CLY Group Total Field VLF-EM Geophysical, Soil / Rock Geochemical, and detailed Geologic Surveys, Bunker Hill Mine area, NTS 082F03 W 1/2 Nelson Mining Division, B.C.

Claims worked on:
CLY2, Bunker Hill C.G. Lot 2939, Mormon Girl C.G. Lot 1949

Latitude 49° 03' 36" Longitude 117° 23' 15"

NTS 082F.004 (1:20,000 scale map) and 082F.003

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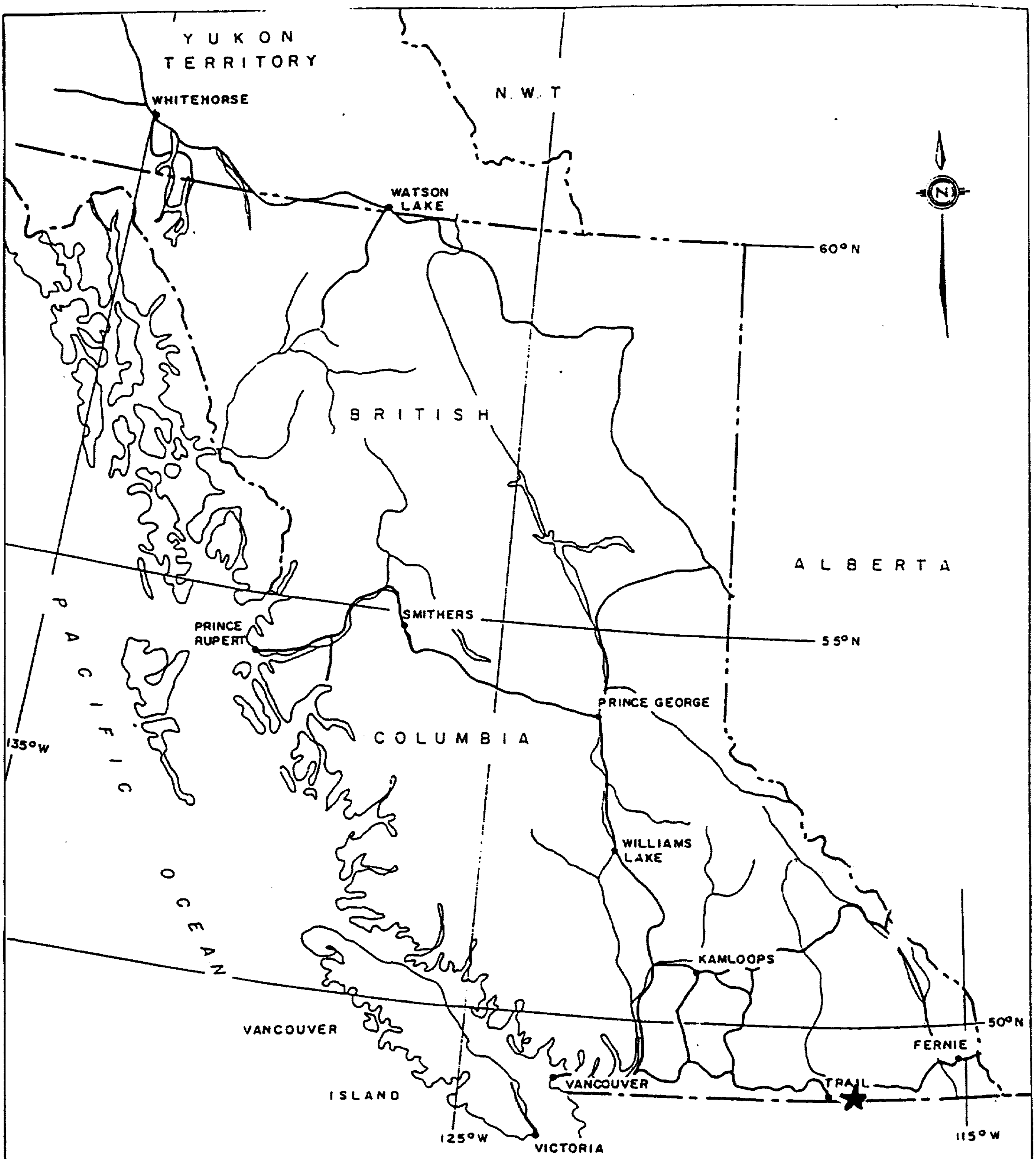
Date: Jan. 22 2000

Figures (1 to 5 after Wehrle 1999)

Drawings

Drafted Maps in enclosure:

Appendices



CLY Group
PROPERTY LOCATION in. B.C.

DATE Nov '99	NTS: 82F /	FIGURE 1

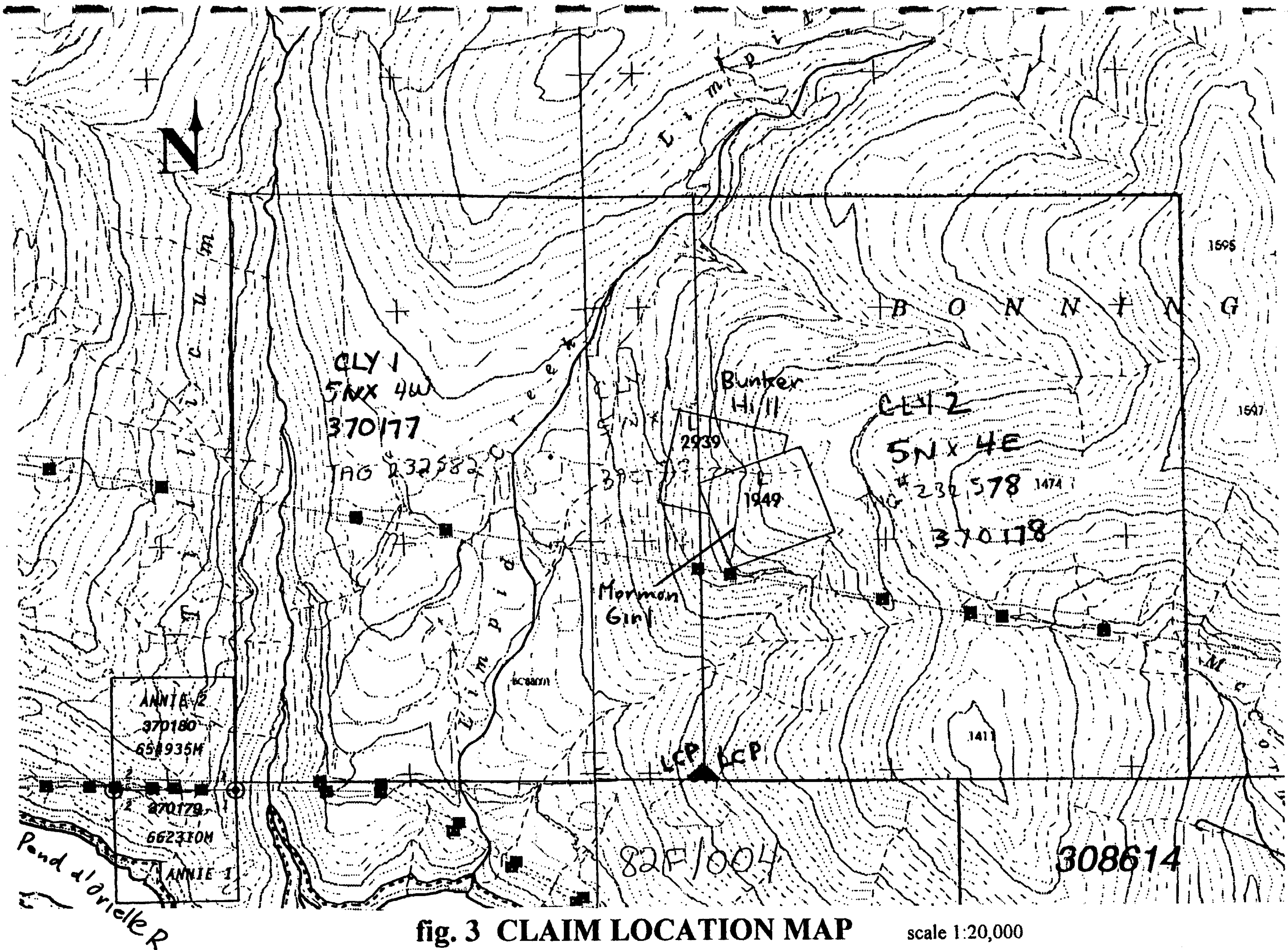


fig. 3 CLAIM LOCATION MAP scale 1:20,000

NTS 082F.004

082F.003 ← | →

100 500 1000 1500 2000

Introduction

1.1 Location and Access

The CLY Group prospect is located in the Nelson Mining Division of B.C. 16 km southwest of the town of Salmo and 6 km north of the international border (Fig. 1 & Fig. 3). The National Topographic System designation is Salmo sheet NTS 082F03 W 1/2 or 082F.004. The centre of the property is latitude 49° 03' 36" longitude 117° 23' 15" (a position just north of the Lefevre skarn trenches). Access from Salmo is by paved highway south to the US border crossing at Nelway. Proceed east on the Pend d'Oreille gravel road, then north and west for 4 km on the Ministry of Forests Limpid Creek Forestry Road. Several B.C. Hydro roads provide further 4X4 access. The magnetic declination used was 18 1/2°.

1.2 Claims

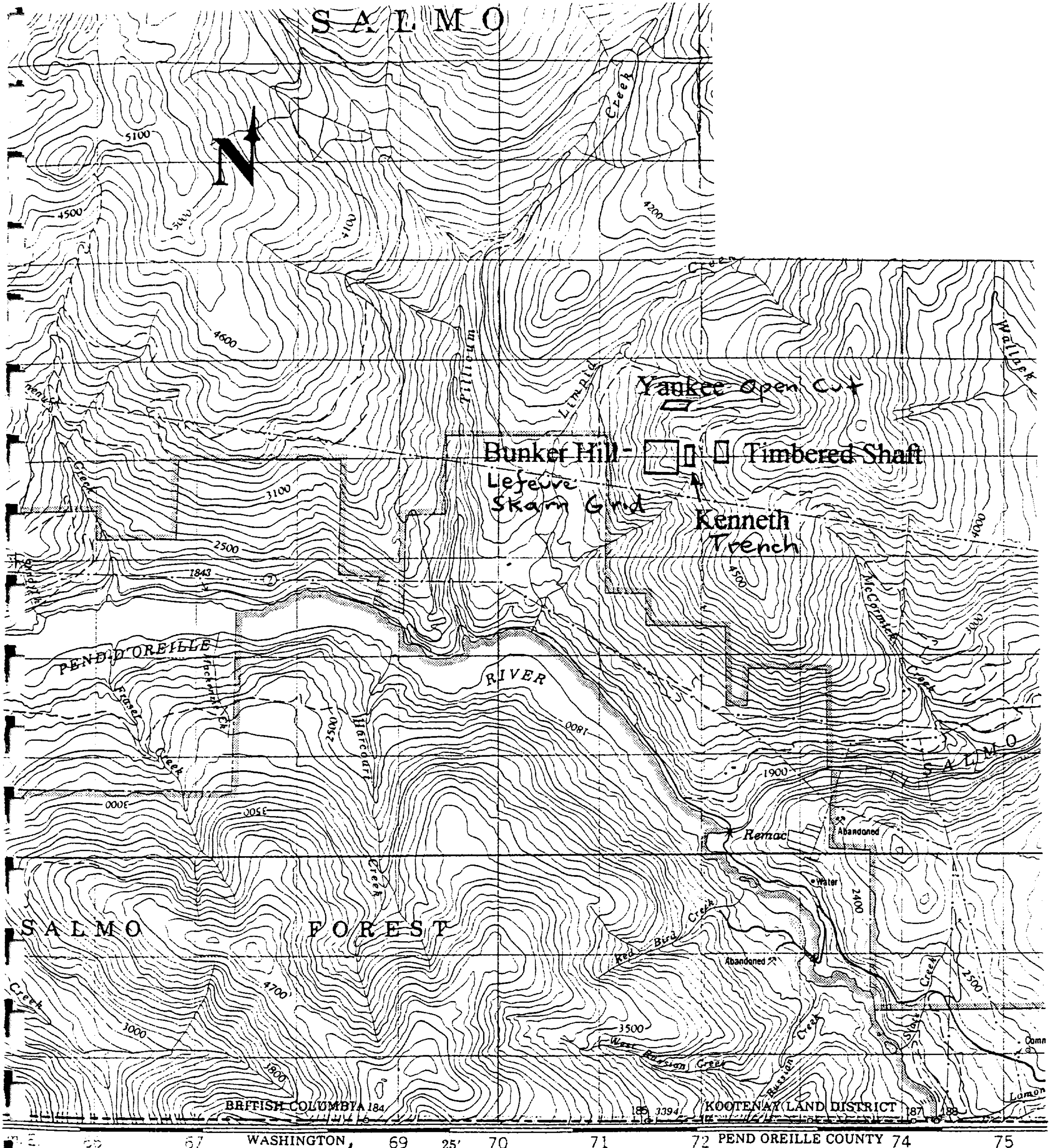
The CLY Group consists of 44 claim units (Fig. 3): two Crown Granted claims Bunker Hill Lot 2939 and Mormon Girl Lot 1949, two modified grid claims CLY 1, CLY 2 (tenure #'s 370177, 370178) and two 2-post claims ANNIE 1 and ANNIE 2 (tenure #'s 370179, 370180). Bunker Hill Lot 2939 is MINFILE 082FSW002. Claims are owned 100% by William R. Howard.

1.3 Physiography and Vegetation

The property is in the southern Bonnington Mountains north of the Pend d'Oreille River valley. Mature, rounded mountainous relief ranges from 600 to 1,700 meters above sea level. Forest cover is of Douglas fir and lodgepole pine with some stands of mature cedar. Some areas are dense and bushy. Numerous stands of poplar and birch occur along moist drainages. Recently small areas have been clear-cut. Most of the area is overlain by glacial drift and superimposed fluvial and alluvial deposits. Rock exposure is scarce (much less than 1%). Uncommon outcrops are found near topographic highs, incised creeks, old road cuts and old workings. New, blasted road cuts along the Limpid Ck Forestry Road provide the best exposures.

1.4 History, Economic and General Assessment

The Bunker Hill and Mormon Girl claims were Crown Granted in 1889. Gold-bearing quartz veins were mined from three adits, now caved. The property was operated by Bunker Hill Gold Mines, Limited from 1933 to 1935 and thereafter Waneta Gold Mines, Ltd. to 1941. Three underground diamond drill holes were collared from Adit No. 3 in 1936. (Minister of Mines 1936). Recorded production in 6 years from 1933 to 1942 totals 3,298 grams gold from 340 tonnes or 9.7 g/t [106 oz. Au from 375 tons or 0.28 oz/ton] (MINFILE 082FSW002). An ore petrography study of Waneta Gold Mines, Ltd. material found gold telluride and lead - bismuth minerals (Warren & Cummings '37).



VLF GRID AREAS
fig. 2 DETAILED LOCATION MAP

scale 1:50,000

part of NTS 82F03 W½
Salmo sheet

Tungsten ore - the mineral scheelite[1] - was discovered in old trenches SE of the adits on the Mormon Girl Crown Grant by H. Lefevre in 1942 (Hedley '43). This replacement mineralization is herein named the Lefevre tungsten skarn.
H. Little mapped the Lefevre tungsten skarn trenches in 1959. To 1959 the area was the northern limit of mapping by the B.C. Department of Mines (Fyles and Hewlett '59 Bulletin 41). In 1965 H. Little compiled Fyles and Hewlett's mapping with his own at 1:63,360 scale (Little GSC Map 1145A). Harris in 1984 surveyed five 150 m spaced lines and collected soils at 30 m intervals. 102 samples were analyzed for gold and tungsten and about 10 rocks. In late 1988 Corona Corp. ran a single line of soils L 24E partly over the project area (Gaunt '90). Results of geologic mapping southwest of the Bunker Hill mine area were released in 1995 (Einarsen, unpublished Ph.D. Thesis). A mineral deposit model in 1996 emphasized the importance of 'oceanic' rocks for hosting gold bearing quartz veins (Ash et al. '96). In 1997 ultramafic rocks - serpentinites and pyroxenites - were found by the writer along and close to the 9-1 / 9-2 Hydro Tower road. The closest are about 550 m NW of Bunker Hill mine Adit 1. Also in 1997 the black cryptocrystalline mineral veining felsic granitoids along the Limpid Ck Forestry road was identified as common Fe^{++} - rich tourmaline, schorl (Ball '97). Mineral deposit studies in 1997 and 1998 researched similar mineralized environments (Newberry et al. '97, Newberry '98). In 1998 the Bunker Hill property was classified as a tungsten skarn by the Geological Survey Branch (Ray & Webster, Bulletin 101). There is no record of a property visit by the authors. In 1999 the Bunker Hill quartz veins were listed as intrusion-related gold-tungsten-bismuth mineralization (Lefebure et al. '99, Lefebure & Cathro '99).

1.5 Work Performed

Several rectilinear grids (Fig. 2 after Wehrle '99) were established about old workings. Lines were topofiled. Flagged grid line kilometers totaled 5.965 km (including baselines not surveyed). D. Wehrle performed Total Field VLF-EM geophysical surveys totaling 5.170 km with a Sabre instrument, model 27 (Wehrle '99). Five undocumented old workings were found (Yankee Open Cut, Yankee Clear Cut Trench, Kenneth Trench, Hand Steel Trench and Timbered Shaft).

Grid or working	Preparatory Grid, Line km	VLF-EM, Line km	Soils	Rocks
Main Bunker Hill mine- Lefevre skarn	3.420	2.800	87	9//
Leo anomaly L 24E	-	-	7	-
Yankee Open Cut	1.065	0.990	34	4
Kenneth Trench	0.420	0.420	-	3
Timbered Shaft	1.060	0.960	25	3
Adit 1 Gallery Quartz vein	*	*	2||	4
Adit 2 Quartz Vein	*	*	*	3
'Moly' trench	*	*	*	5
'Blue Quartz' vein trench	*	*	*	2
Hand Steel Trench	-	-	-	2
^Other	-	-	-	2

[1] $CaWO_4$ calcium tungstate

Totals	5.965	5.170	155	37

* Grid and VLF line-km included under Main Bunker Hill mine- Lefevre skarn grid
|| orientation soils collected over the quartz vein
// all from the Lefevre skarn
^ BH-305 HCA Black Ls Detailed section and BW-01 a quartz vein, both along Limpid Ck Forestry Rd

For the main Bunker Hill mine - Lefevre skarn grid area (including the Leo anomaly) 96 soils from 94 sites were analyzed by fire assay / atomic absorption for gold + ICP for 30 elements by G. Swayze of Loring Laboratories Ltd., Calgary AB. Over the CLY Group a total of 155 soil sites were analyzed. 37 bulk rock samples were analyzed for Au, Te and Bi (fire assay / atomic absorption for gold + ICP for Te and Bi). 12 rocks were also analyzed by 30 element ICP. Four areas were mapped in detail (Drafted Maps in enclosure):

at 1:50 scale total 186 m^2 (0.0186 hectares)

(1) Map 1 Adit 1 Gallery Quartz Vein Plan View

(2) Map 2 Timbered Shaft - Structures and Samples Plan View

(3) Section 1 Harcourt Ck Assemblage 'HCA' Limestone Unit - Detailed Structures of Exposures along the Limpid Ck Forestry Road.

at 1:500 scale total 1,170 m^2 (0.1170 hectares)

Maps 3A to 3C Structural Geology of Exposures along the old Bunker Hill Mine Road - Harcourt Ck Assemblage. The mostly overgrown road was mapped for 585 meters to a point just below the Adit 2 dump.

1.6 Organization of Report

As this report is the first integrated geophysical - geochemical - geologic study of the project area, referenced background information is included for completeness and the reader's convenience. These report Sections are titled 'Background' and are previous work by others. Most of the background information is in Sections 2 to 6 Background - District Geology and 7 Background - Mineral Potential. Following are Sections 8 VLF-EM ground geophysical surveys, 9 Soil Geochem Surveys and 10 Soil Results for the Main Bunker Hill mine - Lefevre skarn grid. Section 11 integrates the above to discuss Domain 5, a New Exploration Target. Sections 12 - 20 describe old workings. Section 21 are conclusions.

2 Background - District Geology

2.1 CS Unit

The first survey of the lower Pend d'Oreille River by R. A. Daly found "Dark greenish, or dark gray to black phyllite, alternating with blackish quartzite, is the dominant rock on both banks of the Pend d'Oreille River ... [with] associated greenstone and altered basic breccias ..." (1912 p. 275). Fyles & Hewlett (1959) described these as sedimentary rocks, "a thick, complexly deformed sequence of phyllite, argillite, quartzite, chert and limestone of uncertain age" (p. 37). Notes of their detailed descriptions are to the left in Drawing #0 the HCA Stratigraphic Succession of the Harcourt Ck Assemblage.

'Stratigraphic' Succession of the Harcourt Ck Assemblage 'HCA', lower Pend D'Oreille River. The Assemblage may represent an upper Paleozoic rifted Back - Arc Ocean basin (Quartzite-Tuff and Limestone Units) evolving to a spreading Ocean Ridge (Meta Basalt Unit). These volcanics have trace element characteristics of Mid Ocean Ridge Basalts (tectonic discrimination diagrams of Einarsen '95, Roback et al '94). On Bunker Hill the folded HCA is upside down, inverted by mid Jurassic thrust faulting

from Fyles and Hewlett 1959 Stratigraphy and Structure of the Salmo Lead - Zinc Area

Drawing # 0 Circled Numbers discussed in text

from Einarsen 1995 Structural Geology of the Pend d'Oreille area ...

ages inferred

Grey or white Limestone. "Weathers white or light blue-grey ... commonly siliceous ... in places contains buff-weathering dolomitic masses..."

Tillicum Thrust Fault
not identified

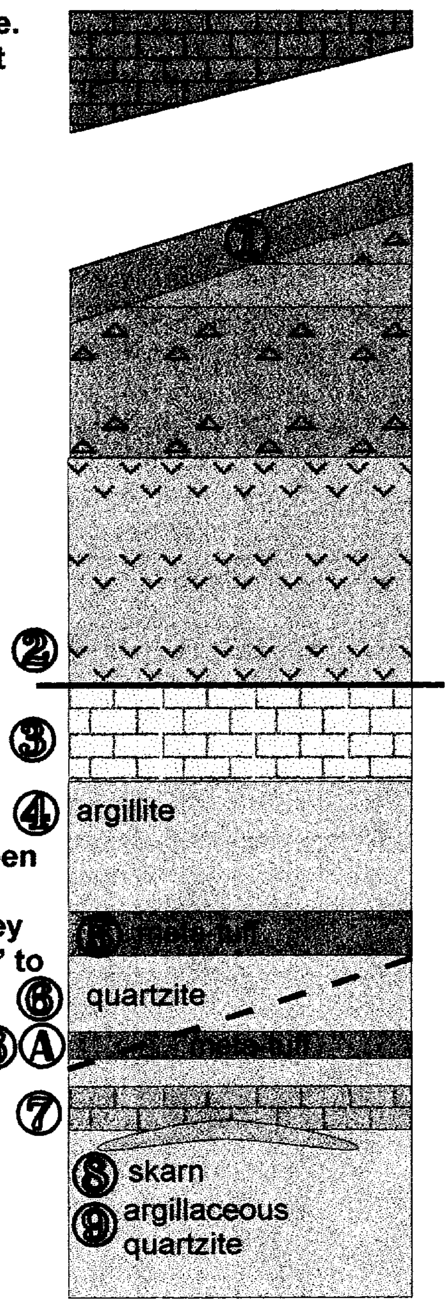
"Thinly banded green & white Chert and ... green sheared Phyllite" possibly a pyroclastic rock of volcanic origin p. 38

"Platy black Argillite with interbeds of grey weathering black Limestone"

Quartzite Unit: "thinly banded grey, green & brown micaceous Quartzite with minor grey Phyllite ... contains a 15' to 20' band of grey platy Limestone" p. 38

Bunker Hill Te - Bi - Gold Quartz Veins

Lefevre Skarn (cap shape): Pyroxene - Garnet - Pyrrhotite - Scheelite - Te - Bi - Au Skarn after argillaceous quartzite, off white marble (Little '59, Pratico '99)



Upper Laib Formation "grey, black & locally green phyllite" p. 37

Charbonneau Ck Assemblage Banded white Marble
Tillicum Thrust Fault
Ultramafics: Serpentinites, Pyroxenites (Wehrlite identified by C. Ash '98)
Permian - Early Triassic ?

Green Slate & green Chert White, tan & pale green Cherts
late Mississippian - early Pennsylvanian ?
HCA Metabasalt Unit: volcanoclastics, tuffs Mid Ocean Ridge Basalt chemistry

Mississippian ?
HCA Limestone Unit: Black marble, very argillaceous, partly very carbonaceous

Devono - Mississippian ?
Siliciclastics (Earn Assemblage ?)
HCA Quartzite - Tuff Unit: White to grey Quartzite, banded Quartzite & grey Phyllite, black Marble, Chert, Slate

In lower Harcourt Ck apparent thickness of HCA is 280' (85 m)

Erosional Unconformity with Lower Cambrian Upper Index Formation (Lardeau Group)

Drawing #0 W. Howard 1999

H. W. Little named this sequence the CS Unit, "a thick assemblage of black argillite and grey massive limestone, with minor chert, greenstone, and phyllite. The age ... is assumed to be Silurian (?), Lower and Middle Devonian, and Carboniferous (?)" ('85).

Triassic rocks may also occur (Roback '93, Roback & Walker '95). H. Little correlated the CS Unit either with the Milford Gp in the northern Kootenay Arc or with the Attwood Formation about Greenwood ('82).

West of CLY Group in the Rossland area T. Höy & K. Andrew describe the CS Unit as "tan to black coloured argillite, silty argillite and minor siltstone, a massive light grey limestone, some massive dolomite and dolomitic siltstone ... locally silicified, sheared, brecciated and veined. Tight, minor folds occur locally, and crenulated phyllites indicate at least two periods of deformation" ('91b).

2.2 Two Structural Divisions of the CS Unit, the Harcourt Ck & Charbonneau Ck Assemblages

Einarsen from district-scale mapping divides the CS Unit into two structural divisions, the Harcourt Ck [HCA] & Charbonneau Ck [CCA] Assemblages ('95). The structural divisions are two fault-bounded packages: the *Tillicum Thrust* separating the overlying CCA from the underlying HCA. Exposures of the CCA are not known on the property. The HCA comprises Fyles and Hewlett's B3 Unit on Little's 1965 geology map. Einarsen describes a 'type section' or lithologic succession of the HCA from lower Harcourt Ck, his Fig. 13 (Einarsen '95). The site is about 4 km SW of the Bunker Hill adits. Drawing #0 compares Fyles and Hewlett's descriptions with Einarsen's. From mapping the old Bunker Hill mine road, apparently the HCA is upside down. This concurs with Einarsen: "The HCA is overturned, based on rare graded bedding, cross-beds and cleavage / bedding relationships observed south of Pend d'Oreille River, west of Seven Mile Dam" ('95 p. 31). The HCA Quartzite - Tuff Unit (see Section 3) is highest in elevation. T. Höy & K. Dunne on colour Geoscience Map 1998-1 (Jan. 1999) briefly describe the CS Unit as "argillite, silty argillite, siltstone; minor limestone."

2.3 District-Scale Structures

In general CLY prospect covers a compressional fold and thrust belt. Extensional high angle normal faults offset the earlier folds and *thrusts*. Just north of the project area Andrew & Höy ('90) detail the district-scale structure:

"... Salmo area is dominated by a complex pattern of rectilinear faults, superimposed on an earlier fold and thrust domain. Four phases of deformation are identified: north - trending folds associated with east - directed *thrusts*, normal faulting prior to intrusion of [Middle Jurassic] Nelson batholithic rocks, and Eocene normal faulting and lamprophyre dyke intrusion. Intense shearing along the eastern edge of exposed Rossland Gp rocks ... in the Hellroaring Ck syncline south of Salmo may result from collisional tectonics along the eastern margin of Quesnellia. With continued compressional tectonics, east-directed *thrusts* and east verging to upright folds developed." One and a half km NW of Bunker Hill "The Hellroaring Ck syncline ... is an overturned, east-dipping syncline with Hall Formation argillites in its core.

A number of layer - parallel faults or shear zones associated with intense penetrative deformation in Elise volcanic rocks parallel the margins of this syncline" (Andrew & Höy '90). It is assumed similar deformation affected the older CS Unit: "All units within the HCA have a well developed foliation and are strongly lineated, and no igneous textures are retained in the meta-basites [HCA metavolcanics] (Einarsen '95 p. 31).

3 Geology of Harcourt Ck Assemblage along the old Bunker Hill Mine Road

The HCA is sufficiently well exposed along the old Bunker Hill 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 (1995) stratigraphic successions or 'type sections' of the HCA along lower Harcourt Ck (Drawing #0). Maps 3A to 3C outline lithologies and structures along the road. Site 2 on Map 3A (also circled on Drawing #0) is representative of the HCA Metabasalt Unit. Dark green, schistose fine grained metabasalt (metabasite) outcrops at the corner intersection of the Limpid Ck Logging Road and the old Bunker Hill Mine road. After nondescript dark grey argillites and a 130 m long covered interval the HCA Limestone Unit begins. This distinctive lithology includes medium to dark grey very argillaceous limestone (marble) with characteristic interbeds of black, carbonaceous very argillaceous limestone (marble) 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 sill-like Wallack Ck granitic intrusion uphill (Section 5.1).

3.1 HCA Limestone - Textures near the old Bunker Hill mine road

These were described in 1998 and are included for completeness. At 7+50 S just downhill of the old Bunker Hill mine road occasional 1 cm sized quartz veins occur both parallel and perpendicular to bedding in the HCA Limestone (Wehrle '98). One boulder contained a 10 - 30 cm wide light grey-blue quartz vein. Another boulder beside the road has free floating breccia fragments in a white siliceous matrix. Outcrop at L 23+98E and 7+50S is dark grey finely laminated argillaceous limestone, weakly to moderately silicified with mm to one cm sized quartz veins. These are mainly concordant to (folded) bedding striking 043° with dip 46° SE. One outcrop shows cherty, folded boudinaged layers with minor crosscutting quartz veinlets and fractures striking 040° dipping 28° SE (from Wehrle '98):

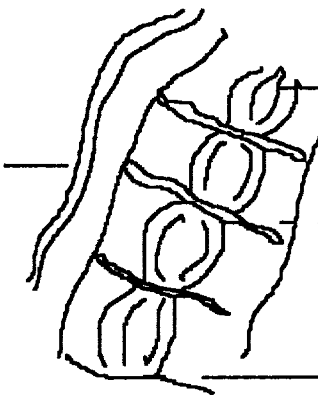


Fig. 6 Quartz Veined and Boudinaged HCA Limestone, view of boulder about 0.5 m

Concluding, veins and unusual textures of the HCA Limestone Unit suggest the Bunker Hill - Lefevre skarn soil grid could be extended north.

4 Geology of HCA Limestone Unit astride Limpid Ck Forestry Road

The HCA Limestone Unit is well exposed in a roadcut astride the Limpid Ck Forestry Road, close to a granitic intrusive contact (Drawing #17). As the dark grey to black argillaceous limestone (marble) is distinctive and may be important for replacement - type mineralization, a 15 m wide exposure was mapped in detail (Section 1). On the uphill side white siliceous limestone breccia occurs, proceeding downhill (W) one outcrop is very thinly bedded, soft, black and very carbonaceous. The other outcrops are very argillaceous dark grey micritic limestone (marble) with trace pyrite, finely bedded on a mm to cm scale. Axial surfaces (planes) of 20 to 50 cm-sized isoclinal folds dip steeply west with northerly strike. Fold axes trend SW and dip 30 - 60°. Generally the limestone strikes N with moderately steep dips. BH-305 a bulk sample of chips collected over 14 m ran < 5 ppb gold.

5 Wallack Ck Leucocratic Granitoids

5.1 Setting and Description

The CS Unit HCA and CCA are intruded by mid Cretaceous (Lefebure et al. '99) Wallack Ck granitoids. The pluton is "leucocratic, equigranular and lineated, ranging in composition from granodiorite to granite. Although it postdates the regional deformation, it is locally sheared along its margins" (Andrew & Höy '89). On the property outcrops are mafic-poor, coarse to very coarse crystalline biotite leuco-granitoids. Shearing in places is minor; commonly the granitoid appears undeformed. Above the Bunker Hill mine a sill or dyke-like body about 200 m wide (Little '65, Harris '85) intrudes the HCA Quartzite - Tuff and HCA Limestone Units. Possibly the HCA Metabasalt Unit is also intruded. M. Harris (1985) mapped the granitic contact as irregular, trending northerly on the 1999 grid area. West and just east of Yankee Corner along the Limpid Ck Forestry Road granitoids are well exposed in blasted roadcuts. These were not mapped.

5.2 Tourmaline Veins and Breccia

Black cryptocrystalline tourmaline veins, up to cm sized, and breccia is common in Wallack Ck granitoids astride the Limpid Ck Forestry Road, notably 110 m N of Yankee Corner (Drawing #17). The black mineral is the common tourmaline mineral schorl, identified by Xray diffraction (Ball '97) from two samples of leucocratic granitoid collected just E of the junction of the Limpid Ck Forestry Road and the 9-1 / 9-2 Hydro Tower Road. The schorl has microscopic intergrowths of potassium feldspar and quartz. The samples were from outcrops very close to *Tillicum Thrust Fault* serpentinites. Here the silicified granite has pervasive tourmaline breccia and sheeted tourmaline veins 10 to 50 volume percent. Veins are sub mm to 10 mm thick (Wehrle '97, '98). Ten-centimeter sized areas of tourmaline breccia display only relict floating quartz crystals. Original mafic and felsic minerals are completely replaced. All tourmaline appears to be hydrothermal in origin, an alteration mineral (Thompson and Thompson '95) rather than an original accessory mineral in the granitoid. Its occurrence is significant as "Boron is commonly associated with gold in practically all types of its deposits ... tourmaline is particularly characteristic of ... gold - quartz veins" (Boyle '79).

6 Eocene lamprophyre dykes

Two lamprophyre dykes were found in 1999 cutting Wallack Ck granitoids at Yankee Corner (described under Section 16.3 Yankee Corner - Lamprophyre dykes). Another two were found cross cutting the HCA Limestone Unit: one is at Site 4 (see Map 3A Structural Geology of Exposures along the old Bunker Hill Mine road). The other is nearby close to the intrusive contact of the HCA Limestone Unit along the Limpid Ck Forestry Road (at the grid origin noted on Section 1 Harcourt Ck Assemblage 'HCA' Limestone Unit - Detailed Structures of Exposures along Limpid Ck Forestry Road and on Drawing #17). The lamprophyres are medium brown, glistening biotite-rich rocks. They are very soft and recessive rocks, undeformed except for minimal shearing. No Coryell alkaline plutonic rocks were found on the property.

7 Background - Mineral Potential

In British Columbia "Gold deposits associated with Slide Mtn terrane formed during a period of uplift and extension in the Early Cretaceous (135 - 110 Ma)" (Ash et al. '96). The Harcourt Ck Assemblage is a favourable exploration target for bulk tonnage replacement mineralization as "Some gold skarns ... are developed in impure calcareous clastic sediments that were deposited along the fracture controlled edge of a back-arc or marginal basin. Such rifted basin margins are particularly favourable for gold skarns because the controlling basement structures preferentially channel the arc-related plutons into suitable carbonate-rich host rocks." (Ray & Webster '91). On the property Wallack Ck leucocratic granites (the "arc-related pluton") intrude an undetermined structure in the lowermost part of the Harcourt Ck Assemblage, the HCA Quartzite - Tuff Unit. This Unit also includes argillites, argillaceous quartzites and minor light grey marble (Drawing #0).

It may be a remnant of a ocean basin marginal to ancestral North America. The map form of the granite is dyke- or sill-like. The Lefevre gold-tungsten skarn is developed at the intrusive contact. It can be compared to "plutonic-related deposits" in Alaska (McCoy et al. '97). In the Fairbanks district tungsten and gold-rich tungsten skarns occur on the periphery of Ft Knox-type plutonic-related granitoid-hosted gold deposits (Newberry et al. '97). Gold bearing quartz veins also occur in plutonic-related deposits. Tungsten + gold skarns resulted "mainly from middle Cretaceous magmatic-generated hydrothermal systems" (McCoy et al. '97 p. 194). In general "Alaskan W skarns ... show variable enrichments in F, Zn, Cu, Sn and Ag and severe depletions in Ni and Co. *Gold-rich skarns are typically rich in As, Te, and Bi and low in Mo and Ag* (Newberry et al. '97 p. 375). Many tungsten skarns resemble gold skarns in containing elevated gold, without abundant copper, and elevated arsenic and bismuth." The Lefevre gold-tungsten skarn has some characteristics of the 9 meter thick 'Bismuth Gold Zone'[1] explored by Sultan Minerals Ltd. [near the past producing Emerald Tungsten Skarn]. The 'Bismuth Gold Zone' is sulphide rich and enriched in Bi, As, Te and Se (Ray '96 p. B33, Wilton '97). Gold correlates well with these elements and not base metals. In general skarns are difficult to explore: "Economic mineralization in gold skarns generally only forms only a small proportion of the total alteration envelope, and ore may be visually indistinguishable from waste" (Ray & Webster '91).

8 VLF-EM Ground Geophysical Surveys

8.1 Objective

Most of the project area is overlain by glacial drift and forest cover. "With rock outcroppings scarce, VLF-EM ground surveys hope to provide new, undiscovered, conductive trends or buried conductors near old workings and showings. Local workings and previous exploration show roughly north to northeast trending features. (Note: the only N-trending feature known is the irregular granitic intrusive contact above the old mine workings). A VLF-EM grid geophysical program was designed to test for northeast trending conductors on each of the target areas (Fig. 2)." (Wehrle '99). Results are discussed under the named old workings.

8.2 Instrumentation and Theory

"A VLF-EM receiver, model 27, manufactured by Sabre Electronic Instruments Limited of Burnaby B.C. was used for the VLF electromagnetic survey. This instrument is designed to measure the electromagnetic component of the very low frequency field (VLF-EM).

[1] "The Bismuth gold zone, exposed in the Jersey mine underground workings, is a flat-lying silicified zone characterized by massive pyrrhotite and arsenopyrite with stibnite and native bismuth. It overlies and is parallel to the east limb of the original Jersey orebody and has assayed up to 12 g/t Au in chip samples. The zone is consistently about 9 metres thick where intersected by drilling and is tentatively interpreted to extend over a north-south distance of 1000 metres." (Wilton '97)

The source of the primary field used was the U.S. navy submarine transmitter at Jim Ck, near Seattle Washington which transmits at a frequency of 18.6 kHz.
In electromagnetic prospecting, a transmitter produces an alternating magnetic field (primary) by a strong alternating current usually through a coil of wire. If a conductive mass such as a sulfide body is within the magnetic field, a secondary alternating current is induced within it which in turn produces a secondary magnetic field which can be detected at surface through deviations of the normal VLF field.
VLF means very low frequency, about 15 to 25 kilocycles per second. Relative to frequencies generally used in geophysical exploration, this is actually very high. Consequently the high frequency of the VLF-EM method results in numerous anomalies from lower conductive sources such as swamps, creeks, topographic highs, electrolyte-filled faults or shear zones, porous horizons, graphite, carbonaceous sediments, lithological contacts, as well as sulfide bodies of too low a conductivity for other EM methods to pick up. On the other hand, the tendency for VLF to respond to poor conductors assists in mapping faults and rock contacts as well as picking up conductors of too low a conductivity for conventional EM methods and too small for induced polarization (Paterson and Hallof '90).
VLF data may have anomalies and it is difficult to differentiate between those that are geologically significant and those that are not. Thus, VLF-EM preferably should not be interpreted without a good geological knowledge of the property and/or other geophysical and geochemical surveys." (Wehrle '99)

8.3 Field Procedure

"Dip angle readings were taken at station intervals along grid lines. Readings were always made with the instrument pointed toward the 18.6 kHz transmitter station at Jim Ck, near Seattle Washington." (Wehrle '99)

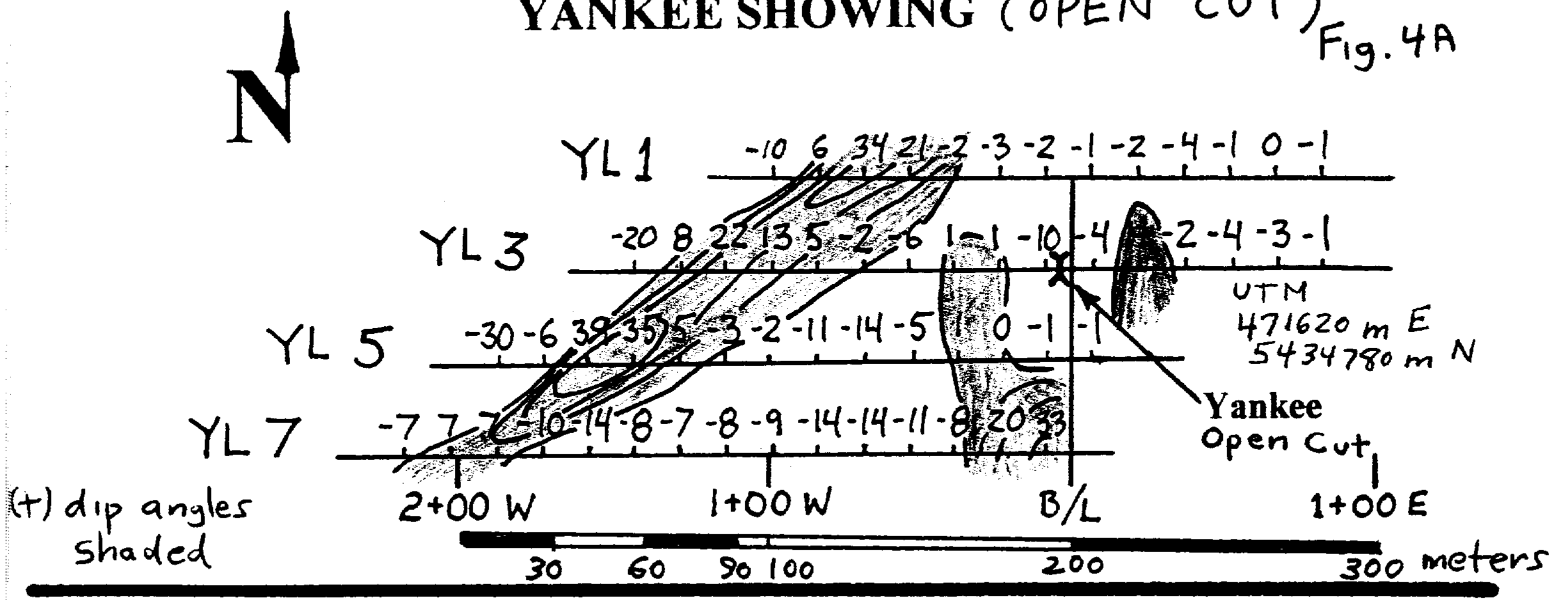
8.4 Data Compilation

"The VLF-EM field results were reduced for plotting by applying the Fraser filter. This is essentially a 4-point difference operator which transforms null (or zero) crossings into peaks, and a low pass smoothing operator which reduces the inherent high frequency noise in the data. Thus noisy, non-contourable data are transformed into a less noisy, contourable form. A conductor that does not show up as a cross-over with unfiltered data will quite often show up as a peak on filtered data. The original field data is recorded in Appendices 1 - 3. The filtered data was plotted [at the midpoints of the raw data grid line stations] and positive dip angle values contoured at 10 degree intervals beginning at zero (Wehrle Figs. 4A, 4B, 5)" (Wehrle '99). Note: if there is poor coupling i.e. the strike of the conductor is perpendicular to the direction of the VLF station, little current will be induced and little or no anomaly is observed (Klein & Lajoie '92). The northeasterly strike of the project's structures is sufficient to cause anomalies. Raw VLF-EM dip angle data for all the target areas is listed in Appendices 1 - 3 (from Wehrle '99).
Three of the four target areas revealed conductors.

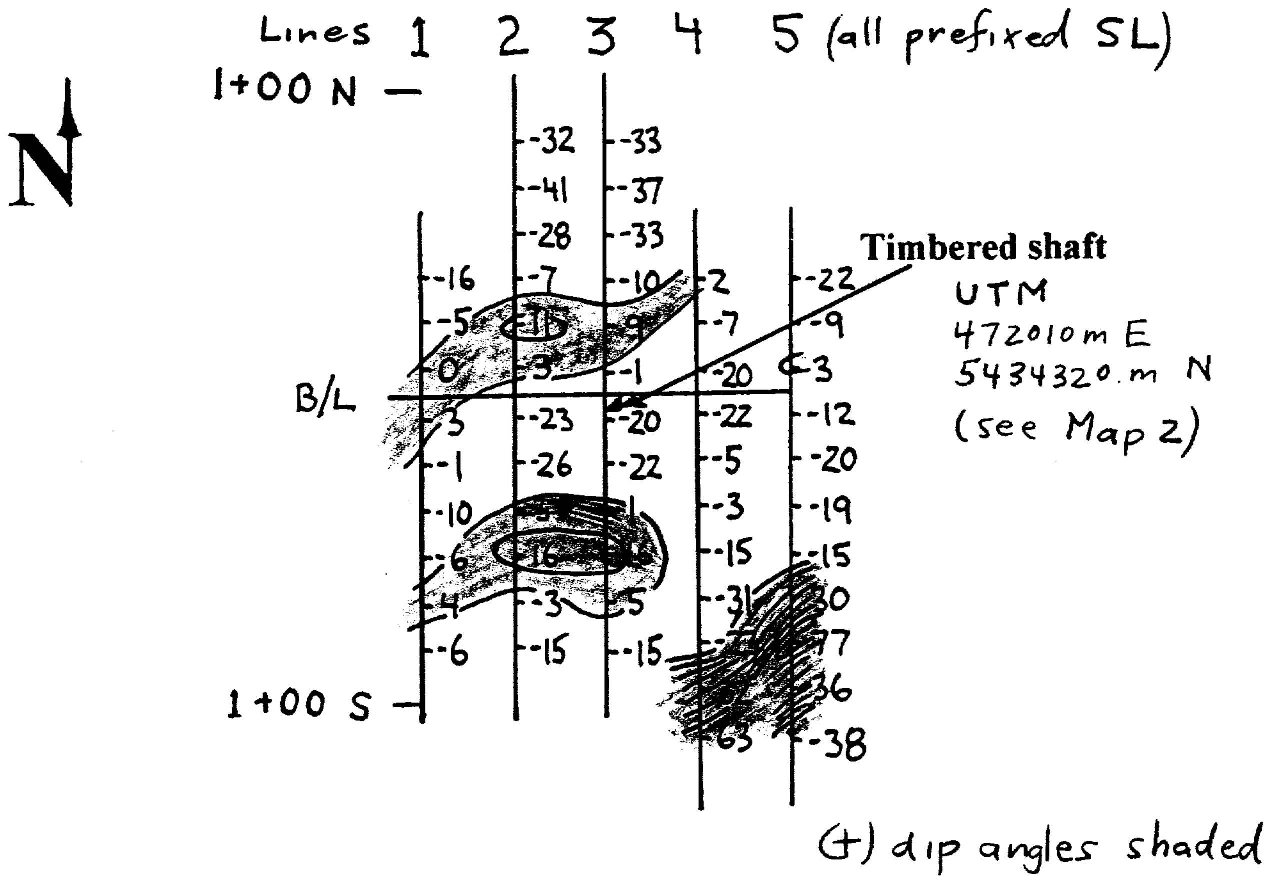
VLF-EM Fraser-Filtered Dip Angle

YANKEE SHOWING (OPEN CUT)

Fig. 4A



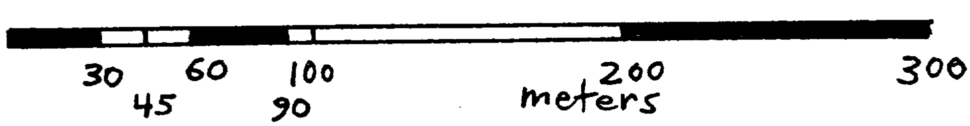
TIMBERED SHAFT SHOWING



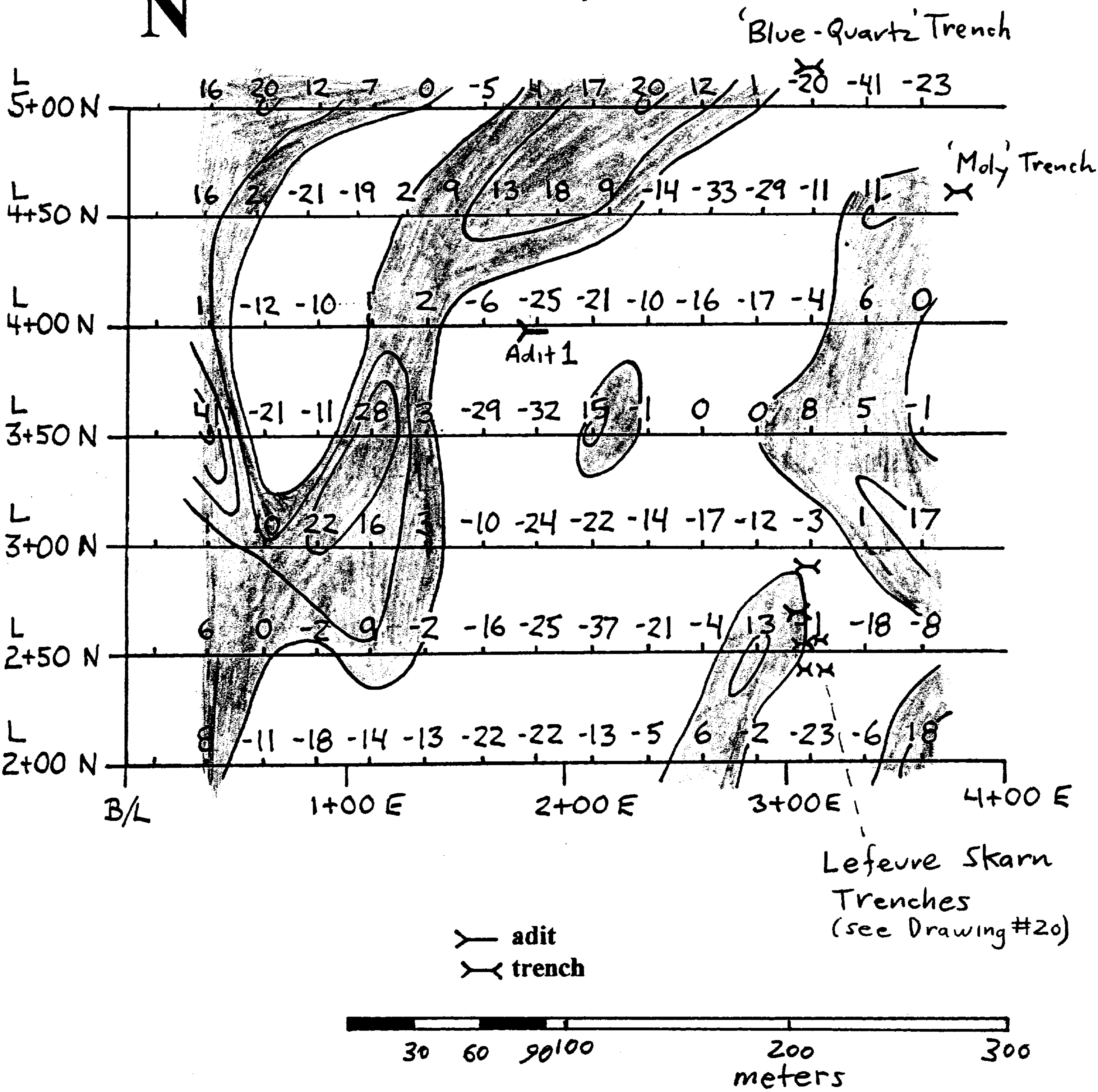
VLF-EM FRASER FILTERED DATA (Dip Angle)

scale 1:2,500

fig. 4 B



BUNKER HILL MINE - LEFEVRE SKARN GRID

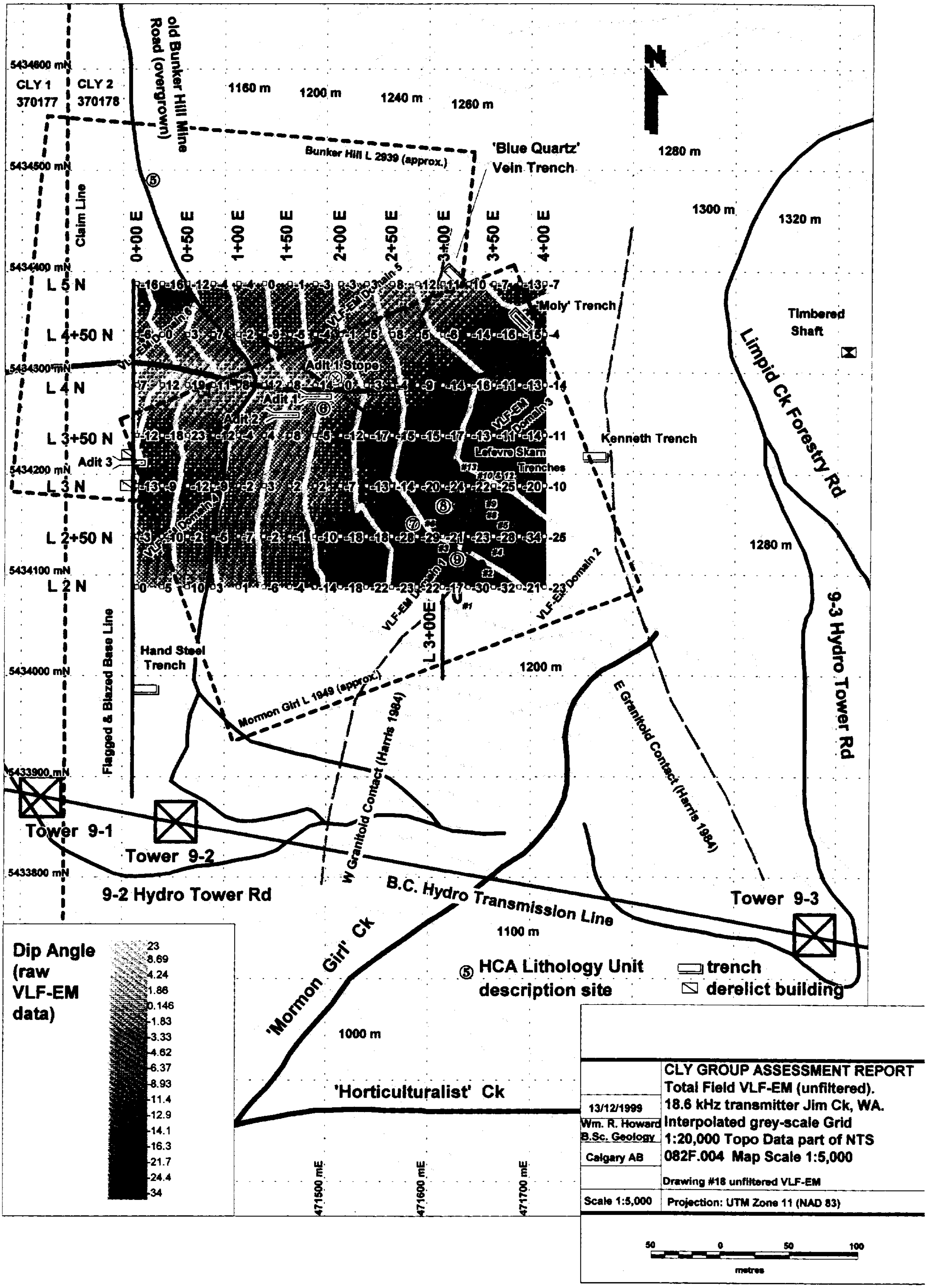


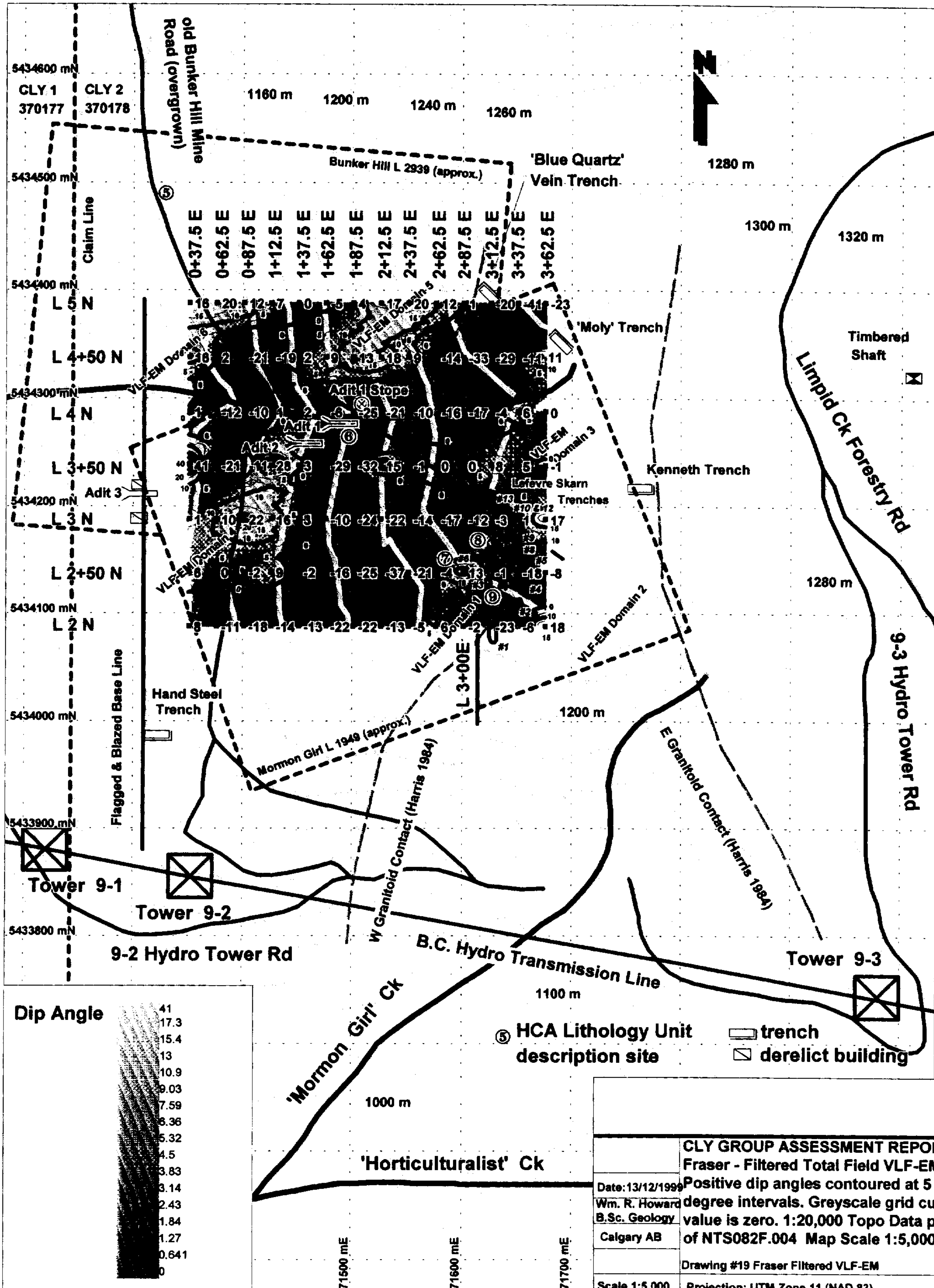
VLF-EM FRASER FILTERED DATA (Dip Angle)

scale 1:2,500

(+) dip angles shaded

fig. 5


CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
'Moly' Trench
Kenneth Trench
Lefevre Skarn Trenches
Timbered Shaft
Limpid Ck Forestry Rd
9-3 Hydro Tower Rd
Claim Line
Flagged & Blazed Base Line
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Hand Steel Trench
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 3+00E
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
1100 m
1000 m
Tower 9-1
Tower 9-2
Tower 9-3
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
'Mormon Girl' Ck
'Horticulturalist' Ck
Dip Angle (raw VLF-EM data)
23
8.69
4.24
1.86
0.146
-1.83
-3.33
-4.62
-6.37
-8.93
-11.4
-12.9
-14.1
-16.3
-21.7
-24.4
-34
HCA Lithology Unit description site
trench
derelict building
CLY GROUP ASSESSMENT REPORT
Total Field VLF-EM (unfiltered).
18.6 kHz transmitter Jim Ck, WA.
Interpolated grey-scale Grid
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
13/12/1999
Wm. R. Howard
B.Sc. Geology
Calgary AB
Drawing #18 unfiltered VLF-EM
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
metres



Date: 13/12/1999

Wm. R. Howard B.Sc. Geology

Calgary AB

CLY GROUP ASSESSMENT REPORT
Fraser - Filtered Total Field VLF-EM
Positive dip angles contoured at 5 degree intervals. Greyscale grid cutoff value is zero. 1:20,000 Topo Data part of NTS082F.004 Map Scale 1:5,000

Drawing #19 Fraser Filtered VLF-EM

Scale 1:5,000

Projection: UTM Zone 11 (NAD 83)

50 0 50 100

metres

Field VLF-EM data from the Yankee Open Cut and Timbered Shaft showings (Figs. 4a & 4b), and the main grid covering the Bunker Hill mine - Lefevre skarn trenches (Fig. 5) was Fraser filtered and contoured onto maps at 1:2,500 scale. The Kenneth Trench showing showed no significant anomalies and no map was prepared. For the main Bunker Hill mine - Lefevre skarn grid areas of positive dip angle are also defined as six numbered Domains on the computer generated Fraser filtered Drawing #19 (at 1:5,000 scale). They trend SW-NE. In all cases anomalies are open-ended. Results for the Yankee Open Cut and the Timbered Shaft are discussed under these workings. The single station 15° anomaly at 2+12.5 E on L 3+50 is likely spurious, possibly caused by buried wire (Wehrle, p.c. '99). Wire - wound wooden culverts were used to ditch and remove overburden by spring time floods in the 1930's.

8.5 Results: Bunker Hill mine - Lefevre Skarn Grid

The VLF dip angle survey on seven W to E lines L2N L2+50N, L3N, L 3+50N, L4N, L4+50N and L5 spaced 50 m apart was performed on Aug. 24 - Aug. 26 1999 using the Seattle transmitter (Wehrle '99). Measurement stations were every 15 m, mostly W of the baseline (Fig. 4a after Wehrle '99). Raw data is presented in Appendix 1. Drawings # 18, 19 and Fig. 5 (after Wehrle '99) at 1:2,500 scale plot the VLF-EM results. Drawing # 18 at 1:5,000 is the Total Field VLF-EM unfiltered (raw) data, values posted over an interpolated grey-scale grid. Drawing # 19 also at 1:2,500 scale is the Fraser Filtered data. Positive dip angles are contoured at 5° contour intervals over an interpolated grey-scale grid. Areas of anomalous positive dip angle are named Domains for reference. Domain 1 consists of two small dip angle anomalies just W of the Lefevre skarn trenches on L2 (13°) and L2+50 (6°) on the S part of the grid. These may connect. Domain 1 is open to the S. Domain 2 is an open 15° anomaly on the grid's SE corner in granitoid. Domain 3 is a large irregular-shaped anomaly to 15° N and E of the Lefevre skarn trenches, also in granitoid. Domains 4 and 6 are irregular areas to 40° dip angle on the W side of the grid below the mine adits. They are not geochemically anomalous. Anomalies may be from faulted, conductive bedrocks. Domain 5 on the north-central part of the grid, N of Adit 1, is a prominent multi-station anomaly to 20° dip angle. It is also geochemically anomalous. In the central grid area, none of the m-wide quartz veins mined from Adit 1 (or the other adits) has a VLF-EM expression. The auriferous quartz veins have very little sulphides and do not produce measurable dip angle anomalies.

9 Soil Geochemical Surveys

9.1 Objective and Theory

As most of the project area is drift covered, prospective areas over known mineral showings were selected for soil surveys. Underlying, or nearby upslope covered mineral occurrences may give anomalous values in gold or pathfinder elements. Two samples collected at the 'B' and deeper 'C' level on L 3+50 at 2+50 E show that the 'B' horizon is comparably enriched in elements Al Ba Cr Cu Fe K Mg Mn Ni P Te (marginally) and Zn.

Some 'B' horizon soils are developed on pebble and cobble-bearing glacial till. In all cases the till is brownish, friable and oxidized, not grey-blue, compact and reduced. Circulation of ground water from bedrock to surface is thought to have been sufficient to form geochemical anomalies in gold or pathfinder elements.

9.2 Field Procedure

'B' horizon soils were collected at regular station intervals along grid lines. A shovel was used to remove ground cover and the 'A' humus horizon. Colour and depth of the soil horizons were noted on pit walls. Soils were placed in high-strength Kraft brown paper envelopes and partially dried. Two field duplicates were taken, No. 3 & No. 4. For the Bunker Hill mine - Lefevre skarn grid soils were collected at 25m intervals on seven, 50 m spaced W-E lines. Initially every other sample was analyzed to identify gold anomalous soil trends on a 50 m spaced grid. Later, selected soils on either side of interesting values were analyzed. W. Howard assisted by M. Murray collected the main grid soils on Aug. 12, 15, 17, 18, 19, 22, 31 (Howard only) & Sept. 14. W. Howard collected soils about the Timbered Shaft Sept. 5 & 6 and with M. Murray on Sept. 15. W. Howard collected soils about the Yankee Open Cut with M. Murray Aug. 22 and with D. Wehrle Sept. 8. Seven soils were collected at 20 m spacings over an old Corona line (Gaunt '90) L24E from 10+40N to 9+20N, the Leo 'Gold Anomaly'.
Results show that soils over and downslope of the Lefevre tungsten - gold skarn are enriched in Au Bi Te As Sb Zn Cd Co (marginally) Fe Mn Mo W and Ti. Silver, copper and lead are low. Results are confirmed by six of seven 20 m spaced soils collected on a N-S crossline L 3+00 E. For the Bunker Hill mine - Lefevre skarn grid 96 soils from 94 sites were analyzed.

9.3 Laboratory Procedure

Soils were analyzed by Loring Laboratories of Calgary AB. Soils were dried at 105° C then sieved to -80 mesh. For ICP analysis 0.500 g of this material was digested with 3 ml 3:1:2 HCl : HNO_3 : H_2O acid at 95° C for 1 hour. This was diluted to a 10 ml volume with distilled water and mixed well. Samples were loaded into a Jarrell-Ash High Resolution Inductively Coupled Plasma [ICP] auto-sampler and run with analytical standards. Note the dissolution is partial for Al B Ba Ca Cr Fe K La Mg Mn Na P Sr Ti and (importantly) W. For geochemical analysis of gold by fire assay / atomic absorption 30 g of -80 mesh sieved soil was placed in a fire assay crucible and mixed with appropriate fluxes and flour. A palladium inquart was added. The crucible was fused in an assay furnace for 40 minutes. Cupel buttons were removed and dissolved with aqua regia in test tubes. After complete dissolution distilled water was added to an appropriate volume. Samples were run against similarly prepared gold standards on a Perkins-Elmer Model 3000 Atomic Absorption [AA] spectrometer. Very similar results for analytical replicates 1+00E on L3N, 2+25E on L5N and Duplicate No. 4 show that AA and ICP analytical variability is very small. Field duplicates No. 3 at L3 30W on the Yankee grid and Duplicate No. 4 at L5N 0+50E on the Bunker Hill-Lefevre grid also show this. Loring Labs in-house standard (STD) and blank (BLANK) results demonstrate analytical accuracy. 11 soils with Bi less than the detection limit were re-analyzed giving a maximum of 6 ppm Bi.

9.4 Data Reduction Procedure

Only single soils were anomalous over the Timbered Shaft and Yankee Open Cut. These results are on analytical certificates in Appendix 4. For the Bunker Hill mine - Lefevre skarn grid, results were compiled in a Microsoft Excel© V 5.0c spreadsheet. Values less than the detection limit for Au Ag B Bi Cd Mo were assigned half the detection limit, respectively 2 ppb for Au, 0.2 ppm for Ag and 0.5 ppm for B Bi Cd and Mo (^ symbol in chart below). Numeric analytical data was visually checked for accuracy and then matched to soil UTM geographic co-ordinates in a MapInfo Professional© V 5.0 table. This is Appendix 5. MapInfo Professional© is software for display and analysis of geographically referenced information. Discover V 3.0 software, a geoscience extension for MapInfo, was used to digitally compute grids for significant elements. The 'moving' ellipse was oriented 042°, the direction of the regional strike. Its size was 60 m (the semi-minor axis) X 90 m (the semi-major axis). Interpolated grid cell size was 2 X 2 m. For enhancement of high cell values, the cell histogram was recomputed using only data above a minimum cut-off value, arbitrarily chosen. This ignores cells representing low geochemical background areas. Also not considered are random analytical errors at low geochem values. A histogram equalization stretch was applied to the 'censored' element data. On the element maps Drawings 1 - 16 values are posted at collection sites, overlying the interpolated grey scale grid.

9.5 Organization of Analytical Results

Results over the main Bunker Hill mine - Lefevre skarn grid are discussed for gold and selected pathfinder elements in Section 10. Domain names are from the VLF-EM dip-angle geophysical survey (Section 8.5). Soil and rock values corresponding to mineralization are also noted under Section 12 the Adit 1 Gallery Quartz Vein, Section 13 Adit 2 Dump Quartz Vein, Section 14 Lefevre Skarn Tungsten-Gold Trenches, Section 15 'Blue Quartz' Vein and 'Moly' Trenches, Section 16 Yankee Open Cut, Section 17 Kenneth Trench and Section 18 Timbered Shaft.

9.6 Statistics

Rather than calculating anomalous threshold values for this limited data set, arbitrary cut-off values are used. These are close to the means. Element statistics compare well with those of a large soil survey on the Mammoth property south of Nelson (Hawkins & Naciuk '92):

						Mammoth Project 1,844 soils		
	Min.	Max.	Mean	S.D.	Cut-off	Mean	S.D.	Threshold
Gold*	2^	300	18.65	52.29	10	7	8	23
Bismuth	0.5^	31.6	3.83	5.73	2	-	-	-
Silver	0.2^	5.8	0.327	0.635	0.5	0.6	1.1	2.8
Tellurium	5	16	9.02	2.39	8	-	-	-
Arsenic	2	140	16.38	18.92	16	15	28	5
Antimony	1	13	4.42	11.32	5	-	-	-
Lead	30	172	50.20	19.57	54	22	12	46
Zinc	75	533	191.4	95.9	180	146	114	374

Cadmium	0.5^	37	1.38	0.75	1.2	-	-	-
Cobalt	32	89	53.24	11.08	59	-	-	-
Iron %	2.13	5.64	3.47	0.58	3.60	-	-	-
Manganese	500	3,147	1,548	626.5	1,600	-	-	-
Copper	17	306	41.5	34.4	40	55	32	118
Molybdenum	0.5^	15.4	2.27	2.64	2	3	2	7
Tungsten	1	166	6.3	23.8	6	-	-	-
Titanium %	0.05	0.15	0.097	0.020	0.09	-	-	-

* ppb ^ assigned value is half the detection limit

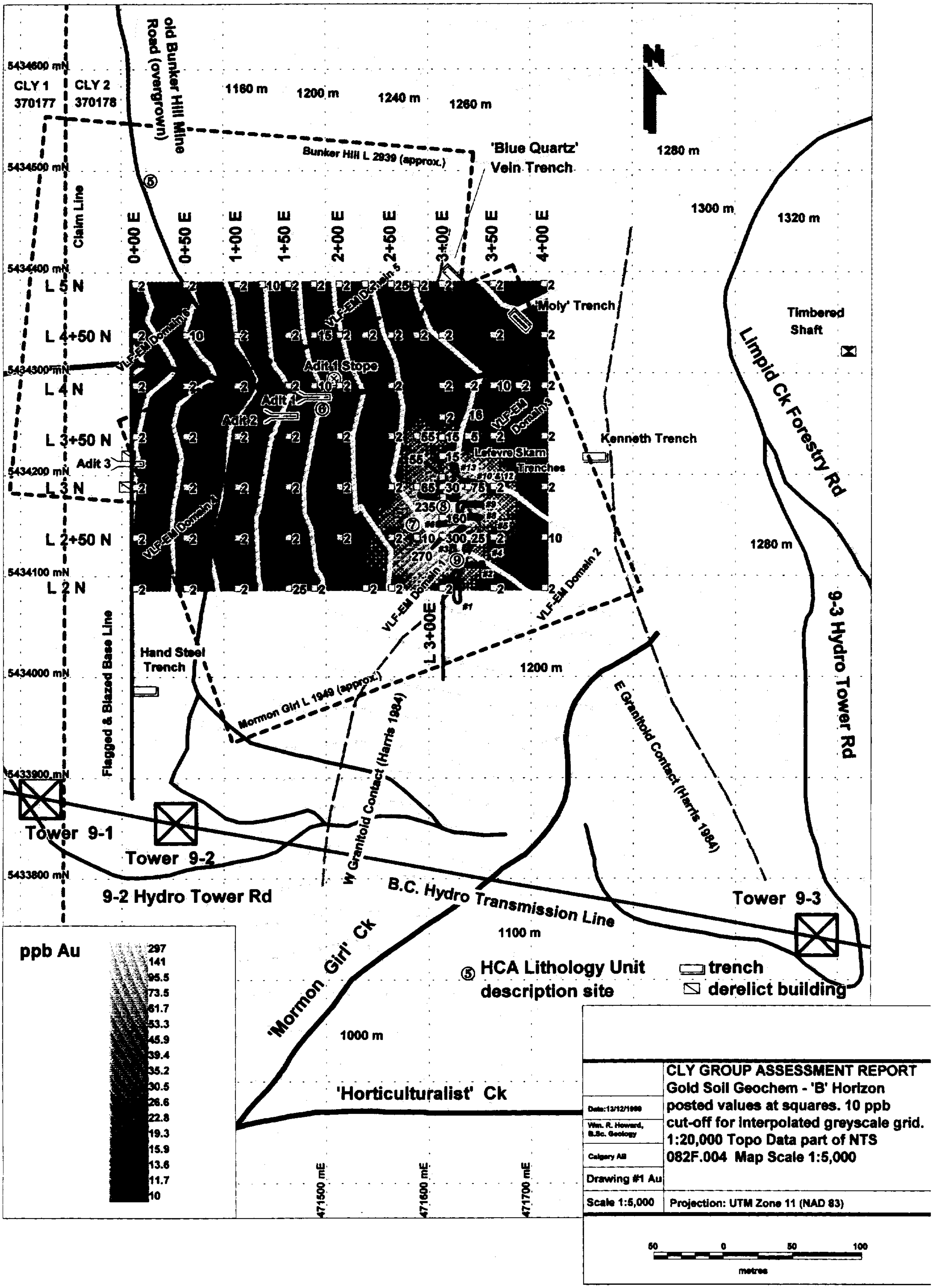
10 Soil Results: Main Bunker Hill mine - Lefevre skarn grid

10.1 Gold in Soil Geochem Drawing #1 Au

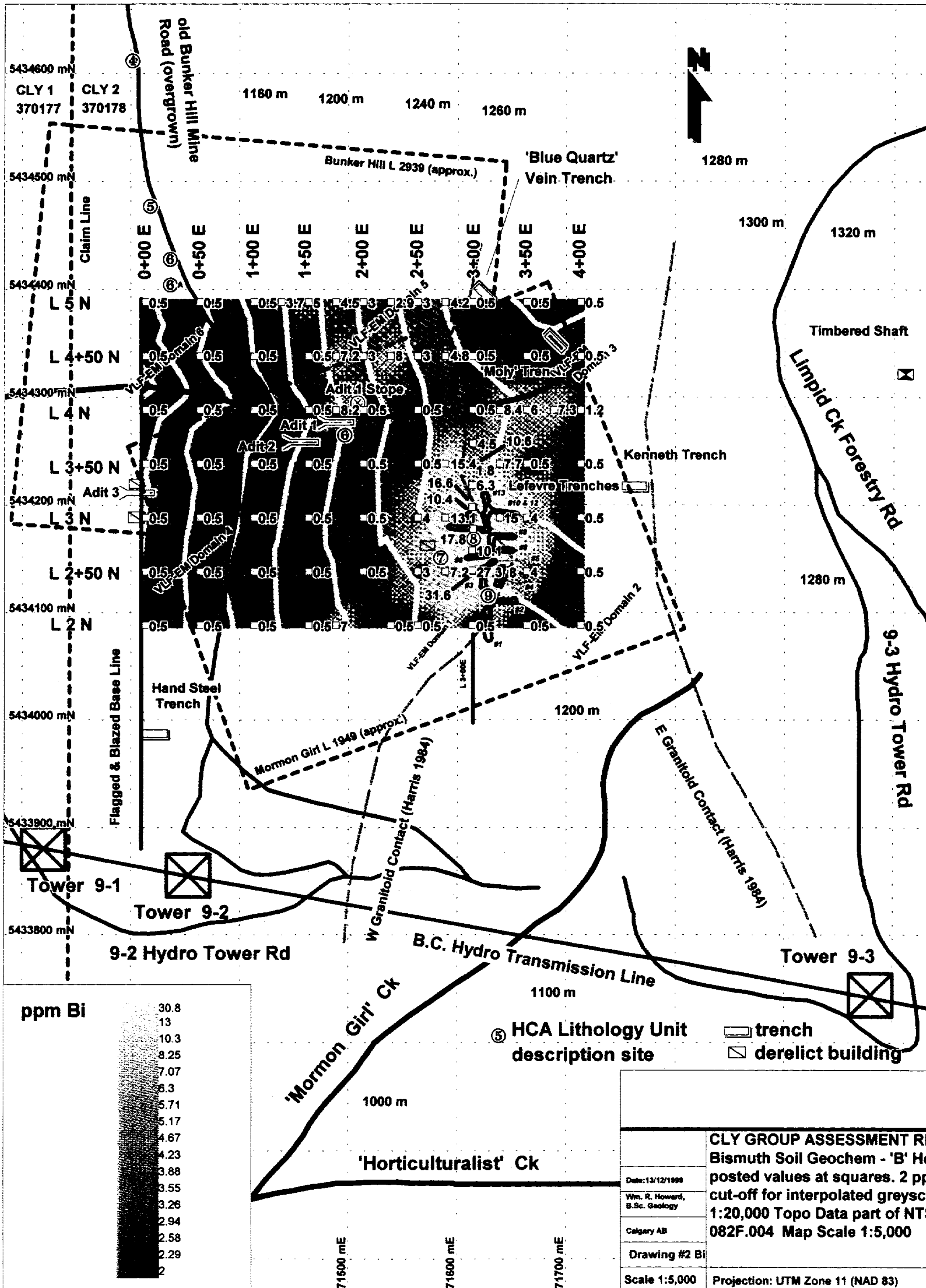
Surprisingly, Au as ionic complexes is mobile in the surficial environment (Rose et al. '79). Gold values have a larger mean and standard deviation than the Mammoth survey (Hawkins & Naciuk '92) as some soils were collected close to old trenches about the gold bearing Lefevre tungsten skarn (Section 14.4). The highest gold value is 300 ppb at 3+00E on L2+50N is just downhill of Lefevre skarn Trench # 5 (Drawing # 20). The same soil has maximum survey values for bismuth 27.3 ppm, tungsten 166 ppm and molybdenum 15.4 ppm. Values are similarly high for the same-site crossline soil L3+00E at 2+50N: Au 270 ppb Bi 31.6 ppm W 142 ppm and Mo 13.8 ppm. Soil here is likely enriched by Trench # 5 dump material. The survey's third highest soil on L3+00E at 2+90N ran Au 235 ppb Bi 17.8 ppm W 32 ppm and Mo 3.9 ppm; it is very close to Trench # 10 and may also be near dump material. Two low-level anomalies 15 ppb on L 4+50 N at 1+75E and 25 ppb on L 5 N 2+50E coincide with the central part of the Domain 5 VLF-EM anomaly. The first soil is high in (ppm) Bi 7.2 Co 82 Pb 82 Sb 13 Te 10 and Fe 4.95%. The second is high in (ppm) Ag 1.3 B 52 Cu 53 Mn 2,691 Te 10 and Zn 326. Adjacent soils with multi-element anomalies suggest Au Bi Ag Te As Sb Pb Zn Cd Co Fe Mn and Ti bearing mineralization underlies Domain 5. More lines to the north could be surveyed.

10.2 Bismuth in Soil Geochem Drawing #2 Bi

Bi is immobile in the surficial environment (Rose et al. '79). It is a prime geochemical pathfinder for gold mineralization (Boyle '79). Soils about the Lefevre skarn trenches are highly anomalous at 10 - 31 ppm. Domain 3 to the north is moderately anomalous with several 7 - 10 ppm values. Domain 5 has two high values on L 4+50 N, 8 and 7 ppm. An 8 ppm value just west of Adit 1 on L4N 1+75E is ascribed to weathering of dump pile quartz vein mineralization. Three slightly high 4 ppm values occur on L5N. On the other S side of the grid soil at L2N 1+75E has 7 ppm Bi with high Sb 12 Pb 55 and Te 13 (all ppm). Eleven soils that originally ran less than the detection limit were re-analyzed (certificate #414271) with 5 and 6 ppm values found. Poor sample dissolution on the original analytical run was likely responsible (G. Swayze, Loring Labs).

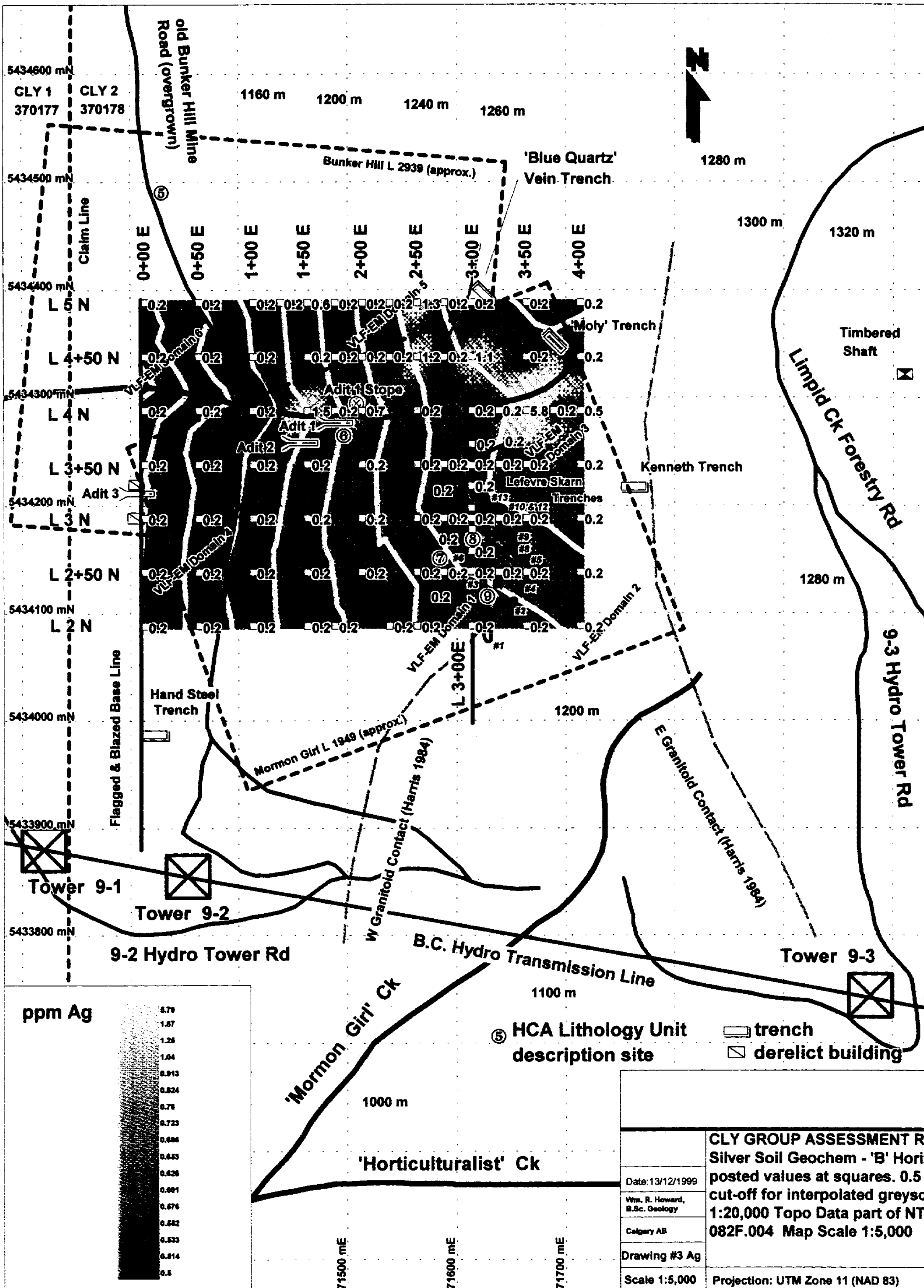


CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
'Moly' Trench
Timbered Shaft
Limpid Ck Forestry Rd
Kenneth Trench
Lefevre Skarn Trenches
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Claim Line
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
L 3+00E
VLF-EM Domain 1
VLF-EM Domain 2
VLF-EM Domain 3
VLF-EM Domain 4
VLF-EM Domain 5
VLF-EM Domain 6
Hand Steel Trench
Flagged & Blazed Base Line
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
9-3 Hydro Tower Rd
9-2 Hydro Tower Rd
Tower 9-1
Tower 9-2
Tower 9-3
B.C. Hydro Transmission Line
'Mormon Girl' Ck
'Horticulturalist' Ck
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
1100 m
1000 m
N
ppb Au
297
141
95.5
73.5
61.7
53.3
45.9
39.4
35.2
30.5
26.6
22.8
19.3
15.9
13.6
11.7
10
⑤ HCA Lithology Unit description site
trench
derelict building
CLY GROUP ASSESSMENT REPORT
Gold Soil Geochem - 'B' Horizon
posted values at squares. 10 ppb
cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
Date:13/12/1999
Wm. R. Howard, B.Sc. Geology
Calgary AB
Drawing #1 Au
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
50
0
50
100
metres



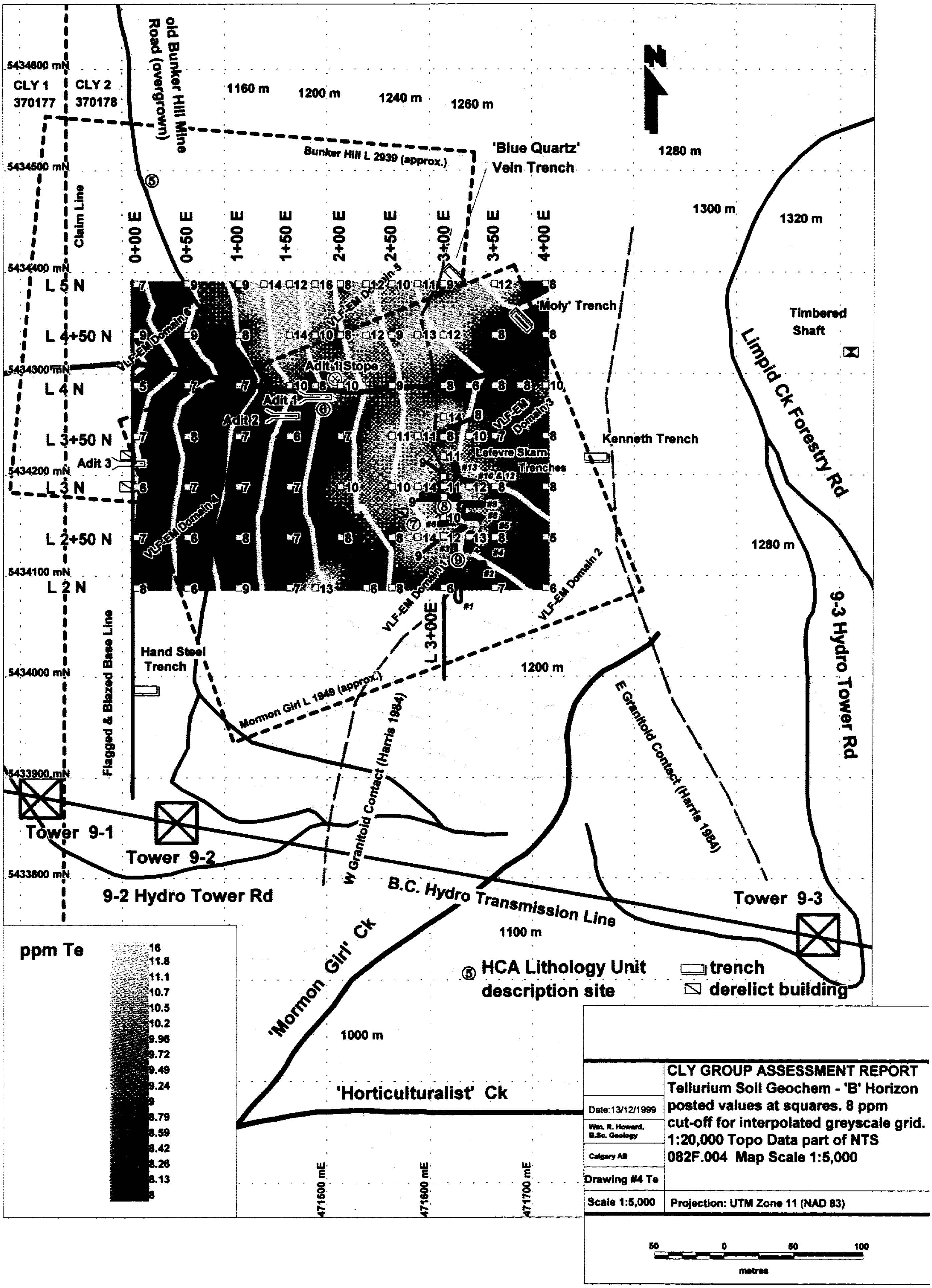
	CLY GROUP ASSESSMENT REPORT Bismuth Soil Geochem - 'B' Horizon posted values at squares. 2 ppm cut-off for interpolated greyscale grid. 1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Date:13/12/1999 Wm. R. Howard, B.Sc. Geology Calgary AB Drawing #2 Bi	
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

50 0 50 100
metres



	CLY GROUP ASSESSMENT REPORT Silver Soil Geochem - 'B' Horizon posted values at squares. 0.5 ppm cut-off for interpolated greyscale grid. 1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Date:13/12/1999 Wm. R. Howard, B.Sc. Geology Calgary AB Drawing #3 Ag	
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

50 0 50 100
metres



old Bunker Hill Mine Road (overgrown)
CLY 1 370177
CLY 2 370178
Claim Line
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
'Moly' Trench
Kenneth Trench
Timbered Shaft
Limpid Ck Forestry Rd
9-3 Hydro Tower Rd
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Lefevre Skarn Trenches
VLF-EM Domain 1
VLF-EM Domain 2
VLF-EM Domain 3
VLF-EM Domain 4
VLF-EM Domain 5
VLF-EM Domain 6
Hand Steel Trench
Flagged & Blazed Base Line
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
L 3+00E
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
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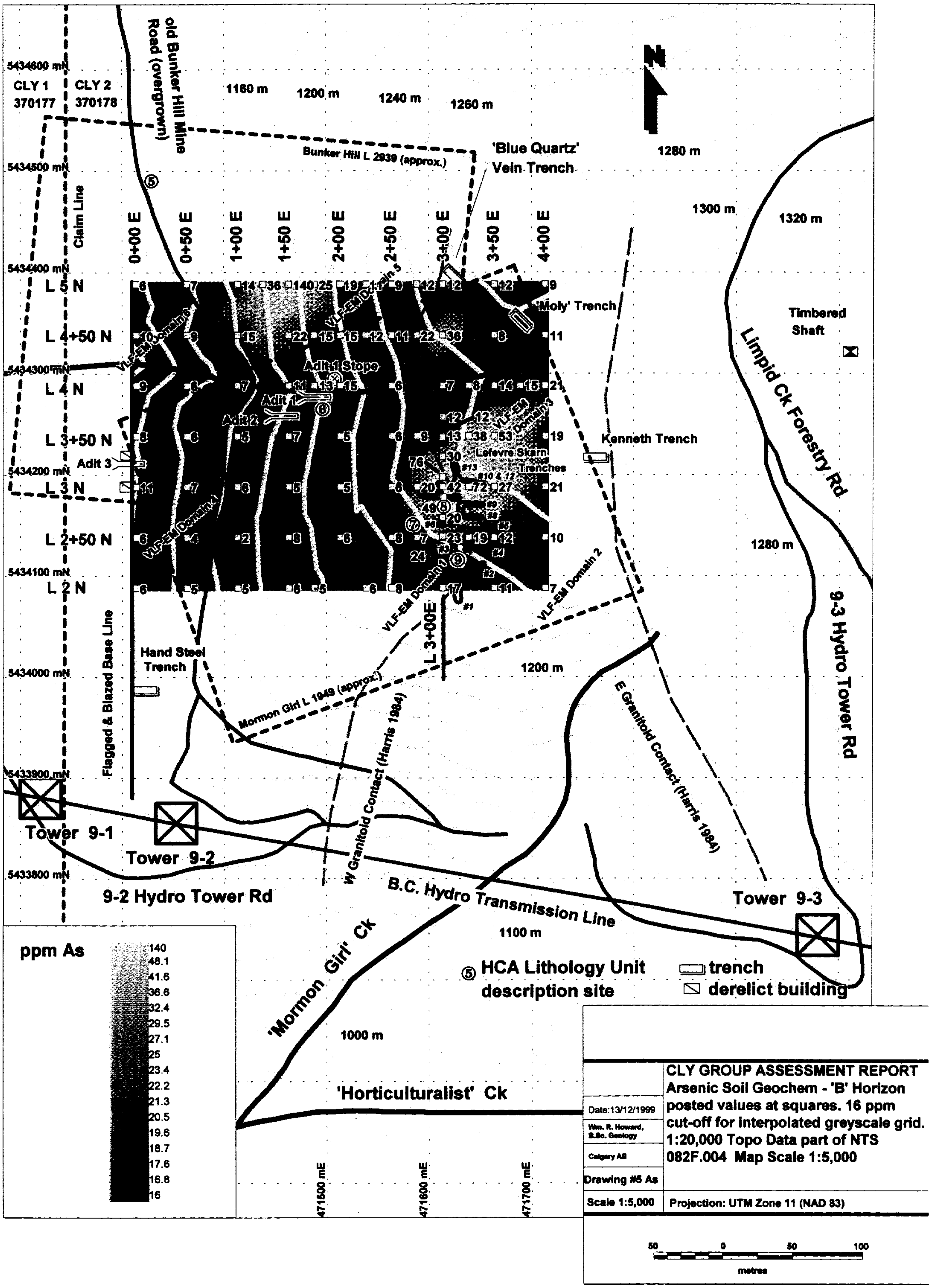
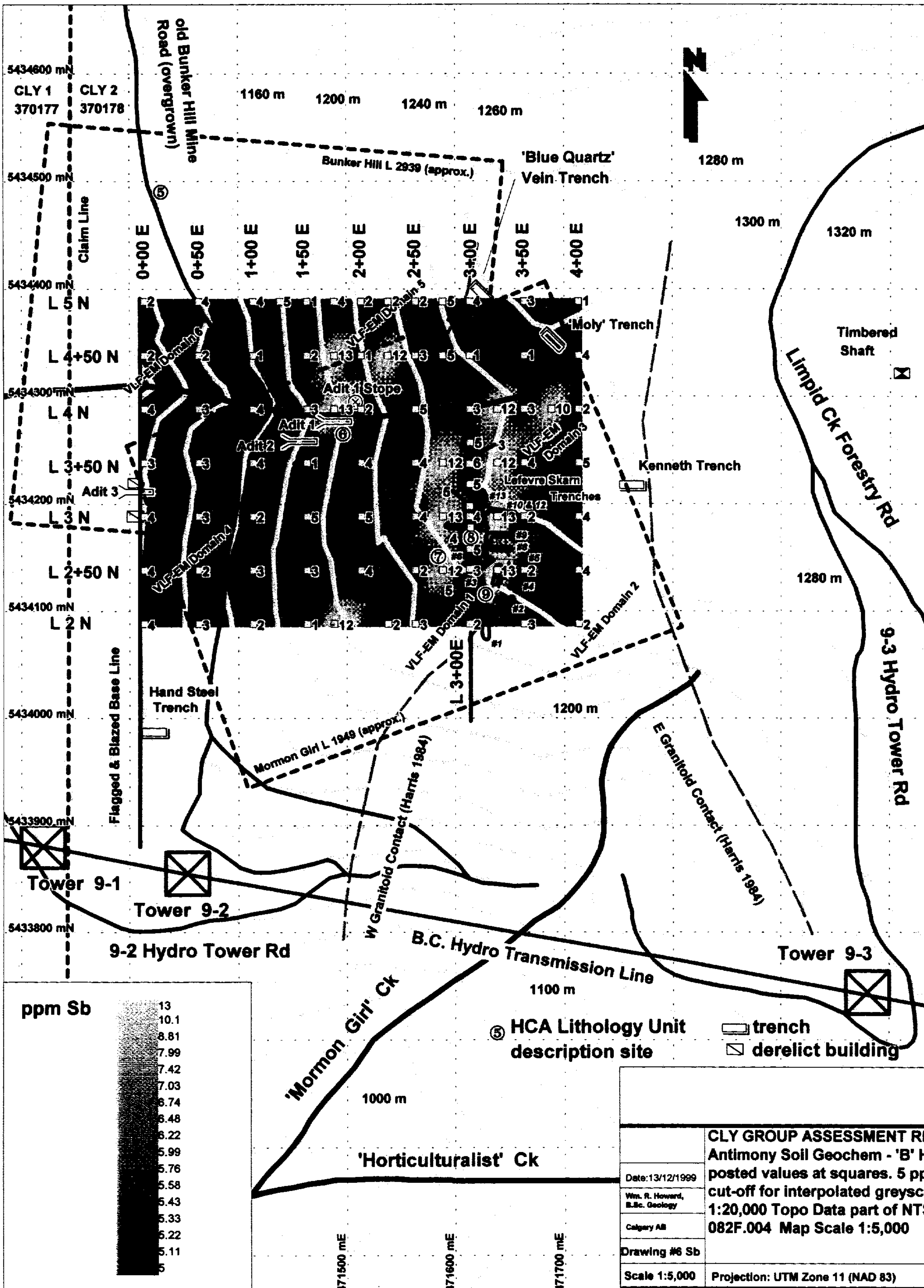
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
1100 m
1000 m
Tower 9-1
Tower 9-2
Tower 9-3
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
'Mormon Girl' Ck
'Horticulturalist' Ck
N
ppm Te
16
11.8
11.1
10.7
10.5
10.2
9.96
9.72
9.49
9.24
9
8.79
8.59
8.42
8.26
8.13
8
⑤ HCA Lithology Unit description site
trench
derelict building
CLY GROUP ASSESSMENT REPORT
Tellurium Soil Geochem - 'B' Horizon
posted values at squares. 8 ppm
cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
Date:13/12/1999
Wm. R. Howard, B.Sc. Geology
Calgary AB
Drawing #4 Te
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
50
0
50
100
metres

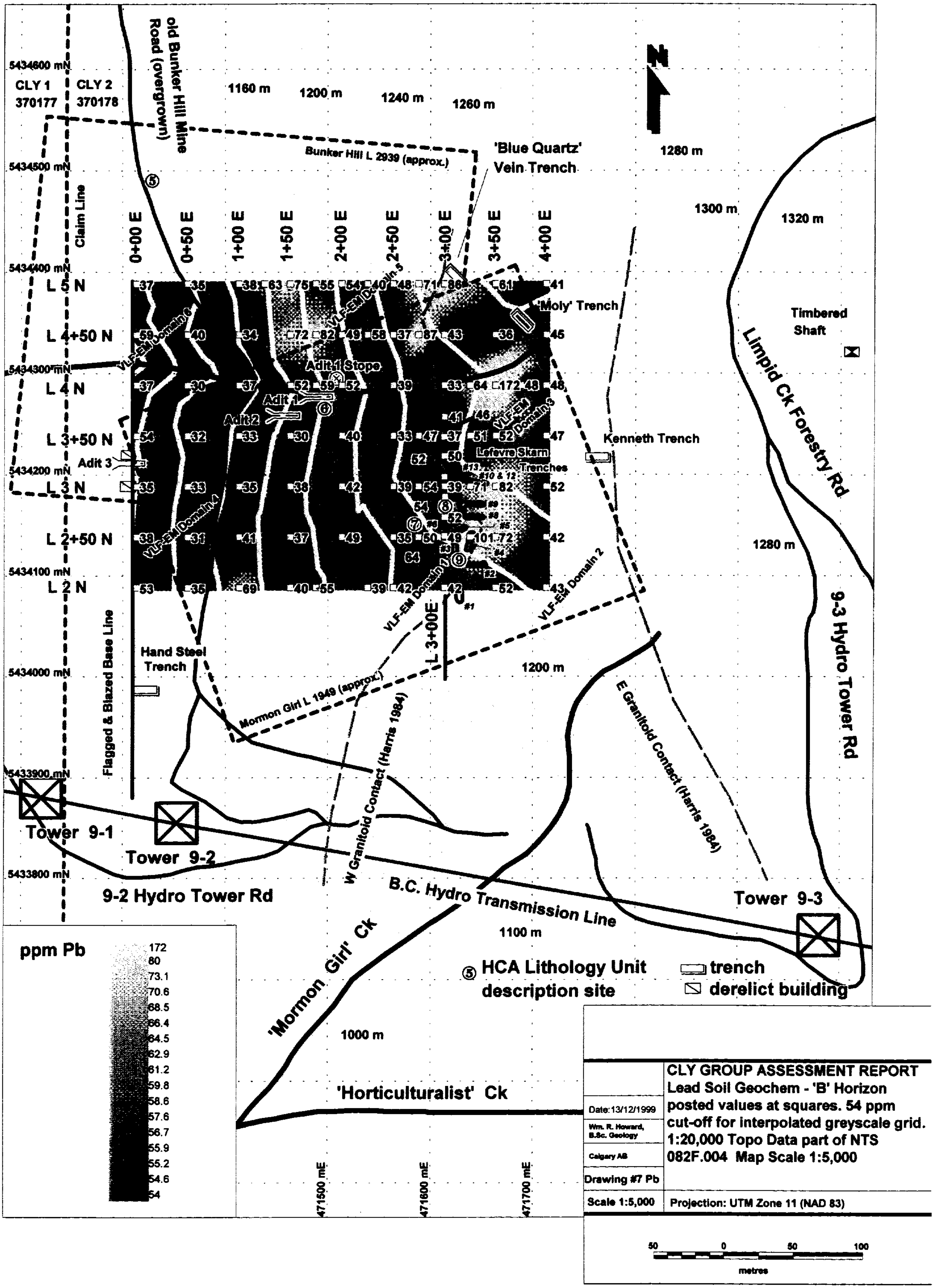


old Bunker Hill Mine Road (overgrown)
CLY 1
370177
CLY 2
370178
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
Claim Line
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
'Moly' Trench
Timbered Shaft
Limpid Ck Forestry Rd
VLF-EM Domain 4
VLF-EM Domain 5
VLF-EM Domain 3
VLF-EM Domain 1
VLF-EM Domain 2
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Lefevre Skarn Trenches
Kenneth Trench
1280 m
9-3 Hydro Tower Rd
Hand Steel Trench
L 3+00E
1200 m
Flagged & Blazed Base Line
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
Tower 9-1
Tower 9-2
Tower 9-3
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
1100 m
'Mormon Girl' Ck
1000 m
'Horticulturalist' Ck
ppm As
140
48.1
41.6
36.6
32.4
29.5
27.1
25
23.4
22.2
21.3
20.5
19.6
18.7
17.6
16.8
16
⑤ HCA Lithology Unit description site
trench
derelict building
471500 mE
471600 mE
471700 mE
Date:13/12/1999
Wm. R. Howard, B.Sc. Geology
Calgary AB
Drawing #5 As
Scale 1:5,000
CLY GROUP ASSESSMENT REPORT
Arsenic Soil Geochem - 'B' Horizon posted values at squares. 16 ppm cut-off for interpolated greyscale grid. 1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
50
0
50
100
metres

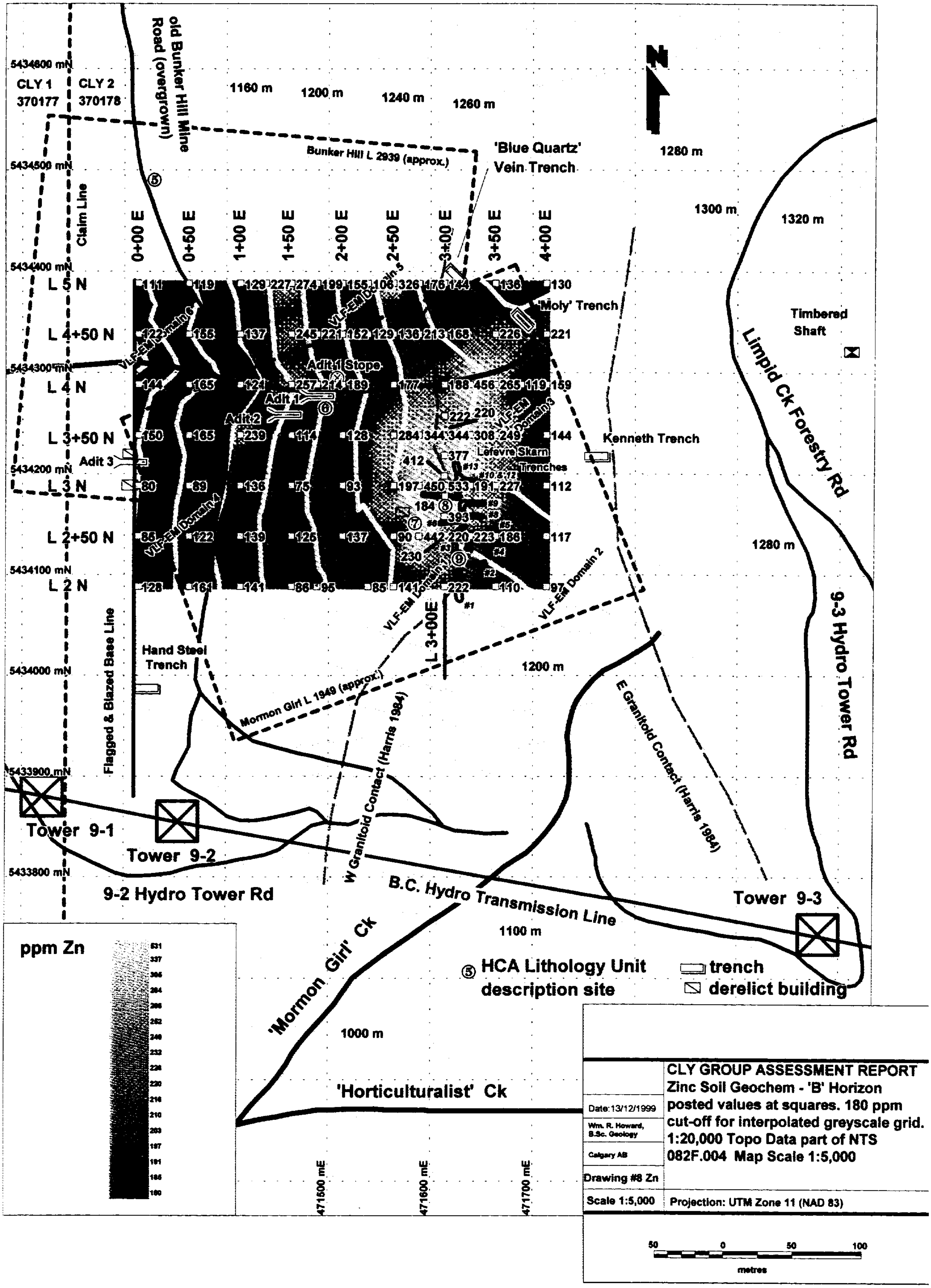


Date:13/12/1999	CLY GROUP ASSESSMENT REPORT Antimony Soil Geochem - 'B' Horizon posted values at squares. 5 ppm cut-off for interpolated greyscale grid. 1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Wm. R. Howard, B.Sc. Geology	
Calgary AB	
Drawing #6 Sb	
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

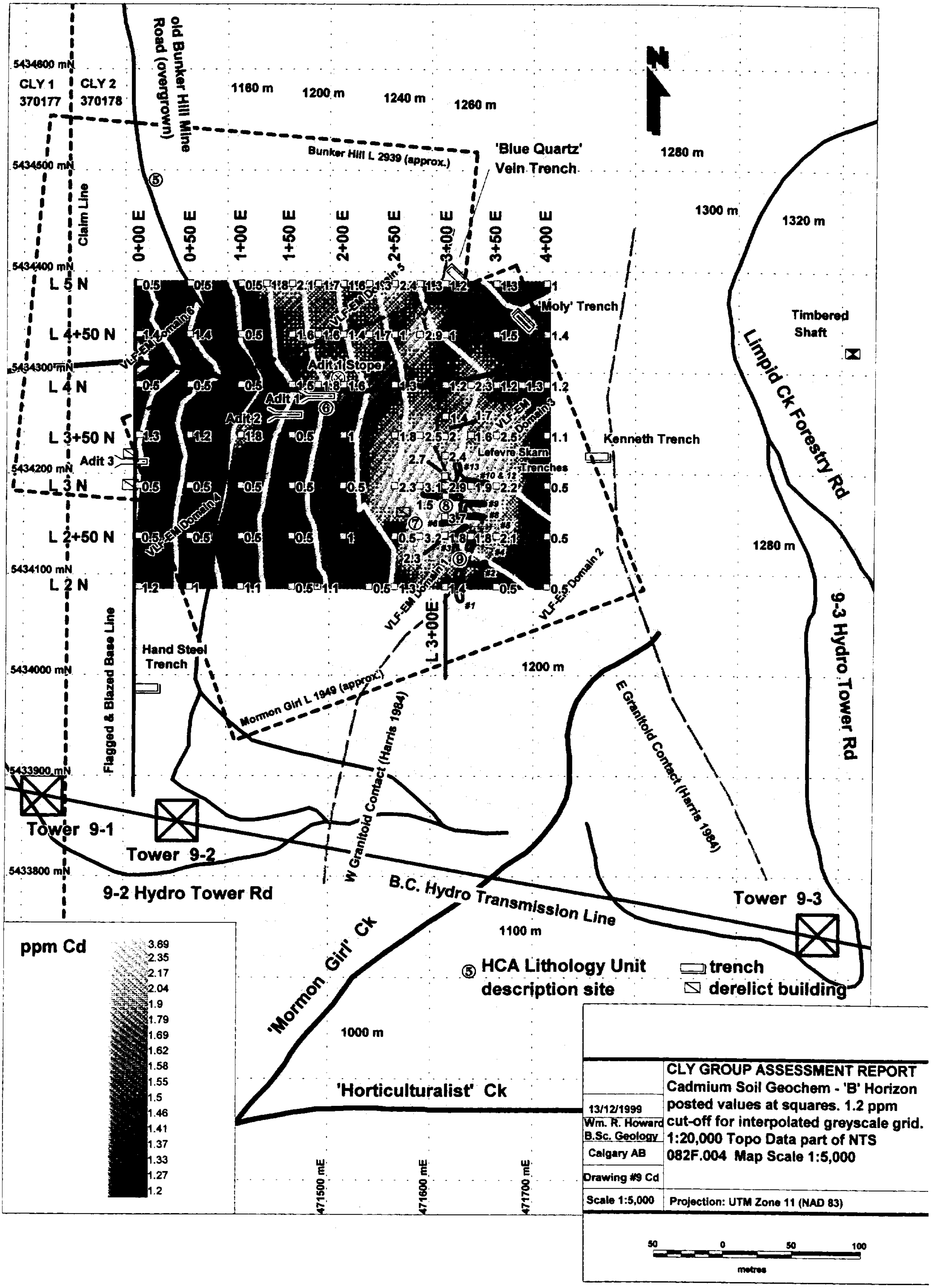
50 0 50 100
metres



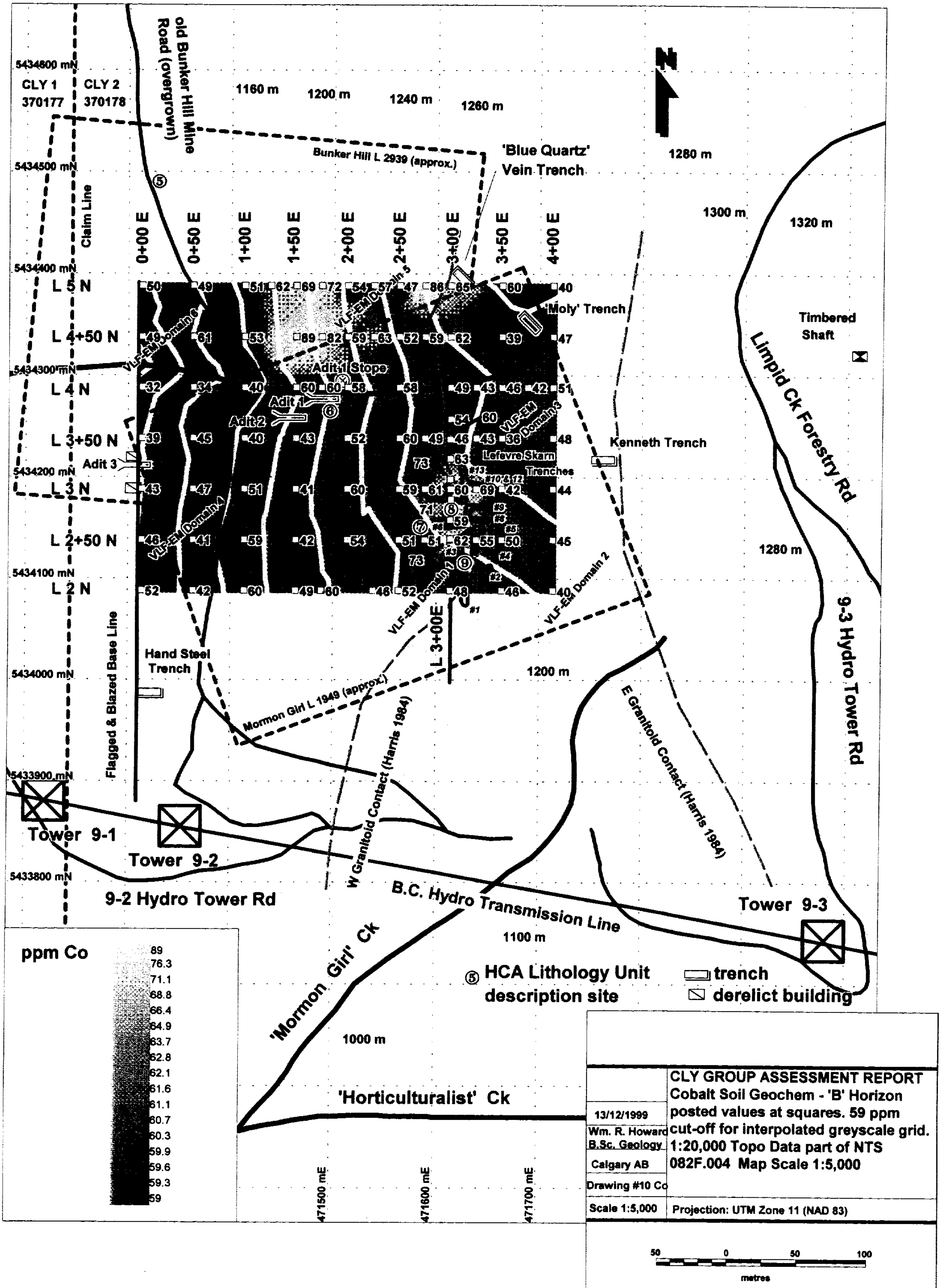
CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
'Moly' Trench
Kenneth Trench
Timbered Shaft
Limpid Ck Forestry Rd
9-3 Hydro Tower Rd
Claim Line
Flagged & Blazed Base Line
Hand Steel Trench
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Lefevre Skarn
Trenches
VLF-EM Domain 1
VLF-EM Domain 2
VLF-EM Domain 3
VLF-EM Domain 4
VLF-EM Domain 5
VLF-EM Domain 6
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
Tower 9-1
Tower 9-2
Tower 9-3
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
'Mormon Girl' Ck
'Horticulturalist' Ck
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
L 3+00E
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
1100 m
1000 m
ppm Pb
172
80
73.1
70.6
68.5
66.4
64.5
62.9
61.2
59.8
58.6
57.6
56.7
55.9
55.2
54.6
54
HCA Lithology Unit description site
trench
derelict building
Date: 13/12/1999
Wm. R. Howard, B.Sc. Geology
Calgary AB
Drawing #7 Pb
Scale 1:5,000
CLY GROUP ASSESSMENT REPORT
Lead Soil Geochem - 'B' Horizon
posted values at squares. 54 ppm cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
50
0
50
100
metres

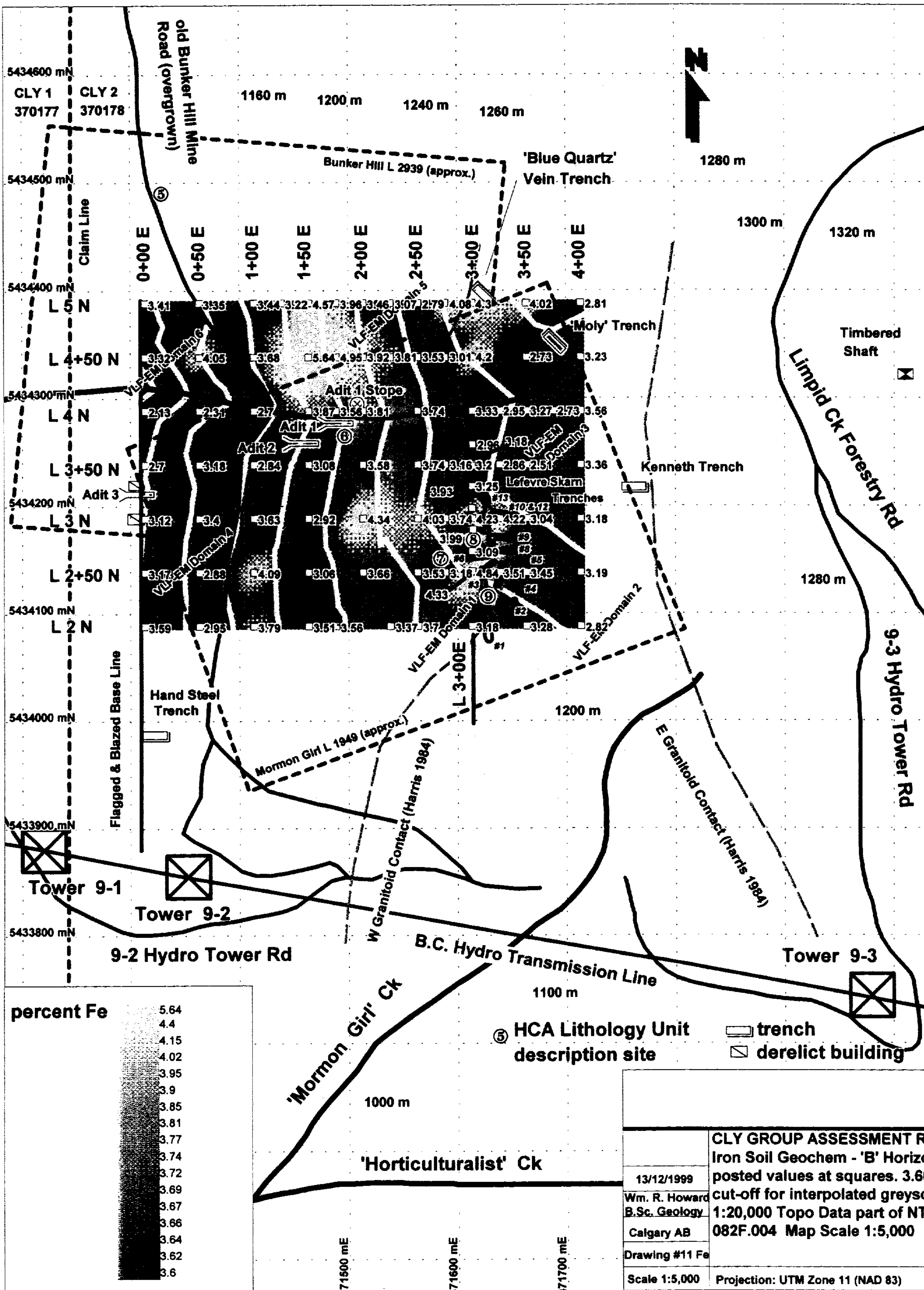


5434600 mN
CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
1160 m
1200 m
1240 m
1260 m
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
1280 m
5434500 mN
Claim Line
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
1300 m
1320 m
5434400 mN
L 5 N
L 4+50 N
5434300 mN
L 4 N
L 3+50 N
5434200 mN
L 3 N
L 2+50 N
5434100 mN
L 2 N
VLF-EM Domain 6
VLF-EM Domain 5
VLF-EM Domain 3
VLF-EM Domain 4
VLF-EM Domain 1
VLF-EM Domain 2
'Moly' Trench
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Lefevre Skarn Trenches
Kenneth Trench
Timbered Shaft
Limpid Ck Forestry Rd
1280 m
9-3 Hydro Tower Rd
L 3+00E
Flagged & Blazed Base Line
Hand Steel Trench
5434000 mN
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
1200 m
5433900 mN
Tower 9-1
Tower 9-2
5433800 mN
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
Tower 9-3
1100 m
'Mormon Girl' Ck
1000 m
'Horticulturalist' Ck
ppm Zn
HCA Lithology Unit description site
trench
derelict building
471500 mE
471600 mE
471700 mE
CLY GROUP ASSESSMENT REPORT
Zinc Soil Geochem - 'B' Horizon
posted values at squares. 180 ppm
cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
Date:13/12/1999
Wm. R. Howard, B.Sc. Geology
Calgary AB
Drawing #8 Zn
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
metres



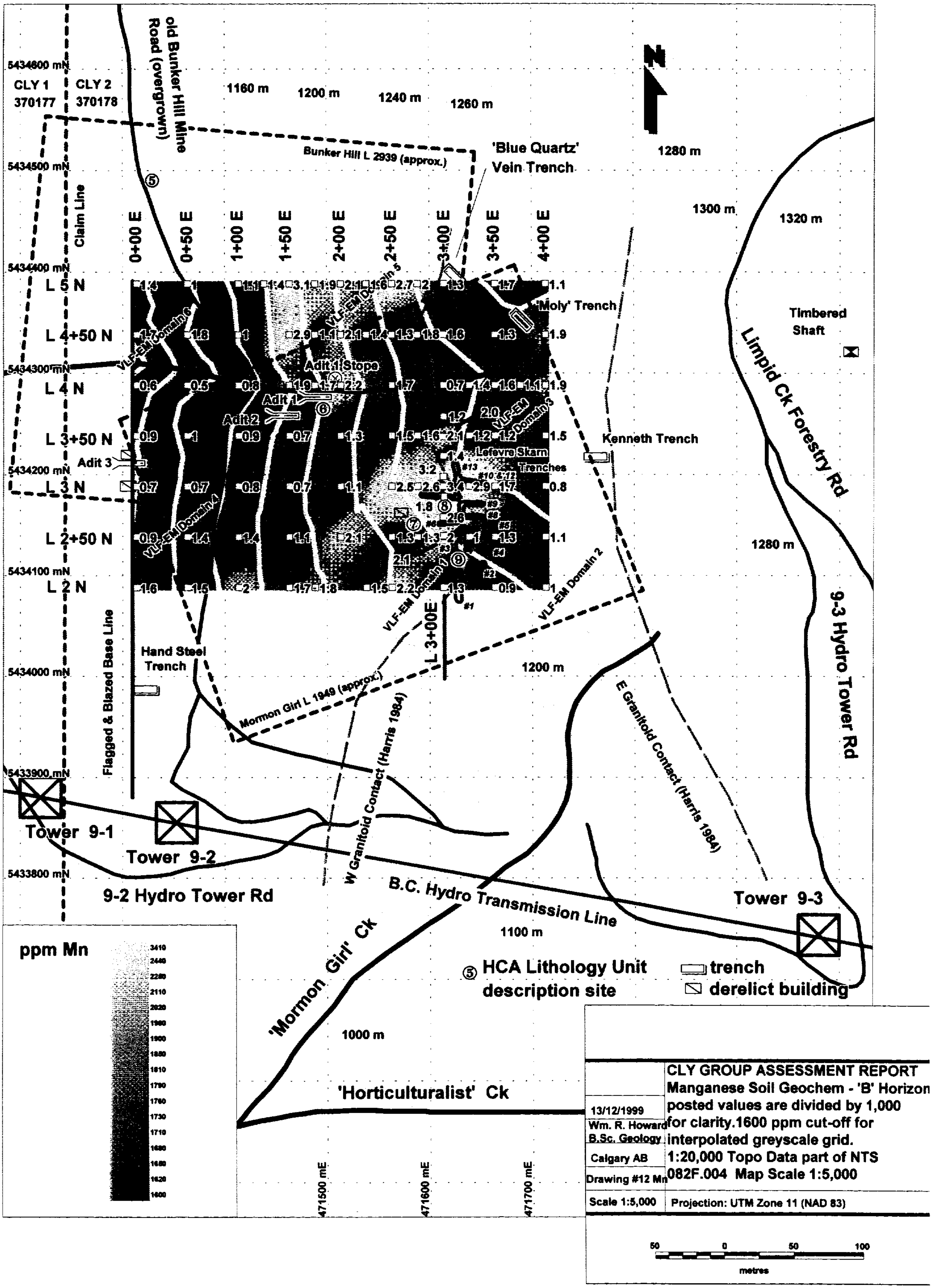
CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
Claim Line
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
'Moly' Trench
Timbered Shaft
Limpid Ck Forestry Rd
Adit 1 (Stope)
Adit 1
Adit 2
Adit 3
Kenneth Trench
Lefevre Skarn Trenches
VLF-EM Domain 6
VLF-EM Domain 5
VLF-EM Domain 4
VLF-EM Domain 3
VLF-EM Domain 2
VLF-EM Domain 1
L 3+00E
Hand Steel Trench
Flagged & Blazed Base Line
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
1200 m
1280 m
9-3 Hydro Tower Rd
Tower 9-1
Tower 9-2
Tower 9-3
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
1100 m
'Mormon Girl' Ck
1000 m
'Horticulturalist' Ck
ppm Cd
3.69
2.35
2.17
2.04
1.9
1.79
1.69
1.62
1.58
1.55
1.5
1.46
1.41
1.37
1.33
1.27
1.2
HCA Lithology Unit description site
trench
derelict building
471500 mE
471600 mE
471700 mE
13/12/1999
Wm. R. Howard B.Sc. Geology
Calgary AB
Drawing #9 Cd
Scale 1:5,000
CLY GROUP ASSESSMENT REPORT
Cadmium Soil Geochem - 'B' Horizon
posted values at squares. 1.2 ppm
cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
50 0 50 100
metres


CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
'Moly' Trench
Claim Line
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
VLF-EM Domain 6
VLF-EM Domain 5
VLF-EM Domain 4
VLF-EM Domain 3
VLF-EM Domain 2
VLF-EM Domain 1
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Lefevre Skarn Trenches
Kenneth Trench
Hand Steel Trench
Flagged & Blazed Base Line
L 3+00E
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
Timbered Shaft
Limpid Ck Forestry Rd
9-3 Hydro Tower Rd
9-2 Hydro Tower Rd
Tower 9-1
Tower 9-2
Tower 9-3
B.C. Hydro Transmission Line
'Mormon Girl' Ck
'Horticulturalist' Ck
1000 m
1100 m
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
ppm Co
89
76.3
71.1
68.8
66.4
64.9
63.7
62.8
62.1
61.6
61.1
60.7
60.3
59.9
59.6
59.3
59
HCA Lithology Unit description site
trench
derelict building
CLY GROUP ASSESSMENT REPORT
Cobalt Soil Geochem - 'B' Horizon
posted values at squares. 59 ppm
cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
13/12/1999
Wm. R. Howard
B.Sc. Geology
Calgary AB
Drawing #10 Co
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
50 0 50 100
metres

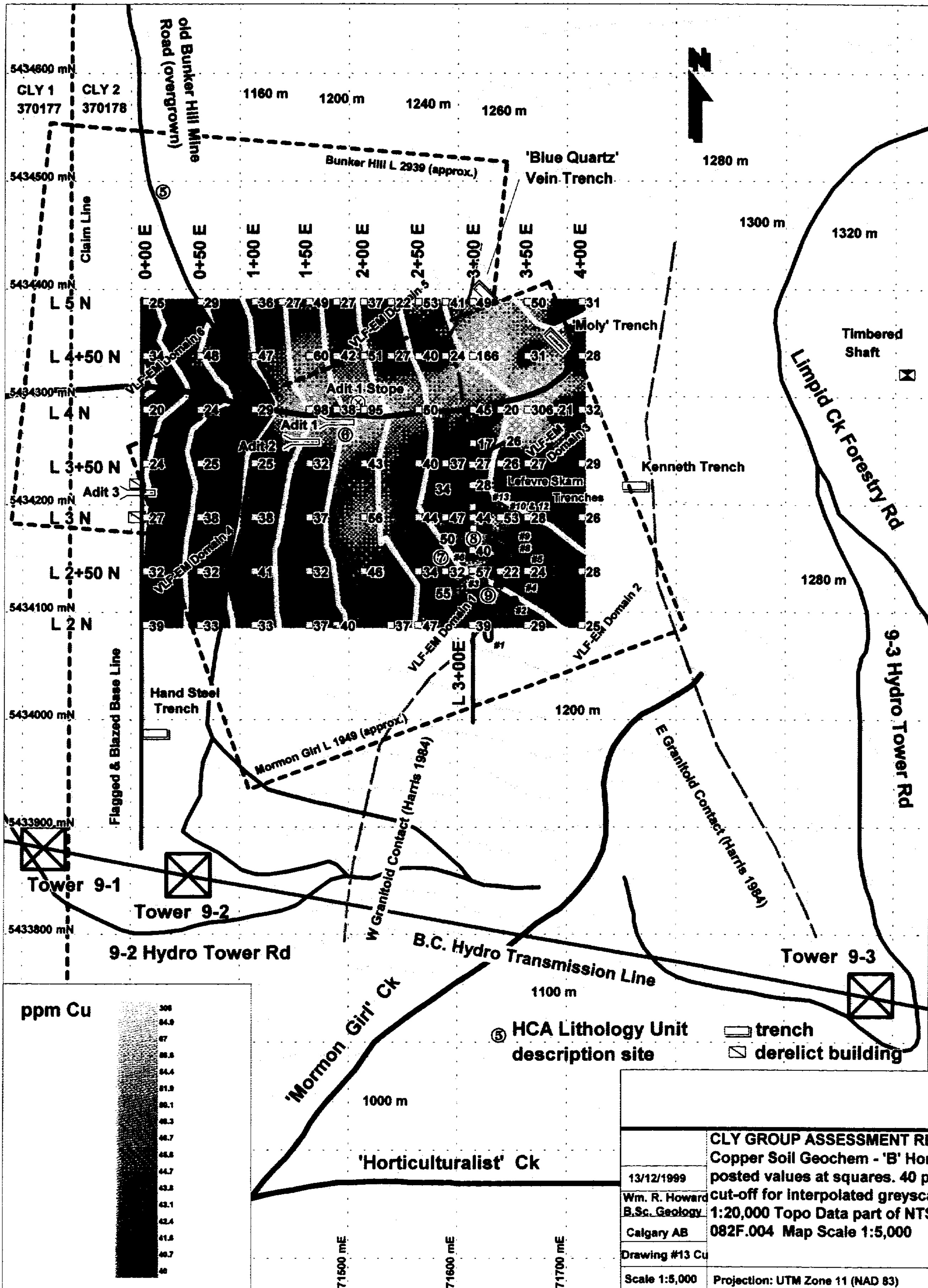


13/12/1999	CLY GROUP ASSESSMENT REPORT Iron Soil Geochem - 'B' Horizon posted values at squares. 3.60 % cut-off for interpolated greyscale grid. 1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Wm. R. Howard B.Sc. Geology	
Calgary AB	
Drawing #11 Fe	
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

50 0 50 100
metres



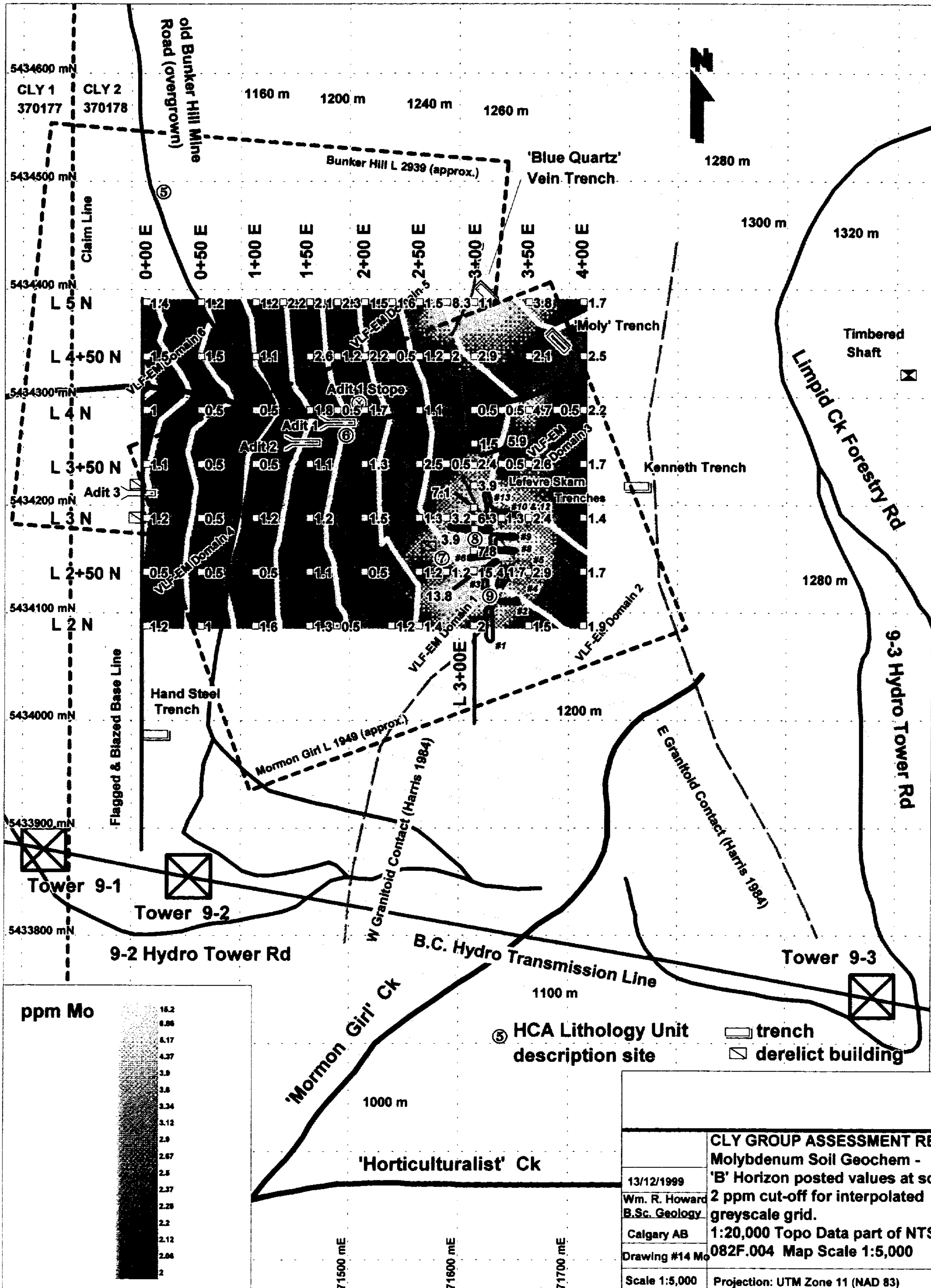
CLY GROUP ASSESSMENT REPORT
Manganese Soil Geochem - 'B' Horizon
posted values are divided by 1,000 for clarity. 1600 ppm cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
13/12/1999
Wm. R. Howard B.Sc. Geology
Calgary AB
Drawing #12 Mn
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
ppm Mn
HCA Lithology Unit description site
trench
derelict building
CLY 1 370177
CLY 2 370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
'Moly' Trench
Kenneth Trench
Timbered Shaft
Limpid Ck Forestry Rd
9-3 Hydro Tower Rd
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
Tower 9-1
Tower 9-2
Tower 9-3
Claim Line
Flagged & Blazed Base Line
Hand Steel Trench
Adit 1 (Stope)
Adit 2
Adit 3
Lefevre Skarn Trenches
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
'Mormon Girl' Ck
'Horticulturalist' Ck
L 3+00E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
metres



	CLY GROUP ASSESSMENT REPORT
13/12/1999	Copper Soil Geochem - 'B' Horizon posted values at squares. 40 ppm cut-off for interpolated greyscale grid.
Wm. R. Howard B.Sc. Geology	1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Calgary AB	
Drawing #13 Cu	
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

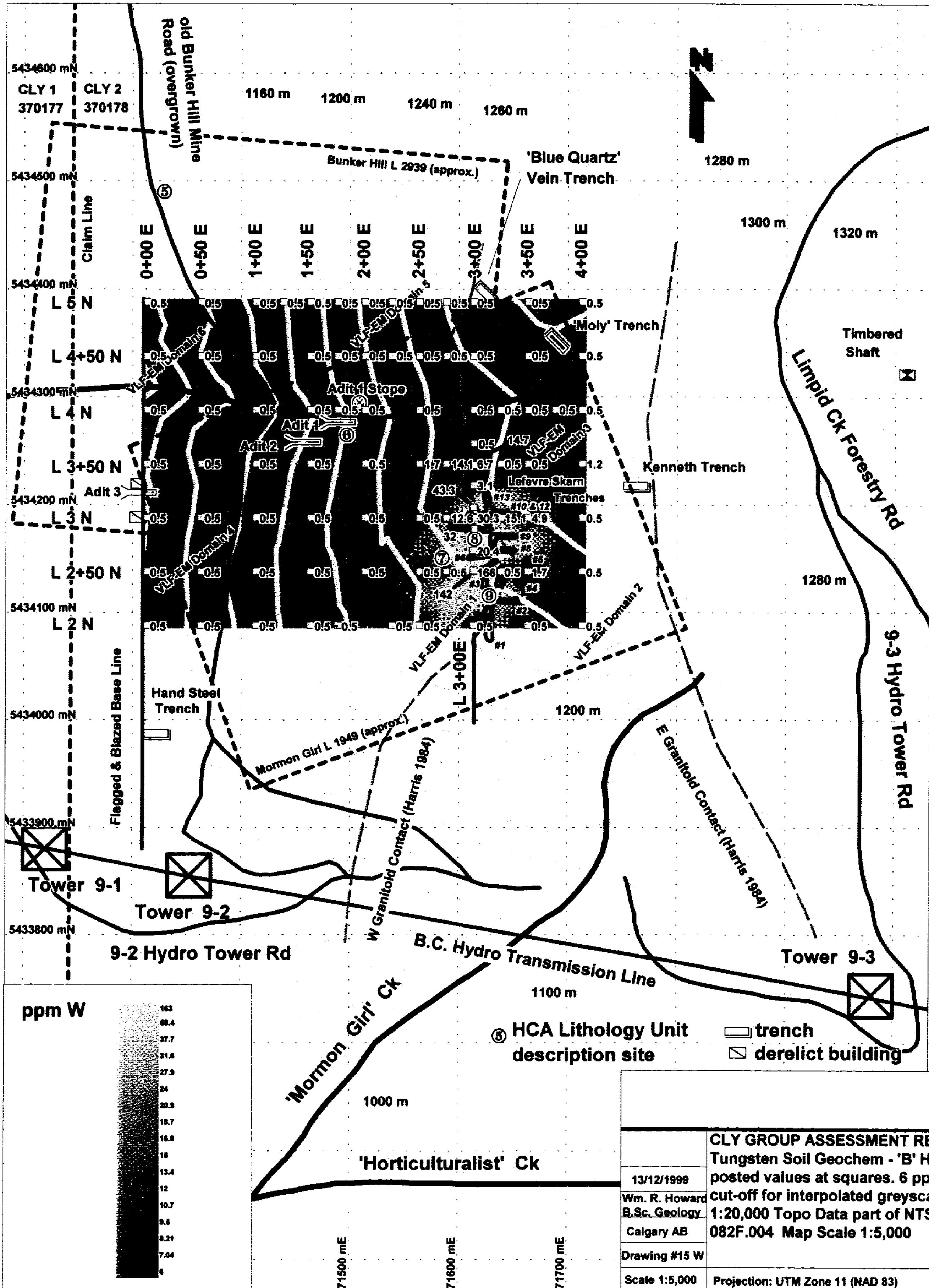
50 0 50 100

metres



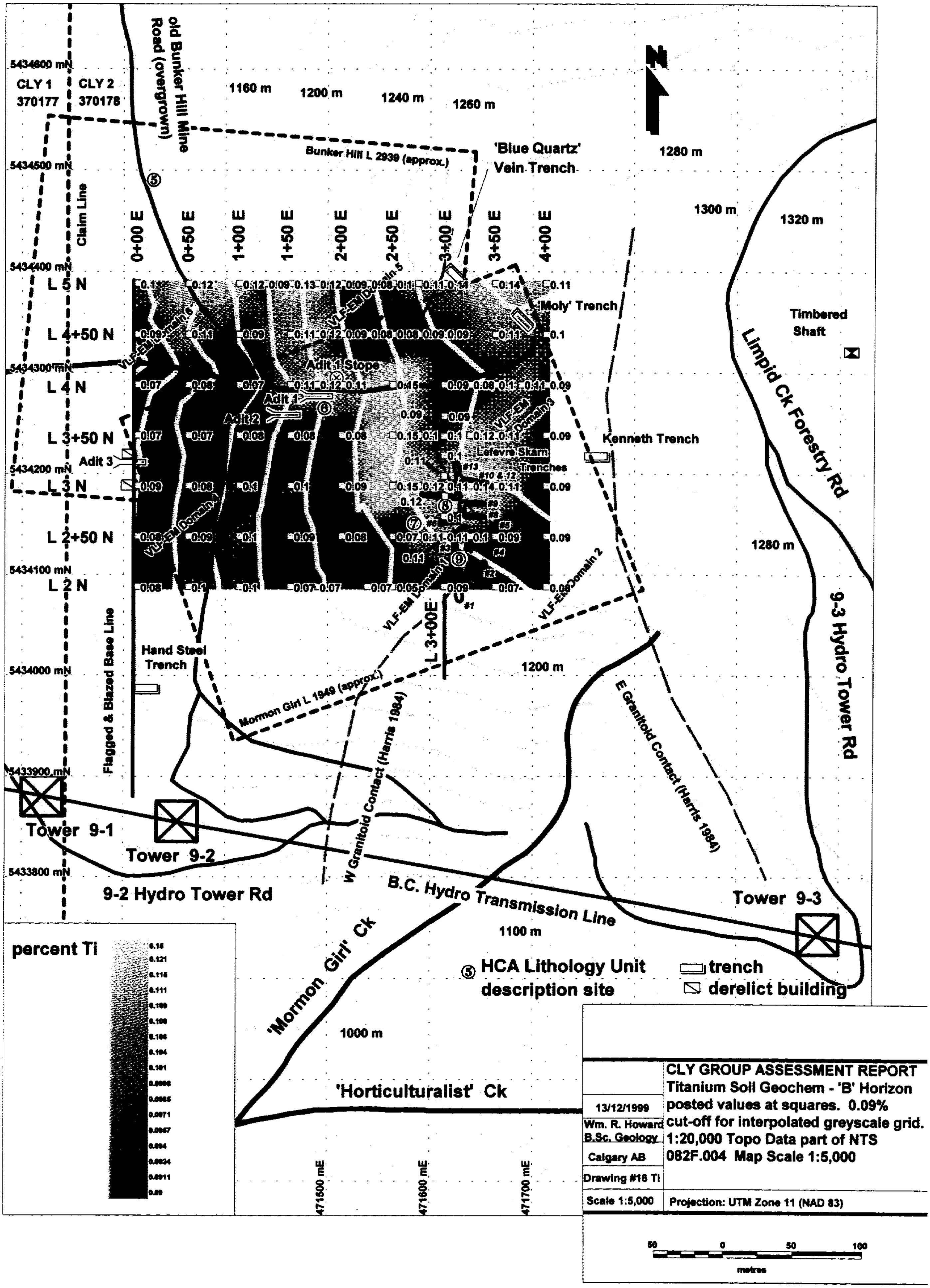
	CLY GROUP ASSESSMENT REPORT
	Molybdenum Soil Geochem -
13/12/1999	'B' Horizon posted values at squares.
Wm. R. Howard B.Sc. Geology	2 ppm cut-off for interpolated greyscale grid.
Calgary AB	1:20,000 Topo Data part of NTS
Drawing #14 Mo	082F.004 Map Scale 1:5,000
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

50 0 50 100
metres



	CLY GROUP ASSESSMENT REPORT
13/12/1999	Tungsten Soil Geochem - 'B' Horizon posted values at squares. 6 ppm cut-off for interpolated greyscale grid.
Wm. R. Howard B.Sc. Geology	1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:5,000
Calgary AB	
Drawing #15 W	
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

50 0 50 100
metres



CLY 1
370177
CLY 2
370178
old Bunker Hill Mine Road (overgrown)
Bunker Hill L 2939 (approx.)
'Blue Quartz' Vein Trench
Claim Line
0+00 E
0+50 E
1+00 E
1+50 E
2+00 E
2+50 E
3+00 E
3+50 E
4+00 E
L 5 N
L 4+50 N
L 4 N
L 3+50 N
L 3 N
L 2+50 N
L 2 N
'Moly' Trench
Adit 1 Stope
Adit 1
Adit 2
Adit 3
Lefevre Skarn Trenches
Kenneth Trench
Timbered Shaft
Limpid Ck Forestry Rd
9-3 Hydro Tower Rd
Hand Steel Trench
Flagged & Blazed Base Line
L 3+00E
Mormon Girl L 1949 (approx.)
W Granitoid Contact (Harris 1984)
E Granitoid Contact (Harris 1984)
Tower 9-1
Tower 9-2
Tower 9-3
9-2 Hydro Tower Rd
B.C. Hydro Transmission Line
'Mormon Girl' Ck
'Horticulturalist' Ck
5434600 mN
5434500 mN
5434400 mN
5434300 mN
5434200 mN
5434100 mN
5434000 mN
5433900 mN
5433800 mN
471500 mE
471600 mE
471700 mE
1160 m
1200 m
1240 m
1260 m
1280 m
1300 m
1320 m
1100 m
1000 m
percent Ti
HCA Lithology Unit description site
trench
derelict building
CLY GROUP ASSESSMENT REPORT
Titanium Soil Geochem - 'B' Horizon
posted values at squares. 0.09%
cut-off for interpolated greyscale grid.
1:20,000 Topo Data part of NTS
082F.004 Map Scale 1:5,000
13/12/1999
Wm. R. Howard
B.Sc. Geology
Calgary AB
Drawing #16 Ti
Scale 1:5,000
Projection: UTM Zone 11 (NAD 83)
metres

10.3 Silver in Soil Geochem Drawing #3 Ag

Ag is highly mobile in the supergene environment (Rose et al. '79). Silver is a usual associate of gold. Silver values have a smaller mean and standard deviation than the Mammoth survey. Spot Ag highs occur in Domain 3 at L4N 4+50E 5.8 ppm and 50 m S of the 'Blue Quartz' vein, 1.1 ppm. The E part of Domain 5 has two anomalous soils 1.3 & 1.2 ppm. Anomalies on L4N at 1+50E and 2+00E are from workings on the Adit 1 mineralization. *Soils infer there is very little silver in the Lefevre skarn; the gold may have high fineness, i.e. little alloyed silver.* "Gold-rich skarns are typically... low in ... Ag" (Newberry et al. '97 p. 375). Silver is not a pathfinder for gold mineralization in the grid area.

10.4 Tellurium in Soil Geochem Drawing #4 Te

Te is "relatively immobile in the supergene environment" (Rose et al. '79) and is a *specific* geochemical pathfinder for gold mineralization (Boyle '79). "...Te concentrations significantly higher than the crustal background (0.005 ppm) are present in many skarn types. Te ... is broadly correlative with gold ... the bulk of Te is probably present as Te - Bi minerals, in the form of inclusions in other sulphides ..." (Newberry et al. '97). The ICP analyses give a low 5 - 16 ppm range for Te. Interpretation may be hindered by this small 11 ppm data spread, but the Lefevre skarn and Domain 5 are enriched. Three values on L5N highlight Domain 5: 1+75E 16 ppm, 1+50E 12 ppm and 1+25E 14 ppm Te. The highest value in rock 92 ppm from BH-306 emphasize the importance of high soil values.

10.5 Arsenic in Soil Geochem Drawing #5 As

As is the classic pathfinder for gold: "Arsenic in soils or sediments is an especially powerful guide to arsenical gold deposits" (Rose et al. '79). It is mobile in the surficial oxidizing environment. Arsenic values have a similar mean though smaller standard deviation than the Mammoth survey. The Lefevre skarn trenches and its Domain 3 extension to the NE are highly anomalous. "Gold-rich skarns are typically rich in As ..." (Newberry et al. '97 p. 375). Three soils downslope of Domain 5 on L5N are anomalous: 25, 140 and 36 ppm As from 1+75E to 1+25E respectively. Downslope of the 'Blue' Quartz Vein trench a soil at L 4+50N 3+00 E ran 36 ppm As.

10.6 Antimony in Soil Geochem Drawing #6 Sb

Sb is comparatively immobile in the surficial environment. Domain 5 is highlighted by two high values on L 4+50 N, 13 ppm at 1+75E and 12 ppm at 2+25E. The 13 ppm value on L 4+00 E at 1+75E is likely from Adit 1 dump material. The Domain 1 to 3 trend is anomalous astride the intrusive contact. Low ICP analytical values are suspect for the seven soils collected along L3+00E (only Bi was re-analyzed).

10.7 Lead in Soil Geochem Drawing #7 Pb

Pb has a low mobility in the surficial environment as its secondary minerals are insoluble (Rose et al. '79). Lead values have a larger mean and standard deviation than the Mammoth survey.

Soils over and downslope of the Lefevre skarn are not enriched but granitoids uphill at the intrusive contact are. Three high values occur just downslope of Domain 5. Anomalous soil at 86 ppm is from the 'Blue Quartz' Vein trench.

10.8 Zinc in Soil Geochem Drawing #8 Zn

Zn has moderately high mobility in the surficial environment (Rose et al. '79). Zinc survey values have a mean 45 ppm larger and a standard deviation comparable to the Mammoth soils. The Lefevre skarn trenches and the larger Domain 3 area are highly anomalous in Zn. "Alaskan W skarns ... show variable enrichment in ... Zn" (Newberry et al. '97 p. 375). In Trench # 1 minor sphalerite and arsenopyrite occur. One soil at the uphill side of Domain 5 at L5N 2+50E is weakly anomalous at 326 ppm. Slightly high values downslope of Domain 5 may be from mineralization or, more likely, from fault - offset bedrock, slightly enriched in Zn.

10.9 Cadmium in Soil Geochem Drawing #9 Cd

Cd is relatively immobile in the surficial environment (Rose et al. '79). The anomaly pattern mimics zinc. High Cd forms a large anomaly about the Lefevre skarn and Domain 3. Weaker anomalies downslope of Domain 5 and the 'Blue Quartz' Vein - Moly trenches may be from mineralization.

10.10 Cobalt in Soil Geochem Drawing #10 Co

Co has "intermediate mobility" in the surficial environment "controlled mainly by ... Mn- and Fe- oxides" (Rose et al. '79). Domain 5 is distinctly anomalous in Co. The Lefevre skarn trenches are anomalous.

10.11 Iron in Soil Geochem Drawing #11 Fe

Fe as Fe^{++} has moderate mobility in the surficial environment (Rose et al. '79). Fe as pyrite or pyrrhotite occurs with auriferous sulphides. Soils high in Fe outline the 'Blue Quartz' Vein trench and the Lefevre skarn. A high 4.34% value at L3N 2+00E may be concentration downslope of the skarn. Soils 25 m downslope of Domain 5 are markedly anomalous, including the highest grid value at 5.64%. Two high soils about Domain 4 and 6 are not mineralized targets. Domain 3 the NE extent of the Lefevre skarn is not anomalous.

10.12 Manganese in Soil Geochem Drawing #12 Mn

Mn has low to intermediate mobility in the surficial environment (Rose et al. '79). Mn has a pattern like Fe. Soils downslope of Domain 5 are anomalous, but mineralization from the 'Blue Quartz' Vein trench is not manganiferous.

10.13 Copper in Soil Geochem Drawing #13 Cu

Cu has moderate mobility in the surficial environment (Rose et al. '79). Copper has a mean 15 ppm less and a standard deviation near equivalent to the Mammoth survey. Copper's distribution is unlike the other elements. The highest values are downslope of the 'Blue Quartz' Vein - 'Moly' trenches.

VLF-EM Domains are not copper bearing. Copper is not a pathfinder for gold mineralization in the grid area.

10.14 Molybdenum in Soil Geochem Drawing #14 Mo

Mo has high mobility in the surficial environment (Rose et al. '79). Molybdenum values have a mean and standard deviation near equivalent to the Mammoth survey. Soils downslope of the 'Blue Quartz' Vein and the Lefevre skarn are highly anomalous. Domain 3, the NE extent of the Lefevre skarn, and Domain 5 are not enriched.

10.15 Tungsten in Soil Geochem Drawing #15 W

W has low mobility in the surficial environment (Rose et al. '79). Tungsten is restricted to Domain 1 over the Lefevre skarn trenches, and is present in tungsten + gold skarns resulting "mainly from middle Cretaceous magmatic-generated hydrothermal systems" (McCoy et al. '97 p. 194).

10.16 Titanium in Soil Geochem Drawing #16 Ti

Ti has limited mobility in the surficial environment. Higher values reflect all the known auriferous showings. The country side contact of the intrusive is markedly anomalous. Quartz veins near the adits likely have a titaniferous signature, and the Lefevre skarn trenches are enriched. Just downslope of Domain 5 are high values. Domain 4 with NE trending midrange titanium values may be from lithology.

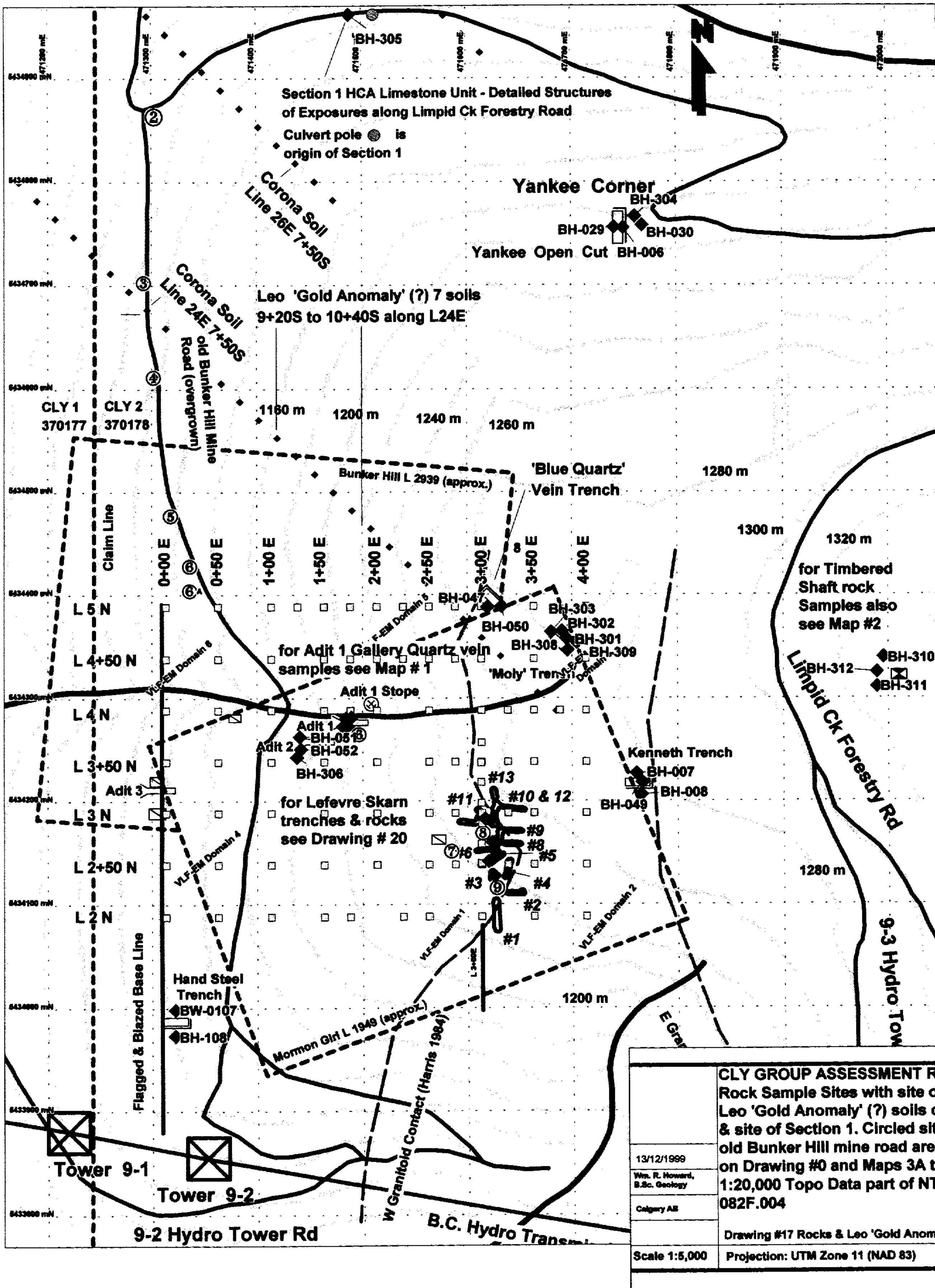
11 Domain 5, a new Exploration Target

VLF-EM Fraser-filtered anomaly cluster Domain 5 is a NE-trending target for buried, auriferous replacement-type mineralization. It is open on the N side of the grid. Elements anomalous in soils presumably associated with presently unknown bedrock mineralization are Au Bi Ag Te As Sb Pb Zn Cd Co Fe Mn and Ti. As molybdenum and tungsten in soils are not enriched but lead and silver are, mineralization evidently differs from the contact-related "proximal" Lefevre tungsten-gold skarn. Domain 5's further distance from the intrusive contact is propitious. Here drift covered mineralization may be developed away [distal] to the granitic contact: "Pyroxene-dominant gold skarn ... ore bodies tend to be sulphide rich [and conductive to VLF-EM?] and are developed distal to the pluton" (Ray '96).

12 Adit 1 Gallery Quartz Vein

12.1 History, Location and Description

The Adit 1 Gallery quartz vein on the Mormon Girl Crown Grant (site on Drawing # 17) was uncovered on Aug. 18 1999. UTM co-ordinates are 471490 m E 5434280 m N; for Map 1 grid co-ordinates are measured from station 1+75 E on L4 +00 N. The vein was dug out on both sides of the level entrance - the 'Gallery' - of the caved portal of Adit 1.



13/12/1999 Wm. R. Howard, B.Sc. Geology Calgary AB	**CLY GROUP ASSESSMENT REPORT** **Rock Sample Sites with site of Leo 'Gold Anomaly' (?) soils collected & site of Section 1. Circled sites along old Bunker Hill mine road are also on Drawing #0 and Maps 3A to 3C 1:20,000 Topo Data part of NTS 082F.004** Drawing #17 Rocks & Leo 'Gold Anomaly' soils
Scale 1:5,000	Projection: UTM Zone 11 (NAD 83)

50 0 50 100

metres

Evidently this same vein was mined from Adit 2, slightly to the east and lower in elevation (Drawing # 17). Minor production from Adit 1 was from another vein uphill (Minister of Mines '35, '36).
The quartz vein is a tabular, meter-plus sized fissure-filling vein in competent, contact metamorphosed siliceous argillite and argillaceous quartzite. Contacts are sharp with the wallrocks.

12.2 Vein Textures

Quartz is generally massive but multiple infilling phases of quartz, ***at least three generations***, are well displayed on the S gallery wall:

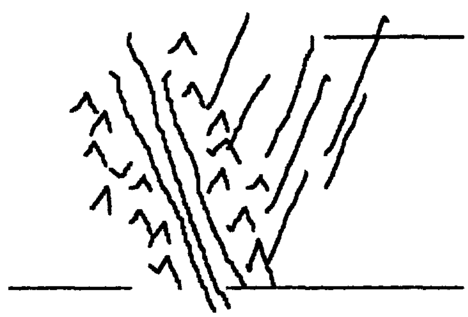


Fig. 7 Sketch of multi-phase Adit 1 Gallery Quartz Vein, about 0.5 m wide. View toward North

12.3 Geology and Strike Extent

The country rock is very dark grey siliceous meta-argillite of the HCA Quartzite - Tuff Unit. Map 1 details structures and locates rock samples. The vein strike is 037° between the gallery walls; the measured attitude is 031 46 SE about 3 m south of the S wall (Map 1). Uphill the vein partially outcrops from grid co-ordinates 3+92N 1+75E to 4+38N 2+09E for a strike length of about 46 m. Three measured widths are 1.35, 1.2 and 1.0 m. The last two widths are from the northernmost exposure at 4+38 N and 2+09 E where, combined, the vein is over 2.2 m wide. Recessive, angular vuggy quartz boulders were dug out between outcrops here. Southeast of Adit 1 the vein is drift covered downslope.

12.4 Soil Geochem Response

Grid soils at 50 m stations failed to outline the NE strike extension of the vein. Soil collected over the vein (soil BH-045) on the N side was generally not anomalous at 10 ppb Au 1 ppm Bi 9 ppm Te but 3.32 % Fe and 0.39% K. Soil directly over the S gallery side vein (soil BH-041) ran 4,350 ppb Au 128 ppm Bi 3.38 % Fe & 20 ppm Te. This was the highest gold-in-soil result of the geochem survey. K in the soil is relatively high at 0.43%; base metals are very low.

12.5 Rock Geochemistry

On the N side of the gallery BH-045 a 0.9 m channel sample of the vein with rust coloured secondary minerals from less than 2% triangular pyrite and considerably less abundant powdery dark grey very fine grained (sulphosalt Bi - Te - Au?) minerals, ran 3,200 ppb Au 330 ppm Bi & 12 ppm Te. On careful resampling with a carbide moil BH-022 a 0.73 m channel sample ran 4,325 ppb Au 93 ppm Bi 6 ppm Te 2.97 % Fe & < 1 ppm W. The vein was re-measured as 0.88 m thick. The quartz vein on the S (right) Gallery side has < 1/4 % sulphides and is slightly vuggy milky-white quartz (Map 1). BH-046 a 1.93 m channel sample about along strike of mostly sulphide-free off white (milky) massive quartz ran 5,075 ppb Au 53 ppm Bi & 4 ppm Te. An additional 0.60 m channel sample BH-041 of this vein further west (downslope) ran 15,840 ppb Au 353 ppm Bi 27 ppm Te 0.61 % Fe & 5 ppm W.

12.5 Internal Fractures and a Report of Bismuth Tellurides

The Gallery quartz vein on the N (left) side has common hairline to 2 mm sized rusty fractures spaced 5 mm to 1 cm apart. Fractures strike 159° with near vertical dip. Small patches of rust coloured secondary minerals have developed from weathered vugs. Sulphides are less than 2% triangular - shaped pyrite and undetermined bismuth and telluride bearing minerals. These may include galenobismutite and gold tellurides, as identified in 1937 from polished section ore petrography of Waneta Gold Mines Ltd. samples by H. V. Warren and J. M. Cummings. Samples location is not mentioned but their Fig. 4 shows *"Pyrite veined by quartz, an unidentified bismuth - lead mineral, probably galenobismutite* [$PbBi_2S_4$] *and a gold telluride"* (p.1-4 in The Relationship Between Gold and Metallic Minerals in British Columbia 1937). *"Gold is present as a telluride which, in close association with an unidentified bismuth mineral, veins pyrite. Gold - bearing telluride has been introduced during a late period of mineralization ... in fractured portions of an old period of mineralization."*

12.6 No VLF EM Response

The VLF EM dip angle survey on seven lines spaced 50 m apart, stations every 25 m, showed no response over the vein. This thin, tabular body is not conductive enough to generate secondary EM fields.

12.7 Conclusion

Adit 1 Gallery Quartz vein is a typical mesothermal gold - quartz vein. These are also called Mother Lode veins, greenstone gold, Archean lode gold, or shear-hosted lode gold (Hodgson '93, Robert et al. '94, Robert '96, Ash & Alldrick '96). As a whole it is presently subeconomic, but better grades may be present as linear ore shoots (Peters '93). Rock and soil results show gold - bismuth - tellurium bearing mineralizing fluids were present away from the Wallack Ck granitic intrusive contact. These were channeled by receptive structures (vein faults / fissures) to form multi-phase quartz veins like the Adit 1 Gallery Quartz vein.

13 Adit 2 Dump Quartz Vein

Three large angular pieces of mineralized quartz from the dump outside Adit 2 on the Mormon Girl Crown Grant (site on Drawing # 17) were sampled. The quartz is thought to be from the Adit 1 Gallery Quartz vein (Section 12).
The highest gold, bismuth and tellurium value of all 33 rocks analyzed was BH-306: 29,760 ppb Au 1,150 ppm Bi and 92 ppm Te. BH-306 was a 19 cm piece with vuggy, euhedral 5 cm sized coxcomb quartz crystals and minor < 2% dark grey sulphides. Two other samples were barren: BH-051 a 33 cm piece of mineralized quartz vein, partly vuggy with about 7 % pyrite ran 60 ppb Au 11 ppm Bi 2 ppm Te and BH-052 a 25 cm piece ran 35 ppb Au 6 ppm Bi 1 ppm Te.

13.1 Quartz Textures

The Adit 2 dump quartz vein is a network of cm-spaced mm-sized fractures. These are partly closed (healed) by quartz and partly expanded with half to one-cm sized open vugs. Euhedral quartz crystals with open-space terminations have partly infilled some vugs. Vein quartz is variably clear, off white, smoky or coloured very light to 'steel' bluish grey with undetermined powdery, dark grey sulphides. Sulphides are 1 / 4 to a maximum of 2 volume %. At least five vein opening and infilling events are recorded in the quartz textures in one boulder. Concluding, multiphase vuggy quartz carries higher gold.

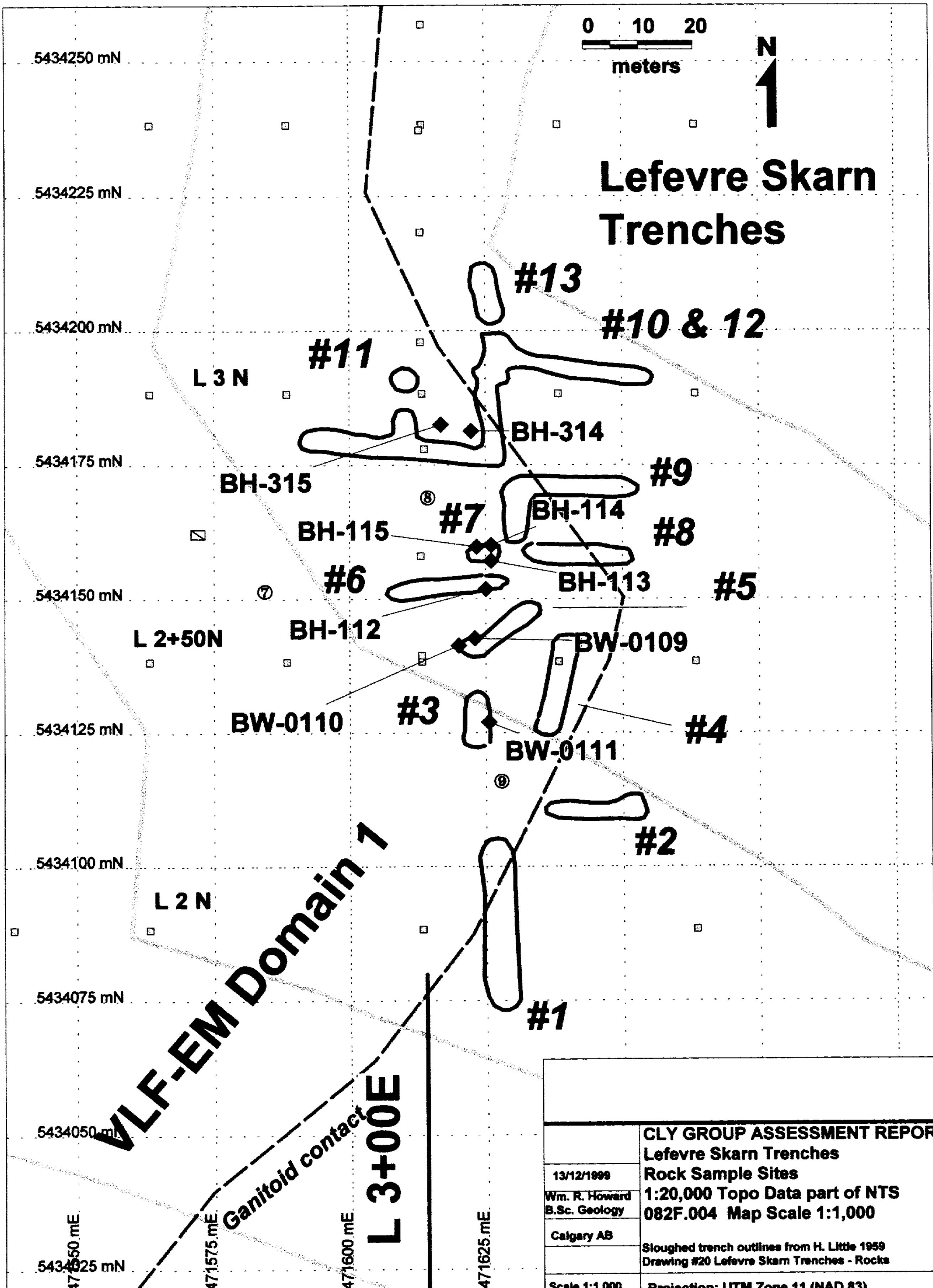
14 Lefevre Skarn Tungsten-Gold Trenches

14.1 History, Location and Access

The Lefevre Skarn Tungsten-Gold showing (Drawing #20 at 1:1,000 scale) consists of very old blasted trenches on the Mormon Girl Crown Grant. They are named after Harry Lefevre, a former mayor of Rossland, who discovered scheelite ($CaWO_4$, calcium tungstate, the common ore of tungsten) with an ultraviolet lamp in old workings above the Bunker Hill adits in 1942. The old trenches were blasted out before this time; most expose auriferous quartz veins. Thirteen trenches and pits over 360 feet are aligned N to S. Access is by the Limpid CK Forestry Road to the top of the 9-1 / 9-2 Hydro Tower Road (4X4), then a short hike up a switchback to the 9-2 Hydro Tower (the second one), then up flagged grid Line 2+50 N to station 3+00 E (see Drawing #17). This site has UTM coordinates 471610 m E 5434140 m N. As the trenches are now mostly sloughed and well overgrown their outlines have been taken from H. Little's 1959 survey. Rock exposure is poor. The geology was not mapped.

14.2 Background - H. W. Little's 1959 Description

The Lefevre skarn was described by M.S. Hedley in 1943 and H. W. Little 1959. Little noted
"bedrock consists of argillaceous quartzite and micaceous schist, and minor skarn ... intruded by granite, probably ... of Cretaceous (?) age. The bedding in the quartzite strikes 004° and dips 83° E. In trench # 4 and in the pits at either end, finely disseminated scheelite is distributed evenly.



	CLY GROUP ASSESSMENT REPORT Lefevre Skarn Trenches Rock Sample Sites
13/12/1999	
Wm. R. Howard B.Sc. Geology	1:20,000 Topo Data part of NTS 082F.004 Map Scale 1:1,000
Calgary AB	Sloughed trench outlines from H. Little 1959 Drawing #20 Lefevre Skarn Trenches - Rocks
Scale 1:1,000	Projection: UTM Zone 11 (NAD 83)

A chip sample from this trench taken across 35' assayed 0.33% WO_3 with no detectable MoS_2. This represented the best scheelite-bearing material observed, except over narrow widths. In trench # 6 a lenticular vein of quartz about 10 inches wide is estimated to contain 2 - 3 % WO_3 ... **" (Little '59 p. 100-102).**

From the layout of the trenches, apparently they were originally blasted to expose crosscutting auriferous quartz veins, not the skarn (Wehrle '98). Bulk tonnage gold ± tungsten skarn is an exploration target (Wehrle '97). The skarn is extremely hard and difficult to sample. Host rocks are hornfelsed, structurally (rock mechanically) very competent due to contact metamorphism by granites to the east.

14.3 Rock Geochemistry

Tungsten and gold analyses of twelve undescribed rocks from the trenches are listed in Harris ('84). Four ran over 900 ppb Au:

Sample	Au ppb	W ppm
MH-84-12	1000	740
MH-84-19	1600	990
MH-84-20	940	1710
MH-84-23	1050	over 2000

9 rock samples collected in 1999 confirm gold occurs in sulphide-rich portions of the skarn in about 1000 ppb values. Skarn and quartz veins were sampled and analyzed separately. The first pit encountered on Line 2+50N is Trench # 5 (H. Little's numbering). Samples were:

BW-0109 from Trench # 5 a bulk sample of a 50 cm wide quartz vein oriented 030 36 NW on the N side ran 6710 ppb Au 1.4 ppm Ag 453 ppm Bi 1.54% Fe 16 ppm Te 127 ppm W and 60 ppm Cu.

BW-0110 from Trench # 5 a composite sample of the pit's host rock ran 1156 ppb Au 104 ppm Bi and 10 ppm Te. The skarn has magnetic pyrrhotite to 25% with interstitial *trace* chalcopyrite. It is mostly very dark green pyroxene (actinolite?) with common red garnet. Some epidote and chlorite is present. No acid reaction was noted.

BW-0111 from Trench # 3 a composite bulk sample of skarn ran 675 ppb Au 46 ppm Bi and 9 ppm Te.

BH-112 from Trench # 6 a 30 cm vuggy quartz vein with 10% dark grey powdery sulphosalt(?) minerals ran 300 ppb Au 14 ppm Bi and 2 ppm Te. This lenticular vein has an estimated 2-3 % WO_3 (Little '59).

BH-113 from the S side of Trench # 7 a 35 cm of very vuggy quartz vein with minor undetermined dark grey sulphides ran 1825 ppb Au 45 ppm Bi and 3 ppm Te.

BH-114 from the N side of Trench # 7 a very soft, pinkish grey argillic - altered quartz vein ran 2,545 ppb Au 114 ppm Bi 1.69 % Fe 5 ppm Te 69 ppm Mo 3,061 Mn and 337 ppm W.

BH-115 from the N side of Trench # 7 a composite chip sample over 1 m of very hard actinolite - garnet skarn ran 200 ppb Au 13 ppm Bi and 5 ppm Te.

BH-314 from Trench # 10 a selected piece of garnet - actinolite (?) pyroxene - pyrrhotite - arsenopyrite - scheelite skarn ran 1225 ppb Au 100 ppm Bi 9.57% Fe 130 ppm Co 235 ppm Ni 31 ppm Te and 435 ppm W.
BH-315 from Trench # 10 quartz vein float ran 9100 ppb Au 464 ppm Bi 1.09% Fe 31 ppm Te and 137 ppm W.

14.4 Soil Geochemistry

Soils over and downslope of the Lefevre trenches are high in Au Bi Mo and W. These may be developed on trench dump material (see Section 10.1). Soils over the skarn are anomalous in Au Bi Te As Sb Zn Cd Co (marginally) Fe Mn Mo W and Ti. Silver, copper and lead are not anomalous. Refer to the Drawings for individual element results and Section 10 for discussion. Six of seven 20 m spaced soils on a N-S line L 3+00 E from 2+50N to 3+70N are anomalous. Concluding, the soil survey shows there is more gold and gold pathfinder elements Bi Te As Zn Cd Co (marginally) Fe Mn Mo W and Ti in the Lefevre skarn and crosscutting veins than in the formerly mined Bunker Hill quartz veins. Sb is enriched at both. Considering the skarn (and veins?) are intrusion - related (Lefebure et al '99, Lefebure & Cathro '99), gold-specific pathfinders enriched in soils are bismuth tellurium molybdenum and tungsten.

14.5 VLF EM Geophysics

VLF-EM Domains 1 to 3, Fraser - filtered VLF anomalies near the Lefevre skarn trenches (Drawing # 19 and Fig. 5 after Wehrle), form "a moderate, northeast trending, disjointed group on the east and south parts of the grid ... stronger sections of the east group [Domain 1] appear to be spatially associated with the tungsten skarn trenches near L 2+50 N and 3+10 E." (Wehrle '99). Trench outlines are superimposed on Drawing #19 . Domain 2 is an open single-station 15° anomaly at the SE corner of the grid. Domains 1 - 2 form a 290 m long SW-NE anomaly 110 m wide. It is open on the S, E and likely N sides (Drawing # 19 and Fig. 5 after Wehrle). High Fraser - filtered dip angles in the positive teens surround single-digit anomalies. The intrusive contact of the Wallack Ck granitic pluton on the east of the grid is not well defined but total field VLF EM geophysics gives minor anomalies over the skarn.

14.6 VLF EM Interpretation infers a Late Normal Fault

The Lefevre VLF-EM anomaly may be disjointed or dismembered by a fault (a late Tertiary normal fault?) trending 125° across most of the Bunker Hill mine - Lefevre skarn grid. This is the dashed line on Drawings #18 & 19. Offset of the NE part of an originally continuos anomaly would be 50-60 m to the NW. High angle NNW to NNE striking (Einarsen '91a, '91b) sinistral normal faults exist in the district. They transect all earlier structures, including the mid Cretaceous granitic intrusive contact and the granite itself. The normal faults dip about 45° E (Fyles & Hewlett '59) with slip mostly down dip and to the east.[1]

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[1] From underground development of the Reeves lead-zinc orebody, estimates of fault displacement are:
(1) B.L. Fault oriented 170 40 E: dip slip 775', left hand strike-slip 275'

14.7 Summary and Conclusion

Rocks and soils from the Lefevre skarn and crosscutting auriferous quartz veins are geochemically anomalous in gold, bismuth, tellurium, arsenic, zinc, tungsten, molybdenum and manganese. Enrichment in gold corresponds with both bismuth and tellurium enrichment. Elemental gold is not visible. Silver, copper and lead are not anomalous in soils. The Lefevre skarn is a reduced, pyrrhotite-rich pyroxene (actinolite?) - garnet - scheelite tungsten + gold skarn formed at the contact of a Wallack Ck leucocratic granitoid. Sphalerite and arsenopyrite occur in minor quantities and bismuth - telluride minerals in smaller amounts. Elements concentrated are characteristic of a reduced W-Au skarn (Newberry et al. '96) in the intrusion-hosted gold environment (McCoy et al. '96), especially Te and Bi. A late (Tertiary ?) normal fault trending 125° may offset the skarn. Magnetic pyrrhotite in the skarn may respond to a magnetic survey. The steep dip of the host HCA Quartzite-Tuff Unit (83° east; Little '59) toward the intrusive contact is thought to have been advantageous for skarn development.

15 'Blue Quartz' Vein and 'Moly' Trenches

These two narrow trenches are tens of meters long and now mostly infilled. They were not mapped. Two samples from the 'Blue Quartz' vein BH-047 & BH-050 ran 20 and 10 ppb gold. Of 5 rock samples (Drawing # 17) from the 'Moly' trench the highest ran 150 ppb gold, BH-308. Three others ran 35 ppb. Nevertheless both showings apparently are gold bearing. Minor past production is recorded from the 'Blue Quartz' vein: "in the open cut [it] has a thickness of 3 to 8 inches wide and dips at 42° to the south. The footwall is of light coloured quartzite, while the hangingwall is somewhat argillaceous quartzite. There is a marked difference between the attitudes of the bedding planes in the two walls. It is reported that 2.2 tons of ore shipped in 1933, which averaged 0.511 oz. gold per ton and 0.4 oz. silver per ton, came from this cut" (Minister of Mines 1936). "No appreciable mineralization was present in the quartz ..." (Minister of Mines 1933). Grid location is 3 +10 E on L 5 N.

The 'Moly' Trench is 25 m NE of a 10° dip angle VLF-EM anomaly part of Domain 3. The "quartz vein is 40 inches wide striking about N 85° W [095° azimuth] dipping 35° to the N. The footwall country rock is granite ... Samples across 27 and 39 inches both assayed 0.40 oz. gold per ton." (Minister of Mines 1933). "In the granite there is from 1 to 3 1/2 feet of quartz irregularly mineralized with molybdenite, pyrite and some fine black sulphide [sulphosalts?]. This quartz is reported to carry spotty gold values. Some 30 tons of rather low-grade material shipped in 1933 was reported to come principally from cut." (Minister of Mines 1936). The record of an auriferous quartz vein in the granite shows it is also an exploration target.

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(2) O'Donnell Fault oriented 165 45 E: dip slip 1,850', left hand strike-slip 125'
(Fyles & Hewlett '59 p. 60). The left hand 60 m ~ 180' strike-slip map displacement of the Bunker Hill mine - Lefevre skarn grid VLF-EM anomalies is in this range.

16 Yankee Open Cut

16.1 Location, Access and General Description

The Yankee Open Cut (Drawing #17) was found by K. Murray on Aug. 21 1999. Access is by a short flagged trail from a hairpin corner on the Limpid Ck Forestry Road. UTM coordinates are 471620 m E 5434780 m N. It is an old working, previously undocumented. It was blasted level into the north-sloping sidehill for 7.5 m bearing 162°. At its south end the Open Cut is 4 m deep and 1.7 m wide. Two thin, ten - centimeter sized tabular quartz veins are exposed on the left (east) and right (west) walls. The veins are typically mesothermal in character with massive very light grey, partly vuggy quartz. Vugs are mm-sized. Vein contacts are sharp. No incorporated wall rocks were noted. The only sulphide is less than 1 / 2 to a maximum of 2 % pyrite as disseminated, striated mm sized cubes. Vein quartz is commonly rusty - orange due to secondary minerals after pyrite.

16.2 Local Geology

The vein host is white medium to coarse grained [metamorphosed] orthoquartzite. Bedding in the quartzite is 039° 44° SE. Local angular granitoid boulder float occurs about 50 m east of the Open Cut. Above and to the west are outcrops of dark grey quartzitic schist (Line YL1 39W). They are moss covered and once stripped bare. A subcrop of dark grey crenulated schist occurs at YL2 45W. Vein host rocks may be part of the HCA Quartzite - Tuff Unit.

16.3 Yankee Corner Lamprophyre dykes

At Yankee Corner on the Limpid Ck Forestry Road (Drawing #17) two lamprophyre dykes occur in clay altered, soft and friable Wallack Ck granitoid. The lamprophyres are biotite-rich, very soft, medium grey - brown glistening rocks. Contacts are knife-sharp: the northern (uphill road-side) dyke is 1.1 m thick with contacts oriented 016 46 E (upper plane) and 006 48E (lower plane). Pass the corner, lower in elevation to the S, again on the uphill roadside another lamprophyre dyke approx. 1 / 2 m thick is oriented 046 73 E.

16.4 Soil Geochemistry

A flagged grid was established with the origin on line YL3, 3 m NE of the level entrance to the open cut (site on Drawing #17). The baseline trended 180° uphill. Four W to E lines YL1, YL3, YL5 and YL7 were spaced 30 m apart. W. Howard with M. Murray surveyed the lines and collected 15 m interval soils on Aug. 22. Howard worked with D. Wehrle on Sept. 8. 34 soils were analyzed. Only the soil on line YL3 at 30W and its Duplicate No. 3 are slightly high at 25 ppb and 33 ppb Au respectively. Medium orange-brown 'B' horizon soils were taken at 0.6 - 0.8 m depth below an uprooted tree. Gold pathfinders are very so analytical results (Appendix No. 4) are not contoured or gridded. Their positions are apparent on Fig. 4a.

16.5 Rock Geochemistry

Four rocks analyzed for gold gave low values. BH-006 a 90 cm channel sample of the metaquatzite host from the left wall ran 10 ppb Au. BH-029 a 15 cm thick channel sample of the 30 cm plus thick vein on the right (west) wall ran 75 ppb Au. Arsenic was high at 615 ppm As. Two dump samples BH-030 and BH-304 returned < 5 and 150 ppb gold. The latter was sugary quartz with sericite-altered selvages. All rocks had very low gold pathfinders - Bi Te and base metals.

16.6 VLF EM Geophysics

A VLF dip angle survey on four W to E lines YL1, YL3, YL5 and YL7 spaced 30 m apart was performed on Sept. 7 1999 using the Seattle transmitter (Wehrle '99). Measurement stations were every 15 m, mostly W of the baseline (Fig. 4a after Wehrle '99). Raw data is presented in Appendix 1. On the Fraser-filtered map the L3 30W anomalous soil coincides with a very weak one unit anomaly. This EM anomaly is stronger "60 m south of the Yankee open cut. Values are strong only on Line YL7, where the anomaly appears open to the south and east." (Wehrle '99 p. 8). The thin, nonconductive quartz veins exposed in the Open Cut gave no anomaly.

16.7 Yankee Clear Cut Trench

In the very corner of a recent clear-cut, 140 m west of Yankee Open Cut a small half by half m trench was found. Angular pieces of off white to medium grey slightly vuggy quartz occur. Sulphides are uncommon. Host rocks are dark grey extremely silicic and bleached metasediments with gneissic banding, possibly part of the HCA Limestone Unit. The trench is coincident with a VLF EM anomaly: (Fig. 4a) "A northeast trending, 4 line conductor, associated with significant, silicified float occurs 100 m west of the Yankee Open Cut. This conductor is 170 m long, 10 to 40 m wide, is open at both ends and appears to be strengthening to the northeast" (Wehrle '99 p. 7-8).

16.8 Conclusion

Yankee Open Cut uncovers thin, mesothermal - style quartz veins 550 m NNE of Bunker Hill mine Adit No. 1. Of four rocks analyzed the highest gold content is BH-304 a dump sample 150 ppb. Of 34 soils analyzed only one site YL3 at 30W was marginally anomalous in gold at 25 or 33 ppb (a field duplicate). Arsenic is a pathfinder element here. Veins are too thin to be of economic interest. Additional (thin?) veins may occur. Further prospecting may explain the northeast trending, 4 line conductor 100 m to the west underlying Yankee Clear Cut Trench.

17 Kenneth Trench

Kenneth trench was found by M. Murray on Aug. 23 1999. UTM co-ordinates are 471762 m E 5434217 m N. Access is by a short flagged trail bearing SW (225°) for 237 m from a point on the upper Limpid Ck Forestry UTM 471890 m E 5434500 m N. The shallow trench trends 100°, blasted into the side of a low rounded knoll of outcropping granitoid. The knoll is 3 m higher than the surrounding covered land.

For the 5.0 m length of the trench the granitoid is vuggy with very common mm to half - cm sized vugs. These are partly infilled with coarse grained pyrite. Most all sulphides have weathered out forming red-orange limonite boxwork. From the back 1.5 m wide face of the trench three unweathered channel samples were collected. BH-007 was a single 22 X 13 cm piece with 20 % pyrite infilling abundant vugs. BH-008 was a channel sample 23 cm long X 5 X 8 cm with 30 % pyrite and common salmon-pink carbonate (calcite?). It was collected 30 cm below BH-007. At the beginning of the trench, non-porous coarse grained biotite granitoid is extremely altered and dark orange to rust-orange coloured.

17.1 VLF EM Geophysics

A VLF dip angle survey on two W to E lines spaced 30 m apart was performed on Sept. 8 1999 using the Seattle transmitter (Wehrle '99). Measurement stations were every 15 m. Results showed no anomalies; the raw data is presented in Appendix No. 3.

17.2 Conclusion and Significance

No further prospecting is warranted about the Kenneth Trench. Nevertheless, the showing has metallogenetic significance: for portions of the biotite granitoid to be vuggy with local infilled pyrite to tens of percent, hydrothermal fluids must have exsolved on cooling of the granitoid. Certain phases of the Wallack Ck granitoid are evidently important in forming Cretaceous-aged gold - tungsten mineralization in intruded country rocks (Lefebure et al. '99, Lefebure & Cathro '99) especially where deep seated structures occur (Ash et al. '96).

18 Timbered Shaft

18.1 Location, Access and General Description

The Timbered Shaft (Drawing # 17) was found by K. Murray on Sept. 4 1999. UTM coordinates are 472010 m E 5434320 m N. Access is by a short flagged trail east of a widened area on the Limpid Ck Forestry Road. The shaft is 115 m east of a turn-about on the road. The easterly dump pile is 121 m east. The showing is on a knoll about 2 m higher than the surrounding covered ground. The forest is open old growth forest and recently was logged about 200 m north.
The Timbered Shaft is an undocumented old working, a blasted pit dug out for 3 m. It was mapped and rock sampled on Sept. 5 - 6. The shaft is rectangular, about 4 m W-E and 3 m N-S at the surface (Map 2). Walls slope inward to a rock-fall covered base. Five layers of timber were laid along the lower walls. These may have supported a small drift as the dump piles appear too large for the volume of rock removed solely from the shaft (K. Murray, p.c.). Rock exposure is poor in the area. Exposures about the shaft were mapped in detail (Map 2 and Fig. 8). A flagged grid of 5 lines was established with grid origin a picket at the Shaft's NW corner.

18.2 Quartz Vein

A massive, mesothermal-style sulphide-poor off white quartz vein at least 0.7 m thick is poorly exposed just above the N shaft wall and on the ground level 1.6 m north of grid origin (Map 2). The vein was uncovered by hand trenching for 4.2 m bearing 077°. The orientation of the quartz vein is uncertain; the strike is thought to be northeasterly with a moderate SE dip. Fractures internal to the vein are common; they are oriented 089 37 NW. In places the vein incorporates 10 cm sized lenses of the host argillites. Rusty and black (manganese bearing?) sericitized breccia dug out at the vein contact (above the N wall, Map 2) is oriented 046 42 SE. The contact immediately underlies the quartz vein. Disrupted argillite very close to the vein oriented 035 42 SE is another measurement of the contact. The quartz vein evidently formed last, infilling a brittle fracture crosscutting both argillite cleavages and phyllonite shears.

18.3 Geology

The quartz vein host is dark grey to black argillite. It is uncertain if this is part of the Harcourt Ck Assemblage or another stratigraphic group. Outcrops 5.6 m N of the grid origin picket (Map 2) are reddish-brown weathering quartz-mica schist oriented 088 35 S (remeasured at 083 34S). Characteristic of the schist are discontinuous cm-sized intrafolial or concordant quartz segregations with yellow-tan coloured sericitic phyllonite-like selvages. On the property scale the Timbered Shaft is close to intrusive contacts of Wallack Ck leuco-granitoids. The Kenneth trench in granitoid is 270 m SW.

18.4 Shear Zone Structures

The Timbered Shaft is interesting for its occurrence of phyllonites, minor folds in phyllonites and quartz boudins. All these structures formed in a shear zone after the argillite cleavage (Map 2). The phyllonites are cardboard-thin lustrous medium grey green rocks, soft from the development of sericite + chlorite from the original argillite. On the Shaft's S wall ten-cm sized open, gentle folds of phyllonite trend 185° with 43° plunge (Map 2). Mm sized crenulation lineations on the phyllonite trend 194° and plunge 19° on a 067 29 SE shear. Rusty, sulphide-bearing elongate quartz boudins outcrop on the W and prominently on the E shaft wall:

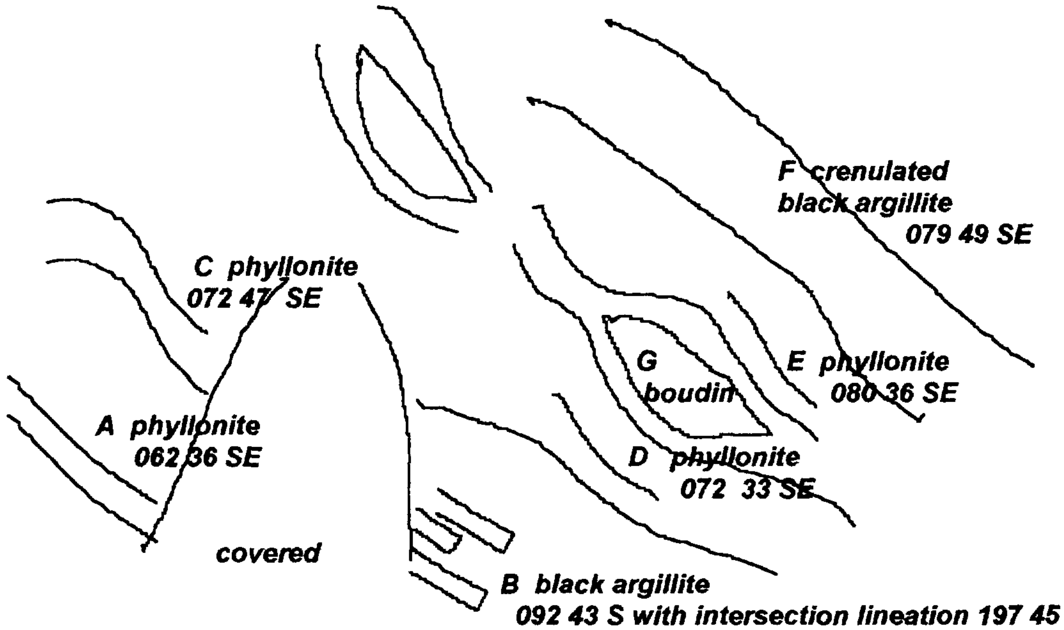

Fig. 8 Sketch of structures on E wall of Timbered Shaft. View about 2.5 m wide

The sulphide-rich boudin at G is 28 cm long and 12 cm wide. Its long axis is oriented 208 32.

18.5 VLF EM Geophysics

A VLF dip angle survey on five N to S lines SL1 - SL5, spaced 30 m apart, was performed on Sept. 7 1999 using the Seattle transmitter (Wehrle '99). Measurement stations were every 15 m (Fig. 4b). Grid origin was 0.5 m W of the Shaft's NW corner on SL3 (Drawing #17 for site, Map 2). Raw data is presented in Appendix 1. "Three significant anomalies occur near the Timbered Shaft showing. Two weak to moderate strength, northeast to east trending anomalies occur 30 m north and south of the Timbered Shaft, respectively. They are approximately 80 m in length, 10 to 30 m in width and appear to be relatively isolated. A third, strong, northeast trending anomaly occurs 100 m southeast of the Timbered shaft. It is at least 40 m long, 40 m in width and is open to the northeast and southwest." (Fig. 4b after Wehrle). The NE anomaly trends correspond to northeasterly striking structures measured about the Timbered Shaft (Map 2).

18.6 Soil Geochemistry

25 selected soils at 15 m spacings were analyzed on two lines SL2 and SL3 (Fig. 4b after Wehrle '99). These were collected by W. Howard Sept. 5, Sept. 6 and with M. Murray on Sept. 15. The highest gold-in-soil value was a low 15 ppb gold on SL3 at 30 N. Pathfinder elements are not enriched. As none of the soils are markedly gold anomalous, they are not contoured or gridded. Sample sites are apparent on Fig. 4b.

18.7 Rock Geochemistry

Three rock samples ran < 5 ppb gold. BH-310 was a 2 cm X 3 cm X 1.5 m channel sample of the hand trenched quartz vein (Map 2). BH-311 was a single 20 cm long bolder from the west shaft wall with about 3 % arsenopyrite and 5 - 10% attached phyllonite wallrock. Sample BH-312 was a single 18 X 12 cm very angular quartz piece also from the west shaft wall with about 1 / 4 % arsenopyrite and 1 % green epidote and red garnet (from incorporation of wallrock slivers?). Dump vein quartz often has attached medium to dark grey green phyllonite wallrock.

18.8 Conclusion and Significance

Three rock samples show the quartz vein is not auriferous at the Timbered Shaft and poor soil results affirm this. The Timbered Shaft is interesting for its occurrence of phyllonites, minor folds in phyllonites and quartz boudins. These structures formed in a shear zone after the argillite cleavage.

19 Leo 'Gold Anomaly'

Corona Corp. on survey line L24 E uphill of picket 7+50 S on the old Bunker Hill mine road (Map 3A) reported several soils enriched in gold and base metals (Gaunt '90). Named Leo, these were collected in an area 150 m SE and uphill of dark grey to black thinly bedded limestone of the HCA Limestone Unit but the bedrock may be different. Seven soils were collected at 20 m intervals from 9+20 S to 10+40 S on L24E. They were analyzed for Au and 30 element ICP; results showed no gold or pathfinder anomalies. Drawing #17 gives the site of the soil line.

20 Hand Steel Trench

Two rock samples BW-107 and BH-108 from this small 1.5 m wide, 2 m long blasted trench had only 2 and 10 ppb Au respectively. Thin, intensely sheared greyish slightly vuggy quartz veins with < 2% dark grey (sulphosalt ?) minerals are hosted by buff, massive quartzite of the Quartzite - Tuff Unit of the lower HCA. Yellow sericitic alteration at the vein contacts is common.

21 Conclusions

The 1999 exploration programme highlights the Lefevre tungsten - gold skarn on the Mormon Girl Crown Grant as a bulk tonnage, low grade gold ore target (Drawing # 20). The skarn is chemically replaced rock at a granitic contact. Gold-bearing Bunker Hill - type quartz veins crosscut the auriferous skarn. A new exploration target, only partially surveyed, is VLF-EM Domain 5 (Drawing #19). Soils from Domain 5 differ geochemically from the Lefevre skarn in having higher Pb and Ag, slightly greater Co but only background Mo and W. Domain 5's greater distance from the intrusive contact may be the reason. Both targets are silver and copper poor.

(1) The mineralization style is Intrusion-Related (McCoy et al. '97, Newberry et al. '97, Lefebure & Cathro '99, Thompson et al. '99) developed "in apexes of middle Cretaceous (mostly 93-86 Ma) reduced plutons and in spatially associated sedimentary and metamorphic rocks. The gold is typically present in and around the tops of intrusions." (McCoy et al. '97)
(2) The Lefevre tungsten - gold skarn is localized by the contact[1] of a mid Cretaceous Wallack Ck leucocratic granitoid, possibly tourmaliniferous (boron - bearing). It is hosted by structurally competent argillaceous metaquartzites and minor grey marble of the lowermost Quartzite - Tuff Unit of the Harcourt Ck Assemblage. The Harcourt Ck Assemblage (Einarsen '95) is a structural division of the upper Paleozoic CS Unit (Little '85, Höy & Dunne '99). Both skarn and crosscutting Bunker Hill - style quartz veins are auriferous. The steep dip of the host rocks (83° east; Little '59) toward the intrusive contact was advantageous for skarn development.
(3) Rocks from the Lefevre skarn and auriferous quartz veins are geochemically anomalous in bismuth, tellurium and tungsten. Zinc and molybdenum are also enriched. As samples with higher gold have greater bismuth and tellurium contents and elemental gold is not visible, the Lefevre skarn has some characteristics of a gold skarn: "The gold in gold skarns is micron size and is generally associated with bismuth-tellurides" (Ray '96).
(4) Soils over and downslope of the Lefevre skarn are enriched in Au Bi Te As Sb Zn Cd Co (marginally) Fe Mn Mo W and Ti. Silver, copper and lead are not enriched.
(5) The Lefevre skarn is a reduced, pyrrhotite-rich pyroxene - garnet - scheelite[2] tungsten + gold skarn. Sphalerite and arsenopyrite are minor, bismuth tellurides are less abundant and chalcopyrite and galena are present in trace amounts. Comparable deposits are tungsten - gold skarns in the Fairbanks, Alaska district (Newberry et al. '97, Newberry '98) or the 'Bismuth - Gold' skarn near the Emerald Tungsten mine, south of Salmo B.C. (Wilton '97, Ray & Webster '98).
(6) Soils infer there is very little silver in the Lefevre skarn. The gold may have high fineness, i.e. little alloyed silver. "Gold-rich skarns are typically ... low in ... silver" (Newberry et al. '97 p. 375).
(7) The Total Field VLF-EM geophysical survey located a replacement-type (skarn?) exploration target away from the intrusive contact. Domain 5 is a prominent multi-station anomaly on the north-central part of the Bunker Hill mine - Lefevre skarn grid, north of Adit 1. It is open on the N side. Fraser - filtered dip angles reach 20° (Wehrle '99).
(8) Domain 5 is a NE-trending target for buried, auriferous replacement-type mineralization away from the intrusive contact. Au Bi Ag Te As Sb Pb Zn Cd Co Fe Mn and Ti are geochemically anomalous in soils. As molybdenum and tungsten are not enriched in soils and lead and silver are, Domain 5 mineralization may differ from the Lefevre tungsten-gold skarn developed at the intrusive contact.

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[1] "Because of the brittle nature of ore-hosting structures, competency contrasts between hosting lithologies control the geometry of plutonic-related deposits." (McCoy et al '97)

(9) Bunker Hill quartz veins and those crosscutting the Lefevre skarn have characteristics typical of mesothermal veins (description of Ash & Alldrick '96). They are tabular fissure-filling veins in competent host rocks. Contacts are sharp. Ore mineralogy is < 2 % triangular pyrite ± gold bearing bismuth - tellurides ± lead - bismuth minerals (galenobismutite?) ± scheelite ± molybdenite (minerals named in Warren & Cummings '37, Little '59, Minister of Mines '36). Vein widths are up to 1.35 meters. Textures are variable: compact, nonporous milky white 'bull' quartz to vuggy, fractured light grey quartz with open-space water-clear coxcomb quartz. Sulphides are sparse, deposited during multiple infilling events. Gold content is greater in veins that are multi-phase, fractured and vuggy.

(10) The sulphide - poor Bunker Hill type quartz veins are not conductive enough to be indicated by the VLF-EM geophysical method used.

(11) Multielement soil geochemistry suggests there is more gold and gold pathfinder elements (bismuth, tellurium, arsenic, zinc, molybdenum, tungsten) in the Lefevre skarn and crosscutting veins than in the Bunker Hill mine quartz veins. Recorded production of the Bunker Hill mine in 6 years from 1933 to 1942 was 3,298 grams gold from 340 tonnes or 9.7 g/t [106 oz. Au from 375 tons or 0.28 oz/ton] (MINFILE 082FSW002).

Wm. R. Howard - Statement of Qualifications

Wm. R. Howard graduated from the University of Alberta with a B.Sc., with distinction, in Geology in 1978. He has attended numerous conferences, field trips and courses on mineral exploration including:

1999 Kamloops Exploration Group K.E.G. Short Course on Intrusion-Related Gold. Kamloops, B.C.

1997 Exploration '97 Fourth Decennial International Conference on Mineral Exploration: Geophysics and Geochemistry at the Millenium. Toronto Ont.

1995 Geological Association of Canada - Mineralogical Association of Canada Joint Annual Meeting, Victoria '95 and Field Trip "Late Paleozoic Arc and Oceanic Terranes and their External Relationships, Southern Quesnellia"

1993 Geological Association of Canada - Mineralogical Association of Canada Joint Annual Meeting, Edmonton '93 and Field Trip "Massive Sulfide and Precious Metal Deposits in Southeastern British Columbia"

Howard has been involved in prospecting in the Canadian Cordillera since 1976 and the Nelson Mining Division since 1988.

Dan Wehrle - Statement of Qualifications

Dan Wehrle of Rossland B.C. is a Professional Geoscientist registered with the Association of Professional Engineers and Geoscientists of British Columbia. He is a 1985 graduate of the University of Saskatchewan with a B.Sc. Honours degree in Geology and has practiced his profession as an Exploration Geologist continuously since 1985.

Ken Murray - Statement of Qualifications

Ken Murray of Nelson B.C. is a long-time prospector of the Nelson Mining Division and southeast B.C. and a past Director of Bluebird Minerals Ltd. and Yellowjack Resources Ltd. He is credited with the discovery of the Katie porphyry copper-gold deposit near Salmo.

Michael Murray - Statement of Qualifications

Michael Murray of Nelson B.C. has prospecting experience in the Nelson Mining Division with Sultan Minerals Ltd. and Bluebird Minerals Ltd. and is a capable field assistant.

Date	Num	Description	Memo	Category	Clr	Amount
		Geochem-Rx				
4/7/99		Superstore	flashlite,pad,plati...	Small Equip't/Ge...	x	-29.45
5/7/99		CanTire	straps,lantern m...	Dispos. Equip/Ge...	x	-7.68
16/7/99		Work World Nels...	glove liners	Dispos. Equip/Ge...	x	-4.52
18/7/99		D. Wehrle	1 day rock sampl...	Labour/Geochem...	x	-160.00
30/7/99		Neville Crosby	rock bags, Al tags	Dispos. Equip/Ge...	x	-27.54
31/7/99		Mtn Equip Coop	pack links	Small Equip't/Ge...	x	-4.72
6/8/99		Neville Crosby	Al tags & markers	Dispos. Equip/Ge...	x	-57.25
11/8/99		Arrow Buliding S...	concrete nails	Dispos. Equip/Ge...	x	-13.33
17/8/99		Shell Nelson	CLY	Car:Gas & Oil/Ge...	x	-18.70
24/8/99		MacDonalds Trail	takeout	Meals/Geochem-...	x	-9.59
24/8/99		K. Murray	2 day prospect / ...	Labour/Geochem...	x	-320.00
4/9/99		K. Murray	1 day sample Ti...	Labour/Geochem...	x	-160.00
14/9/99		W. Howard	7 days field wk	Labour/Geochem...	x	-1,120.00
16/9/99		CanPro	CLY	Car:Gas & Oil/Ge...	x	-10.00
17/9/99		W. Howard	490 km @ 0.19	Mileage/Geoche...	x	-93.10
28/9/99		Loring Labs	#41459	Analytical Fees/G...	x	-729.85
29/9/99		Greyhound	from K.M.	Transport/Geoch...	x	-9.15
		Total Geochem-Rx				-2,774.88
		Geochem-soils				
28/6/99		Ribtor	shovel	Small Equip't/Ge...	x	-20.31
4/7/99		Superstore	insect repellant	Dispos. Equip/Ge...	x	-29.87
8/7/99		Wallmart	propane tank	Small Equip't/Ge...	x	-31.00
17/7/99		Esso Nelson	CLY	Car:Gas & Oil/Ge...	x	-35.48
17/7/99		Work World Nels...	glove liners	Dispos. Equip/Ge...	x	-2.12
30/7/99		Calgary Co-op		Propane/Geoche...	x	-2.68
31/7/99		Ribtor	camp bag	Small Equip't/Ge...	x	-29.92
14/8/99		Shell Nelson	CLY	Car:Gas & Oil/Ge...	x	-31.04
23/8/99		M. Murray	4 days field wk - ...	Labour/Geochem...	x	-400.00
24/8/99		Extra Foods Nels...	paper towels	Dispos. Equip/Ge...	x	-2.05
27/8/99		Revy Calgary	shovel	Small Equip't/Ge...	x	-21.79
6/9/99		Motel	nite in Rossland	Accomodation/G...	x	-42.55
16/9/99		Moyie River Gas	CLY	Car:Gas & Oil/Ge...	x	-20.07
17/9/99		W. Howard	1060 km @ 0.19	Mileage/Geoche...	x	-201.40
28/9/99		Loring Labs	#41427	Analytical Fees/G...	x	-2,950.39
30/10/99		W. Howard	11 days field wk	Labour/Geochem...	x	-1,760.00
30/10/99		W. Howard	2 travel days	Mobilization/Geo...	x	-320.00
26/11/99		Loring Labs	#41617	Analytical Fees/G...	x	-641.26
		Total Geochem-soils				-6,541.93
		Geophys				

Date	Num	Description	Memo	Category	Clr	Amount
16/7/99		Wallmart	tarp	Dispos. Equip/Ge...	x	-12.70
22/7/99		Calgary Co-op		Propane/Geophys	x	-3.75
24/7/99		Greyhound	Sabre VLF-EM	Transport/Geoph...	x	-15.61
24/7/99		Superstore	jug	Small Equip't/Ge...	x	-3.72
27/7/99		Coyote Cafe	/ D. Wehrle	Meals/Geophys	x	-14.50
31/7/99		Ribtor	batteries, repellant	Dispos. Equip/Ge...	x	-11.85
14/8/99		Arrow Buliding S...	washers	Dispos. Equip/Ge...	x	-0.26
24/8/99		Shell Trail	CLY	Car:Gas & Oil/Ge...	x	-20.15
24/8/99		Zellers	CLY	Car:Gas & Oil/Ge...	x	-7.97
26/8/99		Rent-A-Wreck Trail	3 days Aug. 24-26	Truck-rental/Geo...	x	-114.07
26/8/99		D. Wehrle	2 days VLF-EM s...	Labour/Geophys	x	-320.00
27/8/99		Shell Cranbrook	CLY	Car:Gas & Oil/Ge...	x	-24.53
27/8/99		Shell Nelson	CLY	Car:Gas & Oil/Ge...	x	-11.75
4/9/99		Thrifty Gas Erick...	CLY	Car:Gas & Oil/Ge...	x	-24.94
8/9/99		D. Wehrle	2 days VLF-EM s...	Labour/Geophys	x	-320.00
10/9/99		Greyhound	for Sabre VLF-EM	Transport/Geoph...	x	-15.61
13/9/99		Yahk Tire repair	CLY	Car:Gas & Oil/Ge...	x	-19.60
14/9/99		Greyhound	from D.W.	Transport/Geoph...	x	-9.15
14/9/99		Geotronics	Sabre VLF-EM	Rent on Equip/G...	x	-200.00
15/9/99		Greyhound	from D.W.	Transport/Geoph...	x	-6.90
17/9/99		W. Howard	165 km @ 0.19	Mileage/Geophys	x	-31.35
1/10/99		Greyhound	from D.W.	Transport/Geoph...	x	-6.90
5/10/99		Greyhound	from D.W.	Transport/Geoph...	x	-6.90
1/11/99		Greyhound	report from D.We...	Transport/Geoph...	x	-9.15
	Total Geophys					-1,211.36
	Map Geology					
6/6/99		London Drugs	wrap-around saf...	Small Equip't/Ma...	x	-17.10
8/6/99		Ribtor	file,gloves	Dispos. Equip/M...	x	-6.18
9/6/99		Wild Rose Geolo...	small bottle	Dispos. Equip/M...	x	-1.07
14/6/99			cotton tape	Dispos. Equip/M...	x	-12.00
28/6/99		Ribtor	wire, candle	Dispos. Equip/M...	x	-16.54
2/7/99			sunscreen	Dispos. Equip/M...	x	-5.35
16/7/99		Wallmart	sunscreen / repel...	Dispos. Equip/M...	x	-13.42
22/7/99		Staples	pens	Dispos. Equip/M...	x	-5.34
28/7/99		Flamingo Motel C...	in July 28 out Jul...	Accomodation/M...	x	-32.20
27/8/99		W. Howard	2 days @ $160 /d...	Labour/Map Geol...	x	-320.00
6/9/99		Colander	Labour day supper	Meals/Map Geolo...	x	-10.00
8/9/99		Motel	in Salmo	Accomodation/M...	x	-40.25
17/9/99		W. Howard	82 km @ 0.19	Mileage/Map Geo...	x	-15.58
	Total Map Geology					-495.03
	Physical - grid					

CLY Gp Cost Report by Class
1/1/99 Through 31/12/99

1/1'0
CLYGP-CLEL99 PAP

Date	Num	Description	Memo	Category	Clr	Amount
25/6/99		Butler Survey Su...	notebooks,topofi...	Dispos. Equip/Ph...	x	-109.92
2/7/99			stakes	Dispos. Equip/Ph...	x	-9.63
7/7/99		Wallmart	tarp,whistle	Office/Physical - ...	x	-12.27
8/7/99		Butler Survey Su...	flagging	Dispos. Equip/Ph...	x	-149.80
8/7/99		Butler Survey Su...	bear spray	Dispos. Equip/Ph...	x	-30.15
30/7/99		Butler Survey Su...	flagging	Dispos. Equip/Ph...	x	-3.48
23/8/99		M. Murray	4 days field wk	Labour/Physical ...	x	-400.00
15/9/99		M. Murray	2 days field wk	Labour/Physical ...	x	-200.00
17/9/99		W. Howard	165 km @ 0.19	Mileage/Physical ...	x	-31.35
	Total Physical - grid					-946.60
	Transactions - Other					
15/12/99		W. Howard	compiling asses...	Report	x	-400.00
	Total Transactions - Other					-400.00
	OVERALL TOTAL					-12,369.80

Wm Howard

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Appendix N° 1

TIMBERED SHAFT AND YANKEE OPEN CUT
VLF-EM FIELD DATA Dip Angles

TIMBERED SHAFT

Station	Line 1	Line 2	Line 3	Line 4	Line 5
1+05 N		19	27		
0+90 N		23	27		
0+75 N		10	13		
0+60 N	10	0	8	-10	-4
0+45 N	-4	-8	-5	-3	-3
0+30 N	-3	-10	-6	-6	-14
0+15 N	-7	-5	-1	-5	-15
B/L	-5	-2	-1	11	-11
0+15 S	-5	-10	-7	-20	-15
0+30 S	-4	-20	-15	-18	-23
0+45 S	-7	-18	-15	-18	-23
0+60 S	-12	-9	-6	-23	-34
0+75 S	-5	-13	-8	-28	-27
0+90 S	-10	-17	-8	-44	0
1+05 S	-13	-20	-21	-30	16
1+20 S				-10	-7
1+35 S				-1	

YANKEE OPEN CUT

Station	Line 1	Line 3	Line 5	Line 7	
1+05 E	3	3			
0+90 E	5	5			
0+75 E	3	4			
0+60 E	4	3			
0+45 E	4	3			
0+30 E	2	0	1		
0+15 E	2	4	0	2	
B/L	2	3	0	-4	
0+15 W	1	-3	0	13	
0+30 W	1	0	-1	18	
0+45 W	-1	1	1	11	
0+60 W	1	-3	-1	12	
0+75 W	20	-2	-4	6	
0+90 W	14	-2	-10	3	
1+05 W	13	2	-6	1	
1+20 W	11	7	-10	-1	
1+35 W		15	-9	-3	
1+50 W		2	-2	-4	
1+65 W		0	18	-8	
1+80 W			10	-13	
1+95 W			0	-9	
2+10 W			-2	-5	
2+25 W				-10	
2+40 W				-12	

Appendix Nº 2 **BUNKER HILL** MINE - LEFEVRE SKARN GRID

VLF-EM FIELD DATA

Dip Angles

Station	L 2+00 N	L 2+50 N	L 3+00 N	L 3+50 N	L 4+00 N	L 4+50 N	L 5+00 N
B/L	0	-3	-13	-12	7	-6	-16
0+25 E	5	-10	-9	-18	12	0	-16
0+50 E	10	-2	-12	23	19	3	-12
0+75 E	3	-5	-9	-12	11	7	-4
1+00 E	1	-7	-2	-4	8	-2	-4
1+25 E	-6	-2	3	4	12	-9	0
1+50 E	-4	-1	2	8	8	-5	-1
1+75 E	-14	-10	2	-5	14	-4	-3
2+00 E	-18	-18	-7	-12	0	-1	-3
2+25 E	-22	-18	-13	-17	-3	5	3
2+50 E	-23	-28	-14	-15	-4	8	8
2+75 E	-22	-29	-20	-15	-9	5	12
3+00 E	-17	-21	-24	-17	-14	-6	11
3+25 E	-30	-23	-22	-13	-16	-14	10
3+50 E	-32	-28	-25	-11	-11	-16	-7
3+75 E	-21	-34	-20	-14	-13	-15	-13
4+00 E	-23	-25	-10	-11	-14	-4	-7

Appendix N° 3

KENNETH TRENCH – VLF-EM Dip Angles

Kenneth Trench

Station	Line 2	Line 4	
1+05 S	-9	-11	
0+90 S	-11	-13	
0+75 S	-10	-9	
0+60 S	-10	-11	
0+45 S	-10	-11	
0+30 S	-10	-13	
0+15 S	-11	-11	
B/L	-7	-6	
0+15 N	-5	-7	
0+30 N	-4	-4	
0+45 N	-7	-2	
0+60 N	-4	-1	
0+75 N	-4	-1	
0+90 N	0	-4	
1+05 N	0	-1	

Appendix N° 54

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DATE: Sept.13,1999

30 ELEMENT ICP ANALYSIS

"Soil Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	U ppm	V ppm	W ppm	Zn ppm
L2N																														
BL+00E	<5	<0.5	4.06	6	18	216	<1	0.62	1	52	41	39	3.59	0.31	20	0.54	1637	1	0.04	107	0.071	53	4	58	8	0.08	<1	41	<1	128
0+50E	<5	<0.5	3.19	5	18	327	<1	0.99	1	42	41	33	2.95	0.27	21	0.53	1469	1	0.04	109	0.220	35	3	83	6	0.10	<1	38	<1	161
1+00E	<5	<0.5	3.49	5	18	421	<1	0.44	1	60	54	33	3.79	0.29	24	0.77	1999	2	0.04	132	0.203	69	3	70	9	0.10	<1	49	<1	141
1+50E	25	<0.5	3.50	6	18	203	<1	0.66	<1	49	29	37	3.51	0.41	20	0.49	1720	1	0.04	98	0.080	40	1	57	7	0.07	<1	40	<1	86
2+25E	<5	<0.5	3.69	6	17	217	<1	0.70	<1	46	34	37	3.37	0.41	21	0.54	1523	1	0.05	97	0.118	39	2	72	6	0.07	<1	38	<1	85
2+50E	<5	<0.5	3.54	8	20	157	<1	1.35	1	52	20	47	3.70	0.20	23	0.49	2231	1	0.09	98	0.161	42	3	153	8	0.05	<1	30	<1	141
3+00E	<5	<0.5	3.61	17	17	218	<1	0.52	1	48	37	39	3.18	0.28	20	0.53	1278	2	0.04	105	0.072	42	2	37	6	0.09	<1	41	<1	222
3+50E	<5	<0.5	3.14	11	14	146	<1	0.25	<1	46	56	29	3.28	0.30	18	0.63	877	1	0.03	109	0.077	52	3	29	7	0.07	<1	46	<1	110
4+00E	<5	<0.5	3.17	7	15	197	<1	0.35	<1	40	30	25	2.82	0.31	18	0.44	952	2	0.04	81	0.130	43	2	36	6	0.08	<1	34	<1	97
L2+50N																														
BL 0+00E	<5	<0.5	4.10	6	14	185	<1	0.30	<1	46	34	32	3.17	0.39	15	0.59	873	<1	0.03	100	0.069	38	4	39	7	0.08	<1	40	<1	85
0+50E	<5	<0.5	3.41	4	18	229	<1	0.46	<1	41	34	32	2.88	0.27	19	0.46	1405	1	0.05	92	0.099	31	2	46	6	0.09	<1	35	<1	122
1+00E	<5	<0.5	4.15	2	17	300	<1	0.27	<1	59	54	41	4.09	0.36	24	0.69	1400	1	0.04	130	0.096	42	3	59	9	0.10	<1	47	<1	139
1+50E	<5	<0.5	3.60	8	16	280	<1	0.28	<1	42	31	32	3.06	0.29	17	0.47	1128	1	0.05	101	0.246	37	3	49	7	0.09	<1	34	<1	125
2+00E	<5	<0.5	4.26	6	18	194	<1	0.53	1	54	35	46	3.66	0.31	22	0.54	2115	<1	0.04	111	0.069	49	4	49	8	0.08	<1	42	<1	137
2+50E	<5	<0.5	3.13	8	19	189	<1	0.49	<1	51	52	34	3.53	0.30	16	0.67	1251	1	0.04	123	0.091	35	2	44	8	0.07	<1	48	<1	90
3+00E	300	<0.5	3.81	23	<1	219	27	0.33	2	62	35	57	4.84	0.31	25	0.51	2016	15	0.04	111	0.099	49	3	45	12	0.11	<1	39	166	220
3+50E	<5	<0.5	3.33	12	17	340	<1	0.43	2	50	74	24	3.45	0.41	21	0.76	1287	3	0.03	108	0.160	72	2	47	8	0.09	<1	47	2	186
4+00E	10	<0.5	3.63	10	16	271	<1	0.32	<1	45	39	28	3.19	0.32	20	0.53	1131	2	0.04	99	0.088	42	4	35	5	0.09	<1	43	<1	117
L3+00N																														
BL 0+00E	<5	<0.5	3.52	11	15	169	<1	0.21	<1	43	37	27	3.12	0.40	12	0.54	710	1	0.03	95	0.077	35	4	32	6	0.09	<1	41	<1	80
0+50E	<5	<0.5	3.45	7	13	230	<1	0.29	<1	47	47	38	3.40	0.33	17	0.66	725	<1	0.05	111	0.072	33	3	38	7	0.08	<1	47	<1	89
1+00E	<5	<0.5	3.94	6	24	280	<1	0.27	<1	51	44	38	3.63	0.37	21	0.69	801	1	0.05	127	0.113	35	3	48	7	0.10	<1	48	<1	136
1+50E	<5	<0.5	3.94	5	21	233	<1	0.35	<1	41	23	37	2.92	0.25	18	0.45	669	1	0.07	88	0.110	38	5	45	7	0.10	<1	35	<1	75
2+00E	<5	<0.5	4.49	5	15	146	<1	0.40	<1	60	32	56	4.34	0.28	20	0.59	1057	2	0.05	115	0.078	42	5	53	10	0.09	<1	36	<1	93
2+50E	<5	<0.5	3.50	6	30	406	<1	0.93	2	59	99	44	4.03	0.37	27	1.03	2552	1	0.04	136	0.188	39	4	61	10	0.15	<1	46	<1	197
3+00E	30	<0.5	3.58	42	16	188	10	0.71	3	60	41	44	4.23	0.32	26	0.60	3417	6	0.04	145	0.075	39	4	38	11	0.11	<1	43	30	533
3+50E	<5	<0.5	3.97	27	15	260	<1	0.24	2	42	32	28	3.04	0.24	16	0.45	1695	2	0.05	96	0.201	82	3	25	8	0.11	<1	42	5	227
4+00E	<5	<0.5	3.46	21	15	153	<1	0.32	<1	44	43	26	3.18	0.25	15	0.52	763	1	0.03	96	0.129	52	4	30	8	0.09	<1	45	<1	112
L3+50N																														
BL 0+00E	<5	<0.5	2.63	8	13	331	<1	0.34	1	39	35	24	2.70	0.27	12	0.50	942	1	0.04	90	0.256	54	3	45	7	0.07	<1	40	<1	150
0+50E	<5	<0.5	2.96	6	22	317	<1	0.31	1	45	43	25	3.18	0.31	16	0.62	982	<1	0.04	112	0.282	32	3	43	8	0.07	<1	44	<1	165

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30 ELEMENT ICP ANALYSIS

"Soil Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	U ppm	V ppm	W ppm	Zn ppm
L3+50N																														
1+00E	<5	<0.5	3.04	5	22	273	<1	0.36	2	40	41	25	2.84	0.30	17	0.52	848	<1	0.06	97	0.253	33	4	36	7	0.08	<1	37	<1	239
1+50E	<5	<0.5	3.02	7	15	254	<1	0.31	<1	43	35	32	3.08	0.29	13	0.60	708	1	0.04	106	0.152	30	1	40	6	0.08	<1	43	<1	114
2+00E	<5	<0.5	4.01	5	25	181	<1	0.51	1	52	31	43	3.58	0.24	19	0.53	1271	1	0.05	106	0.064	40	4	60	7	0.08	<1	35	<1	128
2+50E"B"	<5	<0.5	3.28	6	26	307	<1	0.43	2	60	105	40	3.74	0.34	17	1.07	1521	2	0.03	142	0.136	33	4	35	11	0.15	<1	48	2	284
2+50E"C"	<5	<0.5	2.93	6	24	227	<1	0.54	1	52	83	33	3.34	0.29	19	0.81	1185	2	0.03	127	0.086	31	3	37	8	0.13	<1	48	1	257
3+00E	15	<0.5	3.37	13	18	225	2	0.77	2	46	40	27	3.20	0.26	21	0.50	2121	2	0.04	108	0.106	37	6	46	8	0.10	<1	44	7	344
3+50E	<5	<0.5	3.73	53	15	303	<1	0.25	3	36	26	27	2.51	0.19	16	0.36	1229	3	0.09	90	0.194	52	4	31	7	0.11	<1	34	<1	249
4+00E	<5	<0.5	3.56	19	25	278	<1	0.25	1	48	44	29	3.36	0.27	15	0.59	1450	2	0.05	118	0.135	47	5	31	8	0.09	<1	44	1	144
L3N1+00E R	<5	<0.5	4.10	7	26	280	<1	0.28	<1	54	47	43	3.72	0.39	21	0.74	823	1	0.05	139	0.118	37	5	52	10	0.11	<1	47	<1	144
STD	<5	1.0	4.43	109	24	37	4	1.79	2	61	84	80	4.78	0.22	22	1.57	652	5	0.35	247	0.045	108	27	87	10	0.07	<1	112	<1	188
BLANK	<5	<0.5	<0.01	<1	<1	<1	<1	<0.01	<1	<1	<1	<1	<0.01	<0.01	<1	<0.01	<1	<1	<0.01	<1	<0.001	<1	<1	<1	<1	<0.01	<1	<1	<1	<1
L4+00N																														
BL 0+00E	<5	<0.5	2.13	9	20	230	<1	0.25	<1	32	41	20	2.13	0.20	12	0.41	611	1	0.03	77	0.187	37	4	23	5	0.07	<1	32	<1	144
0+50E	<5	<0.5	2.43	6	13	223	<1	0.30	<1	34	29	24	2.31	0.24	13	0.44	500	<1	0.05	85	0.214	30	3	28	7	0.08	<1	30	<1	165
1+00E	<5	<0.5	2.57	7	16	220	<1	0.48	<1	40	36	29	2.70	0.42	21	0.53	792	<1	0.03	85	0.222	37	4	48	7	0.07	<1	29	<1	121
1+50E	<5	1.5	4.48	11	18	698	<1	0.94	1	60	35	98	3.87	0.41	43	0.62	1852	2	0.04	153	0.681	52	3	124	10	0.11	<1	38	<1	257
2+00E	<5	0.7	3.81	15	27	407	<1	0.70	2	58	55	95	3.81	0.42	18	0.64	2161	2	0.03	130	0.377	52	2	72	10	0.11	<1	39	<1	189
2+50E	<5	<0.5	3.52	6	18	434	<1	0.73	1	58	99	50	3.74	0.40	24	1.01	1725	1	0.04	157	0.264	39	5	61	9	0.15	<1	48	<1	177
3+00E	<5	<0.5	2.77	7	27	148	<1	0.52	1	49	49	45	3.33	0.22	15	0.67	687	<1	0.03	123	0.073	33	3	38	8	0.09	<1	54	<1	188
3+50E	10	5.8	3.68	14	23	234	<1	0.27	1	46	44	306	3.27	0.23	16	0.49	1566	5	0.05	102	0.228	172	3	28	8	0.10	<1	45	<1	265
4+00E	<5	0.5	3.18	21	25	276	1	0.31	1	51	57	32	3.56	0.24	11	0.61	1930	2	0.03	113	0.177	48	2	31	10	0.09	<1	54	<1	159
L4+50N																														
BL 0+00E	<5	<0.5	3.77	10	36	374	<1	0.56	1	49	38	34	3.32	0.48	13	0.56	1687	2	0.03	99	0.177	59	2	70	9	0.09	<1	38	<1	122
0+50E	10	<0.5	3.77	9	42	310	<1	0.71	1	61	58	48	4.05	0.49	24	1.04	1786	1	0.04	145	0.176	40	2	77	9	0.11	<1	46	<1	155
1+00E	<5	<0.5	3.42	15	46	187	<1	0.47	<1	53	69	47	3.68	0.32	18	0.73	1019	1	0.04	165	0.108	34	1	42	9	0.09	<1	50	<1	137
1+50E	<5	<0.5	4.95	22	53	517	<1	0.35	2	89	43	60	5.64	0.38	45	0.62	2898	3	0.03	185	0.166	72	2	72	14	0.11	<1	58	<1	245
2+00E	<5	<0.5	3.44	15	52	370	<1	0.52	1	59	52	52	3.92	0.26	17	0.63	2132	2	0.03	148	0.123	49	1	99	8	0.09	<1	53	<1	152
2+50E	<5	1.2	2.94	11	46	346	<1	0.54	1	52	48	40	3.53	0.31	16	0.73	1320	1	0.04	137	0.210	37	3	64	9	0.08	<1	50	<1	136
3+00E	<5	1.1	3.42	36	48	251	<1	0.23	1	62	55	166	4.20	0.26	12	0.63	1598	3	0.04	129	0.224	43	1	29	12	0.09	<1	57	<1	168
3+50E	<5	<0.5	3.32	8	46	356	<1	0.48	2	39	42	31	2.73	0.21	14	0.48	1267	2	0.05	99	0.179	36	1	49	8	0.11	<1	44	<1	226
4+00E	<5	<0.5	3.34	11	40	328	<1	0.29	1	47	51	28	3.23	0.22	12	0.51	1853	2	0.04	100	0.314	45	4	30	8	0.10	<1	45	<1	221

Loring Laboratories Ltd.
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Tel: 274-2777 Fax: 275-0541

TO:**BILL HOWARD**
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

FILE:41427

DATE: Sept.13,1999

30 ELEMENT ICP ANALYSIS

"Soil Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	U ppm	V ppm	W ppm	Zn ppm
L5N																														
BL0+00E	<5	<0.5	3.66	6	34	260	<1	0.26	<1	50	63	26	3.41	0.34	13	0.64	1437	1	0.04	132	0.103	37	2	44	7	0.10	<1	51	<1	111
0+50E	<5	<0.5	3.73	7	37	318	<1	0.32	<1	49	66	29	3.35	0.36	16	0.75	1020	1	0.04	129	0.117	35	4	48	9	0.12	<1	46	<1	119
1+00E	<5	<0.5	3.43	14	49	325	<1	0.50	<1	51	61	36	3.44	0.34	20	0.78	1106	1	0.04	134	0.109	38	4	40	9	0.12	<1	48	<1	129
1+50E	<5	0.6	4.30	140	54	465	<1	0.66	2	69	38	49	4.57	0.34	37	0.59	3103	2	0.03	157	0.122	75	1	99	12	0.13	<1	53	<1	274
2+00E	<5	<0.5	3.21	19	50	259	<1	0.49	2	54	43	37	3.46	0.24	17	0.60	2063	1	0.03	136	0.123	54	2	57	8	0.09	<1	48	<1	155
2+50E	25	1.3	2.91	9	52	489	<1	0.86	2	47	37	53	2.79	0.20	19	0.46	2691	1	0.05	155	0.344	48	2	104	10	0.10	<1	34	<1	326
3+00E	<5	<0.5	3.58	12	54	246	<1	0.17	1	65	78	49	4.30	0.29	14	0.94	1343	11	0.03	151	0.119	86	4	30	9	0.11	<1	62	<1	144
3+50E	<5	<0.5	4.23	12	54	221	<1	0.24	1	60	43	50	4.02	0.27	14	0.61	1684	4	0.04	127	0.161	61	3	31	12	0.14	<1	61	<1	136
4+00E	<5	<0.5	3.37	9	52	271	<1	0.21	1	40	45	31	2.81	0.19	11	0.49	1079	2	0.06	94	0.165	41	1	23	8	0.11	<1	50	<1	130
DUP.#4	<5	<0.5	3.72	8	52	324	<1	0.33	<1	50	70	32	3.42	0.38	16	0.78	1030	1	0.05	129	0.110	36	3	49	10	0.13	<1	51	<1	116
YL1																														
0+75W	<5	<0.5	2.90	10	42	713	<1	0.27	<1	40	64	23	2.70	0.22	10	0.57	1891	1	0.05	102	0.390	30	2	34	9	0.11	<1	42	<1	140
0+60W	<5	<0.5	3.04	17	38	652	<1	0.29	<1	43	91	35	2.94	0.31	16	0.94	1177	<1	0.06	128	0.216	30	1	37	10	0.17	<1	52	<1	131
0+45W	<5	<0.5	3.66	45	43	296	<1	0.22	<1	45	51	32	3.04	0.20	13	0.58	1077	1	0.05	107	0.185	37	3	26	7	0.14	<1	54	<1	87
0+30W	<5	2.6	2.64	51	44	258	<1	0.36	1	46	44	41	3.02	0.19	9	0.49	1604	1	0.04	94	0.249	58	2	39	9	0.12	<1	48	<1	136
0+15W	<5	0.7	3.28	38	47	232	<1	0.21	<1	49	49	32	3.19	0.19	12	0.56	1752	1	0.05	102	0.199	48	2	25	9	0.15	<1	57	<1	122
BL 0+00E	<5	<0.5	3.39	18	52	240	<1	0.26	<1	52	57	26	3.31	0.22	10	0.66	1376	1	0.04	125	0.165	40	4	27	9	0.12	<1	54	<1	111
0+15E	<5	<0.5	3.57	11	50	218	<1	0.25	<1	46	52	22	3.19	0.21	11	0.57	1175	1	0.05	113	0.153	39	2	23	10	0.13	<1	54	<1	118
0+30E	<5	<0.5	3.29	9	47	277	<1	0.29	<1	41	50	23	2.81	0.20	11	0.52	1157	1	0.06	102	0.165	39	3	27	7	0.12	<1	48	<1	111
DUP.#3	33	<0.5	3.97	325	45	137	<1	0.14	<1	54	60	47	3.65	0.24	11	0.76	459	2	0.03	159	0.123	36	3	13	8	0.10	<1	55	<1	86
DUP.#4 R	<5	<0.5	3.80	9	48	319	<1	0.33	<1	51	70	34	3.48	0.38	16	0.79	1009	1	0.05	130	0.111	36	4	49	10	0.13	<1	48	<1	116
STD	<5	1.0	4.19	102	52	38	3	1.74	2	58	90	81	4.42	0.20	20	1.49	635	5	0.34	236	0.044	104	25	84	10	0.07	<1	110	<1	172
BLANK	<5	<0.5	<0.01	<1	<1	<1	<1	<0.01	<1	<1	6	<1	<0.01	<0.01	<1	<0.01	<1	<1	<0.01	<1	<0.001	<1	<1	<1	<1	<0.01	<1	<1	<1	<1
YL2																														
75W	<5	<0.5	3.11	8	9	669	<1	0.27	<1	36	41	21	2.40	0.20	11	0.43	765	2	0.05	110	0.461	27	4	40	8	0.10	<1	29	<1	139
60W	<5	<0.5	3.37	27	10	272	<1	0.18	<1	44	39	25	2.85	0.19	10	0.53	829	<1	0.04	103	0.138	36	2	21	8	0.11	<1	45	<1	82
45W	<5	<0.5	2.93	44	11	299	<1	0.20	<1	48	49	19	3.08	0.19	8	0.57	1706	1	0.04	101	0.236	35	2	24	9	0.11	<1	49	<1	115
30W	<5	<0.5	3.44	50	11	286	<1	0.56	<1	45	48	24	2.90	0.18	14	0.56	1307	1	0.05	107	0.129	37	1	49	8	0.13	<1	50	<1	78
15W	<5	<0.5	3.74	61	10	207	<1	0.20	<1	51	49	29	3.22	0.19	11	0.58	1281	1	0.04	114	0.154	36	4	20	7	0.13	<1	53	<1	111
BL 0+00E	<5	<0.5	3.02	28	12	303	<1	0.42	1	48	49	20	3.21	0.20	10	0.60	2027	2	0.04	112	0.197	40	2	37	9	0.11	<1	53	<1	119
15E	<5	<0.5	3.83	17	12	244	<1	0.47	1	56	81	44	3.94	0.30	16	0.97	1834	2	0.04	166	0.126	48	4	33	9	0.09	<1	64	<1	151
30E	<5	<0.5	3.41	14	12	342	<1	0.23	<1	53	73	21	3.69	0.26	10	0.71	1528	1	0.03	149	0.215	43	2	24	8	0.09	<1	60	<1	148

Loring Laboratories Ltd.

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Tel: 274-2777 Fax: 275-0541

TO: **BILL HOWARD**
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

FILE:41427

DATE: Sept.13,1999

30 ELEMENT ICP ANALYSIS

"Soil Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	U ppm	V ppm	W ppm	Zn ppm
YL2																														
45E	15	<0.5	3.59	8	9	250	<1	0.18	<1	37	38	18	2.49	0.16	9	0.40	535	<1	0.06	94	0.145	34	2	22	8	0.12	<1	40	<1	77
YL3																														
75W	<5	<0.5	3.50	17	11	265	<1	0.20	<1	46	52	29	3.07	0.21	12	0.62	1021	1	0.04	116	0.129	32	1	25	8	0.11	<1	50	<1	80
60W	<5	<0.5	3.01	20	9	221	<1	0.16	<1	47	50	21	3.01	0.20	9	0.59	1422	1	0.03	108	0.196	38	2	20	8	0.09	<1	47	<1	108
45W	<5	<0.5	3.45	32	10	221	<1	0.21	<1	47	50	24	2.99	0.18	10	0.58	1280	1	0.04	107	0.143	33	3	23	9	0.11	<1	50	<1	83
30W	25	<0.5	3.76	310	10	123	<1	0.11	<1	51	57	43	3.46	0.23	9	0.71	444	2	0.03	144	0.122	33	2	10	9	0.09	<1	53	<1	84
15W	10	<0.5	2.69	82	10	163	<1	0.09	<1	53	53	28	3.18	0.19	8	0.63	1546	1	0.03	95	0.176	44	4	13	11	0.13	<1	60	<1	108
BL 0+00E	<5	<0.5	2.75	44	9	130	<1	0.07	<1	51	53	26	3.46	0.21	6	0.58	690	2	0.03	106	0.128	31	2	9	10	0.11	<1	57	<1	110
15E	<5	<0.5	3.17	12	9	180	<1	0.10	<1	46	59	29	3.14	0.21	4	0.64	405	<1	0.04	122	0.176	33	3	13	7	0.08	<1	50	<1	110
30E	<5	<0.5	3.66	15	11	164	<1	0.18	<1	53	72	44	3.77	0.24	11	0.73	797	2	0.03	152	0.123	38	4	16	8	0.08	<1	62	<1	121
YL4																														
75W	<5	<0.5	3.36	15	12	228	<1	0.23	<1	49	57	25	3.29	0.20	11	0.64	1205	2	0.04	115	0.158	32	2	25	9	0.11	<1	53	<1	81
60W	<5	<0.5	3.00	14	12	313	<1	0.28	<1	46	54	27	3.09	0.21	10	0.61	1533	2	0.04	111	0.165	35	3	29	8	0.10	<1	48	<1	84
45W	<5	<0.5	3.37	16	12	274	<1	0.28	<1	48	53	28	3.23	0.20	12	0.64	1251	2	0.04	116	0.125	33	2	32	9	0.11	<1	57	<1	81
30W	<5	<0.5	3.57	47	11	213	<1	0.16	<1	55	59	33	3.58	0.20	12	0.72	1339	2	0.04	96	0.203	35	4	16	10	0.15	<1	61	<1	110
BL 0+00E	<5	<0.5	2.94	7	10	174	<1	0.14	<1	43	50	20	3.03	0.19	6	0.57	652	1	0.04	108	0.134	27	5	16	7	0.09	<1	50	<1	111
15E	<5	<0.5	2.80	5	9	258	1	0.20	<1	36	35	17	2.47	0.17	7	0.43	1041	1	0.05	94	0.172	27	2	21	7	0.09	<1	37	<1	130
30E	<5	<0.5	2.74	7	10	215	<1	0.43	<1	36	39	20	2.51	0.16	11	0.41	1165	1	0.04	94	0.180	26	<1	29	8	0.09	<1	40	<1	86
45E	<5	<0.5	3.25	7	10	194	<1	0.23	<1	36	32	22	2.49	0.16	13	0.42	650	2	0.05	92	0.111	30	3	20	7	0.10	<1	38	<1	115
BH-041	4350	2.5	2.98	10	11	326	128	0.67	<1	50	53	30	3.38	0.43	15	0.51	853	3	0.02	106	0.446	45	1	52	20	0.07	<1	32	<1	165
BH-045	10	0.9	3.86	18	10	123	1	0.24	<1	49	45	71	3.32	0.39	15	0.48	477	2	0.06	108	0.192	44	2	26	9	0.11	<1	38	<1	170
YL3 15E R	<5	<0.5	3.09	11	10	176	<1	0.10	<1	45	59	26	3.13	0.20	5	0.62	384	1	0.04	121	0.171	31	5	11	6	0.08	<1	50	<1	107
STD	<5	1.1	4.24	112	11	33	4	1.67	2	56	87	74	4.57	0.21	18	1.43	630	5	0.34	227	0.043	111	24	74	10	0.06	<1	119	<1	169
BLANK	<5	<0.5	<0.01	<1	<1	<1	<1	<0.01	<1	<1	<1	<1	<0.01	<0.01	<1	<0.01	<1	<1	<0.01	<1	<0.001	<1	<1	<1	<1	<0.01	<1	<1	<1	<1

0.500 Gram sample is digested with Aqua Regia at 95 C for one hour and bulked to 10 ml with distilled water.
Partial dissolution for Al, B, Ba, Ca, Cr, Fe, K, La, Mg, Mn, Na, P, Sr, Ti, and W

Certified by: [signature]

Loring Laboratories Ltd.

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Tel: 274-2777 Fax: 275-0541

TO: BILL HOWARD
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

FILE: 41427

DATE: Sept.13,1999

GEOCHEMICAL ANALYSIS

Sample No.	Au ppb	Bi ppm	Te ppm
BH-006	10	<1	1
BH-007	<5	2	2
BH-008	<5	2	2
BH-022	4325	93	6
BH-041	15840	353	27
BH-045	3200	330	12
BH-046	5075	53	4
BH-047	20	4	1
BH-049	<5	<1	1
BH-050	10	75	20
BH-051	60	11	2
BH-052	35	6	1
BH-108	10	11	4
BH-112	300	14	2
BH-113	1825	45	3
BH-114	2545	114	5
BH-115	200	13	5
BH-301	35	3	1
BH-302	30	1	<1
BH-303	<5	<1	2
BH-304	150	1	<1
BH-305	<5	1	1
BH-306	29760	1150	92
BH-308	150	8	1
BH-309	35	4	<1
BW-01	<5	<1	3
BW-0107	<5	7	5
BW-0109	6710	453	16
BW-0110	1156	104	10
BW-0111	675	46	9

Gravimetric fire assays are recommended for samples with gold values over 1000 ppb.

Certified by: [signature]

Loring Laboratories Ltd.
629 Beaverdam Road N.E.
Calgary, Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

FILE:41427

TO:**BILL HOWARD**
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

DATE: Sept.13,1999

30 ELEMENT ICP ANALYSIS

"Rock Samples"

Sample No.	Ag ppm	Al %	As ppm	Au ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	U ppm	V ppm	W ppm	Zn ppm
BH-022	1.0	0.03	9	<5	23	8	93	0.01	<1	40	175	50	2.97	0.01	2	<0.01	85	33	0.01	66	0.010	5	<1	1	6	<0.01	<1	7	<1	9
BH-041	1.6	0.04	7	<5	20	16	353	0.01	<1	9	147	17	0.61	0.02	2	0.01	7	14	0.01	18	0.009	21	1	2	27	<0.01	<1	6	5	8
BH-114	0.5	0.53	5	<5	<1	30	114	0.19	<1	21	70	38	1.69	0.30	7	0.04	3061	69	0.03	21	0.013	19	2	3	5	0.02	<1	9	337	4
BH-306	2.9	<0.01	13	<5	27	5	1150	0.07	<1	6	180	141	0.36	<0.01	<1	<0.01	39	2	0.01	13	0.002	60	4	2	92	<0.01	<1	6	5	8
BW-0109	1.4	0.21	<1	<5	6	9	453	0.07	<1	20	179	60	1.54	0.07	5	0.07	348	13	0.02	33	0.009	41	3	5	16	0.01	<1	11	127	5

0.500 Gram sample is digested with Aqua Regia at 95 C for one hour and bulked to 10 ml with distilled water.
Partial dissolution for Al, B, Ba, Ca, Cr, Fe, K, La, Mg, Mn, Na, P, Sr, Ti, and W

Certified by: [signature]

Loring Laboratories Ltd.

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FILE:41459

TO:**BILL HOWARD**
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

DATE: Sept.23,1999

30 ELEMENT ICP ANALYSIS

"Soil and Rock Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	Se ppm	V ppm	W ppm	Zn ppm
SL2 90S	<5	<0.5	3.15	19	36	174	1	0.64	<1	71	18	48	4.48	0.16	30	0.40	1364	2	0.06	155	0.055	58	<1	72	14	0.07	<1	27	<1	123
SL2 75S	<5	<0.5	4.01	17	30	195	<1	0.23	<1	61	27	38	3.73	0.20	18	0.47	1095	2	0.05	148	0.118	46	2	25	12	0.11	<1	47	<1	151
SL2 60S	<5	<0.5	3.89	11	35	249	1	0.35	<1	54	25	33	3.22	0.19	25	0.43	2128	2	0.05	134	0.114	42	<1	41	15	0.14	<1	45	<1	151
SL2 45S	5	<0.5	3.37	11	33	220	2	0.32	<1	60	33	38	3.38	0.20	24	0.51	1581	2	0.04	156	0.070	42	<1	36	13	0.10	<1	43	<1	129
SL2 30S	<5	<0.5	3.81	16	37	229	1	0.53	<1	64	37	31	3.76	0.19	23	0.50	2529	2	0.04	157	0.092	49	2	50	14	0.11	<1	41	<1	139
SL2 15S	<5	<0.5	4.47	9	33	177	3	0.32	<1	62	27	33	3.57	0.18	18	0.44	1933	2	0.05	151	0.093	50	2	37	16	0.15	<1	45	<1	133
SL2 BL	<5	<0.5	3.79	15	36	172	2	0.51	<1	63	19	47	3.67	0.16	22	0.34	2162	3	0.05	146	0.109	62	1	44	15	0.14	<1	34	<1	150
SL2 15N	<5	<0.5	3.94	14	34	337	2	0.38	<1	64	61	41	3.62	0.21	21	0.77	2133	1	0.04	172	0.131	43	<1	36	17	0.14	<1	50	<1	158
SL2 30N	<5	<0.5	3.80	15	38	377	1	0.39	1	77	59	48	4.07	0.19	20	0.77	3448	2	0.03	183	0.257	44	<1	39	14	0.14	<1	49	<1	194
SL2 45N	5	<0.5	4.04	12	28	231	1	0.22	<1	69	37	46	3.84	0.18	23	0.55	1700	2	0.04	166	0.127	43	<1	26	14	0.11	<1	47	<1	137
SL2 60N	<5	<0.5	4.59	15	52	202	2	0.27	<1	78	39	48	4.12	0.19	22	0.57	1417	2	0.05	211	0.160	46	<1	28	17	0.15	<1	55	<1	171
SL3 105S	<5	<0.5	4.71	13	35	185	1	0.30	<1	60	34	35	3.38	0.26	25	0.46	1423	2	0.06	143	0.159	48	2	35	15	0.15	<1	46	<1	91
SL3 90S	<5	<0.5	3.93	14	37	280	<1	0.44	1	62	28	28	3.33	0.23	21	0.45	2165	2	0.05	142	0.166	46	<1	51	13	0.15	<1	47	<1	126
SL3 75S	<5	<0.5	4.12	14	38	283	<1	0.33	1	63	37	36	3.62	0.23	25	0.51	1653	1	0.04	159	0.090	47	<1	35	15	0.14	<1	49	<1	158
SL3 60S	<5	<0.5	4.30	14	38	185	3	0.24	<1	72	43	50	4.17	0.22	29	0.57	1039	2	0.04	173	0.061	48	<1	26	14	0.12	<1	51	<1	137
SL3 45S	<5	<0.5	4.42	13	39	206	<1	0.38	<1	68	32	52	3.78	0.19	32	0.49	2079	2	0.05	154	0.087	49	<1	36	16	0.14	<1	45	<1	97
SL3 30S	<5	<0.5	4.35	12	37	222	2	0.39	<1	70	38	50	3.96	0.20	29	0.51	2059	2	0.05	164	0.120	47	1	44	15	0.14	<1	46	<1	132
SL3 15S	<5	<0.5	4.42	11	38	289	2	0.43	<1	63	25	52	3.54	0.18	29	0.39	3311	2	0.06	145	0.128	47	1	50	15	0.15	<1	44	2	156
SL3 15N	<5	<0.5	4.89	14	29	225	<1	0.45	<1	81	35	62	4.30	0.18	28	0.59	2205	2	0.05	195	0.106	63	<1	52	18	0.15	<1	43	<1	153
SL3 30N	15	<0.5	4.73	7	30	444	8	0.38	<1	74	99	40	3.74	0.23	18	1.64	1356	2	0.05	225	0.100	41	2	41	19	0.22	<1	55	<1	134
SL3 45N	<5	<0.5	4.39	7	39	339	6	0.26	<1	69	89	33	3.63	0.18	18	1.32	1619	1	0.06	203	0.076	42	2	31	16	0.21	<1	55	<1	164
SL3 60N	<5	<0.5	4.95	10	49	222	8	0.33	<1	68	69	35	3.67	0.19	20	1.04	1308	2	0.07	183	0.135	43	<1	33	17	0.21	<1	53	3	134
SL3 75N	<5	<0.5	4.42	10	42	246	<1	0.34	<1	62	42	37	3.33	0.18	15	0.55	699	1	0.07	158	0.127	41	<1	32	15	0.17	<1	47	<1	150
SL3 90N	<5	<0.5	4.85	8	41	292	<1	0.31	<1	57	23	25	3.14	0.17	16	0.30	2451	2	0.08	131	0.252	41	<1	36	16	0.18	<1	40	<1	193
SL3 105N	<5	<0.5	4.46	10	39	284	<1	0.27	<1	46	23	23	2.57	0.15	16	0.25	2100	2	0.09	112	0.163	39	<1	30	12	0.19	<1	39	<1	201
BH-029	75	<0.5	0.30	615	26	71	2	0.03	<1	28	85	13	1.61	0.17	6	0.07	97	4	0.05	54	0.009	19	<1	4	4	0.01	<1	6	<1	11
BH-030	<5	<0.5	0.89	8	34	60	<1	0.07	<1	41	121	48	2.39	0.16	9	0.30	193	2	0.03	80	0.021	11	<1	7	5	0.01	<1	16	<1	18
BH-310	<5	<0.5	0.11	1	46	14	2	0.01	<1	16	147	9	0.86	0.01	2	0.04	139	8	0.02	34	0.009	4	<1	3	<1	<0.01	<1	3	<1	10
BH-311	<5	<0.5	0.41	<1	20	20	<1	0.31	<1	68	98	44	3.39	0.05	5	0.21	377	4	0.04	147	0.004	6	<1	13	8	<0.01	<1	4	<1	18
BH-312	<5	<0.5	0.20	<1	27	7	<1	0.83	1	52	99	40	2.53	0.01	10	0.16	663	9	0.05	108	0.004	10	<1	30	3	<0.01	<1	2	<1	231
BH-314	1225	0.6	2.59	<1	<1	46	100	1.86	<1	130	55	143	9.57	0.92	45	0.94	9317	4	0.10	235	0.042	17	<1	52	31	0.10	<1	23	435	35
BH-315	9100	1.3	0.14	<1	48	3	464	0.10	<1	19	114	42	1.09	0.02	5	0.02	947	3	0.03	33	0.004	3	<1	1	31	<0.01	<1	2	137	5
SL3 90S-R	<5	<0.5	4.17	15	55	291	2	0.45	1	64	31	30	3.47	0.24	23	0.48	2225	2	0.05	142	0.171	47	<1	53	15	0.15	<1	46	4	131

Gold analyzed by fire assay/A.A.
0.500 Gram sample is digested with Aqua Regia at 95 C for one hour and bulked to 10 ml with distilled water.
Partial dissolution for Al, B, Ba, Ca, Cr, Fe, K, La, Mg, Mn, Na, P, Sr, Ti, and W

Certified by: [signature]

Loring Laboratories Ltd.

629 Beaverdam Road N.E.
Calgary, Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

TO: **BILL HOWARD**
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

FILE:41617

DATE: Nov.23,1999

30 ELEMENT ICP ANALYSIS

"Soil Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	Se ppm	V ppm	W ppm	Zn ppm
L2N 1+75E	<5	<0.5	4.38	5	29	221	7	0.60	1	60	35	40	3.56	0.40	23	0.58	1835	<1	0.06	148	0.061	55	12	52	13	0.07	<1	44	<1	95
L2+50N 2+75E	10	<0.5	4.35	7	25	321	7	0.51	3	51	53	32	3.18	0.34	19	0.65	1276	1	0.09	162	0.090	50	12	49	14	0.11	<1	46	<1	442
L2+50N 3+25E	25	<0.5	3.90	19	24	232	8	0.30	2	55	70	22	3.51	0.35	18	0.79	1030	2	0.05	155	0.105	101	13	34	13	0.10	<1	60	<1	223
L3N 2+75E	65	<0.5	4.63	20	29	296	13	0.60	3	61	51	47	3.74	0.37	31	0.70	2574	3	0.07	165	0.067	54	13	43	14	0.12	<1	51	13	450
L3N 3+20E	75	<0.5	4.31	72	25	436	15	0.43	2	69	82	53	4.22	0.40	34	0.93	2928	1	0.06	172	0.115	71	13	64	12	0.14	<1	65	15	191
L3+50N 2+75E	55	<0.5	3.72	9	24	252	15	0.55	3	49	39	37	3.16	0.32	27	0.54	1561	<1	0.07	148	0.089	47	12	40	11	0.10	<1	44	14	344
L3+50N 3+25E	5	<0.5	4.11	38	35	288	8	0.26	2	43	38	26	2.86	0.25	19	0.50	1207	<1	0.11	138	0.158	51	12	25	10	0.12	<1	46	<1	308
L4N 1+75E	10	<0.5	4.16	13	26	361	8	0.65	2	60	51	38	3.56	0.46	20	0.60	1722	<1	0.06	164	0.398	59	13	53	8	0.12	<1	48	<1	214
L4N 3+25E	<5	<0.5	3.48	8	26	249	8	0.52	2	43	51	20	2.95	0.27	17	0.55	1360	<1	0.07	150	0.156	64	12	38	6	0.08	<1	45	<1	456
L4N 3+75E	<5	<0.5	3.83	15	25	298	7	0.25	1	42	48	21	2.73	0.25	14	0.51	1085	<1	0.12	140	0.180	48	10	26	8	0.11	<1	46	<1	119
L4+50N 1+75E	15	<0.5	5.04	15	25	564	7	0.25	2	82	56	42	4.95	0.42	38	0.70	1139	1	0.06	232	0.147	82	13	51	10	0.12	<1	60	<1	221
L4+50N 2+25E	<5	<0.5	3.28	12	30	316	8	0.33	2	63	70	27	3.81	0.37	17	0.87	1376	<1	0.05	187	0.175	58	12	42	12	0.08	<1	67	<1	129
L4+50N 2+75E	<5	<0.5	3.21	22	14	425	5	0.70	3	59	40	24	3.01	0.28	18	0.57	1747	2	0.06	120	0.297	87	5	76	13	0.09	<1	46	<1	213
L5N 1+25E	10	<0.5	3.86	36	12	326	4	0.82	2	62	44	27	3.22	0.30	22	0.60	1374	2	0.06	145	0.330	63	5	69	14	0.09	<1	42	<1	227
L5N 1+75E	<5	<0.5	4.53	25	12	579	5	0.34	2	72	24	27	3.96	0.33	30	0.66	1908	2	0.06	159	0.167	55	4	61	16	0.12	<1	56	<1	199
L5N 2+25E	<5	<0.5	2.92	11	13	271	3	0.59	1	57	34	22	3.07	0.26	17	0.59	1549	2	0.05	131	0.128	40	2	56	12	0.08	<1	58	<1	106
L5N 2+75E	<5	<0.5	3.86	12	13	225	4	0.19	1	86	59	41	4.08	0.29	14	0.70	2010	8	0.05	159	0.175	71	5	28	11	0.11	<1	65	<1	176
L3+00E 2+50N	270	<0.5	3.99	24	<1	248	32	0.33	2	73	29	55	4.33	0.29	25	0.49	2149	14	0.06	121	0.110	64	5	38	9	0.11	<1	40	142	230
L3+00E 2+70N	160	<0.5	3.97	20	11	242	10	0.65	4	59	36	40	3.09	0.26	26	0.55	2575	8	0.06	112	0.113	52	5	38	10	0.10	<1	39	20	393
L3+00E 2+90N	235	<0.5	4.38	49	6	268	18	0.37	2	71	43	50	3.99	0.43	33	0.74	1794	4	0.05	130	0.059	54	4	41	9	0.12	<1	49	32	184

Loring Laboratories Ltd.

629 Beaverdam Road N.E.
Calgary, Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

TO: **BILL HOWARD**
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

FILE:41427

DATE: Dec.23,1999

ICP ANALYSIS

"Soil Samples"

Sample No.	Bi ppm
L2+50N 2+50E	3
L2+50N 3+50E	4
L2N 2+50E	5
L3N 2+50E	4
L3N 3+50E	4
L4N 3+50E	6
L4+50N 2+00E	3
L4+50N 2+50E	3
L5N 1+50E	5
L5N 2+00E	3
L5N 2+50E	3

Certified by: ________

Loring Laboratories Ltd.

629 Beaverdam Road N.E.
Calgary, Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

FILE:41617

TO:BILL HOWARD
215 Silvermead Cr. N.W.
Calgary, Alberta
T3B 3W4

DATE: Nov.23,1999

30 ELEMENT ICP ANALYSIS

"Soil Samples"

Sample No.	Au ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	Sb ppm	Sr ppm	Te ppm	Ti %	Se ppm	V ppm	W ppm	Zn ppm
L3+00E 3+10N	55	<0.5	3.73	76	20	219	17	0.65	3	73	35	34	3.93	0.30	27	0.54	3229	7	0.06	144	0.106	52	5	48	9	0.11	<1	40	43	412
L3+00E 3+30N	15	<0.5	3.83	30	14	161	6	0.65	2	63	31	28	3.25	0.25	16	0.55	1373	4	0.05	126	0.091	50	5	39	11	0.10	<1	45	3	377
L3+00E 3+50N	65	<0.5	3.57	12	35	210	11	0.42	2	60	22	26	3.18	0.28	18	0.57	2048	6	0.06	117	0.089	46	3	33	8	0.09	<1	46	15	220
L3+00E 3+70N	<5	<0.5	3.32	12	12	200	5	0.32	1	54	40	17	2.96	0.29	13	0.57	1225	2	0.06	115	0.120	41	5	24	14	0.09	<1	46	<1	222
L24E 90+20S	<5	<0.5	3.03	7	10	491	3	0.20	1	51	63	15	2.70	0.27	13	0.71	1294	2	0.07	113	0.254	51	3	25	12	0.12	<1	39	<1	100
L24E 90+40S	<5	<0.5	4.02	3	9	635	4	0.32	<1	59	77	18	3.18	0.51	18	0.95	732	2	0.08	154	0.201	45	5	48	12	0.17	<1	48	<1	85
L24E 90+60S	<5	<0.5	3.17	6	12	571	4	0.31	1	50	34	14	2.73	0.32	19	0.58	1934	1	0.07	102	0.291	72	3	43	13	0.11	<1	38	<1	103
L24E 90+80S	<5	<0.5	3.39	11	12	306	4	0.34	1	46	24	15	2.41	0.24	15	0.43	1737	2	0.08	102	0.235	51	3	40	11	0.10	<1	34	<1	106
L24E 10+00S	<5	<0.5	3.60	14	12	286	5	0.33	3	52	23	20	2.73	0.24	15	0.46	2216	3	0.07	115	0.200	99	4	32	12	0.09	<1	37	<1	269
L24E 10+20S	<5	<0.5	3.13	16	15	266	3	0.75	7	53	37	21	2.77	0.25	16	0.55	1473	2	0.06	112	0.169	77	5	50	11	0.08	<1	40	<1	427
L24E 10+40S	<5	<0.5	3.27	12	13	301	4	0.65	5	50	35	20	2.69	0.25	19	0.51	1376	3	0.07	113	0.282	47	5	51	11	0.09	<1	44	<1	353
L5N 2+25E-R	<5	<0.5	2.88	10	31	258	4	0.59	1	58	37	21	3.06	0.26	16	0.59	1509	2	0.05	131	0.129	40	4	56	11	0.08	<1	55	<1	106

0.500 Gram sample is digested with Aqua Regia at 95 C for one hour and bulked to 10 ml with distilled water.
Partial dissolution for Al, B, Ba, Ca, Cr, Fe, K, La, Mg, Mn, Na, P, Sr, Ti, and W

Certified by:

EAST	NORTH	PEGNU	LINE	LOCAL	LOCAL	Au_ppt	Ag_ppn	Al_percent	As_ppn	B_ppn	Ba_ppn	Bi_ppm	Ca_percent	Cd_ppn	Co_ppn	Cr_ppm	Cu_ppn	Fe_percent
471,313.36	5,434,388.22	67	5	0+00E	L5+00N	2	0.2	3.66	6	34.2	260	0.5	0.26	0.5	50	63	25	3.41
471,363.36	5,434,388.22	68	5	0+50E	L5+00N	2	0.2	3.73	7	37.3	318	0.5	0.32	0.5	49	66	29	3.35
471,413.36	5,434,388.22	69	5	1+00E	L5+00N	2	0.2	3.43	14	48.6	325	0.5	0.50	0.5	51	61	36	3.44
471,438.36	5,434,388.22	70	5	1+25E	L5+00N	10	0.2	3.86	36	11.6	326	3.7	0.82	1.8	62	44	27	3.22
471,463.36	5,434,388.22	71	5	1+50E	L5+00N	2	0.6	4.30	140	54.2	465	5.0	0.66	2.1	69	38	49	4.57
471,488.36	5,434,388.22	72	5	1+75E	L5+00N	2	0.2	4.53	25	11.9	579	4.5	0.34	1.7	72	24	27	3.96
471,513.36	5,434,388.22	73	5	2+00E	L5+00N	2	0.2	3.21	19	50.5	259	3.0	0.49	1.6	54	43	37	3.46
471,538.36	5,434,388.22	74	5	2+25E	L5+00N	2	0.2	2.92	11	12.9	271	2.9	0.59	1.3	57	34	22	3.07
471,563.36	5,434,388.22	75	5	2+50E	L5+00N	25	1.3	2.91	9	52.0	489	3.0	0.86	2.4	47	37	53	2.79
471,588.36	5,434,388.22	76	5	2+75E	L5+00N	2	0.2	3.86	12	12.5	225	4.2	0.19	1.3	86	59	41	4.08
471,613.36	5,434,388.22	77	5	3+00E	L5+00N	2	0.2	3.58	12	54.4	246	0.5	0.17	1.2	65	78	49	4.30
471,663.36	5,434,388.22	78	5	3+50E	L5+00N	2	0.2	4.23	12	53.8	221	0.5	0.24	1.3	60	43	50	4.02
471,713.37	5,434,388.22	79	5	4+00E	L5+00N	2	0.2	3.37	9	52.4	271	0.5	0.21	1.0	40	45	31	2.81
471,313.36	5,434,338.22	55	5	0+00E	L4+50N	2	0.2	3.77	10	36.4	374	0.5	0.56	1.4	49	38	34	3.32
471,363.36	5,434,338.22	56	5	0+50E	L4+50N	10	0.2	3.77	9	41.7	310	0.5	0.71	1.4	61	58	48	4.05
471,413.36	5,434,338.22	57	5	1+00E	L4+50N	2	0.2	3.42	15	46.3	187	0.5	0.47	0.5	53	69	47	3.68
471,463.36	5,434,338.22	58	5	1+50E	L4+50N	2	0.2	4.95	22	52.7	517	0.5	0.35	1.6	89	43	60	5.64
471,488.36	5,434,338.22	59	5	1+75E	L4+50N	15	0.2	5.04	15	25.3	564	7.2	0.25	1.6	82	56	42	4.95
471,513.36	5,434,338.22	60	5	2+00E	L4+50N	2	0.2	3.44	15	52.4	370	3.0	0.52	1.4	59	52	51	3.92
471,538.36	5,434,338.22	61	5	2+25E	L4+50N	2	0.2	3.28	12	30.2	316	8.0	0.33	1.7	63	70	27	3.81
471,563.36	5,434,338.22	62	5	2+50E	L4+50N	2	1.2	2.94	11	46.1	346	3.0	0.54	1.0	52	48	40	3.53
471,588.36	5,434,338.22	63	5	2+75E	L4+50N	2	0.2	3.21	22	13.5	425	4.8	0.70	2.9	59	40	24	3.01
471,613.36	5,434,338.22	64	5	3+00E	L4+50N	2	1.1	3.42	36	47.7	251	0.5	0.23	1.0	62	54	166	4.20
471,663.36	5,434,338.22	65	5	3+50E	L4+50N	2	0.2	3.32	8	45.5	356	0.5	0.48	1.5	39	42	31	2.73
471,713.37	5,434,338.22	66	5	4+00E	L4+50N	2	0.2	3.34	11	40.0	328	0.5	0.29	1.4	47	51	28	3.23
471,363.36	5,434,288.22	44	4	0+50E	L4+00N	2	0.2	2.43	6	12.7	223	0.5	0.30	0.5	34	29	24	2.31
471,413.36	5,434,288.22	45	4	1+00E	L4+00N	2	0.2	2.57	7	15.5	220	0.5	0.48	0.5	40	36	29	2.70
471,463.36	5,434,288.22	46	4	1+50E	L4+00N	2	1.5	4.48	11	17.8	698	0.5	0.94	1.5	60	35	98	3.87
471,488.36	5,434,288.22	47	4	1+75E	L4+00N	10	0.2	4.16	13	26.4	361	8.2	0.65	1.8	60	51	38	3.56
471,513.36	5,434,288.22	48	4	2+00E	L4+00N	2	0.7	3.81	15	26.6	407	0.5	0.70	1.6	58	55	95	3.81
471,563.36	5,434,288.22	49	4	2+50E	L4+00N	2	0.2	3.52	6	18.5	434	0.5	0.73	1.3	58	99	50	3.74
471,613.36	5,434,288.22	50	4	3+00E	L4+00N	2	0.2	2.77	7	26.6	148	0.5	0.52	1.2	49	49	45	3.33
471,638.36	5,434,288.22	51	4	3+25E	L4+00N	2	0.2	3.48	8	26.3	249	8.4	0.52	2.3	43	51	20	2.95
471,663.36	5,434,288.22	52	4	3+50E	L4+00N	10	5.8	3.67	14	23.5	234	6.0	0.27	1.2	46	44	306	3.27
471,688.36	5,434,288.22	53	4	3+75E	L4+00N	2	0.2	3.83	15	24.6	298	7.3	0.25	1.3	42	48	21	2.73
471,713.37	5,434,288.22	54	4	4+00E	L4+00N	2	0.5	3.18	21	25.2	276	1.2	0.31	1.2	51	57	32	3.56
471,313.36	5,434,238.22	33	4	0+00E	L3+50N	2	0.2	2.63	8	13.1	331	0.5	0.34	1.3	39	35	24	2.70
471,363.36	5,434,238.22	34	4	0+50E	L3+50N	2	0.2	2.96	6	21.9	317	0.5	0.31	1.2	45	43	25	3.18
471,413.36	5,434,238.22	35	4	1+00E	L3+50N	2	0.2	3.04	5	22.0	273	0.5	0.36	1.8	40	41	25	2.84
471,463.36	5,434,238.22	36	4	1+50E	L3+50N	2	0.2	3.02	7	15.2	254	0.5	0.31	0.5	43	35	32	3.08
471,513.36	5,434,238.22	37	4	2+00E	L3+50N	2	0.2	4.01	5	24.8	181	0.5	0.51	1.0	52	31	43	3.58
471,563.36	5,434,238.22	38	4	2+50E	L3+50N	2	0.2	3.28	6	25.9	307	0.5	0.43	1.8	60	105	40	3.74
471,588.36	5,434,238.22	39	4	2+75E	L3+50N	55	0.2	3.72	9	23.9	252	15.4	0.55	2.5	49	39	37	3.16
471,613.36	5,434,238.22	40	4	3+00E	L3+50N	15	0.2	3.37	13	18.4	225	1.8	0.77	2.0	46	40	27	3.20

P. 1
Appendix 5
MapInfo table
BunkerHil mine–
Lefevre skarn
grid soils

0+00E L5+00N

P. 2

K_percent	La_ppm	Mg_percent	Mn_ppm	Mo_ppm	Na_percent	Ni_ppm	P_Percent	Pb_ppm	Sb_ppm	Sr_ppm	Te_ppm	Ti_percent	V_ppm	W_ppm	Zn_ppm	Mn_by_1000
0.34	13	0.64	1,437	1.4	0.04	132	0.103	37	2	44	7	0.10	51	0.5	111	1.4
0.36	16	0.75	1,020	1.2	0.04	129	0.117	35	4	48	9	0.12	46	0.5	119	1.0
0.34	20	0.78	1,106	1.2	0.04	134	0.109	38	4	40	9	0.12	48	0.5	129	1.1
0.30	22	0.60	1,374	2.2	0.06	145	0.330	63	5	69	14	0.09	42	0.5	227	1.4
0.34	37	0.59	3,103	2.1	0.03	157	0.122	75	1	99	12	0.13	53	0.5	274	3.1
0.33	30	0.66	1,908	2.3	0.06	159	0.167	55	4	61	16	0.12	56	0.5	199	1.9
0.24	17	0.60	2,063	1.5	0.03	136	0.123	54	2	57	8	0.09	48	0.5	155	2.1
0.26	17	0.59	1,549	1.6	0.05	131	0.128	40	2	56	12	0.08	58	0.5	106	1.6
0.20	19	0.46	2,691	1.5	0.05	155	0.344	48	2	104	10	0.10	34	0.5	326	2.7
0.29	14	0.70	2,010	8.3	0.05	159	0.175	71	5	28	11	0.11	65	0.5	176	2.0
0.29	14	0.94	1,343	11.0	0.03	151	0.119	86	4	30	9	0.11	62	0.5	144	1.3
0.27	14	0.61	1,684	3.8	0.04	127	0.161	61	3	31	12	0.14	61	0.5	136	1.7
0.19	11	0.49	1,079	1.7	0.06	94	0.165	41	1	23	8	0.11	50	0.5	130	1.1
0.48	12	0.56	1,687	1.5	0.03	99	0.177	59	2	70	9	0.09	38	0.5	122	1.7
0.49	24	1.04	1,786	1.5	0.04	145	0.176	40	2	77	9	0.11	46	0.5	155	1.8
0.32	18	0.73	1,019	1.1	0.04	165	0.108	34	1	42	8	0.09	50	0.5	137	1.0
0.38	45	0.62	2,898	2.6	0.03	185	0.166	72	2	72	14	0.11	58	0.5	245	2.9
0.42	38	0.70	1,139	1.2	0.06	232	0.147	82	13	51	10	0.12	60	0.5	221	1.1
0.26	17	0.63	2,132	2.2	0.03	148	0.123	49	1	98	8	0.09	53	0.5	152	2.1
0.37	17	0.87	1,376	0.5	0.05	187	0.175	58	12	42	12	0.08	67	0.5	129	1.4
0.31	16	0.73	1,320	1.2	0.04	137	0.210	37	3	64	9	0.08	50	0.5	136	1.3
0.28	18	0.57	1,747	2.0	0.06	120	0.297	87	5	76	13	0.09	46	0.5	213	1.8
0.26	12	0.63	1,598	2.9	0.04	129	0.224	43	1	29	12	0.09	57	0.5	168	1.6
0.21	14	0.48	1,267	2.1	0.05	99	0.179	36	1	49	8	0.11	44	0.5	226	1.3
0.22	12	0.51	1,853	2.5	0.04	100	0.314	45	4	30	8	0.10	45	0.5	221	1.9
0.24	13	0.44	500	0.5	0.05	85	0.214	30	3	28	7	0.08	30	0.5	165	0.5
0.42	21	0.53	792	0.5	0.03	85	0.222	37	4	48	7	0.07	29	0.5	121	0.8
0.41	43	0.62	1,852	1.8	0.04	153	0.681	52	3	124	10	0.11	38	0.5	257	1.9
0.46	20	0.60	1,722	0.5	0.06	164	0.398	59	13	53	8	0.12	48	0.5	214	1.7
0.42	18	0.64	2,161	1.7	0.03	130	0.377	52	2	72	10	0.11	39	0.5	189	2.2
0.40	24	1.01	1,725	1.1	0.04	157	0.264	39	5	61	9	0.15	48	0.5	177	1.7
0.22	15	0.67	687	0.5	0.03	123	0.073	33	3	38	8	0.09	54	0.5	188	0.7
0.27	17	0.55	1,360	0.5	0.07	150	0.156	64	12	38	6	0.08	45	0.5	456	1.4
0.23	16	0.49	1,566	4.7	0.05	102	0.228	172	3	28	8	0.10	45	0.5	265	1.6
0.25	14	0.51	1,085	0.5	0.12	140	0.180	48	10	26	8	0.11	46	0.5	119	1.1
0.24	11	0.61	1,930	2.2	0.03	113	0.177	48	2	31	10	0.09	54	0.5	159	1.9
0.27	12	0.50	942	1.1	0.04	90	0.256	54	3	45	7	0.07	40	0.5	150	0.9
0.31	16	0.62	982	0.5	0.04	112	0.282	32	3	43	8	0.07	44	0.5	165	1.0
0.30	17	0.52	848	0.5	0.06	97	0.253	33	4	36	7	0.08	37	0.5	239	0.9
0.29	13	0.60	708	1.1	0.04	106	0.152	30	1	40	6	0.08	43	0.5	114	0.7
0.24	19	0.53	1,271	1.3	0.05	106	0.064	40	4	60	7	0.08	35	0.5	126	1.3
0.34	17	1.07	1,521	2.5	0.03	142	0.136	33	4	35	11	0.15	48	1.7	284	1.5
0.32	27	0.54	1,561	0.5	0.07	148	0.089	47	12	40	11	0.10	44	14.1	344	1.6
0.26	21	0.50	2,121	2.4	0.04	108	0.106	37	6	46	8	0.10	44	6.7	344	2.1

3+00E L3+50E

EAST	NORTH	PEGNU	LINE	LOCAL	LOCAL	Au_ppb	Ag_ppm	Al_percent	As_ppm	B_ppm	Ba_ppm	Bi_ppm	Ca_percent	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_percent
471,638.36	5,434,238.22	41	4	3+25E	L3+50N	5	0.2	4.11	38	35.4	288	7.7	0.26	1.6	43	38	26	2.86
471,663.36	5,434,238.22	42	4	3+50E	L3+50N	2	0.2	3.73	53	14.5	303	0.5	0.25	2.5	36	26	27	2.51
471,713.37	5,434,238.22	43	4	4+00E	L3+50N	2	0.2	3.56	19	24.7	278	0.5	0.25	1.1	48	44	29	3.36
471,313.36	5,434,188.22	22	3	0+00E	L3+00N	2	0.2	3.52	11	14.8	169	0.5	0.21	0.5	43	37	27	3.12
471,363.36	5,434,188.22	23	3	0+50E	L3+00N	2	0.2	3.45	7	13.4	230	0.5	0.29	0.5	47	47	38	3.40
471,413.36	5,434,188.22	24	3	1+00E	L3+00N	2	0.2	3.94	6	23.6	280	0.5	0.27	0.5	51	44	38	3.63
471,463.36	5,434,188.22	25	3	1+50E	L3+00N	2	0.2	3.94	5	20.8	233	0.5	0.35	0.5	41	23	37	2.92
471,513.36	5,434,188.22	26	3	2+00E	L3+00N	2	0.2	4.49	5	15.4	146	0.5	0.40	0.5	60	32	56	4.34
471,563.36	5,434,188.22	27	3	2+50E	L3+00N	2	0.2	3.50	6	30.3	406	4.0	0.93	2.3	59	99	44	4.03
471,588.36	5,434,188.22	28	3	2+75E	L3+00N	65	0.2	4.63	20	28.7	296	13.1	0.60	3.1	61	51	47	3.74
471,613.36	5,434,188.22	29	3	3+00E	L3+00N	30	0.2	3.58	42	16.4	188	10.4	0.71	2.9	60	41	44	4.23
471,638.36	5,434,188.22	30	3	3+20E	L3+00N	75	0.2	4.31	72	24.8	436	15.0	0.43	1.9	69	82	53	4.22
471,663.36	5,434,188.22	31	3	3+50E	L3+00N	2	0.2	3.97	27	15.2	260	4.0	0.24	2.2	42	32	28	3.04
471,713.37	5,434,188.22	32	3	4+00E	L3+00N	2	0.2	3.46	21	15.1	153	0.5	0.32	0.5	44	43	26	3.18
471,313.36	5,434,138.22	11	3	0+00E	L2+50N	2	0.2	4.10	6	14.2	185	0.5	0.30	0.5	46	34	32	3.17
471,363.36	5,434,138.22	12	3	0+50E	L2+50N	2	0.2	3.41	4	17.6	229	0.5	0.46	0.5	41	34	32	2.88
471,413.36	5,434,138.22	13	3	1+00E	L2+50N	2	0.2	4.15	2	16.6	300	0.5	0.27	0.5	59	54	41	4.09
471,463.36	5,434,138.22	14	3	1+50E	L2+50N	2	0.2	3.60	8	15.6	280	0.5	0.28	0.5	42	31	32	3.06
471,513.36	5,434,138.22	15	3	2+00E	L2+50N	2	0.2	4.26	6	17.6	194	0.5	0.53	1.0	54	35	46	3.66
471,563.36	5,434,138.22	16	3	2+50E	L2+50N	2	0.2	3.13	8	19.5	189	3.0	0.49	0.5	51	52	34	3.53
471,588.36	5,434,138.22	17	3	2+75E	L2+50N	10	0.2	4.35	7	25.3	321	7.2	0.51	3.2	51	53	32	3.18
471,613.36	5,434,138.22	18	3	3+00E	L2+50N	300	0.2	3.81	23	0.5	219	27.3	0.33	1.8	62	35	57	4.84
471,638.36	5,434,138.22	19	3	3+25E	L2+50N	25	0.2	3.90	19	23.7	232	8.0	0.30	1.8	55	70	22	3.51
471,663.36	5,434,138.22	20	3	3+50E	L2+50N	2	0.2	3.33	12	17.2	340	4.0	0.43	2.1	50	74	24	3.45
471,713.37	5,434,138.22	21	3	4+00E	L2+50N	10	0.2	3.63	10	16.0	271	0.5	0.32	0.5	45	39	28	3.19
471,313.36	5,434,088.22	1	2	0+00E	L2+00N	2	0.2	4.06	6	18.2	216	0.5	0.62	1.2	52	41	39	3.59
471,363.36	5,434,088.22	2	2	0+50E	L2+00N	2	0.2	3.19	5	18.1	327	0.5	0.99	1.0	42	41	33	2.95
471,413.36	5,434,088.22	3	2	1+00E	L2+00N	2	0.2	3.49	5	18.0	421	0.5	0.44	1.1	60	54	33	3.79
471,463.36	5,434,088.22	4	2	1+50E	L2+00N	25	0.2	3.50	6	17.9	203	0.5	0.66	0.5	49	29	37	3.51
471,488.36	5,434,088.22	5	2	1+75E	L2+00N	2	0.2	4.38	5	28.5	221	7.0	0.60	1.1	60	35	40	3.56
471,538.36	5,434,088.22	6	2	2+25E	L2+00N	2	0.2	3.69	6	17.4	217	0.5	0.70	0.5	46	34	37	3.37
471,563.36	5,434,088.22	7	2	2+50E	L2+00N	2	0.2	3.54	8	20.0	157	0.5	1.35	1.3	52	20	47	3.70
471,613.36	5,434,088.22	8	2	3+00E	L2+00N	2	0.2	3.61	17	16.8	218	0.5	0.52	1.4	48	37	39	3.18
471,663.36	5,434,088.22	9	2	3+50E	L2+00N	2	0.2	3.14	11	14.2	146	0.5	0.25	0.5	46	56	29	3.28
471,713.37	5,434,088.22	10	2	4+00E	L2+00N	2	0.2	3.17	7	14.9	197	0.5	0.35	0.5	40	30	25	2.82
471,613.12	5,434,158.01	81	3	L3+00E	2+70N	160	0.2	3.97	20	11.2	242	10.1	0.65	3.7	59	36	40	3.09
471,613.45	5,434,256.86	86	3	L3+00E	3+70N	2	0.2	3.32	12	11.7	200	4.5	0.32	1.4	54	40	17	2.96
471,613.77	5,434,177.95	82	3	L3+00E	2+90N	235	0.2	4.38	49	6.1	268	17.8	0.37	1.5	71	43	50	3.99
471,613.12	5,434,197.85	83	3	L3+00E	3+10N	55	0.2	3.73	76	20.3	219	16.6	0.65	2.7	73	35	34	3.93
471,613.12	5,434,218.35	84	3	L3+00E	3+30N	15	0.2	3.83	30	13.8	161	6.3	0.65	2.4	63	31	28	3.25
471,613.29	5,434,139.34	80	3	L3+00E	2+50N	270	0.2	3.99	24	0.5	248	31.6	0.33	2.3	73	29	55	4.33
471,612.96	5,434,237.2	85	3	L3+00E	3+50N	65	0.2	3.57	12	34.7	210	10.6	0.42	1.7	60	22	26	3.18
471,313.36	5,434,288.44	94	4	0+00E	L4+00N	2	0.2	2.13	9	20.0	230	0.5	0.25	0.5	32	41	20	2.13

p. 3

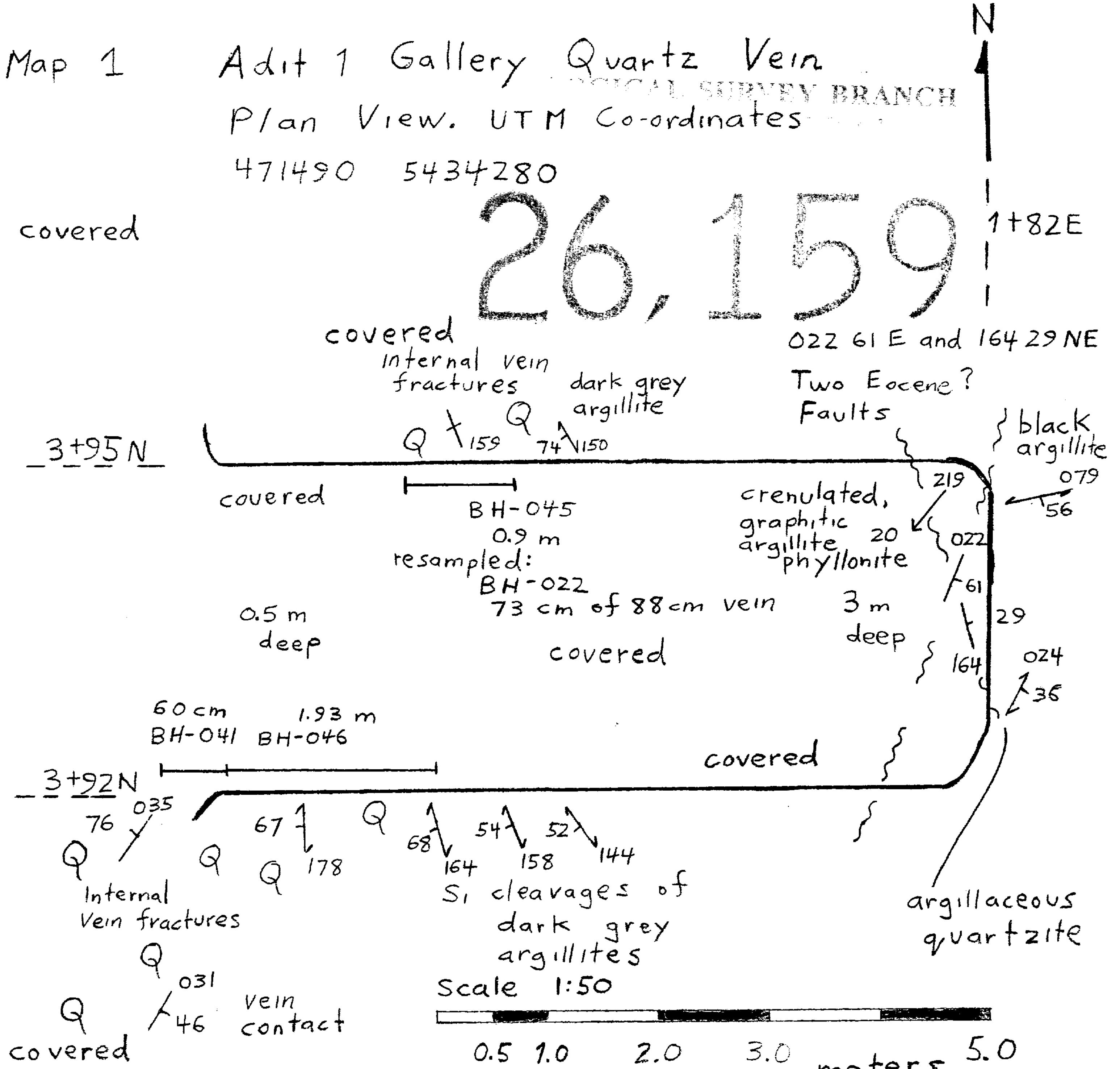
K_percent	La_ppm	Mg_percent	Mn_ppm	Mo_ppm	Na_percent	Ni_ppm	P_Percent	Pb_ppm	Sb_ppm	Sr_ppm	Te_ppm	Ti_percent	V_ppm	W_ppm	Zn_ppm	Mn_by_1000	
0.25	19	0.50	1,207	0.5	0.11	138	0.158	51	12	25	10	0.12	46	0.5	308	1.2	3+25E 3+50N
0.19	16	0.36	1,229	2.6	0.09	90	0.194	52	4	31	7	0.11	34	0.5	249	1.2	
0.27	15	0.59	1,450	1.7	0.05	118	0.135	47	5	31	8	0.09	44	1.2	144	1.5	
0.40	12	0.54	709	1.2	0.03	95	0.077	35	4	32	6	0.09	41	0.5	80	0.7	
0.33	17	0.66	725	0.5	0.05	111	0.072	33	3	38	7	0.08	47	0.5	89	0.7	p. 4
0.37	21	0.69	801	1.2	0.05	127	0.113	35	2	48	7	0.10	48	0.5	136	0.8	
0.25	18	0.45	669	1.2	0.07	88	0.110	38	5	45	7	0.10	35	0.5	75	0.7	
0.28	20	0.59	1,057	1.5	0.05	115	0.078	42	5	53	10	0.09	36	0.5	93	1.1	
0.37	27	1.03	2,552	1.3	0.04	136	0.188	39	4	61	10	0.15	46	0.5	197	2.5	
0.37	31	0.70	2,574	3.2	0.07	165	0.067	54	13	43	14	0.12	51	12.6	450	2.6	
0.32	26	0.60	3,417	6.3	0.04	145	0.075	39	4	38	11	0.11	43	30.3	533	3.4	
0.40	34	0.93	2,928	1.3	0.06	172	0.115	71	13	64	12	0.14	65	15.1	191	2.9	
0.24	16	0.45	1,695	2.4	0.05	96	0.201	82	2	25	8	0.11	42	4.9	227	1.7	
0.25	15	0.52	763	1.4	0.03	96	0.129	52	4	30	8	0.09	45	0.5	112	0.8	
0.39	15	0.59	872	0.5	0.03	100	0.069	38	4	39	7	0.08	40	0.5	85	0.9	
0.27	19	0.46	1,405	0.5	0.05	92	0.099	31	2	46	6	0.09	35	0.5	122	1.4	
0.36	24	0.69	1,400	0.5	0.04	130	0.096	41	3	59	8	0.10	47	0.5	139	1.4	
0.29	17	0.47	1,128	1.1	0.05	101	0.246	37	3	49	7	0.09	34	0.5	125	1.1	
0.31	22	0.54	2,115	0.5	0.04	111	0.069	49	4	49	8	0.08	42	0.5	137	2.1	
0.30	16	0.67	1,251	1.2	0.04	123	0.091	35	2	44	8	0.07	48	0.5	90	1.3	
0.34	19	0.65	1,276	1.2	0.09	162	0.090	50	12	49	14	0.11	46	0.5	442	1.3	
0.31	25	0.51	2,016	15.4	0.04	111	0.099	49	3	45	12	0.11	39	166.0	220	2.0	
0.35	18	0.79	1,030	1.7	0.05	155	0.105	101	13	34	13	0.10	60	0.5	223	1.0	
0.41	21	0.76	1,287	2.9	0.03	108	0.160	72	2	47	8	0.09	47	1.7	186	1.3	
0.32	20	0.53	1,131	1.7	0.04	99	0.088	42	4	35	5	0.09	43	0.5	117	1.1	
0.31	20	0.54	1,637	1.2	0.04	107	0.071	53	4	58	8	0.08	41	0.5	128	1.6	
0.27	21	0.53	1,469	1.0	0.04	109	0.220	35	3	83	6	0.10	38	0.5	161	1.5	
0.29	24	0.77	1,999	1.6	0.04	132	0.203	69	2	70	9	0.10	49	0.5	141	2.0	
0.41	21	0.49	1,720	1.3	0.04	98	0.080	40	1	57	7	0.07	40	0.5	86	1.7	
0.40	23	0.58	1,835	0.5	0.06	148	0.061	55	12	52	13	0.07	44	0.5	95	1.8	
0.41	21	0.54	1,523	1.2	0.05	97	0.118	39	2	72	6	0.07	38	0.5	85	1.5	
0.20	23	0.49	2,231	1.4	0.09	98	0.161	42	3	153	8	0.05	30	0.5	141	2.2	
0.28	20	0.53	1,278	2.0	0.04	105	0.072	42	2	37	6	0.09	41	0.5	222	1.3	
0.30	18	0.63	877	1.5	0.03	109	0.077	52	3	29	7	0.07	46	0.5	110	0.9	
0.31	18	0.44	952	1.9	0.04	81	0.130	43	2	36	6	0.08	34	0.5	97	1.0	
0.26	26	0.55	2,575	7.8	0.06	112	0.113	52	5	38	10	0.10	39	20.4	393	2.6	
0.29	13	0.57	1,225	1.5	0.06	115	0.120	41	5	24	14	0.09	46	0.5	222	1.2	
0.43	33	0.74	1,794	3.9	0.05	130	0.059	54	4	41	9	0.12	49	32.0	184	1.8	
0.30	27	0.54	3,229	7.1	0.06	144	0.106	52	5	48	9	0.11	40	43.3	412	3.2	
0.25	16	0.55	1,373	3.9	0.05	126	0.091	50	5	39	11	0.10	45	3.1	377	1.4	
0.29	25	0.49	2,149	13.8	0.06	121	0.110	64	5	38	9	0.11	40	142.0	230	2.1	
0.28	18	0.57	2,048	5.9	0.06	117	0.089	46	3	33	8	0.09	46	14.7	220	2.0	
0.20	12	0.41	611	1.0	0.03	77	0.187	37	4	23	5	0.07	32	0.5	144	0.6	0+00E L4+00N

Map 1 Adit 1 Gallery Quartz Vein

Plan View. UTM Co-ordinates

471490 5434280

26,159



LEGEND

022 61 Eocene ? Fault

36 024 S_1 Cleavage in argillite
Schistosity in argillaceous quartzite

Q Quartz vein

outcrops of red brown argillaceous quartzite 052 37 063 45

Local grid co-ordinates measured from flag 1+75 E on L 4 N

Drawn by Wm R Howard

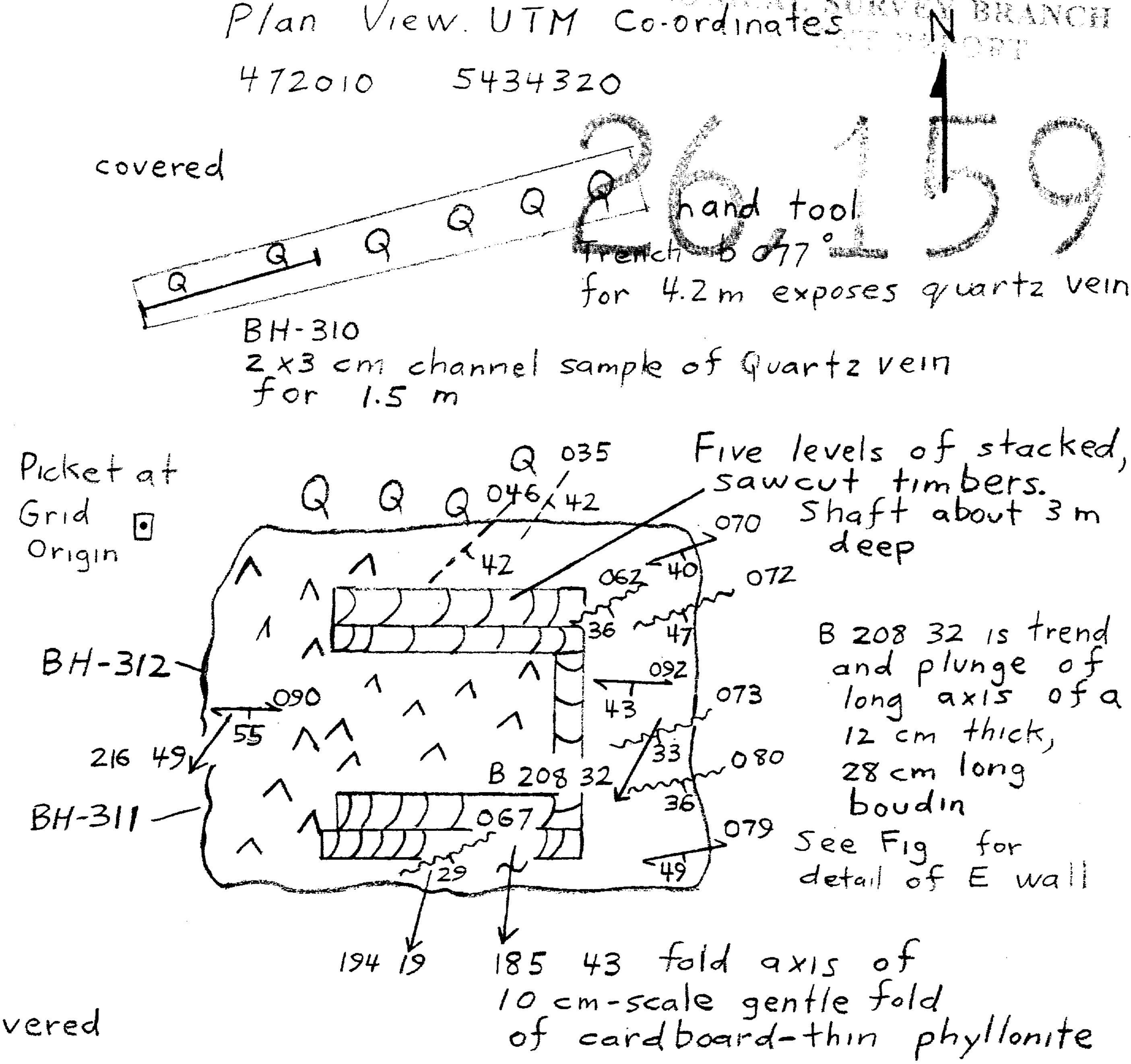
Nov. 1999

outcrop siliceous argillite 088 35

Map 2 Timbered Shaft - Structures and Samples

Plan View. UTM Co-ordinates

472010 5434320



Scale 1 : 50

0.5 1.0 2.0 3.0 5.0

meters

LEGEND

089 / 36 Phyllonite S2 Shear plane strike 089° dip 36°

^^ sloughed

Q Quartz vein

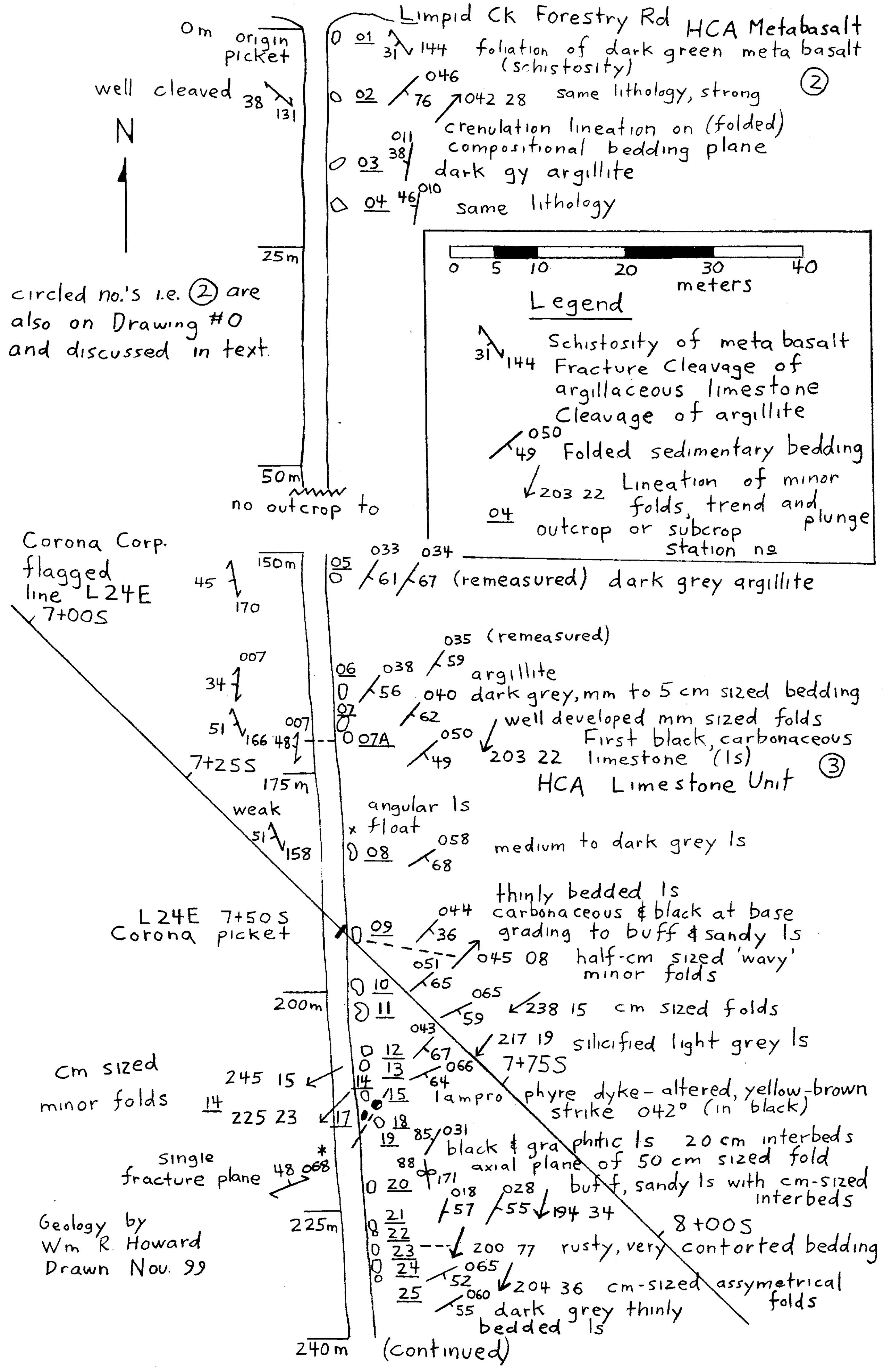
079 / 49 argillite S1 cleavage plane strike 079° dip 49°

194 19 crenulation lineation trend 194° plunge 19°

Drawn by Wm R Howard

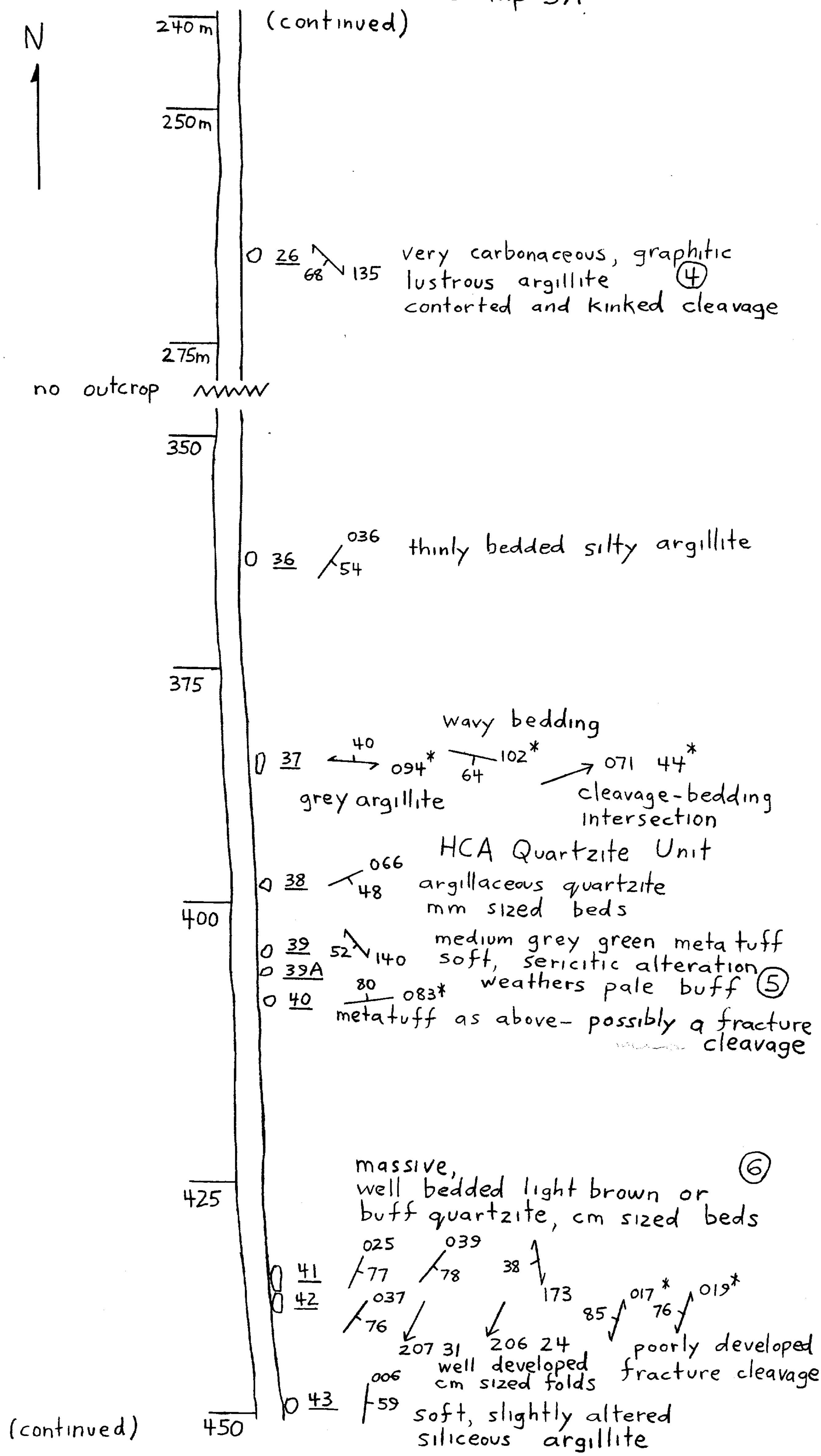
Nov. 1999

Map 3A Structural Geology of Exposures along the old Bunker Hill Mine Road – Harcourt Ck Assemblage. To 240m.



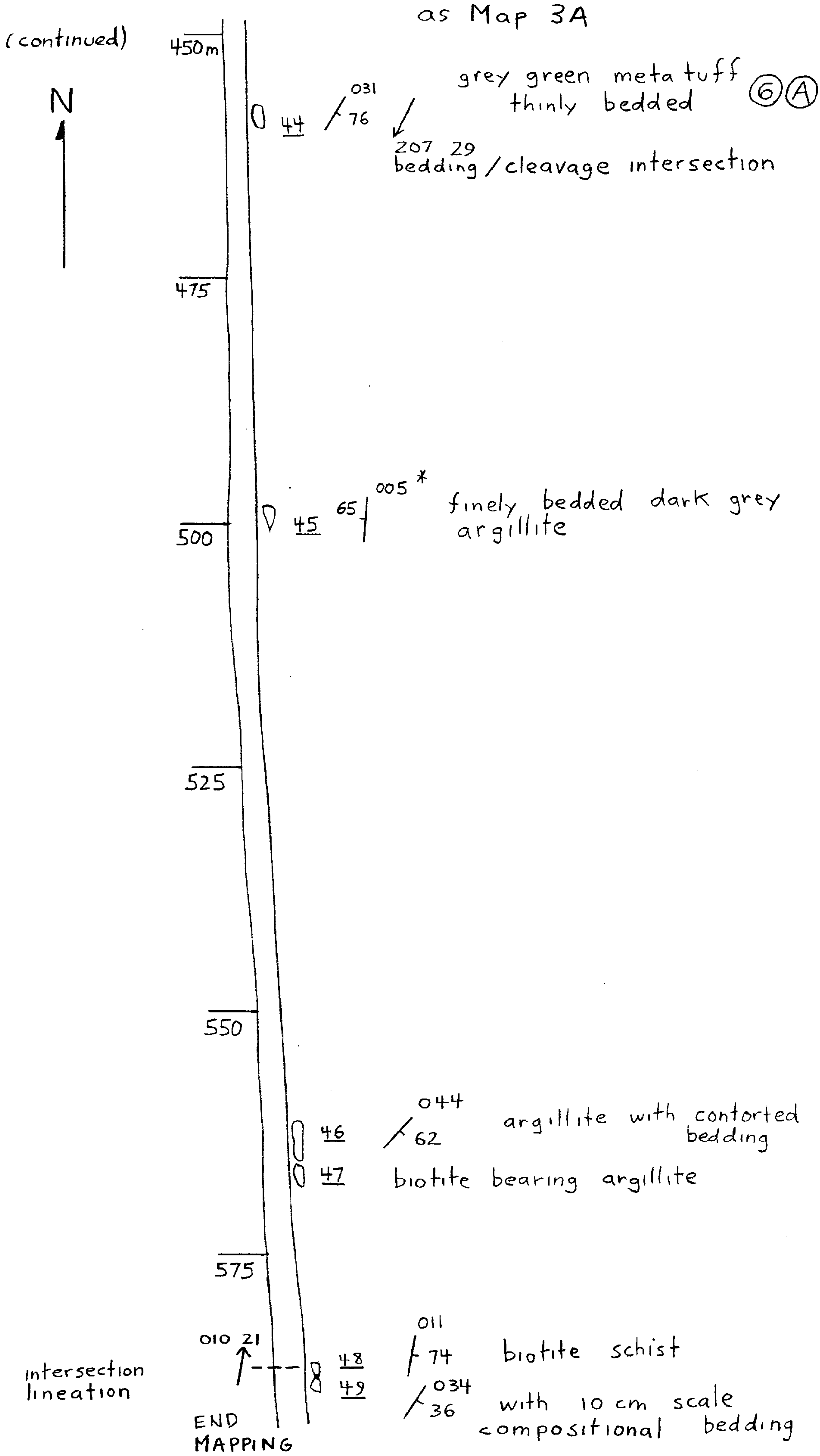
Map 3B Structural Geology of Exposures along the old Bunker Hill Mine Road- Harcourt Ck Assemblage. To 450 m.

Same Legend and Scale as Map 3A



Map 3C Structural Geology of Exposures along the old Bunker Hill Mine Road- Harcourt Ck Assemblage. To 590 m.

Same Legend and Scale as Map 3A



Section 1 Harcourt Ck Assemblage 'HCA' Limestone Unit - Detailed Structures of Exposures along Limpid Ck Forestry Road. Grid origin is UTM co-ordinates 0471510 5434960

View toward 170° about South.