895284

Report on the

Vowell Creek Project

Golden Mining Division
N.T.S. 82K/14, 15 & 82N/3
Latitude50° 57' N, Longitude 116° 58' 30" W

for

Jasper Mining Corporation
1020, 833 - 4th Avenue S.W.
Calgary, Alberta
T2P 3T5

Submitted by:

Richard T. Walker, M.Sc., P.Geol.

of

Dynamic Exploration Ltd.
656 Brookview Crescent
Cranbrook, B.C.
V1C 4R5

Submitted: April 30th, 2002

SUMMARY

The Vowell Creek Project consists of a diverse group of mineral claims, Crown Grants and Mineral Leases held by Mountain Star Resources Ltd., a wholly owned subsidiary of Jasper Mining Corporation. The claims cover an elongate area of approximately 5,030 hectares oriented northwest-southeast and approximately 19 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)-type mineralization. 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 and replacement-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 sedimentary exhalative (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 potential for carbonate replacement-type deposits.

Since acquiring the property, the Company has completed surface and limited underground diamond drilling in the former Ruth-Vermont mine, surface drilling to test the LCP Zone, a brief transient electromagnetic and gravity geophysical survey, a partial compilation of underground mine plans and sections and a compilation of surface geochemistry immediately adjacent to the claims.

Acquisition of stratigraphic and structural data at surface, coupled with compilation of underground data from the former Ruth-Vermont mine may lead to more confident assessment of mineralization in the immediate vicinity of the former Ruth-Vermont and LCP Zone. Finally, these data can be used to project the Ruth limestone and the vein system identified along Vermont Creek southward toward the LCP Zone and north into Malachite Creek to assess the extent and vein- / replacement-type potential of the mineralized system.

In summary, previous work on behalf of Jasper Mining Corporation has emphasized the potential for SEDEX type mineralization. While acknowledging the SEDEX potential interpreted for the area, the author differs in opinion from previous (recent) authors by recommending emphasis on work to increase vein- and replacement-type reserves remaining at the former Ruth-Vermont mine.

Table of Contents

List of Figures

List of Appendices

1.00 INTRODUCTION

1.1 Terms of Reference

The author has been requested by Jasper Mining Corporation to prepare a summary report, as follows:

- Review geological and physical work completed on the mineral claims and Crown Grants covering the former Ruth-Vermont Mine, including the immediately adjacent area and claims extending south to the LCP Zone, with emphasis on work completed by, or on behalf of, Mountain Star Resources Ltd, Bright Star Metals Inc., Bright Star Ventures Inc. and Jasper Mining Corporation

- Evaluate previous exploration work completed in this area and, if appropriate, propose an exploration program to continue assessment of the former Ruth-Vermont Mine and/or the immediately surrounding area.

- Follow the guidelines and framework defined in Form 43-101F1, pertaining to National Instrument 43-101, "Standards of Disclosure for Mineral Projects".

1.2 Purpose of Report

It is the understanding of the author that the report is intended to be used to assist financing activity on the part of Jasper Mining Corporation.

1.3 Sources of Information

This report is based on a variety of reports, primarily internal reports and Assessment Reports filed on the former Ruth-Vermont mine and the immediately surrounding area. The author utilizes early regional correlations by Price and Mountjoy (1979), Okulitch and Woodsworth (1977), Reesor (1973), Young et al. (1973) and Wheeler (1963). Subsequent work with respect to correlations has been utilized from a Ph.D. by Kubli (1990) and Kubli and Simony (1994).

Assessment reports documenting previous work have been incorporated into the text, primarily those of Bottril et al. (1983), Nolin et al. (1983), Dickie and Longe (1982), Brophy and Slater (1981), Nolin (1981) and Smith et al. (1980).

The author relied on a number of reports and internal communications pertaining to the former Ruth-Vermont mine during, and subsequent to, its operation, including Fyles (1966), Manning (1972), Tough (1972), Forman (1982, 1981)

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.

On the basis of his literature review, Gidluck (1997) states that "... 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 ... , in many instances, are a "best estimate".

Finally, work to date on behalf of the Company has been completed by MineQuest Exploration Associates Ltd. and reports documenting their work has been relied upon, including Longe et al. (2001, 2000), Cukor and Longe (1997), Cukor (1996) and Longe (1993a, b; 1985).

1.4 Extent of Field Involvement of the Qualified Person

The author has been on the property on a number of separate occasions. The author first visited the property in 1991 while employed by Kootenay Exploration (Cominco) Ltd. to undertake mapping along Crystal Creek, immediately south of Vermont Creek and the former Ruth-Vermont mine. Subsequently, in 1999, the author undertook a property visit with Robert Longe (representative of MineQuest Exploration Associates - property vendor) to examine the Ruth-Vermont and LCP Zone areas, both areas in which subsequent exploration has taken place. In 2000, the author was retained by Bright Star Ventures Corp., through MineQuest Exploration Associates, to log drill core arising from diamond drilling on the Ruth-Vermont (2 holes) and LCP Zone (3 holes).

2.0 PROJECT DESCRIPTION AND LOCATION

2.1 Project Area

The Vowell Creek Project consists of a diverse group of contiguous mineral claims, Crown Grants and Mineral Leases, located in the Golden Mining Division, held by Mountain Star Resources Ltd, a wholly owned subsidiary of Jasper Mining Corporation. The claims cover an elongate area of approximately 5,030 hectares oriented northwest-southeast and approximately 19 km in length (Figure 1), approximately 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.

2.2 Location and Access

The property comprises an area extending from the headwaters of Bobbie Burns, Malachite, Vermont and Crystal creeks, through Crystalline Creek to the confluence of Conrad and Vowell creeks in the northern Purcell Mountains (Figure 2). The centre of the claims is located approximately 30 km southwest of Golden, B.C. (Figure 1) and 27 km west-southwest of the town of Parson, British Columbia (Figure 1) at approximately latitude 50° 57' N, longitude 116° 58' 30" W (UTM coordinates 501500 E, 5644000 N, Zone11). The property lies on NTS mapsheets 82N/2, 3 and 82K/14, 15. Alternatively, with reference to the BC Geographic Survey 1:20,000 Terrain and Resource Information Management (TRIM) maps, the property lies on mapsheets 082K 085, 086, 095, 096, 082N 005 and 006.

The central portion of the property (the focus of this report), comprising the Ruth-Vermont and VMT Claim Groups, can be accessed by 2-wheel drive 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.

Tembec Industries Inc. has recently rehabilitated the old mining road from the Vowell Creek Mainline into the Vermont Creek drainage in order to access timber along the lower portion of the creek. Therefore, an access road compliant with haul road standards under BC's Forest Practices Code exists and can be utilized in the near future, however, the road does not extend to the former Ruth-Vermont mine site. Furthermore, despite the fact that Tembec Industries Inc. utilized an existing and established mining road, they probably have incurred liability under the Forest Practices Code for its use and maintenance and therefore authorization for its use by mineral tenure holders is recommended.

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 Lodge, located on the Vowell Creek logging road at the 57 km post, adjacent to the VMT claims.

2.3 Physiography And Climate

Elevations on the property vary from approximately 1400 m (4600 ft) at the southern edge of the property adjacent to Vowell Creek to 2870 m (9400 ft) on Vermont Mountain (Figure 9). Much of the property, however, is situated above tree line 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 as 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 in the Northern Purcell Mountains. As such, they 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, the possibility of early, heavy snowfall and freezing (at higher elevations) as early as mid-September, can be expected to result in delays during some aspects of an exploration program.

2.4 Property Ownership

The initial property was comprised of mineral claims and mining leases staked in 1989 and 1990 by MineQuest Exploration Associates Ltd. on behalf of the Spillamacheen Joint Venture. In 1995, the VMT claims were acquired by Mountain Star Resources Ltd., which had previously acquired the former Ruth-Vermont mine, with additional subsequent claims subsequently acquired by staking. The property owned by Mountain Star Resources Ltd in 1997 was "... comprised of 34 minerals dispositions made up of 218 whole or partial (fractions) claim units covering a total of approximately 3474 hectares. The land package is made up of three major claim group, the VMT group in the south, the Ruth-Vermont group in the middle and the BB group which occupies the northern two-thirds of the property" (Gidluck 1997).

On November 28, 1997, Bright Star Ventures Corporation, incorporated on November 28,1994 acquired the all of the issued and outstanding shares of Mountain Star Resources Ltd. as its "major transaction" to fulfil Junior Capital Pool requirements under Alberta Stock Exchange regulations, subsequently changing its name to Bright Star Metals Inc. on August 11, 1998. In the interim, several of the BB claims were allowed to lapse.

On May 31, 1999, Bright Star Metals Inc. entered into an option agreement with Mellenco Investments Ltd. to acquire 13 Crown granted claims immediately adjacent to the former Ruth-Vermont mine. In 2000, following a diamond drill program along the Vermont Creek valley and LCP

Zone, the CYD claim group was staked by the company to cover the interpreted sub-surface projection of a favourable horizon.

On February 8, 2001, the company changed its name to Jasper Mining Corporation and now holds a contiguous block of mineral claims, Crown Grants and Reverted Crown Grants extending approximately 19 km on a northwest-southeast direction and centred approximately on the former Ruth-Vermont mine.

2.5 Claim Status

The property, located in the Golden Mining Division, consists of 24, 2-post and 14, 4-post mineral claims (see Figure 2, 9 and 10), staked in accordance with existing government claim location regulations. The mineral claims, leases and Reverted Crown Grants are held, or have been optioned by, Mountain Star Resources Ltd., a wholly owned subsidiary of Jasper Mining Corporation.

The BB Claim Group comprises the northern portion, the Ruth-Vermont and VMT Claim Groups comprises the centre and the CYD Claim Group comprises the southern portion of the property. The property includes 13 whole or partial Reverted Crown Grants, contained in 2 Mineral Leases (Mineral Leases 95 and 97), and 16 Crown Grants. The property comprises a total area in excess of approximately 5,030 ha (12,430 acres).

The claims have not been legally surveyed.

Significant claim data are summarized on the following pages:

Registered to Mountain Star Resources Ltd.

Claim	Units	Tenure Number	Type	Due Date*	Area (ha)
BB Claim Group					
BB-5	18	340409	Claim	Sept. 24, 2002	450
BB-6	9	340410	Claim	Sept. 24, 2002	225
BB-7	9	340411	Claim	Sept. 24, 2002	225
BB-8	18	340412	Claim	Sept. 24, 2002	450
BB-9	18	340413	Claim	Sept. 24, 2002	450
BB-10	20	340414	Claim	Sept. 24, 2002	500

Claim	Units	Tenure Number	Type	Due Date*	Area (ha)
Ruth Vermont Claim Group					
Vermont 1	3	213300	Claim	Apr. 3, 2005	75
Vermont 2	12	213301	Claim	Apr. 3, 2005	300
Cleopatra	1	213875[2]	L. 8122	Aug. 21, 2002	
Vermont	1	213875[2]	L. 8123	Aug. 21, 2002	
Sheba	1	213875[2]	L. 8124	Aug. 21, 2002	
Ruth Fr.	Fract.	213875[2]	L. 8125	Aug. 21, 2002	119.69
Ruth	1	213875[2]	L. 418	Aug. 21, 2002	
Minnie	1	213875[2]	L. 419	Aug. 21, 2002	
Charlotte	1	213875[2]	L. 405	Aug. 21, 2002	
?????	1		L. 15310		
C.M.R.M.C.	Fract.		L. 10476		
Total	21				

2. Mineral Lease 97

Claim	Units	Tenure Number	Type	Due Date*	Area (ha)
VMT Claim Group					
VMT #2	20	213576	Claim	Sept. 15, 2002	500
VMT #3	2	213577	Claim	Sept. 15, 2002	50
VMT 5	1	213770	Claim	Sept. 12, 2002	25
VMT 6	1	213769	Claim	Sept. 15, 2002	25
VMT 7	1	213768	Claim	Sept. 15, 2002	25
VMT 8	12	213766	Claim	Sept. 15, 2002	25
VMT 9	1	213771	Claim	Sept. 14, 2002	25
VMT 10	1	213772	Claim	Sept. 14, 2002	25
VMT 11	1	213773	Claim	Sept. 14, 2002	25
VMT 12	1	213767	Claim	Sept. 15, 2002	25
VMT Fr.	Fract	213774	Claim	Sept. 15, 2002	≈12
Excelsior	1	213268	Rev.	April 26, 2004	Campeau Estate
Total	42				

CYD Claim Group

CYD 1	12	381156	Claim	Sept. 29, 2002	300
CYD 2	16	381157	Claim	Sept. 30, 2002	400
CYD 3	16	381158	Claim	Oct. 1, 2002	400
CYD 4	1	381165	Claim	Oct. 2, 2002	25
CYD 5	1	381166	Claim	Oct. 2, 2002	25
CYD 6	1	381164	Claim	Oct. 2, 2002	25
CYD 7	1	381159	Claim	Sept. 30, 2002	25
CYD 8	1	380910	Claim	Sept. 29, 2002	25
CYD 9	1	381160	Claim	Sept. 28, 2002	25
CYD 10	1	381161	Claim	Sept. 28, 2002	25
CYD 11	1	381162	Claim	Sept. 28, 2002	25
CYD 12	1	381163	Claim	Sept. 28, 2002	25

Registered to Gordon Dixon

Claim	Units	Number	Type	Due Date*	Area (ha)
Bryan	1	213877[1]	L. 3951	Apr. 17, 2003	16.94
Lincoln	1	213877[1]	L. 3952	Apr. 17, 2003	18.13
Lucky Jack	1	213877[1]	L. 3953	Apr. 17, 2003	15.30
Total	95				

3. Mineral Lease 95

Crown Grants

Crown Grants	Name	Folio Number	
L. 672	Syenite Bluff	008850	
L. 763	Black Horse	008850	
L. 764	Agnes	008850	
L. 6662	Eureka	010634	
L. 6663	Wild Horse	010634	
L. 6664	White Horse	010634	
L. 15307	Golden Bluff	019950	Approximately
L. 15317	Agnes Fraction	019950	100 ha
L. 15318	Charlotte Fraction	019950	
L. 15445	Ruth No. 2	019950	
L. 15446	Lion	019950	
L. 15447	Unicorn	019950	
L. 15448	Mazeppa	010634	

2.6 Encumbrances

As noted under Section 2.4, the Mountain Star Resources Ltd. acquired the former Ruth-Vermont mine, however, the author has not been able to determine whether Mountain Star Resources Ltd., and subsequently Jasper Mining Corporation, has incurred liability for the settling ponds (Figure 10) from the former mining operation. The settling ponds represent approximately 50 hectares of mined material along Ruth-Vermont Creek.

In acquiring mineral tenures, the company has generally acquired sub-surface rights (with the exception of the Crown granted claims, which may have some surface rights attached) and the author is uncertain as to whether the settling ponds were specifically included in the transfer of mineral title to Mountain Star Resources Ltd. and, subsequently, Jasper Mining Corporation.

In addition, in order to conduct an exploration program in British Columbia involving any mechanical disturbance of the ground (such as diamond drilling), a Mineral Exploration permit is required. The author is unaware of a mineral exploration permit for the 2002 field season. However, there is still considerable time in which to apply for, and receive, the permit in sufficient time to undertake a proposed 2002 exploration program.

3.0 HISTORY

Regionally, the area has a history of episodic exploration, primarily for gold and silver in quartz veins, with more recent activity directed toward identification of base metal, particularly sedimentary exhalative (SEDEX)-type, mineralization. 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 (and associated replacement-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 (i.e. VAD property, claims owned by Adamson / Berar).

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 (Brophy and Slater 1981). 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 potential for carbonate replacement-type deposits.

The following historical summary has been taken from Gidluck (1997) for the VMT and Ruth-Vermont Claim Groups:

"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. Renn, 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)".

Fyles (1966) reports "The property is an old one, originally consisting of 11 Crown-granted claims, on which more than a dozen short adits were driven before 1930. In 1956 and 1957 Rio Canadian Exploration Ltd. made an extensive survey of the property and did a small amount of drilling and soil-sampling. In 1964 the old Crown grants which had reverted were taken up by Mel Pardek, of Vancouver, as a mineral lease and about 40 claims surrounding the lease were located. The present company (Columbia River Mines Ltd.) acquired the property in 1965 and began underground work in an old adit called the Old Timers level and subsequently referred to as the 6000 level.

The main activities in 1966 were directed to the development of the 6000 level. The level was driven from the footwall to the hangingwall of a mineralized zone containing appreciable value of lead, zinc, and silver, and was extended along the hangingwall for 1,200 feet. Contact was maintained with the zone by frequent drilling, which amounted to 132 holes totalling 20,000 feet by the year-end. A new level was opened at the 5,750-foot elevation and was extended 650 feet. It is expected that the 5750 will eventually become the main haulage level. Surface activities included the construction of an 88- by 20-foot power-house and machine-shop near the portal of the lower level. A new 4½-mile access road replacing the old road was built, partly on the south side of the valley of Vermont Creek to avoid snowslides as much as possible and to improve snow removal".

Gidluck (1997) continues "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 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).

The following historical production data was taken from the British Columbia Ministry of Energy and Mines provincial Minfile database, and was compiled from Ministry of Mines Annual Reports and other records filed with the Ministry.

Production Year	Tonnes Mined	Tonnes Milled	Recovery					
			Silver (g)	Gold (g)	Cadmium (kg)	Copper (kg)	Lead (kg)	Zinc (kg)
1981	12,839	12,839	1,720,000	1	1,359	6,521	297,874	203,214
1979	62	62	20,964	26			3,981	5,459
1978	36	36	75,083		166	384	13,600	21,901
1976	60,725	60,725	5,025,312	2,830	9,003	14,435	949,099	1,276,240
1975	10,258	10,258	1,110,066	453	1,385	3,414	210,279	217,213
1973	24,455	24,455	2,989,154	1,524	3,655	9,911	653,591	551,584
1971	32,177	34,792	2,208,282	2,861		21,028	294,986	2,591,396
1970	35,652	32,864	3,885,231	1,524	7,569		797,782	1,073,782
1965	15	15	32,845	31			4,688	2,914
1951	1	1	778				179	44
1930	32	32	107,088	124			14,986	3,428
1927	5	5	8,647	31			1,617	247
1892	19		64,539					11,294

Summary Totals

Tonnes Mined	Tonnes Milled	Recovery					
		Silver (g)	Gold (g)	Cadmium (kg)	Copper (kg)	Lead (kg)	Zinc (kg)
176,276	176,084	17,247,989	9,405	23,137	55,693	3,253,956	5,947,422

The following is taken from Gidluck (1997):

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). ...

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)".

4.0 GEOLOGICAL SETTING

4.1 Regional Geology

The following has been taken from Gidluck (1997):

Stratigraphy

"The Vermont Property is underlain by a thick sequence of Hadrynian marine sedimentary rocks (Figure 3) exposed in the core of the northwest trending Purcell Anticlinorium, on the west side of the Rocky Mountain Trench. 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. 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).

However, Longe et al. (2001) note that although"... the sediments of the Vowell Creek claims have been mapped as Windermere and therefore assigned an Hadrynian age, there is, we understand from both the Geological Survey of Canada and the B.C. Geological Survey, some possibility (exists) that they could helong in the Phanerozoic. ...".

4.2 Detail Geology

4.2.1 VMT Claim Group (Figure 4)

The following has been taken from Fyles (1966):

> "The (Atlas) claims are west of Vowell Creek between Vermont and Crystalline Creeks. The main work has been on showings at an elevation of 5,800 feet on the slope north of Crystal Creek, a small tributary of Crystalline Creek from the west. The workings are reached by a steep "Cat" road from a trailer camp at Mile 33 on the Vermont Creek logging-road. They are bulldozer strippings on a steep jack pine slope covering an area about 400 feet square which exposes showings of galena discovered by Renn in 1965. Two short diamond-drill holes were put down in the upper northwest corner of the stripped area in July, 1966.
>
> The rocks exposed at the showings are dark-grey slates and grey to light brownish-grey micaceous quartzites. The slates are pyritic, and the quartzites contain rusty iron carbonates.
>
> The showings consist of half a dozen scattered occurrences of gossan or galena, sphalerite, and pyrite in both the slates and the quartzites. The zones of gossan are mainly in slates, ranging from 2 to 4 feet wide, and are parallel to the cleavage. ... The sulphides are mainly in the quartzites. One showing consists of massive galena, minor pyrite, and sphalerite along a series of fractures in the quartzite that strike 120 to 125 degrees and dip steeply. They form a lens of sulphides 1 to 2 feet thick and several feet long more or less parallel to a bed of quartzite on the northeast limb of a small syncline. ... Another showing 300 feet to the southwest contains galena and minor sphalerite and pyrite disseminated in quartzite. The sulphide zone is irregular and poorly defined and is well mineralized over widths up to 5 feet. ...
>
> The mineralized quartzites lie above the slates containing the gossans, and the rocks have the form of a shallow open syncline with an essentially horizontal axis and vertical axial plane trending 135 to 140 degrees. The folds are asymmetric and lie on the northeastern limb of an anticline. The exposures provide very slight evidence on the control of mineralization, but the mineralization appears to be associated with fractures principally in the quartzitic beds. Locally the quartzites near the fractures are replaced by the sulphides".

The following has been taken from Gidluck (1997):

> 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 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).

<u>Structure</u>

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° and dipping from 70° to 90° 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. 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).

...

4.2.2 Ruth Vermont Claim Group

The most informative description of the geology is from the former Ruth-Vermont mine itself. The following has been taken from Fyles (1966):

> "Rocks in the Vermont Creek area are grey slates; light-grey quartzites, grits, and pebble conglomerates; and minor limestones belonging to the Horsethief Creek Group of Late Precambrian age. The slates commonly carry disseminated pyrite, the quartzitic rocks contain white quartz veins and rusty iron carbonates, and the limestones are dark grey, fine-grained, and more or less micaceous and cleaved. The slates and limestones are thin bedded, and beds crossed by cleavage are apparent in almost every exposure. Minor folds are fairly common, and from a distance major folds can be seen in cliffs.
>
> In the mine area a bed of limestone 30 to 50 feet thick, here referred to as the Ruth Limestone, lies between two thick slate formations. The lower slate, which is several hundred feet thick, is underlain by a greyish-brown quartzite that forms prominent cliffs on the Charlotte claim east of the mine and on the north side of Vermont Creek. It is buff-weathering to light-grey somewhat micaceous quartzite with rounded bluish-white quartz grains up to one-eighth inch in diameter. The quartzite has an irregular fracture cleavage, and contains local stockworks of barren white quartz veins.
>
> A major asymmetric anticline trending northwest crosses Vermont Creek near the Ruth property. Reconnaissance suggests that it continues southeast and northwest of the mine for many miles and that most of the known showings of the region are near the hinge zone. On Vermont Creek the anticline plunges gently to the southeast and the axial plane dips steeply to the northeast parallel to the cleavage in the slates.
>
> ... (Two) large anticlines (are evident), the Charlotte on the northeast, the Sheba on the southwest, and between them the Ruth syncline. They are named from the old Crown-grajted claims on which they are well exposed. All three folds are in the hinge zone of the major anticline just referred to and are local structures which change in form up or down the axial plane and along the axis of the anticline.
>
> The Ruth syncline as outlined by the Ruth limestone is exposed near the portals of the 6000 level and is encountered underground on the level. The synclinal axis plunges at 5 degrees toward an azimuth of 135 degrees, and the axial plane dips 75 degrees to the northeast. In the inner part of the working the axis appears to swing to the

west and steepen somewhat in plunge. The limestone on the southwest limb has a fairly uniform attitude with an average strike of 140 degrees and a dip of 30 degrees to the northeast. This southwest limb of the Ruth syncline contains the sulphide mineralization currently being developed.

The following has been taken from Manning (1972):

"Polymict quartz pebble conglomerates grade locally to grit and impure quartzite which in turn grade into slate or argillite and argillaceous limestone.

The conglomerates contain blue and white quartz pebbles, are sericitic, chloritic and contain scattered pyrite. Locally they are limey. Deformation of the beds has produced an elongation of the pebbles. The finer grained character of the grit and quartzite is the only discernible difference between them and the conglomerate.

Argillite beds are locally slaty, phylitic and limey and vary from 1/8 inch to several feet in thickness and are black, green and grey. Porphyroblasts of ankerite are present within all the argillite members. Syngenetic pyrite, as euhedral and elongated cubes and pyritohedrons, occurs parallel to the bedding. Minor drag folding is common.

The argillaceous limestone units are conformable to overlying and underlying slatey argillite members. They are bluish grey, aphanitic, exhibit minor drag folding, and are the most significant host rocks in the area. The main unit is 20 to 50 feet thick with individual beds varying from a fraction of an inch to several feet in thickness.

All members of the series are intercolated with readily discernible facies changes both along the strike and dip.

Structurally, the units have been folded to an anticline approximately 600 feet from crest to trough. The fold plunges gently to the southeast. To the east of this, the Ruth Anticline, lies a series of synclines and anticlines of varying amplitudes which culminate near the eastern extremity of the Charlotte crown grant, into the Charlotte Anticline which is overturned to the west. The main workings are along the limbs of a southeast plunging syncline, immediately east of the Ruth Anticline.

Three sets of quartz-calcite fissure veins occur obliquely, transversly and parallel to bedding relative to the fold structures. The oblique veins strike southeast and have an average dip of 65° to the southwest. They are well mineralized and cut at an angle of 15° to the strike of the beds. The transverse veins are poorly mineralized and are representative of fissure fillings along a series of near vertical and parallel shears. Tension gashes are generally related to such veins. The veins parallel to the bedding normally mark concordant contacts between the argillite and argillaceous limestone. Sulphide content in the veins is low. Scheelite occurs in varying amounts in the three sets of veins".

5.0 DEPOSIT TYPES

Mineralization identified to date on the property consists predominantly of vein, and locally, replacement type deposits (i.e. former Ruth-Vermont Mine). In recent years, Sedimentary Exhalative ("Sedex") potential has been emphasized on the basis of its lithological composition (similar to the Earn Group), identification of a bedded manganese horizon identified immediately south of Crystal Creek and an intercept of massive sulphides markedly different from other intercepts reported from the LCP Zone. While the author acknowledges the SEDEX potential interpreted for the Horsethief Creek Group, emphasis on documented vein- and replacement-type mineralization is strongly recommended, particularly with regard to increasing reserves reportedly remaining in the former Ruth-Vermont mine. Further geological mapping, together with compilation of existing data, can be utilized to evaluate occurrences of stratabound mineralization with regard to potential SEDEX mineralization.

The author believes there is a considerable amount of information potentially available regarding vein and replacement mineralization on the property, particularly with respect to the former Ruth-Vermont Mine, and the potential to increase remaining reserves within the Vermont Creek valley, southward into Crystal Creek and northward into Malachite Creek . The following has been taken from Manning (1972) with regard to vein- and replacement-type mineralization in the former Ruth-Vermont mine:

> "Vein Type
>
> Two veins of particular importance are the Pine tree Vein and the Blacksmith Vein. The Pine tree Vein has been traced underground for a length of some 1200 feet and it plays a significant role as the main feeder for the replacement zone of the Nelson Orebody. The underground work and diamond drilling have proven a vertical extension of 500 feet to the vein. The surface trace of the vein, in a southeasterly direction, is approximately 2600 feet. The average grade of the vein over a length of some 1200 feet is 12.27 oz Ag/ton, 7.0% Pb and 6.06% Zn across a width of 5.0 feet.
>
> The Blacksmith Vein has been developed by four drifts over a vertical height of 400 feet and along a horizontal distance of 500 feet. The vein is almost parallel to the Pine Tree Vein and it has a surface trace of some 2600 feet to the southeast. The average grade of the vein in the area covered by underground development is 10.00 oz Ag/ton, 5.20% Pb and 3.10% Zn across 4.0 feet. ...

The average grade over a length of 65 feet of the Pine Tree Vein extension across a 4.0 foot width is 3.68 oz Ag/ton and 6.75% Pb. The Pb-Zn ratio in the area of the vein recently developed is 1:0.87, hence the probable zinc content of the above portion of the vein would be 5.81%.

The Blacksmith Vein extension was sampled over a length of 90 feet and averaged 2.59 oz Ag/ton and 6.74% across 4.0 feet. The Pb-Zn ratio of the reserves developed underground is 1:0.6 thus the zinc content could well be 4.05% Zn.

During the course of underground diamond drilling two other significant veins were intersected. They are the South Vein and the North Vein. The South Vein has an average grade of 8.28 oz Ag/ton, 5.68% Pb and 6.78% Zn across a width of 5.25 feet, whereas the north Vein averaged 15.26 oz Ag/ton, 10.74% Pb and 5.16% Zn across 5.1 feet.

The minerals present in the veins are pyrite, galena, sphalerite, arsenopyrite, boulangerite, freibergite, chalcopyrite and scheelite. Gold occurs generally associated with arsenopyrite and pyrite.

Replacement Type

The most important replacement zone developed is the Nelson Orebody. The zone has been delineated for a length of 1180 feet and varies from 20 to 110 feet in width. Silicification accompanying sulphide replacement has taken place where the mineralizing veins have intersected the argillaceous limestone beds. Minerals which occur in the replacement body are pyrite, galena, sphalerite, arseonpyrite, chalcopyrite, boulangerite, and freibergite. Scheelite is also present as fine disseminations. The replacement, depending on the intensity of the mineralizing veins, is represented by a mineral halo emanating from the veins and extending in all directions.

The extent of the replacement mineralization varies with the size and number of the feeder veins. A plunge to the zone is effected by the oblique intersection of the veins across the limestone. The mineralization of the zone exhibits lineations both parallel and normal to the bedding; the latter coincides with slaty cleavage, or axial plane cleavage of small drag folds. The average grade of the replacement ore presently blocked out is 5.5 oz Ag/ton, 4.4% Pb and 6.1% Zn.

... The system of veins is known to extend northwesterly from the property for several miles and the acquisition of the adjoining properties may provide a similar or greater potential ore reserve. Other veins are known to exist within the Ruth-Vermont property and are yet to be explored.

Replacement Deposits

The potential of increasing ore reserves appears excellent as geologic structures in the immediate area may provide a repetition of replacement zones similar to the Nelson Orebody. Wherever the feeder veins cut folded limestone units, replacement bodies may exist.

A relatively unexplored replacement zone further up-dip from the Nelson Orebody may provide potential ore. To the southwest, and at a much higher elevation from the Nelson Orebody, another limestone unit is known to exist. Veining has also been noted in this area.

A replacement zone of unknown dimensions has been examined by the writer on the Syenite Bluff crown grant immediately north of the Ruth-Vermont property on the north side of Vermont Creek. (There is another) ... property at the headwaters of McMurdo Creek, some 10 miles to the northwest which contains vein and replacement deposits which have been partially developed by underground and diamond drilling.

Several veins have been traced some four miles northwest of the Ruth-Vermont property on Carbonate Mountain. The vein system there has been traced for over two miles between Malachite or Copper Creek and Bobbie Burns Creek.

"The writer notes one important factor which appears to have been overlooked. The Pinetree vein and North vein have been responsible for providing the solutions which resulted in the replacement ore body within the limestone at the 6,000 foot elevation. These veins, however, are not paralleled in either strike or dip.

They come together on the 6,000 foot level at section 1175 and diverge going east, and are 50 to 60 feet apart at section 1650. The result is the replacement zone between 1150 and 1400 sections is a single ore body but east of this becomes two ore bodies separated by a horse of non-commercial mineralization. A second feature as yet to be defined is the extent and movement of a major fault obliquely cutting the ore zone beyond section 2000. This fault has never been mapped but is clearly indicated in the diamond drill holes" (Forman 1982).

Further reference to vein mineralization has been documented in Assessment Reports, extending from Warren Creek, south of the property to the Flying Dutchman, in or adjacent to, the BB claims at the northern end of the property.

Sedimentary Exhalative ("Sedex") deposits

The following has heen paraphrased from Longe et al. (2001):

"McIntyre (1990) identified the Windermere Supergroup, of which the Horsethief Creek Group is a major component, as prospective for sedex occurrences due to its interpreted environment of deposition at the edge of a rifted continental margin. A similar tectonic regime has been interpreted to have prevailed in the Canadian Cordillera during the Devonian-Mississippian which localized sedex deposits at several places from central British Columbia (Cirque) to the Selwyn Basin in the Northwest Territories (Tom, Jason). Particularly interesting is the striking similarity between the lithologies of the Devonian Earn Group (microturbidites of the Gunsteel Formation and the related grit units) and the Precambrian sediments underlying the Vowell Creek claims. Insofar as lithologies alone can be a guide, the similarities are considered sufficient to prompt recognition of the Horsethief Creek Group as prospective for sedex lead-zinc deposits. The presence of numerous apparently stratabound lead-zinc occurrences in the Horsethief Creek Group adds credence to the inference that the sedimentary package represents an environment prospective for sedex deposits.

Brophy and Slater (1981) reported the occurrence of "... apparently stratabound base metals in correlatable units of a black shale dominated stratigraphic package ..." and recent reports by MineQuest (Longe et al. 2001, Longe 1993a, b) have placed considerable emphasis on an apparently bedded manganese horizon south of Crystal Creek which may represent an exhalite horizon. Finally, of the five diamond drill holes completed during Bright Star's 2000 program, a short, fault bounded massive sulphide interval was recovered in drill core. It was tentatively proposed that it may represent a bedded sulphide horizon in that it was markedly different from other sulphide intervals examined. It had no associated calcite and/or quartz, which was consistently associated with other sulphide intervals and, therefore, may not have been precipitated from metal-bearing fluids associated with hydrothermal fluids resulting in the vein and/or replacement common in the area.

6.0 MINERALIZATION

6.1 VMT Claim Group (Figures 4 to 8)

The following has been taken from Gidluck (1997):

"The principal zones of interest on this group are the four areas illustrated by the four clusters of drilling and trenching activity 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. ... The most southerly and most significant area of interest is the LCP Zone (Figure 5) 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 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 (Figure 5) 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. 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 (Pelzer 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. ...

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. 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 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 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.005% Zn (Nolin et al 1983) ...".

6.2 Ruth - Vermont Mine

The following has been taken from Fyles (1966):

> "... Quartz veins occur in well-defined sets of fractures. One set contains most of the sulphides, and the others are sparingly mineralized or barren. A set of barren quartz veins is perpendicular to the axis of the Ruth syncline. Other mineralized veins lie parallel to the bedding; the most prominent of them is on the footwall of the Ruth limestone.
>
> The veins containing most of the sulphides trend 110 to 115 degrees and dip at

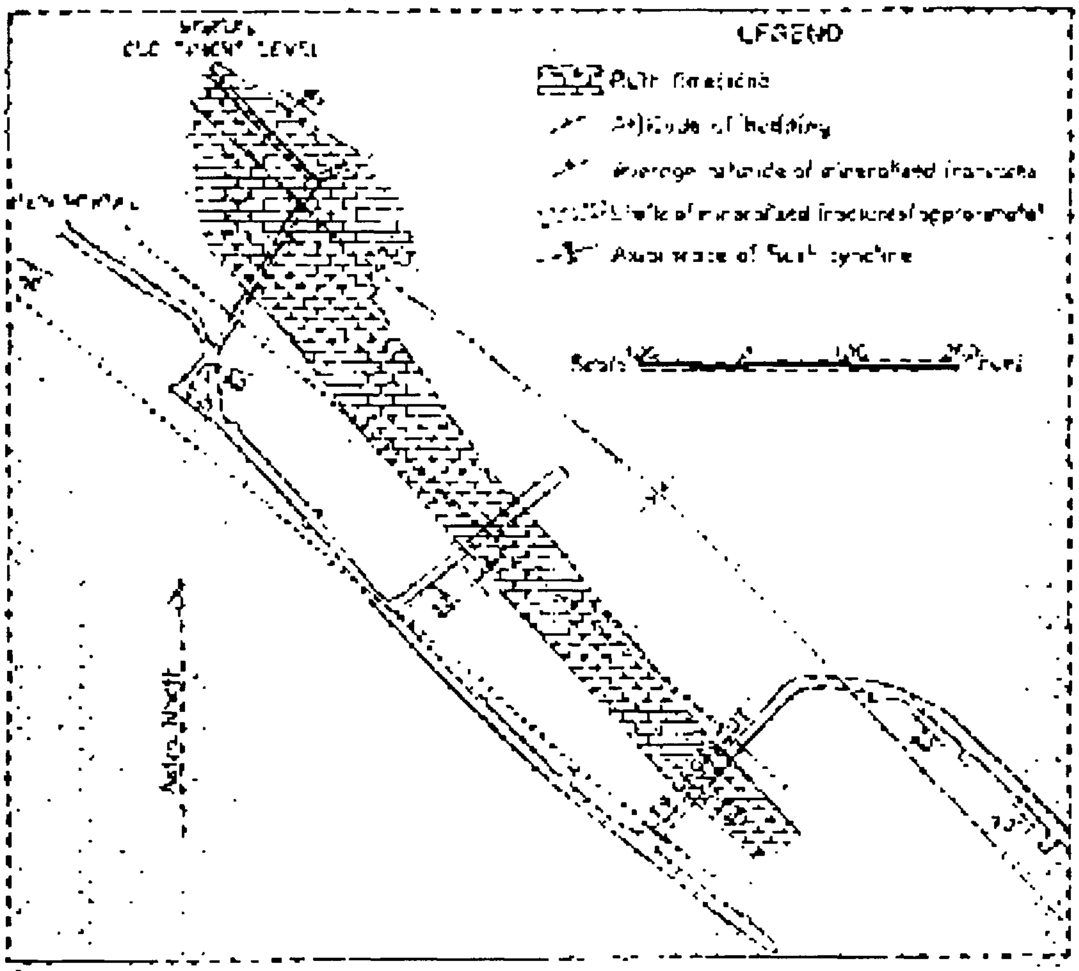

Figure 30. Columbia River Mines Ltd. Geological sketch-map of part of the 6000 level of the Ruth Vermont mine.

moderate to steep angles to the south. They are well displayed in the 6000 level and in cliffs near the new portal. The veins are oblique to the structure transecting both the folds and the cleavage and occurring in the Ruth limestone and the slate above and below it. They contain galena, sphalerite, pyrite, and arsenopyrite and small amounts of chalcopyrite, boulangerite ($Pb_5Sb_4S_{11}$), argentiferous tetrahedrite, scheelite, and carbonates. The attitudes of these mineralized fractures which form a mineralized zone and the relationships of the mineralization to the Ruth limestone and the Ruth syncline are shown on Figure 30.

The veins in the slate beneath the limestone are up to a foot thick and most are only a few inches thick. They are lenticular and many pinch out in one direction or another where exposed in the workings. The largest one was stoped in the early days for about 80 feet along the level and for 15 feet above it. The veins are more numerous and richer in sulphides just under the limestone, and they extend for several tens of feet beneath it, dying out irregularly down their dip. The quartz is vuggy and the sulphides are medium grained, occurring in clusters and pods which commonly occupy the entire width of a vein. The slates above the Ruth limestone contain veins which are more widely spaced than those below it.

In the limestone itself where a mineralized section is exposed in the T-9 cross-cut, the sulphides are along mineralized fractures ranging from many very closely spaced ones a fraction of an inch thick to one fracture containing up to 5 feet of massive coarse-grained sulphides. Fine-grained sulphides, formed by replacement, are disseminated in the limestone adjacent to the fractures, but replacement ends abruptly and is very closely controlled by the fractures.

... The veins and mineralized limestone in the 6000 level are known as the Nelson orebody and two groups of veins above the limestone as the Blacksmith and the Pine Tree veins.

A shipment of sorted ore made in 1965 averaged: Silver, 63 ounces per ton; lead, 31 per cent; zinc, 19 per cent.

As indicated on Figure 30, the veins and the fractures that contain most of the sulphides form a mineralized zone with more or less well-defined margins that trends 130 degrees and probably dips steeply to the southwest. Within the zone are many in echelon (sic.) veins and fractures which on the average strike 112 degrees and dip 50 degrees to the south. The veins transect the cleavage of the slates and are oblique to the trend of the Ruth syncline. Mineralization appears to have developed along tensional openings superimposed on the uniform and gently dipping southwestern limb of the Ruth syncline. The limestone obviously controlled the amount of fracturing and may also have aided the precipitation of the sulphides. Possible changes in the character of the mineralized zone as it crosses the Sheba anticline on surface to the northwest are of paramount importance in current exploration. The search for comparable zones along the southwestern limb of the Ruth syncline is continuing".

"Some of the veins have been traced underground for some 2000 feet and where they intersect the limestone beds, replacement bodies have formed. The oblique veins occur in swarms which produce bulges and the irregular shape of such replacement zones. Diamond drilling has shown that the veins tend to widen at depth. The vein system has been traced intermittently on surface for some six miles. On the property they vary from ½ inch to eight feet in width" (Manning 1972).

The following has been taken from Gidluck (1997):

"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. 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. 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 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 (the "Target Shale") 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. Apparently this is the best gold value available from only a few gold analyses registered in the old the mine records".

7.0 EXPLORATION

In 1996, Mountain Star Resources Ltd. contracted MineQuest Exploration Associates Ltd. to complete three diamond drill holes (totaling 496.2 metres) from underground in the former Ruth-Vermont mine. "Prior to the drill program, archived mine records (principally cross sections) were compiled. The records for the section of the mine between 1225E and 1750E were entered into a database and the digital information was used to generate a mine plan and cross-sections. ... No sedex mineralization was found but the last hole intersected significant gold (71 grams per tonne over 1.70 metres in DDH 96-3)" (Cukor and Longe 1997).

In addition, Frontier Geosciences Ltd was contracted by MineQuest, on behalf of Mountain Star Resources Ltd, to undertake "A brief program of transient electromagnetometer and gravity surveying ... on the VMT property. Although lacking the context that more extensive coverage would allow, a broad low amplitude gravity high was observed ... The TEM survey detected distinct geoelectric units and provided an estimate of the resistivities of thes eunits in limited coverage. The resistivity values observed are in the range of background rock resistivities expected at this site" (Liu and Candy 1996).

In 1997, M. Gidluck was contracted by Mountain Star Resources Ltd. undertake a geological evaluation of the property, based "... on a review of all the various reports and documents available in the company's offices in Calgary, reports and maps available at MineQuest Exploration Associates Ltd offices in Vancouver, selected published references and selected assessment reports ... A property examination ... was conducted on the eastern portion of the VMT claim block ... and a small portion of the northern BB claims ..." (Gidluck 1997).

In late 1999 – early 2000, the author copied all available Assessment Reports and completed a partial compilation of geochemical data available in the Assessment Reports under contract to Bright Star Metals Inc. A total of 4,796 soil, 1,905 rock and 1,299 silt (lake or stream) samples were compiled and plotted "... in an attempt 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" (Walker 2000). The mandate for the compilation was for data lying immediately outside the claim boundaries, as work pertaining to the claims had apparently been completed by MineQuest Exploration Associates Ltd. and so interpretation of, and conclusions arising from, the compiled data were biased.

In 2000, Bright Star Metals Inc. contracted Minequest Exploration Associates Ltd. to complete a 1,050 metre diamond drill program. A total of five NQ diamond drill holes were completed, two on the north side of Vermont Creek across from the former Ruth-Vermont mine (totaling 641 metres) and three in the LCP Zone (totaling 399 metres). A total of 83 core samples were taken and submitted to Bondar-Clegg for geochemical analysis (see section 10.0). A downhole geophysical survey was undertaken on the VC-02 and VC-05 holes (LCP Zone) by Frontier Geosciences Inc. of North Vancouver.

The following description of the drill program has been taken from Longe and Walker (2000):

> "Results of the 2000 Program
>
> Drilling adjacent to the Ruth Vermont mine site
>
> The purpose of drilling at Ruth Vermont was to test stratigraphic levels below the grit intersected in vertical hole drilled from underground in 1996. For that purpose the valley floor, the lowest point topographically, was preferred and a site close to Vermont Creek was selected. ... The site selected was as close to valley side and therefore to outcrop.
>
> The first hole, VC-01, penetrated overburden for 18 metres and then a series of interbedded siltstone, sandstones and grits. The hole was terminated at 71 metres because the core axis was too close to bedding.
>
> The second hole, VC-02, was drilled at minus 600 degrees on a bearing of 240 degrees. This dip was selected as the most likely to be normal tot he bedding direction revealed by the first hole. Its orientation was designed to be parallel to the axis of the valley in case a fault should have controlled the position and direction of the valley. It was also directed towards the strike of the extension of the Pinetree vein on the mine itself on the south side of the valley.
>
> The hole reached 563 metres which was the limit of the drill. ... Most of the rock intersected was either a grit (ranging from pebble conglomerate to interbedded sandstone and siltstone) or a turbidite, variously described as siltstone or argillite. Fining sequences within each bouma sequence allowed top determinations to be made.
>
> The drill hole intersected one argillitic turbidite unit but did not demonstrate a thick sequence of turbidites beneath the grit. Minor quartz veins and a trace of sulphides were also intersected. Fining sequences which changed from one direction to the other suggested that the hole penetrated first one limb and then the other of an anticline or syncline. One initial interpretation of the drill hole is that the north side of the valley is displaced to the east relative tot he south side. The true value of information derived from the drill hole will become apparent only after the surface has been geologically mapped".

The following has been modified slightly from Longe et al. (2001):

"The LCP zone (Figure 5 to 8)

Prompted by the very significant intersection in Medesto's drill hole 77-3, Norcen Energy Resources undertook major exploration programs in 1978 (geochemistry, geophysics, and geological mapping) followed in 1979 by trenching and drilling. ... But continuity of the sulphides intersected in the LCP zone could not be demonstrated.

The recent drill program was designed on the basis of a reinterpretation of the geology: that the stratigraphy, despite local complexity, including isoclinal folding, is mostly shallow-dipping. The zone in which the sulphide were intersected was interpreted in 1994 as a fault-bounded panel of flat-lying sediments which are tightly folded and steep-dipping near the principal structure, the Medesto fault. To test this interpretation, near vertical holes were drilled to greater depth than those previously drilled.

The site selected for the recent drill program was designed to intersect the down dip extension of the earlier intersections and to avoid the deep folding near the Medesto fault. A subordinate purpose ... was to obtain representative samples of the mineralization that had prompted so much work but for which there are, to the writer's knowledge, no existing samples. ...

The LCP zone, drill holes, recent and previous intersections and road are shown in Figure 5. Figure 6 is a composite cross-section oriented at right angles to the plane of axial cleavage and to the principal fault, the Medesto Fault. Figure 7 is a longitudinal section in the plane of the most common expression of the axial cleavage (140 degrees and vertical).

All three holes intersected the sediments seen at surface, microturbidites which were described as "argillite", "siltstone", or "interbedded siltstone and sandstone", together with variants of the above. The sediments, as a whole, were interpreted as distal turbidites. ...

The first hole was drilled at –60 degrees towards the known mineralization. It intersected sulphides with lead, zinc and silver values in five places as shown in Table 2. Some of the sulphides are interpreted to suggest primary sulphide deposition, others a replacement origin. Numerous fault zones were observed in the core. The second and third holes, VC-03 and VC-04, produced similar results though with fewer intersections.

Table 2

List of significant intersections in Drill Holes VC-00-03, 4 and 5

Drill hole	From (m)	To (m)	Width (m)	Pb (%)	Zn (%)	Ag g/t
VC-03	47.61	48.70	1.09	2.81	5.47	134
VC-03	50.88	51.26	0.38	2.40	7.36	133
VC-03	53.00	53.42	0.42	2.89	0.71	329
VC-03	58.10	59.60	1.50	0.83	3.69	30
VC-03	88.00	90.59	2.59	3.19	2.70	51
VC-04	38.95	41.55	2.60	0.52	1.14	35
VC-04	80.46	80.60	0.14	4.32	14.43	96
VC-04	89.15	90.90	1.75	0.92	2.30	31
VC-05	33.86	35.75	1.89	0.35	1.45	19
VC-05	125.27	125.52	0.25	0.02	7.58	7

The following discussion of the drill results has been taken from Longe et al. (2001):

"LCP Zone

Geochemistry of the drill intersections

The only drill holes for which multi-element data exits are the three holes drilled in 2000. Geochemical comparisons between all the mineralized intervals are not, therefore, possible. Initial study of analytical data from the recent drilling have made it clear that more sampling would be desirable, ...

Manganese shows strongly in several samples from drill hole VC-03. It appears that both the upper and lower beds are rich in manganese but this enrichment does not appear to extend to the intersections of the upper bed in holes VC-04 and 05.

In several of the mineralized intervals, gold exceeds 1 g/t, usually in association with elevated arsenic. The significance of these elevated values is not known but they need to be considered in context with two other places where gold is significant: the Ruth Vermont mine where an underground hole (DDH 96-3) intersected 1.7 metres of 71 g/t Au in an argillaceous limestone, and a gossanous soil topographically beneath the manganese occurrence on the VAD claims. ...

There appear to be two mineralized beds. Lead-zinc mineralization in the upper bed is weaker than in the lower. Continuity from the Norcen intersections to all three Bright Star holes is reasonably well established. The same mineralized bed appears to extend to drill hole 79-10, although ... that section of core was not assayed.

The lower mineralized bed has produced promising grades, the best of which was 4.8 metres of 3.4% Pb, 8.6% Zn, 117 g/t Ag in drill hole 77-3. The same bed appears to have been intersected in VC-03 but is not obvious in the other recent holes. One of us (RW) identified a 10 cm section of the core in VC-04 as possibly more significant than any other. The piece contains a 1 x 4 cm band of massive sphalerite cut by a fault. Its perceived significance lay in the lack of quartz or calcite adjacent to it and, because of that, its possible status as slice from a massive sulphide. This piece plots exactly where the lower bed should be were it not for the fault, now called the Norcen fault, adjacent to it.

Unlike the upper mineralized bed, the lower is not seen in drill hole VC-05, but, given the number of faults identified in all these holes, another fault is a reasonable explanation. Hole 79-10 was probably not deep enough to intersect the lower mineralized bed".

Subsequent to the drill program, "... (six) galena-bearing samples of drill core (were)... sent for isotopic analysis to the Department of Earth and Ocean Sciences at the University of British Columbia. Samples were selected from sections of core where sulphide textures appeared to represent bedding. The results show the age of the lead to be Triassic and to lie close to the "Shale Curve". (Author's note: in order to calculate an age of mineralization, some assumptions must be made (see Appendix C and references therein). The magnitude of the assumptions made is dependent upon the level of geological information associated with the isotopic sample. As the author has not seen a copy of the report pertaining to the galena-lead isotopic geochronological dating, it is not possible to comment on the validity of the assumptions necessary to determine an age date. Therefore, the Triassic age is enigmatic but the issue cannot be addressed at this time)

The significance of these results are still under review. Given that the age of the lead is not Hadrynian (the mapped age of the enclosing rocks), it now becomes important to determine the actual age of the rocks, about which there appears to be some uncertainty"(Longe et al 2001). A subsequent attempt to recover micro-fossils (i.e. conodonts) from drill core samples was not successful. (Author's note: see Section 12.0 - Interpretations and Conclusions for a discussion of correlations pertaining to the Horsethief Creek Group).

8.0 SAMPLING METHOD AND APPROACH

As there has only been limited exploration work undertaken by Jasper Mining Corporation during initial evaluation of the property, there has been no consistent or rigorous sampling methodology established. The author logged and sampled a total of 83 separate intervals from the drill core during the 2000 drill program and will discuss sampling as it pertained to that program.

The samples were recovered from five exploratory holes drilled to test for the presence, grade and nature of mineralization. There is, as yet, insufficient data to address the issue of predominant host lithologies (with the exception of the well documented former Ruth-Vermont mine - see section 6.0).

8.1 Sampling Method

In the course of logging core, mineralized intervals were noted and described on location. Core boxes containing mineralized intervals were transported to Cranbrook under the author's supervision.

In Cranbrook, the core was re-examined and mineralized sample intervals marked for subsequent splitting. Intervals immediately above and below high grade intervals were generally sampled to evaluate and document possible mineralized haloes associated with vein type mineralization. Each sample interval was described in detail (see Appendix B) and then cut into halves, approximately perpendicular to the plane of mineralization, using a diamond bladed rock saw. Half of each sample was retained and half sent for analysis to Bondar-Clegg Canada Limited in North Vancouver. To sample mineralized intervals consisting of broken core, large pieces were cut and approximately half of the smaller material was sent to the lab.

A list of samples, the sample interval and a description of each sample is included in Appendix B.

8.2 Sample Quality and/or Sample Biases

With much of the mineralization occurring in veins cross-cutting the core axis at a variety of angles and with samples cut perpendicular to the foliation / bedding, some mineralized intervals resulted in core splits with disparate representation of mineralization. In such cases, a notation was made regarding which split was retained.

In addition, in broken intervals, there is no way of knowing what proportion and which portion of the core has been lost. For example, did the mineralization represent the competent portion and thus retained in core, with the less competent host strata washed away (resulting in concentration of mineralization. Alternatively, mineralization may have been recessive, resulting in dilution.

Finally, sphalerite occurred as both black sphalerite and as fine-grained honey-blonde sphalerite. Its presence was suspected in many intervals and sampled accordingly, in many instances confirming the presence of sphalerite. Therefore, the association of fine-grained honey-blonde sphalerite with pyrite might lead to over-estimating pyrite content and not sampling the interval. In the 2000 drill program, early recognition of the possibility of fine-grained honey-blonde sphalerite in pyritic intervals lead to sampling of all strongly pyritic intervals. However, the possibility should be considered in future sampling programs and may have been a factor in previous programs (particularly those on the LCP Zone).

The core from the Ruth-Vermont area is stored in the field, together with that from the 1996 program, along the access road. The core from the LCP Zone was moved to a location on a private residence south of Parson, B.C. Core boxes containing mineralized intervals have been stored at a private residence south of Cranbrook. The remaining half of the core for each sampled interval remains in its proper location in the appropriate core box, with aluminum tags affixed to the core box to mark the appropriate sample number. Several of the high grade intervals were, however, removed and sent to MineQuest Exploration Associates Ltd, where they were polished and ~~retained for~~ display purposes.

9.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

Each sampled interval was washed prior to cutting to remove cuttings, rod grease and other possible contaminants. Except in the case of broken core or highly fissile and/or friable core intervals, each sample interval is bounded by an upper and lower cut perpendicular to the core axis. Immediately upon cutting the core, all pieces were again washed, re-assembled to the extent possible, properly oriented and replaced in the core box.

During subsequent sampling, one half of the core sample was placed into a plastic sample bag and a lab tag was placed inside for identification. A duplicate of each tag, with sample interval and sample length recorded, was retained by the author. Each bag was then tied for closure. The samples were subsequently boxed and sent to Bondar-Clegg using Greyhound Courier.

All samples utilized 35 element ICP analysis with Fire Assay for gold. High grade silver was re-analyzed using Atomic Absorption. High grade copper, lead and zinc were re-analyzed using four acid digestion followed by Atomic Absorption.

Each analysis for silver, lead and zinc was qualitatively compared to the visual estimate recorded during sampling for comparison.

10.0 DATA VERIFICATION

As the 2000 diamond drill program represents a preliminary exploration program initiated to test for the postulated presence of sedimentary exhalative mineralization (Ruth-Vermont area - Holes 1 and 2) or to follow-up on mineralization previously reported on the LCP Zone (Holes 3 to 5), no rigorous procedures were followed to ensure sample security and/or accuracy of results at this point. In the event Jasper Mining Corporation elects to pursue the character and controls of gold mineralization, measures will need to be taken to address the probability of the "Nugget Effect". In addition, should the company elect to pursue evaluation of the mining potential of the former Ruth-Vermont mine, then delineation drilling and a program to monitor analytical accuracy and reproducibility of drill core samples will need to be considered, along with a program of Data Verification.

11.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

Disclaimer: Several generations of Reserve Estimates are available to the author pertaining to the former Ruth-Vermont mine, from as early as 1972 to the last available tabulation in 1982. The estimates appear to conform to the categories in sections 1.3 and 1.4 of the National Instrument and were apparently based upon underground drill holes and subsequent mine sections and plans developed from drill hole data and underground workings. A copy of a Table of Contents to Appendices to accompany the 1972 Feasibility Report for the Ruth-Vermont mine (Manning 1972) make reference to "Ore Reserves - Calculations", "Vein Ore Reserve Calculations - E-W Projection" (map), "Typical Cross Sections - N-S 13+00" and "N-S 19+75", "Known Ore Zone Outlines - Plan of Ore Zones" and "E-W Projection of Ore Zone and Schematic of Planned Development". These data were developed for planning purposes of an operating mine and are therefore **assumed** to utilize a recognized and widely accepted (at the time) methodology.

However, the author has not reviewed core logs for previous diamond drill holes; analytical results; mine plans or sections, data pertaining to reserve calculations or any other data from the former mine operation, with the exception of the descriptions incorporated into this report.

Therefore, the following information represents an unaudited (by the author) report regarding reserves. The author believes much of the data from which reserves were calculated may be in the possession of MineQuest Exploration Associates Ltd and, therefore, potentially available to Jasper Mining Corporation for review.

> "The following report is an update of the writer's report of April 18, 1979. ...Vein ore deposits have been increased since the 1981 operation indicated their (sic.) increased potential as an ore source.

Ore Reserves

Replacement Ore	Ag.	Pb.	Zn.

Tons Diamond Drill Indicated	101,000	5.0	3.6	4.9
Probable Ore	57,000	4.9	3.5	4.9
Sub-total	158,000	4.9	3.5	4.9
Vein Deposits				
Tons Diamond Drill Indicated	44,000	9.0	6.3	6.1
Probable Ore	100,000	9.0	6.3	6.1
Sub-total	144,000	4.9	3.5	4.9
Total	302,000	6.8	4.8	5.4

... Exploration of the vein deposits on the 5750 level have added one new vein system to the ore potential and other parallel vein structures are indicated to the East.

Notes on Tonnage

Twenty-six thousand tons of replacement ore left in the backs and floors of the present stopes is still recoverable. The stope survey completed by Mr. J. Start on March 22nd, 1977 shows this on the diamond drill sections. This survey indicates that some 58,000 tons of ore should remain in the stoped area. A large part of this tonnage was left in the roof and floor of the old stopes and can be mined at today's metal prices.

Replacement ore between sections 1650 and 1975 is estimated at 99,672 tons based on diamond drill sections after an allowance of 10% for dilution. Diamond drilling in the 1975 section is not sufficient to allow accurate ore calculations and this tonnage has been reduced to 75,000 tons until further development has been done.

Exploration of the vein deposits is limited to a few hundred feet of drifting and a series of diamond drill holes put in from the 6,000 foot level. Since the drill holes were largely oriented to prove up the replacement ore tonnage, only a few holes shed light on continuity of the vein deposit.

Four vein systems have been found in the exploration to date, namely the Blacksmith, Pinetree, North vein and South vein. They have a combined strike length of 2700 feet and two have a vertical range of from 200 feet to 500 feet within the confines of the present workings. Taken over an average five foot mining width and a specific gravity of eleven cubic feet to the ton, they have an ore potential of 429,545 tons. Since exploration to date is too limited to estimate the distribution of ore shoots within the vein a conservative estimate of one ton of ore in each three tons of ore potential has been used. Possible ore is therefore 142,512 tons, of which 44,000 tons within the Pinetree vein are diamond drill indicated, leaving possible ore as 98,512 tons. The figure of 100,000 tons has been used in calculating ore reserves.

Ore Grades

Replacement ore grade has been based on the mill heads secured in the milling of 93,389 tons by Copperline (Mining Company) in 1970-71 and the milling of 41,057 tons in 1976. This grade is below the estimate made from diamond drilling and indicates poor grade control in mining. Until mining control has been improved the former mill heads are believed to be the best indicator of ore grade.

All vein ore grade calculations were made over a five foot vein width although practice has shown that mining is quite possible over a four foot width. The silver content of vein ore has been reduced by one ounce since the grade of the large tonnage of possible estimated ore remains to be proven.

Mill Recoveries

The best record of metallurgical performance was kept by Copperline Mining Company in the milling of 93,389 tons of ore in 1970-71. These show Lead concentrates contained 76.4% of the Silver, 81.3% of the lead, and 3.8% of the Zinc. Zinc concentrates contained 14.6% of the Silver, 76.4% of the Zinc and 7.4 pounds of Cadmium.

Concentrate grades were as follows:

Lead Concentrates	72.3 oz. Ag., 59.8% Pb. And 3.02% Zn.
Zinc Concentrates	Silver 9.12 oz., Zinc 48.6%, lead not recorded and Cadmium 7.42 pounds

Test work done on Columbia's ores shows only slight improvement on the above results. A small percentage of graphite in the ore is given as the cause of the poor recoveries. Consolidated Columbia River Mines milled 41,057 tons in 1976 but neither tonnage milled nor assays were accurate. Smelter returns from this tonnage shows concentrate grades of 58.8% for lead and 50.1% for Zinc.

The milling in 1976 suffered an 18% time loss through power plant failures, inexperienced operators and the lack of a cleanup sump to recover spillages. If these factors are improved there is every reason to expect that both recoveries and concentrate grades will be upgraded.

The metallurgical results are, however, not satisfactory and every attempt should be made to upgrade them. If new test work is undertaken it would be advisable to make the first test on replacement ore, the second on vein ore and a third using three parts replacement ore and one part vein ore.

The following results are believed readily attainable and have been used in calculating head values.

Lead - 81% recovered in the Lead concentrate, 77% of the Silver content and 78 pounds of Zinc.

Zinc - 78% of the Zinc in the Zinc concentrate, 16% of the Silver, 60 pounds of lead and 7.4 pounds of Cadmium.

1981 concentrates ran from 90 to 120 ounces in Silver and it is believed this resulted from the milling of a much higher percentage of vein ore. The vein deposits have a higher ratio of Silver to Lead content" (Forman 1982).

"Production to the end of November has used up approximately 17,000 tons of reserves but development on the 5750 has indicated an additional 15,000 tons of vein ore ... It is the writers considered opinion that for the present the main objective of the mine is to produce at a profit with the minimum expenditure of its ore reserves" (Forman 1981a).

12.0 INTERPRETATION AND CONCLUSIONS

Correlations of strata underlying the property with the Hadrynian Horsethief Creek Group are, apparently, in doubt by members of the Geological Survey of Canada and the B.C. Geological Survey Branch (Longe et al. 2001). Subsequent isotopic age dating of six galena-bearing core samples from the property returned an apparent Triassic age (Longe et al. 2001). As a result, work has been proposed in an attempt to determine the age of the sediments with a greater degree of confidence. The author is not aware of the specifics of the doubt regarding the geological age of sedimentary strata in the area but suspects it may be based on a possible (upper Silurian or) upper Devonian age estimate based upon lead isotope data from samples of host rocks from the former Mineral King mine on Toby Creek, west of Invermere (Lydon and Graf 2000). The host strata are interpreted to be Hadrynian age strata of the Dutch Creek or Gateway Formation and so, if the age data are correct, correlations of Precambrian – Cambrian strata in the Toby-Horsethief Creek area are incorrect, as are correlations of Hadrynian age strata (including the Horsethief Creek Group northward). However, correlations north from Toby Creek rely, to a large degree, on the Toby Formation, a very distinctive regional marker horizon separating the Windermere Supergroup (of which the Horsethief Creek Group is the basal unit) from the underlying Purcell Supergroup. The Toby Formation has been traced from its type section at Toby Creek, north through Horsethief Creek (the type section for the

Horsethief Creek Group) and has been mapped in Bugaboo Creek, approximately 20 km to the south of the property.

A second line of reasoning is evident on the basis of mapping Horsethief Creek Group strata by Kubli (1990). A regional marker, the Baird Brook division has been identified, in the Dogtooth Range of the northern Purcell Mountains, allowing separation of Horsethief Creek Group strata into a lower and an upper grit division. The "...Baird Brook division occurs south of the study area in the upper part of a section in the Mount Forster Syncline, on the northeast ridge of Law Mountain. There, the Baird Brook division is located 835 m above the basal contact of the Horsethief Creek Group, which conformably overlies the Toby Formation. Thick packages of slate, alternating with lenses of pebble conglomerate and minor limestone or calcareous sandstone comprise the lower 500 m of that section. This unit is informally named the "basal pelitic division". ... The abundance of coarse clastics, as well as their feldspar content gradually increases up-section, and felspathic grits predominate in the 150 m immediately below the Baird Brook division. The presence of calcareous sandstone and limestone interbeds, together with boulder size clasts of dolomite in the coarse-grained grits of the basal pelitic division, indicate the proximity of a carbonate platform" (Kubli 1990).

Subsequent to its identification, the Baird Brook division was correlated to the Lower Hector Formation in Jasper National Park, the Old Fort Point Formation southwest of Jasper and comparable units in the Miette Group in the Rocky Mountains and the Kaza Group in the Cariboo Mountains, confirming its utility as a widespread regional marker (Kubli 1990).

The presence of two distinctive regional markers, the Toby Formation and the Baird Brook division, both of which can be traced with confidence from the Toby – Horsethief Ceek area northward to Bugaboo Creek (Toby Formation) and into the Dogtooth Range north of the property suggests the stratigraphic package between these two markers can similarly be correlated. Therefore, the author considers the strata underlying the property belongs to the Horsethief Creek Group, as defined at its type section at Horsethief Creek and that the broadly homogeneous package can be correlated north to the property on the basis of two regionally distinctive markers. The isotopic age date determined for mineralization is, therefore, considered to be related to a later mineralizing event consistent with vein- and replacement-type mineralization identified to date, although the Triassic age is enigmatic.

Preliminary exploration programs undertaken on behalf of Mountain Star Resources Ltd and, subsequently, Bright Star Metals Inc. have emphasized potential for a sedimentary exhalative type deposit at the expense of well documented vein- and replacement-type mineralization typified by the former Ruth-Vermont mine.

> "Among the most diagnostic features of sedex deposits are sulphide textures formed by the superposition of layer upon layer of sulphide as partially consolidated chemical sediments at the sea floor, so-called "syngenetic" sulphides. But other processes also contribute: Near any hydrothermal vent, metal-bearing fluids pass through sediments,

> either along fissures or by exploiting the sediment's permeability. Deposition during such processes can range from replacement of water in unconsolidated sediments to replacement of fully lithified rock. The resulting textures include veining, brecciation, and selective replacement of rocks and minerals ...
>
> For separating sedex deposits from other deposit types, the important distinction is not between textures of replacement on one hand and those of chemical sediments on the other, but between textures which resulted from original rock-forming processes and those which resulted from much later events. Primary processes are more likely to create large sulphide deposits because vertical and lateral growth during deposition can be relatively unconstrained. Replacement processes, occurring long after lithification of all surrounding rocks are more likely to be restricted in volume and therefore tonnage. ...
>
> Any sedex deposit of significant size is likely to be associated with a hydrothermal vent where the thickness of mineralized rock is greater than in more distal portions ..." (Longe et al. 2001).

As sedex mineralization would be associated with hot fluids originating from a hydrothermal vent, one might expect alteration to the associated a sedex deposit, particularly in the footwall in proximity to the source vent. However, alteration associated with SEDEX deposits range from poorly developed in siliceous host rocks to well developed in feldspathic host strata (Turner 1996).

"Hydrothermal alteration associated with stratiform deposits differs according to host rock type. Deposits in siliceous rocks tend to have poorly developed alteration zones; where present silicification is dominant, ferroan carbonate alteration can be important (e.g. Tom-Jason, Yukon; Cirque and Driftpile, B.C.). Calcareous sediment-hosted deposits tend to have more extensive alteration that includes silicification, dolomite or ferroan carbonate alteration (Sheep Creek, Montana; Mt. Isa and Century, Australia; Jason end, Yukon). Feldspathic sediment-hosted deposits display the best developed alteration zones and most diverse alteration assemblages. These include potassic (muscovite, k-spar), tourmalinite, chloritic and albitic assemblages (e.g. Sullivan, B.C.; Broken Hill and Cannington, Australia; Zincgruven, Sweden; Anvil, Yukon)" (Turner 1996).

The Aldridge Formation of the Purcell Supergroup underlies the Windermere Supergroup and is interpreted to have occupied an analogous position during an earlier stage of rifting. It is characterized by a diverse range of alteration over an areally extensive area.

> "The Mesoproterozoic Sullivan graben system hosted an extensive submarine mud volcano and hydrothermal field coeval with formation of the Sullivan orebody. Diverse and extensive hydrothermal alteration in the Sullivan graben system reflects the reactive feldspathic composition of host rocks, widespread distribution of

permeable syn-rift coarse clastic rocks, permeable syn-rift faults, and superposition of several hydrothermal events. Sulphide-rich tourmalinite bodies represent the upflow zones of sulphide-forming hydrothermal systems (e.g. Sullivan, Stemwinder). Chlorite-pyrrhotite alteration along the margins of the Sullivan orebody and tourmalinite pipe formed by ingress of seawater into the ore-forming hydrothermal system. Small sulphide-poor tourmalinite bodies occur along syn-rift faults. Disseminated Mn-garnet and Mn-garnet-rich laminae are widespread within and adjacent to the Sullivan graben system and relate to seafloor exhalation and subsurface flow of hydrothermal fluids.

Granofels, biotite hornfels, albitic and sericitic alteration are genetically related to post-ore emplacement of gabbro sills. Sericitic alteration surrounds albite-chlorite on or adjacent to syn-rift faults intruded by gabbro. Sericitic alteration surrounding the Sullivan orebody and distal pyrrhotite laminated horizon may be coeval with and post-date ore formation. Extensive sericitic alteration within coarse syn-rift basin fill and underlying clastic dykes relates to sill emplacement and albitic alteration, and ore-stage hydrothermal activity. Chlorite-pyrite alteration overprints albitic alteration at the Sullivan deposit, and along the Kimberley fault. Post-metamorphic carbonate-sericite-pyrite alteration is likely of Cretaceous or Tertiary age.

Extensive areas of Ca-Na depletion due to replacement of detrital feldspar, and addition of B, S, Fe, and trace metals (Pb, Z, Sn, Cu) are associated with garnet, sericitic, tourmalinite, and chlorite-pyrrhotlte altered rocks. An extensive area of elevated potassium content is associated with garnet and sericitic altered rocks, while tourmalinite, chlorite-pyrrhotite, albitic, and silicified rock contain reduced K contents. Na enrichment and Ca, K, Mg, B, Pb, and Zn depletion is associated with albitic alteration and silicification.

Regional faulting, mud volcanism, and hydrothermal activity during formation of the Sullivan graben system resulted from syn-rift extension, early release of geopressured fluids causing mud volcanism, magmatic heating of stratified waters within the sedimentary basin, and seafloor exhalation of both boron-rich waters and metal- and boron-rich brines" (Turner et al. 2000).

No unambiguous examples of these features, however, are known to the author on, or immediately adjacent to the property. However, this may be a function of the limited regional exploration that has been undertaken in the Horsethief Creek Group for the purposes of mineral exploration. While there has been geological mapping on the Vowell Creek property, it has been largely stratigraphic in nature, with limited structural and no alteration mapping. Furthermore, no mapping has been undertaken by the company for the purposes of evaluating the mineral potential.

In the author's opinion, potential sedimentary exhalative mineralization on the Vowell Creek Claims remains largely interpretive. The author supports the observation by McIntyre (1990) and the working hypothesis of MineQuest that the Horsethief Creek Group is **prospective** for sedex type mineralization. Tentative support for SEDEX potential can be argued on the basis of occurrences of stratabound mineralization north of the former Ruth-Vermont mine (Brophy and Slater 1981), an apparently bedded manganese horizon south of Crystal Creek (Longe et al. 2001), and a tentatively identified fault-bounded massive sulphide drill intercept (Longe et al. 2001).

Further work is recommended as follows:

1. Examination of the stratabound mineralization north of the former Ruth-Vermont mine, stratigraphic location and host lithologies may result in confident projections of mineralized horizons.

2. The bedded manganese horizon might, with further geological mapping, be confirmed as an exhalite horizon at a distal edge of a sedimentary exhalative horizon.

3. Additional drilling at the LCP Zone may return unambiguous bedded sulphides indicative of proximity to a postulated sedex deposit.

With respect to exploration, specifically with reference to a sedex deposit, "Preferred methods are geological mapping, gravity and drilling. Given that a sedex deposit, if present, is expected to be stratigraphically controlled, a geological understanding of both stratigraphy and structure is likely to be key to most decisions. Gravity has been shown (Tambo Grande in Peru and Red Dog in Alaska) to work well with large sulphide targets in flat-lying sediments. While the steep topography either side of Vermont Creek may prevent its use, gravity is likely to be an effective technique for most of the claims south of the Vermont Creek watershed" (Longe et al. 2001).

However, gravity can be expected to respond to, and potentially identify, any large sulphide target, regardless of whether it is sedex, vein- or replacement-type sulphide deposit. Distinguishing between a large sedex deposit and a low tonnage, high grade vein will be a matter of the magnitude of a gravity response. Therefore, a gravity survey can be a very useful means of delineating a sub-surface drill target.

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" (Bottrill et al 1983). 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.

Nineteen years later, the author believes this conclusion is still correct, the property does have considerable merit, particularly with respect to documented vein-type and replacement-type mineralization in contrast to largely postulated sedex potential.

Arguably, the most important data with which to evaluate potential ore-grade (vein- and replacement-type) mineralization is available as archival mine data, principally in the form of cross sections, believed by the author to be in the possession of MineQuest Exploration Associates Ltd. for the former Ruth-Vermont mine. These data should be reviewed and re-evaluated with respect to the documented remaining reserves and the possibility of projecting information to surface to aid and constrain interpretation of surface data.

In addition, geological mapping of the steep ground immediately south of the former Ruth-Vermont mine is very important. In his report, Fyles (1966) includes a photograph outlining the Ruth Limestone which is clearly critical to replacement-type mineralization in the former Ruth-Vermont mine, as a stratigraphic (Eh/pH barrier) and/or structural control in localizing mineralization along the base and into the limestone unit. Mapping the Ruth limestone should allow the unit to be projected into the sub-surface and to project the mutual intersection of the limestone and the cross-cutting vein system as a potential vein- and replacement-type deposit. Furthermore, field work to map the Ruth Limestone, which may be an easily recognizable and distinctive local marker, may allow identification of faults and determination of offset, both critical to the economic potential of the property. The tentatively identified "major fault" that obliquely cuts the ore zone beyond section 2000 (Forman 1982) needs to be critically evaluated with respect to its potential effect on the ore zone (i.e. does it duplicate, and therefore thicken the ore zone, or potentially eliminate it). Forman (1982) also refers to another limestone unit to the southwest and at higher elevation, associated with veining, and "a replacement zone of unknown dimensions" on the Syenite Bluff crown grant. These may represent fault duplicates, additional veins cross-cutting the Ruth (or another) limestone unit or other stratigraphically and/or structurally controlled mineralization in the local anticlinorium.

It is interesting to note that the Pinetree and Blacksmith vein system (repeatedly described as having a 2600 foot surface trace) was projected south from the former Ruth-Vermont mine into the northern portion of the Crystal Creek drainage, which has been the locus of several phases of exploration to determine the origin and extent of a number of high grade mineralized intercepts recovered in previous drill programs, particularly on the LCP Zone. Future exploration programs should address the potential to expand these reserves by testing the proposed extension of the vein system along strike. The possibility of an extension to the mineralized vein-system documented in the former Ruth-Vermont mine (and, therefore, an opportunity to increase reserves) is considered by the author to be a significant component of subsequent exploration and should be the primary objective of programs in the near future.

Potential for SEDEX mineralization has been interpreted on the basis of several observations, including:

1. The 2000 diamond drill program documented a fault-bounded, possibly bedded interval of massive sulphides,

2. An interpreted bedded manganese horizon has been identified south of Crystal Creek, and

3. "All occurrences of a stratabound character are enclosed within the black laminated slate units ... at the base of the stratigraphic column ... The hosting units include Unit C (ribbon slate & limestone), Unit Db (sandy carbonate and slate) and Unit Dc (carbonate breccia)" (Brophy and Slater 1981).

However, the author differs in opinion from previous recent authors in recommending emphasis on exploration for vein-type and/or replacement-type mineralization in the immediate vicinity of the former Ruth-Vermont mine, extending north into Malachite Creek and south into Crystal Creek and the LCP Zone. Subsequent field work can be utilized to build a stratigraphic and structural database for the property. Subsequent evaluation of mineralized occurrences with respect to stratigraphy and structure should assist in clarifying the probable origin of the mineralization and, as a result, evaluation of the SEDEX potential. Diamond drill holes to test vein- and/or replacement-type mineralization can be extended to test SEDEX potential postulated on the basis of projections constrained by surface data.

Finally, reports describing mineralization at the former Ruth-Vermont refer to the documented silver-lead-zinc vein and replacement ore specifically with respect to the price of silver (as the principal commodity of economic interest). "The Ruth Vermont Mine is largely dependent upon its Silver values for an economical operation. When silver prices drop below $8.00 U.S. per ounce the mine's ore grade quickly becomes marginal. When the Silver price exceeds $8.00 U.S. per ounce the property has excellent potential to become a profitable long-term producer" (Forman 1982). However, historically, there has been a total of 55,693 kg of copper and 23,137 kg of cadmium recovered from the mine. This represents average grades of 0.13% cadmium and 0.32% copper, with 18.47% lead and 33.78% zinc in concentrate, despite poor grade control (Forman 1982). In addition, there was sufficient tungsten for Forman (1982) to propose a separate circuit to recover tungsten (as scheelite), having grades as high as 18% WO_3. Finally, there is also the possibility of gallium associated-with the silver-lead-zinc ore which might add value to the remaining ore reserves. In the future, these additional co-products need to be considered when considering the potential economics of vein- and replacement-type mineralization.

13.0 RECOMMENDATIONS

A two phase program is proposed in which Phase I consists of compilation of all available data followed by geological fieldwork to assess the database and ground-proof interpretations. Phase II consists of diamond drilling. The author strongly recommends all aspects of the Phase I program proceed to completion in order to provide a complete database for subsequent work. Recommended criteria on which to base a decision as to whether to proceed to drilling are identified for the proposed Phase II program.

Phase I

Pre-Field

13.1 "Between 1990 and 1994 they (Author's note: MineQuest Exploration Associates Ltd. conducted geological mapping, minor soil sampling and compiled all the previous exploration data" (Gidluck 1997). The author strongly recommends that compilation of all available data for the property continue to completion. A partial geochemical compilation was completed in 2000 and compilation of geological information was initiated but not completed (see Figure 9). The geochemical data compiled by the author has not, to the author's knowledge, been combined with that of MineQuest, compiled between 1990 and 1994. All available data pertaining to the property, comprised of regional and detailed geological data, geochemical analyses (rock, silt, stream and drill core), drill hole locations and trenches, should be compiled, evaluated and interpreted.

Much of the difficulty in continuing compilation of data is with regard to poor documentation associated with some of 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 ...". An internally consistent compilation of regional data (geological and geochemical) would allow subsequent exploration to utilize and evaluate interpretations from previous geological mapping and allow mineralized horizons and/or structures to be identified and projected.

13.2 The most important data with which to evaluate potential ore-grade (vein- and replacement-type) mineralization and potential reserves is available as archival mine data, principally in the form of plans and cross sections, believed by the author to be in the possession of MineQuest Exploration Associates Ltd. for the former Ruth-Vermont mine. In 1996 limited data from the archived mine records was reportedly compiled to facilitate correlation of stratigraphy and identification of possible drill sites by MineQuest Exploration Associates Ltd (Cukor and Longe 1997).

The author strongly recommends these records be acquired from MineQuest and digitized in their entirety, together with data from the 1996 and 2000 drill programs, and a database built from which new plans and sections can be plotted. A revised reserve estimate should then be made, using these data in consultation with either Mr. T. Tough (resident in Vancouver) who is, apparently, a former Ruth-Vermont mine geologist and consultant for Ruth Vermont Mine Ltd and/or H.D. Forman (if still available) to incorporate their knowledge and insights into subsequent work on the former mine and surrounding area. Examination of the resulting digitized mine data, as plans and sections, with respect to surface geology and geochemistry is likely sufficient to propose a logical drill program. "The present mine program should be continued until such time as exploration and development programs have a better knowledge of the ore shoots . The immediate need underground is an 1000 foot diamond drill program to definitely establish the location of the Pinetree vein on the 5750 foot level. It would also provide information on the exact location of the major fault at the 2000 section" (Forman 1982).

13.3 Topographic and other pertinent data (rivers, streams, roads, etc) should be digitized for the portions of the claims extending south of the current digital database (see Figure 9), specifically, the northern portion of TRIM maps 082K 086.

13.4 The database, comprised of drill holes and mineralized intercepts, arising from work in 2000-2001 by Minequest Exploration Associates Ltd. for the LCP Zone should be critically evaluated with respect to sub-surface stratigraphic and structural correlations. Data should be evaluated with respect to surface geochemical data, plotted with respect to topography and projections of underground (Recommendation 13.2) and surface data from the Ruth-Vermont area.

Field

13.5 The current database for the property, subsequent to compilation, needs to be "ground proofed" by geological mapping and sampling, initially for the region extending from the LCP Zone north-northwest to Malachite Creek.

Stratigraphic correlations proposed from the LCP area northward to Malachite Creek should be confirmed and plotted on digital 1:20,000 TRIM topographic maps, with reference to underground data from the former Ruth-Vermont mine. The reported stratabound lead ± zinc and manganese horizons should be plotted and subsequently followed up in the field with stratigraphic and/or structural mapping in an attempt to identify and map possible marker horizons and extend correlations. These stratabound horizons obviously represent the best opportunity in the immediate future to evaluate the SEDEX potential of the area.

This work is expected to result in an understanding of the stratigraphic and structural relationships in the area centred around the former Ruth-Vermont mine site and allow interpretation of the relationship between stratigraphy, structure and documented mineralization to determine:

1. If mineralization is predominantly stratabound or vein-type, primary or replacement,
2. The extent to which gold (± cadmium ± copper ± gallium ± tungsten) is associated with documented silver + lead + zinc,

3. If a consistent stratigraphy be identified in the area and, if so, if it can be correlated north to Malachite Creek where apparently stratabound lead - zinc mineralization was previously reported?
4. If there are preferred mineralized horizons and, if so, whether they can be mapped and projected?
5. If veins in the Ruth-Vermont area are structurally controlled (i.e. by faults and/or a fold axis)?

13.6 Geochronological studies should continue given the stated uncertainty regarding the age of the Horsethief Creek Group host strata and/or the age of mineralization. In 2001, argillite-rich samples were selected from drill core in the belief that they would represent greater depth and, therefore, a thicker water column, thus maximizing the potential to recover a more diverse and abundant assemblage of micro-fossils. However, the silicic nature of the samples reportedly made dissolution difficult and the attempt was not successful. Samples should emphasize samples from lime-rich strata (i.e. Ruth Limestone).

In addition, a set of six galena samples were submitted for lead isotope geochronology at the Department of Earth and Ocean Sciences at the University of British Columbia and reportedly returned Triassic ages. The report detailing the methodology and assumptions made should be obtained for review. Additional samples should be taken from the Ruth-Vermont vein- and replacement-type ore bodies, the LCP Zone and other showings in the area. Geochronological age dating of these various mineralized bodies would provide a suite of galena-lead isotopic data with which to evaluate the nature of the mineralization in which the genesis is uncertain (i.e. primary vs. secondary) with respect to the well documented vein- and replacement-type mineralization at the Ruth Vermont.

13.7 Geological mapping of the steep ground immediately south of the former Ruth-Vermont mine is considered very important. The Ruth Limestone is clearly critical to replacement-type mineralization in the former Ruth-Vermont mine, both as a stratigraphic (Eh/Ph barrier) and/or structural control in localizing mineralization along the base and within the limestone itself. Mapping the Ruth limestone should allow the unit to be projected into the sub-surface and to project the mutual intersection of the limestone and the cross-cutting vein system as a potential vein- and replacement-type deposit. Field work to map the Ruth Limestone may allow identification of faults and determination of offset, both critical to the economic potential of the property.

Furthermore, "A relatively unexplored replacement zone further up-dip from the Nelson Orebody may provide potential ore. To the southwest, and at much higher elevation from the Nelson Orebody, another limestone unit is known to exist. Veining has also been noted in this area.

A replacement zone of unknown dimension has been examined by the writer on the Syenite Bluff crown grant immediately north of the Ruth-Vermont property on the north side of Vermont Creek" (Forman 1982).

Future exploration programs should address the potential to expand reserves documented at the former Ruth-Vermont mine by testing the proposed extension of the vein system along strike. It is interesting to note that the Pinetree and Blacksmith vein system (repeatedly described as having a 2600 foot surface trace) was projected south from the former Ruth-Vermont mine into the northern portion of the Crystal Creek drainage, which has been the locus of several phases of exploration to determine the source of a number of high grade mineralized intercepts recovered in previous drill programs on the LCP Zone (see Figure 10).

13.8 Base of slope geochemical sampling should be considered along either side of Vermont Creek, from east-northeast of the former Ruth-Vermont mine, west-southwest toward the headwaters. The ground is probably too steep for an effective gravity survey and, therefore, the most cost effective method of identifying mineralized occurrences is probably searching upslope from anomalous base of slope geochemical anomalies. In addition, structural projection of mineralized occurrences and/or horizons would be a complementary methodology.

13.9 The tentatively identified "major fault" that obliquely cuts the ore zone beyond section 2000 (Forman 1982) needs to be critically evaluated with respect to its potential effect on the ore zone (i.e. does it duplicate, and therefore thicken the ore zone, or potentially eliminate it). The other limestone unit to the southwest and at higher elevation, associated with veining, and "a replacement zone of unknown dimensions" on the Syenite Bluff crown grant (Forman 1982) may represent fault duplicates, additional veins cross-cutting the Ruth (or another) limestone or other stratigraphically and/or structurally controlled mineralization in the local anticlinorium. Furthermore, geological mapping of the Medesto and Cochrane faults in the LCP Zone (see Figure 10) should be undertaken to evaluate the possibility these faults project into Vermont Creek.

13.10 Re-evaluation of previously described mineralized occurrences is strongly recommended. These occurrences should be geologically mapped and re-sampling. Precise location of these occurrences on topographic maps and, if possible, with respect to their stratigraphic and/or structural position is key to evaluating their origin, whether primary (SEDEX) or secondary (vein- or replacement-type).

13.11 "Disseminated Mn-garnet and Mn-garnet-rieh laminae are widespread within and adjacent to the Sullivan graben system and relate to seafloor exhalation and subsurface flow of hydrothermal fluids" (Turner et al. 2000). The bedded manganese horizon previously described southeast of Crystal Creek (see Figure 4) might, with further geological mapping, be confirmed as an exhalite horizon, potentially at the distal edge of a sedimentary exhalative horizon.

Further work to assess and determine the nature and extent of the bedded manganese horizon should be undertaken. Work should include:

a. Contour soil sampling on either side of Crystal Creek in an attempt to delineate the geochemical expression and extent of the manganese horizon.
b. Geological mapping of the manganese horizon exposed in a recent road-cut for structural data to allow projection of the horizon into the sub-surface.

Confirmation of the bedded nature of the manganese horizon, its potential as an exhalite horizon and/or delineation of its surface trace would be highly significant with regard to evaluating the SEDEX potential for the immediate area.

Furthermore, the manganese horizon represents a very distinctive, local marker with which to attempt determination of displacement associated with the Cochrane and/or Medesto faults.

13.12 A gravity survey should be undertaken extending from the LCP Zone northward to the height of land separating Crystal Creek from Vermont Creek. The survey should be sufficiently wide to detect the presence of a SEDEX massive sulphide body and, if present, determine its margins. In addition, the survey should respond to sufficiently large, potentially economic vein- and/or replacement-type mineralization. Interpretation of the data resulting from the proposed gravity survey would benefit greatly from compilation of the Ruth-Vermont underground mine data (Recommendation 13.2) in determining the probable strike extensions of the Pine Tree, Blacksmith, North and/or South vein from the Ruth-Vermont southwest into the Crystal Creek drainage.

13.13 Structural data is required as a fundamental and integral part of all future exploration programs, including, but not limited to, bedding, foliation, fault and/or fractures measurements from outcrop, underground workings and/or diamond drill holes. The author considers the consistent lack of these data to represent a significant weakness in the documentation accompanying all previous reports. Without structural data, no meaningful 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.

13.14 An initial attempt should be made to undertake alteration mapping in both the LCP Zone and at the former Ruth-Vermont mine and surrounding areas. The feldspathic grits should be particularly susceptible to alteration effects, by analogy with the Sullivan mine. Identification of widespread alteration, coupled with a reported bedded manganese horizon and possible bedded massive sulphides in the LCP Zone would strongly support SEDEX potential postulated for the area.

13.15 All future soil, rock and drill core analyses should utilize multi-element ICP analysis with assays on high (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. In addition, the presence of possible co-products, such as cadmium, copper, gallium, gold and/or tungsten can be evaluated. 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.

13.16 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 and believes an overflight of the area may have been completed on behalf of Bright Star Metals Inc. in 2000. If the imagery has been acquired, then it should be completed as an orthophoto to assist with mapping.

13.17 In addition, a differential GPS survey should be considered for the claims on the property. A GPS survey has the advantage of providing precise claim location data to evaluate claim holdings and identify possible gaps in the claim block.

13.18 Diamond drilling is recommended underground, if possible, on the 5,750 foot level to ascertain the location of the Pinetree vein (see Recommendation 13.2) and the location of the major fault at the 2000 section. If underground drilling is neither cost-effective nor feasible, a surface drill program should be considered utilizing sub-surface data from the digitized and re-compiled underground data.

Phase II

A phase II program is recommended on the basis of meeting the general conditions outlined below. The author anticipates that a drill would be available and on-site to fulfill Recommendation 13.18 (i.e. drill testing the 5,750 foot level underground in the Ruth Vermont)

13.19 Drilling is recommended upon:

a. favourable results from the proposed gravity survey, defined as a gravity anomaly:

   i) having interpreted potential for SEDEX massive sulphide mineralization,
   ii) having interpreted potential for vein-and/or replacement-type ore, and/or
   iii) coincident with the projection of the mineralized system documented from the former Ruth-Vermont mine),

b. identification of potential to expand reserves previously documented, arising from compilation and evaluation of archival underground data from the former Ruth-Vermont mine,

c. identification of other potential vein- and/or replacement-type mineralized occurrences from geological mapping along the structural trend of the vein system, the other limestone horizons described topographically above the Ruth-Vermont mine and/or additional replacement orebodies up-dip from the Nelson Orebody and/or on the Syenite Bluff Crown Grant,

d. identification of potential drill targets constrained by:
   i) evaluation of the sub-surface database for the LCP Zone,
   ii) sub-surface projection of mineralized occurrences mapped at surface, constrained by surface data .

14.0 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.

Phase I

Recommendation	Description of Work	Estimated Cost
	Pre-Field	
	Permitting	$ 700
13.1	Compile Available data and append to existing database	$ 5,000
13.2	Digitize / Scan Ruth-Vermont underground plans and sections	$ 5,000
13.3	Digitize topographic information - 082K 086	$ 500
13.4	LCP Zone sub-surface data analysis	$ 5,000
13.16	Orthophoto	$ 6,000
	Sub-Total	**$ 22,200**
	Field	
	Mob / De-mob	$ 2,000
13.5	Geological Mapping - 50 days	
13.7	Geologist - 50 days at $500 / day	$ 25,000
13.9	Assistant - 50 days at $250 / day	$ 12,500
13.10	4WD Truck - 50 days @ $75 / day	$ 3,750
13.11b	Food / Accommodation - 50 days @ $150 / day	$ 7,500
13.13	1 ATV's - 50 days @ $75 / day	$ 3,750
13.14	Hand-held radios - 50 days x 2 @ $15 / day	$ 1,500
	100 rock samples @ $25 / sample	$ 2,500
	Helicopter (Jet Ranger) - 6 hours @ $1,000 / hr	$ 6,000
	Sub-Total	**$ 64,500**
13.6	Geochronology - Lead isotope and/or micro-fossils	
	Sample collection - 3 days	
	Geologist / Assistant	$ 2,250
	4WD Truck	$ 225
	10 samples @ $500 / sample	$ 5,000
	Food / Accommodation	$ 450
	Sub-Total	**$ 7,925**

Phase I (cont'd)

Recommendation	Description of Work		Estimated Cost
13.8	Contour geochemistry - Crystal Creek / Vermont Creek		
13.11b	400 samples @ $20 / sample		$ 8,000
	10 days - Geologist / Assistant		$ 7,500
	4 WD truck		$ 750
	Food / Accommodation		$ 1,500
		Sub-Total	**$ 17,750**
13.12	Geophysical Survey - Gravity		
	Grid Preparation		$ 15,000
	Levelling and Survey		$ 3,500
	Gravity survey and report		$ 55,000
		Sub-Total	**$ 73,500**
13.17	Differential GPS survey of claims		
	6 days - Geologist / Assistant		$ 4,500
	Differential GPS - 6 days @ $100 / day		$ 600
	4WD Truck		$ 450
	Food / Accommodation		$ 900
	Base Station Files - 62 @ $6		$ 372
	Helicopter (Jet Ranger) - 2 hrs @ $1,000 / hr		$ 2,000
		Sub-Total	**$ 8,822**
13.18	Drilling - surface / underground at Ruth Vermont		
	Mob / Demob drill and drillers		$ 4,000
	Site Preparation		$ 20,000
	Supervision - Geologist / Assistant		$ 12,000
	4WD Truck		$ 1,200
	Food / Accommodation		$ 2,400
	Drilling - 1000 m @ $90 / metre (underground)		$ 90,000
	Supplies / Consumables @ $150 / day		$ 2,400
	Assays / Geochemistry - 500 samples @ $25 / sample		$ 12,500
	Reclamation / Reseal Portal		$ 15,000
		Sub-Total	**$ 159,500**

Phase II

13.19	Drilling - LCP Zone / Gravity anomalies / Ruth Vermont area		
	Site Preparation, bulldozer and manual - $2000 / site x 8 sites		$ 16,000
	Supervision - Geologist / Assistant - 30 days		$ 22,500
	4WD Truck		$ 2,250
	Transportation - 30 days @ $125 / day (drillers)		$ 3,750
	Food / Accommodation		$ 4,500
	Drilling - 1200 m @ $70 / metre (surface)		$ 84,000
	Supplies / Consumables		$ 4,500
	Helicopter - 212 to sling drill equipment - 20 hrs @ $1,500 / hr		$ 30,000
	Assays / Geochemistry - 600 samples @ $25 / sample		$ 15,000
	Reclamation		$ 12,000
		Sub-Total	**$ 192,250**

Post-Field

Report		$ 15,000
Drafting		$ 10,000
	Sub-Total	**$ 25,000**

Phase I		
Pre-Field		**$ 22,200**
Field		**$ 331,997**
Phase II		**$ 192,250**
Post-Field		**$ 25,000**
	Sub-Total	**$ 571,447**
Contingency (10%)		**$ 57,145**
		$ 628,592
	Total	**$ 630,000**

15.0 REFERENCES

Bottril, T.J., Robinson, S.D. and McCance, J.A. 1983. Spillamacheen Project, Geology, Geophysics and Diamond Drilling on the DEB Claims, Golden Mining Division, Assessment Report 11,806, filed Nov., 1983.

Brophy, J.A. and Slater, J. 1981. Report on Regional and Detailed Geological Sampling Surveys conducted on Group 1, Group 2, Group 3 and Group 4 of the DEB Claims, Assessment Report #10,061

Cukor, D. 1996. Ruth-Vermont Property, Reclamation following the 1996 Drill Program, report prepared for the inspector of mines

------------ and Longe, R.V. 1997. Ruth-Vermont Mining Lease Underground Drilling, MineQuest Exploration Associates Ltd., report for Mountain Star Resources Ltd and Bright Star Ventures Corp.

Dickie, G.J. amd Longe, R.V. 1982. DEB Project, Geology and Geochemistry of the DEB Claims, MineQuest Exploration Associates Ltd., Assessment Report #10,823, dated October, 1982

Evans, C.S. 1933. Brisco-Dogtooth Map Area, B.C., Geological Survey of Canada Summary Report 1932.

Forman, H.D. Feasibility Report of Ruth Vermont Mine Ltd. (N.P.L.), dated March 15, 1982

----------------. 1981. Internal report for Ruth Vermont Mine Ltd, 1981, 7 pg.

Fyles, J.T. 1966. Ruth Vermont Mine, Golden Mining Division, British Columbia Minister of Mines Report, 1966, pp. 230-235.

Gidluck, M.J. 1997. Geological Evaluation and Exploration Potential of the Vermont Project Mineral Claims, Internal report for Mountain Star Resources Ltd., filed September 9, 1997, 29 p.

Godwin, C.I., Gabites, J.E. and Andrew A. 1988. Leadtable: A galena lead isotope data base for the Canadian Cordillera, with a guide to its use by explorationists, British Columbia Ministry of Energy, Mines and Petroleum Resources, paper 1988-4, 188 p.

---------------- and Sinclair, A.J. and Ryan, B.D. 1982. Lead isotope models for the genesis of carbonate-hosted Zn-Pb, shale-hosted Ba-Zn-Pb, and silver-rich deposits in the northern Canadian Cordillera, Economic geology, vol. 77, pp. 82-94.

-------------------------------------. 1982. Average lead isotope growth curves for shale-hosted zinc-lead deposits, Canadian Cordillera, Economic geology, vol. 77, pp. 675-690.

-------------------------------------. 1981. Preliminary interpretations of lead isotopes in galena-lead from shale-hosted deposits in British Columbia and Yukon Territory, in Geological Fieldwork 1980, British Columbia Ministry of Energy, Mines and Petroleum Resources paper 1981-1, pp. 179-194.

Kubli, T.E. 1990. Geology of the Dogtooth Range, Northern Purcell Mountains, British Columbia, Ph.D. Thesis, University of Calgary, 351 p.

------------- and Simony, P.S. 1994. The Dogtooth Complex, a model for the structural development of the northern Purcell Mountains, Canadian Journal of Earth Sciences, Vol. 31

Longe, R.V., Richards, J.B. and Walker, R.T. 2001. Potential of Vowell Creek Claims for Sedimentary Exhalative Lead-Zinc Deposits, MineQuest Report # 304, dated July, 2001.

-------------- and Walker, R.T. 2000. Vowell Creek Claims - Drilling 2000, MineQuest Report # 303, dated December, 2000.

--------------. 1993a. The case for Exploration of the VMT and Neighbouring Claims, A Summary Report, Spillamacheen Joint Venture, MineQuest Exploration Associates Ltd. Report # 263, dated May, 1993

--------------. 1993b. VMT and Neighbouring Claims, Geological Mapping, Minequest Exploration Associates Ltd. Report # 269, September 1993 - Assessment Report #23,439

--------------. 1985. Ruth Vermont Property - A geological case for an untested shale hosted lead-zinc target, Minequest Report #103 for Esso Resources Canada Ltd, filed November, 1985

Manning, L.J. 1972. Feasibility Report, Ruth - Vermont Mine, for Columbia River Mines Ltd. (N.P.L.), April 1972.

Ministry of Environment, Lands and Parks. 1996. NAD27 to NAD83 Conversion in British Columbia - National Transformation: Version 2, 30 p. plus Appendices.

Morrow, J.J. 1995. Annual Reclamation Report for 1994 for Centipede Resources Ltd, Reclamation Permit M-89

Nolin, G. 1981. Crystal Creek Prospect, B.C., 1981 exploration program, internal report for Bluesky dated October, 1981

-----------, Dundas, T. and Vonhof, A. 1983. Crystal Creek Exploration Program, Geophysics and Drilling on Cochrane Joint Venture Claims (Pro 10, Tect 1 to 4, Cog 2), report for Cochrane Oil and Gas Ltd, dated November 1983.

Okulitch, A.V. and Woodsworth, G.J. 1977. Kootenay River Map Area, Geological Survey of Canada Open File 481

Pelzer, M.A. 1978. Report on Geochemical Soil Sampling Survey and Diamond Core Drilling, ME Mineral Claim Group, Assessment report 6,744, dated April 28, 1978.

Price, R.A. and Mountjoy, E.W. 1979. McMurdo Map Sheet - West, Geological Survey of Canada Map 1502A

Reesor, J.E. 1973. Geology of the Lardeau Map Area, East Half, BC, Geological Survey of Canada Memoir 369

Smith, L.J., Slingsby, A., and Laird, R. 1980. Crystal Creek Project, B.C., 1980. Exploration Program, internal report for Norcen dated December 1980

Tough, T.R. 1972. Geological Report Relating to the Ore Reserve Potential of the Ruth-Vermont Mine for the Columbia River Mines Ltd. (NPL), March 1972, by T.R. Tough, P.Eng., Consulting Geologist, report included with Manning Feasibility Study

Walker, R.T. 2000. Assessment report for the Ruth-Vermont, BB and VMT Claim Groups, internal report for Bright Star Metals Inc., dated May 16, 2000

Wheeler, J.O. 1963. Rodgers Pass Map Area, Geological Survey of Canada Paper 62-32

Young, F.G., Campbell, R.B. and Poulton, T.P. 1973. The Windermere Supergroup of the Southeastern Canadian Cordilera, Belt Symposium 1973, Volume 1, September 1973, Moscow, Idaho.

Appendix A

Statement of Qualifications

Richard T. Walker, M.Sc., P.Geol.
656 Brookview Crescent
Cranbrook, B.C.
V1C 4R5

I, Richard T. Walker, hereby certify that:

1. I am a Professional Geologist (P.Geol.) registered with the Association of Professional Geologists and Geoscientists of British Columbia,

2. I graduated from the University of Calgary with a Bachelor of Science in Geology in 1986 and subsequently obtained a Masters of Science in structural geology from the University of Calgary in 1989,

3. I have worked as a geologist and a consulting geologist from 1986 to the present in the provinces of British Columbia, Alberta and New Brunswick, the Northwest Territories, the state of Montana and Brazil,

4. I have completed contract work for the Geological Survey of Canada and the government of the Northwest Territories, junior and senior resource companies as both a contract employee and as a consultant,

5. As a result of my experience and qualifications, I am a Qualified Person as defined in N.I. 43-101,

6. I am the principal of Dynamic Exploration Ltd., 656 Brookview Crescent, Cranbrook, B.C. and work as a Consulting Geologist,

7. I personally prepared this report, with reference to material disclosed in Section 1.3 – Sources of Information and as itemized in Section 14.0 – References,

8. I am not aware of any material fact or material change with respect to the subject matter of this technical report which is not reflected in this report, the omission to disclose which would make this report misleading,

9. I have read the National Instrument 43-101, Form 43-101F1 and this report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated in Cranbrook, British Columbia this 29th day of April, 2002.

Richard (Rick) T. Walker, P. Geol.

Appendix B

Sample Descriptions

Drill Core 2000

Hole Number	Sample Number	From	To	Description
VC-00-02	112701	104.69	104.74	Irregular milky white quartz vein (≤ 2 cm) at approx. 70° and offsets pale grey quartz and yellow to white ankerite vein (0.3 cm thick). Thicker vein contains 5-10% pyrite (as one coarse aggregate mass ≤1 cm diameter) and 5-10% chalcopyrite (as irregular aggregates up to 1 cm in length)
	112702	104.95	105.04	Irregular milky white quartz + ankerite vein with coarse pyrite (5%) and ≤20-25% galena (Ga) having a mesh-like texture
	112703	105.35	105.39	As above, irregular vein up to 2 cm thick, 40% .
	112704	112.77	112.98	Upper contact of vein in host grit. Vein oriented at approx. 20° to c.a. Vein extends 2/3 along length of sample, comprising 1/3 of sample by volume. 1% pyrite to 3 mm in host along contact and up to 3 cm into host grit. Pyrite in vein (1%) coarser (up to 0.5 cm) and less abundant. Arsenopyrite (Aspy) as aggregates in discontinuous band along contact with host grit and up to 2 cm into vein. 2-5% orange brown and charcoal coloured sphalerite (Sph) as coarse aggregates up to 2 cm diameter (Note: most Sph in sample for analysis)
	112705	112.98	113.09	Aspy and Sph band contact extends length of sample and comprises ½ of sample. Remainder is apparently barren cavity/void filling quartz vein.
	112706	113.09	113.44	Barren(?), void-filling quartz vein.
	112707	113.44	113.65	Lower contact of quartz vein. Coarse aggregates of pyrite (to 2 cm long dimension) within Aspy band. Discontinuous band of Aspy parallel to contact with host grit, 2-2.5 cm from vein margin. Aspy forms irregular, discontinuous band up to 4 cm thick. Aspy up to 10% over 4 cm thick.

	112708	113.65	113.88	≤2 cm of apparently barren quartz vein (underlying Aspy band) at lower contact extends ½ length of sample, comprises approx. 1/4 of sample. Trace Aspy needles in host grit.
	112709	116.42	116.64	Coarse grit to pebble conglomerate with Aspy-bearing vein. Grit overlying quartz vein
	112710	116.64	116.71	Quartz vein into Aspy-bearing grit
	112711	116.71	116.86	Trace Aspy in underlying grit.
VC-00-04	112712	34.59	34.65	Cavity filling quartz + ankerite vein with host sandstone inclusions and 0.5% Ga.
	112713	38.95	40.33	38.95-41.55 Badly broken core from approx. 37.0-38.95, so start of interval approximate. Fine-grained pyrite along coarser bedding planes. Minor quartz + ankerite veins with minor Sph + (<< 0.5%).
	112714	40.33	40.6	Thicker quartz + ankerite veins (≤3 cm) with (up to 10%) and Sph (0-3%) in veins (diluted over sample interval).
	112715	40.6	40.85	Orange coloured Sph (≤10%) + (≤3%). Galnea in quartz (core) + ankerite (margins) veins, comprising up to 40% of veins (up to 0.5 cm thick). Sph associated with quartz sweats (?) or quartz + ankerite-rich portions of the host and in quartz + ankerite veins (±) comprising up to 10% of veins.
	112716	40.85	41	Broken interval. Fine-grained pyrite (≈5%) ± fine-grained ± Sph. Coarse-grained (1%) and Sph (2%) present throughout interval, generally within quartz ± ankerite veins and veinlets.
	112717	41	41.55	Similar to above but unbroken, more quantitative analysis possible.

	112718	88.81	89.15	Pyritic Fining Upward Sequence. 4 cm of sandstone at base fining upward to argillite. Coarse argillite to 1.5 cm (2%) throughout argillite, weak tendency to aggregate at contacts with sandstone. Fine-grained pyrite also present (<1%).
	112719	89.15	89.97	Semi-massive to locally massive pyritic Fining Upward Sequence (FUS). Coarser grained base has semi-massive to massive fine-grained pyrite whereas argillitic tops have coarse disseminated to semi-massive pyrite. Minor moderately coarse grained ± Sph noted (≈1%). Abundant (20-30%) dark grey specks (to 2 mm) in matrix may be argillitic (lithic) clasts but may also be ± Sph.
	112720	89.97	90.58	Lithic rip-up bearing, coarse-grained base to FUS. Disseminated to semi-massive pyrite. Possible + Sph. Partial to complete replacement of individual layers (laminae) in rip-up clasts.
	112721	90.58	90.9	Coarse (≤1 cm aggregates) and Sph (≤0.5 cm elliptical masses) enriched base to FUS. 3-5%, Sph ≈5-7% over interval.
	112722	80.46	80.6	Fault 80.50-80.55. Two faults oriented at a high angle to one another results in a sample from 80.46-80.60.
	112723	56.23	56.4	Quartz + ankerite vein with Aspy and skeletal/runic coarse crystals. Aspy needles (trace) in host sandstone above and possible below vein. Aspy in vein (≤1%), Ga (≤1%). Aspy-bearing sandstone above vein.
	112724	56.4	56.55	Vein
	112725	56.55	56.62	Sandstone below vein
	112726	57.63	57.83	Fine needles to laths of Aspy (0.2 mm thick x 0.4 mm length)
VC-00-05	112727	27.06	27.16	Semi-massive pyrite zone

	112728	77.72	78	Graphitic, pyritic sandstone. Pyrite to 10%. Lithic rip-ups at base of interval.
	112729	11.65	11.73	Rotten, massive pyritic interval.
VC-00-03	112730	51	51.13	2 small (1.0-1.5 cm) quartz + ankerite veins with 40% Sph and 20% Ga in fine sandstone as described above.
	112731	50.88	51	Fine sandstone with medium grained pyrite porphyroblasts to 0.4 cm and up to 7% fine grained pyrite in matrix.
	112732	51.13	51.26	Same as Sample 112731
	112733	53.19	53.27	2 cm thick quartz + ankerite vein with ≤40% Ga + 20% pyrite in core
	112734	53	53.19	Upper 10 cm alternating siltstone and sandy siltstone laminae, lower 9 cm argillite with bedding at moderate angle to core.
	112735	53.27	53.32	Fine to medium sandstone with ≤5% fine-grained pyrite and up to 1% fine-grained Sph (?)
	112736	52.32	52.46	Branching quartz + ankerite veins up to 1.0 cm thick with or without 20% Ga + 5% pyrite in laminated siltstone-argillite. Ga ≈1% over sample interval
	112737	55.16	55.23	2 cm thick quartz + ankerite vein with core of 7-10% Ga + 1% pyrite
	112738	47.61	47.65	Sulphide- and grit-bearing sandstone. Sulphides include ≤3% Sph, ≤10% very fine Ga, ≤3% coarse Ga and 15-20% fine-grained pyrite

	112739	47.65	48.1	20% coarse Ga over upper 5 cm, 5% medium grained Ga to end of sample interval. 5% medium grained, dark brown Sph over lower 7 cm. Medium-coarse Ga + Sph associated with quartz + ankerite. 15-20% disseminated to locally semi-massive, fine-grained pyrite over sample intervals. 5-10% fine-grained Sph over intervals.
	112740	48.1	48.7	Proportion of medium-coarse Ga decreases to 0%, Sph decreases to 3%, pyrite ≈15-20%. Fine-grained Sph ± Ga suspected in matrix.
	112741	48.7	48.95	Contact between upper sandstone and underlying coarse pyrite-bearing argillite. Contact at shallow angle to core axis.
	112742	48.95	49.1	Pyritic base to FUS in sandstone. Approx. 7% fine-grained pyrite.
	112743	58.1	58.4	Broken interval at top of sandstone bed with coarse disseminated Sph (to 3 mm diameter) and quartz + ankerite veins up to 1.0 cm. Sph ≈2%, Ga ≈0.5%.
	112744	58.4	59	Diffuse bands of disseminated Sph (as above), perhaps controlled by bedding. Sph 3-5%, Ga 0.5-1.0 % (suspected)
	112745	59	59.6	Sph decreases to 1-2%, Ga ??
	112746	73.5	74.25	Massive fine-grained pyrite + minor coarse Ga ± fine-grained Ga
	112747	74.25	75.16	Massive fine-grained pyrite + minor coarse Ga ± fine-grained Ga
	112748	72	73.5	Broken interval with greater proportion of pyritic sandstone laminae (<60%) associated with increased quartz (±ankerite?) In interstices. Minor coarse aggregates of sph (≤1%, up to 1.0 cm diameter) + ga (≤2%, up to 0.5 cm diameter) evident.

	112749	71.25	72	Fine-grained pyrite (≤5%) in coarse laminae (sandstone to sandy siltstone), comprising 20% of interval. Coarse py to 1.0 cm diameter comprises <1% of interval.
	112750	75.16	75.8	Siltstone-argillite, minor fine-grained pyrite.
	112751	75.8	75.98	Massive pyritic, sandstone dominated interval
	112752	75.98	76.62	3 pyritic sandstone (30%) bands between 1.0-1.5 cm thick between 76.20-76.47, warp gently into, then back out of core. Thin qtz±ankerite veinlets and 1.4 cm thick qtz vein present in interval. Coarse pyrite cubes to 1 cm present in siltstone.
	112753	76.62	77.8	Pyritic sandstone dominated interval. Pyritic sandstone (semi-massive - 30-40% py) bands between 3 cm to 10+ cm dominate interval (70%), with minor parasitic folds evident/ Qtz+ankerite veinlets and elongate lenses present, comprising approx. 3% of interval.
	112754	77.8	78.4	Broken interval. Appears to be similar to preceding interval.
	112755	78.4	78.82	Similar to 112753, however, semi-massive to massive interval between 78.40-78.52.
	112756	78.82	79.84	Dominantly siltstone interval with pyrite banded sandstone layers and medium-coarse pyrite
	112757	79.84	80.8	Dominantly siltstone interval with pyrite banded sandstone layers and medium-coarse pyrite
	112758	80.8	81.8	Dominantly siltstone interval with pyrite banded sandstone layers and medium-coarse pyrite

	112759	84.1	85.34	Very coarse pyrite cubes (up to 2.0 cm diameter) comprise 5% of sample. Coarse disseminated pyrite (to 0.2 cm diameter) comprises up to 2-3% of interval (locally up to 7% over 10 cm).
	112760	85.34	85.72	10% irregular quartz + ankerite with 1.0 cm pyritic band at 20° to c.a. Qtz+ankerite veins and irregular lenses comprise up to 20% of interval, cross-cut 1.0 cm thick pyritic band at 20° to c.a. Comprises 60% of sample, remaining 40% consists of material similar to 112759.
	112761	85.72	86.63	Ga-rich (≤60%) vein 4.0 cm thick between 86.0-86-04. Fine ga on margins (<0.2 cm thick) coarsens to 0.5 cm thick in core of vein at 70-80° to c.a. 2 py bands (85.89-86.0 and 86.4-86.63) up to 3 cm thick consist of abundant disseminated to locally massive (over 3 cm) pyrite to 0.2 cm diameter.
	112762	86.63	87.54	Py-bearing sst up to 2.0 cm thick slightly oblique to sub-parallel to c.a. Moderate to abundant py up to 0.1 cm diameter. Disseminated py in siltstone up to 15% in lower ½ of sample.
	112763	87.54	88	Abundant disseminated py (up to 20%) in slightly coarser base of fining upward sequence. Possibly two generations of py. Approx. 2-3% coarse py (up to 0.4 cm diameter) with up to 20% fine pyrite (up to 0.1 cm diameter) - apparently bimodal size populations.
	112764	88	88.9	Similar to above with presence of minor, local patches/lenses of ga (to 1.5 cm diameter) and sph (to 0.4 cm diameter). Interstices of sandstone appear to have elevated qtz (±ankerite?) content, associated with increased ga + sph content (as coarse disseminations to 0.4 cm diameter) and minor, thin discontinuous veinlets. Ga ≈4.0%, sph ≈2.0%.

	112765	89.11	89.83	1-2% disseminated py to 0.3 cm diameter. Qtz(± ankerite?) veinlets to 0.2 cm with very fine grained orange coloured sph (40%) ± py comprise 0.5% interval. Minor coarse Ga + black sph aggregates (to 1.0 cm diameter). Disseminated ornage-brown sph (0-2%) ± ga (≤0.5%) throughout interval. Disseminated py increases in size toward base of interval ≤0.5 cm diameter. Two py-enriched bands between 89.66-89.76, abundant disseminated to semi-massive, fine-grained py in sandstone laminae up to 1.0 cm thick.
	112766	89.83	90.59	Similar to above, however, fewer small mineralized (sph+ga) veinlets and slightly more galena (1-2%) and sph (≤0.5%) in aggregate masses with quartz and/or ankerite margins.
VC-00-03	112767	90.59	90.84	"Zebra" texture. Dilational (?) fracture fill at high angle to lower contact with argillite. Quartz + ankerite fracture fill with 0.5% Sph (± Ga) with pyrite (0.5%)
	112768	90.84	91.24	10% silty sandstone laminae up to 1 cm highly folded (disharmonic folds) within argillite. Pyrite (0.5%) with possible Sph + Ga (0.5-1% over interval).
	112769	88.9	89.11	Ga + sph masses (up to 2.0 cm diameter) and veinlets up to 0.5 cm) locally abundant over interval. Ga ≈4.0%, sph≈4.0%. Ga and/or sph masses and veinlets have qtz ± ankerite rinds up to 0.3 cm thick.
VC-00-05	112770	12.3	12.47	Siltstone, 0.5% Sph + Ga in thin veinlets
VC-00-05	112771	12.19	12.3	Sandstone, no apparent mineralization
VC-00-04	112772	35.91	36.1	
VC-00-05	112773	75.8	75.98	Geochemical blank

	112774	33.86	34.73	Broken interval. Siltstone from 33.86-34.06 with ≤0.5% disseminated galena and ≤1% disseminated pyrite. Remainder of interval consists of pyritic sandstone. Abundant disseminated to semi-massive (locally massive), fine-grained py associated with sandstone laminae to thin beds.
	112775	34.73	35.75	Broken interval, slightly more intact than previous interval. Disseminated py (bimodal ≤0.2 cm and ≤0.5 cm). One qtz + ankerite vein with sph (3%) and ga (1%), 2.0 cm thick. Fragments of abundant disseminated to semi-massive, fine-grained py above next interval (< 10 cm thick).
	112776	35.75	35.9	Massive, fine-grained pyritic interval.
	112777	35.9	36.25	Broken interval comprised of fragments of semi-massive to massive, fine-grained py in some sandstone bands. Minor ga (≤0.5%) and sph (≤0.5%).
	112778	36.25	36.76	Abundant disseminated (to locally massive), fine-grained py in sandstone. Pyrite content (15-20%) decreases markedly from 36.57-36.76.
	112779	125.27	125.52	Bimodal population. Fine-grained disseminated py (1-2%), slightly enriched along bedding and within sandstone laminae with fine-grained arsenopyrite (1%). Coarser py cubes up to 0.5 cm diameter.
	112780	125.52	125.55	1-2 cm thick qtz (±ankerite) vein with coarse intermixed, black and brown sph crystals up to 1.5 cm and aggregate masse up to 3+ cm. Very fine-grained arsenopyrite along vein margin, forms a thin (0.1-0.2 cm) rind within vein at contact with host siltstone.
	112781	125.55	126.23	Very fine-grained py (≤1%) with possible arsenopyrite (fine needles) <<1%. Coarser disseminated py (up to 0.4 cm) <1% also present.
	112782	126.23	126.59	Coarse (<1 cm) disseminated py (1-2%), slight enrichment along bedding.

	112783	126.59	127.3	Similar to 112781. Decrease in coarse py population (≤1%), increase in fine-grained (≤0.3 cm) pyrite population (2-3%), both disseminated and slightly concentrated along sandstone laminae.

Appendix C

Shale Growth Curve Notes

similar crustal environments, with related geochemical histories – namely, the deposits occur in clastic-shale environments located along the western paleomargin of the North American craton, the craton being the source of sediments in the clastic-shale environments.

Overall similarities in deposit characteristics, host-rock type, and overall crustal setting, together with a systematic change in galena-lead isotopes with time, indicated that a lead isotope growth curve model applicable to a confined but large segment of the Canadian Cordillera could be developed empirically ..."

Lead isotope data from the following East Kootenay deposits was utilized in developing the growth curve – Estella, Fors, Kid, Kootenay King, North Star, Society Girl, St. Eugene, Sullivan, Stemwinder and Vulcan, in addition to data from the Anvil District and Howards Pass area, Yukon Territories.

"We anticipate that our model will yield acceptable ages for samples of shale-hosted deposits ... in the Eastern fold belt, and in at least part of the Omineca crystalline belt ...

The model is a predictive tool within the Canadian Cordillera in determining model ages for shale-hosted deposits and distinguishing epigenetic from syngenetic mineralization

Precise model age estimates with an error generally less than 0.05 m.y. can now be made for shale-hosted deposits in the Canadian Cordillera. This is particularly useful for evaluation of a property during exploration, because in many cases the model can help to establish whether or not a deposit is syngenetic or epigenetic. Furthermore, if it known from, say, textural or geometrical evidence that the deposit is probably syngenetic, then the approximate age of the host rock can be determined even if it is nonfossiliferous or if it is metamorphosed to the point either that fossils are obliterated or that lithological correlations become doubtful".

The following has been taken from Godwin et al. (1988):

"Sometimes data for a suite of related samples ... lie on straight lines on a plot of $^{207}Pb/^{204}Pb$ versus $^{206}Pb/^{204}Pb$. These lines are isochrons; they join data of the same age ...

If the linear array is for data from galena representing a group of deposits that have similar characteristics and occur within the same tectonostratigraphic terrane, then the different isotopic compositions are produced in three ways:
(1) by addition of variable amounts of radiogenic lead from the host or source rocks to a homogeneous lead at the time of mineralization (this often applies to

vein deposits ...). In this instance the age of T_2 is the mineralization age, and T_1 reflects the age of the source or host rocks. A series of pairs of source ages (T_1) and mienralization ages (T_2) can be calculated from the slope (M) Fixing either T_1 or T_2 by independent evidence establishes the other.
(2) By taking lead from a source that was initially homogeneous with respect to lead isotopes at time T_1, in which lead evolved in different uranium-lead sub-environments, so that at the time of mineralziation (T_2), the galena lead isotopes produce (a) linear relationship ... As with case (1), the mineralization age is T_2, but here T_1 is the age of a homogenization event (such as major regional metamorphism) in the source. T_1 and T_2 are estimated as for case (1) above.
(3) By mixing between reservoirs that have different lead isotope characteristics ... This situation does not represent systems that share initial conditions or history ... but the slope may give some indication of the length of time that the different systems evolved independently.

... The lead isotopic composition of galena therefore depends on; (1) the source of the lead, (2) the age of the mineralization, and (3) the selectivity of the mineralizing process. Any combination of the above factors can affect the isotopic composition of lead in a deposit, making interpretation difficult unless the analyses are accompanied by sound geological information, including the tectono-stratigraphic setting.

Examination of galena lead from deposits in the Omineca (O), Foreland (F) and Selwyn (S) Belts has been a recent focus of research. The models explained below can be used to interpret most lead data from mineral deposits in these belts.

The shale curve, defined by Godwin and Sinclair (1981, 1982) is an empirical fit to data from stratiform deposits in British Columbia and the Yukon Territory with closely known ages. Major deposits used in the shale curve model included the Middle Proterozoic Sullivan deposit, the Early Cambrian Anvil district deposits, the Silurian Howards Pass deposits, the Devonian Mac Pass deposits, and the Devono-Early Carboniferous Gataga – Akie deposits. This shale curve can be used to date many deposits either in shale basin environments or in adjacent carbonate platforms. ... Dating using this curve is attractive because many deposits in shale and carbonate environments can be difficult to date by either paleontological or other isotopic means".