GEOPHYSICAL REPORT
ON
ELECTROMAGNETIC - SELF POTENTIAL SURVEYS

82L/13W
+ 92I/16E

ARGO CLAIM GROUP

W. J. STUART

LOUIS CREEK AREA, KAMLOOPS M.D., B. C.

OCTOBER, 1970; JUNE, JULY, 1971

ARGO CLAIM GROUP: 21 miles N42E of Kamloops, B.C.

50° 120° NE

N.T.S.: 82 L/13W & 92 I/16E

Report by: DAVID G. MARK
Geophysicist
GEOTRONICS SURVEYS LTD.
514 - 602 W. Hastings St.
Vancouver 2, B.C.

Written for: W. J. STUART
910 Calverhall St.
North Vancouver, B.C.

September, 1971

VLF-EM and SP Surveys
ARGO Claim Group

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VLF-EM and SP Surveys
ARGO Claim Group

S U M M A R Y

VLF-EM and SP survey work was done over the ARGO claims during the exploration seasons of 1970 and 1971. The property is located approximately 21 miles northeast of Kamloops in the Kamloops Mining Division. Access to the property is excellent as one can drive to the property from Kamloops by a series of public roads and logging roads. The claims are on the east slope of a plateau in the Louis Creek Valley.

The area is underlain by Cache Creek sedimentary, metamorphic and volcanic rocks with some granitic intrusions. Mineralization is in the form of chalcopyrite and pyrite within quartz veins. The host rock is argillite. The sulphides have good values in silver, in addition to copper.

The VLF-EM produced some anomalies, all of which seem to strike in a N70E direction. The main showing is reflected by a weaker anomaly. One anomalous zone could be due to 1 or 2 narrow conductors or 1 large conductive body.

The SP survey revealed a number of anomalies with poor continuity between survey lines. Some correlate with the EM anomalies.

It is recommended to prove out these anomalies before continuing with any further geophysics.

Geotronics Surveys

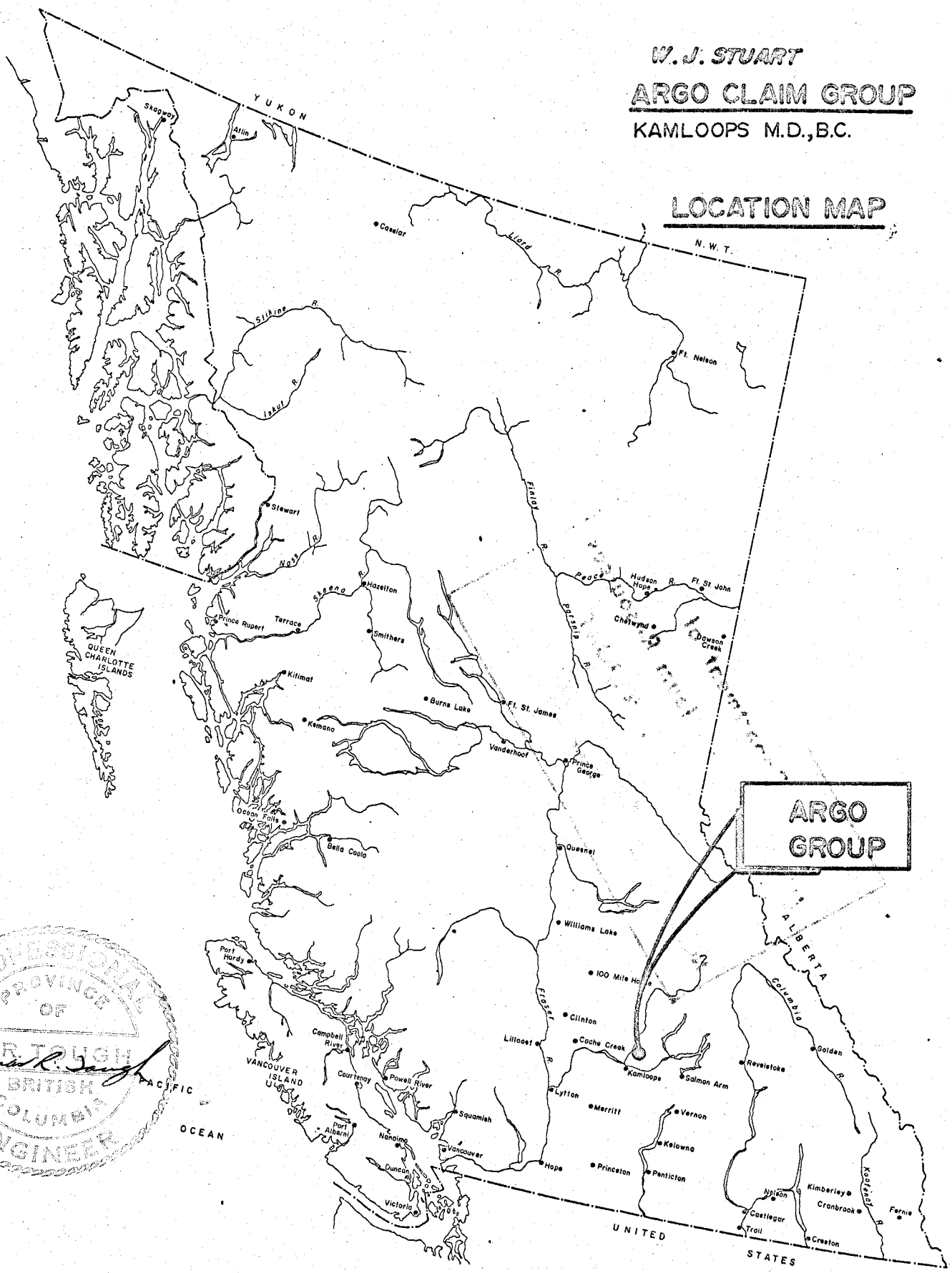
517 · 602 West Hastings Street, Vancouver, British Columbia, Canada ✱ Telephone 688-4342

GEOPHYSICAL REPORT
ON
ELECTROMAGNETIC - SELF POTENTIAL SURVEYS
ARGO CLAIM GROUP

INTRODUCTION

This report discusses the procedure and results of VLF-Electromagnetic (EM) surveying and Self Potential (SP) gradient surveying carried out by Mr. W. J. Stuart on the ARGO mineral claims northeast of Kamloops.

VLF-EM surveying was done over the main prospect in October, 1970, SP gradient surveying over the main prospect and a portion east of the main prospect in June, 1971 and additional VLF-EM surveying over the eastern portion in July, 1971. The data was brought to the writer in August, 1971 for compilation and interpretation. Before and after each of the surveys, Mr. Stuart was in consultation with the writer over survey methods and procedure. From these personal contacts and since Mr. Stuart had a night school course in geophysical surveying, the writer is entirely satisfied that the surveys were done in a competent and professional-like manner.



SCALE 1" = 110miles

The ARGO Claim Group consists of 20 claims, ARGO 1-20, of which ARGO 7, 9 and 11 are fractional claims. The surveys were done on claims ARGO 1-8.

The prospect consists of sulphides, pyrite and chalcopyrite, in massive form within a quartz vein. The object of the VLF-EM and SP work was, therefore, to find out if these methods would react to the known mineralization and then to see if there was any extension of the mineralization.

LOCATION AND ACCESS (50° 53.5'N - 120° 0.5'W)

The property is located on the immediate west side of Louis Creek approximately 21 miles in a straight line northeast of Kamloops.

The property is easily accessible by roads. One travels about 13 miles north of Kamloops on Highway No. 5 to Heffley Creek where one turns east and travels about 15 miles on the Heffley Creek Road past Heffley Lake and as far as the Louis Creek Road. One then turns north and goes for 8 miles and then about 1 mile west on a logging road to the property.

PHYSIOGRAPHY

The property is found in the physiographic division known as the Thompson Plateau, part of the

Interior Plateau, on the east slope in the Upper Louis Creek Valley. The elevation change is 1,900 feet varying from 2,400 to 4,300 feet above sea level. The slope is of moderate steepness, about 20-30°. Louis Creek flows northerly on the east edge of the claim group and 2 tributaries flow easterly on the north and south edges, respectively, through deep canyons.

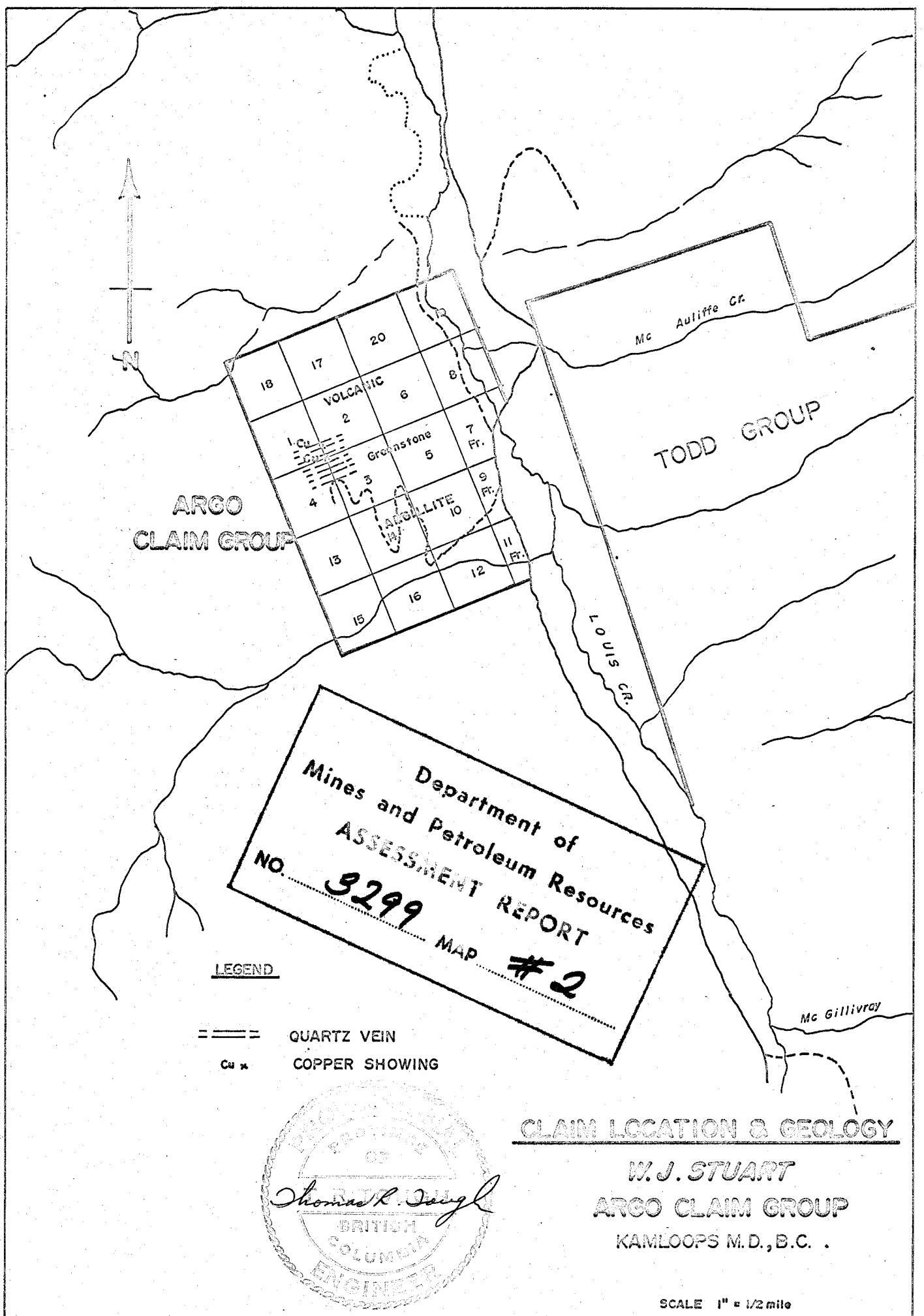
The claims area is covered with a dense forest of mixed coniferous and deciduous trees ranging in different areas from young growth to fully mature.

HISTORY OF PREVIOUS WORK

In the exploration season of 1969, Stuart prospected the area and staked the first 4 ARGO claims in September around the main showing. In 1970, he dug and blasted out several trenches, some to expose sulphides and others to reveal geological information.

GEOLOGY

The references used in this section are Uglow (1921), Cockfield (1947) and Stuart by personal communication. A sketchy map of the geology with the claims is included within the report. However, the contacts were not known specifically and therefore were not drawn in.



CLAIM LOCATION & GEOLOGY

W. J. STUART

ARGO CLAIM GROUP

KAMLOOPS M.D., B.C.

SCALE 1" = 1/2 mile

In the general region of the property, the bedrock lithology is mainly rocks of the Cache Creek Group, as labelled by Cockfield, or the Badger Creek, Fennel, and Barriere Formations as labelled earlier by Uglow and are of Carboniferous and Permian Age. It appears that Group 1 of the Cache Creek rocks is equivalent to the Barriere Formation and Group 2 to the Fennel Formation. Group 1 is composed of sediments, metasediments and some volcanic rock and Group 2 is composed of volcanic rock, largely greenstone. There are also Coast Intrusions in the area that are as close as 3 miles, as shown on Cockfield's map.

On the property itself, Stuart has found rocks of both groups of the Cache Creek rocks. The main rock-type of Group 1 is grey and black banded argillite as well as brownish weathering sericitic quartzite, brownish sericite schist, limestone, dolomitic quartzite, silicified argillite and schistose basalt. Much of the property is also underlain by greenstones of Group 2 which include also basalt as well as the coarse-grained equivalent, gabbro. Stuart has also noticed diorite dykes on his property. These are perhaps related to the Coast Intrusions of the area and are likely responsible for the sulphide mineralization.

The mineralization is in the form of chalcopyrite and pyrite within quartz veins, the host rock of which is argillite. Six quartz veins have been found so far within a zone about 1,000 feet wide and are about 200

to 300 feet apart. They strike consistently in about a N70E direction and dip 70° to 80° in a N20W direction. The width of these quartz veins varies from 1 to 4 feet and their length so far is unknown. Some of these veins are mineralized and others are barren.

The main showing occurs about 100 feet S70W of the initial post of ARGO claims 1-4 on L-8 at the base line. The trench dug here exposes a 12-inch quartz vein for 10 to 15 feet, highly mineralized with chalcopyrite and pyrite. Two grab samples from this showing assayed about 13% copper, 20 oz./ton silver and 19% copper, 30 oz./ton silver, respectively (Copies of assay results are in back). A 24-inch quartz vein 300 feet N20W of the main showing was blasted to a depth of 2 feet which revealed sparse chalcopyrite mineralization confined to the footwall side of the vein. At 100 feet N70E of the main showing, an area of rusty, metamorphosed sediments was drilled and blasted. The only sulphide found was finely disseminated pyrite. Float was found at the bottom of the hillside at 3S 50 feet east of L-40 and showed very fine disseminations of chalcopyrite in volcanic rock.

INSTRUMENTATION AND THEORY

1) VLF-EM - The VLF-EM survey in October, 1970 was carried out using a G-28 receiver manufactured by Geotronics Instruments Ltd. of Vancouver, B.C. It is

a visual-null type. The survey carried out in July, 1971 used as the receiver an EM-16 manufactured by Geonics Limited (formerly Ronka) of Toronto, Ontario and is an audio-null type instrument. On both these surveys, the U.S. Navy submarine transmitter located at Seattle, Washington and which transmits at 18.6 KHz, was used.

In all electromagnetic prospecting, a transmitter produces an alternating magnetic field (primary) by a strong alternating current usually through a coil of wire. If a conductive mass such as a sulphide body is within this magnetic field, a secondary alternating current is induced within it which in turn induces a secondary magnetic field that distorts the primary magnetic field. It is this distortion that the EM receiver measures. The VLF-EM uses a frequency range from 16 to 24 KHz whereas most EM instruments use frequencies ranging from a few hundred to a few thousand Hz. 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, electrolyte filling fault or shear zones and porous horizons, graphite, carbonaceous sediments, lithological contacts as well as sulphide 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 IP). However, its susceptibility to lower conductive bodies results in a number of anomalies, many of them difficult to explain and, thus, VLF-EM preferably should not be interpreted without a good geological knowledge of the property and/or other geophysical and geochemical surveys.

2) SELF POTENTIAL - The SP instrument used was a model G-18-A manufactured by Geotronics Instruments Ltd. It is a transistorized millivoltmeter with a high input impedance and has a sensitivity of 2 mv./meter division on the 100 mv. scale. Unglazed, porous porcelain pots were used for the electrodes and copper sulphate solution was used for the electrolyte.

Self potentials are produced in the crust of the earth from a variety of processes that are chemical, physical, and electromagnetic inductive. Sulphide bodies produce a potential from chemical processes that range in magnitude from a few tens of millivolts to several hundred millivolts and, in rare cases, above 1,000 millivolts. The causes of sulphide self potentials is not fully understood or agreed upon by geophysicists. However, the more accepted theory is that this 'battery action' is caused by a difference in pH in the upper ground water electrolytes (more acidic) and the lower ground water electrolytes (less acidic) and is abetted by the oxidation of sulphides near the surface forming acids that, therefore, increase the contrast. The

current caused by the potential flows from the apex of the sulphide body to some point at depth (terminus of deposit or point of minimum acidity), into the wall rock, back to the surface and back into the sulphide apex. A negative pole is thus created at ground surface and, therefore, except for a few rare cases, sulphide bodies are reflected by negative anomalies.

Two field methods are in common practice. One measures the potential itself and its field work is carried out by keeping one electrode fixed and moving the other at equal intervals. The other measures the potential gradient by moving both electrodes, with a fixed interval, usually 100 feet. Each method can be calculated from the other.

SURVEY PROCEDURE

The base line in the area of the main showing runs in a direction of N70E (same as quartz veins) until 500 feet N70E of the main showing where it changes direction to N80E. All crosslines or survey lines run in a direction of N10W, with these and their stations being labelled as shown on the set of maps in the pocket.

The VLF-EM was read on lines 1-13 and 26 at 50-foot interval stations. Lines 22, 30 and 35 were read at 100-foot interval stations.

The self potential survey was carried out using the gradient method with a 50-foot electrode spacing and a 50-foot station spacing on lines 5 and 8 and a 100-foot electrode spacing and 100-foot station spacing on lines 22, 26, 30, 35 and 40.

TREATMENT OF DATA

Being that VLF-EM data is of relatively high frequency, it is subject to geological and topographical noise. This has been filtered out by use of the Fraser Filter method which changes noisy non-contourable data into less noisy contourable data in which anomalies are shown by positive highs.

The unfiltered data is shown on sheet 1 which, like all the maps, has a scale of 1" = 400'. The filtered data is shown on sheet 2 and contoured at an interval of 5°.

The self potential gradient data was placed on sheet 3. This data was then added together in the direction of S70E to N70W to give the self potential data, of which the data points are mid-way between the gradient data points (a self potential value at a specific point is the sum of all gradient values S70E of that

point). The self potential data is displayed on sheet 4. It was attempted to contour the values but the contours followed the survey lines. This could be due to 1 or 2 gradient readings taken in error resulting in all self potential values N20W of the wrong reading being in error. On L-35 and L-40, it appears the lines were started on the eastern edge of an anomaly resulting in all successive readings being more positive than they should be. The self potential and self potential gradient data were profiled on sheet 5.

DISCUSSION OF RESULTS

1) VLF-EM - The anomalies recognized on the filtered EM map have been labelled by letters A to G and are discussed in detail below.

Anomaly A is the one produced by the main showing on L-8 though it is displaced 50 feet north. Possibly, this displacement is caused by topography. It has a magnitude of 14^{o} over the main showing and extends quite weakly to L-1 where its magnitude increases again to 14^{o} and at which end it is open, giving it a length of at least 800 feet. The strike is that of the quartz veins, S70W. The whole length, therefore, very probably reflects sulphides within the quartz vein uncovered on L-8 with the variations in magnitude reflecting differing concentrations (though this is not always the case).

Anomaly B on the south part of L-7 and anomaly C on the north part of L-8 have magnitudes of 14° and 12°, respectively, and possibly also reflect sulphide-quartz veins but lack surrounding EM work for a fuller interpretation.

Anomaly D reaches a high of 20° and quite possibly reflects an extension of the sulphide-quartz vein associated with anomaly A, since D is on strike of A. However, alternatively, it could be striking in an east-west direction and would then be part of anomaly E. This is less likely though, since it does not agree with the known geology. It has a length of 400 feet and if reflecting sulphides, would appear to result from a sharp increase in sulphide amount and/or concentration of sulphides for 400 feet.

Though it is not definite, because of lack of surrounding EM work, it appears that anomaly E also strikes in the direction of S70W. Its highest values are 25° and 23° each on L-22 around 10N. If this anomaly is also the result of a sulphide-quartz vein, it is at 10N that the vein is probably located.

There is a possible alternative interpretation to anomalies D and E. Because of their broadness and because of negative values being surrounded on at least 3 sides by anomalies, this whole zone could reflect a much larger conductive zone that would be about 1,200 to 1,600 feet in diameter. The anomalies in this case

would only reflect the edges of such a body. Whether this body would be sulphides or not would be rather difficult to say without further investigation.

Anomalies F and G to the south have magnitudes of 16° and 20°, respectively, and also seem to strike in direction of quartz veins and, thus, also have a good possibility of reflecting sulphide-quartz veins. Both are at least 400 feet long and open at both ends.

Any of the above mentioned anomalies very possibly reflect structure such as faults, shear zones or contact zones, rather than, or as well as, the sulphide-quartz veins. Any structure on the property very possibly strikes in this same direction.

2) SELF POTENTIAL - The following discussion on the SP work is almost wholly qualitative. It was felt that to do any quantitative interpretation, such as dip and topographical corrections, more accuracy would be needed which, in the writer's opinion, could be attained by measuring the self potential in the field rather than its gradient and by minimum spaced 50-foot readings.

There are a number of anomalies produced by the SP survey and are labelled by letters on the gradient map and on the profiles. There is some correlation with the VLF-EM. The SP anomalies are quite discontinuous from one survey line to the next. Perhaps the

sulphides are patchy or perhaps the oxidation zone, necessary for sulphide SP anomalies, is quite limited in different areas, such as around the main showing. This would probably be due to the steep slope.

Anomalies A and B are the 2 most classical-type gradient SP anomalies. Each, because of their respective double positive and negative peaks, appears to reflect a double source. The sources on anomaly A would be centered at 4N and 7N on L-22 and those on anomaly B, 3S+50' and 6S on L-26. Anomaly A is on strike of the sulphide-quartz vein of the main showing and, therefore, is strongly possibly caused by an extension of the same. However, a NW strike between anomalies A and B should not be precluded because of their similarities. Anomaly B could extend onto L-30 though this extension is much weaker. The source of both anomalies appears to dip northerly. The magnitudes of anomaly A is -285 and -135 millivolts and that of B is -253 and -248 millivolts.

SP anomaly C, centered at 6N and 9N on L-30 (perhaps a double source also) reaches magnitudes of -859 and -841 millivolts, respectively. This is very high for self potential and is not that common and, therefore, the possibility of error in field measurements should be strongly considered. However, the anomaly appears to continue onto adjacent lines 26 and 35. That on L-26, labelled H, has also a double source appearance and reaches less than $\frac{1}{4}$ the magnitude

at -175 and -190 millivolts. That on L-35 is a little more difficult to recognize because of the error (as explained in next paragraph). But if the error were to be corrected, it appears that the anomaly on this line would be in the order of -200 to -300 millivolts. In addition, anomaly C correlates well with the VLF-EM anomalies in this area if the interpretation is taken that this EM anomalous zone is caused by one large conductive body, perhaps sulphides, centered in this area on L-30.

Both L-35 and L-40 appear to have been started in the center of SP anomalies on the S20E end (subsequent readings are thus more positive than they should be) and are labelled D and E, respectively. D correlates fairly well with EM anomaly G.

Adjacent to D is anomaly F with a probable magnitude of -250 millivolts. It is wider than the others with a source appearing to be 300 to 400 feet wide and correlates well with EM anomaly F.

On L-40 adjacent to E is anomaly G which has a magnitude of approximately -200 millivolts and is centered at 10S. It correlates with EM anomaly G if G extends N70E to L-40.

Anomalies I to K on L-8 are barely above the noise level. Anomaly I reflects the main showing. Anomaly L could be one bad reading since on the gradient profile

there is not a correlating positive high to the negative high. Possibly the negative reading was misread and there is no anomaly.

Though it is not known whether graphite occurs in the area or not, the possibility of it causing some or all of the anomalies should not be overlooked.

CONCLUSIONS AND RECOMMENDATIONS

The VLF-EM and SP surveys produced a number of anomalies, some being rather discontinuous from one survey line to the next and thus, perhaps, reflecting variations in sulphide content. Some of these anomalies seem to be striking in the same direction as the sulphide-quartz veins and some of those of the SP correlate well with the VLF-EM. Therefore, further exploration on this property is definitely warranted and is recommended in the following manner:

1) SP anomalies L and C should be rechecked. The gradient SP survey should be continued S20E on lines 35 and 40 until they are well out of the anomalies D and E.

2) All of the VLF-EM and SP anomalies should be rechecked before any further survey work of this type is done on this property. The most economical method is by soil geochemistry with the samples being tested for copper.

3) The anomalies that prove out by (2) should then be further checked by hand or 'cat' trenching and/or by a small X-ray diamond drill.

4) The property, especially around the survey area should be geologically mapped. This will have a twofold value in helping to ascertain the property potential and in assisting any further geophysical interpretation.

5) Further geophysics will then depend on the results of (1) to (4).

Respectfully submitted,

GEOTRONICS SURVEYS LTD.

DAVID G. MARK
Geophysicist

DGM:ly
September 15, 1971

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
R. J. [illegible]

REFERENCES

Cockfield, W. E., Geology and Mineral Deposits of Nicola Map-Area, British Columbia, Memoir 249, Geol. Surv. of Canada, 1961 (Geology written in 1947).

Uglow, W. L., Geology of the North Thompson Valley Map-Area, B.C., Geol. Surv. of Canada Summary Report 1921.

Stuart, W. J., Personal communication.

VLF-EM and SP Surveys
ARGO Claim Group

COST BREAKDOWN - Job No. 71-90

Geophysical Exploration Program conducted on the ARGO Claim Group from October 1, 1970 to September 29, 1971.

Line Cutting, 8 days, 2-man crew @ $120.00/day	$960.00	
Equipment Rental, 8 days @ $25.00/day	200.00	$1,160.00
Self Potential Survey, 5 days, 2-man crew @ $120.00/day	$600.00	
Equipment & Instrument Rental	285.00	
Survey Supplies	50.00	935.00
VLF-EM Survey, 5 days, 2-man crew @ $120.00/day	$600.00	
Equipment & Instrument Rental	245.00	
Survey Supplies	50.00	895.00
SP & Geochem Soil Sample Tests:		
H. Larson, B.Sc. Geophysicist, 3 days @ $100.00/day	$300.00	
W. J. Stuart, 3 days @ $60.00/day	180.00	
Equipment & Instrument Rental	135.00	
Survey Supplies	50.00	
Analysis, 25 samples @ $2.00/sample	50.00	715.00
CARRIED FORWARD		$3,705.00

VLF-EM and SP Surveys
ARGO Claim Group

COST BREAKDOWN (Cont'd.)

BROUGHT FORWARD	$3,705.00
Mapping & Plotting (PDT Drafting Services)	300.00
Geophysicist's Report (D. Mark, B.Sc.)	600.00
Engineering Fees (T. R. Tough, P.Eng.)	300.00
TOTAL COSTS	$4,905.00

RESUME OF WILLIAM J. STUART

1956 to Present

Independent prospector. Active in Coast Range and along North Thompson River.

1969 to 1970

Completed course in Geophysical Prospecting at the British Columbia Institute of Technology.

RESUME OF PROFESSIONAL AND TECHNICAL EXPERIENCE
OF
DAVID G. MARK, B.Sc.

EDUCATION

Graduate of the University of British Columbia in Science (B.Sc.) in Geophysics.

EXPERIENCE IN INDUSTRY

Experience, technical and interpretational, in various geophysical surveys: magnetometer, electromagnetic, self-potential, gravity, induced polarization, resistivity and seismic methods.

1968 - Present - Geophysicist for Geotronics Surveys Ltd., Vancouver, B.C.

1968 (exploration season) - Field Geophysicist for Geo-X Surveys Ltd., Vancouver, B.C.

1967 (exploration season) - Field Supervisor in geochemical work and geological mapping for Anaconda (Canada) Company.

1966 (exploration season) - Field Supervisor for geophysical and geochemical work and prospecting for Mastadon-Highland Bell Mines Ltd.

1965 (exploration season) - Prospecting and geological evaluation for New Taku Mines Ltd.

* * * * * * *

Member of the British Columbia Geophysical Society and the Vancouver Branch of The Canadian Institute of Mining and Metallurgy.

P. Eng. applied for with the Association of Professional Engineers of B.C.

OFFICE OF THE CHIEF ANALYST AND ASSAYER

Report #1

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF MINES AND PETROLEUM RESOURCES
VICTORIA

SAMPLE RECEIVED FROM Mr. W.J. Stuart,

ADDRESS 910 Calverhall St., North Vancouver, B.C.

LABORATORY No.	SUBMITTER'S MARK	LABORATORY REPORT
32311	421 C	Spectrochemical Analysis: Copper, and a very small fraction of 1 per cent of zinc were found; the other base metals found, and their percentages, were those occurring normally in rocks. Assays: Gold — trace Silver — 20.4 oz. per ton Copper — 12.79% Radioactivity: No greater than that occurring normally in rocks.
32312/15	422/25 C	Referred to the Mineralogical Branch for examination; you will hear from them direct.

DATE April 14th 1970

S. Metcalfe

CHIEF ANALYST AND ASSAYER.

BONDAR-CLEGG & COMPANY LTD. geochemists ers ⊙ analytical chemists

1500 PEMBERTON AVENUE, NORTH VANCOUVER, B.C.
PHONE: 988-5315 TELEX: 04-54554

Report #2

CERTIFICATE OF ASSAY

TO W.J. Stuart
910 Calverhall St.
North Vancouver, B.C.

Report No A21-126
Samples Rec'd: April 19, 1971
Results Completed: April 23, 1971

I hereby certify that the following are the results of assays made by us upon the herein described Ore samples.

MARKED	GOLD		SILVER	Cu							TOTAL VALUE PER TON (2000 LBS.)
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
Ore											
A-1	.005		29.8	19.38							
A-2	Mineral identification - Major - silicates Minor - carbonate										

NOTE:
Rejects retained two weeks
Pulps retained three months
unless otherwise arranged.

Gold & Silver values reported on these sheets have not been adjusted to compensate loses and gains inherent in fire assay methods.

Gold calculated at $.....per ounce

J. J. Bicman
Registered Assayer, Province of British Columbia

Report #3

BONDAR-CLEGG & COMPANY LTD.

geochemists • assayers • analytical chemists

1500 PEMBERTON AVENUE, NORTH VANCOUVER, B.C.
PHONE: 988-5315 TELEX: 04-54554

REPORT OF: Spectrographic Analysis REPORT No. A21-372

PROJECT: DATE: July 21, 1971

REPORTED TO: W.J. Stuart

910 Calverhall St.

North Vancouver, B.C.

SAMPLE	A21-372-1
Aluminum	10.
Antimony	ND
Arsenic	ND
Barium	0.03
Beryllium	ND
Bismuth	ND
Boron	0.001
Cadmium	ND
Calcium	Major
Chromium	0.01
Cobalt	0.003
Copper	0.005
Gallium	0.01
Gold	Trace
Iron	5.
Uranium	ND
Thorium	ND
Lead	ND
Magnesium	Major
Manganese	0.1
Molybdenum	0.001
Niobium	ND
Nickel	0.01
Silicon	Matrix
Silver	Trace
Strontium	0.05
Tantalum	ND
Tin	ND
Titanium	0.5
Tungsten	ND
Vanadium	0.03
Zinc	ND
Sodium	3.
Potassium	1.

All results expressed as percent by weight
Matrix- Major constituent : Major - above normal spectrographic range
Trace - Detected but minor amounts : N.D. Not detected

Geotronics Surveys

517 · 602 West Hastings Street, Vancouver, British Columbia, Canada ✱ Telephone 688·4342

SOIL SAMPLING AND RECHECKING OF SELF POTENTIAL LINES ARGO CLAIMS KAMLOOPS M.D., B. C.

Howard Larson, geophysicist, of Geotronics Surveys Ltd., carried out SP work during the latter part of September, 1971 and was accompanied by W. J. Stuart, owner of the claims. The purpose was to check the results of 2 lines. Time permitted also to extend the end of one line as the end was anomalous and open. Stuart also picked up soil samples on L-30.

Larson also examined the main showing and the initial post for ARGO claims 1-4 and found them to exist as mentioned in the main report.

SELF POTENTIAL

1) SURVEY PROCEDURE - As recommended previously in the report, lines 8 and 30 were resurveyed, by directly measuring the self potential rather than

its gradient as was done before. This was carried out by planting 1 electrode (unglazed porcelain pot) in 1 spot and moving the second electrode at 50-foot or 100-foot intervals. The southern electrode was always attached to the negative terminal. Line 40 was continued southwards by the gradient method to 25S with gradient readings 14+50' and 15+50' being retaken.

2) RESULTS - Since this work is mainly a check on the previous work, the results are given in table form below rather than mapped. Profiles are drawn on sheet 6.

L I N E 8

Station	Reading (mlvs.)	Station	Reading (mlvs.)
10N	-4	1	+16
9	-3	0	+20
8	+16	1S	+5
7	+15	2	+5
6	+24	3	+11
5N	-7	4	+16
4+50'	+21	5S	+6
4	+21	6	+5
3+50'	+30	7	+2
3	+18	8	+12
2+50'	+19	9	-2
2N	-13	10	0
1+50'	+8		

L I N E 30

Station	Reading (mlvs.)	Station	Reading (mlvs.)
9+90N	-735	4	-160
9	-785	5S	-265
8	-705	6	-190
7	-625	7	-170
6	-815	8	-180
5N	-685	9	-75
4	-410	10S	-30
3	-255	11	-25
2	-70	12	-25
1	-85	13	-20
0	-25	14	-25
1S	-180	15S	-10
2	-275	16	0
3	-230		

L I N E 40

Station	Reading mlvs./100 ft.	Self Potential (mlvs.)
14+50'S	+82	
15		+180
15+50'	+180	
16		0

L I N E 40

Station	Reading mlvs./100 ft.	Self Potential (mlvs.)
16+50'	-105	
17S		+105
17+50'	-70	
18		+275
18+50'	+90	
19		+185
19+50'	+165	
20		+20
20+50'	+25	
21		-5
21+50'	-64	
22		+59
22+50'	-40	
23		+99
23+50'	-75	
24		+174
24+50'	0	
25		+174

3) DISCUSSION OF RESULTS - On line 8, all readings were within the noise level. Therefore, anomalies I, J, K and L were found not to exist. The reasons for this could be as follows:

a) Line 8 was not resurveyed on exactly the same line as before. Therefore, if the anomalies are very localized, anomalies J and K could have been missed.

b) The resurveyed readings on all lines are generally lower than those taken on first survey which is probably due to the different ground conditions which in turn is caused by the seasonal change in weather. This could eliminate all anomalies except perhaps L, if it existed.

c) The 100-foot spacing missed I which can only be picked up by 50-foot spacing.

However, the purpose of resurveying line 8 was to determine whether anomaly L existed. Taking (b) into consideration, it, in all probability, does not exist and was therefore initially caused by operator error.

The shape of the self potential profile of L-30 surveyed by measuring self potential and that surveyed by measuring its gradient agree very closely. However, the magnitude of many of the readings are

less than those taken previously, the reason of which is discussed in the previous paragraph. The fact that anomaly C checks so closely lends more probability to the interpretation that the VLF-EM anomalous zone in this area is caused by one large conductor.

The extension on L-40 did not complete anomaly E but has shown rather that it has 2 negative maxima and perhaps more if the line was extended further. From the probable zero level, their magnitudes are about -300 millivolts.

SOIL SAMPLING

1) SAMPLE PROCEDURE - All samples were dug with a garden shovel to a depth of 6-8 inches. Most of the samples taken were from the B horizon which was a rusty colour and, where no B existed, from the C horizon which was more greyish. They were then placed in brown wet-strength paper bags with the sample number marked thereon. The number of samples taken was 27.

2) TESTING PROCEDURE - All samples were tested for copper by Bondar-Clegg & Company Ltd. of North Vancouver, B.C. The sample was first thoroughly

dried and then sifted through an 80-mesh screen. A measured amount of the sifted material is then put into a test tube with subsequent measured additions of aqua regia acid. The mixture is then heated for approximately 3 hours. The parts per million (ppm) copper is then measured by atomic absorption.

3) DISCUSSION OF RESULTS - The results are shown at the end of this appendix. The profile of the results is drawn on sheet 6.

The results are rather disappointing since all, except one value, are around the background level. Though the number of samples are too few to give an accurate statistical analysis, the background level appears to be approximately 40-60 ppm. The one value at station 0 is therefore anomalous at 106 ppm.

Therefore, it can be said that the SP anomaly C is not caused by chalcopyrite or any other form of copper sulphide. It is the writer's opinion then that the most probable cause is massive pyrite with 2 lesser possibilities being pyrrhotite and graphite. These 3 minerals are the most likely to produce an anomaly of such magnitude, but pyrite is the only one so far found in the area.

CONCLUSIONS

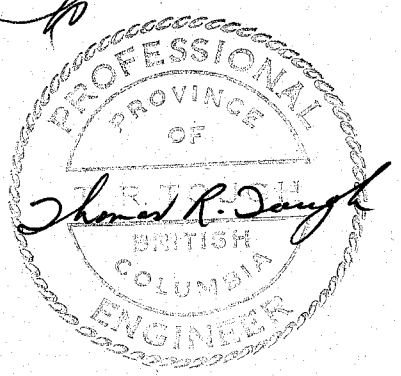
The recommendations at the end of the main report should continue to be carried out until all the anomalies have been checked. Also, the source of anomaly C should still be determined since, if it is pyrite, it could have good gold values.

An additional comment the writer would like to make on the SP survey is that many of the anomalies on different lines could well join with one another but tighter surveying such as on 200-foot spaced lines would have to be carried out in order to determine this. For instance, anomalies A, B, C (south part), F and G could be due to one continuous source striking in a N70W-S70E direction. Furthermore, D could join to G or to E. However, since funds are limited, it is much more important to follow the recommendations the results of which, in any case, may reveal the continuity and strike of the source(s) of the anomalies.

Respectfully submitted,

GEOTRONICS SURVEYS LTD.

DAVID G. MARK
Geophysicist



DGM:ly
October 12, 1971

BONDAR-CLEGG & COMPANY LTD.

geologists ○ geochemists ○ analysts

1500 PEMBERTON AVENUE, NORTH VANCOUVER, B.C.
PHONE 988-5315

GEOCHEMICAL LAB REPORT

No. 21 - 802

Extraction: Hot Aqua Regia

Method: Atomic Absorption

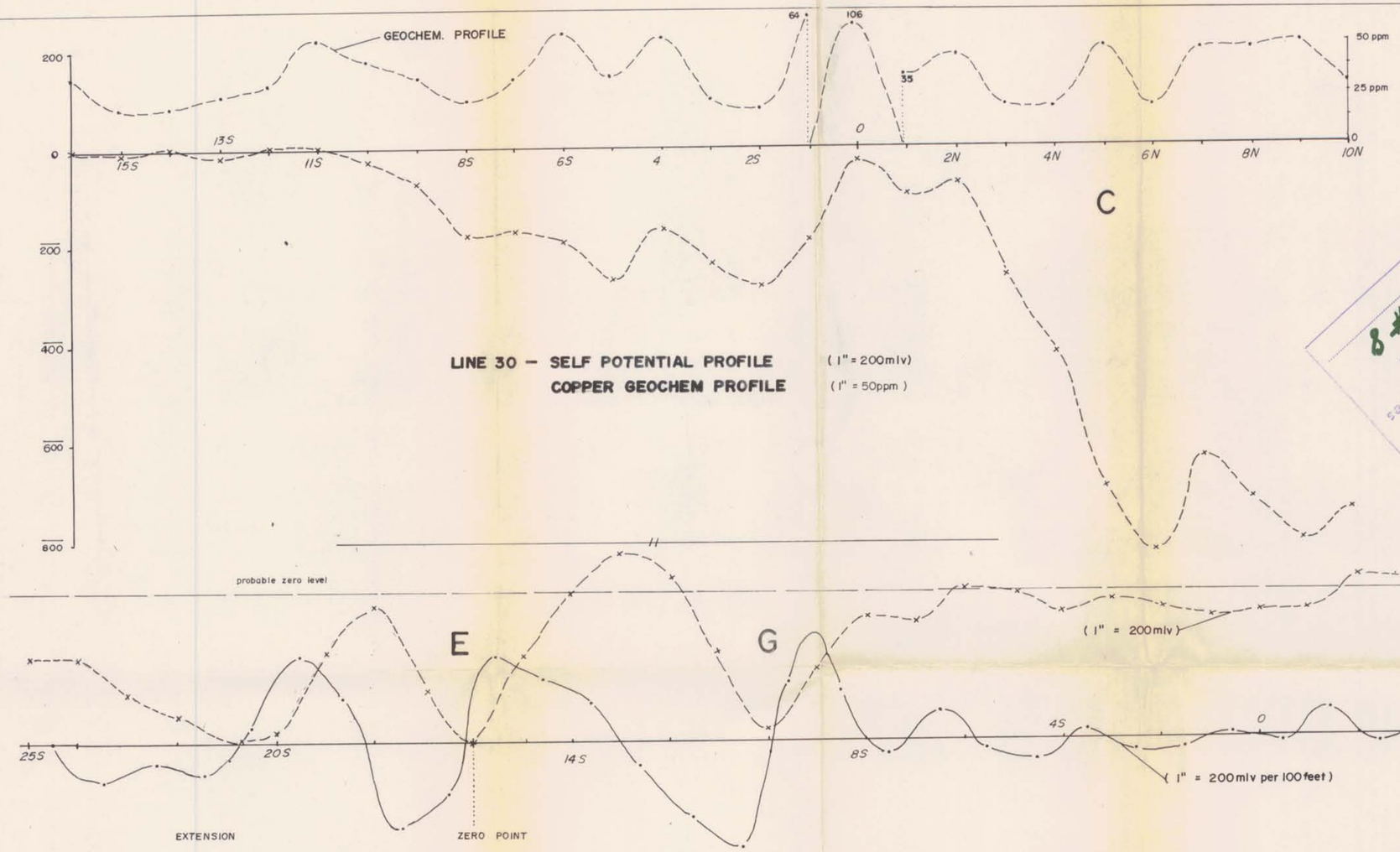
Fraction Used: - 80 mesh

From: Mr. W.J. Stewart

Date: October 6, 1971 19

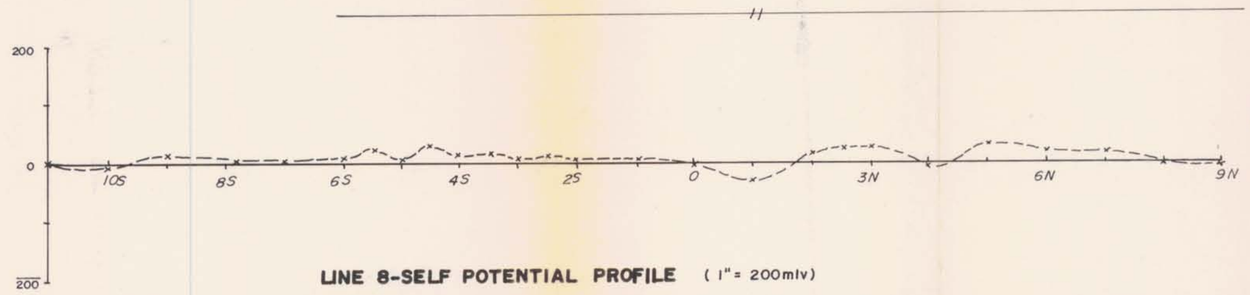
Analyst: K.B.

SAMPLE NO.	Cu ppm							REMARKS
1101	30							
1102	50							
1103	48							
1104	43							
1105	20							
1106	48							
1107	20							
1108	20							
1109	44							
1110	35							
1111	106							
1112	64							
1113	19							
1114	24							
1115	55							
1116	36							
1117	58							
1118	35							
1119	24							
1120	36							
1121	44							
1122	64							
1123	33							
1124	27							
1125	21							
1126	21							
1127	38							



LINE 30 — SELF POTENTIAL PROFILE (1" = 200mlv)
COPPER GEOCHEM PROFILE (1" = 50ppm)

LINE 40— GRADIENT AND SELF POTENTIAL PROFILES



LINE 8-SELF POTENTIAL PROFILE (1"= 200mlv)

NOTE

1) SELF-POTENTIAL OF LINES 8 and 30 SURVEYED AND IS CHECK ON PREVIOUS WORK
2) GRADIENT OF SELF-POTENTIAL OF LINE 40 EXTENDED TO 25S
3) SOIL SAMPLE PROFILE ON L-30

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, B.Sc.

W. J. STUART

ARGO CLAIM GROUP, KAMLOOPS M.D., B.C.

SELF POTENTIAL & GEOCHEMICAL SURVEY (SOIL SAMPLING) COPPER

PROFILES

SCALE
HORIZ. 1" = 200 feet
VERT. as shown

DATE: OCT. 1971
JOB: 70-90

SHEET No. 6
DRAWN BY P.P.

MAGNETIC DECLINATION 23°

LEGEND

E.M. SURVEY

SP SURVEY

NOTE READINGS ARE IN DEGREES

SEATTLE TRANSMITTER STATION
SOUTH 55° W

3299

M-3

NTS 92I/16E

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. R. TOUGH

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, B.Sc.

W. J. STUART

ARGO CLAIM GROUP

KAMLOOPS M.D., B.C.

VLF – EM
type of survey
FIELD DATA

scale	date	job no.	sheet no.	drawn by
1" = 200'	AUG. 1971	71 – 90	1	P. P.

MAGNETIC DECLINATION 23°

L-1 L-2 L-3 L-4 L-5 L-6 L-7 L-8 L-9 L-10 L-11 L-12 L-13 L-22 L-26 L-30 L-35 L-40

NORTH

SOUTH

Cu

Cu float

LEGEND

E.M. SURVEY

SP SURVEY

NOTE: READINGS ARE IN millivolts

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. G. MARK

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, B.Sc.

W. J. STUART

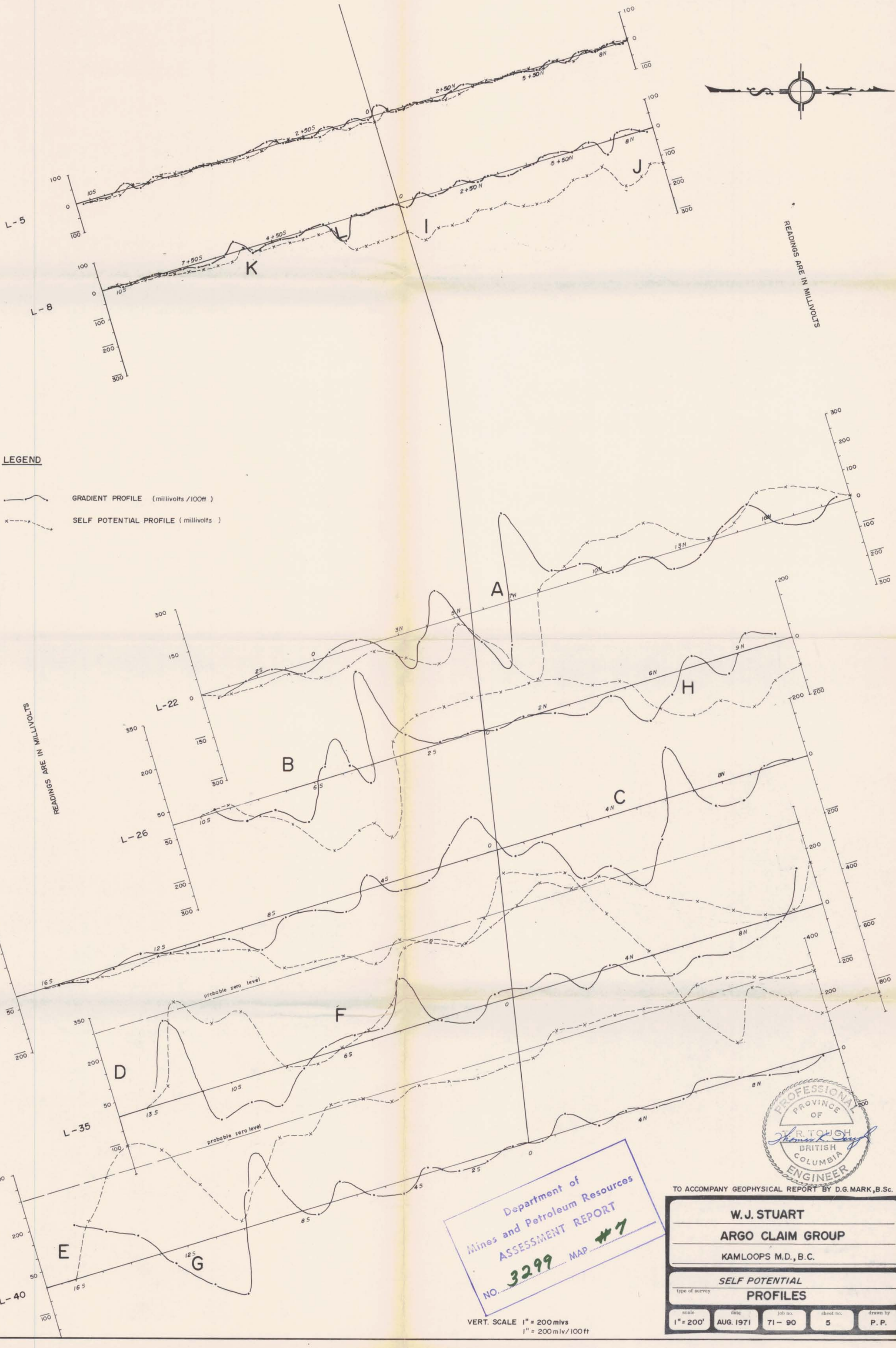
ARGO CLAIM GROUP

KAMLOOPS M.D., B.C.

type of survey: **SELF POTENTIAL DATA**

scale	date	job no.	sheet no.	drawn by
1" = 200'	AUG. 1971	71-90	4	P.P.

NTS 92I/16E



LEGEND

GRADIENT PROFILE (millivolts / 100ft)

SELF POTENTIAL PROFILE (millivolts)

VERT. SCALE 1" = 200 mlvs
1" = 200 mlv/100 ft

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
T.R. TOUGH

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, B.Sc.

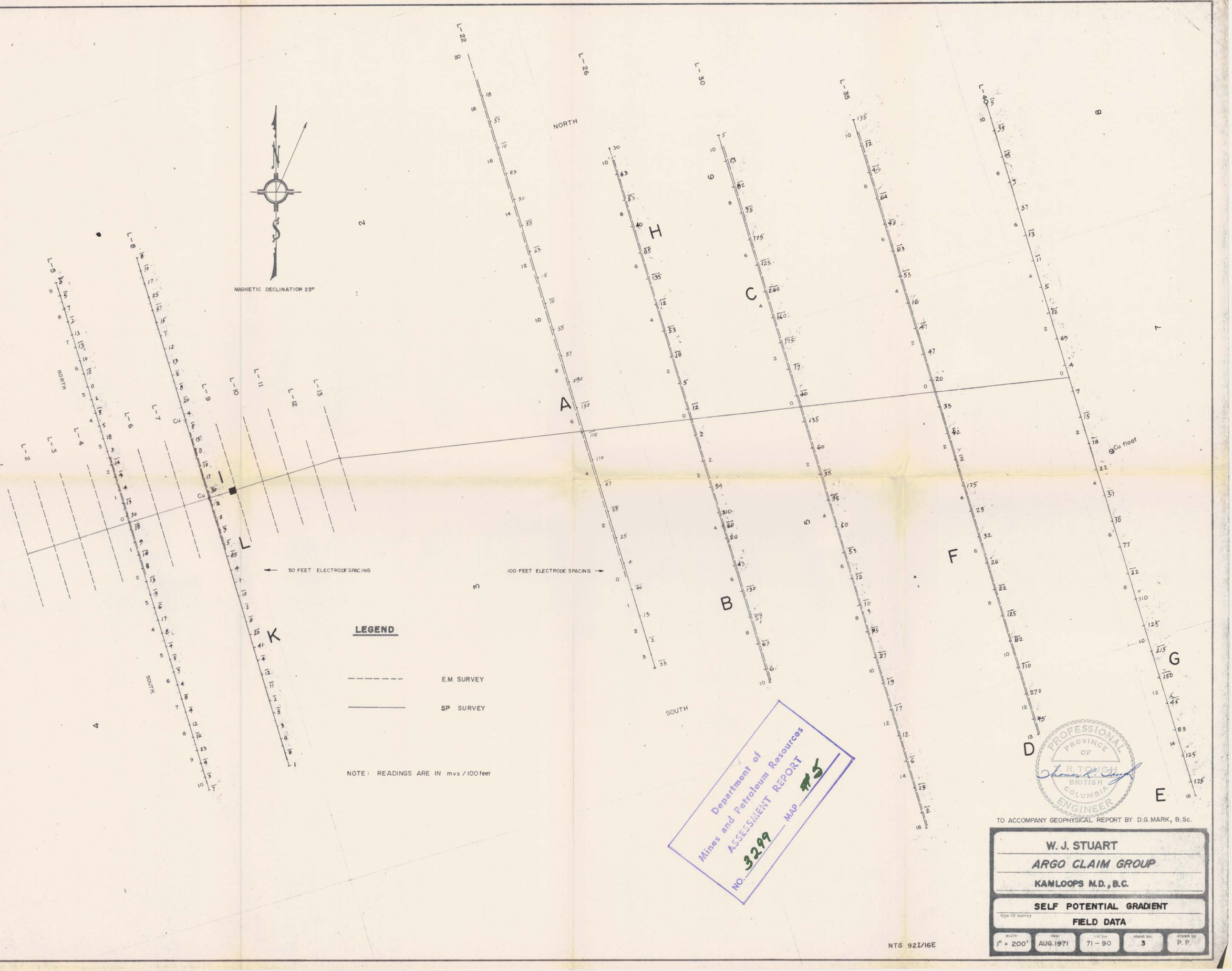
W.J. STUART

ARGO CLAIM GROUP

KAMLOOPS M.D., B.C.

type of survey: *SELF POTENTIAL* **PROFILES**

scale	date	job no.	sheet no.	drawn by
1" = 200'	AUG. 1971	71 – 90	5	P. P.



LEGEND

\- - - - - - - - E.M. SURVEY

———— SP SURVEY

NOTE: READINGS ARE IN mvs / 100 feet

NTS 92I/16E

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
THOMAS R. TOUGH

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, B.Sc.

W. J. STUART

ARGO CLAIM GROUP

KAMLOOPS M.D., B.C.

SELF POTENTIAL GRADIENT

type of survey: **FIELD DATA**

scale	date	grid no.	sheet no.	drawn by
1" = 200'	AUG. 1971	71 – 90	3	P. P.

MAGNETIC DECLINATION 23°

L-1 L-2 L-3 L-4 L-5 L-6 L-7 L-8 L-9 L-10 L-11 L-12 L-13 L-22 L-26 L-30 L-35 L-40

NORTH

SOUTH

A B C D E F G

Cu

Cu float

LEGEND

E.M. SURVEY

S.P. SURVEY

NOTE READINGS ARE IN DEGREES

CONTOUR INTERVAL 5°

SEATTLE TRANSMITTER STATION
S, 55° W

NTS 92I/16E

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. R. TOUGH

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, B.Sc.

W. J. STUART

ARGO CLAIM GROUP

KAMLOOPS M.D., B.C.

type of survey	scale	date	job no.	sheet no.	drawn by
VLF-EM FRASER FILTER & CONTOURS	1" = 200'	AUG. 1971	71 – 90	2	P.P.