FILE NO:

**GOLDBRAE DEVELOPMENTS LTD.**

GEOPHYSICAL REPORT ON AN

AIRBORNE MAGNETIC AND VLF-EM SURVEY

**DEEP 2 - 8 & 11 CLAIMS**

OSOYOOS MINING DIVISION

LATITUDE: 49°45'N LONGITUDE: 119°50'W

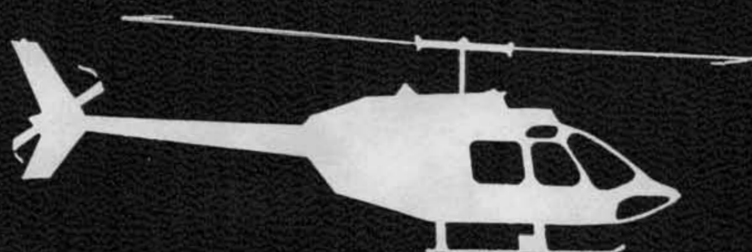
NTS: 82E/12W & 13W

THOR: Jeff C. Murton, B.Sc., P.Geoph.(Alberta

Geophysicist

TE OF WORK: 24 and 25 January 1989

TE OF REPORT: 1 May 1989



*Western Geophysical Aero Data Ltd.*

18739

## ARIS SUMMARY SHEET

District Geologist, Kamloops Off Confidential: 90.02.22

ASSESSMENT REPORT 18739 MINING DIVISION: Osoyoos

PROPERTY: Deep
LOCATION: LAT 49 45 00 LONG 119 50 00
UTM 11 5514469 295899
NTS 082E12W 082E13W
CLAIM(S): Deep 2-8,Deep 11
OPERATOR(S): Goldbrae Dev.
AUTHOR(S): Murton, J.C.
REPORT YEAR: 1989, 27 Pages
KEYWORDS: Eocene,Tertiary,Okanagan Batholith,Coryell Intrusion
Nelson Plutonic Rocks,Valhalla Intrusion,Syenites,Granodiorites
Gneisses
WORK
DONE: Geophysical
EMAB 160.0 km;VLF
Map(s) - 2; Scale(s) - 1:10 000
MAGA 160.0 km

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**ILLUSTRATIONS**

## INTRODUCTION:

On January 24 and 25, 1989 an airborne reconnaissance magnetic and VLF-EM survey was conducted over the **Deep 2-8** and **Deep 11** claims (referred to in this report as the **Deep Claim Group** ) by Western Geophysical Aero Data Ltd. for **Goldbrae Developments Ltd.** The property is east and southeast of Peachland, British Columbia (Figure 1).

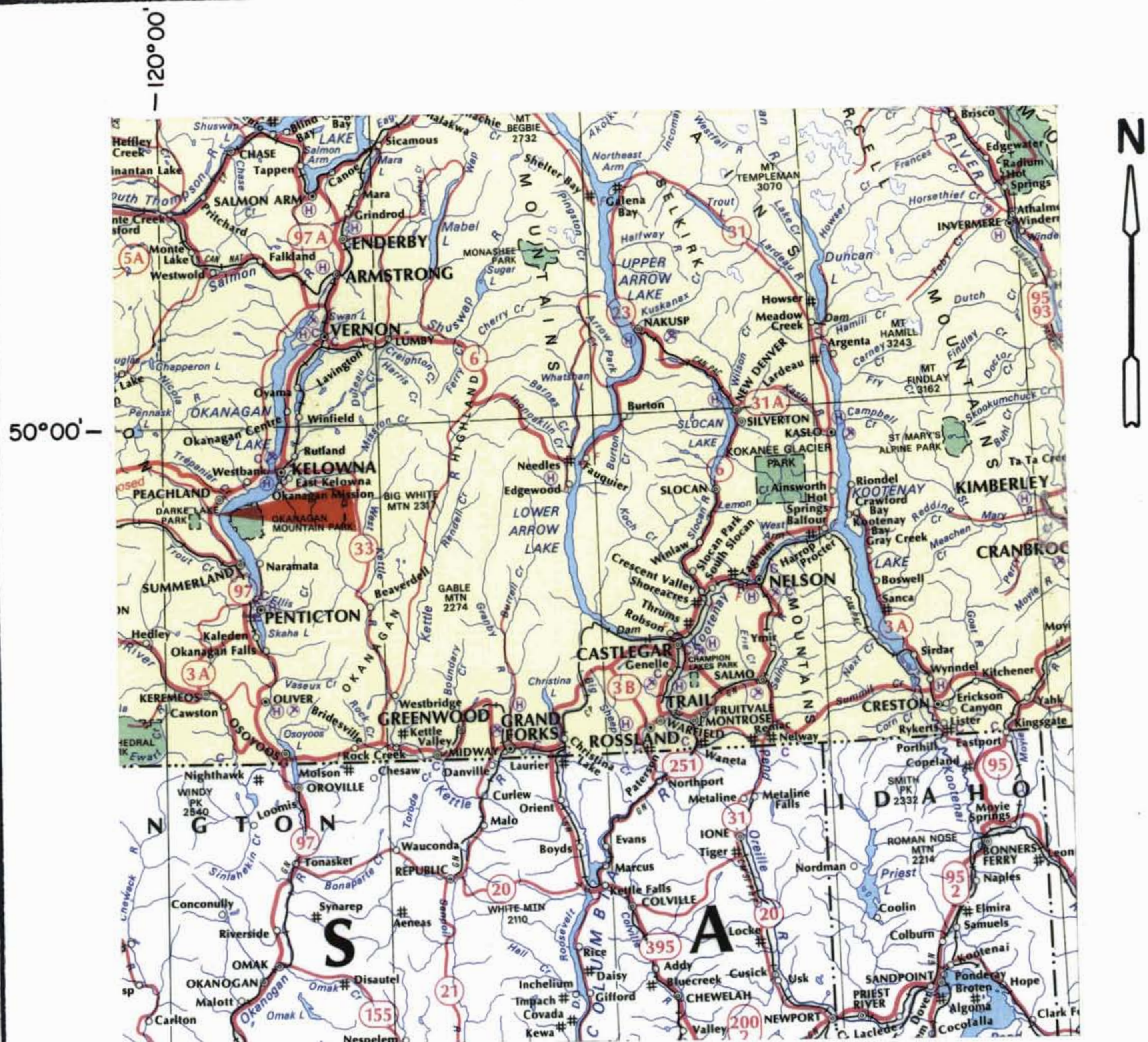
The intention of this survey is to direct further exploration to favorable target areas and to assist in the geological mapping of the property. Approximately 160 line kilometers of airborne magnetic and VLF-EM data have been collected, processed, and displayed in order to evaluate this property.

## PROPERTY LOCATION AND ACCESS:

The **Deep Claim Group** is owned and operated by **Goldbrae Developments Ltd.** The claims are described in the table below and illustrated in Figure 2.

| Claim Name | Units | Record No. | Record Date |
|---|---|---|---|
| **Deep 2** | 20 | 2819 | 22 February 1988 |
| **Deep 3** | 8 | 2820 | 22 February 1988 |
| **Deep 4** | 20 | 2821 | 22 February 1988 |
| **Deep 5** | 20 | 2822 | 22 February 1988 |
| **Deep 6** | 20 | 2823 | 22 February 1988 |
| **Deep 7** | 20 | 2824 | 22 February 1988 |
| **Deep 8** | 20 | 2825 | 22 February 1988 |
| **Deep 11** | 10 | 2959 | 15 August 1988 |

The property is situated between Eneas Lakes Provincial Park and Darke Lake Provincial Park, to the east; and the municipality of Peachland and the shore of Okanagan Lake, to the west. The property is in the Osoyoos Mining Division of British Columbia. The NTS coordinates are 82E/12W and 13W. The approximate




# GOLDBRAE DEVELOPMENTS LTD.

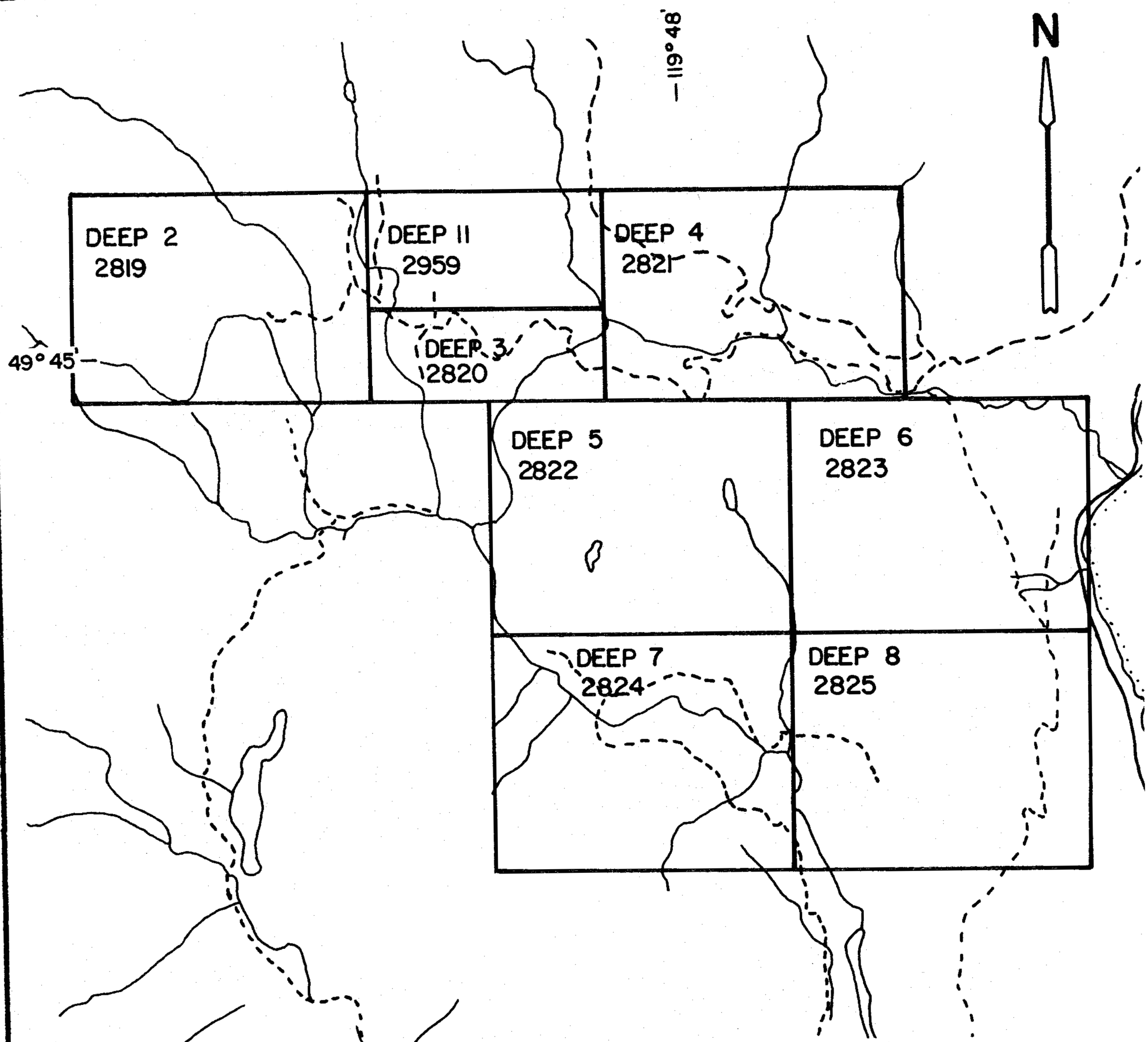
## DEEP 2-8; DEEP II

## LOCATION MAP

N.T.S. 82E/12W & 13W

SCALE= 1: 2 000 000

FIG. 1




# GOLDBRAE DEVELOPMENTS LTD.

# DEEP CLAIM GROUP

# CLAIMS MAP

N.T.S. 82E/12W & 13W

SCALE=1:50 000

FIG. 2

geographical coordinates are 49°45'N latitude and 119°50'W longitude. There is good year-round vehicle access to the area from provincial Highway Number 97 which follows the west shore of Okanagan Lake. There is reasonable access to the north of the property from the gravel road to Brenda Mines and the dirt roads which intersect it.

Access to the south of the property is from the gravel road which follows Eneas Creek northwest to Garnet Lake and the gravel road which follows Darke Creek up to Darke Lake Provincial Park.

**REGIONAL AND LOCAL GEOLOGY:**

Regionally, the **Deep Claim Group** is west of the surface expression of a gently west-dipping fault, the Okanagan Fault, which follows along the Okanagan Lake valley. It has been proposed that this plate, fractured into many blocks, is the top portion of a crustal shear system where two plates are pulled apart - along a low-angle, crustal-scale extension fault (Tempelman-Kluit and Parkinson, 1986). The separation of rocks suggested by the extension is significant; matching the Eocene lower plate and upper plate rocks, shows that displacement might be measured in tens of kilometres.

The principal lithologies in the prospect area are Mesozoic plutonic basement rocks, and, to a lesser extent, Tertiary volcanics, volcanic intrusives, metamorphic rocks, and deltaic to shallow marine clastic sediments (Figure 3). The following rock assemblages are located on or near the **Deep Claim Group.**

The "Okanagan Gneiss" unit, a strongly sheared and thermally altered unit which becomes progressively chloritized eastward towards Okanagan Fault. This contact metamorphic unit, radiometrically dated to middle Eocene, is mapped along the southern portion of **Deep 8** claim, and to the south, between Garnet and Okanagan Lakes. Also of Eocene age and covering most

# LEGEND

## MAP SYMBOLS

*Outcrop boundary.*

*Probable stratigraphic contact, location approximate.*

*Geological contact, relations unknown, possibly faulted.*

*Strike and dip of bedding.*

*Strike and dip of foliation.*

*Trend and plunge of lineation and minor folds.*

*Inferred fault, age and displacement unknown.*

*Inferred normal fault, age unknown, circle on downthrown side.*

*Inferred Eocene normal fault, circle on downthrown side.*

*Slide- inferred fault in metamorphosed rocks, roughly parallel to foliation.*

*Mineral occurrence with commonly used name.*

*Locality with radiometric age determination, K-bi, wr, hb, ser,ms- potassium argon model age on biotite, whole-rock, hornblende, sericite and muscovite respectively: U-zirc low 80 up 1500- Uranium lead age on zircon with upper and lower intercept ages as noted: F-ap, sp- fission track ages on apatite and sphene respectively: Sr-bi, fsp, ms, wr- Rubidium-strontium ages on biotite, feldspar, muscovite and whole-rock respectively.*

*Fossil locality- fossil type as follows:*
- ⊙ *Conodonts*
- △ *Ammonites*
- ◇ *Brachiopods*
- ⊡ *Plant macrofossils*
- ⊙ *Other*

*Geology compiled 1985, 1986 by Dirk Tempelman-Kluit, from sources referenced with new fieldwork during 1983, 1984. I acknowledge the excellent help in compilation by J. Rhodes, A. Jung, R.A. Arnold, E.A. Fuller, and G. Lynch. By his continuing interest in the geology of this region, Rick Myers of British Columbia Geological Survey at Kamloops, encouraged me to complete this work*

**Etr** — *TREPANIER RHYOLITE: white and locally pink, greenish or light grey, flow banded rhyolite with subhedral quartz, hornblende and biotite phenocysts to 3 mm in an aphanitic matrix. K-Ar ages of 47.7 and 46 ± 2 Ma were determined by Church (1981) west of Trepanier*

**Ec** — *CORYELL SYENITE: alkalic to calc-alkalic, high level, pink and buff syenite and quartz monzonite and trachytic pink feldspar porphyry dykes: plutonic equivalent of the Marron Group especially the Kitley Lake Formation: gradational to pulaskite and to Shingle Creek Porphyry: probably includes JKg undifferentiated in East half of map area: poorly dated*

**Egn** — *"OKANAGAN GNEISS": massive, medium grey weathering, resistant hornblende-biotite granodiorite orthogneiss: strongly foliated: grades to mylonitic gneiss, mylonite and blastomylonite: minor amphibolite and paragneiss- minor schist: minor pegmatite and aplite: strongly chloritized along Okanagan Fault: grades eastward (and up the structural succession) to JKg, mJg and Pm units of which it is presumed as to the sheared equivalent: probably also includes sheared equivalents of the Anarchist Group: presumed sheared and thermally overprinted during the Eocene: Egn1- quartz chlorite microbreccia and related altered rocks close to the Okanagan Fault*

### CRETACEOUS AND/OR JURASSIC

**JKg** — *OKANAGAN BATHOLITH: massive, light grey weathering, medium- to coarse-grained, equigranular to porphyritic, unfoliated to weakly foliated, fresh biotite granodiorite and granite: includes undifferentiated granodiorite of the Nelson suite: age poorly constrained*

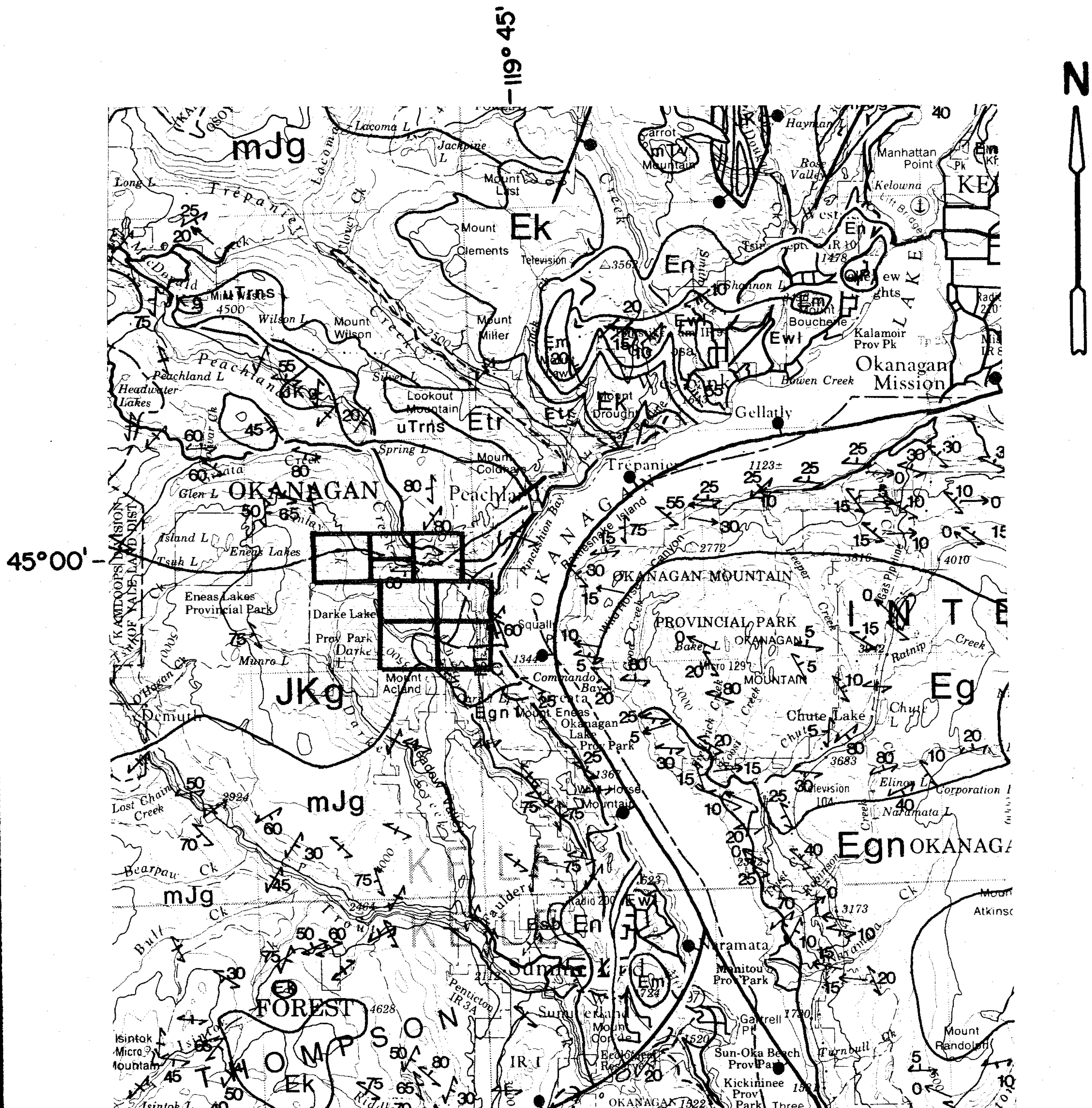
### MIDDLE JURASSIC

**mJg** — *NELSON PLUTONIC ROCKS: massive, generally moderately foliated, medium grey weathering, medium- to coarse-grained, equigranular, hornblende-biotite granodiorite, quartz diorite and granite: includes undifferentiated biotite granite of the Valhalla suite: age poorly constrained*

### UPPER TRIASSIC AND/OR LOWER JURASSIC

**uTrv** — ROSSLAND AND/NICOLA GROUPS
*Massive greenstone, andesite, latite, agglomerate and volcanic breccia of greenstone fragments locally with limestone clasts, minor greywacke: minor interbedded limestone: includes lenses of silicified equivalents: may include undifferentiated Lower Jurassic volcanics of similar lithology*

**uTrns** — *Rusty weathering, black pyritic slate, phyllite and argillite, locally silicified or "cherty": minor quartzite:minor interbedded argillaceous limestone: includes undifferentiated greenstone lenses*




# GOLDBRAE DEVELOPMENTS LTD.

## DEEP 2-8; DEEP II

## LOCAL GEOLOGY

N.T.S. 82E/12W & 13W

SCALE = 1:250 000

FIG. 3

of **Deep 8**, and minor parts of **Deep 5, 6,** and **7** is the Coryell syenite; an alkalic to calc-alkalic, high level, pink and buff syenite and quartz monzonite with trachytic pink feldspar porphyry dikes.

The Cretaceous-Jurassic Okanagan Batholith dominates the **Deep Claim Group** encompassing parts of **Deep 2-7** claims. This lithologic unit, known as the Valhalla plutonic rocks, is mainly massive, light grey weathering, medium-grained to coarse-grained, equigranular to porphyritic, unfoliated to weakly foliated, fresh biotite granodiorite and granite. The surficial bounds of the Valhalla plutonic rocks to the southeast are the Eocene Okanagan gneiss and the Coryell syenite.

The Valhalla rocks are constrained to the north, northeast and due south by the middle Jurassic Nelson plutonic rocks which in part cover the north of **Deep 2, 4,** and **11** claims, the east part of **Deep 6** and the southeast portion of **Deep 7.** The Nelson plutonic rocks consist of massive, generally moderately foliated, medium-grained to coarse-grained, equigranular, with medium grey weathering, hornblende-biotite granodiorite, quartz diorite and granite.

Two to three kilometers north of the **Deep Claim Group**, just north of Peachland Creek is lower Jurassic - upper Triassic Jurassic Nicola Group. The Nicola Group consists of massive greenstone, andesite, latite, agglomerate and volcanic breccia of green stone fragments locally with limestone clasts, minor interbedded limestone and minor greywacke.

An epithermal model is visualized as the source of mineralization in the area west of Okanagan Lake. The detached upper plate of Eocene volcanics and of Mesozoic plutonic basement rocks may have been broken by high-angle normal faults as a result of the extensional stress (Tempelman-Kluit and Parkinson, 1986). Meteoric water descends along some of the high angle faults until it reaches the detachment zone and the low-angle extensional fault were it is heated and driven up along the top plate leaching sulfides and precious metals along its path.

The high pressure - high temperature fluid follows a path of least resistance; it is driven up from depth along one of many intersecting high-angle normal faults toward the surface and lower pressure where the enriched solution "boils" and the polymetalic ore is deposited (Figure 4).

**AREA HISTORY AND PREVOUS WORK:**

Initial exploration in the Peachland area was done by the Camp Hewitt Gold Mining Company who held and operated the majority of the ground in the area during the 1890's. Work included short exploratory workings and small shipments of ore (Kidlark, 1988). In the mid 1930's the Bureau of Geology and Topography, predecessor to Geological Survey of Canada, sponsored a reconnaissance survey area which encompassed the Peachland area (Cairnes, 1937). Significant exploration activity did not return to the area until the 1960's when the area was intensively explored for porphyry Cu-Mo systems after the Brenda Mines discovery. In 1967 Brenda Mines Ltd. initiated stripping for their Cu-Mo open pit mine approximately 20 kilometres NW of the **Deep Claim Group.**

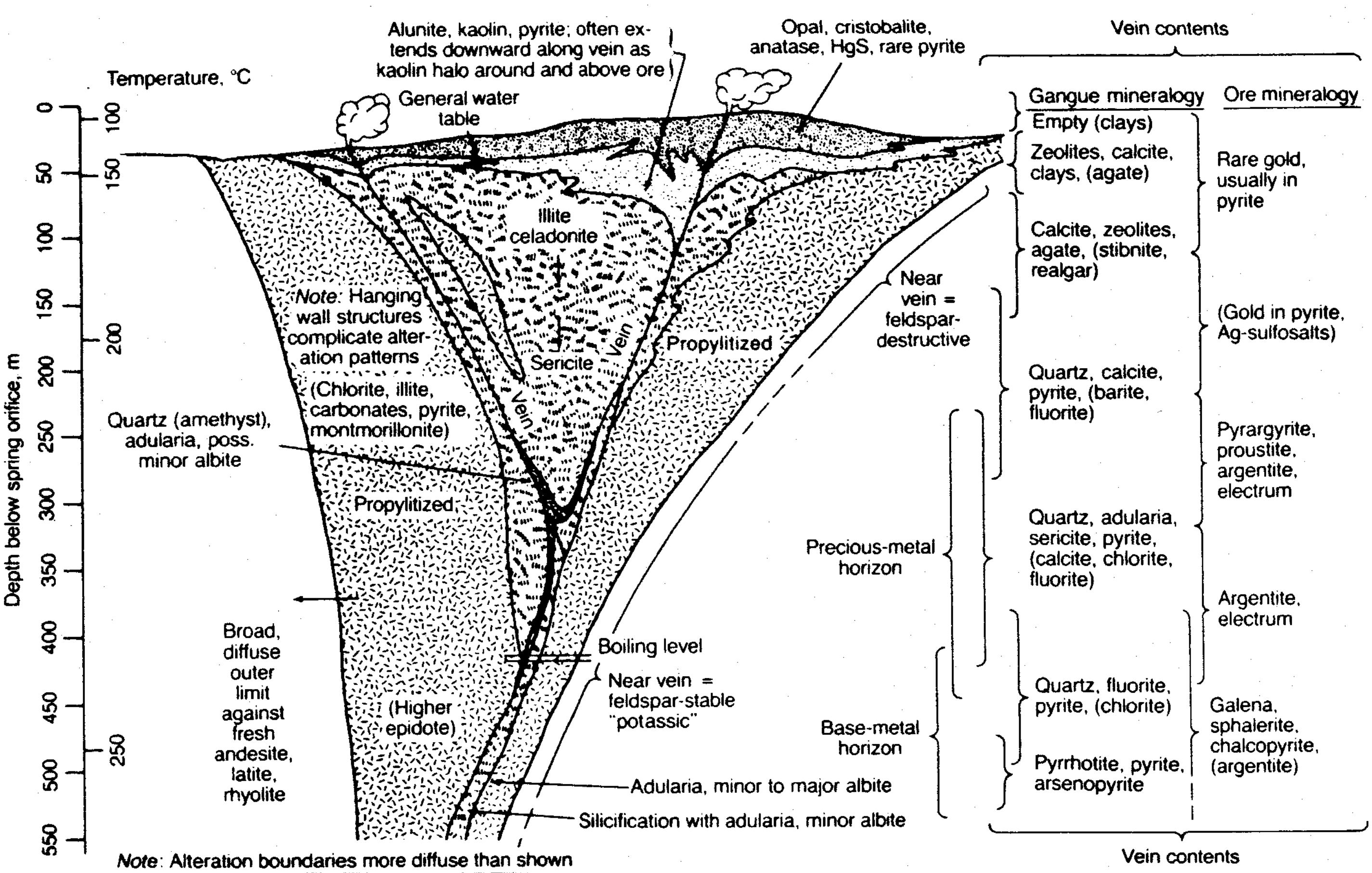
More recently in the area, three kilometres northwest of the **Deep 3** claim, Fairfield Minerals Ltd delineated auriferous massive sulphide skarns and quartz veins on their Oka property. Two gold showings were noted returning 0.51 oz/ton Au across 5.0 feet of garnet skarn (grab samples assayed up to 4.36 oz/ton) and 1.38 oz/ton Au from arsenic-rich quartz veins (Vancouver Stockwatch, May 22, 1987). Between these two gold showings an extensive soil geochemical survey revealed a linear belt of gold anomalies in 1986. The Oka property find is viewed by some as a similar geological setting to the open pit Mascot Mines gold deposit near

# GOLDBRAE DEVELOPMENTS LTD.

# DEEP CLAIM GROUP

## "TYPICAL" PRECIOUS METAL EPITHERMAL DEPOSIT-
## HIGHLIGHTING ALTERATION EFFECTS

## N.T.S. 82E/12W & 13W




From: Guilbert, J.M. and Park, C.F., 1986, Geology of Ore Deposits, W.H. Freeman & Co., Figure 5-11, Page 197.

FIG. 4

Hedley, B.C. (Lenard, 1988). In 1987 Ashworth Explorations Ltd. conducted geological prospecting, mapping, and geochemical sampling of the Peach Claim Group (Big Bear, Deer Fly, Coldham, View I and View II claims - owned and operated of Clive Ashworth), for assessment purposes (Scroggins, 1987). In July, 1988 additional prospecting, mapping, rock and silt sampling was done by Roger Kidlark on the Peach claim group (Kidlark, 1988).

There are at least eight BCMEMPR documented mineral showings near or adjacent to the **Deep Claim Group.** Within 300 metres of the north boundary of the **Deep 4** claim, along Peachland Creek are the Little Duncan, Panorama, and Sid showings of Cu, Mo, Pb, Ag, and Au. Further east and north are the Collex a, Reg 2, and Lakeview showings of Cu, Mo, Pb, Zn, Ag, and Au. East of the **Deep 2** claim is the Cache showings of Cu and Ag.

**AIRBORNE MAGNETIC AND VLF-ELECTROMAGNETIC SURVEY:**

This geophysical survey simultaneously monitors and records the output signals from two Develco tri-axis ringcore magnetometers, separated by a vertical distance of four metres, a Barringer Research proton precession magnetometer, and a Herz dual-frequency VLF-EM receiver. The sensors are installed in an aerodynamically stable "bird" which is towed thirty metres below a helicopter. Fixed to the helicopter skid is a shock and gimbal-mounted, downward-facing video camera. A video signal is recorded and later reviewed and correlated with a recent air photograph in order determine the precise locations of the flight paths. The elevation of the helicopter above the ground is recorded by a radar altimeter and monitored by the pilot and navigator in order to maintain a constant ground clearance.

A computer records readings of the magnitude of the earth's magnetic field and of the fields induced by two powerful VLF-EM transmitters (located in Cutler, Maine and Seattle, Washington). This data, the time and date it was observed, radar altimeter values, and survey fiducial points are all superimposed on the video image and recorded on both video cassettes and 3.5inch computer diskettes.

Data quality is assured by the survey operator monitoring a real-time display of direct and unfiltered recordings of all the geophysical output signals while a navigator directs the helicopter pilot from an air photograph.

Magnetic data is useful for mapping the position and extent of regional and local geological structures which have varying concentrations of magnetically susceptible minerals. Many lithological changes correlate with a change in magnetic signature.

VLF-EM data is useful for mapping conductive zones. These zones usually consist of argillaceous graphitic horizons, conductive clays, water-saturated fault and shear zones, or conductive mineralized bodies. The VLF-EM data is presented as contoured total field data overlain by quadrature (out-of-phase component) profiles. Conductors are located at inflection points or a change in sign (cross-over) of the quadrature component over a local total field VLF-EM high.

In a typical VLF-EM survey, satisfactory conductor coupling and imaging occurs only within 45° of the primary field selected (in the direction of the transmitter). It follows that those fields induced by the second, ideally perpendicular transmitter would not be usually apparent. This survey is a special case; the two Cutler and Seattle stations transmit their primary fields at relatively close frequencies (24.0 kHz and 24.8 kHz respectively), so conductors induced by the other station are apparent on each VLF-EM display (Figures 6 and 7).

**DATA PROCESSING:**

The video image, with superimposed line and fiducial identification, recording times, and the recorded data, is correlated with both the navigator's and operator's field notes and topographic features observed from an air photograph. The "recovered" flight paths are digitized to obtain relative x and y positions which are then combined with the data. Subsequently, all geophysical data is filtered to remove spurious noise bursts and chatter, and then plotted as flight path profiles and contour maps for each of the sensors.

Both the total field magnetometer signal and the total field and quadrature components of VLF-EM signal are sensitive to topographic changes and bird oscillations. Short wavelength (less than 200 meters) oscillations, are attenuated by filtering the VLF-EM data with a digital low-pass filter. Long wavelength effects (anomalies greater than 2000 metres) attributed to broad topographic features, are also removed from both the magnetometer and VLF-EM data by high-pass filtering.

A composite display of the magnetometer data (Figure 5) was produced using the top, or second Develco flux-gate ringcore magnetometer data collected on January 24 and the Barringer Research proton precession magnetometer data from January 25. The differences between Barringer and Develco background magnetometer levels (readily observed comparing the parallel flight lines "L 16" and "L 17") are attributed to, in part, differences in instrument design, instrument calibration, and sensor elevation. The larger "dynamic range" of the Develco magnetometer is due to greater instrument sensitivity and shorter ground-to-sensor distance.

## DISCUSSION OF RESULTS:

The **Deep Claim Group** was surveyed on January 24 and 25, 1989. Over 160 line kilometers of airborne magnetic and VLF-EM survey data have been recorded and evaluated. Survey lines were flown approximately east-west in a Hughes 500D helicopter with an average spacing of 300 metres. The geophysical survey data were recorded on average two times per second for an effective sample interval of 15 metres. The sensors were towed below the helicopter with an average terrain clearance of 30 metres where possible. The survey area covered contains many areas where abrupt topographic changes are encountered.

The deep ravines and gullies associated with Eneas, Findlay, and Peachland Creeks contribute up to an additional forty metres of ground-to-sensor separation. In any airborne geophysical survey an increase in the ground-to-sensor distance by five metres is noteworthy and by ten metres is significant. The effect of increases of this magnitude upon the magnetic and VLF data responses is a marked reduction in measurable intensity, in other words, the appearance of a mappable magnetic and VLF-EM low. In many geological settings the location of creeks and rivers correspond to the surface expression of fault and shear zones, or lithological contacts and are likely areas to observe significant VLF-EM conductors. In this survey it is likely that the size and shape of the interpreted conductors are over printed by topographic effects perhaps masking conductors that would be observed on a ground survey.

Overall the VLF conductors induced by both transmitters (Figures 6 and 7) are relatively weak and predominantly reflect ground-to-sensor variations. Also noteworthy is that some of the conductors which have satisfactory line-by-line correlation have a very low recorded value of three to six percent. Data collected in this range are just outside of the error measured in static tests; the low signal to noise ratio of the data forces us to be suspect of their reliability. The intensity of the conductors imaged by the Cutler, Maine transmitter (Figure 6) are greater than those induced by the Seattle, Washington transmitter (Figure 7). This is because the coupling alignment of the conductors is better for the Cutler station than for the nearer Seattle station.

The magnetic signature in areas of topographic change would be further depressed in areas of increased sediment cover. Pockets of glacial till, erosional and stream bed debris have a effect similar to increased ground-to-sensor separation. As expected the magnetic data collected does not display noticeable contrast in magnetic susceptibility between the Okanagan Batholith Rocks and the Nelson Plutonic rocks mapped by the GSC. There is a marked contrast in the magnetic response along the south and southwest contact between the Eocene Coryell syenite and the Cretaceous-Jurassic granites and granodiorites (Figure 5).

**CONCLUSIONS AND RECOMMENDATIONS:**

The airborne magnetic and VLF-EM survey on the **Deep Claim Group** property has indicated a number of locations which warrant further exploration. The geologic targets are polymetalic ores in veins and porphyries associated with high angle faults. The geophysical signatures of these structurally constrained enrichment zones would be VLF-EM highs, with strong quadrature cross-overs, possibly coincident with local magnetic depressions as result of the destruction of magnetic minerals by the silicification and propylitic alteration of the rocks.

A recommended exploration program would consist of two parts: first; a visual inspection of the areas in the vicinity of the interpreted conductors for surface signs of mineralization and faulting (particularly in the area associated with Peachland Creek), and second; a detailed ground magnetic and VLF-EM survey to accurately determine the extent of the area of low magnetics and to position the conductors. Induced polarization surveys should be conducted over areas of interest to confirm mineralization and to determine the approximate depth of burial and attitude before locating drill holes.

Respectfully submitted,

Jeff C. Murton, B.Sc., P.Geoph.(Alberta)

**REFERENCES:**

Cairnes, C.E., 1937, Preliminary Report: Mineral Deposits of the West Half of Kettle River Area, British Columbia, Geological Survey of Canada, Ottawa, 1937.

Kidlark, R.G., 1988, Report on the Geochemical and Geological Surveys on the Peach Claim Group, Osoyoos Mining Division, B.C., for Clive E. Ashworth, August 2, 1988.

Lenard,N., 1988, Assessment Report on the Brae 2 Claims, Osoyoos Mining Division, Peachland, B.C, Assessment Report Number 16922.

Scroggins, E.A., 1987, Geochemical and Geological Assessment Report on the Peach Claim Group, Osoyoos Mining Division, Peachland, B.C., for Ashworth Explorations Limited, November 18, 1987.

Tempelman-Kluit, D., 1989, Open File 1969; Penticton Map-Area, British Columbia: Geological Survey of Canada , Ottawa, Canada, 1989.

Tempelman-Kluit, D.,and Parkinson, D., 1986, Extension across the Eocene Okanagan crustal shear in southern British Columbia: Geology, Vol.14, April 1986, p. 318-321.

## INSTRUMENT SPECIFICATIONS

**BARRINGER AIRBORNE MAGNETOMETER**

| | | |
|---|---|---|
| MODEL: | | M 1041 |
| TYPE: | | Proton Precession |
| RANGE: | | 20,000 to 100,000 gammas |
| ACCURACY: | | + 1 gamma at 24 V d.c. |
| SENSITIVITY: | | 1 gamma throughout range |
| CYCLE RATES: | | |
| Manual | - | Pushbutton single cycle |
| External | - | Actuated by a contact closure (short) longer than 10 microseconds |
| Continuous | - | 1.114 seconds with external pins shorted |
| Internal | - | 1 second to 3 minutes in 1 second steps |
| OUTPUTS: | | |
| Analogue | - | 2 channels, 0 to 99 gammas or 0 TO 990 gammas at 1 m.a. or 100 mV full scale deflection. |
| Digital | - | Parallel output 5 figure 1248 BCD, TTL compatible |
| Visual | - | 5 digit numeric display directly in gammas |
| SIZE: | | Instrument set in console 19" x 3.5" x 10" |
| WEIGHT: | | 10.6 lbs. |
| POWER REQUIREMENTS: | | 28 ± 5 volts dc, @ 1.5 amps - polarizing 4 amps |
| DETECTOR: | | Noise cancelling torroidal coil installed in air foil. |

## INSTRUMENT SPECIFICATIONS

**FLIGHT PATH RECOVERY SYSTEM**

i) T.V. Camera:

| | |
|---|---|
| Model: | RCA TC2055 Vidicon |
| Power Supply: | 12 volt DC |
| Lens: | variable, selected on basis of expected terrain clearance. |
| Mounting: | Gimbal and shock mounted in housing, mounted on helicopter skid. |

ii) Video Recorder:

| | |
|---|---|
| Model: | Sony SLO-340 |
| Power Supply: | 12 volt DC / 120 volt AC (60Hz) |
| Tape: | Betamax 1/2" video cassette - optional length. |
| Dimensions: | 30 cm X 13 cm X 35 cm |
| Weight: | 8.8 Kg |
| Audio Input: | Microphone in - 60 db low impedance microphone |
| Video Input: | 1.0 volt P-P, 75Ω unbalanced, sync negative from camera. |

iii) Altimeter:

| | |
|---|---|
| Model: | King KRA-10A Radar Altimeter |
| Power Supply: | 0-25 volt (1 volt/1000 feet) DC signal to analogue meter, 0-10 v (4mv/ft) analogue signal to data acquisition unit |
| Mounting: | fixed to T.V. camera housing, attached to helicopter skid. |

## INSTRUMENT SPECIFICATIONS

### DEVELCO RINGCORE MAGNETOMETER

| | |
|---|---|
| Model: | 1210 |
| Sensor: | 3-axis ringcore fluxgate |
| Orthogonality: | ±1° degree with respect to other axes and reference surface |
| Sensitivity: | 0.0025 Milligauss (0.25 gamma) |
| Range: | ±1000, ±300, ±100, ±30, ±10, ±3 mG |
| Analog Output: | ±5V dc for above ranges |
| Output Impedance: | 600 ohms |
| Zero Field Offset: | < ±7 mG absolute |
| Linearity: | ±0.5% |
| Noise: | 0.1 to 1 Hz, 0.0025 mG peak-to-peak<br>1.0 to 10 Hz, 0.0025 mG peak-to-peak<br>1.0 to 100 Hz, 0.01 mG peak-to-peak |
| Gain Stability: | ±3%, 0 to +60° C |
| Field Nulling: | ±0.04 mG to full scale |
| Low-Pass Filtering: | Switch selectable 1, 10, 100 and 500 Hz (-3 dB with -18 dB/octave roll-off, Butterworth response) |
| High-Pass Filtering: | DC, 0.1, and 1 Hz (-3 dB with -18 dB/octave roll-off, Butterworth response) |
| Notch Filter: | 40-dB notch at 60 Hz, switch selectable, in or out |
| Battery Life: | 25-hour minimum, rechargeable |
| AC Power: | 115-230V; 1/4 A |
| Size: | Sensor: 3.2 cm x 3.5 cm x 10.16 cm<br>Control Unit: 43 cm x 13 cm x 41 cm |
| Weight: | Sensor Probe: 0.62 kg<br>Control Unit: 13.6 kg |

## INSTRUMENT SPECIFICATIONS

### DATA ACQUIISITION UNIT

| | |
|---|---|
| Model: | HP-3852A |
| Mainframe Supports: | Eight function module slots<br>Data acquisition operating system<br>System timer<br>Measurement pacer<br>Full alphanumeric keyboard, command and result displays |
| Number of Channels: | 20 channel relay multiplexer HP44708A/H |
| Voltmeter: | 5 1/2 to 3 1/2 digit intergrating voltmeter HP44701A measures:<br>DC voltage<br>resistance<br>AC voltage<br>Range ±30V, ±0.008%, +300uV<br>Intergration Time 16.7 msec<br>Number of converted digits 6 1/2 |

| | |
|---|---|
| Reading rate (readings/sec) | 57 |
| Min-Noise rejection (dB) Normal Mode Rejection at 60 Hz ±0.09% | 60 |
| DC Common Mode Rejection with 1 KΩ in low lead | 120 |
| Effective Common Mode Rejection at 60 Hz ±0.09% with 1 KΩ in low lead | 150 |

| | |
|---|---|
| Communication: | HPIB interface with Compaq |
| Power Requirements: | 110/220 Volts AC at 60/50 Hz |
| Dimensions: | 45.7 cm x 25.4 cm x 61.0 cm |
| Weight: | 9.5 kg. |

## INSTRUMENT SPECIFICATIONS

### CONTROLLER AND RECORDING SYSTEM

| | |
|---|---|
| Type: | Compaq Portable II<br>An 80286 microprocessor<br>640 Kbytes of RAM<br>2 three and a half inch 720 Kbyte drives<br>one 20-Megabyte fixed disk drive<br>Monochrome, dual-mode, 9-inch internal monitor<br>Asynchronous communications interface<br>Parallel interface<br>Composite-video monitor interface<br>RGB monitor interface<br>RF modulator interface<br>Two expansion slots<br>Real-time clock<br>An 80287 coprocessor<br>A HPIB Interface Card |
| Data Storage: | 3 1/2 inch diskettes in ASCII<br>Roland 1012 printer for printed output<br>Beta I video cassettes |
| Power Requirements: | 115 Volt AC at 60 Hz |
| Weight: | 11 kg |
| Dimensions: | 45 cm x 25 cm x 30 cm |

## INSTRUMENT SPECIFICATIONS

### HERZ TOTEM - 2A VLF-EM SYSTEM

| | |
|---|---|
| Source of Primary Field: | -Global network of VLF "OMEGA" radio stations in the frequency range of 14 KHz to 30 KHz |
| Number of Channels: | Two; Field selectable by 100 Hz steps. Ex:<br>Seattle, Washington at 24.8 KHz<br>Annapolis, Maryland at 21.4 KHz |
| Type of Measurement: | Total Field Strength<br>(Location of Conductors)<br>Vertical Quadrature<br>(useful in interpreting the quality and depth to a conductor)<br>Horizontal Quadrature<br>(orientation of field & structures) |
| Type of Sensor: | Ferrite antennae array of 3 orthoganal coils mounted in a fiberglass bird with preamp. |
| Output: | -0 to ± 1000 mV displayed on two switch selectable analogue meters.<br>-noise monitoring light.<br>- audio monitor speaker. |

| | |
|---|---|
| Filters: | Noise blanking spherics (lightning)<br>Anti Aliasing filters (Adjacent Stations)<br>Crystal Controlled Phase Lock loop digital tuning.<br>1 sec. output Time Constant. |
| Sensitivity: | 130 micro V/m at 20 kHz. |

# STATEMENT OF QUALIFICATIONS

**NAME:** MURTON, Jeff C.

**PROFESSION:** Geophysicist

**EDUCATION:** B.Sc - Geophysics Major
University of British Columbia

**PROFESSIONAL ASSOCIATIONS:** Society of Exploration Geophysicists

Association of Professional Engineers, Geologists, and Geophysicists of Alberta

**EXPERIENCE:**

1984-88 - Geophysicist, Interactive Graphics with Western Geophysical Company of Canada Ltd. in Calgary, Alberta.

1988 - Geophysicist with White Geophysical Inc.

**COST BREAKDOWN:**

The geophysical data was collected, processed and analyzed. Geological information was researched and compiled. This report and survey was prepared for an all inclusive fee of $13,800.00. This total is based upon a survey acquisition and processing cost of $55 per kilometre of collected total field magnetic data and two stations of VLF-EM data. The survey was conducted by Western Geophysical Aero Data Ltd. employees Bob Acheson and the writer, Jeff Murton.

| | |
|---|---|
| Mob/Demob - truck rental, helicopter ferry........... | $ 2,000.00 |
| Map and Photo preparations........................... | 600.00 |
| Survey -over 160 kilometers of magnetic and VLF-EM data at $55 per kilometre ..................... | 8,800.00 |
| Processing, plotting, drafting and reproduction of 1:10000 plots of data on a photomosaic base map | 1,200.00 |
| Interpretation and assessment report................. | 1,200.00 |
| TOTAL | $13,800.00 |

**TOTAL ASSESSMENT VALUE OF THIS REPORT** **$13,800.00**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CUTLER VLF TRANSMITTER

SEATTLE VLF TRANSMITTER

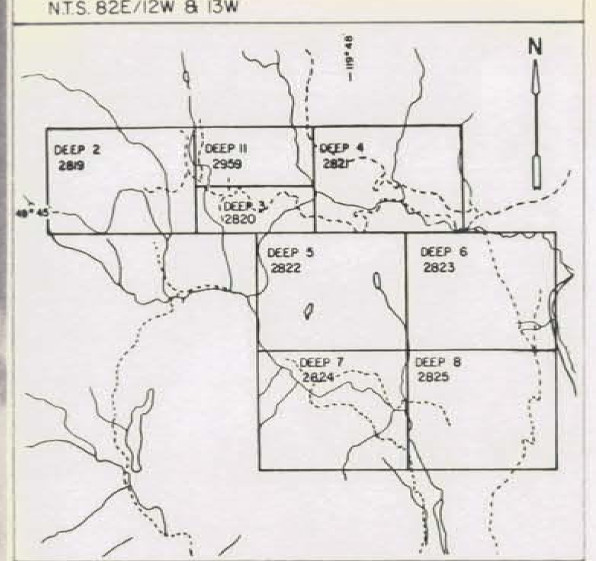
GEOLOGICAL BRANCH
ASSESSMENT REPORT

18,739

· QUADRATURE PROFILE SCALE = 25%/cm

T- TOPOGRAPHIC EFFECT

VLF-EM CONDUCTOR




GOLDBRAE DEVELOPMENTS LTD.

DEEP CLAIM GROUP

VLF-EM TRANSMITTER: CUTLER, MAINE

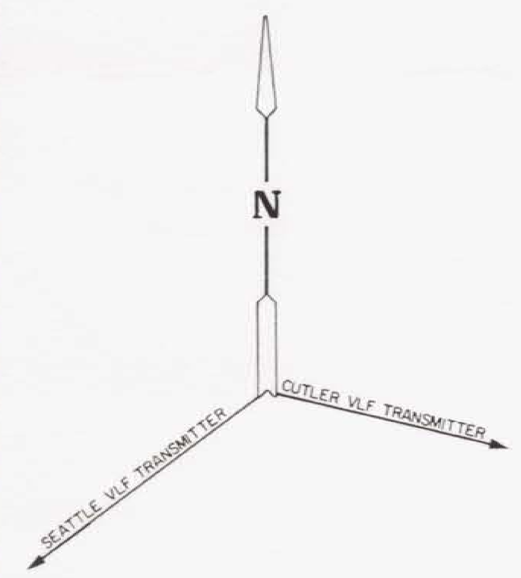
TOTAL FIELD CONTOURS AND QUADRATURE PROFILES

Scale 1: 10000.0

0 200 400 600 800 1000 M

| Date: April 1989 | Survey: January 1989 | Fig. 6 |
|---|---|---|

WESTERN GEOPHYSICAL AERO DATA LTD.

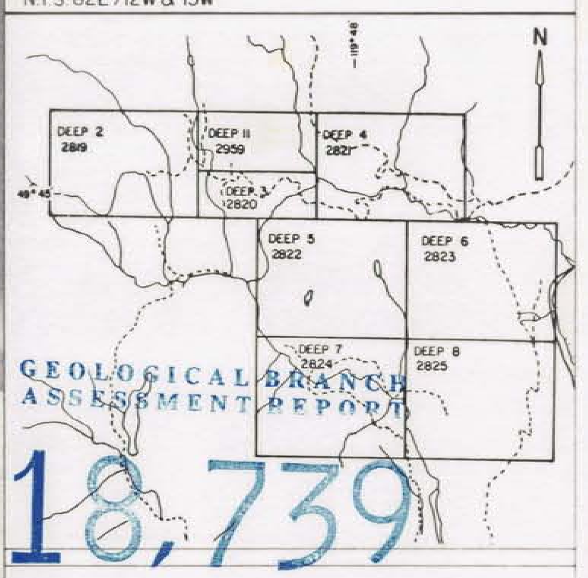




· QUADRATURE PROFILE SCALE=25%/cm

T— TOPOGRAPHIC EFFECT

— VLF-EM CONDUCTOR

N.T.S. 82E/12W & 13W




GEOLOGICAL BRANCH
ASSESSMENT REPORT

18,739

GOLDBRAE DEVELOPMENTS LTD.

DEEP CLAIM GROUP

VLF-EM TRANSMITTER: SEATTLE, WASHINGTON

TOTAL FIELD CONTOURS AND QUADRATURE PROFILES

Scale 1: 10000.0

0 200 400 600 800 1000 M

| Date: April 1989 | Survey: January 1989 | Fig. 7 |
|---|---|---|

WESTERN GEOPHYSICAL AERO DATA LTD.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— — — TOPOGRAPHIC EFFECTS

— — — CORYELL SYENITE

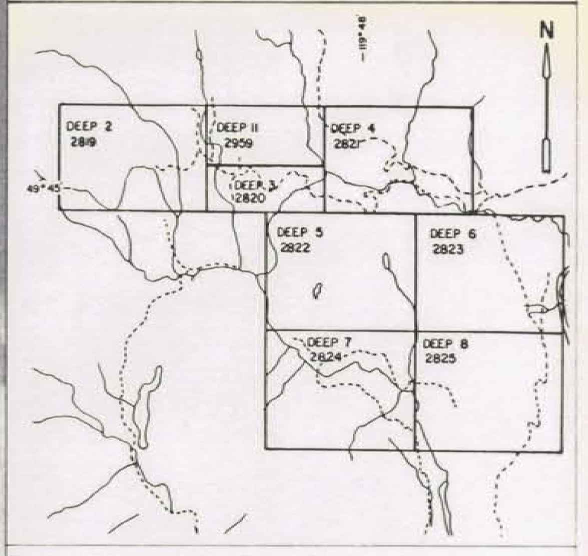
VVV INTERPRETED FAULT

C POSSIBLE CULTURAL ANOMALY

LINES L 3 — L 16 BARRINGER MAGNETOMETER

LINES L 17 — L 23 DEVELCO MAGNETOMETER

N.T.S. 82E/12W & 13W




GOLDBRAE DEVELOPMENTS LTD.

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COMPOSITE MAGNETOMETER DISPLAY

BARRINGER AND DEVELCO "2" CONTOURS

Scale 1: 10000.0

0 200 400 600 800 1000 M

| Date: April 1989 | Survey: January 1989 | Fig. 5 |
|---|---|---|

WESTERN GEOPHYSICAL AERO DATA LTD.