DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

GEOPHYSICAL SECTION

GROUND SCINTILLATION SURVEYS IN THE RADIUM HILL AREA

by

I.A. Mumme
Geophysicist

Rept. Bk. No. 46/221
G.S. No. 1070
Geophysic. No. 8/58
D.M. 349/58

26th June, 1958.

GROUND SCINTILLATION

SURVEYS IN THE RADIUM HILL

AREA

by

I.A. Hamm
Geophysicist

Rept. Bk. No. 46/221
S.S. No. 1070
Geophys. No. 8/58
D.M. 349/58.

26th June, 1958.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GROUND SCINTILLATION SURVEY IN THE RADIUM HILL AREA, SOUTH AUSTRALIA.

SUMMARY.

Several anomalous radioactive areas were located and uranium mineralisation shown to be in association with five of them. These areas require further investigation by geological mapping to determine whether or not there are possibilities of economic deposits of uranium minerals occurring either at depth or under alluvium in the general area.

There are large areas of alluvium which may conceal uraniferous deposits and the writer recommends that further investigations be carried out in the areas by methods based on Radon gas detection.

INTRODUCTION.

A ground scintillation survey was carried out in the area shown in the accompanying plan No. (1).

Hand scintillometers (Halross and La Foe) were used initially and later a vehicle mounted aerial scintillometer.

Uranium mineralisation occurs in several places, however, these surface expressions are not large but further extensions may occur north and south of the exposed ore bodies under alluvium.

Visible uranium mineralisation occurs at the Rocky Ridge prospects No. 1, 2 and 3 and at Harry's Prospect.

GEOLOGICAL AND PREVIOUS GEOPHYSICAL WORK.

Aerial scintillometer surveys were conducted in the area by Mr. Gross for the South Australian Department of Mines, the Bureau of Mineral Resources, and J. Harris (Geophysicist) of the South Australian Department of Mines. Ground surveys have been conducted in the area by departmental prospectors with hand geiger counters.

Preliminary geological mapping was carried out by E.C. Spriggs and further detailed mapping was undertaken by Mr. K. Hiern (geologist) of the Uranium and Fuel Section of the Mines Department.

METHODS USED.

A series of parallel traverses were pegged (with 100 feet peg intervals) along the grid lines 1000W, 0, 1000E, 2000E, 3000E, 4000E and 5000E (conforming to the Main Mine grid).

The area was radiometrically explored by traversing in a landrover at 4 miles per hour along lines 50 feet apart connecting pairs of grid lines until the whole area was effectively covered.

Initially hand scintillometers were used (Mullrose and La Ree) but these were superseded by the use of a landrover mounted aerial scintillometer which has a higher sensitivity to gamma ray flux and a shorter response time.

The hand scintillometers were used to grid areas which could not be traversed in the landrover.

INTERPRETATION OF RESULTS.

The results were computed and an Isorad plan prepared. The scintillation plan (No. 1) shows several areas of surface radioactivity greater than 30 counts per second.

These are associated with visible uranium mineralisation and are called the Rocky Ridge Prospects Nos. 1, 2 and 3 and Harry's prospect.

No radiometric anomalies were located in the areas of alluvium between the Archaean outcrops suggesting that the alluvium is thick and of a transported nature. Reconnaissance scintillation gridding was also carried out from the area west of the road between the Radium Hill North Prospects and the Nonython Hill prospects as far as Taylor's shaft in an attempt to locate extensions of the known lode structure in the area. No positive results were obtained.

RECOMMENDATIONS AND CONCLUSIONS.

Encouraging uranium mineralisation in particular at Rocky Ridge Prospects 1, 2, 3 and Harry's Prospect, occurs in the area prospected, and detailed geological mapping over the area investigated might help to locate structures which are favourable for uranium mineralisation.

It is possible that the ore-bearing structures may project under the alluvial covered areas.

Recommendations are also made to investigate an area south of the main mine area adjacent to the Clary Creek by magnetic methods to attempt to locate possible extensions of the main lode structures beneath the deep alluvium.

Surface radiometric prospecting should be carried out on the Archaean outcrop in the South West corner of plan No. (1).

Further surface radiometric gridding is also recommended for the area north of the area gridded on the survey and join up with the original radiation survey conducted by the writer at Radium Hill and be extended as far as Mongthon Hill in an attempt to locate extensions to the South Hill lodes and the Rocky Ridge prospects.

In the alluvial areas the writer recommends that geophysical investigations be made on methods to detect radon gas associated with uranium mineralisation concealed by alluvium, and discussions have been made with D. McPharlin and R.G. Stafford of the Parkside laboratories about procedures that could be adopted for field exploration work.

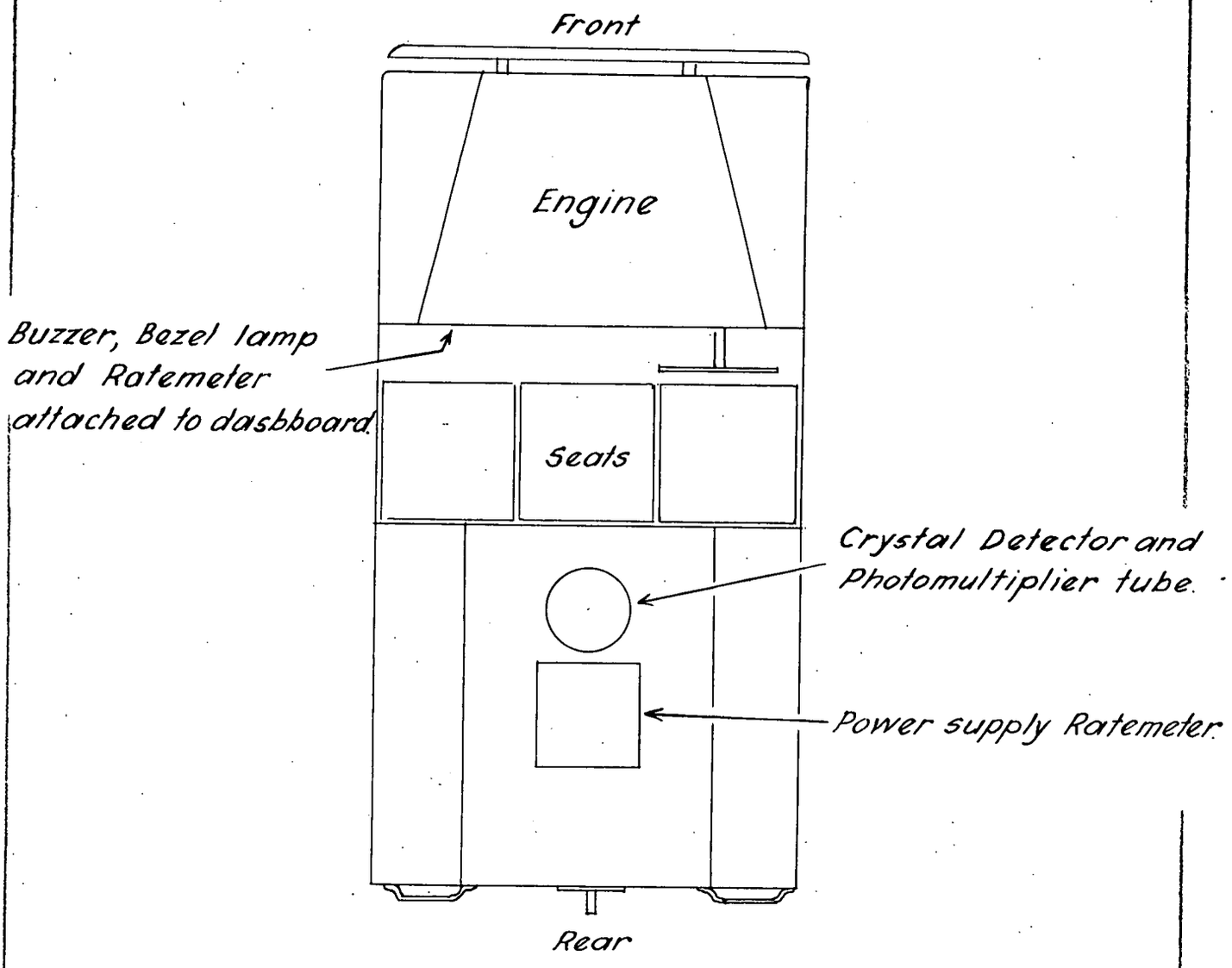
Recent overseas investigations demonstrate that it can be used to detect concealed uraniferous deposits more effectively than scintillometers and also to greater depths.

Recently the writer located a few "fissures" of dacidite north of the South Hill prospect in an area of alluvium. It is possible that these may represent the surface expression of an extension of the South Hill lodes to the north of the known outcrops and this area may be a suitable one for carrying out experiments with the Radon and gas method as surface contamination in the area is small.

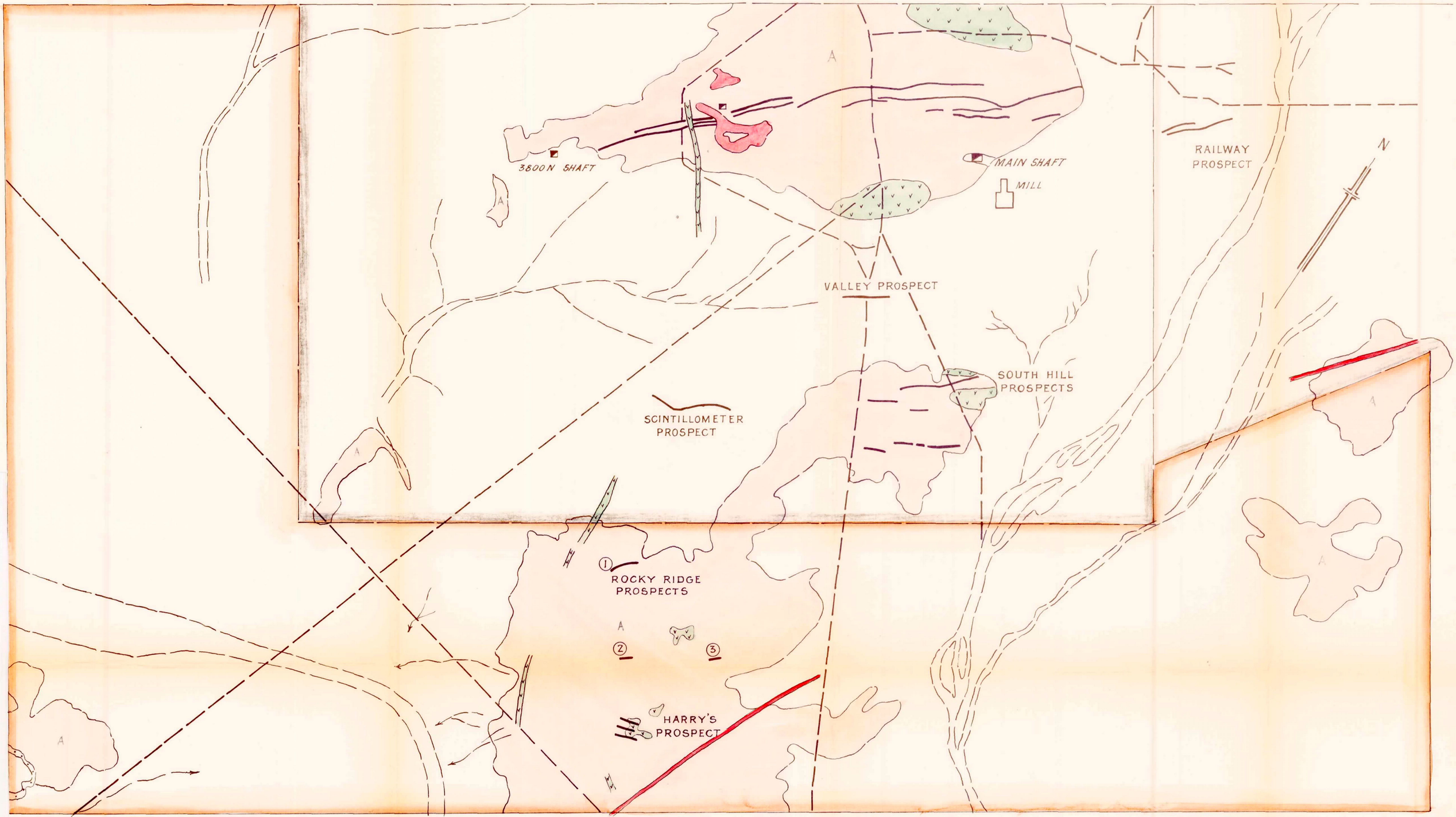
I.A. [redacted]
GEOPHYSICIST

IAM:AGK
26/6/58

LANDROVER



S.A. DEPARTMENT OF MINES					
Approved	Passed	Drn.	VEHICLE MOUNTED AERIAL SCINTILLOMETER PLAN SHOWING LAYOUT USED ON SURVEY AT RADIUM HILL	D.M.	Scale 2ft. to 1in (app.)
		Tcd. ML.		Req.	S1851
		Ckd.			
Director		Exd.			Date 27-6-58 | MGI



Area already investigated by Ground Scintillometer Survey in detail

Area recommended for close Scintillometer Gridding

Archaean Outcrops
Amphibolite
Aplite
Lodes (Uraniferous)
Roads
Creeks

FIG. 3

To accompany report by I. A. Mumme.

S.A. DEPARTMENT OF MINES

Associated Drawing	No.	No.	Amendment	Exd.	Date

Req. No.
D.M.
Compiled from

RADIUM HILL AREA PROSPECTING AREAS

Approved — Director of Mines
Passed

Drn. I.A.M.
Tcd. R.R.
Ckd.
Exd.

Scale: 500 Feet to 1 inch.

58 - 35
FI.

Date 27 - 2 - 58

S.A. DEPT OF MINES

RADIUM HILL AREA

ISO – RAD PLAN

LEGEND

- Less than and up to 26 counts per second
- Greater than 26 and up to 28 counts per second
- Greater than 28 and up to 30 counts per second
- Greater than 30 counts per second
- Roadway (Dirt)
- Creek
- Iso-rad Contours
- Power Line
- Fence
- Archean Outcrops

SCALE

400 200 0 400 800 1200 1600 2000

FEET

Area recommended for further geophysical surveys to determine whether Main Lode structures occur in the area.

Powder Magazines

Base Line

0

TRACK

FORD

O L A R Y C R E E K

FORD

POWER LINE

To Radium Hill

To Morgan

No. 1.

Rocky Ridge Prospects

No. 2.

No. 3.

Harry's Prospect

Area recommended for further investigations to determine whether lode structures occur under the Alluvium.

Area recommended for surface radiometric prospecting.

Grid Shown is Main Mine Grid.

L58-32
FI