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REPORT ON
GEOPHYSICAL TESTS ON
CARMACKS COAL DEPOSIT
YUKON TERRITORY

SUMMARY

A series of geophysical measurements over the Carmacks coal deposit, Yukon, point to VLF em as the most appropriate geophysical method for reconnaissance prospecting for coal. Subtle scintillometer and magnetic responses would appear useful only if used in conjunction with VLF. Although diagnostic of coal, resistivity is far too impractical and expensive as a reconnaissance tool. I.P. response over the coal was not discernible from background.

Respectfully Submitted,

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1. INTRODUCTION

During the period from October 22nd to October 26th, 1976, a series of geophysical tests were carried out on the Carmacks coal deposit, Yukon Territory, on behalf of Kerr Addison Mines Ltd., with the permission of Cyprus Anvil Mining Corporation, owner of the deposit. The field work was carried out by D. MacQuarrie, geologist/geophysicist, under the direction of M.G.Berretta, geophysicist.

Traverses were made at four separate locations, and were roughly perpendicular to the northwesterly strike of the coal, as shown in Figure 1. Nearby trenches revealed the location and extent of the coal with respect to the survey lines, as well as the presence of a sandstone unit southwest of the coal, and a conglomerate northeast of the coal, as shown in Figures 1 and 2. Overburden cover was observed to be in the range of 5-10 ft.

A total of five geophysical instruments were employed in the tests. These are : VLF-EM16, with Seattle as transmitter to ensure maximum coupling between primary field and geologic structure, total count scintillometer, anomalous vertical field magnetometer, frequency domain induced polarization, and resistivity.

2. RESULTS AND INTERPRETATION

The results are shown in Figure 2.

VLF

The most consistent and diagnostic response was obtained with this high frequency em system. All four traverses revealed the presence of a conductor about 100 to 200 ft. southwest of the coal. The tilt angle data was filtered to remove topographic effects as well as high frequency noise, and the resulting maxima clearly define the conductor locations. The tilt angle and quadrature profiles seem to indicate a moderate, near surface conductor of broad dimensions, such as a fault zone, or possibly a better conductor at depth, within a non conductive host. A moderate to steep dip to the northeast is also indicated. Although the coal itself was not found to be conductive, consistent with laboratory tests conducted on coal samples, the presence of a possibly related conductive structure makes the VLF method a reasonably good tool for reconnaissance work.

MAGNETIC

Only two of the traverses (C-C' and D-D') appear to yield some sort of signature over the coal. This consists of a subtle low of about 40 to 60 gammas. Although under some conditions such small variations can be quite diagnostic, it is felt that mag is not a good tool for reconnaissance work over large areas of unknown geology and overburden conditions. However, it may

be helpful if used in conjunction with VLF.

SCINTILLOMETER

The scintillometer data also gave a subtle diagnosis of the presence of coal, by displaying a transition of about 60 to 80 cpm. This may be due to a slightly higher content of radioactive minerals within the conglomerate, compared to the sandstone. Here also, it seems that radiometric data may be of help if taken with VLF and mag.

I.P.

The percent frequency effects observed were in the range of 0.5 to 2.5%. These values are typical background values within rocks such as conglomerate and sandstone. No characteristic response whatsoever was noticed over the coal.

RESISTIVITY

As expected from the laboratory studies on coal, the resistivity data displays a high (few hundred ohm-metres) with respect to the host rocks. However, the slow operation and high cost of this type of survey render it impractical as a first phase prospecting tool. This is especially true in view of the fact that only the 25 ft and 50 ft dipoles (and not the 100 ft dipole) were successful in detecting the coal. Resistivity may be useful in detailing targets defined by other methods.

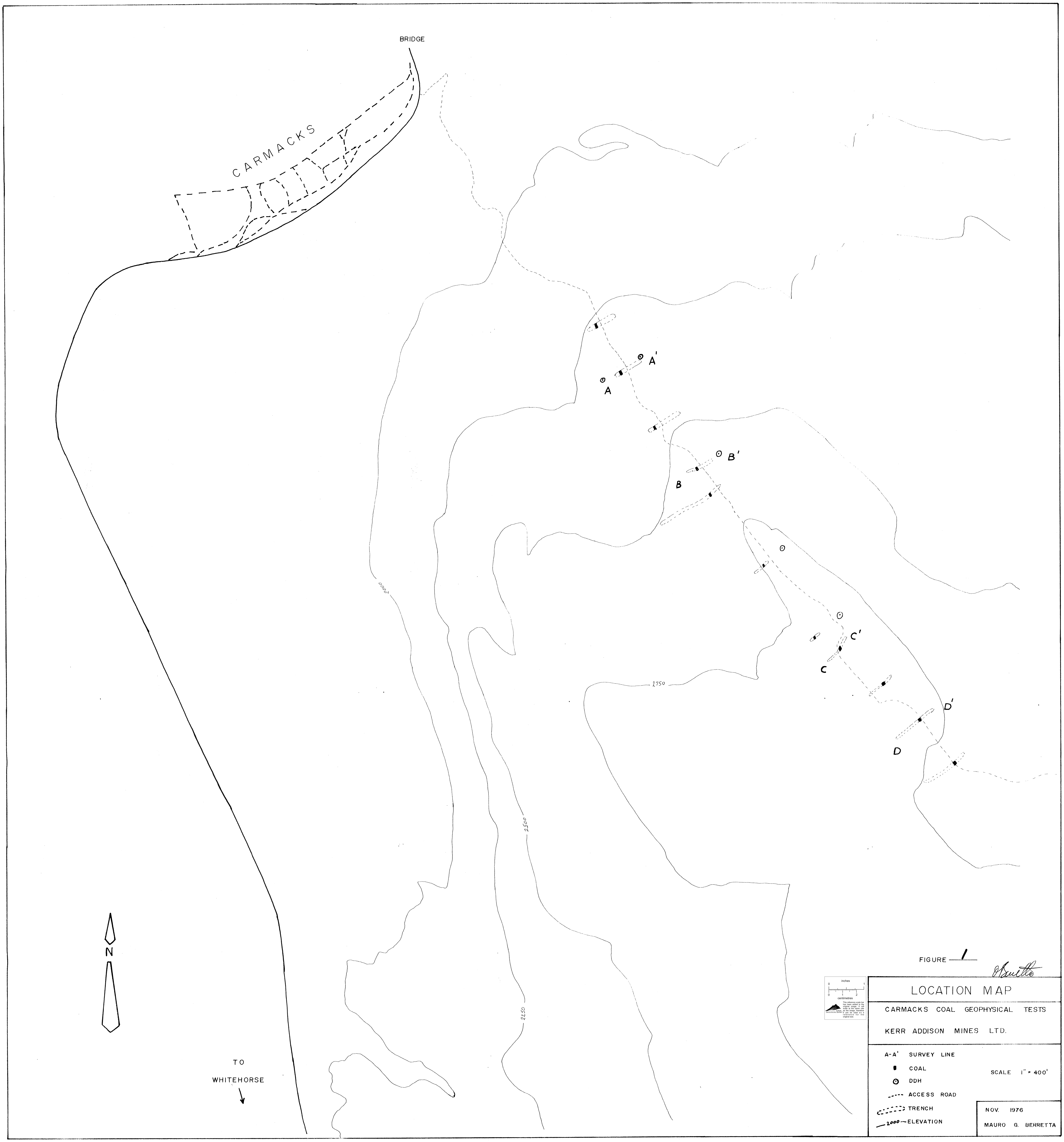

FIGURE 2

GEOPHYSICAL RESULTS

CARMACKS COAL TESTS

KERR ADDISON MINES LTD.

MAURO G. BERRETTA

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