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No. 3132

EL 361

SUNDOWN CREEK

**PROGRESS AND FINAL REPORTS TO LICENCE
EXPIRY/SURRENDER FOR THE PERIOD
3/10/1977 TO 2/10/1979**

Submitted by
Comalco Ltd
1980

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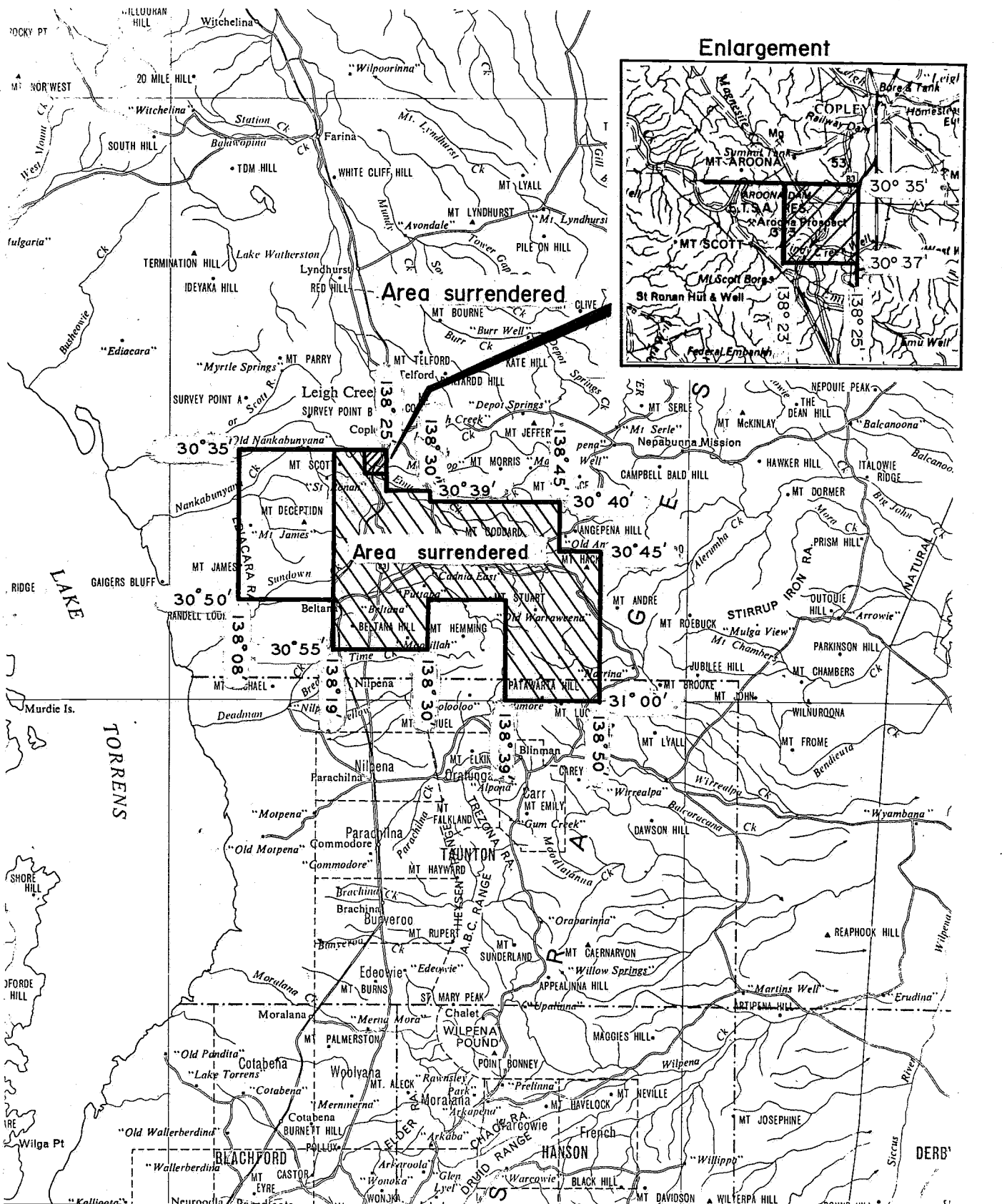
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Telephone: (08) 8463 3000
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Government of South Australia
Primary Industries and Resources SA

SCHEDULE A



SCALE 1:1 000 000



APPLICANT: ~~COMALCO LIMITED~~ COMMONWEALTH ALUMINIUM CORPORATION LIMITED

D.M.: 275 / 77

AREA: ~~1916~~ Square kilometres

1: 250 000 PLANS:

COPLEY

EXPIRE

LOCALITY: SUNDOWN CK AREA - EAST OF L. TORRENS

EXPIRY DATE: 3.10.78

E.L. No.: 361

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White A.H. 1977

FIRST QUARTERLY REPORT

14.10.77-14.1.78

E.L. 361 Comalco Ltd.

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White A.H. 1978

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14.1.78-14.4.78

E.L. 361 Comalco Ltd.

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White A.H. 1978

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14.4.78-14.7.78

E.L. 361 Sundown Creek

Comalco Ltd.

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Buchhorn I.J. 1978

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 14.7.78 - 14.10.78

E.L. 361 Sundown Creek

Comalco Ltd.

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EXPLORATION LICENCE NO. 361

First Quarterly Report

14.10.77 - 14. 1.78.

by

A. H. White



Comalco Limited,
95. Collins Street,
Melbourne,
Victoria. 3000.

January, 1978.

CONFIDENTIAL STATEMENT

to

The Director General of Mines and Energy

on

bearing of work for quarter to 14.1.78. on E.L.361

The detailed stratigraphic measurements in the Bunyeroo have not revealed any potentially favourable area for economic mineralisation, however reconnaissance geological, ground magnetometer and gravity work carried out between Mount Deception and Mount James is considered most encouraging.



(Dr.) A. H. White
Senior Geologist.

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EXPLORATION LICENCE 361 SUNDOWN CREEKQuarterly Report for period ending 14 January, 1978GEOLOGICAL(1) Stratigraphic compilation

A stratigraphic compilation of the Adelaide Geosyncline, Stuart Shelf, Gawler Platform, Curnamona Craton, Willyama Block and Kanmantoo Trough was completed (Figure 2) in order to provide a framework for the stratigraphic work planned for Exploration Licence 361. The compilation includes correlations from the Gawler Platform across to the Willyama area.

(2) Sedimentology

Exploration Licence 361 has been fairly thoroughly covered by detailed geochemical surveys by previous exploration ventures and it was not considered worthwhile to repeat any of this work. The area was taken up by Comalco partly because of the large number of small strata-bound copper showings in the Bunyerroo Formation. No synthesis of the sedimentology of this particular area exists, and therefore a programme of measuring sections in detail through the various units of the Adelaidean formations was commenced. The object of this detailed work was to compile sufficient data to allow a reconstruction of the sedimentary history of the Adelaideans in the area, and thereby locate the most favourable environments for possible stratabound base metal mineralisation. During the period eight sections totalling 25 700 metres were measured in the Bunyerroo and Wonoka Formations (Figures 3a - 3h). Further sections in other formations are planned for measurement before a synthesis of the sedimentary history of the area is commenced.

The Bunyerroo Formation was found to contain a thin turbidite sequence, informally named in the sections the St. Ronans Sandy Member, which occurs between Mount Deception on the west and the railway line on the east. It is hoped that the significance of this turbidite sequence will be explained by sedimentary analysis.

GEOPHYSICS

(1) Gridding

Commencing at the old Mount James Homestead, a north - south base line, with east - west lines spaced at two kilometres was surveyed (Figure 4) using tape measure and dumpy level with compass incorporated. The grid has not been closed yet but an accuracy of $\pm$ ten metres is anticipated.

(2) Ground Magnetometer Survey

A ground magnetometer survey using a Scintrex MF-2 fluxgate magnetometer was carried out on the grid, to locate and check a large magnetic high located by a previous airborne survey (South Australian Mines Department 1:1 000 000 magnetic map). Readings were taken at fifty metre intervals on the grid and the magnetometer was checked on a regular basis for diurnal shift. The resultant profiles confirm the presence of the magnetic high (Figures 5 - 9); a contour map of these results is presently being compiled.

(3) Gravity Survey

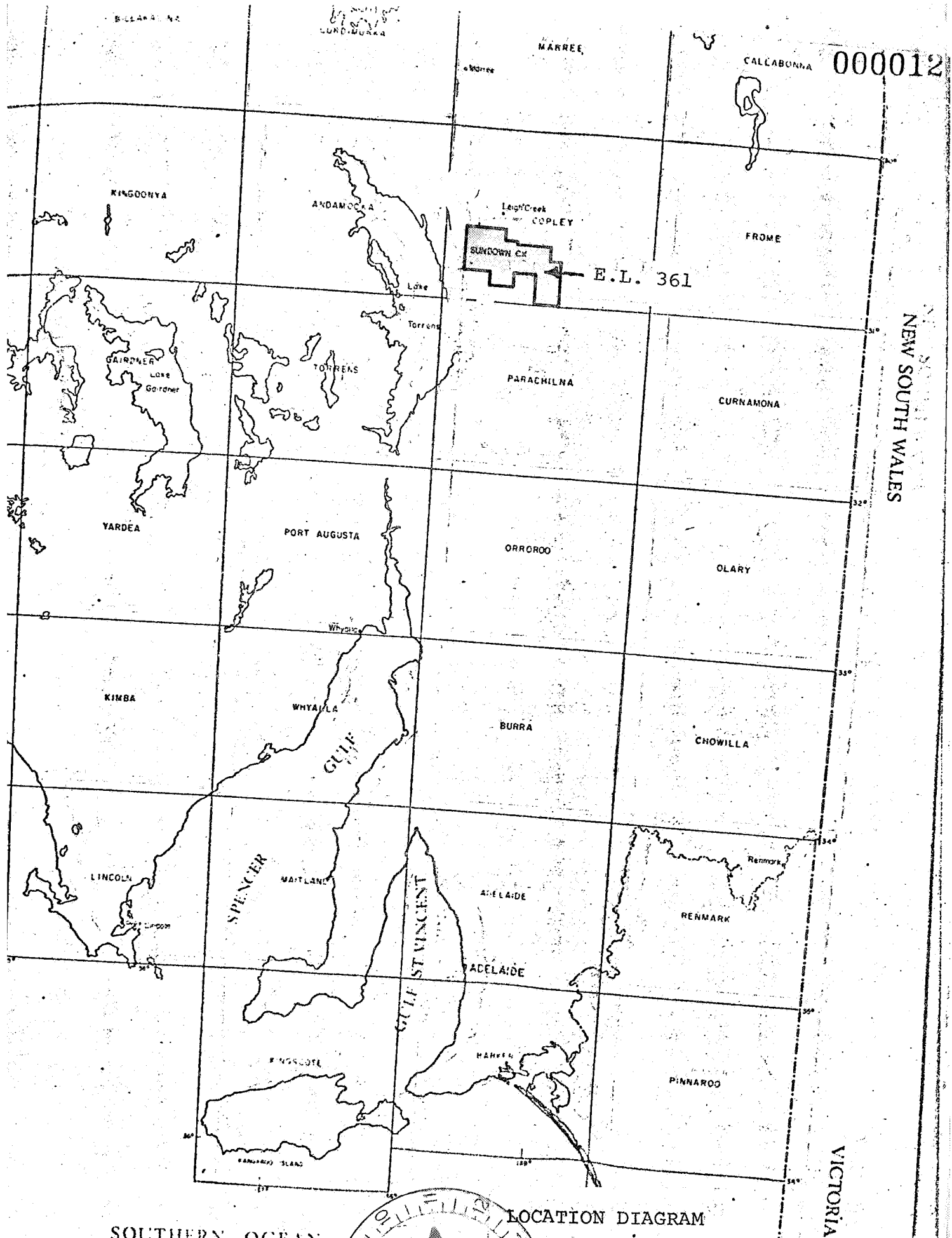
A reconnaissance gravity survey was carried out over the magnetic high using a Sodin Prospector 410 gravity meter. The operator was H. C. Lau. Stations were occupied on the grid at one hundred metre intervals, and a base station was established at the Old Mount James Homestead. Drift curves were established for the data and the field

data was reduced applying Bouguer, free air, latitude and where necessary, topographic corrections. Levels were taken using a Fuji-Koh Sunray S-207W automatic level.

The gravity survey partly defined a positive anomaly of about 3 milligals, trending northeast along the eastern edge of the magnetic high (Figures 10 - 13). Several faults were also indicated on the profiles, but an interpretation of these awaits further gravity work.

STATEMENT OF EXPENDITURE14.10.77 - 14. 1.78.E.L. 361

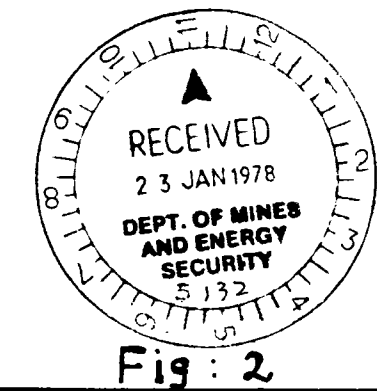
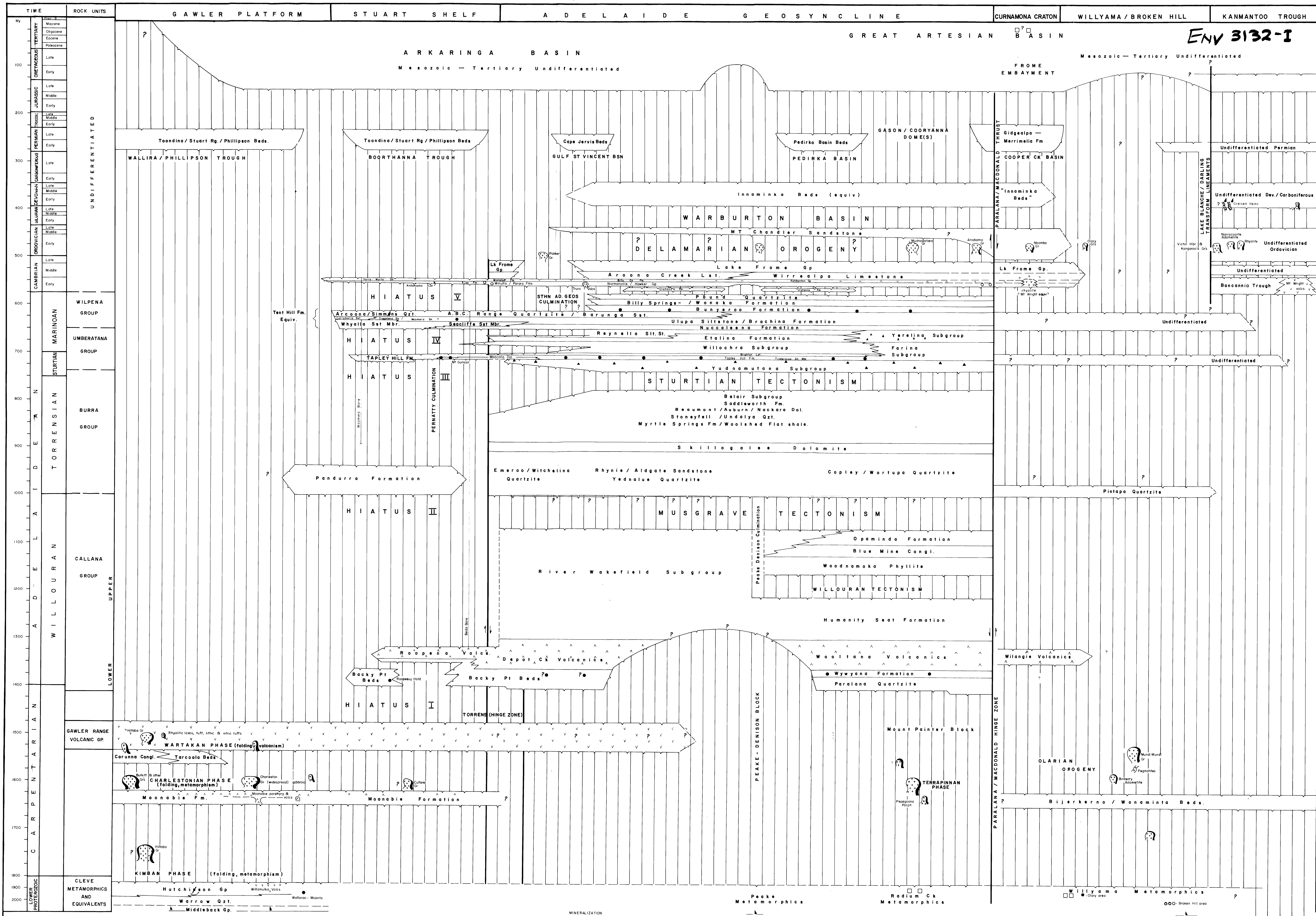
Geological and Geophysical:	
(a) Gravity and Magnetic Surveys	4 500.00
Drilling	Nil
Logistics	
(a) Geologists' salaries	9 000.00
(b) Field Assistants' salaries	6 000.00
(c) Camp costs	4 200.00
(d) Vehicles, maintenance etc.	3 500.00
(e) Reports, maps, reproductions, drafting	500.00
Administration	1 385.00
<u>TOTAL:</u>	<u>\$29 085.00</u>



LOCATION DIAGRAM

"SUNDOWN CREEK"
E.L. 361.

FIG. 1



COMALCO LIMITED	
SOUTH AUSTRALIA	
TIME / ROCK / TECTONIC SYNOPSIS	
SOUTH AUSTRALIA ADELAIDE GEOSYNCLINE	
(To accompany Tectonic Map Eastern Sheet)	
Compiled: P.W. Stanton	Revised:
Date: May 1977	Scale: N.T.S.
Drawn: M. Atwell	Dwg. No.: SA / 77 / 4

Fig. 2

ENV 3132-1

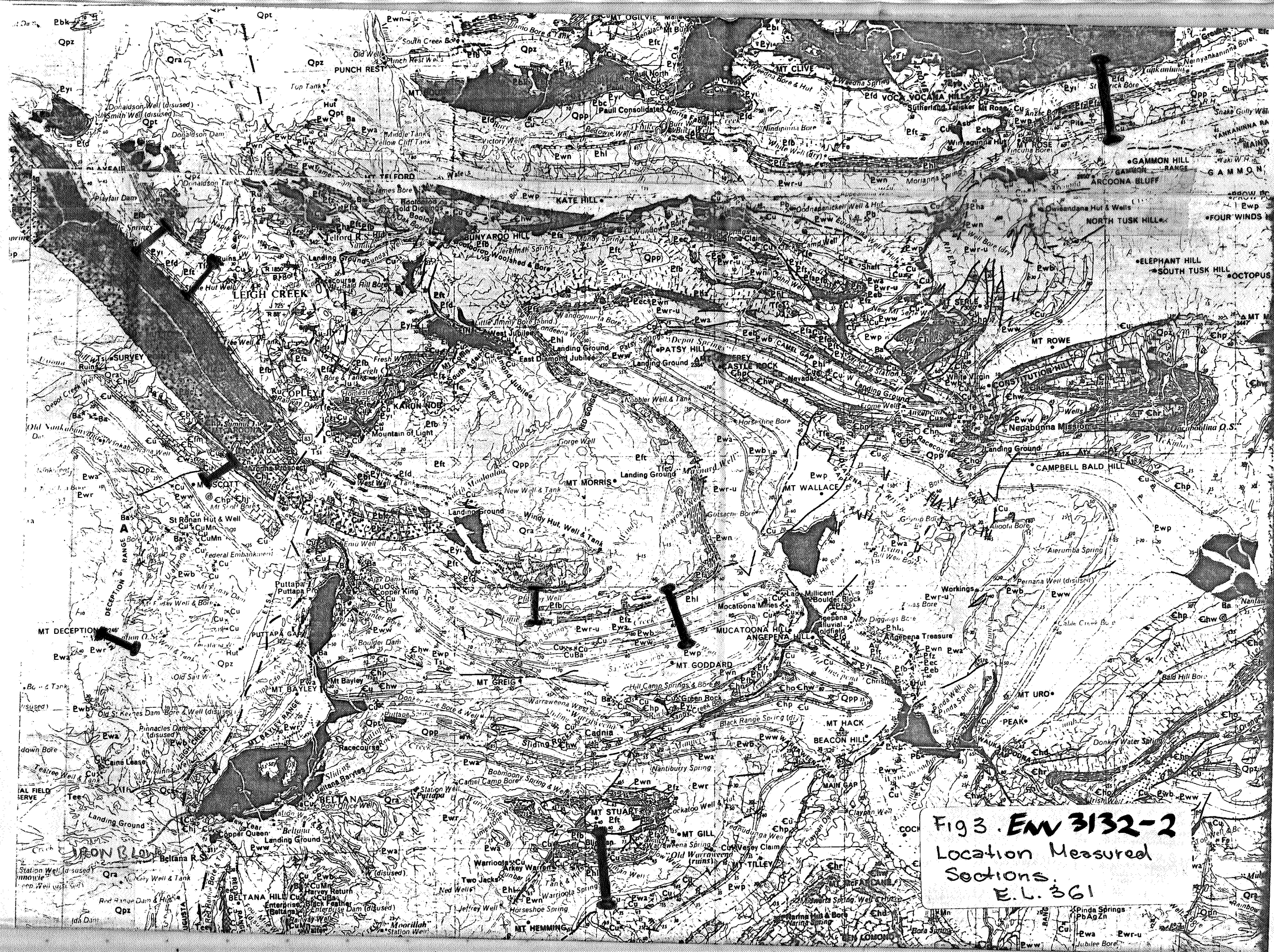
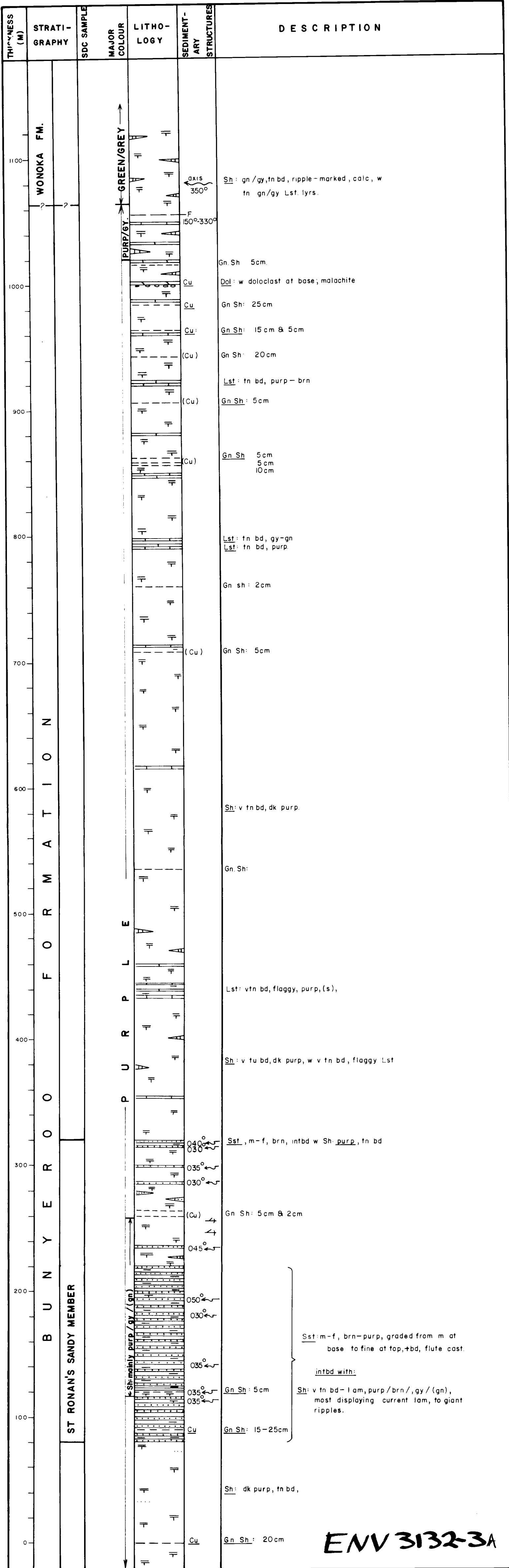


Fig 3. **EW 3132-2**
Location Measured
Sections.
E.L. 361

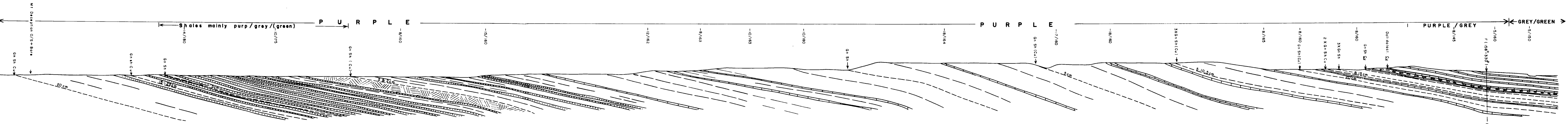
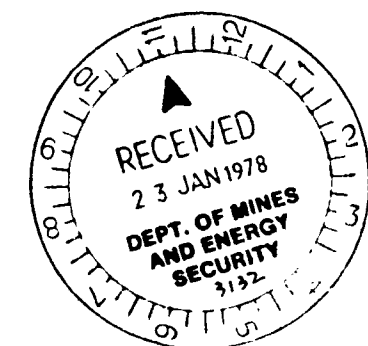


SECTION-MT DECEPTION O/S & BORE
LITHOSTRATIGRAPHY

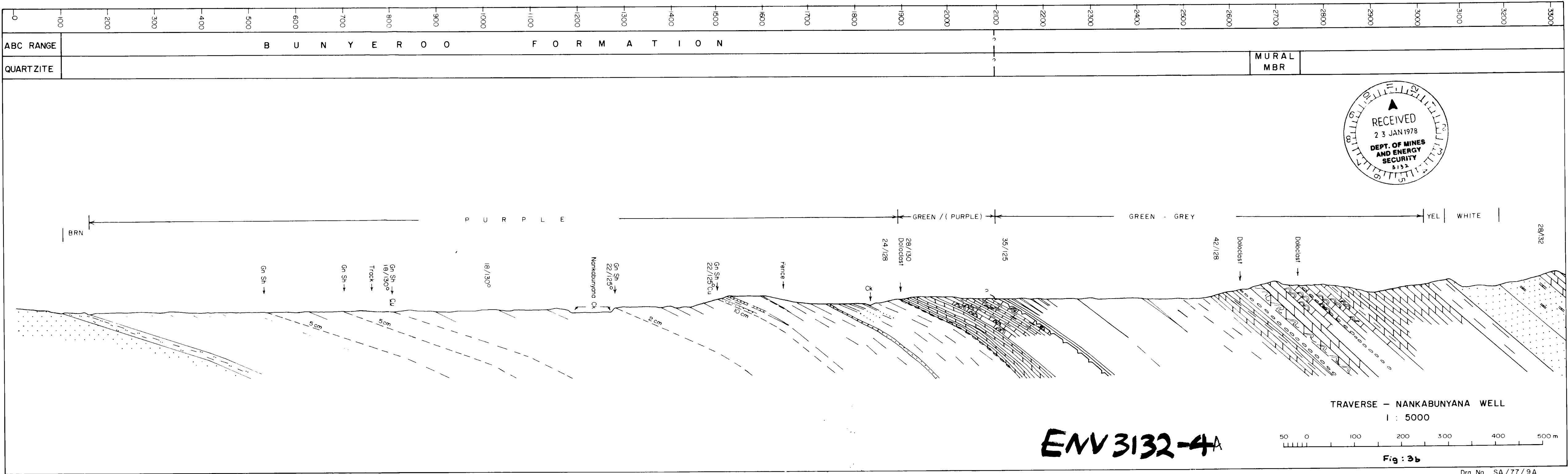
1: 2000 (metres)

(Corrected to true thickness)

B U N Y E R O O F O R M A T I O N



TRAVERSE - MT DECEPTION O/S & BORE
EN 3132-3b
Scale 1:5000
50 0 100 200 300 400 500m
Fig - 3a
Drg. N° SA-77-10



THICKNESS (M)	STRATIGRAPHY	SDC-SAMPLE	MAJOR COLOUR	LITHOLOGY	SEDIMENTARY STRUCTURES	DESCRIPTION	TV - I			UNIMAG (GAMMAS)
							Tc	Tl	T2	
1600	WONOKA FORMATION					Dol lt brn, (s), tn - bd, lime mud	1800	60	20	5745
						Sst mtld, gy/wh/gn, calc, w increasing s Lst lys 4	2000	60	15	5745
1500						Sst wh m-f, por, perm, fri	2500	80	25	5747
		011				Sh gn - khaki, tn bd				
		010				Sst brn - purp dol	3000	90	20	5745
1400						Intlam Sh - gy gn, tn bd & Sst dol, + bd brn Dol s, + bd brn, (alg)	2000	100	30	5746
							2500	80	20	5747
1300						Doloclast				
						Intlam dol Lst (alg) / tn bd gn Sh				
		009				Photo 30	2500	70	25	5748
1200	WONOKA FORMATION	008				Sst strongly + bd dol Sst dk brn - purp, intbd w gn/gy sh	2500	80	10	5748
						Photo 30				
						Int lam alg Dol / gn Sh	2500	150	25	5750
1100							2500	45	20	5750
1000						Sh gy-gn, f lam - bd, w v tn flaggy Lst (dol)	2500	80	25	5750
							2500	100	30	5751
900						Sh gn f lam	3000	80	25	5751
						Alg Lst (dol) intbd w gn-gy sh	2500	60	15	5751
800		007				Photo 29				
		006				Sh/Lst gn/gy sh tn bd intbd w flaggy tn bd dol Lst	2500	80	15	5753
	BUNYEROO FORMATION	005				Doloclast in dol Lst Gn Sh	2000	40	45	5754
700							2500	60	50	5754
						Sh purp, tn bd - lam, w tn Sst lam	3000	75	30	5755
600						Gn Sh (10 cm tk) w malachite stn	2500	60	15	5755
							7000	60	30	5755
500						Gn Sh 2 cm	3000	70	25	5752
							2500	60	35	5755
400						Sh purp, tn bd - lam	3500	100	35	5757
							3000	100	30	5758
300							3000	100	30	5758
	BUNYEROO FORMATION	002				Gn Sh 2 - 10 cm over 25 cm tk	3000	60	25	5757
200						Sh purp, tn bd - lam	3500	30	10	5759
						Gn Sh 5 cm	3500	100	15	5759
100							3500	150	10	5759
		001				Sh purp, tn bd - lam	7500	90	20	5762
						Sltst lam purp / brn	5000	50	15	5755
0										

SECTION: NANKABUNYANA WELL
LITHOSTRATIGRAPHY
1 2000 (metres)
(corrected to true thickness)

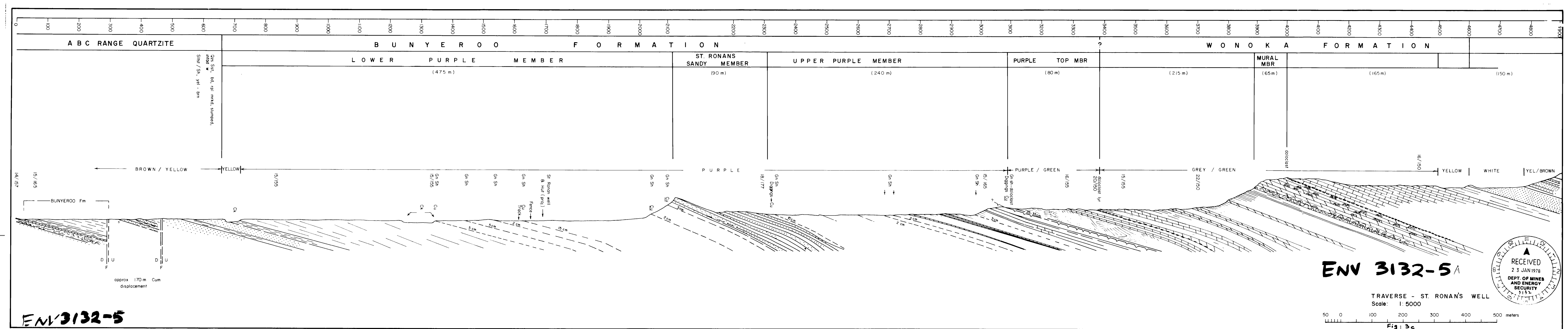
ENV 3132-4

ENV 3132-4 B

THICKNESS (m)	STRATIGRAPHY	SDC SAMPLE	MAJOR COLOUR	LITHOLOGY	SEDIMENTARY STRUCTURES	DESCRIPTION	TV - I			UNIMAG (GAMMAS)
							TC	T2	T3	
500	WONOKA FORMATION					<u>Dol</u> lt brn bd - tn bd (slt),	2000	80	30	5723
						<u>Sst</u> (arg) mtlld wh/gy/gn	2000	80	25	5723
1400						<u>Sst</u> wh, m-f, <u>srt</u> <u>por</u> , <u>perm</u>	2500	70	30	5723
						<u>Sh</u> tn - bd, <u>gn</u> - <u>khaki</u>	3500	70	40	5724
						<u>Dol</u> brn/(purp) <u>tbd</u> <u>Dol</u> intbd w tn bd, gn - khaki <u>Sh</u>	2500	80	35	5723
1300							2500	100	30	5724
						<u>Sst</u> / <u>Dol</u> : m - crs, <u>tbd</u> brn - bf - (purp)	2500	100	40	5724
							3000	100	30	5723
1200						Doloclast Stromatolitic Lst (dol)	2500	60	30	5723
						<u>Sst</u> / <u>Dol</u> strongly tbd, slumped <u>Sst</u> / <u>Dol</u> strongly rippled	2500	60	25	5723
1100						<u>Sh</u> gn-gy tn bd, w v tn lam and bds of <u>Dol</u>	3000	100	15	5723
							3500	100	40	5723
1000						<u>Dol</u> : tn bd, flaggy intbd w gy/gn <u>Sh</u>	3000	100	30	5723
						<u>Dol</u> tn bd, flaggy intbd w gy/gn <u>Sh</u>	3000	100	30	5723
						Dolcast lyr	3000	70	40	5723
900						<u>Sh</u> tn bd flaggy intbd gy/ purp w tn dol <u>Sst</u> and <u>Dol</u> lys	3000	80	25	5723
						Photos - 2 t bd purp/gn sh lge scale t bds <u>Doloclasts</u> 25-30 cm, containing malachite/ azurite Photos 34-36	3000	80	30	5727
						<u>Gn</u> <u>Dol</u>	3000	90	40	5727
800						<u>Gn</u> <u>Sh</u>				
						<u>Dol</u>	3000	100	35	5728
						<u>Sh</u> purp w v tn lam (1-2cm tk) of <u>Dol</u> / dol sltst	3000	70	30	5728
700						<u>Dol</u> : (purp/brn)	3500	65	15	5728
						<u>Gn</u> <u>Sh</u> ripples // strike (160°-340°)	3500	100	40	5728
						<u>Sh</u> purp, tn bd - lam	3000	80	25	5728
600						<u>Gn</u> <u>Sh</u> 10-15 cm, malachite, Diggings on frge zone	4000	100	40	5728
						<u>Intbd</u> flaggy calc/dol Slst/sst and purp tn bd - lam <u>Sh</u> There appears to be regular grading of each clastic unit - <u>Graded Beds</u>	3000	100	15	5729
500						tn (2cm) lys <u>Gn</u> <u>Sh</u> w malachite stn	2500	30	30	5729
						<u>Gn</u> <u>Sh</u> 2cm	3500	150	30	5728
400						<u>Sh</u> purp, tn bd - lam	3000	70	25	5729
							3500	45	25	5730
300						<u>Gn</u> <u>Sh</u> 15 cm Malachite stn	3500	80	20	5730
						<u>Gn</u> <u>Sh</u> 2 cm	3500	100	40	5730
200						<u>Gn</u> <u>Sh</u> , 5 cm	3000	150	10	5731
						<u>Sh</u> gn 5cm tk, malachite stn	3000	90	30	5731
100						<u>Sh</u> tn bd - lam, purp	2500	100	20	5732
							2000	80	20	5732
						<u>Sh</u> yel/ brn, slt	2500	80	20	5733
0						<u>Qzt</u> : gy/ brn, t bd, slumped, (mic)	3000	80	20	5734
							2000	60	15	5735
							2000	60	30	5735

SECTION: ST. RONANS WELL
LITHOSTRATIGRAPHY

1 2000 meters
(corrected to true thickness)



THICK- NESS	STRATI - GRAPHY	SDC - SAMPLE	MAJOR COLOUR	LITHOLOGY	SED. STRUCT.	DESCRIPTION	TV - I			UNIMAG GAMMAS
							Tc	Ti	T2	
1200	WONOKA FORMATION	MURAL MBR	GREY / GREEN			Dol/Sst: + bd brn				
						Sh gy/gn - khaki, tn bd - lam				
						Lst, gn, alg				
1100						Lst, gn, alg				
						Lst: alg, tn bd - bd	2000	80	25	5724
1000						Sst/Dol strongly + bd brn - purp, bd - tn bd, slumping				
						Sh gn - khaki, tn bd	2500	100	15	5725
900						Lst: tn bd, slumping over 10 cm	2000	80	25	5725
800						Sh gn/gy, tn bd, w v tn calc Sst	3000	100	25	5725
700						Lst. (dol), tn bd flaggy w v tn gy/gn sh lam	2000	80	15	5725
600	BUNYEROO FORMATION		GREY / GREEN			Sh gn/gy w tn rare lam of dol Sst & dol Lst	2000	80	15	5725
500						Sh gn/gy w tn rare lam of calc & dol Sst & Lst	2000	60	20	5725
400						Calc Vn	2500	60	20	5725
						Sh: gn/gy tn bd, w tn flaggy calc / dol Sst, & flaggy Lst	2500	60	25	5725
300						040° Sh gn/gy, tn bd - lam	2500	60	25	5725
						Cong/Doloclast containing blocks of Qtz & purp Sh & Dol Gn/Purp Sh Int lam - Intbd gn/purp	2000	70	15	5725
						Gn Sh - 15 cm				
						Gn Sh - 15 cm				
						Gn Sh - 15 cm				
						Gn Sh - 10 cm				
200			PURPLE			Sh purp, tn bd - lam	2500	60	20	5725
100						Gn Sh (2 cm)	3000	60	15	5725
						Sh. purp, tn bd				
0						Sst. mass - tn bd, brn - gy brn	3000	100	15	5725

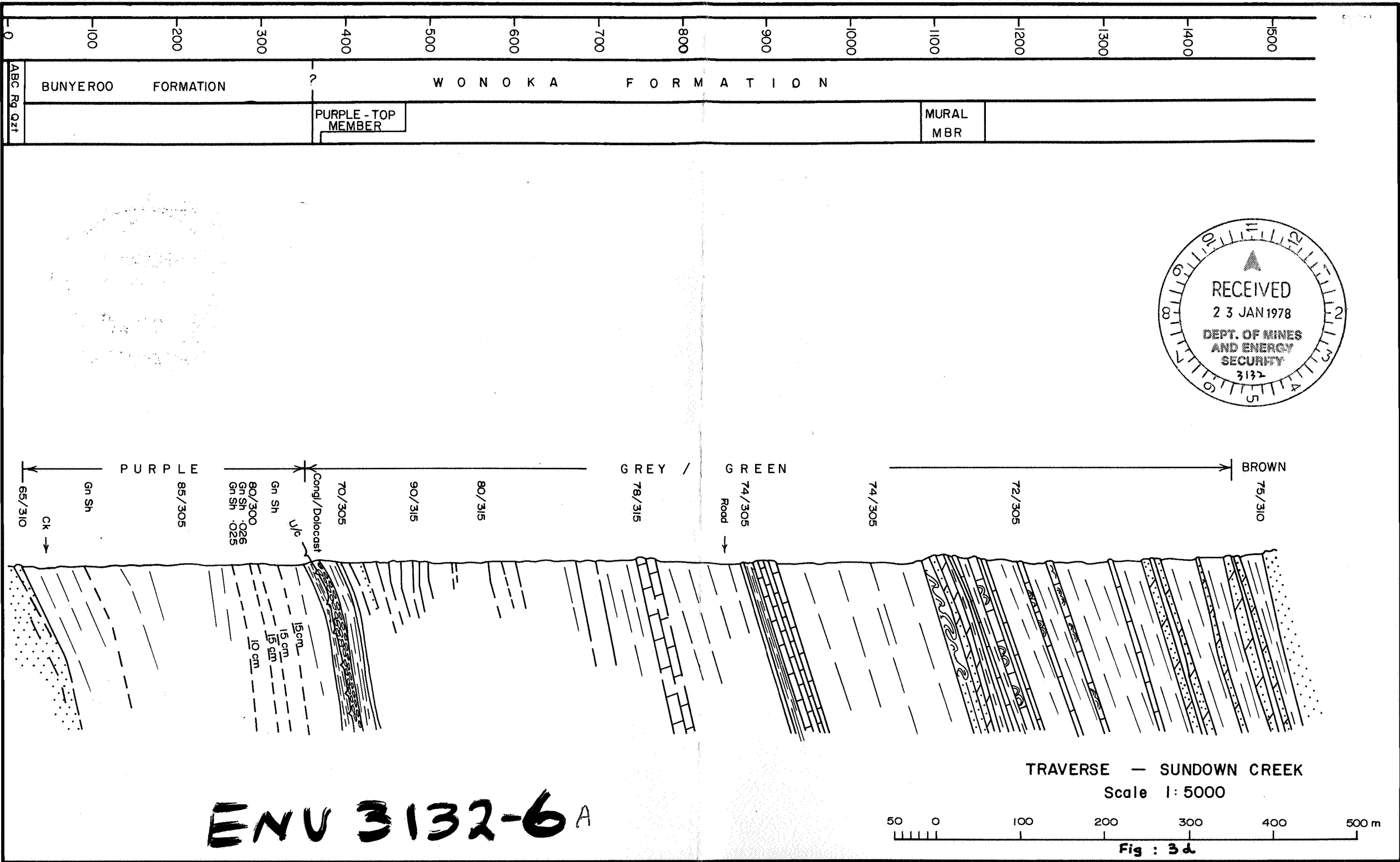
SECTION: SUNDOWN CREEK

LITHOSTRATIGRAPHY

Scale: 1:2000 (metres)

(Corrected to true thickness)

ENV 3132-6



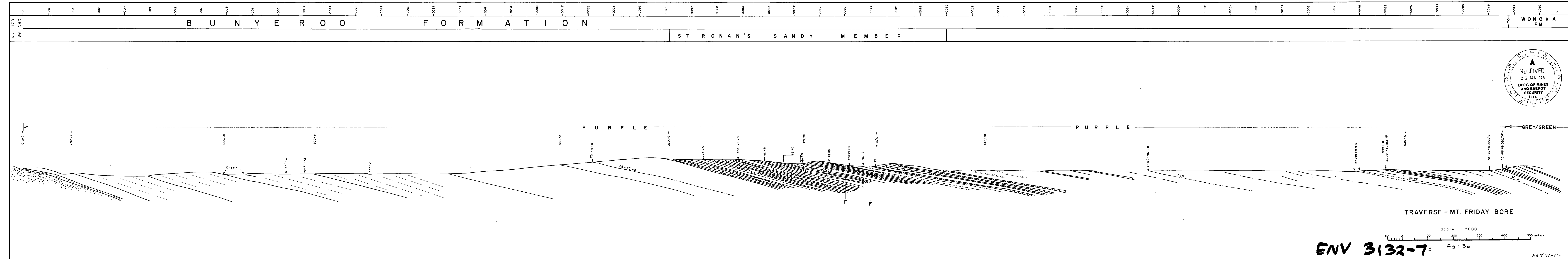
THICKNESS (m)	STRATIGRAPHY	SDC SAMPLE	MAJOR COLOUR	LITHOLOGY	SEDIMENTARY STRUCTURES	DESCRIPTION	TV - I			UNIMAG (GAMMAS)
							TC	T ₁	T ₂	
1300	WONOKA FORMATION		GREY / GREEN			Gn Sh 10cm	3500	40	30	5723
						Gn Sh 5cm	4000	50	15	5723
						Gn Sh 10cm	3000	60	20	5723
						Gn Sh 2 x 15cm in tn flaggy gy Lst	3000	100	30	5723
						Gn Sh 30cm	4000	90	30	5724
							4000	70	20	5724
1200						Gn Sh 5cm & 10cm Gn Sh 2 x 10cm ← Lst; gy-gn	4000	90	30	5724
						Lst gy-gn tn bd, flaggy				
		046				Gn Sh 4 x 5 -20cm	4000	80	15	5724
							4000	80	25	5724
							4000	90	20	5724
						Sh: purp, tn bd, w tn flaggy Lst lyrs (purp)	3000	80	50	5724
							3000	100	25	5724
							4500	100	25	5724
							4500	60	20	5723
							4500	90	35	5724
1000						Gn Sh 5cm	4000	60	20	5725
							3000	90	20	5725
						Lst: tn, flaggy, purp, (s)	3500	80	20	5725
							4000	50	25	5725
							4500	50	20	5725
							2500	50	30	5724
900							4000	100	20	5726
							4000	80	15	5726
							4500	70	25	5727
							4500	90	40	5727
						Gn Sh 5cm Gn Sh 15cm Gn Sh 5cm	4000	40	15	5727
800	ST. RONAN'S SANDY MEMBER					Gn Sh 10cm	2500	90	25	5731
						Gn Sh 2cm Gy Sh 25cm	2500	80	30	5726
						Gn Sh 5cm	3000	60	30	5727
							4500	100	35	5728
							3000	80	25	5728
700						Gn Sh 5cm	2500	80	30	5728
							3000	80	30	5728
							3000	100	30	5729
						Sh purp, tn bd	3000	150	35	5730
600		045				Gn Sh prominent 25-35 cm w malachite strn throughout	4500	150	15	5729
							5000	80	30	5731
							4500	80	25	5730
							3500	100	25	5731
							3000	60	30	5731
							3500	90	25	5733
400						Sh: v tn bd, purp	3500	90	30	5732
							3500	80	30	5733
							4000	90	25	5732
							2000	55	20	5733
300							3000	70	40	5734
							4000	80	15	5734
							3500	80	15	5736
200						Sh: v tn bd, flaky, purp	3500	90	15	5734
							4500	90	25	5735
							4500	100	10	5735
100							3000	100	15	5738
							3500	100	50	5737
						V tn lyrs (5cm) gy-yel sh	3000	100	20	5737
0	ABC RG. Qzt Fm.					Sh: tn bd, gn-khaki, Qzt: mass, brn-lt brn, jnt.	3500	100	35	5736

SECTION-MT FRIDAY BORE
LITHOSTRATIGRAPHY

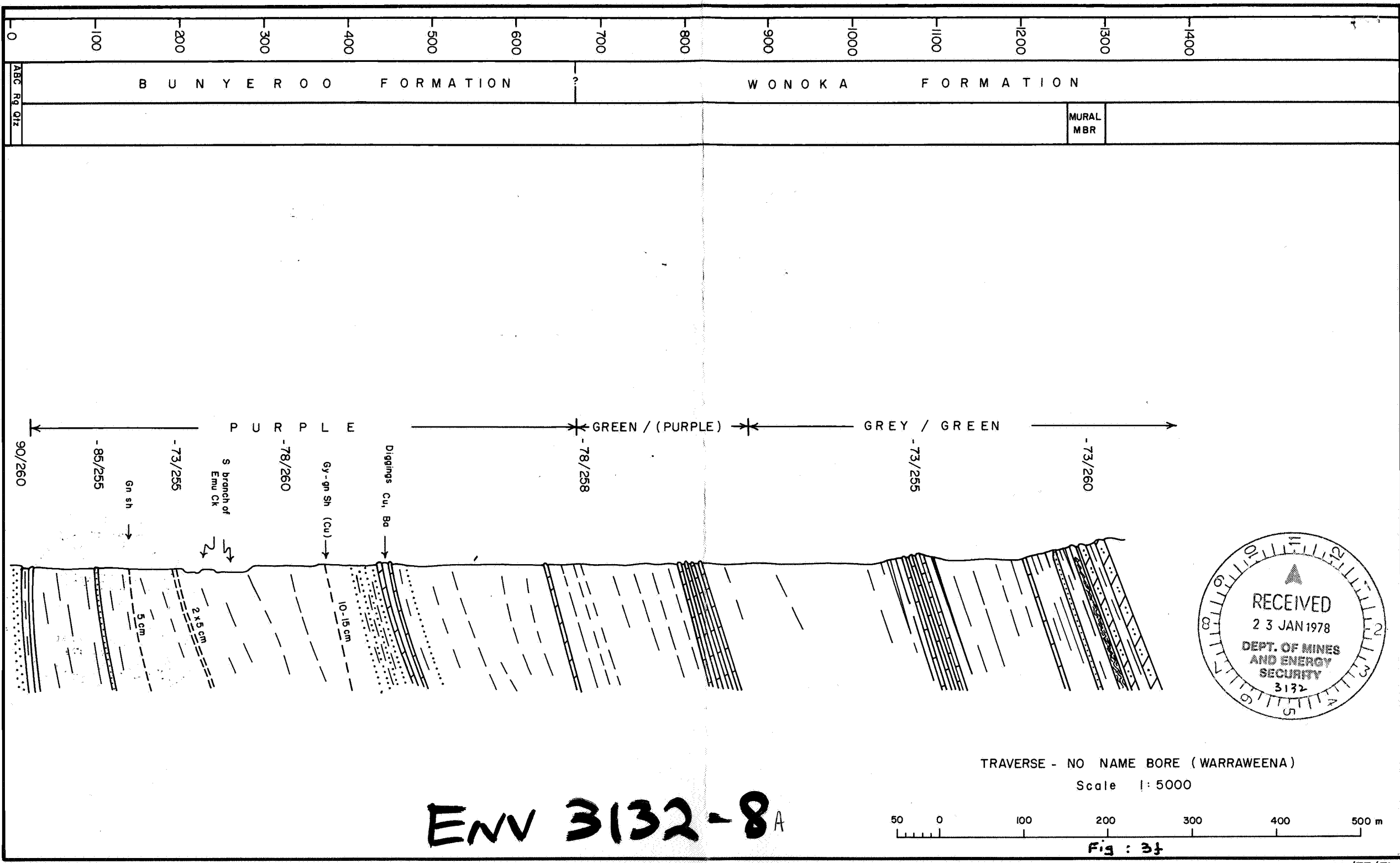
ENV 3132-7

Scale 1:2000 (metres)
(Corrected to true thickness)

Drg N° SA-77-13



THICKNESS (m)	STRATI - GRAPHY	SDC SAMPLE N°	MAJOR COLOUR	LITHO - LOGY	SEDIMENTARY STRUCTURES	DESCRIPTION	TV - I			UNI MAG (GAMMAS)
							Tc	T1	T2	
1300	WONOKA FORMATION	MURAL MBR	DARK BROWN			Sst: m-f, dol & bd, some minor slumping, dk brn, forming prominent strike ridges	2000	60	30	5732
1200						Sst: dol, flaggy, tn bd Sh: gn brn - khaki, w, v, tn, sst lam Sst: calc, (dol)	3000	150	30	5732
1100			GREY / GREEN			Sh: gn gy, (slt), tn bd	2500	60	35	5732
1000						Lst: alg stl, gn gy Lst: s, & bd, (dol)	2500	150	40	5733
900			GREY - GREEN / (PURPLE)			Sh: gn gy, tn bd, slt, w tn Lst: lyrs increasing	3000	150	20	5733
800						Lst: (dol), s, & bd, flaggy	3000	60	20	5732
700						Sh: gy gn w minor purp lam, and tn dol Lst lyrs near top	3000	100	35	5732
600						Section to be checked Sh: dk purp, tn bd Dol: s, & bd, purp	3000	100	40	5732
500						Sh: dk purp, (brn), w some tn gy lyrs	3000	60	40	5732
400						Mineralization (i) cp, pyr - syng (ii) Ba, mal - fract fill, bdg, & jnt pls Intbd purp Sh / purp - (brn gy) Slstst	3000	100	35	5732 5732 5732
300	BUNYEROO FORMATION		PURPLE			Gn Sh: 10 - 15 cm, minor malachite	3000	150	35	5732
200						Sh: dk purp, tn bd Gn Sh: 2 x 5 cm Gn Sh: 5 cm	2500	75	30	5732
100						Sh: dk purp, tn bd w minor tn gy lam	3000	100	20	5730
0	ABC Rg Qtz Fm					Sh: tn bd, gn - brn Sst: qtz cmt, gy - brn, m-f bd	2500	60	25	5730



TRAVERSE - NO NAME BORE (WARRAWEENA)
Scale 1:5000



Fig : 3f

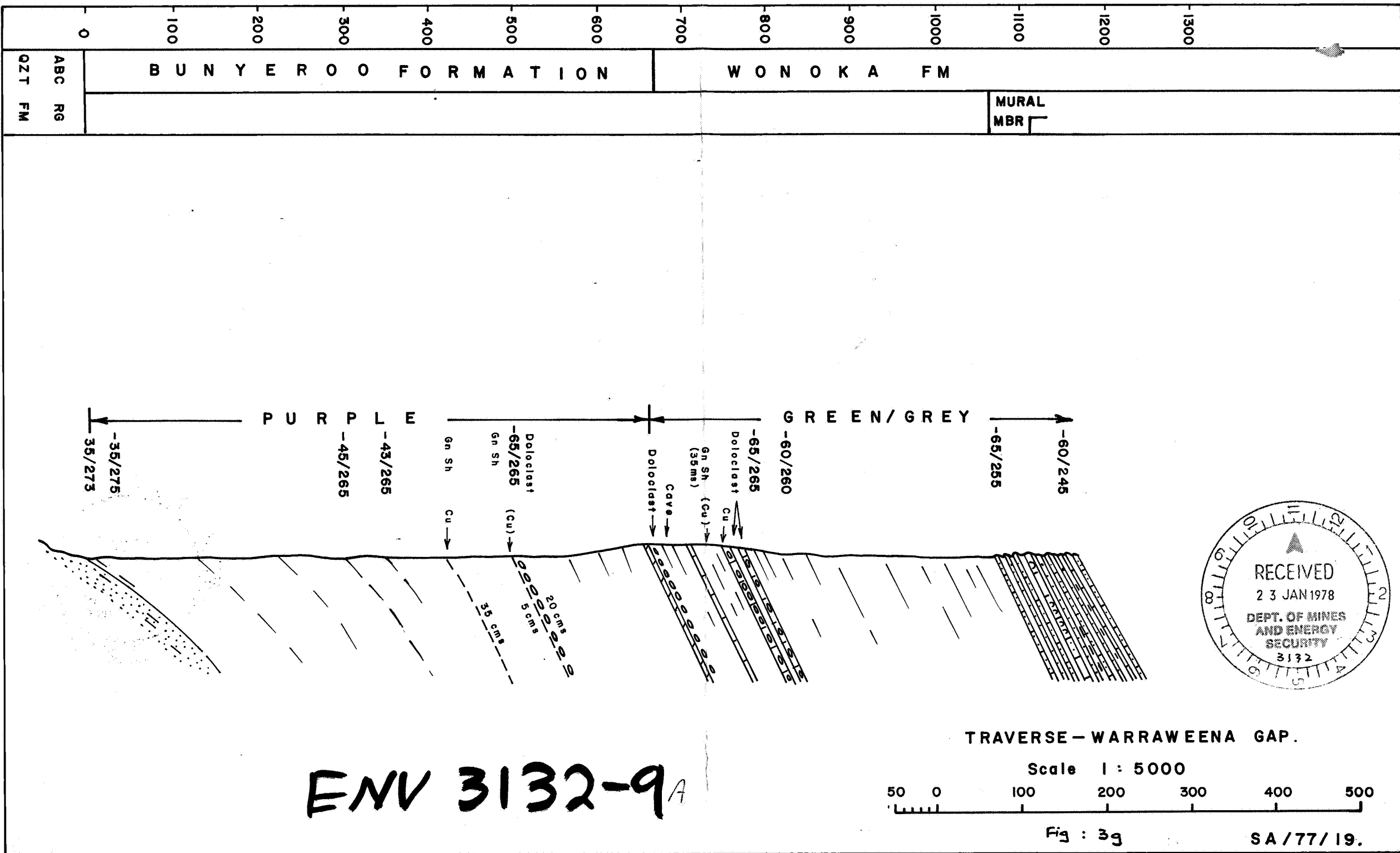
ENV 3132-8A

THICKNESS. (m)	STRATI- GRAPHY		SDC SAMPLE N°	MAJOR COLOR	LITHO- LOGY	SEDIMENTARY STRUCTURES	DESCRIPTION	TV-I			UNIMAG (GAMMAS)
								TC	T ₁	T ₂	
1000	WONOKA FORMATION						Intbd Lst/Sst/sh				
900							Lst S (dol) intbd w Sst: Calc,(dol)	3000	80	25	5748
800	WONOKA FORMATION							3000	75	20	5750
700							Sh: gn(gy) vln bd, w vln flaggy Lst lam near base	4000	80	30	5750
600	WONOKA FORMATION						Doloclast/Congl w traces of Malachite Sh: predom Gn Sh containing traces of Malachite	3500	80	20	5752
500							Dol: purple (gy), w minor Lst lam	4000	80	25	5753
400	WONOKA FORMATION						Sh: dk purple, tn bd w minor flaggy Lst lyrs near top.	4000	150	35	5753
300							Doloclast 20cms Gn Sh 5cms.	3500	150	25	5754
200	BUNYEROO FORMATION						Sh: dk purp, tn bd.	3000	85	35	5755
100							Sh: dk purp, tn bd w minor tn gylam at base,	3500	70	25	5754
0	ABC R6 QZT FM						Qzt: m.f, gy- gy brn +bd slumped.	3500	90	30	5756

ENV 3132-9

SECTION: WARRAWEENA GAP.
LITHO STRATIGAPHY.
Scale 1 : 2000 (metres)
(Corrected to true thickness).

SA/77/18

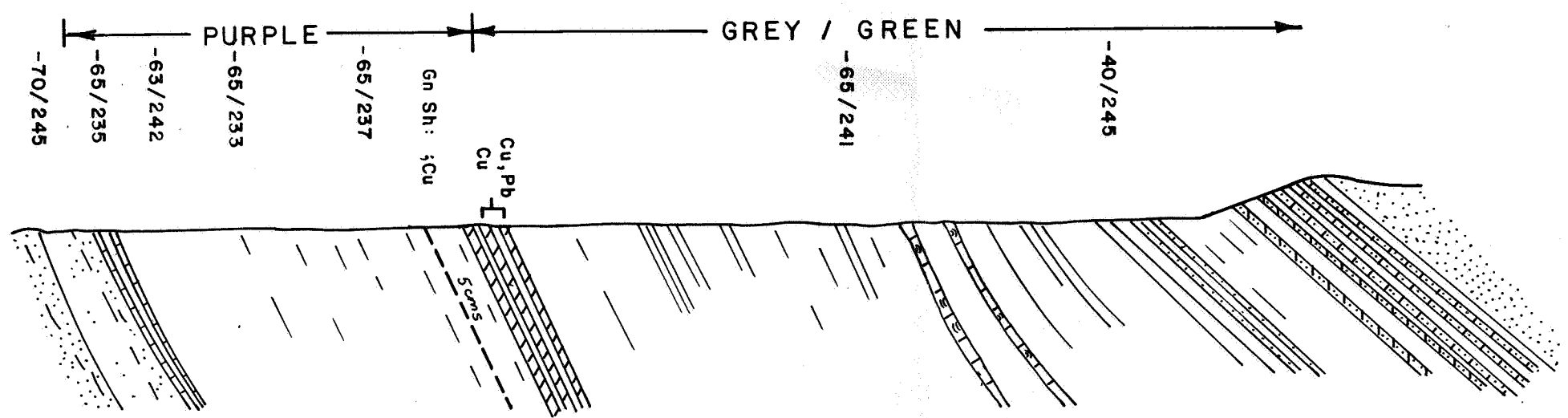
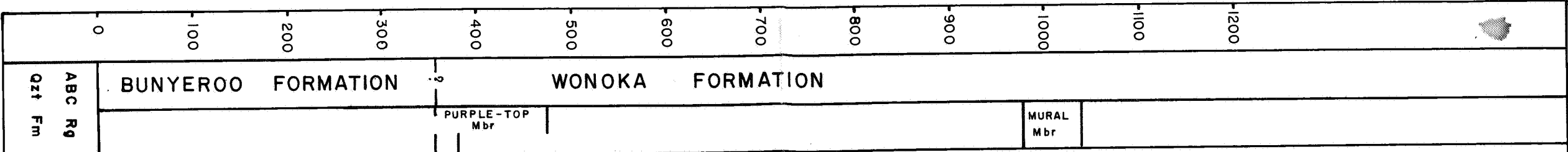


THICKNESS (cm.)	STRATI- GRAPHY	SDC SAMPLE No	MAJOR COLOR	LITHO- LOGY	SEDIMENTARY STRUCTURES	DESCRIPTION	TV - 1			UNIMAG (GAMMAS)
							Tc	T ₁	T ₂	
1100	W O N O K A F O R M A T I O N	MURAL Mbr	GREY GREEN	DARK BROWN		Sst: M - crs r - rbrn.				
1000						Sst: M - f, wh, fri, por, perm, Sst				
900						Sst tn bd, calc mtlid (bl/gy) M - f				
						Lst S, (dol) + bd, intbd w gn - Khaki sh.	5000	80	35	5743
800						Sh: tn bd, gn/gy - khaki	4500	80	15	5743
700						Slst: (dol), tn bd, flaggy.	3500	90	20	5743
600						Lst: Sl, (dol), gn/gy.	4500	75	35	5742
						Sh: gn/gy - khaki, tn bd.	4000	150	10	5743
500						Lst: Vtn flaggy, (dol), gy - brn lyrs.	4500	70	40	5742
400						Sh gy/gn - khaki tn bd				5742
						Cu, Pb?				5742
						Cu, Pb?				5742
						Dol: lyrs 10-20cm tk, cont stratif Cp, Pyr (Pb?) in Vtn Strks over approx 8m.	4500	150	10	5743
						St st; dol, purp.				5742
300						Cu, Ba?				5742
						Gn Sh 5cm malachite				
200							4500	90	40	5742
100						Sh: dk purple, Vtn bd.				
						Sh: dk purp bd, w tn gy slst lyrs	3500	85	30	5742
						Lst: s, tbd, intbd w purp Sh				
						Slst: purp/gy intbd				
0	ABC RG Qzt Fm					Qzt: brn-gy m-f, mass-bd	3500	150	30	5742

ENV3132-10

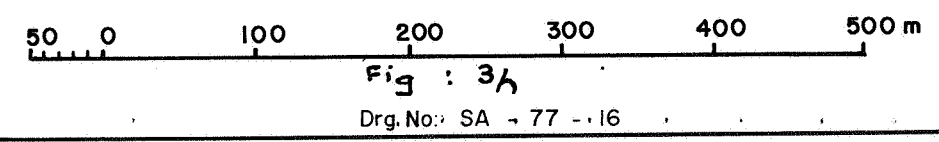
SECTIONS - MUCATOONA HILL
LITHOSTRATIGRAPHY.
1:2000 (metres)

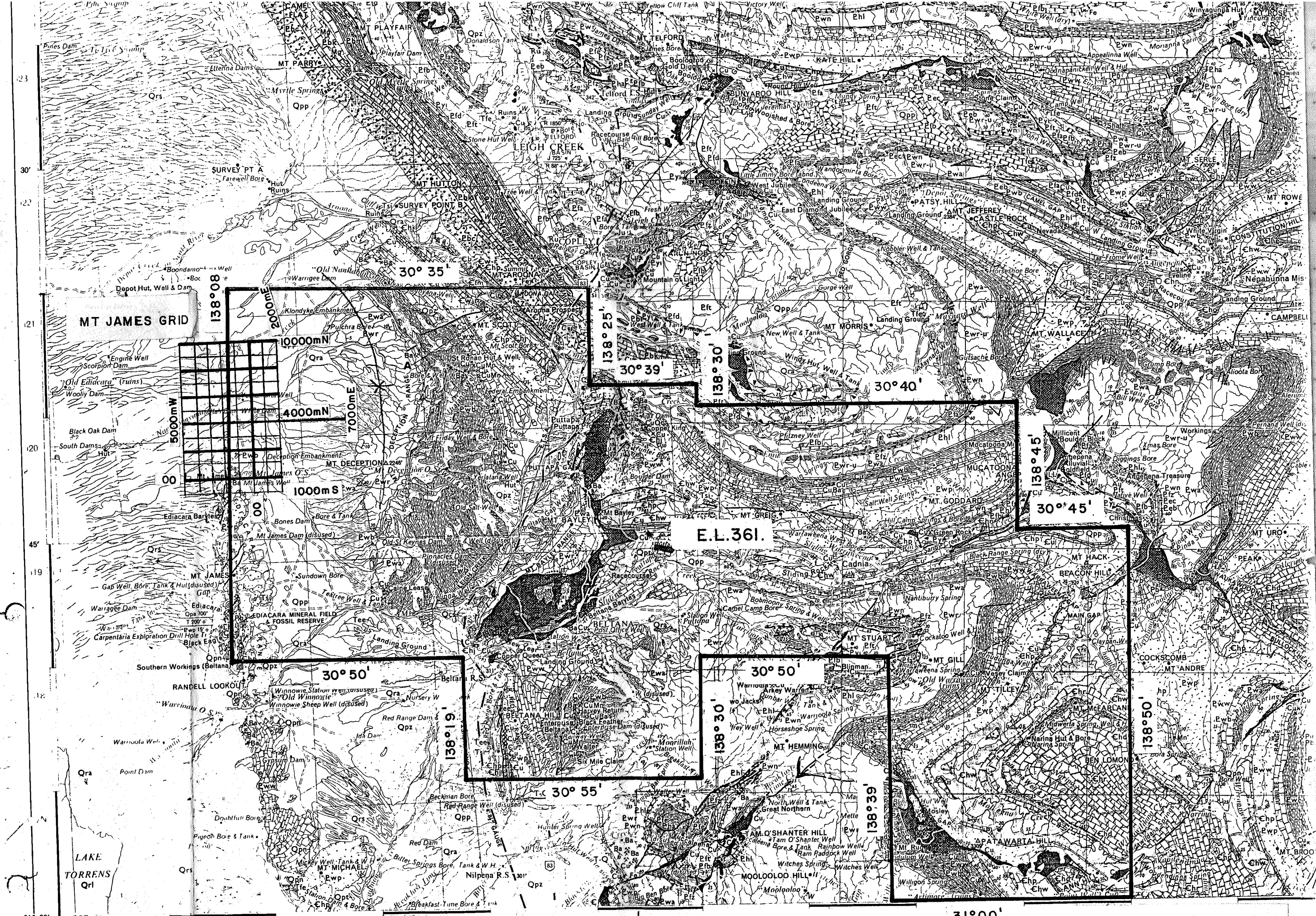
(Corrected to true thickness)



TRAVERSE - MUCATOONA HILL.
1:5000

ENV 3132-10A



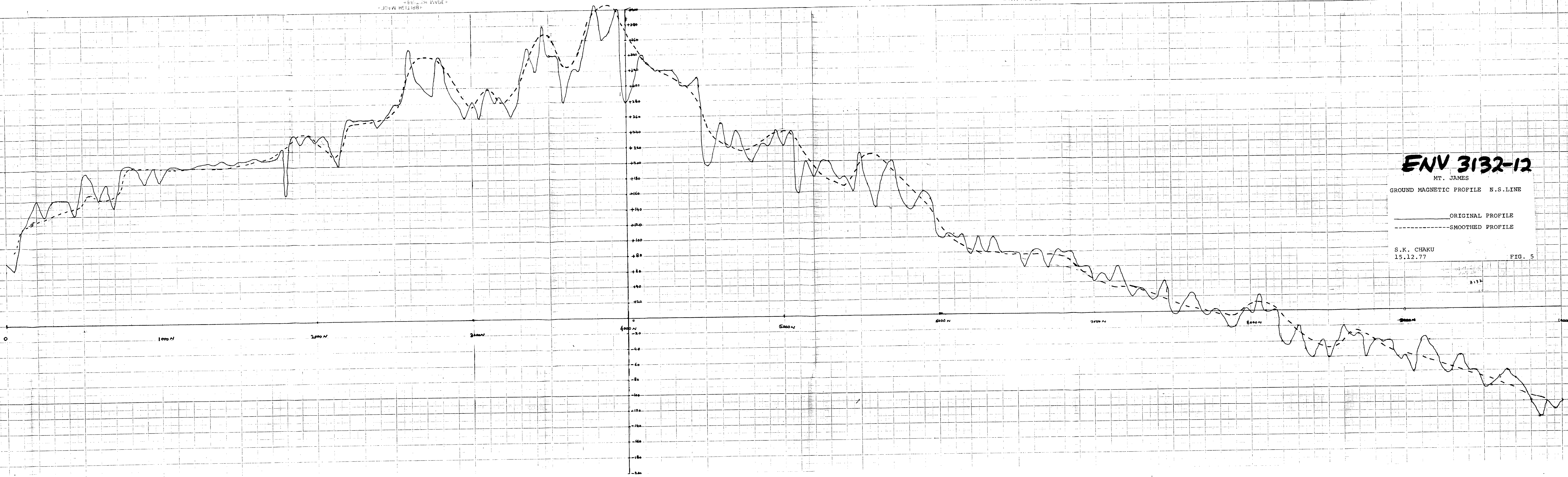


LOCATION DIAGRAM
MT JAMES GRID
E.L.361. Fig 4

ENV 3132-11

BRITISH MADE
30cm WIDE

BRITISH MADE
30cm WIDE



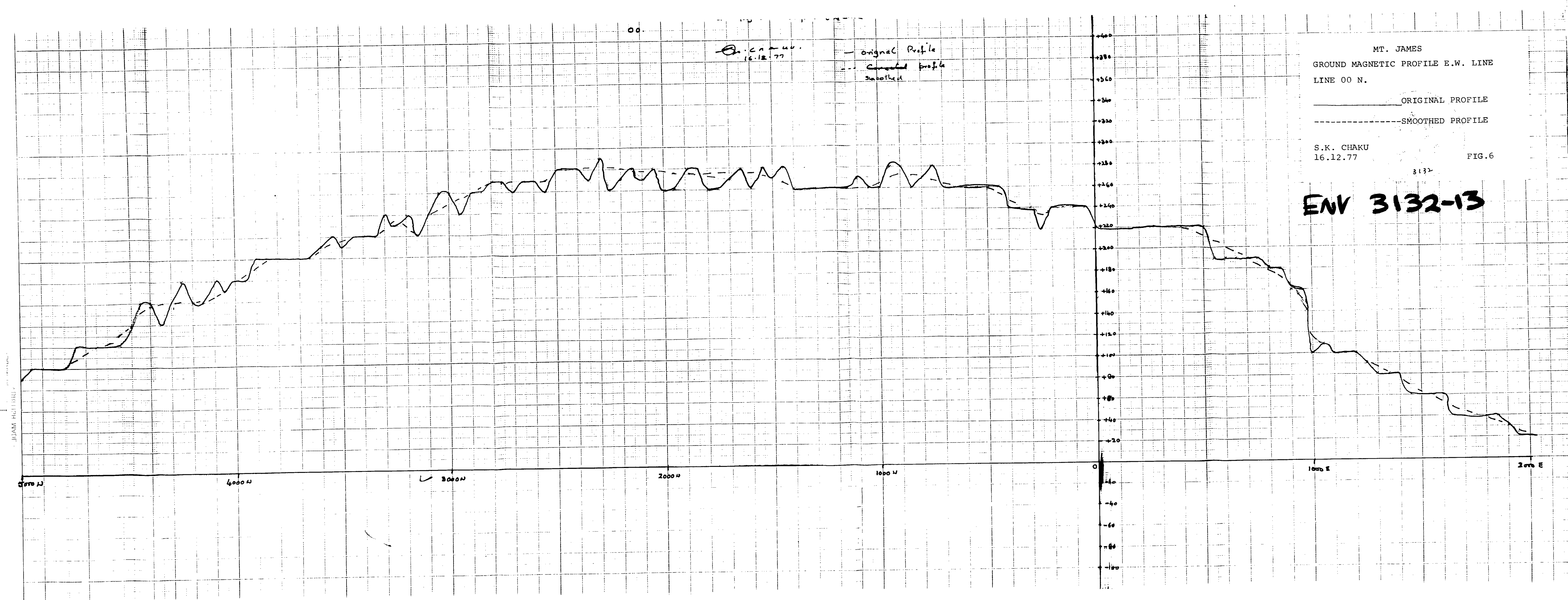
ENV 3132-12

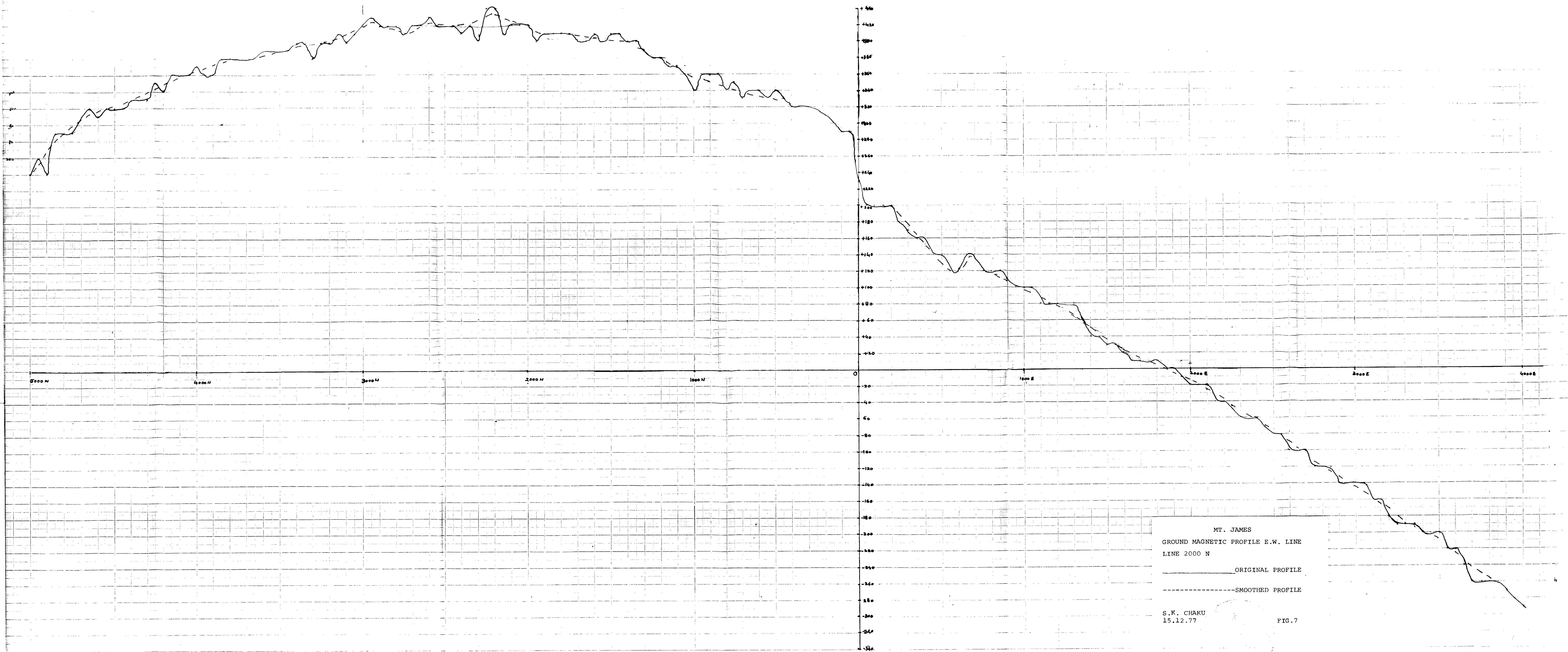
MT. JAMES
GROUND MAGNETIC PROFILE N.S. LINE

— ORIGINAL PROFILE
- - - SMOOTHED PROFILE

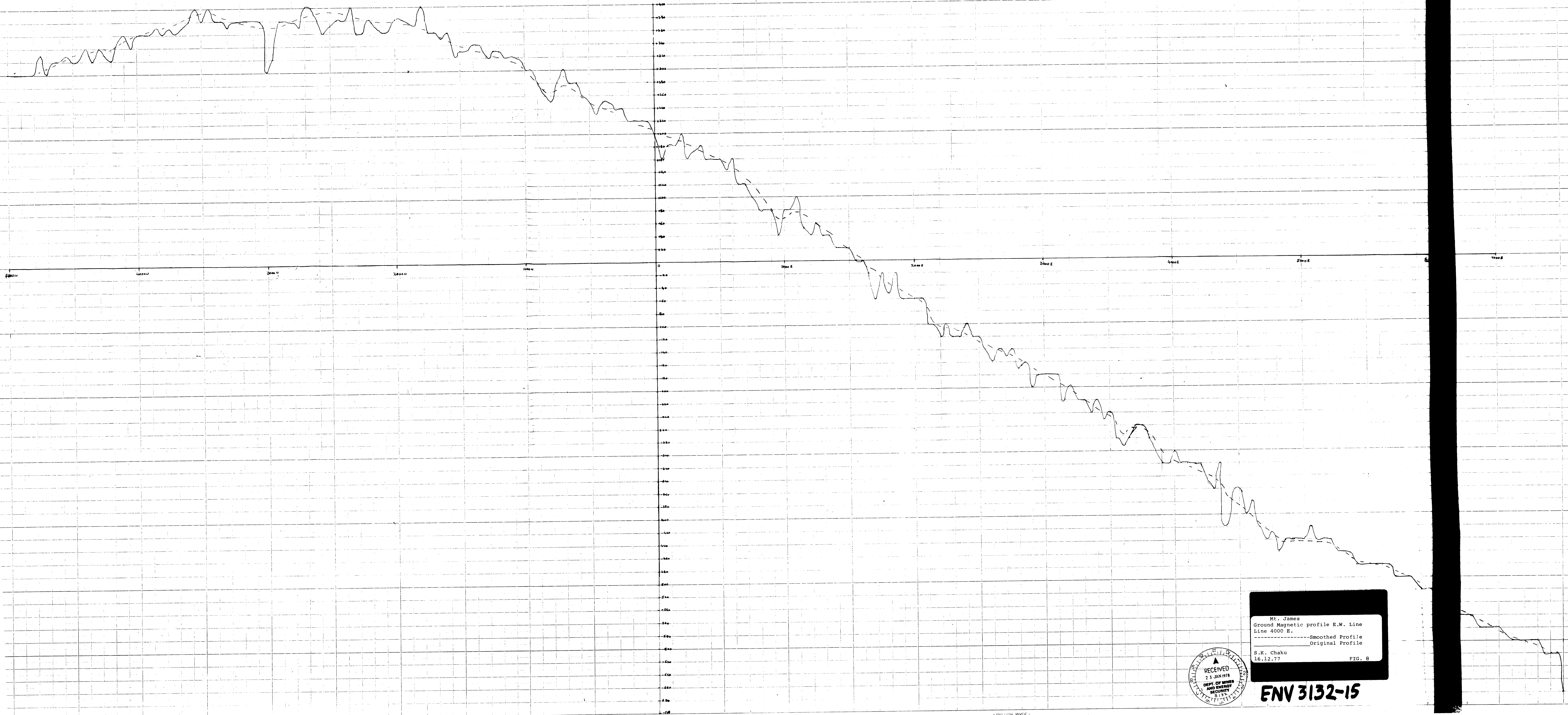
S.K. CHAKU
15.12.77

FIG. 5

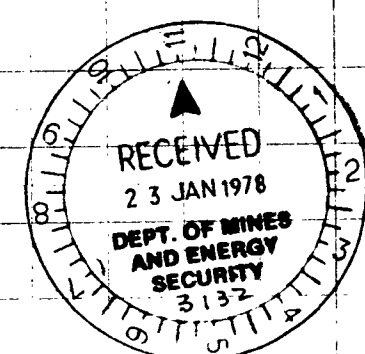




ENV 3132-14



Mt. James
Ground Magnetic profile E.W. Line
Line 4000 E.
-----Smoothed Profile
Original Profile
S.K. Chaku
16.12.77
FIG. 8



ENV 3132-15

MT. JAMES
GROUND MAGNETIC PROFILE E.W. LINE
LINE 6000 N.

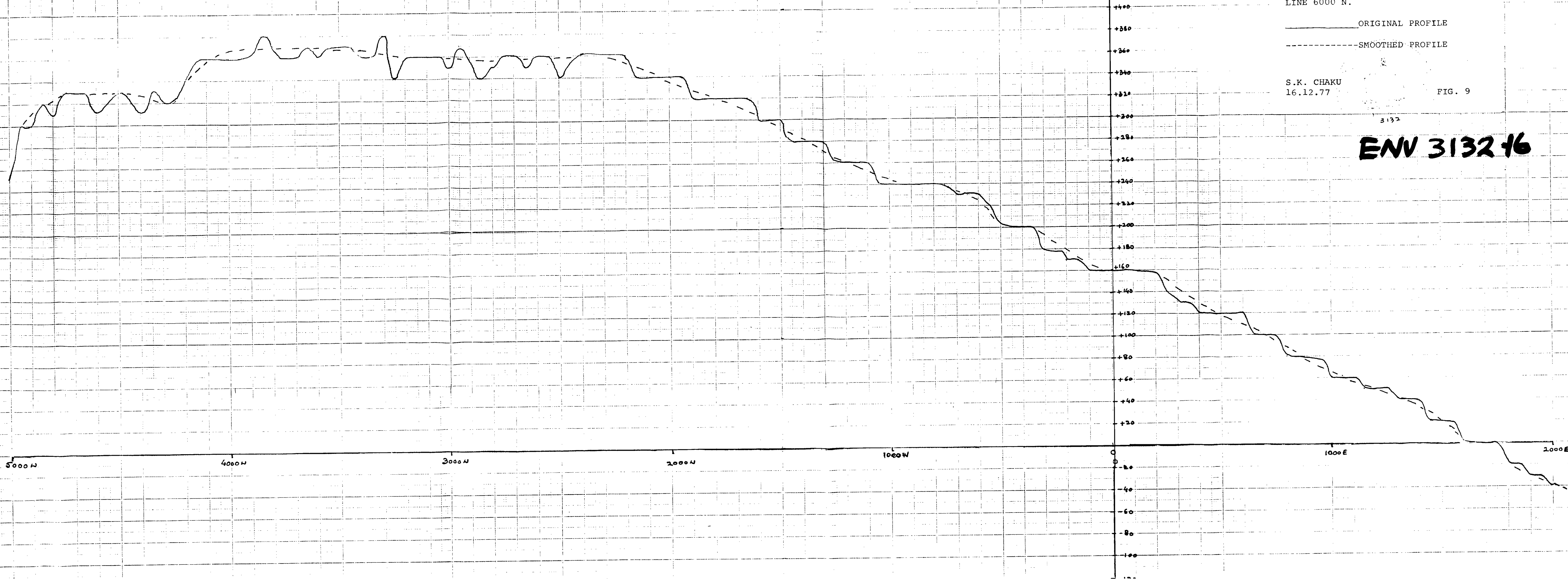
—— ORIGINAL PROFILE
----- SMOOTHED PROFILE

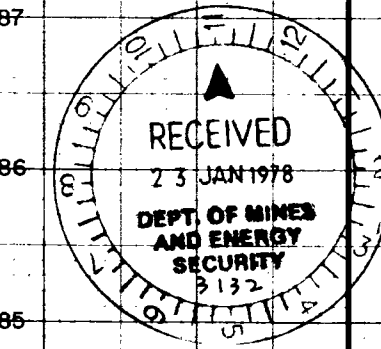
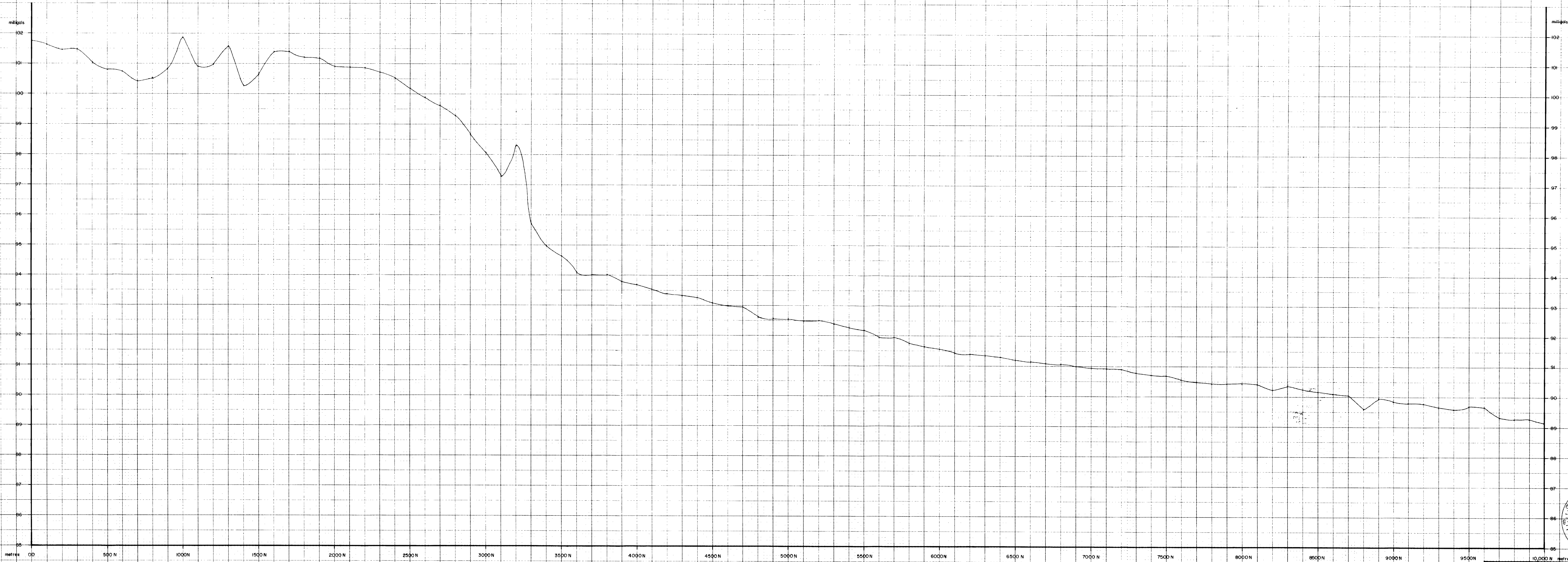
S.K. CHAKU
16.12.77

FIG. 9

3132

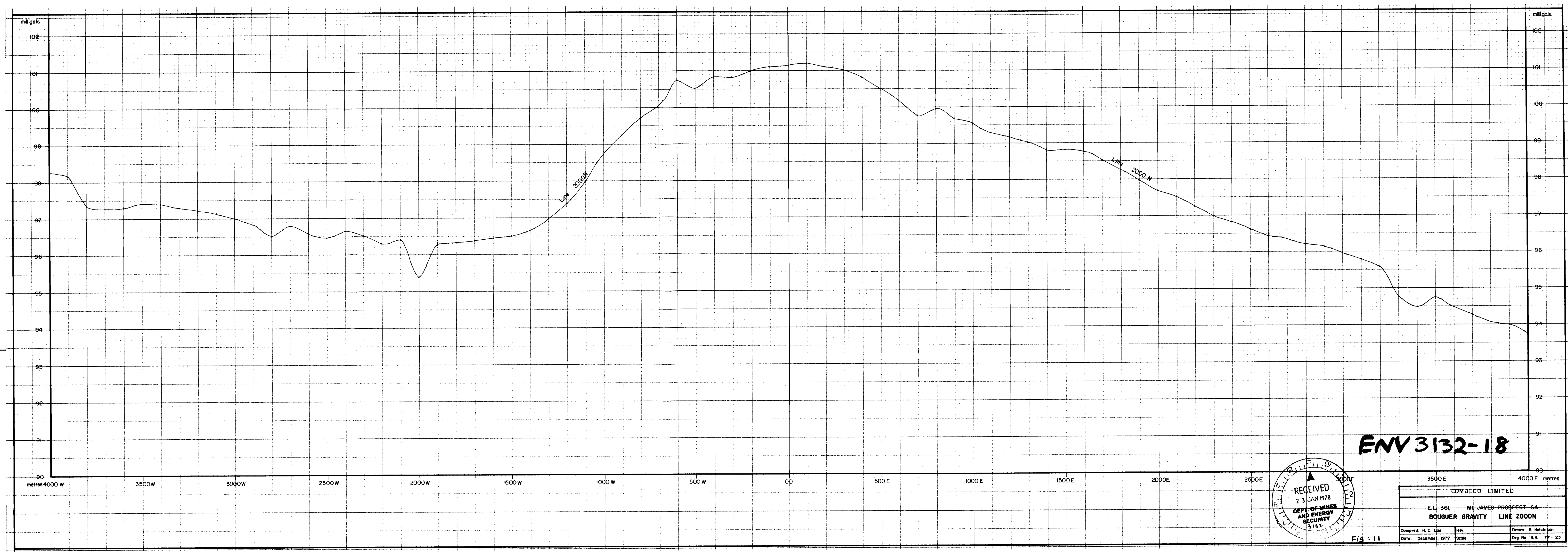
ENV 3132-16

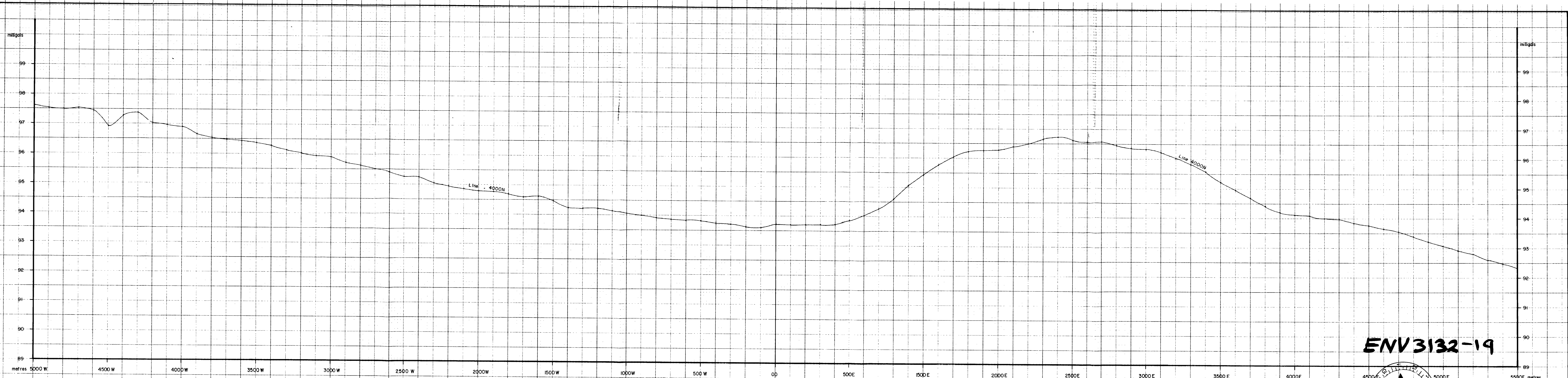




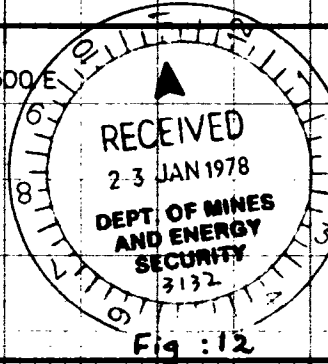
ENV-3132-17

COMALCO LIMITED			
EL. 361 - MT. JAMES PROSPECT SA			
BOUGUER GRAVITY N - S BASE LINE			
Compiled: H.C. Law	Revised:	Drawn: S. Hutchinson	
Date: December 1977	Scale:	Orig. No: SA-77-28	

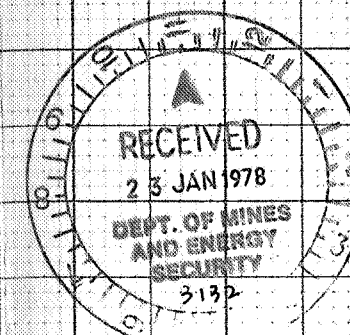
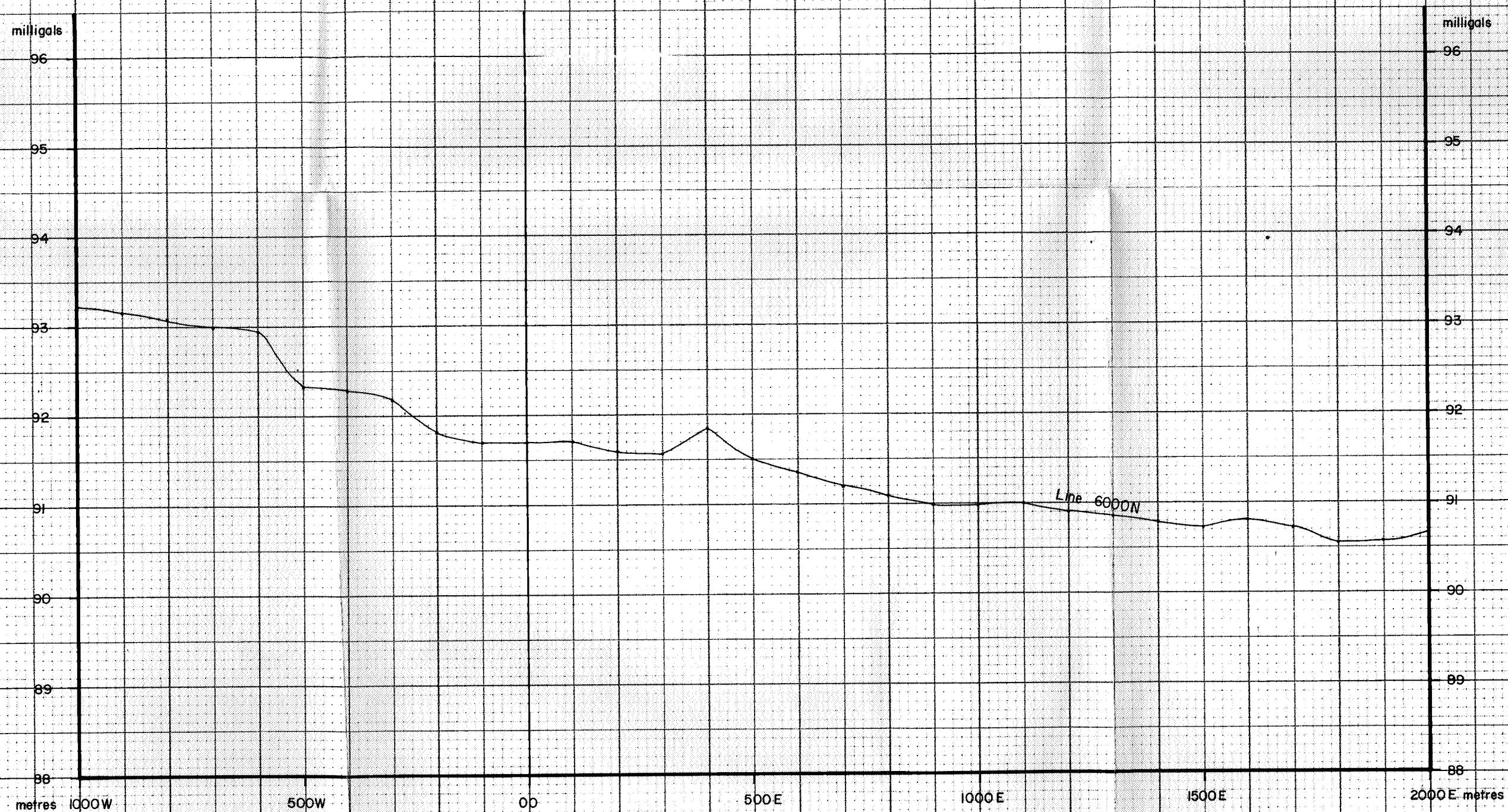




ENV3132-19



COMALCO LIMITED			
E.L. 36,		MT. JAMES PROSPECT SA	
BOUGUER GRAVITY LINE 4000N			
Compiled H.C. Liu		Revised	
Date: December, 1977		Scale:	
		Drawn S. Hutchison	
		Orig No: SA-77-25	



ENV 3132-20

COMALCO LIMITED

E.L. 361, MT JAMES PROSPECT SA

BOUGUER GRAVITY LINE 6000N

Fig. 13

Compiled: H.C. Lou	Revised:	Drawn: S. Hutchison
Date: December, 1977	Scale:	Orig. No: SA-77-27

CONFIDENTIAL STATEMENT

to

The Director General of Mines and Energy

bearing of work for quarter to 14.4.78. on E.L. 361

The detailed stratigraphic measurements of the Tapley's Hill to ABC Range Quartzite sequence in the Exploration Licence have not revealed any potentially favourable area for mineralisation, however continued analysis of ground magnetometer and gravity work between Mount Deception and Mount James supports the favourable indications of earlier work.



(Dr.) A. H. White
Senior Geologist



EXPLORATION LICENCE NO. 361

Second Quarterly Report

14. 1.78 - 14. 4.78

by

A. H. White

Comalco Limited,
95 Collins Street,
Melbourne,
Victoria. 3000.

April, 1978.

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GEOPHYSICAL	
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(2) Gravity Survey	2

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- ✓ SA77/21 Measured section East Windy Hut
- ✓ SA78/43 Measured section Old Myrtle Springs well.
Tapley's Hill Formation
- ✓ SA78/45 Measured section St. Patrick's Bore
- ✓ SA78/46 Measured section Southern Mount Stuart
- ✓ SA78/47 Measured section St. Patrick's Bore
- ✓ SA77/20 Structural/geological photo interpretation
part E. L. 361
- ✓ SA77/24 Part E.L. 361 ground magnetic contour
map
- ✓ SA77/22 Base map Copley and Parachilna magnetic
map
- ✓ SA77/26 Part E.L. 361 Bouguer gravity contour
map
- ✓ SA78/48 Part E.L. 361 Residual gravity map

APPENDIX I	Input instructions and programme listing for Bouguer corrections, H.P. 67 (by G. Cucuzza)
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EXPLORATION LICENCE 361 SUNDOWN CREEKQuarterly Report for period ending 14 April, 1978GEOLOGICAL(1) Sedimentology

As a continuation of the detailed sedimentological investigation of Adelaidean formations in Exploration Licence 361 (refer first quarterly report) a further five stratigraphic sections totalling 9300 metres were measured, (Figures SA77/21, SA78/43, SA78/45, SA78/46 and SA78/47). Two of these sections were outside the boundary of Exploration Licence 361 but were considered necessary to gain sufficient regional data to allow a sedimentological synthesis of the area to be made. The sections were measured in the stratigraphic interval from the base of the Tapley's Hill Formation to the top of the ABC Range Quartzite.

A structural/geological photo interpretation of part of Exploration Licence 361 was compiled to assist the regional studies (Figure SA77/20).

GEOPHYSICAL(1) Ground Magnetometer Survey

Using profiles previously obtained, a contour map of the ground magnetometer vertical magnetic field intensity of the area around Mount James outstation was compiled (Figure SA77/24). The smooth positive anomaly on the airborne data (Figure SA77/22) was found to be somewhat modified by the ground magnetometer data, and fill-in ground

magnetic data on a closer grid will have to be obtained before interpretation of the magnetics can be attempted.

(2) Gravity Survey

A contour map of the reduced gravity data was compiled (Figure SA77/26), and a first residual gravity contour map (Figure SA78/48) drawn from the previously obtained gravity data. A Programme for reduction of the gravity data to obtain Bouguer gravity was devised for use in a Hewlett-Packard model 67 computer (Appendix I).

STATEMENT OF EXPENDITURE14.1.78 - 14.4.78E.L. 361

Geological and geophysical:

(a) geophysical surveys	2 000.00
-------------------------	----------

Drilling

Nil

Logistics:

(a) Geologists' salaries	8 000.00
(b) Field assistants' salaries	5 500.00
(c) Camp costs	5 500.00
(d) Vehicles, maintenance etc.	3 000.00
(e) Reports, maps, reproductions, drafting	1 000.00

25 000.00

Administration

1 250.00

\$26 250.00

HP67 INPUT INSTRUCTIONS FOR BOUGUER PROGRAMME

000019

(G. CUCUZZA)

1. First input is the value of the observed gravity, i.e. g in milligals
key it in as follows:
93.69 STO 1
2. Second input is height of the station above datum, i.e. h in metres
key it in as follows:
8.78 STO 2
3. Third input is North - South distance from datum latitude, negative if its south or positive if its north of datum latitude, u x in km
key it in as follows:
8.5 STO 3 (i.e. north i.e. + 8.5)
OR 8.5 CHS STO 3 (i.e. south i.e. - 8.5)
4. Fourth input the value of bouguer density, i.e. gm/cm^3
key it in as follows:
2.67 STO 4
5. Fifth and final input is the latitude (to nearest 10 minutes, angle expressed in decimal) of the base station, in degrees
key it in as follows:
30.70 STO 5

OUTPUT:

When all the above values have been keyed in, KEY A must be pressed to initiate the calculations.

The output sequence is as follows:

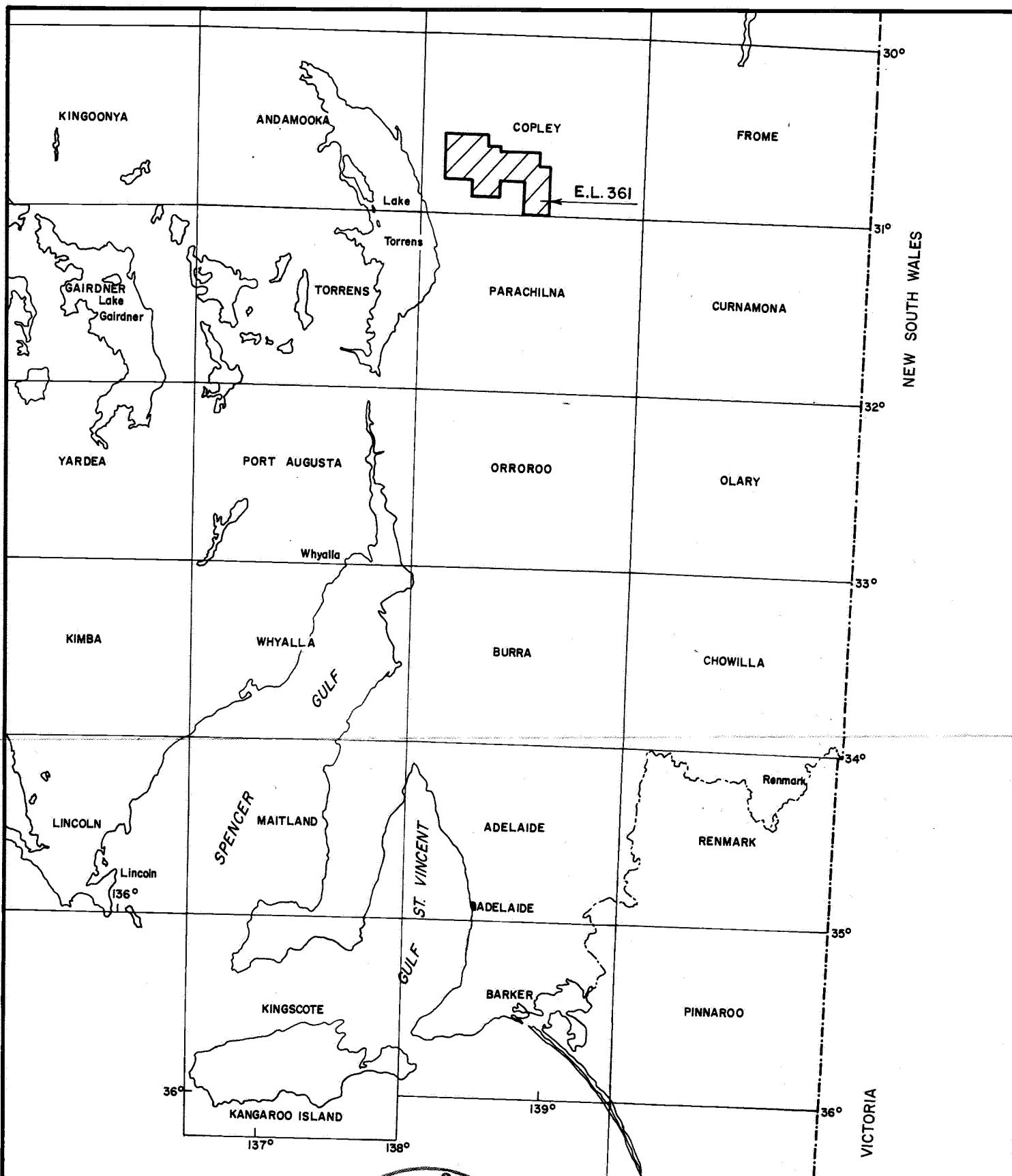
- (a) First displayed output is the value of BOUGUER CORRECTION, which will be displayed for 5 seconds, plenty of time to write it down
- (b) Second display is the value of the FREE AIR CORRECTION, also displayed for five seconds
- (c) Third display is the value of the LATITUDE CORRECTION, again displayed for five seconds
- (d) Fourth display is the value of the TOTAL CORRECTION,
- (e) Final display is the value of the CORRECTED OBSERVED GRAVITY, this value is permanently displayed.

To start the sequence again we must go to 1 and key in input for next station.

N.B. Normally in a given area, the latitude and density will remain the same, so it is only necessary to key in the values of g , h and x for next station.

HP.67 PROGRAMME LISTING FOR BOUGUER CORRECTIONS

Step No.	Key Codes	Key
1	31 25 11	LBL A
2	83	0
3	00	0
4	04	4
5	01	1
6	09	9
7	01	1
8	42	CHS
9	33 06	STO(06)
10	83	.
11	03	3
12	00	0
13	08	8
14	06	6
15	33 00	STO(00)
16	34 02	RCL(02)
17	34 04	RCL(04)
18	34 06	RCL(06)
19	71	X
20	71	X
21	31 84	f-x-
22	33 09	STO(09)
23	34 02	RCL(02)
24	34 00	RCL(06)
25	71	X
26	31 84	f-x-
27	33 08	STO(08)
28	34 05	RCL(05)
29	02	2
30	71	X
31	31 62	f sin
32	83	.
33	08	8
34	01	1
35	02	2
36	01	1
37	34 03	RCL(03)
38	71	X
39	71	X
40	31 84	f-x-
41	34 09	RCL(09)
42	34 08	RCL(08)
43	61	+
44	61	+
45	84	R/S
46	34 01	RCL 01
47	35 52	hX ≥ Y
48	61	+
49	35 22	h RTN



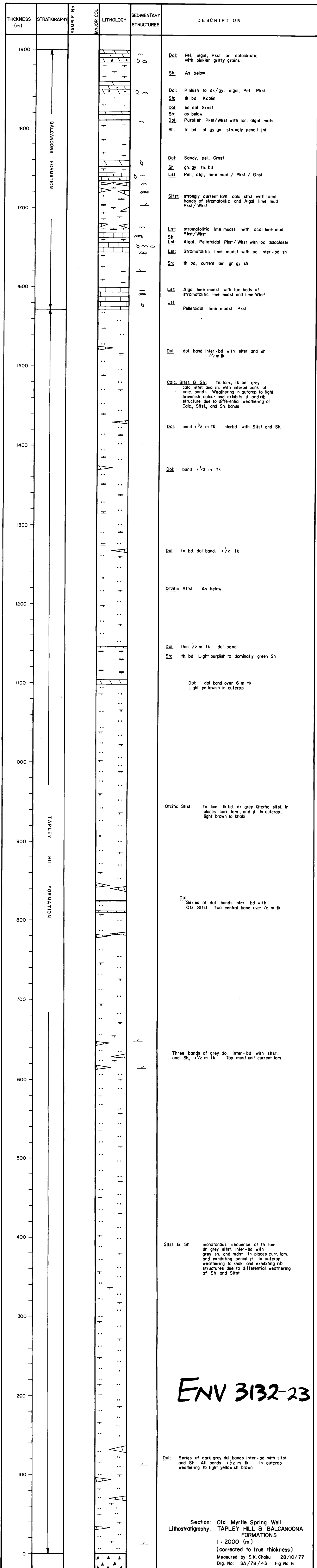
SOUTHERN OCEAN



20 0 20 40 60 80 100 120 140 160 180 200 km

COMALCO LIMITED		
SOUTH AUSTRALIA		
LOCATION MAP		
E.L. 361		
Fig		
Comp. B.F. BRADY	Rev.	Drawn. S.HUTCHISON
Date. DEC. 77	Scale.	Drg. No. SA - 78 - 55

ENV 3132-21



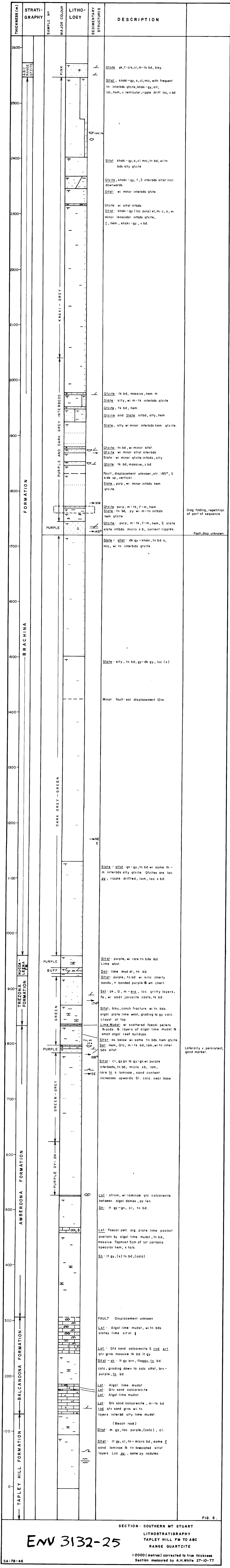
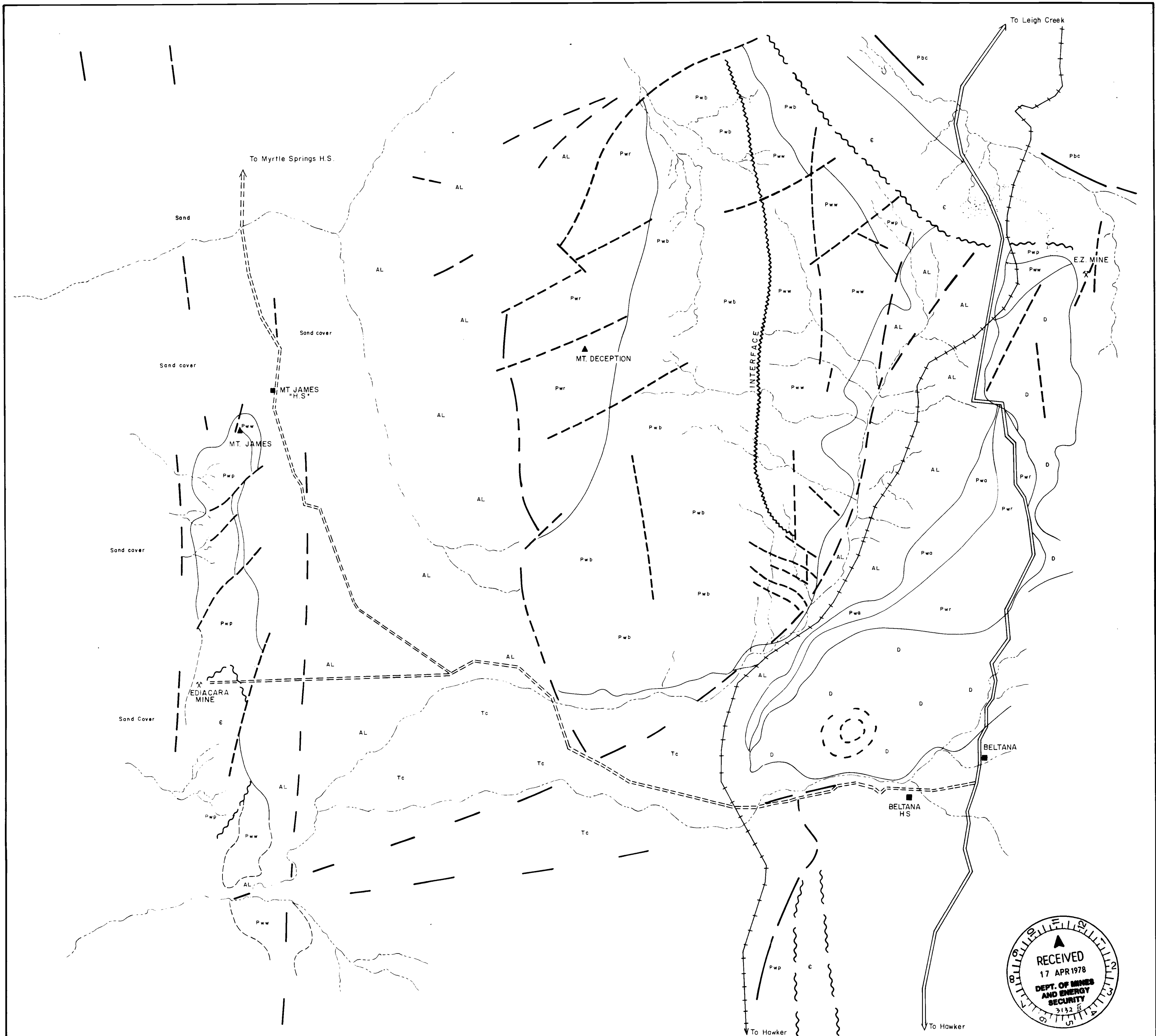


FIG. 5.

SECTION: SOUTHERN MT STUART
LITHOSTRATIGRAPHY
TAPLEY HILL FM TO ABC
RANGE QUARTZITE

ENV 3132-25

1:2000 (metres) corrected to true thickness
Section measured by A.H.White 27-10-77



L E G E N D

- Minor Faults
- Major Faults
- Unconformities
- Inferred Faults and Lineaments
- == Main Roads
- == Tracks
- == Railways
- Drainage
- Circular - structure with Diapir.

- Sand cover
- AL - Aluvium
- Tc - Tertiary sand cover
- E - Cambrian
- Pwp - Pond Quartzite
- Pww - Wonoka formation
- Pwb - Banyaroo formation
- Pwa - A.B.C. Range Quartzite
- Pwt - Brachina formation
- Pbc - Copley Quartzites
- D - Diapir

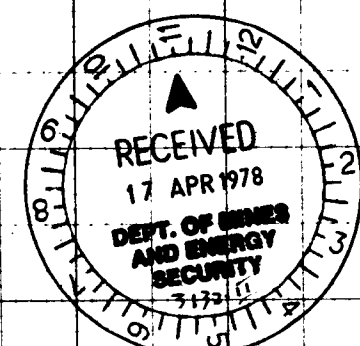
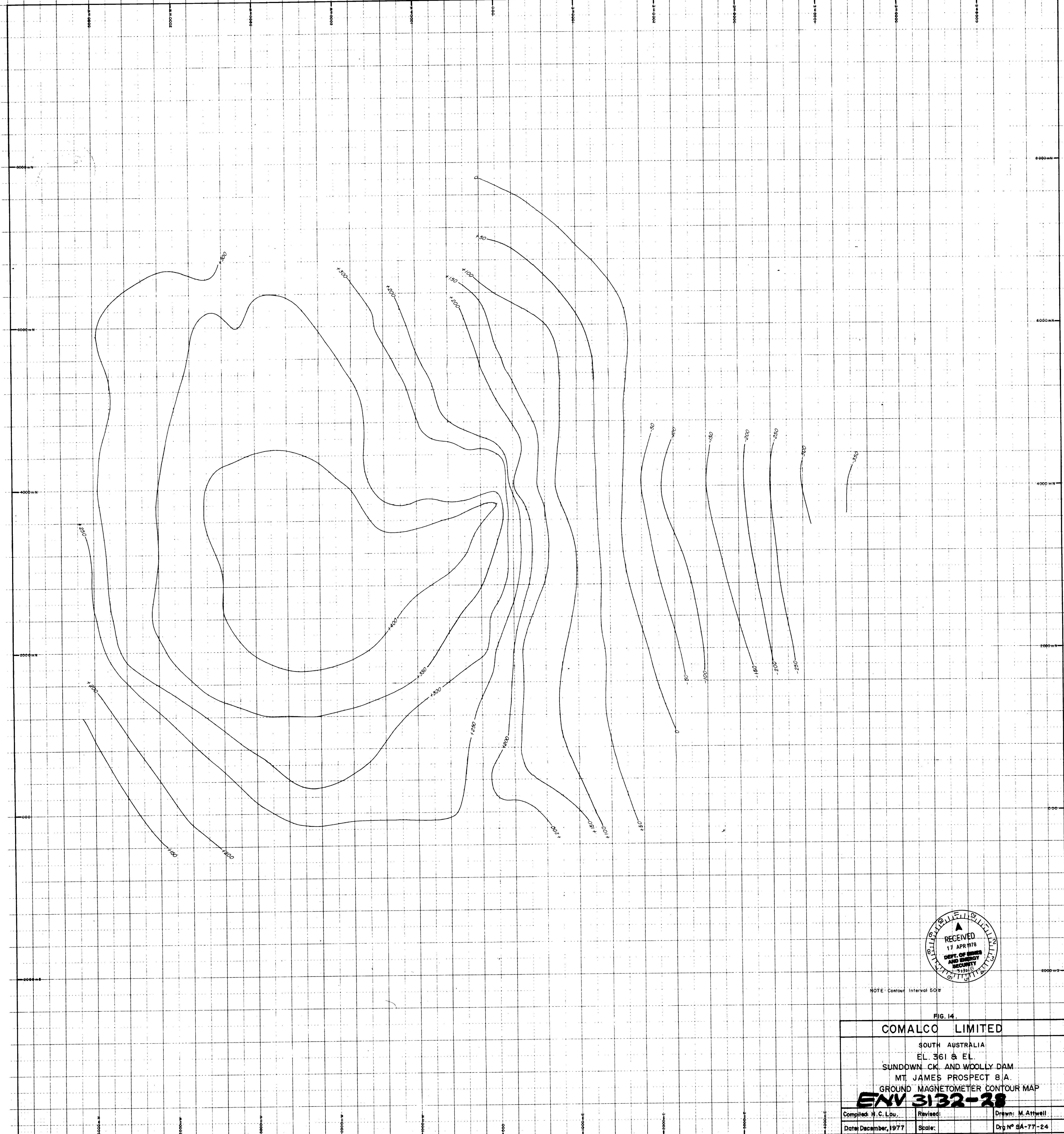
COMALCO LIMITED

ENV 3132-27

SOUTH AUSTRALIA

STRUCTURAL / GEOLOGICAL
PHOTO-INTERPRETATION
PARTS OF SUNDOWN CREEK
& WOOLLY DAM E.L's

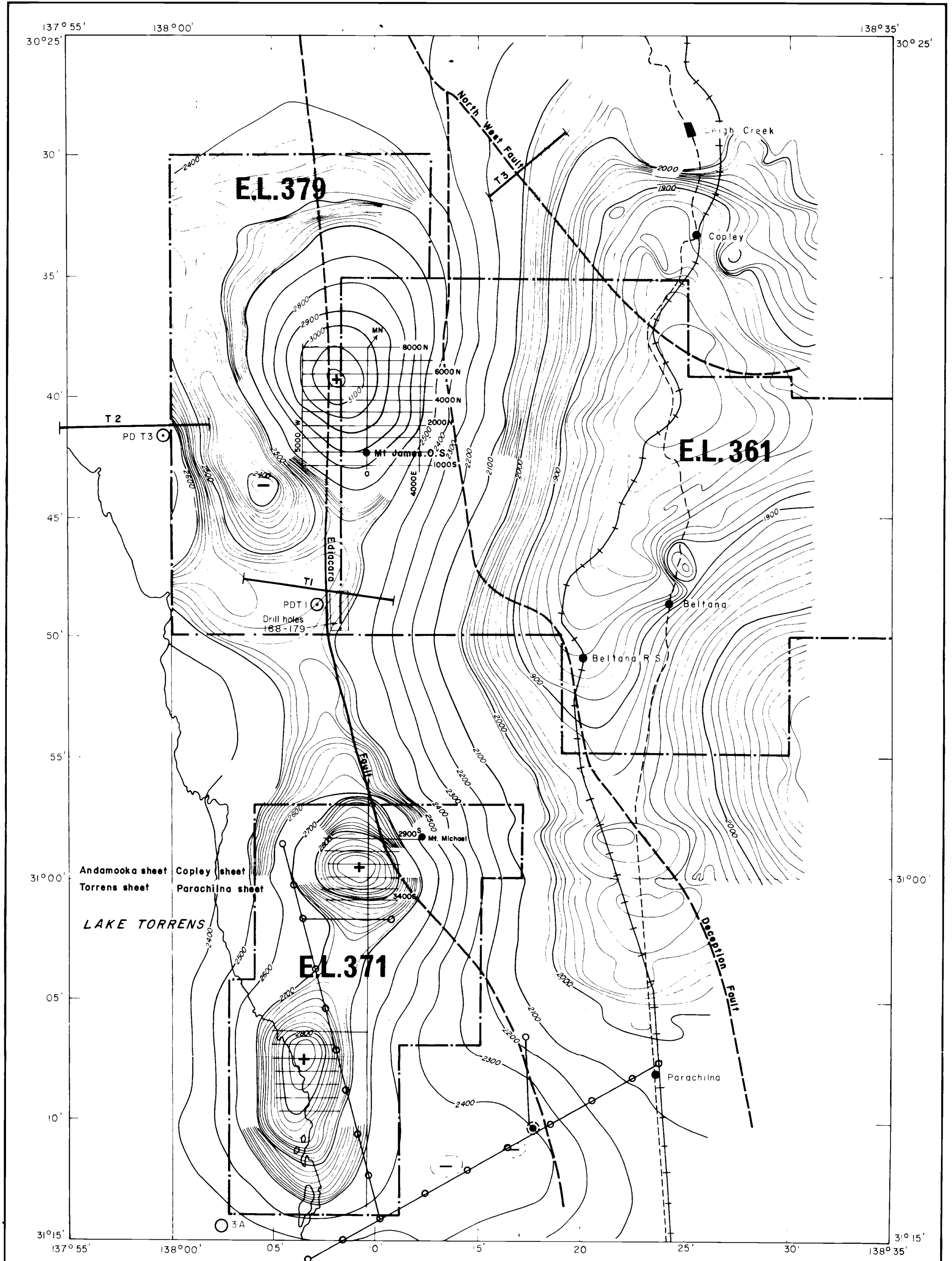
Compiled: S. K. Chaku.	Revised:	Drawn:
Date: December, 1977	Scale Approx 1:80,000	Drg N° SA-77-20



NOTE: Contour Interval 50γ

FIG. 14.

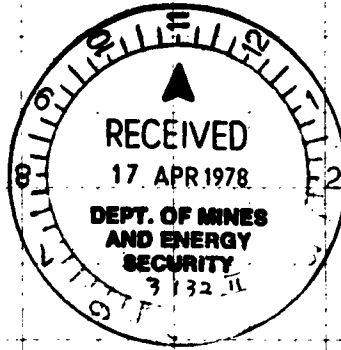
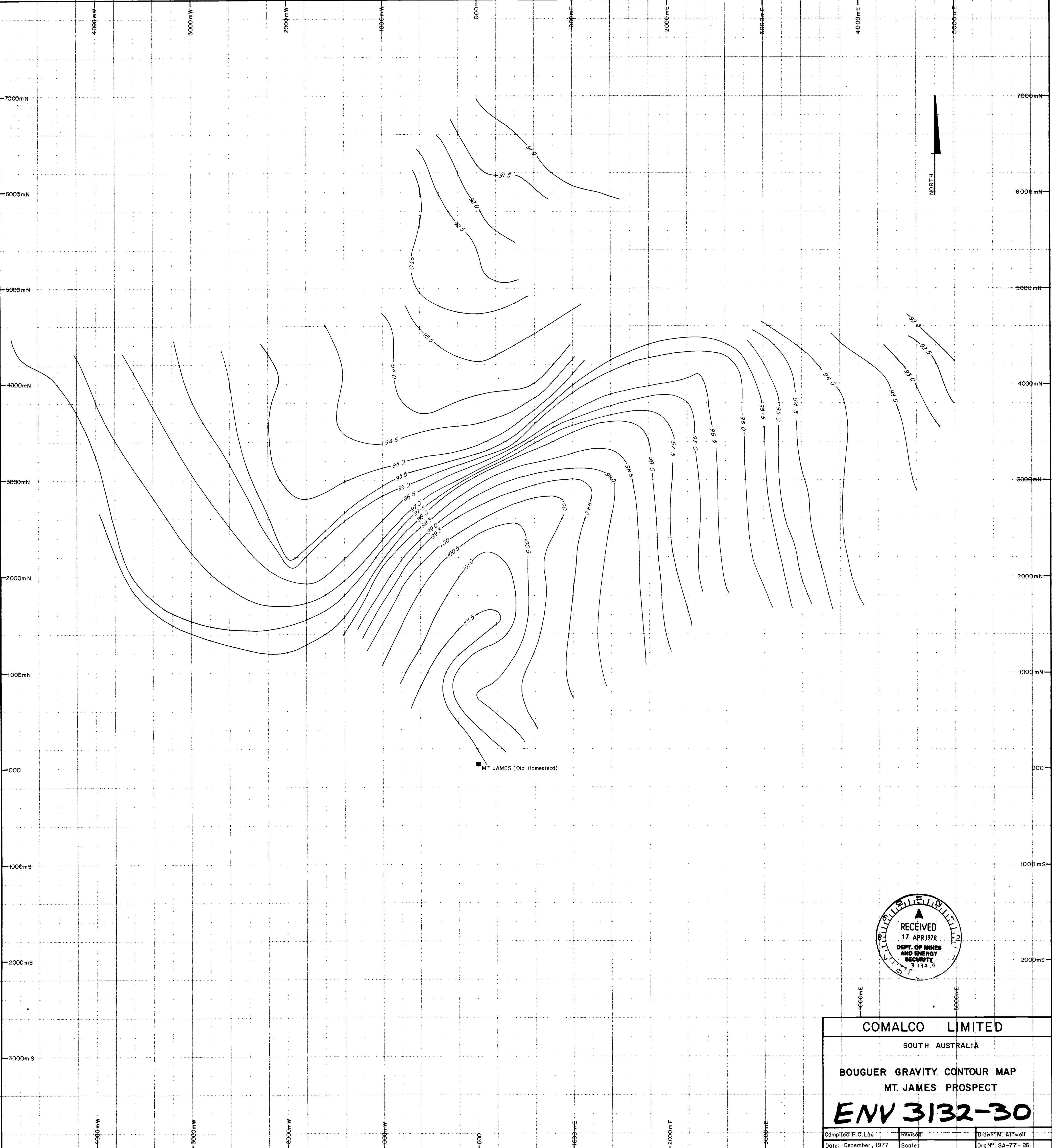
COMALCO LIMITED		
SOUTH AUSTRALIA		
EL. 361 & EL.		
SUNDOWN CK. AND WOOLLY DAM		
MT. JAMES PROSPECT 8 A.		
GROUND MAGNETOMETER CONTOUR MAP		
ENV 3132-28		
Compiled: H. C. Lau.	Revised:	Drawn: M. Attwell
Date: December, 1977	Scale:	Drp. No SA-77-24



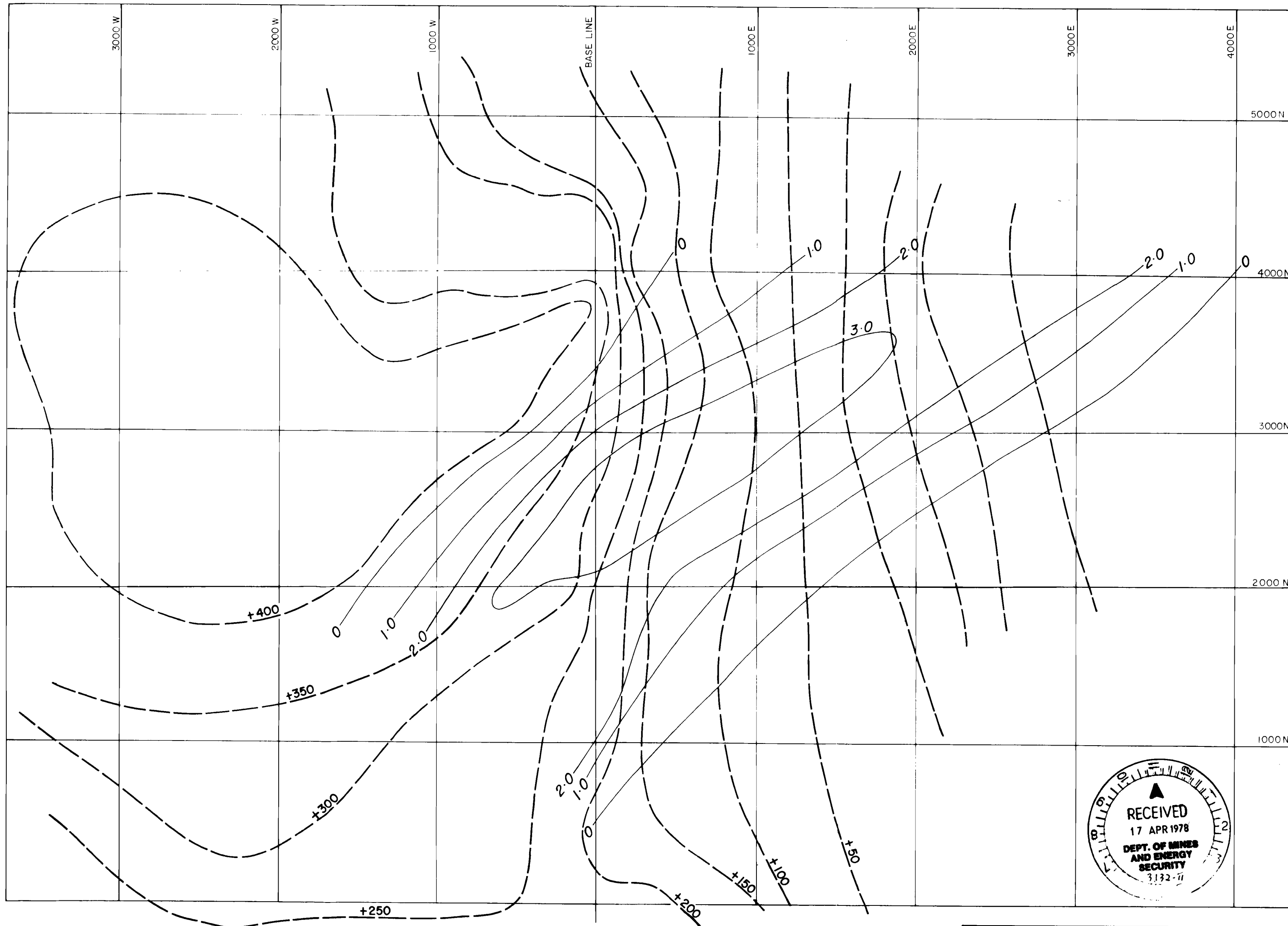
- Seismic lines Dept. of Mines S.A.
- Gravity and Magnetic Traverse Lines
Carpentaria Exploration
- Carpentaria Exploration Drill Holes
- Santos Motpena St Bore
- Mines Branch Stratigraphic Bore
- Fault
- .-.- E L Boundary
- Road Second Class



COMALCO LIMITED		
SOUTH AUSTRALIA		
BASE MAP COPLEY AND PARACHILNA MAGNETIC MAP		
ENV 3132-29		
Compiled SK Chaku	Revised: March, 1978	Drawn M Attwell
Date January, 1978	Scale: 1" = 250,000	Drg N° SA -77-22



COMALCO LIMITED		
SOUTH AUSTRALIA		
BOUGUER GRAVITY CONTOUR MAP		
MT. JAMES PROSPECT		
ENV 3132-30		
Compiled: H.C. Lou	Revised:	Drawn: M. Atfwell
Date: December, 1977	Scale:	Drg No: SA-77-26



LEGEND

- — — — — Fluxgate ground magnetometer
0 (x)
- Residual gravity (milligals)

COMALCO LIMITED

SOUTH AUSTRALIA
E.L. 361

MT. JAMES PROSPECT
RESIDUAL GRAVITY MAP
ENV 3132-31

Compiled A H White	Bi Monthly Report Feb. 1978	Drawn M. Attwell
Date Feb. 1978	Scale 1:10,000	SA-78-48

000021

EXPLORATION LICENCE 361

'SUNDOWN CREEK'

Third

~~Fourth~~ Quarterly Report

14.4.78 - 14.7.78.

A. H. White

Comalco Limited,
Exploration Department,
31. Deeds Road,
North Plympton,
ADELAIDE. S. AUSTRALIA.

August, 1978.

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Geophysics	2
Statement of Expenditure	3

Figures:

SA77/20.	Structural/geological photo-interpretation parts of Sundown Creek and Woolly Dam E.L.'s
SA78/85	Mt. James Grid Geology
SA78/68	Regional Geology, Mt. James Area
SA78/65	Mt. James grid - base plan
SA78/71-SA78/81 SA78/82	Proton magnetometer ground survey profiles Proton magnetometer contour map,
SA78/83	Stacked Bouguer gravity profiles Mt. James
SA78/84	Bouguer contour map Mt. James

EXPLORATION LICENCE NO. 361, SUNDOWN CREEK

Quarterly Report for period ending 14th July, 1978.

GEOLOGICAL:

(1) Mapping: The detailed geology of the gridded area around Mount James outstation (Drawing SA77/20) was mapped at a scale of 1:20 000. Previously unrecorded exposures of Adelaidean rocks were observed during this work (refer Drawing SA78/85).

(2) General geology of the Mount James area was mapped at a scale of 1:21 000 (photo scale) (refer Drawing No. SA78/68).

(3) Sedimentology: A sedimentological reconstruction of the deposition of the Bunyerroo Formation in E.L. 361 was completed, as the final report on part of E.L. 361 to be relinquished.

GEOPHYSICAL

(1) Surveying: A grid covering an area of approximately 11 kilometres x 14 kilometres was completed (refer drawing No. SA78/65). Pegs were placed in the ground at 100 metre spacings on lines mostly East - West and one kilometre apart. The levels of each peg was surveyed using a theodolite.

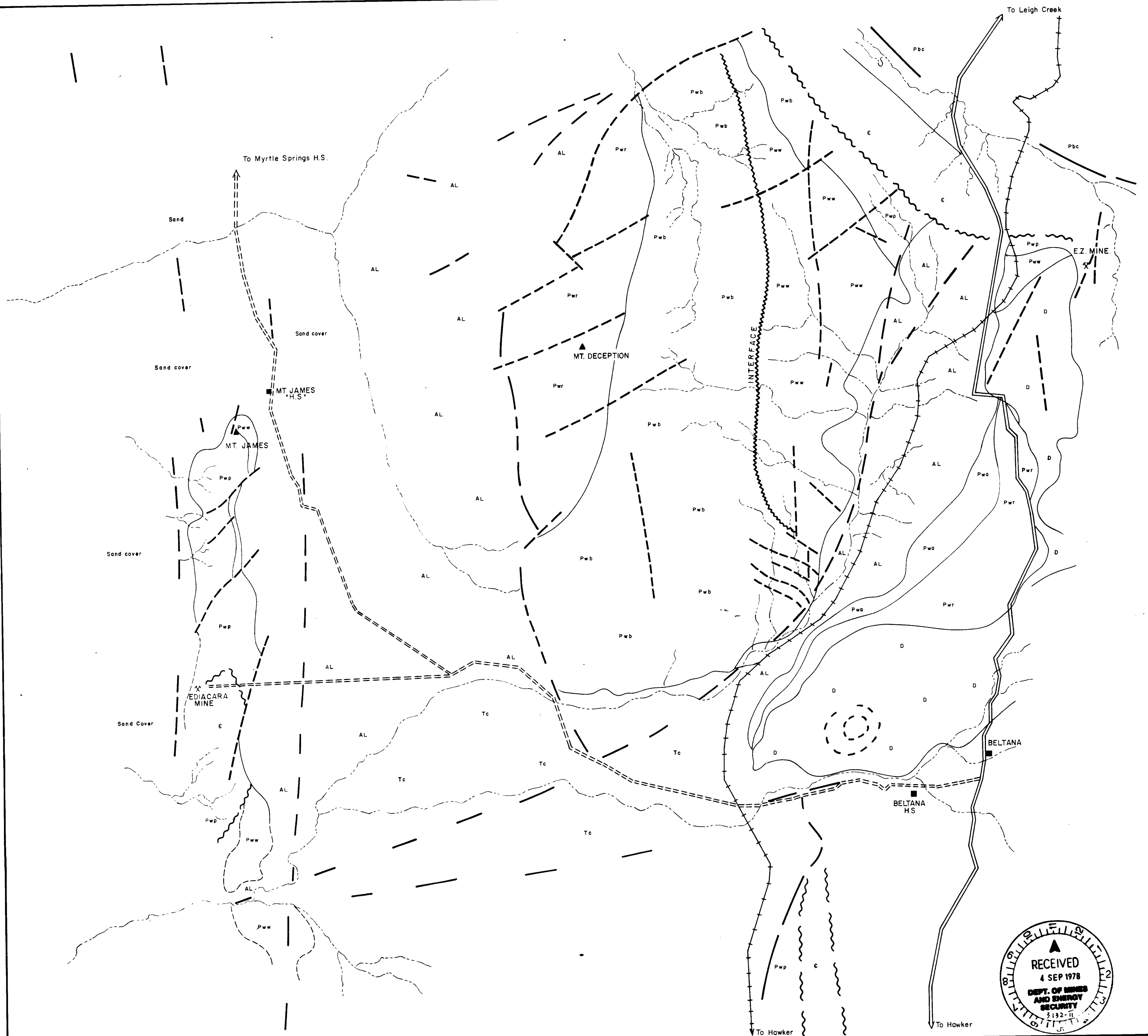
(2) Magnetics: The entire grid was re-surveyed using an Austral proton precession magnetometer. The results are illustrated in drawings numbers SA78/71 - SA78/82 inclusive.

(3) Gravity: Using a Sodin Prospector gravity meter, serial number 124, a gravity survey of the entire grid was completed. The additional data led to a different interpretation of the gravity anomaly detected in the initial work. Bouguer profiles and Bouguer contours for the completed survey of the grid are given in drawings numbers SA78/83 and SA78/84. Modelling and interpretation of the gravity data is in progress.

(4) Refraction Seismic: A refraction seismic survey using Geospace GT2B and Bison 1575B instruments was carried out near Mount James outstation to gain information on stratigraphy and interval velocities. A final report on this survey is in preparation.

STATEMENT OF EXPENDITURE

Geology and Geophysical (field studies)	
salaries (2 professional, 4 field crew)	10 500.00
Logistics, camp costs	6 600.00
Geological reporting (office studies)	3 200.00
Drafting	500.00
Administrative costs	1 000.00
	\$21 800.00



L E G E N D

- Minor Faults
- Major Faults
- ~ Unconformities
- - - Inferred Faults and Lineaments.
- == Main Roads
- ==== Tracks
- Railways
- ~ Drainage
- () Circular - structure with Diapir.

- Sand cover
- AL - Aluvium
- Tc - Tertiary sand cover
- E - Cambrian
- Pwp - Pond Quartzite
- Pww - Wonoka formation
- Pwb - Banyaroo formation.
- Pwa - A.B.C. Range Quartzite.
- Pwt - Brachina formation
- Pbc - Copley Quartzites
- D - Diapir

COMALCO LIMITED

SOUTH AUSTRALIA
ENV 3132-32
 STRUCTURAL / GEOLOGICAL
 PHOTO-INTERPRETATION
 PARTS OF SUNDOWN CREEK
 & WOOLLY DAM E.L's

Compiled: S. K. Chaku.	Revised:	Drawn:
Date: December, 1977	Scale Approx 1:80,000	Drg No SA-77-20



- RECENT
- PLEISTOCENE
- TERTIARY
- ADELAIDEAN
- POUND QUARTZITE
- WONOKA FORMATION
- BUKVEROO FORMATION
- BRACHINA FORMATION

Aeolian sand dunes, height 2-20 metres
Dune directions schematically shown

Pan deposits, may contain shearwash gravel or
alluvial sand and silt

Gravelly sand and silt shearwash, predominantly
Brachina Formation derived clasts

Massive, cryptocrystalline siltstone capping
siltstone and calcareous grits

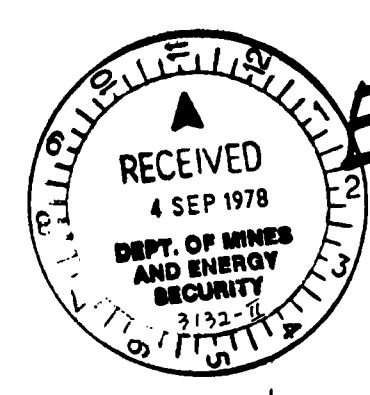
Kaolinitic white quartzite, variably pebbly and shaly,
clay galls and large scale crossbedding common

Yellow laminated dolomite, minor green
calcareous shale

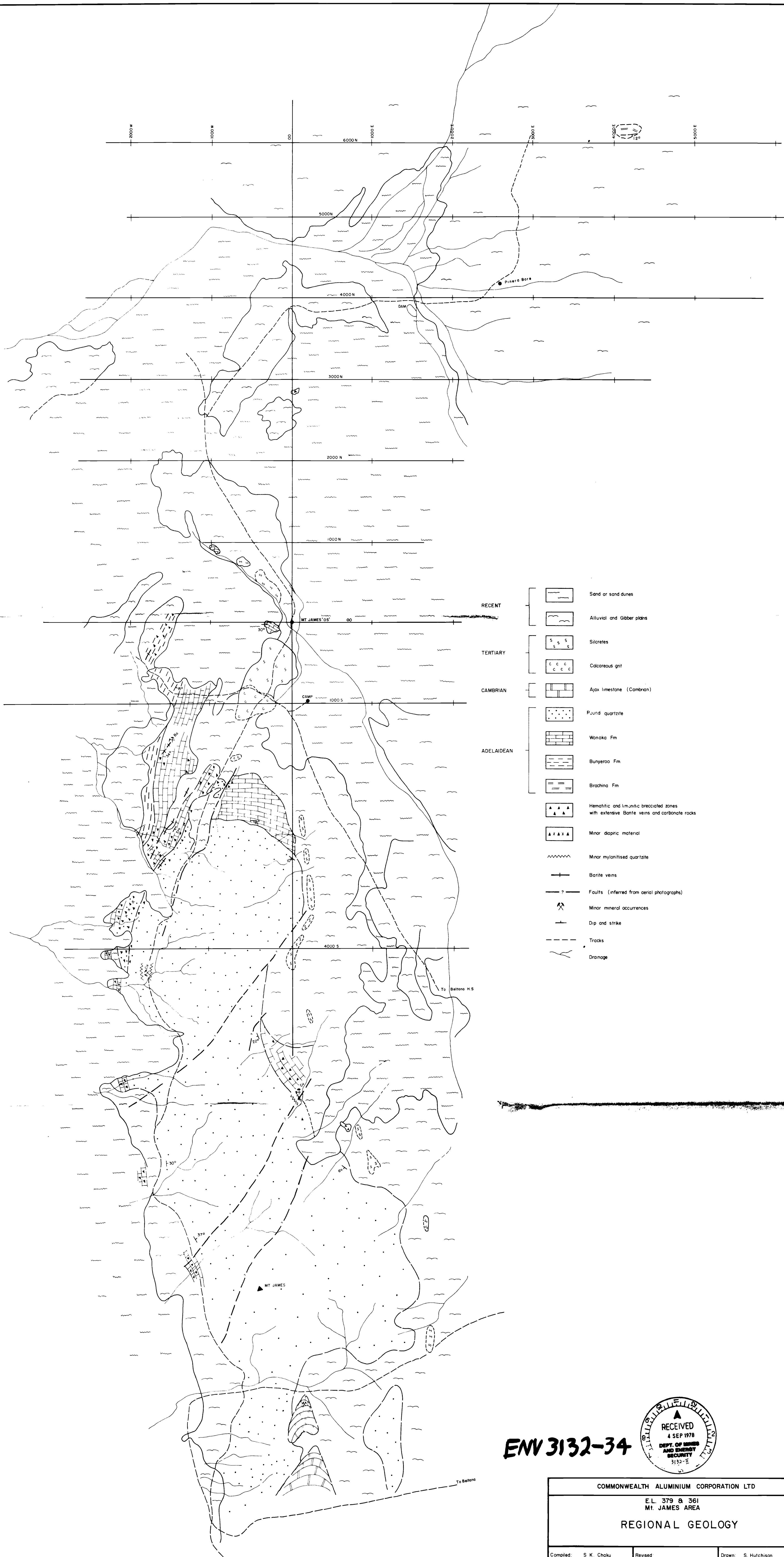
Red micaceous shale, minor red limestone
at top of formation

Dark grey quartzite siltstone to sandstone,
common banded haematitic kaolinitic quartzite

- Barite vein, usually associated quartz and limonite
- Gypcrete, very fine crystal aggregates
- Ephemeral drainage
- Plateau with scarp
- Lithological boundary
- Outcrop boundary
- Dip and strike of bedding
- Synclinal axis
- Fault
- Farm track
- Fence
- Water bore



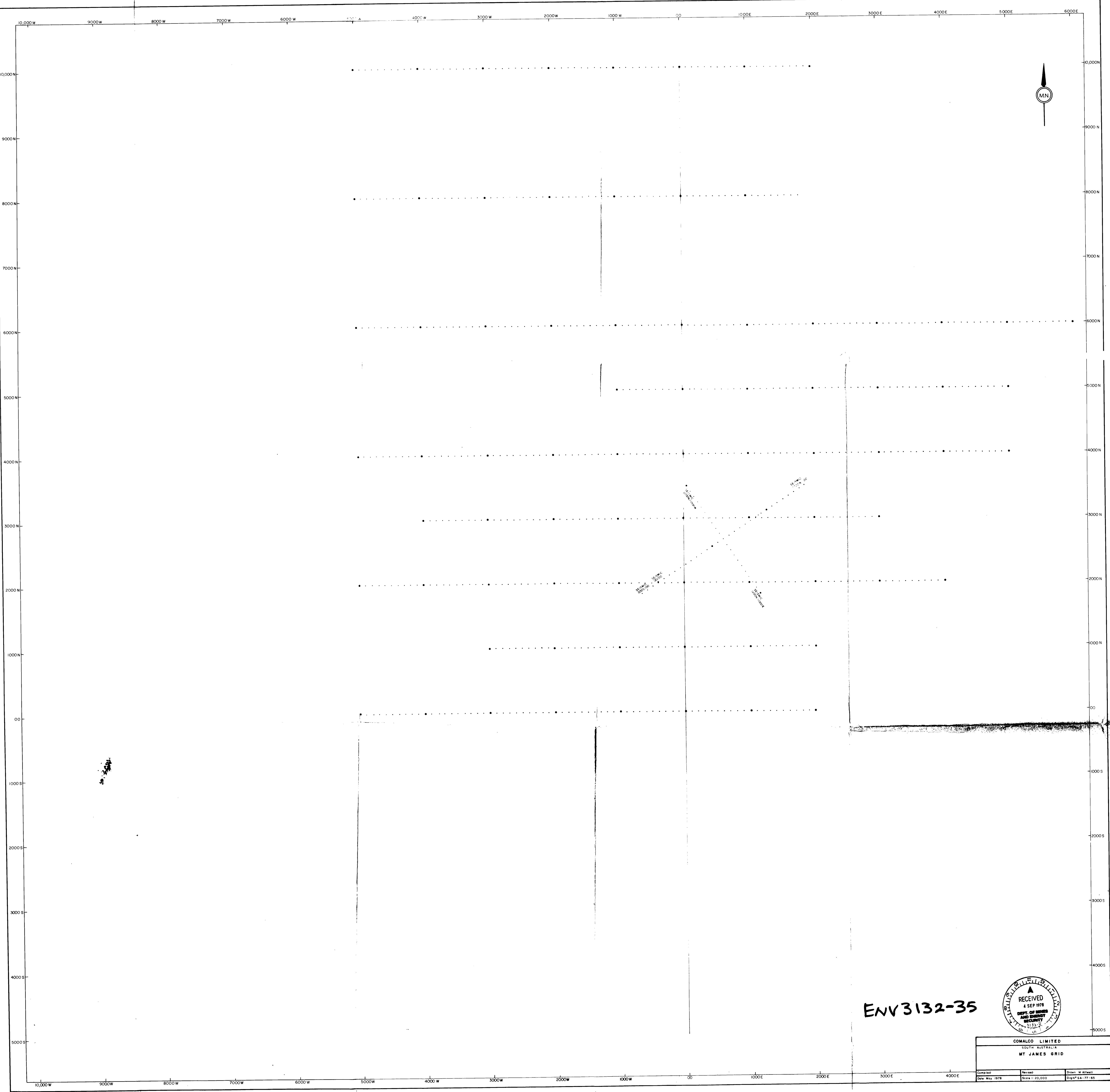
ENV 3132-33



ENV 3132-34



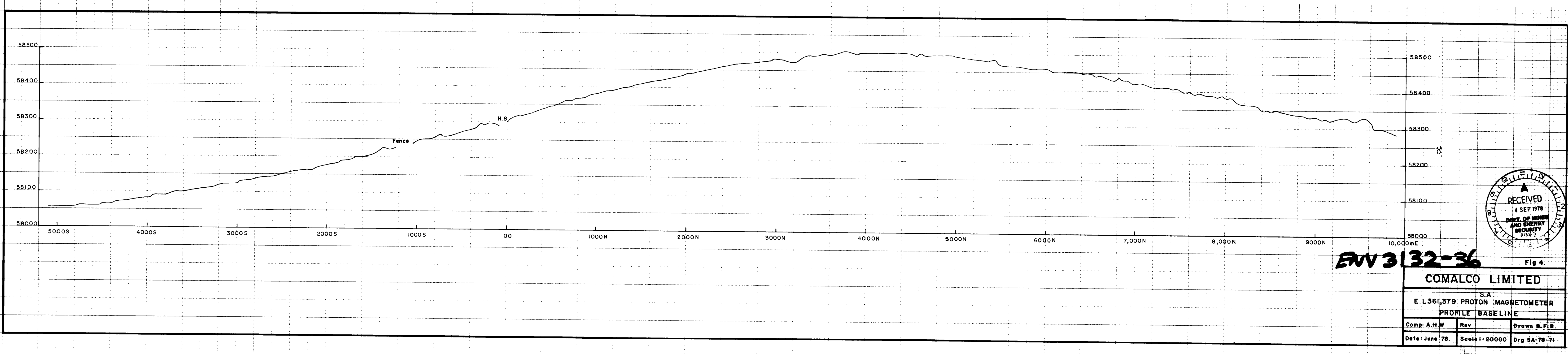
COMMONWEALTH ALUMINIUM CORPORATION LTD		
E.L. 379 & 361 MT. JAMES AREA		
REGIONAL GEOLOGY		
Compiled: S. K. Choku	Revised:	Drawn: S. Hutchison
Date: June, 1978	Scale: 1:2100	Org. No. SA - 78 - 68

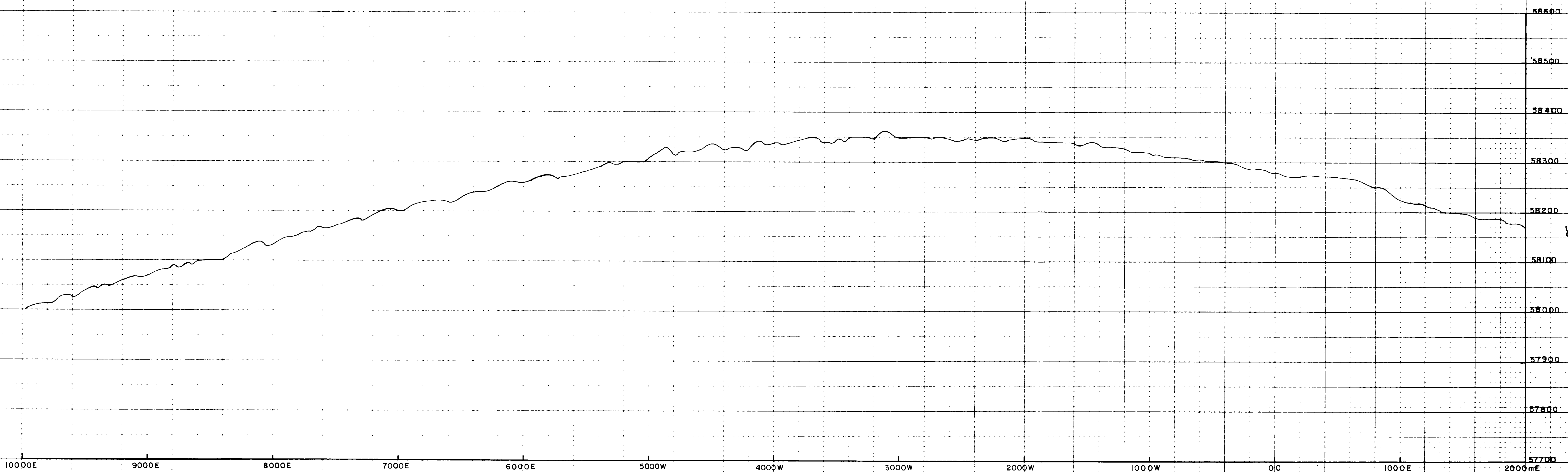


ENV3132-35



COMALCO LIMITED		
SOUTH AUSTRALIA		
MT JAMES GRID		
Compiled	Revised	Drawn: W. Atwell
Date: May 1978	Scale: 1:20,000	Drawn: SA-77-65





EN 3132-37

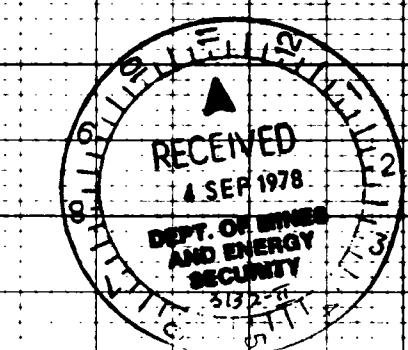
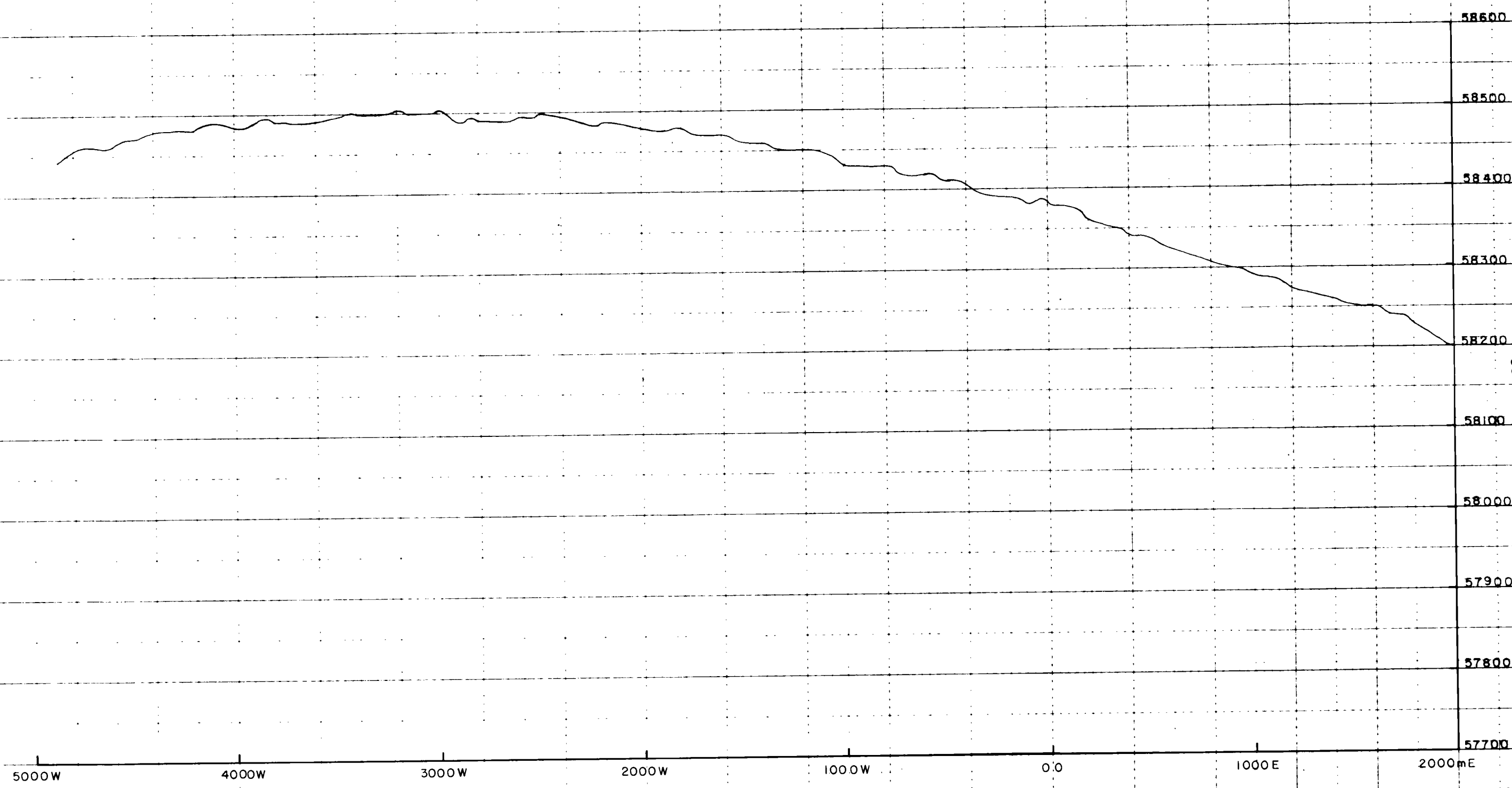


Fig. 5

COMALCO LIMITED		
S-A		
EL 361,379 PROTON MAGNETOMETER		
PROFILE LINE 10000 N		
Comp: A.M.W.	REV:	Draw: B.F.B.
Date: June '78	Scale: 1:20,000	Org: SA-78-72



ENV 3132-38

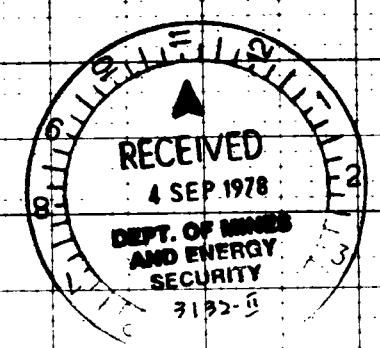
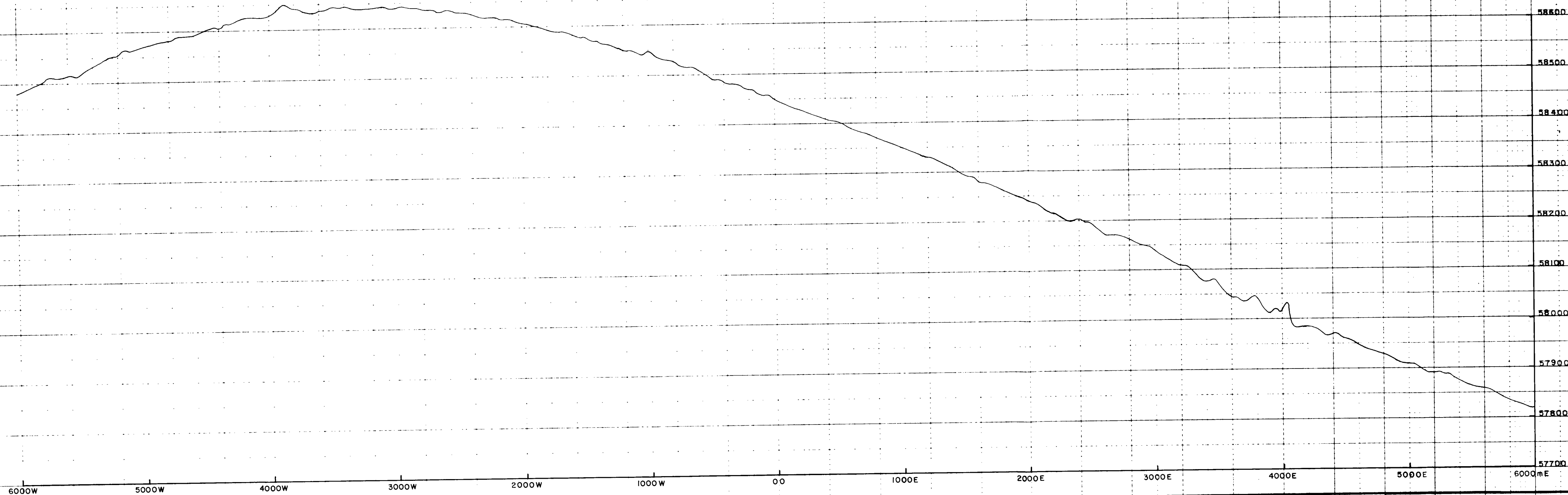


Fig. 6.

COMALCO LIMITED		
9-A		
EL 361,379 PROTON MAGNETOMETER		
PROFILE LINE 8000N.		
Comp: A.M.W.	Rev:	Drawn B.F.B
Date: June '78	Scale 1:20000	Dwg. SA-78-73



ENV 3132-39

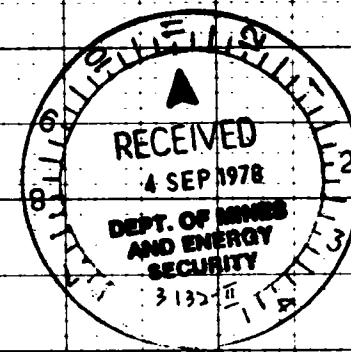
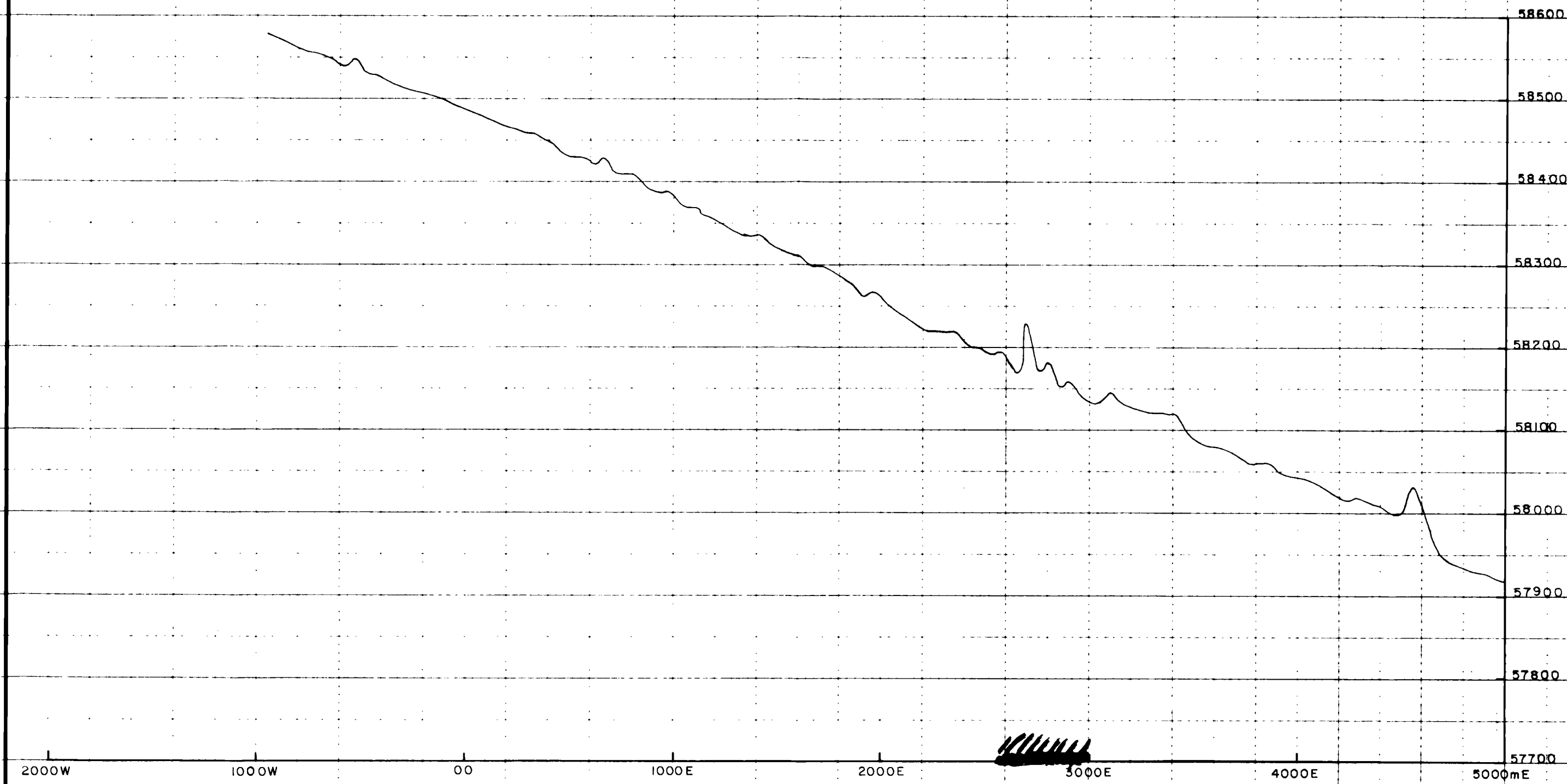


Fig. 7.

COMALCO LIMITED		
S-A		
EL 361,379 PROTON MAGNETOMETER		
PROFILE LINE 6000 N		
Comp: A.M.W.	Rev:	Draw: B.F.B.
Date: June '78	Scale: 1:20,000	Org: SA-78-74



ENV 3132-40

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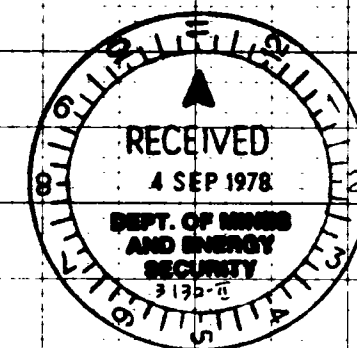


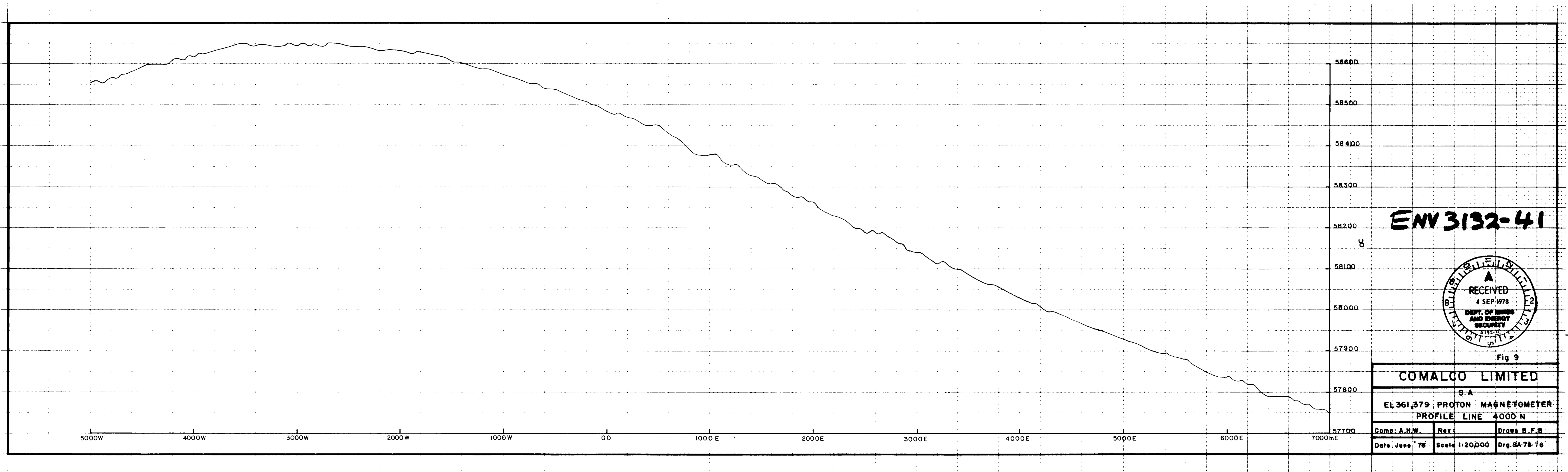
Fig. 8.

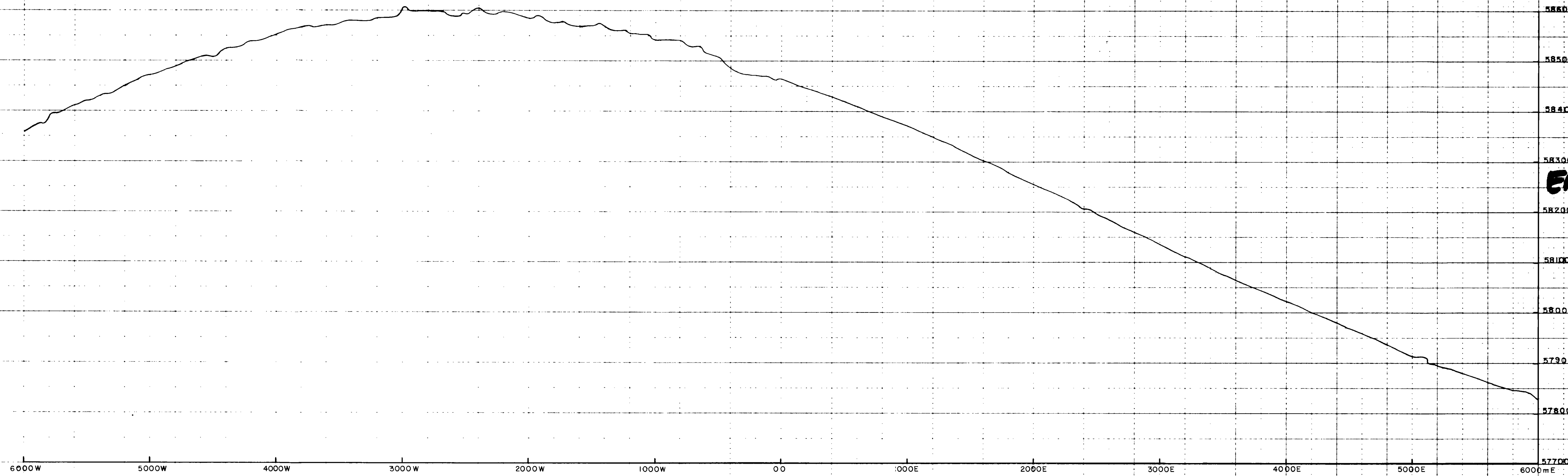
COMALCO LIMITED

S.A

EL 361,379 PROTON MAGNETOMETER
PROFILE LINE 5000N

Comp: A.H.W.	Rev:	Drawn: B.F.B.
Date: June '78	Scale: 1:20,000	Dwg: SA-78-75





EN 3132-42

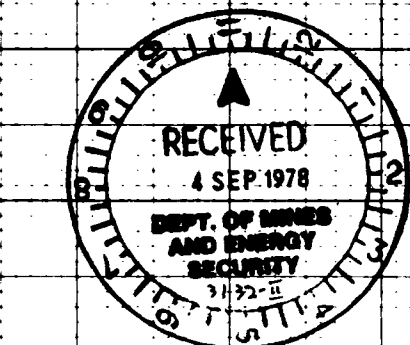
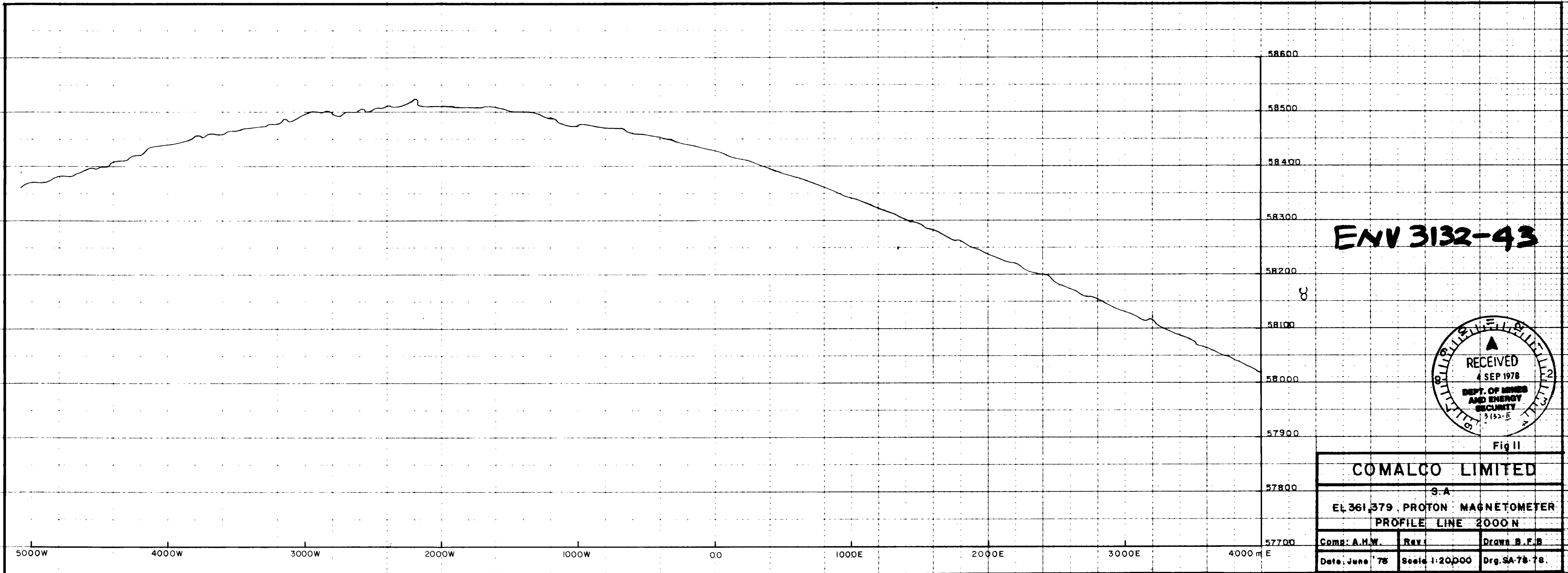
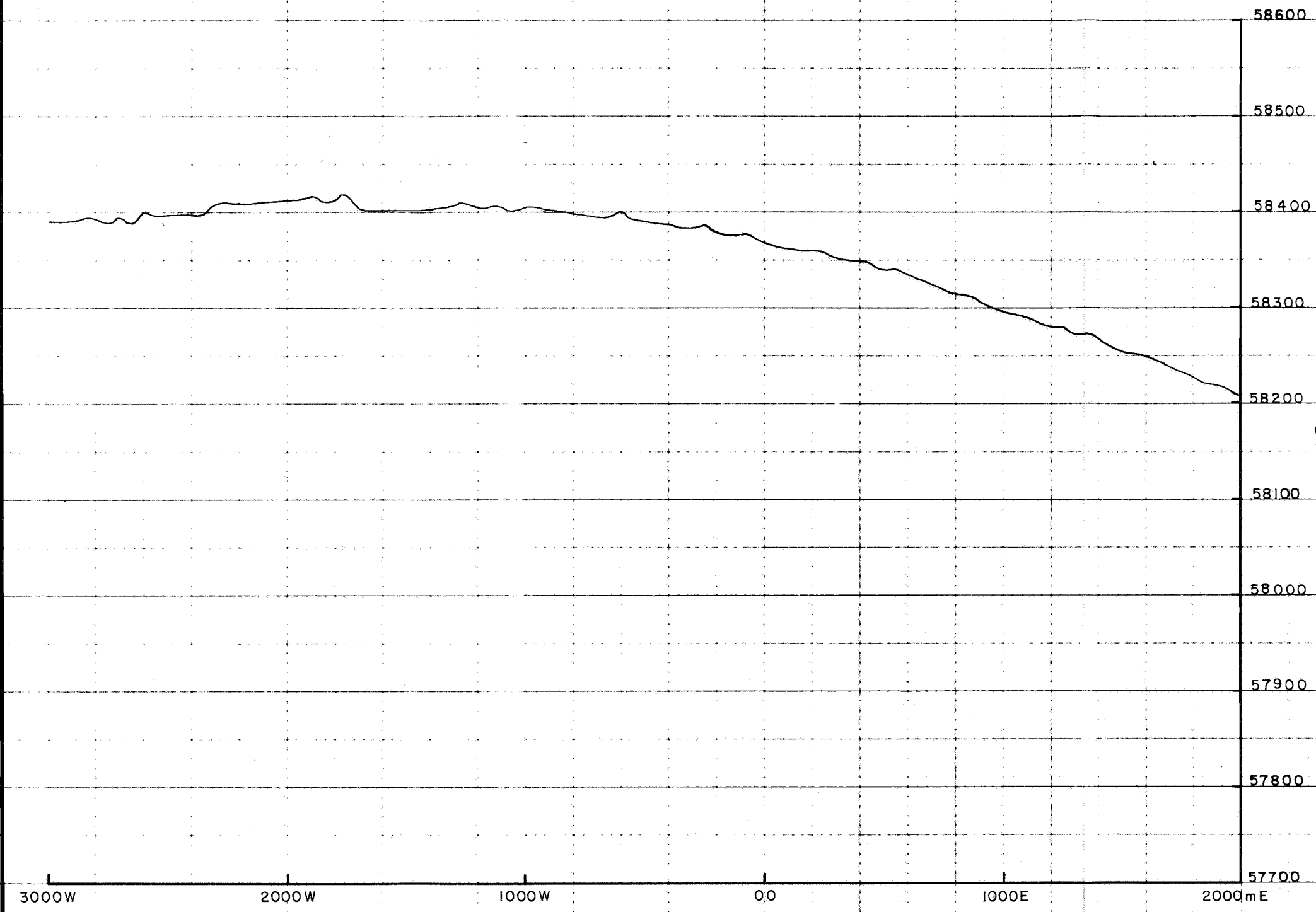


Fig 10

COMALCO LIMITED		
S.A		
EL 361,379 PROTON MAGNETOMETER		
PROFILE LINE 3000N		
Comp: A.H.W.	Rev:	Drawn: B.F.B
Date: June '78	Scale: 1:20,000	Dwg: SA-78-77





ENV 3132-44

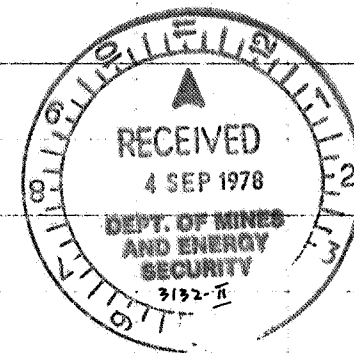


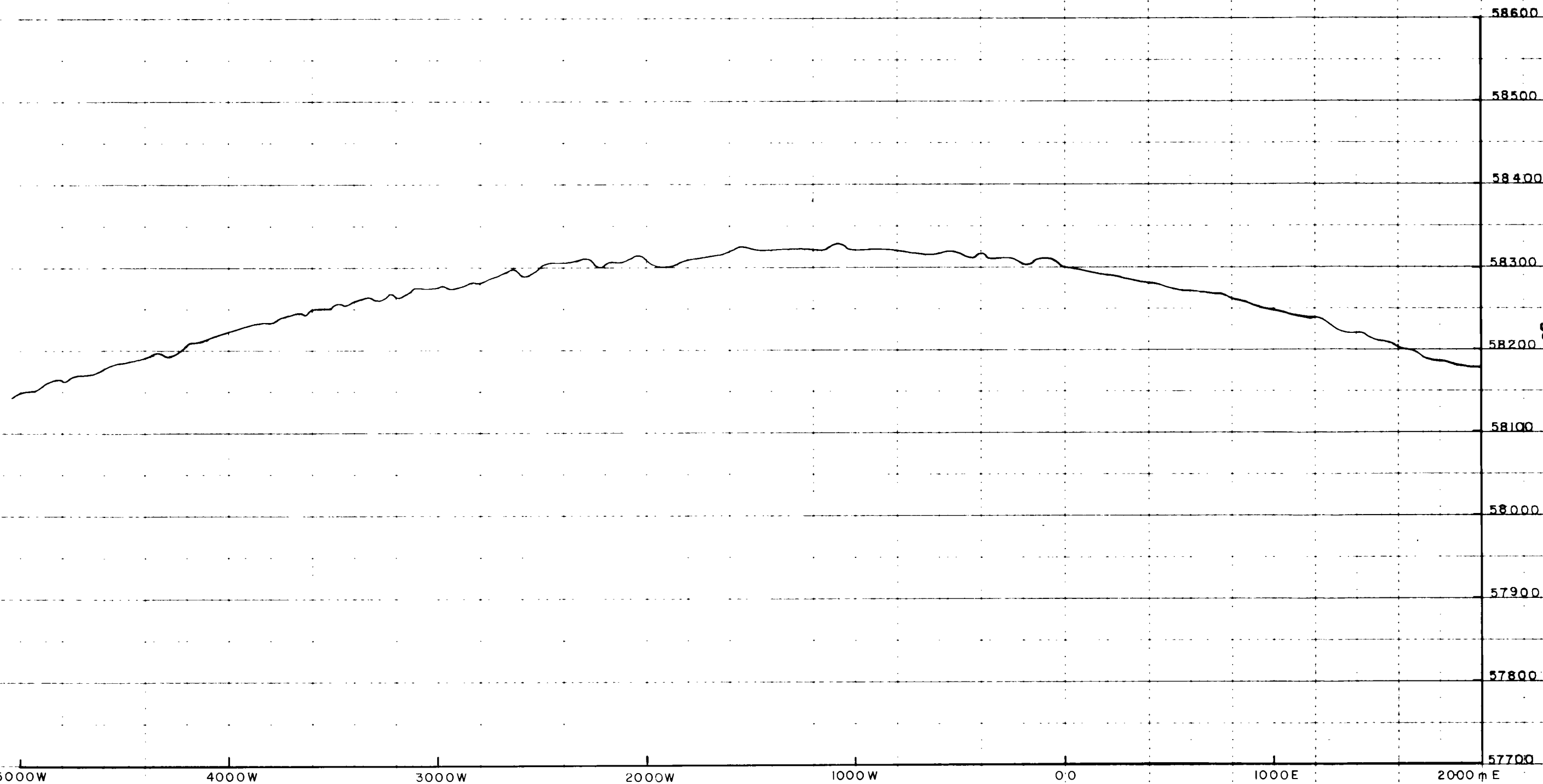
Fig 12.

COMALCO LIMITED

S.A

EL 361,379 . PROTON MAGNETOMETER
PROFILE LINE 1000 N

Comp: A.H.W.	Rev:	Drawn B.F.B
Date: June '78	Scale 1:20,000	Drg. SA-78-79.



ENV 3132-45

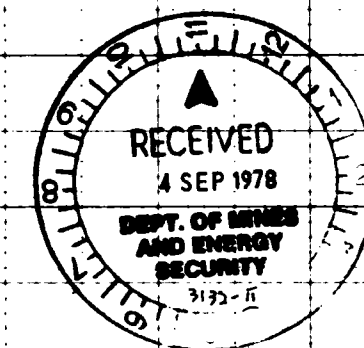


Fig. 13.

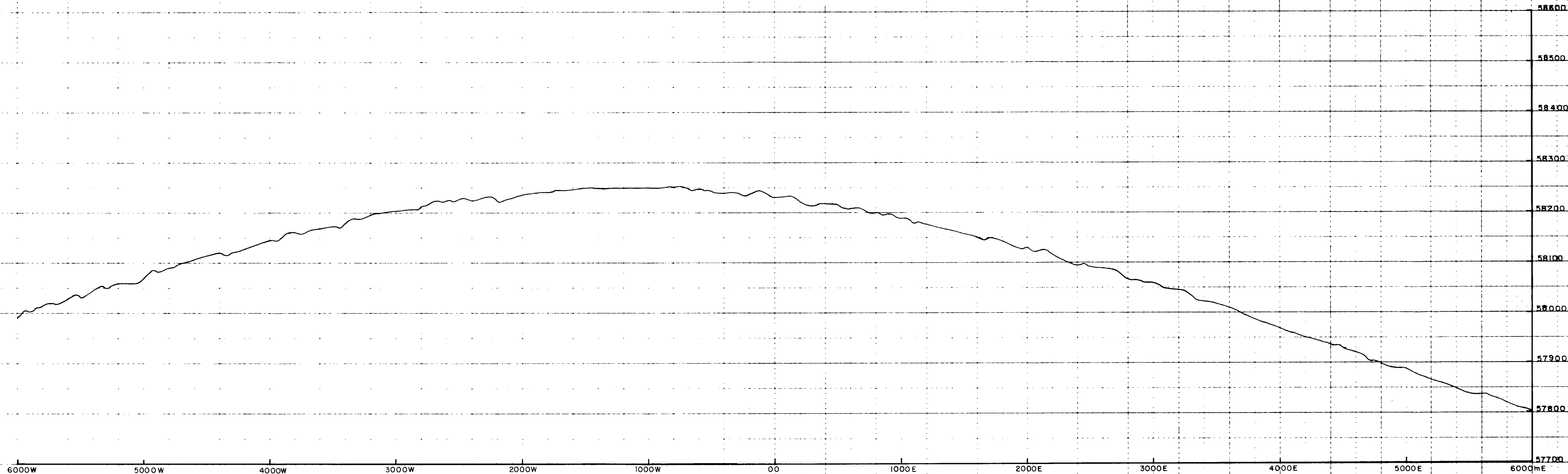
COMALCO LIMITED

S.A

EL 361,379. PROTON MAGNETOMETER

PROFILE LINE 000

Comp: A.H.W.	Rev:	Drawn: B.F.B.
Date: June '78	Scale: 1:20,000	Drg. SA-78-00



ENV 3132-46

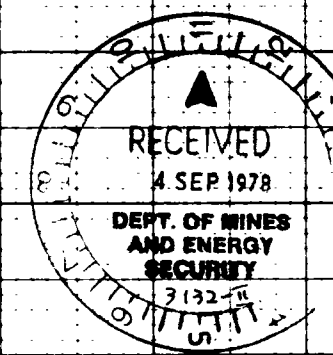


Fig 14.

COMALCO LIMITED

S.A

EL 361,379 PROTON MAGNETOMETER
PROFILE LINE 1000'S

Comp: A.H.W.	Rev:	Drawn: B.F.B.
Date: June '78	Scale: 1:20,000	Dwg: SA-78-41

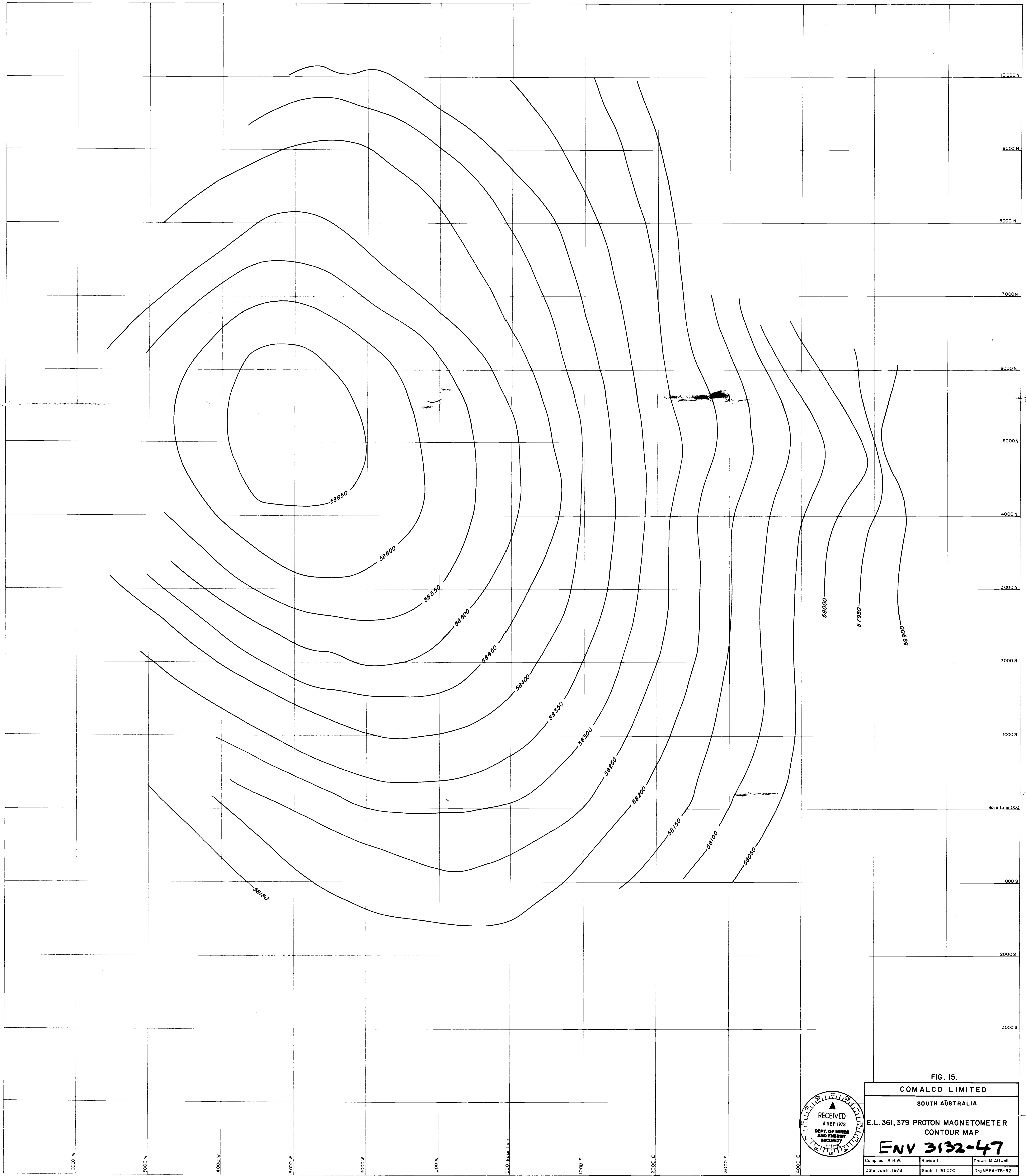


FIG. 15.

COMALCO LIMITED		
SOUTH AUSTRALIA		
E.L. 361,379 PROTON MAGNETOMETER CONTOUR MAP		
ENV 3132-47		
Compiled: A.H.W.	Revised:	Drawn: M. Attwell.
Date June, 1978	Scale 1: 20,000	Dwg N°SA-78-B2

EXPLORATION LICENCE 361 - SUNDOWN CREEK

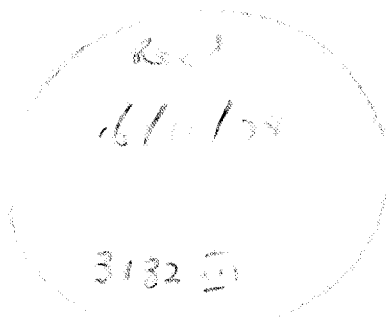
Quarterly report for the period

14. 7.78 - 14.10.78.

I. J. Buchhorn

Comalco Limited,
Exploration Department,
10. Hampton Road,
Keswick,
Adelaide. S. Australia.

October, 1978.



EXPLORATION LICENCE 361 - SUNDOWN CREEK

Keywords

Copley	1:250 000	SH54-9
Copley	1:100 000	6536
Angepena	1:100 000	6636
Nankabunyana	1: 50 000	6536-IV
Warrioota	1: 50 000	6536-III
Copley	1: 50 000	6536-I
Beltana	1: 50 000	6536-II
Goddard	1: 50 000	6636-IV
Cadnia	1: 50 000	6636-III
Warrina	1: 50 000	6636-II
Torrens Hinge Zone		
Magnetics		
Gravity		
Wilpena Group		
Ediacara Fault		
Diapirs		

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Geophysics	10
Future Work	14
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Appendix

Appendix I - Report on the Interpretation of the Seismic work at Mount James - G. Cucuzza

Figures:

✓ SA78/ 64	Mount James Grid Layout	
✓ SA78/130	Geology of the Barites Working Area, Mount James Grid	
✓ SA78/132	Geological Sketch Map, Ferruginous 'Diapir' Zone, Mount James Grid, 3500S/2000W	
✓ SA78/101	Proton Magnetometer Profile - line 10 000S	
✓ SA78/102	"	line 4 000S
✓ SA78/125	"	line 2 500S
✓ SA78/103	"	line 2 000S
✓ SA78/126	"	line 1 500S
✓ SA78/127	"	line 500S
SA78/76	"	line 4 000N
SA78/75	"	line 5 000N
SA78/74	"	line 6 000N
SA78/128	"	line 00 cross-line
SA78/82	Proton Magnetometer Contour Map	
SA78/104	Bouguer Gravity, base line (10 000N - 4000S)	
SA78/105	Bouguer Gravity Profile	line 10 000S
SA78/106	"	line 4 000S

(ii)

SA78/107	Bouguer Gravity Profile	line 2 000S
SA78/108	"	line 1 000S
SA78/109	"	line 00
SA78/110	"	line 1 000N
SA78/111	"	line 2 000N
SA78/112	"	line 3 000N
SA78/113	"	line 4 000N
SA78/114	"	line 6 000N
SA78/115	"	line 10 000N
SA78/116	Bouguer Gravity Contour Map	
SA78/120	Theoretical Model for line 10 000S	
SA78/121	"	line 1 000S
SA78/ 86	Residual Gravity Profile	line 10 000S
SA78/87	"	line 4 000S
SA78/88	"	line 2 000S
SA78/89	"	line 1 000S
SA78/90	"	line 00
SA78/91	"	line 1 000N
SA78/92	"	line 2 000N
SA78/93	"	line 3 000N
SA78/94	"	line 6 000N
SA78/95	"	line 10 000N
SA78/96	Residual gravity perpendicular to fault, line A-B	
SA78/97	"	line C-D
SA78/98	~~Residual~~ ^{Regional} Gravity Contour Map	
SA78/135	Seismic Refraction Data, Mount James	

INTRODUCTION

This report covers work carried out during the fourth quarter of tenure of Exploration Licence 361 between 14.7.78 and 14.10.78.

The Licence has now been reduced in area, and the term of tenure extended to 3.10.79.

The main work for the quarter was the detailed interpretation of the Mount James grid gravity data undertaken by Comalco geophysicist G. Cucuzza between July and September, 1978.

Field work was restricted to limited 'fill-in' gridding prior to the selection of residual-gravity diamond drilling targets. The gridding was carried out between August 23rd and August 29th, 1978 (refer Figure SA78/64 for gridding progress). Personnel involved in the field work were two geologists, three field assistants and one cook. The base camp was at Mount James Outstation.

GEOLOGY

Detailed geological grid mapping was done on the following lines:

Line 4000S	8.0 kilometres
2500S	3.0
2000S	5.0
1500S	3.0
500S	3.0
4000N extension	0.7
5000N extension	0.2
6000N extension	3.5
crossline 0	<u>6.0</u>
<u>Total:</u>	<u>32.4 kilometres</u>

In addition, limited photo mapping was done in the area of the barites workings between lines 000 and 4000S (Fig. SA78/130), and small carbonate plugs and alteration zones at grid co-ordinates 500S/1800W, 2500S/1650W and 3500S/2000W (Fig. SA78/132) were mapped in detail.

Stratigraphy:

A detailed description of the geology in the eastern part of the licence accompanied the E.L. 361 Partial Surrender Form (Stainton, 1978).

In the area of the Mount James grid, Adelaidean rocks mostly outcrop beneath cover of Quaternary aeolian sands and sheetwash gravels. Sheetwash deposition is related to the uplift of the Mount Deception Range, while the accumulation of the aeolian dune field appears to be a younger event, with major dunes being restricted to west of the Ediacara Fault.

In the Mount James area, the outcropping Adelaidean sequence consists of a continuous Wilpena Group succession from Brachina Formation to Pound Quartzite. The succession appears to be sedimentologically intermediate between the thin paralic sandstone-shale sequences of the Stuart Shelf, and the thick, marine siltstone-carbonate-shale-sandstone sequences of the Adelaidean Trough.

Brachina Formation

Outcrop is restricted to the north-east part of the grid near the Mount Deception Range. Typically, the formation consists of dark grey, silty, fine grained sandstones with distinctive yellow limonitic clay 'flecks' (weathered ferro-magnesian minerals?).

The entire Brachina Formation is distinguished by an abundance of hematite, usually in the form of fine grained, banded, hematitic, kaolinitic sandstone, (e.g. grid co-ordinate 6000N/4300E). Occasional thin bands (up to 5 cm) of massive limonite-hematite occur within the sandstones.

Brachina Formation clasts are the distinguishing lithotype of the Pleistocene sheetwash gravels shed from the Mount Deception Range (Pooraka and Arrowie Formations, Copley 1:250 000 geological sheet). These gravels also occur to the immediate west of the Ediacara Range, and indicate that sheetwash deposition preceded uplift of the Ediacara Range horst.

Bunyerroo Formation

This formation consists of monotonous red shales without any significant sedimentary structures. The shales become calcareous towards their upper transitional contact with the overlying Wonoka Formation.

Outcrop of the Bunyerroo shale is restricted to very small exposures north-west of the Ediacara Range at the edge of the dune field. It is likely that Bunyerroo shales sub-outcrop throughout much of the Mount James grid, since Pinera bore (grid co-ordinate 4200N/2500E) intersected Bunyerroo shales at 197 metres depth.

Wonoka Formation

This formation consists of a subordinate lower, grey to red, thin bedded calcareous shale/limestone, and a predominant upper, massive to well bedded, yellow, dendritic dolomite. Sedimentary structures include pervasive laminar and thin bedding, and minor flute casts, ripple marks and quartz pebble horizons. Rare crenulated, undulatory laminations possibly indicate algal structures.

The Wonoka dolomite appears to be a typical tidal sediment, probably deposited in a sabkha environment. The higher energy structures such as flute casts and ripple marks are probably indicative of tidal channels. At its upper contact, the Wonoka dolomite is interbedded with fluviatile quartzites and grits of the lower Pound Quartzite. This facies change represents a regression.

Pound Quartzite

Two distinct facies are present in the Pound Quartzite. The lower is a red, silty, fine grained to pebbly, kaolinitic micaceous sandstone, commonly containing low angle crossbedding, clay galls, ripple marks, scour and fill channels and streaming lineations. One unequivocal mudcrack occurrence was noted (grid co-ordinate 2500S/500W). The sandstones appear to be fluviatile deposits, having formed in an alluvial deltaic plain environment.

Overlying the red sandstone facies is a yellow-white, friable, fine to medium grained feldspathic sandstone. The entire unit consists of medium scale (5 cm - 2 m) sets of low angle crossbeds, with foreset bed dips typically 15° - 20° . Trough cross bedding showing well defined channels is very common. These sandstones are interpreted to be fluviatile point bar deposits, with the extensive, sheet-like nature of the sandstone resulting from deposition by an anastomosing channel complex on a deltaic flood plain. Shallow marine incursions into the flood plain are represented by minor interbeds of massive, well sorted orthoquartzite.

In the Ediacara Range, the yellow-white quartzite is overlain by a red, silty clay gall-rich sandstone facies, representing a regressive cycle and a return to the sedimentary conditions of the basal Pound Quartzite.

Channel directions, ripple marks and streaming lineations in the Pound Quartzite indicate current directions from the south-west and west, i.e. from the Stuart Shelf.

Carbonate Breccia Veins, Dykes and Plugs

This suite of rocks is restricted to areas between lines 000 and 4000S immediately to the west of the Ediacara Range

Typically, the breccias consist of quartz vein fragments in a yellow-white carbonate matrix, with variable barite, limonite, pyrolusite and hematite (very minor specularite). The breccias are extremely vuggy, with extensive second generation drusy white calcite. Very occasionally, malachite staining is present (e.g. Caine Lease). Mono-mineralic veins of either barite, yellow white carbonate or quartz are relatively common. In addition, thin (up to 10 cm) veins of coarsely crystalline yellow-brown siderite are also present. Angular fragments of Adelaidean country rock commonly occur within the carbonate breccias, frequently with primary bedding attitudes still retained. This indicates very passive replacement and intrusion. No basic or alkaline intrusives have been noted in association with the Mount James breccias.

Ferruginous alteration and barite veining is mainly restricted to the upper and lower contacts of Wonoka dolomite with 'non-reactive' Bunyeroo shale and Pound Quartzite.

Throughout the Flinders Ranges, carbonate breccias are termed 'diapirs', and are generally considered to be Adelaidean in age. However, it is possible

that the emplacement of breccias at Mount James may have continued into the Cainozoic (or was re-activated in the Cainozoic), since the breccias are spatially related to Cainozoic faults, and are observed intruding Tertiary or Pleistocene gravels (Arrowie Formation?).

Structure

The Mount James area has been subject to extensive Cainozoic faulting, with the dominant structural feature being the north-south trending Ediacara Range horst.

Three main fault trends are apparent, these being:

(i) 'north-south'

normal faults bounding the eastern and western margins of the Ediacara Range horst

Mount Deception fault

(ii) north-east to east-northeast

Ediacara Fault north of grid line 2000N

drainage linears associated with Nankabunyana Creek

uplifted plateau scarps in the north-east of the grid

barite veins between lines 000 and 4000S

(iii) northwest to north-northwest

drainage linears in the Beltana Sub-basin

e.g. Bones Dam Creek and Mount James H.S. creeks.

In the field, faulting is generally only recognised from ground magnetics in association with topographic features such as plateau scarps, linear drainages, dune fields and alluvial terraces.

From LANDSAT imagery, it is apparent that the dominant fracture trend is northeast, which corresponds to the main trend of barite veining, and is

considered to be a 'deep-seated' fracture system.

GEOCHEMISTRY

Rock sampling:

Comprehensive rock sampling was done in conjunction with the grid mapping. The aim was to sample fault zones, alteration zones and intrusives as possible guides to 'blind' mineralisation. A total of 267 samples were submitted to AMDEL on 19.9.78, with no results as yet available.

Water sampling:

Three water bores adjacent the Ediacara Fault zone (Mount James bore, Old Mount James well and Pinera bore) and a 'background' bore (Sundown bore) were sampled for base metals and radon (see Table 1). A low order Rn-Fe-Zn-Mn anomaly was found at Mount James bore. The interpretation of the anomaly is complicated by possible Fe-Zn water pipe contamination, and the high overall radon background for the Beltana Sub-basin.

9

TABLE I

Sample No.		pCi/l Rn	U	F	Ag	Co	Fe	mg/l Ni	Mn	Pb	Cu	Mo	Zn	Final depth metres	Probable Rock Type
MJW1	Sundown	<u>270</u>	0.006	0.90	<0.01	<0.015	0.80	<0.015	<0.007	<0.03	0.01	0.1	0.035	27.1	Tertiary gravel, clay
MJW2	Mt. James	<u>950</u>	<0.001	0.55	<0.01	0.015	<u>2.70</u>	<0.015	<u>0.27</u>	<0.03	0.01	<0.1	<u>0.250</u>	35.7	Wonoka dolomite
MJW3	Pinera	<u>150</u>	<0.001	0.50	<0.01	<0.015	<u>1.15</u>	<0.015	0.095	<0.03	0.015	<0.1	0.010	201.5	Bunyerroo shale
dupli- cate } 4	Old Mt. James Well	40	<u>0.013</u>	<u>1.60</u>	<0.01	<u>0.045</u>	0.35	<0.015	0.025	<0.03	0.01	0.1	0.050	9.1	Quaternary alluvial sand
dupli- cate } 5	Old Mt. James Well	33	<u>0.012</u>	<u>1.50</u>	<0.01	<u>0.045</u>	0.60	<0.015	0.04	<0.03	0.01	0.1	0.055	9.1	Quaternary alluvial sand
	'typical' background in natural waters*	10	0.001	0.5	0.01	0.001	0.3	0.01	0.1	0.03	0.01	0.01	0.05		

* 'background' information is approximate estimating from Neville Bleasing, AMDEL, Perth.

GEOPHYSICS

Magnetics:

Interpretative work: Ground magnetometry has confirmed the broad magnetic high as shown by the regional airborne magnetic survey. However, the full lateral extent of the anomaly was not delineated, so that modelling is not possible.

If a flight line profile is considered, interpretation suggests the anomaly source to be a four kilometre thick prism at a depth of 6.5 kilometres. Although results show a susceptibility contrast in the range of basic volcanics, it is felt that the magnetic high reflects an Archaean basement feature. Indirect evidence for this can be seen in the striking similarity of the Mount James magnetic high to the highs just south of Lake Torrens, which are most likely basement features.

Minor anomalies of the order of 10 gammas are associated with the Ediacara Fault. However, this association is not always present. (Figures SA78/101, SA78/102, SA78/103). Areas west of the fault are characterised by very disturbed magnetic profiles.

In the eastern part of the grid, the numerous faults associated with linear drainages and plateau scarps are distinctly shown as 10 to 100 gamma dipole-type anomalies.

Field Work: Ground proton magnetometry was done at a 50 metre interval on the following lines:

line 2500S	3.0 kilometres	Figure SA78/125
1500S	3.0	SA78/126
500S	2.0	SA78/127
4000N extension	0.7	SA78/76

line 5000N extension	0.2 kilometres	Figure SA78/75
6000N extension	3.5	SA78/74
00 cross-line	6.0	SA78/128
<u>Total:</u>	19.4 kilometres	

The Mount James grid magnetic contour plan was updated (Fig. SA78/82), with the fill-in line data agreeing very well with the initial data.

Gravity:

Interpretative work: All gravity data has been reduced and a Bouguer contour map compiled (Figures SA78/104 - SA78/116 inclusive). The main feature indicated by the Bouguer gravity map is the eastward deflection of the Ediacara Fault, which previously was thought to continue northwards. The downthrow on the fault is estimated to be 300 metres to the west.

Regional-residual separation was achieved by graphical means. A contour map of the regional gravity was compiled (Fig. SA78/98). The map indicated a decrease in gradient to the northeast, which would be consistent with a general thickening of Adelaidean sediments to the east.

Residual gravity profiles were obtained after removing the appropriate regional surface from the observed gravity profiles (Figures SA78/86 - SA78/97 inclusive).

Two-dimensional modelling of the residuals was attempted, using a Hewlett-Packard 9830A desk computer.

Lines 10 000S, 4000S, 1000S and 1000N were modelled, as well as two lines perpendicular to the fault taken directly from the Bouguer contour map, lines A-B and C-D. (Figures SA78/120, SA78/121).

Basically, the results confirmed previous work which suggested that the anomalies can be explained by the density contrast across the Ediacara Fault between a sequence of Tertiary sediments downthrown to the west against Adelaidean rocks. This density contrast was shown by Carpentaria Exploration Limited to be 0.56 tonnes per cubic metre (Okill, 1971).

Modelling has revealed the existence of second order residuals with amplitudes of about 1 milligal. Because of their position relative to outcropping Adelaidean rocks, it is thought that the residual anomalies are due to lateral density changes within the Adelaidean.

By applying rules of thumb to the residual on line 1000S, the depth to the top of the body is in the range of 150 to 250 metres, depending on the density contrast used. The minimum density contrast is of the order of 0.11 tonnes per cubic metre.

Field work: A further 25.4 kilometres of levelling was done in preparation for gravity surveying, which is anticipated to be completed by November, 1978.

Seismic:

An interpretation of the April, 1978 seismic refraction survey was completed (Appendix I). Interpretation of the data was complicated by velocity inversions resulting from near-surface layers with velocities exceeding those in the underlying material. The 'inversion' probably corresponds to a silcrete-capped calcareous grit of Tertiary age.

Seismic velocity data, with associated lithotypes, is shown in Figure SA78/135, and is summarised as follows:

Lithotype	velocity (m/sec)	depth to top (metres)
aeolian sand	1000	surface
calcrete/silcrete	2560	0 - 20
Tertiary sand/clay	1940	10 - 25
Adelaidean	4040	30 - 98

The interpreted 'north-south' section shows that the Tertiary cover thickens towards the northeast, and the 'east-west' section indicates that a gentle Adelaidean palaeo-ridge is present immediately to the east of the Ediacara Fault.

FUTURE WORK

A total of 25.4 kilometres of intermediate lines on the Mount James grid remains to be gravity surveyed. Field work should be completed by November, 1978, with diamond drilling hopefully to commence in early 1979.

All magnetics, mapping and geochemical sampling for the Mount James grid has been completed.

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Ltd.

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Formations - E.L. 361, Beltana area, South
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STATEMENT OF EXPENDITURE
EXPLORATION LICENCES 361 and 379

14.7.78. - 14.10.78.

Geological and Geophysical:

(a) literature, map purchases	50.00
(b) computer time	50.00
(c) theodolite hire	28.00
(d) geochemical analyses	516.00

Drilling:

none carried out

Logistics:

(a) geologists' salaries (two geologists)	2 625.00
(b) geophysicist salary (one geophysicist)	6 625.00
(c) field assistants' salaries (five field assistants)	2 520.00
(d) accommodation (Mount James Outstation)	50.00
(e) vehicles, maintenance etc. (three Toyota Landcruisers)	690.00
(f) equipment, supplies	340.00
(g) report compilation, drafting	4 100.00

Depreciation:

(a) geophysical equipment	100.00
(b) machinery	20.00

Administration	850.00
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Total:	<u>\$18 564.00</u>
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Expenditure attributable to E. L. 361	\$9 282.00
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E.L. 361 Annual Expenditure Commitment	\$75 000.00
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Expenditure for first year	\$86 417.00
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000046

APPENDIX I

000047

REPORT ON THE INTERPRETATION OF THE SEISMIC
WORK AT MOUNT JAMES

G. Cucuzza

Comalco Limited,
Exploration Department,
31 Deeds Road,
North Plympton,
ADELAIDE, S. AUSTRALIA.

September, 1978

REPORT ON THE INTERPRETATION OF THE SEISMIC
WORK AT MOUNT JAMES

For a description of the field procedure and results of previous work refer to 'Seismic Refraction Survey at Mount James' (Comalco Exploration Department 1978 Annual Conference).

The purpose of this report is to describe the problem encountered in the interpretation of the refraction results. In refraction work it is generally assumed that the velocity of the successive layers increases with increasing depth. However this assumption is not always justified.

Relevant to the interpretation of the Mount James survey is the work of Risley (1963) who made a velocity survey of drill hole P.D.H.3A drilled by the South Australian Department of Mines in Lake Torrens, which indicated a series of velocity inversions within the Cainozoic. One layer, for example, of dense clay with interval velocity of 2740m/sec overlies a layer of siltstone with interval velocity of 1980m/sec.

Basically there are two unusual situations complicating interpretation of results. The first case is where a low velocity layer is sandwiched between two high velocity layers or where a high velocity layer is sandwiched between two lower velocity layers (Fig. 1). It has been shown for the former situation that the calculated depth to the second velocity discontinuity is greater than the actual depth, and that the difference between the two is directly proportional to the thickness of the low velocity layer and is a function of the three

velocities. In this case the low velocity layer cannot be detected by conventional refraction shooting (Dobrin, 1974). However, if the refraction shothole penetrates the top of the low velocity layer (i.e. that layer beneath the high velocity layer) the thickness of the layer can be determined (Knox, 1967). When the shothole is at the surface or does not penetrate the low velocity layer an exact solution is not possible.

Depth to the top of the V_3 layer can be estimated if we replace the low velocity layer and the overlying high velocity layer with a fictitious layer having an average velocity of $\bar{V}$ then

the thickness of this fictitious layer is

$$Z = \frac{(T_3 - T_1) \bar{V}}{\sqrt{1 - \left(\frac{\bar{V}}{V_3}\right)^2}} + \frac{1}{2} \left(D_s - \frac{T_1 V_1}{\sqrt{1 - \left(\frac{V_1}{V_2}\right)^2}} \right)$$

where D_s is the shothole depth and T_1 and T_3 are time intercepts. Refer figure 1.

If the high velocity layer is very thin or the underlying low velocity layer is thicker then $\bar{V}$ is nearly V_2 , and Z will be very nearly the correct thickness. The other case often encountered is described as the blind-zone problem. In this case the velocities in the layers increase with increasing depth. However, in certain circumstances, the intermediate layer is not recorded as first arrivals. The reason for this is that the critical distance of the underlying refractor is equal to or less than the critical distance of the masked layer. In engineering problems this masked layer is often represented by the zone of the watertable above the high velocity bedrock.

Approximate analytical solutions to the above problems are possible. Hawkins and Maggs (1961) presented nomograms for determining the limiting depth to the top of the masked layer, its maximum thickness, and the maximum depth to the recorded refractor. The situation at Mount James closely resembles the first case. The time-distance plots are characteristic of a near-surface layer with a velocity greater than the underlying material. The presence of such a layer is indicated by geological mapping which indicated the presence of near-surface calcrete or a silcrete horizon.

McInerney et al (1977) have shown that velocities in the range of 2100 m/sec - 2800m/sec are common in calcretes. This compares well with the average velocity of the layer observed at Mount James (i.e. 2500m/sec). Thus, it is thought that a calcrete horizon underlies most of the area; however a rather variable nature is suggested by the range in the velocities. The calcrete horizon is not observed at the southern end of the North-South line. Thus the first arrivals must be from the layer which elsewhere is overlain by calcrete. Because the velocity obtained (1940m/sec) lies in the range of velocities observed for Tertiary sands and clays by Carpentaria Exploration Co. Pty. Limited (Yakunin and Michail, 1970), it is thought that the low velocity layer represents Tertiary. Since the shotholes did not penetrate the Tertiary no solution is possible. However, by replacing the calcrete layer and the Tertiary layer with a fictitious layer with average velocity in the range 2070m/sec - 2295m/sec estimates of the depth of the high velocity refractor were made. The high velocity refractor has already been correlated with Adelaidean rocks. The results are shown in figure 2.

The layer overlying the calcrete horizon is quite variable. The estimate of its thickness was based on three weathering spreads, resulting in an average

velocity of 1000m/sec to be adopted for the layer. The thickness of the calcrete layer is not known, but is probably in the range of one to five metres. Considering the North-South traverse first we see that there is evidence that the Tertiary is thickening northwards. This is confirmed by the log from the Pinera bore situated about two kilometres north of the line, which indicates a 197 metres sequence of Tertiary. Assuming a uniform slope, a thickness in the vicinity of 90 metres is indicated in the survey area and compares well with a calculated thickness of 65 metres at 1200N. The results suggest that the calcrete horizon might be thinning southwards. Also the sand weathered layer is definitely thinning northwards, which is to be expected since the sand dunes are absent north of 1600N.

The East-West line shows thickening of the Tertiary to the west which is consistent with the known geology. The 1000m/sec layer is generally thicker along this line. The agreement between the two lines at the cross point is good; along the East-West line the depth to Adelaidean is calculated to 69 metres whereas along the North-South line it is in the vicinity of 75 metres.

Conclusion

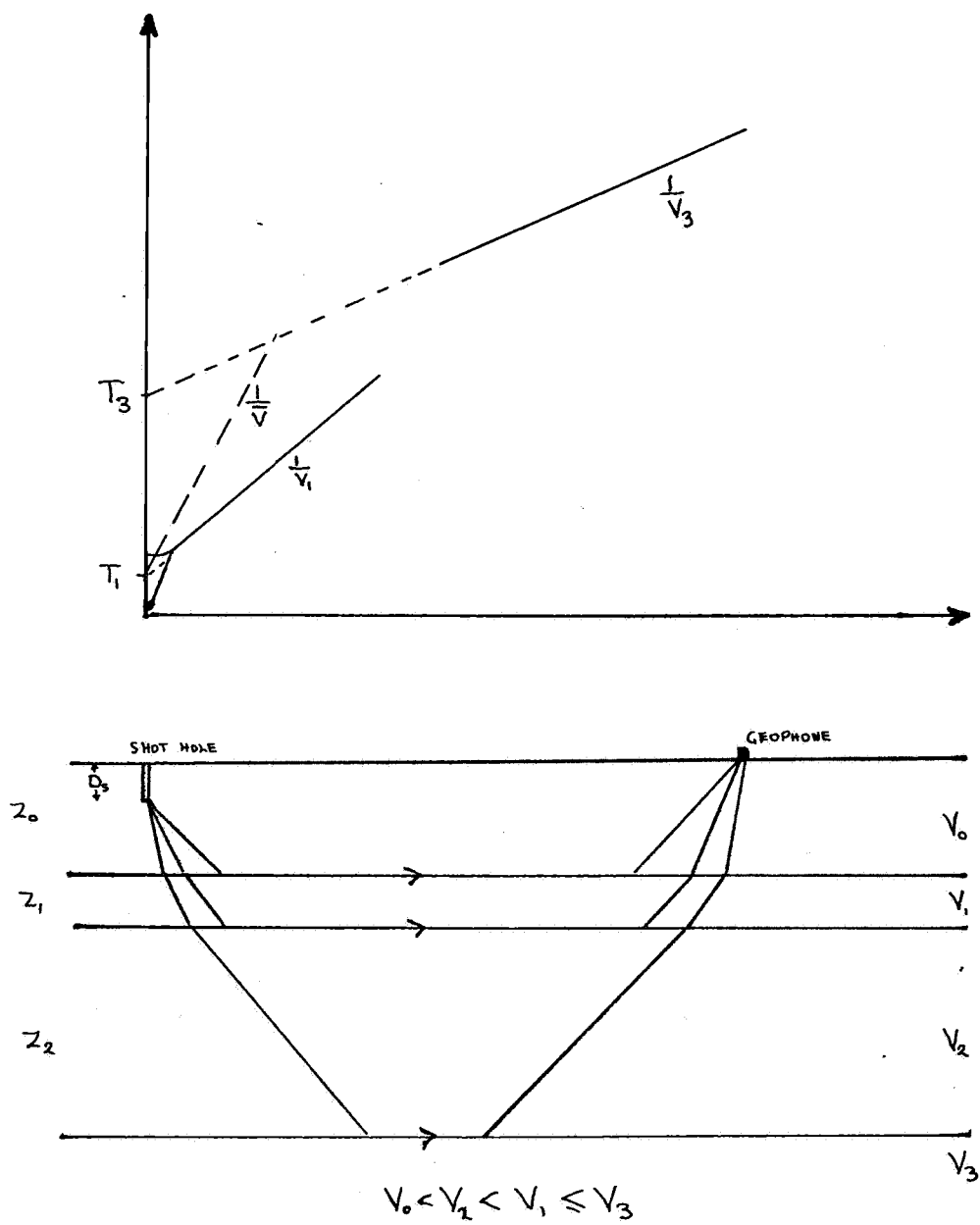
The results show that there is a calcrete horizon underlying most of the survey area. The layer underlying the calcrete is correlated with the Tertiary. No unique solution of the depth to the high velocity refractor (Adelaidean) is possible. However, estimates made by assuming a fictitious layer with average velocity between the Tertiary and calcrete velocities indicate that the depth of the Adelaidean at 600N is about 30 metres, increasing to 69 metres at 1200N along the North-South line. Along the East-West line the Tertiary thickness is interpreted to be 75 metres at 200E, increasing to 98 metres at 400W. It is not possible to estimate the thickness of the calcrete layer. However, estimates of thickness and velocity will be possible after the proposed holes in the area have been drilled.

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Australia Pty. Ltd.

FIGURE 1

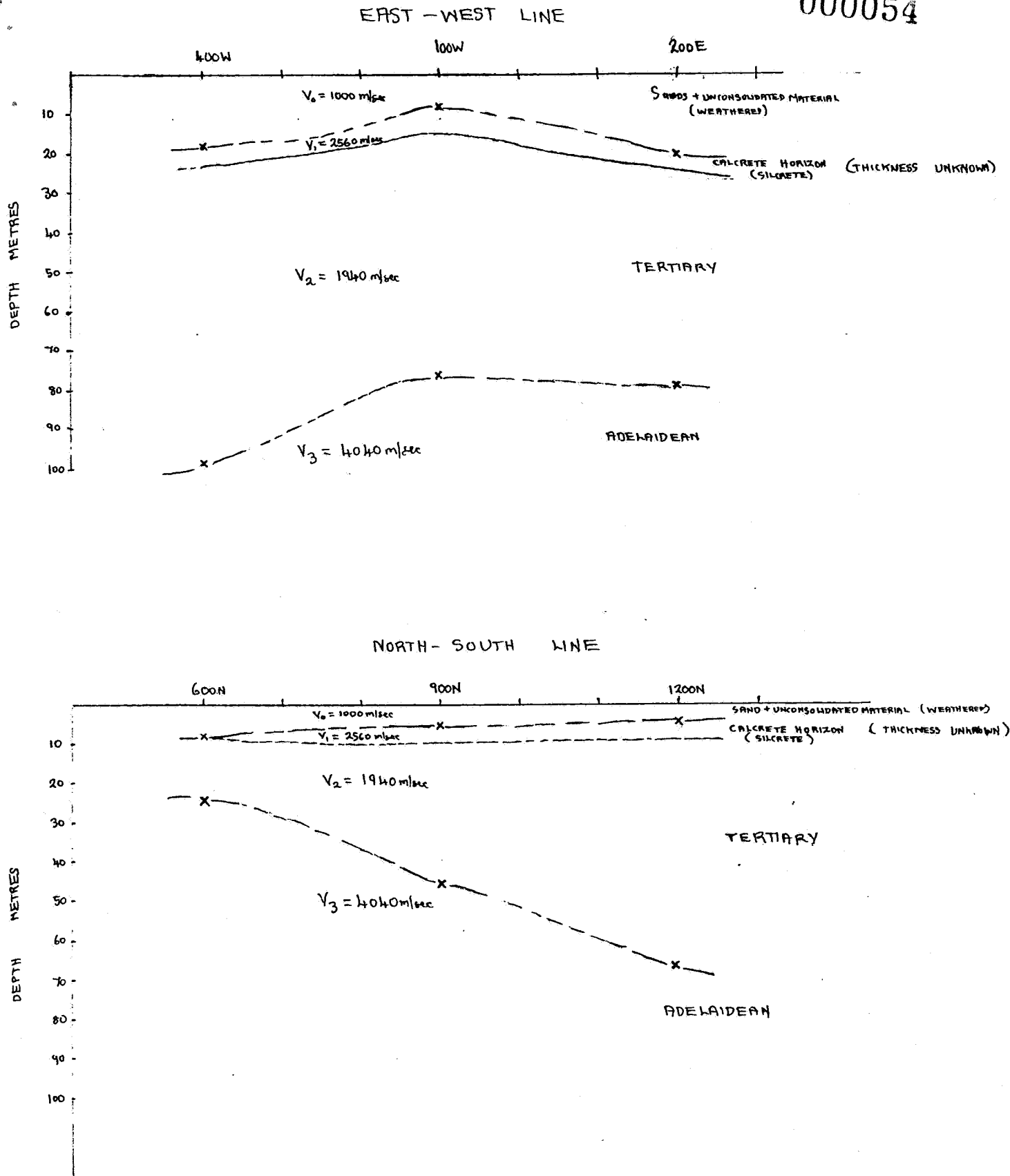
000053



RAYPATHS AND REFRACTION GRAPH FOR SHOT IN LAYER V_0
WHERE $V_1 > V_2$

FIGURE 2.

000054



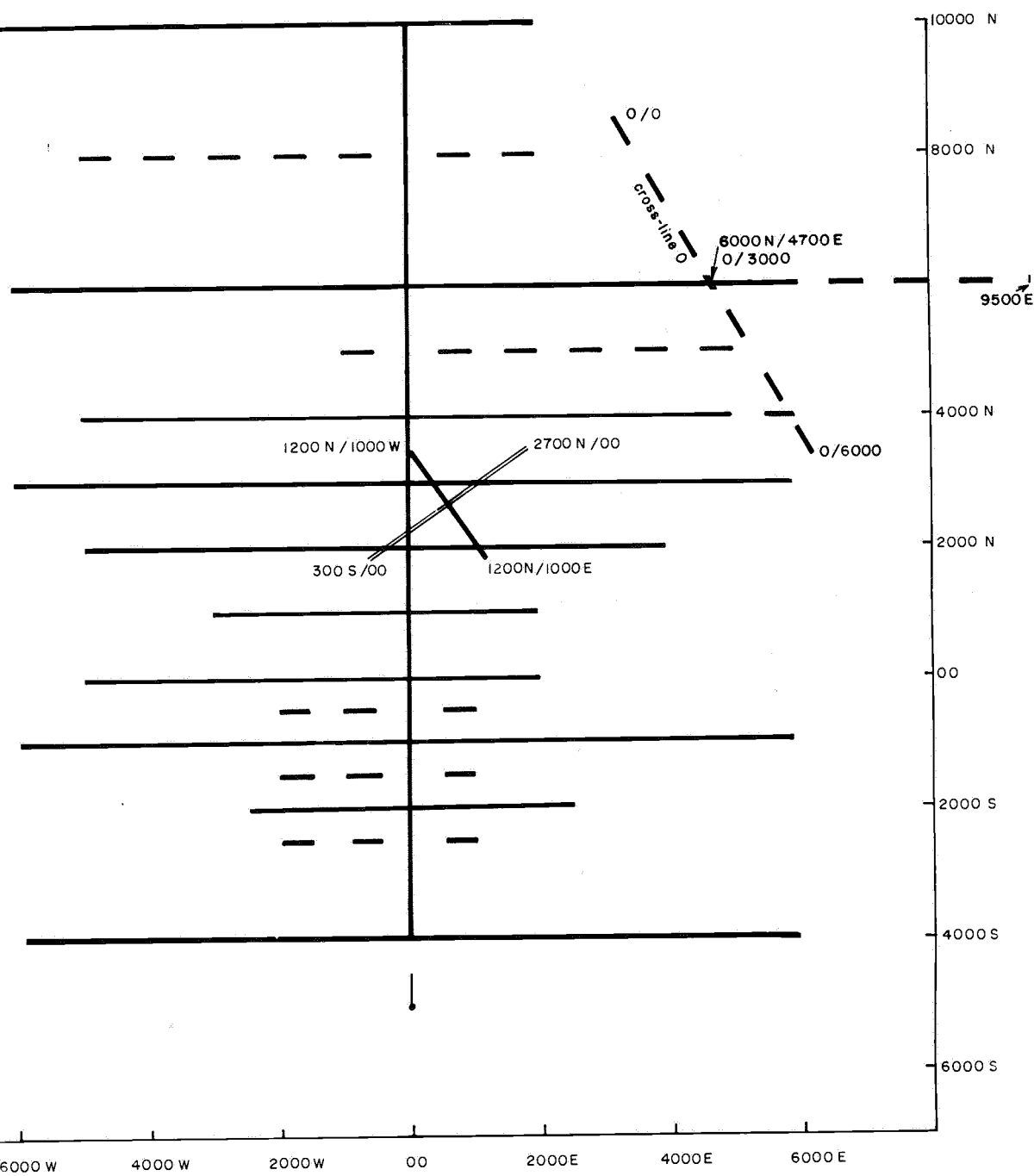
VELOCITIES SHOWN ARE AVERAGE VELOCITIES

X COMPUTED DEPTH POINTS

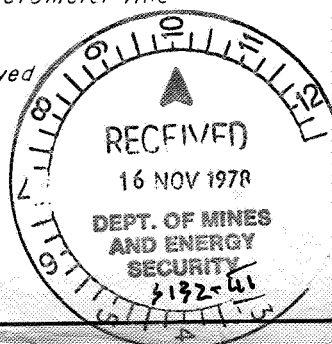
H. SCALE 1: 666.7

$$\frac{V}{H} = 4$$

000055

**LEGEND**

- Gridded and ground magnetometer surveyed
- Gravity survey of magnetometer line
- == Seismic refraction surveyed

**COMALCO LIMITED****SOUTH AUSTRALIA**

MT JAMES GRID LAYOUT
 progress to 31-9-78
 EL's 361,379.

Compiled: I.J.B.

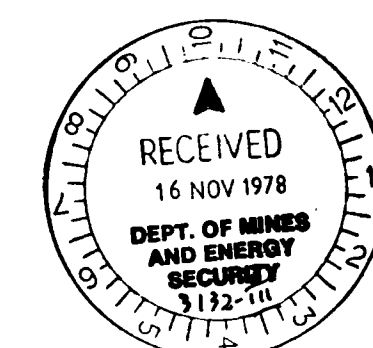
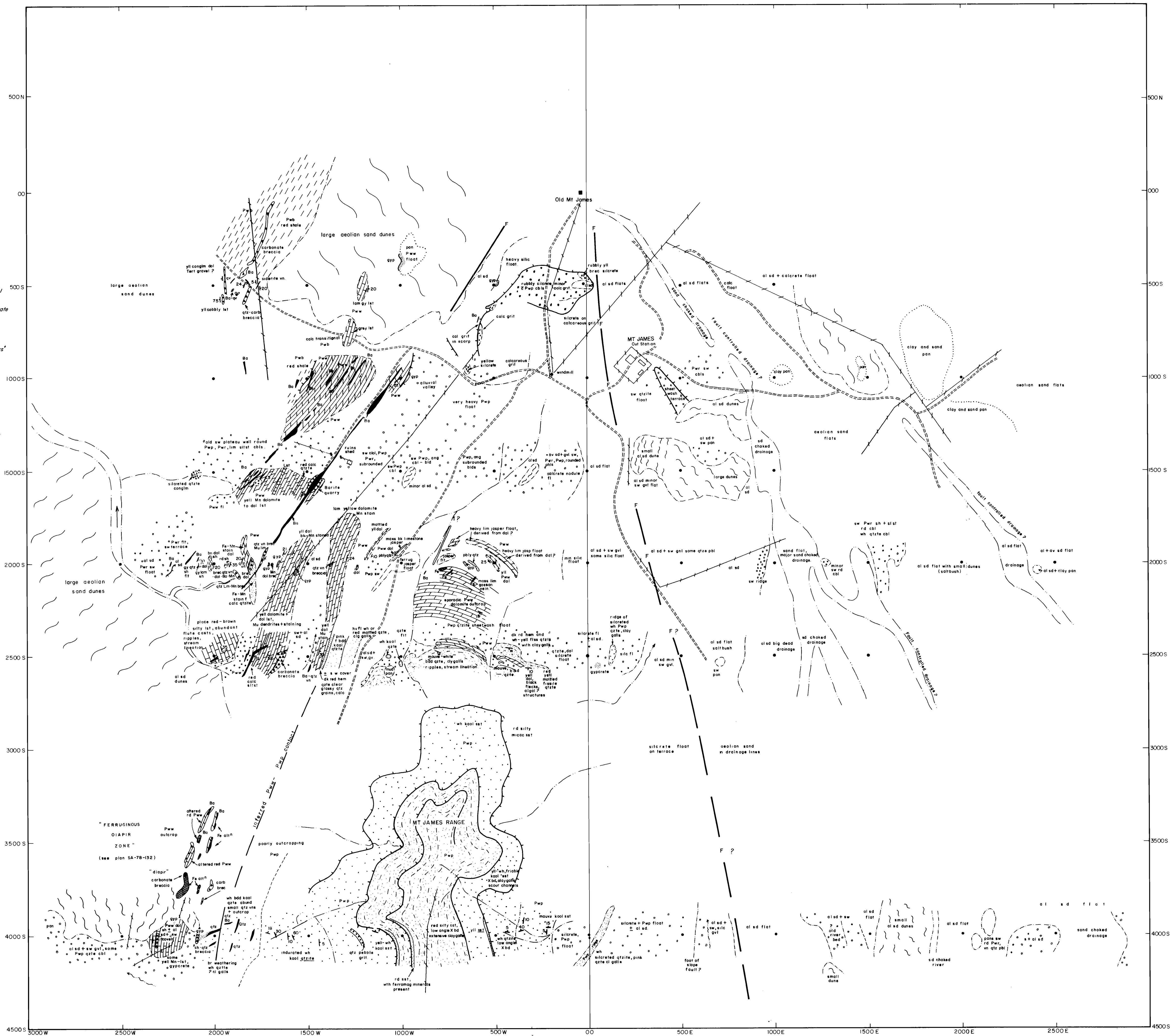
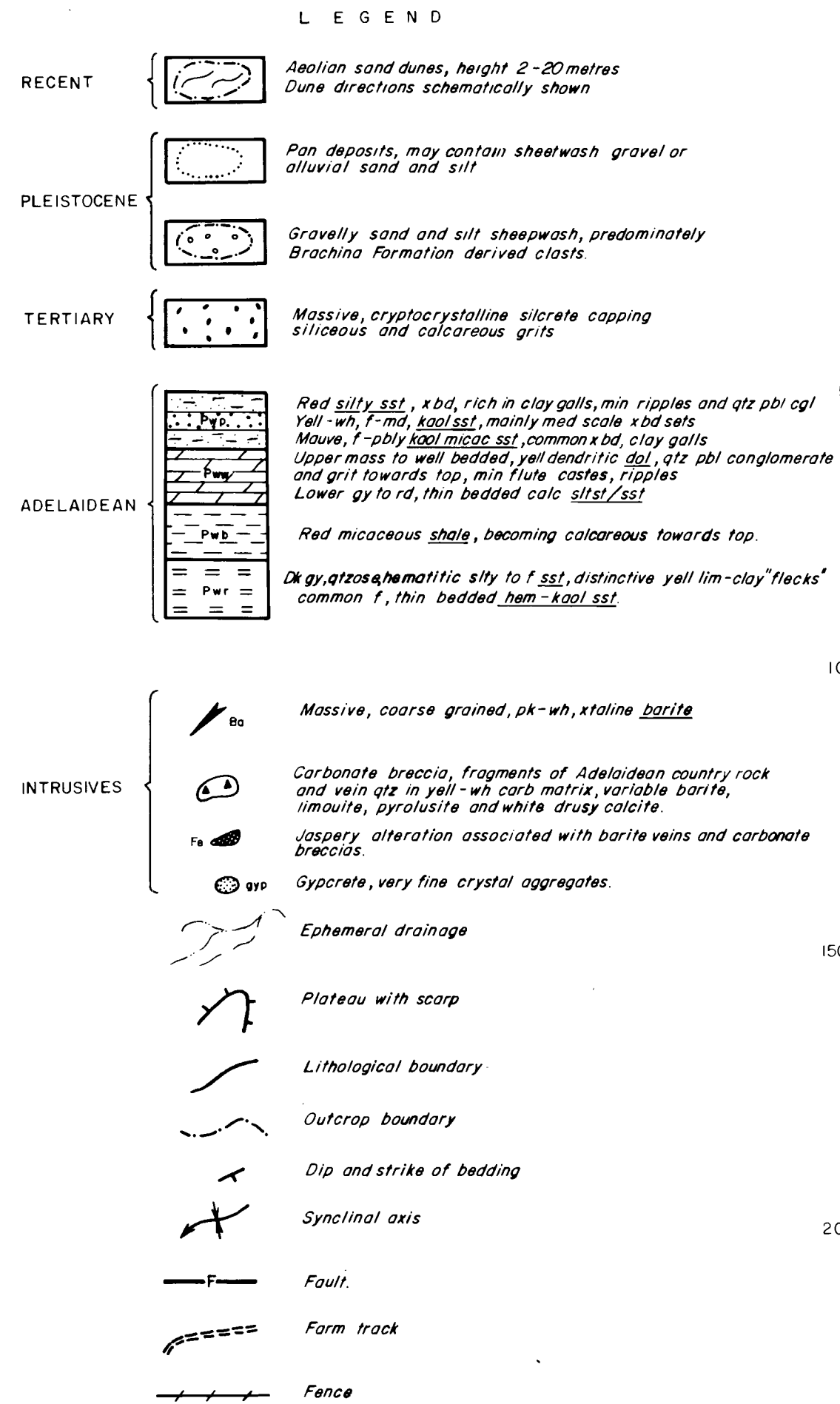
Revised: Oct., 78.

Drawn: M.A.

Date: April, 1978

Scale: 1:100 000

Drg No SA-78-64

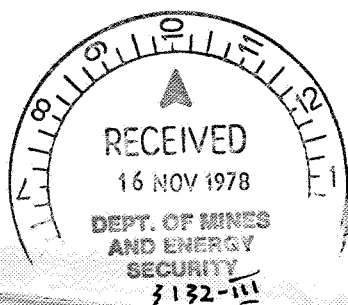
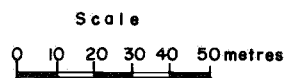
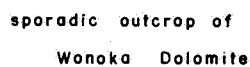


COMALCO LIMITED
SOUTH AUSTRALIA
GEOLOGY OF THE BARITES
WORKINGS AREA MT JAMES GRID
E.L. 361, 379

ENV3132-50

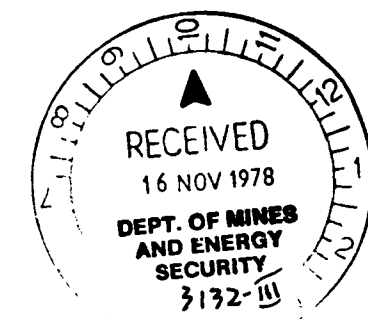
Compiled: I. J. B.	Revised:	Drawn: M. A.
Date: October, 1978	Scale:	Drq N° SA-78-130

000056



SOUTH AUSTRALIA

Compiled: I. J. B.	Revised:	Drawn: M. A.
Date: Sept, 1978	Scale: 1:2000	Dwg No SA-78-132



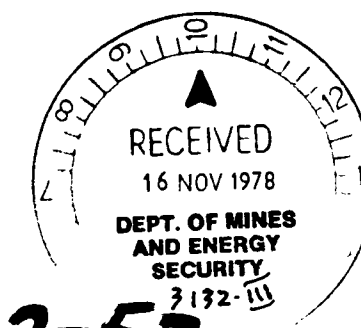
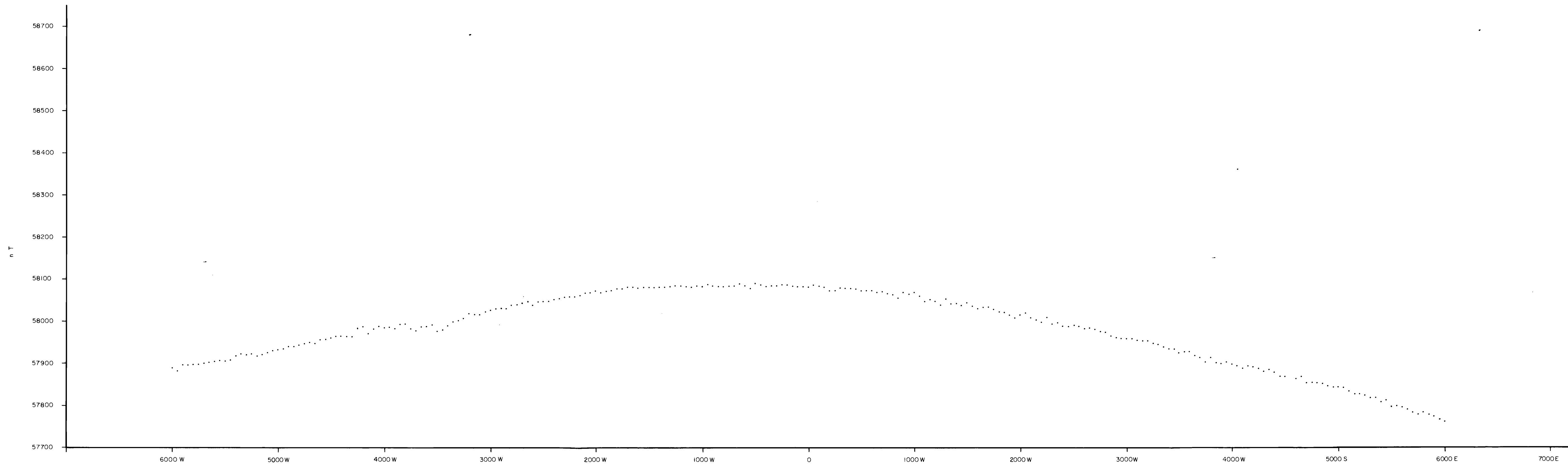
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COMALCO LIMITED

SOUTH AUSTRALIA EL's 369,371

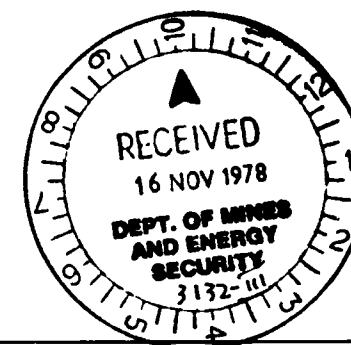
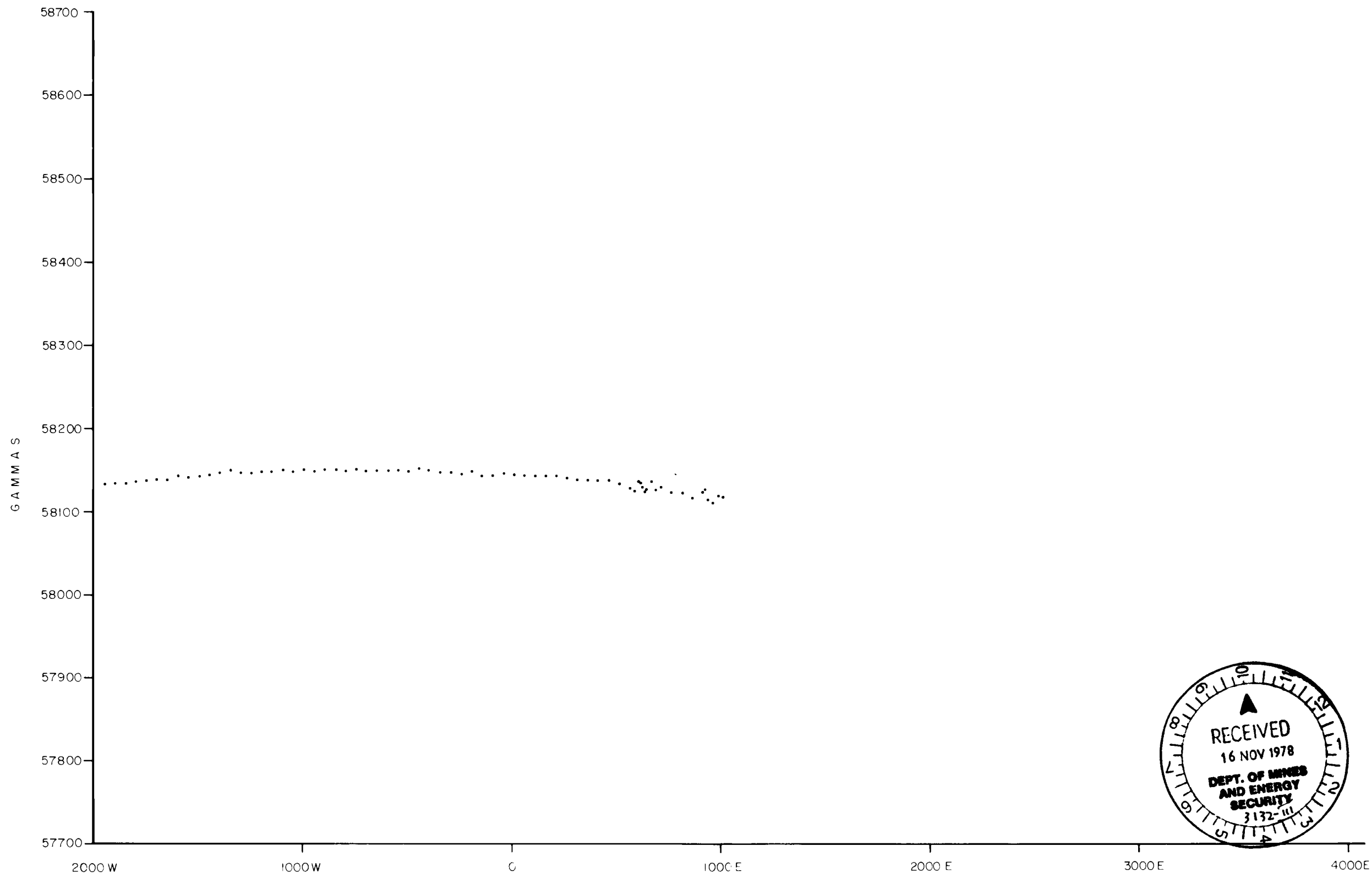
PROTON MAGNETOMETER
PROFILE LINE 10,000 S

Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Org No SA - 78 - 101



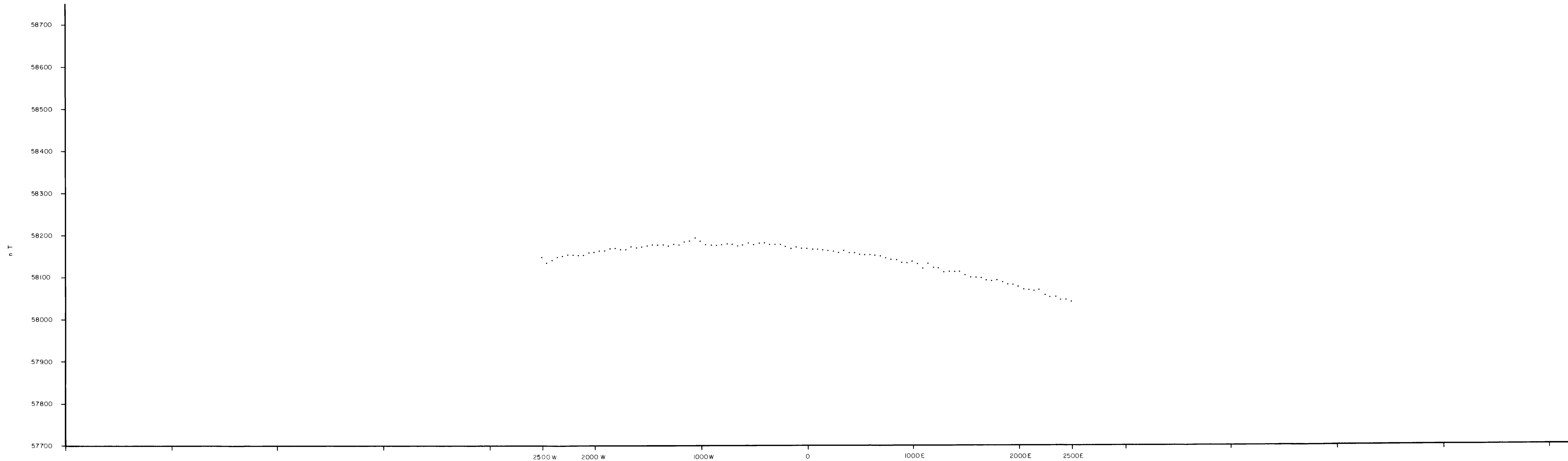
ENV 3132-52

COMALCO LIMITED		
SOUTH AUSTRALIA EL's 369, 371		
PROTON MAGNETOMETER PROFILE LINE 4000 S		
Compiled J. C.	Revised	Drawn S Hutchison
Date August, 1978	Scale 1:20,000	Org No SA - 78 - 102



ENV3132-53

COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
PROTON MAGNETOMETER PROFILE LINE 2500S		
Comp I Buckhorn	Rev	Drawn S Hutchison
Date September, 1978	Scale 1:20,000	Drg No SA-78-125



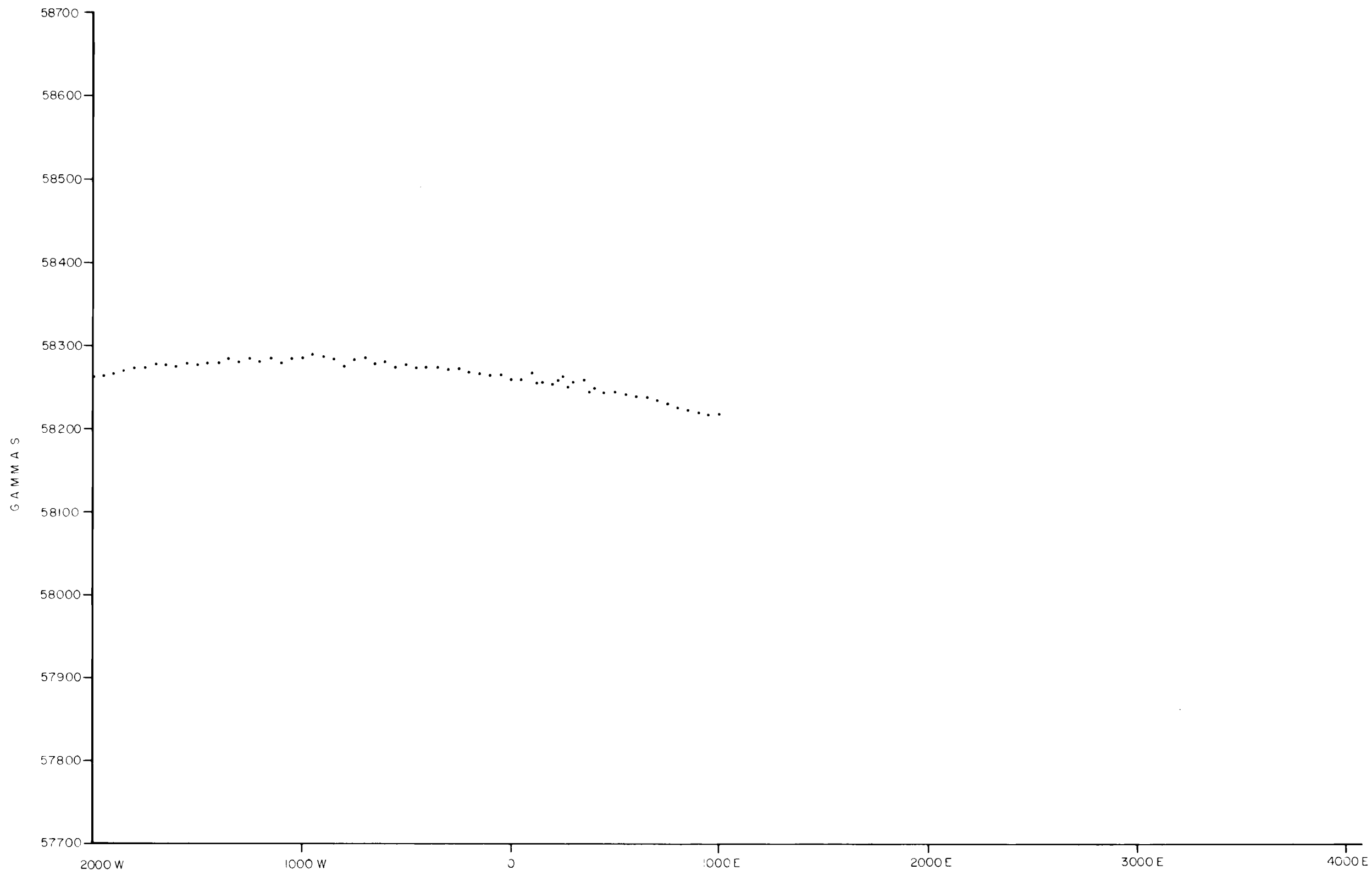
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COMALCO LIMITED		
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Compiled J C	Revised	Drawn S Hutchison
Date August, 1978	Scale 1 20,000	Drg No SA - 78 - 103



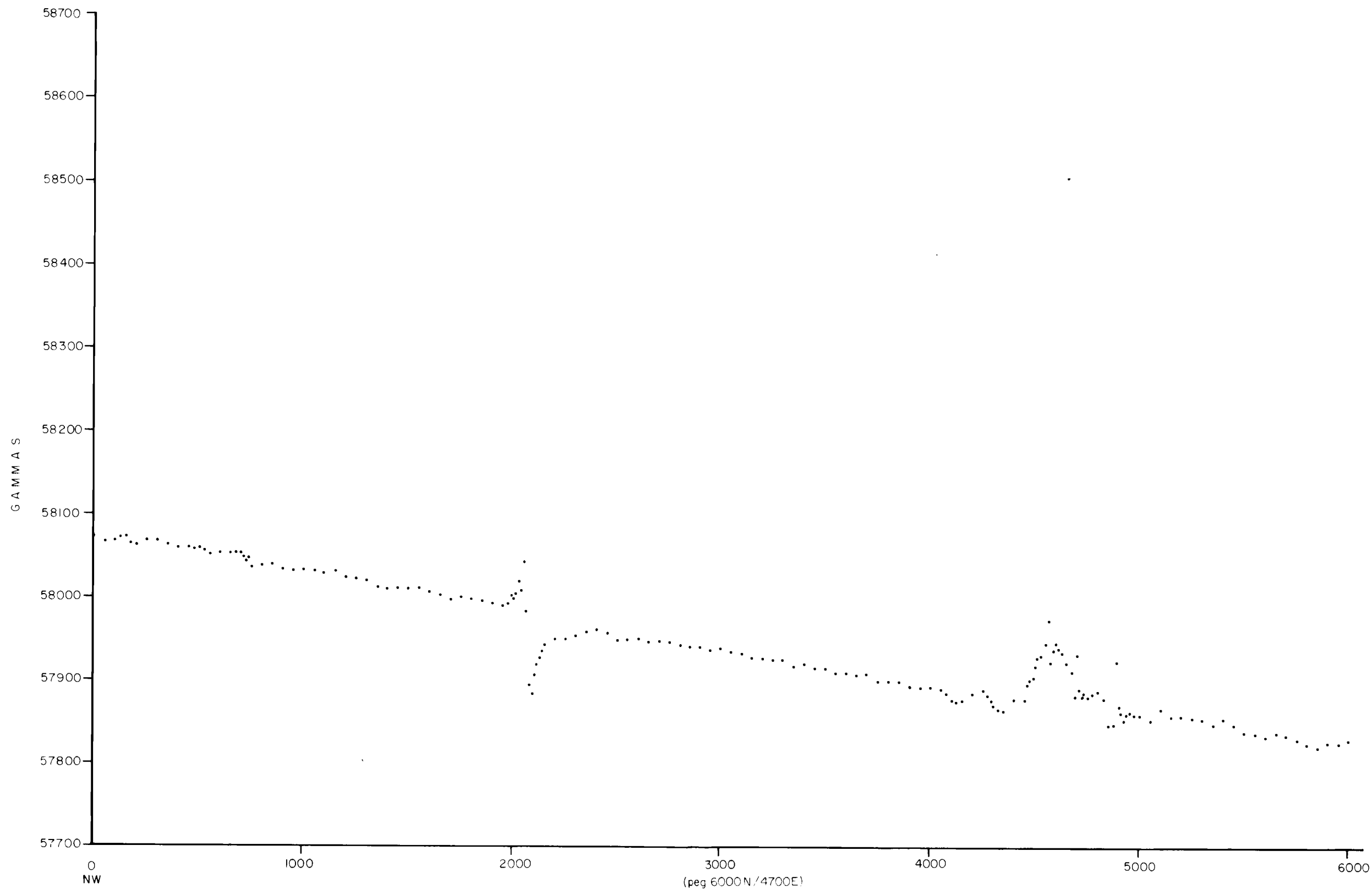
ENV 3132-55

COMALCO LIMITED		
SOUTH AUSTRALIA E.L.'s 361, 379		
PROTON MAGNETOMETER PROFILE LINE 1500 S		
Comp I Buckhorn	Rev	Drawn S Hutchison
Date September, 1978	Scale 1 20,000	Drg No SA - 78-126



ENV 3132-56

COMALCO LIMITED		
SOUTH AUSTRALIA E.L.'s 361,379		
PROTON MAGNETOMETER PROFILE LINE 500 S		
Comp I Buckhorn	Rev	Drawn S Hutchison
Date September, 1978	Scale 1:20,000	Dwg No SA-78-127



ENV 3132-57

COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
PROTON MAGNETOMETER PROFILE LINE O CROSS LINE		
Comp I Buckhorn	Rev	Drawn S Hutchison
Date September, 1978	Scale 1 20,000	Org No SA -78-128

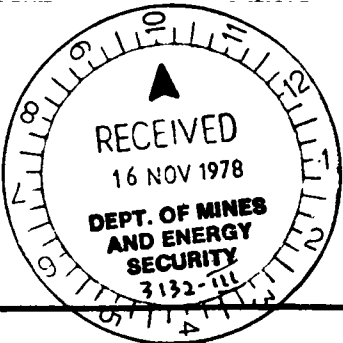
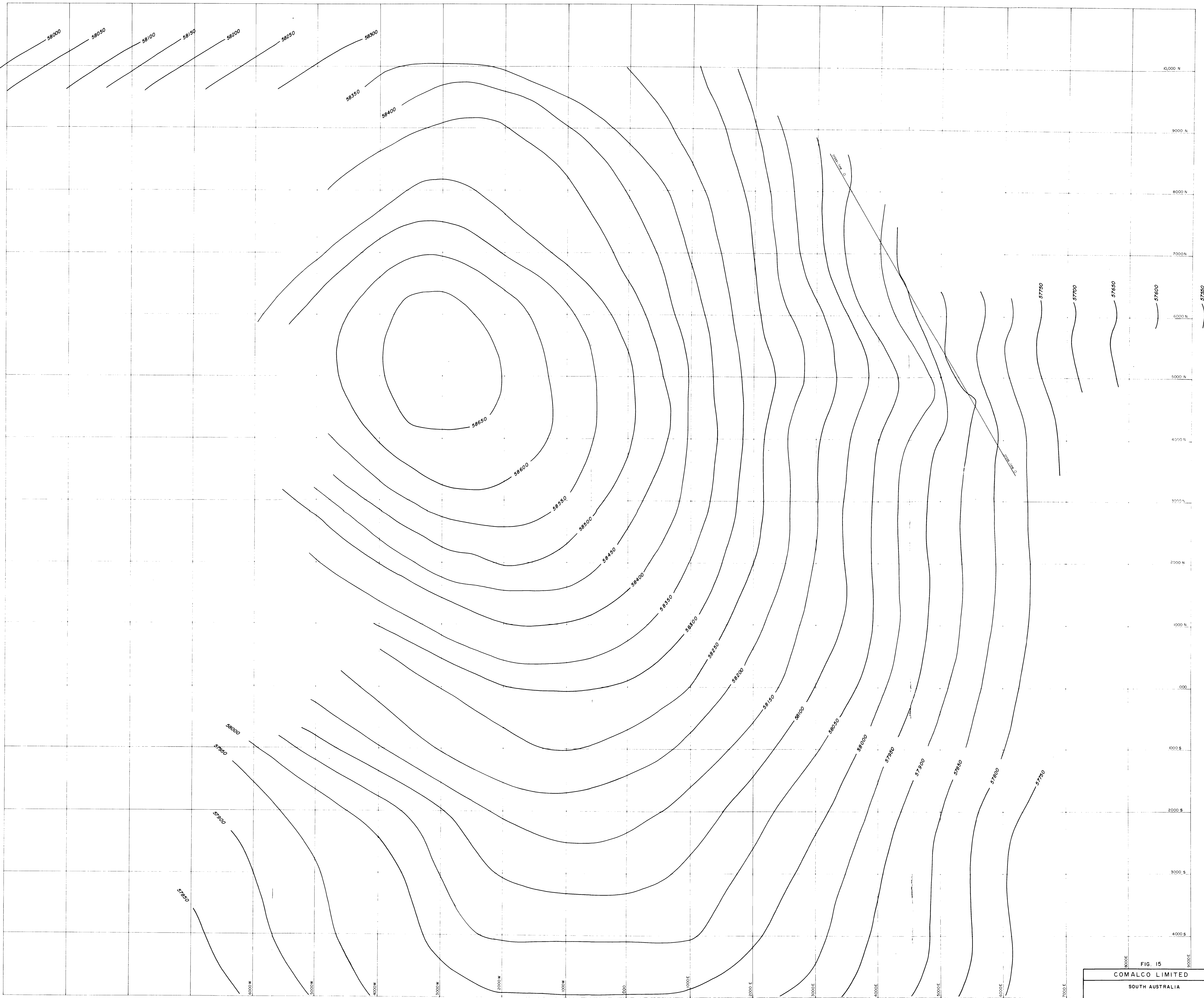
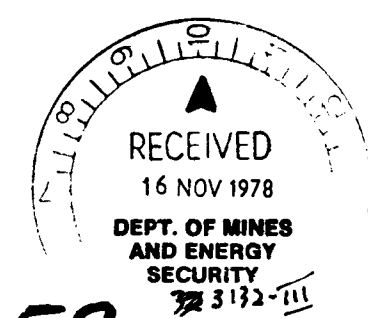
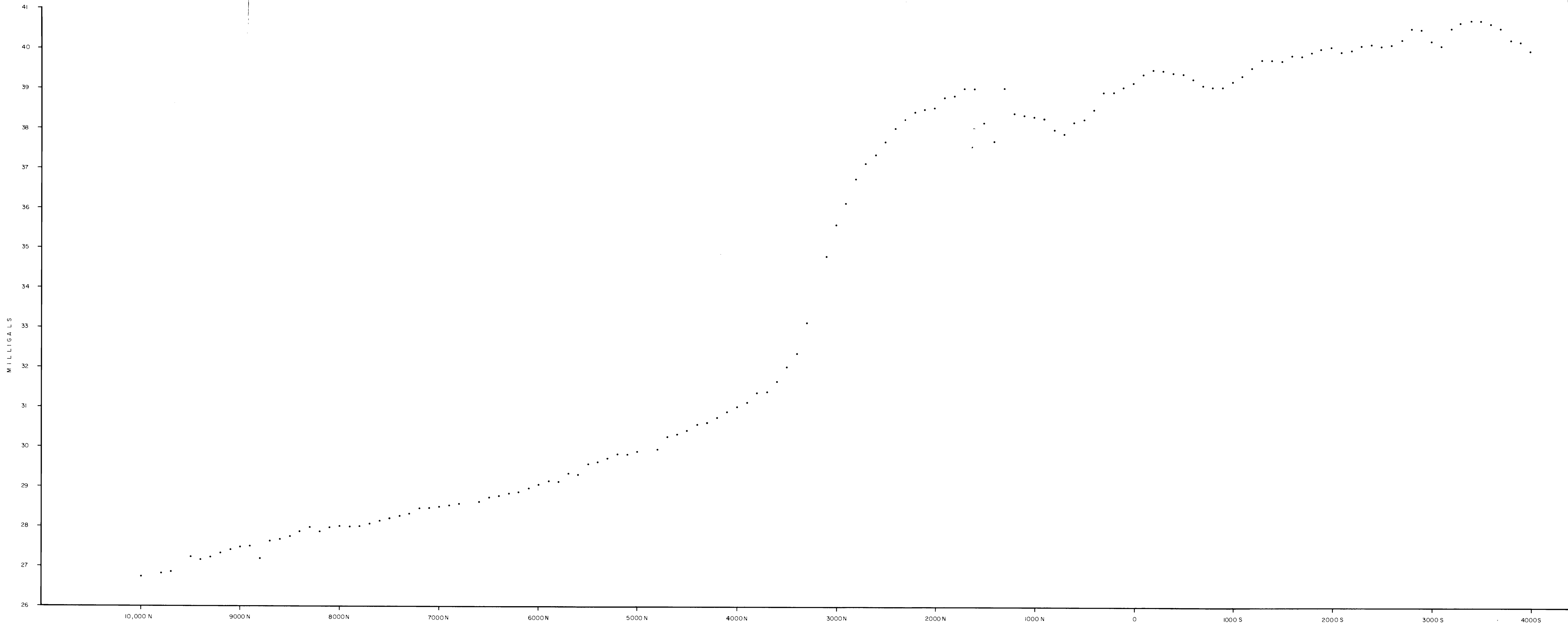
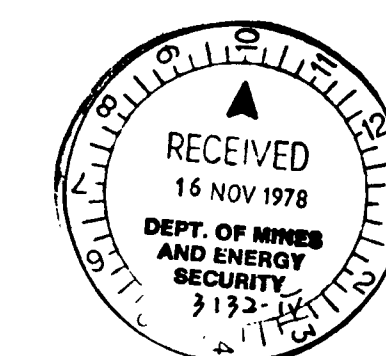
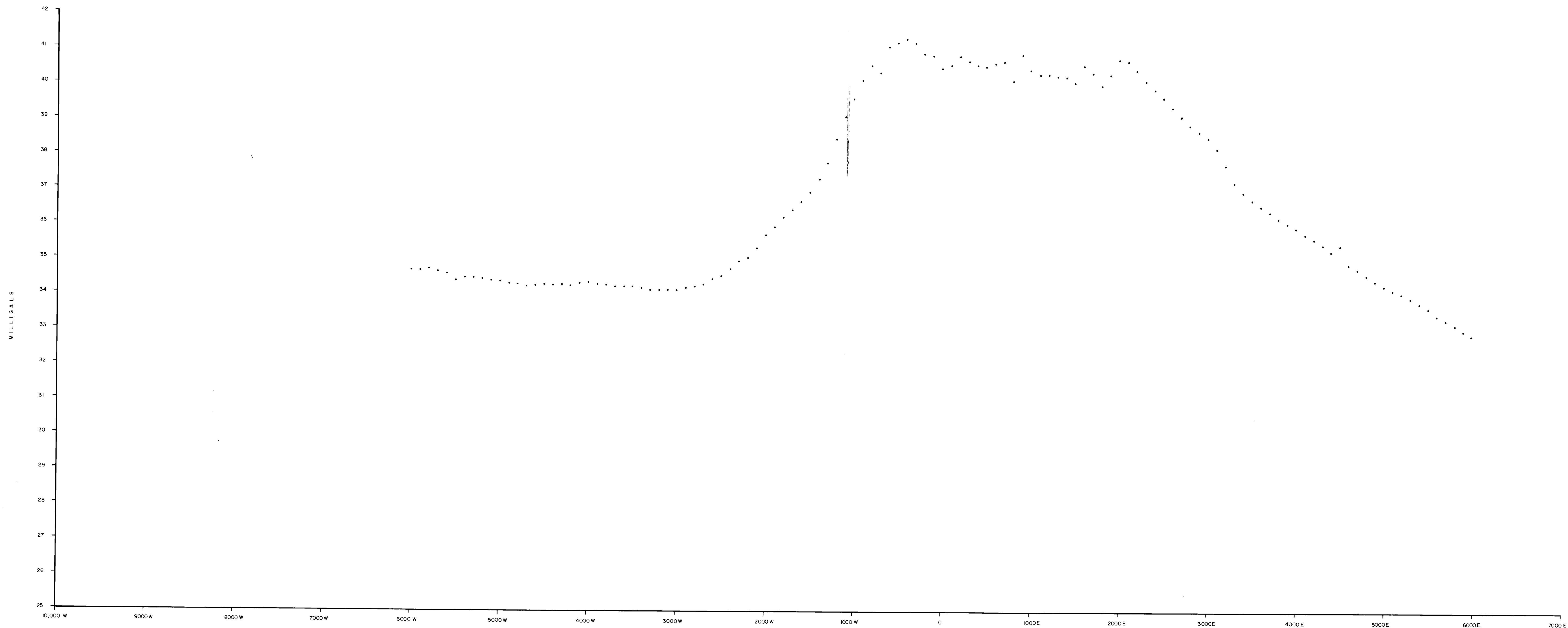


FIG. 15		
COMALCO LIMITED		
SOUTH AUSTRALIA		
E.L. 361, 379 PROTON MAGNETOMETER		
CONTOUR MAP		
ENV 3132-58		
Compiled A.H.W.	Revised September, 1978	Drawn M. Athwell
Date June, 1978	Scale 1:20,000	Dwg No. SA-78-82

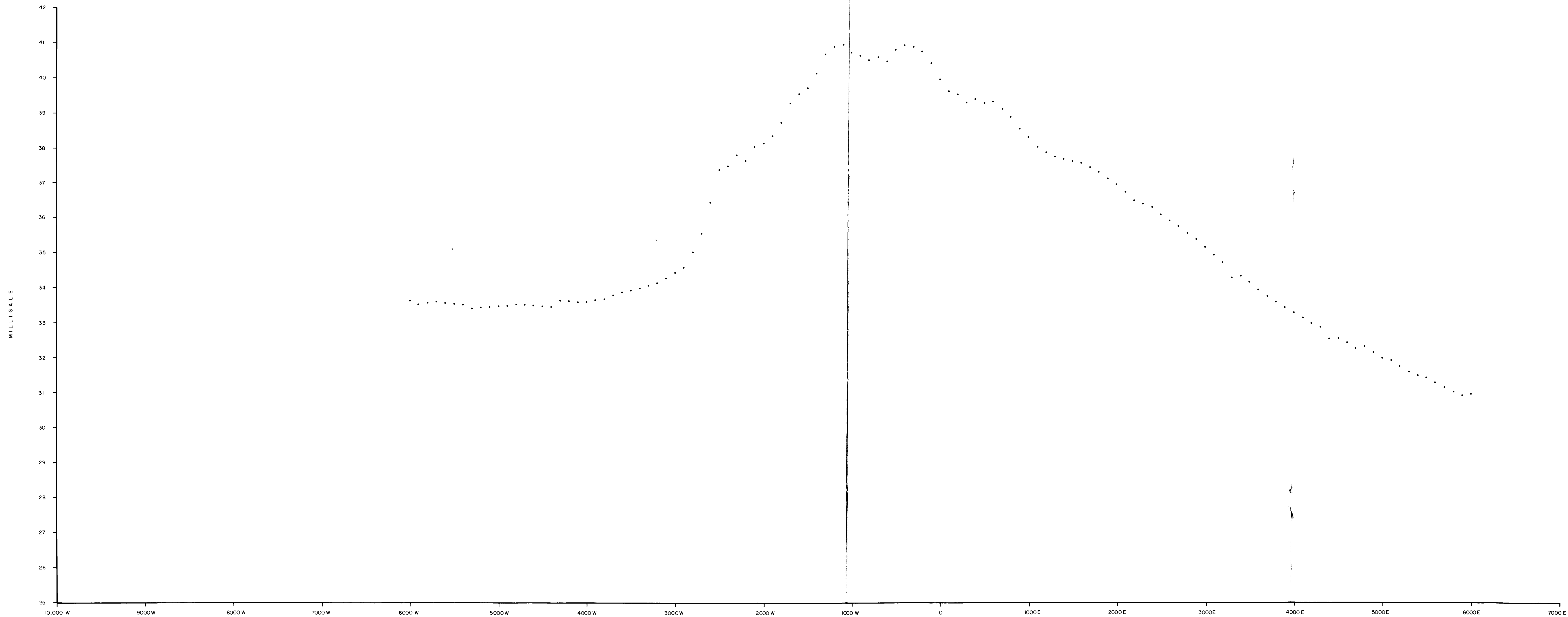


ENV 3132-59

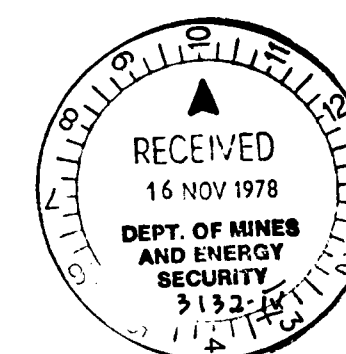
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 369, 371		
BOUGUER GRAVITY		
BASE LINE		
10,000 N - 4000 S		
Compiled J.C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Drg No. SA - 78 - 104



COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 10,000S ENV3132-60		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Orig No SA - 78 - 105



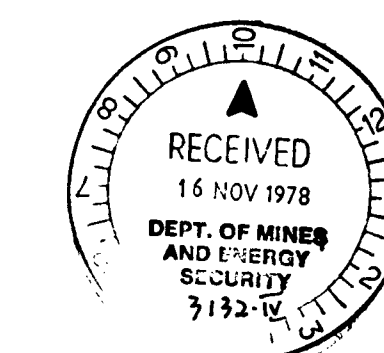
ENVU3132-61



COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 4000S		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1 : 20,000	Org. No. SA - 78 - 106



ENV 3132-62



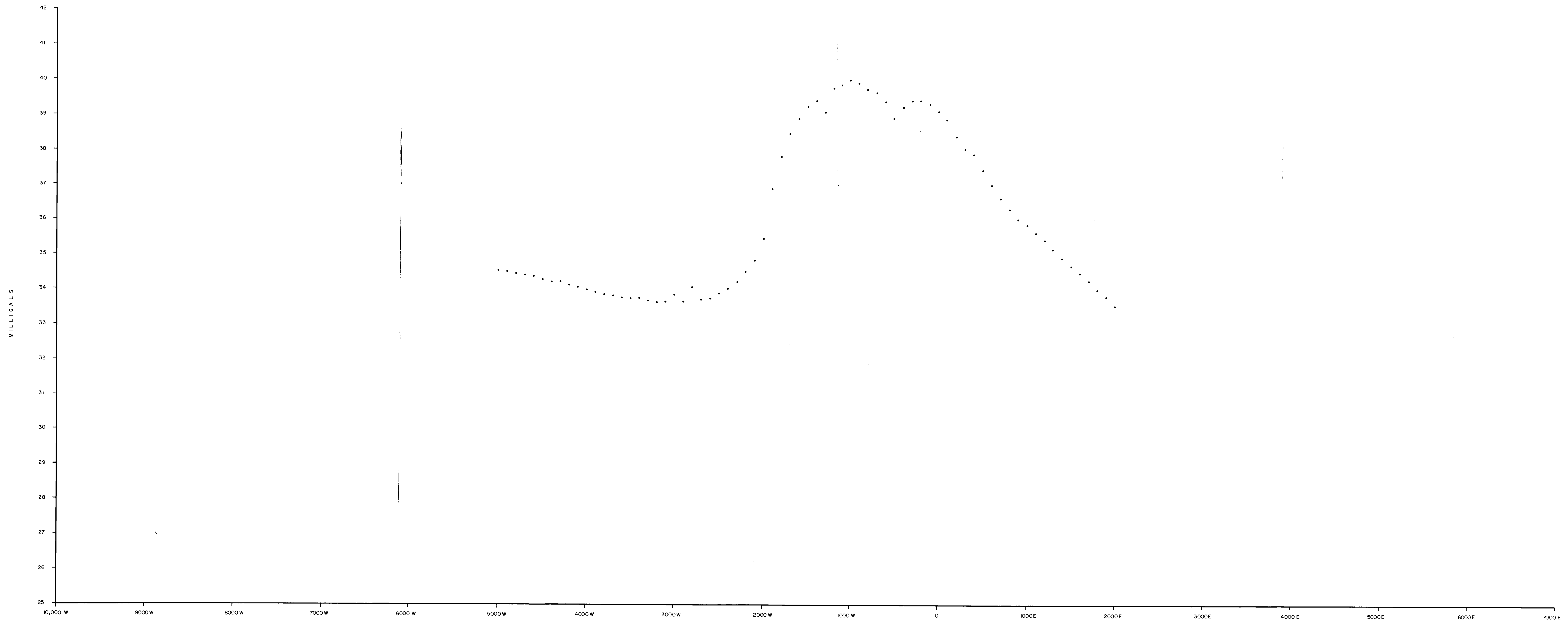
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 2000S		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Dwg No SA - 78 - 107



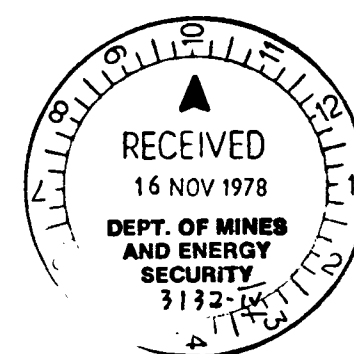
ENV 3132-63



COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 1000S		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1 : 20,000	Org No SA - 78 - 108



ENV 3132-64



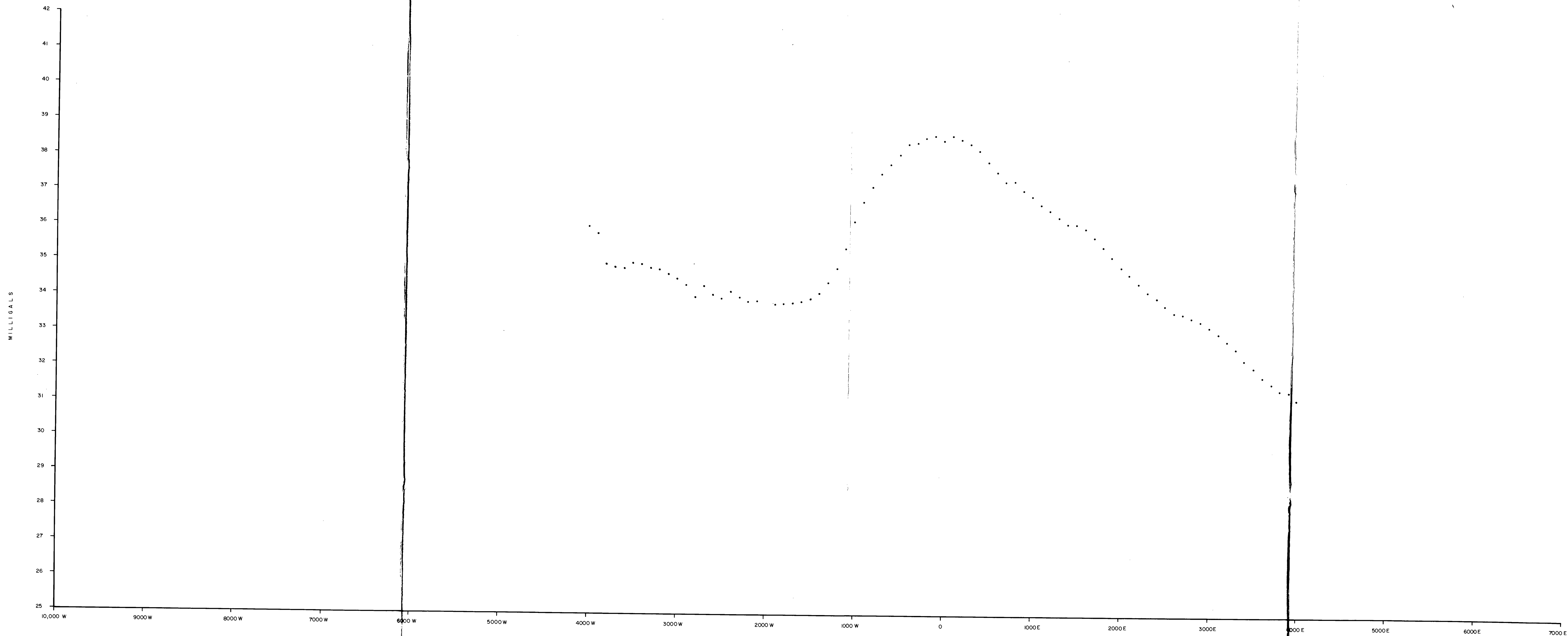
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 0		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Dwg. No SA - 78 - 109



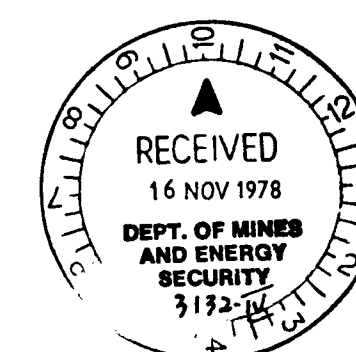
ENV 3132-65



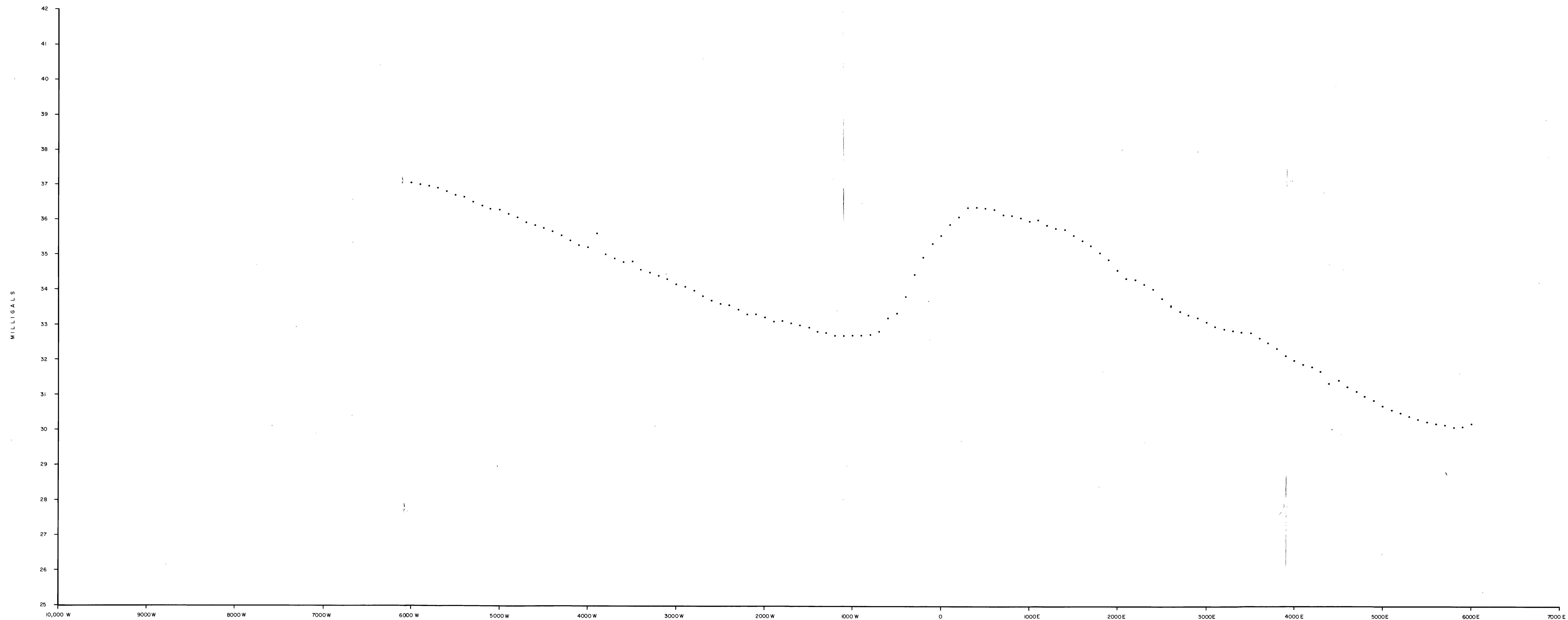
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 1000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:20,000	Dwg. No: SA - 78 - 110



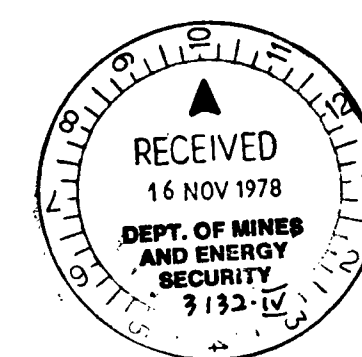
ENV 3132-66



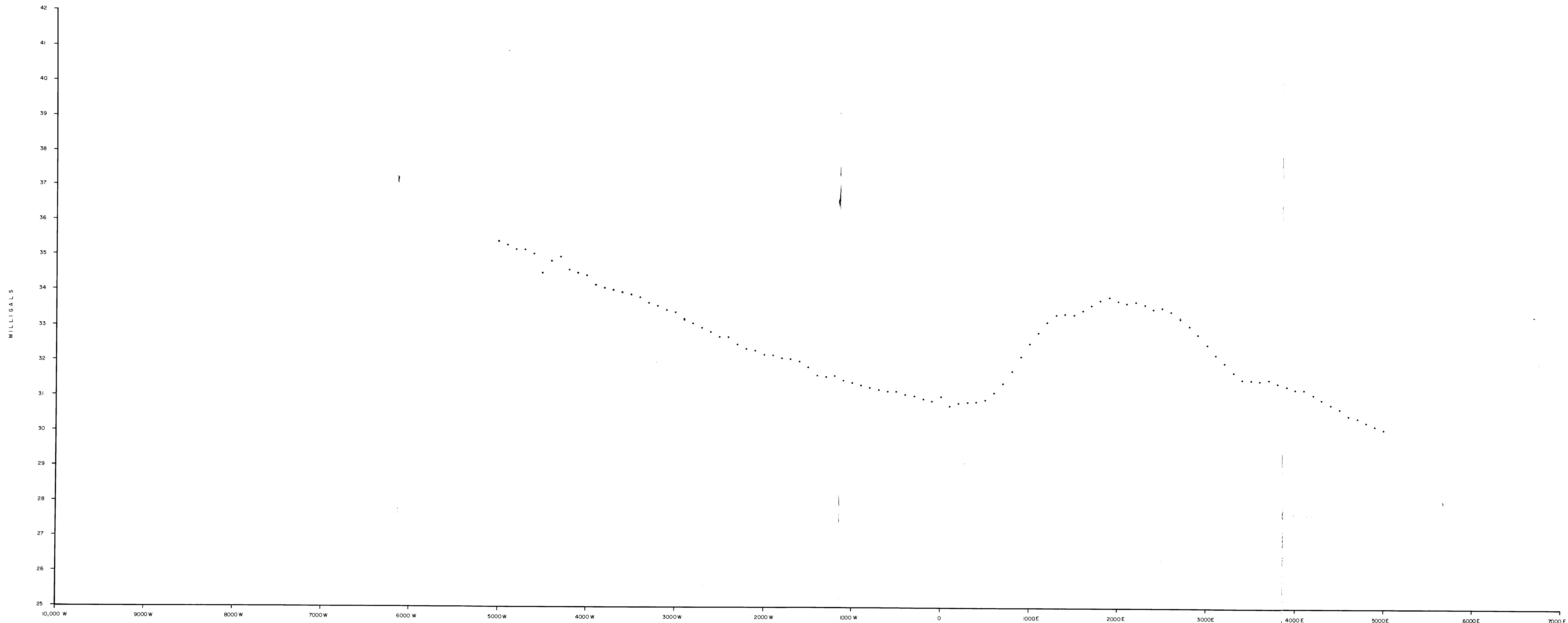
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 2000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:20,000	Dwg. No: SA - 78 - 111



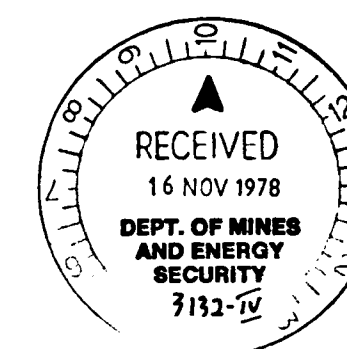
ENV 3132-67



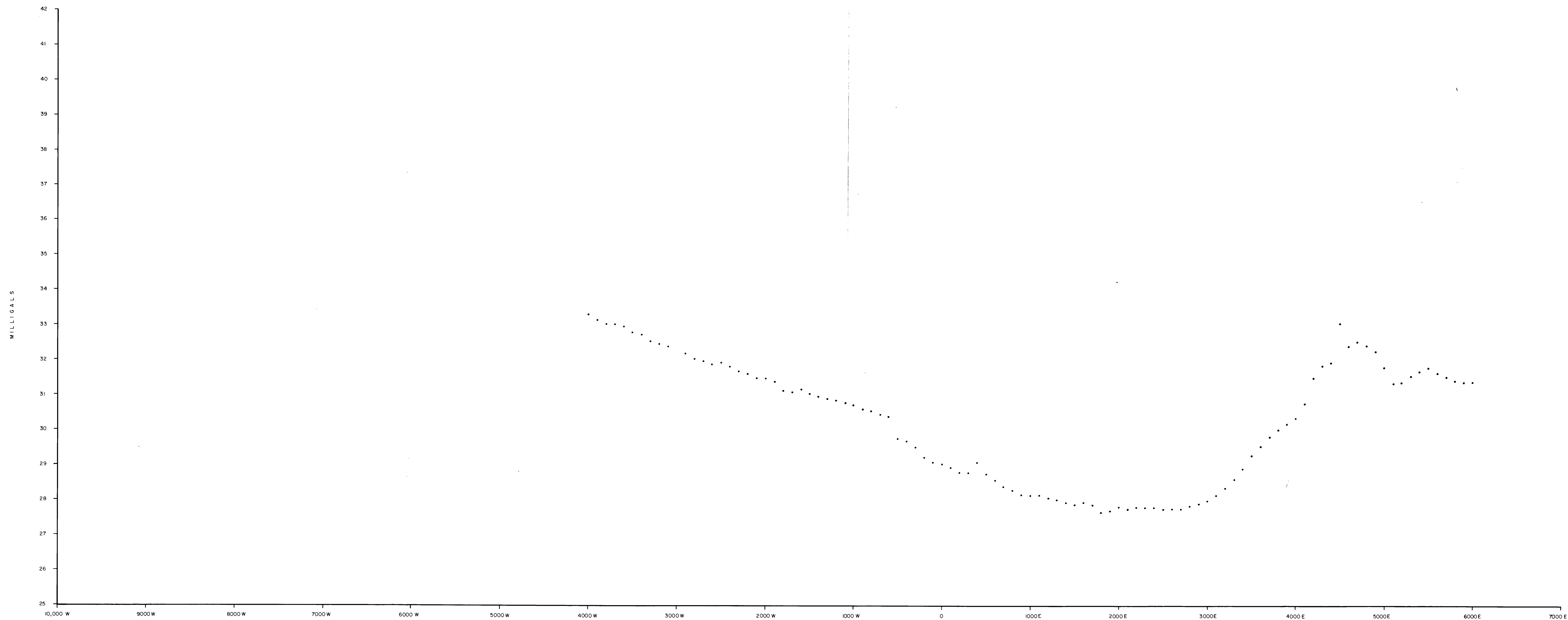
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 3000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:20,000	Dwg No: SA - 78 - 112



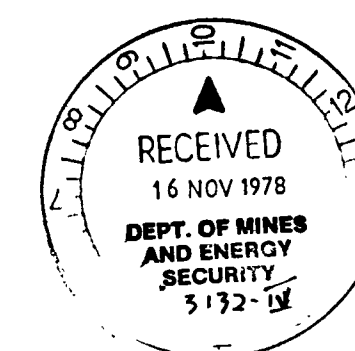
ENV 3132-68



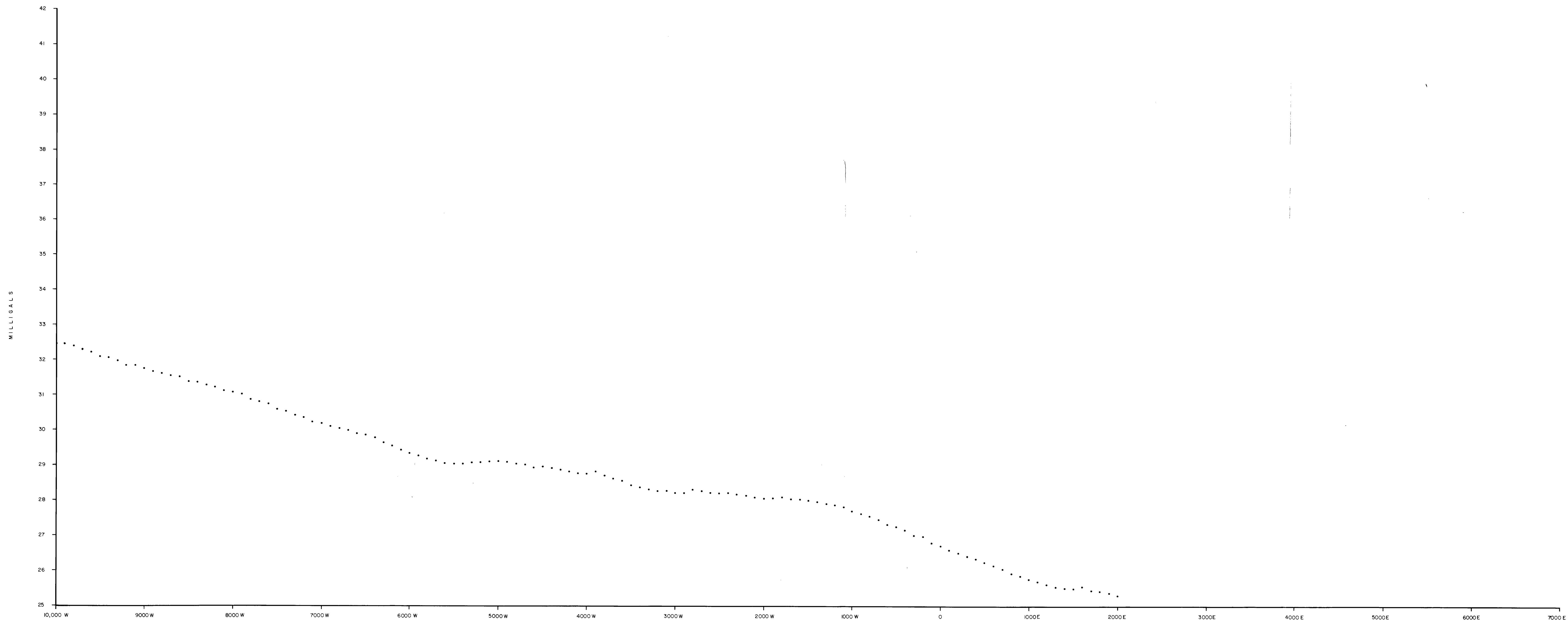
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 4000N		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Org No SA - 78 - 113



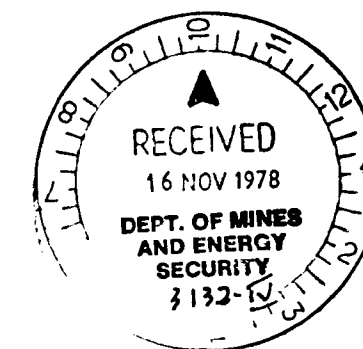
ENV 3132-69



COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 6000N		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Drq No SA - 78 - 114



ENV 3132-70

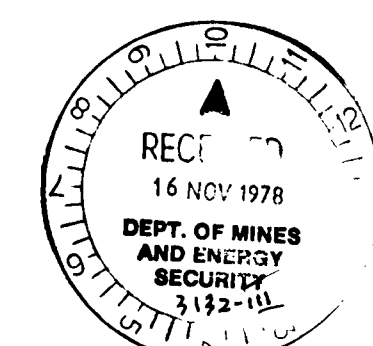


COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361, 379		
BOUGUER GRAVITY		
LINE 10,000N		
Compiled J. C.	Revised	Drawn S. Hutchison
Date August, 1978	Scale 1:20,000	Dwg No SA - 78 - 115

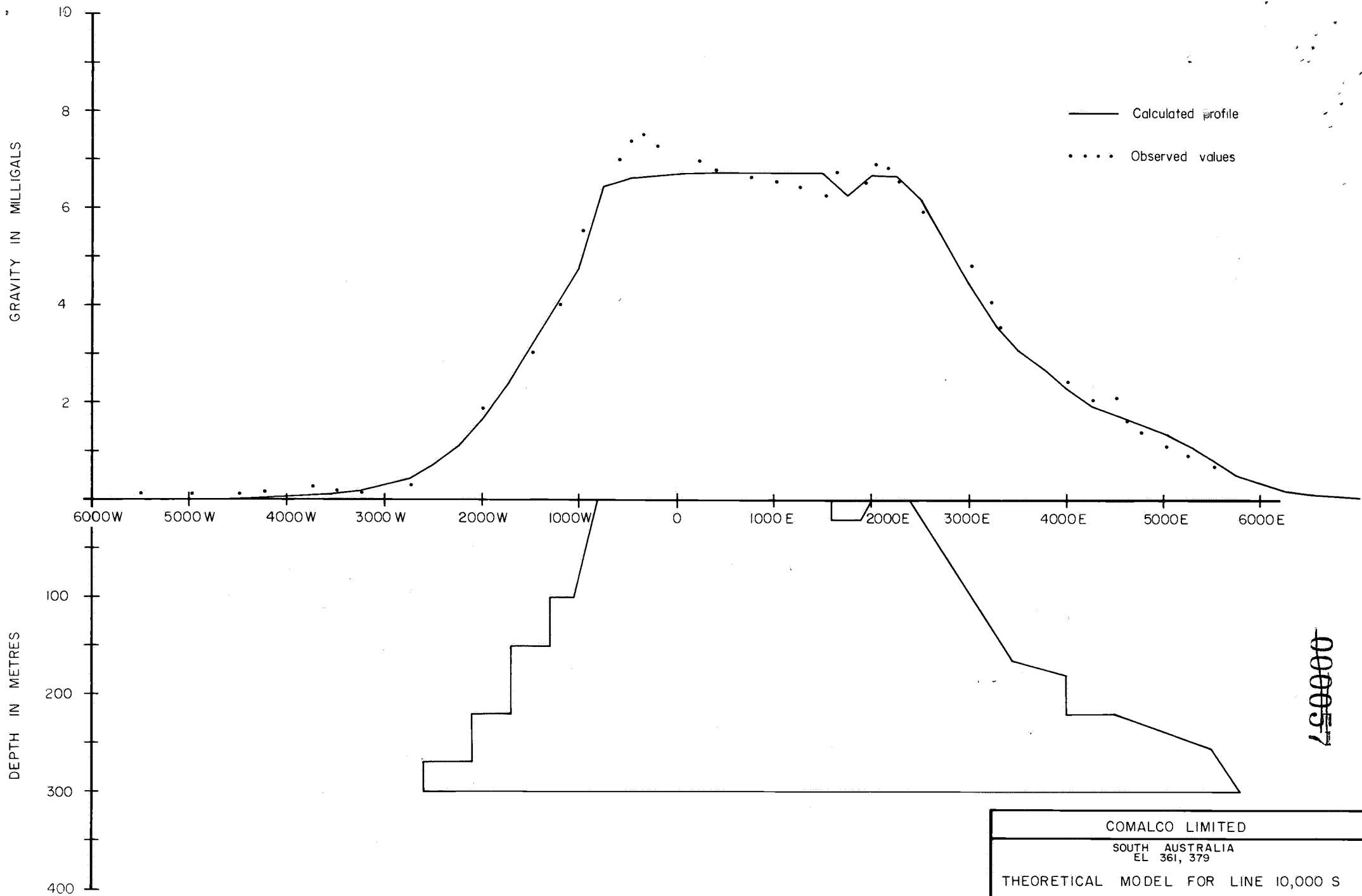


BOUGUER GRAVITY

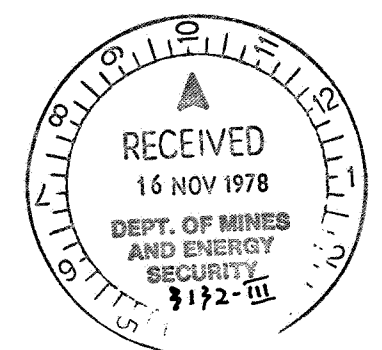
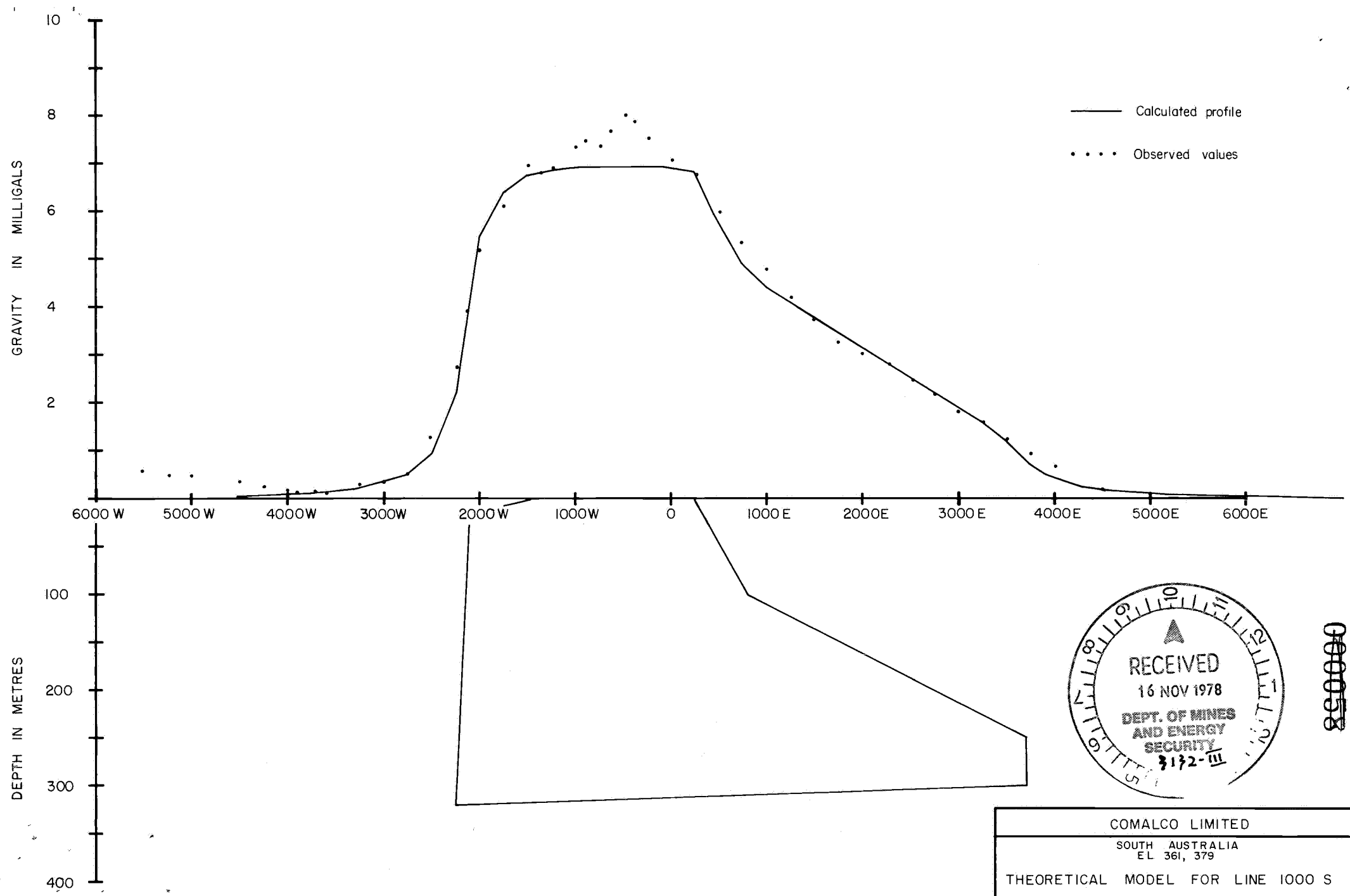
Density $2.20 \text{ gm/cm}^3 - 2.67 \text{ gm/cm}^3$



COMALCO LIMITED		
SOUTH AUSTRALIA		
EL. 361, 379		
BOUGUER GRAVITY		
(Contour Interval 0.5 milligals)		
ENV 3132-71		
Compiled: J.C.	Revised:	Drawn: M.A.
Date: August, 1978	Scale: 1:20,000	Fig No SA-78-116

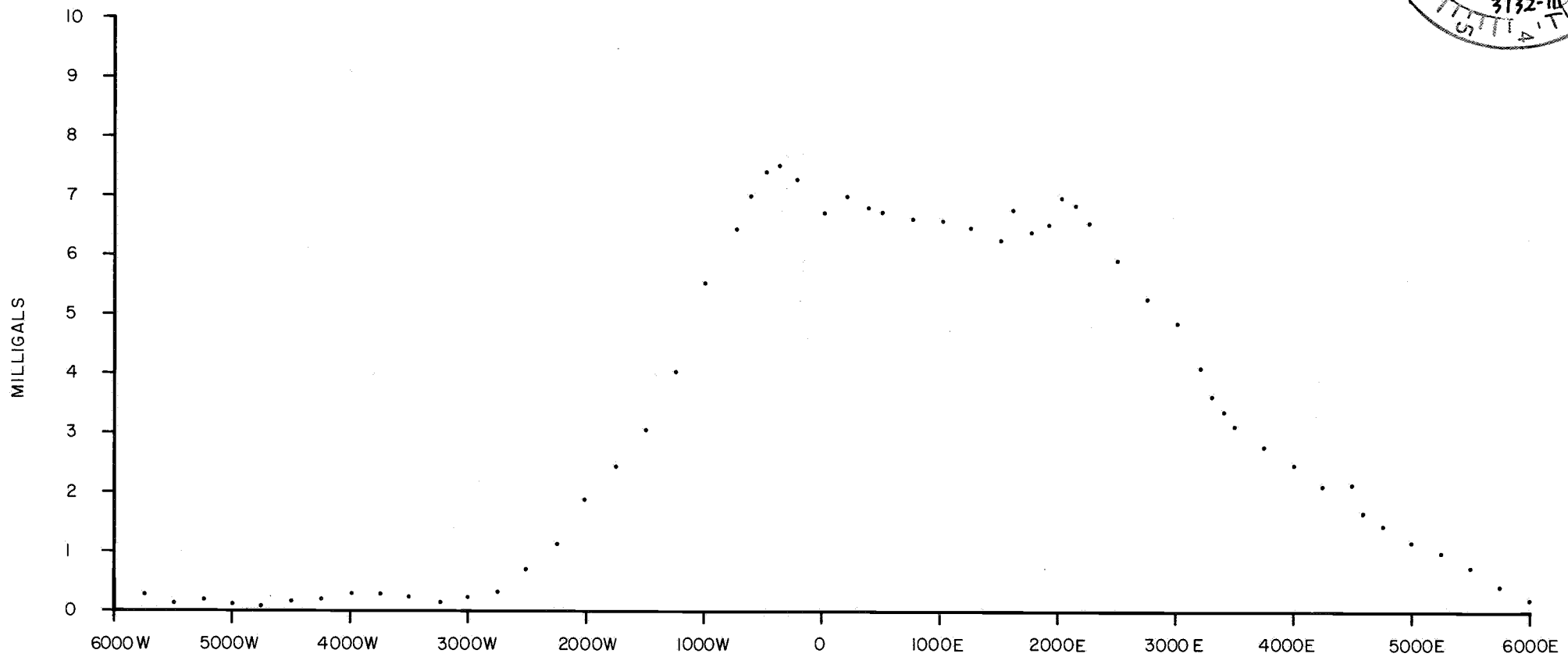


COMALCO LIMITED		
SOUTH AUSTRALIA EL 361, 379		
THEORETICAL MODEL FOR LINE 10,000 S		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: September, 1978	Scale:	Drg No: SA - 78 - 120



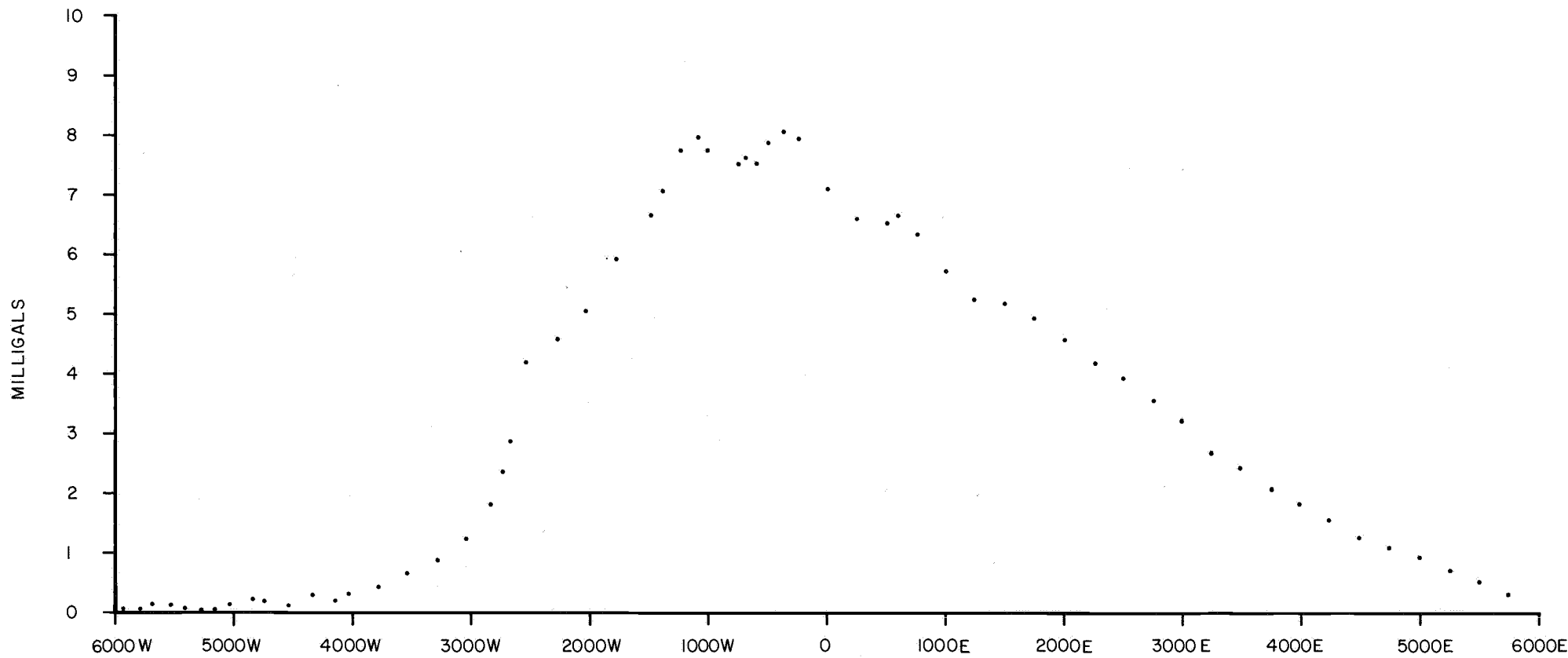
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COMALCO LIMITED		
SOUTH AUSTRALIA EL 361, 379		
THEORETICAL MODEL FOR LINE 1000 S		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: September, 1978	Scale:	Org. No. SA - 78 - 121



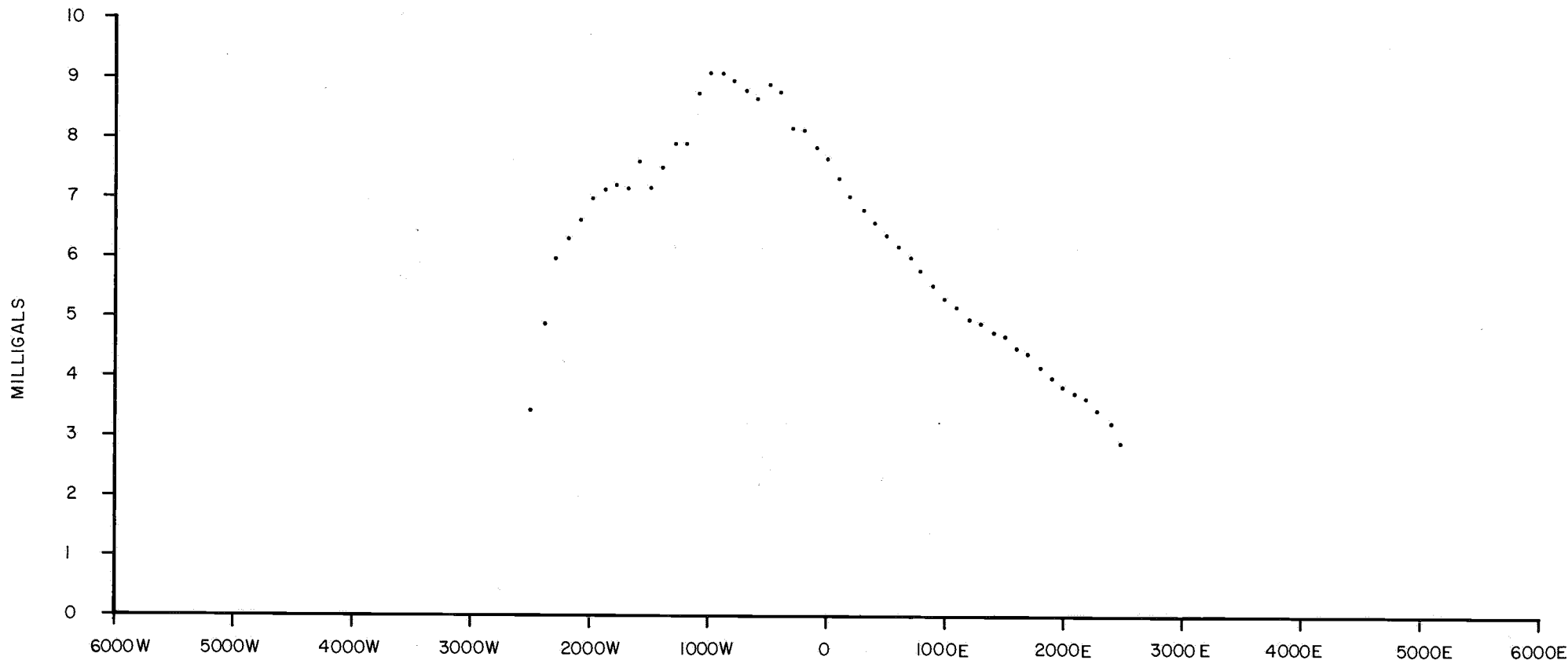
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COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 10,000S		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 86



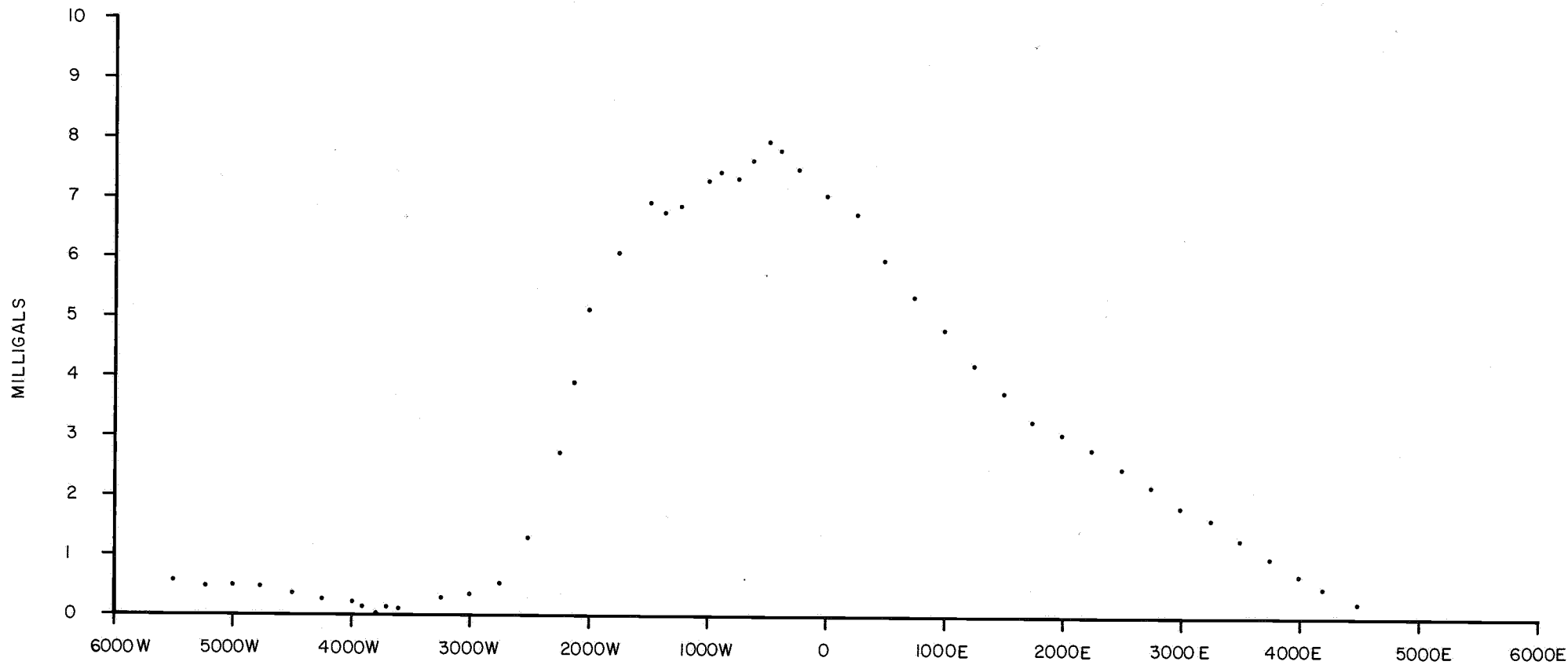
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COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 4000S		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 87



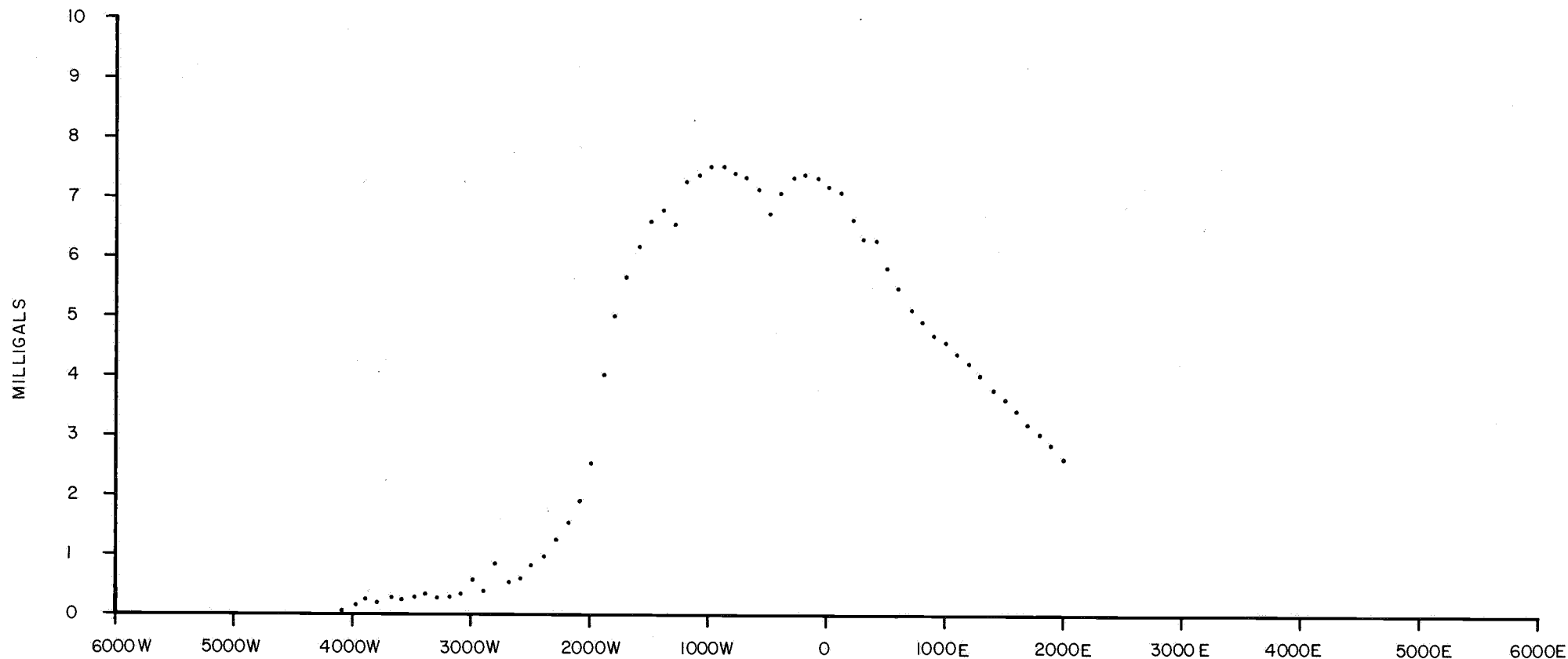
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COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 2000S		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 88



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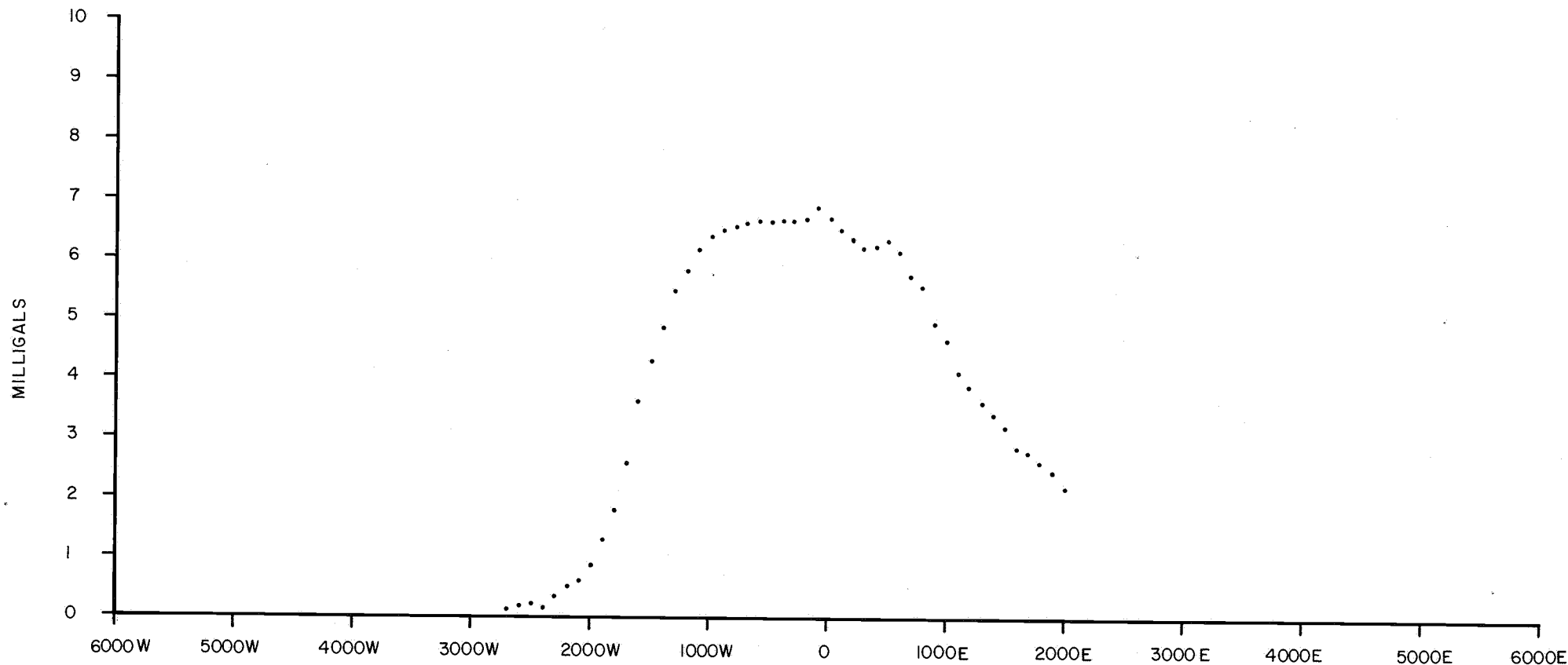
COMALCO LIMITED		
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RESIDUAL GRAVITY		
PROFILE LINE 1000S		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 89



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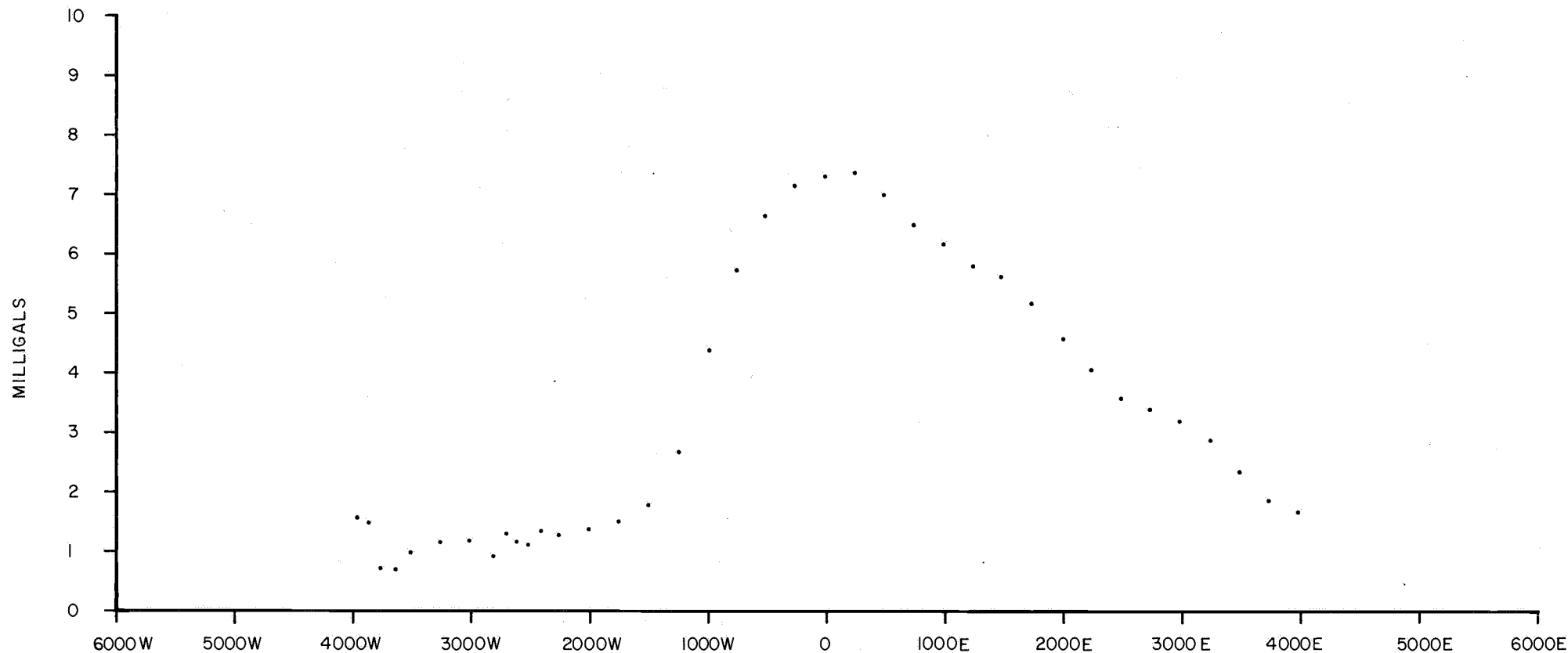
COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 0		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 90

64



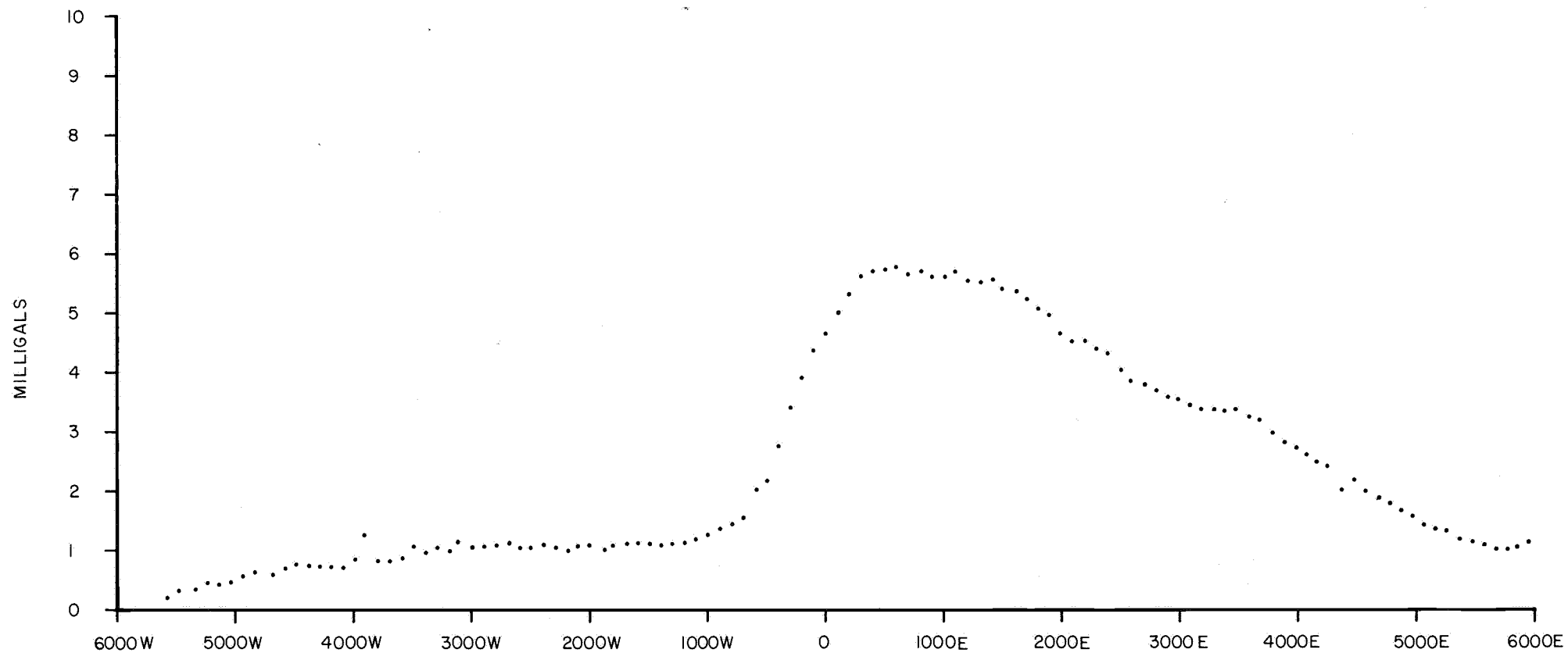
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COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 1000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 91



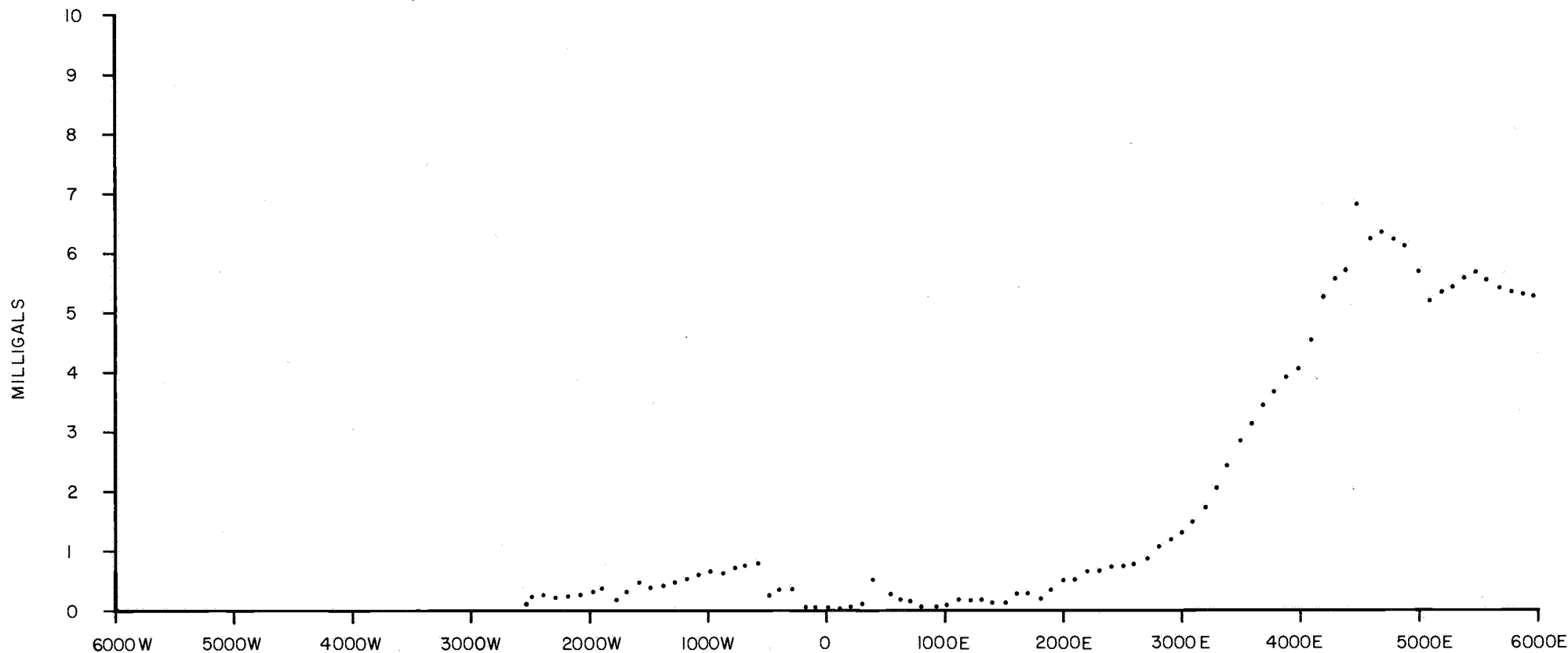
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COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 2000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 92



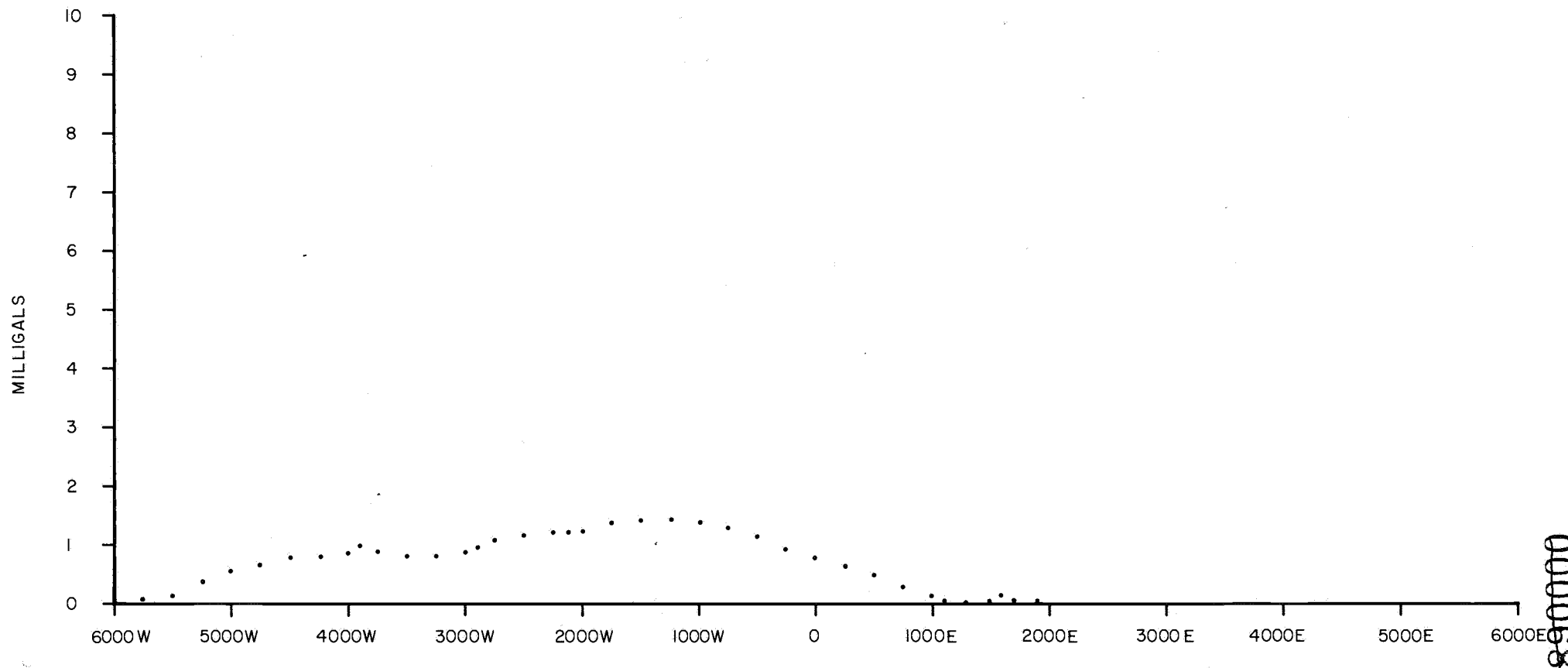
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COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 3000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Org. No: SA - 78 - 93

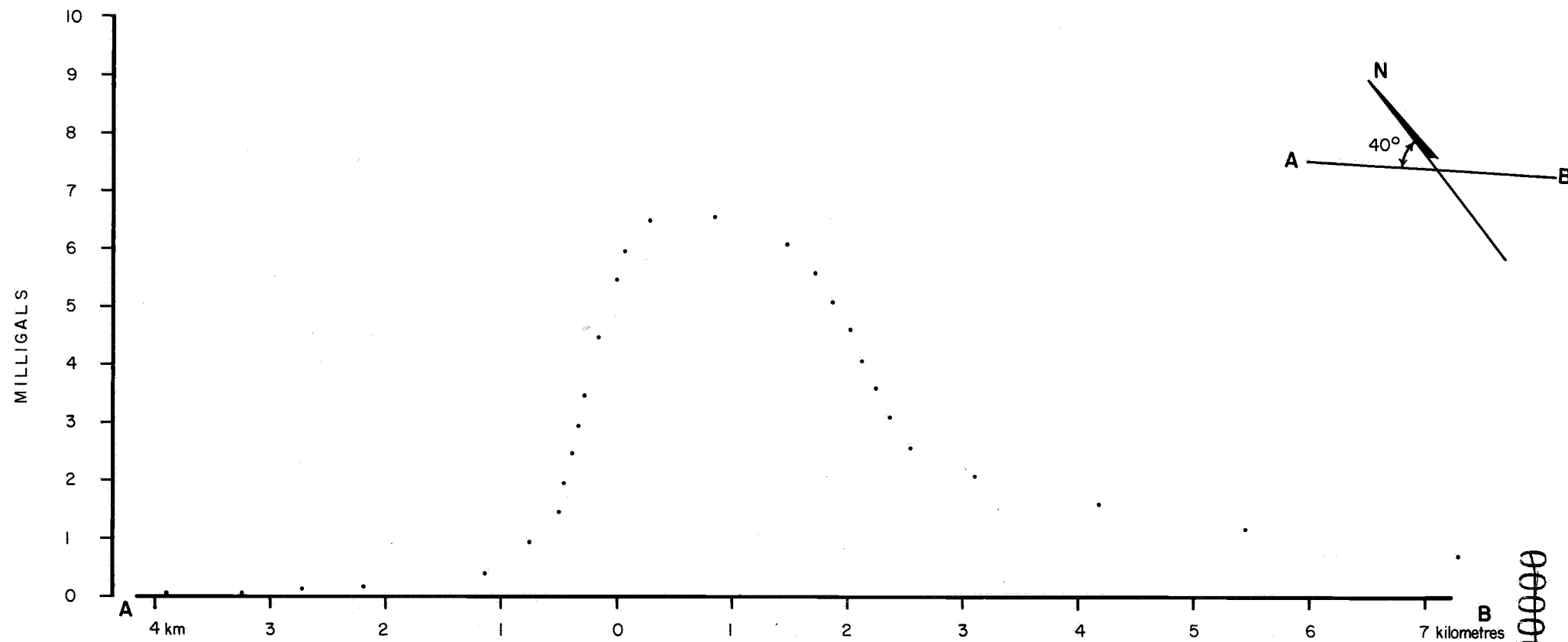


000067

COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 6000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 94

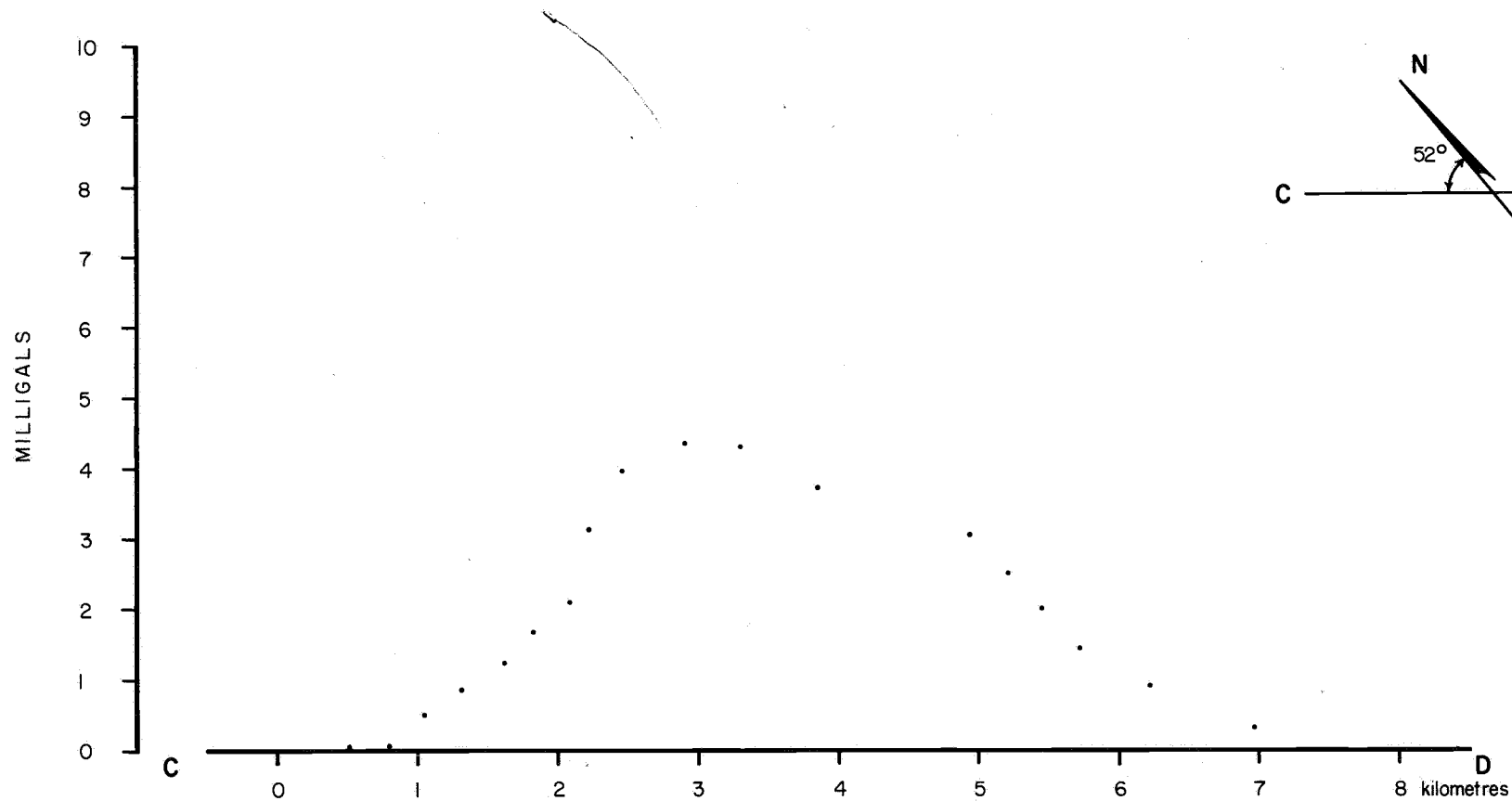


COMALCO LIMITED		
SOUTH AUSTRALIA EL's 361,379		
RESIDUAL GRAVITY		
PROFILE LINE 10,000N		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Drg. No: SA - 78 - 95



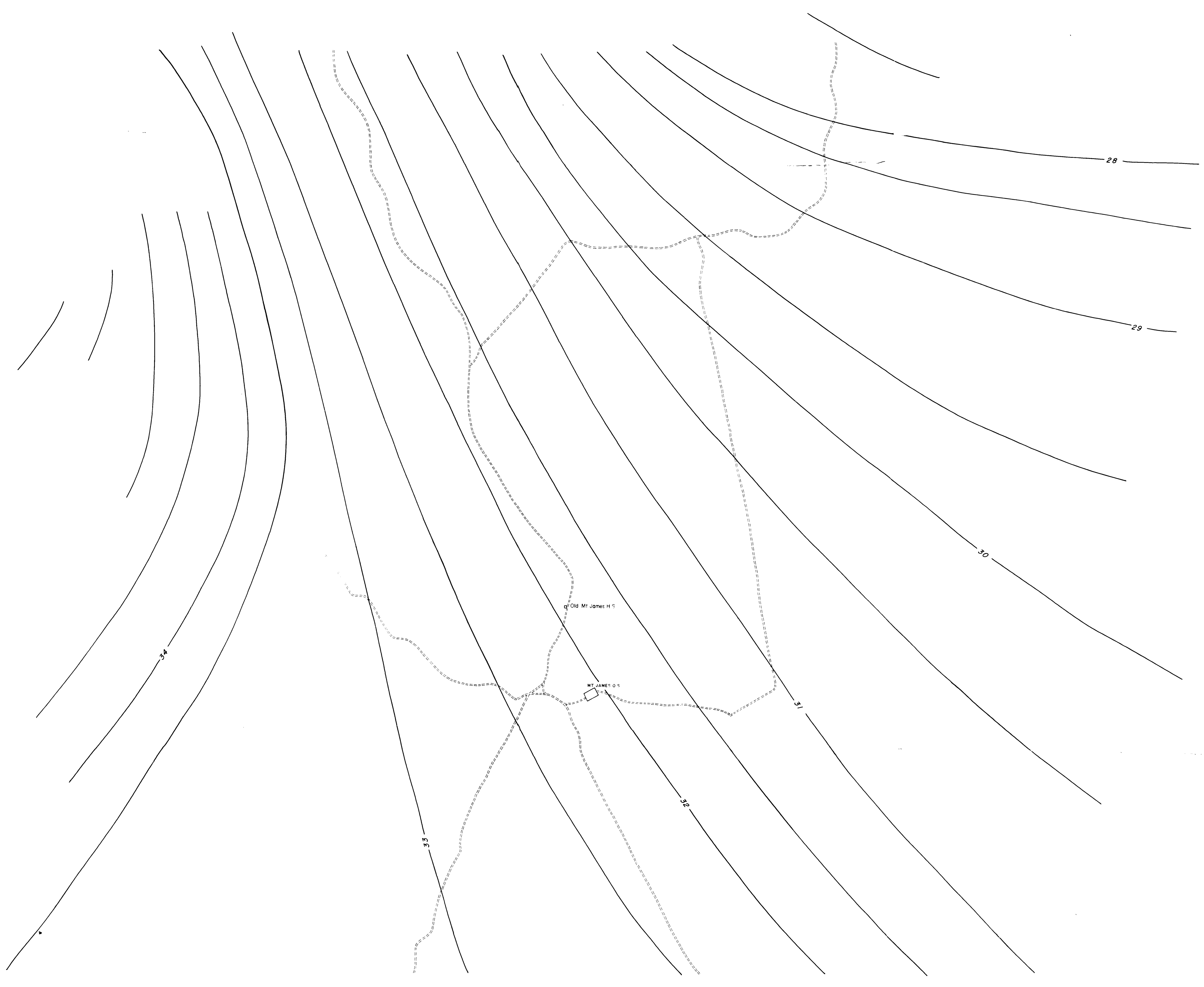
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COMALCO LIMITED		
SOUTH AUSTRALIA E.L's 361,379		
RESIDUAL GRAVITY		
PROFILE PERPENDICULAR TO FAULT		
LINE A - B		
Compiled: J.C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1: 50,000	Drg. No. SA - 78 - 96

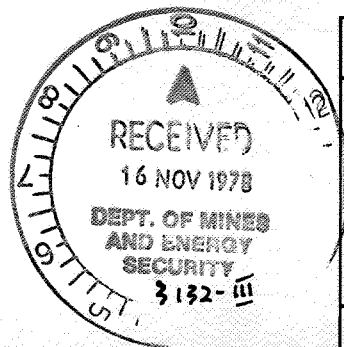
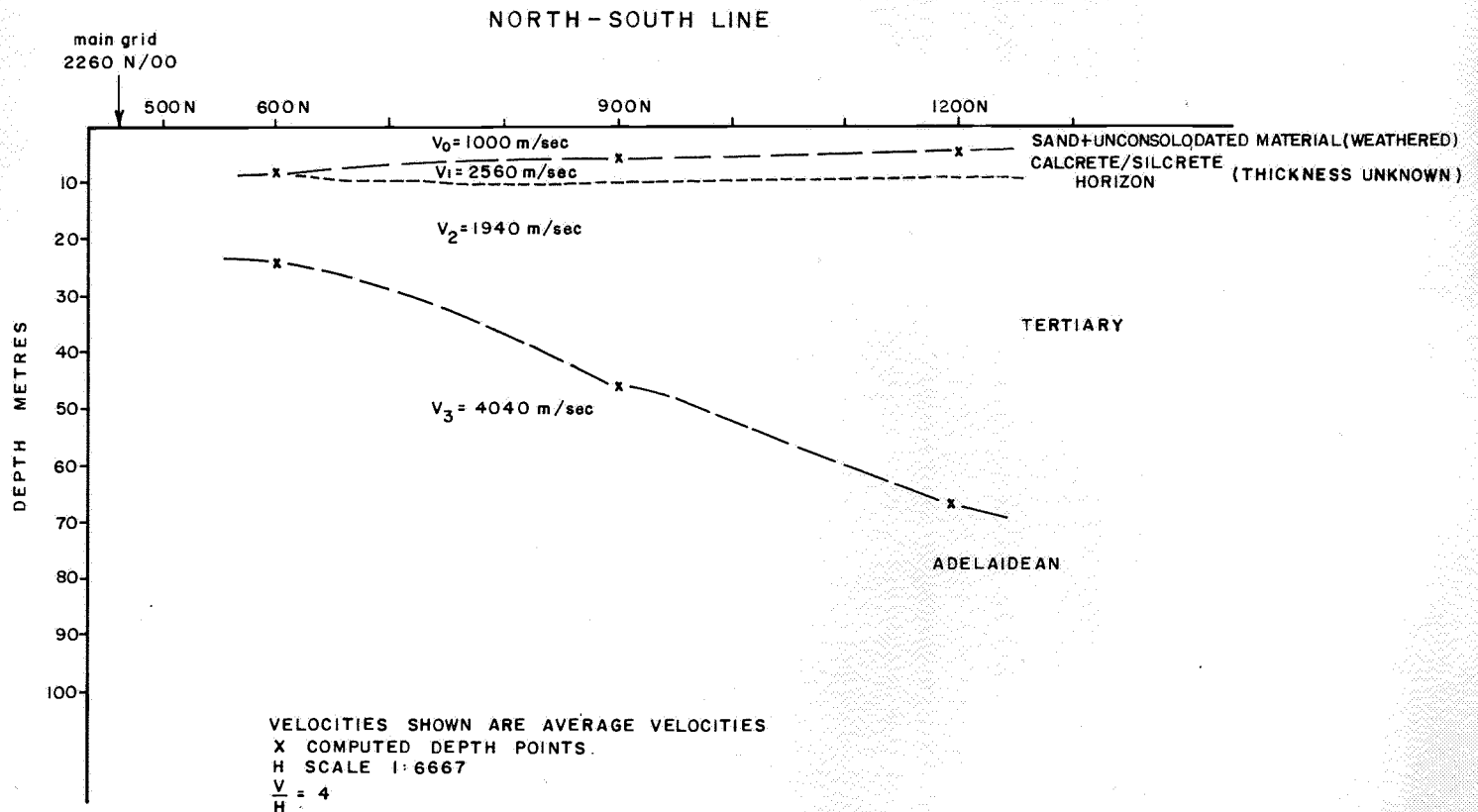
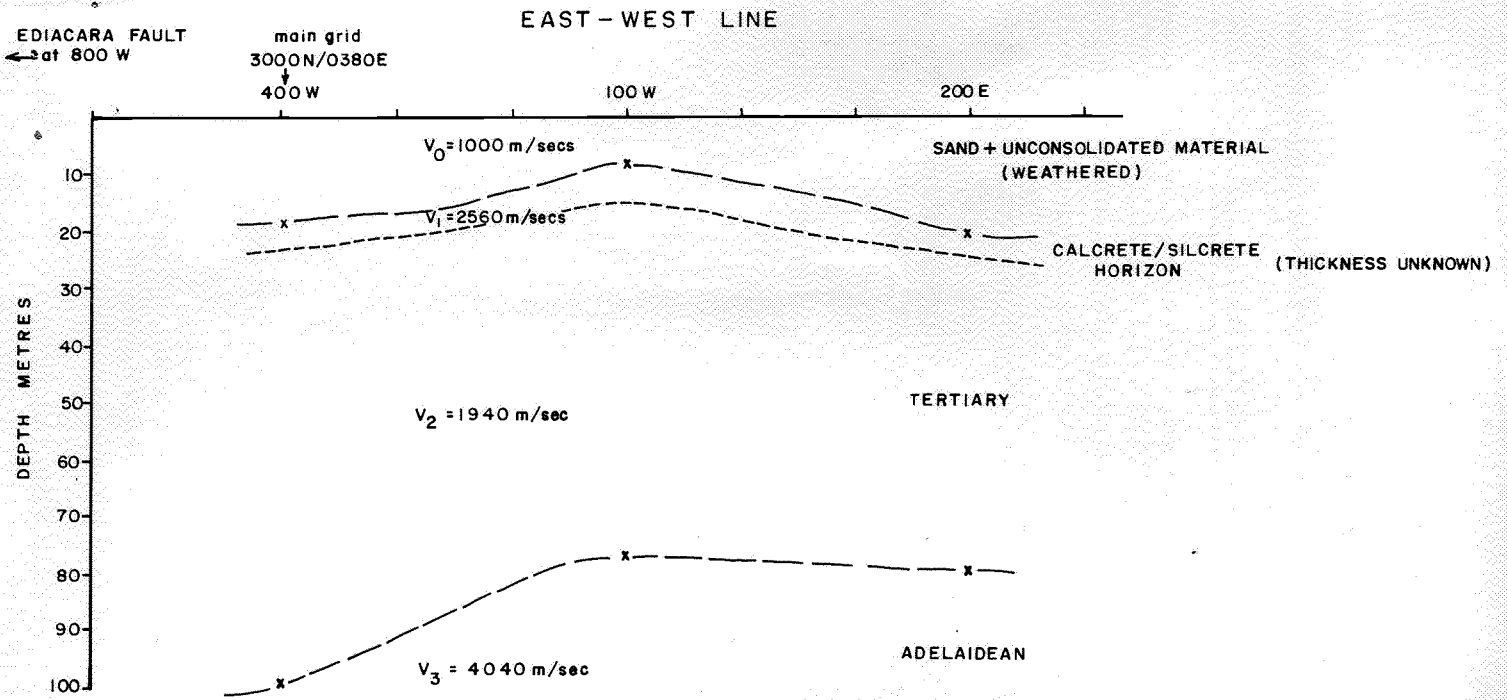


COMALCO LIMITED		
SOUTH AUSTRALIA E.L.'s 361, 379		
RESIDUAL GRAVITY		
PROFILE PERPENDICULAR TO FAULT		
LINE C - D		
Compiled: J. C.	Revised:	Drawn: S. Hutchison
Date: August, 1978	Scale: 1:50,000	Orig. No: SA - 78 - 97

REGIONAL GRAVITY



COMALCO LIMITED		
SOUTH AUSTRALIA		
E.L. 361, 379		
REGIONAL GRAVITY		
(Contour Interval 0.5 milligals)		
ENV 3132-72		
Compiled: J. C.	Revised:	Drawn: M. A.
Date: August, 1978	Scale: 1:20,000	Drg No SA-78-98



COMALCO LIMITED		
SOUTH AUSTRALIA E.L. 361		
SEISMIC REFRACTION DATA MT. JAMES		
Compiled: G.C.	Revised:	Drawn: M.A.
Date: Oct., 1978	Scale: as shown	Drq N° SA-78-135



000072

COMALCO LIMITED
Incorporated in Victoria

95 Collins Street
Melbourne Australia

Adelaide Regional Office,
Exploration Department,
P.O. Box 20,
PLYMPTON, S. AUST. 5038.

AHW/SW

5th January, 1979.

The Director General,
South Australian Department of Mines and Energy,
191. Greenhill Road,
EASTWOOD, S.A. 5063.

Dear Sir,

Quarterly Report, E.L. 361 - Sundown Creek, for the period
3.10.78 to 3. 1.79.

During the quarter to 3rd January, 1979, geochemical analysis of
rock chip samples obtained from the Mount James area of Exploration
Licence 361 were received, and detailed study of the geochemical analyses
is being carried out.

Yours faithfully,
COMALCO LIMITED.

(Dr.) A. H. White
Senior Geologist.

STATEMENT OF EXPENDITURE

EXPLORATION LICENCE 361

3.10.78 - 3. 1.79.

Geological and geophysical:

Geologists' salaries	500.00
Depreciation geophysical equipment	100.00
Administration	200.00
Geochemical analyses	1498.00
	\$2298.00

EXPLORATION LICENCE 361 - SUNDOWN CREEK

Quarterly report for the period

3.1.79 - 3. 4.79

I. J. Buchhorn



COMMONWEALTH ALUMINIUM CORPORATION LIMITED,
Exploration Department,
10 Hampton Road,
Keswick,
Adelaide, South Australia.

June, 1979.

EXPLORATION LICENCE 361 - SUNDOWN CREEK

Keywords

Copley	1:250 000	SH54-9
Copley	1:100 000	6536
Nankabunyana	1: 50 000	6536-IV
Warrioota	1: 50 000	6536-III
Copley	1: 50 000	6536-I
Beltana	1: 50 000	6536-II
Geochemistry		
Magnetics		
Gravity		
Drilling		

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Geochemistry	2
Geophysics	3
Future Work	8
Statement of Expenditure	9

Figures:

- SA79/160. Stacked Profiles of Gravity, Magnetism and Topography of lines 1000N, 0, 500S, 1000S, 1500S, 2000S, 2500S
- SA79/161. Gravity Profile of line 5000N
- SA79/162. Gravity, Magnetism and Topography of line 6000N
- SA79/163. Profiles of Gravity, Magnetism and Topography of Cross Line

EXPLORATION LICENCE 361 - SUNDOWN CREEK

Quarterly report for the period 3.1.79 - 3.4.79

INTRODUCTION

This report covers work carried out in Exploration Licence 361 between 3.1.79 and 3.4.79, this period being the second quarter of the second year of tenure.

No field work was done during the quarter. All work was restricted to interpretation of geochemical and gravity surveys carried out previously.

GEOCHEMISTRY

Results were received for detailed rock sampling which was done in the Mount James area. It had been hoped that the work would allow grading of gravity anomalies, and through vein sampling, possibly outline blind mineralisation. Carbonate breccias were also sampled to test for carbonatite affiliations.

Veins

A distinct Ba-Mn-Sr-Cu association is present. This reflects the dominant vein mineralogy of quartz-barite-pyrolusite-hematite. Apart from Cu, there is no base metal enrichment. Typically, the veins contain 0.3 - >>1.0% Ba, 0.1 - >>1.0% Mn, and 0.05 - >1.0% Sr, with anomalous Cu ranging from 200 - 2800 ppm.

Carbonate Breccias

Apart from minor Cu enrichment, the breccias contain nothing of interest. There are no anomalous 'carbonatite' elements (Ti-Nb-Ta-Si-Y-La-Ce-Yb-Th), so that on geochemical criteria, the breccias cannot be termed carbonatites.

The only results of any interest are from the ferruginous 'diapir' zone at grid co-ordinates 3500S/2000W (see Figure SA78/132, Exploration Licence 361 quarterly report to 14.10.78). A representative suite of massive limonitic jaspers, barite-limonite-quartz breccias and brown carbonates contain between 290 and 4000 ppm Cu, with Ba and Mn also anomalous.

Adelaidean Sediments

No sediments contain any significant syngenetic base metal enrichment. The highest values are for Wonoka dolomites around grid co-ordinate 2500S/1400W, where three samples analysed at 170, 370 and 550 ppm Cu. No follow up is required.

GEOPHYSICS

During March, 1979, twentyfive line kilometres were gravity surveyed. Twelve of the twentyfive kilometres were at a reduced spacing of fifty metres.

The lines surveyed were 2500S, 1500S, 500S, 5000N, 6000N and a cross line at a 330° bearing, centred at 6000N/4700E. Lines 5000N and 4000N were extended eastwards to meet the crossline (see Figures SA79/160, 161, 162 and 163).

Results

In the following discussion, reference will be made to plans SA78/85 and SA79/130, which illustrate the geology of the area (see Exploration Licence 361 quarterly reports to 14.7.78 and 14.10.78). The geophysical results are discussed on a plan by plan basis.

(1) Plan SA79/160

This plan contains the stacked profiles of gravity and magnetics, along with the topography of all lines south of and including 1000N.

On line 2500S, apart from the minor peaks to the west, a prominent peak is present at 750W. A secondary gravity peak is present at 950W, and lies between two areas of dolomite outcrop. There is a possibility of a minor fault being present in the vicinity of 1150W, with the upthrown side to the east. The smaller peak situated at 450W is coincident with an area where heavy limonitic jasper float is present, this material probably being derived from dolomite.

Lines 2000S and 1500S have a number of features in common. Firstly, between 1000W and 1500W, there is on both lines a pronounced negative gradient with minor serrations. Secondly, the peak at 950W on line 2000S is the southern extension of the peak at 900W on line 1500S. There is reason to suspect that the peak of 2000S/450W is the same as the one at 1500S/250W. The latter peak has a magnetic disturbance ($\sim 18\text{nT}$) associated with it, although slightly offset to the west. This is the only significant magnetic feature present, and is restricted to line 1500S.

The gravity picture on line 500S is a little more complex, with what appears to be two highs separated by a low. The high centred at 300W seems to coincide with a topographic feature consisting of a massive silcrete capping of siliceous and calcareous grits. The topography indicates this capping to be five to ten metres thick. The effect of this material on

000080

the gravity would be to depress the values. Thus, after correcting for this, the result would be a slightly higher peak than is observed on plan SA79/160. The peak at 1200W coincides with a grey limestone outcrop. The gravity depression in the centre could indicate the presence of a graben-like feature that has been infilled by Recent sediments. The faults are suspected to be at 725W and 1025W, the former being 75 metres west of a mapped fault.

The profile of line 0 shows two minor gravity lows flanking a broad high. The centre of the high, 950W, coincides with an outcrop of dolomite within aeolian sands. The flanks are probably reflecting faults which have formed scarps that have subsequently been covered by sand. The throw of the faults would have to be of the order of 25 metres, assuming that the density contrast is between sand and consolidated sediments. The high on the gravity profile between 100E and 500W is obviously related to the one present on line 500S centred at 300W.

Except for two minor peaks, the gravity profile on line 1000N is featureless. Both peaks are over aeolian sand flats. The magnetic profile reflects the regional trend.

The foregoing discussion has been largely qualitative and no attempt has been made to explain the source of the anomalies. It has been noted that there is a possible correlation between peaks and dolomite outcrop. This correlation is probably due to the fact that dolomite generally has a high density, and thus would give rise to the local positive density contrast required to account for the anomalies. For this reason, subcropping mineralisation need not be the direct cause of the observed anomalies. However, the source of some anomalies, e.g. those of 1000S and 2000S, is obscure. One interesting feature of these two anomalies is that they are the highest points on the gravity profile. On lines north of and including 500S, this property is absent.

Theoretical modelling of the gravity profiles was attempted on line 1000S, the results of which are shown on plan SA78/121 (see Exploration Licence 361 quarterly report to 14.10.79). The modelling has revealed the presence of a 500 metre wide gravity high centred at 500W. In this area, a relatively thin overburden layer consisting of sand and calcareous grits with scattered quartzite float completely covers the bedrock.

(2) Plan SA79/161.

The results of line 5000N are shown on plan SA79/161. The profile cuts the main fault at an oblique angle, thus reducing the gradient. However, the fault trace is thought to be in the vicinity of 2200E. A magnetic anomaly

is present at 2360E, suggesting the fault to be at about 2360E. This discrepancy is probably due to the dip of the fault plane.

A minor fault with a throw of about 20 metres to the west is indicated at 60W.

(3) Plan SA79/162

Plan SA79/162 includes the magnetic and topographic profiles along with the gravity profile of line 6000N.

This line is particularly interesting in that a second order residual was thought to be present, centred at 4700E. This has prompted the surveying of a cross line centred at 4700E and running at a bearing of 330° . The results of this line are shown in plan SA79/163.

Considering line 6000N, it is seen that west of 4700E, the gravity profile exhibits two distinct negative gradients, the first at 4160E, the second at 3400E. One interpretation for these gradients is that they are due to faults. Since the line is at an oblique angle to the main fault, the true gradients are in fact sharper than those displayed on the plan. Assuming that the gradients are representing fault planes, a number of observations can be made. Firstly, the fault at 4160E is closer to the surface than the one present at 3400E. Secondly, the latter has a much greater throw and is obviously the Ediacara Fault. East of 4700E, there is another sharp gradient situated at 5000E. The fault here is at about the same depth and throw to that of 4160E. Outcrop of Brachina Formation is observed at 4200E, and in gully exposures to the east. The outcrop at 4200E coincides with a topographic inflexion which marks a slope increase resulting from Mount Deception alluvial fans.

It appears that the line 6000N residual is the result of a block of Adelaidean rocks being present close to the surface. The block is about 800 metres wide, and is bounded by faults at 4160E and 5000E. This agrees with Adelaidean rocks not being observed west of 4200E. Between 3400E and 4200E the magnetic field is disturbed, with the maximum disturbance occurring in the vicinity of 4040E. This is due to faulting in the area.

East of 5000E, the gravity field is probably reflecting the depth variation to the top of the Adelaidean. Interestingly, a change of gradients in topography at 7500E is coincident with a change in gradient of the gravity profile.

(4) Plan SA79/163

The cross-line shown in plan SA79/163 is perpendicular to the main fault, and thus allows quantitative analysis. After smoothing, the semi-infinite

thick prism model was used to estimate the fault characteristics.

The results obtained were -

Depth	96 metres
Throw	245 metres
Dip	75° northwards

The above calculations were based on a density contrast of 0.56 tm^{-3} existing between Tertiary and Adelaidean. The theoretical profile was calculated for a fault with the above characteristics and is included in the plan. There is good agreement between the two gradients.

Using the maximum horizontal gradient (dg/dx), the fault is located at 2200. This agrees with the theoretical model, which has the edge of the fault at 2260, dipping 75° to the north.

The magnetics indicate however that the fault should be located at 2090. This discrepancy will arise if the magnetic source is located downdip along the fault plane. The result would be shifting of the magnetic disturbance relative to the point of maximum gradient on the gravity profile, as is observed. This, however, is contradictory in that the magnetic anomaly is of a shallow origin, coinciding with an ephemeral creek.

It is clear that the gravity is reflecting the topography of the Adelaidean. To the northwest of 3000, the Adelaidean has a gentle slope, probably interrupted by minor step faults, eventually reaching a depth of about 96 metres at 2260. To the southeast, an analogous situation possibly occurs, with the Adelaidean beginning to level out to a depth of some 150 metres after 4500.

An interesting magnetic feature is present at 4560, and appears to be related to a fault scarp centred at 4700. On smoothing, a magnetic high of 100 nT is revealed. No significant gravity anomaly is associated with it, although a minor high of about 0.2 milligals is obviously associated with the scarp. No magnetic anomalies of similar magnitude have been observed elsewhere in the area. However, it is virtually certain that the magnetic feature relates to a very shallow fault. The fault zone would probably have to contain magnetite over significant widths to explain the observed magnetic amplitude.

Conclusions

- (1) There is possibly a correlation between minor gravity highs and areas where dolomites outcrop.

- (2) This inferred correlation is seen as far north as 1000N, which may be the northern limit of Wonoka Formation outcrop.
- (3) The cause of the anomalies at 2000S/1000W, 1000S/500W, 1500S/1000W and 1500S/240W is uncertain, but may correspond to lateral density changes within the Adelaidean.
- (4) The gravity of line 6000N and the cross line is reflecting the topographic surface of the Adelaidean. A 'topographic' high is indicated at 6000N/4700E.
- (5) The characteristics of the Ediacara Fault at 2200 on the cross line are:

Depth	~ 90 metres
Throw	~ 240 metres
Dip	~ 75°N

FUTURE WORK

Residual gravity anomalies on lines 1000S and 6000N are to be tested by two 450 metre diamond drill holes. Diamond Drilling Pty. Limited have been awarded the drilling contract, and should begin drilling in late June, 1979.

No other field work remains to be done in Exploration Licence 361 until diamond drilling has been completed.

000085

STATEMENT OF EXPENDITURE

EXPLORATION LICENCE 361

3.1.79 - 3. 4.79

Second quarter of second year of tenure

Geological and Geophysical:

none carried out

Drilling:

none carried out

Logistics:

(a) geologists' salaries	520.00
(b) geophysicist's salary	1560.00
(c) report compilation, drafting	470.00

Depreciation:

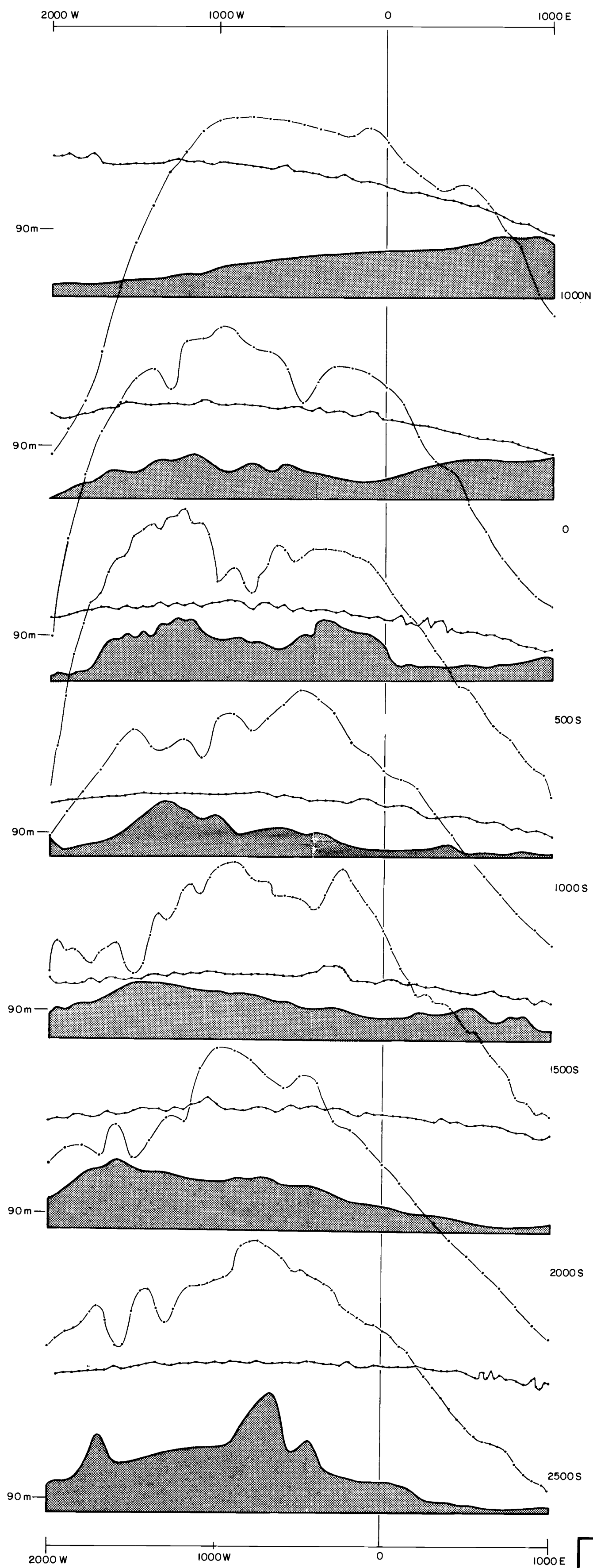
none applicable

Administration	200.00
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\$2750.00

E. L. 361 Accumulative Expenditure	\$91 465.00
------------------------------------	-------------

E. L. 361 Expenditure commitment (24 months)	\$94 000.00
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L E G E N D

--- Gravity

--- Magnetics

--- Topography

ENV 3132-73

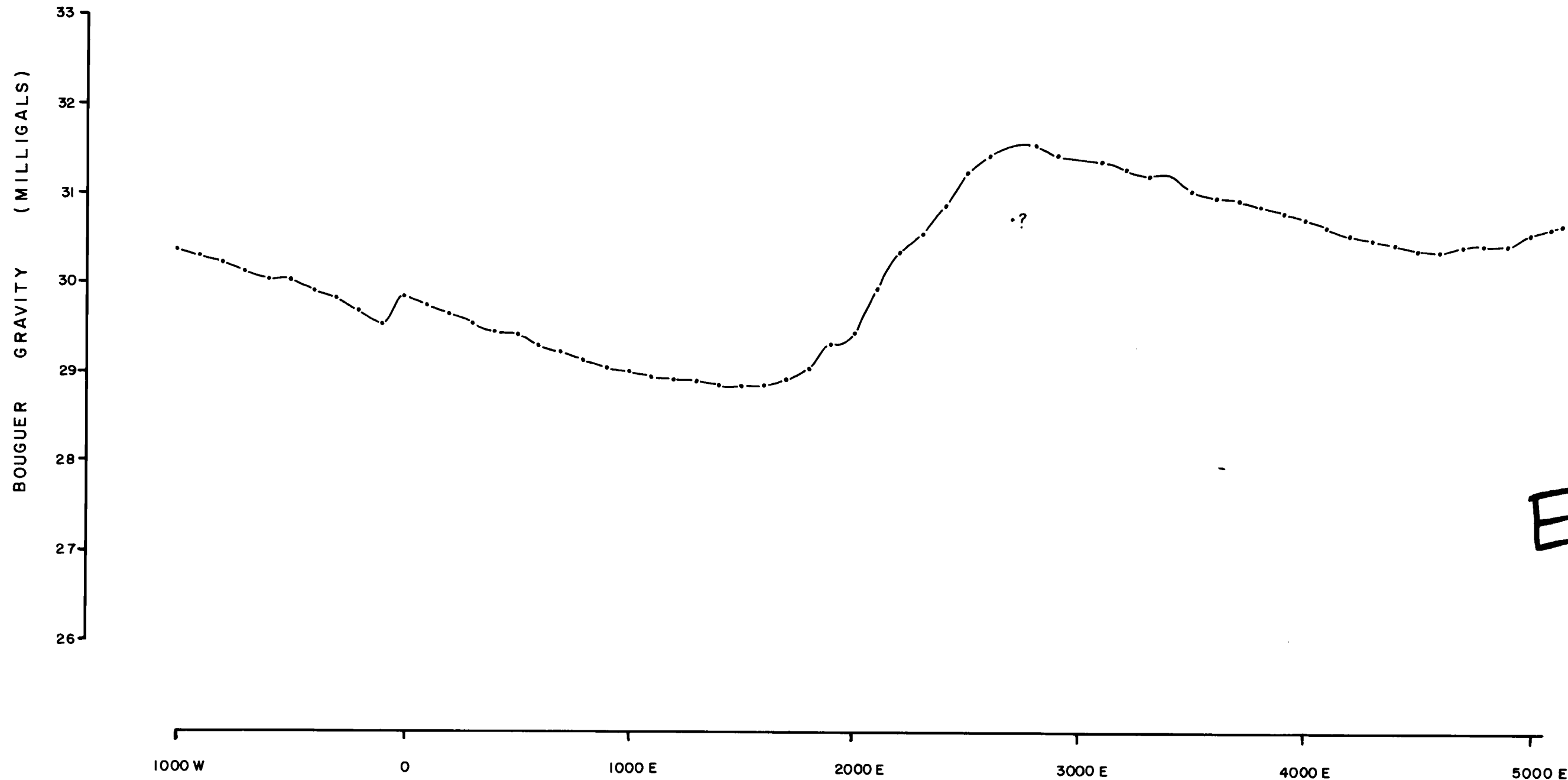


C O M A L C O

SOUTH AUSTRALIA
E.L. 361.

STACKED PROFILES OF GRAVITY
MAGNETICS & TOPOGRAPHY OF
LINES 1000N, 0, 500S, 1000S, 1500S
2000S 2500S.

Compiled: J.C.	Revised:	Drawn: M.A.
Date: April, 1979	Scale: vs. 1:1000	Drq N° SA-79-160



ENV3132-74

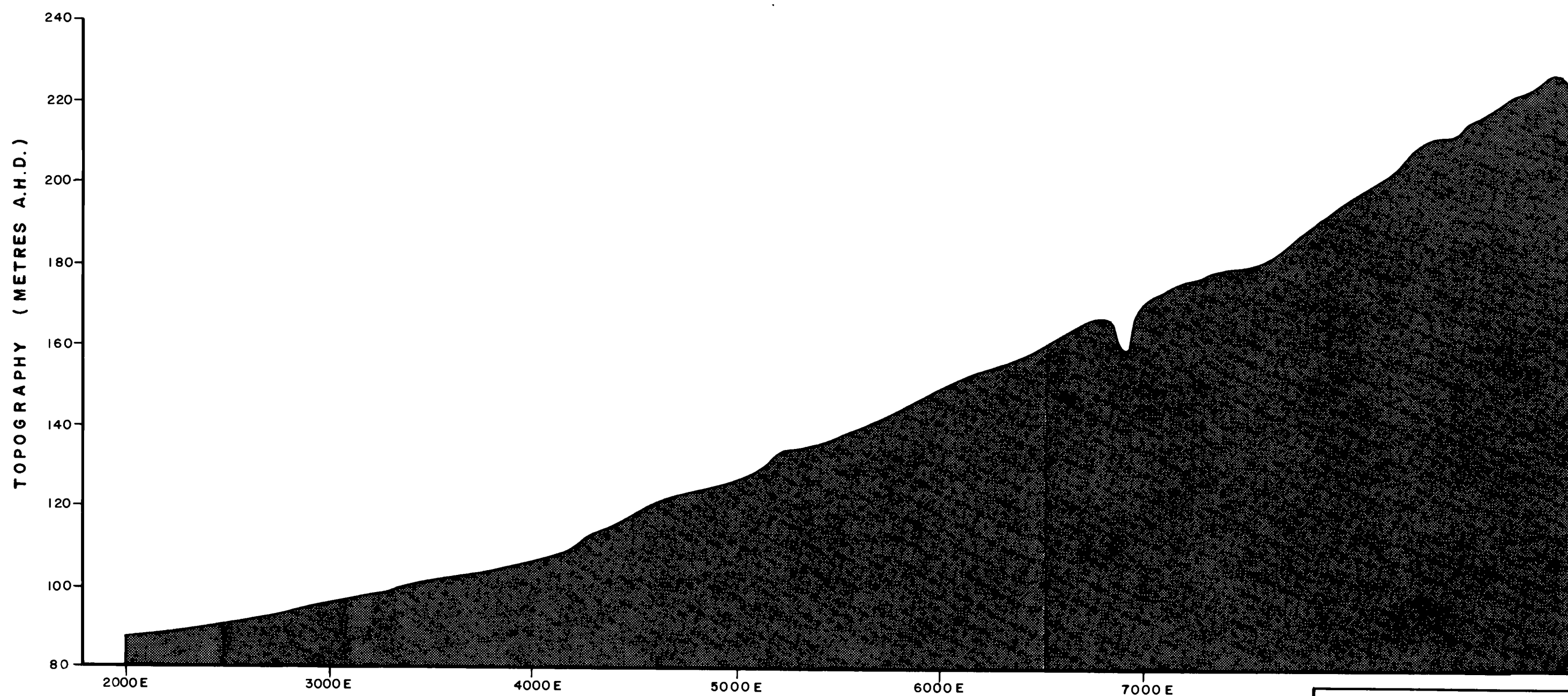
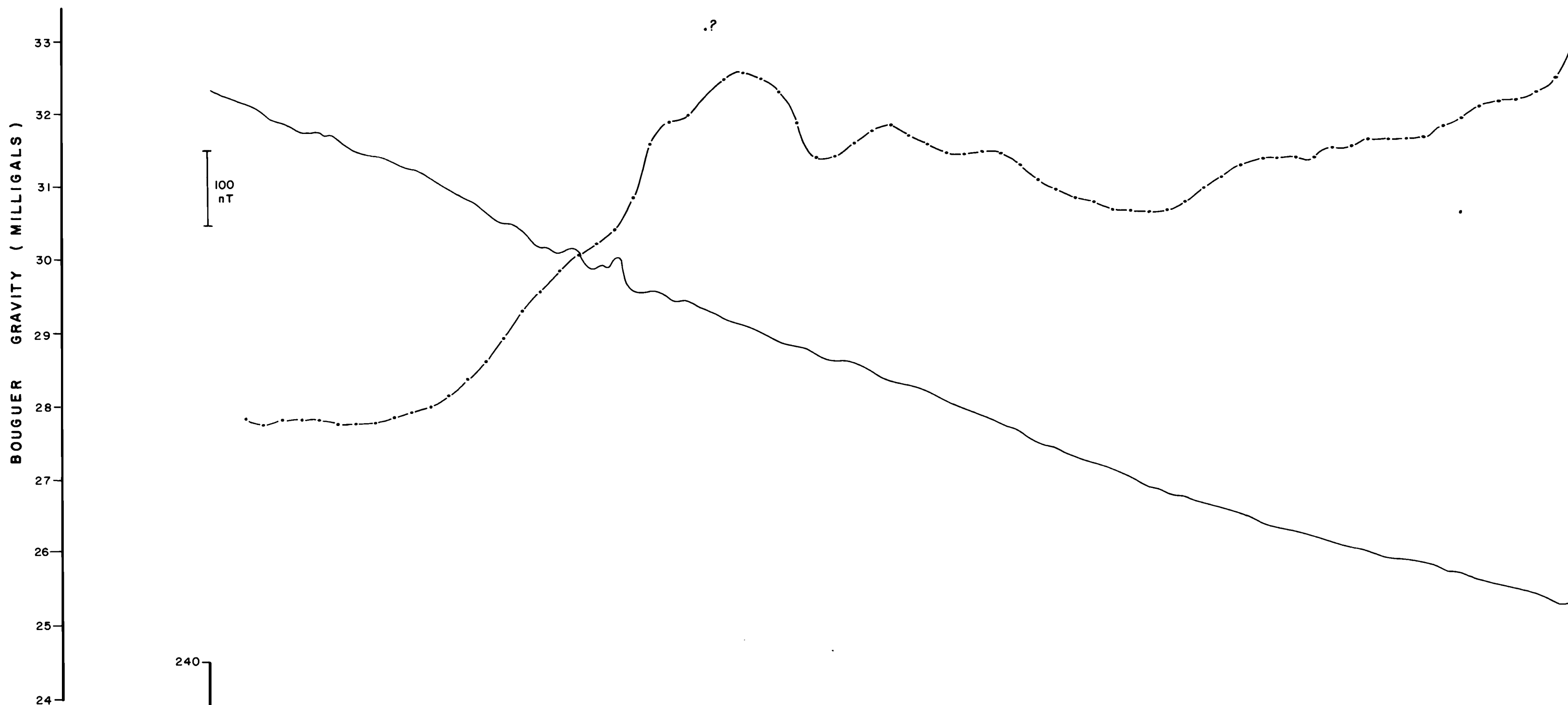


C O M A L C O

SOUTH AUSTRALIA
EL 361

GRAVITY PROFILE
OF LINE 5000 N

Compiled J.C.	Revised:	Drawn: M.A.
Date: April, 1979	Scale: HS 1:20,000	Drg No SA-79-161

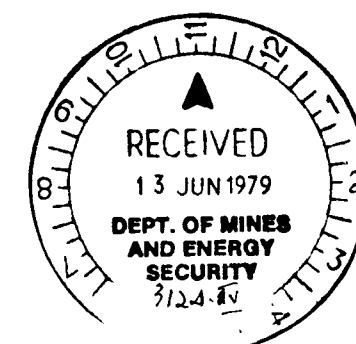


LEGEND

--- Gravity

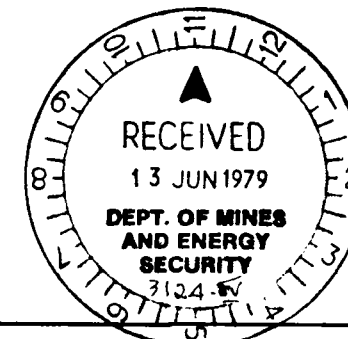
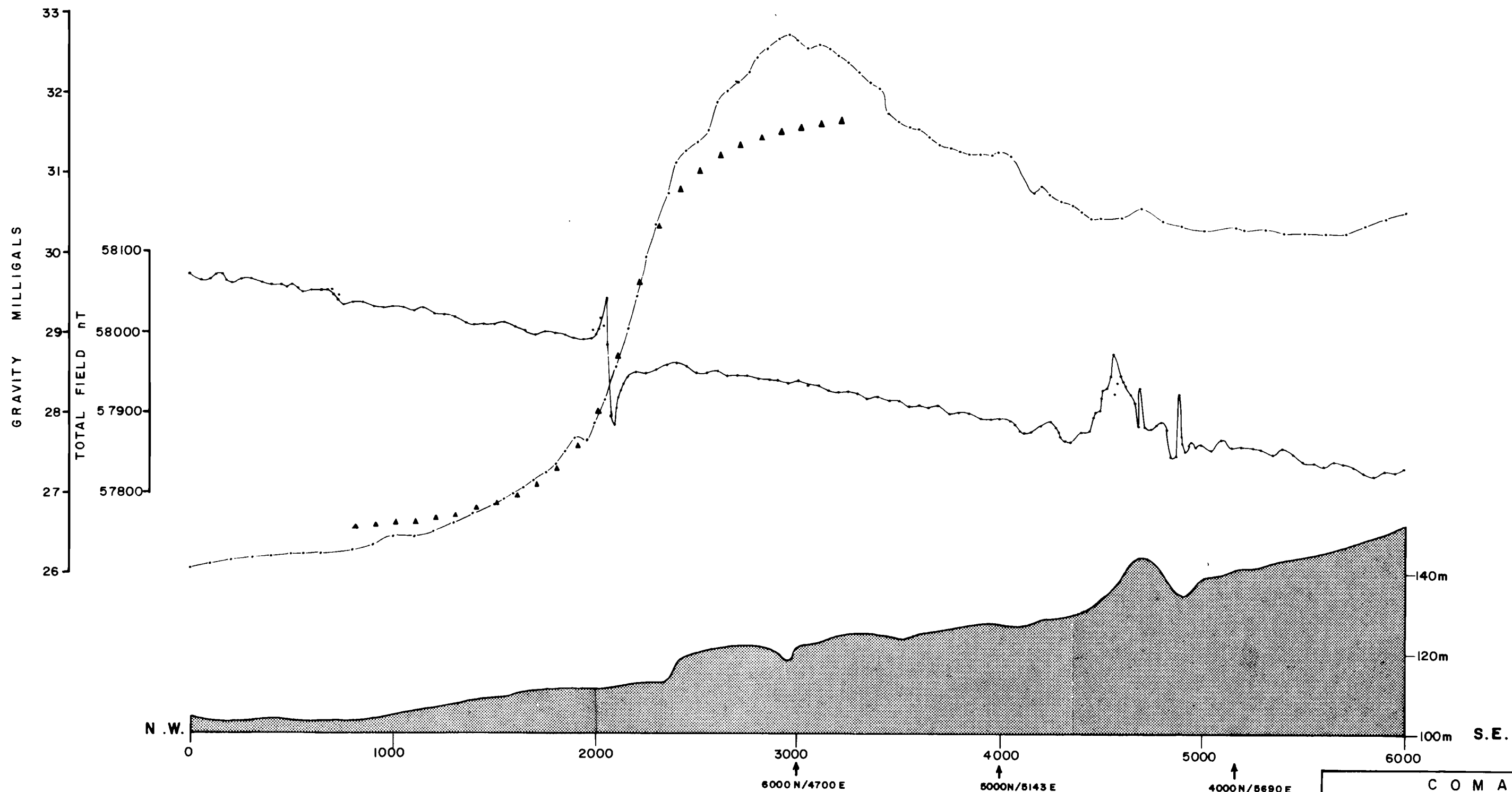
--- Magnetics

Topography



COMALCO		
SOUTH AUSTRALIA E.L. 361.		
GRAVITY, MAGNETICS AND TOPOGRAPHY OF LINE 6000 N		
Compiled: J.C.	Revised:	Drawn: M.A.
Date: April, 1979	Scale: 1:20000 vs 1:1000	DrgN° SA-79-162

ENV 3132-75



C O M A L C O		
SOUTH AUSTRALIA		
E.L. 361		
PROFILES OF GRAVITY MAGNETICS & TOPOGRAPHY OF CROSS LINE		
ENV 3132-76		
Compiled: J. C.	Revised:	Drawn: M. A.
Date: April, 1979	Scale: MS 1: 20,000 VS 1: 1000	Dwg No SA-79-163



000086

COMALCO LIMITED
Incorporated in Victoria

95 Collins Street
Melbourne Australia

Please reply to: Adelaide Regional Office
Exploration Department
P.O. Box 20,
PLYMPTON, S.A., 5038.

AHW/JW

13 August, 1979.

The Director General,
South Australian Department of Mines & Energy,
P.O. Box 151,
EASTWOOD, S.A., 5063.

Dear Sir:

Quarterly Report EL 361 - Sundown Creek
for the period 4.4.79 to 3.7.79.

I wish to advise that during the quarter 4.4.79 to 3.7.79, diamond drilling was commenced in EL 361 and at 3.7.79 drilling was still in progress. One vertical hole is being continuously cored to a target depth of 450m and upon completion will be logged for SP, Resistivity, gamma ray and density logs. The results of the drilling, logs etc. will be forwarded to you with the next report. Please find attached a map confirming the location of the drill hole. //

Yours faithfully,
COMMONWEALTH ALUMINIUM CORPORATION LIMITED.

(Dr.) A. H. White
Senior Geologist.

Encl.

GPO Box 2773 Y Melbourne 3001
Telegraphic 'Forcomal' Telex 30108
Telephone 6544211





000087

COMALCO LIMITED
*Incorporated in Victoria*95 Collins Street
Melbourne Australia

Please reply to: Adelaide Regional Office
Exploration Department
P.O. Box 20,
PLYMPTON, S.A., 5038.

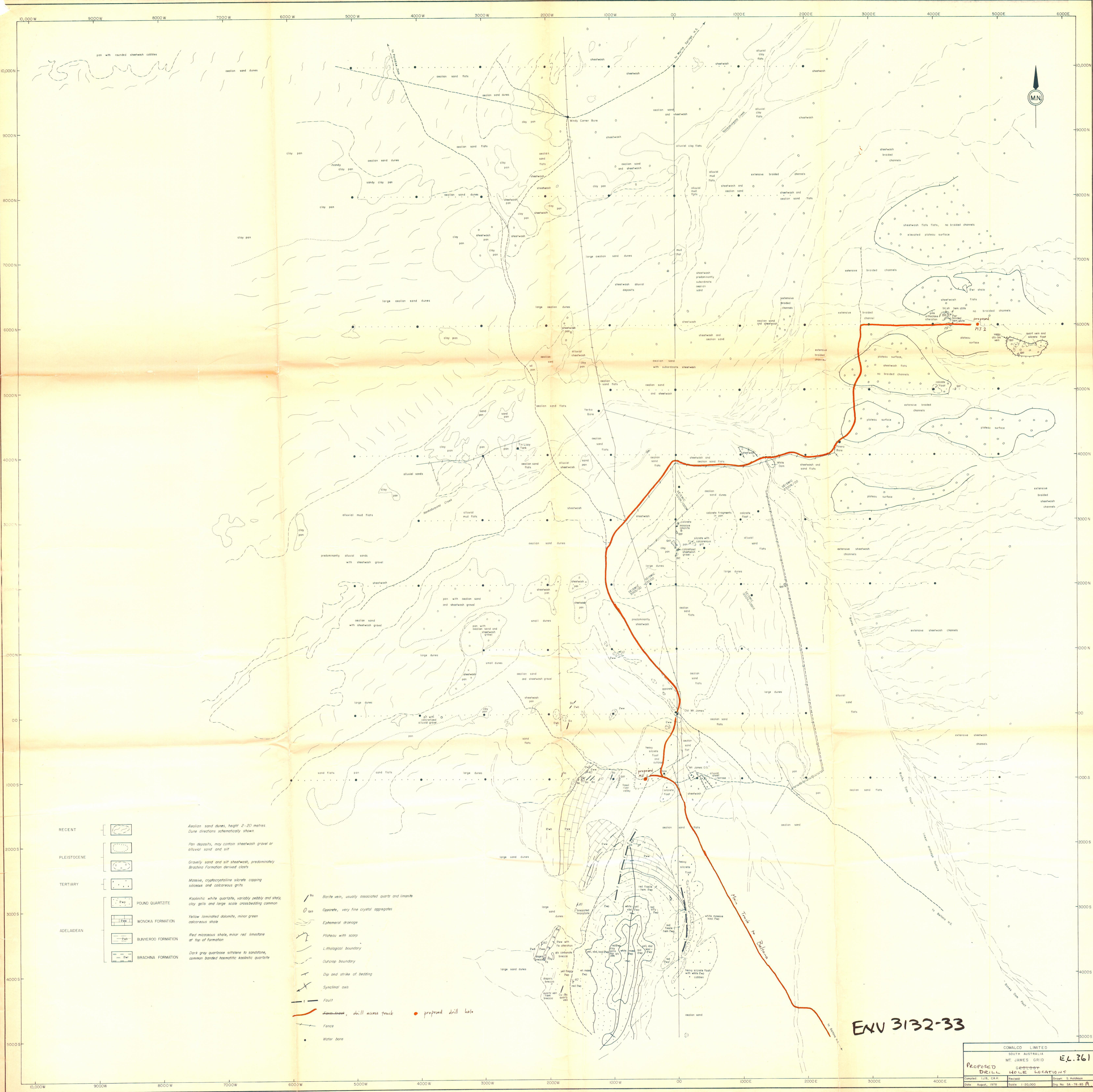
AHW/JW

13 August, 1979.

STATEMENT OF EXPENDITURE

E.L. 361 4.4.79 - 3.7.79

Geological and Geophysical	none carried out
Drilling	\$ 11,404.00
Logistics (a) geologists' salaries	3,650.00
(b) geophysicist's salary	300.00
(c) field assistants' salaries	800.00
(d) field supplies	500.00
(e) vehicle costs	450.00
Depreciation: Middilogger	73.00
Equipment	25.00
Administration	500.00
	\$ 18,252.00
E.L. 361 Accumulative expenditure	\$108,717.00
E.L. 361 Expenditure commitment (24 months)	\$ 94,000.00



ENV 3132-33

000088

FINAL REPORT

EL 361

Sundown Creek

by A.H. WHITE
Exploration Manager

COMMONWEALTH ALUMINIUM
CORPORATION LIMITED

26 May, 1980

CONTENTS

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PREVIOUS WORK	1
PHYSIOGRAPHY	1
SUMMARY OF EXPLORATION	
1. <u>Adelaidean</u>	1
2. <u>Tertiary</u>	3
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REFERENCES	5

Appendix I List of Quarterly Reports

Figures SA-78-82 ✓
 SA-78-116 ✓
 SA-78-136 ✓ A
 SA-79-168 A B C D ✓

INTRODUCTION

Exploration of the western part of EL 361 was carried out to assess the mineral potential of an area of Adelaidean rocks along the Ediacara Fault, and to test the Tertiary sequence in the adjacent Pirie-Torrens Basin for saline evaporite minerals. Geophysical investigations, geological mapping and drilling programs were completed without finding any mineralisation, and the exploration licence was subsequently allowed to lapse. This final report is a summary of the work carried out, the details of which are contained in quarterly reports (Appendix I).

PREVIOUS WORK

Previous work with a bearing on the geology of the area of EL 361 has been published by Leeson (1970), Coates (1973) and Binks (1972). Previous mineral exploration in the region was concentrated to the south around the Ediacara lead-silver workings (Binks, 1972).

PHYSIOGRAPHY

The area covered by EL 361 is semi-arid to arid, with average annual rainfall being less than 200 mm. The region has several distinct physiographic features: on the eastern side is Mt. Deception (685 m) which is flanked on the west by spectacular coalescing piedmont fans which spread onto a plain east of the Ediacara Range. The latter is a line of hills trending north-south, and reaching 100 m above sea level at Mt. James. West of the Ediacara Range a modern dune field 20 km wide borders the modern playa surface of Lake Torrens, which is about sea level. EL 361 takes in Mt. Deception, the piedmont fans, and the eastern flank and the northern end of the Ediacara Range.

SUMMARY OF EXPLORATION

1. Adelaidean

A large magnetic high is visible on the SA Department of Mines & Energy 1:1,000,000 total magnetic intensity map. The location of this was checked using a ground proton precession magnetometer

survey. An east-west gravity traverse run concurrently with the magnetometer survey indicated a gravity high, northeast of Mt. James, and it was decided to complete a detailed gravity survey on a grid which eventually covered an area 14 km by 10 km (Fig. SA-78-136).

The magnetic survey confirmed the existence of a broad magnetic high which as interpreted to reflect magnetic basement at about 7 km depth (Fig. SA-78-82). The gravity survey revealed two features: firstly, that the Ediacara Fault swings northeastwards from the northern end of the Ediacara Range, (Fig. SA-78-116); and secondly, that there is a marked positive Bouguer gravity anomaly on the eastern side of the fault. The anomaly was variously interpreted to indicate either fault bounded blocks of Wonoka Formation dolomite near the surface, in a northern subcropping continuation of the Ediacara Range, or to indicate denser rocks possibly containing disseminated mineralisation.

A seismic refraction survey was completed in the area of the Ediacara Fault and consisted of two orthogonal lines, a north-south traverse and an east-west traverse oriented parallel and perpendicular respectively to the gravity anomaly. The seismic refraction survey was designed to estimate the total throw on the Ediacara fault. A total of 3.6 km of continuous refraction profile was shot.

Geological mapping and geochemical surface sampling were completed in the general area of the magnetometer-gravity survey grid. Intrusive dolomite breccias were discovered along the western margin of the Ediacara Range, in what was assumed to be the zone of the Ediacara Fault. Minor copper and baryte mineralisation appeared to be related to the intrusive dolomite breccias. Analyses indicated a distinct anomalous barium-manganese-strontium-copper association in the dolomite breccia veins. Insignificant concentrations of base metals were found in surface samples of Adelaidean sediments. Several outcrops of heavily hematite and goethite stained sandstone were found

northwest of Mt. Deception in Brachina Formation outcrops.

A diamond drill hole was drilled to a total depth of 450 m in EL 361 (see Fig. SA-78-136 for location) as the ultimate test of the theories of mineralisation. The drill hole was located on a gravity anomaly. Several attempts were made to run electric logs in the hole, however, due to caving in the hole, logs were only obtained down to 320 m. The drill hole intersected essentially unmineralised Brachina Formation (upper Adelaidean) dolomitic sandstones, siltstones and shales (Fig. SA-79-168). The rocks are similar to those cropping out to the east at Mt. Deception, and are a red-bed sequence interpreted to be part of a lacustrine delta sequence on the basis of bed thickness, thinly interbedded claystone, siltstone and sandstone units, and the presence of cross bedding and micro cross bedding in the sediments. The sedimentary rocks locally contain narrow fractures filled with chlorite and calcite and some pyrite. Disseminated pyrite in small amounts is present in some of the grey sandstones and siltstones.

2. Tertiary

The seismic refraction survey indicated that there was up to 130 m of Tertiary sediments. The Tertiary sediments contained two velocity layers, the first layer being a few metres thick with a velocity of 1000 m/sec. and the second layer being of the order of 100 m thick with a velocity of 2120 m/sec - 2870 m/sec. These overlie a high velocity refractor with a velocity of 3880 m/sec. - 4330 m/sec. The Tertiary sequence was drilled by means of a rotary drilling programme in the adjacent Exploration Licence 379. The Tertiary rocks were considered to be prospective for evaporite minerals deposited in the Pirie-Torrens Basin, however the drilling programme proved that there was little likelihood of finding economic saline mineral deposits in the Tertiary sequence. Since the two drilling programmes failed to show any sign of economic mineralisation, Exploration Licence 361 was allowed to lapse.

EXPENDITURE

Salaries & logistics	\$ 86,580.00
Reporting	9,770.00
Depreciation	218.00
Drilling	11,404.00
Administration	3,570.00
	\$ 111,542.00

John White

REFERENCES

- BINKS, P.J., 1972, Late Cainozoic Uplift of the Ediacara Range,
Proc. Aust. I.M.M. 243.
- COATES, R.P., 1973, Copley 1:250,000 Geological Series Sheet
SH/154-9, Geol. Surv. S. Aust.
- LEESON, B., 1970, Geology of the Beltana 1:63,360 Map Area,
Rep. Invest. Geol. Surv. S. Aust. 35.

APPENDIX I

Quarterly Report EL 361 , 14.10.77 - 14.1.78, by A.H. WHITE

" " " 14.1.78 - 14.4.78, by A.H. WHITE

" " " 14.4.78 - 14.7.78, by A.H. WHITE

" " " 14.7.78 - 14.10.78, by A.H. WHITE

" " " 3.1.79 - 3.4.79 , by I.J. BUCHHORN

" " " 3.4.79 - 3.7.79 , by A.H. WHITE

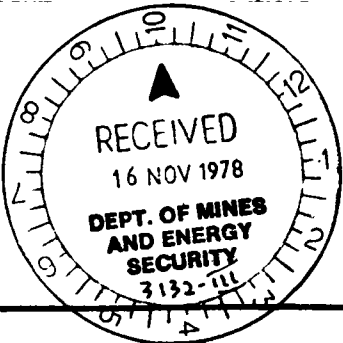
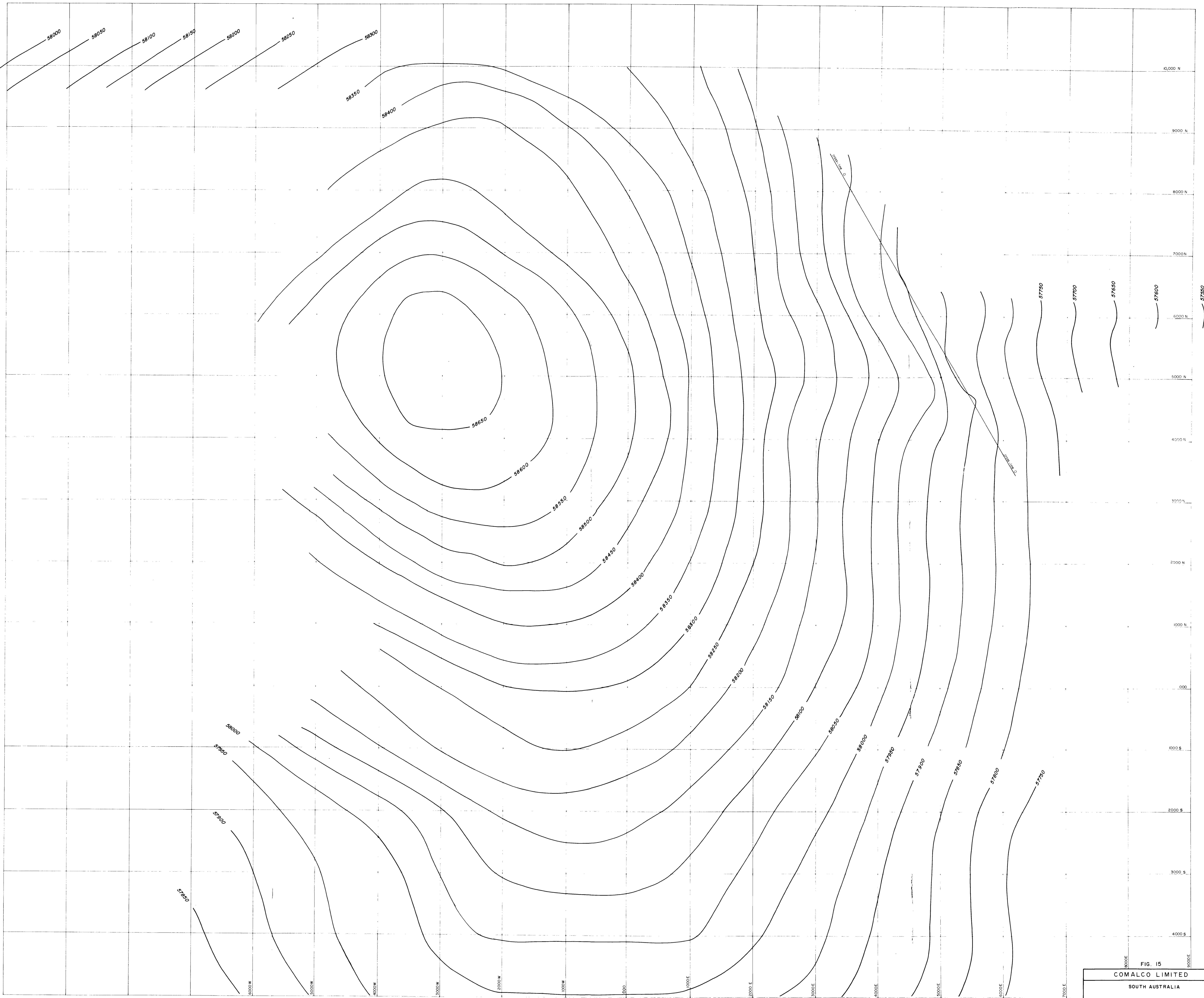
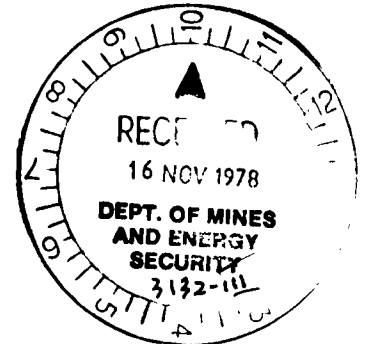


FIG. 15	
COMALCO LIMITED	
SOUTH AUSTRALIA	
E.L. 361, 379 PROTON MAGNETOMETER	
CONTOUR MAP	
ENV 3132-58	
Compiled A.H.W.	Revised September, 1978
Date June, 1978	Scale 1:20,000
Drg No SA-78-82	

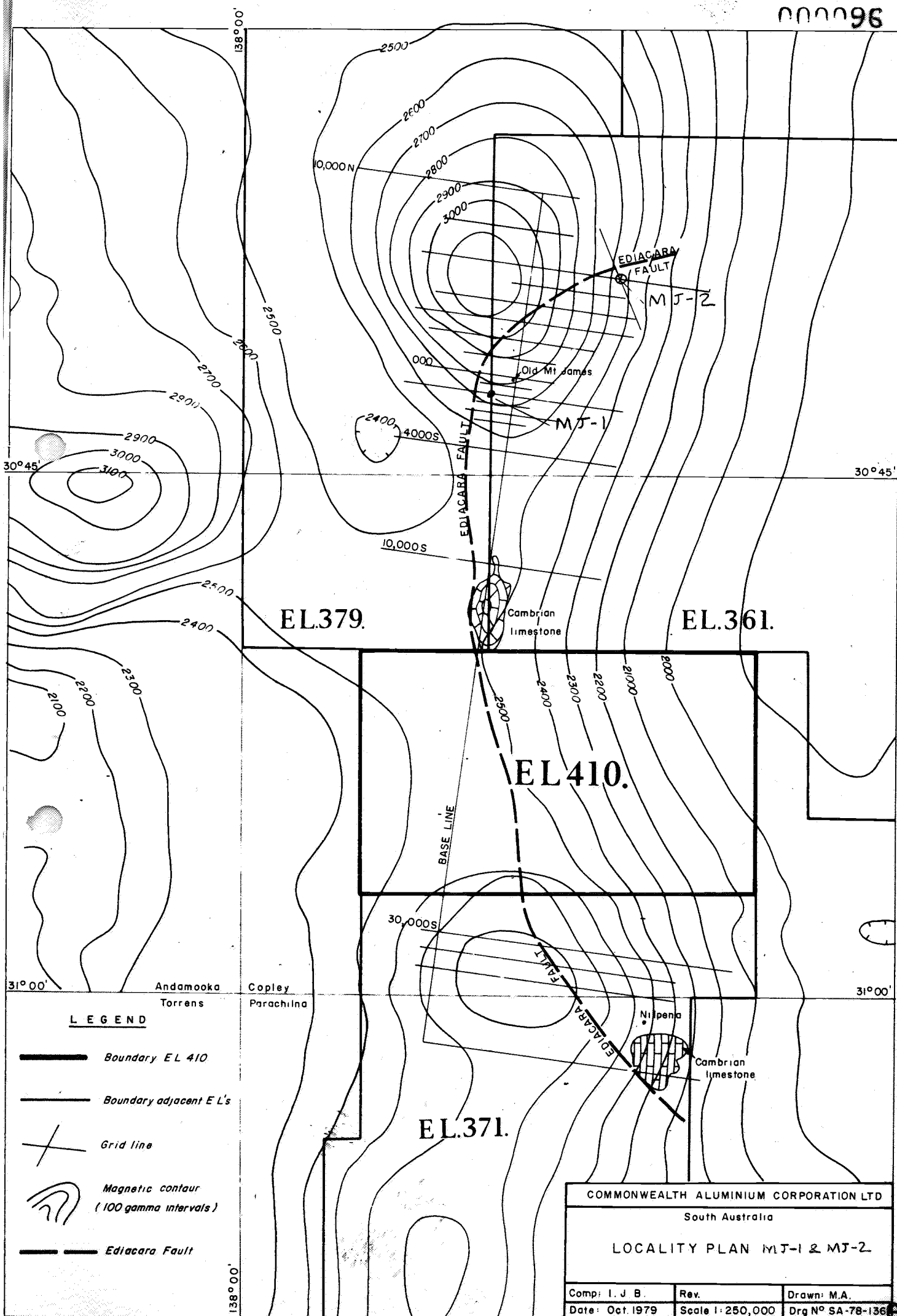


BOUGUER GRAVITY
Density 2.20 gm / cm³ - 2.67 gm / cm³

8000 W 7000 W 6000 W 5000 W 4000 W 3000 W 2000 W 1000 W 000 1000 E 2000 E 3000 E 4000 E 5000 E 6000 E

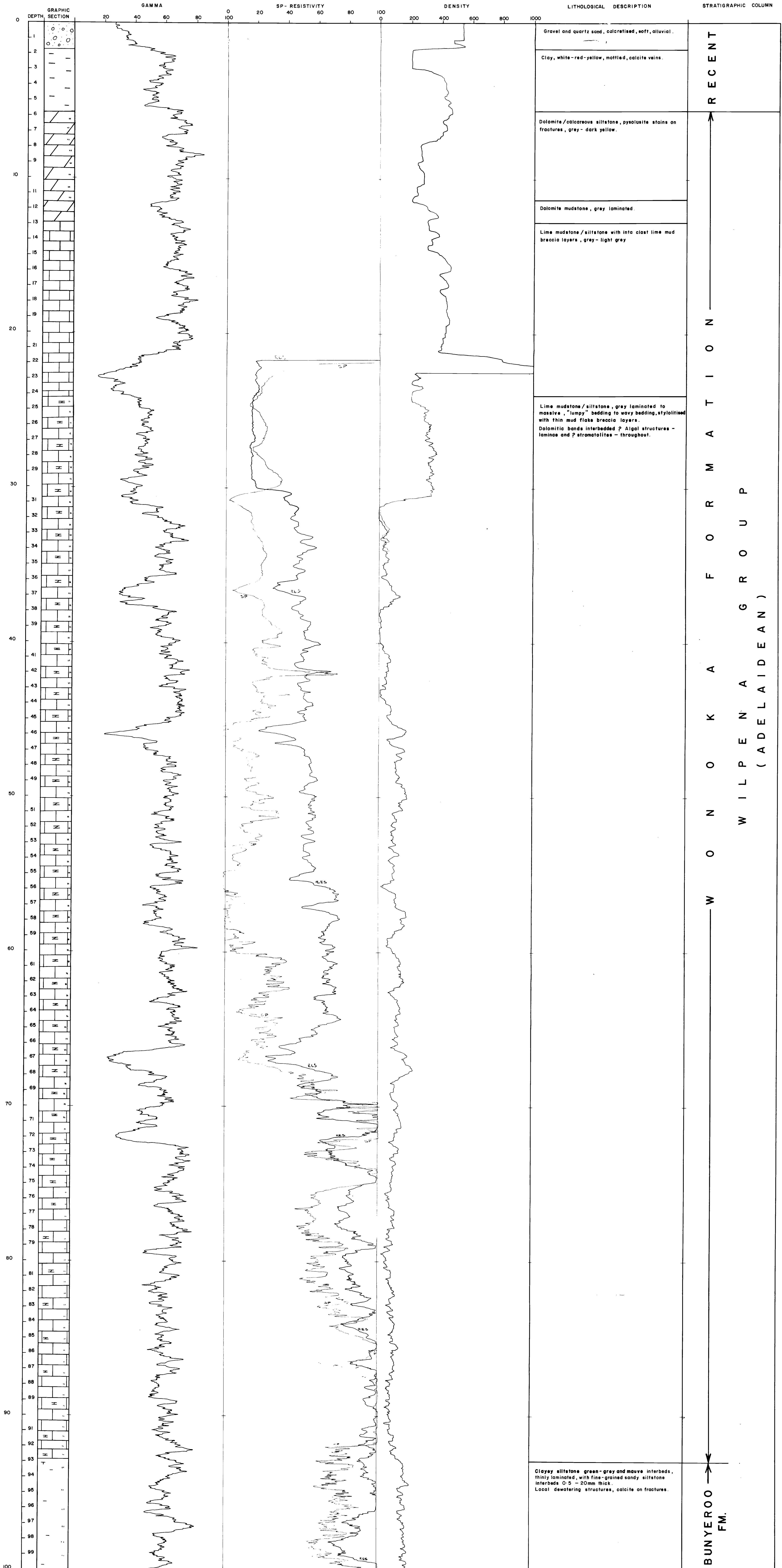


COMALCO LIMITED		
SOUTH AUSTRALIA		
EL. 361, 379		
BOUGUER GRAVITY		
(Contour Interval 0.5 milligals)		
ENV 3132-71		
Compiled: J.C.	Revised:	Drawn: M.A.
Date: August, 1978	Scale: 1:20,000	Org No SA-78-116



C O M A L C O		
SOUTH AUSTRALIA		
MOUNT JAMES E.L. 361.		
COMPOSITE WELL LOG - DRILL HOLE MJ-2 (1)		
Compiled I. J. B.	Revised:	Drawn M. P., MA
Date: October, 1979	Scale 1:100	Drg N° SA-79-168 A

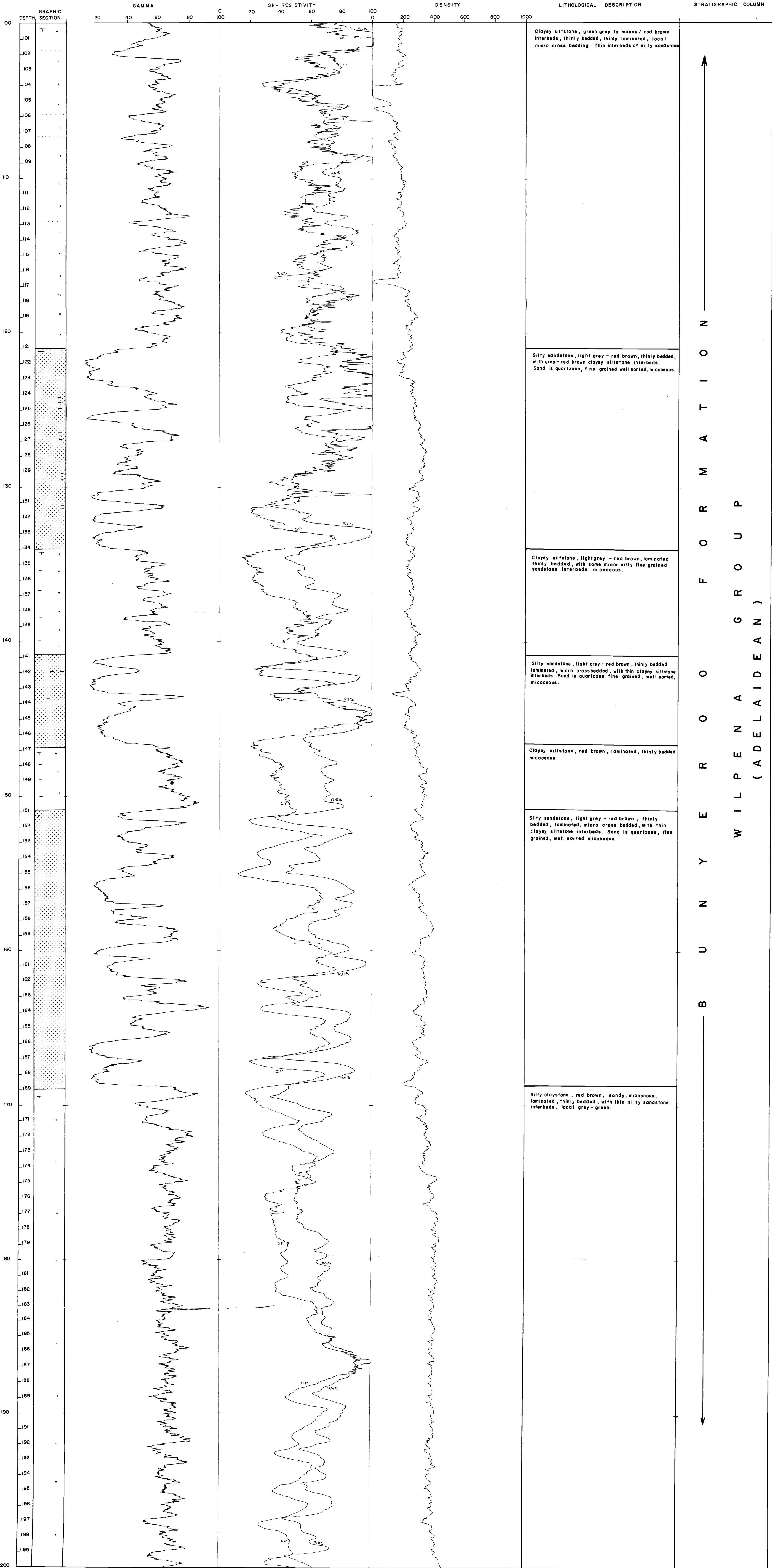
Location:	Latitude: 30° 39' 14" S	Date Spudded: 22-7-79	Drilled by: Diamond Drilling Pty Ltd.	Logged By: Comalco Exploration Dept.
	Longitude: 138° 12' 35" E	Date completed: 15-8-79	Drill: Longyear 38	Logging unit: Austral L800
	Grid: 6000 N / 4700 E		Well Site Geologist:	Logger:
Elevation:	m. a. s. l. 110 metres (approx)	Casing 1.5m of 4" casing 6m of HQ casing		Hole Diameter: 96.1mm from 0.00 to 30.42m, HQ 75.7mm from 30.42 to 303.08m, NQ 59.9mm from 303.08 to 454.15m, BQ.
Logs Run:	S.P.	Resistivity	Gamma Ray	Density
Logged Depth:	315.30m	315-30m	311.00m	225-90m
Scale range:	100 mv - ve polarity	100 ohm	100 cps	1000 cps
Paper speed:	1 cm / m	1 cm / m	1 cm / m	1 cm / m
Logging Speed:	8m / min	8m / min	4m / min.	4m / min.
				15cm spacer.



ENV 3132-78

C O M A L C O		
SOUTH AUSTRALIA		
MOUNT JAMES E.L. 361.		
COMPOSITE WELL LOG - DRILL HOLE MJ-2		
Compiled: J.B.	Revised:	Drawn: M.P. MA
Date: October, 1979	Scale: 1:100	Drill No: SA-79-168 B

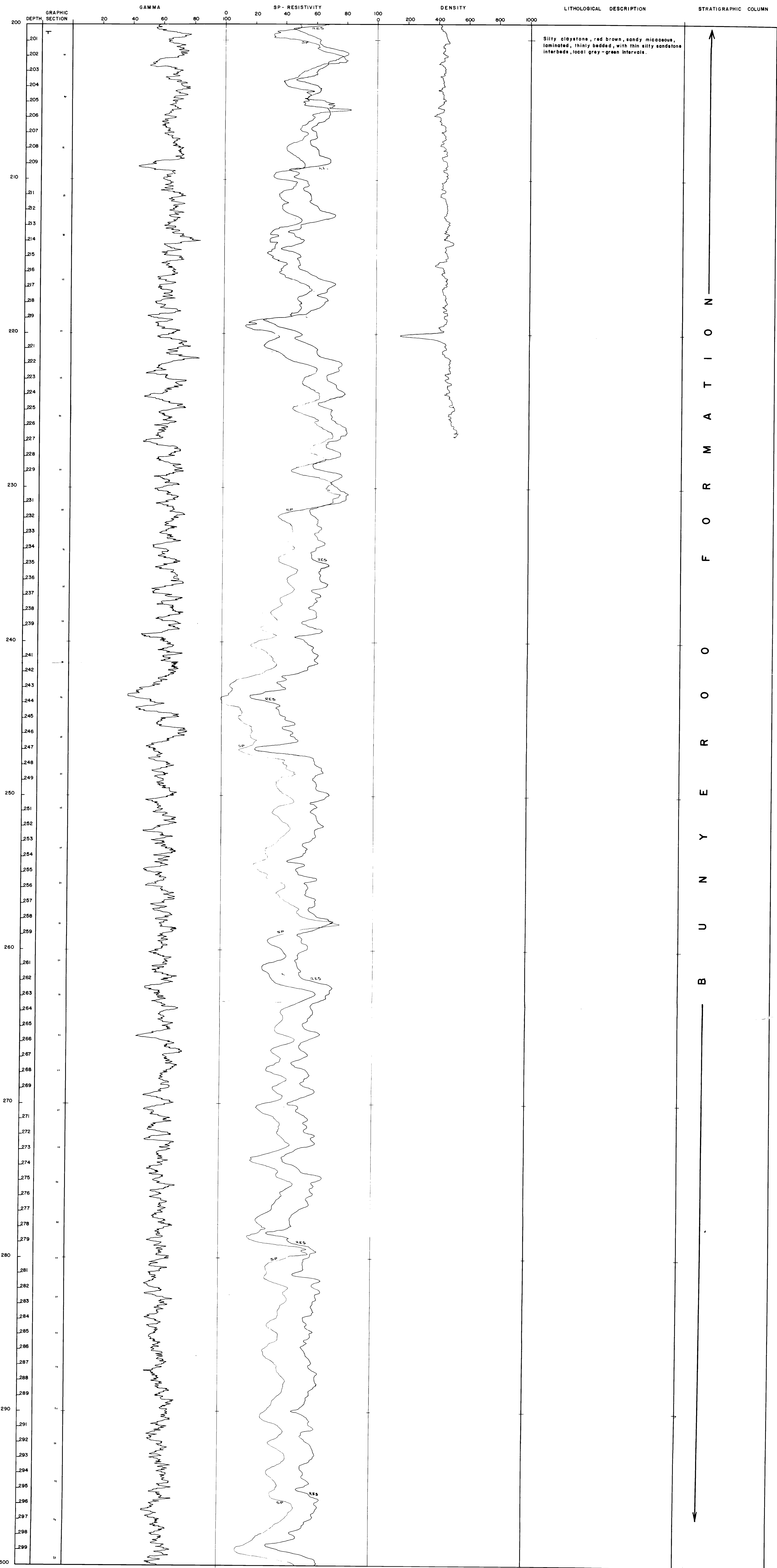
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	Longitude: 138° 12' 35" E	Date completed: 15-8-79	Drill: Longyear 38	Logging unit: Austral L800
	Grid: 6000 N / 4700 E		Well Site Geologist:	Logger:
Elevation:	m a.s.l. 110 metres (approx)	Casing: 15m of 4" casing 6m of HQ casing		Hole Diameter: 96.1mm from 0.00 to 30.42m, HQ 75.7mm from 30.42 to 303.08m, HQ 59.9mm from 303.08 to 434.15m, HQ
Logs Run:	S.P.	Resistivity	Gamma Ray	Density
Logged Depth:	311.40m	311.30m	311.00m	2.5-90m
Scale range:	100 mv -ve polarity	1.0 ohm	100 cps	1000 cps
Paper speed:	1 cm / m	1 cm / m	1 cm / m	1 cm / m
Logging Speed:	8m / min	8m / min	4m / min	4m / min
				15cm spacer



ENV 3132-78

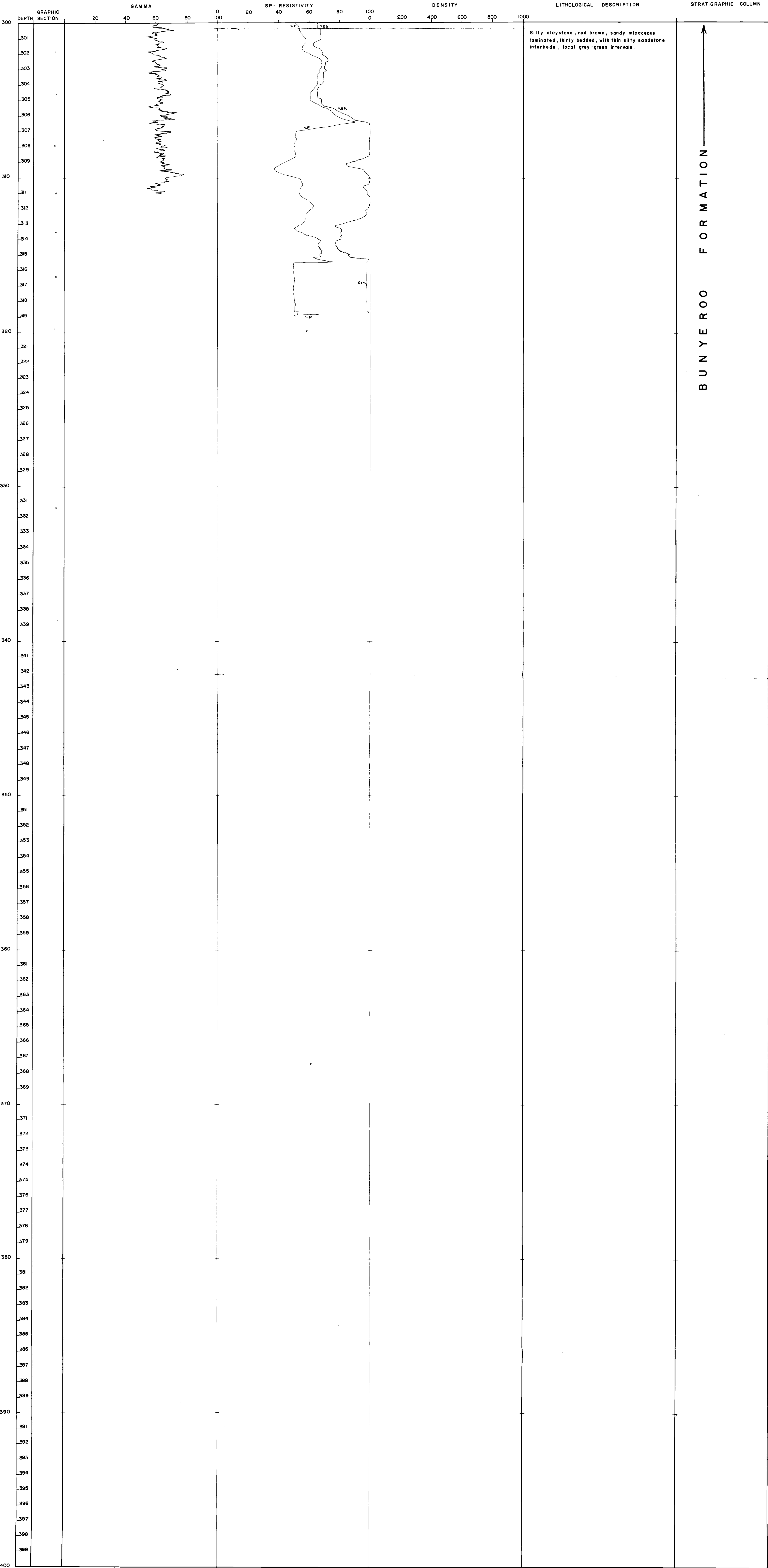
C O M A L C O		
SOUTH AUSTRALIA		
MOUNT JAMES E.L. 361.		
COMPOSITE WELL LOG - DRILL HOLE MJ-2		
Compiled: I. J. B.	Revised:	Drawn: M. P. MA
Date: October, 1979	Scale: 1:100	Drg N° SA-79-168 C

Location:	Latitude: 30° 39' 14" S	Date Spudded: 22-7-79	Drilled by: Diamond Drilling Pty Ltd.	Logged By: Comalco Exploration Dept.
	Longitude: 138° 12' 35" E	Date completed: 15-8-79	Drill: Longyear 38	Logging unit: Austral L800
	Grid: 6000 N / 4700 E		Well Site Geologist:	Logger:
Elevation:	m. a. s. l. 110 metres (approx)	Casing: 1.5m of 4" casing 6m of HQ casing		Hole Diameter: 96.1mm from 0.00 to 30.42m, HQ 75.7mm from 30.42 to 303.08m, NQ 59.9mm from 303.08 to 454.15m, BQ
Logs Run:	S.P.	Resistivity	Gamma Ray	Density
Logged Depth:	315.00m	315-30m	311.00m	205-90m
Scale range:	100 mv - ve polarity	100 ohm	100 cps	1000 cps
Paper speed:	1cm / m	1cm / m	1cm / m	1cm / m
Logging Speed:	8m / min	8m / min	4m / min.	4m / min.
				15cm spacer.



C O M A L C O		
SOUTH AUSTRALIA		
MOUNT JAMES E.L. 361.		
COMPOSITE WELL LOG - DRILL HOLE MJ-2		
Compiled: J. J. B.	Revised:	Drawn: M.P., MA
Date: October, 1979	Scale: 1:100	Drn: SA-79-168 D

Location:	Latitude: 30° 39' 14" S	Date Spudded: 22-7-79	Drilled by: Diamond Drilling Pty Ltd.	Logged By: Comalco Exploration Dept.
	Longitude: 138° 12' 35" E	Date completed: 15-8-79	Drill: Longyear 38	Logging unit: Austral L800
	Grid: 6000 N / 4700 E		Well Site Geologist:	Logger:
Elevation:	m.a.s.l. 110 metres (approx)	Casing: 1.5m of 4" casing 6m of HQ casing		Hole Diameter: 96.1mm from 0.00 to 30.42m, HQ 75.7mm from 30.42 to 303.08m, HQ 59.9mm from 303.08 to 454.15m, HQ.
Logs Run:	S.P.	Resistivity	Gamma Ray	Density
Logged Depth:	315.30m	315.30m	311.00m	225.90m
Scale range:	100 mv - ve polarity	100 ohm	100 cps	1000 cps
Paper speed:	1 cm / m	1 cm / m	1 cm / m	1 cm / m
Logging Speed:	8m / min.	8m / min	4m / min.	4m / min.
				15cm spacer.



BUNYEROO FORMATION