494	4	16	20	_
47	_	40	47	4
3,529	1	40	47	4
211		30	32	_
1,724	3	50	57	3
222	6	40	44	_
47	_	50	59	3

Hercynite_gns_0.25-0.5_mm	Hercynite_gns_0.5-1.0_mm	Hercynite_Total_gns	Hercynite_N_Total_gns	Hercynite_Total_N_Rank	Au_Total_gns	Au_N_Total_gns
0	0	0	0	0	8	9
0	0	0	0	0	16	21
0	0	0	0	0	5	6
0	0	0	0	0	9	10
6	5	11	12	1	7	8
0	0	0	0	0	5	6
0	0	0	0	0	9	12
0	0	0	0	0	2	2
0	0	0	0	0	5	6
0	0	0	0	0	10	12
0	0	0	0	0	4	4
0	0	0	0	0	7	8
0	5	5	6	2	8	9
0	0	0	0	0	7	8

Au_N_rank_gns	Exotic HM indicator gns	Tabled_Bulk_silt_kg
3	1 red rutile + 1 anatase + tr [unpicked] apatite	8.6
1	2 pyrolusite + 1 zircon + tr [unpicked] apatite	7.8
_	1 anatase + 1 zircon	8.7
3	2 rutile + 1 zircon	9.2
3	11 hercynite + 5 apatite + 1 red rutile + 2 rutile + 5 Ti-augite	9.0
_	>15% [unpicked] augite + 9 uvarovite + 1 Mn-epidote + 3 red rutile + 9 anatase + 1 epidote + 18 zircon + tr [unpicked] apatite	7.9
2	tr [unpicked] apatite	7.7
_	>15% [unpicked] augite + tr [unpicked] apatite	8.1
_	1 anatase + tr [unpicked] apatite	8.5
2	4 anatase + 1 pyrolusite + 2 zircon + tr [unpicked] apatite	8.5
_	1 anatase + 1 chalcopyrite + 3 pyrolusite + 1 zircon	9.5
3	Tr 50 gns axinite + 1 uvarovite + 5 andradite + tr [unpicked] apatite	8.7
3	5 hercynite + tr [unpicked] apatite	9.0
3	1 zircon	8.5

Appendix 9 Review of Tungsten skarns

Following are extracts from L. Meinert et al. (2005) 'World Skarn Deposits'

"Tungsten skarns … are associated with coarse-grained, equigranular batholiths (with pegmatite and aplite dikes) surrounded by large, high-temperature, metamorphic aureoles (Newberry and Layer 1998). These features are collectively indicative of a deep environment. Plutons typically are fresh with only minor myrmekite and plagioclase-pyroxene endoskarn zones near contacts. The high-temperature metamorphic aureoles common in the W skarn environment contain abundant calc-silicate hornfels and skarnoid formed from mixed carbonate-pelite sequences (e.g., Figs. 2A-C, 3C therein). Such metamorphic calc-silicate minerals reflect the composition and texture of the protolith and [are] distinguished from ore-grade metasomatic skarn …

Newberry and Einaudi (1981) divided W skarns into two groups: reduced and oxidized types, on the basis of host rock composition (carbonaceous versus hematitic), skarn mineralogy (ferrous versus ferric Fe), and relative depth (metamorphic temperature and involvement of oxygenated ground water). Early skarn assemblages in **reduced W skarns** are dominated by hedenbergitic pyroxene [$CaFeSi_2O_6$] and lesser grandite garnet [grossular $Ca_3Al_2Si_3O_{12}$ to andradite $Ca_3Fe_2Si_3O_{12}$ solid solution] with associated disseminated **fine-grained, Mo-rich scheelite** (powellite).

Later garnets are sub-calcic (Shimazaki 1977; Newberry 1983) with significant amounts (as much as 80 mol %) of spessartine [$Mn_3Al_2Si_3O_{12}$] and almandine [$Fe_3Al_2Si_3O_{12}$]. This **sub-calcic garnet** is associated with leaching of early disseminated scheelite and re-deposition as **coarse-grained, commonly vein-controlled, low Mo scheelite** ... [and] the introduction of sulfide minerals, such as **pyrrhotite**, molybdenite, **chalcopyrite, sphalerite, and arsenopyrite**, as well as hydrous minerals such as biotite, hornblende, and **epidote.**

In oxidized W skarns, andraditic garnet is more abundant than pyroxene, scheelite is Mo poor, and ferric Fe phases are more common than ferrous phases. For example, at the Springer deposit in Nevada, garnet is abundant and has andraditic rims, pyroxene is diopsidic [$CaMgSi_2O_6$] ($<Hd_{40}$), epidote is the dominant hydrous mineral, pyrite is more common than pyrrhotite, and **sub-calcic garnet** [spessartine - almandine - pyrope $Mg_3Al_2Si_3O_{12}$ solid solution] **is rare to absent** (Johnson and Keith 1991). In general, oxidized W skarns tend to be smaller than reduced W skarns, although the highest grades in both systems typically are associated with hydrous minerals and retrograde alteration (Meinert et al. 2005, and refs. therein)."

With common carbon-bearing rocks present it is likely any W skarns present on CLY are the reduced type.

Re Tungsten skarn deposits in the Canadian Cordillera

The following quotes G.E. Ray (2013) including his table 3. Words in bold by WH.

Scheelite, molybdenite, chalcopyrite, pyrrhotite, sphalerite, arsenopyrite, **pyrite**, powellite. May contain trace *wolframite, fluorite, cassiterite, galena, marcasite and bornite.* Reduced types carry pyrrhotite, magnetite, ***bismuthinite, native bismuth*** and have high pyrrhotite:pyrite ratios. Variable amounts of quartz-vein stockwork (with local molybdenite) can cut both the exoskarn and endoskarn. *The Emerald Tungsten skarns in B.C. include pyrrhotite-arsenopyrite pods that carry up to 9 g/t Au.*

Geochemical signature: **W**, Cu, Mo, **As, Bi** and **B**. Less commonly Zn, Pb, Sn, Be, F (Au).

Exoskarn: inner zone of **diopside-hedenbergite (Hd60-90, Jo5-20) ± grossular-andradite (Ad10-50, Spess5-50)** ± biotite ± vesuvianite, with outer barren wollastonite-bearing zone. An innermost zone of massive quartz may be present. Late-stage **spessartine** ± almandine ± biotite ± amphibole ± plagioclase ± phlogopite ± epidote ± fluorite ± sphene.

Reduced types characterized by **hedenbergitic pyroxene [low-Cr Diposide-Hed.]**, Fe-rich biotite, fluorite, vesuvianite, scapolite and low garnet to pyroxene ratios. Oxidized types characterized by **salitic pyroxene**, epidote and andraditic garnet and high garnet to pyroxene ratios.

Exoskarn can be associated with extensive areas of biotite hornfels.

Endoskarn: **pyroxene ± garnet** ± biotite **± epidote** ± amphibole ± muscovite ± plagioclase ± pyrite ± pyrrhotite **± trace tourmaline** and scapolite; local greisen developed.

"The scheelite-bearing ore at Emerald Tungsten generally comprises sulfide-poor and garnet-rich skarn with minor fluorite and powellite (Ray and Webster 1995). However, some pyrrhotite, arsenopyrite, and quartz-rich zones lack scheelite and instead contain anomalous Au (up to 9 g/t), with **enrichment in Bi, Sb, Te, and Se, and rare telluride and selenide minerals** (Ray and Webster 1997). These Au-bearing quartz and sulfide-rich veins commonly lie structurally above the garnet-scheelite skarns (L. Dandy, personal communication, 2003), although some zones are close to the margins of the stocks. … the Au-Bi-bearing quartz-sulfide veins [may be] related to, and a more distal part of, the W skarn system … (p. 37)."

See Fig. 11 Photo of Emerald tungsten skarn from Ray (2013).

Appendix 10 The East Dodger Tungsten deposit, reviewing its petrology and mineralogy

"Tungsten (scheelite) at the East Dodger mine occurs with garnet-bearing skarn adjacent to the granitic Dodger stock … confined to skarn beds within the Truman and Reeves Members of the Laib Formation… **The lead-zinc orebodies** occur within the lower part of the Reeves Member and **are older than the Dodger stock and the tungsten orebodies.**

In the mine area the Truman Member consists of variegated calc-silicate skarn, quartzitic argillite, micaceous quartzite and marble; the Reeves Member is banded grey and white, medium-coarse crystalline marble. *[An oversight: The presence of dolomite marble or magnesian-silicate skarn in the Reeves is not mentioned.]*

The [W] orebody consists of three mineralized zones the 'upper lime', the 'middle skarn' and 'lower lime' zones. In each scheelite occurs in light brown and green **garnet-bearing diopside skarn.** The upper and lower ore zones are bounded by marble, the middle skarn zone is in contact with *unmineralized skarn*, argillite and marble of the Truman Member. **The tungsten ore is roughly conformable with [the compositional] layering … within the garnet-bearing zones (R.I. Thompson 1973)."**

"A thin section of typical skarn ore is mainly garnet, pyroxene, green amphibole, chlorite and vesuvianite, with minor calcite and quartz... and **clinozoisite-epidote** (in fig. 3 of Mulligan 1984). … Similar [typical ore] locally contains vugs lined with calcite, coarse **red garnet** and acicular green amphibole. Sections of argillaceous rock have alternating bands of quartz-biotite, quartz-muscovite and **garnet**. Scheelite occurs in very small scattered gns… Vesuvianite is common. Noteworthy is the sharp stratigraphic separation between tungsten mineralization and surrounding (in plan) lead-zinc mineralization in the Dodger area… both have been deformed. **No major tungsten concentrations occur except in contact with granitic stocks** (Mulligan 1984)."

In the same mineralized system Sultan Minerals Inc.'s Emerald Tungsten Property has a NI-compliant measured and indicated resource of 19.46 million pounds of WO3 grading 0.358%, and an additional inferred resource 15.93 million pounds of WO3 at 0.341%, both at a cutoff grade 0.15% WO3 (Giroux and Grunenberg, 2009). "Sultan has extensively drill tested the deposits, completed three Resource Estimates, a Preliminary Economic Assessment, a Scoping Study, and a baseline Environmental Study" and has an "Option Agreement with Margaux Resources Ltd. (TSX-V: MRL "Margaux") for the disposition of 100% of the Jersey-Emerald Tungsten--Zinc Property" (Apr. 30 & Nov. 11 2013 Sultan Minerals Inc. News Releases).

Appendix 11 Review of Gold skarns

Following are extracts from L. Meinert et al. (2005) 'World Skarn Deposits'

"The term "Au skarn" is used here in the economic sense suggested by Einaudi et al. (1981) and refers to ore deposits that are mined solely or predominantly for gold and which exhibit calc-silicate alteration, usually dominated by garnet and pyroxene, this related to mineralization….

Reduced gold skarns

The highest grade (5–15 g/t Au) Au skarn deposits are relatively reduced, are mined solely for their Au content, lack economic concentrations of other metals, and have a distinctive Au-Bi-Te-As ± Co geochemical association. Most high-grade Au skarns are associated with reduced (ilmenite-bearing, Fe_2O_3 / (Fe_2O_3 + FeO) << 0.75) diorite-granodiorite plutons and dike/sill complexes. They typically occur in clastic-rich protoliths rather than pure limestone, and skarn alteration of dikes, sills, and volcaniclastic units is common.

Reduced Au skarns are dominated by hedenbergite-diopside pyroxene (typically >Hd50), but proximal zones can contain **abundant intermediate grandite garnet** [GRANDite - GRossular $Ca_3Al_2Si_3O_{12}$ to ANDradite $Ca_3Fe_2Si_3O_{12}$]. Other common minerals include K-feldspar, scapolite, vesuvianite, **apatite**, and amphibole. Distal and/or early zones contain biotite ± K-feldspar hornfels that can extend for 100s of meters beyond massive skarn. Due to the clastic-rich, carbonaceous nature of the sedimentary rocks in these deposits, most skarn is relatively fine grained. Gold in these deposits is relatively late and is present as native Au intimately associated with Bi minerals [from] low-temperature unmixing….

Transitions to other Au ore types

The range of Au skarn types and environments overlaps with several other deposit types. For example **Au skarns in metamorphic environments overlap with the general class of orogenic Au deposits (Goldfarb et al., 2005), a deposit type which typically exhibits a strong structural control on gold distribution along shear zones and in conjugate vein sets. In the deeper parts of these systems, temperatures may be high enough to stabilize calcsilicate minerals in appropriate host-rock compositions. In some cases, a shear zone or other structural conduit may cut through a calcareous or Fe-rich lithology and only develop skarn alteration within that lithologic unit**, even though Au mineralization is widespread outside of that skarn envelope ...All of these occurrences share a lack of association with igneous activity and have formed almost entirely within a regional metamorphic environment, regardless of whether individual deposits are called skarn or orogenic.

The overlap between Au skarns and various porphyry and epithermal ore deposit types is relatively well understood (e.g., Sillitoe 1993; Meinert 2000) …

Trace metals

Even though skarn metal contents are quite variable, anomalous concentrations of pathfinder elements in distal skarn zones can be an important exploration guide. Geochemical studies of individual deposits have shown that metal dispersion halos can be zoned from proximal base metal assemblages, through distal precious metal zones, to fringe Pb-Zn-Ag vein concentrations (e.g., Theodore & Blake 1975, 1978). Anomalies 10s - 100s ppm for individual metals can extend for more than 1,000 m beyond proximal skarn zones.

Comparison of geochemical signatures among different skarn classes suggests that each has a characteristic suite of anomalous elements and that background levels for a particular element in one skarn type may be highly anomalous in other skarns. For example, **values Au 1 Te 10 Bi 100 and As 500 (all ppm) are not unusual for Au skarns but are rare to absent for other skarn types** (e.g., Meinert et al. 1991; Myers and Meinert 1991).

Perhaps the first question to be asked for each element is what values are anomalous for skarn deposits (Kotlyar et al. 1998). From the data set illustrated in Meinert et al. (1991), values in excess of 75 ppb Au, 5 ppm Ag, 50 ppm As, 1 ppm Sb, 50 ppm Bi, 1 ppm Te, 5 ppm Se, 250 ppb Hg, 10 ppm Cd, 100 ppm Cu, 100 ppm Pb, 200 ppm Zn, 100 ppm W, 25 ppm Mo, 50 ppm Co, 75 ppm Ni, and 25 ppm Cr could be considered anomalous for skarn deposits in general.
…many use thresholds 400 - 500 ppb Au…

For W skarns, W and Mo are consistently high with local anomalies of Bi Te Cu and Zn. For Au skarns, Au Ag As Sb Bi Te Hg are high with local anomalies of Co Ni Cr Cu Pb Zn and W.

Re Gold skarn deposits in the Canadian Cordillera

The following quotes G.E. Ray (2013) including his table 3. Words in bold by WH.

Two subtypes, Pyroxene-rich & garnet-rich. ORE MINERALOGY & GEOCHEMISTRY, QUALITATIVE SULPHIDE CONTENTS & PYRRHOTITE:PYRITE RATIOS, EXOSKARN & ENDOSKARN ALTERATION

Pyroxene-rich sub type (**bold** if in CLY HMs):

ORE MINERALOGY **Native gold**, pyrrhotite, arsenopyrite, *chalcopyrite, tellurides, bismuthinite, cobaltite, native bismuth, pyrite, sphalerite, maldonite.*

Generally high sulfide content and high pyrrhotite-pyrite ratios.

Extensive exoskarn with high pyroxene:garnet ratios. Prograde minerals: K-feldspar, Fe-rich biotite, **low-Mn grandite garnet (Ad10-100)**, wollastonite, **diopsidic to hedenbergitic clinopyroxene (Hd20-100; Jo0-20)** and vesuvianite. **Trace rutile**, **axinite (Ca,Mn,Fe)3Al2BO3Si4O12(OH)** and sphene.
Late minerals include epidote, chlorite, clinozoisite, vesuvianite, scapolite, tremolite-actinolite, sericite and prehnite.

"Pyroxene-rich Au skarns have high pyroxene/garnet and pyrrhotite /pyrite ratios with **grandite garnet, generally hedenbergitic pyroxene**, and Fe-rich biotite (his fig. 6). The related intrusions … [have] high total Ti contents and low Fe2O3/FeO ratios (Ray et al., 1995; 1996). The sulfide-rich orebodies tend to lie in the outer parts of the exoskarn envelopes.

Examples include the Marn skarn in the Yukon (fig. 1; Brown and Nesbitt, 1987) and the Nickel Plate, Canty, French, and Good Hope deposits at Hedley, in British Columbia (figs. 15A and 15B; refs. therein). **They favour calcareous siltstone host rocks and the skarn mineralogies** (e.g., high pyrrhotite content and the presence of Fe-rich biotite and hedenbergitic pyroxene) **suggest that the hydrothermal systems were relatively reduced… [Gold] is commonly associated with Bi minerals (including Bi tellurides) and arsenopyrite; some deposits display sporadic enrichment in Co (table 3).**

Garnet-rich sub type:

*IMPT "Large, economic garnet-rich Au skarns have not yet been identified in the Canadian Cordillera (p. 30)."
Garnet-rich type: **Native gold**, pyrite, magnetite, *chalcopyrite, arsenopyrite, sphalerite, hematite, pyrrhotite, galena, tellurides, bismuthinite.*

Generally low to moderate sulphide content and low pyrrhotite:pyrite ratios.

Extensive exoskarn with low pyroxene:garnet ratios. Prograde minerals: K-feldspar, **low-Mn grandite garnet (Ad 10-100)**, wollastonite, diopsidic clinopyroxene (Hd 0-60) **(?)**, **epidote**, vesuvianite, sphene and **apatite**.
Late minerals include epidote, chlorite, clinozoisite, vesuvianite, tremolite-actinolite, sericite, dolomite, siderite and prehnite.

Geochemical signature for Pyroxene- and Garnet-rich subtypes **Au, As, Bi, Te, Co, Cu, Zn or Ni.**

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BC ME&M = B.C. Ministry of Energy and Mines
BC MEMPR = B.C. Ministry of Energy, Mines and Petroleum Resources
GAC = Geological Association of Canada
USGS = U.S. Geological Survey

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excerpt from p. 9:
Geology of Harcourt Ck Assemblage along the old BH mine road

The HCA is sufficiently well exposed along the old BH mine road to divide it into three informal lithological Units. These can be compared to the lithologies of Fyles & Hewlett's (1959) and Einarsen's (1994) stratigraphic successions or 'type sections' of the HCA along lower Harcourt Ck (see Drawing #0, Plate 1 enclosed). Maps 3A to 3C outline lithologies and structures along the road. Site 2 on Map 3A (also circled on Plate #1) is representative of the HCA Metabasalt + Argillite Unit. Dark green, schistose fine-grained metabasalt (metabasite) outcrops at the corner intersection of the Limpid Ck Logging Road and the old BH Mine road [These are MORB's, not Rossland Group island arc andesites].

Walking the old mine road after nondescript dark grey argillites and a 130 m long covered interval the HCA Limestone + Argillite Unit begins. This distinctive lithology includes medium to dark grey very argillaceous limestone with characteristic interbeds of black, carbonaceous very argillaceous limestone Site 3. It is thinly bedded on a mm- to cm-scale. Minor buff, sandy argillaceous limestone also occurs. It is a possible host for replacement-type gold mineralization. After a covered interval beginning at 237 m a single exposure of very carbonaceous, graphitic lustrous argillite occurs (Map 3B, Site 4 and Drawing #0). Two additional argillites subcrop in another mostly covered interval.

At 397 m the HCA Quartzite + Tuff Unit begins. It consists of argillaceous quartzite followed by medium grey green meta-tuff Site 5, light brown or buff quartzite Site 6, a bed of soft siliceous argillite and another bed of thinly bedded grey green metatuff Site 6A (on Map 3C). Thereafter the roadside is mostly drift covered with a few argillite exposures. Biotite - bearing argillite and biotite schist from 560 m have developed by contact metamorphism of argillites by the BH sill [Wallack Ck outlier] granitic intrusion."

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"Some [tungsten] skarns are also Au-bearing, which suggests that they should be re-examined as an economic source of by-product Au. For example, the sulfide-rich Au-As-Bi-Te mineralization in parts of the Emerald Tungsten deposits and at the nearby Bunker Hill mine (Ray and Webster, 1997) suggests that other W skarns … may contain Au-bearing orebodies. In the Yukon, the "Tombstone Gold Belt" (Burke, 2004) includes many skarn and non-skarn Au-rich occurrences that are related to Cretaceous intrusions. Many of these skarns include W as well as Au and Bi, and some are similar in age, alteration, and chemistry to the W skarns in southern British Columbia, such as those in the Emerald Tungsten Camp (fig. 1). Yukon examples of these Au-bearing skarns (Emond, 1992; Emond and Lynch, 1992) include Scheelite Dome (Yukon MINFILE 115P003), Mahtin (115P007), Aurex (105M060), and the McQuesten (105M029)."

"The Cretaceous plutonism was concentrated in two major metamorphic zones (Monger et al., 1982; Woodsworth et al., 1991), the easternmost of which resulted in mostly felsic, I and S-type intrusions with initial $^{87}Sr/^{86}Sr$ ratios greater than 0.706 (Armstrong, 1988). This eastern zone was an indirect result of collision, during the mid Jurassic, between the Intermontane Superterrane and Ancestral North America, which produced thickening of the continental crust in the outer part of the platformal sedimentary wedge. This was followed by I and S-type plutonism that culminated in mid-Cretaceous time (Woodsworth et al., 1991). These Cretaceous plutons, which are commonly peraluminous two-mica granites, were responsible for most of the W and Sn skarns (fig. 3D, E and F) in the eastern part of the region (fig. 1)."

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