615

PRELIMINARY GEOPHYSICAL REPORT ON

THE PROPERTY OF

THE VALUE LINE MINING LTD. (NPL)

VANCOUVER B. C.

Claims Surveyed:

Claims	Recording Number
Ruth E.-6	19407
Ruth E.-7	19408
Ruth E.-8	19409
Ruth E.-9	19410
Ruth E.-10	19411
Ruth E.-11	19412
Ruth E.-12	19413
Ruth E.-13	19414

Location:

The above claims are located about three miles northwest of Grand Forks, B.C., which places the group about four miles north of latitude 49° N, the International Boundary, and one mile west of longitude 118°-30'.

The work was carried out during the period from September 17, through November 20, 1964, and continued intermittently thereafter, under the direction of the writer.

Prepared by:

Earl F. Elstone, Mining Consultant, Geophysicist,

Professional Engineer Montana & Alberta

Canada Address: 539 - 8th Ave SW,

Calgary, Alberta

INDEX

Maps in Folder

Plan No. 1 Geophysical Test Surveys - Betts Area

Plan No. 2 Geophysical Test Surveys - Caledonia Area

Plan No. 3 Geophysical Test Surveys -
Detail - Caledonia Area

Value Line Mining Ltd. (NPL)
c/o Clark, Wilson, Flight, Clark & Maguire
916 Stock Exchange Bldg.
475 Howe Street
Vancouver, B. C.

Gentlemen:

The following report describes the preliminary results and interpretations of the geophysical reconaissance surveys carried out over a part of the optioned group of claims as listed.

Reconaissance lines were cut, staked and self potential and magnetometer readings taken. Where anomalous areas were indicated, detailed 100 ft. spaced grids were established and electromagnetic surveys were conducted. Some reconaissance traverses were made using the electromagnetic instruments.

All of these surveys were supervised and conducted by Earl F. Elstone. The results are shown on the accompanying maps and described herein.

GEOPHYSICAL EQUIPMENT & TECHNIQUE

MAGNETOMETER

A magnetometer was used to measure differences in the magnetic susceptibilities at various positions on the property. The readings taken are shown on the accompanying maps as five digit numbers immediately below the station or stake numbers. The magnetometer used here is a Sharpe Model A-3, vertical force measuring type and is considered to be a reconaissance instrument only. It is self adjusting, direct reading, and has a sensitivity of 50 gammas over a 50,000 gamma range by using the null method. See Exhibit "A", Page 10.

SELF POTENTIAL

The self potential or spontaneous polarisation measuring instrument is used to measure the minute electric currents generated by metallic sulphide bodies near the surface. Simply stated, this is possible because the particular mineral body acquires an electrical polarity with electric currents similar to the galvanic action taking place in a battery. The instrument used here is a Sharpe Model V.P.-6, Ground Voltameter using non-polarising electrodes filled with a saturated copper sulphate solution for making direct contact with the soil. This instrument has a sensitivity of one millivolt over a range of 0 to 1,000 millivolts, and is direct reading.

The strength of the potentials generated depends largely on the concentration of sulphides in the deposit, and hence indicates ability as a conductor. The more massive the sulfides, the better the conductor, and the stronger are the potentials generated. Very large readings usually indicate the presence of graphite, but since the presence of graphite is usually limited to metamorphic, schistose Precambrian sediments which are not present in this locality, no more will be mentioned of this here. Of all the geophysical methods applicable to the search for sulphides, the spontaneous polarisation method furnishes quick and quite definite information for all excepting sphalerite (zinc sulphide).

Spontaneous Polarisation readings are shown below and on each side of the station in a grid area, or with two readings

between stations on a reconaissance line, as each reading covers the ground between two probes spaced 50 feet apart. Holes are made three to four inches deep for placing the probe below the humus or organic layer. Readings below 30 could be considered as of doubtful importance, but all over this figure are checked for repetition in other holes about two feet distant.

ELECTRO-MAGNETIC EQUIPMENT

Electro-magnetic surveys are made using electricity and magnetism, by passing an alternating current through a coil which broadcasts a magnetic field. This primary magnetic field will cause currents to be induced in any subsurface conductor which will broadcast a secondary magnetic field, that along with the primary field, may be picked up by a receiver and the intensity judged. The secondary field, if strong enough, distorts the primary field, which distortion can be measured in terms of dip or tilt angles.

Mostly the subsurface geologic conductors are metallic sulfide bodies and graphite zones. Other conductors, generally of lesser strength, include electrolyte filled shears and faults, massive magnetite, serpentine and certain types of overburden.

The equipment used here is a Sharpe Model SE-300 Dual Frequency Transceiver. It consists of two identical transmitter and receiver units each of which alternately transmits and receives with the other set. Where conditions permit broadcasts are made on frequencies of 1600 and 400 cycles per second.

Field proceedures employ the use of null configurations, either by a voltmeter gauge or by sensitive ear phones. In all proceedures followed on this property, the so-called "A" configuration was used. The coil being used as a transmitter is held with its plane vertical and pointing toward the receiver coil. The receiver coil is held with its plane horizontal and then tilted about the axis joining the two coils until the "null" or minimum signal tilt is observed. The tilt angles are recorded for both high and low frequency readings and are plotted on the accompanying plan maps Nos. 1, 2, and 3.

On reconaissance surveys the two instruments follow a line along measured stations 400 feet apart, each taking readings at each 100 foot station. The same ground is actually covered twice, but each plot includes other portions in the reading. On detail plats where a grid has been established the readings are frequently along parallel lines and where done here are marked as "Broadside" method as differentiated from the "In Line Method". As marked on the profiles Tx, with station numbers, indicates the position of the transmitter as the respective readings were taken.

Notice is called to the relationships of the tilt angles at L.F.-400 c.p.s. and H.F.-1600 c.p.s. on a particular conductor. For low conductivity such as out of phase effects, overburden, shear zones, serpentines, weak sulphide bodies etc., there may be erratic variations. There is no way that these various possible conductive relationships

may be resolved from electrical measurements only. Note the near unity relationship of H.F. to L.F. in the Plat of Anomaly "C", indicating a good conductor, with four peaks over a 1,750 foot length.

SUMMARY OF FIELD OPERATIONS

Self potential and magnetometer surveys were carried out along reconaissance lines chosen after geological examination of accessible areas indicated evidences of surface mineralization. Of the areas studied, a suitable potential seemed indicated in, around and between the Betts and Caledonia claims.

A small magnetic anomaly was indicated on the Betts and Ruth E.-11 claims and some outcrop mineralization. A large tunnel dump showed sulphides, including pyrrhotite, a magnetic iron sulphide. On the strength of this showing, an area 1,000 x 1,700 was measured off, lines cut and a grid established with numbered stakes at the corners of 100 foot squares.

An electro-magnetic survey hereinafter referred to as E.M., was run over part of this grid and a medium strength conductive zone was indicated as shown on Plan No. 1, Anomaly A. On the strength of this evidence a contractor was hired to open the caved portal of the old Betts Tunnel for examination which showed a substantial pyrite and pyrrhotite replacement of limestone, but sub-commercial values of copper.

The low valued magnetic anomaly continued northward

to O-8-N, but other mineralized areas show only slight increases in magnetic intensity.

Low intensity anomalous self potential readings hereinafter referred to as S.P. were obtained at Anomaly B on Plan No. 2. The dump of the old shaft showed large amounts of big boulders of iron oxides though no green stains to indicate the presence of copper were noted. The old shaft was not accessible for examination. Electro-magnetic readings over this anomalous area showed strong intensity on the west end. It seems indicated that a small but highly conductive shoot of sulphide mineralization probably exists as a replacement pipe in the limestone below the surface.

To the east of Anomaly-B, traverses along the cut lines show less than anomalous readings, excepting only at 39N-27E where a slightly anomalous magnetometer reading was secured. Old shallow surface workings showing iron stained rocks in limestone with epidote streaks were noted nearby.

A reconaissance traverse with the E.M. equipment along the road CL 49-47, R-17 to R-1, platted as Anomaly C, shows rather strong reaction on the profile. The present ground surface is near the top of the limestone formation. The disclosed iron oxide in the cut might form a larger replacement below. Southwest along the road from the cut copper green stains are seen in several fractures, but the rock outcrops are sparse in this area.

Strong reactions with the S.P. were obtained on the Caledonia - Ruth E.-14 claims and a grid was established for

more detailed testing. Details and profiles of the E.M. tests are charted on Plan No. 3 map in the folder. This is designated as Anomaly "D". This area has had some investigation by surface trenching along the eastern edge of the anomaly and by two shallow shafts in the vicinity of station 39-45. One of these, an incline winze about 20 feet deep with a small cross winze discloses a six inch vein of massive sulfides, with visible copper minerals. The S.P. readings indicate a zone wider to the west and there may be a series of fractures containing enough conductors to account for the results.

From the abrupt cutoff of the readings to the southeast a fault was suspected and surface investigation to the southwest confirmed its presence. The fault fractures are occupied with a quartz vein at station 36-28 and the limestone block on the southeast has been uplifted several hundred feet to where it outcrops at the top of the hill. Possibly the mineral zone outlined by the geophysical work and surface traces as Anomaly "O", has been shifted to the west on its south side and continues eastward from station 34-37.

Bad weather accompanied by heavy snow fell in this area as this work was being done and prevented further investigation and extension on this anomalous area.

Begining at 46N-42E a line was cut and staked North 15 West extending from 46 to 131, a distance of 8,500 feet. It starts on Anomaly "D" but continues only for a short distance,

though it indicates several E.M. anomalies further along its course. It has not yet been tested by the magnetometer or S.P.

RECOMMENDATIONS

All of the Anomalies discussed in the foregoing pages are worthy of further testing and exploration. Priority of application of funds for this purpose would be in order of their judged importance as follows:

Anomalies "C" and including "B" which is probably a continuation of it, should be tested by soil sampling to determine surface concentrations of copper, lead and zinc, prior to the spotting of several diamond drill holes into the underlying limestone. Some further closely gridded E.M. and S.P. tests should be made also to help determine strike of the anomalous structures.

Anomaly "D", warrants considerable further testing before any specific program is chosen. Since it is also underlain by limestone it could have replacement mineralization, though so far no strong concentrations are indicated.

SURVEY DATA

A total of 114 stations were set by marked stakes on the claims surveyed for this report, not including the Betts and Calendonia claims.

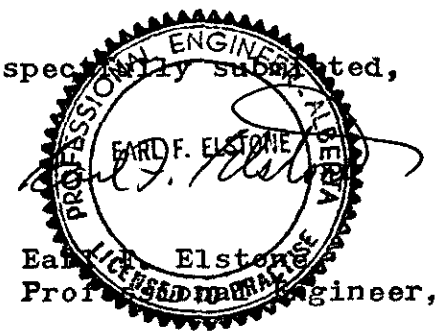
This entailed line cutting of 11,400 feet.

Magnetometer readings were taken at 94 stations. S.P.

readings were taken at 50 foot intervals and a total of 276 readings were recorded.

At each location where E.M. readings were taken, four separate reading tests were taken and recorded. Readings were taken on 56 stations, totalling 224 readings.

Respectfully submitted,



Earl F. Elstone
Professional Engineer, Geophysicist

Grand Forks, B. C.
December 8, 1964.

Exhibit "A" To Geophysical Report of December 10, 1964.

INTERPRETATION OF MAGNETOMETER READINGS

Magnetometer readings are actually measurements of the intensities of the earth's magnetic field; from a geologic standpoint they are determinations of the magnetic susceptibilities of the rocks underlying the point where the readings were taken. It is possible to measure any angular or intensity component, but experience has shown that vertical intensity anomalies are the most interpretable.

Strong magnetic anomalies are due mostly to the presence of magnetite, weaker ones probably pyrrhotite, and other minerals only weakly magnetic. Rock types are also major influences causing major anomalies; particularly mafic or ferromagnesian rich (basic) igneous rocks seem to show the highest magnetic susceptibilities. As silica increases-- as in granitic rocks (acid)--susceptibilities fall. In sedimentary and metamorphic rocks magnetic susceptibilities are probably related almost entirely to the magnetite content. In the final analysis, probably all three great rock types, igneous, sedimentary and metamorphic, produce local anomalies based on the shape, size, and distribution of the portions of their rocks that are richest in magnetite concentrations. This is particularly true close to the surface; at depths, other influences such as size, shape and densities of differing rock components exert modifying influences.

In preliminary reconnaissance traverses such as the sub-

ject one where no significant magnetic anomalies have been found, little attention is given to this physical state for the time being. In the event that evidences of other anomalous circumstances are found to be present without being sufficiently corroborated by geological interpretations, some thought may be given to the desirability of a more accurate survey by a sensitive magnetometer over a grid, whereby instrument readings are referred to a base, corrected for temperature, diurnal variation, multiplied by the proper scale values and corrected for the normal geographic variation. From these readings an isonamily map would be prepared.

Judging from the reconnaissance readings secured, which though uncorrected, show less than 5% variation and some periodic consistencies, the changes noted were probably caused by changes in formations, with or without structural changes.

Interpretations of magnetic anomalies in terms of geologic formations and structures is largely qualitative and empirical. In some cases it is possible to make more quantitative depth interpretations using a torsion balance, preferrably. This is a so-called gravity method and is based on measurements of the the gravitational field which is in turn affected by differences in densities and dispositions of geologic bodies beneath the surface.

With the use of a Schmidt Vertical Magnetometer, approximately the same result can be reached. It consists of a magnetic system suspended by a knife edge and oriented at right angles to the magnetic meridian. The magnetic vertical inten-

sity is compared with gravity, which is assumed to be constant in these measurements; the deflections are read on an auto-collimation telescope. Though the interpretations must necessarily be of an indirect nature, magnetic anomalies can be calculated from their potential; if the bodies are extended in strike, the logarithmic potential takes place of the Newtonian potential. Magnetically, the anomaly is inversely proportionate to the square of the distance; gravitationally it is inversely proportional to the first power of distance.

To bodies magnetized homogeneously in the earths field by induction, a theorum by Poisson applies; their magnetic potential is equal to their intensity of magnetization, multiplied by the gravity component in the direction of magnetization. As magnetic intensities are gradients of magnetic potential, it follows that they are related to the gravity gradients measured with the torsion balance. Hence, magnetic effects of given bodies can be calculated by the same analytic and graphic methods used in torsion balance work.

Respectfully submitted,

Earl F. Elstone

Earl F. Elstone

January 11, 1965

Missoula Montana

EXHIBIT "B" TO GEOPHYSICAL REPORT OF December 10, 1964

RECORD OF EMPLOYMENT ON PORTION OF PROJECT

The following men were employed doing field work in gathering data for the geophysical project as compiled in the Geophysical Report on the Ruth E.-6 thru -13, inclusive, mining claims:

Operators	Rate of pay per day
Clayton S. Powney	$30.00
Ronald P. McBean	$30.00
Line Cutter and Helper	
Wm. Ed. Koftindff	$16.00
Project Manager	
Earl F. Elstone	$75.00

All of the parties worked November 9 through November 14, 1964, inclusive, and November 16 through November 20, 1964 inclusive.

Respectfully submitted,

Earl F. Elstone

Earl F. Elstone

EARL F. ELSTONE

MINING CONSULTANT

PHONE 543-5611
2115 26TH AVE.
MISSOULA, MONTANA

REGISTERED PROFESSIONAL ENGINEER
MINING ENGINEER AND GEOLOGIST
ATTORNEY AT LAW

EXHIBIT "C" TO GEOPHYSICAL REPORT of December 10, 1964

QUALIFICATIONS AS A GEOPHYSICIST

The writer was instructed by Scurry-Rainbow Oil Ltd. to make a geological and geophysical examination of the Ruth E-6 to 13, inclusive, mining claims. The work was carried on during the period from September 17 to November 20, 1964, and was continued intermittently thereafter, subject to weather. All work was done under the supervision of the writer.

The writer's qualifications are as follows: A graduate of the University of Idaho School of Mines, Moscow, Idaho, on June 6, 1927, with a BSc in Mining Engineering, in which course was included subjects of physics and engineering physics. Practice in the fields of engineering, geology and mining has been continuous since that time.

The writer studied law as a spare time improvement project and in 1948 took examinations for an LLB degree and admittance to the Bar of the State of Montana.

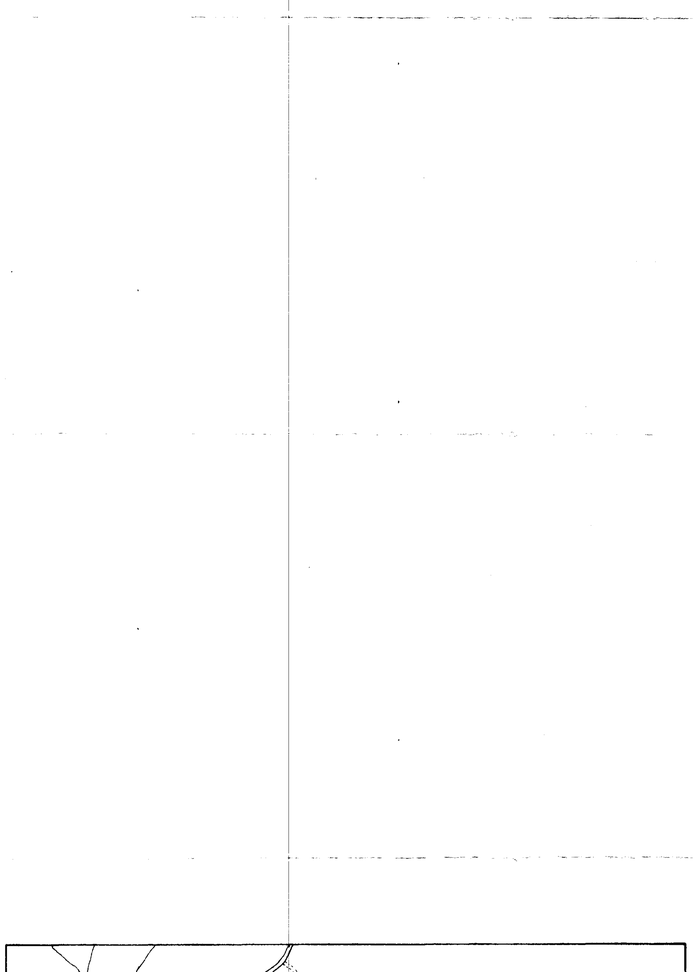
The writer studied a non-credit course in electricity from the Cooke Electrical School in 1950. In 1951 he began the study of earth sciences and geophysics which has continued to the present.

Since September, 1961, the writer has acted as Mining Consultant for Scurry-Rainbow Oil Ltd. of Calgary, Alberta, in the field of the hard minerals, during which time the writer has conducted and supervised a number of geophysical test programs, both in the United States and Canada.

Respectfully submitted,

Earl F. Elstone

Earl F. Elstone
Professional Engineer
Montana and Alberta



LOCATION MAP
SCALE 1"=1500'

PLAN NO. 1

GEOPHYSICAL TEST SURVEYS OVER PART OF PROPERTY

VALUE LINE MINING LTD.(NPL)

MAGNETOMETER, SELF POTENTIAL & ELECTRO-MAGNETIC READINGS & GEOLOGICAL INTERPRETATIONS

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 615 MAP 1

GRAND FORKS

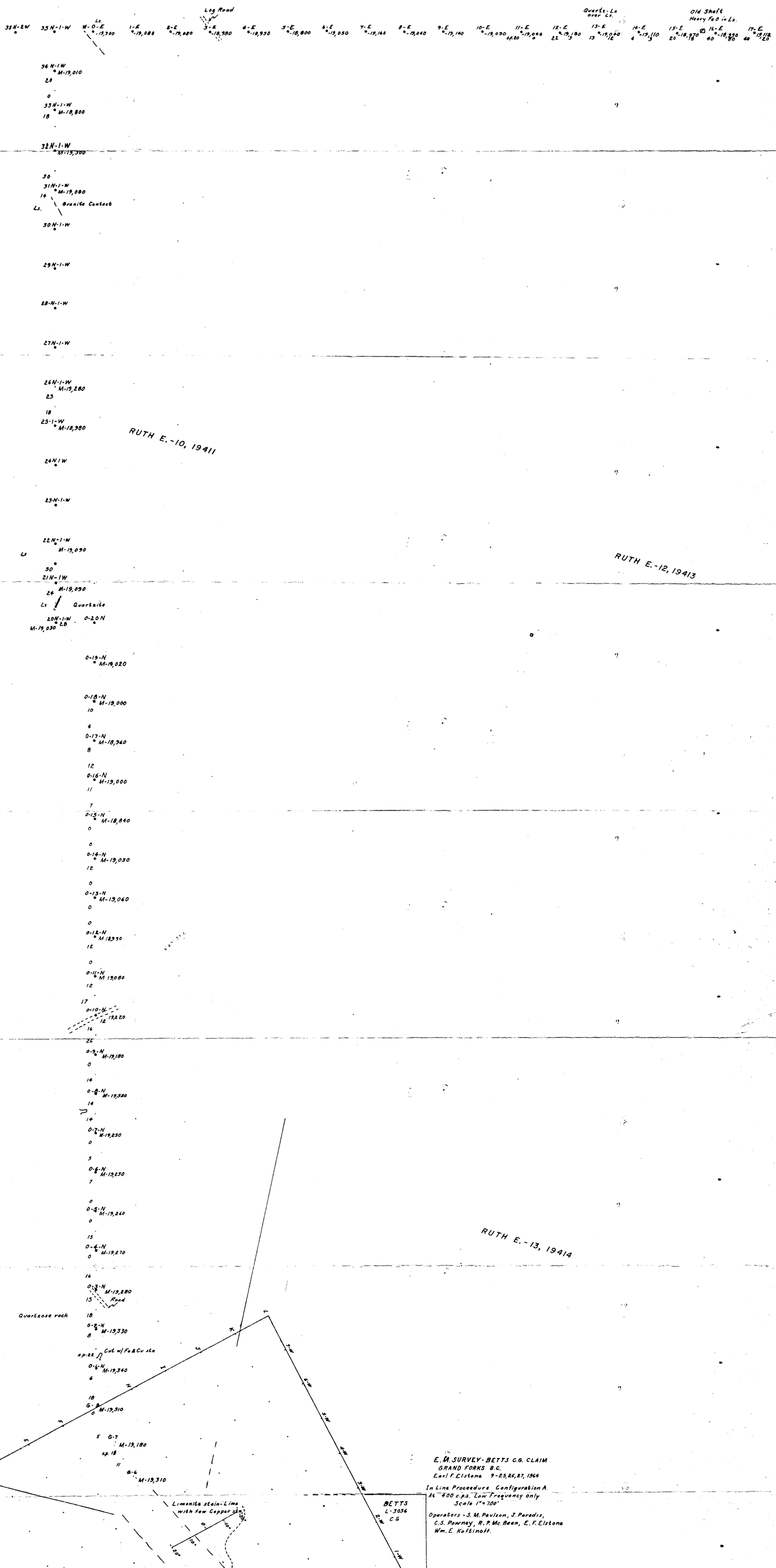
BRITISH COLUMBIA

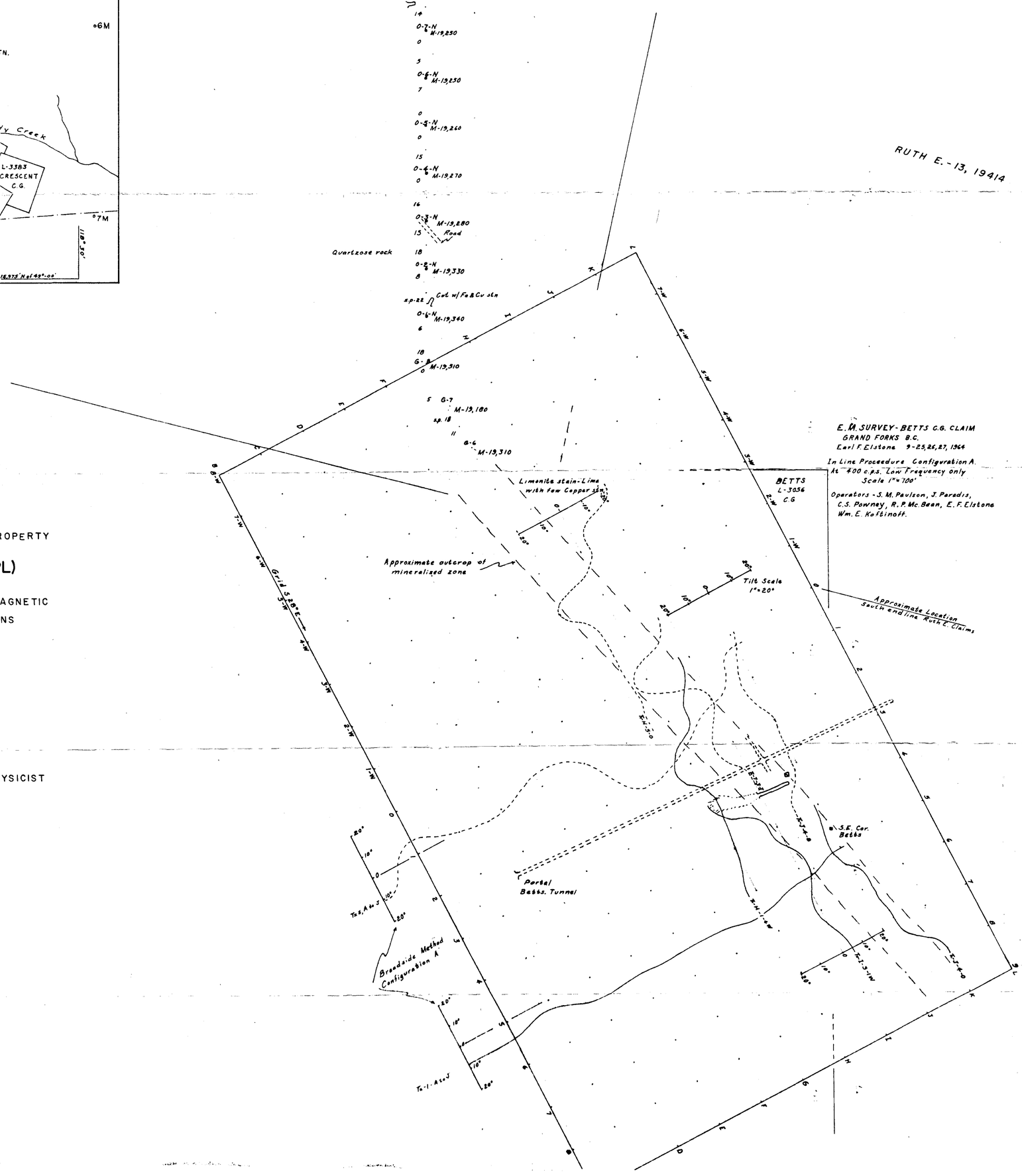
GEOPHYSICAL SURVEYS BY

EARL F. ELSTONE, PROFESSIONAL ENGINEER, GEOPHYSICIST

SCALE 1"=100'
0 50 100 200 300

To accompany Report dated Dec 8, 1964





ADDENDA TO MAP LEGEND TO ACCOMPANY REPORT OF Dec 8, 1964

The EM readings plotted on the profiles represent a combination of parameters measured, being (1), direction of the secondary field broadcast by a conductor; (2), the degree of distortion shown by the tilt angles; (3), the ratio of the low frequency to the high frequency readings; (4), the effects of out-of-phase conductors, if present; and (5), some manifestations of the intensity of the signals re-broadcast by the conductors.

The amplitudes of the profile curves do not represent linear measurements, but are directly proportional to their probability of indicating anomalous conditions under certain circumstances.

Earl F. Elstone
PROFESSIONAL ENGINEER BRITISH COLUMBIA
EARL F. ELSTONE
LICENSED TO PRACTICE

Earl F. Elstone
PROFESSIONAL ENGINEER
EARL F. ELSTONE
LICENSED TO PRACTICE

615

PLAN NO. 2
GEOPHYSICAL TEST SURVEYS OVER PART OF PROPERTY
VALUE LINE MINING LTD. (NPL)
MAGNETOMETER, SELF POTENTIAL & ELECTRO-MAGNETIC
READINGS & GEOLOGICAL INTERPRETATIONS
GRAND FORKS
BRITISH COLUMBIA
GEOPHYSICAL SURVEYS BY
EARL F. ELSTONE, PROFESSIONAL ENGINEER, GEOPHYSICIST
SCALE 1" = 100'
0 50 100 200 300
To accompany Report dated Dec. 8, 1964
N
E.M. In Line Method Configuration A
E.M. In Line Method, Configuration A
Tilt Scale
E.M. Projected from Line 35-13-35-20
ANOMALY "B"
ANOMALY "C"
E.M. Readings Projected from R-1 to 17 & CL-47 to 49
Projection of E.M. Readings 37 to 44E
Phosphyritic Lava
Initial Cor. Ruth E.14 & BCC 6
Final Cor. BCC 5 & 6
To 400' North
To 400' South
LEGEND
E.M. In Line Method, Configuration A
400' Instrument Spacing - 1600 & 400 c.p.s.
H.F. Forward Instrument
L.F. " "
H.F. Rear Instrument
L.F. " "
Grid Station
35N 17E Co-ordinates
19290 Magnetometer reading in gammas
40 20 Self Potential readings in Millivolts
E.F.E.
ADDENDA TO MAP LEGEND TO
ACCOMPANY REPORT OF Dec 8, 1964
The EM readings plotted on the profiles represent a combination of parameters measured, being (1), direction of the secondary field broadcast by a conductor; (2), the degree of distortion shown by the tilt angles; (3), the ratio of the low frequency to the high frequency readings; (4), the effects of out-of-phase conductors, if present; and (5), some manifestations of the intensity of the signals re-broadcast by the conductors.
The amplitudes of the profile curves do not represent linear measurements, but are directly proportional to their probability of indicating anomalous conditions under certain circumstances.
PROFESSIONAL ENGINEER ALBERTA
EARL F. ELSTONE
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 615 MAP 2
615

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 615 MAP 3

PLAN NO. 3

GEOPHYSICAL TEST SURVEYS OVER PART OF PROPERTY

VALUE LINE MINING LTD. (NPL)

MAGNETOMETER, SELF POTENTIAL & ELECTRO-MAGNETIC READINGS & GEOLOGICAL INTERPRETATIONS

GRAND FORKS
BRITISH COLUMBIA

GEOPHYSICAL SURVEYS BY
EARL F. ELSTONE, PROFESSIONAL ENGINEER, GEOPHYSICIST

SCALE 1" = 100'
0 50 100 200 300

To accompany Report dated Dec. 8, 1964

LEGEND
44 N 33 E Grid Station Coordinates
-19,040 Magnetometer reading in gammas
0 33 Self potential readings in Millivolts
E.F.E.
Tilt Scale 1" = 20°
Start NW Reconnaissance Line
ANOMALY "D"
Ruth E.-7
Ruth E.-6
Ruth E.-14
Approximate outline of mineralization as indicated by Self Potential readings.
Quartzite
Lava & Tuff
Epi-Lava
Grn porph over
Greenstone
Fault
SE Cor. Caledonia
Initial Cor Ruth E.-16
Final Cors B.C.C 526
Open pit. Cu Stn
Cu Shows in float
Heavy FeO Float
Top of Hill 3800' El
Bottom of CALEDONIA SHEET

ADDENDA TO MAP LEGEND TO ACCOMPANY REPORT OF Dec 8, 1964

The EM readings plotted on the profiles represent a combination of parameters measured, being (1), direction of the secondary field broadcast by a conductor; (2), the degree of distortion shown by the tilt angles; (3), the ratio of the low frequency to the high frequency readings; (4), the effects of out-of-phase conductors, if present; and (5), some manifestations of the intensity of the signals re-broadcast by the conductors.

The amplitudes of the profile curves do not represent linear measurments, but are directly proportional to their probability of indicating anomalous conditions under certain circumstances.

PROFESSIONAL ENGINEER - ALBERTA
EARL F. ELSTONE
LICENSED TO PRACTISE

615