

Assessment Report for the  
**Ruth-Vermont, BB and VMT Claim Groups**

Golden Mining Division  
N.T.S. 82K/14, 15 & 82N/3  
Latitude 51° 00' N, Longitude 116° 55' W

for

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## SUMMARY

The Vermont Project consists of a diverse group of mineral claims, Crown Grants and Mineral Leases assembled and held by Mountain Star Resources Ltd., a wholly owned subsidiary of Bright Star Metals Inc. The claims cover an elongate area oriented northwest-southeast and approximately 14 km in length, centred on the former Ruth-Vermont mine site. The strata underlying the claims have been correlated to the Late Proterozoic Horsethief Creek Group, deformed into a series of northeast trending folds and faults in the Purcell Anticlinorium in the hanging wall of the Purcell Thrust.

The area has a history of periodic exploration, primarily for gold and silver in quartz veins, with more recent activity directed toward base metals, particularly for sedimentary exhalative (SEDEX) potential. Results from previous work in the northern portion of the property (in the Bobbie Burns and Malachite Creek drainages) appear to document predominantly gold and/or silver mineralization in quartz veins with subordinate copper. The area of the former Ruth-Vermont mine hosts a number of vein-type deposits, on which mining activity occurred in the early 1970's. Precious and base metal mineralization has been identified on the southern portion of the claims and adjacent areas (VAD property).

Exploration and mining activity has documented the mineral potential of replacement-type (manto) and vein-type deposits, however, more recent identification of apparently stratabound base metals in correlatable units of a black shale dominated stratigraphic package has been interpreted as indicative of SEDEX potential. In addition, the presence of the Bugaboo Batholith to the south and the well documented presence of mineralized veins and manto-type (replacement) deposits may indicate carbonate replacement-type deposits.

This report documents work undertaken on behalf of Bright Star Metals Inc. in an attempt to compile all previous geochemical information to utilize in future exploration programs on the property. A total of 4,796 soil, 1,905 rock and 1,299 silt (lake or stream) samples have been compiled from previous Assessment Reports to identify geochemically anomalous areas on the property as well as possible gaps in geochemical coverage. An initial compilation of available geological mapping data has also been undertaken in an effort to synthesize data arising from a number of local and regional exploration programs within or immediately adjacent to the property.

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## INTRODUCTION

The Vermont Project consists of a diverse group of mineral claims, Crown Grants and Mineral Leases assembled and held by Mountain Star Resources Ltd. The claims cover an elongate area oriented northwest-southeast and approximately 14 km in length, centred on the former Ruth-Vermont mine site. The strata underlying the claims have been correlated to the Late Proterozoic Horsethief Creek Group, deformed into a series of northeast trending folds and faults in the Purcell Anticlinorium in the hanging wall of the Purcell Thrust.

The area has a history of periodic exploration, primarily for gold and silver in quartz veins, with more recent activity directed toward base metals, particularly for sedimentary exhalative (SEDEX) potential. Results from previous work in the northern portion of the property (in the Bobbie Burns and Malachite Creek drainages) appear to document predominantly gold and/or silver mineralization in quartz veins with subordinate copper. The area of the former Ruth-Vermont mine hosts a number of vein-type deposits, on which mining activity occurred in the early 1970's. Precious and base metal mineralization has been identified on the southern portion of the claims and adjacent areas (VAD property).

Exploration and mining activity have documented the mineral potential of replacement-type (manto) and vein-type deposits, however, more recent identification of apparently stratabound base metals in correlatable units of a black shale dominated stratigraphic package has been interpreted as indicative of SEDEX potential. In addition, the presence of the Bugaboo Batholith to the south and the well documented presence of mineralized veins and manto-type (replacement) deposits may indicate carbonate replacement-type deposits.

This report documents work undertaken on behalf of Bright Star Ventures Corp. in an attempt to compile all previous geochemical information to utilize in future exploration programs on the property. A total of 4,796 soil, 1,905 rock and 1,299 silt (lake or stream) samples have been compiled from previous Assessment Reports (including 5446, 6744, 7409, 8096, 8097, 8098, 8099, 8100, 8101, 8102, 8103, 8104, 8140, 8141, 8154, 8155, 8294, 8297, 8646, 8733, 9671, 10061, 10823, 11806, 18849, 20312, 21448, 21639, 22125, 22415, 22986, 23020, 22525, 23440, 24537) to identify geochemically anomalous areas on the property as well as possible gaps in geochemical coverage. An initial compilation of available geological mapping data has also been undertaken in an effort to synthesize data arising from a number of local and regional exploration programs within or immediately adjacent to the property.

In the author's opinion, work on the property to date on behalf of Bright Star Ventures Corp. has suffered from the lack of a single, comprehensive compilation of all available data. This report documents a preliminary attempt to address this oversight. It is strongly recommended that work continue on the compilation effort, particularly with respect to addition of MineQuest data.

## **LOCATION AND ACCESS**

Bright Star's Ruth-Vermont Project consists of a northwest oriented group of mineral claims, active and Reverted Crown Grants and Mineral Leases extending through the headwaters of Bobbie Burns, Malachite and Vermont Creeks, west of Vowell Creek in the northern Purcell Mountains. The centre of the claims is located approximately 30 km southwest of Golden and 27 km west-southwest of the town of Parson, British Columbia (Figure 1). The property lies on NTS mapsheets 82N/3 and 82K/14,15.

The southern part of the property can be accessed using a network of well maintained logging roads west of Vowell Creek, originating from Highway #95 at Parson. Old logging and mining roads from Vowell, Vermont and Crystal Creeks can be utilized for 4-wheel drive, All Terrain Vehicle and/or foot access to the main areas of interest on the VMT and Ruth-Vermont claim blocks.

The northern two thirds of the property is not currently accessible by vehicle. An unused logging road branching north off the main road system at the 40 km post, was negotiable in 1997 by standard vehicle for a distance of 8.2 km up Bobbie Burns Creek. The boundary of the northern BB claims, however, is another 14 km upstream from this point. An old mining road, constructed in 1966 along Bobbie Burns Creek, is grown over in many places and eroded beyond use for 4 wheel drive vehicles. An ATV trail utilizing the old road bed appears to be partially maintained by hunters to a point about 1 km east of the property boundary.

Currently, the best access to the northern portion and high elevation areas of the property is by helicopter based out of the town of Golden. Accommodation and helicopter charter may also be available on a seasonal basis, from the Bobbie Burns Ski Lodge located on the Vowell Creek logging road at the 57 km post, adjacent to the VMT claims.

## **PHYSIOGRAPHY AND CLIMATE**

Elevations on the property vary from about 1400 m (4600 ft) at the southern edge of the property adjacent to Vowell Creek to 2870 m (9400 ft) on Vermont Mountain. Much of the property, however, is situated above treeline at about 2285 m (7500 ft) in this region. Snow generally remains on a large portion of the claims, particularly north facing slopes and valleys, until mid July and permanent snow and ice is present in ice fields on the BB-1, BB-10 and VMT-2 claims.

Vegetation in the area consists primarily of coniferous trees with undergrowth comprised largely of slide alder.

The claims are located west of the Rocky Mountain Trench and east of Rogers Pass and are subject to heavier precipitation than areas to the south and east. Therefore, the property is available for geological exploration from May (at the lowest elevations and on south facing slopes) to late October. However, significant snow falls can be expected as early as mid-September, possibly resulting in delays during certain aspects of an exploration program.

## CLAIM STATUS

The property consists of 7 2-post and 11 4-post claims (see Figure 2), staked in accordance with existing government claim location regulations. The claims, leases and Reverted Crown Grants are held, or have been optioned by, Mountain Star Resources Ltd., a wholly owned subsidiary of Bright Star Metals Inc.

The BB Claim Group comprises the northern portion, the Ruth-Vermont Claim Group comprises the centre and the VMT Claim Group comprises the southern portion of the property. The property includes 10 whole or partial Reverted Crown Grants, contained in 2 Mineral Leases (Mineral Leases 95 and 97), and 12 Crown Grants. In addition, the Crown Grants of R. Mellon have been optioned by Mountain Star Resources Ltd. Therefore, in total, the property comprises an area in excess of approximately 2450 ha (6,054 acres). Significant claim data are summarized below:

<u>Claim</u>	<u>Units</u>	<u>Tenure Number</u>	<u>Type</u>	<u>Due Date*</u>	<u>Owner</u>
<b>BB Claim Group</b>					
✓BB-5	18	340409 Claim		Sept. 24, 2000	Mountain Star Res. Ltd.
✓BB-6	9	340410 Claim		Sept. 24, 2000	Mountain Star Res. Ltd.
✓BB-7	9	340411 Claim		Sept. 24, 2000	Mountain Star Res. Ltd.
✓BB-8	18	340412 Claim		Sept. 24, 2000	Mountain Star Res. Ltd.
✓BB-9	18	340413 Claim		Sept. 24, 2000	Mountain Star Res. Ltd.
✓BB-10	20	340414 Claim		Sept. 24, 2000	Mountain Star Res. Ltd.
Bryan	1	213877 <sup>1</sup>	L. 3951	Apr. 17, 2001	Gordon F. Dixon
Lincoln	1	213877 <sup>1</sup>	L. 3952	Apr. 17, 2001	Gordon F. Dixon
Lucky Jack	1	213877 <sup>1</sup>	L. 3953	Apr. 17, 2001	Gordon F. Dixon
Total	95				

\* Mineral Lease 95

**Ruth Vermont Claim Group**

✓ Vermont 1	3	213300 Claim		Apr. 3, 2005	Mountain Star Res. Ltd.
✓ Vermont 2	12	213301 Claim ↙		Apr. 3, 2005	Mountain Star Res. Ltd.
✓ Cleopatra	1	213875 <sup>2</sup>	L. 8122	Aug. 21, 2000	Mountain Star Res. Ltd.
✓ Vermont	1	213875 <sup>2</sup>	L. 8123	Aug. 21, 2000	Mountain Star Res. Ltd.
✓ Sheba	1	213875 <sup>2</sup>	L. 8124	Aug. 21, 2000	Mountain Star Res. Ltd.
✓ Ruth Fr.	Fract.	213875 <sup>2</sup>	L. 8125	Aug. 21, 2000	Mountain Star Res. Ltd.
✓ Ruth	1	213875 <sup>2</sup>	L. 418	Aug. 21, 2000	Mountain Star Res. Ltd.
✓ Minnie	1	213875 <sup>2</sup>	L. 419	Aug. 21, 2000	Mountain Star Res. Ltd.
✓ Charlotte	1	213875 <sup>2</sup>	L. 405	Aug. 21, 2000	Mountain Star Res. Ltd.
Total	21				

<sup>2</sup> Mineral Lease 97

**VMT Claim Group**

✓ VMT #2	20	213576 Claim		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ VMT #3	2	213577 Claim ↙		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ VMT 5	1	213770 Claim		Sept. 12, 2000	Mountain Star Res. Ltd.
✓ VMT 6	1	213769 Claim		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ VMT 7	1	213768 Claim		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ VMT 8	12	213766 Claim		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ VMT 9	1	213771 Claim		Sept. 14, 2000	Mountain Star Res. Ltd.
✓ VMT 10	1	213772 Claim		Sept. 14, 2000	Mountain Star Res. Ltd.
✓ VMT 11	1	213773 Claim		Sept. 14, 2000	Mountain Star Res. Ltd.
✓ VMT 12	1	213767 Claim		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ VMT Fr.	Fract	213774 Claim		Sept. 15, 2000	Mountain Star Res. Ltd.
✓ Excelsior	1	213268 Rev.		April 26, 2001	Campeau Estate ×
Total	42				

**Crown Grants**

<u>Crown Grants</u>	<u>Name</u>	<u>Folio Number</u>	<u>Owner</u>
L. 672	Syenite Bluff	008850	R. Mellon
L. 763	Black Horse	008850	R. Mellon
L. 764	Agnes	008850	R. Mellon
L. 6662	Eureka	010634	R. Mellon
L. 6663	Wild Horse	010634	R. Mellon
L. 6664	White Horse	010634	R. Mellon
L. 15307	Golden Bluff	019950	R. Mellon
L. 15317	Agnes Fraction	019950	R. Mellon
L. 15318	Charlotte Fraction	019950	R. Mellon
L. 15445	Ruth No. 2	019950	R. Mellon
L. 15446	Lion	019950	R. Mellon
L. 15447	Unicorn	019950	R. Mellon
L. 15448	Mazeppa	010634	R. Mellon





## **HISTORY**

The following has been taken, with permission, from Gidluck (1997):

### **“The Spillimacheen District**

Many of the mineral occurrences and existing mining leases (original Crown Grants) on and adjacent to the present BB and Ruth-Vermont claim groups were first worked during the later years of the nineteenth century. A second phase of activity took place between 1920 and 1940. Most of this work was directed towards small scale mining and prospecting for gold and silver in quartz veins, however, lead and zinc was mentioned in many of these occurrences and occasionally copper as well.

A further attempt at mining lead-zinc-silver veins took place at the old Ruth-Vermont mine between 1965 and 1973. Then from the mid 1960's to the early 1980's, a variety of more extensive modern exploration surveys looking for stratiform lead-zinc-silver were conducted over different claim groupings within the boundaries of the present property package. Government mapping in this district is quite limited and regional in nature. The few maps that exist over this area, at best, only show rocks of the Horsethief Group occurring on the property. None of these maps show any detail of the divisions within this group (Reesor 1973, Wheeler 1962, Okulitch and Woodsworth 1977, Price and Mountjoy 1979).

### **VMT Claim Group**

The first evidence of exploration in this area is from incomplete records which indicate that between 1965 and 1973 Mr. R. Rem, from Calgary, did a limited amount of geological mapping, biogeochemistry and trenching, and drilled at least 7 or 8 diamond drill holes on the property. Apparently core recovery was poor and no cores, core descriptions or hole locations are available (BCDM - AR # 6257 and #6744).

In 1974 to 1977 Medesto Exploration Ltd. conducted geochemical soil sampling, geological mapping, trenching and drilled three diamond drill holes in 1975 and two in 1977 to test the geochemical anomalies. The best intersection obtained in 1975 was in DDH 75-1 where 8 ft. of lead-zinc-silver mineralization was encountered. The best in 1977 was in DDH 77-3 where a similar zone 14.5 ft wide was intersected. Trenching 80 ft south of DDH 77-3 sampled a zone 24 ft. wide indicating possible thickening to the south (BCDM - AR #6744).

In 1979 Norcen Energy Resources conducted a widespread exploration program over a strike length of about 25 km from Vermont Creek in the north to Warren Creek (off the VMT claims) in the south. Part of their program included soil geochemistry, geological mapping, trenching and diamond drilling on the VMT claim group (BCDM - AR # 8140 and #8154). Most of this work was done on the north and east slopes of Crystal Creek in the south eastern corner of the property where they drilled 12 holes in 1979 and another 7 holes in 1980. The best intersection was located on the same zone as encountered by DDH 77-3, the Medesto trenches and coincident soil anomalies, however, they concluded the drilling did not obtain any zones of "significance" (Smith et al - 1980).

Bluesky Oil & Gas Ltd. obtained the property in 1981. They conducted more geological mapping, soil geochemistry and drilled another 4 holes in areas of known mineralization and previous drilling at the southeastern end of the VMT group. They encountered significant massive and disseminated mineralization and their best intersection was, again, in the Medesto-Norcen zone (LCP Zone). They recommended further work in 1982 to include; more standard surveys as well as drilling and an exploration adit to test the mineralized zone above (Nolin 1981).

After the claims expired in 1989 and 1990, the VMT claims were staked over this ground by MineQuest Exploration Associates Ltd of Vancouver, B.C. Between 1990 and 1994 they conducted geological mapping, minor soil sampling and compiled all the previous exploration data (Longe 1993).

The claims were optioned to Mountain Star Resources Ltd. in August of 1996 who then conducted a one line test survey of transient EM and gravity at the north end of the claim group.

### **Ruth - Vermont Claim Group**

Lead-zinc-silver mineralization was discovered on the property in 1893 and a 150 tons of hand sorted ore was shipped from the Ruth Mine in 1896. The Galena Syndicate from London, England, held the property until the early 1960's and completed several hundred feet of underground development prior to 1930. Rio Canadian studied the property in 1956 and 1957 (Manning 1972).

The property was optioned to Columbia River Mines in 1965 who conducted 2,300 feet of underground development on the 5750 and 6000 Levels, drilled approximately 40,000 feet of diamond drill core and shipped a load of high grade ore to the smelter at Trail.

In 1969 the property was optioned to Copperline Mines Ltd. who brought the Ruth-Vermont mine into full production and from 1970 to 1971 they milled 94,469 tons of ore. The mine was then shut down from 1971 to 1973 due to low metal prices (Longe 1997).

During this period L.J. Manning and Associates Ltd from Vancouver B.C. conducted a feasibility study on the mining leases (Manning - 1972). The study concluded that there was 291,384 tons of mineable ore reserves remaining in the mine. They stated the opportunity was good for increasing ore reserves and recommended that a more favourable smelter contract be obtained before starting up the operation again. An independent geological report, included with the study, indicates an excellent potential for finding more replacement ore in the immediate area (Tough 1972).

Consolidated Columbia Mines Ltd. took over the operation in 1973 and shipped 26,975 tons of concentrate to the Cominco's smelter in Trail, B.C. In 1974 the mine facilities suffered extensive damage from snowslides. There was a short lived attempt to bring the mine back into production in 1981.

The Manning Feasibility Study was updated in 1982 (Foreman 1982) and concluded the economics of the Ruth-Vermont Mine was dependant upon the price of silver. The mine lay derelict until 1994 when all the buildings and machinery were removed from the property, the surface sites reclaimed and underground openings sealed (Morrow 1995).

In 1996 data from the archived mine records was compiled and the stratigraphy correlated by MineQuest Exploration Associates Ltd. A three hole underground diamond drill program was conducted to test for a Sedex lead-zinc deposit below the workings and to verify a high gold assay reported in mine archives. No evidence for Sedex mineralization was found in the one hole that penetrated the "Target Shale", however, another hole did intersect 5.6 ft of gold mineralization. MineQuest concluded further underground drilling and sampling of the mine tailings was required to evaluate the gold potential. The workings were once again sealed and the access road reclaimed after this program was completed (Cukor 1996).

## **BB Claim Group**

### Old Claims in the Malachite Creek Basin

Additional old trenches and an adit are situated in the Malachite Creek basin in the central part of the property where gold vein prospecting was also conducted in the early 1900's.

### Old Claims Adjacent to the BB Claim Group

In the 1890's several adits were driven on claims west of the claim group (Bennison claims) where a significant gold deposit was rumoured to occur in a 32 ft. wide gold bearing quartz vein. Very little data, however, is available on this prospect (Dearin 1991).

Mineralization found on the the Crown Point claims at about the same time, just northwest of the claims, consists mainly of replacement lead-zinc mineralization in limestone and quartz veins with minor gold values (Dearin 1982).

In 1917 an adit was driven into a wide quartz-carbonate vein containing a 17 inch wide massive chalcopyrite seam northeast of the property on Copper Creek. A one ton sample at that time averaged 11.92% Cu (Dearin 1982).

### Recent Exploration on the BB Claim Group

In 1980 First Nuclear Corporation conducted reconnaissance geological mapping, prospecting and geochemical surveys over the entire BB claim group and the surrounding area. This program indicated the western highland portion of the property to be the most prospective for lead-zinc-silver. In 1981 mapping, prospecting and rock geochem concentrated on these highland areas and stratabound lead and zinc mineralization was found associated with carbonate horizons on four areas within the property (Brophy and Slater 1981).

In 1982 Samim Canada Ltd. optioned the property and engaged MineQuest to follow up in these areas of interest and conduct further mapping, prospecting and sampling. This work reported 6 showings of conformable lead-zinc mineralization on the present property, all occurring at one of three stratigraphic levels near a shale - limestone contact. They concluded the Ruth-Vermont deposit to the south may also occur at one of these levels thus adding potential to this horizon on the BB claims. They recommended more mapping, prospecting, IP - EM surveys and drilling on the Malachite showings (Dickie and Longe 1982).

In 1983 Samim conducted a follow-up program including geological mapping, IP surveys, soil sampling and 11 holes of diamond drilling on the Malachite Creek detail area in the southern part of the claim group. Though no economic deposits were located they confirmed the presence of highly altered and mineralized black shales on the surface. IP anomalies in black shales with associated soil geochem anomalies remain to be explored in the Carbonate Mountain area.

Samim concluded that various features of these lead-zinc showings are indicative of possible nearby bedded Sedex mineralization. They recommended more mapping, geochem and IP surveying as well as diamond drilling. They concluded the property remains one of considerable merit but recognized that a long term program of further work is required if a deposit is to be found ( Bottrill et al 1983)".

## REGIONAL GEOLOGY

The following has been taken, with permission, from Gidluck (1997):

### Stratigraphy

"The Vermont Property is underlain by a thick sequence of Hadrynian marine sedimentary rocks exposed in the core of the northwest trending Purcell Anticlinorium, on the west side of the Rocky Mountain Trench (Figure 3). The anticline is deformed by subsequent thrust faulting and folding parallel to the structural axis (Okulitch and Woodsworth 1977, Kubli and Simony 1994).

The majority of lithologies exposed on the property belong to the Horsethief Creek Group, a subdivision of the Windermere Supergroup of Hadrynian age (Table 2). The Horsethief Creek Group is composed of four general divisions which are not easily separable; a lower Grit Division of turbidite sandstones and shales, a deep water Slate Division, a shallow water Carbonate Division and an Upper Clastic Division of shales, sandstone and carbonate deposited during a marine transgression (Evans 1933, Young et al 1973).

Conformably underlying the Horsethief Creek are diamictic conglomerates of the Toby Formation derived from subaqueous slides and debris flows. These rocks have been mapped in the Bugaboo Creek valley 20 km to the southeast of the property (Reesor 1973).

Overlying the Horsethief Creek Group in the Purcell Mountains is the Lower Cambrian Hamill Group which occurs to the northeast of the property. This Group is largely comprised of quartzites, slates, phyllites and schists and is probably in sharp, unconformable contact with the Horsethief Creek Group (Reesor 1973).

## DETAIL GEOLOGY

### VMT Claim Group

Reconnaissance style geological mapping was conducted over large land holdings in this area by Norcen and Bluesky Oil & Gas between 1979 and 1982. It was not until 1992 and 1993, however, that mapping by MineQuest (Figure 8) established the first detailed stratigraphic sequence of lithologies (below) on the VMT claims. All these units are believed to be within the Grit Division (Table 2) of the lower Horsethief Creek Group.

#### Stratigraphic Sequence - in descending order (Longe 1994)

Unit W	Whitebark Grit - white quartz grit with micaceous cleavage
Unit M	Schists - brown weathering ankeritic and tuffaceous appearing micaceous schists interbedded with grey argillite. - base of unit is host to sulphide occurrences.
Unit A	Argillite - grey or buff weathering argillite composed of thin turbidite beds with abundant disseminated pyrite.
Unit C	Cedar Grit - white quartz grit with micaceous cleavage and occasional beds of quartz pebble conglomerate

The stratigraphic thickness of the shale units, A and M, in this area appear to be approximately 300 m thick (Longe 1993).

#### Structure

These pelitic units occur on a shallow dipping, north plunging anticlinorium which is deformed locally by tight isoclinal folds and faults where bedding is near vertical. Typically there is a well developed axial plane cleavage striking  $140^{\circ}$  and dipping from  $70^{\circ}$  to  $90^{\circ}$  at these localities. A major northwest striking, northeasterly dipping fault zone, the Medesto Fault, appears to separate the LCP Zone from the other mineralized zones on the VMT claims (Figures 8, 9 and 10). MineQuest has interpreted this to be a northeasterly dipping, reverse fault which may have caused considerable displacement to a single mineralized horizon (Unit M) on this part of the property (Longe 1994).

## **BB Claim Group**

### Stratigraphic Sequence - in descending order (Dickie and Longe 1982)

Unit G	Sandstone and Grit - thickly bedded; laminated shales at bottom
Unit F	Calcareous Sandstone - bedded siltsione and shale in lower half
Unit E	Calcareous Sandstone - no shale
Unit D	Siltstone and Shale - regularly interbedded
Unit C	Sandstone and Grit - thickly bedded
Unit B	Shale - strongly foliated with crenulated bedding
Unit A	Sandstone and Grit - some elastic limestone and phyllitic shale

The seven units above have been identified and traced discontinuously throughout the length of the BB property but because of their potential for hosting base metal deposits the finer grained units were studied in more detail. The black shales in this sequence contain considerable siderite (up to 25%) and variable amounts of pyrite (up to 10%). Black fine grained pyritic limestones occur in each of the shale units and pinch out laterally into black shales or calcareous siltstones.

Stratabound lead-zinc mineralization occurs in the limy beds within the following three shale units; Unit B at Crown Point (and possibly Ruth-Vermont), Unit D at Crown Pont, Decision Creek and Malachite Creek and Unit F at Crown Point, Decision Creek and Malachite Creek (Dickie and Longe 1982). The individual thickness of each of these shale units is about 80 metres and no significant thickness changes in the shales have been mapped on the BB claim group to date.

### Structure

The lithologies described above comprise the centre of the broad northwest trending Purcell Anticlinorium which expose the oldest strata in the creek valleys. This major structure, in turn, is further complicated by a series of smaller scale folds and north or northwest striking faults perpendicular to the fold axes. There is a strongly developed vertical foliation parallel to their axial planes.



## MINERAL SHOWINGS AND DRILL INTERSECTIONS

### VMT Claim Group

The principal zones of interest on this group are the four areas illustrated by the four clusters of drilling and trenching activity (Figure 9) located on the VMT 2 and 3 claims. An approximate total of 35 diamond drill holes were drilled to undercut or test extensions of lead-zinc mineralization found in trenches on the surface. Most of the drill holes and trenches are shown on Figure 9, however, it should be noted that in the public and private reports available, there is considerable conflicting evidence on the location and orientation of many of the drill holes. As most of these sites have long since deteriorated and can not be confirmed in the field, the locations shown on Figure 9, in many instances, are a "best estimate".

The most southerly and most significant area of interest is the LCP Zone (Figure 9) where the best drill intersection on the property was obtained in DDH 77-3. This hole cut 14.5 ft of 3.43% Pb, 8.61% Zn and 3.39 oz/t Ag. Two other drill holes, 79-8 and 81-3, at this location also intersected 6.9 ft and 5.4 ft, respectively, of similar lead-zinc-silver values (Longe - Feb 1992)

Trenching 80 ft south of these holes in Trench 77-3, apparently revealed the zone to be 24 ft wide averaging 4.8% Pb, 5.4% Zn and 4.7 oz/t Ag indicating possible thickening to the south (Pelzer 1978). The writer was unable to locate this particular trench. There was evidence of ground sluffing due to recent logging road construction immediately up slope from the suspected location so this trench is probably covered. The LCP Zone is also associated with a series of generally northwest trending, coincident lead-zinc-silver soil anomalies (Figure 10) found by Norcen in 1979 (Smith 1980). These anomalies extend over a distance of about 500 metres and include the other mineralized zones on the claim group (below).

Separating the two main groups of soil anomalies is the prominent northwest striking Medesto fault which dips steeply to the east and can be seen in several outcrops. Other workers have speculated that there may be other subsidiary faults and minor folds but more detailed mapping and structural analysis is required before additional structures can be reasonably incorporated into the geological interpretation of this area. Based on a preliminary structural model, MineQuest hypothesized that the Pb-Zn-Ag mineralization in the LCP Zone dips gently at about 20° to the northwest. They feel the geochemical anomalies may represent "leakage" from a deeper source rather than from subcropping sulphide beds (Longe 1994).

Another zone of surface mineralization, approximately 200 metres northeast of the LCP Zone, was tested by 8 drill holes between 1975 to 1981 with little apparent success (Figure 9). Numerous holes in the 1975 and 1977 drill campaigns reported drilling problems and poor core recovery. DDH 75-3 did mention anomalous cuttings in the range of 3% Pb and 7% Zn associated with quartz vein material (Petzer 1978). A massive lense of highly weathered siderite, sphalerite, galena and pyrite(?) assaying 7.3% Pb, 8.3% Zn, 5.7 oz/t (189 ppm) Ag and 990 ppb Au was sampled by the writer (97-MG-04B) in old Trench 75-3 at this showing. The prominent cleavage (bedding?) dips to the northeast and accordingly all the holes were angled to the southwest. There is evidence, however, of subvertical to steep westerly structures in the form of faulting and associated quartz veining within the zone of mineralization. It is the writer's opinion there is a reasonable chance these structures may be controlling the orientation of the mineralized zone and hence the holes may have been drilled "down dip" and missed the sulphides on the surface. A rather puzzling statement in the report (Pelzer 1978) indicates that 45.5 ft of chip sampling in a trench just "east" of DDH 75-3 produced values as high as 6.61% Pb, 4.84% Zn and 5.16 oz/t Ag, however, this hole appears to plot east of the trench referred to above and no mineralization was observed by the writer east of the drill holes at this location.

The third area of interest is located about 300 m north of the LCP Zone where three holes were drilled to test a small exposure of lead-zinc mineralization in quartz veins (Figure 9). A grab sample in 1980 from this location produced 2.96% Pb, 5.60% Zn, 2.38 oz/t Ag and 0.01 oz/t Au (Smith 1980), however, drilling failed to encounter these grades at depth. Again the holes were drilled westerly with the exception of the first hole, DDH 75-2, which was abandoned due to stuck drill rods and poor core recovery. This showing also has a coincident lead-zinc soil anomaly on both the Medesto and Norcen surveys.

The fourth and most northerly area of interest is 500 m to the north of the LCP Zone (Figure 9) where DDH 75-1 intersected disseminated galena and sphalerite in a reported massive limestone assaying 2.17% Pb, 5.6% Zn and 2.4 oz/t Ag over a length of 8 ft. This hole was apparently drilled on a Medesto soil geochem anomaly (Pelzer 1978). The 1979 Norcen soil survey (Figure 10) does not appear to go that far north.

Another potential area of interest occurs near the northwest boundary of the VMT 2 claim where prospecting in 1983 located two massive argentiferous galena and boulangerite veins each over one foot in width. Grab samples are reported from these veins with values as high as 44.5% Pb, 2.63% Zn, 44.3 oz/t Ag, 0.18 oz/t Au,

12.6 Sb and 1.07% Cu (Nolin et al 1983). There is no indication of followup work in this area nor could the exact location of these showings be found in the records.

The same report indicates 6 diamond drill holes were drilled in 1983 in conjunction with combined SP, magnetic and gravity surveys conducted over a large land package that covered more than the VMT Claim Group. Apparently though, no significant widths of mineralization were encountered in this program as the best width obtained, in DDH. 83-1, was 0.25 m of 1.41 oz/t Ag, 0.42% Pb and 0.005% Zn (Nolin et al 1983).

### **BB Claim Group**

The BB Claim Group is comprised of two types of mineral dispositions with two different exploration histories; isolated mining leases worked in the late 1800's for gold and silver and large mineral claim groupings which were explored in a more systematic fashion in the 1980's for stratiform lead-zinc mineralization.

#### BB Claims

First Nuclear Corporation (F.N.C.) conducted widespread reconnaissance geological mapping, prospecting and regional geochemical surveys in 1980, some of it over the present BB Claim Group. They concluded that the western highland portion, within the Purcell Anticlinorium of the Horsethief Creek Group, to be the most prospective for lead-zinc-silver. In 1981 further work in this area revealed stratabound lead and zinc mineralization associated with carbonate units in the basal half of this stratigraphic succession. The following four broad areas of interest (Figure 6) were identified within the present property configuration (Brophy and Slater 1981).

#### **Malachite Creek Area**

This area is situated in the headwaters of the Malachite Creek basin on the south side of the main creek on the BB- 8 and 9 claims. Numerous occurrences of stratabound galena and sphalerite, some with conformable quartz veining, in limestones and sandy carbonates enclosed by black laminated slates, were reported over a length of one kilometre. Mineralized strata ranged from 0.3 to 9.0 m in thickness and individual samples assayed as high as 6.1% Pb, 6.3% Zn and 5.8 oz/t Ag. Average grades were about 1.83% combined Pb- Zn over an interval of 0.9 m (Brophy and Slater 1981).

MineQuest in 1982 continued exploring the property for Samim, with the emphasis directed towards finding stratabound lead-zinc mineralization. As a result they

prospected and further enhanced the following three F.N.C. showings in the Malachite Creek area (Figure 7). At the Malachite Ridge and Malachite Adit showings, high grade bedded galena and sphalerite mineralization was traced over a strike length of 200 metres in black limestone beds in stratigraphic Unit F. At the Malachite Trench showing, galena and sphalerite are disseminated in limestone and dolostone near the top of stratigraphic Unit D. The mineralized section averaged 4-5% combined Pb-Zn over intervals of 1-2 metres. The carbonate lithologies, which contain the lead and zinc, were traced over a distance of 1.5 km but the mineralization was only observed in the trenches (Dickie and Longe 1982).

A follow-up program in 1983 by Samim included geological mapping, IP surveys, soil sampling, 493 metres of diamond drilling and a petrographic study. This work developed an additional showing, the SR Showing, where trenching revealed massive stratabound galena and minor pyrite mineralization lying within tightly folded Unit F shales.

Eleven holes were drilled on the grid, three of which tested the SR Showing (Figure 7). Only sideritic shales with anomalous zinc, however, were encountered at this location. Due to complex folding all three holes are interpreted to have only tested the footwall of the massive galena showing on the surface (Bottrill et al 1983).

Five holes were drilled at the Malachite Trenches showing (Figure 7). The best of these, DDH 83-6, tested an IP anomaly and encountered a narrow vein of high grade massive sulphides assaying 16.4% Pb, 16.7% Zn and 15.9 oz/t Ag over 18 cm overlying a lower grade section of stratabound mineralization. The other four holes at this showing, however, only returned minor or insignificant mineralization.

The remaining three holes in the program tested the Malachite Adit Showing (Figure 7) but failed to encounter the bedded sphalerite observed on the surface. One of these holes, DDH 83-10, intersected a massive arsenopyrite vein with minor lead-zinc values. Another hole, DDH 83-11, cut 2.47% Pb, 5.05% Zn and 0.5 oz/t Ag over a narrow section of 25 cm. Though no economic deposits were located during the drilling Samim, did confirm the presence of highly altered and mineralized black shales on the surface (Bottrill et al 1983).

The petrographic study analysed 37 thin sections and 7 polish sections from mineralized showings and drill core. Samples from the Adit Showing clearly displayed banded sphalerite, galena and chalcopyrite parallel to bedding indicating "sedimentary hosted lead-zinc mineralization". Samples from drill holes and the Adit Showing displayed pyrite bands in arsenopyrite replaced by sphalerite, galena and chalcopyrite with accessory tetrahedrite and argentite. The interpretation is that

the silver is "clearly late and intimately associated with galena and the remobilisation of Pb, Cu, Ag and S" (Bottrill et al 1983).

Rock referred to in the field as green "quartzite" was identified in thin section as highly altered mafic volcanics. It contains phenocrysts, probably after olivine, of serpentine and chlorite with opaques and calcite, quartz and muscovite, probably after calcium feldspar.

Samim concluded that various features of these lead-zinc showings, especially in the Malachite Detail area, are indicative of possible nearby bedded mineralization of the Sedex type. They recommended considerably more mapping, geochem and IP surveying as well as diamond drilling including possible pattern drilling over favourable stratigraphy and alteration sequences. Their final conclusion was that the property remains one of considerable merit but recognized that a long term program of further work is required if a deposit is to be found (Bottrill et al 1983).

The Cliff Showing is situated just inside the property. It is a one metre thick horizon of galena and sphalerite at the limestone-siltstone contact in Unit D. Mineralization has been traced along strike for a distance of 100 metres. Several other showings also occur near the Crown Point adits on unoptioned mining leases (Dickie and Longe 1982).

### **Ruth - Vermont Mine**

The underground workings lie on the southwest limb of a southeast plunging syncline (Fyles 1966) comprised of a series of gently dipping argillites, limestones and grits belonging to the Grit Division of the Horsethief Creek Group sediments. These rocks are all cut by quartz veins. Argillite-limestone contacts are gradational and display well developed turbidite features. The grits range from coarse grained sandstones to pebble size conglomerates. Small scale folding and soft sediment deformation is common (Cukor and Longe 1996).

Lead-zinc-silver mineralization occurs as two distinct types; a) a series of quartz veins with galena, sphalerite, pyrite and scheelite and b) stratabound replacement sulphides of pyrite, sphalerite, galena and arsenopyrite. Chalcopyrite, boulangerite and tetrahedrite have also been reported. The replacement type (manto deposits) occur where quartz veins, especially the Pine Tree Vein, cut the limestone beds.

There are two main veins of particular economic importance in the mine, the Pine Tree Vein and the Blacksmith Vein (Figure 4). The Pine Tree Vein has a surface trace of 2600 feet in a southeast direction and vertical extent of 500 feet. The

average grade of this vein over a length of 1200 ft underground is 7.0% Pb, 6.06% Zn and 12.27 oz/t Ag across a width of 5.0 ft. The Blacksmith vein is parallel to the Pine Tree and also has a length of 2600 ft. Underground it averages 5.2% Pb, 3.1% Zn and 10 oz/t Ag across a width of 4.0 ft. During the course of underground drilling several more veins with similar grades and thicknesses were intersected (Tough 1972).

A three hole underground diamond drill program in 1996 (Figures 4 and 5) was designed to accomplish two objectives; a) to test for an underlying, shale hosted lead-zinc deposit, possibly the source for vein and replacement mineralization and, b) to find additional gold mineralization associated with a single gold value obtained in previous drilling. A deep vertical hole, DDH 96-1, did encounter a shale unit below the mine grit units, however, it failed to find any evidence of Sedex type lead-zinc-silver mineralization.

On the other hand, DDH 96-3 intersected 5.6 ft of 2.08 oz/t Au in a section of limy argillite with replacement type disseminated pyrite, arsenopyrite and sphalerite and massive vein type galena (Cukor and Longe 1997). This mineralization was found only a short distance away from a gold value of 0.54 oz/t Au over 4.5 ft obtained in an old hole drilled in 1968 (Figure 5). Apparently this is the best gold value available from only a few gold analyses registered in the old the mine records”.

## **1999-2000 PROGRAM**

Work completed from April 1999 to April 2000 consists exclusively of compilation of all available geochemical data (Appendix B) contained within Assessment Reports as documented in the provincial governments Assessment Report Index System. A total of 4,796 soil, 1,905 rock and 1,299 silt (lake or stream) samples have been compiled from previous Assessment Reports (including 5446, 6744, 7409, 8096, 8097, 8098, 8099, 8100, 8101, 8102, 8103, 8104, 8140, 8141, 8154, 8155, 8294, 8297, 8646, 8733, 9671, 10061, 10823, 11806, 18849, 20312, 21448, 21639, 22125, 22415, 22986, 23020, 22525, 23440, 24537) for the purposes of this report. In addition, an initial compilation of available data from geological mapping has also been undertaken in an effort to synthesize data arising from a number of local and regional exploration programs within or immediately adjacent to the property.

The reports represent exploration activity undertaken within or adjacent to the claim block, ranging from small detailed programs to large regional programs. The quality of the data is highly variable, ranging from assays of a few selected elements to multi-element ICP analyses, with accompanying location information currently missing for a significant sub-set of the data. For the remainder, locations have been determined largely by "rubber sheeting" digital scans of sample location maps onto the digital 1:20,000 TRIM maps and determining UTM coordinates within Autocad. North American Datum 1927 (NAD27) coordinates were provided in some instances (i.e. provincial government Regional Geochemical Survey (RGS) data) and were converted to NAD 83. As a result, the location of any single analysis is considered accurate to approximately  $\pm 100$  metres. Subsequent work with the database and the digital TRIM maps could result in better location of the data, however, it is probably more cost effective to treat the locations as semi-quantitative and determine precise UTM coordinates for work completed in subsequent programs. The data compiled in this report should facilitate identification of geochemically anomalous areas worthy of subsequent follow-up.

Continued compilation of available data is strongly recommended.

## DISCUSSION

The report of Gidluck (1997) provides a good summary of previous results arising from a variety of exploration programs over the years. In the report, he summarizes data documenting replacement-type lenses and veins throughout the property and those mined in the Ruth-Vermont workings. He also summarizes data leading to postulated SEDEX (sedimentary exhalative) potential on the claims, particularly in the southern portion of the claims. This report is intended to provide initial semi-quantitative data on which to base subsequent exploration decisions and with which to evaluate SEDEX and/or replacement potential.

MineQuest data has intentionally been omitted from this compilation effort, as such compilation is apparently protected contractually by an agreement with Mountain Star Resources Ltd. Obviously, inclusion of this data would greatly assist evaluation of the mineral potential within the claims and identification of anomalous areas for subsequent follow-up. Obviously, future work on the property will benefit greatly through addition of this data to the existing geochemical and geological database.

The most striking aspect of the property to date is the lack of a single coherent compilation of all available quantitative data, for which the work documented herein represents an initial attempt. Much of the difficulty in continuing the compilation effort will be with the poor documentation associated with the data. As noted by Gidluck (1997), "... in the public and private reports available, there is considerable conflicting evidence on the location and orientation of many of the drill holes ...". Compilation work in the future may have to gather all data and separate it into two databases. The first would consist of all available information, together with the variable uncertainty and a second consisting exclusively of well documented information with a high order of reliability. The preliminary database compiled for this report should be utilized in a semi-quantitative manner on a regional basis to indicate areas of anomalous geochemistry for subsequent follow-up and verification. MineQuest data is expected to be high quality data with precise UTM coordinates (or for which coordinates can be determined) and should be added to high quality contained in the current database. Field data arising from subsequent field work should be added to this database on an ongoing basis.

The database compiled for this report consists of a total of 4,796 soil, 1,905 rock and 1,299 silt (lake or stream) samples compiled from previous Assessment Reports (including 5446, 6744, 7409, 8096, 8097, 8098, 8099, 8100, 8101, 8102, 8103, 8104, 8140, 8141, 8154, 8155, 8294, 8297, 8646, 8733, 9671, 10061, 10823, 11806, 18849, 20312, 21448, 21639, 22125, 22415, 22986, 23020, 22525, 23440, 24537). These data were compiled to identify geochemically anomalous areas on the property as well as possible gaps in geochemical coverage. The bulk of the data consists predominantly of lead + zinc analyses, with subordinate copper ± silver ± gold.



Approximately 75% of the data compiled have been plotted in Figures 11-13 (Regional Lead, Zinc and Copper Analyses). A small sub-set of the data are available north of 5657000N but the majority of the data not plotted for this report lies south of 5641000N, extending from the southern portion of the Bright Star claim block through the VAD, AVD claims south along Vowell Creek toward Warren Creek. As this area is not pertinent to the current program, these data have not been included in the plots.

(Note: the claims to the northwest have been allowed to lapse since Figures 11-13 were plotted in May, 1999)

The main features to note in Figures 11-13 are the cluster of anomalous values on either side of Malachite Creek (particularly the south) and north of Crystalline Creek (the LCP Zone). The lack of data between these zones reflects the absence of Minequest data and documents the necessity for this data to be included in the immediate future.

#### Regional Lead (Figure 11)

Classification of analytical results was taken from previous reports and utilized in a semi-quantitative manner for the purposes of this report. Categories range from background ( $\leq 40$  ppm), through weakly ( $>40$  to  $\leq 90$  ppm) and moderately ( $>90$  to  $\leq 140$  ppm) anomalous to strongly anomalous ( $>140$  ppm). The categories are semi-quantitative in that they are identical for Rock, Soil and Silt data and incorporate analyses obtained using a variety of analytical methods (i.e. ICP, Fire Assay, Whole Rock, etc.).

Despite the semi-quantitative nature of the data classification, the mineralized character of the area is evident, with a high proportion of the moderately to highly anomalous values contained within the current claims, although there is an inherent bias due to sample density in that the majority of the data compiled lie within or adjacent to the claims (i.e. there are few sample locations west of the claims).

#### Regional Zinc (Fig 12)

As with the lead data, zinc was also classified into background ( $\leq 60$  ppm), through weakly ( $>60$  to  $\leq 120$  ppm) and moderately ( $>120$  to  $\leq 180$  ppm) anomalous to strongly anomalous ( $>180$  ppm). As an aside, zinc values of 145 ppm are considered strongly anomalous in the Aldridge Formation (which hosts the world class Sullivan Mine) in the underlying Purcell Supergroup, therefore, the bounding values for the categories **may** be too high.

The regional zinc plot also documents a high proportion of moderately to highly anomalous data within the claims but there is a significant sub-set of data which lies east of the claim block. In addition, stream geochemical data in the Vermont Creek valley record a number of strongly

anomalous values east of the Mellenco claims and the former Ruth-Vermont mine site. Given the grade of ore mined, the documented presence of a series of high grade veins in the Ruth-Vermont mine as well as the possibility of sedimentary exhalative horizons postulated in previous reports (i.e. Longe 1985), further evaluation of this area is warranted followed by acquisition by staking if high grade mineralization in outcrop is identified.

### Regional Copper (Fig. 13)

As with lead and zinc, copper data have been classified in a semi-quantitative manner into background ( $\leq 30$  ppm), through weakly ( $>30$  to  $\leq 50$  ppm) and moderately ( $>50$  to  $\leq 70$  ppm) anomalous to strongly anomalous ( $>70$  ppm).

An interesting feature of the graphical copper data is the apparent relationship between strongly anomalous values and higher elevations, particularly east of the claims on either side of Malachite Creek. In addition, there appears to be an association between strongly anomalous copper and both lead and zinc on either side of Malachite Creek as well as the headwaters of Vermont Creek. These observations represent initial observations from the graphical plots, however, much of the data is comprised of Pb and Zn analyses only, with copper included in a subordinate number of analyses reported. Therefore, these observations probably represent an artifact of the database rather than regional metal zonation.

### Detailed Plots (Figs. 14-16)

Since the Regional maps were plotted in May, 1999, approximately 300 additional analyses have been added to the database for the area south of Malachite Creek. These data represent the result of approximately 1500 soil samples which were subsequently composited, with the resulting composite samples analyzed. As a result, the detailed maps contain only slightly more information than the Regional maps and therefore will not be discussed in detail.

A ground geophysical program was considered for the 1999 field season, extending from Crystalline Creek northwest to Malachite Creek. For this reason, a sub-set of the compiled database was plotted, comprised of all data in an area extending from the height of land between Vermont and Crystalline creeks northwest to the height of land north of Malachite Creek. As with the Regional Plots, the absence of MineQuest data results in limited data in the southern portion of the claim block plotted. For comparative purposes, however, there are abundant strongly anomalous data for copper, lead and zinc in the area south of Malachite Creek. Given the documented northwest trend of the veins in the Ruth-Vermont area, these anomalous data are interpreted to document similar vein type mineralization in northwest trending structures, possibly associated with fold hinges and/or faults.

As described in the Regional plots, moderately to strongly anomalous copper, lead and zinc values are present in soils from the headwaters of Vermont Creek. In addition, strongly anomalous zinc values are present in silt samples east of the Ruth-Vermont mine, north of Vermont Creek. On the basis of these data, consideration should be given to undertaking follow-up soil and/or rock sampling in these areas to evaluate the mineral potential (subsequent to amending the geochemical database with all available MineQuest data).

Another feature that becomes more apparent on the detailed geochemical plots relative to the Regional plots is the error associated with sample locations. This is most apparent in the silt samples, which were taken along water courses. The average error is in the order of  $\pm 100$  metres, however, in several instances greater error is apparent. This is a function of a number of contributing factors:

1. Differences in topographic bases - the base map for this report is a composite of the digital 1:20,000 TRIM maps whereas previous reports utilized 1:50,000 NTS map bases or hand drawn versions of the map,
2. Sample location maps were all copied from microfiche, which represent second generation copies,
3. Microfiche maps were copied using a fiche reader/printer having a curved lenses which introduced variable error from the centre to the edge of each copy and each map consisted of portions of the fiche map subsequently sliced together,
4. The spliced sample location maps were then scanned using a roll scanner (which would have introduced very little error). The digital image was then "rubber-sheeted" onto the digital TRIM base using available topographic landmarks and/or coordinates and then sample locations determined using Autocad.

In some instances, precise coordinates (i.e. RGS data) were provided whereas in other reports only approximate coordinates were available. However, the coordinates utilized the North American 1927 Datum (NAD 27). Therefore, these coordinates were converted into NAD 83 (so as to be consistent with the TRIM maps) using the National Transformation: version 2 software (MELP 1996). The conversion may also have introduced some error.

The conclusion resulting from the 1983 Samim Canada program was "... that various features of these lead-zinc showings, especially in the Malachite Detail area, are indicative of possible nearby bedded mineralization of the Sedex type. They recommended considerably more mapping, geochem and IP surveying as well as diamond drilling including possible pattern drilling over favourable stratigraphy and alteration sequences. Their final conclusion was that the property remains one of considerable merit but recognized that a long term program of further work is required if a deposit is to be found (Bottrill et al 1983)".

Seventeen years later, the author believes this conclusion is still valid and correct. Considerable geochemically anomalous data exists through the core of the property, from the LCP Zone, through the former mine workings to Malachite Creek. A total of 7998 soil, silt and rock analytical data have been compiled from Assessment Reports filed for a number of different areas covered by, or adjacent to, the current claim block. Regionally, there appears to be a broad zonation from copper dominated data from Warren Creek (southeast of the property), through base and precious metal mineralization in the southern portion of the claims to precious metal dominated mineralization in the northern portion of the claims (i.e. Flying Dutchman). This may be evidence of a tilted epithermal system or a carbonate replacement deposit system associated with igneous intrusives in the area. Alternatively, it may be a function of analytical bias (i.e. the result of analysis for selected elements). Subsequent analysis using multi-element ICP should provide quantitative data with which to evaluate these possibilities.

## CONCLUSIONS

This report represents an initial attempt to compile the varied and diverse information available pertaining to Bright Star Venture Corp's claim group. The data consists predominantly of analytical data for soil, silt and/or rock samples taken within, and in the immediate area of, the Bright Star claims, with the exception of MineQuest data (the compilation of which is contractually protected). The intentional omission of this data represents a significant loss of data in the claims and it is strongly recommended that this data be compiled and appended to the database in the future.

The data compiled and plotted for this report documents the geochemically anomalous nature of a zone extending from the LCP Zone northwest through the former Ruth-Vermont mine site to Malachite Creek. This region is underlain by the Late Proterozoic Horsethief Creek Group and lies north of the Bugaboo Batholith. The Ruth-Vermont mine was in limited production from 1970 to 1971 and again in 1973, producing silver, lead and zinc from a series of north-northwest trending veins, primarily from the Blacksmith and Pine Tree veins. Several other veins were reportedly identified in the underground workings.

A series of regional programs from the mid 1960's onward attempted to evaluate sedimentary exhalative (SEDEX) potential in the area, primarily the central to northern portion of the claims. A number of stratabound lead±zinc horizons were reported and an apparently consistent local stratigraphy identified and applied discontinuously throughout the area. Correlations are difficult due to the broadly homogeneous nature of the Horsethief Creek Group and structural complications within the Purcell Anticlinorium in the hangingwall of the Purcell Thrust.

In the author's opinion, the current database needs to be amended by addition of MineQuest's data, followed by a short field program to gather predominantly geological information (i.e. stratigraphic and/or structural information) from the region extending from the LCP Zone to Malachite Creek. This work should result in a coherent understanding of the stratigraphic and structural relationships in the area centred around the former Ruth-Vermont mine site and allow initial interpretation of the relationship between documented mineralization in the area and the stratigraphy and/or structure, including (but not limited to) the following:

1. Is mineralization predominantly stratabound or vein-type?
2. Is there significant gold associated with documented silver + lead + zinc in the area?
3. Can a consistent stratigraphy be identified in the area and, if so, can it be correlated to the north?
4. Are there preferred mineralized horizons and can they be mapped?
5. Are veins in the Ruth-Vermont area controlled by faults and/or a fold axis?
6. Do the mineralized horizons and/or structures extend off property to the east and/or west?

Given the current level of information available to the author, a drill program is not recommended at this time. In the author's opinion, there is insufficient information with which to identify a potential sub-surface target and provide constraints on the orientation, inclination and probable depth to such a target from surface information. However, with the addition of the MineQuest geochemical data as proposed and compilation of geological (stratigraphic and structural information), together with the possible additional mapping in the vicinity of a proposed drill location, a drill program may be justified.

Upon review of Minequest's data, two drill holes located in areas of known surface and sub-surface mineralization may prove very informative. In the case of the Ruth-Vermont area, original copies of maps and sections of the underground workings are apparently in the possession of MineQuest. Examination of such data, together with surface geology and geochemistry, would likely be sufficient to propose a drill hole.

In the case of the LCP Zone, surface soil geochemistry has been presented in contoured form in Gidluck's (1997) Figure 10. Locating a possible drill location would be assisted greatly by having the original data plotted, together the contoured data on a topographic base. In addition, a review of the results of previous drill holes and their respective orientations should be included in identifying a drill location. Ideally, plotting the previous drill holes in three dimensions and incorporating the sub-surface information in a series of sections together with available surface data (geology and geochemistry) should be undertaken in order to propose a suitable location.

## RECOMMENDATIONS

The conclusion resulting from the 1983 Samim Canada program was "... that various features of these lead-zinc showings, especially in the Malachite Detail area, are indicative of possible nearby bedded mineralization of the Sedex type. They recommended considerably more mapping, geochem and IP surveying as well as diamond drilling including possible pattern drilling over favourable stratigraphy and alteration sequences. Their final conclusion was that the property remains one of considerable merit but recognized that a long term program of further work is required if a deposit is to be found (Bottrill et al 1983)".

Seventeen years later, the author believes this conclusion is still valid and correct. To that end and to the extent possible, the author strongly recommends that all available information continue to be compiled for the area covered by the property and the immediately adjacent area. The initial emphasis should extend from the LCP area, northwest through the Ruth-Vermont mine site to Malachite Creek. The data should be evaluated with respect to its probable accuracy such that poor quality data should be considered for field based verification whereas good to high quality data can be treated as accurate and utilized for decision making. Field work undertaken in the future should attempt to document trenches (i.e. location, orientation, mineralization and/or geological information), geochemical and/or geophysical station locations (UTM coordinates and elevation) and/or drill holes (UTM coordinates, elevation, azimuth and inclination of the collar). Maps and cross-sections of the underground workings of the Ruth-Vermont Mine should be scanned to ensure they are preserved. Serious consideration should be given to digitizing the maps and/or sections and reviewing / re-interpreting the correlations with any available remaining records (i.e. geology, assay/analytical, drill hole data, etc.). Drill hole data should be compiled and entered into a 3 dimensional database to facilitate correlation with surface data and underground mine data.

Structural data is required as an integral part of all future exploration programs, including measurements from outcrop, underground workings and/or diamond drill holes. These data represent a significant weakness in the documentation accompanying all previous reports. Without such data, no meaningful regional projections and/or correlations can be attempted and no significant cross sections can be developed to integrate surface and underground data (whether from diamond drill holes or from underground workings). Finally, with the possible exception of deep penetrating geophysics, no meaningful sub-surface drill targets can be developed or proposed.

Exploration data from subsequent programs should be added on an ongoing basis to the database to increase confidence pertaining to evaluation of the property and its potential. In particular, geological mapping, emphasizing stratigraphic correlations and structural data should be gathered in the area surrounding the Ruth-Vermont mine site and, together with underground mine data, used to develop a better constrained cross section as an aid for further drilling to test

the postulated SEDEX potential in the "Target Shale". To the author's knowledge, the only existing section to date on which decisions can, and have been made, is Figure 5 in the report of Gidluck (1997).

Stratigraphic correlations made from the LCP area northward to Malachite Creek should be confirmed and refined by MineQuest and plotted on the digital 1:20,000 TRIM topographic map. The reported stratabound lead  $\pm$  zinc and manganese horizons should be plotted and subsequently followed up in the field with stratigraphic and/or structural mapping to map possible marker horizons and attempt to extend correlations. These stratabound horizons obviously represent the best opportunity in the immediate future to evaluate the SEDEX potential of the area.

The second aspect to mineralization in the area is that of replacement manto and/or vein potential, as exemplified by the Ruth-Vermont mine. In discussing the mine, Gidluck (1997) states "... There are two main veins of particular importance in the mine, the Pine Tree Vein and the Blacksmith Vein (Figure 4). The Pine Tree Vein has a surface trace of 2600 feet in a southeast direction and vertical extent of 500 feet. The average grade of this vein over a length of 1200 ft underground is 7.0% Pb, 6.06% Zn and 12.27 oz/t Ag across a width of 5.0 ft. The Blacksmith vein is parallel to the Pine Tree and also has a length of 2600 ft. Underground it averages 5.2% Pb, 3.1% Zn and 10 oz/t Ag across a width of 4.0 ft. During the course of underground drilling several more veins with similar grades and thicknesses were intersected (Tough 1972)". In addition, "A feasibility study in 1972 indicated there was 291,384 tons of mineable ore reserves (after dilution) averaging 4.76% Pb, 5.65% Zn and 6.62 oz/t Ag with good prospects of increasing these reserves (Manning 1972)". Scanning, digitizing and re-interpreting maps and sections of the underground mine workings, together with additional stratigraphic and/or structural data, should result in a logical program to address the possibility of increasing reserves identified and documented at the mine.

All future soil, rock and drill core analyses should utilize multi-element (28 to 30 element) ICP analysis with assays on high grade (potentially ore grade results) to facilitate identification of base and/or precious metal potential and/or pathfinder elements, together with the effects of possible alteration. Where direct base and/or precious metal results are disappointingly low, pathfinder elements (i.e. Cd for Zn) may indicate proximity to higher grade results and/or the possibility of interference or masking by other elements.

In his recommendations, Gidluck (1997) stated "Tight topographic elevation control will be required for the detailed structural and stratigraphic mapping. It will be necessary to have an orthophoto made of the area with 1 to 2 metre contours and survey control points, especially in the area of the LCP Zone. A mapping grid will then be cut or refurbished and tied into the orthophoto". The author agrees that an orthophoto would be an extremely useful resource for interpretive and mapping purposes, however, a 1 to 2 metre contour significantly exceeds the level of control available in any of the data available at this time. Aerial photographs at a scale



of 1:15,000 are available (and have been acquired) for the property and can be orthorectified (corrected in 2 dimensions) then subsequently mosaiced together. The resulting orthorectified mosaic can then be attached to a Digital Elevation Model (DEM) to produce an orthophoto. The 1:20,000 TRIM map can be digitally attached as a vector overlay to produce an orthophoto with a 20 metre contour interval. If a differential GPS is used for control in all future exploration, then in the event a more detailed orthophoto is required in the future, the GPS data can be utilized to accurately plot all data on the revised orthophoto.

In addition, a differential GPS survey should be considered for the claims on the property. Utilizing new government regulations, differential GPS data collected can be submitted for one years assessment credit. This represents an extremely cost effective manner with which to address claim maintenance issues. It has the further advantage of providing Bright Star with precise claim location data to evaluate its claim holdings and identify any possible gaps in the claim block. Although strongly recommended to be included with other field work, it could be undertaken as a separate program (at additional cost).

In 1999, a ground geophysical program was considered for a proposed survey extending from the LCP Zone northwest to the height of land between Vermont and Malachite creeks. A number of geophysical companies were contacted to recommend programs and provide estimates for their programs. Frontier Geosciences Inc. of North Vancouver was considered to have presented the most cost effective program, representing a compromise between depth penetration and survey cost. They recommended a Transient Electromagnetometer (TEM) survey to test a relatively near surface northwest trending vein system and a potential deep (SEDEX) horizon to as much as 1500 metres below surface. The total cost of the program was estimated at \$20,615 and did not include the cost of line-cutting.

Due to the high relief present in the area considered for a ground geophysical program, the issue of the quality of data to be expected needs to be considered. Corrections required to process the field data may mask or create anomalies or make interpretation of the data difficult. An alternative might be consideration of down hole geophysics. However, the cost of drilling the hole(s) would exceed the cost of the proposed ground geophysical program and the areal extent of the down hole survey would be much more restricted than that of a ground survey. The advantage is that the quality of data arising from a down hole survey would be much better than the ground survey.

Therefore, if two holes were drilled in areas of known, documented high grade mineralization, then the possibility of additional, potentially high grade ore could be evaluated. One hole drilled in the vicinity of the Ruth-Vermont Mine site where there are still documented reserves remaining and reasonable grounds to interpret the possibility of additional resources strongly suggests a drill hole followed by down hole geophysics is worthy of consideration. A second

possible location is in the LCP Zone where both surface and sub-surface mineralization has been identified in previous programs.

Proposing a location for one or both of these drill holes presents an initial difficulty, however, in that the quality of geological information currently available to the author is not considered adequate to determine the orientation of (a) proposed hole(s). Surface geological and/or geochemical data is probably available to MineQuest and could be utilized to identify a collar location and this data, together with sub-surface mine plans and sections would probably be sufficient to propose an orientation (azimuth and inclination) best suited to test for mineralization in the area of the former Ruth-Vermont mine.

Contoured geochemical information for the LCP Zone was included in Gidluck's (1997) report, however the sample locations were not included. Individual data should be plotted with all available surface geological information on the topographic base. In addition, where possible, the drill holes should be plotted and sections produced which incorporate the surface and sub-surface information, particularly with respect to the possible presence and sub-surface projections of the Medesto Fault. Drilling, followed by down hole geophysics, would be largely ineffective if the mineralization were cut-out across a fault. (Note: lining the drill holes with PVC tubing should be considered so as to minimize the risk of losing the down hole geophysical tool **provided** it would not interfere with acquisition or quality of the data)

At present, geophysics is being considered in an attempt to evaluate mineralization documented on the property and develop additional targets in the sub-surface with the goal of defining additional, potential resources at the former Ruth-Vermont mine as well as testing possible sub-surface mineralization elsewhere on the property. The advantages and disadvantages of a ground geophysical survey versus a drill program followed by down hole geophysics needs to be discussed with a qualified, unbiased geophysicist with reference to surface geology and geochemistry in order to make an informed decision.

In summary, the above recommendations advocate consideration of developing a Geographic Information System (GIS) database for the property given its size and extent, the variety and detail of data available, the differing deposit types proposed for consideration and the requirement to evaluate these data together. All future geological, geochemical, and/or geophysical information must be plotted with reference to topography to allow meaningful interpretation of the results.

The budget proposed on the following pages has been broken down and estimated for separate modules as per the preceding recommendations.

**PROPOSED BUDGET**

The following tentative budget is proposed, however, the actual rates have not been determined at the time of writing and will have to be confirmed by the geologist supervising the project.

1.	MineQuest - compile data and append to existing database	\$ 4,000
2.	Digitize / Scan Ruth-Vermont underground maps, plans and sections	\$ 5,000
3.	Orthophoto - 31 air photos	
4.	Geocode / Orthorectify air photos - 62 hours	\$ 3,100
	Mosaic air photos - 10 hours	\$ 500
	Convert topographic contours to 3d - 40 hours	\$ 2,000
	Attach TRIM map to orthophoto - 2 hours	\$ 100
	Plotting - 3 copies at \$35 / copy	<u>\$ 105</u>
	Total	\$ 5,805
5.	Geological mapping extending from LCP Zone to Malachite Creek, as follows: - assume 20 day program	
	Pre-Field - mob/demob	\$ 2,000
	Field Program	
	Personnel - Senior Geologist - \$400 / day	\$ 22,000
	Junior Geologist - \$300 / day	
	Two assistants - \$200 / day each	
	Analytical - assume 30 samples / day @ \$20 / sample analysis	\$ 12,000
	Food/Grocery	\$ 1,000
	Truck - 1 truck w/ camper and 1 4WD truck	\$ 4,500
	Fuel	\$ 1,000
	Helicopter - 3 hrs at \$1,000 / hr	\$ 3,000
	Supplies	\$ 1,000
	Miscellaneous	\$ 1,000
	Equipment Rentals - 2 hand-held radios @ \$60 / day	<u>\$ 2,400</u>
		\$ 49,900
	Contingency on Field Program (10%)	\$ 5,000
	Post-Field - report writing / data plotting	<u>\$ 5,000</u>
	TOTAL:	\$ 59,900
6.	GPS Survey - assume separate program (less if built in with above program)	\$ 15,000
7.	Ground TEM (geophysical survey) plus line cutting	\$ 40,000

8.	Drill program - large diameter (HQ - 2.5" core diameter)	
	- 2 holes - 460 m (1,500 feet) each, totalling 920 m (3,000 feet)	
	- mob/demob	\$ 6,000
	- 3,000 feet at \$30 per foot (high end of price range)	\$ 90,000
	- 1,500 feet of PVC tubing	\$ 6,000
	- rehabilitation of road to facilitate access for drill	<u>\$ 15,000</u>
		Sub-total \$117,000
		20% contingency <u>\$ 23,000</u>
		\$140,000
9.	Down hole geophysics (estimate)	\$ 40,000
10.	Camp costs - assume conservative 40 metres core recovered / day - 23 days	
	- Cook - 23 days at \$200 / day	\$ 4,600
	- Food - 4 man drill crew, one geologist, one cook	
	- 7 people at \$60 / person/day x 23 days	\$ 9,660
	- Accommodation - rent trailers or build wood sided tents (?)	
	- 7 people at \$100 / day x 23 days	<u>\$ 16,100</u>
		\$ 30,360
11.	Core description/sampling	
	- Geologist - 23 days at \$400 / day	\$ 9,200
	- Assistant - 23 days at \$200 / day	\$ 4,600
	- assume 200 samples, 1 metre in length	
	- Analytical costs - 200 samples @ \$20 / sample	\$ 4,000
	- consumables (sample bags, felt markers, tags, etc.)	\$ 500
	- binocular microscope - 23 days at \$50 / day	\$ 1,150
	- rock saw (split core - half for analysis, retain half)	
	- \$40 / day x 23 days	\$ 920
	- extra blades	\$ 300
	- shipping	\$ 300
	- generator - 23 days at \$100 day	\$ 2,300
	- 4 WD truck - 23 days at \$75 / day	\$ 1,725
	- mileage - 1,500 km at \$0.30 / km	\$ 500
	- fuel	<u>\$ 1,000</u>
		\$ 26,495

**TOTAL****\$366,560**

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## **Appendix A**

### **Statement of Qualifications**



## STATEMENT OF QUALIFICATIONS

I, Richard T. Walker, of 656 Brookview Crescent, Cranbrook, BC, hereby certify that:

- 1) I am a graduate of the University of Calgary of Calgary, Alberta, having obtained a Bachelors of Science in 1986.
- 2) I obtained a Masters of Geology at the University of Calgary of Calgary, Alberta in 1989.
- 3) I am a member in good standing with the Association of Professional Engineers, Geologists and Geophysicists of Alberta.
- 4) I am a member of good standing with the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
- 5) I am a consulting geologist and Principal with the firm of Dynamic Exploration Ltd. with offices at 656 Brookview Creseent, Cranbrook, British Columbia.
- 6) I am the author of this report which is based on work I personally performed between April 4, 1999 and March 31, 2000.

Dated at Cranbrook, British Columbia this 16<sup>th</sup> day of May, 2000.

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Richard T. Walker, P.Geo.

## **Appendix B**

### **Geochemical Analyses**

**Appendix C**

Statement of Expenditures

## STATEMENT OF EXPENDITURES

The following expenses were incurred on behalf of the Vermont 1 and 2 claims for the purposes of preparatory work within the period April 4th, 1999 to March 31, 2000.

### PERSONNEL

R.T. Walker, P.Geo.: Data Compilation	\$ 3,350.50
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### DISBURSEMENTS

BC Online Charges	\$ 69.00
CD-ROM data back up	\$ 20.00
Drafting	\$ 688.55
Miscellaneous	\$ 20.00
Reproduction	\$ 155.13
Shipping	\$ 20.00
Telephone	\$ 20.23

### REPORT / REPRODUCTION

R. Walker, P.Geo.:	<u>\$ 300.00</u>
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Total:	<u><b>\$4,643.41</b></u>
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## **Appendix D**

### Program-Related Documents

**MINEQUEST EXPLORATION ASSOCIATES LTD.**

HOLE NO.

VC-00-01

**DRILL LOG: DIAMOND DRILL CORE**

**CLAIM BLOCK CODE:**

**NTS:** 82K/14, 15 **UTM:** 82K096

**CLAIM NAME:** Ruth-Vermont SURVEY

**LOCATION - GRID NAME:**

**GRID N:** 5644379 **GRID E:** 501264 **DEPTH AZIM** **DIP** **DEPTH AZIM.** **DIP**

**SECTION** **ELEV:** 1709

**AZIM:** 240° **LENGTH:** 88.39 m

**DIP:** -90° **CASING LEFT?:**

**CORE SIZE:** NQ

**CORE STORAGE:** G. Mason, Parson, BC

**DRILLING CO:**

Britton Bros.

**STARTED:**

Sept. 1, 2000

**COMPLETED:**

Sept. 2, 2000

**PURPOSE**

To test

stratigraphy

**CORE RECOVERY:**

Almost 100%

**LOGGED BY:**

R. Walker

**DATE LOGGED:**

Sept. 1-3, 2000

**ASSAYED BY:**

**LAB REPORT NOS.:**

**MINEQUEST EXPLORATION ASSOCIATES LTD.**

HOLE NO. VC-00-02

**DRILL LOG: DIAMOND DRILL CORE**

**CLAIM BLOCK CODE:**

NTS: 82K/14, 15 UTM: 82K096

CLAIM NAME: Ruth-VermoSURVEY

**LOCATION - GRID NAME:**

GRID N 5644065 GRID E: 501361 DEPTH AZIM DIP DEPTH AZIM. DIP

SECTION ELEV: 1709 149 -65° 299 -60°

AZIM: 240° LENGTH: 562.63 m 500 -55°

DIP: -60° CASING LEFT?:

CORE SIZE: NQ

CORE STORAGE: G. Mason, Parson, BC

DRILLING CO: Britton Bros.

STARTED: Sept. 2, 2000

COMPLETED: Sept. 10, 2000

PURPOSE To test

stratigraphy

CORE RECOVERY: Almost 100%

LOGGED BY: R. Walker

DATE LOGGED: Sept. 1-11, 2000

ASSAYED BY: R. Walker

LAB REPORT NOS.: