COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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REPORT ON AN INSPECTION OF URANIUM DISCOVERIES IN THE CALVERT HILLS AREA, NORTHERN TERRITORY

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PLATES

INTRODUCTION

In May, 1956, an inspection was carried out of a uranium discovery, made by A. R. Blackwell near Central Creek in the Northern Territory (see "Report on an Inspection of a Uranium Discovery near Central Creek, Northern Territory" by J. H. Lord). Since that inspection, North Australian Uranium Corporation has taken an option on Blackwell's Discovery (Lease 42C) and has commenced prospecting on a 2,000 square mile Authority to Prospect held by the company (see Plate I).

The company prospectors, who operate by horse, receive one hundred pounds reward in addition to their normal wages for every occurrence of uranium mineralisation located. As a result of this system, about 16 occurrences have been found in the volcanic rocks of this area. No detailed investigation of these discoveries has been made by the company, but many will be of no economic importance.

The area was inspected on 27-31st September, 1956. Prospects beyond Blackwell's Discovery and King's Ransome were accessible only by horse.

GEOLOGY

Recently the Bureau of Mineral Resources commenced regional mapping in this area and the preliminary map should be available shortly.

The uranium discoveries are all in the same volcanics as the original discovery made by Blackwell. The volcanics are correlated at present with the Peter's Creek Volcanics of Lower Proterozoic age and not the Redbank volcanics, as originally suggested. Otherwise, the geology is as described in the previous report.

THE DISCOVERIES

Due to the difficulty of access, only a few prospects were visited, including those which the company considered to be the most promising.

Development work by the company has been concentrated on Blackwell's original discovery. Some bulldozing and a limited amount of costeaning have been done on Old Parr, White Heather and King's Ransome. On El Hoosin some costeaning has been done by the prospectors.

All prospects located are in the Peter's Creek volcanics, associated with hematised and silicified shears.

BLACKWELL'S DISCOVERY

The principal development on this discovery since the last inspection has been the deepening of the shaft to 75 feet and the driving of an adit (see plates 2, 3 & 4).

The shaft followed the mineralised fractures to a depth of 37 feet, where they terminated against a flat-lying shear. The shaft was continued to 75 feet in barren volcanic rock.

The adit was commenced to the south of Blackwell's shaft and is being driven in a northerly direction towards the shaft (see plate 4). The adit is following a weak shear-zone and, in places, has encountered silicified fractures carrying pitchblende associated with iron minerals. An examination of the roof of the adit, using a Philips geiger counter, was made and the results are shown on plate 3. The fractures carrying pitchblende can be distinguished by the higher readings.

No detailed channel sampling has been completed by the company. The pitchblende assays only 40% e U_3O_8 approximately because of the amount of iron intimately associated with it.

Two diamond drill holes, No. 1 and No. 2 (see plate 2) have been put down. These holes intersected the shear zone, but the mineralisation was very weak.

OLD PARR PROSPECT

This prospect is situated about 2,000 feet south of Blackwell's Discovery. It is in the same volcanic formation and probably is on the same line of shearing.

Some bulldozing has been done and a costean 10 feet long and 5 feet deep has been sunk. Some yellow secondary uranium minerals occur in sheared silicified basic volcanic rock. The radioactivity measured on a Philips geiger counter varied from 10 to 30 counts per second, with a maximum of 50 counts per second in the south-east corner of the costean.

KING'S RANSOME PROSPECT

This is identical with the prospect mentioned in the previous report as having been located by A. R. Blackwell, but not pegged. It is situated about 1.5 miles west north-west of Blackwell's Discovery.

Blackwell's original pothole has been cleaned out and extended to a costean about 6 feet long and 6 feet deep. This has disclosed secondary uranium minerals in hematised and silicified fractures, within a zone of shearing.

The shear-zone, which strikes at 165 degrees and dips at 83 degrees to the west, is in basaltic rocks.

Near the centre of the costean, 50 to 60 counts per second were obtained over a width of 2 feet. Counts decreased to 5 to 10 per second at either end of the costean.

WHITE HEATHER PROSPECT

This prospect, about 1.2 miles west north-west of Blackwell's Discovery, shows traces of secondary uranium mineralisation in basic volcanic rocks. Some bulldozing has been done, without disclosing anything of interest. The maximum count obtained was 20 per second.

MONTE CARLO PROSPECT

This prospect is about 4.1 miles west of Blackwell's Discovery (see plate 1). It is in a silicified hematised shear, which passes through the basic volcanics, striking at 110 degrees with a vertical dip. This shear can be traced for at least one mile and varies in width from 1 to 2 feet.

The only uranium mineralisation located was a small patch associated with copper minerals, extending over a length of about 4 feet. The best reading obtained on a Philips geiger counter was 40 counts per second.

The only other mineralisation located along the shear was a small patch of secondary copper minerals.

EL HOOSIN PROSPECT

The northern end of this prospect is situated about 2.6 miles west south-west of Blackwell's Discovery. It was located from the air by Mr. H. Newton, using a scintillograph. Later, after several unsuccessful attempts, two prospectors, H. Hoosin and F. Woerle, located it on the ground.

The prospect occurs along a shear in the Peter's Creek basic volcanics, striking at 140 degrees. The shear is on the downthrow side of a fault, which strikes parallel to it and is situated about 100 feet to the east.

Only limited development has been done on this prospect. This consists of small costeans across the strike at six points along the shear, which shows uranium mineralisation discontinuously over a length of about ¾ of a mile. The shear is covered with talus and soil in many places and requires bulldozing to uncover it.

The six occurrences of uranium mineralisation are as follows commencing at the northern end :-

(a) The most northerly occurrence is a small outcrop of hematised uraniferous material. The mineralisation is about 12 inches wide and the surrounding area is covered with talus. The material consists mainly of pitchblende and secondary uranium minerals associated with hematite and other iron minerals, which put the Philips geiger counter off-scale.

(b) This occurrence is about 400 feet south of (a) on a talus-covered slope. In a small costean, pitchblende and secondary uranium minerals, which put the counter off-scale, occur over a few inches. Counts of 100 per second were obtained over a width of 4 feet.

(c) This occurrence, about 2,000 feet south of (b), covers an area of about 3 square feet, which shows uranium mineralisation and gave counts up to 300 per second. The adjacent area is rubble-covered.

(d) This occurrence, about 300 feet south of (c), is in a small pothole showing secondary uranium mineralisation, which gave 150 counts per second on the Philips geiger counter. A shallow costean has disclosed only a narrow seam of secondary uranium minerals, with counts up to 50 per second.

(e) This occurrence, about 1,000 feet south of (d), is in a costean about 15 feet long. There is secondary uranium mineralisation exposed in weathered basic volcanic rocks. 50 counts per second were obtained over 2 feet and 10 to 20 counts per second over the remainder of the costean. Some magnesite occurs nearby.

(f) This occurrence, about 600 feet south of (e), is in a costean ten feet long. Secondary uranium minerals occur and 50 counts per second were obtained over a width of 3 feet. The remainder of the costean gave readings of 10 to 15 counts per second.

No further occurrence has been located south of (f). The mineralisation appears to be decreasing from north to south, but a considerable amount of investigation is required before this prospect can be assessed properly. It has been suggested to the company that radiometric gridding should be done over the complete line of the shear. This should be followed by bulldozing to remove the talus cover.

Stream testing for uranium in this valley and other volcanic areas during the wet season may assist in locating further extensions of this prospect or new prospects.

A sample of pitchblende which crops out at the northern end of the shear was examined by W. M. B. Roberts, who reports as follows :-

> A specimen of radioactive ore was submitted by Mr. J. H. Lord of the Darwin Office for mineragraphic examination. The specimen, from the Calvert Hills area, N.T., is an irregular piece of what appears superficially to be massive hydrated iron oxide containing veins and irregular masses of secondary uranium minerals.

Upon breaking open, the specimen was seen to contain numerous angular fragments and irregular masses of a black, sub-metallic mineral, which when removed from the matrix and tested on the Austronic B.G.R.I. counter registered 20,000 + counts per minute, giving the full deflection of the scale for this instrument.

These fragments were selected so as to contain as little as possible secondary uranium minerals, in which case these high counts suggested that they are pitchblende.

Sections were polished of two representative fragments and the mineral was found to be hard, isotropic, to have a medium to high reflectivity and effervesced and turned black with dilute HNO_3. A fluoride bead gave a very strong positive test for uranium. These results identify the mineral as pitchblende.

The principal secondary uranium mineral is gummite, the typical direct alteration product of pitchblende. This mineral forms irregular masses ranging up to 2.5 cm. across, and fine fracture fillings. Further alteration of the gummite has given rise to a straw-yellow amorphous material which fluoresces pale green in ultra-violet light, and which is probably the calcium uranium silicate uranophane.

Other secondary uranium minerals are present in the ore but are of relatively minor importance. They are intimately intergrown which makes their accurate identification difficult.

The matrix of the rock consists entirely of hydrated oxides of iron which have been extensively fractured, the resultant fissures, which cut both the pitchblende and the matrix, have been filled with secondary crystalline hematite and the secondary radioactive minerals.

The six largest portions of the broken specimen were sawn through and a visual estimation of the pitchblende content was made, which showed roughly 20-25 percent pitchblende present. No estimation was

possible for the secondary uranium mineral content, of which there is a considerable quantity present.

CONCLUSIONS

A number of uranium prospects have been located in the Peter's Creek volcanics on the Authority to Prospect held by North Australian Uranium Corporation in the Calvert Hills area. Although the prospects have not yet been investigated thoroughly, it is considered that many will be of no economic importance. However, the El Hoosin prospect, which shows pitchblende at the surface, warrants a close detailed investigation.

Development on Blackwell's Discovery shows that rich uranium mineralisation occurs in narrow discontinuous fractures within a shear zone. Further development is required to ascertain if these fractures are of such extent to warrant mining on a company scale.

PLATE 1

MAP SHOWING LOCALITY OF URANIUM DISCOVERIES IN THE CALVERT HILLS AREA NORTHERN TERRITORY.

Scale - 4 Miles to Inch.

Zone 4 | Zone 5

132° | 138°

C | 12° | D | 16° | E | 20°

DARWIN

Pine Ck.

Birdum.

Newcastle Waters.

Tennant Creek.

Northern Territory

WESTERN AUSTRALIA.

QUEENSLAND

CALVERT HILL 8

N.T.

WA. SA. QLD. N.S.W. VIC.

Redbank Mines.

"Wollogorang"

NMH 39

12 Mile Ck.

9 Mile Ck.

5 Mile Yard

15 Mile Yard

Central Creek

Branch Ck.

KINGS RANSOME

MONTE CARLO

WHITE HEATHER

OLD PARR

EL HOOSIN

BLACKWELL'S DISCOVERY

Lagoon Creek

Calvert R.

NMH 102.

Seigals Ck.

Seigals Ck"

AP (NORRIS)

NORRIS' PROSPECT

AP438 (NAUC)

Agnes Ck.

Fish River

Pandanus Creek.

NMH 101

Creek.

"Fish River"

AP444 (MT ISA MINES)

Nicholson River

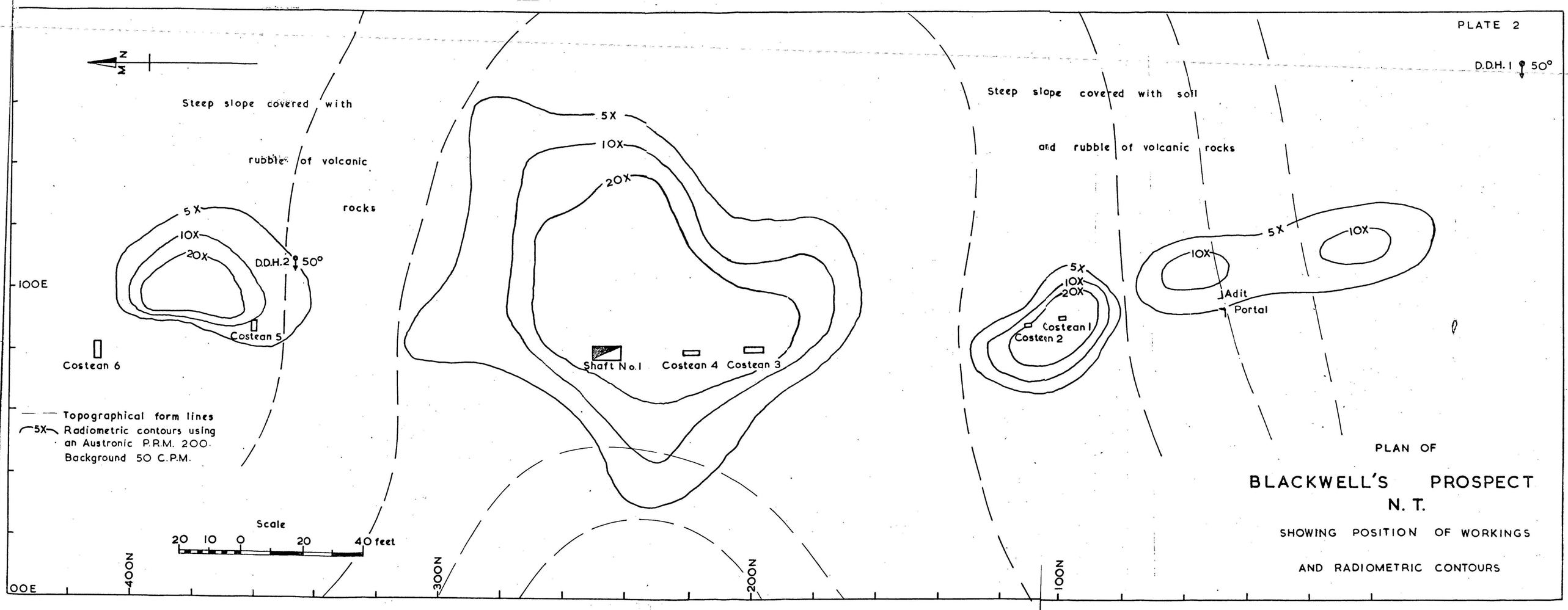
138°00'

137°30'

17°30'

18°00'

PLATE 2



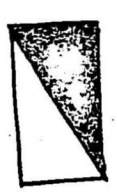
PLAN OF

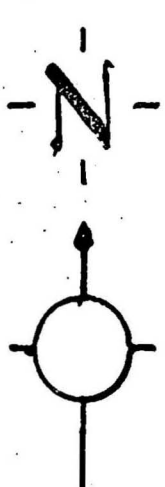
BLACKWELL'S PROSPECT N. T.

SHOWING POSITION OF WORKINGS AND RADIOMETRIC CONTOURS

PLATE 3

SHAFT





SHAFT

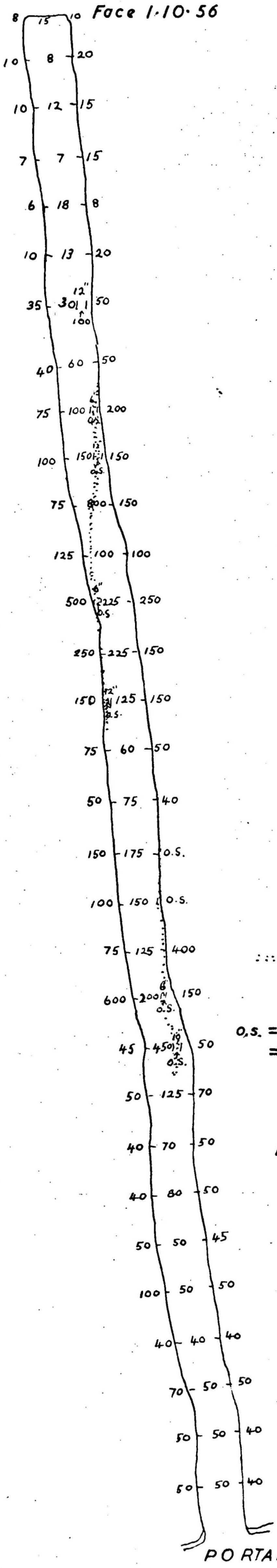
North Wall

Depth in feet

0.5	100	170	10
120	80	60	
100	50	70	20
50	60	80	
750	200	100	30
300	120	50	
100	50	50	
25	30	35	
15	15	15	40
15	10	10	
			50

Inaccessible

Face 1·10·56



:::: Mineralised fracture containing Pitchblende

O.S. = Off Scale
= More Than 800 Counts Per Second

Scale

10 5 0 10 20 feet

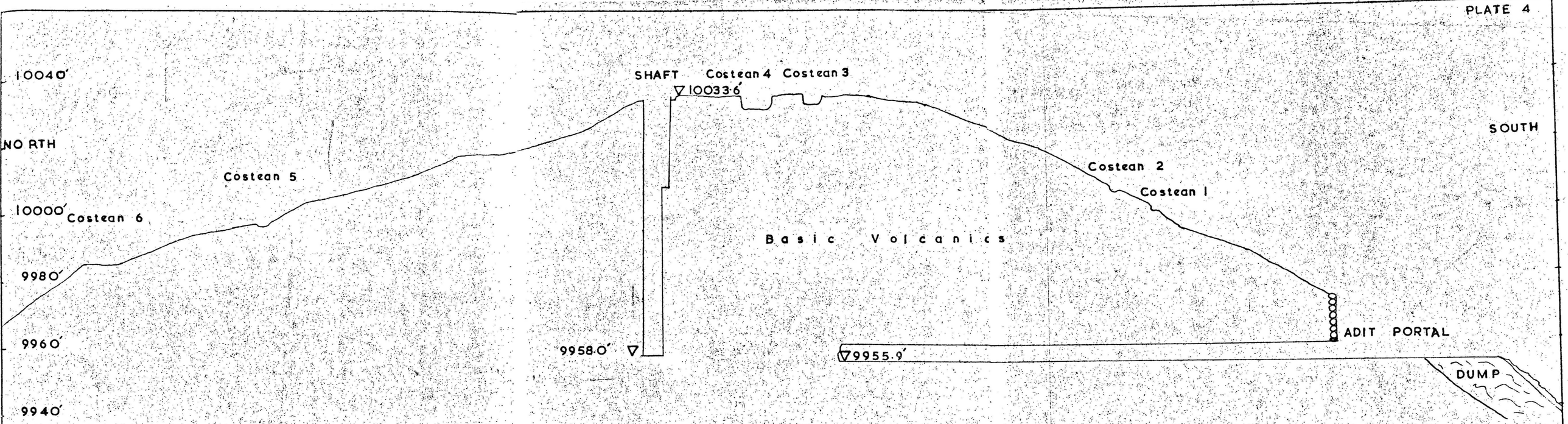
Plan and Section of

BLACKWELL'S PROSPECT

Northern Territory

Showing Philips Geiger Counter readings in counts per second

PLATE 4



LONGITUDINAL SECTION
THROUGH
BLACKWELL'S PROSPECT
N.T.
showing position
of workings

Sept. 1956