D. C. RESISTIVITY SURVEY

IN THE

SOUTH MEAGER - ELAHO RIVER VALLEY

(INTERIM REPORT)

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by

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Prepared for

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1.0 SUMMARY AND CONCLUSIONS

Eight kilometres of continuous survey coverage have been obtained in the Elaho Pass and in the drainage of the South Fork of Meager Creek.

An anomalous zone at the north end of the line meshes with existing South Fork area anomalous data.

The South Fork anomalous zone is thus extended south toward the Elaho Pass, where it is bounded by higher resistivities.

Completion of the survey line to the south has been postponed until 1982 because of heavy snows and limited air access.

2.0 INTRODUCTION

In September and October of 1981, Premier Geophysics Inc., of Richmond, B. C. commenced a reconnaissance electrical resistivity survey on a line extending from the South Fork area of Meager Creek Geothermal Area, south into the Elaho River valley. Completion of the survey line has been postponed until 1982 because of heavy snows and limited flying weather.

This survey is part of a preliminary program of geological, geochemical and geophysical investigation of the area to assess the potential for discovery of a geothermal resource.

2.1 Program Management

The survey program was operated to specifications set forth in an operating agreement between Nevin Sadlier-Brown Goodbrand Ltd., and Premier Geophysics Inc. Greg A Shore of Premier Geophysics was responsible for the scientific conduct of the field survey, in consultation with Nevin Sadlier-Brown Goodbrand staff geologists.

Preparatory cutting and chaining of the survey line and the maintenance of a field camp was undertaken by Nevin Sadlier-Brown Goodbrand Ltd.

Post-survey data reduction and analysis, and preparation of this report was done by Greg Shore and Michael Schlax of Premier Geophysics.

2.2 Objectives

The resistivity survey was conducted to provide a first evaluation of the electrical characterisitics of the area geology.

The survey line originated near the South Fork Meager resistivity anomalies, and extended south, slightly obliquely to the main trend of the Central Garibaldi eruptive system.

The array type and dimension was selected to provide rapid coverage of a large area while retaining sensitivity to typical geothermal manifestations such as brine accumulations in alluvium, and fluid bearing fracture zones and fault structures.

3.0 SCOPE OF THIS REPORT

The recorded measurements are presented in pseudosection form along with a plan map showing the line location and area covered. The results are discussed briefly, in the context of the very general geological knowledge of the area in which the survey has been completed.

4.0 TECHNICAL DESCRIPTION OF THE SURVEY

4.1 Electrode Configuration

The survey consisted of a single line of dipole-dipole type resistivity measurements, using dipole lengths of 300 m. Terrain and access conditions required the use of some non-uniform dipole lengths, ranging from 300 m to 400 m. Dipole separations up to n=8 were read consistently, with some readings obtained at up to n=12.

Steel electrodes were used for both current and potential dipoles.

4.2 Instrumentation

The transmitters used were a Huntec LOPO Model M-4 200 watt transmitter, providing a polarity-reversing, effective D. C. waveform at 0.125 Hz., and a Phoenix Geophysics IPT-1 1 kilowatt transmitter with a similar waveform.

The receiver was a Hewlett-Packard 7155B microvoltmeter strip chart recorder, recording the complete signal waveforms and noise for later analysis and digitization. Signal buffering and self-potential compensation were accomplished with a Premier Geophysics four-channel compensator.

4.3 Data Processing

The field records were hand digitized, in some cases with the aid of a mechanical method of filtering out telluric disturbances (Premier, 1979). Apparent resistivities are calculated exactly, using the electrode position plotted on the field map to obtain dipole length and orientation. Data is plotted in Hallof-type pseudosection form and contoured to aid interpretation.

4.4 Data Plotting

The calculated dipole-dipole data are plotted in a pseudosection convention developed by Hallof (1957) and used for most geothermal resistivity results in British Columbia and many induced polarization and resistivity survey results throughout the world. The observer is reminded that a pseudosection is an organization of data to aid in interpretation, and represents neither the true resistivity at any point relative to another, nor any absolute vertical scale.

Areas of anomalous data are identified by solid or dashed bars at the top of the pseudosection, and on the line location plan map.

An envelope encloses sections of the survey lines on the plan map (Figure 1), to indicate the scope of array sampling along the line. The distance from the line to the edge of the envelope is an estimate of the extent of effective search for the array dimensions noted. The estimate is based on the depth of investigation characteristic (D. I. C.) (Roy and Apparao, 1971) of the maximum array dimensions used, as modified for pseudosection use by Edwards (1977) who calls it effective penetration, Ze. In essence, a substantial volume of strongly anomalous materials at the edge of or within the envelope, to either side or to corresponding depth below, will be apparent as an anomaly in the pseudosection data (provided other local effects do not obscure the results). An anomaly is represented by a bar plotted along the survey line. The observer can use the envelope in conjunction with the pseudosection to identify and evaluate a range of possible geologic or topographic explanations for the anomaly, narrowing the choice by logical deduction as additional information is obtained.

The envelope plots serve as a visual catalog of approximate resistivity data coverage (providing substantially more information than plots of line location alone). Where no indicators of topographic or conductive masking or distortion are present, for instance, the terrain enclosed in the envelope can be considered "explored" to the limits of the Ze definition of the envelope boundary. Where an anomaly exists, and no firm indication of anomaly source location can be determined (a shallow anomaly at distance "D" to one side may, in pseudosection data, look the same as an anomaly at depth "D" directly under the line) further survey may be necessary to resolve the anomaly. The trial plotting of the proposed detail lines and their search envelope provides an opportunity to evaluate in advance the potential effectiveness of the proposed new data in clarifying the location of the anomaly source.

5.0 INTERPRETATION

Line ELA data obtained to date are presented as Figure 1. South of station 60N, apparent resistivities commonly greater than 1000 ohm-metres are observed. North of station 55N an anomalous resistivity zone meshes with existing South Fork area anomalous data (lines C, E, S, T). Because the line ELA data do not overlap existing data, the interpretation of the anomaly characteristics remain ambiguous. The north end of Line ELA has served its primary reconnaissance purpose in extending the South Fork anomalous zone and in defining a southern boundary.

The anomaly starts on the slope below the Elaho Pass, and extends to the end of the measured data in the South Fork valley bottom. The lowest observed values occur in the valley bottom. The saline brines (as noted in well M-14) which are thought to cause the other anomalies in the South Fork area may originate near this point, or further upstream to the west.

Ward (1981) has suggested that a north-south structure may cross the valley west of the present survey line. This would be a southerly extension of a structure controlling the South Reservoir resistivity anomaly.

The plan map of line locations (Figure 1) indicates that there is little to be gained from re-starting and completing the remaining 2 km of line ELA to the north. Other more useful tests can be designed to further evaluate the ELA anomaly in the context of prior work in the area.

6.0 RECOMMENDATIONS

A line in the South Fork valley itself (an extension of line S to the west) would map the conductivity, to the west, crossing line ELA and mapping the area due south of the South Reservoir to provide an initial test of Ward's hypothesis. The upstream point of brine inflow could also be mapped by this line. Further investigation of the South Fork anomaly should be undertaken as part of the ongoing exploration program at the Meager Creek Geothermal Area.

The completion of reconnaissance line ELA to the south into the Elaho Valley is planned for early 1982.

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Appendix A

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