COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS.

1961/80

PERCUSSION DRILLING NEW GUINEA 1958 to 1960

by

D.B. DOW

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ILLUSTRATIONS

PERCUSSION DRILLING NEW GUINEA

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SUMMARY

This report is a brief summary of percussion drilling carried out in the years 1958 to 1960 in the Territory of New Guinea by the Division of Mines, T.P.N.G.

The writer recommends the marking of each finished programme with a concrete datum peg.

INTRODUCTION

GENERAL

The Division of Mines, T.P.N.G. has available for hire three percussion drilling rigs with crews, the rentals for which are highly subsidised for approved exploratory programmes.

EQUIPMENT

The scheme started in 1958 with the purchase of a Bethune 400 percussion drill (see figure 1). After alterations to the undercarriage, the drill was adequate for sites relatively easy of access but the cost of shifting the rig to more inaccessible areas proved to be prohibitive.

In July 1959 two Overall McCray units were purchased (see figures 2 and 2A). These are light rigs with a wooden mast which can be dismantled; they can drill to a maximum of about 200 feet. One of the rigs was modified to enable it to be broken down into loads of maximum weight 300 pounds and can be carried by Otter aircraft to advanced airstrips and carried by native labour to drill site.

The Bethune 400 uses standard 6 inch or 5 inch casing and the Overall-McCray 4 inch or 3 inch casing.

The drills are operated by native crews under the supervision of a European driller, a system which is working very satisfactorily.

SAMPLING

Under the drilling agreements the hirer is responsible for the testing of the samples from the holes, but in some cases the Resident Geologist has undertaken to do the work.

Figure 1: Bethune 400 percussion drill at Koranga Open Cut. The slip blocking the headrace can be seen in the background.

Figure 2: Overall McCray percussion drill at Golden Gates Lease, Koranga Gold Sluicing Ltd. near Wau.

Figure 2A: Close-up Overall McCray percussion drill showing native crew.

For alluvial gold prospects the samples are reduced by panning then agitated with mercury to amalgamate the gold. The amalgam is then separated from the heavy mineral concentrates by panning, the mercury dissolved by pure nitric acid, and the gold residue weighed. The separation of the amalgam from the heavy mineral concentrates is sometimes hindered by the formation of very finely divided mercury globules. This "flouring" was found to be reduced by the use of strong caustic soda solution.

Lode material is mechanically split in the wet state, dried, and then sent for assay.

RECOMMENDATIONS

To enable the percussion drill holes to be found at a later date, the writer recommends that each programme be marked by a surveyed concrete datum peg with marked metal inset with particulars of the programme. If possible the datum should be sited when the programme is finished in a position not likely to be removed by later mining operations.

DRILLING PROGRAMMES

The following drilling programmes had been completed by the Bethune 400 rig up to December 1960: (see plate 1).

Date of Completion	Programme	Locality
October 1958	Koranga Open Cut	Wau
January 1958	Burke Creek	Wau
June 1959	Golden Ridges	Wau
March 1960	Koranga No.4 Face	Wau
May 1960	Golden Peaks Geological	Wau

The following were completed by the Overall-McCray rigs:

January 1960	Mt. Victor Prospect	Kainantu
December 1960	Cleopatra Leases	Edie Creek

KORANGA OPEN CUT (See Plate 2)

OBJECTIVES

A large slip blocked the main headrace of No.1 Face at Koranga Open Cut in December 1957 (see figure 1) and a line of percussion drill holes was put down along a proposed diversion cut designed to by-pass the slip.

RESULTS

Eight holes were drilled by the Bethune rig for the following results:

Hole	Depth Feet	Rock Type	Value pence per cubic yard
M.P. 2	130	Otibanda	40.4
M.P. 3	129	Lake	14.5
M.P. 4	130	Beds	23.54
M.P. 5	90	conglomerate	3.54
M.P. 6	140	and sandstone	6.29
M.P. 7	140		9.31
M.P. 8	100		7.22
M.P. 9	92		not available

CONCLUSIONS

The values proved, though marginal, justified the proposal to by-pass the slip.

BURKE CREEK

OBJECTIVES

The holes were drilled for New Guinea Goldfields Ltd. in an area 500 feet east of the Burke Creek-Andersons Creek junction. In addition, hole M.P. 12B.C.1 was drilled for geological information at the request of the Resident Geologist, Wau.

The drilling had two objectives:-

(1) To find an extension of the manganiferous gold lodes worked by Allen pre-war under tribute to New Guinea Goldfields Ltd. Attempts to re-open these workings after the war were prevented by a large slowly moving slip which had covered them up.

(2) Fisher (1945)* from a study of gold fineness, concluded that Edie Creek must have been the source of much of the gold found in the Otibanda Lake Beds at Koranga. The Burke Creek drilling would test for the extension of the Lake Beds towards Edie Creek.

* Fisher (1945), The fineness of gold, with special reference to the Morobe Goldfield, New Guinea. Econ. Geol., 40, 449-495 & 537-563.

RESULTS

Six holes were drilled between October 1958 and January 1959 for the following results:

Hole	Depth Feet	Formation	Rock Type	Gold Values pence/ cub.yard
MP12BC1	0 - 95	Lower Edie porphyry		nil
MP12BC2	0 - 50	Recent terrace remnant	Auriferous conglomerate	8.2
	50 - 95	Upper Ridges Breccia	Igneous breccia	nil
MP12BC3	0 - 10	Recent terrace remnant	conglomerate	nil
	10 - 70	Otibanda Lake Beds	conglomerate sandstone	nil
	70 - 100	Lower Edie Porphyry	Andesite porphyry	nil
MP12BC4	0 - 55	Recent terrace remnant	Auriferous conglomerate	28.7
	55 - 90	Lower Edie Porphyry		nil
MP12BC5	0 - 50	Upper Ridges Breccia		nil
MP12BC6	0 - 50	Koranga Rhyolite	Rhyolite tuff	nil

Extensive pitting operations were also done. These proved that the gold values in the recent terrace remnant found by the drill were payable.

The ridge to the west of Andersons Creek has been proved by drilling to consist of upfaulted Lower Edie Porphyry and Upper Ridges Breccia, from which the Otibanda Lake Beds have been stripped by erosion. Rhyolite volcanics, which are younger than the Lake Beds, overly the Lower Edie Porphyry in places but wherever they have been penetrated (by pitting and drilling) the Lake Beds are missing, so it is concluded that the Lake Beds were stripped before the rhyolite volcanics were emplaced.

GOLDEN RIDGES (see Plate 4)

OBJECTIVES

Six holes were drilled for New Guinea Goldfields Ltd. in an effort to find extensions of eluvial gold deposits proved by earlier drilling. There was also an outside chance that calcite lode material would be discovered. It was proposed to work any alluvial ground discovered by alluvial methods and the samples were tested by amalgamation. Where lode material was suspected the samples were also assayed for gold.

RESULTS

Hole	Depth	Gold Values: Alluvial pence/c.yd	Gold Values: Assay Ozs/ton	Rock Type
MP16GR1	0 - 10	0.27		Upper Ridges Breccia
	10 - 15	0.10		
MP16GR2	0 - 5	21.94		
	5 - 10	347.7		
	10 - 15	261.5		
	15 - 20	36.15		
	20 - 25	27.8		
	25 - 30	51.23		
	30 - 35	30.15		
	35 - 40	4.2	0.02	
	40 - 45	40.6	tr	
	45 - 50	14.5	tr	
	50 - 55	114.5	0.16	
	55 - 60	36.3	0.03	Upper Ridges Breccia
	60 - 65	9.11	0.03	
	65 - 70	6.3	tr	
	70 - 75	7.1	tr	
	75 - 80	5.1	tr	
	80 - 85	3.9	tr	
	85 - 90	4.7	tr	
	90 - 95	0.42	0.01	
	95 - 100	0.64	tr	
	100 - 105	0.34	tr	
	105 - 110	0.25	tr	
	110 - 115	0.25	tr	
MP18GR3	0 - 100	negligible		Upper Ridges Breccia
	100 - 105	0.37	0.37	
	105 - 110		0.38	
	110 - 115		0.41	
MP19GR4	0 - 85	negligible	0.02	Upper Ridges Breccia
	85 - 145		0.025	Lower Edie Porphyry
MP20GR5	0 - 45	80.0		
	45 - 75	negligible	0.03	Upper Ridges Breccia
	75 - 100		0.03	Lower Edie Porphyry
MP21GR6	0 - 20	43.05		Upper Ridges Breccia
	20 - 35	21.7	0.01	Lower Edie Porphyry
	35 - 45	8.9	0.01	Upper Ridges Breccia
	45 - 70	tr	tr	

CONCLUSIONS

An extension of the eluvial deposit previously proved was indicated, though the drilling was of insufficient density to prove reserves. No significant calcite lodes were discovered.

KORANGA NO.4 FACE (See Plate 2)

OBJECTIVES

The drilling programme was proposed to test a large area of readily accessible ground. Two drill holes drilled previously on the southern edge of the area had proved promising, though not quite payable values.

RESULTS

Eleven holes were drilled by the Bethune 400 rig between July 1959 and March 1960. All penetrated conglomerate and sandstone of the Otibanda Lake Beds for the following results:

Hole	Depth	Value pence/cub.yd. Interval	Average (Cumulative)
LK.1.	0 - 20	3	3
	20 - 40	15	9
	40 - 60	2	7
	60 - 80	3	6
	80 - 100	0	5
	100 - 120	0	4
	120 - 140	11	5
	140 - 160	24	7
	160 - 180	24	9
	180 - 200	8	9
	200 - 220	6	9
LK2	0 - 20	21	21
	20 - 40	14	18
	40 - 60	8	14
Visual	60 - 80	4	12
	80 - 100	5	11
	100 - 120	4	9
	120 - 140	36	13
	140 - 160	43	17
	160 - 175	8	17

Hole	Depth	Value pence/cub.yd. Interval	Average (Cumulative)
LK3	0 - 20	5.5	5.5
	20 - 40	21	14.4
Assay	40 - 60	110	46.4
	60 - 80	7.4	36.7
	80 - 100	11	31.6
	100 - 150	Not assayed	
LK4	0 - 20	1.63	1.6
	20 - 40	16.4	9.0
Assay	40 - 60	19.8	12.6
	60 - 85	23.2	14.3
	85 - 105	1.31	11.9
LK5	0 - 20	5.5	5.5
	20 - 40	16	5.8
Assay	40 - 60	45.2	18.9
	60 - 80	50.0	26.7
	80 - 95	6.4	23.8
LK6	0 - 20	3.9	3.9
	20 - 40	9.5	6.7
Assay	40 - 60	43.1	18.9
	60 - 85	25.2	19.5
LK7	0 - 20	2.9	2.9
	20 - 40	4.5	3.7
Assay	40 - 60	13.4	6.9
	60 - 80	16.2	9.3
	80 - 105	32.2	13.3
LK8	0 - 20	3.7	3.7
	20 - 40	12.4	8.1
Assay	40 - 60	9.5	8.5
	60 - 80	11.7	9.4
	80 - 100	12.8	10.0
	100 - 120	4.1	9.1
LK9	0 - 20	1.3	1.3
	20 - 40	5.1	3.2
	40 - 60	13.5	6.6
	60 - 80	19.2	7.8
Assay	80 - 100	29.2	13.7
	100 - 120	14.4	13.2
	125 - 150	6.2	11.8
LK10	0 - 20	1.7	1.7
	20 - 40	1.9	1.8
	40 - 60	5.9	3.2
	60 - 80	41.5	12.7
Assay	80 - 100	12.2	12.6
	100 - 120	15.1	13.0
	120 - 140	1.7	11.4
	140 - 160	2.7	10.3
LK11	0 - 20	1	1
	20 - 40	2	1
	40 - 60	3	2
	60 - 80	4	2
Visual	80 - 100	2	2
	100 - 120	7	3
Est.	120 - 140	4	3
	140 - 160	7	3
	160 - 180	13	4
	180 - 200	4	4
	200 - 220	5	4

CONCLUSIONS

The drilling was not of sufficient density to prove ore reserves, but it is estimated that there is a total volume of 3,600,000 cubic yards of ground with an approximate value of 16.0 pence per cubic yard. It will be possible to mine selectively a section in the vicinity of holes 3, 4, 5, 6 and 9 which contain about 500,000 cubic yards of ground with a value of at least 30 pence per cubic yard.

GOLDEN PEAKS GEOLOGICAL (See Plate 6)

OBJECTIVES

Mr. J.E. Thompson, Senior Geologist, put forward the suggestion that the Golden Peaks Orebody is a large slip deposit and the holes were designed to test this hypothesis.

RESULTS

Two holes were drilled but the target depth of 200 feet was not reached because the casing could be driven only to 55 feet and caving ground was met with between 90 feet and 105 feet which stopped the drilling. The following drill logs were recorded:

Hole	Depth	Formation	Assay Ozs. Gold per ton
C33	0 - 17	Peaks Deposit	0.29
	17 - 106	Upper Ridges Breccia	trace
C34	0 - 10	Surface rubble	0.03
	10 - 40	Peaks Deposit	0.10
	40 - 55	Upper Ridges Breccia	0.17
	55 - 90	?	?

MT. VICTOR PROSPECT

The results of this drilling programme have been incorporated in "The Geology of the Mt. Victor Gold Prospect", Bureau of Mineral Resources Aust. Record No. 1961/113.

CLEOPATRA D.S.L. (See Plate 5)

Nine percussion drill holes were put down by the Mines Department on the Cleopatra Lease, Edie Creek, New Guinea, for Mr. L.C. Shoppee of Wau. The object of the drilling was to trace a suspected buried auriferous lead. Because of difficult drilling conditions, only two holes reached the bottom of the lead and the results were inconclusive.

LOCATION AND ACCESS

The lease is situated at Edie Creek, approximately 4½ miles west of Wau, Territory of New Guinea (see Plate 1). Access to Edie Creek is by formed road, and the lease is gained by the bed of the Edie Creek from the Merri Creek junction, or alternatively, by a steep walking track from the road above the lease.

TENURE

The area is covered by D.S.L. 198, which is held by Mr. L.C. Shoppee of Wau who requested the present drilling programme.

DRILLING

The drilling programme was laid out by the writer. The equipment used was an Overall-McCray Percussion Drill which can be dismantled into loads of maximum weight 300 lbs. Access in this case was reasonably good and the rig was wheeled to the site down Edie Creek.

Nine holes were drilled, only two of which reached the target. Each five foot run was concentrated by panning and the gold values visually estimated. The concentrates for one completed hole and several random samples were sent for assay, and were used as a check on the visual estimates.

GEOLOGY AND DRILLING OBJECTIVES

Most of the lease consists of fairly flat ground on the south-western bank of Edie Creek. Bedrock is soft weathered andesite porphyry, in which are cut several old channels of the ancient Edie Creek. The auriferous gravels in these old channels, and several auriferous terrace remnants, have been worked out, with the exception of one old channel which runs north-eastwards through the middle of the lease.

The history of work done on this old lead is obscure, but it was worked for 240 feet to the point where it dips under the water-table. Values in this section are reputed to have been extremely rich. The gravels were then elevated and another 30 feet of channel was worked, but then operations ceased, probably because the values were uneconomic. There is some controversy as to whether a shaft was sunk on the old lead ahead of the elevated ground; there is no evidence, as the area in question is covered by tailings from later work.

A line of percussion drill holes was laid out across the line of the old channel, 80 feet beyond the elevated ground to test for the extension of the wash.

RESULTS

Of the six holes drilled on this line, only one reached bottom (see drill logs).

CL6E1 (R.L. 88 feet) : Stopped at 29 feet on buried wood.

CL6E2 (R.L. 88 feet) : Stopped at 23 feet on buried wood.

CL6E3 (R.L. 91 feet) : Abandoned at 35 feet because of a buckled driving shoe.

CL6E4 (R.L. 90 feet) : Abandoned at 14 feet because of jammed casing and caving ground.

CL6E5 (R.L. 89 feet) : Abandoned at 36 feet because of jammed casing and caving ground.

CL6E6 (R.L. 90 feet) : Reached porphyry bottom at 35 feet (R.L. 55 feet).

Gold values in hole CL6E6 were disappointing, and even the basal five feet of wash contained only 341 pence per cubic yard. However, with only one hole on the line reaching bottom, there was no means of telling if it was on the main channel.

Up to this stage of the drilling, the casing had not been kept close to the end of the hole, and it was obvious that when the bit entered the zone of loose boulder wash, the caving of the wash caused boulders to fall down. When the casing was driven, these boulders caused it to jam, and in the extreme case buckled the driving shoe. For the next two holes the writer insisted that the casing be kept within one foot of the end of the hole.

Keeping in mind the difficulties encountered in the previous programme, it was decided to drill another line of holes across the lead 45 feet further down the lead.

Hole CL6E7 (R.L. 101 feet) bottomed on porphyry at 45 feet (R.L. 56 feet). Again values were disappointing but this was expected as bottom was one foot higher than in the previous hole showing that the hole was not on the line of the channel.

Hole CL6E8 was abandoned at 34 feet as the casing jammed on a quartz boulder after having been driven five feet in a zone of loose boulder wash.

Hole CL6E9 was also abandoned at this level because of jammed casing and caving ground. In this hole the casing was kept close to the end of the hole throughout the drilling without avail.

CONCLUSIONS

The drilling proved that the old lead exists at least 120 feet beyond the point where it was last worked, and that the bulk of the gravels filling the lead are not an economic proposition. However, it is probable that the holes that reached bottom were not on the main channel, and there is still a chance that better values exist along the bottom in the main channel. To be an economic proposition, these bottom gravels would have to be good enough to mine by underground methods.

The prospects for such high values are not good for the following reasons:

(1) The pre-war elevating done along the main channel was discontinued, probably because of uneconomic values.

(2) The best values found by the drilling programme were only 341 pence per cubic yard.

On the credit side are the following factors:

(1) The drilling has established that the bottom of the channel dips very steeply between the last workings and the first line of drill holes. This could explain the poor values in this section and the values are likely to improve where the lead flattens out again.

(2) The drill holes that reached the bottom were probably not on the main channel.

RECOMMENDATIONS

If the lessee, in view of the above considerations, wishes to do more exploration development work on the property, the writer recommends that a shaft be sunk to find the main channel. As the bottom profile is not known, the siting of the shaft is mainly guesswork. Assuming that the boulder wash marks the main channel, the best site is probably close to drill hole CL6E8. If the shaft is sunk during the dry season there should be no difficulty with water to the 25 foot mark, below which considerable water was met with in the drilling. A pump with a lift of at least 50 feet would be necessary equipment.

PERCUSSION DRILL LOGS :: CLEOPATRA LEASE

HOLE	DEPTH In Feet	ROCK TYPE	GOLD VALUES pence/cub. yard Estimated	Assay
CL6E1	0 - 8	Tailings		
	0 - 29	Pebble Wash	12	
	--- Abandoned 29 ft. on buried log ---			
CL6E2	0 - 7	Tailings		
	7 -23	Pebble Wash	18	
	--- Abandoned 23 ft. on buried log ---			
C16E3	0 - 17	Tailings		
	17 - 25	Pebble Wash	18	
	25 - 30	Pebble Wash	40	46
	30 - 35	With garnet, cinnabar	60	85
	---Abandoned 35 ft. buckled casing ---			
CL6E4	0 - 12	Tailings		
	12 - 14	Cobble wash		
	--- Abandoned 14 ft. casing jammed ---			
CL6E5	0 - 17	Tailings		
	17 - 25	Pebble Wash		
	25 - 35	Cemented wash		
	--- Abandoned 36 ft. jammed casing, --- caving ground			
CL6E6	0 - 9	Tailings		
	9 - 20	Pebble wash some beds of clay	12	
	20 - 25	Loose wash, carbonised wood cinnabar	24	
	25 - 30	Loose cobble wash cinnabar	60	
	30 - 35	Boulder wash, green porphyry boulders	240	341
	35 - 40	Porphyry bottom		
	--- Stopped at target ---			
CL6E7	0 - 5	Peat, carbonised wood		
	5 - 15	Pebble wash, zircon	36	45
	15 - 20	As before	20	6
	20 - 30	Grey clay	3	6
	30 - 35	Loose cobble wash	3	7
	35 - 40	Cobble wash	120	260
	40 - 45	As before	36	117
	45 - 48	Porphyry bottom		
	--- Stopped at target ---			
CL6E8	0 - 8	Peat		
	8 - 15	Pebble wash	18	
	15 - 28	Grey clay	-	
	28 - 34	Boulder wash	12	
	--- Abandoned 34 ft. casing jammed --- on quartz boulder			
CL6E9	0 - 6	Peat		
	6 - 15	Pebble wash		
	15 -25	Grey clay		
	25 - 30	Cobble wash		
	30 - 35	Loose boulder wash		
	--- Abandoned 35 ft. jammed casing, --- caving ground			

PLATE 3

PLATE 2

PLATE 4

N.G.G. MILL

GOLDEN PEAKS

PLATE 6.

CREEK

NAMIE

CK

WHITBURN

HOMESTEAD

BLIKKE

ANDERSONS CREEK

CREEK

KURANGA CREEK

KOPANGA OPEN CUT

WAU

EDGE CREEK

MAGNETIC NORTH

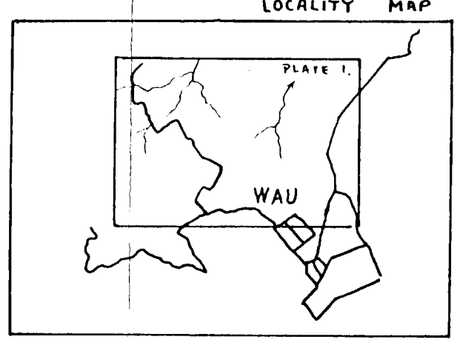
LOCALITY PLAN
PERCUSSION DRILLING
WAU AREA

SCALE

250 0 500 1000

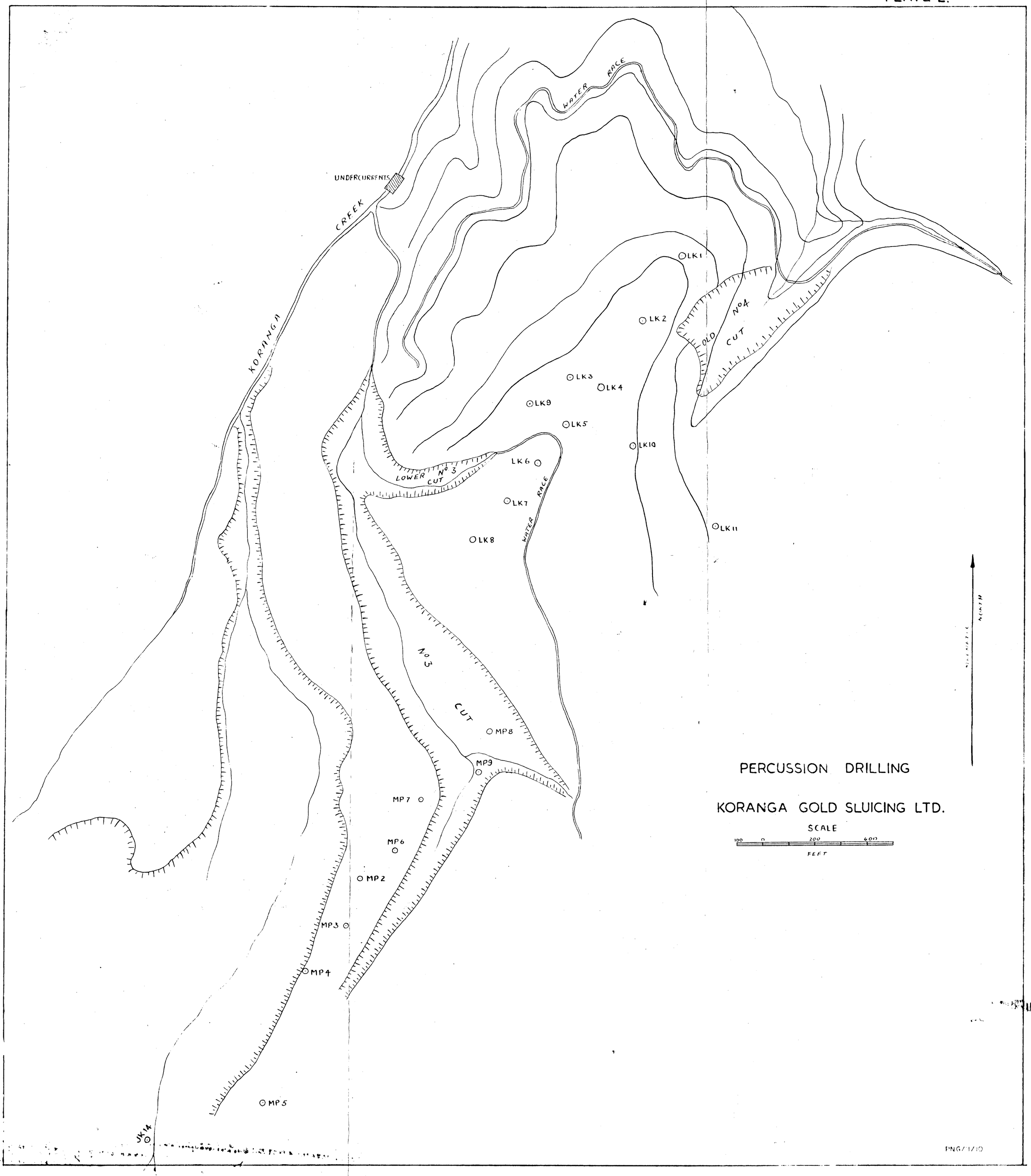
ONE INCH = 500 FEET

LOCALITY MAP



PNG/11/7

PLATE 2.



PNG/1/10

NAMIE CREEK

ANDERSONS CREEK

BURKE CREEK

BC5

BC3

BC2

BC4

BC1

BC6

F

25

40

F

Terrace Remnant

Koranga Rhyolite

Otibanda Lake Beds

Upper Ridges Breccia

Lower Edie Porphyry

BC2 Percussion Drill Hole

MAGNETIC NORTH.

PERCUSSION DRILLING
BURKE CREEK

SCALE

FEET
ONE INCH = 200 FEET.

PNG/11/8

PLATE 4

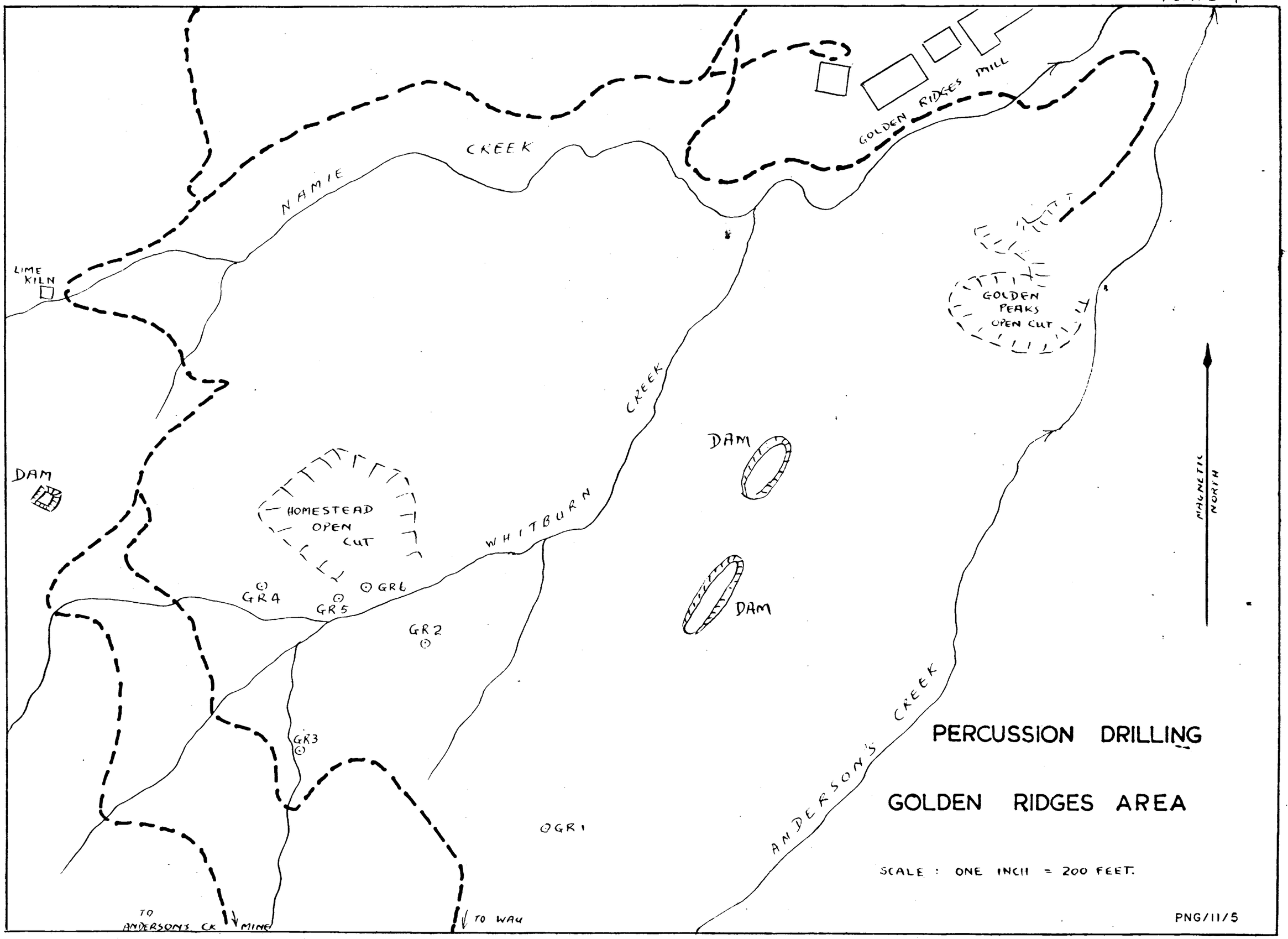

GOLDEN RIDGES MILL
NAMIE CREEK
LIME KILN
GOLDEN PEAKS OPEN CUT
DAM
HOMESTEAD OPEN CUT
WHITBURN CREEK
DAM
DAM
GR4
GR5
GR6
GR2
GR3
GR1
ANDERSON'S CREEK
TO ANDERSONS CK MINE
TO WAU
MAGNETIC NORTH
PERCUSSION DRILLING
GOLDEN RIDGES AREA
SCALE : ONE INCH = 200 FEET.
PNG/11/5

PLATE 5.

PERCUSSION DRILLING
CLEOPATRA LEASE

SCALE
40 0 40 80
FEET
ONE INCH TO 40 FEET

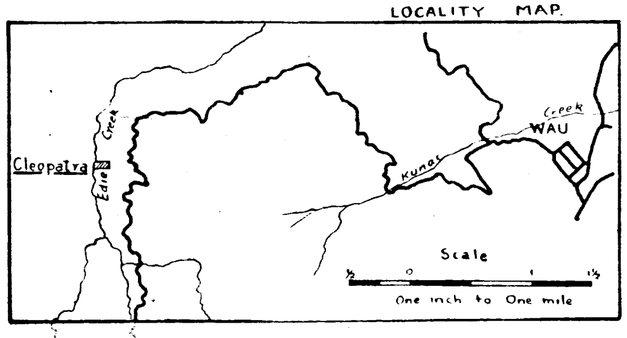
MAGNETIC NORTH

REFERENCE

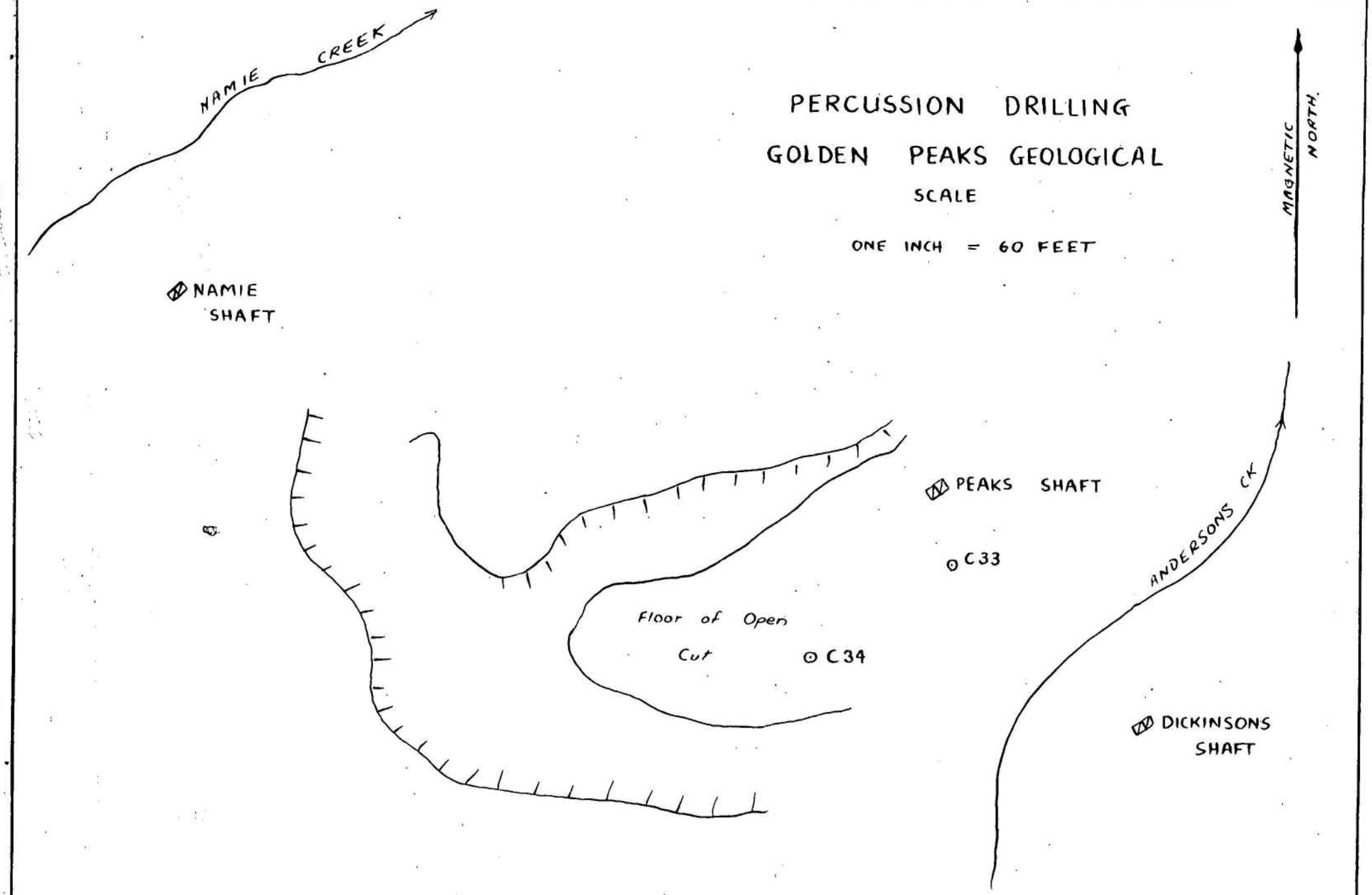
- Geological Boundary
- Strike and dip of strata
- Contour . from plane table. survey . Reduced Level Arbitrary
- Survey Station
- Face of old workings
- Percussion Drill Hole
- Auriferous Wash

R.L. 53'
R.L. 58'
EDIE CREEK
WEATHERED
PORPHYRY
FAULT
BRECCIA
IGNEOUS
OLD CHANNEL OF EDIE CREEK (WORKED OUT)
Elevated Ground (Swamp)
No. 7 Bottomed at R.L. 56'
Hole No. 6 Bottomed at R.L. 55'
R.L. 100'
6070
6080
6090
6100
6110
6120
6130
6140

LOCALITY MAP.



PNG/11/9


NAMIE CREEK
PERCUSSION DRILLING
GOLDEN PEAKS GEOLOGICAL
SCALE
ONE INCH = 60 FEET
MAGNETIC NORTH
NAMIE SHAFT
PEAKS SHAFT
C33
Floor of Open Cut
C34
ANDERSONS CK
DICKINSONS SHAFT