JAN, LOUISE 92HSE 047, 1786 FILE 1786 FILE 1786 FILE 1786 FILE

# 008969

Description of the Jan and the Louise Claim Groups

(TAKEN FROM KIRBY ENERGY INC. PROSPECTUS : JUNE 30, 1989)

# Location, Access and Net Area

The Jan Claim Group is located predominantly north of the Similkameen River, and just west of the town of Hedley, British Columbia. It is bounded to the east by Indian Reservation 2, to the south by the claims of Banbury Gold Mines Ltd., and on all other sides by existing claims.

The Jan Claim Group has excellent access existing both to the Jan Claim Group and on it. Highway #3 traverses the south boundary of the Jan Claim Group from east to west, while a network of logging roads and the service road of a natural gas pipeline provide access to all parts of the Jan Claim Group.

The Louise Claim Group is located on the south side of the Similkameen River due south of the town of Hedley. The Louise Claim Group is bounded to the northeast by Indian Reservation 2, and on all other sides by existing claims.

The Louise Claim Group can be accessed along the northern edge of the Louise Claim Group at river level by the old railway grade that intersects the No. 3 Highway 7 kilometres west of Hedley. Access to the south part of the Louise Claim Group is by the John's Creek logging road which intersects the No. 3 Highway 7.5 kilometres west of Hedley.

The net area of the Jan Claim Group is 543 hectares, or the equivalent of 21.7 claim units. The net area of the Louise Claim Group is 325 hectares, or the equivalent of 13 claim units. The total net area of the Jan and Louise Claim Groups is the equivalent of 34.7 claim units.

# Geological History of the Area and the Region

The following historical information on the Jan and Louise Claim Groups has been excerpted from an engineering report dated March 30, 1988, as revised to April 11, 1989 (hereinafter referred to as the "Jan and Louise Claim Groups Report"), prepared for the Issuer by Michael R. Sanford, Geologist, as endorsed by I. Borovic, P.Eng., both of Box 225, Hedley, British Columbia. The complete text of the Jan and Louise Claim Groups Report may be examined during normal business hours at the head office of the Issuer







ŝ



IT & IT PRINTER AN ING SAMAN CLEARPAINT &

٢.











.\*



located at 1140 - 625 Howe Street, Vancouver, British Columbia, V6C 2T6, and is available for inspection at 2550 -555 West Hastings Street, Vancouver, British Columbia, V6B 4N5, during normal business hours while the primary distribution of the securities offered hereunder is in progress and for a period of thirty (30) days thereafter.

#### "Regional History

Placer gold in the Similkameen River was discovered in the mid eighteen hundreds and actively worked until the turn of the century. The first major discovery of lode gold in the region was on Nickel Plate Mountain in 1897. Since then the area has had a long history of gold mining and between 1902 and 1955 approximately 51 million grams (1.6 million ounces) of gold were won from several mineralized skarn orebodies. Most production came from the Nickel Plate and Hedley Mascot mines located near the summit of Nickel Plate Mountain. Total production from the smaller French, Canty, Good Hope and Banbury mines was approximately 1.8 million grams of gold. Mineralization is also seen at the Peggy (Hedley Amalgamated ) Gold Hill properties, and the Mission Prospect, adjacent to the Cass and Louise claims.

The Hedley District was geologically mapped more than 40 years ago (Camsell, 1910; Bostock, 1930, 1940a, 1940b) but since that time little regional geological work has been done. The areas immediately surrounding some of the gold producers were mapped and studied in detail (Warren and Cummings, 1936; Dolmage and Brown, 1945; Lee, 1951), but less attention was devoted to either the regional geology or synthesising and comparing the various gold bearing deposits in the district.

Interest in the Hedley gold camp has recently revived due to Mascot Gold Mines Limited planned 1987 reopening of the Nickel Plate mine as an open-pit operation (Simpson and Ray, 1986). Current open-pit reserves total approximately 6.5 million tonnes of ore grading 5.1 grams gold per tonne.

Banbury Gold Mines, currently under option to Noranda Exploration, has also created interest in the Hedley camp in prospects peripheral to Mascot Gold Mines Ltd.

# **Property History**

It is evident that the properties have held interest for many years. Many open cuts, shallow shafts, and five short adits were discovered, mainly excavated in gossans and sulphide-rich zones. As far as this author can make out, these are not recorded in any literature.

In the fall of 1980, a soils geochem survey was completed over part of the Jan claim group, and the several anomalous zones were reported on by R. W. Phendler, P. Eng.

In the fall of 1982, 21 line km of simultaneous magnetic and VLF-EM surveys were carried out over part of the Jan Claim Group, and reported on by David B. Mark.

A preliminary report on the geology of the Jan Group was prepared by Thomas R. Tough, P. Eng. in February, 1983.

In 1984, the Jan Group and the Louise Group were geologically mapped by Guy A. Royer, Geologist, on a scale of 1:5000, by reconnaissance traverses.

A report summarizing the exploration work completed on the properties was completed by Thomas R. Tough in October, 1985.

#### Geology

#### Regional

The Hedley region lies within the Intermontane Belt of the Canadian Cordillera. The area between Winters Creek to the east, and Smith Creek to the west is underlain by a sedimentary and volcaniclastic package of rocks of Upper Triassic age of the Nicola Group. These rocks are relatively highly deformed, and in the Hedley area are folded tightly along North-South axial planes. The entire package is roughly 1500 m thick.

As did Bostock in 1930, G. Ray of the B.C. Department of Mines divides the package in two, comprising an older Hedley sequence, and a younger Whistle Creek Sequence. A description of these two sequences follows:

"... our preliminary work indicates that the package can be informally separated into a younger Whistle Creek sequence to the west and an older Hedley sequence to the east. The latter comprises a generally westerly dipping, 450 to 600 metre-thick succession of sedimentary rocks that are characterized by thin-bedded, calcareous and cherty turbiditic silt stones, black argillites and impure limestone beds of variable thickness. Some parts of the Hedley sequence, particularly its upper portion, contain appreciable amounts of fine-grained volcaniclastic and crystal tuff material...

The Hedley sequence passes stratigraphically upwards into the 700 to 1200 metre-thick Whistle Creek sequence. This forms a generally westerly dipping, west-facing succession that mainly underlies the western portion of the district although small, downfaulted outliers of the sequence are present east of Hedley township and in the vicinity of Lookout Mountain. It contains tuffaceous siltstones and rare argillites in its lower portion, but higher in the succession is characterized by bedded to massive ash and lapilli tuffs with minor volcanic breccia. The Whistle Creek sequence is distinguished from the underlying rocks by a general lack of limestones and a predominance of volcaniclastic material. No volcanic flows have been identified in the sequence.

The Whistle Creek sequence is divisible into three stratigraphic units, the older (Unit A) is believed to be Late Triassic in age, while the precise age of the upper two younger units (Units B and C) is uncertain. Unit A is mainly comprised of well-bedded to massic ash tuffs of andesitic to basaltic composition. In its lower portion the unit is predominantly sedimentary in character and includes tuffaceous siltstones, interbedded within horizons of well-bedded to massive crystal-lithic tuff. Higher in the unit, ash tuffs with minor lapilli tuffs and volcanic breccias predominate; individual horizons are thicker and more massive, and sedimentary bedding is uncommon. Thin-section studies reveal that many ash tuffs in Unit A contain abundant euhedral, pristine crystals of plagioclase and proxene that show little evidence of mechanical abrasion or transportation...

The Whistle Creek and Hedley sequences are separated by a limestone boulder conglomerate which forms the most distinctive and important stratigraphic marker horizon in the district. This conglomerate is best developed west of Hedley where if forms a northerly trending, steeply dipping unit that is traceable discontinuously for over 15 kilometres along strike. Remnant outliers of the same conglomerate are also seen further east, in the Nickel Place mine-Lookout Mountain vicinity where it was originally called the "Copperfield breccia".

The Copperfield conglomerate is best developed and explored west and northwest of the Banbury Gold Mines property where it reaches its maximum thickness of 200 metres. Elsewhere, it is often less than 10 metres thick, but is well developed south of Lookout Mountain (100 metres thick), and southeast of Ashnola Hill (70 metres thick). The conglomerate varies from clast to matrix supported and is characterized by abundant, well-rounded to angular pebbles, cobbles, and boulders of limestone generally up to 1 metre in diameter. In some localities, rare limestone blocks and olistoliths up to 15 metres in diameter are present, usually at the stratigraphic base of the conglomerate. Limestone generally comprises more than 95 percent of the clasts but rare clasts of argillite, siltstone, wacke, chert, crystalline quartz, and both felsic plutonic and acid intermediate volcanic rocks are also present. The limestone clasts vary considerably in appearance, from grey to buff to pink in colour, from fine to course grained, and from massive to thin bedded. Some limestone boulders contain fragments of bivalve shells and crinoid stems, and a few are comprised of a limestone conglomerate comprising grey limestone cemented in a calcareous matrix. Other less common boulders consist of chert pebble conglomerate with a gritty calcareous matrix.

Some of the larger, elongate, siltstone clasts are deformed and exhibit soft sediment deformation structures, suggesting that they were unlithified when incorporated into the conglomerate. The conglomerate throughout the district exhibits both normal and reverse grading; larger blocks and boulders are generally more common towards the stratigraphic base, and finer grained, moderately bedded grits and conglomerates are found towards the top of the units. The conglomerate matrix varies from massive to thin bedded and ranges from siliceous and gritty, to calcareous or finely tuffaceous; locally it shows evidence of chaotic slumping and soft sediment disruption.

The Copperfield conglomerate is interpreted to be an olistostrome. It probably resulted from the catastrophic slumping of an unstable accumulation of reef debris down a steep submarine slope, and the sidespread, chaotic deposition of this mass onto a sequence of unlithified, deeper water turbidites. South of Lookout Mountain some of the larger limestone blocks were apparently autobrecciated during the downslope movement. They are now represented by highly angular, closely interlocking fragments, separated by a thin limy gouge matrix. Sedimentary indicators show that the Hedley and Whistle Creek sequences generally young westward.

Measurements of crossbeds and flame structure indicate that the Hedley sequence, and Unit A of the Whistle Creek sequence were deposited by northwesterly to southwesterly directed paleocurrents.

Three plutonic suites are recognized in the area:

The oldest is probably Middle Jurassic in age and comprises massive, coarse-grained, hornblende-bearing diorites, guartz diorites and minor gabbros of the Hedley intrusion (Rice, 1947). Potassium-argon age dates from these rocks range between 170 and 190 million years (Roddick et al., 1972). These rocks form major stocks up to 1.5 kilometres in diameter and swarms of thin sills and dykes, up to 200 metres in thickness and over 1 kilometre in strike length. The suite is absent in the Apex Mountain Group. but further west is widespread throughout the Upper Triassic rocks in the Hedley district. Most of the Hedley intrusions are concentrated along a northerly trending, elongate zone that coincides with the slope related change of sedimentary facies in the Hedley sequence. Varying degrees of sulphide-bearing skarn alteration are developed within and adjacent to many of these intrusions. Some previous workers (Billingsley and Hume, 1949; Dolmage and Brown, 1945) considered this plutonic suite to be genetically related to the skarn-hosted gold mineralization in the district. including that at the Nickel Plate, Hedley Mascot and French mines. The preliminary geochemical and mapping results of this project support their conclusions.

The second plutonic suite, the Similkameen intrusion, comprises coarse, massive, biotite hornblende-bearing granodiorite of presumed Late Jurassic age; most potassiumargon ages from these rocks range from 150 to 160 million years (Roddick et al., 1972). These intrusions generally form large bodies such as the Pennask pluton which outcrops northwest of Hedley and a granodiorite body outcropping between Winters Creek and Hedley township...referred to as the Cahill Creek Pluton type in the region.

The third and youngest intrusive suite in the district is represented by a fine-grained, felsic, quartz-bearing porphyry that cuts and postdates the Cahill Creek pluton. These rocks are characteristically leucocratic and contain rounded, partially resolved quartz phenocrysts up to 4 millimetres in diameter. Sills and dykes, generally less than 3 metres wide; are widespread but not abundant throughout the area. West of Ashnola Hill one 300-metre-wide, 1.3 kilometer-long dyke-like body of quartz porphyry is controlled by the west-southwest-trending Cahill Creek fracture zone.

#### **Property Geology**

#### Jan Group ...

The Jan Group lies at the geological boundary between the Hedley and Whistle Creek sequences and these are separated by the Copperfield conglomerate. To the east the Mary claim is composed entirely of Hedley sequence sediments with minor volcaniclastics while to the west the Tuf-3 claim is underlain entirely be Whistle Creek sequence rocks. Striking N 15E through the Tuf-1, Omega, Franklin 1-2 and Jan claims runs the Copperfield conglomerate, separating the steeply dipping Hedley sequence to the east from the younger steeply dipping Whistle Creek sequence to the west. All strata young to the west indicating that the sediments across the property form the western limb of a major anticline.

The sequence has been invaded by three suites of intrusive rocks. The oldest of these represents the mid-Jurrasic Hedley intrusions of dioritic to gabbroic composition. On the Tuf-3 claim, the Whistle Creek sequence is intruded by a 50 metre wide medium-grained gabbro dyke trending N-S and dipping steeply east. The several pits and short adits were located in quartz veins and sulphide bearing shear zones in the volcaniclastic rocks within 50m of this dyke. It would appear that the gabbro is responsible for the quartz veining, sulphide introduction, and the associated gold values that accompany these small leads. These are reported later in this section. On the Tuf-1, Franklin 1+2, Omega, and Jan-1 claims several small sills and dykes of prophyritic composition were encountered. These are believed to be of the Hedley diorite suite of intrusives. They contain between 2% and 4% fine pyrrhottite and pyrite, and are generally less than 3 meters wide. They are usually conformable or sub-conformable to bedding, and intrude both the Hedley and Whistle Creek sequences.

The north part of the Jan claim is composed of the Late Jurassic Pennask Pluton, of quartz-diorite composition. In general it is barren, medium to coarse-grained, unmineralized, and uninteresting. Its contact with the Nicola package to the southeast on the claims is somewhat irregular, and has had little effect on the sediment-volcaniclastic country rocks other than a moderate hornfelsing.

The youngest intrusives on the property are biotite-feldspar porphyry dykes which are generally steeply dipping, and are from one meter to 30 meters wide. Generally these are altered to a greenish colour, the biotite and hornblende phenocrysts are chloritized, and the ground mass mafics altered to epidote and chlorite. Typically they have five to twenty percent fine to medium-grained phenocrysts in a fine to very fine-grained groundmass. These are widespread, and are thought to accompany zones of weakness in the sediment-volcanic package. On Banbury Gold Mines property, adjacent to the south, these dykes often accompany shear zones and quartz veins.

Across the southern boundaries of the Franklin-2 and Omega claims runs a N 60E fault. Movement along the fault, as indicated by the offset Copperfield conglomerate, is 500m. Displacement along the sub-parallel fault 200 meters to the southeast of this appears to be negligible.

Sixteen chip samples were taken for assay from the claim group ... Briefly, the areas of interest are as follows:

1. Anomaly-1: a NS zone of moderately silicified and altered Hedley formation limestones, argillites, and cherts that runs roughly from 23N/6750E to 29.5N/6950E, this zone is from 50 to 200m wide. Four rock samples were taken on or near the zone.... A summary is presented below.

SAMPLE	TYPE	LOCATION	Au	Zn	Pb	Ag
I.D.		<b>COOR DINATES</b>	ppb	ррт	ррт	ppm

R83573	GRAB	25.40N/6710E	270	960	2742	8.6
R83574	GRAB	25.00N/6760E	50	4559	80	1.1
R83579	GRAB	23.05N/6770E	6	291	23	0.4
R83580	GRAB	23.50N/6810E	28	597	131	1.0

2. Anomaly-2: an EW zone of weakly silicified Hedley formation sediments. Copperfield conglomerate and Whistle Creek sequence tuff, this zone runs from 17.50N/6250E from the claim boundary, to roughly 18.00N/6950E. Only one rock sample was taken from this zone and is summarized below:

SAMPLE	ΤΥΡΕ	LOCATION	Au	Zn	Pb	Ag
I.D.		COORDINATES	ppb	ppm	ppm	ppm
R83578	GRAB	18.20N/6920E ()	38	26669	1000	3.9

3. Anomaly-3: a quartz-calcite-arsenopyrite vein associated with late stage altered dykes on the Mary claim. It lies in Hedley formation limestones and is accompanied by weak silicification. It is 0.4m wide and trends NE while dipping steeply to the NW.

SAMPLE I.D.	TYPE/WIDTH	LOCATION COORDINATES	Au ppb	As ppm
R83572	CHIP-0.4m TRUE THICKNESS	3.40N/8455E	5500	171,054
	(	·)		

4. Anomaly-4: a system of quartz fissures and shears that lie within the weak contact aureole of a large Hedley diorite dyke on Tuf-3 claim, this zone lies within tuffs and wackes of the Whistle Creek sequence. Four samples were taken from the small quartz-carbonate-sulphide leads, or shears and are summarized below.

SAMPLE I.D.	TYPE/ DE WIDTH	SCRIPTION	LOCATION COORDINATES	Au ppb	As ppm	Ag ppm
R83583	CHIP/0.5m	SHEAR	10.95N/4655E	15	15	2.7
R83584	CHIP/15cm	APY/SH.	10.75N/4685E	19500	16460	2.9
R83585	GRAB	QUARTZ	12.00N/4660E	65	16	0.1
R83586	CHIP/0.5m	GOUGE	12.65N/4650E	4	11	0.3
			()			

#### Louise Group ...

In 1983, T. R. Tough wrote in his Geological Report on the Jan and Louise Claim Group, Hedley Area, B.C., "The Louise claim group is underlain by the Nicola group of rocks along most of the western portion of the claims and by granodiorite on the east and south sections.

Limestone, the most predominant sediment on the Louise group, is quite pure, weathering to a buff or brown on surface. Quartzite is often interbedded with the limestone.

Green to dark grey quartzite, interbedded with argillite, limestone, chert, and volcanics, occurs in the northwest part of the Cass claim. Dark green volcanics, feldspar porphyry, are intercalated with the sedimentary rocks."

A brief reconnaissance mapping by the author of the logging roads revealed rocks of the Hedley formation, including thick limestone members similar to those near the Mascot Mine. Minor thin-bedded skarns were also evident in this package which comprises the western two-thirds of the claims. The eastern third of the claims is underlain by a coarse granodiorite."

# Current Exploration

From May 1 to October 31, 1986, Michael R. Sanford, Geologist, of Box 225, Hedley, British Columbia, completed a preliminary exploration program of 6.5 kilometres of grid cutting and geological surveying at even intervals aligned to intersect regional geological trends in a way to provide for optimum traverses of the Jan and Louise Claim Groups. In addition, 16 rock samples and 462 soil samples were geochemically sampled and analyzed, and Magnetometer, VLF Electromagnetic and Induced Polarization surveys were undertaken over a 10.5 kilometre area. The program (initiated in 1985 at an interim cost to the Issuer of approximately \$7,558) was completed on behalf of the Issuer in 1986 at an approximate remaining cost of \$26,607 (for a total cost of approximately \$34,165), and the results of the program, together with a review and interprepation of the data collected on the Jan and Louise Claim Groups between 1980 and 1986, are the subject of the aforementioned Jan and Louise Claim Groups Report.

The following information respecting the Jan and Louise Claim Groups has again been excerpted from the Jan and Louise Claim Groups Report. The complete text of the Jan and Louise Claim Groups Report may again be examined during normal business hours at the head office of the Issuer located at 1140 - 625 Howe Street, Vancouver, British Columbia, V6C 2T6, and is available for inspection at 2550 -555 West Hastings Street, Vancouver, British Columbia, V6B business 4N5, durina normal hours while the primarv distribution of the securities offered hereunder is in progress and for a period of thirty (30) days thereafter.

#### "Geochemistry

#### Historical Surveys

#### Jan Group ...

Part of the Jan Group was covered by a geochemical survey in 1980, by R. W. Phendler. This included the Omega, Franklin 1 and 2, and parts of the Tuf-1 and

Jan-1 claim. The soils were taken on 100 meter lines with a 50 meter spacing, and analyzed for gold. Several anomalous zones were outlined, and the zones of primary importance are reviewed.

Soil Geochem Anomaly "E" is located along the northern boundary of the Omega Claim and has an east-west orientation. It was the largest anomaly discovered in the survey area, measuring seven hundred meters long by one hundred to one hundred and fifty meters wide. It is located in the Whistle Creek sequence. Gold values ranged from a low of 70 ppb to a high of 330 ppb.

Soil Geochem Anomaly "F" is centered on line 29N, 6800E and has a north-south orientation. It is roughly 200 meters long and 75 meters wide, having gold values between 80 and 200 ppb.

Numerous other values were obtained locally from 70 to 270 ppb.

Louise Group ...

To the best of the author's knowledge there have been no geochemical surveys conducted on the claims in the past.

#### Present Work

#### Jan Group ...

The current survey was carried out over the Jan-1, samples were taken on 100 meter lines with 50 meter sample intervals over the entire Mary 1 claim, while samples were taken on 50 meter lines with 25 meter sample intervals over parts of the other claims. The grid area between lines 18N and 26N, and between 6650E and 7150E were covered. The soils were taken from the "B" horizon, and were analyzed for Au, As, Zn, Pb, Ag, Cu, Co, Mo, Mn, Sb, and W....

In the Hedley area As, Zn, and Pb are useful pathfinder elements in indicating broad mineralized envelopes of rock in which gold may be concentrated.

Zoning of elements within these envelopes is common on the Banbury property immediately to the north, and is probably due to distance from the source of the mineralizing fluids as well as many other factors. Each generation or pulse of fluids may have carried different elements and encountered changing chemical and structural conditions within the same vent leading to a zonation or possibly a random distribution of the constituents.

While soil geochem anomalies H and I are not anomalous in gold the silification and alteration of the rocks as well as the presence of other metals indicate zones of economic potential.

The most significant anomalies indicated by the survey can be summarized as follows:

1. Soil Geochem Anomaly "G": This is centered on line 24.5N at 6750E, and trends N-S. It is 300m long and open to the north, and is 100m wide. It is strongly anomalous in zinc (300 to 4,000 ppm), moderately anomalous in arsenic (40 to 200ppm) and lead (40 to 1300ppm) and weakly anomalous in

gold (70 - 100 ppb). There is a strong relationship between zinc, arsenic, and lead, but the relationship with gold is unclear. Anomaly "G" appears to be southerly extension of Anomaly "F" of the 1981 geochem survey. It is evident that the 50 meter by 25 meter soils grid should be extended to the north to cover Anomaly "F", and the samples should be tested for Zn, PB, and As as well as Au.

- 2. Soil Geochem Anomaly "H": This is centered on line 24N at 7025E and is sub-parallel to Anomaly "G". It is 250 meters in length and 100 to 200 meters wide. It is far less intense than Anomaly "G" with less relationship between the elements. It trends off the property to the NE. It is anomalous in lead and zinc.
- 3. Soil Geochem Anomaly "I": This is only partially picked up on lines 18N and 18.5N at 6850E - 7000E, and represents an extension of Anomaly "E". Further testing to the south and west is necessary. It is anomalous in lead, zinc, and arsenic.

#### Louise Group ...

No geochemical surveys have been conducted over the claims.

#### Geophysical Survey

#### Historical Surveys

#### Jan Group ...

During 1982, magnetometer and VLF-EM surveys were carried out over the Jan-1, Omega, Franklin 1-2, and Tuf-1 claims. The following are excerpts from the report dated January 6, 1983 by D. G. Mark, Geo-physicist, entitled "Geophysical Report on Magnetic VLF-EM Surveys over the Jan Claim Group and the Louise Claim Group, Hedley Area, B.C."

"The major trend of the VLF-EM anomalies, as seen on the Jan Claim Group is primarily southwest ... considering the VLF-EM anomalies are likely to be reflecting structure, the major strike of structure ... is concluded to be in (this) direction.

On the Jan Claim Group, the survey has produced a high number of anomalies. In the writer's experience the anomalies are relatively short with good intensity. Also the anomalies are quite complex striking in several directions and therefore indicating cross structure ... the highs often are at points of intersection of two conductors striking in two different directions.

(The significance of these VLF-EM anomalies is considered in (the next) section of this report.)

The magnetic field ... is relatively fairly quiet. Over most of the southern two thirds of Jan Claim Group, the magnetic field varies only 3600 to 4000

gammas, and on the northern third, 4200 to 4600 gammas . . . This is typical of Nicola Group rocks.

... one magnetic high lineation located on the Jan Claim Group is of particular interst. It correlates with soil geochemistry Anomaly "E" as well as a series of VLF-EM anomalies."

#### Louise Group ...

Mark reported the following from his 1982 geophysical report on the Cass and Louise claims:

"The major trend of the VLF-EM anomalies on the Louise Claim Group is primarily south. Considering the VLF-EM anomalies are likely reflecting structure. The major strike of structure on the Louise Group is concluded to be in this direction.

On the Louise Group the VLF-EM anomalies are not quite as intense as on the Jan Group, though they seem to be equally complex."

#### Present work

Jan Group ...

The geophysical survey conducted in 1986 included magnetic and VLF-EM surveys as well as an I.P. survey where chargeability and resistivity of the rocks were measured. The surveys were conducted over Nicola Group rocks in the Jan-1, Omega, Franklin 1-2, and Tuf-1 claims. Readings were taken at 25 meter intervals on 100 meter E-W lines. Delta Geoscience Ltd. of Vancouver, B.C. conducted the surveys under the supervision of Grant Hendrickson, Geophysicist.

A Scintrex MP4 was used for the magnetometer survey, and the total field intensity was measured. A Scintrex VLF4 was used for the VLF survey and the station used was Seattle, NLK broadcasting at 24.8 KH.

A Scintrex IPR-10 Time Domain Receiver and 250W Time Domain Transmitter was used for the I.P. Survey. The Schlumberger array was used with AB=175m and MN=25m.

The magnetic method of geophysical surveying consi(s)ts of precisely measuring the resultant magnetic field produced by rock formations on the inherent earth's magnetism. The result varies with rock type (magnetic susceptibility) and rock history (magnetic field left in the rock due to prior magnetization).

The results of this survey can be used as an aid to geological mapping, and to identify zones of intense magnetism that may indicate deposits of pyrrhotite or magnetite. In general in the Hedley area pyrrhotite accompanies skarns and veins, while magnetite is often associated with the Hedley diorites and gabbros. These environments host the gold ores of the Hedley gold camp.

The VLF-EM method utilizes the electromagnetic field transmitted through the earth's crust from a certain radio station. The signals are propagated with the magnetic component of the field being horizontal in undisturbed areas. Contrasts

of conductivity in the earth's crustal rocks cause secondary fields, producing a vertical component and changes in the strength of the electromagnetic field. These conductive areas may be located and qualitatively evaluated by measuring the parameters of this electromagnetic field.

Because of its relatively high frequency, the VLF-EM can pick up bodies of a much lower conductivity and therefore is more susceptible to clay beds, electrolytefilling fault or shear zones and porous horizons, graphite carbonaceous sediments, lithological contacts as well as suphide bodies of too low a conductivity for other EM methods to pick up. Consequently the VLF-EM has additional uses in mapping structure and in picking up sulphide bodies of too low a conductivity for conventional EM methods and too small for induced polarization. (In places it can be used instead of I.P.) However, its susceptibility to lower conductive bodies results in a number of anomalies, many of them difficult to explaim.

The major cause of the VLF-EM anomalies, as a rule, are geologic structures such as fault, shear and breccia zones. It is therefore logical to interpret VLF-EM anomalies to likely be caused by these structural zones. Of course, sulphides may also cause VLF-EM response. But generally in the western cordillera, when VLF-EM anomalies correlate with sulphide mineralization, the anomalies are usually reflecting the structure associated with the mineralization rather than the mineralization itself. This is not true if the sulphides are massive enough.

Unlike the survey of 1982, the major trends of both magnetic and VLF-EM surveys were shown to be predominantly N10E to N20E. VLF-EM conductors are generally moderate to weak and from 100 meters to 500 meters in strike length. Magnetic anomalies strengthen in general towards the northeast part of the survey area. This observation corresponds with the alteration zone noted in this area, and may represent a sulphide enriched contact aureole sitting on top of an underlying diorite.

Anomaly 1 is accompanied by an() I.P. anomaly of high chargeability and relatively low resistivity which may represent enhanced sulphide development in the rocks. This runs roughly N-S and corresponds with the mag and VLF-EM trends on this part of the survey area.

Further geophysical work must be done both south and west of the 1986 survey areas in order to correlate them with Anomaly 2.

The I.P. surveys indicate a strong N10E to N20E trend on the survey area which is likely reflecting dykes, mineralized structures and/or lithology. Often these three features are conformable or sub-conformable in the Hedley area.

The major N65E trend across the southern portion of the grid as indicated by the I.P. chargeability survey may be caused by faulting with related sulphide enhancement.

#### Louise Group ...

No Geophysical surveys were conducted over the Cass and Louise claims under the current exploration program."

# Summary, Conclusions and Recommendations

#### Summary

The Jan and Louise Claim Groups Report summarizes its findings, at pages 1 and 2, as follows:

# "(...)

Four main target areas have been identified on the Jan Group, while a favorable geological environment on the Louise group indicates that a basic exploration program should be undertaken. Other targets may be discovered with further exploration.

The four target areas on the Jan Group have been labeled Anomalies 1 through 4. They are based on soil geochemistry grid results and/or rock samples taken from promising structures and areas of alteration or sulphide enrichment. Each target is anomalous in gold, while Anomalies 1 and 2 also have elevated lead and zinc values. Arsenic is associated with all four target areas. As seen on the compilation map, the targets are widely dispersed on the property. Each... can be briefly summarized as follows:

<u>Anomaly 1</u>: 600m in strike length overall, this is a multi-element soils anomaly confirmed by four rock chip samples. Only gold was analysed for in soils taken on the north part of the anomalous area, with anomalous values up to 200 ppb. Anomalous zinc, lead, silver, and arsenic with minor gold values form the southern 300m of the anomaly with zinc values up to 0.4% in the soils. Four rock samples were taken from this southern zone displayed a similar trend to the soil samples, with zinc values as high as 0.45%, lead as high as 0.27%, and gold up to 270 ppb....

<u>Anomaly 2</u>: Similar to Anomaly 1 and 700m in strike length, this gold-lead-zincarsenic soils anomaly is highlighted by gold values up to 330 ppb, zinc values up to 0.18%, and lead values up to 0.13% in the soils as well as 2.7% zinc in the one rock chip sample that was taken on the zone....

<u>Anomaly 3</u>: A 0.4m wide quartz-calcite-arsenopyrite fissure vein on the Mary-1 claim contained 5500 ppb (0.16 opt) gold, as well as high arsenic and anomalous silver values....

<u>Anomaly 4</u>: A series of small fissure veins lies near a diorite contact on the Tuf-3 claim. A 15cm quartz-calcite vein carried 19,500 ppb (0.57 opt) gold across its width, as well as anomalous silver and copper values....

The Louise Group of mineral claims is undelain by a stratigraphic sequence similar to that which hosts the Mascot mine. The VLF-EM survey conducted over part of the claim has indicated plentiful structure in the rocks.

The anomalous zones have characteristics similar to gold deposits within rocks of the Nicola group in the Hedley gold camp, namely Mascot Gold Mine and Banbury Gold Mine, and are considered to be favorable environments for gold mineralization...."

#### Conclusions

The Jan and Louise Claim Groups Report concludes, at pages 24 to 26, as follows:

# "Jan Group ...

"1. The Jan Claim Group has anomalous gold values in both soils and rocks in four discrete areas.

In order of importance, these are:

- i) Anomaly-1: 600 meters in strike length; probably related to bedding; in Hedley sequence; moderate silicification and alteration; partial fit to Mascot type model.
- ii) Anomaly-2: 700 meters in length; possibly related to faulting-shear zones; possible fit to Banbury-vein model.
- iii) Anomaly-3-Mary-1 vein: arsenopyrite-quartz-calcite vein in Hedley sequence.
- iv) Anomaly-4-Tuf-3 hydrothermal system: arsenopyrite-quartz calcite veinlets in Whistle Creek sequence adjacent to Hedley gabbro intrusion.
- 2. The lithology is similar in many ways to both Banbury Gold Mines Ltd. and Mascot Gold Mines Ltd.
- 3. Except in the northeast part of the Jan Group, the alteration is weak. Alteration seen in the northeast part of the Jan Group is similar to that on the Banbury property, and thought to be a product of Hedley diorite intrusives.
- 4. The Hedley diorite intrusives on the Jan Group are limited to small dykes and sills of low intensity. It is thought that the northeast part of the property may overlie a more significant intrusion, and that the anomalous geophysics, geochem, and especially the silicification, alteration, and evidence of hydrothermal venting is reflecting this phenomenon.
- 5. Major faulting in the south part of the Jan Group as described may represent channel ways along which mineralizing fluids emigrated.

Louise Group ...

- 1. The lithology is similar to that present at the Mascot Mines. Particularly encouraging is the presence of skarnification.
- 2. Gold-Silver showings have been located in granodiorite-Nicola group contact region on the Mission Claims immediately to the west. A similar geological environment occurs on the Louise Group."

# Recommendations

The Jan and Louise Claim Groups Report then recommends, at pages 26 to 31, as follows:

#### "Phase | Program

# Jan Group ...

The past year's exploration has led to the discovery of several interesting gold anomalies. Further systematic data collection is necessary to refine target areas, define structure, and fill in gaps in the proposed theoretical property model. This would consist of tighter geochemical and geophysical surveying as follows:

- 1. extend the soils geochem grid north and south to completely cover Anomaly "F-G" and Anomaly "E-I" with 50 meter lines and 25 meter sample intervals. As well, the grid should be tightened up around the anomalous soils geochem result at line 6N, 7750E and around the quartz-arsenopyrite vein located at line 3N, 8450E on the Mary-1 claim. The Tuf-3 grid should be sampled. All samples should be analyzed for Au, As, Zn, Pb, and Cu.
- 2. continue the geophysical surveys south to cover the major fault system on the Tuf-1, Omega, and Franklin 1-2 claims. A geophysical survey should be carried out over the area of silicification and alteration in the northeastern part of the property. Suggested line spacing: 50 meters; 25 meter intervals.

#### Louise Group ...

Systematic exploration at a grass roots level should be completed on the Louise group as follows:

- 1. Grid establishment The 100m X 25m grid that was begun in 1986 should be completed over the entire claim group.
- 2. Geological Mapping The grid should be mapped at a scale of 2500:1, paying particular attention to levels of skarning and indications of quartzcarbonate development. All gossans, veins, mineralized skarns, zones of stockwork, shear zones and silicified rocks should be sampled and assayed for gold, arsenic, silver, zinc, lead and copper.
- 3. Geochemical Survey Soil samples should be taken on a 100m X 25m grid from the B-Horizon, and tested for the elements indicated above.
- 4. Magnetic and VLF-EM Surveys These should be taken on a 100m X 25m grid using both Seattle and Annapolis transmitters."

# Phase II

# Jan Group ...

Upon completion of Phase I on the Jan Group claims, diamond drill targets should be established to test target areas as follows:

- 1. A drill hole should be targeted below the most promising surface expression of Anomaly "F-G" which is located in zone of alteration in the northeast part of the claim group to a depth of 200m. This will determine whether the mineralization increases to depth, and may indicate the presence of a Hedley diorite intrusive.
- 2. A drill hold should be targeted to determine the nature and possible economic significance of the fault zone that strikes N60E and is represented by Anomaly "E-I".

#### Cost Estimate of Recommended Program

#### Phase I

"1. Grid Establishment: Jan and Louise Groups

	- 20km @ \$75/km	\$ 1,500
	<ul> <li>Fransportation to days @</li> <li>\$50/day, includes rental &amp; fuel</li> <li>Food and accommodation - 20</li> </ul>	\$ 500
	man days @ \$25/day	<u>\$ 500</u>
	Sub-Total:	\$ 2,500
2.	Geological Survey: Louise Group	
	- Geologist - 20 days @ \$300/	
	day, includes food and accommodation - Transportation - 20 days @	\$ 6,000
	\$50 per day	\$ 1,000
	- Samples - 30 samples @ \$20/sample	<u>\$ 600</u>
	Sub-Total:	\$ 7,600
3.	Geochemical Surveys: Jan & Louise Groups	
	– 850 soil samples @ \$18/sample	• •
	includes taking and assaying	\$15,300
4.	Geophysical Survey: Jan and Louis Groups	
	- 24 man days @ \$200/day includes	
	machine rental, food & accommodation	\$ 4,800
	- Transportation - 12 days @ \$50/day	<u>\$ 600</u>
	Sub-Total:	\$ 5,400

3