DEPARTMENT OF MINES

SOUTH AUSTRALIA

GROUND SCINTILLATION SURVEY AT THE HILLSIDE, HARTS AND PARARA COPPER MINES,

by

I.A.MUMME.

February 14, 1955.

Geophysical Report 3/55.

39/22.

G.S. 241.

D.M. 204/55.

DEPARTMENT OF MINES

SOUTH AUSTRALIA

GEOPHYSICAL SECTION

GROUND SCINTILLATION SURVEY

at the

HILLSIDE, HARTS, & PARARA COPPER MINES,

and a

COPPER PROSPECT ON SECTION 39 OF THE HD. OF MULOOWURTIE, ARDROSSAN

by

I. A. Mumme
Assistant Geophysicist

GEOPHYSICAL REPORT NO. 3/55

D.M. 204/55.

SUMMARY

Three copper prospects were radiometrically surveyed in the Hundred of Muloowurtie. These comprise the Hillside copper mine, Hart's copper mine and a prospecting shaft on section 39.

These mines are situated between 8 and 9 miles south of Ardrossan.

In addition the Parara mine (approximately 1 mile from Ardrossan) on section 4430 NE (mineral section) of the Hundred of Cunningham was inspected.

No significant radioactivity was located in these areas.

INTRODUCTION

Radiometric assays of specimens collected by M.L. Wade and G.W. Cochrane at the Hillside Copper Mine during 1952 showed that small amounts of radioactive material occur at this mine.

This area was investigated privately by A. Davis in 1954 who forwarded radioactive specimens to the Mines Department for assaying.

Small amounts of pitchblende were recognised in the rock specimens.

In connection with this, R. Rowley visited the mine and tested the mine workings and dumps for radioactive minerals and suggested that radiometric work be carried out in the area as well as in adjacent mines.

Reconnaissance radiometric work and gridding was carried out by the author at this mine, at the Hart's mine, at the prospecting shaft on section 39 (Hundred of Muloowurtie) and at the Parara mine.

PREVIOUS GEOPHYSICAL & GEOLOGICAL WORK

(a) Hillside Copper Mine

This mine has been examined on various occasions by officers of the Mines Department and is mentioned in the following reviews -

Mining Review 25 pp. 89-90	1916 (H. Jones)
Mining Review 51 pp. 67-69	1929 (L.J. Winton)
Mining Review 52 pp. 66-67	1930 (L.J. Winton)
Mining Review 54 p. 120	1931 (J.L. Pearson)
Mining Review 55 pp. 93-95	1932 (H.S. Cornelius)

The geology of this mine has been dealt with in a report by Wade and Cochrane, and in a report G.S. 228, 39/8 by R. Rowley.

(b) Hart's Copper Mine

The mine is located in section 2 of the Hundred of Muloowurtie on a cliff face overlooking the sea.

There is no geological plan of this area.

A survey plan was prepared by J. Saunders.

The mine consists of 2 collapsed shafts and 2 adits.

Some malachite occurs on fracture zones in metamorphic rocks.

The copper mineralization appears to be genetically connected with the intrusion of porphyry which outcrops on the cliff face just north of the track to the beach, and 40 feet east of 0,0 peg, and on the beach about 400 feet south of the 300 foot peg of the base line.

Inland from the coastal cliffs the topography is gently undulating and the bedrock obscured by travertine and soil.

No primary copper minerals were observed in the shafts or adits or on the dump materials.

(c) Copper prospect on Section 39, Hundred of Muloowurtie.

This consists of a filled in prospecting pit in a sheep grazing paddock.

No copper minerals are visible on the dumps.

A light green mineral, possibly a feldspathoid, can

be seen on the dumps. It is possible that it may have been mistaken for malachite.

No outcrops occur in the area adjacent to the shaft due to soil cover.

(d) Parara Mine

This comprises a shaft sunk to an approximate depth of 12 feet on a hillside in sericite micaphyllites.

Small amounts of malachite occur as coatings in fracture zones in the sericite micaphyllites.

No primary copper mineralization was observed. Tourmaline mineralization occurs in the country rock.

METHODS USED

(a) Hillside Copper Mine

The paddock enclosing the mine was radiometrically traversed at slow speed with a Halross Scintillometer (set on 2 second time constant) mounted in a land-rover.

Traverses were completed in a N-S direction at intervals of 50 feet.

No readings greater than the statistical variation of the instrument were observed.

In an attempt to locate shallow soil covered uraniferous lodes adjacent to the mine itself a base line 500 feet long running 15° East of true North was laid out parallel to the collapsed shafts, and from this base line 11 traverses 50 feet apart offset 300 feet in an easterly and westerly direction.

Scintillometer readings were taken at 25 foot centres in the surveyed area and corrected for sensitivity drift.

(b) Hart's Copper Mine

A baseline was laid out above the cliff-face bearing 3°E of true North and a sketch plan of the mine workings prepared by J. Saunders.

Scintillometer work was carried out by the writer, and an isorad plan prepared.

Inspection of the dumps and adits showed that no significant radioactivity is directly associated with the copper mineralization.

The porphyry rocks exhibited slightly radioactive properties and a small area of highly ferruginous rock adjacent to the beach gave readings of 175 counts per second with the scintillometer

(c) Copper Prospect in Section 39 of the Hundred of Muloowurtie

Reconnaissance scintillometer work was carried out in this area but no radioactive zones located.

(d) Parara Mine

No results of significance were located in this area. Reconnaissance radiometric surveying did not locate areas greater than background count.

INTERPRETATION

The purpose of this survey was to check copper bearing areas located in the Hundred of Muloowurtie and Cunningham for copper mineralization and to attempt to locate uraniferous lodes which may be concealed under soil cover adjacent to the mines.

As the soil appears to be genetically related to the bedrock, weathering processes would result in a radioactive "halo" in the soil above the weathered uraniferous lode.

The intensity and shape of the surface radioactivity in the soil would depend upon the following factors -

(1) Grade, attitude and size of the uraniferous orebody

(2) Weathering processes, nature of the bed rock, soil types, thickness of soil and depth of water table.

Retention of insoluble radium disintegration products, upward capillary movements of radon gas and uranium salts in aqueous solution and diffusion of radon gas would tend to enhance this surface radioactivity whereas leaching would have the opposite effect.

No scintillometer anomalies were located over soil covered areas which could be related to shallow seated uraniferous lodes; however some localized radioactivity was located in ferruginous metamorphic rocks at the Hart's copper mine.

This does not appear to be significant.

RECOMMENDATIONS

The strongest copper mineralization can be seen at the Hillside copper mine where traces of pitchblende occur. Surface radioactive indications do not appear encouraging.

Radiometric prospecting has failed to locate uraniferous lodes which may occur in the area under soil cover. However, as there is an association between copper and uranium mineralization the writer recommends that an area surrounding the Hillside copper mine be geochemically tested for copper.

This could be done by sinking a number of shallow holes with an auger on a grid pattern and geochemically testing the soil for copper traces.

Self potential and resistivity survey would also aid in delineating areas of sulphide mineralization if they are present above the level of the water table.

Radioactive ferruginous rocks occur at Hart's copper mine but no results of significance were obtained and hence no recommendations for drilling can be made.

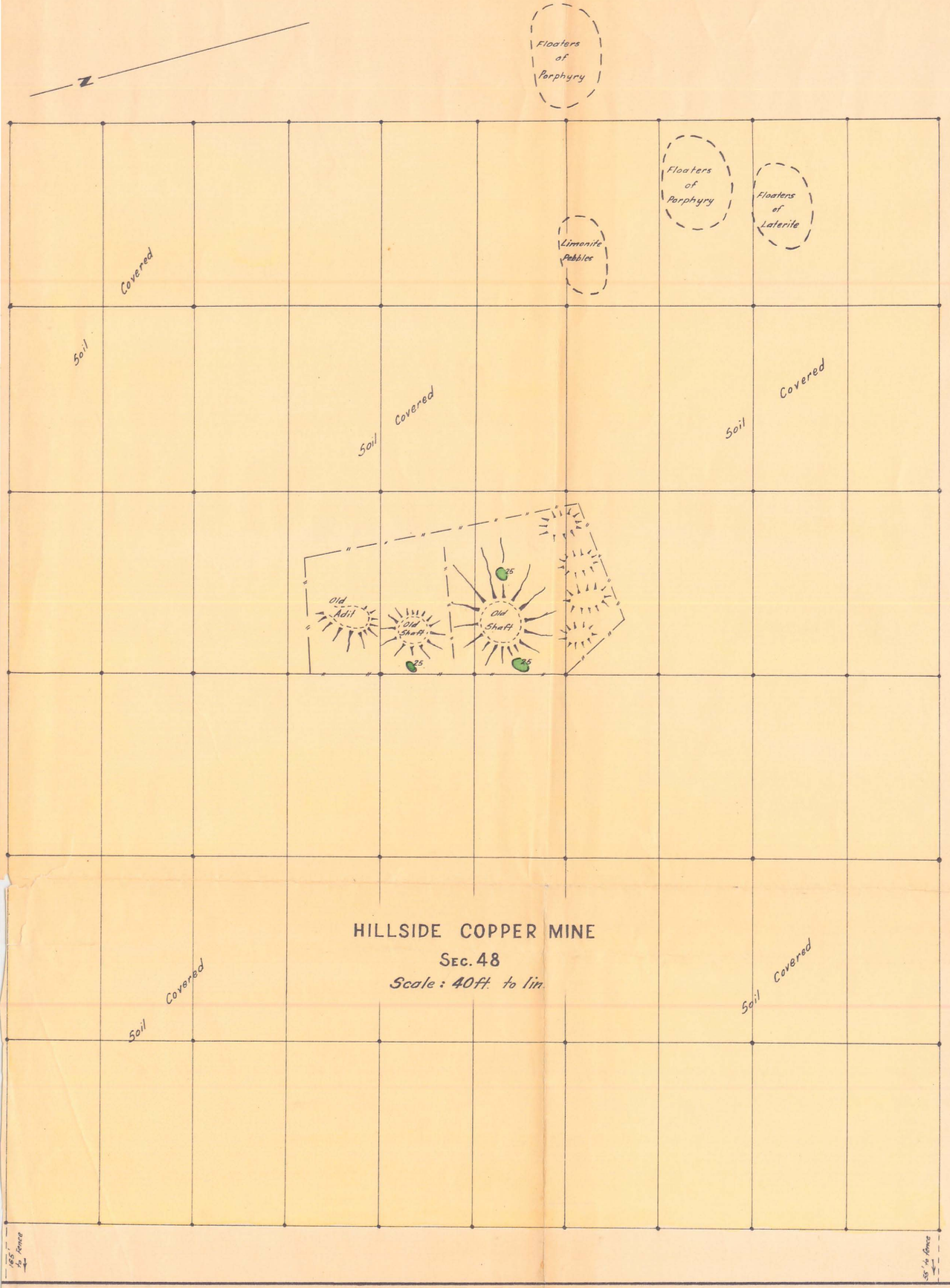
No radioactivity was located at the copper prospects on section 39 (Hundred of Muloowurtie) and section 4430 NE (Hundred of Cunningham) and no further investigation is warranted at these two prospects.

(I. A. MUMME)
ASST. GEOPHYSICIST

Plans accompanying Report:-

55-17

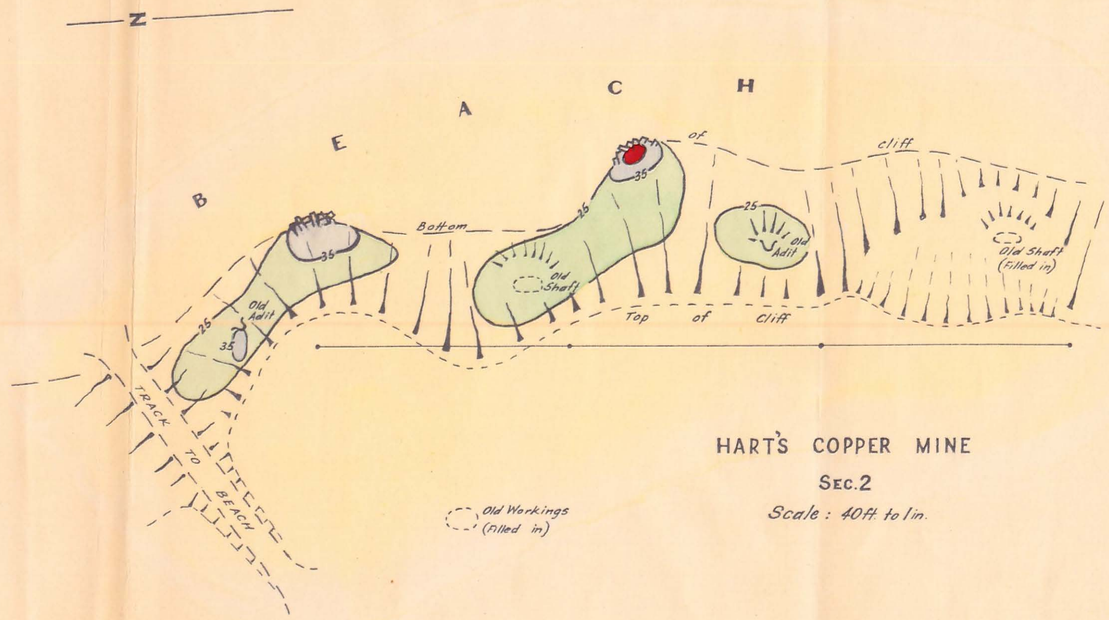
IAM:AGK
4/8/55



HILLSIDE COPPER MINE

Sec. 48

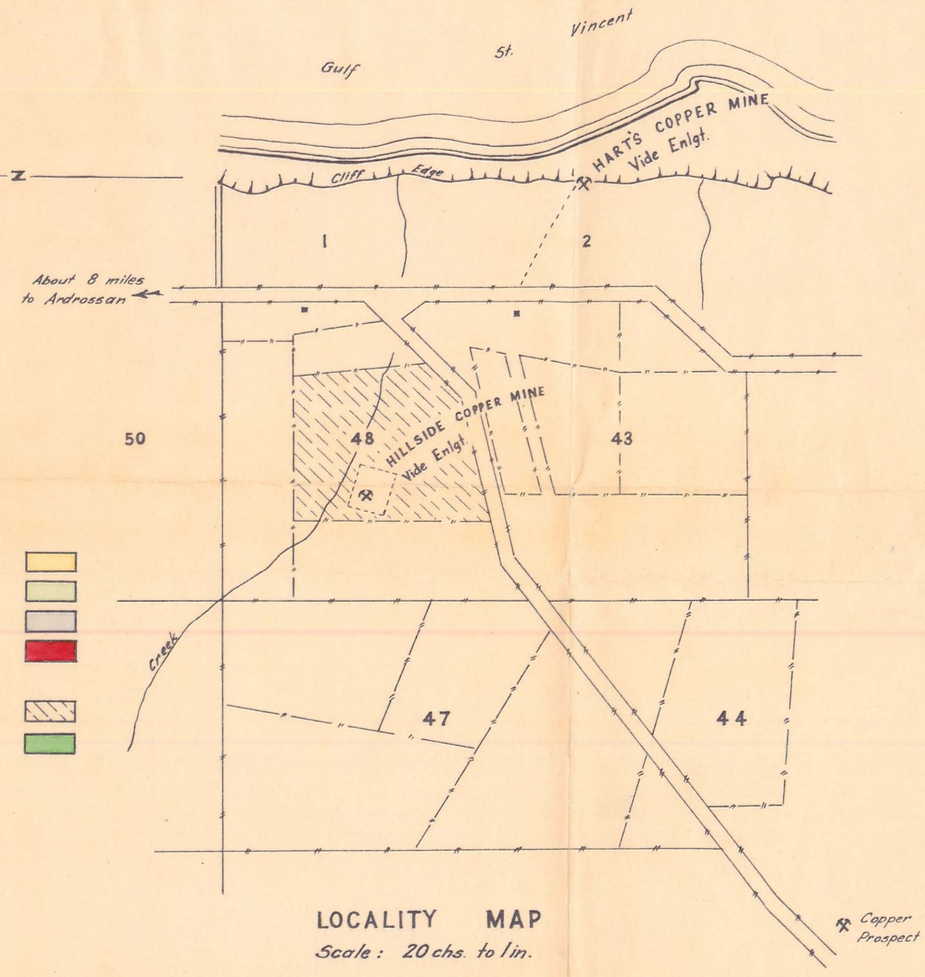
Scale : 40ft. to 1in.



HART'S COPPER MINE

Sec. 2

Scale : 40ft. to 1in.



LOCALITY MAP

Scale : 20 chs. to 1in.

LEGEND

- Less than 25 counts per sec.
- Greater than 25 cps. & less than 35 cps.
- Greater than 35 cps. & less than 50 cps.
- Greater than 50 cps. & less than 200 cps
- Area traversed with scintillometer in Land-Rover shewn thus
- Greater than 25 cps. & less than 200 cps.

S. A. DEPT. OF MINES

ted Drawing	No.	No.	Amendment	Exd.	Date	Req. No. D.M. Compiled from originals by I.A. Mumme.	HILLSIDE & HART'S COPPER MINES SECS. 2 & 48 HD. MULOOWURTIE SCINTILLOMETER SURVEY

Approved	Passed		Scale Various
		Drn.	55 - 17 Gh 5
		Tcd. J.F.S	
Director of Mines		Ckd.	
		Exd.	Date 10 - 2 - 55