GEOPHYSICAL MEASUREMENTS AT BUCHANS

by

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A variety of surface and borehole geophysical measurements were carried out at Buchans, Newfoundland, during the period August 1982 to March 1983. These included: mise-a-la-masse, IP/resistivity, gamma-ray spectrometry, and Pulse EM techniques in boreholes and deep penetration EM techniques on the surface. These studies were conducted to evaluate the usefulness of the above techniques for outlining the mineralization and to evaluate their potential usefulness in the search for new ore in the Buchans area.

Drill hole mise-a-la-masse, IP/resistivity and natural gamma-ray spectrometry measurements were carried out over three prospects at Buchans. The mise-a-la-masse potential and IP measurements were conducted underground in the MacLean Extension orebody. Two drill holes at the Mudhole prospect and one at the Clementine prospect were logged with IP/resistivity and gamma-ray spectrometry.

The sulfide mineralization in the MacLean Extension, which has high conductivity relative to the host rock, was easily traced from hole to hole with the mise-a-la-masse technique. Drill hole resistivity logs from the Clementine prospect indicate that the conductivity contrast between the mineralization and the host rock is low, making this prospect a poor target for surface electrical and EM techniques. Examination of the raw gamma-ray spectral logs indicates that this may be a useful technique for characterizing the lithology in volcanic settings.

Deep electromagnetic surveys with Maxi-probe and Geonics EM-37 systems were carried out at two sites near Buchans, Newfoundland, during the summer of 1982. The first test site was over the Clementine prospect, which is an irregular sulfide body rich in sphalerite and barite at a depth of about 300 m from the surface. Because of the low conductivity of the orebody and great depth, the EM response on the ground was very weak. It is doubtful whether processing will improve the signal/noise ratio in data from this area.

The second test survey area was at Mary March, about 24 km from Buchans, where several shallow sulfide boulders have been found in the past. The EM survey located several weak conductors in the area, but it is not clear whether the weak response is due to the small size of the bodies or their poor electrical conductivity contrast with the country rock.

Experimental borehole pulse EM surveys were also carried out in selected locations to determine whether the technique could detect new orebodies in the Buchans geologic setting. Primarily due to the absence of suitable open boreholes for these tests, results are inconclusive. However, further analysis of these data is in progress to evaluate the significance of some low level anomalies recorded in the measurements.

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