PACIFIC PETROLEUMS LTD.

KELSAL 1-32 CLAIM GROUP

ATLIN MINING DIVISION
GEOPHYSICAL REPORT

ON

Induced Polarization, Magnetometer
and Electromagnetometer Surveys

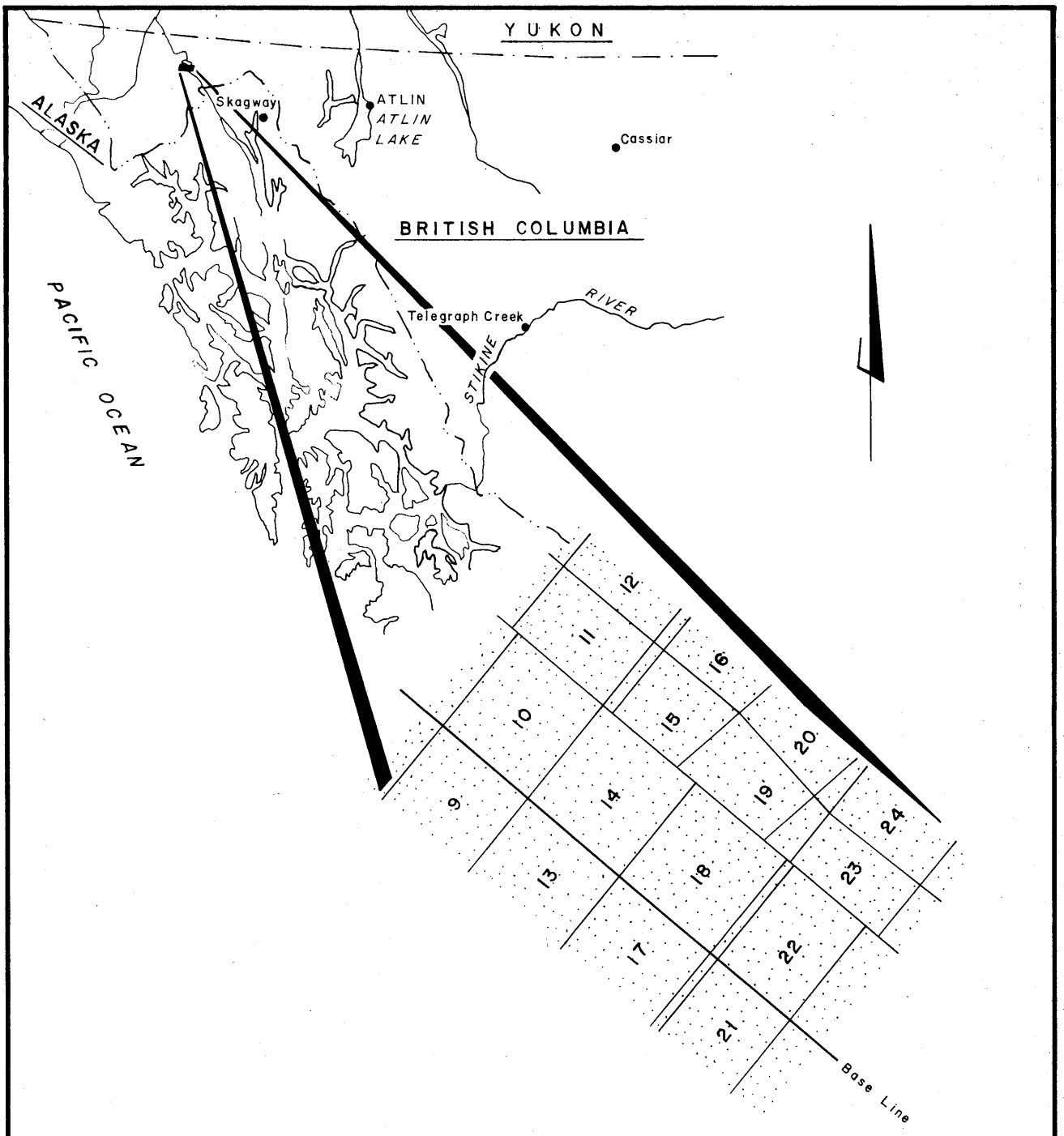
by

TRI-CON EXPLORATION SURVEYS LTD.

August 20, 1970

C O N T E N T S

I L L U S T R A T I O N S



PACIFIC PETROLEUMS LTD.

KELSAL CLAIMS

LOCATION AND CLAIMS MAP

SCALE : LOCATION MAP: 1" = 80 MILES - CLAIMS MAP: 1" = 2000 FEET Approx.

Tri-con
EXPLORATION SURVEYS LTD.

Fig. 1

A.N.S. Aug. 20, 1970

INTRODUCTION

During the period June 25, 1970 to July 12, 1970 Tri-Con Exploration Surveys Ltd. of North Vancouver, B.C. conducted a program of ground magnetometer, electromagnetometer and induced polarization surveying over a group of claims known as the Kelsal group, in the Kelsall Lake area, Atlin Mining Division, Province of British Columbia. The survey was conducted on behalf of Pacific Petroleums Ltd.

The purpose of the electromagnetometer survey was to try and delineate any conductors indicative of massive mineralization or fault structures, while the induced polarization survey was undertaken to try to locate either disseminated or massive sulphide mineralization. The ground magnetometer survey was completed to try and detect any magnetic patterns indicative of structure or lithology which upon correlation with the other survey data would aid in determining the significance of any induced polarization, or electromagnetometer anomalies.

LOCATION AND ACCESS

The Kelsal claim group is situated on the southwestern shore of Kelsall Lake, longitude 136° 35'W, latitude 59° 47'N, Atlin Mining Division, Province of British Columbia.

Facile access to the property is by float equipped aircraft from Whitehorse, Yukon Territory a distance of some 80 miles. If necessary the property can be reached by foot from a rough road which branches off the Haines U.S.A. to Haines Junction Yukon, road and terminates at the western end of Kelsall Lake.

THE PROPERTY

The mineral claims on which the surveys were completed are listed as follows:

Claims	Record Numbers
Kelsal #1-32	13212H - 13243H

SURVEY SPECIFICATIONS

The Magnetometer Survey

The magnetometer survey was conducted using a Sharpe MF-1 Fluxgate magnetometer. This instrument measures the vertical component of the earth's magnetic field to an accuracy of 10 gammas. Corrections for diurnal variation were made by tying into previously established base stations at intervals not exceeding two hours. Readings were taken at 100 foot intervals along the traverse lines.

The Electromagnetometer Survey

This survey was conducted using a Ronka EM 16. This instrument acts as a receiver only. It utilizes the primary electromagnetic fields generated by VLF marine communication stations. These stations operate at a frequency between 15-25 KHZ, and have a vertical antenna-current resulting in a primary horizontal field. Thus, the EM 16 measures the inphase and quadrature components of the vertical secondary field in terms of the primary horizontal field present.

For maximum coupling, a transmitter station located in the same direction as the geological strike should be selected, since the direction of the horizontal electromagnetic field is perpendicular to the direction of the transmitting station.

Readings were taken at 50 foot intervals and the data filtered in the field by the operator as described by D.C. Fraser, Geophysics Vol. 34, No. 6 (December 1969). The advantage of this method is that it removes the dc and attenuates long spatical wave lengths to increase resolution of local anomalies, and phase shifts the dip-angle data by 90 degrees so that crossovers and inflections will be transformed into peaks to yeild contourable quantities.

The Induced Polarization Survey

The induced polarization survey was conducted with a Hewitt 1KW I.P. transient pulse type unit deployed in the Wenner electrode configuration with an "a" spacing and traverse interval of 200 feet.

In the pulse (also known as time domain) method a steady direct current is impressed into the ground for a few seconds, abruptly terminated for a short time (usually equal to the length of pulse time) and then a steady current is impressed in the reverse direction for a few seconds and then abruptly terminated for a few seconds. This is one cycle which can be repeated. A fraction of a second after each cessation of the current pulse the decay voltage is integrated and measured. The current and total integrated primary voltage and total integrated decay voltage are then recorded for the given number of cycles. From these three measurements the chargeability in millivolts/volt and apparent resistivity in ohm-feet are calculated. The values calculated are then plotted at the center position of the array for a given set of readings.

The Survey Grid and Data Presentation

The surveys were conducted on a traverse grid with lines orientated in a NE-SW direction turned off every 300 feet from a NW-SE directed baseline.

The magnetometer and electromagnetometer surveys were conducted on every line. Some 17 line miles of magnetometer surveying and some 17 line miles of electromagnetometer surveying were conducted. The survey data accompanies this report as contour maps drawn at a scale of 1"=300 feet and are listed as follows:

Figure 2. Magnetic Intensity-contoured at 500 gamma intervals.

Figure 3. Electromagnetometer, dip-angle, contoured at 5^{o}, 10^{o}, 15^{o} and 20^{o}

Figure 4. Induced polarization chargeability-contoured at 1 millisecond intervals to a level of 11 milliseconds.

Figure 5. Induced polarization-resistivity-contoured logarithmically at 1000, 1500, 2000, 3000, 5000. 7500 and 10,000 ohm-feet levels.

Figure 6. Interpretation Map

DISCUSSION OF RESULTS

The ground magnetometer data (Figure 2) shows considerable variation in magnetic intensity from a minimum of some 3400 gammas to a maximum of some 11,250 gammas. The general magnetic trend and areas of high magnetic intensity are illustrated on the interpretation map (Figure 6). The principle feature on the magnetic contour map is the northwest-southeasterly trending magnetic ridge. This magnetic ridge contains areas of relatively concentrated high magnetic susceptibility material as is illustrated by the "Magnetic High" areas and appears to be dissected by almost N-S and E-W orientated magnetic linears.

The electromagnetometer data (Figure 3) shows a series of pronounced N-S, E-W and NW-SE trending conductors. These electromagnetic conductors appear to reflect steeply dipping fault planes, and in some places coincide with the magnetic linears. On Figure 6, the interpretation map, the areas of high electromagnetic response are illustrated as conductors and the weaker but continous responses are shown as inferred faults.

The induced polarization chargeability data varies from a background of some 2 milliseconds to a high of some 17.5 milliseconds. In general, the chargeability values which can be considered anomalous are as follows:

6-7 milliseconds-possibly anomalous
7-9 milliseconds-anomalous
9-and above-strongly anomalous

Three interesting areas of anomalous chargeability have been delineated and designated A, B and C in order of interest. Correlation of the electromagnetic and chargeability data indicates that the chargeability anomalies may possibly be structurally controled.

Chargeability Anomaly A is definitely anomalous. It occurs near the western flank of the magnetic ridge at an intersection of N-S, E-W and NW-SE faults.

Chargeability anomaly B is much smaller in size but is interesting in that it occurs in an area of low magnetic intensity.

Chargeability anomaly C is not fully defined because of deep snow, however, it appears to be associated with areas of high magnetic intensity. Several hand specimens of strongly magnetic-pyrite impregnated sheared andesitic rocks were taken in this area. Rock of this type may be the cause of this anomaly. There are no high induced polarization responses associated with the strong electromagnetic conductors. This would suggest that the conductors are caused by local increases in aqueous solutions and/or clay minerals along the fault planes.

The induced polarization resistivity data shows considereable variations from a low of some 800 ohmn feet to a high of some 120,000 ohmn feet. Generally the resistivity values above 5000 ohmn feet are indicative of large amounts of outcrop while variations in the resistivity data below this level could be attributed to changes in the physical characteristics and depth of the overburden.

CONCLUSIONS

The ground magnetometer survey located a large NW-SE trending magnetic ridge which represents a magnetite bearing horizon. This horizon has been dissected by N-S, E-W and NW-SE faults as interpreted from the magnetic patterns and filtered V.L.F. electromagnetometer data. The induced polarization survey located three interesting areas of anomalous chargeability which have been designated A,B, and C in order of interest. Both anomalies A and B occur in areas of low magnetic intensity. Anomaly A is the largest and is situated at the intersection of a set of the aforementioned fault systems. Anomaly C is located in an area of high magnetic intensity and may be partially caused by iron sulphides. The intensity of the chargeability anomalies indicates that they may likely represent sulphide mineralization in the order of 3 to 6 percent by volume.

RECOMMENDATIONS

1. Geochemical soil sampling program on established grid to explore the possibility that the induced polarization anomalies may be caused by commercial sulphides.

2. If the geochemical survey indicates the presence of commercial sulphides a minimum footage diamond drill program to test the induced polarization anomalies is suggested as follows.

   (i) To test Anomaly A a hole should be collared at 36S-8E, drilled due north at an angle of -45° for a length of 500 feet.

   (ii) To test Anomaly B a hole should be collared at 18S-4E, drilled N40°E at an angle of -45° for a length of 500 feet.

   (iii) To test Anomaly C a hole should be collared at 48S-19E, drilled N60°E at an angle of -45° for a length of 500 feet.

Respectfully Submitted,

TRI-CON EXPLORATION SURVEYS LTD.

Glen E. White
Chief Geophysicist

C E R T I F I C A T I O N

TO WHOM IT MAY CONCERN:

I, GLEN ELMO WHITE, of the City of Richmond in the Province of British Columbia, hereby certify:

1. That I am a Geophysicist and reside at 112-641 Gilbert Rd. Richmond, B.C.
2. That I studied Geophysics and Geology and graduated from the University of British Columbia with the degree of Bachelor of Science.
3. That I have been engaged in Mining Exploration for eight years.
4. That I do not have, nor do I expect to receive, either directly or indirectly, any interest in the property, or in the securities of Pacific Petroleums Ltd.
5. That this report is based on information derived from Induced polarization, Electromagnetometer, and ground magnetometer surveys carried out by Tri-Con Exploration Surveys Ltd. under my supervision.

Dated this 20 day of August 1970.

Glen E. White, B.Sc.
Chief Geophysicist

STATEMENT OF QUALIFICATIONS

Name:	WHITE, Glen E.
Profession:	Geophysicist
Education:	B.Sc. Geophysics - Geology University of British Columbia.
Professional Associations:	Associate member of Society of Exploration Geophysicists. Active member B.C. Society of Mining Geophysicists
Experience:	Pre-Graduate experience in Geology-Geochemistry-Geophysics with Anaconda American Brass. Two years Mining Geophysicist with Sulmac Explorations Ltd. and Airborne Geophysics with Spartan Air Services Ltd. One Year Mining Geophysicist and technical Sales Manager in the Pacific north-west for W. P. McGill and Associates. Two years Mining Geophysicist and supervisor Airborne and Ground Geophysical Divisions, with Geo - X Surveys Ltd. Presently Chief Geophysicist Tri-Con Exploration Surveys Ltd. Active experience in all Geologic provinces of Canada.

A P P E N D I X

Instrument Specifications

ELECTROMAGNETOMETER

A. Instrument

(a) Type - Geonics VLF-EM

(b) Make - Ronka EM 16

B. Specifications

Measurement (i) Utilizes primary fields generated by VLF marine communication stations, measures the vertical field components in terms of horizontal field present.

(ii) Frequency range 15-25 KHZ

(iii) Range of measurement - in phase ±150% or ±90°
- quadrature ±40%

(iv) Method of reading - null detection by earphone, real and quadrature from mechanical dials.

(v) Accuracy - ±1% resolution.

C. Survey Procedures

Method (a) Select closest VLF station perpendicular to traverse lines.

(b) In-phase dial measures degree of tilt from vertical position.

(c) Quadrature dial calibrated in percent - null

(d) Station plot - plot values read at station surveyed.

(e) Manually filter dip-angle data

A P P E N D I X

Instrument Specification

MAGNETOMETER

A Instrument

(a) Type - Fluxgate

(b) Make - Sharpe MF-1

B Specifications

(a) Measurement - Vertical Magnetic Field

(b) Range - ±100 K gammas in 5 ranges

(c) Sensitivity - Maximum 20 gammas per scale division

(d) Accuracy - ±10 gammas

C Survey Procedures

(a) Method - Two hour loops

(b) Corrections - (i) Base
(ii) Diurnal

(c) Station relationship - each station read for intensity of vertical magnetic field.

A P P E N D I X

Instrument Specification

INDUCED POLARIZATION

A Instrument

(a) Type - Transient Pulse Prospecting Equipment
(b) Make - Hewitt Enterprises 200
(c) Size - 13¼"W x 15½"L x 9½" Deep

B Specifications

(a) Transmitter
  (i) 1,000 Watt nickle cadnium battery supply
  (ii) operation mode 2 seconds on, 2 seconds off, 2 seconds reverse
    4 seconds on, 4 seconds off, 4 seconds reverse
  (iii) Cycles .5, 1, 2, 3, 4. selected on switch.
  (iv) Timing - solid state logic circuitry
  (v) Current Ranges 10, 50, 100, 500, 1,000, 5,000, milliampere

(b) Receiver
  (i) Solid State
  (ii) dV and I.P. solid state memory storage.
  (iii) dV ranges 10, 50, 100, 1,000, 1,500 millivolts
  (iv) I.P. ranges .1, .5, 1.0, 5, 10, 15, millivolts
  (v) Self-potential-direct dial reading from polartometer
  (vi) A.C. filtering-low pass active filter
  (vii) Transient delay period .4 seconds
  (viii) Integrating period 1.2 seconds
  (ix) Power supply-four 9 volt transistor radio batteries.

C Survey Procedure
(i) Wenner, pole-dipole or schlumberger array

D Data Presentation
(i) chargeability percent chargeability in milliseconds or $\frac{\text{millivolts}}{\text{volt}}$
(ii) Resistivity - ohmn - feet
(iii) Self-potential-millivolts often not used

CERTIFICATE

I, William G. Stevenson, DO HEREBY CERTIFY:

- That I am a Consulting Geological Engineer with offices at Suite 209 Stock Exchange Building, 475 Howe Street, Vancouver 1, B.C.

- That I am a graduate of the University of Utah 1946, with a B.Sc. Degree.

- That I am a registered Professional Engineer in the Association in British Columbia.

- That I have practised my profession for 22 years.

- That I have no direct, indirect or contingent interest in the Kelsal Mineral Claims or in the securities of Pacific Petroleums Ltd., nor do I intend to receive any such interest.

- That I have reviewed a report dated August 20, 1970, based on work conducted by Tri-Con Exploration Surveys Ltd. under the supervision of Glen E. White, B.Sc., Chief Geophysicist.

DATED at Vancouver, British Columbia, this 26th day of August, 1970.

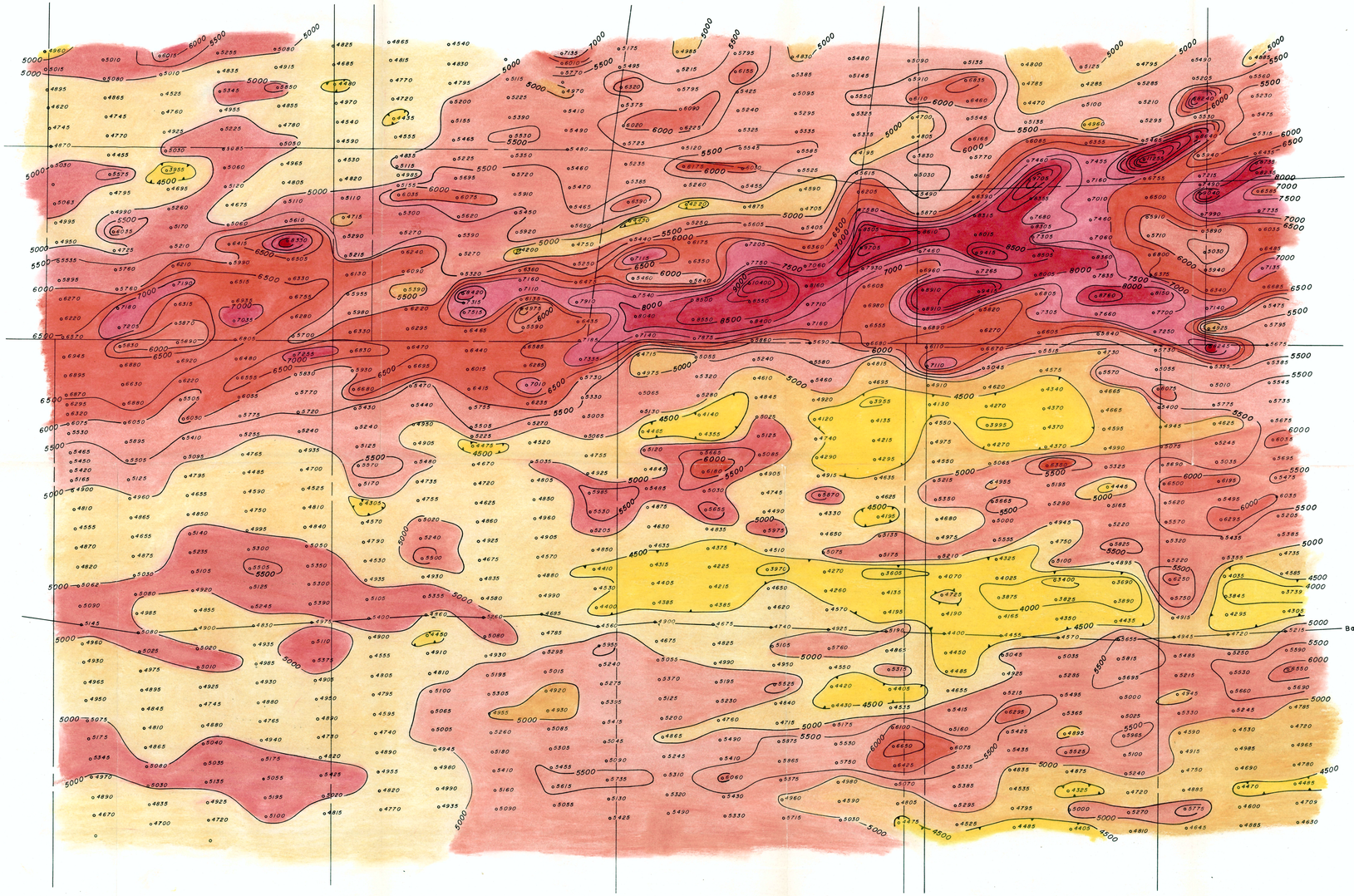
W. G. STEVENSON & ASSOCIATES LIMITED
Consulting Geologists

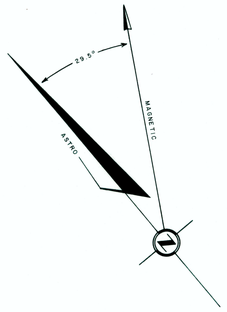
W. G. Stevenson, P. Eng.

Wellington Lake Project

	T.D (Feet)	Visible Pyrite footage Sulphide mineralization	maximum assays oz/ton Au	Ag	Cu %
DDH 1	500	0'/5%	~~.005~~ .005	~~.05~~ 0.01	~~.05~~ 0.01
2	501	13'/5%	Tr.	.03	.16 Au: 0.01
3	501	25', 5%	.005	.05	.03
4	500	1', 5%	Tr.	0.02	.011 Au: 0.01
5	500	1.5', 10%	Tr	Tr.	0.01
≤	2502				

Compiled. Sept. 16/11
H DK





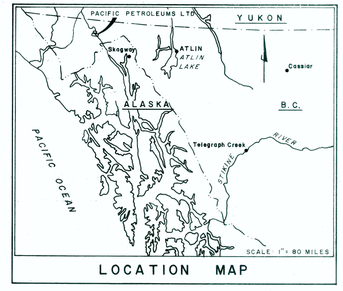
L E G E N D

	Base Line Plotted from Field Notes
	Outline of Kelsal Claims
5215 5590	Stations Surveyed & Reading
	Contour Line – Contour Interval – 500 gammas.
	Magnetic Depression
INSTRUMENT	Sharpe MF-1 (Fluxgate)

MAGNETIC INTENSITY KEY

NOTE:

To Accompany Geophysical Report Dated Aug. 20, 1970
on KELSAL CLAIMS,
Atlin Mining Division – British Columbia, Canada.
By: G.E. White – Chief Geophysicist



LOCATION MAP

SCALE 300 0 300 600 FEET
1" = 300'

PACIFIC PETROLEUMS LTD.

KELSAL CLAIMS

ATLIN MINING DIVISION – BRITISH COLUMBIA, CANADA

GEOPHYSICAL MAP

MAGNETIC INTENSITY (gammas)

Tri-con EXPLORATION SURVEYS LTD.

INTERPRETED by G.E. White
DRAFTED by A.N. Schampier
Fig. 2
Aug. 1970 | REVISED | PROJECT No. 109 | FILE B7

29+00E
23+00E
17+00E
11+00E
5+00E
0+00
5+00W
11+00W
6+00S
12+00S
18+00S
24+00S
30+00S
36+00S
42+00S
48+00S
54+00S
60+00S
66+00S
Base Line
LEGEND
Base Line Plotted from Field Notes
Outline of Kelsal Claims
Stations Surveyed & Reading
Contour Line - Contour Interval - 5 degrees
INSTRUMENT Ronka EM-16
DIP-ANGLE KEY
20 degrees
15 degrees
10 degrees
5 degrees
MAGNETIC
ASTRO
29.5°
NOTE:
To Accompany Geophysical Report Dated Aug. 20, 1970 on KELSAL CLAIMS,
Atlin Mining Division - British Columbia, Canada.
By: G.E. White - Chief Geophysicist
Approximate Direction to V.L.F. Station, Jim Creek, Washington, U.S.A.
PACIFIC PETROLEUMS LTD.
YUKON
ATLIN
ATLIN LAKE
Skagway
Cassiar
ALASKA
B.C.
Telegraph Creek
STIKINE RIVER
PACIFIC OCEAN
SCALE: 1" = 80 MILES
LOCATION MAP
SCALE 300 0 300 600 FEET
1" = 300'
PACIFIC PETROLEUMS LTD.
KELSAL CLAIMS
ATLIN MINING DIVISION - BRITISH COLUMBIA, CANADA.
GEOPHYSICAL MAP
ELECTROMAGNETOMETER - FILTERED DIP-ANGLE
Tri-con EXPLORATION SURVEYS LTD.
INTERPRETED by: G.E. White
DRAFTED by: A.N. Schampier
Fig. 3
Aug. 1970
REVISED
PROJECT No. 109
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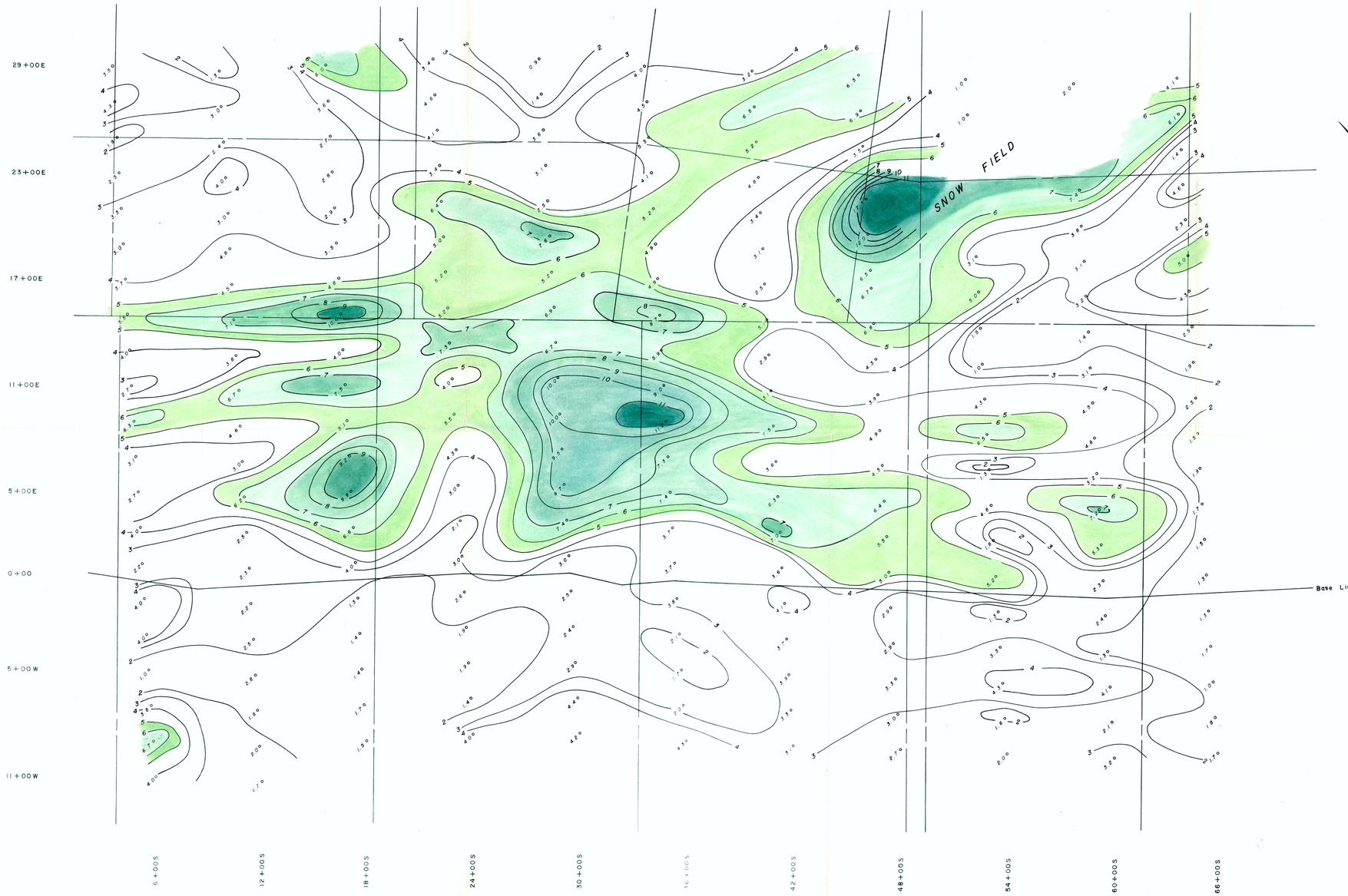
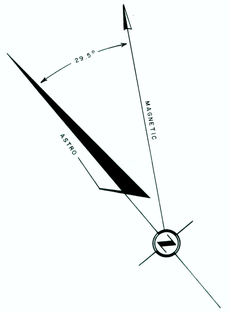




L E G E N D

Base Line Plotted from Field Notes

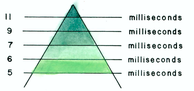
Outline of Kelsal Claims

1.9° 1.7° Stations Surveyed & Reading

Contour Line – Contour Interval – 1 millisecond

INSTRUMENT Hewett KEW–200 (Wenner Array a = 200')

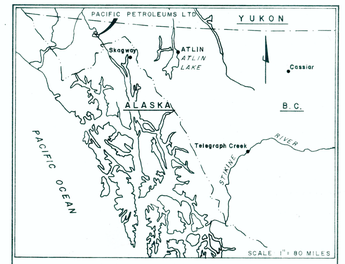
CHARGEABILITY KEY



NOTE:

To Accompany Geophysical Report Dated Aug. 20, 1970 on KELSAL CLAIMS, Atlin Mining Division – British Columbia, Canada.

By: G.E. White – Chief Geophysicist



LOCATION MAP

SCALE 300 0 300 600 FEET
1" = 300'

PACIFIC PETROLEUMS LTD.

KELSAL CLAIMS

ATLIN MINING DIVISION – BRITISH COLUMBIA, CANADA

GEOPHYSICAL MAP
INDUCED POLARIZATION
PERCENT CHARGEABILITY-(milliseconds)

Tri-con EXPLORATION SURVEYS LTD.		INTERPRETED by G.E. White	
		DRAFTED by A.N. Schompier	Fig. 4
Aug. 1970	REVISED	PROJECT No. 109	FILE B7

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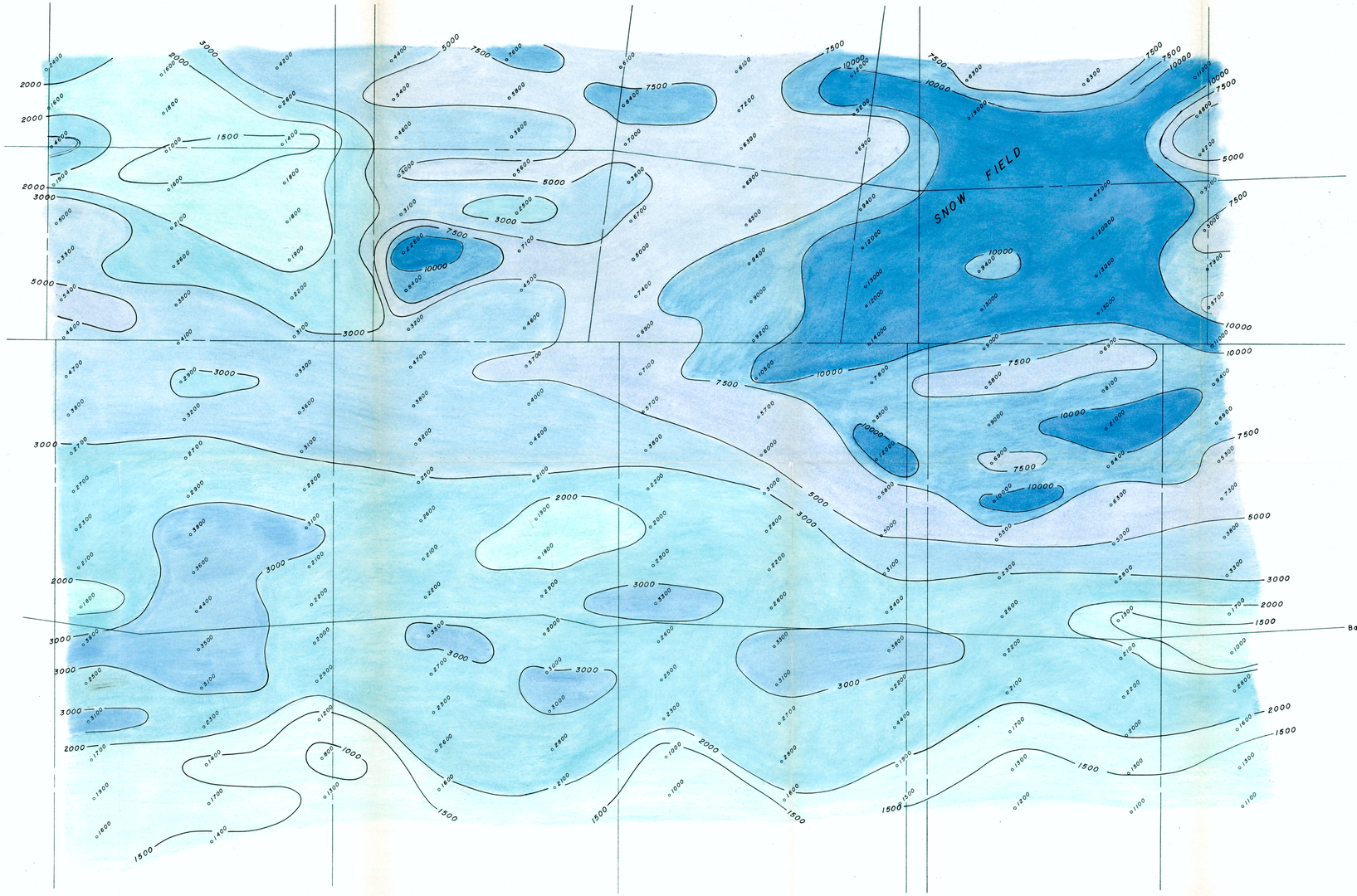
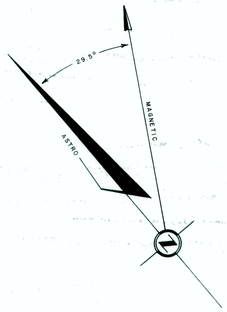


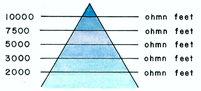


L E G E N D

- Base Line Plotted from Field Notes
- Outline of Kelsal Claims
- 9400 8900 Stations Surveyed & Reading
- Contour Line – Contoured Logarithmically at – 1000, 1500, 2000, 3000, 5000, 7500 and 10000 ohmn feet.

INSTRUMENT Hewett KEW-200 (Wenner Array a = 200')

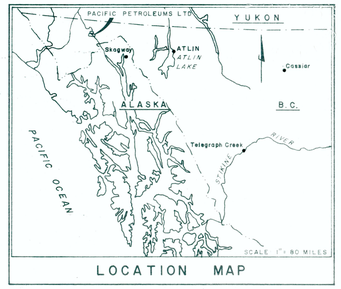
RESISTIVITY KEY



NOTE:

To Accompany Geophysical Report Dated Aug. 20, 1970 on KELSAL CLAIMS, Atlin Mining Division – British Columbia, Canada.

By: G.E. White – Chief Geophysicist



LOCATION MAP

SCALE 300 0 300 600 FEET
1" = 300'

PACIFIC PETROLEUMS LTD.

KELSAL CLAIMS

ATLIN MINING DIVISION – BRITISH COLUMBIA, CANADA

GEOPHYSICAL MAP

INDUCED POLARIZATION – (ohmn feet) RESISTIVITY

Tri-con EXPLORATION SURVEYS LTD.		INTERPRETED by G.E. White
		DRAFTED by A.N. Schamper
Aug. 1970	REVISED	PROJECT No. 109
		Fig. 5
		FILE B7

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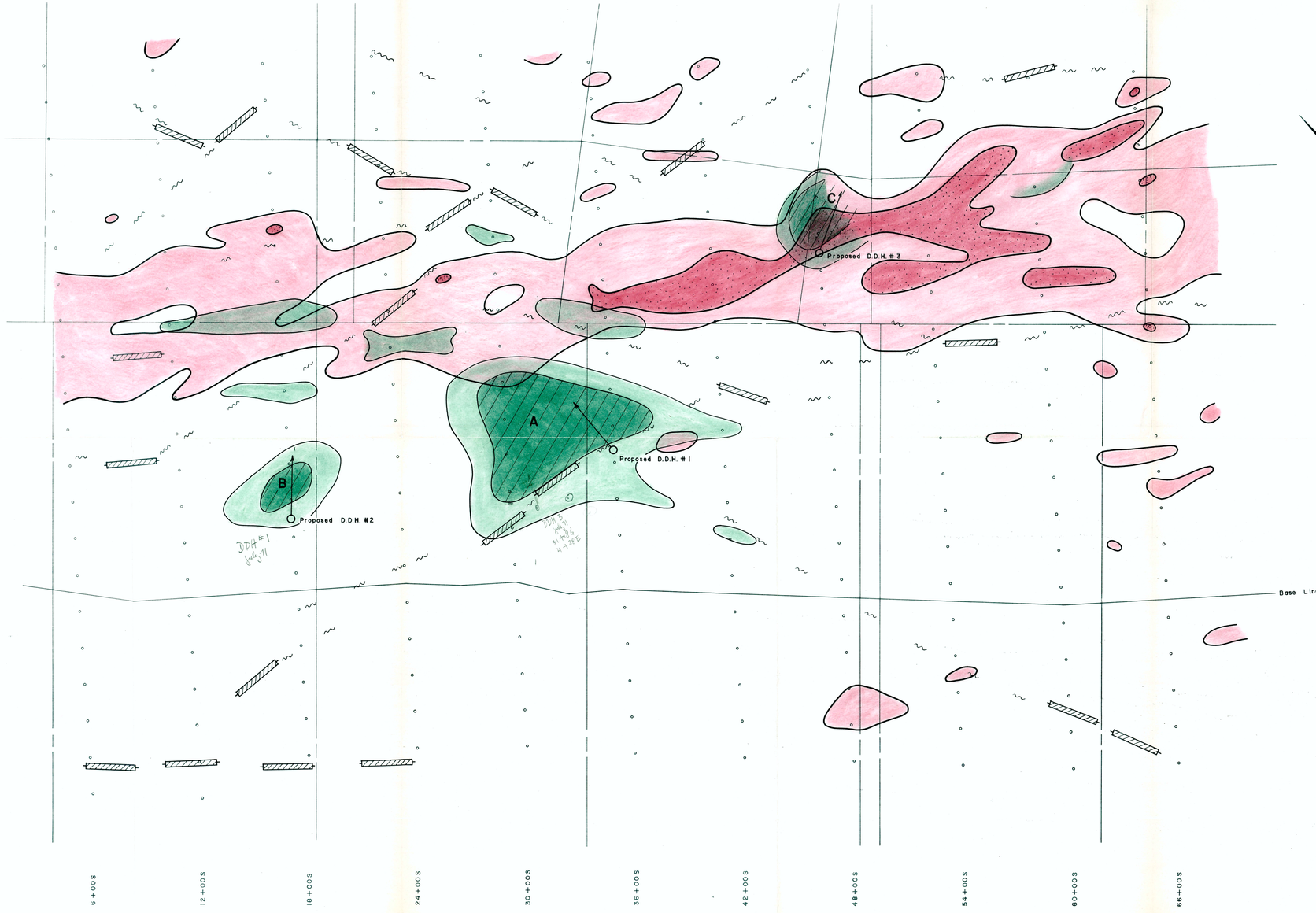
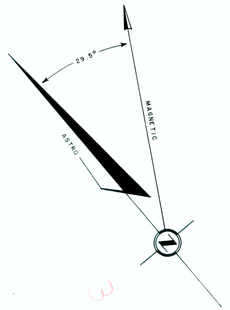
TM27-98
E-4
C374





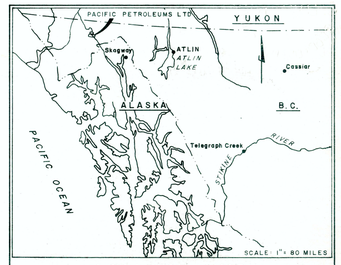
L E G E N D

- Base Line Plotted from Field Notes
- Outline of Kelsal Claims
- Stations Surveyed & Reading
- Magnetic High
- Magnetic Trend
- Chargeability Peak
- Anomalous Chargeability
- Electromagnetic Conductors
- Inferred Faults
- Proposed Diamond Drill Hole

NOTE:

To Accompany Geophysical Report Dated Aug. 20, 1970 on KELSAL CLAIMS, Atlin Mining Division – British Columbia, Canada.

By: G.E. White – Chief Geophysicist



LOCATION MAP

SCALE 300 0 300 600 FEET
1" = 300'

PACIFIC PETROLEUMS LTD.

KELSAL CLAIMS

ATLIN MINING DIVISION – BRITISH COLUMBIA, CANADA

INTERPRETATION MAP

Tri-con EXPLORATION SURVEYS LTD.		INTERPRETED by G.E. White
		DRAFTED by A.N. Schampier — Fig. 6
Aug. 1970	REVISED	PROJECT No. 109 — FILE B7