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RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED
MELBOURNE, AUSTRALIA

PROJECT:— PRP/7/100

REPORT No. :— MISCELLANEOUS/1959.

THE PINNACLES-CHESTER AREA, TASMANIA.

PART I GEOCHEMICAL SURVEY

by

E. Muceniekas

PART II GEOPHYSICAL SURVEY

by

J. Boniwell

59 - 278

Pinnacles - Chester Area, Geochim &
Geophysical Surveys
by E. Muceniekas & Boniwell
14/5/59

FILE REFERENCE:— 8D/20S

MAP REFERENCE:—

DATE:— 14/5/59.

365.

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THE PINNACLES-CHESTER AREA, TASMANIA.C O N T E N T S.PART I

GEOCHEMICAL SURVEY, by E. Muceniekas.

PLANS

T.564 Geochemical anomalies plotted on geophysical grid.

SCALE

400' to 1"

PART II

GEOPHYSICAL SURVEY, by J. Boniwell.

PLANS.

T.571	Pinnacles Areas. Phase difference contours Contour Interval = 2° Phase.	400' to 1"
T.572	Pinnacles Areas. Ratio contours Contour Interval = 0.10	400' to 1"
T.573	Pinnacles Area. Bouguer Gravity Profiles	400' to 1" Vert. 1Mgal to 1"
T.574	Pinnacles Area. Residual Gravity Contours Contour Interval = 0.2 mgals.	400' to 1"
T.575	Chester-Pinnacles Area. Topographic Contours Contour Interval = 20'.	400' to 1"
T.576	Pinnacles Area. Magnetic Profiles	400' to 1" Vert. 100' to 1"
T.577	Chester-Pinnacles Area. Phase difference Contours Contour Interval = 2° Phase.	400' to 1"
T.578	Chester-Pinnacles Area. Equi-ratio contours Contour Interval = 0.10.	400' to 1"
T.579	Chester Mine Area. Vertical loop - E.M. Profiles	400' to 1" 20° tilt to 1"
T.580	Chester Mine Area. Bouguer Gravity Profiles	400' to 1" Vert. 1Mgal to 1"
T.581	Chester Mine Area. Residual Gravity Contours Contour Interval = 0.2 mgal.	400' to 1"
T.582	Chester Mine area. Topographic contours Contour Interval = 50ft.	400' to 1"
T.583	Chester Area. Magnetic Profiles	400' to 1" 100' to 1"
T.584	Chester-Pinnacles Area. Regional Gravity Gradients	400' to 1" Vert. 1.0mgal to 1"
T.590	Pinnacles Area. Residual Gravity Contours Contour Interval = 0.1 mgal.	400' to 1"

GEOCHEMICAL SURVEY OF THE PINNACLES AREA, N.W.
TASMANIA.

by

E. Muceniekas

The geochemical investigation in this area indicated two mineralized zones (see Plan No. T.564).

1. The better geochemical anomaly occurs on geophysical grid lines CL and 12N with medium Pb and slight Zn mineralization.
2. The less significant mineralized line runs from 28S to 52S with low Pb and traces of Zn.

DISCUSSION

The area generally was satisfactory for geochemical investigations, bearing in mind the Tasmanian conditions. The mineralization observed is in or near black carbonaceous slate with small quartz veins very similar to those at the Rosebery mine. The slates are adjoined on the east by quartz porphyries which are slightly mineralized in places, as for example at 16N/12W where the Zn content can be classed as medium to high. To the west of the slate there is the silicified slate or quartz schist. Some tuffs between the slate were observed on lines 44S, 48S, 52S.

The best Pb mineralization was located on geophysical line 4N/14W. The slate observed in the creek at that place contains pyrite and the gossans on the right bank contain lead. Similar mineralization occurs in the blue slate on the same line at 16W. The slate is on line 8N/16W and on line 12N it is in a creek at 19W. On line 16N the slate disappears under the porphyry scree derived from the east, but for no apparent reason on the same line at 15W very slight Cu mineralization was observed in yellow clay.

The southern anomaly occurs as the northern most in dark slate on line 28S/16W with weak Pb mineralization, and extends to the south, probably swinging to the west on lines 48S and 52S with increasing mineralization.

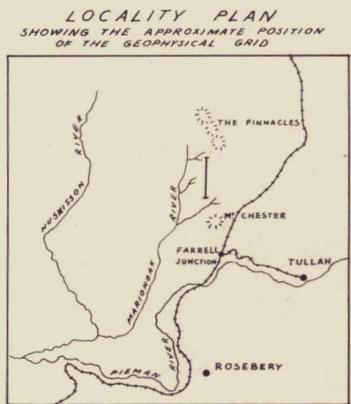
In the Marionoak River sheared slates, small specks of galena were observed. The water and manganese dioxide seeping into the river from the east as far as 52S, contains Pb and Zn. Quartz schists, dipping west, south of the Hollway rivulet were observed with traces of galena. One small creek coming from the west, half a mile from the Pieman River showed Pb mineralization. Outcrops of Permian (?) mudstone observed along the eastern bank of the Marionoak River were found to be slightly mineralized.

E. Muceniekas,
Geochemist.



PLOTTED RIVER POSITION AS SHOWN ON GEOPHYSICAL PLANS

CORRECT POSITION OF RIVER IN RELATION TO GEOPHYSICAL GRID LINES



- LOW
- MEDIUM
- HIGH

NOTE: WHERE DEFINITE MINERALISATION IDENTIFIED AT ANY ANOMALY IT IS INDICATED BY THE MINERAL SYMBOL OTHERWISE IN THIS AREA ANOMALIES REPRESENT EITHER LEAD OR ZINC.

364003



RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED.			
PINNACLES AREA			
GEOCHEMICAL ANOMALIES PLOTTED ON GEOPHYSICAL GRID			
E. Mucenichas, 2.4.53.	SCALE: 1 inch = 400 feet	PRP/7/100	Plan N°T 564

PART IIGEOPHYSICAL SURVEYS IN THE PINNACLES-CHESTER
AREA, TASMANIA.

by

J. Boniwell.

An extensive area of Cambrian Dundas volcanics fault-bounded in the west against a bedded series of slates, tuffs and shales, was covered geophysically in the summer field season, 1958-59. Mineralization in the area is most notably represented by the Pinnacles Mine (pyrite, minor Cu. Pb. Zn.) in the north, and the Chester Mine (pyrite) in the south, both occurrences contained within a porphyry host rock. Several other small showings exist, particularly in the Pinnacles Hills area, which, together with the above, lay emphasis on a broad zone in the porphyries immediately east of the contact.

The Surveys

Primary coverage relied upon the electromagnetic surveying of traverses 400 feet apart, and pegged at 100 feet intervals, controlled by base-lines bearing true north. Both vertical loop and Turam dual frequency horizontal loop methods were employed, not in complementary roles, but in concurrent efforts to expedite the work. Of the Turam results, only the lower frequency data have been compiled into plans. Gravimetric and magnetic coverage was strictly confined to the auxiliary function of discrimination of those electrically anomalous zones resolved in the primary phase.

Electromagnetic

In the Turam survey, which covered the bulk of the area, few, if any, phase anomalies were obtained within the porphyry sheet. Immediately north of the Hollway Rivulet, narrow conducting linears occur in the slates of the contact zone; further north, and north of Pinnacles, several apparently finite conductors occur again in the slates, but, here at points, they may encroach into the porphyries as a result of the contact shearing. The accompanying ratio anomalies are a little more confused, particularly in the south circa lines 44S-52S where differentiations in grounding conditions to the reference cable have induced attenuated "aerial" effects; but, nonetheless, the anomaly centres provide some qualitative degree in the inherent conductivities, e.g. all zones are of good quality, but the northern-most is not in the same high conductivity range as those south. Exhibited dips are consistently east at about 70 degrees.

The significant feature of this coverage is that the Pinnacles Mine mineralization is non-conducting.

The confinement of the electromagnetic anomalies in the north and west to the slates allows the description of the Chester area to be regarded as a separate entity; and the plans have been arranged accordingly. Here, conductor indications, resolved by vertical loop coverage, are wholly within the porphyry sheet. The conductors, themselves, apart from one line (112S) are generally

weaker and of poorer quality. On this one line, the sole dip determination can be made, viz. approximately 60 degrees east. Considerable dip extent is indicated here, and elsewhere, although, on the weaker conductors, an appreciable cover could be affecting the profiles.

Again the conductors of the area are significantly dissociated from the known mineralization (Chester sulphides). It is pertinent to note that the brief Afmag test on line 116S at the Chester Mine (7th March, 1959) indicated findings, at the time thought to be inconclusive, that are, in fact, confirmed by this later survey. That is, over the short traverse distance, the only indicated conductor was to the N.E. not at the mine.

Gravimetric

(a) North Pinnacles

The gravity setting to the electromagnetic horizons is complex. The evidence is very suggestive of a pattern of orthogonal cross-fractures, oriented as a unit through roughly 45 degrees from the north bearing boundary fault. The N.E. bearing are conducting, the N.W. are fault planes along which, on electrical indications, some lateral movement may have taken place (Plan No. T.574). Recognition of the contact expression in the gravity data has allowed the plotting of the contact locus, from which, it is seen, drag-strikes can be inferred in remarkable accordance with the postulated cross movement.

The conduction is clearly not due to sulphide incidence, but rather to the contact shearing itself, more probably to associated graphitic material, although the zones of mass-deficiency in correlation are more likely to be directly due to the extent of the shearing rather than to any graphite.

A positive gravity expression occurs at 8W on line 8S. The proximity of the Pinnacles Mine on strike must demand that it be given some consideration, but it is difficult, particularly in view of incomplete local definition, to gauge how much is real, how much is apparent in an area where changing gravity gradients are suspected. No abnormal conductivities exist in correlation.

(b) Hollway Rivulet

In this area of high topographic relief, the gravity profiles are being greatly influenced by cover to bedrock relationships, and by terrain effects. Despite the resultant distortion, a regional gradient similar to that observed in the north might be presumed, in which case some structural representation can be made. The fault boundary is recognisable (Plan No. T.574) as are some of the shear zones in the slates where en echelon displacements are apparent. There is some evidence for a cross-structural "break" circa lines 44S-48S.

Again, there appears no significant sulphide association with the conducting horizons.

(c) Chester

Profiles of Bouger gravity obtained near and over the Chester pyrite body are remarkably singular in the sense and order of the indicated mass-effects. Albeit the surface relief is markedly severe, the very magnitudes and abruptness of the anomaly resolutions can only be accounted for by large local density contrasts coupled to major structural effects.

It is difficult to evaluate a rapidly changing gravity setting when obviously the picture is incomplete, but sufficient evidence exists to presume a major structural member - actually depicted as two parallel fault axes in plan (No. T.581) - striking from the S.W. into the mine area, and terminating immediately north against a "cross-break". The latter, it is suspected, is no simple thing, although, for the want of more detail, it is represented as a single cross-fault.

Nevertheless, recognition of such regional influences, rather than of actual structural elements, has allowed the removal of smooth regional gradients to provide clear evidence of local excess-mass effects. In a residual section of line 120S (Plan No. T.581), the gravity expression inherent to the Chester sulphide body now appears neatly resolved. The anomaly form and order is perfectly compatible with a body of approximately $2\frac{1}{2}$ million tons of 40% sulphides steeply dipping to the east at about 60 degrees. This for 400 feet of strike only. Assuming 10 cu. ft. to the ton, the indicated depth extent is of the order of 600 feet.

The high point of interest, nonetheless, lies in the resolution of a second residual anomaly 800 feet to the west in a completely analogous setting to that of the Chester. Assuming, therefore, a similar mineral concentration, i.e. 40% sulphides, the implied tonnage, again for a 400 feet strike length, is of the order of 1.8 million tons down to a depth of about 500 feet. For these determinations, a one-station peak value at station 4E, in doubt whilst unchecked, has been reduced by 0.5 mgal. to an apparently more realistic, and certainly more conservative figure. Nevertheless, this one reading may well be genuine, thus providing a clear expression of dip, again to the east at approximately 60 degrees.

This second body, on the face of it, is a near virgin discovery. Exploration and development at Chester did not indicate its presence, apart from a trenched section across the inferred strike S.W. in which a zone of considerable pyrite was intersected (MacIntosh Reid, 1918). It is significant, too, that geology has mapped an area of altered porphyries of the Chester type also on strike in this direction. As both the gravity features remain open to the south, the mineral potential of the area could be substantial.

The lack of electromagnetic correlation is disconcerting. It is true that a conducting axis does actually exist with the westerly body, but it is strongly felt that this is symptomatic to the fault shearing rather than to the sulphides. Yet lesser sulphide mineralization of a patently similar type (the Corridor ore-body, Mt. Lyell) has been shown amenable to vertical loop detection. Thus, the one extenuating circumstance appears to be related to the mineragraphic setting of the Chester ore.

Magnetic

The only magnetic activity of significance was recorded in the Chester area. On line 116S, a regional magnetic gradient can be recognised strikingly consistent with the gravity-inferred structure (s). Unfortunately, on line 120S, this effect is entirely obscured by superficialities arising from the workings.

However, at no point in this, or the other areas, can magnetic minerals in situ be implied.

Conclusions and Recommendations

In toto, all the interest resulting from these surveys, is unquestionably focussed on the Chester Mine and its environs. As the information here is far from complete, it is beholden to future surveying to achieve greater elaboration of the initial discoveries. It is highly desirable that Turam coverage of the Chester mineralization be undertaken, as the method, by virtue of its high susceptibility to galvanic responses, may well be the optimum primary tool to cope with the evident peculiarities of the sulphide incidence.

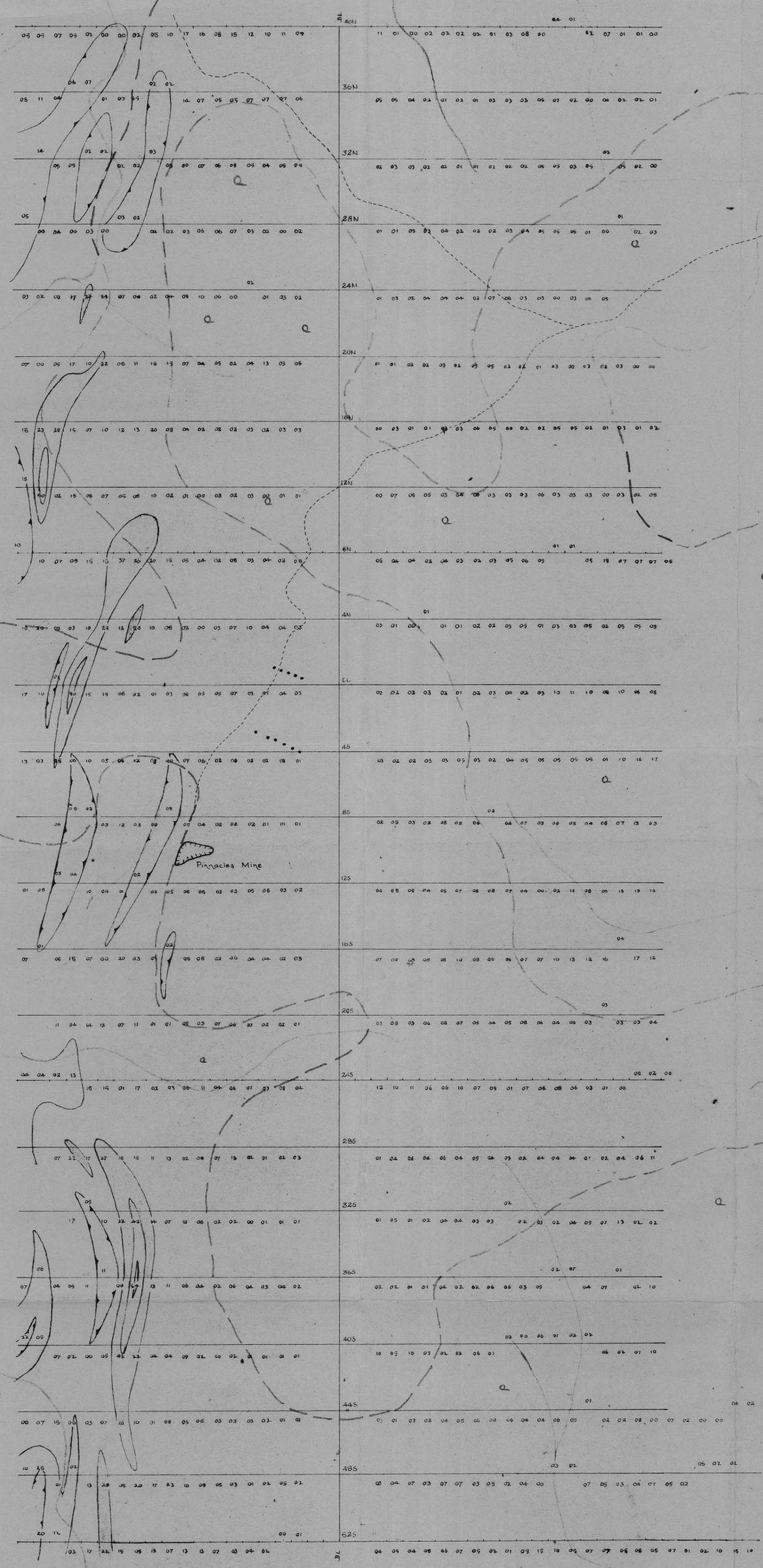
It is implicit to the foregoing that future exploration is needed to extend the coverage S.W. to the porphyry boundary fault, or that is, a coverage virtually embracing that area south to the Pieman River. Also, there is possibly room for additional surveying N.E. of the Chester dam.

Nevertheless, almost despite future geophysical work, the Chester area should be regarded as one that will inevitably demand a sizeable drilling programme.

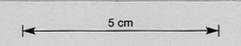
Zeehan, Tas.
14th May, 1959.

J.B. Boniwell,
Geophysicist.

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364008



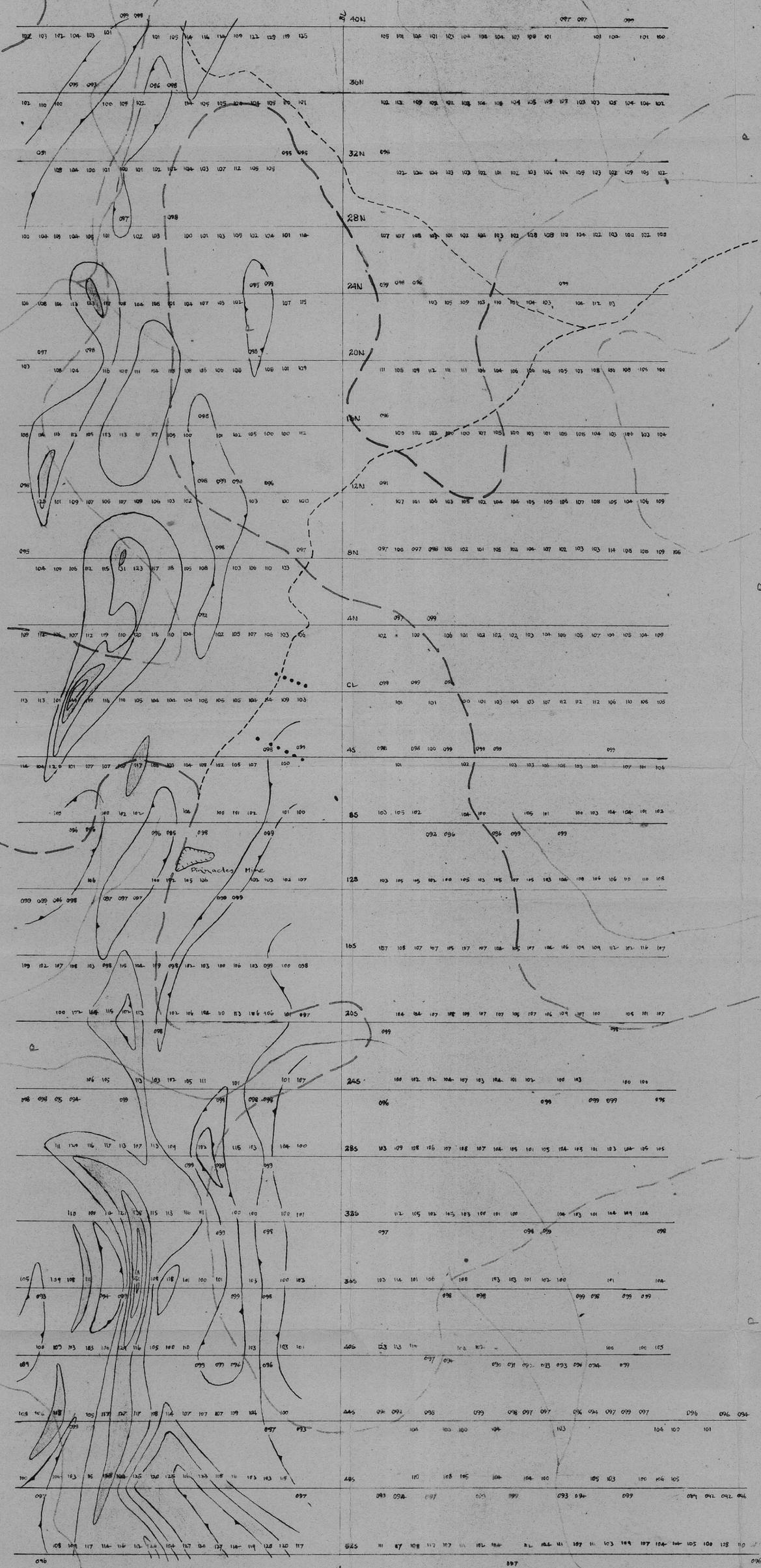
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**PINNACLES AREAS
PHASE DIFFERENCE CONTOURS**

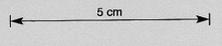
Scale 1" to 400 feet. Contour Interval - 2" Phase *Plan No*
 Date May 1959 PRP/7/100 7571

HOLLOWAY RIVULET

003



364009



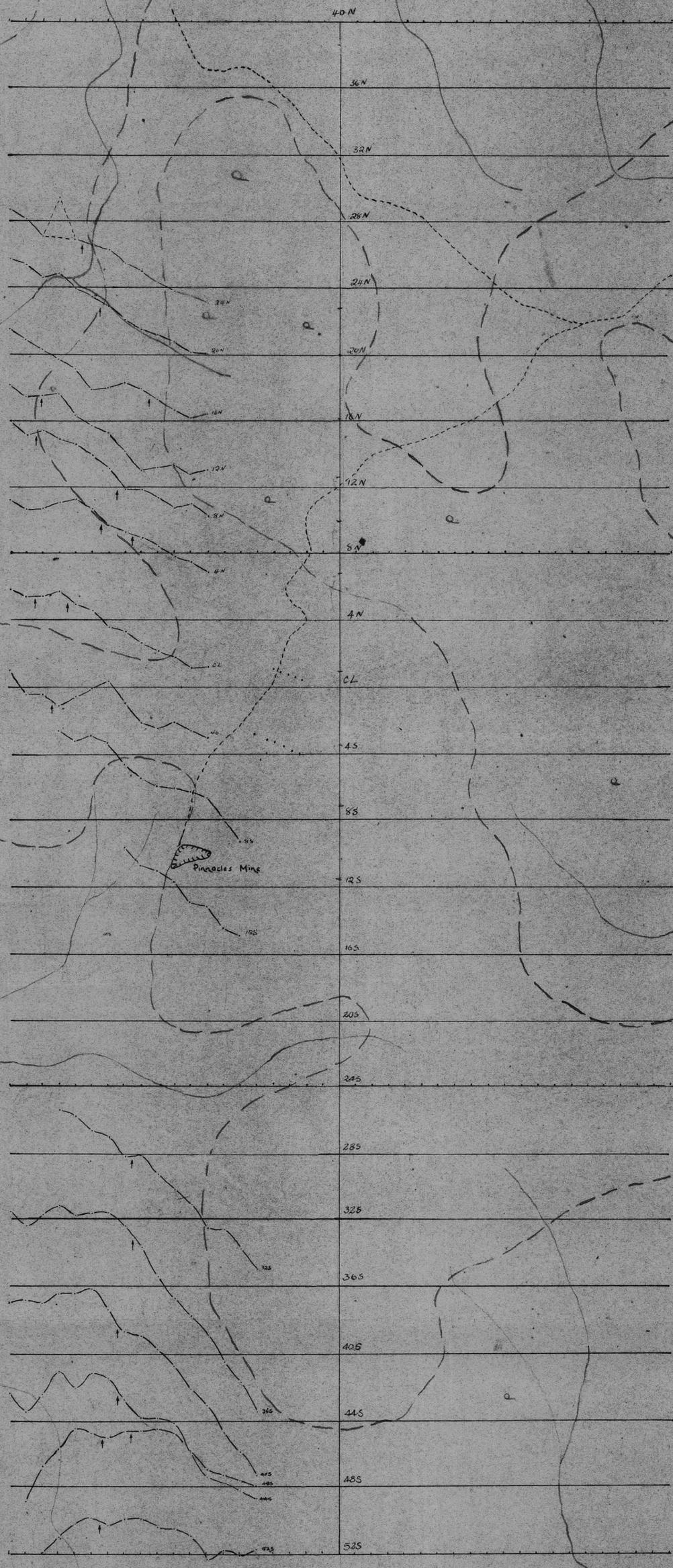
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

**PINNACLES AREAS
RATIO CONTOURS**

Scale 1" to 400 feet. Contour Interval 0-10 Plan No

Date May 1959 PRP/7/100 7572

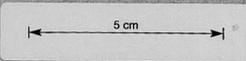
MARIONOAK RIVER



HOLLOWAY RIVULET

Scale 1" = 400 feet

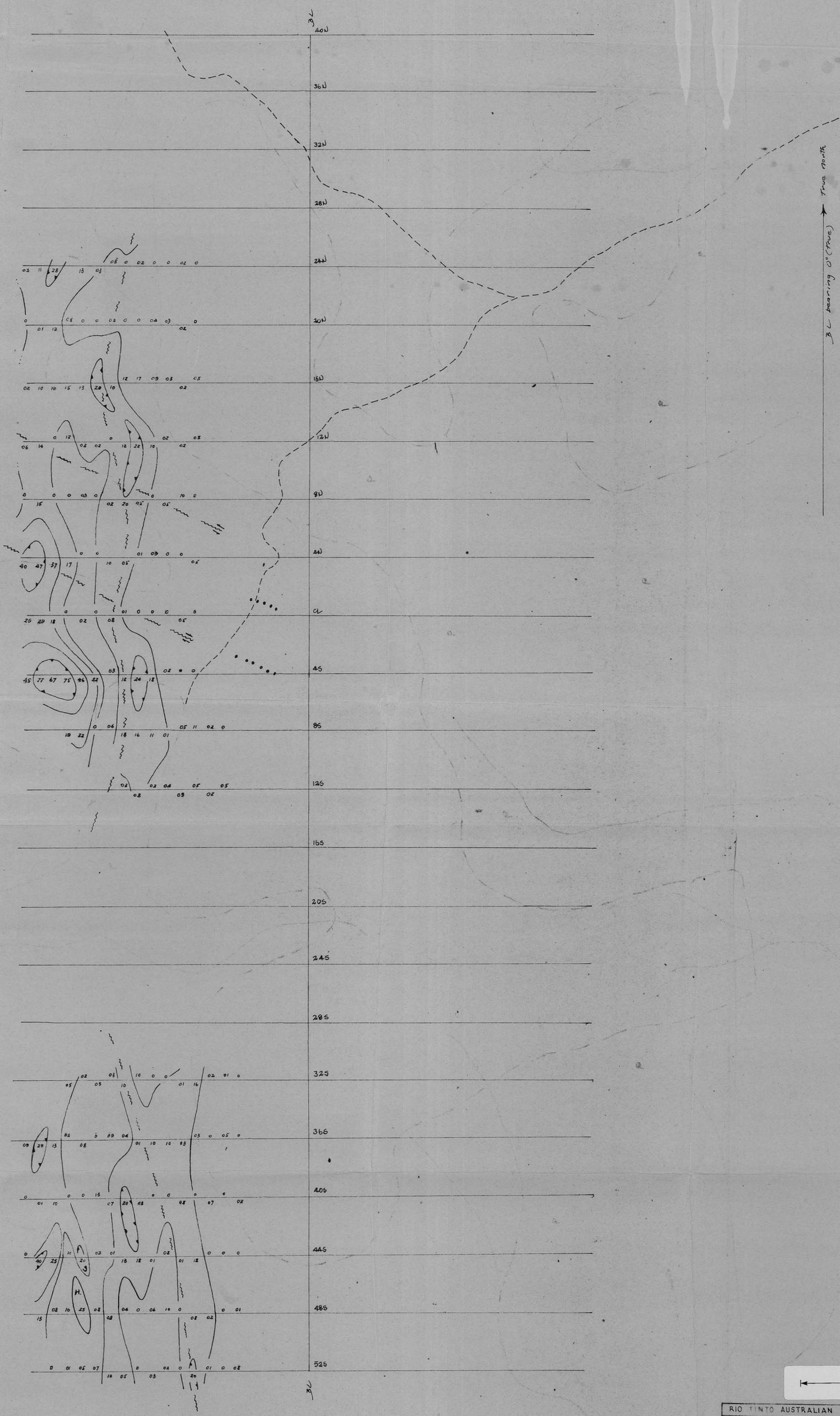
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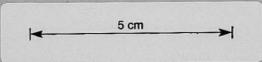
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

PINNACLES AREA
BOUGUER GRAVITY PROFILES

Scale: 1" to 400 feet. Vert 1" to 1 mgal.	Plan No
Date May 1959	PRP/7/100 1573



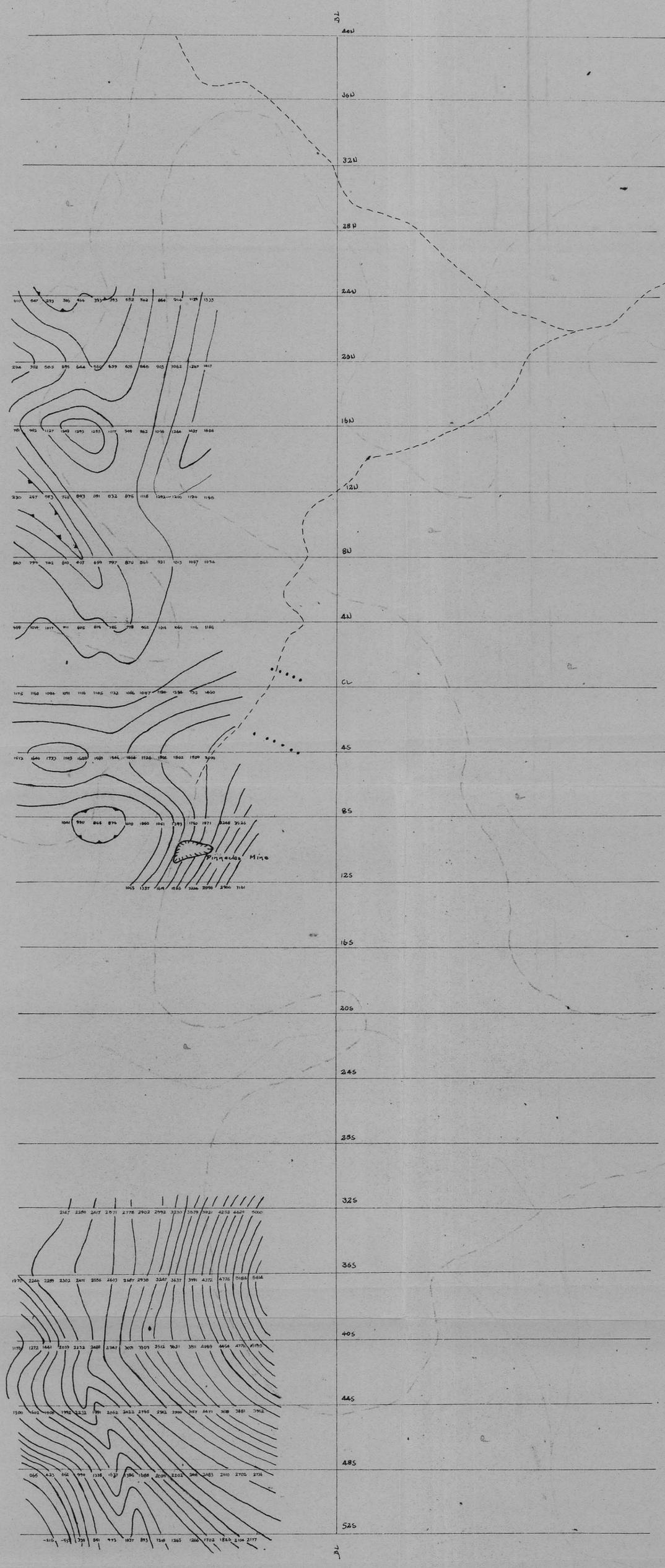
364011



RIO TINTO AUSTRALIAN EXPLORATION PTY LIMITED		
PINNACLES AREA RESIDUAL GRAVITY CONTOURS		
Scale 1" to 400 feet	Contour Interval 0.2 mgals	Plan No
Date May 1959	PRP/7/100	T 574

HOLLWAY RIVULET

M A R I O D O A K R I V E R



True north
364 bearing 0° (True)

H O L L O W A Y R I V U L E T

364012

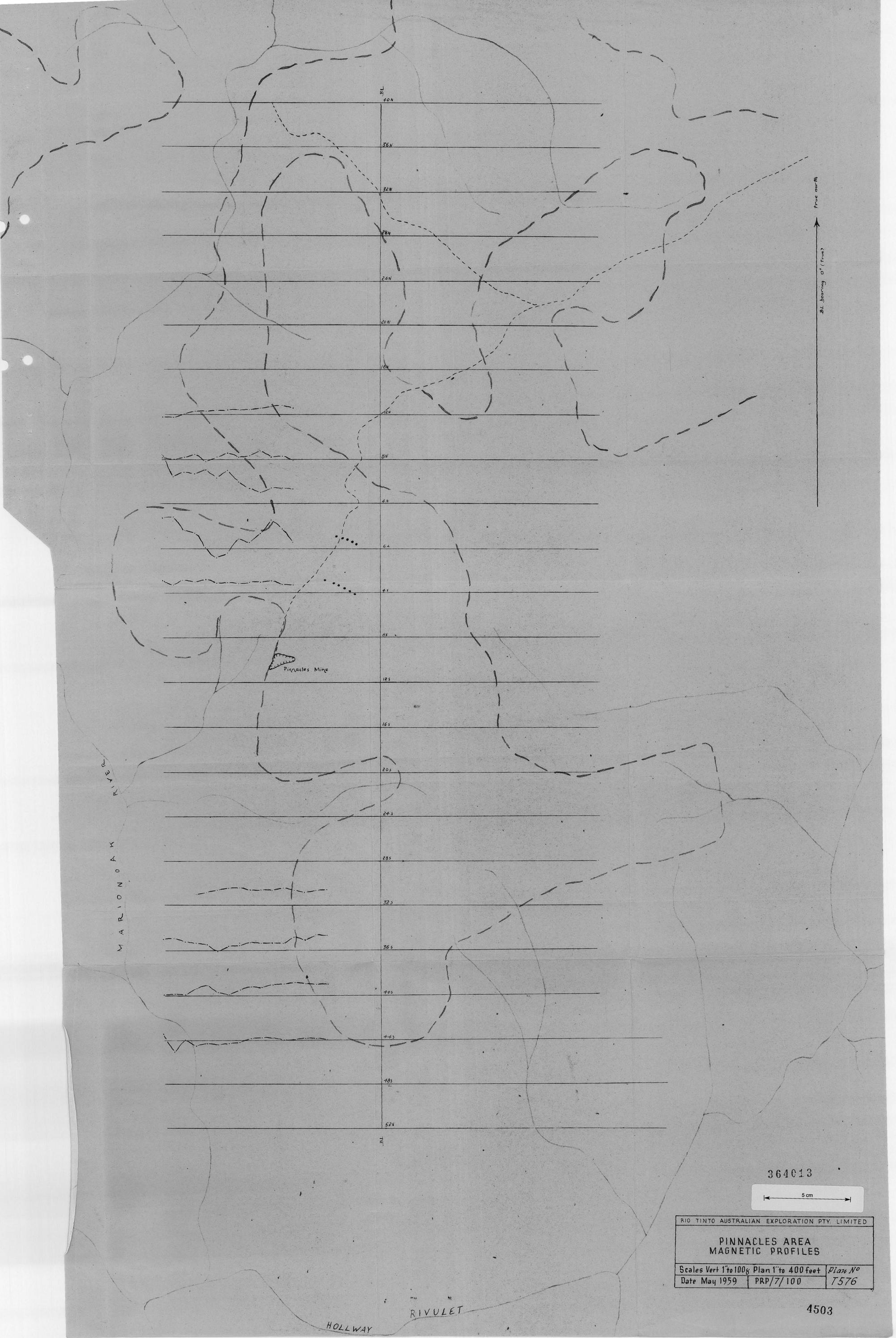


RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

CHESTER - PINNACLES AREA
TOPOGRAPHIC CONTOURS

Scale 1" to 400ft. (Contour Interval 20ft.)	Plan No
Date May 1959	PRP/7/100 T 575

4502



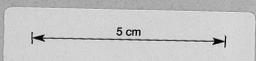
MARIONDAK RIVER

Pinnacles Mine

HOLLWAY

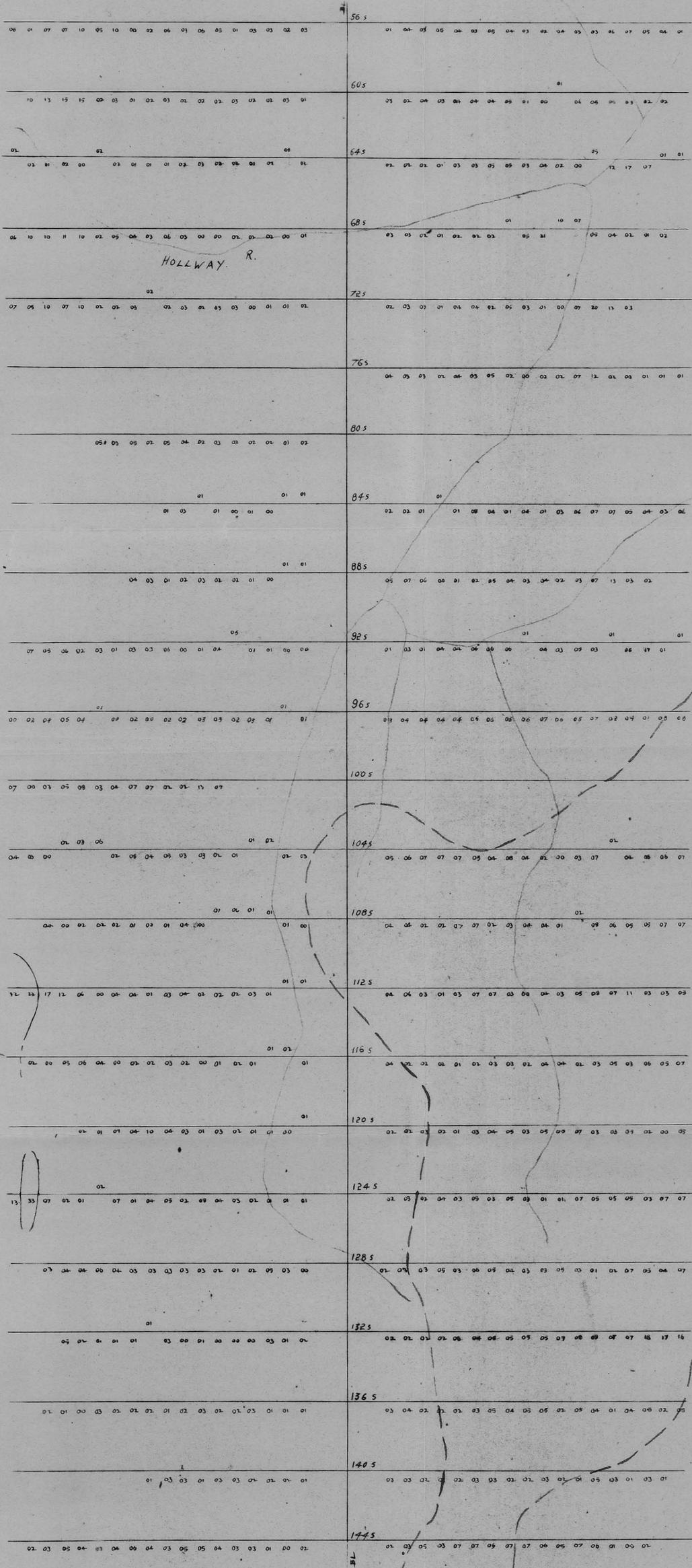
RIVULET

364013



RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED		
PINNACLES AREA MAGNETIC PROFILES		
Scales Vert 1" to 100g	Plan 1" to 400 feet	Plan No
Date May 1959	PRP/7/100	7576

4503

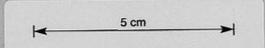


True north
M.L. bearing 0° (True)

DAM

CHESTER

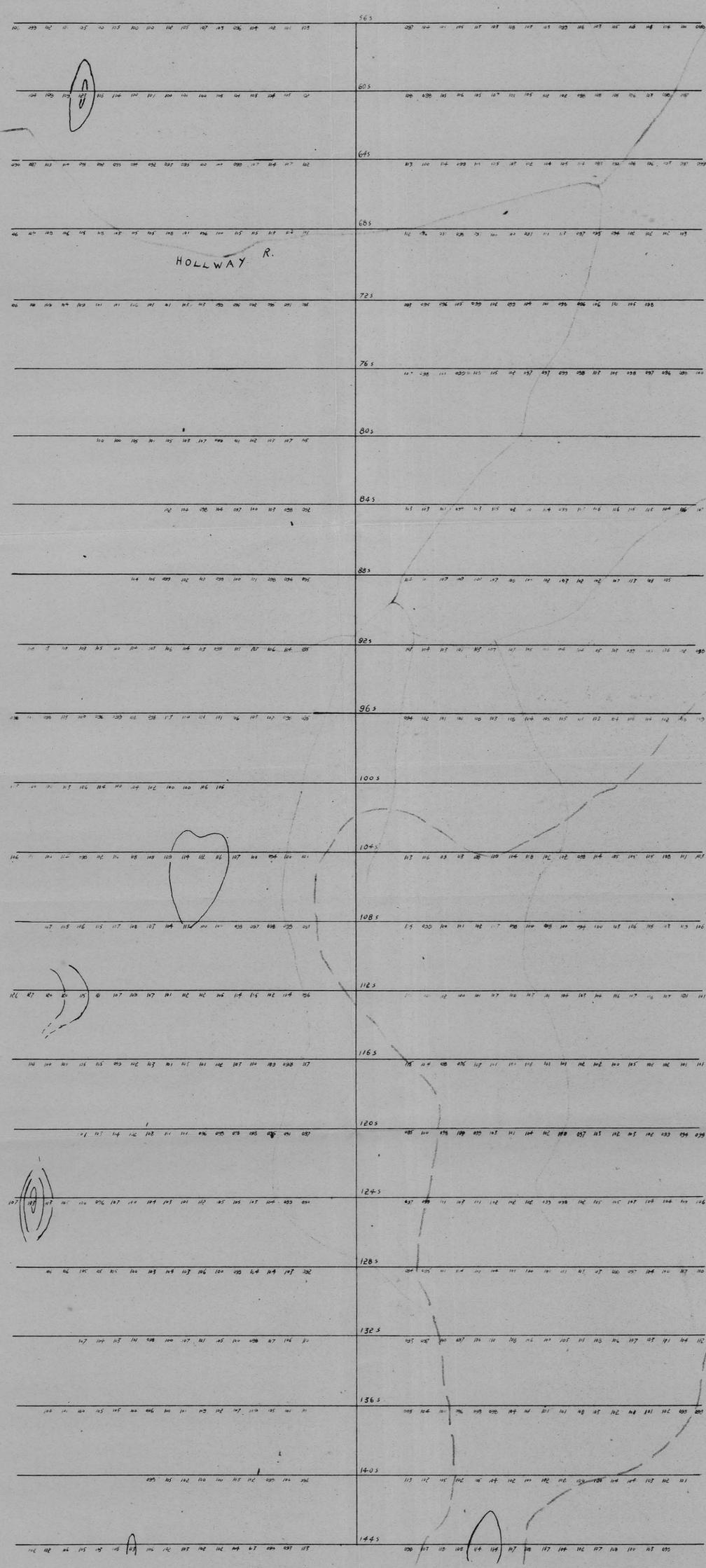
364014



RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

CHESTER-PINNACLES AREA
PHASE DIFFERENCE CONTOURS

Scale (Contour Interval 2° Phase) 1 to 400 ft Plan No
Date May 1959 PRP/7/100 T 577



True north
M.L. bearing 0° (true)

HOLLWAY R.

DAM

CHESTER

364015

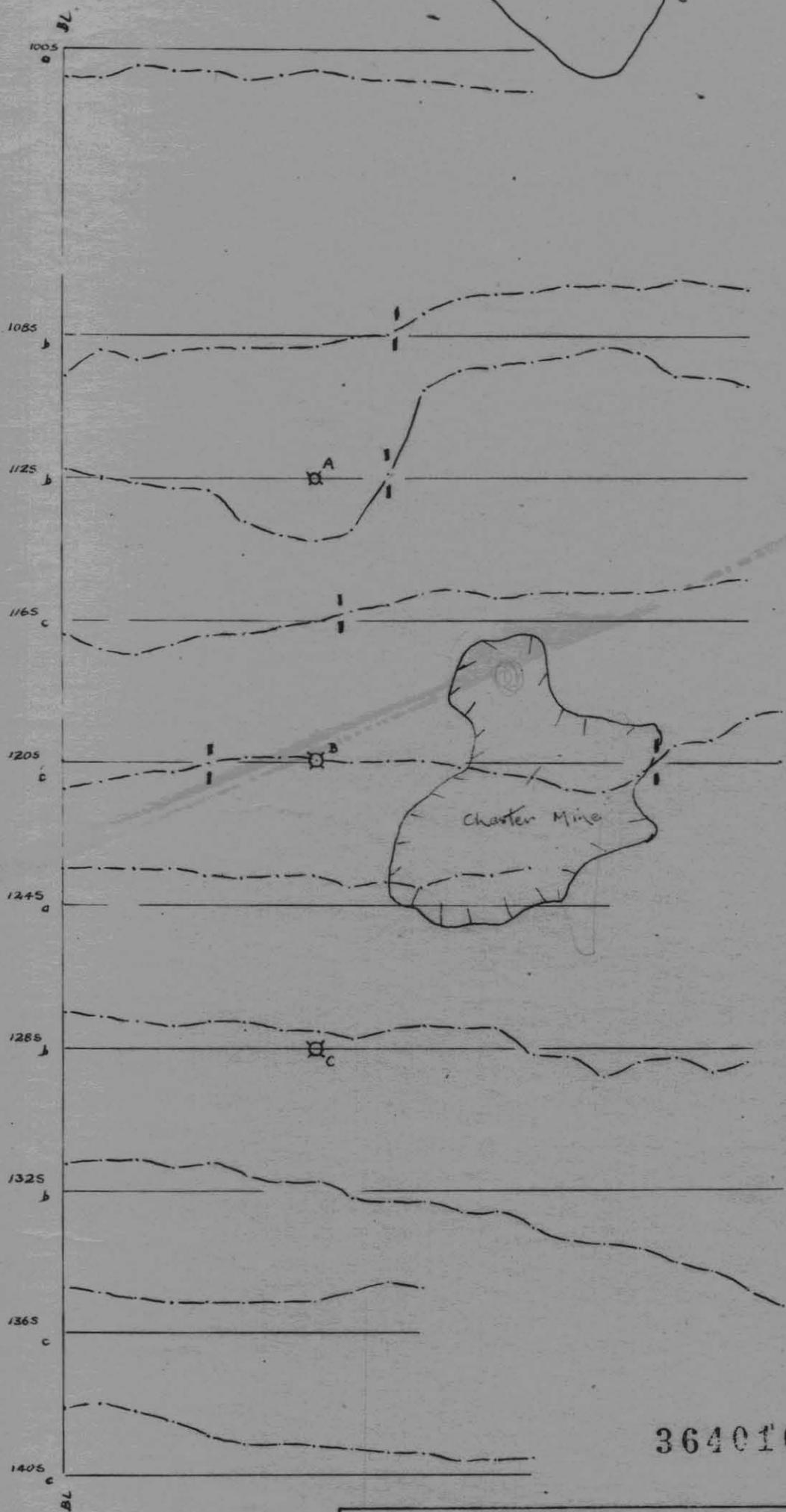
5 cm

RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED
CHESTER - PINNACLES AREA
EQUI-RATIO CONTOURS
 Scale Contour Interval 0.10 Vert 400' to 1" Plan No 7578
 Date May 1959 PRP/7/100

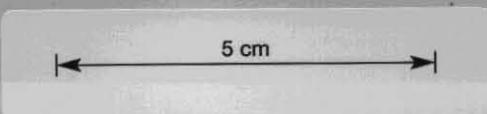
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TZ
Base Line Bearing 0° (True)

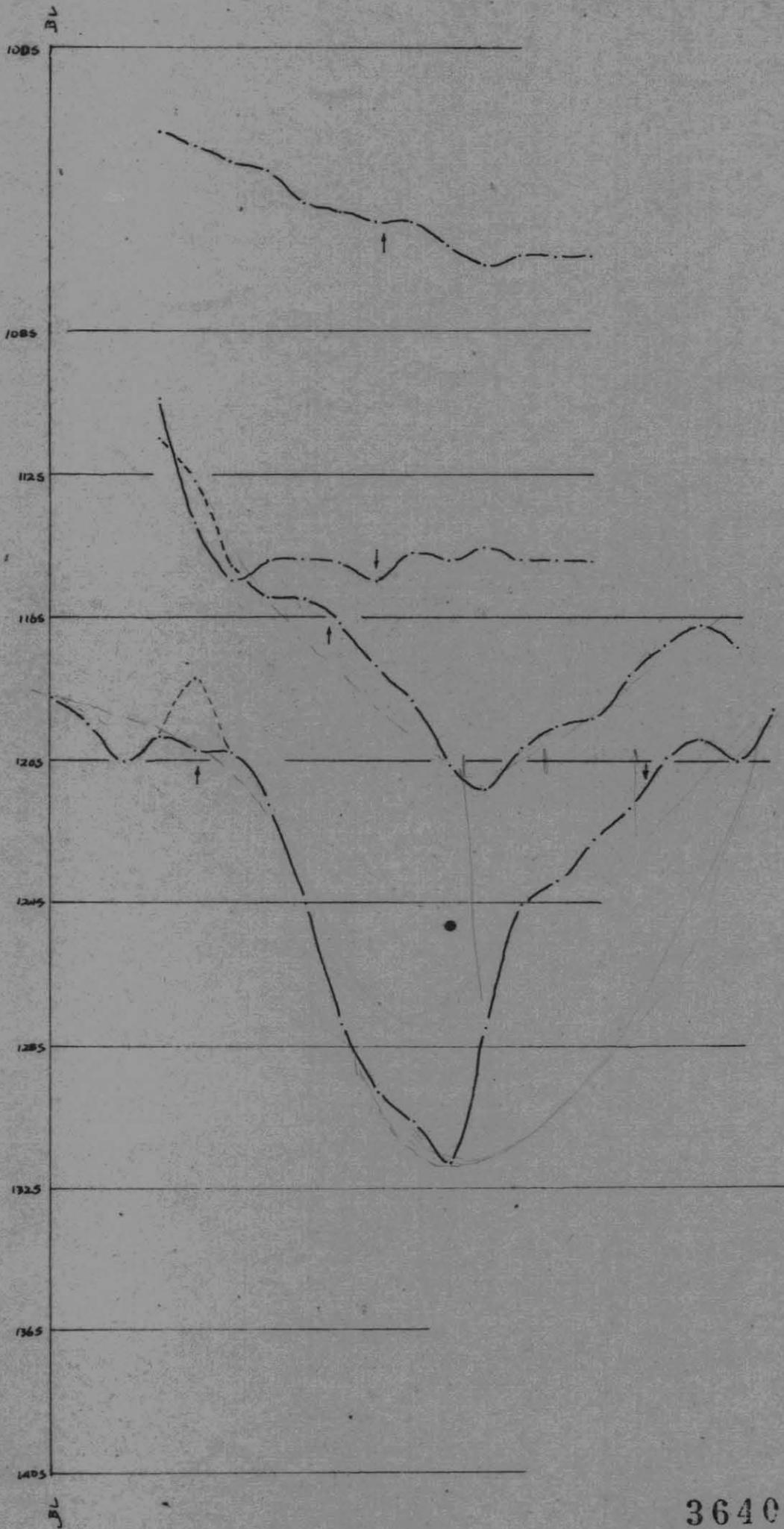


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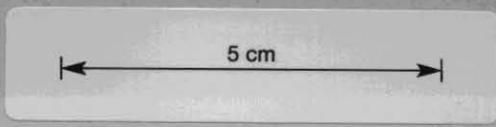
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED		
CHESTER MINE AREA VERTICAL LOOP - E.M. PROFILES		
Scale Vert. 1" to 20' tilt. Plan 1" to 400 ft	Plan No 7579	
Date May 1959	PRP/1/100	

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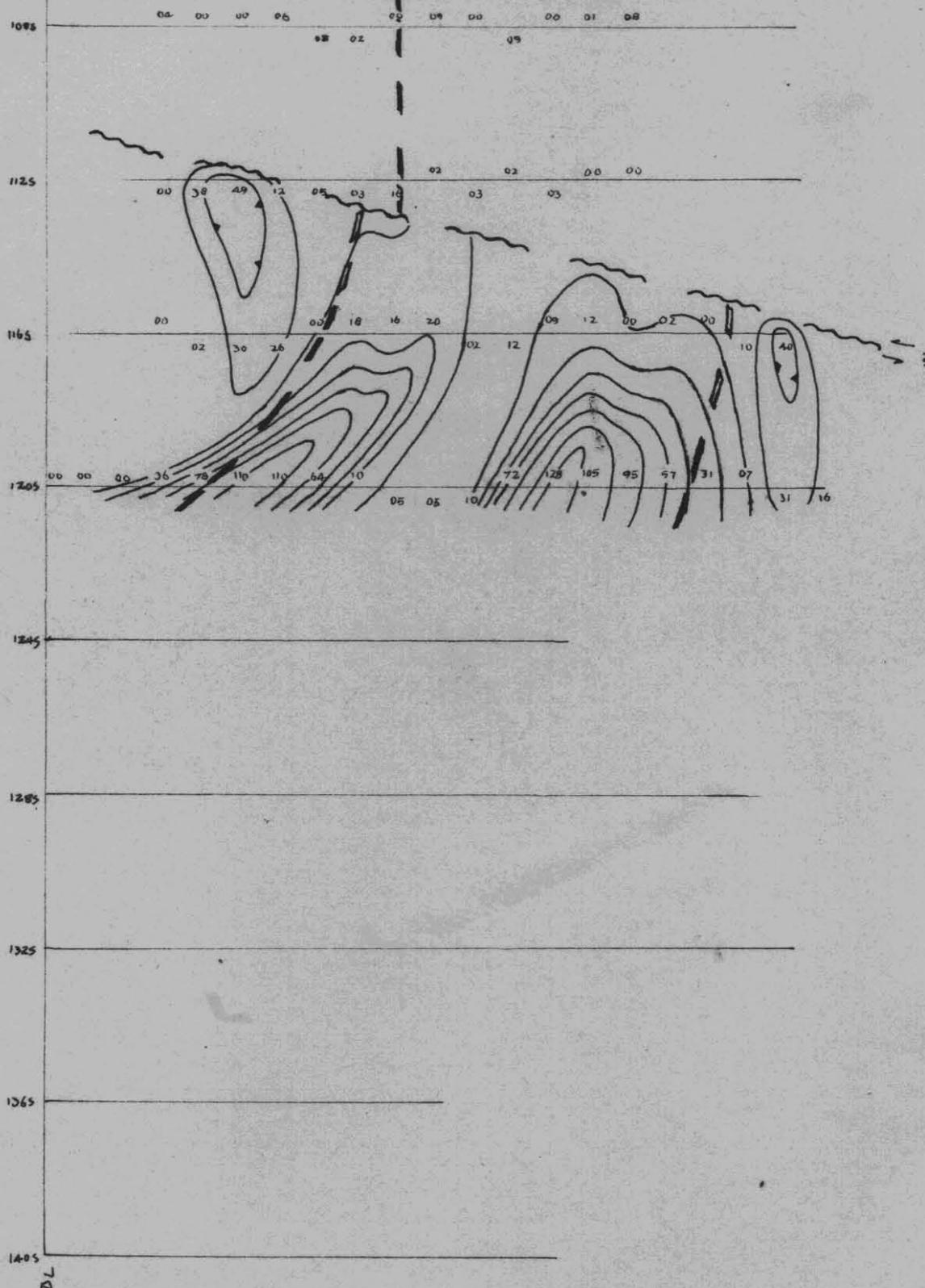
TN
 Base Line Bearing 0° True

364017

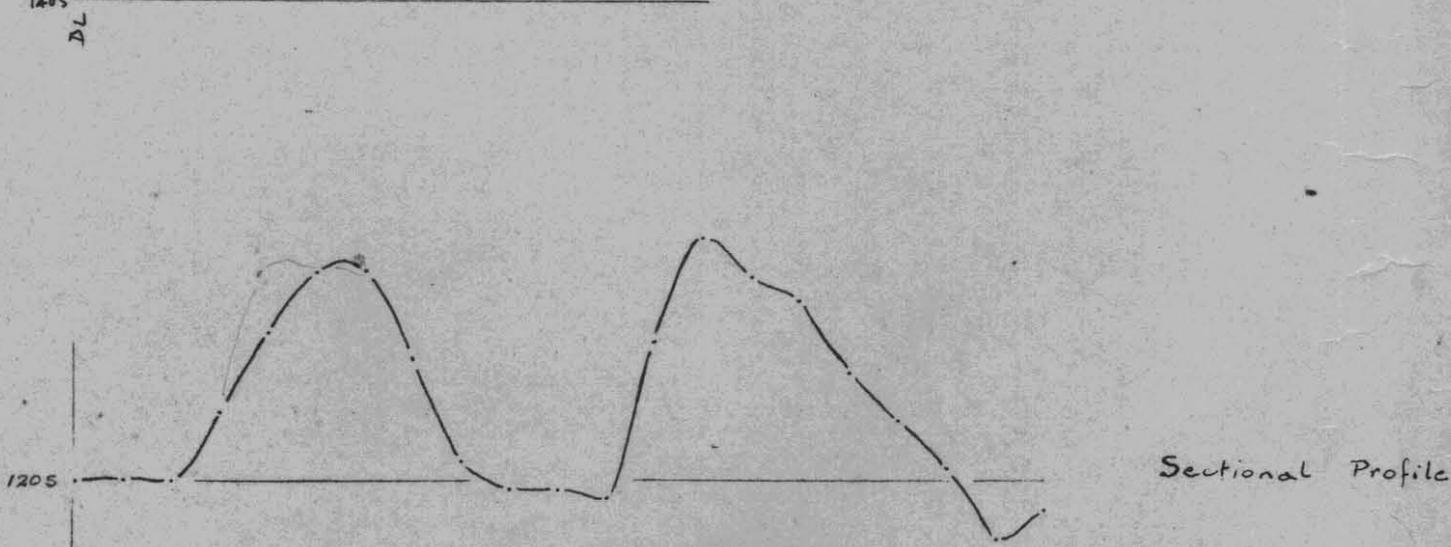


RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED		
CHESTER MINE AREA BOUGUER GRAVITY PROFILES		
Scales: Vert 1" to 1mgal. Plan 1" to 400ft		Plan No.
Date May 1959	PRP/7/100	T580

011

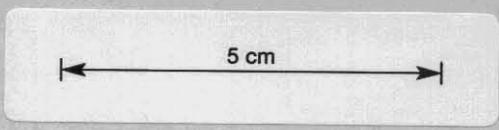


TN
Base Line Bearing 0° True



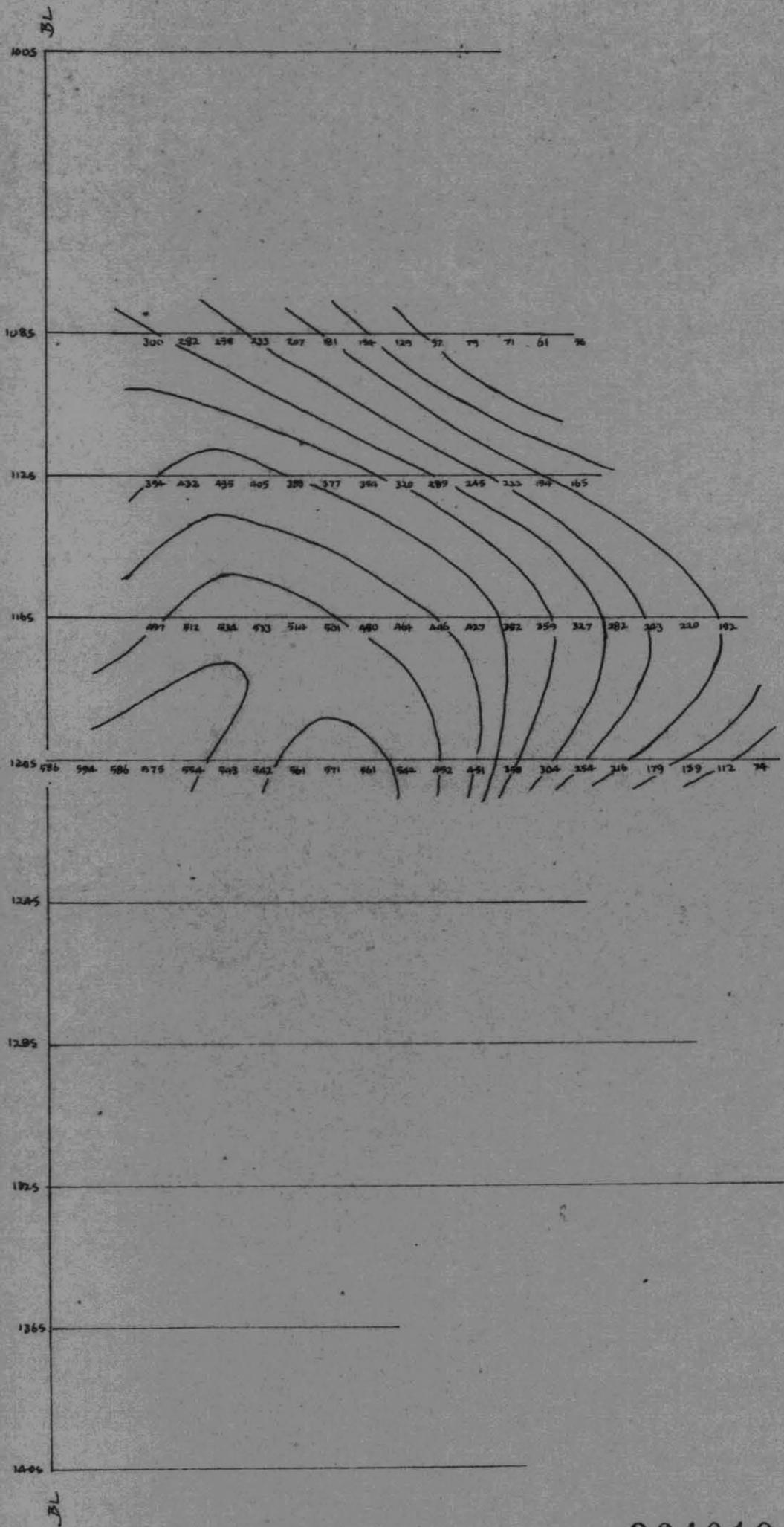
Sectional Profile

364018



RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED		
CHESTER MINE AREA RESIDUAL GRAVITY CONTOURS Contour Interval 0.2 mgal.		
Scale 1 inch to 400'	Vert 1" to 1 mgal	Section Plan No
Date May 1959	PRP/7/100	T581

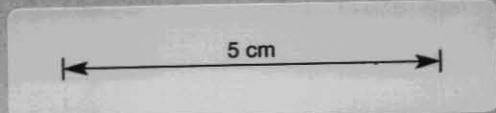
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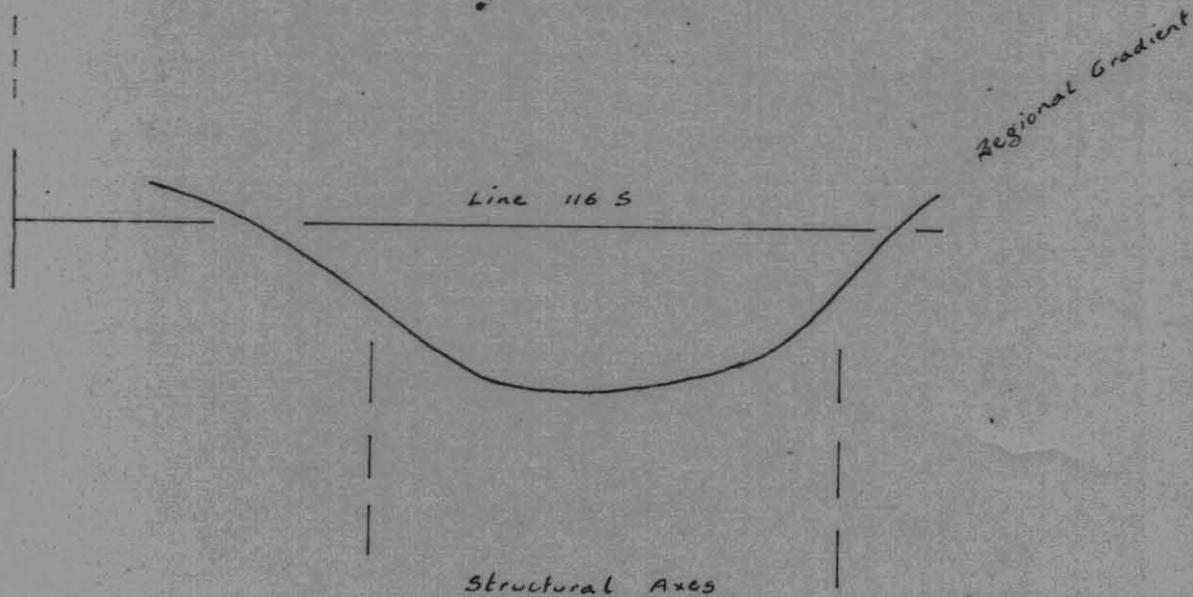
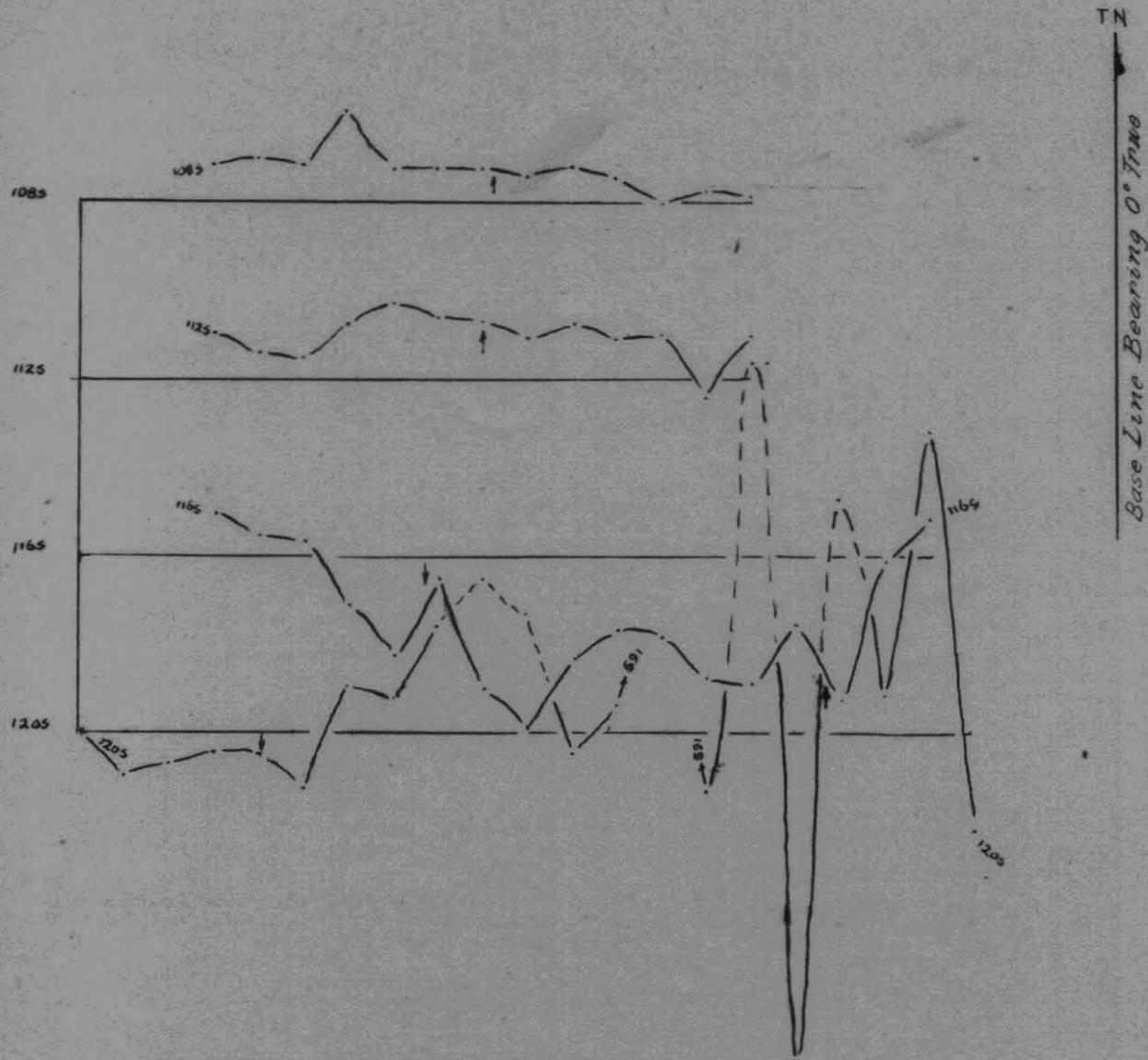
TN
Base Line Bearing 0° (True)

364019

RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED		
CHESTER MINE AREA TOPOGRAPHIC CONTOURS		
Scale 1" to 400 feet (Contour Interval 50ft.)	Plan No T582	
Date May 1959	PRP/7/100	



013



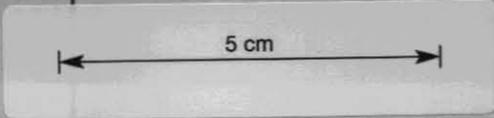
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RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

CHESTER AREA
MAGNETIC PROFILES

Scales Δz: 1" to 100γ Plan 1" to 400 feet

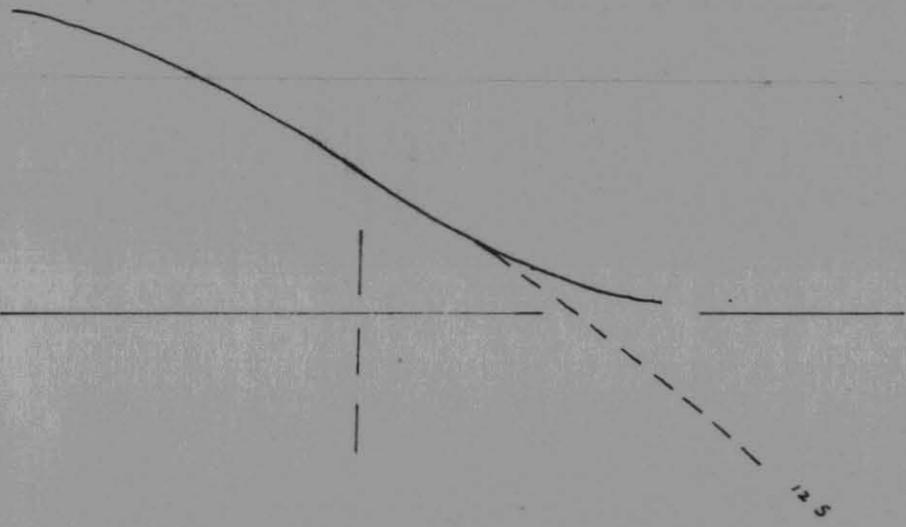
Date May 1959 PRP/7/100 Plan N° T 583



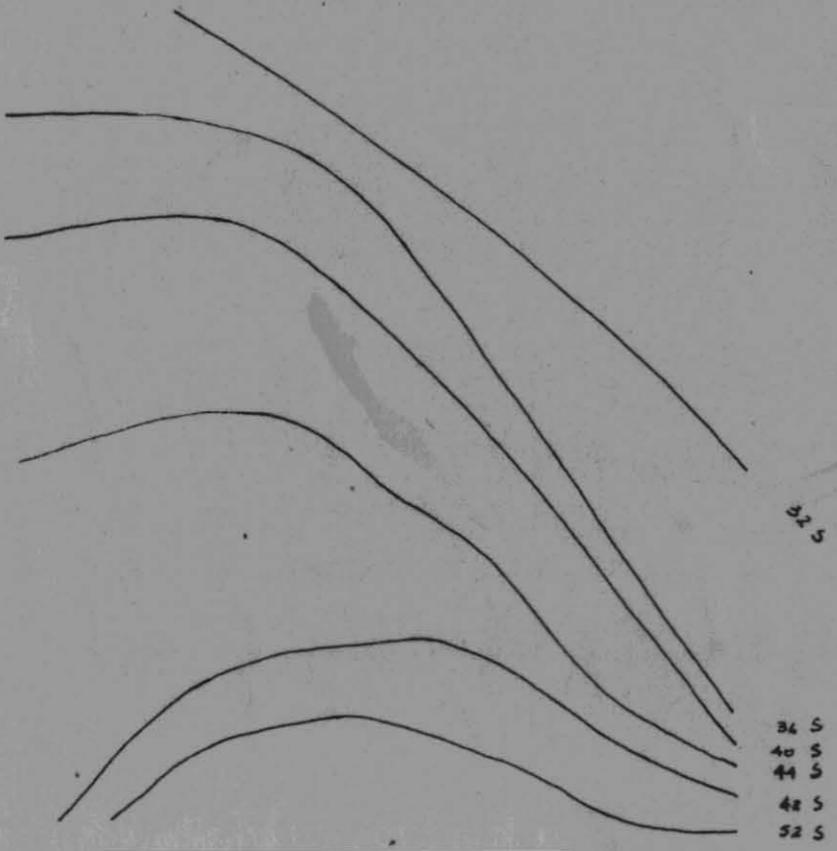
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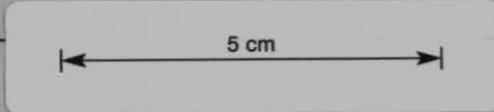
Pinnacles North



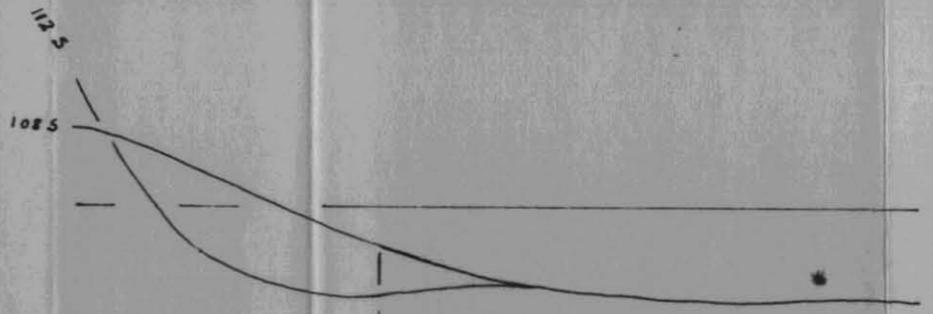
Hollway Rivulet



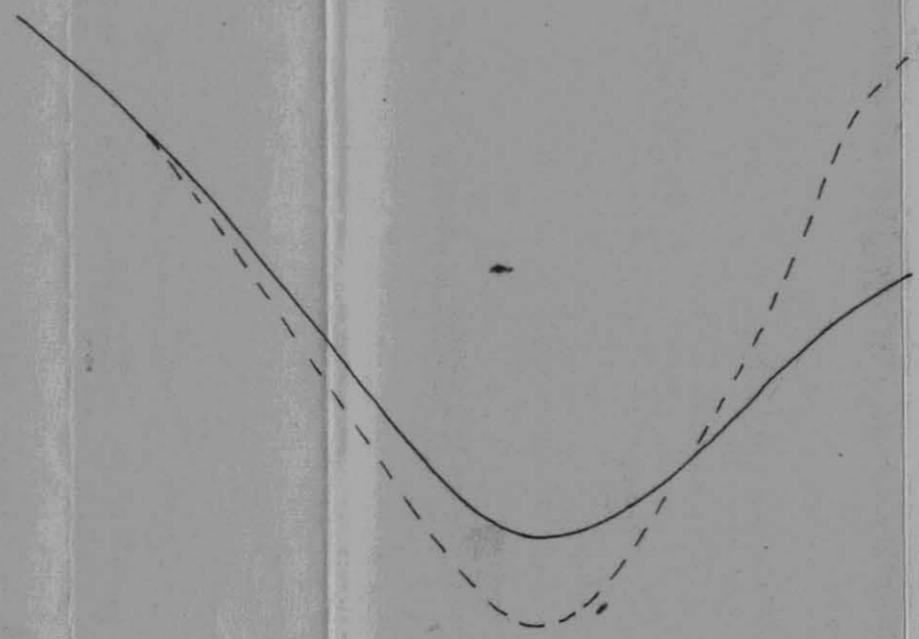
34 S
40 S
44 S
48 S
52 S



Chester



112 S
108 S



120 S (displaced 100' E)

116 S

364021

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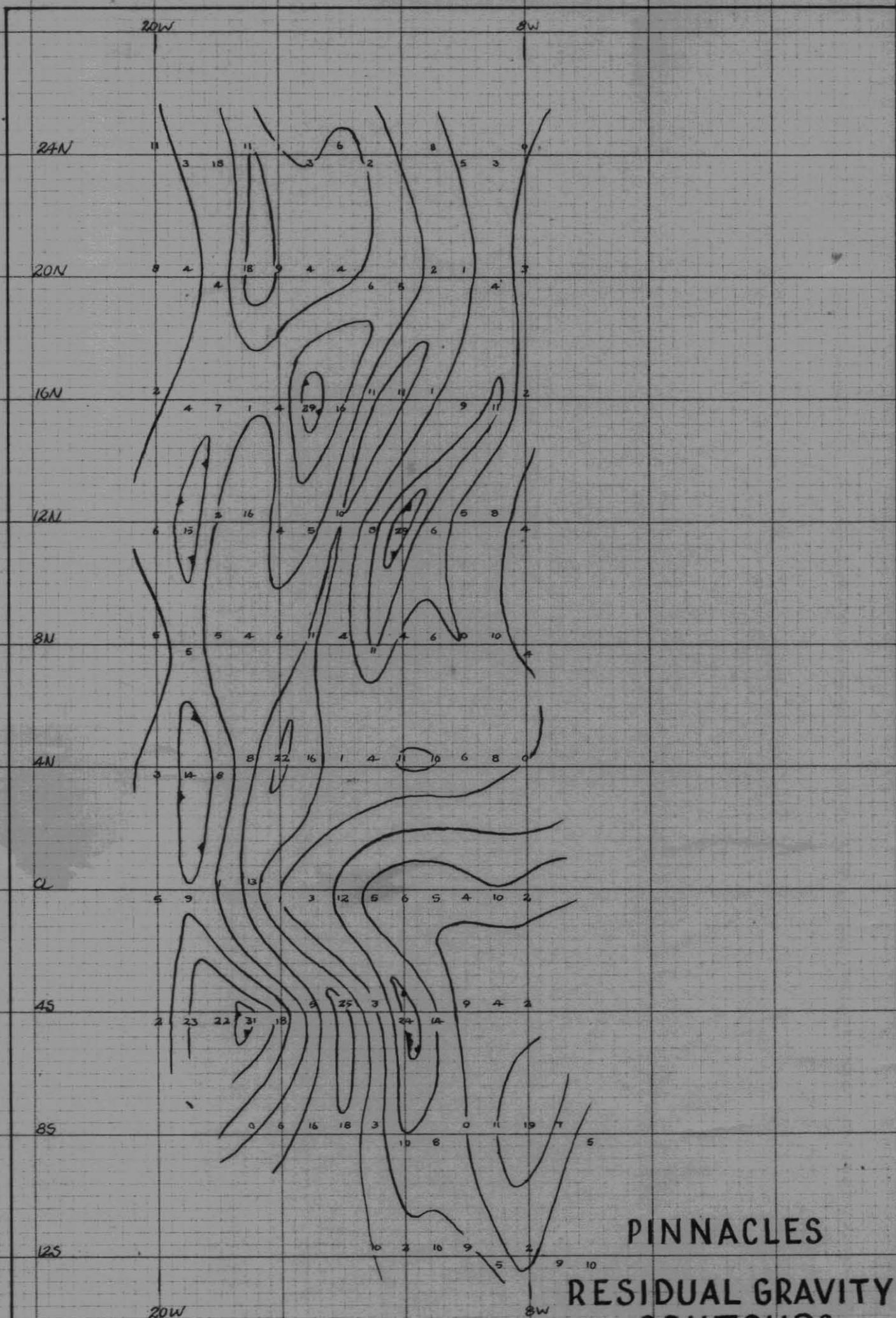
CHESTER - PINNACLES AREA
REGIONAL GRAVITY GRADIENTS

Scales 1" to 1.0 mgal. Plan 1" to 400 feet

Date May 1959

PRP/7/100

Plan No
T584



PINNACLES

RESIDUAL GRAVITY
CONTOURS

CONTOUR INTERVAL 0.1 mgals
SCALE 1" = 400 FT.

T590

