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# GEOPHYSICAL REPORT

MERRITT AIRBORNE PROJECT, 1981

NICOLA MINING DIVISION, BRITISH COLUMBIA

MAP SHEET 921/2E

APPROX. CO-ORDINATES 50° 03' N, 120° 36' W



July 8, 1981

W. G. Timmins Exploration & Development Ltd. Columbia Geophysical Services Ltd.

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Magnetic Contour Map with EM Conductors Contour Interval = 100 Gamma

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Map Pocket

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#### SUMMARY

A combined airborne magnetometer and VLF-EM survey known as the Merritt Airborne Project, 1981 was flown by Columbia Geophysical Services Ltd. during the month of June, 1981 as a joint exploration programme. The data was collected, mapped and analysed in this report covering the entire area.

In general the area is underlain by Lower Cretaceous Kingsvale Group volcanics and sediments, Nicola Group volcanics and Upper-Jurassic to Lower-Cretaceous conglomerate, grit, and sandstone. Several copper showings are known to occur within the area. A northeast trending fault and fault contact occur in the northwest section and south central sections of the survey area and major northeast and northwest trending fault structures occur in the southeastern section of the survey area.

Magnetics have outlined several rock types and contacts within the survey area. VLF-EM anomalous responses on which follow up ground work is recommended occur in the RB3 claim, RB2 claim, RB5 claim, OCl claim, Crl claim, CR2 claim, Dor claim and the TP4 claim.

Follow up ground work consisting of geological mapping, prospecting, ground VLF-EM surveys, and soil sampling

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surveys are recommended over anomalous EM conductive zones particularly in contact areas and highly faulted areas.

July 8, 1981

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#### INTRODUCTION

During the month of June, 1981, a joint venture exploration programme was carried out by Columbia Geophysical Services Ltd. in the Merritt area of British Columbia. The programme is referred to as the Merritt Airborne Project 1981 consisting of combined airborne magnetometer and VLF-Electromagnetic surveys.

This report discusses the geology of the area and the geophysical results obtained by the airborne survey.

# PROPERTIES COVERED BY SURVEY

Company	Claim Name	No. of Units	Record No.	Expiry Date
Devon Ind. Inc.	RB5	20	880	May, 1981
Brigade Res. Ltd.	RB <b>2</b>	20	835	April, 1981
Celeste Res. Ltd.	RB4	20	879	May, 1981
Pentagon Res. Ltd.	CR1		356	Dec., 1984
Sutherland Res. Ltd.	TP1 -	15	774	Nov, 1981
	TP2.	20	779	Dec., 1981
	TP3、	20	778	Dec, 1981
Cameron Res. Ltd.	CR <b>2</b>	15	365	Jan, 1982
Unavailabl <b>e</b>	Dor	20		June, 1982
Vanvailable	TP4、	20		June, 1982

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#### LOCATION AND ACCESS

The area is located about 15 km. southeast of the town of Merritt, British Columbia and may be reached by B.C. Highway #5. Several secondary roads provide access to the various claims within the area.

#### TOPOGRAPHY, VEGETATION, WATER SUPPLY

The topography is one of gently rolling hills and upland pastures with stands of coniferous trees and very little underbrush. Elevations in the area range from approximately 1100 meters to 1500 meters.

Sufficient water for exploration purposes would be available from several small lakes and streams scattered throughout the claims area.

#### POWER

Although diesel electric power would be required for initial phases of exploration and development, hydro power lines run through the northern and southern sections of the survey area.

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#### SUPPLIES

Most supplies would be available from Merritt or Kamloops, British Columbia.

# TRANSPORTATION

Rail service is located in Merritt and good daily truck transportation is also available in the area.

#### HISTORY

The Nicola volcanic belt has long been the object of mineral exploration. This belt consists of both marine and terrastrial volcanic rocks as well as associated sediments, and a high background level of copper appears to be a common characteristic of the volcanics. There are numerous copper showings in the Aspen Grove camp a few kilometers to the south, and major producers in the area include the Ingerbell-Copper Mountain deposits near Princeton, Craigmont deposit, near Merritt, and the Afton deposit, near Kamloops.

In the Courtney Lake area, copper mineralization occurs within shear zones in Nicola meta-volcanics. Similar copper occurrances are found accompanied by magnetite in the Hamilton Creek area.

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Various portions of the survey area have been subjected to ground geological and geophysical surveys as well as some soil sampling surveys in the past. A few shafts, pits and adits have been excavated in some places within the survey area in years past. Some diamond drilling is known to have been carried out on the CR 1 and Dor mineral claims.

#### REGIONAL GEOLOGY

A northerly trending band of Triassic Nicola rocks ranging from 12 to 35 kilometers wide stretches from near the U.S. border in the south to beyond Kamloops Lake in the north. Within the Nicola Group, which is comprised of volcanic flows, conglomerates, argillites, tuffs, breccias and limestones, are more recent formations of sedimentary rocks as well as stocks and plugs of Jurassic Coast and Copper Mountain intrusives.

Large scale, north trending faults, both parallel and subparallel occur to the south of Merritt, British Columbia.

Numerous copper occurrences have been located in the Aspen Grove camp since the early 1900's.

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Adapted from Preto and Northcote, 1977

#### GEOPHYSICAL SURVEY

<u>Survey Proceedure</u>: During the month of June, 1981 the Merritt Airborne Project, 1981, consisting of a combined airborne magnetometer and VLF-EM survey was carried out over the area by Columbia Geophysical Services Ltd.

Instrumentation used was a Sabre Electronics Airborne system consisting of proton precession magnetometer and VLF-Electromagnetic receiver. The detecting elements are housed in a two meter "bird" which was towed 15 meters below the aircraft at a mean terrain clearance of 75 meters, with a flight line spacing of 200 meters.

Flight line control was visual using a topographical map on a scale of 1:10,000, correlating prominent topographical features to the map and strip charts. There are numerous visual tie points, so the flight lines are considered to be accurately plotted. Flight lines were oriented in an east - west direction.

The survey was flown, using a Bell 206 Jet Ranger helicopter from Highland Helicopters, at Agassiz, British Columbia. The air survey crew consisted of pilot, project geophysical supervisor and operator, T. Rolston and navigator, E. Dodd.

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Total survey mileage is 360 line kilometers and all data were recorded on analog strip chart recorders and data compiled on a map scale of 1:10,000.

#### INSTRUMENTATION & THEORY

#### MAGNETIC SURVEY

The magnetic data was detected, using a nuclear free precession proton magnetometer manufactured by Sabre Electronic Instruments Ltd. of Burnaby, B. C. This measured the total count of the earth's magnetic field intensity with a sensitivity of one gamma. The data is recorded on a 12 cm. analog strip chart.

Only two commonly occurring minerals are strongly magnetic; magnetite and pyrrhotite. Hence magnetic surveys are used to detect the presence of these minerals in varying concentration. Magnetic data are also useful as a reconnaissance tool for mapping geologic lithology and structure, since different rock types have different background amounts of magnetite or mafic minerals.

#### VLF ELECTROMAGNETIC SURVEY

A VLF-EM receiver manufactured by Sabre Electronic Instruments Ltd. of Burnaby, B. C. was used for the VLF-EM survey. The transmitter used was NLK Arlington (Seattle) Washington, U.S.A. transmitting at 18.6 KHz.

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This station transmission was used due to its orientation in line with the geological structure on this property and very good signal strength. The measure taken on the survey was variation in the horizontal component of the signal field strength. Because of its EM frequency, the VLF-EM can pick up conductors caused by electrolyte-filling fault or shear zones and porous horizons, graphite, carbonaceous sediments, lighological contacts as well as sulphide bodies.

#### MAGNETIC RESULTS

Background magnetics for the survey area are in the range of 1100 gammas and magnetic readings range from less that 1000 gammas to 1900 gammas. High magnetics ranging from 1200 to 1500 gammas in the northwestern section of the survey area through most of the RB2 claim, the eastern half of the RB3 claim, the northern and western section of the RB5 claim, the western section of the RB4 claim, the western half of the CR1 claim and the eastern section of the OC1 claim indicate that these areas are underlain by Kingsvale Group rocks.

A northeast trending fault contact is indicated in the area of the RB2 and RB3 claims, between Kingsvale Group rocks on the east and Nicola Western Belt volcanics to the west. A magnetic depression indicates the fualt contact zone.

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Low magnetics in the eastern section of the RB5 and RB4 claims indicate a contact between Kingsvale Group rocks and upper Jurassic to Lower Cretaceous, chert, pebble and cobble conglomerate, minor grit and sandstone or Nicola group eastern belt volcanics.

The southeastern section of the survey area in proximity to the TP1, TP2, TP3, CR1, CR2 and Dor claims is an area of conplex faulting indicated by magnetic lows. A northeast trending fault through the CR2 and TP1 claims indicates a fault contact between Kingsvale Group rocks on the northwest side and probable Nicola volcanics eastern belt on the southeast side. A parallel northeast trending fault occurs through the Dor, TP3 and TP2 claims in the vicinity of Quilchena Creek. A northwest trending fault intersects the northeast trending fualt structures and passes through the TP4, Dor, CR2 and the southern protion of the CR1 These fault zones are all major structures in claim. the area. High magnetics in the central southern section of the RB2 claim ranging from 1200 to 1900 gammas and magnetics ranging from 1200 to 1500 gammas in the southeastern corner of the TPl claim, the northeast corner of the CR2 claim and the northwestern corner of the TP3 claim as well as high magnetics ranging from 1200 to 1700 gammas in the south central section of the Dor claim indicate the presence of possible dioritic intrusives magnetite and/or pyrrhotite.

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Magnetics ranging from 1200 to 1400 gammas in the eastern section of the TP3 claim and southeastern corner of the TP2 cliam indicate a change in rock type underlying this area.

#### VLF-EM RESULTS

Hydro power transmission lines are the causitive source for the strong, conginuous EM conductive zones through the RB2 and RB5 mineral claims and the TP4 and TP3 mineral claims.

A northeast trending conductor occurs in the fault zone area of the RB3 mienral claim which is intersected by two northwest trending conductors. This conductive zone appears to cross the fault contact. Although the fault zone itself may be the causitive source for the EM anomaly, this area should be ground geologically investigated. Two parallel northwest trending EM conductors occur in the southwest section of the RB3 claim and should also be ground investigated.

Four EM anomalous zones trending north-southerly and northeast - southwesterly occur in the central section of the RB4 claim across and on both sides of the geological contact zones. These EM anomalous zones also warrant ground checks as sulphide mineralization may be the causitive source.

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A northwest trending conductor in the the northeast corner of the OCl claim and two northwest trending conductors in the CRl claim should be geologically ground checked to determine the causitive source which may be due to shear zones and possible sulphide mineralization.

A high priority area of anomalous EM activity occurs in the vicinity of the mojor cross faulted structures particularly within the CR2 mineral claim, the southeastern section of the CR1 mineral claim, the southwestern corner of the TP1 mineral claim and the northern sector of the Dor mineral claim should be thoroughly investigated, as sulphide mineralization may be present in this highly faulted area.

A northeast trending EM conductor occurs on the northeast side of a major fault in the southeastern portion of the TP4 mineral claim paralleling the flank of a hill. This conductor should be geologically ground checked to determine the causitive source.

#### CONCLUSIONS AND RECOMMENDATIONS

A combined airborne magnetometer and VLF-EM survey known as the Merritt Airborne Project, 1981 was flown by Columbia Geophysical Services Ltd. during the month of June, 1981 as a joint exploration programme. The data was collected, mapped and analysed in this report covering the entire area.

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In general the area is underlain by Lower Cretaceous Kingsvale Group volcanics and sediments, Nicola Group volcanics and Upper-Jurassic to Lower Cretaceous conglomerate, grit and sandstone. Several copper showings are known to occur within the area. A northeast trending fault and fault contact occur in the northwest section and south central sections of the survey area and major northeast and northwest trending fault structures occur in the southeastern section of the survey area.

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Follow up ground work consisting of geological mapping, prospecting, ground VLF-EM surveys, and soil sampling surveys are recommended over anomalous EM conductive zones particularly in contact areas and highly faulted areas.

Respectfully submitted:

W. G. Timmins, P. Geol W. G. Timmins Exploration & Development Ltd.

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T. Rolston Columbia Geophysical Services Ltd.

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# CERTIFICATE

I, WILLIAM G. TIMMINS, maintaining offices at 502-900-6th Avenue, S. W., Calgary, Alberta, do hereby certify that:

- I am a geologist having been practising my profession for seventeen years.
- 2. I am a graduate of the Provincial Institute of Mining, Haileybury, Ontario, and have attended Michigan Technological University, Houghton, Michigan.
- 3. I am a member in good standing of the Association of Professional Engineers of British Columbia, and of the Association of Professional Engineers, Geologists and Geophysicists of Alberta.
- 4. I have no interest direct or indirect in the properties or securities of the various companies represented by this survey area.
- 5. This report is based on private and government reports and maps, numerous visits to the area, and an analysis of date provided by Columbia Geophysical Services Ltd.

Dated this 8th Day of July, 1981.

Well Transie

W. G. Timmins, P. Geol.W. G. Timmins Exploration & Development Ltd.

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# Columbia geophysical supplies Itd.

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Phone: (604) 528-1732 or (604) 687-6671

# CERTIFICATE OF QUALIFICATIONS

I, Tom Rolston, of 7050 Halligan Street, Burnaby, B.C. have actively been engaged in my profession since 1953 and state as follows:

- 1953 to 1964 with the R.C.A.F. as Instrument and Electronic Technician with crew supervisory capacity in various electronic and instrumentation systems.
- 2. 1964 to 1966 with Kerr-Addison Mines Ltd. as Electronic Technician servicing, repairing and maintaining various types of geophysical instruments. Also two seasons as Field Supervisor and Geophysical Instrument Operator in mining exploration, including airborne and ground geophysical surveys, geochemical surveys, geophysical and geochemical drafting and mapping.
- 3. 1966 to 1981 contracting geophysical/geochemical surveys in close association with mining engineers for various mining companies as Exploration Manager and Field Supervisor of geophysical and geochemical surveys and Instrument Operator of various geophysical instruments such as airborne and ground systems magnetometer, electromagnetic, gravity meter, self-potential meter, scintillometer and induced polarization.
- 4. Exploration Manager of Columbia Geophysical Services Ltd., airborne geophysical services.

Dated at Burnaby, British Columbia this / day of JULY 1981.

TC Rokt

Tom Rolston, Project Manager

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July 27, 1981

MERRITT AIRBORNE PROJECT 1981

During the month of June to July 1981, a joint venture exploration program was carried out by Columbia Geophysical Services Ltd. The program is referred to as the Merritt Airborne Project 1981, consisting of combined airborne geophysical survey, magnetometer and VLF electromagnetic survey at 200 metre flight line spacing with a mean terrain clearance of 75 metres.

The data were collected, mapped, analyzed and produced on one report covering the complete area: "Merritt Airborne Project 1981."

The cost of this project was Thirty-six Thousand (\$36,000.00) Dollars (360 Line Km at \$100.00) and was profated among the participating companies, as per the following.

COLUMBIA GEOPHYSICAL SERVICES LTD.

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Tom Rolston, Project Geophysicist/Manager

# MERRITT AIRBORNE PROJECT 1981

COMPANY	CLAIM	RECORD NO.	EXPIRY DATE	NO. UNITS
Devon Industries Inc.	RB 5	880	May 1981	20
Brigade Resources Ltd.	RB 2	835	April 1982	20
Celeste Resources Ltd.	RB 4	879	May 1982	20
Pentagon Resources Ltd.	CR 1	356	Dec. 1984	
Sutherland Resources Ltd.	TP 1	774	Nov. 1981	15
Sutherland Resources Ltd.	TP 2	779	Dec. 1981	20
Sutherland Resources Ltd.	TP 3	778	Dec. 1981	20
Cameron Resources Ltd.	CR 2	365	Jan. 1982	15
Missile Resources Ltd.	Dor	1078	June 1982	20
Missile Resources Ltd.	TP 4	1079	June 1982	20
Gloria Resources Inc.	OC 1	969	Oct. 1981	20





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CELESTE RESOURCES LTD RB 4 CLAIM









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GLORIA RESOURCES INC. OC 1 CLAIM

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