71-745 895001

GEO-SENSING SYSTEMS COMPANY PTY. LTD.

P.O. Box 58.
HUNTERS HILL. N.S.W. 2110
PHONE 25-5481

MJS:1007

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PROPOSAL FOR AN AEROGEOPHYSICAL SURVEY OVER INTERNATIONAL MINING CORPORATION'S EXPLORATION LICENCE 13/69 (REDUCED), AVOCA, TASMANIA

LOCATION

The Exploration Licence is located on the edge of the Ben Lomond mountain plateau, the southern peak of which rises to 5010 feet (Stacks Bluff), in an area of generally rugged terrain. The Exploration Licence is located approximately 7 miles north of Avoca on the Esk Highway and approximately 4 miles west of Rossarden. The nearest major airfield is located at Launceston 30 miles north-west of the area. The reduced area of the Exploration Licence is 14 square miles.

PHYSIOGRAPHY

The regional terrain drops rapidly from 5010 feet at Stacks Bluff to 3000 ft. on the northern boundary of the Licence. In the vicinity of Storeys Creek, the Aberfoyle Rivulet and other tributaries to the Esk River have cut sharp gorges to depths of between 400 and 800 feet. To the west within the Exploration Licence, the Ben Lomond marshes occupy a relatively flat step in the topography which then falls away to undulating slopes of about 1200 feet altitude. An accurate evaluation of topographic variations is essential in the selection of a suitable aircraft to carry the geophysical sensors.

GEOLOGY

Silurian and older sediments were intruded by Devonian granite prior to slow peneplanation. The granite contained tin, wolfram and uranium mineralisation, which in the Storey's Creek-Rossarden area formed metal concentrations as Sn and Wo bearing quartz fissure fillings, while at Avoca stratiform uranium deposits have developed in Permian sediments overlying the granite. Block faulting, uplift and erosion produced the present complex geology. In general the original granite source hosts only low grade mineralisation while the adjacent Silurian and Permian sediments may be considered prospective for economic deposits of base metals and uranium respectively.

PREVIOUS EXPLORATION

An airborne scintillometer survey has been conducted over the Ben Lomond-Snow Hill area (map G209-1 grid reference K/55/4) by the Bureau of Mineral Resources. Various confidential reports indicate that broad zones of high gamma radioactivity have been correlated with coarse grained granite fractions. Sharp anomalies were restricted to fracture zones and exposed outcrop of Permian shale. Evaluation of these distinct sites of radioactivity does not appear to have been reported yet. No aeromagnetic or airborne electromagnetic surveying is known to have been conducted over the Exploration Licence to date.

Ground operations have consisted of geochemical sampling, geological mapping, radiometric traversing (using a Scintrex BGS-IS scintillometer), percussion drilling aimed at stratigraphic correlation, and borehole gamma ray logging. Almost all work was of a reconnaissance nature and cannot be considered to preclude the possibility of viable deposits occurring in the area.

The most promising results obtained were high gamma count rates in surface exposures and at shallow depth in one of the boreholes. The possible occurrence of other near-surface radioactive sources in relatively remote or inaccessible areas, or in any other areas not visited during the reconnaissance exploration invites a comprehensive detailed survey with the capabilities of distinguishing radiation solely due to uranium and its daughter isotopes.

FEASIBILITY OF AN AIRBORNE SPECTROMETER SURVEY

A gamma ray spectrometer is an instrument designed to differentiate gamma radiation produced by various commonly occurring radioisotopes.

The most common of these are potassium (K40), thallium (Tl208 daughter product of the decay of thorium Th238) and bismuth (Bi214 daughter product of the decay of uranium U238). The first two are commonly associated with granites and enable granitic rocks to be mapped by reconnaissance airborne spectrometer surveying. A scintillometer is unable to distinguish the source of recorded gamma radiation and therefore requires detailed ground follow-up work to assess whether the source is of any economic significance. By proper design of the airborne survey specifications, it is possible to detect virtually all surface occurrences of radioactive elements, and to distinguish uranium series isotopes from those of potassium and thorium. Gamma radiation is strongly absorbed by relatively thin rock cover. However transported salts of uranium and diffusing radon gas often produce detectable gamma ray emissions on the ground above buried uranium bodies. Water also absorbes gamma radiation. As part of the Exploration Licence is swampy it is important that the survey be conducted in the dryer season of the year. Very dense vegetation may also mask significant radiation. This effect might also be reduced by flying in the dry season.

Resolution of radioactive sources is only possible from spectrometer data recorded below 500 feet. Thus to explore the area effectively, the optimum altitude and flight line spacing is limited to less than 400 feet and 500 feet respectively. Ruggedness of topography imposes a lower limit on the survey altitude. In this area, a minimum altitude of the order of 300 feet would apply for both fixed wing aircraft and helicopters. A survey at 350 feet altitude along lines 400 feet apart constitutes a suitable specification for this survey.

AEROMAGNETIC AND ELECTROMAGNETIC SURVEYING

Though neither the uranium mineralisation nor the base metal mineralisation is associated with magnetic minerals (in particular magnetite) aeromagnetic surveying would be a valuable guide in defining structural controls, geological contacts, and basement structure by virtue of contrasts in magnetic susceptibility between various rock units associated with the mineral occurrences.

Similarly a VLF electromagnetic sensor utilising fields radiated by stations of the U.S. submarine communications network might well define extensions of known fault systems, black uraniferous shales and geological boundaries.

These instruments may be carried by the spectrometer survey aircraft at little additional cost and could provide useful information to complement the radiometric data.

APPROXIMATE COST

The main factor determining the cost of the aerogeophysical survey will be the type of aircraft required. Generally in the Storey's Creek-Rossarden area, the rugged topography necessitates the use of a helicopter to maintain reasonably constant ground clearance. In fact an airborne Turair survey using a Bell Jet Ranger is to be conducted soon in the Rossarden area. It is feasible to house a spectrometer and magnetometer though not a VLF-EM system in this aircraft. However despite the fact that mobilisation and demobilisation charges would be shared, the high line mileage rate of approximately $50 per line mile would render this project too expensive. Fortunately the Exploration Licence is located on a relatively flat step where the average gradient along east-west flight lines is about 1 in 20. The maximum gradient of about 1 in 4 occurs in the south west corner of the area. By reducing slightly the area covered (e.g. by eliminating areas of outcrop of Jurassic dolerite) it would appear possible to fly the area with a fixed wing aircraft such as an Islander. The applicable line rate for such an aircraft carrying spectrometric, magnetic and VLF-EM sensors would be of the order of $20 to $25 per line mile.

Thus for a flight line spacing of 400 feet, approximately 180 flight lines are involved (including tie-lines and peripheral flying) at a cost of between $3,600 to $4,500. A mobilisation and demobilisation charge of approximately $800 would be applicable. Our interpretation and report charge of approximately $1,000 would bring the total cost to between $5,400 and $6,300.

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