GEOLOGICAL BRANCH ASSESSMENT REPORT
15,723
TWIN FACLE RESOLIDCES INC
GEOPHYSICAL REPORT AIRBORNE MAGNETOMETER AND VLF-EM SURVEY on the
GOLDMOUNT CLAIM GROUP SIMILKAMEEN MINING DIVISION TULAMEEN, BRITISH COLUMBIA
NTS 92 - H/10W
N. Lat. $49^{\circ} 33' 00''$ W. Long. $120^{\circ} 54' 00''$
by
AL E. HUNTER, GEOPHYSICIST / R. J. ENGLUND, B.Sc.
STRATO GEOLOGICAL ENGINEERING LTD. 3566 KING GEORGE HIGHWAY SURREY, BRITISH COLUMBIA, V4A 5B6
OCTOBER 20, 1986
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1. INTRODUCTION

1.1 Objectives

Pursuant to a request by the Directors of Twin Eagle Resources Inc., 8665 Barnard Street, Vancouver, British Columbia, a low-level airborne magnetic and VLF electromagnetic survey was carried out over the Goldmount Claim Group. This survey was part of a larger program conducted by Strato Geological Engineering Ltd. for several companies holding mineral properties in the Lawless Creek area.

Due to highly unpredictable weather conditions and persistant valley fog the survey was flown in short intervals during the period September 19 to October 4, 1986. Field work was carried out using a 206 Jet Ranger III helicopter and a Sabre Electronics Airborne system.

The intent of the survey was to map magnetic and conductive trends across the property to assist in geological mapping of regional structures and to locate isolated features which may be related to localized massive sulphide lenses, graphitic zones, and/or faulting known to be associated with copper, silver and gold mineralization.

This report presents the results of some 142 line kilometers of airborne survey work covering the claims area.





1.2 Location and Access

(See Figures 1 and 2) Province: Area: Mining Division: NTS: Latitude: Longitude: Property Name: Operator:

British Columbia Tulameen Similkameen 92 - H / 10 W 33'00" 49 degrees N 120 degrees 55" W Goldmount Claim Group Twin Eagle Resources Inc.

The Goldmount claim group is located on Grasshopper Mountain just north of the Tulameen River, some 7 kilometers west of the village of Tulameen in the southern interior of British Columbia.

Access to the property from Tulameen is via the Tulameen River road to the southern property areas and via the Lawless Creek and Britton Creek main haulage roads for a distance of about 28 kilometers to the northern claim areas. Good gravel road access from the Coquihalla Highway, via the Tulameen and Britton Creek logging roads, for a distance of 16 kilometers is also available. While the main gravel roads are easily travelled by 2WD vehicles, a 4WD truck is necessary to gain access to the central property areas using secondary logging roads.





1.3 Operations and Communications

The airborne geophysical survey was flown from the Agassiz base of Highland Helicopters Ltd. by Mr, G, Freeman. A 206 Jet Ranger III helicopter was used. Mr. H. Brooks (B.S.PE.) provided navigational control and Mr. A. E. Hunter (Geophysicist)operated the instrumentation. Field work was carried out under the supervision of R. J. Englund (Geophysicist).

1.4 Physiography

Elevations on the property range between 850 meters (2,800 feet) at the Tulameen River in the southeast property area to over 1,400 meters (4,800 feet) above sea level in the southwest on Grasshopper Mountain.

Lawless Creek traverses northwest through the northeast property area and topographic relief is considered moderate to steep in most of the claim areas. The southwest slope of Lawless Creek and some areas north of the Tulameen River on the south slopes of Grasshopper Mountain are precipitous.

Recent logging on the north west slopes of Grasshopper Mountain provide new access roads to the northwestern, and the Rabbitt Mine areas.



1.5 Property Status

The Goldmount claim group consists of eleven mineral claims containing 52 claim units in the Similkameen Mining Division some 7 kilometers west of Tulameen, British Columbia.

The claims are shown of the British Columbia Mineral Titles Map M 92H/10W (Figure 3). Information on file with the Gold Commissioner at Princeton, B.C. is as follows:

CLAIM NAME	NO. OF	RECORD NO.	EXPIRY DATE	
	UNITS			
Goldmount	12	340(5)	May 9 1090	
	12	340(3) 241(E)	May 0, 1909	
Gall Gold	4	341(5)	May 0, 1909	
Weldonna	1	344(5)	May 8, 1989	
Bonanza Gold	1	344(5)	May 11, 1989	
Bonanza-Queen			-	
and Nevada	1	511(2)	Feb.12, 1989	
Ace	8	1381(3)	Mar. 16, 1989	
Gold Creek	4	1382(3)	Mar. 16, 1989	
Grasshopper 1	10	1803(1)	Jan. 10, 1987	
Grasshopper 2	10	1804(1)	Jan. 10, 1987	
Au Fraction	1	1947(6)	June 15, 1989	

The claims are held by Monica Resources Ltd. and are the subject of a joint venture agreement with Twin Eagle Resources Inc. (the operator), Mt. Grant Mines Ltd. and 297706 B.C. Ltd. The western 12 units of the Grasshoper 1 and 2 claims are subject to a joint venture agreement with Newmont Exploration of Canada Ltd.





2. HISTORY

The history of the area dates back to the 1880's when the Tulameen River became a major producer of placer gold. Hard rock prospecting started soom after and since then the majority of work has centered on the Law's Camp, the Rabbitt Mine, and the El Alamein Mine. The combined production from these mines, as reported by the Minister of Mines, 1960, is 1,288 oz. gold, 1,075 oz. silver, and 869 lbs. copper. Although these prospects are located on the south side of Lawless Creek, the Nicola group rocks also occur to the north of the creek and little exploration work appears to have been undertaken in this area.

Mining development has occurred in the property area on the former Bonanza Queen and Nevada Crown Grants, the Rabbitt Mine, the Old Glory and the Sunrise Group. Quartz veins with a general northerly strike and steep dip occur in assiciation within Nicloa Group volcanic rocks. The veins, composed of glassy quartz and brecciated wall rocks, vary in width up to 2 meters. The veins carry free gold, chalcopyrite, pyrite, galena and sphalerite.

An important gold mineralized structure, occurring on the present claim group, is the former Rabbitt Mine. This former mine is located within the Gail Gold claim (Figure 3). It was located in 1938 by the Rabbitt brothers and about 1,050 ounces of gold were recovered between 1938 and 1940. The reported average grade was 0.68 oz. gold/ton and 0.38 oz. silver/ton.



From October 1983 to February 1986, Monica Resources Ltd. has carried out considerable exploration work on the property. Geological mapping, geochemical and geophysical surveys, and some 1600 meters of diamond drilling have been completed. This work has been concentrated in the Rabbitt Mine area and most of the Goldmount claim group was considered relatively unexplored (DiSpirito, March 1986).



3. GEOLOGY

The geology of the property area has been described in several government reports (Geological Survey of Canada, Memoir 243, H.M.A. Rice, 1960; B.C.D.M. Annual Report, 1960).

The geology essentially comprises a northwesterly trending, southwesterly dipping sequence of Nicola Group metavolcanic and sedimentary rocks lying to the northeast of the lodestone ultramafic complex and bounded on the west by the Eagle Granodiorite intrusive. The majority of the Nicola rocks in the area have not been closely identified and have been termed greenstones. Possibly andesitic in composition, they include lavas, flow breccias, pyroclastics, greywacks, and mixed phyroclastics and greywacks. Interbedded with the greenstones are bands of dacite, rhyolite, fine grained dark sediments, sedimentary schists, limestone and minor conglomerate.

The Lodestone Intrusions include pyroxene, syenite, pyroxenite, peridotite, dunite, diorite, gabbro and feldspar porphyry. The intrusions occur as dykes and stocks in the southern Lawless Creek area and on the south slopes of Grasshopper Mountain.

The structural pattern in the area is complex and poorly understood, the rocks having been folded, intruded, and faulted susequent to deposition.



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4. GEOPHYSICS

4.1 Survey Procedures

The survey grid initially established consisted of 45 lines, bearing 120 degrees and spaced 200 meters apart, drawn on a 1:10,000 scale topographic map. Fourteen lines (labelled 14 through 27) were flown over the Goldmount Claim area. Due to very steep topography in the lower Lawless Creek and Tulameen River areas lines C 2 through C 11 were flown east-west across the southern property areas and contour lines C 12 through C 17 were flown at constant elevation in the northern claims area. Α sufficient number of topographical features, creeks, roads, and cultural features allowed for easy ground positioning of fiducial points and survey line position. Actual survey flight paths are illustrated on the topographic map which is also used as a base map for presentation of survey results (Figure 4).

The survey system simultaneously monitors and records the output from a total field proton precession magnetometer and two VLF electromagnetic receivers. Instrumentation consisted of the Sabre Electronics Proton Magnetometer and a two channel, omnidirectional, VLF-Electromagnetic receiver tuned to the Seattle and Annapolis transmitter stations. Data output is through analog meters onto a three channel analog strip chart recorder. Instrument specifications are provided in Appendix I.



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The aerial platform was a 206 Jet Ranger III helicopter owned by Highland Helicopters Ltd. based out of Agassiz, B.C. and piloted by Mr. G. Freeman. Visual ground reference was excellent in all areas of the survey grid and flight line positioning is considered to be accurate to better than 50 meters. Topography underlying the survey area is considered steep to moderate and several canyons, trending through the survey area, negated the maintaining of constant air speed and fixed terrain clearance in Noise, introduced into the VLF-EM data as the some areas. helicopter changed air speed when approaching ridges or canyons, introduced a recognizable sinusoidal pattern in the EM data. The net result is that there is a certain amount of terrain noise inherent in the data which must be considered in the interpretation.

Flight line locations and fiducial points are shown on the accompanying geophysical maps. Magnetic data was picked from analog strip charts, porated between fiducial marks and plotted on a 1:7500 topographic base map for each flight line (Figure 5). Final magnetic values were contoured on a topographic base map. VLF-EM data was interpreted from analog strip charts and the conductors are shown superimposed on the magnetic contour map. Results are presented on the Aeromagnetic VLF-EM Survey Map.



4.2 Discussion of Results

The results of the magnetic survey are presented in contour map form over a topographic base of the claim area (Figure 4). The magnetic intensity observed varied from a low 55,300 to 61,000 gammas in the west-central property areas. The results of the electromagnetic survey (VLF-EM) are presented along with the magnetic survey results. The VLF-EM survey employed a total field intensity receiver to detect conductive, near surface features and a number of strong to weak conductive zones were detected. The Annapolis transmitter station was down for maintenance during the survey period resulting in VLF data being collected only from the Seattle station.

Magnetically the area of the Goldmount Claim Group is characterized by very large anomalies whose magnitude is up to 4,000 gammas above and 1,700 gammas below background values, estimated to be 5,700 gammas. This background value is about 300 gammas higher than surrounding areas and is probably a reflection of the presence of ultramafic rocks of the Tulameen complex. Due to the magnitude of the measured anomalies a variable contour interval was used to present the magnetic results in a definitive manner. Numerous moderate to very weak northerly trending electromagnetic anomalies are also found in the area.



Western Claim Group Area

The regionally mapped Lodestome Intrusives in the western claim group area are reflected by a number of strong magnetic highs, up to 4,000 gammas above background. A large circular anomaly just northeast of the peak of Grasshopper Mountain is caused by the ultramafic rocks which outcrop in this area. A number of magnetic highs of similar magnitude but smaller lateral extent are found to the north and northeast of the main anomaly. These highs are attributed to smaller intrusive plugs of the ultramafic unit east of and north of the regionally mapped contact. Several magnetic lows are associated with these high anomalies, especially northeast of Grasshopper Peak, and are thought to be caused by alteration and or shearing within the nearby intruded volcanics.

A number of northerly trending electromagnetic anomalies are found to be associated with these magnetic highs, or the flanks of the highs. Several of these anomalies show zones of increased near surface conductivity over strike lengths of up to 1,000 meters. The source of these conductors is not known and ground follow-up in recommended. In the northeast group of magnetic highs (Ace-Gail Gold claim area) three electromagnetic anomalies may reflect shearing caused by the intrusive plugs in this area.



Central and Eastern Claim Group Area

The main magnetic high feature, up to 4,000 gammas above background, is a northwest-southeast, elongate anomaly showing a width up to 400 meters extending over 2,100 meters, from south of the Tulameen River northwest to the central Goldmount claim area. This anomaly is interpreted to reflect a regionally mapped greenstone unit in contact with a rhyolite unit to the northeast (Eastwood, B.C.D.M. Annual Report, 1960). A magnetic high, located some 1,200 meters northwest, in the southern Gold Creek claim area, displays a similar intensity and is thought to reflect a northwest extension of this unit. Between these anomalies, in the Rabbitt Mine area the magnetic intensity is of the Nicola Group volcanics and **VLF** representative а electromagnetic anomaly indicates a weak to moderate zone of increased near surface conductivity between these magnetic highs.

The soutwest corner of the Goldmount claim (south-central claim group area) is dominated by a broad magnetic low feature with values as much as 1,500 gammas below background. This low flanks the northwest trending magnetic high (greenstone unit) on the southwest, has a width of up to 700 meters, a north-northwest strike length of over 900 meters, and extends southeasterly across the Tulameen River. A moderate to strong electromagnetic anomaly is located on the northwest flank of the magnetic low and likely reflects faulting or shearing associated with ultramafic



plugs outcropping here. The magnetic low covers an area of mixed Nicola Group volcanics and sediments. A number of mineral shavings located on the flanks of this low have been worked. These include the Rambler Mine on the east flank and the Bonanza-Queen on the west flank of the anomaly.

This anomaly is cut off to the northwest by a number of local magnetic highs which have been attributed to lodestone intrusive plugs. A significant local magnetic low (300 gammas) located about 400 meters northwest of the broad low discussed above may be a northwest extension of this low and probably reflects altered Nicola sediments since it is on strike with the trend of mineral showings to the south and the Rabbitt Mine located some 400 meters north.

To the northeast of the main, elongate magnetic high (in the northeast claim area) is a magnetic low, to just below background values, in an area of higher magnetic response. The lows are associated with two electromagnetic anomalies, trending north and northwest. The western, northerly trending anomaly shows a strong increase in near surface conductivity and is probably associated with zones of increased conductivity to the south.



This conductive zone is explained by a regionally mapped north-south fault (B.C.D.M. Annual Report, 1960). The offset nature of the airborn conductors indicates the regional faulting to be somewhat offset, or a system of faults through this area. The northwest-southeast conductive zone associated with the eastern magnetic low here is thought to reflect a geological contact, possibly with associated shearing.

The northeast the claim group corner of shows a northwesterly magnetic gradient, increasing to the southwest to form a magnetic high which follows the western slope of the Lawless Creek canyon culminating in a narrow, dipolar high (1,400 gammas) at the confluence of Lawless Creek and the Tulameen A porphyritic rhyolite has been mapped in this area River. (B.C.D.M., 1960) and may account for the magnetic response here. Two mineral showings have been located along the Tulameen River in this immediate area and follow-up ground work is needed to explain the cause of this anomaly.



5. CONCLUSIONS AND RECOMMENDATIONS

The airborne geophysical survey has identified several major magnetic feature underlying the Goldmount claim group. Magnetic highs in the western claim areas show the presence of ultramafic intrusive plugs east of and north of the regionally mapped contact. An elongate southeast trending magnetic anomaly of similar magnitude crosses the south-central Goldmount claim area and may outline a band of Nicola greenstones in this area. A major magnetic low between these anomalies, located in the southcentral claim area, reflects an area of Nicola sediments and volcanics which is likely altered. Several mineral showings. including the Rambler Mine, are found on the flanks of this magnetic low. VLF electromagnetic anomalies also indicate faulting and/or shearing in the area.

A north-south trending series of electromagnetic anomalies crosses the general northwest magnetic trend in the eastern property area and is attributed to a regionally mapped fault crossing the central Goldmount claim. Geophysical results indicate the fault to be a system of faults or the presence of some fault offsets along the major fault trend.



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Ground surveys should be conducted to precisely locate all observed magnetic and electromagnetic anomalies. Particular interest should be concentrated in north-central, east-central, and south-central claims areas where a number of anomalies may be representative of faulting and/or alteration which is associated with sulphide or precious metal mineralization.

Follow-up ground exploration should be carried out on a grid basis and should consist of geological, geochemical, and magnetic and VLF electromagnetic survey work. Any defined anomalies will require detail work which should include self-potential, induced polarization, and trenching to determine the mineral potential of the anomalies.

Respectfully submitted, Strato Geological Engineering Ltd.

A. E. Hunter, B.A.Sc. Geophysicist

October 20,1986

R. J. Englund, B.Sc. Geophysicist



6. REFERENCES

Rice, H. M. A. (1960) Geology and Mineral Deposits of the Princeton Map Area, B.C.; Geological Survey of Canada Memoir 243.

B.C.D.M. (1960) Annual Report, G.E.P. Eastwood, pp. 42 to 55.

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- Wares, R. (August, 1984) Report on the Rabbitt Mine, Goldmount Claim Group, Tulameen River Area, Similkameen M.D., unpublished Report for Monica Resources Ltd.
- DiSpirito, F. and Uher, L. (March 1986) Report on the Rabbitt Mine-Goldmount Claim Group, Grasshopper Mountain-Tulameen River Area, Similkameen M.D., Tulameen B.C., private report for Monica Resources Ltd.

DiSpirito, F. (March 1986) Report on the Goldmount Claim Group, Similkameen M.D., Tulameen, B.C., unpublished Report for Mt. Grant Mines Ltd.

DiSpirito, F. (March 1986) Report on the Matheny 1 Claim and the Rambler Claim Group, Similkameen M.D., Tulameen, B.C., private Report for Bordeaux Resources Ltd.



7. CERTIFICATE

I, Al E. Hunter, of Vancouver, British Columbia, Canada do hereby certify the following:

- 1. I am a Geophysicist employed by Strato Geological Engineering Ltd. with offices at 3566 King George Highway, Surrey, B.C.
- 2. I will receive the degree of Bachelor of Applied Science with Specialization in Geophysics from the University of British Columbia, Vancouver, British Columbia in 1986.
- 3. Since leaving university I have practiced my profession in western and northern Canada for approximately 5 years.
- 4. I have no direct, indirect or contingent interest, nor do I expect to receive such interest, in the securities or properties of Twin Eagle Resources Inc., or any associated companies having an interest in the property.

Dated at Surrey, British Columbia, this 20th day of October, 1986.

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A. E. Hunter, Geophysicist



CERTIFICATE

I, Ralph J. Englund, of 17948 24th Avenue, Surrey, British Columbia, do hereby certify as follows:

- 1. I am a Consulting Geophysicist with offices at 3566 King George Highway, Surrey, British Columbia V4A 586.
- 2. I graduated in 1971 from the University of British Columbia, with a degree of Bachelor of Science.
- 3. I have been engaged in the study, teaching, and practice of exploration geophysics continuously for a period of 14 years. I have worked as a geophysical consultant on numerous projects in Western North America since 1972.
- 4. I am a member in good standing of the British Columbia Geophysical Society.
- 5. The field work and the interpretation of results of this report were done under my direct supervision.

DATED at Surrey, British Columbia, this 20th day of October, 1986.

R. J. Englund, B.Sc.



APPENDIX I

INSTRUMENT SPECIFICATIONS

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INSTRUMENT SPECIFICATIONS

Sabre Electronics Airborne VLF Electomagnetic System

The bird, towed 15 meters below the aircraft contains two, simultaneously operating omni-directional VLF-EM receivers and amplifiers tuned to separate very low frequency submarine, long range radio transmitting stations. This unit is currently tuned to the following two stations:

> Seattle, Washington 24.8 KHz Annapolis, Maryland 21.4 KHz

The instrument measures horizontal field strength of the frequency electromagnetic fields initiated very low from designated radio stations. The primary electromagnetic field propogated in undisturbed areas is horizontal. Conductivity contrasts within the earth create secondary fields resulting in variations in net field strength. These field strength variations yield the VLF anomalies which are recorded by this instrument.

Sensors: Ferrite antennae coils, one for each frequency, mounted in bird.

- Output: 0-100 percent field strength analog meters, one for each frequency;
 - : terminals for data output to any desired data recording system;
 - : analog strip chart recorder with variable scale deflection (standard setting is 100% for full scale) and separate pens for each frequency.

Sabre Electronics Airborne Magnetometer

The Proton Precession Magnetometer sensor is towed in a bird

some 15 meters below the aircraft.

Sensitivity: + 1 gamma.

- Output: Total field, 20,000 100,000 gammas, potentiometer control and analog meter (4 position selector switch from 100 to 10,000 F.S.D.)
 - : Terminals for data output to any desired data recording system.
 - : Analog strip chart recorder with variable scale deflection (standard setting is 100 full scale).

APPENDIX II

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TIME - COST DISTRIBUTION

Time - Cost Distribution

The airborne survey was carried out over the Goldmount Claim Group by Strato Geological Engineering Ltd. as part of a larger program over the Grasshopper Mountain - Lawless Creek Area during the period of September 19 to October 4, 1986.

A listing of personnel and distribution of cost is as follows:

Personnel

H. Brooks

Geophysicist, Equipment Operator

Navigator

G. Freeman (Highland Helicopter)

R.J. Englund, B.Sc.

A. Hunter, B.A.Sc.

Pilot

Project Geophysicist

Cost Distribution

Airborne Survey - (incl. data collection, 206 Jet Rauger Helicopter, data reduction & processing) - 142 line km @ \$55/1.km. 7,810.00

Geophysical Interpretation & Report (incl. drafting, reproduction, typing, copying, etc.)

1,800.00

Total

\$9,610.00

Signed

Strato Geological Engineering Ltd.







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 Roads

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 Property Boundary

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 Fiducial and magnetometer reading (gammas)

 Magnetic Spikes (narrower than 30 m) showing value above base level in gammas



 $\langle 23 \rangle$ GEOLOGICAL BRANCH PART 20F2 FIGURE 5 TWIN EAGLE RESOURCES INC. GOLD MOUNT CLAIM GROUP SIMILKAMEEN M.D., NTS 92 H/ IOW AEROMAGNETIC DATA MAP A.E. Hunter, Geophysicist STRATO ENGINEERING LTD. Date: October 1986