

ARIS SUMMARY SHEET

District Geologist, Cranbrook

Off Confidential: 94.11.22

ASSESSMENT REPORT 23142

MINING DIVISION: Fort Steele

PROPERTY: Roar  
LOCATION: LAT 49 33 00 LONG 115 16 00  
UTM 11 5489824 625379  
NTS 082F09W

CAMP: 001 Purcell Belt (Sullivan)

CLAIM(S): Roar 1-51  
OPERATOR(S): Cominco  
AUTHOR(S): Jackisch, I.  
REPORT YEAR: 1993, 21 Pages

COMMODITIES

SEARCHED FOR: Lead, Zinc, Silver  
KEYWORDS: Proterozoic, Aldridge Formation, Sullivan type  
WORK

DONE: Geophysical, Physical  
EMGR 15.1 km; UTEM  
Map(s) - 1; Scale(s) - 1:20 000  
LINE 16.2 km

**SUB-RECORDER  
RECEIVED**  
NOV 22 1993  
M.R. # ..... \$ .....  
**VANCOUVER, B.C.**

COMINCO LTD.

LOG NO: JUN 29 1994 RD.  
ACTION: *back from  
amendment*  
FILE NO:

EXPLORATION  
NTS: 82F/9

LOG NO: DEC 23 1993 RD.  
ACTION:  
FILE NO:

WESTERN CANADA

**GEOPHYSICAL REPORT  
ON A  
UTEM SURVEY  
ON THE ROAR PROPERTY  
FORT STEELE M.D., B.C.  
- ASSESSMENT REPORT -**

Latitude : 49°33'N  
Longitude : 115°16'W  
116

FILMED

TIME PERIOD OF FIELD WORK : AUG. 22, 24-27, 1993

WORK PERFORMED BY : I. JACKISCH & D. HALL

CLAIMS COVERED : ROAR 1-8, 14-23, 27, 29, 30, 31, 35, 37, 39  
41, 43, 45-51

CLAIM OPERATOR : COMINCO LTD.  
**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

NOVEMBER 1993

INGO JACKISCH

23,142



# ROAR PROPERTY

Fort Steele M.D., B.C.



NTS  
82-F/9

|            |      |            |      |
|------------|------|------------|------|
| Drawn by:  |      | Traced by: |      |
| Revised by | Date | Revised by | Date |
|            |      |            |      |
|            |      |            |      |
|            |      |            |      |
|            |      |            |      |

## LOCATION MAP

Scale: noted above      Date: October 1993      Plate: 412-93-1

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LEGEND FOR UTEM DATA SECTIONS /

### DATA SECTIONS

|        |        |              |
|--------|--------|--------------|
| D.S. 1 | LOOP 5 | LINE 4500N / |
| D.S. 2 |        | 4000N /      |
| D.S. 3 |        | 3500N /      |
| D.S. 4 | LOOP 4 | LINE 3000N / |
| D.S. 5 |        | 2500N /      |
| D.S. 6 |        | 2000N /      |
| D.S. 7 |        | 1500N /      |

8  
PLATE 412-93-1 Location Map [in text] ✓

PLATE 412-93-2 Grid Map including 1993 UTEM GRID and  
INTERPRETATION ✓

**COMINCO LTD.**

**EXPLORATION**

**WESTERN CANADA**

**NTS: 82F/9**

**GEOPHYSICAL REPORT  
ON A UTEM SURVEY  
ON THE ROAR PROPERTY  
FORT STEELE M.D., B.C.**

**- ASSESSMENT REPORT -**

**INTRODUCTION**

During the time period Aug. 22 - 27, 1993, 16.2 kms of UTEM surveying was carried out on the ROAR Property by a COMINCO geophysical crew under the direction of geophysicists, I. Jackisch and D. Hall. The purpose of the UTEM survey was to search for Zn/Pb Sullivan-type deposits at depth.

This property was covered by two UTEM loops, each approximately 1.5 km by 1.5 km in size, with lines running east-west. Parts of the property are very steep and cliffy, especially in the north part of the claims.

This report describes the operation of the UTEM system, the UTEM plotting format, and presents the results.

**LOCATION AND ACCESS**

The ROAR Property is located 30 kms southwest of Kimberley, B.C., and 8 kms southwest of St. Mary Lake, at Latitude 49°33'N and Longitude 115°16'W.

Access is from the St. Mary gravel road. Immediately east of St. Mary Lake, head south across the St. Mary River for approximately 1 km, then turn south onto the Hellroaring Creek road.

**LIST OF CLAIMS SURVEYED**

The following list of claims were covered by UTEM surveying:  
ROAR 1-8,14-23,27,29,30,31,35,37,39,41,43,45-51

## **TOPOGRAPHY**

The ROAR claim area is mountainous with logging road access to the lowest elevations on the extreme east side of the claims. Slopes are moderately to very steep and large cliffs form impass-able barriers. Elevation range is 1,300 to 2,700 metres. Exposure is very good except on some of the moderate slopes where a 10 to 30 metre overburden cover is estimated.

## **GEOLOGY**

The Aldridge is the oldest formation within the Proterozoic Purcell Supergroup; it consists of at least 5 kms of siliciclastic sediments and includes about 15% gabbro sills and some dykes. The sediments are predominantly turbidites and related material that represent a submarine fan deposit. Three subdivisions are recognized within the Aldridge Fm, the lower is typically thin to medium bedded and rust weathering, the middle is thin, medium and thick bedded with grey and rust weathering intervals, and the upper is laminated and rust weathering.

The Sullivan orebody, one of the largest Sedex deposits in the world, occurs at the top of the lower division of the Aldridge Fm. This orebody has contributed much of the mineral wealth generated in British Columbia since its discovery in 1892, and in particular, since the start of continuous operations in 1921. Several criteria associated with Sullivan are used to select areas to explore for a similar target; strata deposited at the same time as Sullivan is one.

## **HISTORY OF THE ROAR PROPERTY**

The Roar property was staked in 1992 following reconnais-sance mapping in which the transition from the lower division to middle division of the Aldridge Fm. was recognized. The first intensive exploration work on this property is reported on in this report.

## **DESCRIPTION OF THE UTEM SYSTEM AND FIELD PROCEDURE**

Utem is an acronym for "University of Toronto Electro- Magnetometer". Dr. Y. Lamontagne [1975] developed the system as part of his doctoral thesis at that university.

The field procedure consists of first laying out a large transmitter loop of single strand, enamel insulated copper wire. Survey lines are usually oriented perpendicular to one side of the loop and surveying can be performed both inside and outside the loop.

The UTEM III transmitter energizes the loop with a precise triangular waveform at a carefully controlled base frequency [30.974 Hz for this survey]. Power is supplied by a 2200W motor generator. The UTEM III receiver system includes a sensor coil and backpack portable receiver which has a digital recording facility on solid state memory and backup solid state memory. Time synchronization between transmitter and receiver is achieved through quartz crystal clocks in both units, accurate to about one second in 50 years.

The receiver sensor coil measures one or more components of the electromagnetic field and responds to its time derivative. In this survey, only the vertical component was measured. Since the transmitter current waveform is triangular, the coil will sense a perfect square wave in the absence of conductors. In the presence of electrical conductors, which may be geologic or cultural in origin, deviations from the perfect square wave are observed. The receiver stacks any pre-set number of cycles to increase the signal to noise ratio.

The UTEM receiver samples each half cycle of the waveform in ten channels or time windows. The delay time of each channel is equal to the width of the time window over which the signal is averaged. For a standard 30 Hz transmitted signal the delay times range from 16 microseconds for channel 10, to 8.33 milliseconds for channel 1. Therefore, the higher numbered channels [7-10] correspond to short time or high frequency while the lower numbered channels [1-4] correspond to late time or low frequency. Poor and/or small conductors will respond on channels 10, 9, 8, and 7. Better and/or larger conductors will give responses on progressively lower number channels as well. For example, large, massive, highly conducting sulphide or graphite bodies should produce a response on all ten channels.

At the end of the survey day, the data in the receiver is transferred to a personal computer and processed. It is then plotted on a printer using Cominco Ltd. proprietary software. In this report, the data is presented on Data Sections as profiles, with one profile for each of the first eight channels.

#### 1. Continuously Normalized Plots

This is the standard normalization scheme for general presentation.



a) For Channel 1:

$$\% \text{ Ch.1 anomaly} = \frac{\text{Ch.1} - \text{P}}{\text{P}} \times 100\%$$

where P is the primary field from the loop at the station and Ch.1 is the observed amplitude for channel 1.

b) The remaining channels [n=2 to 10] are channel 1 reduced and channel 1 normalized:

$$\% \text{ Ch.n anomaly} = \frac{\text{Ch.n} - \text{Ch.1}}{\text{Ch.1}} \times 100\%$$

where Ch.n is the observed amplitude of Channel n [n=2 to 10]

This normalizing procedure results in errors from miscalculations in the primary field, due to chainage errors, being displayed in Channel 1 only.

The channel 9 and 10 windows have such a small delay time that in most geological environments, it becomes completely saturated at a very short distance from the transmitter loop. In most cases, it provides no valuable information and overwrites other useful channels. Therefore, channels 9 and 10 have not been presented in this report.

## **GEOLOGICAL INTERPRETATION OF GEOPHYSICAL RESULTS**

Two UTEM anomalies were obtained during the survey. That to the south is shallow and of no immediate interest. That to the north appears to coincide with the transition from Lower to Middle Aldridge Fm. where transected by a fault. However, it is not considered a drill target. Claims were staked to the north-west where the favourable horizon is inferred to be present.

## **INTERPRETATION**

The claim boundary, UTEM loops, lines, and conductor locations along with their accompanying labels are shown on Plate 412-93-2. The individual line profiles are included in Data Sections 1-7.

Two crossover conductors were detected, one on Line 1500N, the other on Line 4500N. The halfspace response increases in conductivity to the north.

**CONCLUSIONS**

15.1 kms of UTEM surveying was carried out from Aug. 22-27, 1993 on the ROAR Property. Two crossover conductors were detected.

Report by : Ingo Jackisch  
Ingo Jackisch  
Geophysicist  
Cominco Ltd.

Approved for  
Release by : John Hamilton  
J.M. Hamilton, P.Eng/P.Geo  
Manager, Exploration  
Western Canada  
Cominco Ltd.

**Distribution:**

|                             |     |
|-----------------------------|-----|
| Mining Recorder             | [2] |
| Kootenay Exploration Office | [1] |
| Western District Files      | [1] |
| Geophysics Files            | [1] |

**REFERENCE**

Lamontagne, Y., 1975 Applications of Wideband, Time Domain EM Measurements in Mineral Exploration: Doctoral Thesis, University of Toronto

APPENDIX I


IN THE MATTER OF THE B.C. MINERAL ACT  
AND THE MATTER OF A GEOPHYSICAL PROGRAMME  
CARRIED OUT ON THE ROAR PROPERTY  
LOCATED 30 KMS SOUTHWEST OF KIMBERLEY, B.C.  
IN THE FORT STEELE MINING DIVISION OF THE  
PROVINCE OF BRITISH COLUMBIA,  
MORE PARTICULARLY

N.T.S. 82F/9

S T A T E M E N T

I, Ingo Jackisch, of 424 Somerset Street, in the City of North Vancouver, in the Province of British Columbia, make oath and say:

1. THAT I am employed as a geophysicist by Cominco Ltd. and, as such have a personal knowledge of the facts to which I hereinafter depose;
2. THAT annexed hereto and marked as "Exhibit A" to this statement is a true copy of expenditures incurred on a geophysical survey on the ROAR Property;
3. THAT the said expenditures were incurred from Aug. 22-27 1993, for the purpose of mineral exploration on the above-noted property.

  
\_\_\_\_\_  
Ingo Jackisch  
Geophysicist, Cominco Ltd.

Dated this 12 day of November, 1993  
at Vancouver, B.C.

APPENDIX II

EXHIBIT "A"

STATEMENT OF EXPENDITURES

ROAR PROPERTY - AUG. 22-27, 1993


|   |              |
|---|--------------|
| Staff Costs - Preparation, field days,<br>reporting |              |
| Geophysicists                                       | \$ 5,082.00  |
| Assistants  | 2,219.00     |
| Operating Day Charges                               |              |
| 4 days @ \$445/day                                  | 1,780.00     |
| Equipment Rental                                    |              |
| 8 days @ \$475/day                                  | 3,800.00     |
| Expense Accounts                                    | 1,699.45     |
| Line Cutting Cost                                   | 14,001.09    |
| Transportation                                      | 3,825.22     |
|   | -----        |
|   | \$ 32,406.76 |

APPENDIX III

CERTIFICATION OF QUALIFICATIONS

I, INGO JACKISCH, of 424 Somerset Street, in the City of North Vancouver, in the Province of British Columbia, do hereby certify:

- i. THAT I graduated with a B.Sc. in Geophysics from the University of British Columbia in 1975.
- ii. THAT I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
- iii. THAT I have been actively practising Geophysics from 1975 to 1993, and have been an employee of Cominco Ltd. from 1980 to 1993.

  
\_\_\_\_\_  
Ingo Jackisch, B.Sc. P.Geo.  
Geophysicist

November, 1993

LEGEND

UTEM DATA SECTIONS

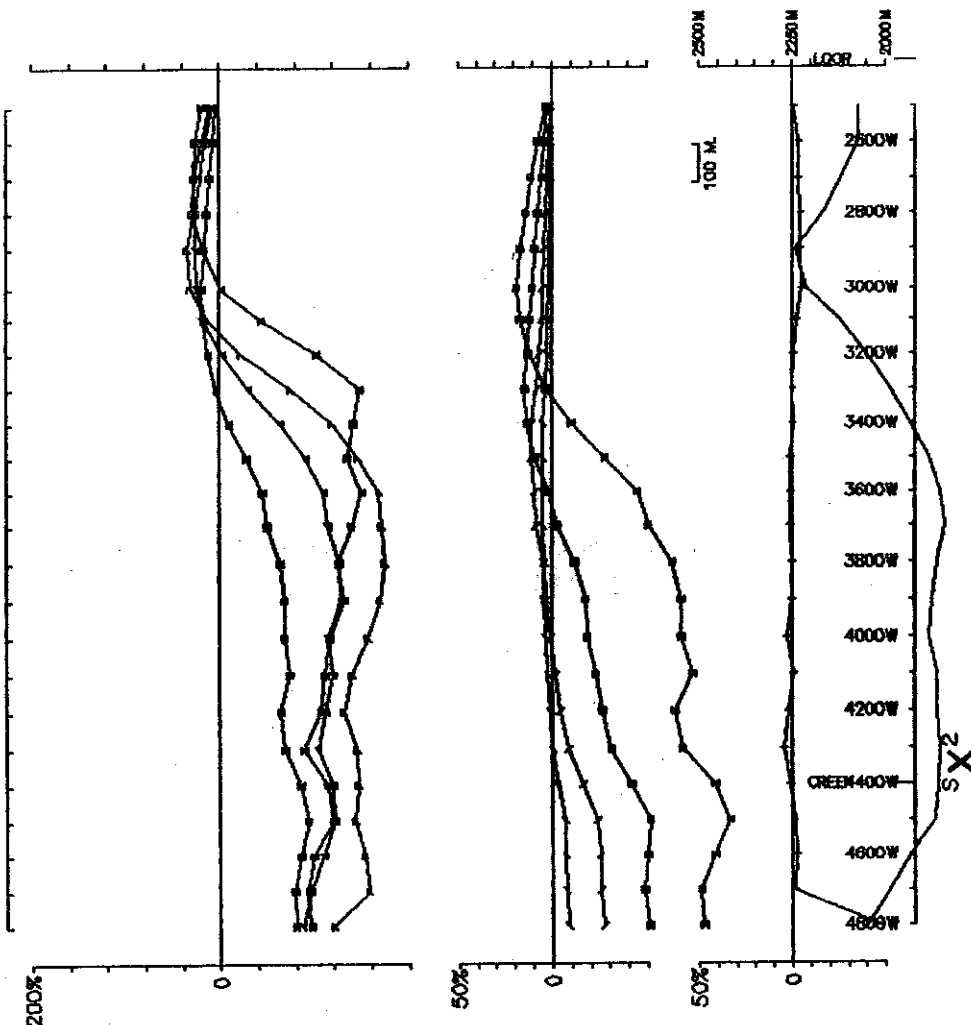
ORDINATE: Amplitude scale is given in %

ABSCISSA: Station or Picket Numbers in Hundreds of Meters

| <u>SYMBOL</u> | <u>CHANNEL</u>         | <u>MEAN DELAY TIME [30 HZ]</u> |
|---------------|------------------------|--------------------------------|
|               | . . . . . 1 . . . . .  | 12.8 ms                        |
| /             | . . . . . 2 . . . . .  | 6.4                            |
| \             | . . . . . 3 . . . . .  | 3.2                            |
| □             | . . . . . 4 . . . . .  | 1.6                            |
| Σ             | . . . . . 5 . . . . .  | 0.8                            |
| △             | . . . . . 6 . . . . .  | 0.4                            |
| 7             | . . . . . 7 . . . . .  | 0.2                            |
| Σ             | . . . . . 8 . . . . .  | 0.1                            |
| △             | . . . . . 9 . . . . .  | 0.05                           |
| ◇             | . . . . . 10 . . . . . | 0.025                          |

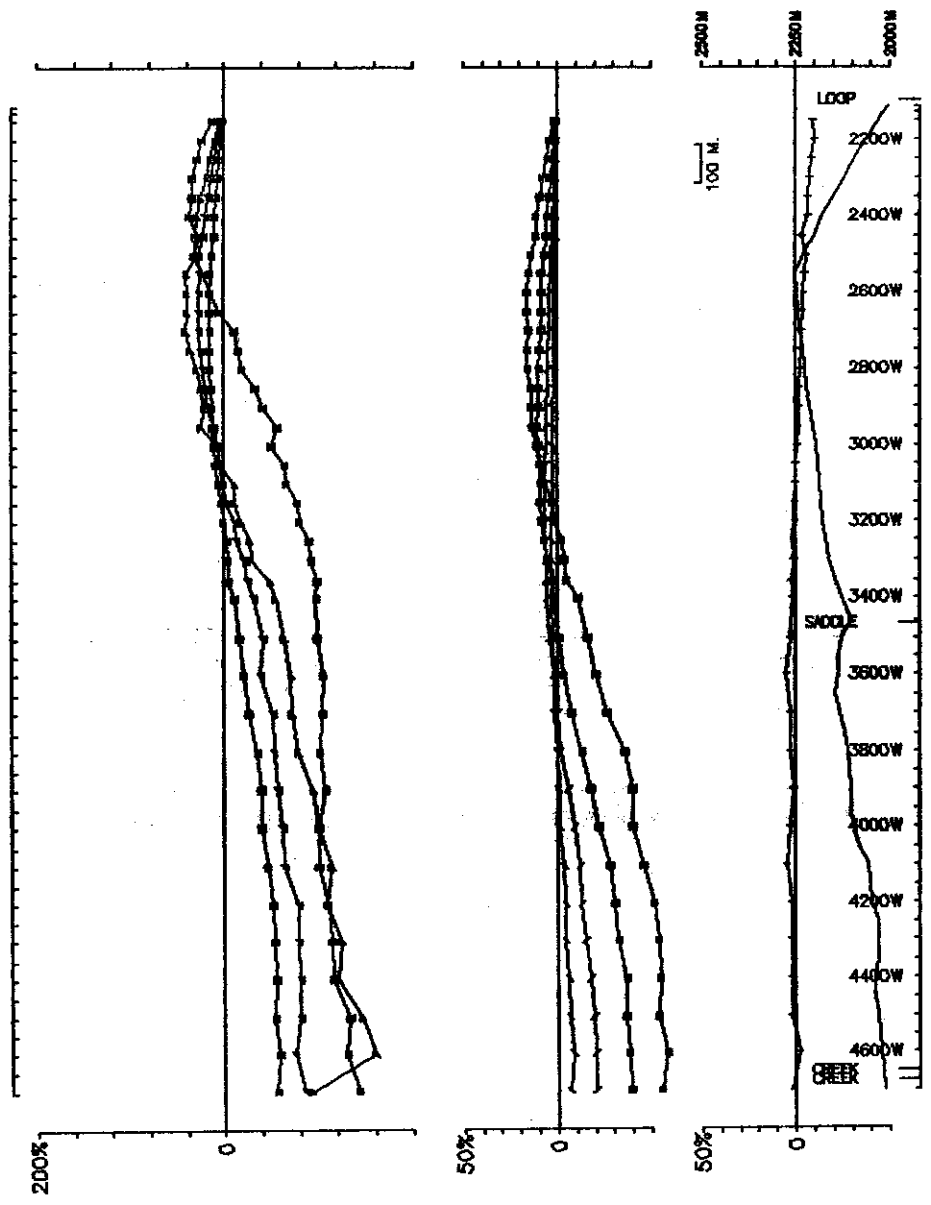
DESCRIPTION OF INTERPRETATION SYMBOLS

- Superscript indicates depth to top {S shallow 0-50m  
{M moderate 50-150m  
{D deep >150m
- Superscript indicating latest anomalous channel
- s 2 Axis of crossover conductor
- X Axis of crossover conductor
- A1 Conductor Name [for major features only]
- Resistivity Contact [arrow points in direction of low resistivity zone]
- R Reverse crossover conductor

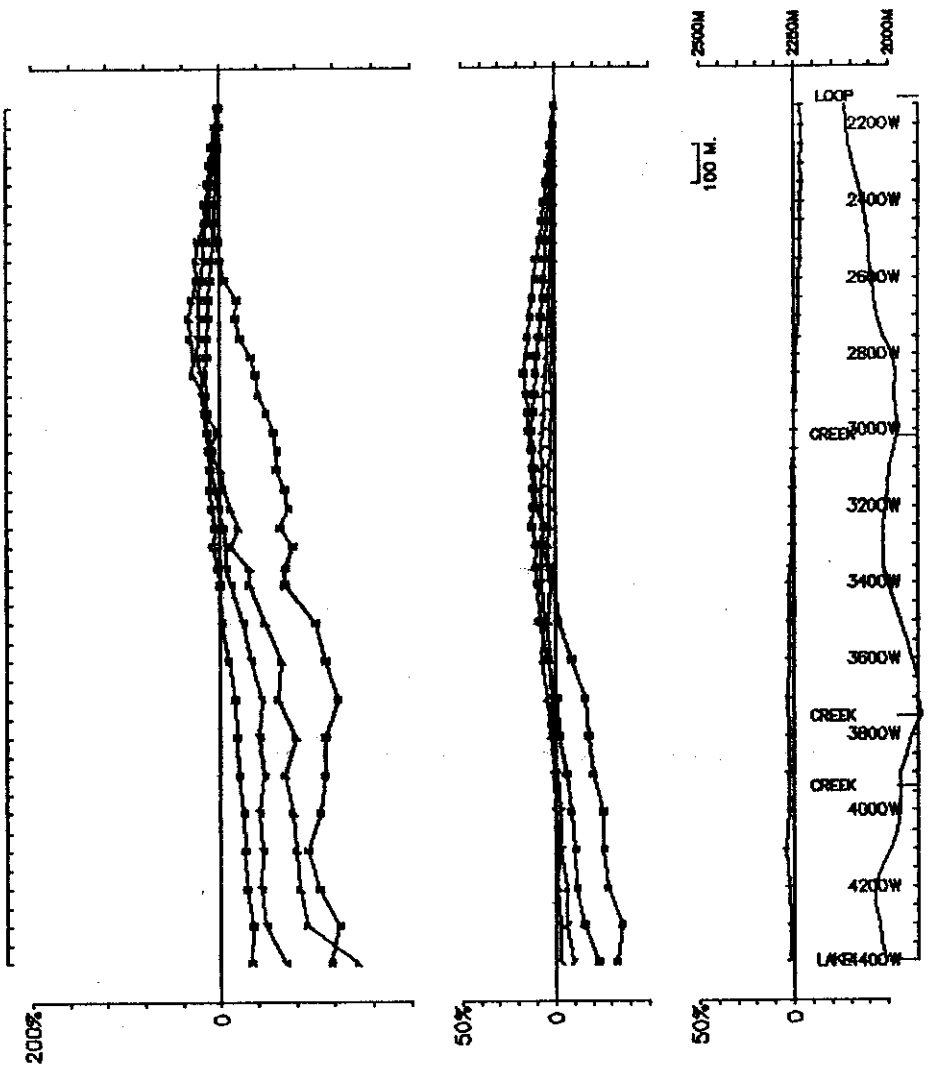


ROAR PROPERTY COMINCO LTD Hz  
 Dp: U, DH Freq(Hz): 30.974 #Stns: 24 Loop: 5 Line: 4500N DS: 1  
 Ch1 reduced, Ch1 normalized. Totals: P-2158M, L-2308M, Line Azim.: 290, Rx Lobes: 45

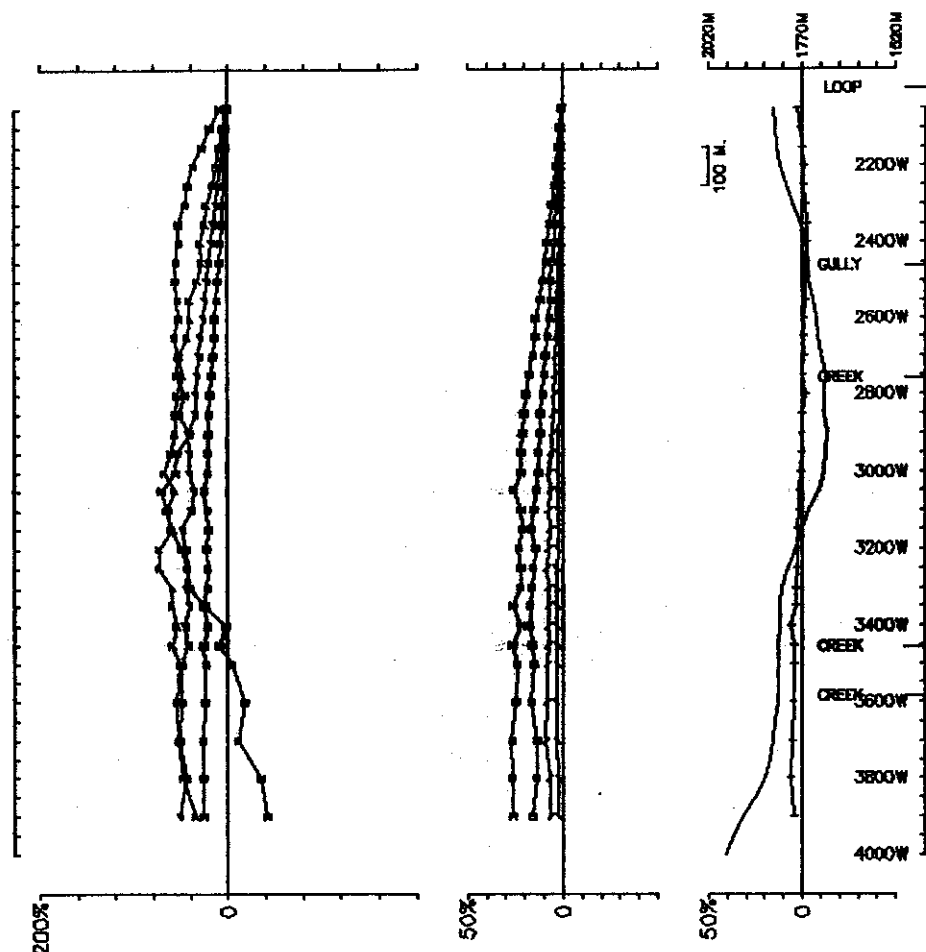




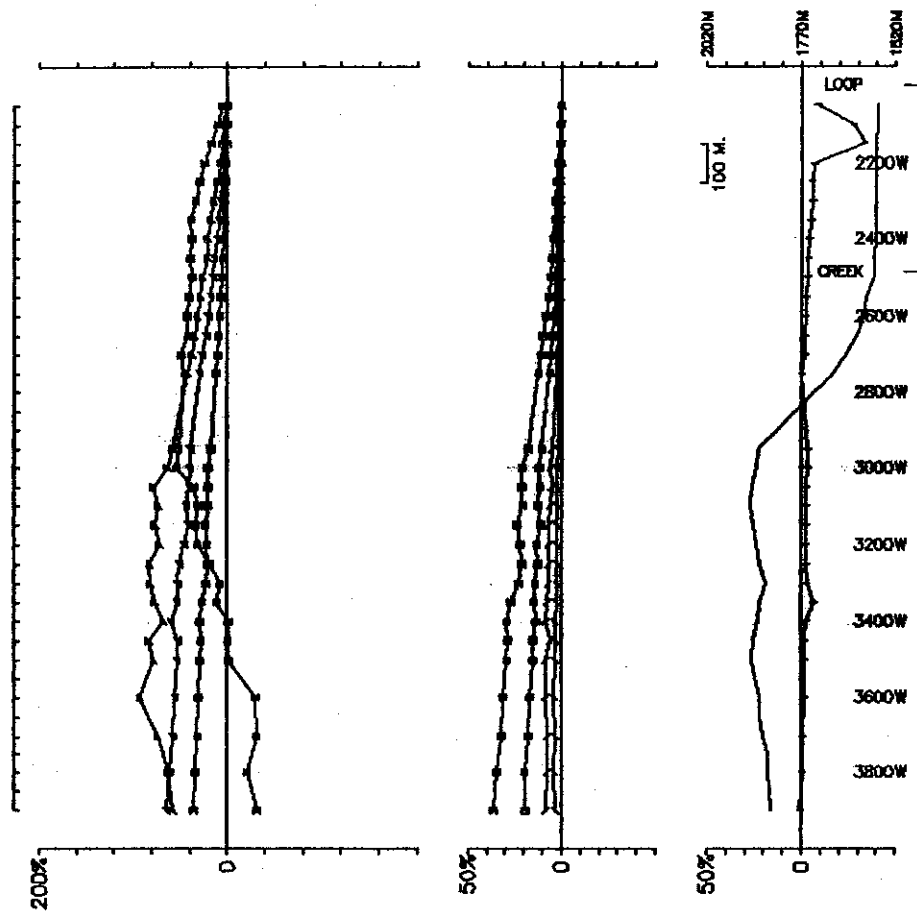
ROAR PROPERTY                      COMINCO LTD                      Hz                      DS: 2  
 Op: U,DH                      Freq(Hz): 30.974                      #Strs: 39                      Loop: 5                      Lines: 4000N  
 Ch1 reduced. Ch1 normalized.                      Totals: P-2546M, L-2584M. Line Azim.: 270. Rx Label: 40



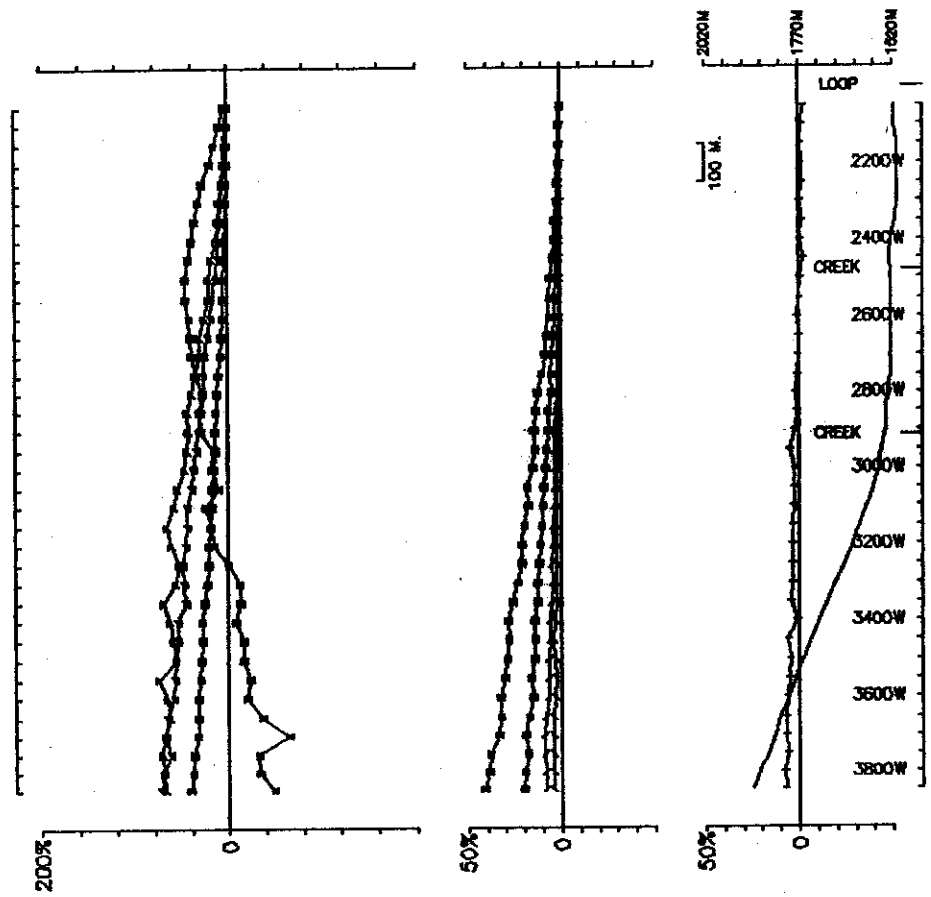
ROAR PROPERTY                      COMINCO LTD                      Hz                      DS: 3  
 Op: U,DH      Freq(Hz): 30.974      #Strs: 36                      Loop: 5      Line: 3500M  
 Ch1 reduced. Ch1 normalized.      Totals: P-2250M, L-2251M. Line Azim.: 270 - Rx Label 35



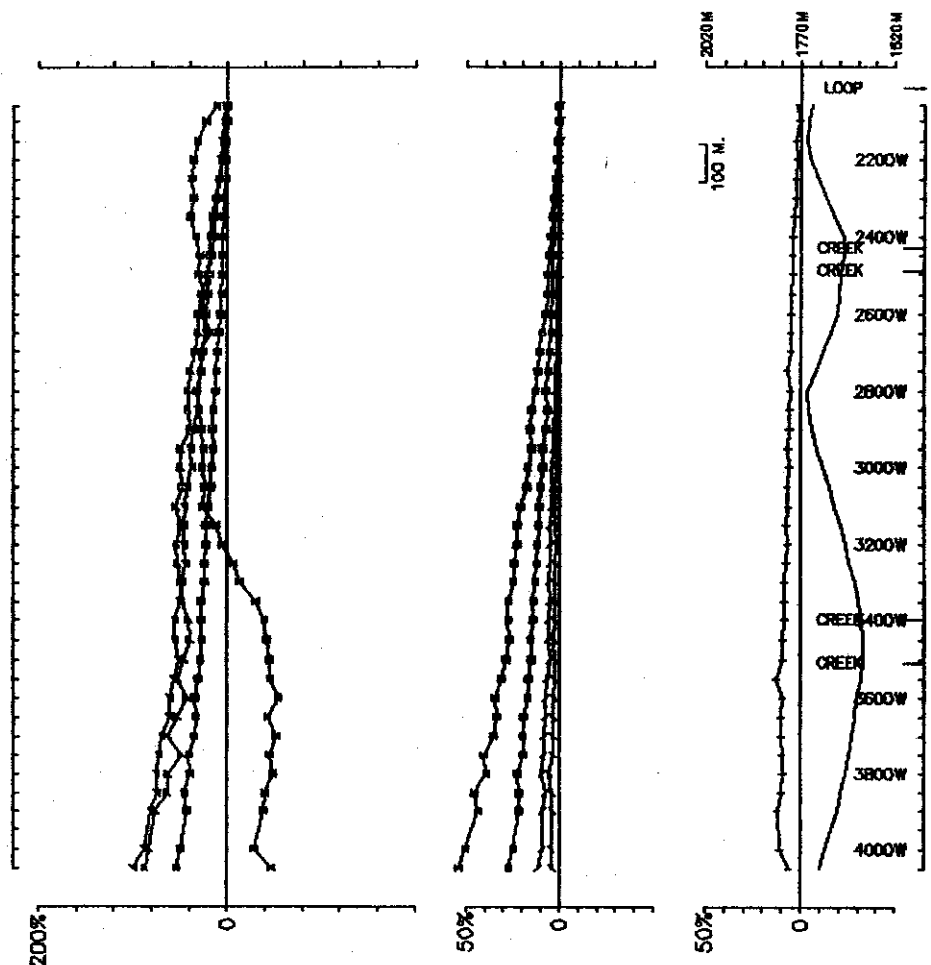
ROAR PROPERTY                      COMINCO LTD                      Hz  
 Op: W,DH                      Freq(Hz): 30.974                      #Strs: 34                      Loop: 4                      Line: 3000N                      DS: 4  
 Ch1 reduced. Ch1 normalized.                      Totals: P-1853M, L-1953M. Line Azim.: 270 . Rx Label: 30



ROAR PROPERTY                      COMINCO LTD                      Hz  
 Op: U,DH                      Freq(Hz): 30.974                      #Stns: 31                      Loop: 4                      Line: 2500N                      DS: 5  
 ChI reduced. ChI normalized.                      TotalsP- 1844M./L- 1844M.                      Line Azim.: 270                      Rx Label: 25



ROAR PROPERTY                      COMINCO LTD                      Hz                      DS: 6  
 Op: U,DH      Freq(Hz): 30.974      #Strs: 37      Loop: 4      Line: 2000N  
 Ch1 reduced. Ch1 normalized.      TotlecP-1794M/L-1794M. Line Azim.: 270 . Rx Label: 20



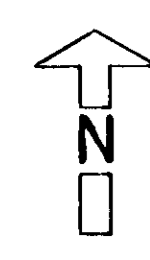
S X 8

ROAR PROPERTY COMINCO LTD Hz  
 Op: U,DH Freq(Hz): 30.974 #Strs: 40 Loop: 4 Line: 1500N DS: 7  
 Ch1 reduced. Ch1 normalized. Totals: P-1992M, L-1998M. Line Azim.: 270 . Rx Label: 15



GEOLOGICAL BRANCH  
ASSESSMENT REPORT

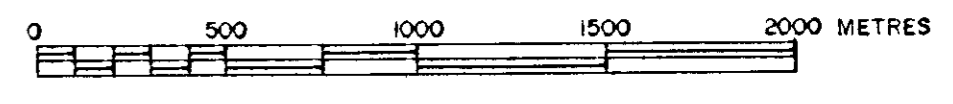
23,142



topographic contour interval : 20 metres

refers to depth to top of conductor  
s - shallow 0-50 m  
— indicates latest anomalous channel  
X — UTEM crossover anomaly

U TEM transmitter loop  
and loop number



|   |             |                        |                |
|---|-------------|------------------------|----------------|
| <b>ROAR PROPERTY</b>                                    |             | Fort Steele M.D., B.C. | NTS<br>82-F/9  |
| Drawn by:   | Traced by:  |                        |                |
| Revised by:   | Revised by: |                        |                |
|   |             |                        |                |
|   |             |                        |                |
|   |             |                        |                |
|   |             |                        |                |
|   |             |                        |                |
|   |             |                        |                |
|   |             |                        |                |
| Scale: 1 : 20,000                                       |             | Date: October 1993     | Plate: 42-93-2 |
| GRID MAP INCLUDING<br>1993 UTEM GRID and INTERPRETATION |             |                        |                |