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NORTHWESTERN EXPLORATIONS, LIMITED

REPORT

Induced Polarization Survey

R.K. 7 - 30 M.C's.

Kamloops Mining Division

1958

by

D. A. Barr, P. Eng.

INDEX

PLATES

(in pocket)

NORTHWESTERN EXPLORATIONS, LIMITED

INTRODUCTION

The R. K. Group of mineral claims includes 51 claims and seven fractions held by location on the slopes of Forge Mountain, approximately 17 miles south-easterly from Ashcroft.

The claim area lies in the northern portion of the copper-bearing Guichon Creek batholith. Few granitic outcrops are exposed on the R.K. claims, as a result of the occurrence of capping volcanic rocks of Miocene age in the western portion of the claim area, and glacial drift in the eastern part.

In an attempt to investigate the drift-covered portion of the claim area, an induced polarization survey was recommended. Work on the R.K. Nos. 7 - 30 mineral claims inclusive was carried out during the period July 3 to 23, under the direct supervision of Dr. D. A. Hansen, geophysicist, Bear Creek Mining Company, working in co-operation with the author. Key geophysical personnel, including W. Thompson and F. Bottos, and all geophysical equipment were obtained under contract from McPhar Geophysics Limited of Toronto.

In the following report, information concerning the equipment used in the survey was kindly supplied by W. Thompson.

The survey was carried out on chained east-west picket lines, turned off by transit at 1600-foot intervals from a north-south base line, established by transit and chain (c.f. plate No. 1).

ABSTRACT

THE INDUCED POLARIZATION METHOD

Induced Polarization effects occur when there is a change in the method of electrical conduction in the ground. In ordinary earth materials conduction is by ions. Sulfides, native metals, graphite, magnetite, and other minerals with metallic lusters exhibit metallic conduction or conduction by electrons. If conduction paths through the earth involve both types of conduction and direct current is used, the metallic conductors become blocked or polarized just as the electrodes in an electrolytic cell become polarized. This effect is known as interfacial polarization, overvoltage, or double-layer charging. Polarization does not occur with alternating current and the resistance of paths involving electronic conductors is accordingly less with alternating current than with direct current.

This effect is utilized in prospecting by making standard Resistivity measurements first using direct current and then using alternating current. A decrease in apparent resistivity with the alternating current measurement is an indication of the presence of metallic conductors.

Two quantities are obtained from field measurements--the DC apparent resistivity designated ρ_{DC} and the AC apparent resistivity designated ρ_{AC}. The units of both of these quantities are ohm-feet divided by 2π. From ρ_{DC} and ρ_{AC} two additional quantities are computed. These are the Percent Frequency Effect, PFE, and the Metallic Conduction Factor, MCF.

$$PFE = \frac{\rho_{DC} - \rho_{AC}}{\rho_{AC}}$$

and

$$MCF = \frac{PFE}{\rho_{DC}} \times 10^5$$

These two quantities are studied with the DC resistivity in arriving at an interpretation. The Percent Frequency Effect must be significantly greater than (a) instrumental precision and (b) background frequency effects of the area in order to be considered as indicative of metallic conduction. In some cases only ρ_{AC} and the MCF are presented in the data. It must then be established that the values given for the MCF are based upon significant frequency effects. Anomalous values of the MCF are considered to indicate metallic conduction, which may or may not consist of economic mineralization.

The method of presenting data is illustrated on the attached drawing. The end-on electrode arrangement is used with current applied to the earth through a long wire grounded at both ends of interval "a." The receiver consists of a suitable voltmeter grounded at both ends of interval "c." In practice the intervals a, b, c, . . . etc. are equal and vary from 100 to 1000 feet, depending on the problem at hand. With the Sender across interval "a" and the Receiver across interval "c," the values of the MCF are plotted at the point "a,c" below the reference line and ρ_{DC} is plotted at point "a,c"

above the reference line. Points "a,c" are determined by the intersection of 45° diagonals drawn from the mid-points of Sender and Receiver intervals. The next reading would be taken with the same Sender position but with the receiver advanced to interval "d." The data for this arrangement is plotted at points "a,d." The Receiver is stepped outward until the observed voltage is too small for a reliable reading. The Sender is then advanced to interval "b" and the procedure with the Receiver is repeated.

The values plotted at the various points are then contoured. Percent Frequency Effects, if shown, appear as superscripts to ρ_a and are not contoured. The reference line on the drawing represents the line of electrodes on the ground. Electrical changes in the ground at increasingly greater distances away from the electrode line are indicated by the behavior of contours parallel to and away from the reference line. Lateral electrical changes along the line of electrodes are indicated by contours along the direction of a 45° diagonal.

As with other geophysical methods, experience is an important factor in the deduction of a valid interpretation.

EQUIPMENT

Induced polarization equipment includes a current transmitter powered by a gasoline-operated motor generator unit which induces current into the ground through two spaced metal electrodes. A receiver unit, which is essentially a voltmeter, measures the ground voltage between two porous-pot contact electrodes which are inserted in the ground, set distances away from the transmitting electrodes.

INTERPRETATION OF INDUCED POLARIZATION DATA

An examination of the induced polarization profiles of Plates 2 and 3 reveals no anomalous values of metallic conduction factor (MCF) and percent frequency effect (PFE). The small variations in the data values are best explained by normal instrumental drift and local variations in ground conditions.

An examination of the resistivity data ($\rho a/2\pi$) reveals contrasts which may be interpreted in terms of rock type once a certain amount of geologic control as available. Plate 1 displays the distribution of rock types as inferred from the resistivity data.

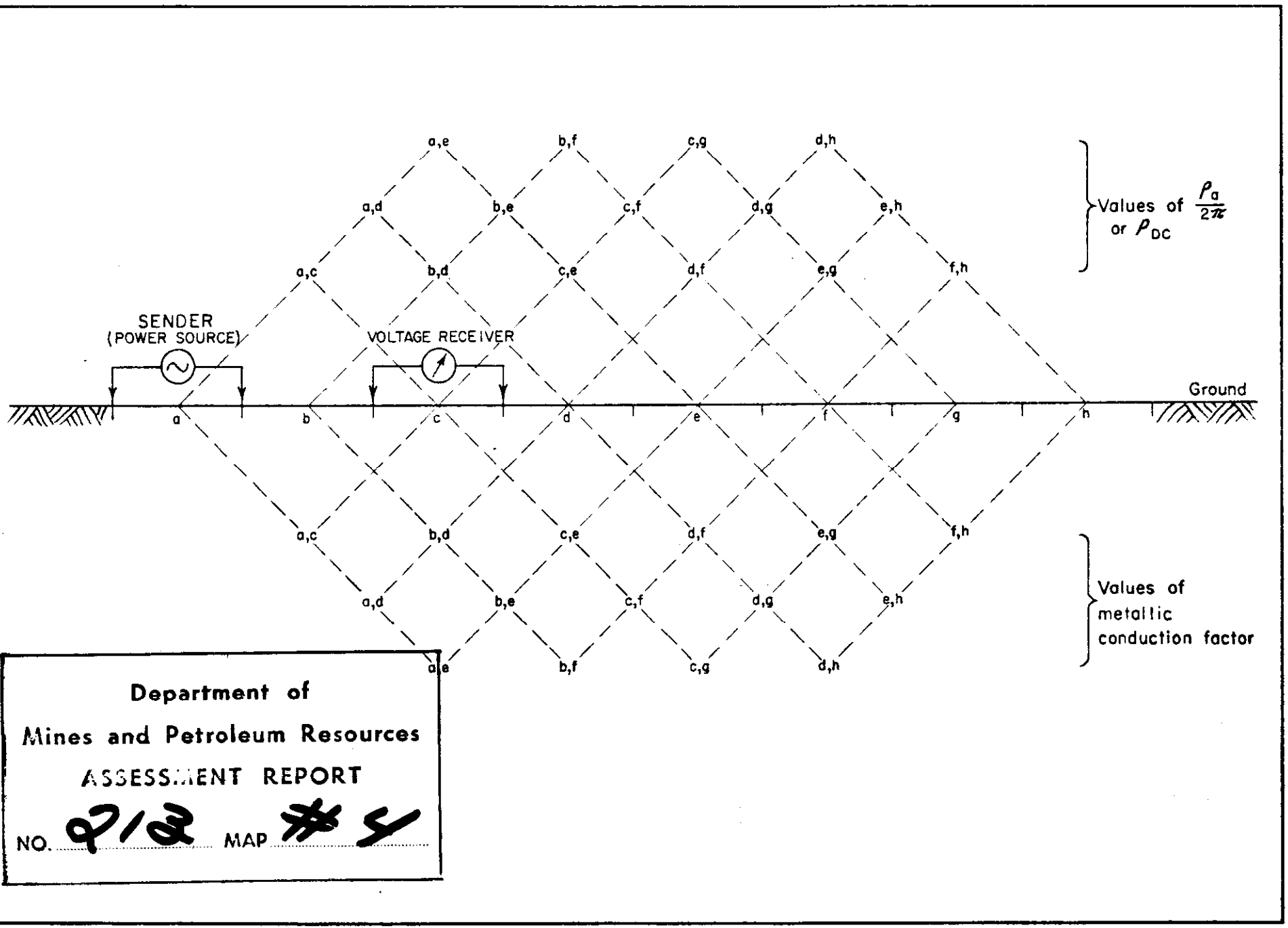

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FIGURE 6

EXPENDITURES

McPhar Geophysics Limited of Toronto supplied Northwestern Explorations, Limited, a junior geophysicist and one technician and induced polarization equipment at the rate of $4,000.00 per month plus expenses. An agreement (Project No. 65750) covering the contract, was dated April 11, 1958. By agreement, Northwestern supplied three men to assist in the survey. Additional expenses covering supervision by D.A. Hansen, are also applicable to the cost of the survey.

Survey period: July 3-23, less July 4th	20 days
Work month:	26 days
Lineal feet surveyed during period:	62,400 feet
Lineal feet surveyed on RK 7-30 M.C's.	38,400 feet
Percentage of work applicable to survey	62%
McPhar contract cost during period less expenses:	$3,075.00
Portion of contract cost applicable to survey:	1,900.00
Northwestern personnel wages:	
H. Laanella @ $250.00/month	119.00
G. Davies @ $400.00/month	191.00
8 shifts @ $15.00 watering I.P. lines	120.00
Supervision: D. Hansen @ $35.00/day 4 days	140.00
TOTAL	$2,470.00

Cost of survey per claim = $100.00+

D. A. Barr.

Vancouver, B.C.

July 28, 1958

R.K. 30 | R.K. 28 | R.K. 26 | BASE LINE | R.K. 24 | R.K. 22 | R.K. 20

52W 48W 44W 40W 36W 32W 28W 24W 20W 16W 12W 8W 4W 0 4E 8E 12E 16E 20E 24E 28E 32E 36E 40E 44E

LINE 160 NORTH

R.K. 29 | R.K. 27 | R.K. 25 | R.K. 23 | R.K. 21 | R.K. 19

very thin cover

LINE 144 NORTH

Thin cover of volcanics

Deep volcanics

R.K. 18 | R.K. 16 | R.K. 14 | R.K. 12 | R.K. 10 | R.K. 8

LINE 128 NORTH

R.K. 17 | R.K. 15 | R.K. 13 | R.K. 11 | R.K. 9 | R.K. 7

Deep volcanics

LINE 112 NORTH

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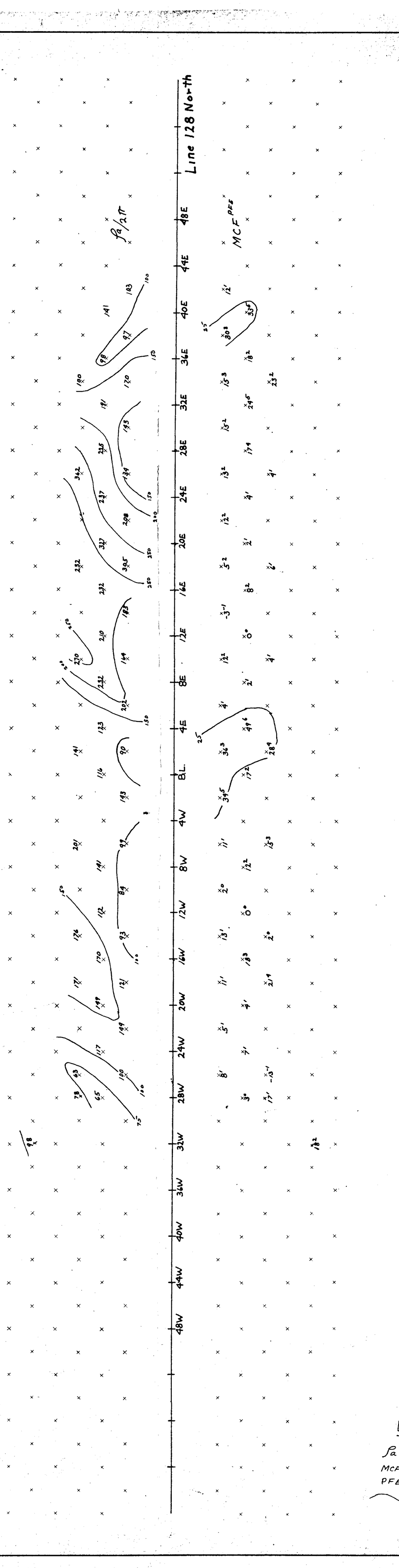
ANOMALOUS ZONES.

POSSIBLE ANOMALOUS ZONES.

NORTHWESTERN EXPLORATIONS LIMITED

KEY MAP
INDUCED POLARIZATION SURVEY
R.K. Na's 7 - 30 M.C.'s
Kamloops Mining Division
British Columbia

DATE: 28/7/58	DRAWN BY: [illegible]	PLATE NO. 1
REVISED BY	DATE	SCALE: IN FEET 0 100 200 300 400



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Legend

Pa Apparent resistivity

MCF Metallic Conduction Factor

PFE Percent Frequency Effect

150 Contour Interval Logarithmic

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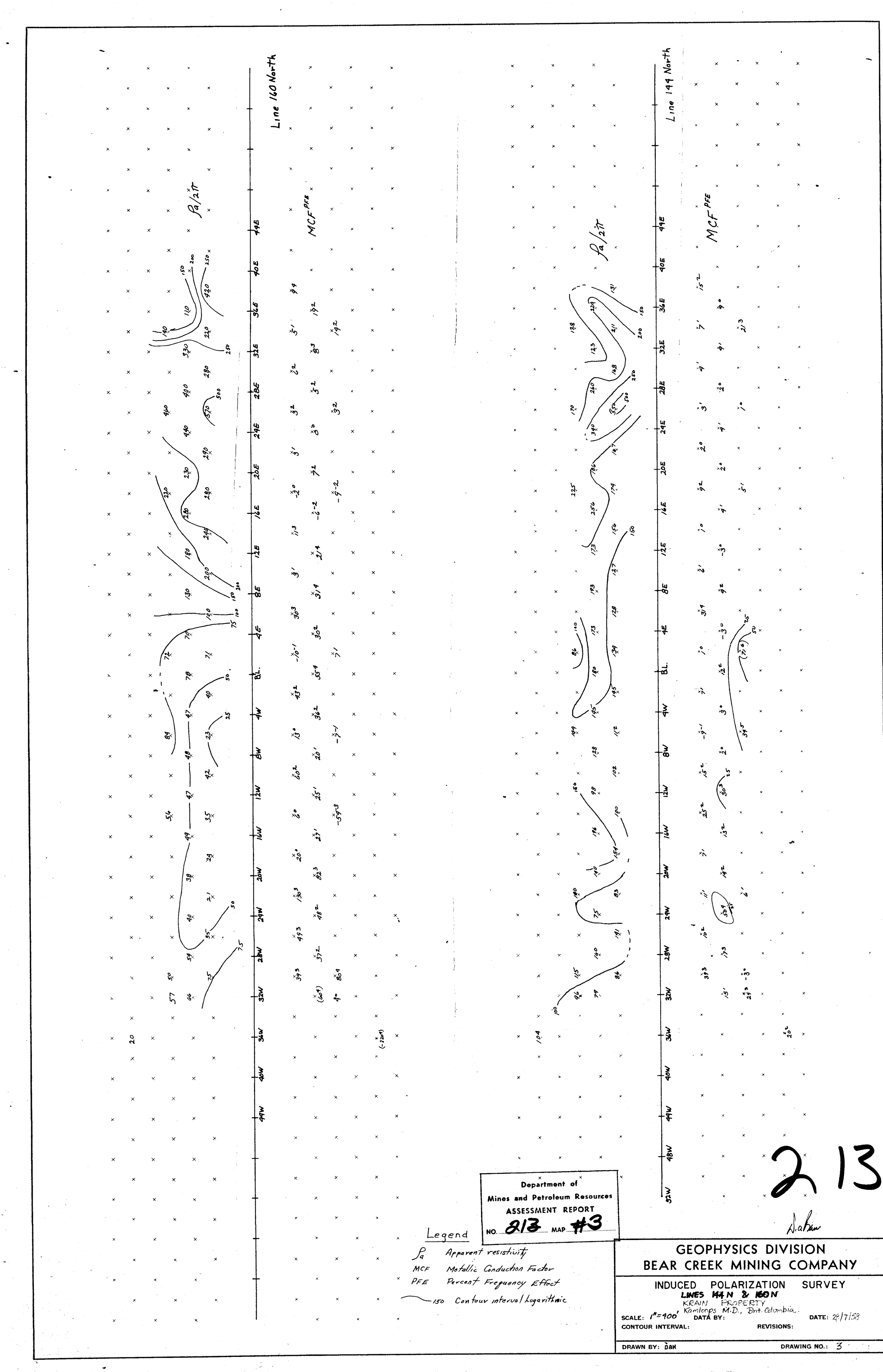
D. A. Bam.

GEOPHYSICS DIVISION
BEAR CREEK MINING COMPANY

INDUCED POLARIZATION SURVEY
LINES 112 N & 128 N
KRAIN PROPERTY
Kamloops M.D., Brit Columbia

SCALE: 1"=400' DATA BY: DATE: 28/7/58
CONTOUR INTERVAL: REVISIONS:

DRAWN BY: D&M DRAWING NO.: 2



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Legend

Pa Apparent resistivity
MCF Metallic Conduction Factor
PFE Percent Frequency Effect
150 Contour interval/logarithmic

GEOPHYSICS DIVISION
BEAR CREEK MINING COMPANY

INDUCED POLARIZATION SURVEY
LINES 144N & 160N
KRAIN PROPERTY
Kamloops M.D., Brit. Columbia.

SCALE: 1"=400' DATA BY: DATE: 28/7/58
CONTOUR INTERVAL: REVISIONS:

DRAWN BY: D&H DRAWING NO.: 3

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