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SML 174

MOUNT CRAWFORD

PROGRESS AND FINAL REPORTS TO LICENCE EXPIRY/SURRENDER FOR THE PERIOD 1/3/1968 TO 28/2/1970

Submitted by
Australian Blue Metal Ltd
1969

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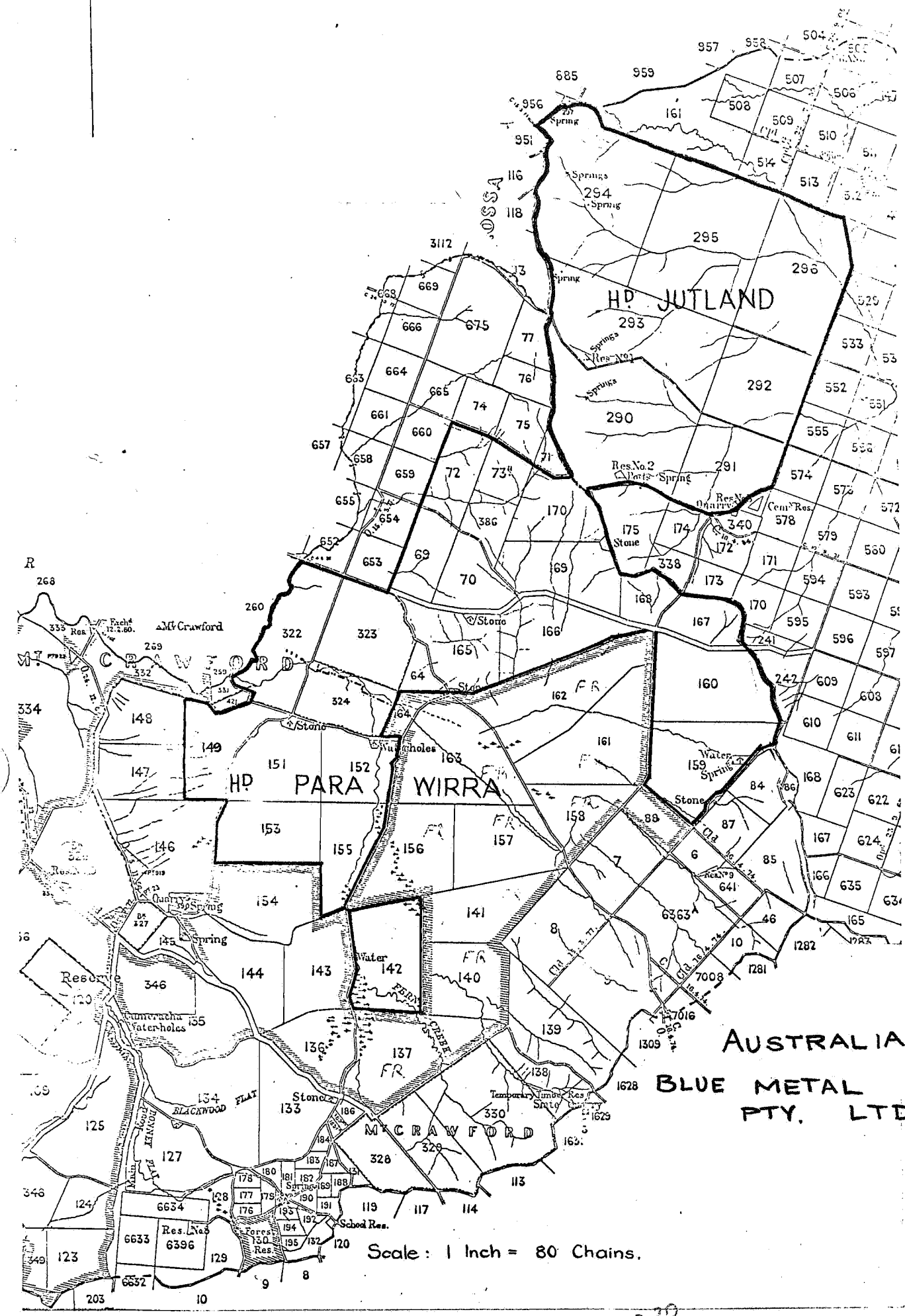

AUSTRALIAN BLUE METAL PTY. LTD.

DM. 227/68

EXP 28.2.70

S.M.L. 174

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TENEMENT: S.M.L. 174

TENEMENT HOLDER: AUSTRALIAN BLUE METAL PTY. LTD.

REPORTS

918

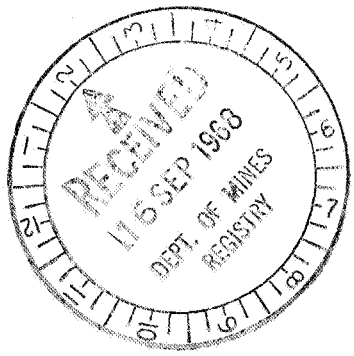
03

Australian Blue Metal Ltd.

PROGRESS REPORT No. 1

Special Mining Lease 174

September 9, 1968.



REPORT ON EXPLORATION WORK FROM
MARCH 1 TO SEPTEMBER 1, 1968

SPECIAL MINING LEASE NO. 174

Introduction

Special Mineral Lease No. 174 was granted by the Minister for Mines for South Australia on March 1, 1968 to Australian Blue Metal Ltd. (The lease initially covered an area of 13 square miles but an application has been made recently for the inclusion of additional areas which would make a total area of approximately 22 square miles in the Hundreds of Jutland and Para Wirra).

The main interest in this area is a deposit of kaolinised sandstone.

Initial scout drilling and two open cuts confirmed the existence of kaolinised material over a large area and assay work by The Australian Mineral Development Laboratories revealed promising yields of high quality kaolin from a number of samples.

Interest in the deposit has been shown by a number of overseas companies who are already engaged in the kaolin industry. Based on the evidence which was available at the end of June 1968 it was decided to undertake a complete technical and economic study of the feasibility of developing the deposit. This study is now in progress.

Exploration and Assay Work

A total of 69 scout holes has been drilled using auger type and percussion type drilling equipment. Attached are log sheets and a map showing locations of scout drill holes. Disturbed samples from an open cut and some of the scout drill holes have been analysed and tested for various properties by AMDL. Copies of these reports are included herewith. Analytical work on other scout drill hole samples has been carried out at the laboratory of Ready Mixed

Concrete (S.A.) Pty. Ltd. where atomic absorption spectrophotometric equipment has been installed to assist our prospecting investigations.

Geological Surveys

1. A preliminary geological mapping of the area based upon the Lands Department aerial photographs and field observation has been completed by Mr. John Bryan, a qualified Sydney geologist. Mr. Bryan's map and preliminary report are also attached hereto.

2. A complete geological survey has been commissioned and a brief given to the Principal of Geo Surveys of Australia Pty. Ltd., Mr. R.C. Sprigg. This work is in hand and Mr. Sprigg has already submitted his initial geological survey and recommended a program for the proving of the deposit by pattern drilling, core drilling and sample analysis. (Report attached).

3. Further, we have also retained as consultants for the feasibility studies, English Clays Lovering Pochin Pty. Ltd., who occupy a pre-eminent position in the clay industry. They have undertaken to analyse and evaluate the deposit and advise us generally on its development, the design of a suitable processing plant and the selection of equipment, so as to ensure that any future development is along the broadest possible lines.

Feasibility Studies

To assist Australian Blue Metal Ltd. in preparing information for this feasibility study program, qualified technical and commercial personnel have been seconded to the project from the Head Offices of both Ready Mixed Concrete Ltd. and The C.S.R. Co. Ltd. A working group of five officers has commenced gathering process and marketing information to provide a sound basis for these studies.

Details of expenditure on exploration work

We attach a summary which shows that a total in excess of $17,000 has been spent up to the end of August 1968 in exploration work on the Mt. Crawford deposit, which is

well in excess of the expenditure required in our application for the lease.

Preliminary estimates of the cost of conducting the feasibility study and the proving program for this and associated deposits indicate that a substantial expenditure will be required.

Program of work for the six months
September 1, 1968 to March 1, 1969

	Commencement Date	Completion Date
Geological Survey	August, 1968	October, 1968
Deposit Proving Program	September, 1968	January, 1969
Feasibility Studies -		
Marketing) Technical) Economic)	August, 1968	March, 1969

The program above is a tentative one and is subject to review at the point when deposit proving is complete.

Our investigation to date has indicated that we should aim to prove the existence of at least 10,000,000 tons of high grade kaolin in the lease area to support an annual production rate of processed kaolin of 150,000 to 200,000 tons. Most of this production would be aimed at export markets on the Pacific Coast of U.S.A. and Canada, Japan and the Pacific Basin area. We will also expect to achieve reasonable penetration of the home market in Australia in competition with imported kaolin.

Our feasibility study will explore every avenue of exploitation of the deposit and it may well be that a viable project can be structured around a somewhat smaller deposit. As yet we have not investigated the possibility of marketing the high grade silica which is associated with the kaolin in the deposit. However, this aspect will be covered in the feasibility studies mentioned above.

AUSTRALIAN BLUE METAL LTD.

A.W. Hardwicke
Manager

Costs incurred to date on this S.M.L. No. 174 total approximately $17,225 made up as follows :

	$
Labour	5,700
Laboratory expenses	2,500
AMDL charges	1,860
Travelling and living expenses for workmen	1,400
Vehicle operating costs and outside drilling contractors	4,765
Supervision	1,000
	$17,225

Details are available, if required.

LOG OF DRILLING AT MT. CRAWFORD SML 174

(1) Original proline auger holes

Hole No.	Depth	Material
H 1	0-3	Overburden
	3-21	White clay, thin quartz at 15'
H 2	0-6	Overburden
	6-18	White clay
	18-21	Cream clay
H 3	0-3	Overburden
	3-21	Cream clay
H 4	0-3	Overburden
	3-15	Cream clay
	15-21	Yellow Bentonite-like material
H 5	0-3	Overburden
	3-18	Cream clay
	18-21	White clay
H 6	0-3	Overburden
	3-21	White clay
H 7	0-3	Overburden
	3-21	White clay
H 8	0-3	Overburden
	3-21	White clay
H 9	0-3	Overburden
	3-12	White clay
	12-21	Cream clay
H10	0-3	Overburden
	3-9	White clay
	9-15	Cream clay
	15-18	White clay
	18-21	Cream clay
H11	0-3	Overburden
	3-21	White clay
H12	0-3	Overburden
	3-21	Cream clay
H13	0-3	Overburden
	3-12	White clay
	12-21	Cream clay
H14	0-3	Overburden
	3-21	White clay
H15	0-3	Overburden
	3-21	Cream clay
H16	0-6	Overburden
	6-21	White clay
H17	0-3	Overburden
	3-6	Pink clay)High % of
	6-21	Cream clay) silica
H18	0-3	Overburden
	3-45	White clay
H19	0-3	Overburden
	3-21	White clay
H20	0-6	Overburden
	6-18	White clay
	18-21	Cream clay
H21	0-3	Overburden
	3-18	White (12-15% mica or talc)
	18-21	Cream clay

Bayer.

LOG OF DRILLING AT MT. CRAWFORD SML 174

(2) Scout holes by proline auger

Hole No.	Depth	Material
W 1	0-10	Sand
	10-15	Grey sandy clay
W 2	0-15	Very sandy and hard
W 3	0-6	Overburden
	6-28	Off-white clay, thin band quartz at surface
W 4	0-9	Overburden
	9-30	White clay
W 5	0-6	Overburden
	6-30	White clay
W 6	0-12	Overburden
	12-45	White clay - sandy at top
W 7	0-6	Overburden
	6-30	White clay - quartz stringers at surface
W 8	0-6	Overburden
	6-12	White clay
	12-27	Sandy stained clay
W 9	0-6	Overburden
	6-24	White clay
	24-39	Stained sandy clay
	39-60	White clay
W10		Dry hole
W11		Dry hole
W12	0-3	Overburden
	9-21	White clay, some buff sandy clay
W13	0-3	Overburden
	3-6	Sandy rock and quartz
	6-18	White clay
W14	0-6	Overburden
	6-16	White clay
	16-18	Red stained clay
	18-30	White clay
W15	0-3	Overburden
	3-12	Pink iron stained clay
	12-21	White clay
	21-24	Quartz seam
W16	0-6	Overburden
	6-12	Sandy clay
	12-21	White clay
W17	0-6	Overburden
	6-9	Buff stained clay
	9-12	Buff and orange clay
	12-21	White kaolin (yellow seam at 20')
	24-36	White kaolin with yellow sand
	36-39	Sand
W18	0-3	Overburden
	6-9	Orange and red clay
	12-18	Ironstone and grey clay
	18-24	Red, orange sandy clay
W19	0-6	Overburden
	6-9	White kaolin and sand
	9-21	Sand - some kaolin
W20	0-3	Overburden
	3-9	Iron stained kaolin
	9-12	Grey sandy kaolin
	12-18	Yellow sandy kaolin

Boyles.

LOG OF DRILLING AT MT. CRAWFORD SML 174.

(2) Scout holes by proline auger (cont.)

Hole No.	Depth	Material
W21	0-3	Overburden
	3-9	White kaolin
W22	0-3	Overburden
	3-6	Red clay
	6-12	White kaolin
	12-21	Pink kaolin (mica 18-21')
W23	0-3	Overburden
	3-9	Red kaolin
	9-15	Pink kaolin
	15-27	White kaolin
W 24	0-6	Overburden
	6-9	Pink kaolin
	9-12	Light pink kaolin
	12-33	White kaolin
W 25	0-6	Overburden
	6-24	Pink kaolin
W26	0-3	Brown sandy soil
	3-6	Brown sandy clay soil
	6-9	Light brown sandy clay soil
	9-12	Light brown bentonitic clay
	12-15	Light brown clay
	15-18	White kaolin clay
	18-21	Brown clay
W27	0-3	Overburden
	3-18	White hard kaolinised sandstone
W28	0-3	Overburden
	3-9	Buff siliceous kaolin
	9-24	White kaolinised sandstone
W29	0-3	Overburden
	3-9	Kaolin
	9-12	Pink siliceous seam
	12-24	White kaolinised sandstone
W30	0-9	Hard kaolinised sandstone
	9-24	Pink - buff sandstone
W31	0-3	Overburden
	3-18	White kaolinised sandstone
	18-21	Grey kaolinised sandstone
	21-24	Buff kaolinised sandstone
W32		Quartz, drilling stopped at 4'
W32A	0-3	Overburden
	3-6	Kaolinised sandstone-low % kaolin
	6-24	Buff sand
W33	0-3	Overburden
	3-15	Buff siliceous material - low % kaolin
W34	0-3	Overburden
	3-21	White kaolinised sandstone
	21-24	Siliceous
W35	0-3	Red clay, trace of kaolin
	3-6	Buff kaolin
	6-9	White kaolinised sandstone
	9-15	White kaolin
	15-21	Orange siliceous kaolin
	21-24	Buff-white kaolin

Dayton.

LOG OF DRILLING AT MT. CRAWFORD SML 174

(2) Scout holes by proline auger (cont)

Hole No.	Depth	Material	Hole No.	Depth	Material
W36	0-6	Sandy brown soil, trace of kaolin			
	6-9	White kaolin, some quartz			
	9-21	White kaolin			
	21-27	Orange sand			
	27-36	Buff sand, small % of kaolin			
W37	0-3	Brown sandy soil			
	3-18	Buff sandstone			
W38	0-3	Brown clay soil, kaolin at 1'			
	3-6	White kaolin			
	6-9	Stained kaolin			
	9-18	Buff kaolin			
	18-21	Kaolinised sandstone			
	21-24	Buff sandstone			
	24-27	Micaceous clay			

LOG OF DRILLING AT MT. CRAWFORD SML 174

(3) Scout holes by percussion drill

Hole No.	Depth	Material
P 1	0-30	White kaolinised sandstone
	30-35	Buff clay with stained sand
	35-39	Buff kaolin
	39-40	Redsand
P 2	0-5	Red kaolin
	5-10	Buff clay
	10-25	Kaolin and sand
	25-30	Pure silica
P 3	0-2	Hard sandstone cap
	2-3	Iron stained clay
	3-30	Buff kaolin
P 4	0-5	Overburden
	5-15	Buff sand - some kaolin
	15-20	Pink sand - trace of kaolin
	20-25	Buff sand - some kaolin
	25-30	White kaolin
	30-35	Buff kaolin
P 5	0-5	Brown sandy soil, trace of kaolin
	5-10	Buff sand, some kaolin
	10-15	Buff sand
	15-40	White kaolin
P 6	0-10	Brown clay soil, trace of kaolin
	10-15	White kaolinised sandstone
	15-20	Buff kaolinised sandstone
	20-40	Sandstone, little kaolin
P 7	0-5	Brown clay
	5-15	Buff sandstone, very little kaolin
	15-25	White sandstone, very little kaolin
	25-40	Sandstone
P 8		Dry hole
P 9	0-5	Sandy soil
	5-10	Stained sand
	10-15	Kaolin with silica
	15-25	White kaolin
P10	0-5	Overburden
	5-10	Buff sandy kaolin
	10-15	Sandy quartz stringers
	15-25	Iron stained sandstone
	25-35	Buff kaolin
P11	0-5	Brown clay
	5-10	Buff kaolin
	10-15	Sand seams between kaolin bands
	15-25	Buff kaolin
P12	0-32	White kaolinised material, high % kaolin
P13	0-1	Overburden
	1-10	Buff kaolin
	10-20	Band of stained kaolinised sandstone
	20-25	White kaolin
P14	0-5	Quartz and iron stained kaolinised sandstone
	5-15	Hard kaolinised sandstone
	15-30	Kaolin, soft

Baker.

LOG OF DRILLING AT MT. CRAWFORD SML 174

(3) Scout holes by percussion drill (cont.)

Hole No.	Depth	Material	Hole No.	Depth	Material
P15	0-5	Pink and buff kaolinised sandstone			
	5-15	Hard white kaolinised sandstone			
	15-25	Soft white kaolinised sandstone			
	25-30	Buff silica			

Bayer.

GEOLOGICAL SKETCH MAP - MT. CRAWFORD AREA.

LEGEND.

A  Tertiary - clay, sand, etc. covered at least in part, by alluvium, outwash or soil, in areas of low relief.

B  Pegmatite (indicated by an abundance of quartz scree) associated with ? Tertiary clay and sand deposits.

C  Possibly Pegmatite associated with clay deposits in this area

D  Granite - gneiss

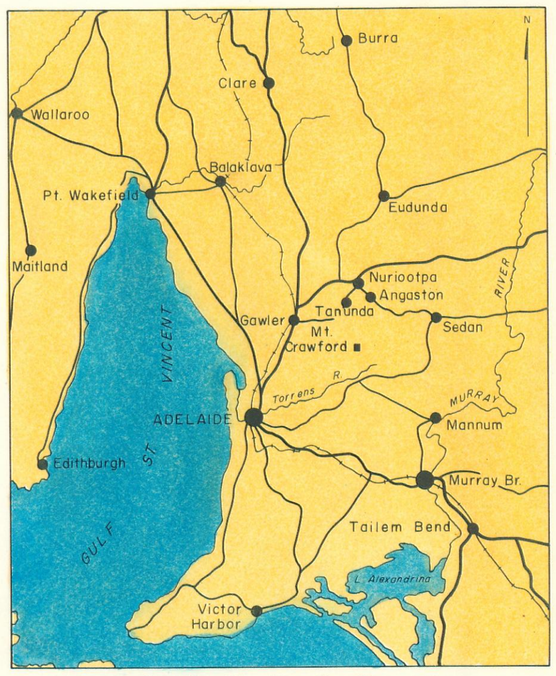
E  Kanmantoo Group (Cambrian)
Micaceous sandstones, semi-schists and quartz-felspar schists and quartzites

———— Geological boundary - approximate only

RECONNAISSANCE GEOLOGY
MT. CRAWFORD
SOUTH AUSTRALIA

To accompany report by:	Date:
Drawn by Geodrafting Services (N.S.W.) P.L.	Date: Aug '68
Scale: 1/2 mile to one inch	PLATE

LOCATION MAP

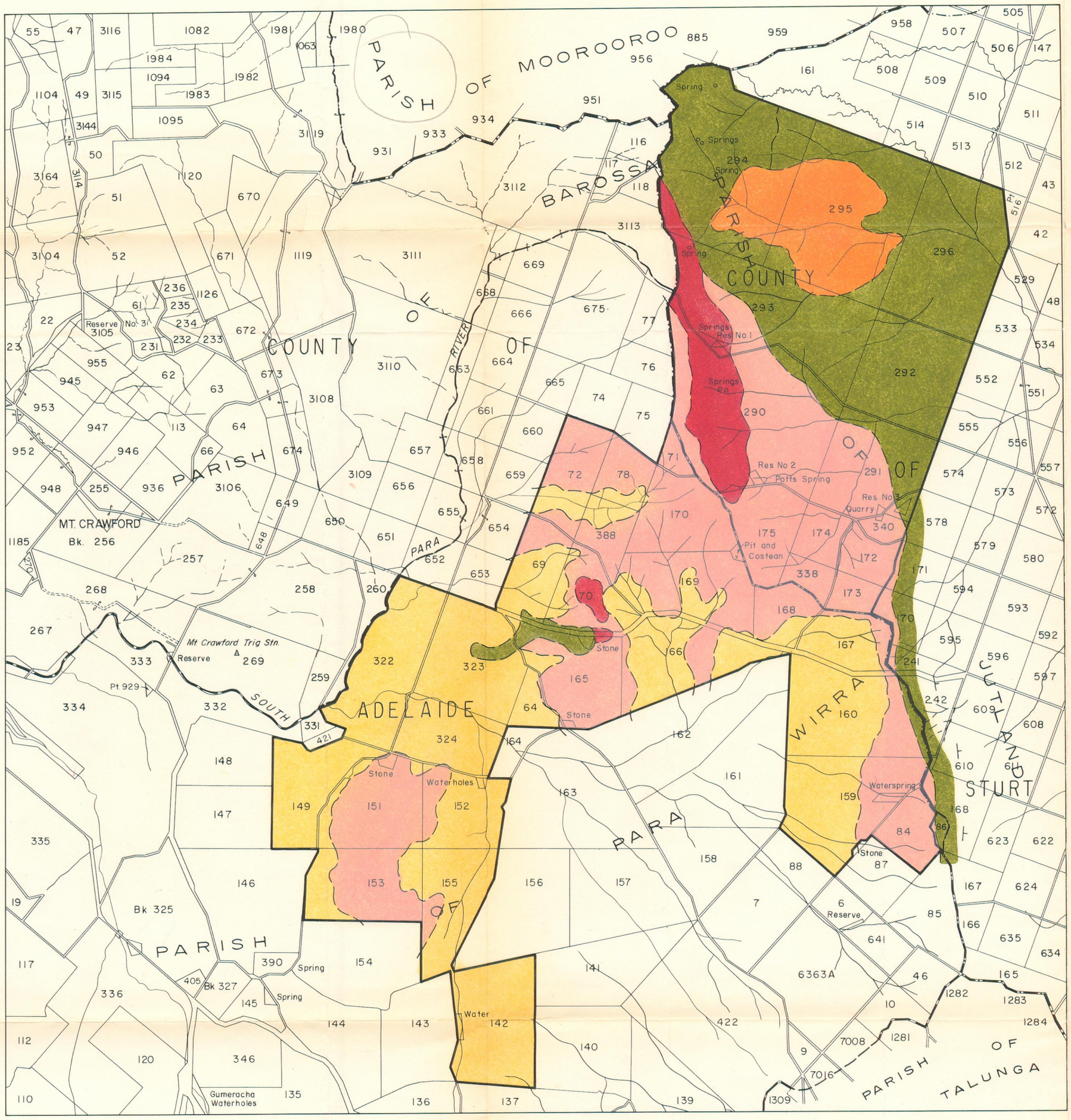


T.N.

SCALE

Chains 80 40 0 80 160 Chains

Miles 1 1/2 0 1 2 Miles



LEGEND

CAINOZOIC		Tertiary clay, sand and gravel overlain in part by Quarternary alluvium.
CAMBRIAN		Kanmantoo Group:- micaceous sandstone, semi schist, quartzite and schist.
UNDIFFERENTIATED MAINLY PRE-CAMBRIAN		Pegmatite associated with ? Tertiary clay and sand.
		Inferred pegmatite possibly associated with clay.
		Gneiss granite.

Geological boundary – position approximate.

Lease boundary.

County boundary.

Parish boundary.

MT. CRAWFORD - KAOLINISED SAND DEPOSITS.

The area under lease lies to the east of Mt. Crawford in the Hundreds of Parra Wirra (Co. Adelaide) and Jutland (Co. Sturt) some 35 miles north-east of Adelaide.

1. GEOLOGY

1.1 Tertiary - clays and sands:

Sediments presumed to be of this age, occupy areas of low relief adjacent to the pegmatites which crop out in more elevated areas. These clays, sands and, in particular, the kaolinised sands, are also closely associated with the pegmatites which are almost certainly the source of the purer kaolinite clays.

In the low lying areas, more recent deposits of alluvium or outwash obscure the clays. Their presence at depths of up to 10 feet is revealed where earth dams have been sunk to depths greater than this. Both the lateral and vertical distribution of the clays and sands must be expected to be somewhat variable, as indeed must be the depth to basement rocks.

The vast quantities of clay were undoubtedly derived, in the main, from the pegmatites. The fine-grained quartz sand possibly owes its origin to the Kanmantoo Group sediments.

1.2 Pegmatite and associated clay deposits:

Much of the area is strewn with quartz scree which has been considered indicative of the presence at depth of pegmatites. ? Tertiary kaolinised sands are found in at least some of these areas. In Portion 169 (Parra Wirra) a small pit and a costean have cut into such material. Thin lenticular quartz veins up to at least 2" wide, cut through the kaolinised sands here. The almost pure white material here is composed of quartz and kaolinite. Any features suggestive of this material having been transported are conspicuous by their absence and it appears that this material has formed more or less in situ as a result of a comparatively lengthy period of weathering with which was associated a process of selective leaching and redeposition. Whereas in this pit (Portion 169) the resultant product is a quartz-kaolinite material, elsewhere either pure kaolinite or pure quartz sand have been encountered.

1.3 Granite-gneiss:

This rock type crops out boldly in areas adjacent to the indicated pegmatites. The clay deposits do not appear to be intimately associated with this rock type

1.4 Kanmantoo Group:

These sediments in general lie to the east of the Pegmatite-Clay deposits. They have an easterly dip and, in general, appear to mark the eastern limit of the clay deposits. In Portions 323 and 165 (Parra Wirra) weathered sediments crop

out weakly on a low ridge. Numerous quartz pegmatite veins cut through these sediments and some clay deposits are present in this area.

In Portions 294 and 295 (Jutland) Pegmatite-clay deposits are possibly associated with the Kanmantoo Group sediments.

SUMMARY.

The area held under lease appears to contain very considerable quantities of kaolinite clay and fine quartz sand. The relative abundance of these two components will probably be somewhat variable and unpredictable. The sparsity of outcrop precludes the possibility of surface geological mapping being of great assistance in delineating the nature and extent of the deposits of clay and sand.

RECOMMENDATIONS.

1. That for purposes of relating and collating all available data, a base map be prepared from the available 40-chain Hundreds maps at a scale of about 10 chains to 1 inch, and that air-photo enlargements be obtained at a similar scale.

2. That the present drilling programme develop along more systematic lines with some continued geological direction by an appropriate local geological organization.

3. That tabulated core logs be prepared for all present and future bore holes in as great detail as is possible.

4. That the present auger drilling be supplemented with some more sophisticated drilling methods which will produce undisturbed samples.

5. That a few of the more prospective areas be drilled to depths of up to 100 ft. or more in order that the depth of these deposits be known more precisely.

JOHN BRYAN.

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GEOSURVEYS

OF AUSTRALIA PTY. LIMITED

GEOLOGICAL AND GEOPHYSICAL CONSULTANTS

Managing Director: R. C. SPRIGG, M.Sc.
A.M.Aus.I.M.M., M.Am.A.P.G., M.G.S.Am.

Seventh Floor
DA COSTA BUILDING
GRENFELL STREET
ADELAIDE
SOUTH AUSTRALIA

G.P.O. BOX 1479L

3-1

17

26th August, 1968.

RCS:HJR

Mr. A. W. Hardwicke,
Regional Manager,
Ready Mixed Concrete (S.A.) Pty. Limited,
82 East Terrace,
A D E L A I D E. SA. 5000

Dear Mr. Hardwicke,

Preliminary Report on Mt. Crawford Clay Deposits

I am forwarding herewith several copies of a preliminary report stemming from my visit to the area in company with your Messrs. E. Taylor and M. Ives on Saturday, 24th August.

The report is self-explanatory, and you will see that I consider it essential that the northern open cut be deepened somewhat and extended slightly, and that another, and possibly two open cuts be made in the southernmost areas of present interest. It is essential that a good face be opened up in each case for reliable bulk sampling and provision of samples for testing. I have suggested that this data be extended by either shallow pitting and/or drilling at regular intervals to obtain deeper sequence of samples.

You will infer that I do not recommend taking shallow, intermediate and deep samples by bulking a group of auger drill cuttings. There are too many variables in this, and the results could well be misleading.

Assuming that the dozer cutting will be completed by mid-week, I will return from Brisbane in order to check out geological mapping of the faces by the end of the week. Our geological assistant, Mr. Anthony von Sanden will carry out the preliminary mapping in order to save time and costs.

Yours faithfully,
GEOSURVEYS OF AUSTRALIA PTY. LIMITED.

R. C. Sprigg,
Managing Director

c.c. Mr. A. T. von Sanden

Encl:

18

PRELIMINARY REPORT ON

MOUNT CRAWFORD CLAY DEPOSITS

by

R. C. Sprigg

GEOSURVEYS OF AUSTRALIA PTY. LTD.

August, 1968.

An inspection of exploration operations in the Mt. Crawford area was made in company with Messrs. P. Taylor, M. Ives, and D. and A. von Sanden, on Saturday 24th August.

GEOLOGICAL FACTORS IN RELATION TO EXPLORATION

The area is one of ancient metasediments (altered sediments), deeply weathered and/or hydrothermally kaolinised with the development of varying vertical thicknesses of kaolinitic deposits. The weathering relates extensively to an ancient land surface and as such is a near surface phenomena. The older hydrothermal activity was however deep seated, and could extend downwards for thousands of feet.

Depending upon which of the foregoing processes dominated locally the vertical depth of the clayey formations, their compositional make up can vary within relatively wide ranges.

Factors likely to complicate tonnage estimations relate particularly to rapid lateral variations in the depth of alteration, to ferruginization (iron staining), irregularity of subsequent erosion, redeposition, etc.

EXPLORATION

Exploration techniques already applied to outlining potentially economic clay deposits have been valuable in determining preliminary areas of interest, and demonstrate the relatively wide - spread nature of the kaolin deposits. The probing has been carried out with the knowledge that more systematic sampling will follow in selected areas, and this is now essential to any field evaluation of the prospects.

THE BROAD CATEGORIES OF DEPOSITS

(a) Degraded lateritic and/or Silcrete fossil soil profiles

Much of the higher level deposits forming cappings to the land surface, appear at this time to be primarily ancient soil profiles. Weathering in the deeper B and C soil layers have typically caused leaching of the original altered slatey deposits (and intrusive pegmatites etc.) to whitish clays, these grading down vertical eventually into relatively unaltered bedrock. Preliminary auger drilling (20 - 40 feet) at this time has only infrequently encountered such substratum.

Typically in a soil profile such as this, either a silicified capping or a lateritic iron-stone layer overlies deeply kaolinised clay in a "pallid zone" grading below into a mottled ferruginised clayey zone and finally into parent rock. This type of formation appears well developed on Section 165 Hd. Para Wirra and is likely to be preserved in its deepest development on the tops of hills, nearest to the pre-existing high-level land surfaoe. Auger drill holes have already sampled across one such plateau situation, but a deeper hole (possibly 60 - 100 feet deep) is needed to test the reliability of this tentative conclusion. More-over the full value of the

clayey deposit in relation to probable dilutants such as patchy iron staining, quartz etc. is best tested by dozer cutting an east-west channel across the southerly nosing of the hill in this situation. Such cut should 31 be extended downward, if possible, through to obvious economic cut-off (if encountered within reasonable depth), or otherwise opened at selected points by pitting.

It is important to note (and establish) that the laterization type process is essentially a sheet-process leading to formation of relatively shallow deposits, depending on the extent of weathering that has occurred. In the present case (Sections 165 and 166) the depth could be expected to extend mostly to about 40 feet with a considerable portion of the superficial material eventually having to be rejected as waste. The deeper sections generally can be extensively downgraded by pockety iron-staining requiring selective quarrying. Opening of respresentation faces is essential for a more satisfactory estimation of clay potential.

(b) "Pneumatolytic" or "hydrothermal" clay deposits

The Mt. Crawford area has produced a wide variety of clay deposits based on metamorphic processes of alteration. Some of these have been related to the introduction of beryl bearing pegmatites, others to concentrations of rutile, etc.

The foregoing processes are deep-seated and can carry down almost indefinitely. Vertical extensions of potential clay deposits of this type, then, are far more likely than in the foregoing "lateritic" class. Horizontal variation, on the other hand can be more rapid, and in fact quite sharp.

In the open cut on Section 170 it appears that some hydrothermal process has, in fact, been operative. The original sedimentary bedding stands almost vertical, and this gives indication that the intensity of alteration does vary from bed to bed, but all of the original felspathic and/or shaley minerals have been deeply kaolinised where observable. Residual materials appear to be almost entirely of quartz (original sand grains and subsequent veins).

This type of deposit is best evaluated in the early stages by costeaning by dozer cutting across the grain of the country (i.e. east-west), but this can be extended by vertical drill holes spaced at a fixed interval to reduce personal bias. In the present cut (which is well located) dozing should be used to deepen by at least another 10 feet, and in the floor of such cut, auger holes to an additional 40 feet will undoubtedly check out the potential and nature of the type of deposit.

FURTHER EXPLORATION AND SAMPLING

Additional drilling beyond this time should be directed to exploring tonnage potential away from the sample areas opening by costeaning. In this way the limitations of depth and/or lateral extention can be determined more systematically. A grid pattern possibly starting at 200 feet centres should next be considered with a view to subsequent infil as more promising areas are selected. 22

A broader pattern of auger drilling as previously carried out is excellent for scouting new areas, but early trial opening by dozer costeaning would be essential to methodical investigation prior to more detailed grid drilling.

TRIAL SAMPLING

Although kaolin deposits spread over a wide area in the exploration area, a considerable proportion is likely to prove shallow, or with poor overburden to recoverable clay relation, or spoiled by pockety staining. (This relates more for the lateritic type deposits). For this reason an open exposure is essential to permit meaningful sampling. Channel sampling across faces is essential, and this can be supplemented with vertical channel sampling, and the latter extended by drilling.

At this time at least two open cuts are required respectively in areas represented by the two principal types of deposits believed represented. The existing and/or proposed cuts on Sections 165 and 170 would be ideal. Each face is to be mapped geologically, and as to staining and other characters likely to effect mining or the end product. Thereafter the face must be channel sampled as by a 4 x 4 inch cut, the whole sample bulked in 5 foot intervals and quartered down to convenient size by competent authority. All material should be retained and carefully labelled, the duplicate sample in excess of immediate requirments being retained for future reference.

In each cut, vertical holes into the floor should be continued to obvious quality cut-off or potential quarrying limit. In fossil soil areas this may total less than 40 feet from the surface, but could be much deeper elsewhere. At this time it is better to over-drill, being careful to segregate samples into 3 to 5 foot lengths (depending on auger flights employed), and retaining all portions of the quartered samples.

WILLIAM ST. PROSPECT, SOUTH AUSTRALIA. TELEPHONE [illegible] TELEGRAMS "MINDEV" ADELAIDE

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

C3

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: CE 3/115/2/0
YOUR REFERENCE:

5th February, 1968

Brisbane
① - Mr Crawford

The Manager,
Australian Blue Metals Pty Ltd,
82, East Terrace,
ADELAIDE.

REPORT CE 2233/68

YOUR REFERENCE:	Application dated 17/1/68	
MATERIAL:	33 samples of kaolin from 2 drill holes marked CM and OLF -	
	1 sample of kaolinised sandstone (Mt Crawford)	
DATE RECEIVED:	17/1/68	
WORK REQUIRED:	Drill samples:	PCE (± Cone 31) on selected samples
	Sandstone:	Wet split at 200 mesh and PCE on clay fraction
LABORATORY NUMBERS:	CM Samples:	CE3249-3272
	OLF:	3273-3281
	Mt Crawford:	3248

Investigated by: T.M. Lennox

Officer in Charge, Ceramics Section: D.C. Madigan

P.A. Young
Director.

TESTING OF CLAY SAMPLES

Mt Crawford Clay.

3. Kaolinised Sandstone

The sample received was crushed and dried, a representative portion was dispersed in water, then washed through a 200 mesh BS screen.

+ 200 mesh BS fraction = 55.0% (silica)
- 200 mesh BS fraction = 45.0% (clay)

The minus 200 mesh clay fraction was allowed to settle, the excess water was drawn off, and the residual clay dried out on a plaster slab. The dried clay was tested according to the procedure set out in ASTM Designation C.24-56, and the following result obtained:

Sample	Pyrometric Cone Equivalent	Fired Colour
Mt Crawford	Greater than Cone 31 (1683°C)	White

... SOUTH AUSTRALIA 5033 TELEPHONE 79 1033 TELEGRAMS 'MINERAL' ADELAIDE

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

254

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: CE 3/115/2/0
YOUR REFERENCE:

7th February, 1968

Australian Blue Metals,
82, East Terrace,
ADELAIDE.

Mt Crawford.
(= white at high temps.)

REPORT CE 2301/68

YOUR REFERENCE:	Application dated 24/1/68	
MATERIAL:	Sandstone (~~Mt Pleasant~~ MT. CRAWFORD);	Kaolin (Cromer)
DATE RECEIVED:	24/1/68	
WORK REQUIRED:	Sandstone:	Separation of clay fraction and preliminary firing test
	Kaolin:	PCE
LAB. NOS.:	Sandstone:	CE3328
	Kdolin:	CE3327

Investigation and Report by: B.J. Baskeyfield

Officer in Charge, Ceramics Section: D.C. Madigan

for P.A. Young
Director.

'MT. CRAWFORD' DEPOSIT. 1. SANDSTONE Mt Crawford Kaolin/Silica

The material ground easily in the end runner mill. After washing and screening through a minus 200-mesh screen the clay was filter pressed at 40-50 psi.

The sand remaining after washing and screening was dried and weighed, and amounted to 56% of the total sample. This material was retained for further investigation.

The filter cakes were extruded not de-aired at a moisture content of 24.2%, a smooth plastic column being obtained. Test buttons were wire-cut from the extruded column. Specimens dried well without cracking or distortion.

Firing was conducted in the 800-1200°C range in 50°C steps with soaking for ½ hour at each temperature. The results of shrinkage, firing behaviour and cold water absorption are shown in Table 1.

The filter-pressed cakes were also mixed to a slip to test castability. The clay cast exceptionally well in 5 minutes and left the mould cleanly after 20 minutes. The material is very promising, and could possibly be used in a blend for the production of tiles, earthenware, pottery and porcelain. It is therefore suggested that a larger batch of this material should be obtained and a more detailed investigation made of its use in whiteware.

This material compares favourably with Cornish clays and is remarkable for its fine white colour in the 1150-1200°C firing range.

2.

TABLE 1: FIRING TEST (MT. CRAWFORD DEPOSIT)

°C	Linear Drying Shrinkage %	Linear Firing Shrinkage %	Total Linear Shrinkage %	24-hour cold-water Absorption %	Remarks
800	6.6	0.0	6.6	38.0	Off-white, soft
850	6.6	1.5	8.1	38.5	do.
900	6.6	2.0	8.6	39.0	"
950	6.6	4.0	10.6	36.6	Slightly harder
1000	6.6	5.0	11.6	36.3	Off-white, harder
1050	6.6	5.0	11.6	35.8	do.
1100	6.6	6.6	13.2	32.2	Off-white, much harder
1150	6.6	10.0	16.6	24.1	Very white, hard
1200	6.6	10.8	17.4	21.6 %	do.

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

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C7

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: CE 3/775/2/0
YOUR REFERENCE:

18th February, 1968

The Manager,
Australian Blue Metals,
82 East Terrace,
ADELAIDE, S.A. 5000

Mt Crawford

REPORT CE 2448/68

YOUR REFERENCE:	Application dated 9/2/68
MATERIAL:	Kaolinised Sandstone
IDENTIFICATION:	Marked Mt. Crawford
DATE RECEIVED:	9/2/68
WORK REQUIRED:	(1) Pyrometric Cone Equivalent of raw material. (2) " " " " of clay fraction.
LABORATORY NUMBER:	CE 3336.

Investigation by: T.M. Lennox

Officer in Charge, Ceramics Section: D.C. Madigan

for P.A. Young
Director.

28 C.7.

EXAMINATION OF KAOLINISED SANDSTONE

RESULTS

A representative sample of the material received was crushed, then dispersed in water and screened through a 200 mesh B.S. sieve. The minus 200 mesh clay fraction was dried, a sample of the dried clay and a portion of the original material were then prepared and tested according to the procedure set out in A.S.T.M. Designation C.24-56. The following results were obtained.

SAMPLE	PYROMETRIC CONE EQUIVALENT
(1) Original raw material	Below Cone 31 (material fused at approx. cone 27 (1640°C)
(2) Clay fraction (Kaolin)	Cone 34 (1763°C)

After the test the cones were examined. The original raw material was white with some brown mottle. The clay fraction was white.

cone approx
55% Silica
45% clay Kaolin

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

cg.

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: CE 3/115/2/0
YOUR REFERENCE:

23rd February, 1968

The Manager,
Australian Blue Metals Pty Ltd,
82, East Terrace,
ADELAIDE. 5000

M^t Crawford
whole
column
after
firing
at 1200°C.

REPORT CE 2470/68

YOUR REFERENCE:	Application dated 13/2/68
MATERIAL:	Sandstone
LOCALITY:	Mt Crawford
DATE RECEIVED:	13/2/68
WORK REQUIRED:	Separation of clay from sand. Chemical analysis of original sample and clay fraction. Reflectance tests on clay fraction.
LABORATORY NUMBER:	CE3337

Investigated by: B.J. Baskeyfield

Officer in Charge, Ceramics Section: D.C. Madigan

P.A. Young
Director.

MT CRAWFORD SANDSTONE

The sample was ground in an end-runner mill. Grinding was very easy. The ground sample was washed and screened on 200 mesh to separate the clay and sand fractions. The undersize was filter-pressed at 40-50 psi.. The filter-cakes constituting the clay fraction were dried, ground to minus 18 mesh, and bagged for delivery. The sand fraction was dried and bagged.

Three 2 x 2 in. tiles were semi-dry pressed from the clay fraction. One tile was dried at 105°C, the other two were fired at 1200°C for 1 hour, and white light reflectance measurements were made, with magnesium carbonate as the standard (100%). The results were:

	Reflectance %
Unfired clay	86.0
Fired clay (1)	91.0
(2)	92.0

The chemical analysis has not yet been completed, but the results will be forwarded as soon as they are available.

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

C/1

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: AN3/115/2/0 - 2470/68
YOUR REFERENCE:

8th March, 1966

Mr P. Taylor,
Australian Blue Metals Pty, Ltd,
82 East Terrace,
ADELAIDE, S.A. 5001.

REPORT AN2470/68 Chem. Analysis

YOUR REFERENCE:	Application dated 13/2/68
MATERIAL:	Sandstone
LOCALITY:	Mt Crawford
IDENTIFICATION:	Laboratory No. CE3337
DATE RECEIVED:	13/2/68

Enquiries quoting AN2470/68 to Officer in Charge please.

Analysis by: A.H. Jorgensen

Officer in Charge, Analytical Section: A.B. Timms

P.A. Young
Director.

Kp:2

REPORT AN2470/68

		ANALYSIS % ore Kaolin/Silica	Kaolin Clay
		CE3337 Original	CE3337 Washed
Silica	SiO_2	75.8	47.8
Aluminium oxide	Al_2O_3	14.7	37.0
Ferric oxide	Fe_2O_3	0.09	0.22
Ferrous oxide	FeO	0.22	0.18
Magnesium oxide	MgO	0.80	0.74
Calcium oxide	CaO	0.01	0.02
Manganese oxide	MnO	<0.01	<0.01
Sodium oxide	Na_2O	0.62	0.21
Potassium oxide	K_2O	0.01	0.01
Titanium oxide	TiO_2	0.32	0.08
Sulphur trioxide	SO_3	<0.01	<0.01
Chlorine	Cl	0.95	0.31
Carbonate	CO_2	0.02	0.01
Water over 100°C	H_2O+	6.55	13.5
Total		100.30	100.15
Less			
O ≡ Cl		0.21	0.07
		100.09	100.08

Fe

Kaolin: $Al_2O_3 2SiO_2 2H_2O$

The above results are on a dry basis.

Copy

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Mr. A.W. Hardwicke,
Regional General Manager,
ADELAIDE.

P. Taylor
S. Ludvig
MINES DIVISION

May 24th, 1968

(1) MT. MAGNIFICENT
(2) MT. CRAWFORD

Report A020/68

IRON DETERMINATION in Silica Sand.

Material: A020/1 (1) Mt. Magnificent Claystone Silica

A020/2 (2) Mt. Crawford Silica Claystone

Work Required: Determination of Iron Oxide in Sample No. A020/1 & A020/2

Laboratory Numbers: Mt. Magnificent Sample A020/1
Mt. Crawford Sample A020/2

Standard Used : British Chemical Standards

Issued By : Bureau of Analysed Samples Ltd.

Type : High Purity Iron Granules Certificate of Analyses B.C.S. No. 149/2

Technique Employed: Atomic Absorption Spectrophotometer

Type S.P. 90 : Atomic Absorption Spectrophotometer

SAMPLE PREPARATION

A 1 lb. sample of (1) Mt. Magnificent and (2) Mt. Crawford Silica claystone was wet pulverised for 1 minute in a Senac Vitamiser and wet split at 200 mesh. The plus 200 mesh material representing approximately (2) 50%, and (1) 90% of the original sample was then dried for 10 minutes at 105°C and examined under a 40 power stereo microscope. The examination revealed approximately (2) 99.5% + of clear angular silica crystals and (1) 99% + of water worn silica crystals. The balance of the material was observed to contain rutile, rutile contaminated silica, and a few grains of unliberated clay particles.

...../2

CHEMICAL ANALYSIS:

1 gr of (1) Mt. Magnificent Claystone Silica and (2) Mt. Crawford Silica Claystone were dissolved in a mixture of Nitric-Perchloric-Hydroflouric Acid, evaporated, and re-dissolved in Hydroflouric Acid. Iron was extracted by the solvent extraction technique using di-isopropyl either from aqueous Hydroflouric acid solution. Iron absorptions were measured 2483 A° resonance line using UNICAM SP90 Atomic Absorption Spectrophotometer. Absorption readings were compared against B.C.S. standards issued by Bureau of Analysed Samples Ltd. (Certificate of Analyses B.S.C. No. 149/2).

RESULTS:

Sample No.	Type of Material	Results
A020/1	Mt. Magnificent Silica	0.012 % Fe_2O_3
A020/2	Mt. Crawford Silica	0.007% Fe_2O_3

INVESTIGATED BY:

Physical Testing by Mr. P. Taylor
Chemical Testing by Mr. S. Ludvig

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

35

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: ML 3/115/2/0
YOUR REFERENCE:

27th May, 1968

REPORTS ON MT CRAWFORD DEPOSIT.

Australian Blue Metal Pty. Ltd.,
82 East Terrace,
ADELAIDE, S.A. 5000

Attention: Mr. P. Taylor

REPORT M. 3605/68

YOUR REFERENCE:	Application dated 22-5-68.
MATERIAL;	Kaolin.
LOCALITY:	Mt. Crawford.
DATE RECIEVED:	22-5-68.
WORK REQUIRED:	Cyclosizing.

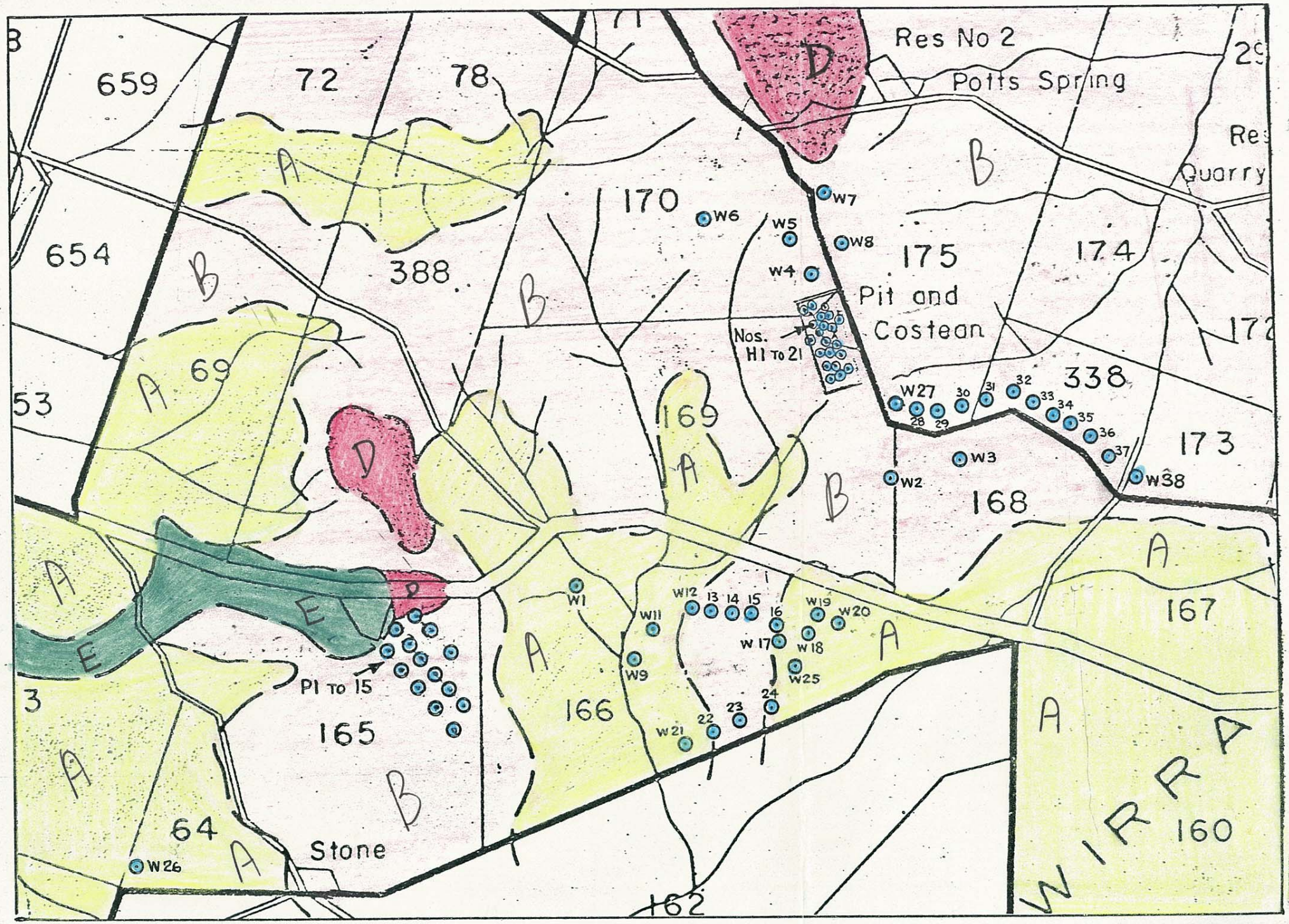
One sample of Mt. Crawford Kaolin was received for cyclosizing. The sample was dried to obtain a true weight and screened on a 200 mesh B.S. screen. A 50g sample of minus 200 mesh material taken and a cyclosizing carried out. The results are shown below.

Microns	Wt. %
+ 41.7	0.3
-41.7 + 31.0	1.2
-31.0 + 21.8	5.6
-21.8 + 14.2	9.5
-14.2 + 11.1	7.2
- 11.1	76.2
	100.0

Investigation and Report by: S. Armstrong.

Officer in Charge, Metallurgy Section: P.K. Hosking.

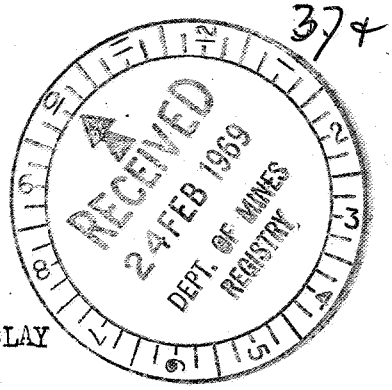
P.A. Young
Director.



LOCATION OF DRILL HOLES - S.M.L. 174 HOLES SHOWN THUS ⊙

ENV 918

374 381



STRICTLY CONFIDENTIAL

FINAL REPORT ON GEOLOGICAL AND CLAY EVALUATION WORK CARRIED OUT ON BEHALF OF AUSTRALIA BLUE METAL LTD. ON SPECIAL MINERAL LEASE NO.174, MT. CRAWFORD, S. AUSTRALIA DURING THE PERIOD 13th SEPTEMBER - 1st NOVEMBER 1968

P.C. Wright.

P.C. Wright,
Geological Section
English Clays Lovering Pochin
& Co.Ltd.,
St.Austell,
Cornwall, U.K.

15th January 1969

CONTENTS

0. 40

SUMMARY

Special Mineral Lease No. 174 covers an area of approximately 22 square miles and geological mapping showed the area to contain a folded series of steeply eastward dipping metamorphosed siliceous, micaceous and talcose rocks of Cambrian (?) age. These rocks probably contained varying proportions of dolomite and felspar before metamorphism. Igneous activity is principally restricted to the occurrence of quartz - felspar - mica pegmatites in the south-western area of the lease whilst minor felspathic and siliceous veining is sporadically present throughout the entire area.

In the course of the investigation 42 holes, totalling 2,671 feet of continuous core drilling, were sited on a 250 metre grid spacing over approximately one square mile of the lease area. White clay matrix worth testing was found in portions of eight of these holes.

The kaolin bearing rocks are the result of prolonged and intense surface weathering of talcose arkosic quartzites and talcose arkosic schists. The presence of talc in the parent rocks has favoured and controlled the formation of montmorillonite from albite felspar during the weathering phase. In the near surface environments oxidising and acidic conditions were more extreme and the montmorillonite itself has been converted to kaolinite. Thus with increasing depths, flowabilities, which are uniformly poor at the surface anyway, deteriorate rapidly with a corresponding decrease in brightness because of the increase in montmorillonite content. Proportions of talc and felspar in the parent rocks which have undergone weathering, vary rapidly both laterally and vertically because of sedimentary differences in original deposition of these sediments and also because of the prevailing steep eastward dips of these rocks. There is thus a corresponding and similarly rapid lateral

and vertical variation in quality of the processed clay fractions. Upon these variations can be superimposed the weathering effect with depth vis a vis montmorillonite or kaolinite formation mentioned earlier. No evidence was found to support the view that these kaolin deposits are the result of hydrothermal activity.

Out of the 40 clay samples tested only those from the depth zone 8.5 - 22 feet from hole AGP2 showed any commercial possibilities with a flowability of 64.1 and bleached brightness of 91.2/1.6; the yield of a poor viscosity SPS fraction was 16.3%. Probable tonnage of this type of raw clay matrix is approximately 190,000 tonnes, which would yield 31,000 tonnes of SPS type paper grade clay on processing. However, in the face of the proven extreme lateral and vertical variation in clay quality in the area of AGP2, it must be concluded that this good quality kaolin occurs as an isolated pocket and is neither sufficiently extensive nor deep enough to warrant commercial exploitation. This same variability of clay quality indicates the virtually impossible task of working such a deposit to produce a consistent grade of clay, even if sufficient reserves were available.

It is evident both from the geological and clay evaluation results that S.M.L. 174 does not contain appreciable deposits of clay suitable for use in paper production.

LIST OF FIGURES

INTRODUCTION

OL 43

Shallow auger hole drilling in the Mount Crawford area of South Australia (see location map 1) in early 1968 by the Readymix (S.A) Mineral Exploration Group, disclosed the presence of kaolinitic material in sections 165, 166, 167, 175 and 338 of the Hundreds of Parra Wirra and Jutland.

A Special Mineral Lease No. 174, covering approximately 12 square miles and including the above sections was granted by the Minister for Mines, South Australia on March 1st, 1968, to Australian Blue Metal Ltd.* of 82, East Terrace, Adelaide. The lease area was provisionally extended in early September to cover an additional 10 square miles, principally to the south and west of the original lease area. The location map shows the full extent of Special Mineral Lease 174.

In mid-1968, one of the parent companies, the Colonial Sugar Refining Co. Ltd. (C.S.R) became interested in the paper clay potential of the area and 25 samples of kaolinitic material from 11 auger holes out of a total of 74 auger holes were sent to English China Clays Ltd.,St.Austell, Cornwall, U.K. for preliminary evaluation as a paper grade clay. The results of those tests indicated that the raw matrix contained clay of possible value for use in paper manufacture.

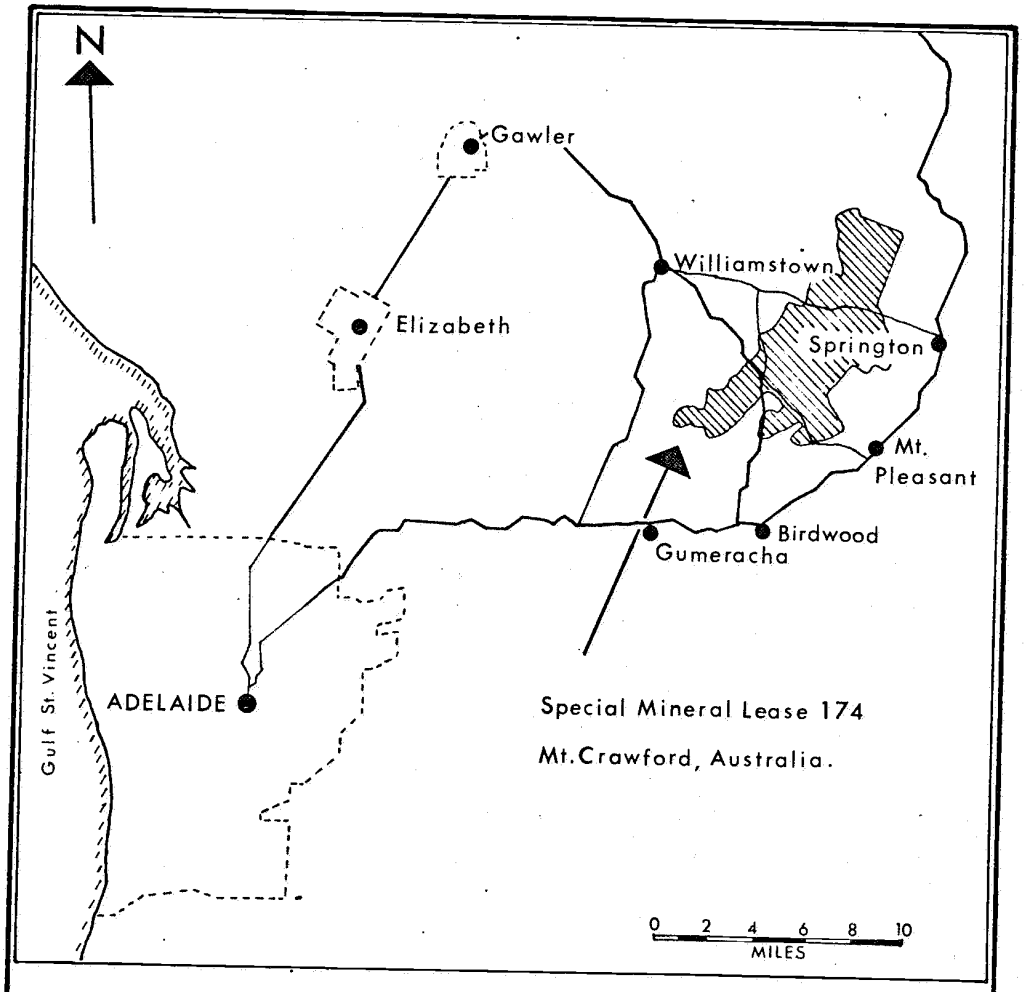
C.S.R. decided that a feasibility study of the area should be made and an agreement was reached with English China Clays Ltd. that they conduct a 'Feasibility study of the development of the kaolin deposits at Mt. Crawford', subject to a 'satisfactory assessment of preliminary core samples' (Mr. Kelman's letter, dated 13th August, 1968, to Mr. A.N.G.Dalton, Managing Director, English Clays Lovering Pochin & Co. Ltd.).

P.C. Wright, B.Sc.,Ph.D., A.M.I.M.M. (Geologist) and J.Williams, A.C.M.S., M.I.Q. (Mining Engineer) arrived in Australia on September 10th, 1968, to commence the study. The field studies were completed on November 4th, 1968, and a Preliminary Report (dated November 19th, 1968) submitted to B. Kelman, Senior Executive Officer of the Colonial Sugar Refining Co.Ltd. in London on November 21st, 1968.

PREVIOUS WORK

The southern and western portions of S.M.L. 174 have been mapped by the Geological Survey of South Australia on a scale of one inch to one mile.

*Australian Blue Metal Ltd. is an associate of the Readymix Group (S.A) which is jointly held by the Colonial Sugar Refining Co.Ltd. and Blue Metal Industries.



Location Map for Special Mineral Lease 174.

MAP1.

The geological maps which are available in this area are the Adelaide Sheet (published 1951), Gawler sheet (published 1953) and Mannum sheet (published 1957). No published geological maps are available for the area containing the kaolinitic rocks.

In general the rocks which outcrop within the area of the lease mapped by the Survey have been tentatively assigned to the Cambrian System and on this basis would be 600 million to 500 million years old. These rocks are known collectively as the Kanmantoo Group and comprise schists, quartzo-felspathic schists, micaceous quartzites and massive quartzites. The Kanmantoo rocks all dip steeply eastwards at angles of 60-70°.

Other geological work which has been carried out within the confines of S.M.L. No.174 is that by M.G. Mason, geologist of the Metallic Minerals Section (Mineral Resources Division, Department of Mines, S. Australia). The existence of this work was unknown until the field feasibility study was practically completed. The report (dated June 20th, 1967) covering this work was held on confidential file until the end of October, 1968, when it was made available. The report (file Nos. Rept. Bk. 64/115; G.S. 3728; D.M. 1825/66) is entitled 'Clay Deposit, Springton, Section 166, Hundred of Para Wirra, Co. Adelaide' and details auger drilling carried out on behalf of Australian Industrial Minerals N.L., who have since relinquished their option to the property held by Mr. I.E. Venning under Mineral Claim 4980. Mason's conclusions were that "White clay, formed by intense leaching of Kanmantoo rocks, is refractory and potentially useful in ceramics. However the deposit is not fully defined and further exploration by drilling and trenching is recommended. Possible reserves amount to 13,000 cu.yds. (20,000 tons of clay) under 11,000 cu.yds. of overburden, and occur in a thin bed, overlying coloured clay. There is some suggestion of thickening to the north". Mason's conclusions and borehole data are in broad agreement with those reached in the present study.

The most recent reconnaissance reports on the geology of the lease area are those of J. Bryan (August 1968), and R.C. Sprigg (26th August, 1968). Both reports are available in Progress Report No.1 (dated 9th September, 1968) which was submitted to the S. Australian Mines Department by Australian Blue Metal Ltd. as evidence of exploration activity in the lease area.

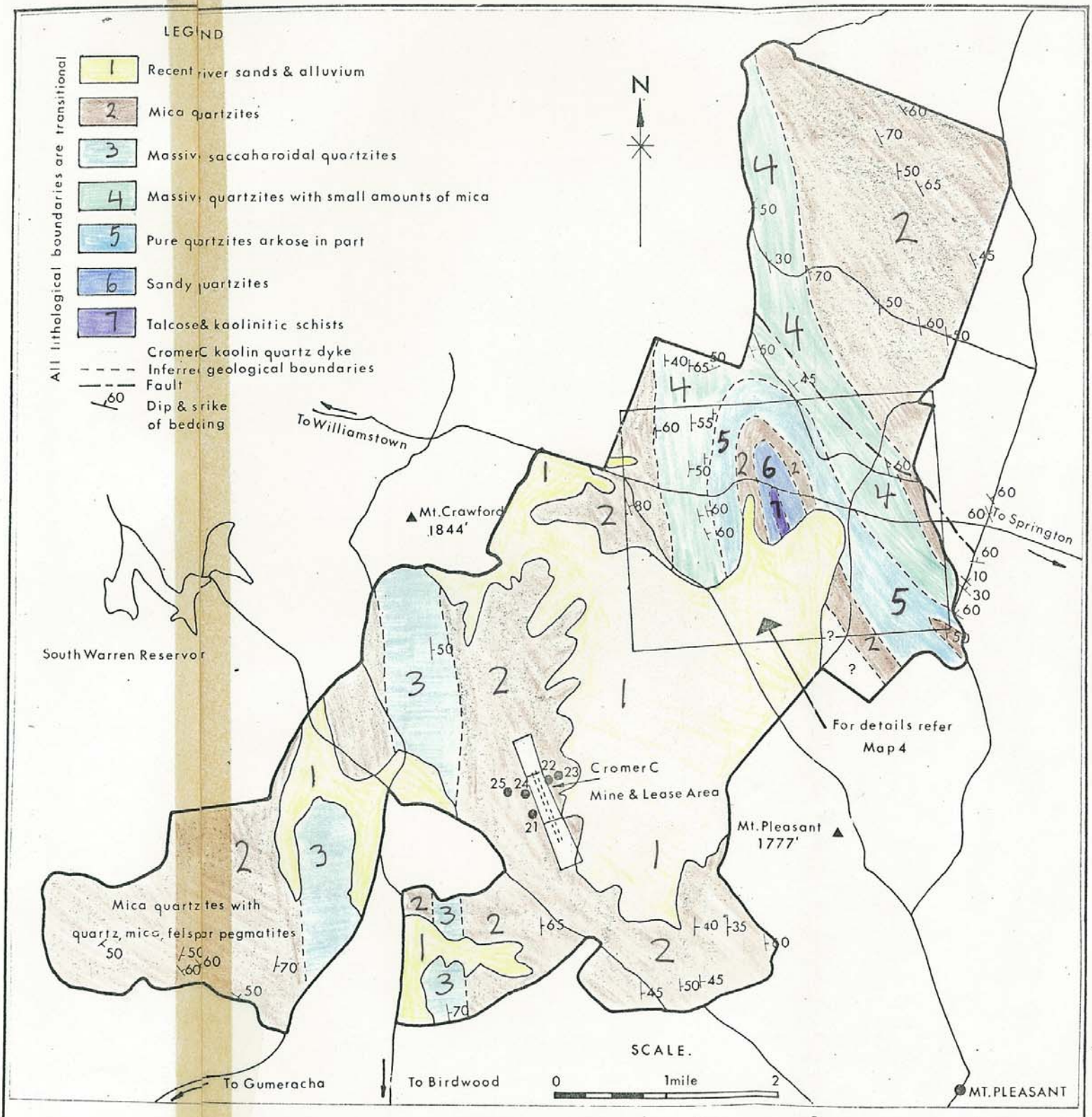
A geological base map (Map 2) was made for the 22 square miles covered by Special Mineral Lease No.174. The rocks comprise a succession of folded regionally metamorphosed sediments of Cambrian age. The grade of metamorphosism if probably lower green-schist facies. Igneous activity in the form of mica felspar pegmatites is principally limited to the south western part of S.M.L. 174, although minor felspathic and siliceous veining is sporadically present throughout the area.

The meta sediments, although very variable in lithology can be broadly grouped into mica quartzites and quartzites which predominate with minor amounts of mica schists and talcose albitic schists. All metasediments are folded about north-south axes and the folds are recumbent at high angles to the west, resulting in a steep eastward dip (Fig.1) in all field exposures. Reference to maps 2, 3 and 4 will show that the main structure which controls the disposition of the separate kaolin-bearing formations is an overturned anticline which plunges at a low angle to the north. The section AB which follows map 3, shows the result of drilling across this anticlinal structure.

Probably during the folding phase injection of small veins and dykes of felspathic and siliceous material, sometimes carrying minor amounts of rutile (anatase) occurred in localised regions of tensional stress. Later shearing and faulting of the metasedimentary succession resulted in the formation of milky white quartz which now appears as residual quartz 'float'.

Subsequent to the folding and faulting the metasediments have suffered a period of prolonged and intense weathering. According to the rock type the effects of weathering have been reflected in various ways. The massive quartzites are predominantly composed of quartz and have resisted weathering and generally remain as rocky outcrops whilst the mica quartzites, with increasing mica content, form a deep weathering profile. This deep weathering profile often consists of 0 - 6 feet lateritic soil (Fig. 2) and subsoil, followed by a bleached zone (6 - 30 feet approximately) of kaolinitic material which is often badly ironstained. The bleached zone is followed by brown weathered disintegrated rock until the fresh rock is encountered at about 70 feet. Thus the total thickness of the weathering zone in this type of material is generally about 70 feet.

The talcose schists and talcose quartzites probably contained albite felspar originally and these have weathered to a talcose kaolinitic sandy



Geological Map of Special Mineral Lease 174, Mt. Crawford, S. Australia.

MAP 2.

Fig 1 - Massive quartzites of the Crowford area showing steep eastward dip.

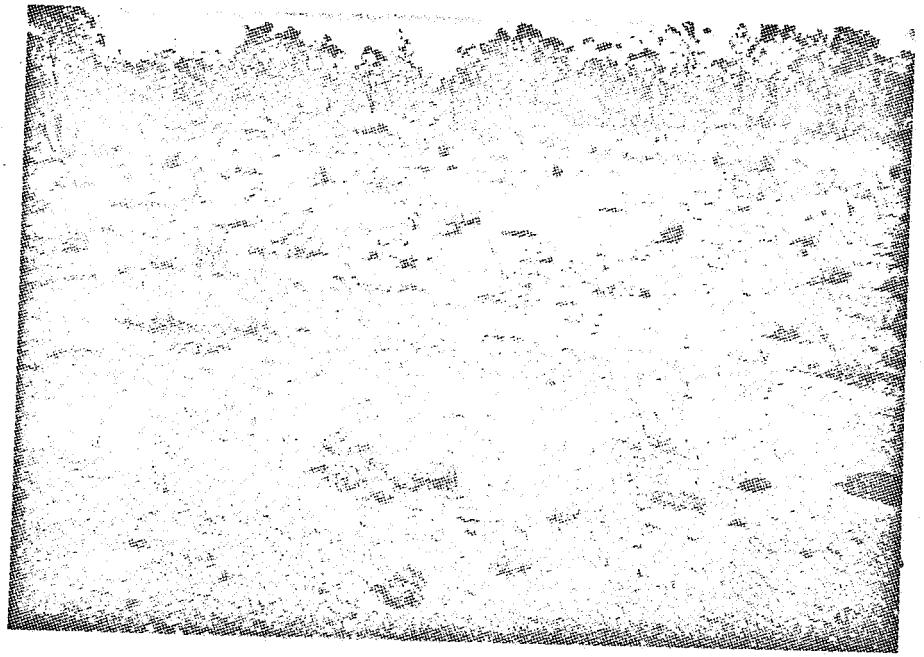


Fig 2 - Typical lateritic soil capping with quartz float overlying deeply weathered mica quartzites in the Cromer C area.

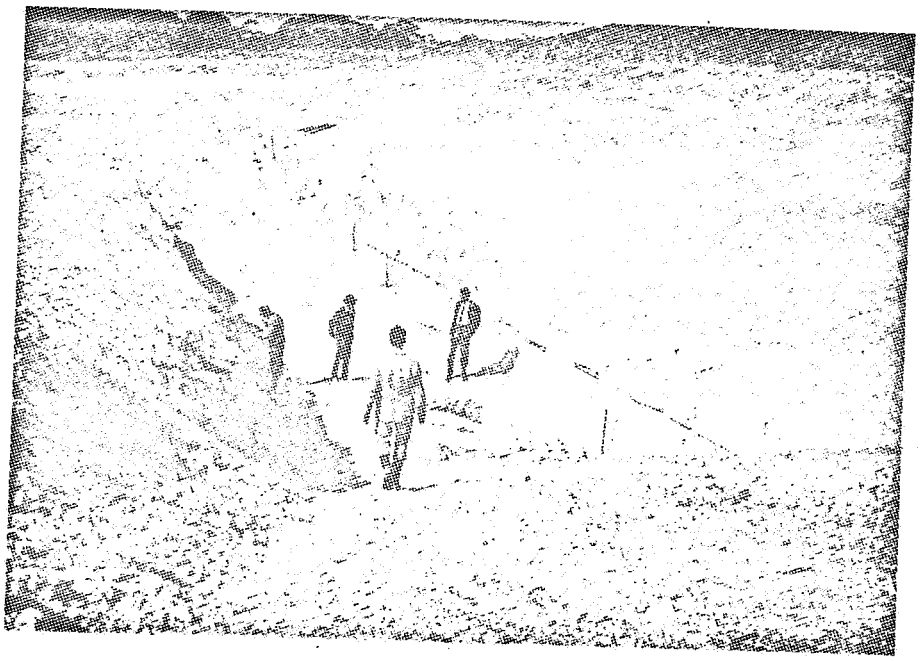


Fig 3 - Trench 1 located in kaolinitic and sometimes talcose sandy clays derived from weathering of arkosic and talcose sandy schist horizons.

clay material. Trenches 1 and 2 (Fig. 3 and 4) are located in this type of material.

Trench 3 (Fig. 5) is located in a som what different rock environment and illustrates the effect of prolonged surface weathering of a slightly talcose quartzite body which, before weathering, contained albite felspar. Weathering of the felspar at the surface has resulted in the formation of kaolin, thus giving rise to a lithologically variable kaolinitic, slightly talcose, sandstone body. At this locality weathering released iron and silica which tended to concentrate at the surface, and resulted in the formation of a hard siliceous capping beneath a thin lateritic capping. Trench 4 is located predominantly in weathered quartzites with significantly smaller amounts of kaolin and larger amounts of silica than Trench 3; iron-staining is also more abundant. Because of the higher silica contents, the degree of weathering is less pronounced. The felspathic veins and stockworks have been weathered to clay, whilst the quartz stringers have remained unaffected.

The Cromer C mine, now abandoned (Fig. 6) is outside SML 174, and is located in a discontinuous, irregular N-S orientated kaolin, quartz rutile pegmatite body some 20 feet in width and perhaps not more than 80-100 yards in length, as indicated by open cut and sub-surface workings. There is evidence to suggest that the body thins markedly both to the north and south of the mine workings. This pegmatite body is believed to be of the same age and origin as the felspathic, now clay, veins found in the other parts of SML 174.

Recent sands, clays and alluvium blanket the central part of the lease and have been extensively planted with conifers. This area forms part of the Mount Crawford Forest Reserve (Fig. 7).

The higher ground surrounding the central flattish area, is formed predominantly of quartzites and Mt. Crawford itself is composed of massive resistant quartzites, (Fig. 8).

No evidence could be found to support the theory that the yakka bush, (Fig. 9) acts as a geobotanical indicator and grows preferentially on kaolin-bearing ground. It can be found throughout the area, growing on a variety of rock types.

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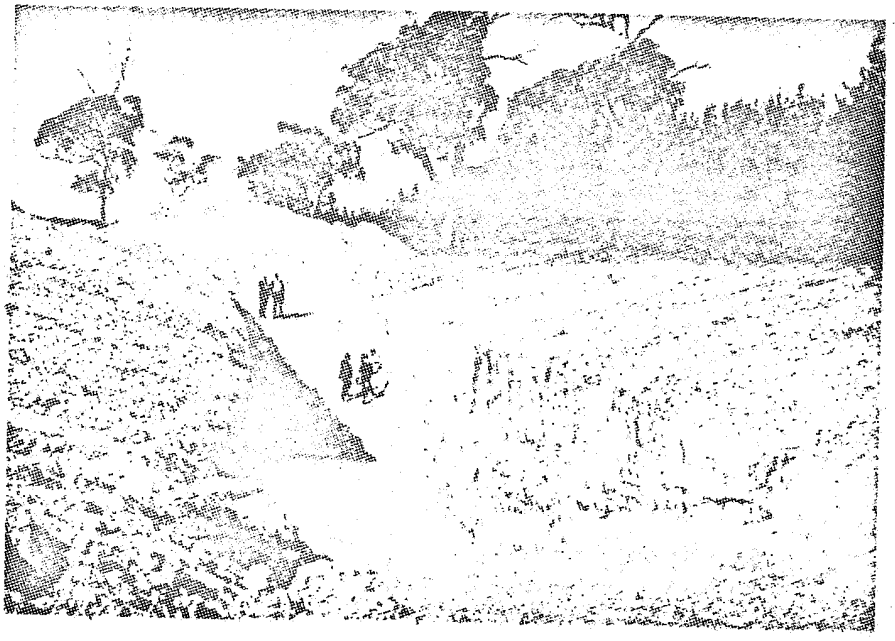


Fig 4 - Trench 2 located in kaolinitic clayey sand stones derived from weathering of arkosic quartzites. Note bad ironstaining throughout.

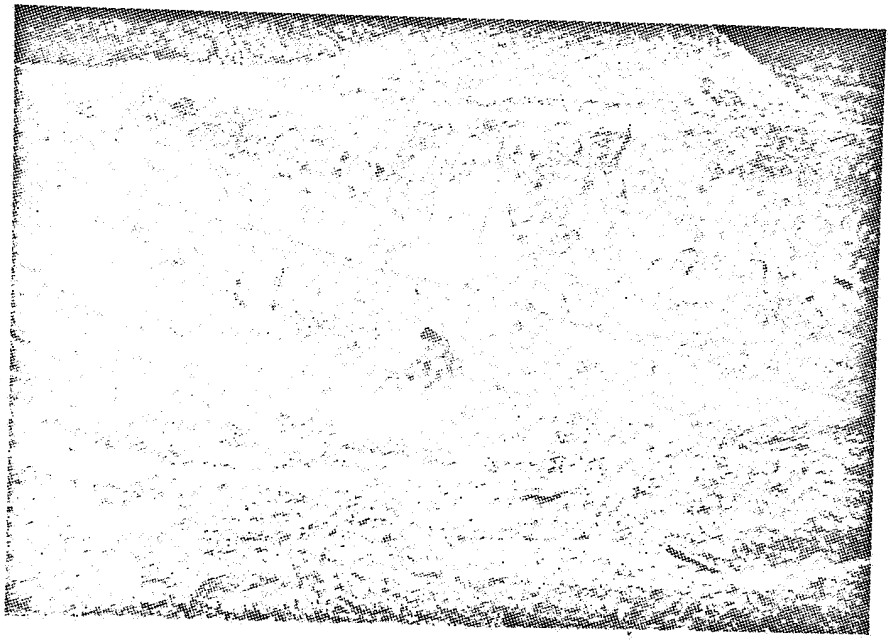


Fig 5 - Trench 3 located in kaolinitic and talcose sandstones derived from weathering of arkosic talcose quartzites.

Fig 6 - Cromer C mine (abandoned) in kaolin-quartz pegmatite dyke.

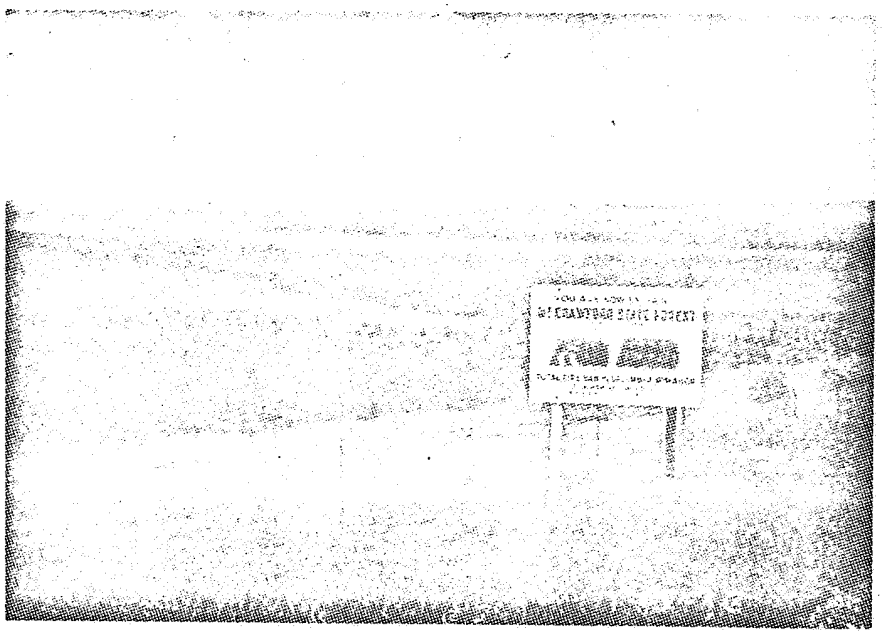
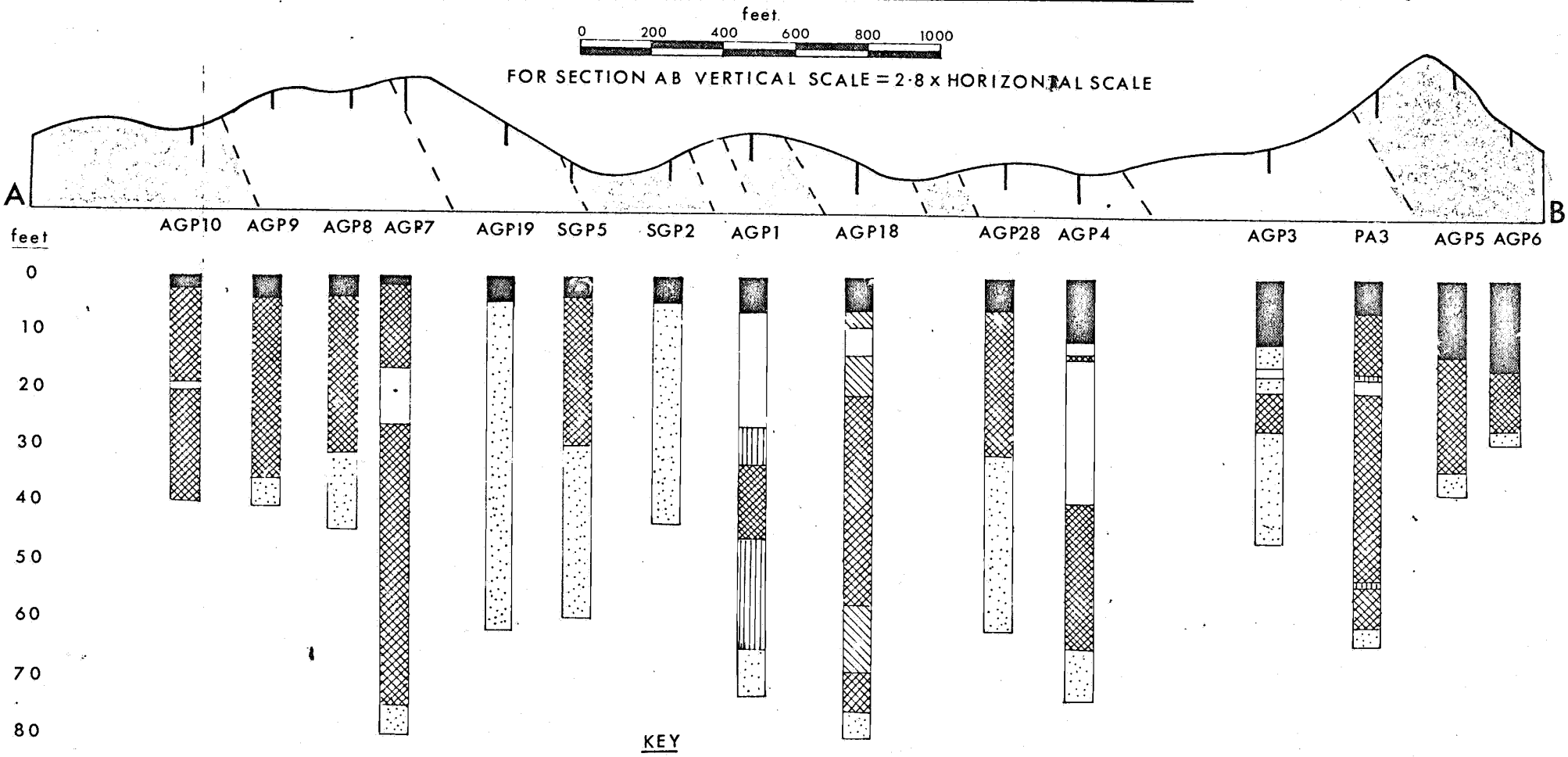


Fig 7 - Mt. Crawford Forest Reserve showing flatish central area of SML174 containing recent sands clays and alluvium.

DRILL HOLES AND DRILL HOLES PROJECTED ONTO LINE OF SECTION AB (MAP 3).



For detailed information refer to actual drill logs.

Fig 8 - Mt. Crawford (1844') composed of Massive quartzites whilst the lower relief ground in the near and middle distance is composed of more easily weathered micaceous quartzites.

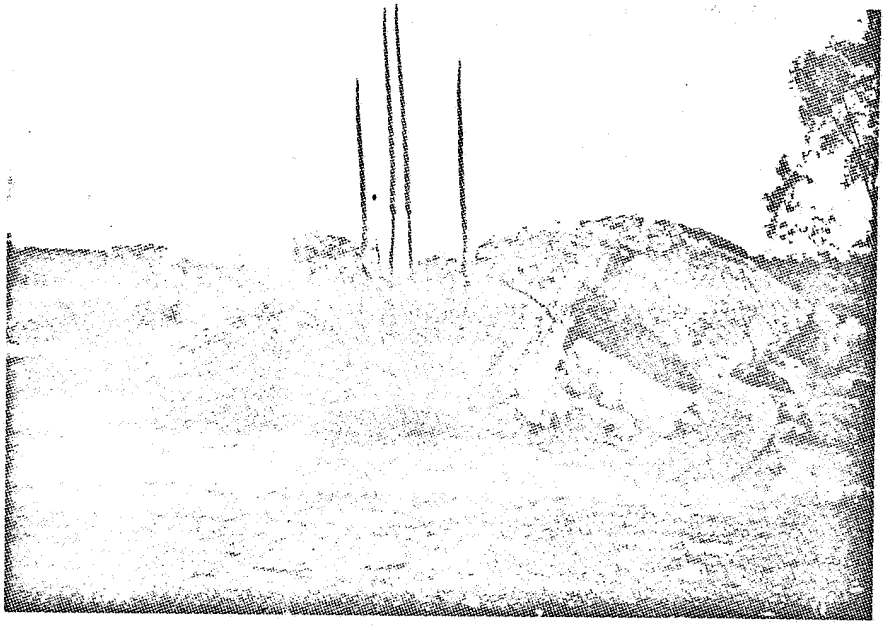


Fig 9 - Yakka bushes growing on massive quartzite outcrop.

SIZE OF CLAY RESERVES REQUIRED TO SUSTAIN ENVISAGED PAPER CLAY INDUSTRY AT 200,000 LONG TONS/ANNUM IN THE MT. CRAWFORD AREA, S. AUSTRALIA, FOR A 20 AND 30 YEAR PERIOD

It is pertinent at this point to review this aspect since initial feasibilities studies carried out by C.S.R. had indicated that a probable 200,000 long tons/annum production of paper clay would be required initially and that a 20 year life for such an industry would be desirable.

A calculation to assess the size of clay reserves needed also helps in providing a rough guide to what type of drilling programme is required, particularly with regard to spacing of drillholes and extent of area to be drilled. It also provides a rough target for the drilling programme. In the following calculation the average rate of growth of kaolin production from the deposit has been assumed to be 6½% per annum. This figure is taken from a paper entitled 'International Aspects of Kaolin' by R.A. Healing and P.C. Wright, published in Vol.14, p.125-135, of the 23rd International Geological Congress, Prague 1968, and is the average rate of growth of world kaolin production for the period 1955-1966. This 6½% figure is roughly equivalent to a doubling of kaolin production every ten years.

Paper Clay Reserves Required

1st ten year period	2,000,000 tons.
2nd ten year period	4,000,000 tons
3rd ten year period	8,000,000 tons
Grand total of paper clay required for 20 year period	= 6 million long tons
Grand total of paper clay required for 30 year period	= 14 million long tons

APPROXIMATE AREA OF GROUND REQUIRED TO CONTAIN CALCULATED RESERVES OF PAPER CLAY

The areal extent of the clay body to contain these calculated reserves will naturally be dependent upon three factors: depth of the clay-bearing material; yield and quality of processed clay from raw matrix; dry bulk density of clay-bearing material.

Initially information on all three factors was scanty, but it was suspected that the kaolin-bearing material was mainly due to surface weathering of a variety of rock types. Subsequent drilling showed this to be true. In fact weathering profiles containing clay vary from 0 - 70 feet and for the purpose of the following calculation we can assume an average depth of say 35 feet of kaolinitic bearing material.

The yield of clay was thought initially to be about 10% of the raw matrix whilst quality was unknown. Subsequent laboratory analysis of the drill cores showed only one hole, AGP2, in the depth zone 8.5 - 22'0" to contain acceptable paper clay and the SPS yield was 16.3%.

The dry bulk density initially guessed at 1.5 g/cc was determined by the Australian Mineral Development Laboratories to be 1.47 g/cc (or 91.8 lbs/cu.ft.).

In the following calculation depth of raw matrix containing presumed paper grade clay is taken as 35 ft. (approx. 10 metres), yield as 16.3%, 1.47 g/cc as dry bulk density of raw matrix.

Then 1 sq. mile	= 2,592,000 sq.metres.
Assume 10 metre thickness:	
Vol. of ground	= 25,920,000 cu.metres.
Dry bulk density 1.47 g/cc	
Bulk tonnage	= 38,100,000 metric tons
Assume 16.3% yield:	
Tonnage paper grade clay	= 6,210,300 metric tons
	= 6.1 million long tons.

∴ Assuming 1 square mile of ground to contain kaolin-bearing matrix to a depth of 32.8 ft. with a yield of 16.3% paper clay, then this volume of ground would contain approximately 6 million long tons of paper clay, i.e. sufficient for 20 year period.

The implication is that providing depth of clay-bearing material, yield and dry bulk density remain sensibly constant, then practically all drill holes located within 1 square mile of the most promising ground must prove at least 30 feet of white clay-bearing matrix containing paper grade clay.

DRILLING AND TRENCHING PROGRAMME

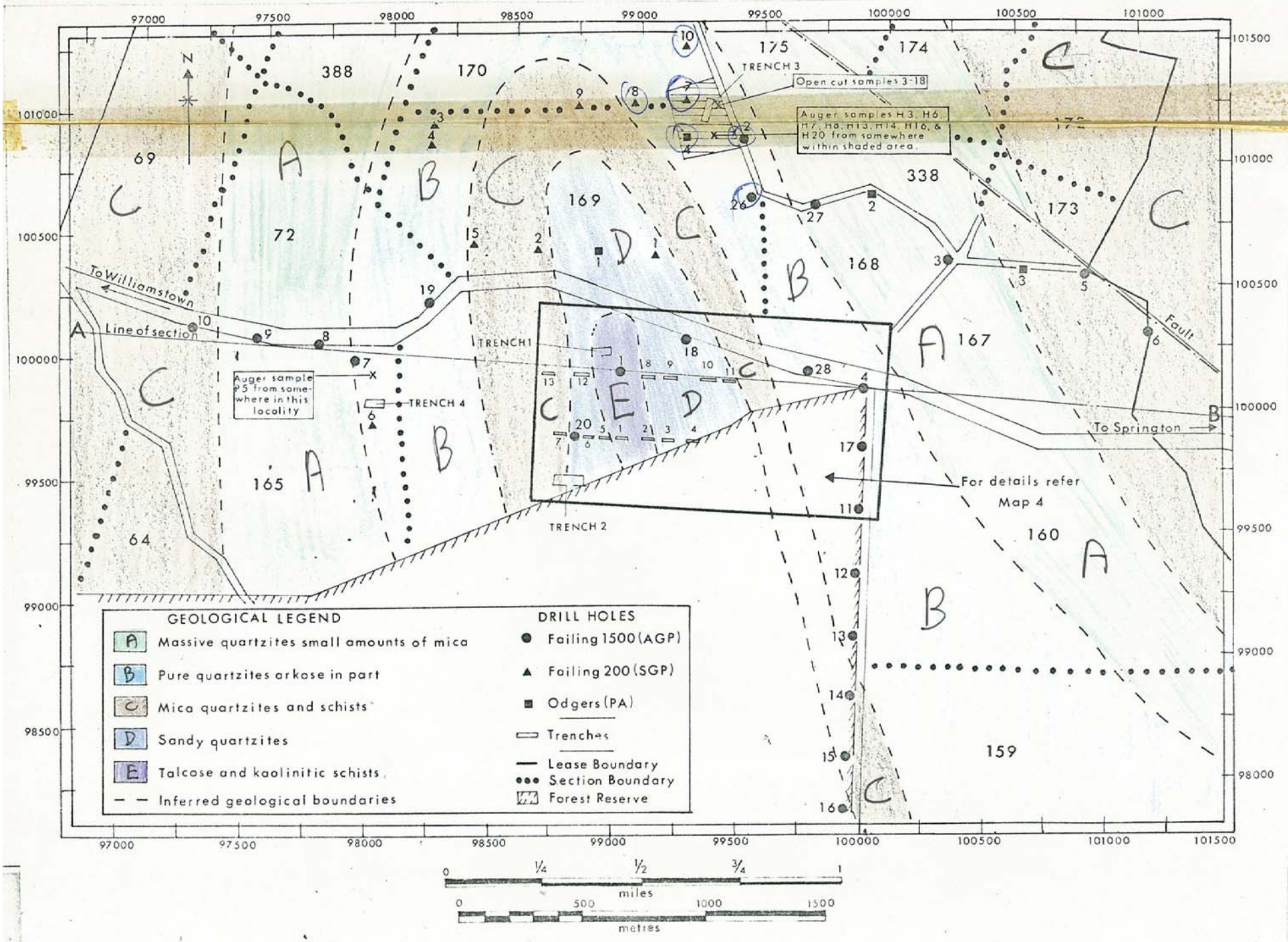
Owing to the extremely poor exposure in the clay bearing area under investigation, the extent and quality of the clay bearing formations could only be investigated by drilling and trenching to obtain undisturbed samples for quality testing.

In the initial stages of the investigation conducted by Readymix Concrete a 6 inch "Proline" auger drill (Fig. 10) had been used, but owing to the need to obtain samples from depths of up to 100 feet or more, a more sophisticated type of drilling rig was needed. The drilling rigs eventually employed for the continuous core drilling programme were a Fayling "1500" (Figs. 11 and 12) and Fayling "200" (Fig. 13) which utilise a split tube core barrel (Figs. 14 and 15) for the retrieval of $2\frac{1}{8}$ inch rock cores. Both of these rigs are truck mounted and are capable of operating with either air or water and achieved average core recoveries of 75% or better in widely varying ground. Figure 16 shows a section of $2\frac{1}{8}$ inch core retrieved from drill hole AGP1 by the Fayling "1500". An Odgers rig (Fig.17) was also employed but was found to be unsatisfactory due to poor core recovery (see Appendix 2).

Bearing in mind the probable tonnages which were required to be found a 250 metre (approximately 800 feet) grid was laid out over approximately one square mile of ground containing the known clay occurrences.

In all 42 holes, totalling 2,671 feet, were drilled and continuously cored, Maps 2, 3 and 4 show the location of these holes. Boggy ground caused by unseasonably high rainfall severely hampered the drilling programme and explains the location of many holes close to the roads. Out of the 42 holes drilled only 8 holes (AGP 1, 2, 4, 13, 16 and PA2 and SGP4) showed any white clay which was worth quartering and airfreighting for laboratory analysis.

Thirteen trenches were dug by a back hoe to a maximum depth of 19'6" where possible, to assess the variability and extent of the clay body revealed by earlier trenches in Section 166, Hundred of Parra Wirra (see map 4. Trenches could not be dug in the area of trench 3, owing to the hard siliceous cap rock in that area.



DRILL, AUGER AND TRENCH SAMPLE LOCATION MAP WITH GEOLOGICAL BOUNDARIES.

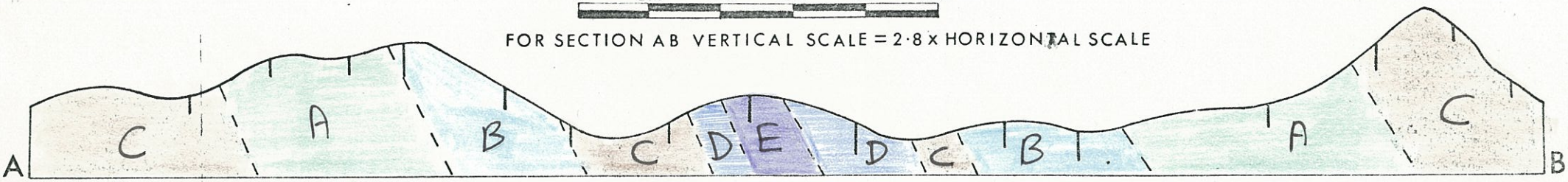
MAP 3.

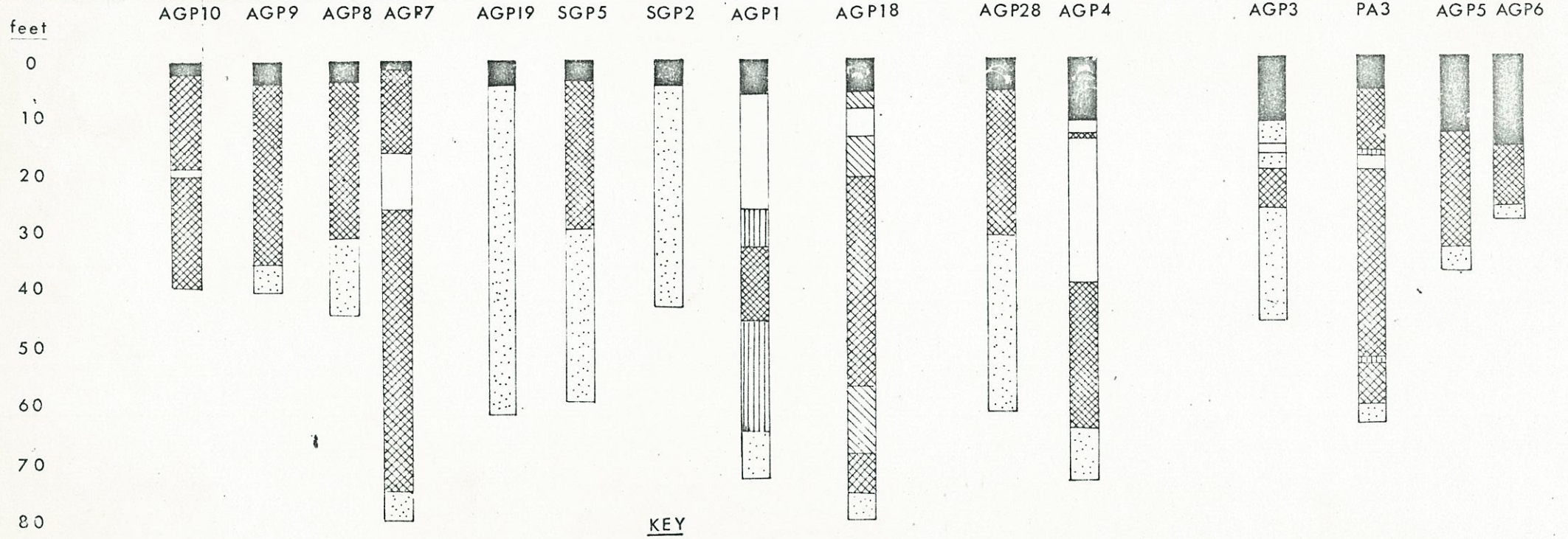
MAP 3.2

DRILL HOLES AND DRILL HOLES PROJECTED ONTO LINE OF SECTION AB (MAP 3).

feet
0 200 400 600 800 1000

FOR SECTION AB VERTICAL SCALE = 2·8 x HORIZONTAL SCALE

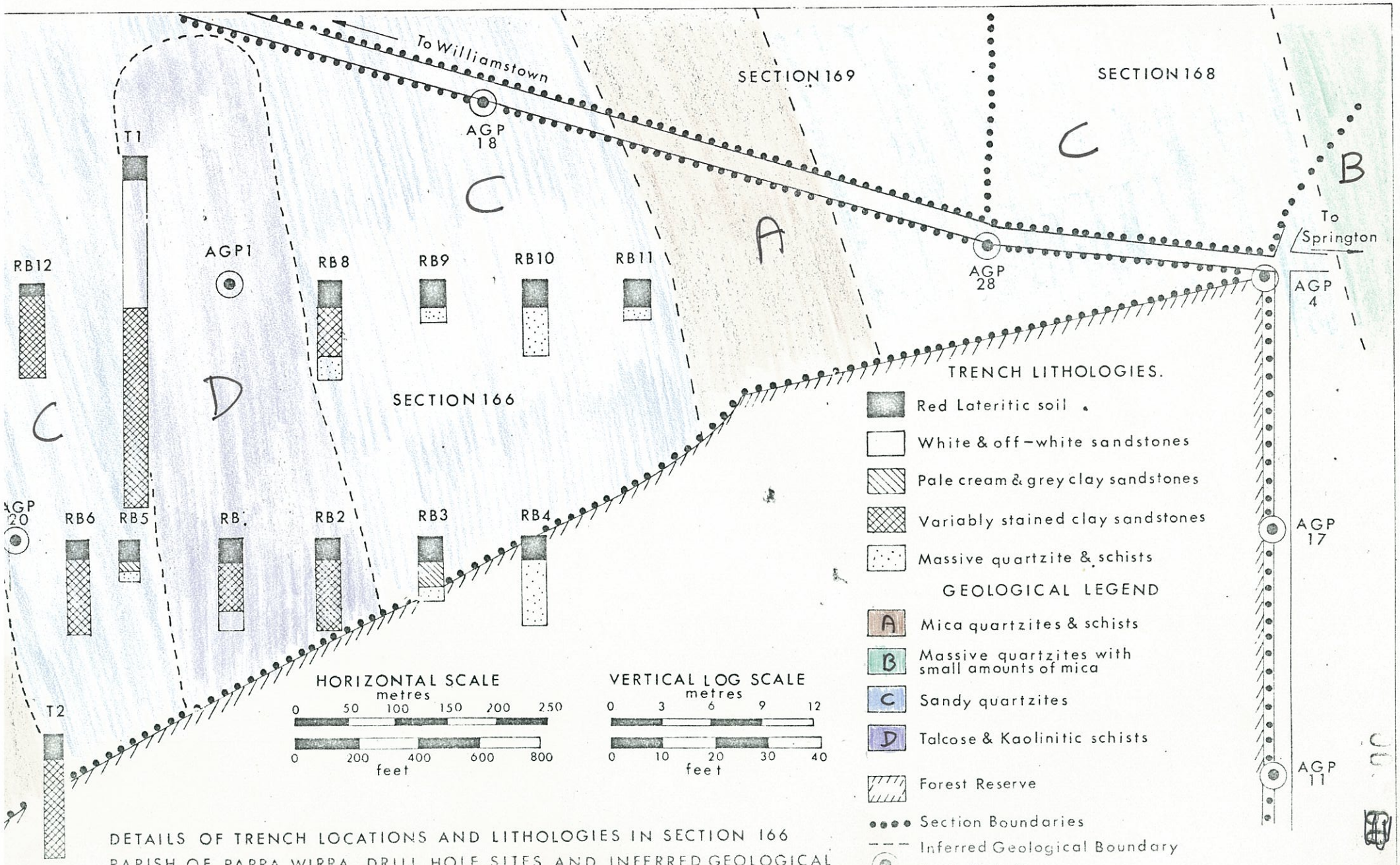




KEY

- Overburden, usually red lateritic soils and subsoils
- White and off-white clays, sandy clays and clayey sandstones
- Pale yellow and grey clays, sandy clays and clayey sandstones
- Pink, brown and variably stained clays and sandy clays
- All green clays, sandy clays and clayey sandstones
- Massive banded quartzites and mica quartzites

For detailed information refer to actual drill logs.



DETAILS OF TRENCH LOCATIONS AND LITHOLOGIES IN SECTION 166 PARISH OF PARRA WIRRA. DRILL HOLE SITES AND INFERRED GEOLOGICAL BOUNDARIES ALSO SHOWN.

MAP 4.

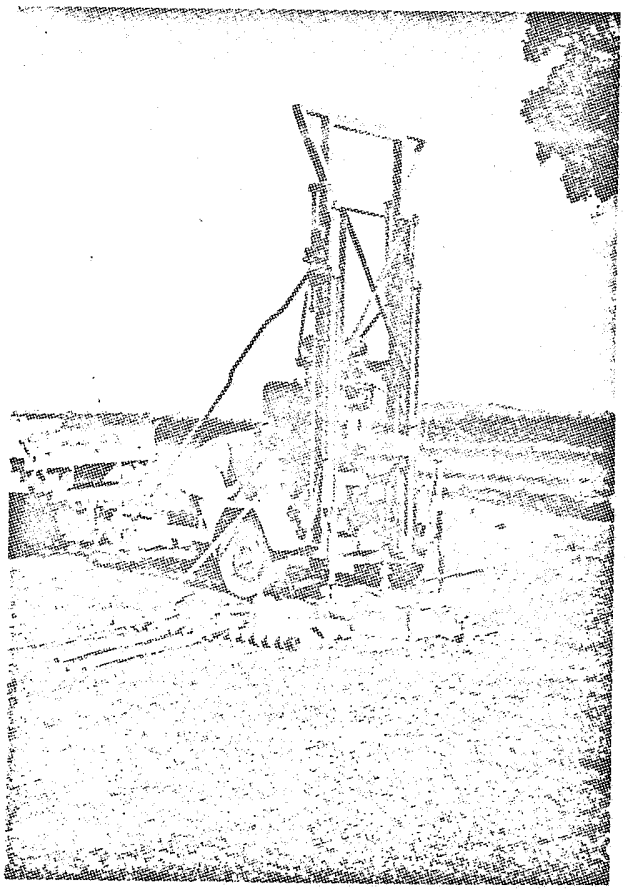


Fig 10 - 6 inch "Proline" auger drill used by Readymix Concrete (S.A.) Ltd., in the initial stages of the investigation to obtain samples.

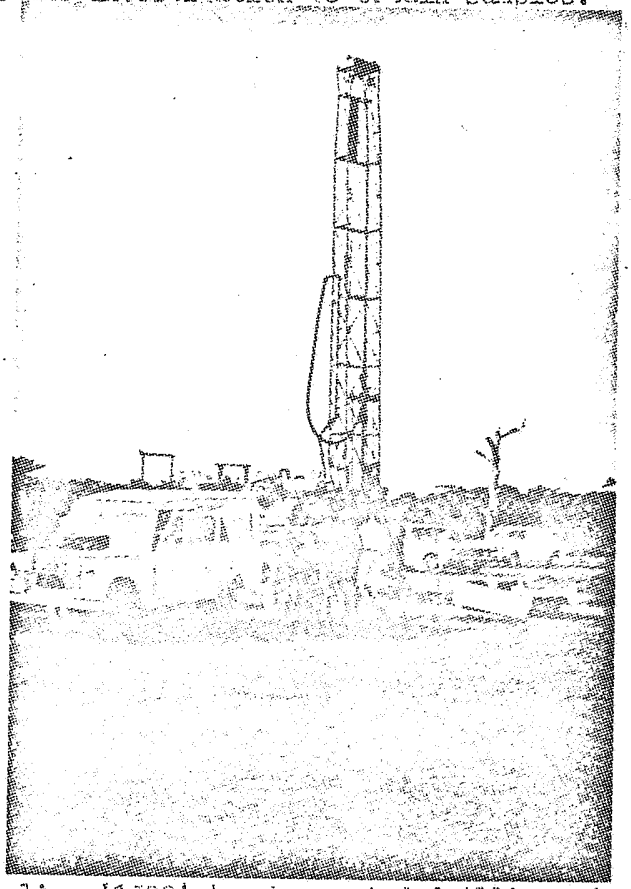


Fig 11 - Fayling '1500' trunk mounted drilling rig site of hole AGP1

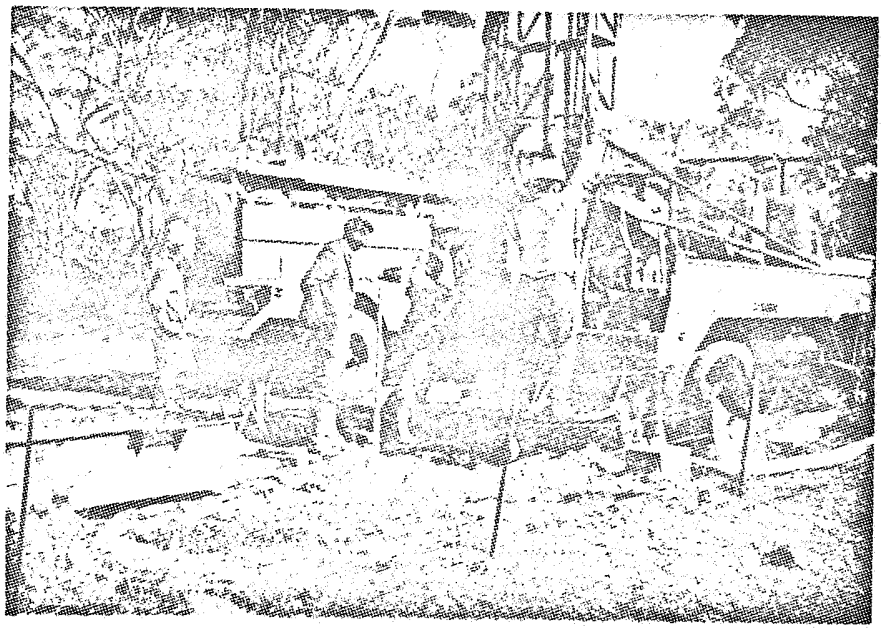


Fig 12 - Backend of 'Fayling' 1500 Drill Rig.
Site of hole AGP2.

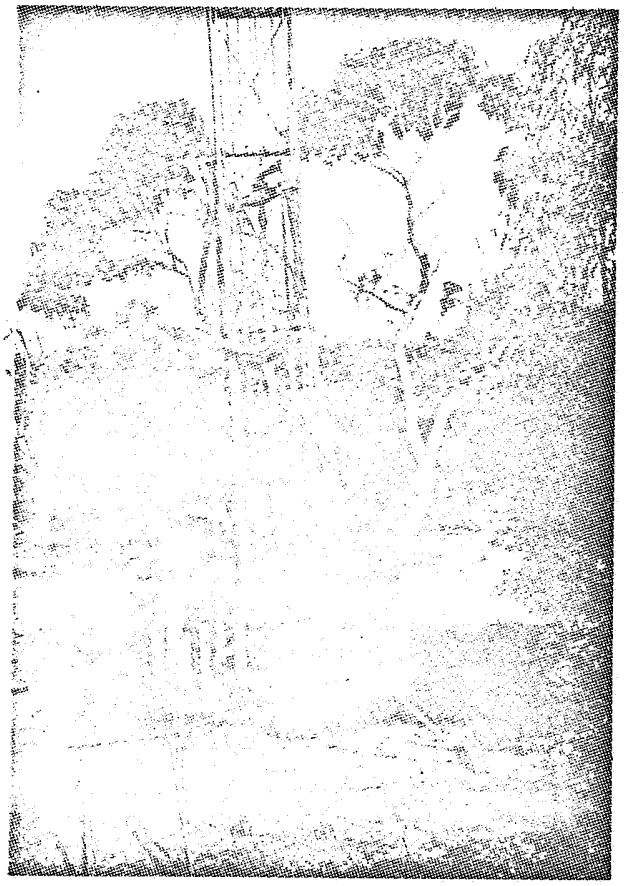


Fig 13 - Fayling '200' drilling rig drilling in hard quartzite using air. Site of hole AGP3.

Fig 14 - Core Barrel lies split in two on ground and each half contains a portion of a ten foot length of core. Site of hole AGP1 looking east.

Fig 15 - Close up of a split tube core barrel on left held together by a series of spring clips along its length. On the right the drill tube which contains the core barrel. Site of hole SGP6. Core is of hard quartzite.

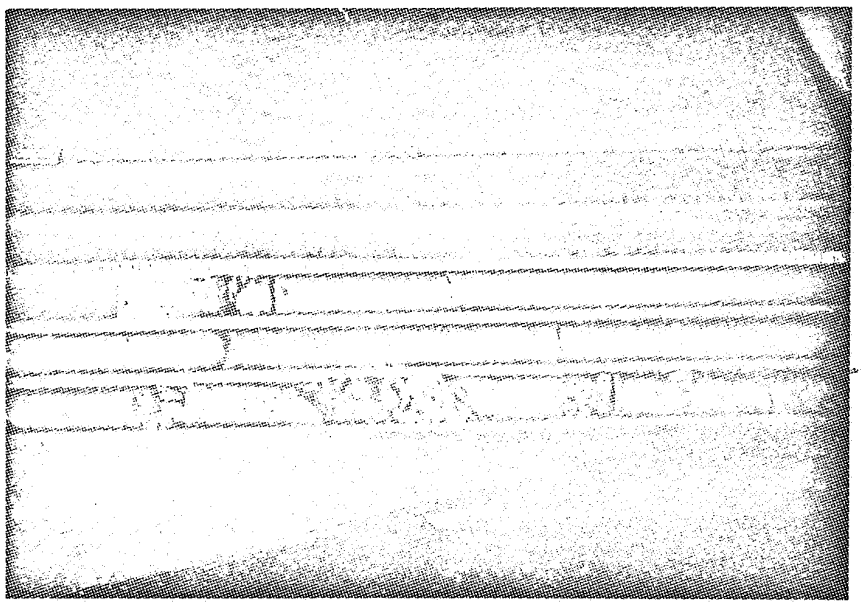


Fig 16 - Sections of continous core obtained by Fayling '1500'. Core shown is from hole AGPI.

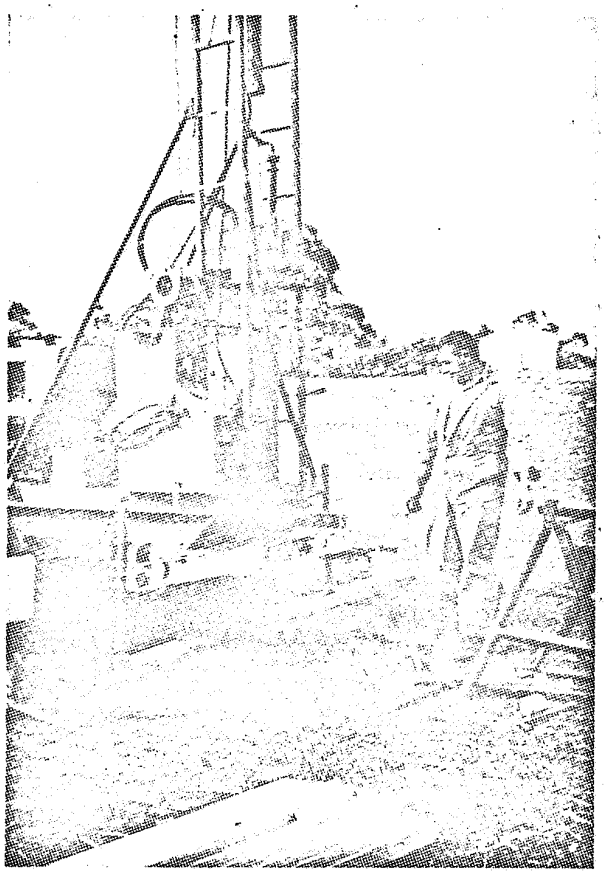


Fig 17 - Odgers drilling rig which was found to give poor core recovery.

CLAY EVALUATION AND X-RAY DIFFRACTION RESULTS

Cores containing white clay were sampled and quartered. In general a ten foot section of 2½ inch core weighs roughly 20 lbs. One quarter of each ten foot section of core was air-freighted to English China Clays Ltd., St.Austell, U.K., for evaluation as a paper clay. Tests were carried out on the processed clay fraction containing approximately 80% of minus 2 micron particle obtained by processing the crude samples and include results on yield of the fraction obtained from original sample, percentage of minus 2 micron fraction, flowability and natural bleached brightness. The clay evaluation results are listed in Table 1. The clay brightness better than 89.0/3.5 (e.g. more than 89.0 and less than 3.5) could be considered as potential paper coating grade clay, but flowabilities are so far below a minimun acceptable control level of 67.0 that the clay would be completely unmarketable.

Some of the processed clay fractions were examined by X-ray diffraction to identify their constituent mineral assemblages. The X-ray diffraction results are listed in Table 2.

DISCUSSION OF CLAY EVALUATION RESULTS

The laboratory clay evaluation results are best reviewed in a geological context. To recap briefly, the kaolinitic clays and sandstones have resulted from prolonged and intense surface weathering of a series of steeply dipping metamorphosed dolomitic, albitic and siliceous sediments whose lithology is very variable. Within the main overturned anticlinal structure (see map 3) controlling the disposition of the formations which have weathered to kaolin-bearing bodies, several broad lithological units can be recognised. In the following discussion each unit is evaluated on the basis of the laboratory results as a source of paper grade kaolin.

(a) Mica Quartzites and Schists: These rocks have been deeply weathered to depths of up to 70'. The mica contained in these rocks is biotite mica (rich in iron). During weathering the biotite is converted to a

TABLE 1 - CLAY EVALUATION RESULTS

b) Laboratory Results on Kaolinitic Sandstones derived from Massive Quartzites:

Field Ref.No.	Yield	-2 micron	Flowability	Nat. Brightness	Bleach Brightness
PA2 (11'-25')	15.4	76	Flocc	73.7/13.0	73.7/12.8

c) Laboratory results on Kaolinitic and Talcose Sandstones derived from weathering of Arkosic Quartzites:

Field Ref.	Yield	-2 micron	Flowability	Nat. Brightness	Bleach Brightness
Trench 3 (0-12')	10.5	79	55.0	80.8/7.3	81.4/6.6
" (3'-18')	12.6	79	59.0	91.0/0.9	91.4/0.5
Auger/H3 (12'-18')	21.6	75	61.7	91.0/2.4	92.0/1.2
" /H6 (6'-21')	17.3	77	54.5	86.5/4.9	86.9/4.9
" /H7 (12'-15')	17.1	86	62.9	90.0/2.7	91.4/1.8
" " (15'-18')	17.9	82	63.1	89.8/3.1	91.3/2.4
" " (18'-21')	16.9	61	54.3	86.3/4.4	87.8/3.4
" /H8 (15'-21')	11.6	75	62.1	86.0/1.2	88.7/0.6
" /H13 (12'-15')	12.4	74	62.7	88.0/4.0	89.4/3.2
" /H14 (12'-21')	10.8	65	58.7	88.8/3.1	89.6/2.3
" /H16 (12'-21')	14.4	72	63.5	84.7/6.6	85.4/5.9
" /H18	16.0	71	62.1	89.0/3.8	89.2/2.8
" /H20 (12'-18')	27.5	57	56.8	86.4/4.3	86.6/3.5
P5 (18'-21')	25.6	88	61.0	89.8/1.8	90.3/1.4
AGP2 (8'6"-22')	16.3	77	64.1	90.5/2.5	91.2/1.6
" (22'-31')	13.3	78	60.6	90.3/4.2	91.2/2.3
" (31'-48')	22.0	75	44.0	59.8/23.6	60.0/22.8
" (48'-59')	10.6	78	Flocc.	53.1/29.0	51.3/29.2
" (59'-75')	8.1	75	50.5	68.1/18.1	67.2/18.1
" (75'-91')	10.7	73	53.9	68.4/16.1	69.2/15.6
" (91'-101')	1.5	77	38.8	60.2/16.6	50.4/17.0
" (101'-107')	1.7	75	40.6	67.5/13.1	67.3/13.0
AGP4 (22'6"-39'4")	17.6	75	56.8	81.9/6.9	81.7/6.9
AGP7 (16'6"-26'6")	19.5	82	61.9	87.8/6.0	84.4/5.2
AGP13 (38'6"-47'6")	55.0	85	62.3	82.6/10.7	83.0/10.0
" (47'6"-55')	44.5	83	54.0	80.4/11.1	80.7/10.3
" (55'-63')	27.8	80	52.4	76.4/9.7	75.9/9.0
SGP4 (5'-15')	5.4	75	Flocc.	81.1/5.2	80.9/4.2

d) Laboratory Results on Kaolinitic Sandstones derived from Sandy Quartzites:

Field Ref.No.	Yield	-2 micron	Flowability	Nat. Brightness	Bleach Brightness
Trench 2 (0-12')	28.8	78	57	86.1/6.5	86.5/6.0
" (12'-24')	58.0	82	60.4	80.0/10.0	81.0/8.9
" (24'-33')	72.5	87	63.9	67.1/17.5	68.8/16.2
AGP 16 (54'-62')	24.7	76	66.7	80.8/8.8	82.3/8.1

e) Laboratory Results on Kaolinitic and Talcose Schists derived from Talcose Albitic Schists and Sandstones:

Field Ref.No.	Yield	-2 micron	Flowability	Nat. Brightness	Bleach Brightness
Trench 1 (0-15')	23.7	88	44.3	83.0/8.6	82.2/8.3
" (15'-27')	50.4	81	61.5	75.0/12.9	76.1/11.6
" (27'-39')	62.8	87	63.3	74.7/13.6	75.4/12.1
AGP 1 (6'6"-19'6")	35.2	80	54.3	78.8/8.9	78.2/8.1
" (19'6"-29')	29.2	82	46.3	66.5/15.0	65.0/15.2
" (29'-42')	18.6	80	Flocc.	68.8/13.9	65.9/14.2
" (42'-64')	6.4	77	Flocc.	66.2/11.7	61.7/12.3

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TABLE 2.

SUMMARY OF X-RAY DIFFRACTION RESULTS ON CLAY FRACTIONS PROCESSED FROM THE SAMPLES FROM THE MT.CRAWFORD AREA, S.AUSTRALIA

It should be noted that the following results relate only to the processed clay fractions and do NOT represent the composition of the original samples.

PROCESSED CLAY FRACTION Field Ref.No.	Kaolinite	Montmor-illonite	Talc	Anatase	Felspar	Quartz	Mica
H3 (12'-18')	90	-	10	-	-	n.d.	n.d.
H6 (6'-21')	97	trace	2	-	-	n.d.	trace
H7 (18'-21')	94	trace	5	-	-	1	n.d.
H14 (12'-21')	-	trace	-	-	-	-	-
H16 (12'-21')	92	-	trace	-	-	n.d.	7
H20 (12'-18')	91	6.9	3	-	-	n.d.	6
Opencut (3'-18')	92	-	4	-	-	n.d.	4
Trench1(0-15')	99	-	n.d.	trace	-	-	n.d.
Trench 1(15'-27')	99	-	n.d.	trace	-	-	n.d.
Trench 1(27'-39')	99	-	n.d.	trace	-	-	n.d.
Trench 2 (0-12')	99	-	trace	n.d.	-	-	n.d.
Trench 2 (12'-24')	99	-	trace	n.d.	-	-	n.d.
Trench 2 (24'-33')	99	-	trace	n.d.	-	-	trace
Trench 3 (0-12')	96	-	3	n.d.	-	trace	trace
AGP1 (19'6"-29')	77	13	8	1	trace	n.d.	-
AGP1 (42'-64')	36		29	n.d.	6	n.d.	-
AGP2 (8'6"-22')	96	0	3	trace	n.d.	trace	n.d.
AGP2 (22'-31')	96	2	2	n.d.	n.d.	n.d.	-
AGP2 (59'-75')	65	11	9	trace	12	3	-
AGP2 (91'-101')	59	23	9	trace	6	2	-

Trace - less than ½% n.d. not detected - not sought.

colourless variety with release of iron oxides and in general clays which have resulted from the weathering process and occur within the bleached zone underlying the lateritic capping (see Fig. 2) are marred by very pockety iron-staining. The staining is so variable and irregular that the bleached zone is more properly titled 'the mottled zone' in the context of this rock group. Clay cores retrieved from this rock group were not worthy of testing, owing to this heavy iron-staining. For details of typical drill logs the reader is referred to AGP 10, 14, 15, 21-25, SGP 2, 5, (Appendix 2).

(b) Massive Quartzites with Small Amounts of Mica - generally these rocks are very resistant to weathering and because of their high quartz content form most of the high ground in the Mt. Crawford lease area. Intercalations of more micaceous quartzites also occur in this group.

Only one clay core was worth testing (PA 2 11'-25') and was obtained from a shattered variety of the massive quartzite and contained a few clay veins derived from alteration of felspar. Laboratory results showed the clay could not be deflocculated in order to measure flowability and natural and bleached brightnesses were extremely bad. For details of typical drill logs refer to AGP 3, 8, 9, 27 (Appendix 2).

(c) Pure Quartzites, Arkose in part - this group has constituted the most favourable parent body for the formation of kaolinitic sandstone by deep surface weathering. Weathering of this group as a whole is rather variable and has been dependent upon the original mineralogical constitution of the parent body. The formation is much more siliceous on the western limb of the anticline, and clay when present at all is extremely variable both in terms of yield and quality. Thus yield varies from 25.6% (P5) to 5.4% (SGP 4) whilst flowabilities range from very poor to 61 and brightness 81-89. In general drill cores from the western limb of the fold show practically pure quartzite with negligible clay content and this area cannot be considered as a source of paper clay. Typical drill logs in the type of material are those of AGP 6, 7, 19 and SGP 3 and 4.

Most of the original auger samples received for evaluation came from the eastern limb of the fold (see map 3) and here the quartzites have generally weathered more deeply than on the western limb, probably because of a lesser content of silica in the parent body and greater amounts of original felspathic material. There is also a greater amount of faulting and shearing in this area, which would facilitate deeper weathering. It is samples from this area which have received most attention. In summarising the laboratory results variability of the clay processed from these samples is the most striking factor. This variability is extremely apparent laterally and auger samples obtained within the immediate area of Trench 3 and samples taken within the trench, show flowabilities ranging from 55 to 64 in the depth zone of 0 - 21 feet. Natural brightness of these samples is generally good, although erratic, and ranges from 81/7.3 to 91/0.9, with an average of about 87. Variability is also most pronounced vertically and at depths greater than 20 feet flowabilities rapidly deteriorate to less than 60, with a marked falling off in natural brightness, i.e. less than 70 generally. Cores further south on the same western limb of the fold and in similar rocks show very poor flowabilities and brightnesses.

The only sample of clay obtained from this group of rocks which possesses commercial possibilities is from hole AGP 2 in the depth zone 8'6" - 22'. However in the face of the extreme lateral and vertical variation in clay quality, it must be concluded that this kaolin occurs as an isolated pocket and is neither sufficiently extensive nor deep enough to warrant commerical exploitation on the scale envisaged. This variability of clay properties indicates the virtually impossible task of working such a deposit to produce a consistent grade clay even if sufficient reserves were available. The reserve figure for the probable tonnage of paper clay raw matrix is 189,300 tonnes, which if possible to selectively work and process, would probably yield 31,000 tonnes of paper grade coating clay.

Typical drill logs in this group of rocks are AGP 2, 4, 11-13, 17 26, 28, and SGP 7, 8, 10.

(d) Sandy Quartzites - These rocks are generally fairly friable although on occasion are massive and do not give rise to ground of high relief. Clay derived from the weathering process usually forms a thin capping and is generally iron-stained. Trench 2 is located in this type of material. Flowabilities of clay near the surface are bad, but improve with depth whilst brightness (86.1/6.5) which is reasonable at the surface deteriorates with depth. The clay derived from weathering of this material does not meet the specification required of paper clay. Typical drill logs in the type of material are AGP 18, 20, PA 1 and SGP 1.

(e) Kaolinitic and Talcose Schists - Situated at the core of the anticlinal structure, these rocks are very variable in lithology. They are fairly susceptible to weathering although the clay produced is of mixed type. The clay appears to be predominantly kaolinite at the higher levels with poor flowabilities (44.3) but reasonable brightness. Flowabilities improve with depth in Trench 1, but in Hole AGP 1 deteriorate rapidly; there is evidence to suggest that flowabilities in Trench 1 deteriorate rapidly below the 39' level. In both cases, with increasing depth natural brightness falls off very rapidly.

The evidence points to the fact that clays of this nature are unsuitable for any paper industry. Typical drill logs in this type of ground are AGP 1, Trench 1, Trenches RB 1 and 2 (see Appendix 2).

DISCUSSION OF X-RAY DIFFRACTION RESULTS PROCESSED CLAY FRACTION

Most of the processed clay fractions contain a predominance of kaolinite, whilst the presence of montmorillonite in all samples in which it was sought accounts for the extremely bad flowabilities recorded at depth and for the rather poor flowabilities recorded throughout the area as a whole. It is also interesting to note that talc is a common associate of montmorillonite in these samples. It is believed that the

talc has resulted from a low grade wet regional metamorphism of a series of predominantly siliceous sediments which probably contain dolomitic and arkosic components. The presence of talc, a mineral rich in magnesia, is believed to have controlled and favoured the formation of montmorillonite from albitic felspar, in preference to kaolinite, during the weathering process. At the surface where weathering conditions were more intense the montmorillonite has itself been converted to kaolinite. The X-ray diffraction results for Hole AGP 2 illustrate the mechanism of this process very well.

The presence of albite felspar in the clay fraction indicates the arkosic nature of some of the quartzitic rocks and it is almost certainly the parent mineral from which both kaolinite and montmorillonite have been derived by weathering.

There is a complete absence of hydrothermal minerals suggesting that hydrothermal activity has played no part in the formation of these kaolin bearing sandstones and schists. Indeed measurements of the kaolinite crystallity index (0.56 - 0.86) tend to confirm the view that the kaolinite has been formed solely by weathering of albitic felspar, through a montmorillonite intermediate stage.

RESERVE ASSESSMENTS

The following calculations refer to raw matrix containing clay and not actual clay present, except where indicated. The calculations also refer to probable tonnages present in the area of section 166 (purple shaded on maps) and in the area of Sections 168, 169, 170 and 338.
It is most important to realise that these figures should be treated with caution because of:

a) The proved rapid lateral and vertical variation in clay types and lithologies.

b) The absence of close pattern drilling to put reserves in the proven rather than probable category. This close pattern drilling was not carried out because of the inferior nature of the clay for paper manufacture.

1. Probable tonnage of White Kaolinite and Talcose Matrix in Section 166

Area of clay containing formation	=	105,000 sq.metres.
Average thickness of horizon	=	7 metres
Volume of ground	=	735,000 cu.metres
Bulk density of raw clay matrix	=	2.37 g/cc
Tonnage of raw clay matrix	=	1.74 million metric tonnes
Deduct 40% for iron-staining	=	1.05 million metric tonnes

Probable tonnage of White Kaolinitic, Talcose Matrix which is unsuitable for paper production = 1.05 million metric tonnes

Amount of Overburden overlying Clay Matrix

Volume of overburden	=	210,000 cu.metres.
Tonnage (assume 2.37 g/cc density)	=	500,000 metric tonnes.

Amount of Overburden overlying Clay Matrix = 500,000 metric tonnes

2. Probable tonnage of Raw Clay Matrix present in Sections 168, 169, 170, 175

This calculation is based upon the area covered by drill holes SGP 7, 8, 10, AGP 2, 26 and PA 4, and estimates the tonnage of weathered matrix containing discernible clay matrix, and does not discriminate initially between iron-stained non-iron stained, montmorillonitic or possible paper clay material. Hole SGP 8 contains only sandy material and hole SGP 10 is becoming predominantly sandy with only small amounts of clay. Therefore the northern boundary of the reserve area has been drawn just north of these holes. The southern boundary to the reserve area is drawn midway between Hole AGP 26 and Hole AGP 28, which contains no clay worthy of inclusion in the reserve calculations. For the purposes of the calculation the following depths of weathered clay matrix for each hole were taken:-

AGP 2 (100'), AGP 26 (52'), SGP 7 (131')

SGP 8 (0'), SGP 10 (16'), PA 4 (25')

Reference to the drill logs will show variation of clay matrix with depth.

Area of ground containing raw clay matrix	=	480,000 sq.metres.
Average depth of weathered clay matrix	=	16.4 metres
Volume of ground	=	7,752,000 cu.metres.
Dry bulk density	=	1.47 g/cc
∴ Tonnage of raw clay matrix	=	11,395,000 tonnes.

Drill logs show at least 50% iron-staining

∴ Probable tonnage of white raw clay matrix = 5.68 million tonnes

3. Probable Tonnage of Raw Clay Matrix with Paper Grade possibilities in Sections 169, 175

Clay matrix containing clay of paper grade specification was found only in Hole AGP 2, in the depth zone 8.5 - 22'0". The sphere of influence of the hole is taken to be a circle around the hole of 100 metres radius, since we found the clay in adjoining areas to be unsuitable for paper.

Area of probable paper clay reserves	=	31,420 sq.metres.
Depth zone	=	4.1 metres
Volume of ground	=	128,820 cu.metres
Dry bulk density	=	1.47 g/cc
∴ Tonnage of raw matrix	=	189,350 tonnes

Yield of paper grade clay is 16.3% of raw matrix.

∴ Probable paper clay reserves = 31,000 tonnes

Amount of Overburden overlying raw clay matrix

Volume of overburden	=	75,400 cu.metres.
Tonnage (assume 1.47 g/cc density)	=	100,800 metric tonnes.

∴ Amount of Overburden overlying Clay matrix = 100,800 metric tonnes

CONCLUSIONS REGARDING THE OCCURRENCE OF KAOLIN ON SML 174, MT.CRAWFORD DRAWN FROM GEOLOGICAL, DRILLING AND LABORATORY RESULTS JL 76

Conclusions drawn from Geological and Drilling Work

1. The lease area SML 174 contains a series of steeply eastward dipping metamorphosed siliceous and micaceous sedimentary rocks of possible Cambrian age. The steep eastward dip is the result of folding about approximate N-S axes with slight overturning to the west.
2. Igneous activity within the lease area is principally confined to the southwast portion where quartz mica felspar pegmatites intrude a succession of mica quartzites and schists. Minor felspathic and siliceous veining is sporadically present througout the entire area.
3. The kaolin-bearing material is the result of prolonged and intense surface weathering of a variety of metamorphosed talcose and albitic quartzites and schists.
4. The principal kaolin-bearing formations are located in Section 166, Hundred of Parra Wirra; and Sections 169, 170 and 175 Hundred of Parra Wirra; their extent can be seen in maps 2 and 3.
5. Geological mapping failed to reveal the presence of other kaolin-bearing formations within the lease area, apart from those detailed above.
6. Drilling showed that thicknesses of white kaolinitic material without bad staining are virtually restricted to the depth zone 6 - 25 feet in both kaolin-bearing formations, and also that lithologies vary rapidly both laterally and vertically.
7. The following reserve assessment figures which should be treated with caution in view of the rapid lateral and vertical variation in clay properties and irregularity of iron-staining show:
   a) Probable tonnage of white kaolinitic and talcose matrix (which is unsuitable for paper propertion) on Section 166 is 1.05 million tonnes overlain by 0.5 million tonnes of overburden.
   b) Probable tonnage of white raw clay matrix present in Sections 168, 169, 170, 175 is 5.68 million tonnes (unsuitable for paper production)
   c) Probable tonnage of raw clay matrix with paper grade possibilities in Sections 169, 175 is 189,350 tonnes which if possible to selectively work and process would probably yield 31,000

tonnes of paper grade clay.

It must be emphasised that owing to the irregular nature of iron-staining, it may not be possible to extract anything like the tonnages quoted even though an allowance has been made for iron-staining in the calculations.

Conclusions drawn from Laboratory Results

8. The quality of the processed clay fractions is extremely variable and is not of paper grade standard except in the depth zone 8.5' - 22' of Hole AGP 2. Flowabilities are generally poor, due to the presence of varying amounts of montmorillonite, and in conjunction with brightnesses, deteriorate markedly with increase in depth. The deterioration in quality is most marked at about the 30 foot level.

9. The presence of talc in most of the clay samples is thought to be the result of low grade regional metamorphism of rocks which originally comprised a varied succession of dolomitic and arkose sandstones.

10. Talc, a mineral rich in magnesia, has favoured and controlled the formation of montmorillonite from albitic felspar during the weathering process.

11. At the surface where more vigorous oxidising and acidic conditions prevailed the montmorillonite itself has been further modified to kaolinite.

12. The absence of minerals normally associated with hydrothermal activity precludes the possibility of kaolinite formation by this agency and drilling has confirmed that the kaolinite formation is surface related.

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Lastly, I would personally like to thank Malcolm Ives of C.S.R. for his competence and administrative skills in the field, and particularly for his friendship and hospitality shown to me in his own home.

APPENDIX I

ORIGIN AND TYPE OF SAMPLES OBTAINED FROM LEASE AREA (REFER SAMPLE LOCALITY MAP) AND SUBJECTED TO LABORATORY ANALYSIS.

1. Auger Samples

The following samples were obtained by shallow auger drilling by Readymix Concrete Ltd., and forwarded St.Austell, U.K., for laboratory analysis.

a. Auger Samples from the immediate area around the original pit and costeen (now Trench 3) adjoining section 169 in the Parish of Parra Wirra.

Holes not surveyed in, no precise locations.

Samples Nos. H3 (12'-18'), H6 (6'-21'), H7 (12'-21'), H8 (15'-21') H13 (12'-15'), H14 (12'-21'), H16 (12'-21'), H20 (12'-18').

b. Five samples from above pit and costeen (now Trench 3) representing 3'-8' vertical channel sample.

c. One auger sample P5 (18'-21') from Section 165, Parish of Parra Wirra. No precise location.

2. Trench Samples

3 trenches were bulldozed to obtain a visual indication of variability of the clay-bearing material and also to obtain vertical and lateral channel samples.

a. Trench 1 - situated in Section 166, Parish of Parra Wirra.
Vertical channel sample 0 - 39 feet.

b. Trench 2 - situated in Section 166, Parish of Parra Wirra.
Vertical channel sample 0 - 33 feet.

c. Trench 3 - situated in Section 169, Parish of Parra Wirra.
Vertical channel sample 0 - 12 feet.

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3. Core Drill Samples

$2\frac{1}{8}$ inch diameter drill cores were obtained from drill holes at the following grid locations (map 3). Ten foot sections of core containing white clay material were quartered and one quarter sent for laboratory analysis.

a. Drill hole AGP 1 (99,000 E/100,000 N) 6'6" - 64'0"

b. Drill hole AGP 2 (99,418 E/101,000 N) 8'6" - 108'0"

c. Drill hole PA 2 (100,000 E/100859 N) 11'0" - 25'0"

d. Drill hole AGP 4 (100,000 E/100,000 N) 9'6" - 39'4"

e. Drill hole AGP 7 (97,900 E/100,000 N) 16'6" - 26'6"

f. Drill hole AGP 13 (100,000 E/99,000 N) 37'6" - 63'0"

g. Drill hole AGP 16 (100,000 E/98,250 N) 54'0" - 62'0"

h. Drill hole SGP 4 (98,170 E/100,900 N) 5'0" - 15'0"

APPENDIX 2

Drill Log Records of Contract Core Drilling and Trenching carried out on Special Mineral Lease 174, Mt. Crawford, S. Australia, during the period 26th September, 1968 - 4th November, 1968.

1) Summary of Contract Core Drilling carried out.

In general both Fayling rigs ('1500' and '200') proved to be very reliable mechanically and were able to average better than 75% core recovery in a very mixed bag of rock lithologies. This was undoubtedly due to the versatile nature of these rigs which can operate with either air or water. The Odgers rig, with only water available, was severely restricted in core recovery capacity in the type of ground encountered, and good core recovery, i.e. better than 75%, could only be obtained in hard rock formations. Circulation of water in the clay bearing formations washed the clay from the predominantly sandy matrix, leaving a residue of unconsolidated sand and silt. This washing effect could perhaps have been avoided by the use of a bentonite or oil-based drilling mud, but would have resulted in severe contamination of the material being sought. The Price Anderson drilling contract was thus terminated on grounds of poor core recovery shortly after its commencement.

Details of the drilling carried out are listed below, followed by the detailed core log description.

Drilling Company	Drilling Rig	Footage Drilled	No. of Holes
Austral Geo Prospectors Pty Ltd. P.O. Box 208, N. Quay, Brisbane, Queensland 4,000 Director: J.A. Walls	1) Fayling 1500	1921' 5"	28
	2) Fayling 200	557'10"	10
Price Anderson Pty Ltd., P.O. Box 7 Charlestown, N.S.W. 2290 Directors: A. Price C. Anderson	Odgers	192' 6"	4

Total Number of Drill Holes = 42 Total Footage = 2,671' 1(

Notes:

With respect to the following core log description:-

1. For drill hole grid references refer Map 3.
2. Drill hole prefixed AGP refers to hole drilled by Fayling 1500
   " " " SGP " " " " " " 200
   " " " PA " " " " " Odgers rig.
3. Core recoveries are calculated individually for each hole on the basis of percentage of core recovered to total footage drilled. Any footage in any hole which is drilled but not cored is taken as 100% recovery for the purposes of calculation.

2) Drill Records of Austral Geoprospectors

Fayling 1500 Rig

(AGP)

CUMULATIVE FOOTAGE: 73'

DRILL HOLE NUMBER AGP 1 (99,000E/100,000 N)

84

Commenced 13.00 26/9/68; finished 16.30 28/9/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 6'	Not cored	Brown red lateritic soil.
6' - 7'3"	7"	Compact core - grey white clay with red specking and iron stained joint surfaces.
7'3" - 8'6"	2"	Material as above.
8'6" - 9'9"	3"	Brown red laterite - probably fallen down hole.
9'9" - 11'0"	1' 3"	Good white clay somewhat sandy. Slight iron staining upper part.
11'0" - 12'3"	1' 3"	White clay with red iron specking.
12'3" - 13'6"	1' 1"	Greenish clay with heavy iron staining.
13'6" - 14'9"	10"	Greenish clay with iron specking.
14'9" - 16'0"	1' 2"	Greenish clay with iron stained upper part.
16'0" - 17'3"	3"	Water at this level. Off white clay with iron specking.
17'3" - 18'6"	1'	Greenish white clay with small black flecks.
18'6" - 19'9"	1' 0"	As above.
19'9" - 24'0"	1' 6"	White kaolinised sandstone, very friable with heavy iron staining in veins.
24' - 25'	9"	Off white clayey sandstone, red and black specking.
25' - 29'	3' 10"	Soft core, grey kaolinised sandstone, greenish in lower part.
29'	20' 9"	
This portion above 29' re-drilled (PTO)		
29' - 34'	1' 0"	2'6" greenish clayey sandstone. 2'6" brown yellow clayey sandstone.
34' - 42'	4' 11"	Upper part brown yellow clay with greyish lower part.
42' - 44'	2' 0"	Variegated yellow, grey and pink sandstone.
44' - 47'	3' 0"	Pink grey and yellow sandstones
47' - 56'	1' 11"	Pale green thixotropic mud during drilling. Solid core shows off-white sandstone with plentiful green veinlets.
50' - 59'	3' 10"	Light green sand slurry upper part. Lower part white and green sandstone.
59' - 64'	2' 8"	Grey green kaolinised sandstone with slight iron staining in lower part.
64' - 69'	4' 5"	Green brown slurry upper part. Core of hard greenish quartzite slightly altered.
69' - 71'	1' 10"	Hard whitish quartzite with ¼" dark bands.
		Changed to diamond bit.
71' - 73'	2' 0"	Green banded quartzite, very hard.
		Hole stopped - diamond bit ruined.

Recovery from 29' - 73' was 31'7"

CUMULATIVE FOOTAGE: 102'6"

DRILL HOLE NUMBER AGP 1 RE-DRILL (99000E/100,000N)

DEPTH DRILLED	CORE RECOVERED	REMARKS
Drill moved 10 ft. to north of peg and the top 30' was re-drilled.		
0 - 3'6"	not cored	Red lateritic overburden.
3'6" - 4'6"	1' 0"	White clay badly iron-stained.
4'6" - 5'6"	11"	As above.
5'6" - 6'6"	8"	Off white compact clay, some tree roots.
6'6" - 8'0"	1' 0"	Off white clay.
8'0" - 9'6"	1' 0"	Off white clay.
9'6" - 11'0"	1' 2"	" " " with iron specking.
11'0" - 12'6"	1' 2"	" " " with slight green specking.
12'6" - 16'6"	2' 4"	Off white sandy clay, minor iron specking. Water table at 16'.
16'6" - 19'6"	2' 7"	Off white clay, increasing green veining.
19'6" - 29'6"	10' 0"	Greenish white clay, plastic, lower and middle portions with some brown iron stained patches.
29'6"	25' 4"	

Total hole = 73'0" Total core = 56'11"

= 78% recovery.

Samples quartered and despatched:

6'6" - 19'6"
19'6" - 29'0"
29'0" - 42'0"
42'0" - 64'0"

CUMULATIVE FOOTAGE: 209'6"

DRILLHOLE NUMBER AGP 2 (99418E/101000N)

86

Started approx. 0930 3/10/68; finished 14.00 4/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'	not cored	Overburden.
3' - 4'6"	1' 2"	Hard siliceous sandstone off-white with variable iron staining and fine black flecking.
4'6" - 5'6"	10"	Hard siliceous sandstone as above.
5'6" - 6'6"	1' 0"	Brown yellow friable sandstone, bottom 4" iron stained white hard sandstone.
6'6" - 8'0"	1' 4"	Buff coloured very hard siliceous sandstone; 10" black mineral banded clayey sandstone - medium hard. 3" soft white clayey sandstone.
8'0" - 9'6"	1' 3"	Buff coloured clayey sandstone.
9'6" - 11'0"	1' 3"	Softish white clayey sandstone. Lower part hard with more clay bands.
11'0" - 14'6"	2' 2"	White medium hard clayey sandstone.
14'6" - 20'6"	5' 2"	Soft white clayey sandstone. Some fine black flecking in top middle sections.
20'6" - 27'6"	6' 7"	White clayey sandstone.
27'6" - 31'0"	2' 5"	White soft friable sandstone.
31'0" - 44'0"	6' 10"	4" quartz stringer soft cream friable sandstone.
44'0" - 46'0"	2' 2"	1'6" soft cream clay, 8" iron stained clay band.
46'0" - 49'6"	3' 6"	1' sandy white clay followed by greenish white then 1' brown clay back into cream clay.
49'6" - 54'6"	5' 0"	1' buff sandy clay, 3' white sandy clay. 1' yellowish brown clay.
54'6" - 61'0"	5' 6"	3' buff friable sandstone with 2' cream sandy clay.
61'0" - 67'	2'	1'6" buff sandy material, 7" white clayey sand.
67' - 73'	2' 6"	White sandy material.
73' - 77'6"	3' 2"	1'1" white hard clayey sandstone, remainder buff sandy material.
77'6" - 86'	5' 0"	9" white medium soft clayey sandstone. 14" buff stained sandy clay. 1' white sandy material. Remainder white to off-white sandy clay.
86' - 88'	2' 0"	6" buff cream sandy clay, 2" cream clay, 1'4" buff sandy clay.
88' - 92'	3' 4"	Cream/buff sandy material - medium soft, last 8" hard.
92' - 98'	4' 8"	8" buff sandy material, 2" dark banding with iron staining above and below. Remainder white quartzite flecked with green. Last 1' white hard clay.
98' - 105'	6' 4"	3' cream madium hard sandy material. 1' soft sandy clay. 1' cream quartsite hard, remainder white sandy material.
105' - 107'	2' 0"	Cream white sandy material, 6" hard quartz bands, remainder hardish quartzite.
Total 107'	80' 2"	Recovery 75%

Sampled for despatch: 8'6"-22'; 22'-31'; 31'-48'; 48'-59'; 59'-75'; 75'-91'; 91'-101'; 101'-107'

CUMULATIVE FOOTAGE: 257'0"

87

DRILLHOLE NUMBER AGP 3 (100365E/100500N)

Commenced 0 p.m. 4/10/68; finished 10.00 5/10/78

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 11'	Not cored	Overburden
11' - 13-6"	2' 1"	Top: medium-hard off-white sandstone. Lower: hard white quartzite with ½" wide quartz vein; slight iron staining throughout.
13'6" - 15'0"	10"	Quartzite and quartz fragments in brown clay matrix.
15'0" - 16'0"	8"	Medium-hard white clayey sandstone.
16'0" - 19'0"	Not cored	Rock bit through hard white quartzitw.
19'0" - 23'0"	3' 6"	Hard to medium-hard white clayey sandstone with bands of orange, green and brown staining.
23'0" - 27'0"	3' 3"	Hard to friable white clayey sandstone with some iron staining.
27'0" - 30'6"	2' 10"	Hard quartzite with some clay and strong green and black flecking with severe iron staining.
30'6" - 32'0"	1' 0"	Hard white quartzite.
32'0" - 33'0"	7"	Quartzite with dark mineral and severe iron staining.
33'0" - 36'0"	Not cored	Hard quartzite: buff coloured rock chips.
36'0" - 39'6"	3' 6"	Hard and soft grey green quartzite with minor brown clay bands.
39'6" - 40'6"	3"	Medium hard buff clayey quartzite.
40'6" - 46'6"	Not cored	Hard buff-white quartzite.
46'6" - 47'6"	10"	Medium hard green quartzite followed by hard grey quartzite.
Total 47'6"	42' 10"	

Recovery 90%

Sample stored - none despatched.

CUMULATIVE FOOTAGE: 332'

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DRILLHOLE NUMBER AGP 4 (100,000E/100,000N)

Commenced 12.00 hours 5/10/68; finished 12.00 hours 7/10/68.

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'0"	Not cored	Overburden.
5'0" - 6'6"	1' 2"	Iron-stained subsoil.
6'6" - 8'0"	11"	" " "
8'0" - 9'6"	1' 3"	Badly iron-stained white clay.
9'6" - 11'0"	1' 3"	Slightly iron-stained white clay.
11'0" - 19'0"	7' 8"	2' white clay, 1' buff clay, remainder white clay sandstone.
19'0" - 29'6"	8' 6"	White clay sandstone.
29'6" - 34'0"	4' 1"	White clay sandstone.
34'0" - 36'0"	Drilled off	Quartz vein.
36'0" - 40'0"	3' 10"	4' white clay.
46'0" - 49'0"	3' 0"	Orange-brown stained clay.
49'0" - 54'6"	2' 5"	Orange-brown stained clay.
54'6" - 55'6"	1' 0"	Buff soft clay
55'6" - 58'6"	1' 8"	Quartz vein - then badly stained clay.
58'6" - 62'6"	3' 10"	Brown sandy clay with quartz vein.
62'6" - 63'0"	1' 0"	Soft buff sandy friable clay.
63'6" - 66'0"	1' 0"	Hard brown clay sandstone.
66'0" - 75'0"	6' 8"	Orange-brown clay passing down into massive quartzite.
75' 0"	57' 3"	

Recovery 76.5%

Sampled for despatch: 9'6" - 22'6"
22'6" - 39'0"

CUMULATIVE FOOTAGE: 399'0"

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DRILLHOLE NO. AGP 5 (100,875E/100,500N)

Commended 7/10/68; finished 12.00 8/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 13'6"	Drilled off	Hard sandstone capping and overburden.
13'6"	2' 7"	Light brown stained sandstone.
16'6" - 22'0"	3' 6"	Buff cream sandstones.
22'0" - 26'0"	4' 0"	Light brown sandstone.
26'0" - 27'6"	1' 6"	Brown sandstone with quartz vein.
27'6" - 32'6"	2' 5"	Hard brown sandstone.
32'6" - 34'6"	2' 0"	Variable stained sandstone.
34'6" - 37'6"	3' 2"	Light brown sandstone grading through to quartzite stained pink and green.
37'6"	32' 8"	

Recovery - 85%

Samples stored.

CUMULATIVE FOOTAGE: 399'0"

90

DRILLHOLE NUMBER AGP 6 (101,085E/100,200N)

Commenced 13.00 hours 8/10/68; finished 14.30 hours 8/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 16'6"	Drilled off	Buff hard sandstone.
16'6" - 20'6"	2' 9"	Brown biotite, muscovite sandstone grading into quartz mica schist.
20'6" - 23'6"	2' 5"	Light brown friable mica quartzite with hard quartzite lower part.
23'6" - 25'0"	1' 5"	Hard iron-stained micaceous quartzite
25'0" - 27'6"	2' 6"	As above.
27'6" - 29'6"	9"	Hard mica quartzite.
29'6"	26' 4"	

Recovery - 89%

Samples stored.

DRILLHOLE NO. AGP 7 (97,900E/100,000N)

Commenced 08.30 9/10/68; finished 16.30 9/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0' - 1'6"	Not cored	Overburden.
1'6" - 16'6"	11' 9"	Brown and buff sandstone and clayey sandstone.
16'6" - 24'6"	4' 9"	Off white and buff clay sandstone.
24'6" - 29'6"	5' 0"	4' off white clay sandstone 1' badly iron-stained sandstone.
29'6" - 37'6"	7' 0"	Badly iron-stained micaceous sandstone
37'6" - 40'6"	3' 0"	As above.
40'6" - 47'6"	4' 6"	As above, becoming less heavily stained in lower part.
47'6" - 56'0"	4' 6"	Quartz vein, with buff silica sand below.
56'0" - 62'6"	5' 3"	Upper part badly stained friable quartz mica sandstone. Lower part off-white to buff friable mica quartzite.
62'6" - 71'0"	3' 8"	Buff quartz-rich friable sandstone.
71'0" - 77'6"	5' 9"	Grey and buff friable sandstone.
77'6" - 81'6"	2' 0"	White to green friable sandstone becoming massive in lower part.
81'6"	58' 8"	

Recovery - 75%

Sampled for despatch - 16'6" - 26'6"

CUMULATIVE FOOTAGE: 525'6" 92

DRILLHOLE NUMBER AGP8 (97,750E/100,050N)

Commenced 0830 10/10/68; finished 14.30 10/10/68

DEPTH DRILLED	CORE RECOVERY	REMARKS
0 - 3'	not cored	Laterite overburden.
3' - 4'6"	1' 4")	Brown sandy clay.
4'6" - 6'0"	1' 2")	
6'0" - 7'6"	1' 4"	Brown white sandy clay.
7'6" - 9'0"	1' 0"	Buff sand.
9'0" - 10'6"	1' 0"	As above.
10'6" - 12'0"	1' 0"	White sandstone iron-stained.
12'0" - 18'0"	5' 9"	Grey-white sandstone with biotite flakes.
18'0" - 21'6"	1' 6"	As above.
21'6" - 27'0"	1' 8"	Iron-stained quartzite.
27'6" - 32'6"	4' 6"	As above.
32'6" - 41'6"	8' 6")	Iron-stained quartzite becoming very massive with green discolouration.
41'6" - 45'0"	)	
45'0"	35' 3"	Samples stored

Recovery - 77%

CUMULATIVE FOOTAGE: 566'6"

93

DRILLHOLE NUMBER AGP 9 (97,500E/100,060N)

Commenced 15.30 10/10/68; finished 09.30 11/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'	Drilled off	Overburden.
3' - 4'6"	1' 4"	Brown and white sandy clays.
4'6" - 6'0"	1' 4"	Off-white sandy clay.
6'0" - 7'6"	1' 4"	Soft brown clay.
7'6" - 9'6"	1' 10"	Brown mottled white clay grading into hard iron-stained quartzite.
9'6" - 11'0"	1' 5"	Brown-orange friable clay sandstone with biotite mica.
11'0" - 19'6"	7' 4"	Buff sandy clay with some white veining, biotite mica evident throughout.
19'6" - 37'6"	7' 3"	Brown sandy clays grading into brown quartzites.
37'6" - 41'0"	3' 3"	Brown red quartzite with biotite mica.
41'0"	29' 1"	Samples stored.

Recovery 71%

CUMULATIVE FOOTAGE: 606'6"

94

DRILLHOLE NUMBER AGP 10 (97.250E/100.080N)

Commenced 10.30 11/10/68; finished 15.30 11/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 1'6"	Not cored	Overburden.
1'6" - 2'6"	8"	Brown iron-stained clay sand.
2'6" - 3'6"	11"	
3'6" - 5'0"	1' 2"	
5'0" - 6'0"	10"	Brown soft clayey sandstone.
6'0" - 7'6"	1' 3"	
7'6" - 9'0"	1' 2"	
9'0" - 10'6"	1' 3"	
10'6" - 16'0"	3' 0"	Severely stained white clay sandstone with thin clay veins.
10'0" - 19'6"	1' 7"	Brown soft sands.
19'6" - 21'0"	1' 6"	5" white clay associated with quartz vein. Rest soft brown clay sandstone.
21'0" - 27'6"	6' 0"	Brown clay sandstone.
27'6" - 34'0"	5' 10"	Brown micaceous soft clay sandstone.
34'0" - 40'0"	5' 0"	Brown micaceous soft day sandstone.
40' 0"	39' 8"	Samples stored.

Recovery - 89%

CUMULATIVE FOOTAGE: 673'0"

DRILLHOLE NUMBER AGP 11 (100,010E/99,506N)

Commenced 16.00 11/10/68; finished 14.00 12/10/68

95

DEPTH DRILLED	CORE RECOVERED	REMARKS
o - 5'	Not cored	Brown-grey sandstone. Hole cased to 6'.
5'0" - 6'6"	1' 3"	Ironstained grey plastic sandy clay.
6'6" - 8'0"	1' 3"	Iron-stained grey plastic sandy clay.
8'0" - 9'6"	1' 2"	Iron-stained grey plastic sandy clay.
9'6" - 11'0"	9' 2"	Iron-stained grey plastic sandy clay.
11'0" - 25'0"	9' 11"	Quartz veins at 11'8" and 12'5". From 17' only slight iron-staining.
25'0" - 33'6"	8' 0"	Grey plastic sandy clay. 4" quartz stringer at 32'0".
33'6" - 39'6"	5' 0"	2' grey plastic sandy clay grading into off white friable sandy clay with some iron staining in last 6".
39'6" - 47'6"	5' 2"	Cream-buff hard clay sandstone with patches of iron-staining. Last 2' of buff sandstone with sillimanite crystals.
47'6" - 52'6"	4' 6"	As above, but grading into grey quartzite with sillimanite in last 1'.
52'6" - 60'6"	7' 1"	Grey mica quartzite variable to buff schistose quartzite.
60'6" - 66'6"	5' 6"	Grey sandy schistose quartzite.
66'6"	55' 0"	Samples stored. Sample from 36' sent for X-ray examination

Recovery - 82.5%

CUMULATIVE FOOTAGE: 730'6"

96

DRILLHOLE NUMBER AGP 12 (100,000E/99,250N)

Commenced: 15.00 12/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'	Not cored	Overburden. Brown sand.
3' - 4'6"	1' 3"	Brown sandy clay.
4'6" - 6'0"	1' 1"	Brown sandy clay.
6'0" - 7'6"	1' 1"	Brown sandy clay
7'6" - 8'6"	1' 0"	Brown sandy clay.
8'6" - 10'0"	11"	Brown sandy clay
10'0" - 22'0"	7' 4"	Grey plastic clay with brown stained patches.
22'0" - 25'6"	3' 3"	Grey plastic clay but more sandy.
25'6" - 31'0"	5' 6"	1' of iron staining, remainder grey plastic clay.
31'0" - 37'6"	6' 0"	4' grey plastic clay, 1' seam of green clay, remainder grey plastic clay.
37'6" - 42'6"	4' 2"	Grey to green clay with patches of iron staining.
42'6" - 46'6"	3' 10"	Brown to cream iron stained sandy clay, some sillimanite evident.
48'6" - 53'0"	6' 6"	Brown sandy clay with some grey sandstone with sillimanite.
53' - 56'	2' 6"	Grey sillimanite quartzite, some quartz veining.
56' - 57'6"	8"	Brown quartzite.
67'6"	48' 1"	Samples stored. 2" core from 43' sent for X-ray examination for sillimanite.

Recovery - 85%

CUMULATIVE FOOTAGE: 816'0"

97

DRILLHOLE NUMBER AGP 13 (100,000E/99,000N)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'	Not cored	
3' - 4'6"	1' 0"	Brown sandy clay
4'6" - 6'0"	1' 4"	-do-
6'0" - 7'6"	1' 1"	-do-
7'6" - 8'6"	6"	-do-
8'6" - 9'6"	8"	-do-
9'6" - 11'0"	1' 0"	-do-
11'0" - 15'0"	4' 0"	-do-
15'0" - 25'0"	2' 0"	Grey sandy plastic clay.
25'0" - 28'0"	2' 10"	Brown clay.
28'0" - 34'0"	5' 5"	Brown sandy clay grading down to 1'6" grey plastic clay.
34'0" - 37'6"	3'6"	Grey sandy plastic clay, last 1' of grey massive quartzite.
37'6" - 47'6"	9' 5"	Cream to light buff clay, very little sand.
47'6" - 52'6"	6' 0"	Buff to cream clay.
52'6" - 62'6"	9' 0"	Mostly cream clay with green and brown laminations.
62'6" - 67'0"	4' 6"	Grey sandy friable clay with slight iron staining.
67'0" - 71'6"	4' 0"	Off white sandy clay.
71'6" - 77'0"	4' 0"	Off-white sandstone stained red, brown and green.
77'0" - 81'0"	3' 4"	Schistose sandstone with sillimanite.
81'0" - 85'6"	4' 1"	-do-
85'6"	70' 8"	Samples for despatch: 37'6" - 47'6" 47'6" - 55'0" 55'0" - 63"0" Rest stored.

Recovery: 82.5%

CUMULATIVE FOOTAGE: 930'6"

DRILLHOLE NUMBER AGP 14 (100,000E/98,750N)

Finished p.m. 16/10/68

98

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 4'0"	Drilled off	
4' - 5'6"	1' 0"	Brown sandy clay
5'6" - 7'0"	1' 2"	Red-brown sandy clay.
7'0" - 8'0"	10"	Brown sandy clay
8'0" - 9'6"	1' 0"	Grey sandy clay
9'6" - 11'0"	1' 2"	Grey sandy clay, patches of iron staining.
11'0" - 18'6"	5' 1"	1' red brown clay, 4'1" grey sandy clay ironstained.
18'6" - 25'6"	5' 10"	Grey clay, ironstained bands.
25'6" - 32'6"	4' 4"	-do-
32'6" - 39'6"	5' 10"	-do-
39'6" - 45'0"	4' 0"	Grey sandy clay.
45'0" - 62'0"	10' 9"	1' grey off white plastic clay, 9' cream buff sticky clay (Talcose).
62' - 66'6"	4' 6"	White cream sticky talcose clay.
66'6" - 74'6"	4' 4"	2' white sticky talcose clay. 2' sandy micaceous white clay.
74'6" - 78'9"	4' 0"	Buff to brown stained white clay.
78'9" - 88'6"	9' 9"	Buff micaceous sandy clay
88'6" - 91'3"	2' 9"	-do-
91'3" - 95'6"	4' 3"	Buff clay sandstone.
95'6" - 103'	5' 7"	Buff schistose sandstone.
103' - 111'	7' 2"	Soft grey clayey sandstone.
111' - 115'	4' 0"	-do-
Total 115'	91' 4"	Samples stored.

Recovery - 79%

CUMULATIVE FOOTAGE: 1,033'

99

DRILLHOLE NO. AGP 15 (100,000E/98,500N)

Commenced 9.00 a.m. 17/10/68; finished p.m. 17/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 4'6"	Not cored.	
4'6" - 6'0"	0' 11"	Brown sand and clay.
6'0" - 7'0"	0' 10"	Brown stained grey clay.
7'0" - 8'6"	1' 2"	-do-
8'6" - 10'0"	1' 0"	Grey and buff soft sandstone.
10'0"- 11'0"	10"	Brown stained grey clay sandstone.
11'0" - 15'6"	3' 1"	-do-
15'6" - 20'6"	4' 2"	-do- lower 1' grey plastic clay.
20'6" - 22'6"	2' 0"	Brown stained grey clay.
22'6" - 24'6"	1' 5"	Grey sandy clay. 2" hard ironstained band at 22'8".
24'6" - 27'6"	1' 10"	Grey sandy clay.
27'6" - 36'6"	6' 8"	Brown stained sandy clay.
36'6" - 44'6"	8' 0"	Grey sandy clay.
44'6" - 48'0"	3' 6"	Grey clayey sand.
48'0" - 52'6"	4' 1"	Buff soft sand, lower part white clay severely iron-stained.
52'6" - 57'6"	4' 0"	White greasy clay severely ironstained.
57'6" - 62'6"	4' 6"	Greasy white and grey dense clay.
62'6" - 68'0"	4' 1"	2' grey clay sand, remainder grey micaceous sandy clay with pyrite.
68'0" - 76'0"	4' 7"	Grey sandy clay with fine pyrite and coarse quartz vein in lower part.
76'0" - 84'6"	4' 8"	Grey micaceous clay sand with quartz and pyrite. Lower part coarse quartz with grey clay matrix, mica and pyrite.
84'6" - 92'6"	6' 9"	Grey plastic micaceous clay.
92'6" - 102'6"	4' 8"	Grey micaceous sandy clay.
Total 102'6"	77' 3"	Samples stored.

Recovery - 75.5%

CUMULATIVE FOOTAGE: 1,126'6"

DRILLHOLE NUMBER: AGP 16 (100,000E/98,250N) 100

Commenced a.m. 19/10/68; finished p.m. 19/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 7'6"	Not cored	Brown sandy soil.
7'6" - 15'6"	5' 9"	Brown and grey sandy clay subsoil.
15'6" - 19'0"	2' 3"	Grey sandy clay with ironstained silicified sandstone pebbles (ironstone).
19'0" - 23'0"	3' 6"	Ironstained grey sandy clay.
23'0" - 32'6"	7' 0"	Grey sandy clay with hard ironstone bands throughout.
32'6" - 36'6"	3' 4"	Ironstained grey sandy clay.
36'6" - 47'0"	8'. 6"	6" ironstone band, remainder ironstained grey sandy clay (ironstained).
47'0" - 52'0"	3' 0"	Ironstained grey sandy clay. Lower 2" white clayey sand and quartz fragments.
52'0" - 62'0"	10' 0"	1' grey iron-stained micaceous clayey sand, 9' highly micaceous white clay with quartz fragments - some ironstaining.
62'0" - 72'6"	10' 6"	7' buff soft clay sand with large mica flakes. Lower 3' badly stained.
72'6" - 77'	4' 4"	Soft sandy micaceous clay, buff colour.
77' - 88'6"	9' 2"	Buff-grey sandy micaceous clay.
88'6" - 93'6"	5' 0"	Grey-black mica rock.
Total 93'6"	79' 10"	Samples for despatch: 54' - 62' Rest stored.

Recovery - 85%

CUMULATIVE FOOTAGE: 1,211'6"

DRILLHOLE NUMBER AGP 17 (100,000E/99,750N) 101

Commenced 07.00 21/10/68; finished 15.30 21/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 6'	Not cored	Brown sand.
6' - 9'	2' 3"	Buff, brown sandy clay.
9' - 11'6"	2' 0"	Brown, red sandy clay.
11'6" - 13'0"	1' 6"	Off-white to grey clay.
13'0" - 20'6"	6' 9"	Buff sandy clay.
20'6" - 24'6"	3' 0"	Cream sandy clay.
24'6" - 30'0"	2' 3"	Friable sandy buff clay.
30'0" - 37'0"	5' 9"	Brown buff sandy clay.
37'0" - 41'6"	3' 6"	-do-
41'6" - 45'0"	2' 3"	Hard buff micaceous quartzite.
45'0" - 55'0"	5' 6"	Brown clay sandstone.
55'0" - 60'0"	3' 7"	Brown micaceous sandstone.
60'0" - 64'0"	3' 8"	Brown friable sandy micaceous material.
64'0" - 71'0"	5' 10"	-do-
71'0" - 75'0"	4' 0"	-do-
75'0" - 78'0"	3' 0"	Brown schistose quartzite.
78'0" - 85'0"	5' 8"	Grey micaceous quartzite.
Total 85'	66' 6"	Samples stored

Recovery - 78.5%

CUMULATIVE FOOTAGE: 1,293'6"

DRILLHOLE NUMBER AGP 18 (99,250E/100,250N) 102

Commenced 15.50 21/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 4'0"	Not cored	
4'0" - 9'6"	5' 4"	2' red brown ironstained clay, 3' hard cream clay sandstone.
9' 6" - 14'6'	4' 6"	White sticky clay.
14'6" - 20'6"	5' 8"	Cream sandy clay.
20'6" - 26'0"	5' 0"	Cream-buff clay sand.
26'0" - 32'6"	6' 0"	Cream-buff sand.
32'6" - 36'6"	1" 2"	Buff sandy clay.
36'6" - 42'6"	4' 0"	Buff brown stained sand.
42'6" - 45'6"	1' 10"	Cream buff sand.
45'6" - 47'6"	2' 0"	-do-
47'6" - 58'0"	8' 2"	-do-
58'0" - 66'0"	6' 6"	Cream coloured sand.
66'6" - 70'6"	3' 2"	Cream white sand.
70'6" - 77'6"	5' 2"	Cream brown stained sand.
77'6" - 82'0"	4' 6"	Cream coloured sand followed by ironstained grey quartzite.
Total 82'0"	67' 0"	Samples stored.

Recovery 81%

CUMULATIVE FOOTAGE: 1,356'0"

DRILLHOLE NUMBER AGP 19 (98,250E/100,250N) 01 103

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 4'0"	Not cored.	
4'0" - 9'0"	5' 0"	White cream quartzite for 3' then cream sand.
9'0" - 11'6"	2' 6"	White sand
11'6" - 15'0"	2' 7"	-do-
15'0" - 20'0"	5' 0"	White quartzite slightly iron-stained.
20'0" - 24'0"	3' 9"	2' Grey quartzite iron stained, remainder white sand.
24'0" - 32'6"	6' 3"	White quartzite with some mineral banding.
32'6" - 43'6"	8' 6"	White sands and quartzites.
43'6" - 47'6"	3' 6"	White quartzites.
47'6" - 59'6"	10' 11"	White cream sandy quartzite.
59'6" - 62'6"	1' 10"	White quartzite.
Total 62'6"	54'C"	Samples stored

Recovery - 87%

CUMULATIVE FOOTAGE: 1,401'6"

DRILLHOLE NUMBER AGP 20 (98,790E/99,750N) 104

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'0"	Not cored	
5'0" - 9'0"	3' 10"	Red brown sandy clay.
9'0" - 16'0"	3' 6"	Ironstained red brown clay with white sandy patches.
16'0" - 22'0"	3' 0"	Buff coloured quartzites.
22'0" - 31'0"	8' 6"	Buff brown ironstained quartzites and sands.
31'0" - 35'6"	2' 6"	Light brown quartzites.
35'6" - 40'6"	4' 9"	-do-
40'6" - 45'6"	5' 0"	-do-
Total 45'6"	30' 1"	Samples stored.

Recovery - 80%

CUMULATIVE FOOTAGE: 1,481'6"

DRILLHOLE NUMBER AGP 21 (No co-ordinates at present refer map 2) 105

General Area - Just south of Cromer C. Lease

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 6'0"	Not cored	Red lateritic soil.
6'0" - 11'0"	5' 0"	Hard grey micaceous sandstone heavily ironstained.
11'0" - 16'0"	4' 6"	2' lateritized white micaceous sandstone. 2'6" grey offWhite micaceous sandstone.
16'0" - 18'0"	Drilled off	Hard quartz vein.
18'0" - 26'0"	7' 0"	Heavily stained buff to grey, clay veined, micaceous sandstones.
26'0" - 32'6"	5' 10"	Laterised white micaceous sandstones.
32'6" - 42'6"	5' 9"	As above with mica clay veins.
42'6" - 47'6"	2' 7"	Brown grey micaceous sandstones.
47'6" - 60'6'	12' 6"	As above.
60'6" - 69'6"	6' 10"	As above becoming harder.
69'6" - 74'0"	4' 3"	Sandy grey micaceous quartzite.
74'0" - 80'0"	5' 0"	-do-
80'0"	57' 3"	Samples stored.

Recovery - 84%

CUMULATIVE FOOTAGE: 1,543'0"

DRILLHOLE NUMBER AGP 22 (Co-ordinates not known at present)

General area - Just East of Cromer C Lease (Refer Map 2)

Commenced 07.30 26/10/68; finished 13.00 26/10/68.

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 -- 4'	Not cored	Red lateritic soil.
4'0" - 8'6"	4' 4"	White, buff and grey laminated micaceous sandstone.
8'6" - 14'6"	5' 3"	Variable stained white mica sandstone.
14'6" - 24'0"	7' 10"	Variable stained mica sandstone.
24'0" - 32'6"	7' 9"	-do-
32'6" - 36'6"	4' 0"	As above with thin ($\frac{1}{8}$") clay veins.
36'6" - 39'6"	3' 0"	Grey micaceous sandstone with thin clay veining.
39'6" - 46'6"	8' 3"	-do-
46'6" - 51'0"	5' 1"	Sandy micaceous grey quartzites.
51'0" - 61'6"	9' 0"	As above, massive and hard in lower part.
Total 61'6"	58' 6"	samples stored.

Recovery - 95%

CUMULATIVE FOOTAGE: 1,606' 0"

DRILLHOLE NUMBER AGP 23 (Co-ordinates not known at present)

General Area - East of Cromer C Lease (Refer Map 2)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 4'6"	Not cored	Red lateritic soil.
4'6" - 9'6"	4' 8"	Buff sandy clay.
9'6" - 17'0"	5' 3"	3' white micaceous sandstone, remainder grey micaceous sandstone.
17'0" - 26'0"	4' 9"	Grey micaceous sandstone.
26'0" - 34'6"	8' 6"	-do-
34'6" - 40'0"	6' 0"	As above with 1' of multiple clay veining at 36'.
40'0" - 50'6"	10' 0"	Grey micaceous sandstone becoming black and massive in lower part.
50'6" - 61'0"	8' 3"	Massive black micaceous sandstone.
61'0" - 63'0"	1' 4"	-do-
Total 63'0"	53' 3"	Samples stored.

Recovery - 84%

CUMULATIVE FOOTAGE: 1,654' 108

DRILLHOLE NUMBER AGP 24 (Co-ordinates not known at present)

General Area - just West of Cromer C mine and lease area

(Refer Map 2)

DRILL DEPTH	CORE RECOVERED	REMARKS
0 - 5'6"	Not cored.	
5'6" - 10'6"	5' 0"	Buff brown bleached and ironstained mica sandstone.
10'6" - 15'0"	4' 0"	-do-
15'0" - 23'0"	5' 4"	-do-
23'0" - 35'0"	8' 6"	-do-
35'0" - 45'0"	9' 7")	Becoming harder and ending in mica quartzite.
45'0" - 48'0"	2' 8")	
Total 48'	40' 7"	Samples stored.

Recovery - 85%

CUMULATIVE FOOTAGE: 1,707'

DRILLHOLE NUMBER AGP 25 (Co-ordinates not known at present)

General Area - West of Cromer C Mine and Lease area (Refer Map 2)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'	Not cored	
5' - 10'	4' 0"	2' red lateritised sandy clay. 2' buff, white sandstone, some mineral banding.
10' - 13'6"	3' 4"	Cream, white clay sandstone, iron-stained.
13'6" - 16'6"	2' 11"	White clay sandstone, ironstained.
16'6" - 19'	2' 1"	White, buff sandy clay.
19' - 22'0"	2' 9"	White sandy clay, ironstained.
22' - 30'	3' 7"	Red sandy clay
30' - 31'6"	1' 6"	White, friable, talcose sandy clay.
31'6" - 37'6"	4' 5"	Red/cream ironstained talcose clay.
37'6" - 53'	9' 11"	Red talcose clay.
Total 53'	39' 6"	Samples stored.

Recovery - 74.5%

DRILLHOLE NUMBER AGP 26 (99,500E/100,750N)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'	Not cored.	
5' - 7'6"	2' 6"	Ironstained cream clay sandstone.
7'6" - 12'	4' 5"	Hard, offwhite clay sandstone.
12' - 22'	8' 8"	-do-
22' - 29'	6' 8"	Off white clay
29' - 34'6"	5' 4"	Off white clay sandstone.
34'6" - 43'0"	4' 9"	White sandy clay.
43' - 59'	7' 10"	White, buff sandy clay.
59' - 64'	Drilled off	Hard quartzite.
64' - 68'	3' 0"	-do-
Total 68'	53' 2"	Samples stored.

Recovery - 78%

DRILLHOLE NUMBER AGP 27 (99.75OE/100.72ON)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'	Not cored	
5' - 10'	5' 0"	Hard white sandstone
10' - 14'6"	3' 7"	Cream clay sandstone
14'6" - 23'	8' 6"	Cream clay sandstone, ironstaining.
23' - 32'	7' 0"	Buff, white clay sandstone.
32' - 36'	3' 9"	Medium hard, brown micaceous sandstone.
36' - 47'6"	11' 3"	Brown micaceous sandstone (schist)
47'6" - 51'	2' 7"	-do-
51' - 59'6"	7' 4"	Grey mica, quartz schist.
59'6" - 77'6"	18' 0"	-do-
77'6" - 84'6"	6' 4"	-do-
Total 84'6"	78' 4"	Samples stored

Recovery - 93%

CUMULATIVE FOOTAGE: 1,921'6"

DRILLHOLE NUMBER ABP 28 (99.750E/100.050N)

Finished 3/11/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'	Not cored	
5' - 12'	6' 0"	3' grey, buff plastic clay. 3' Sandy clay, iron-stained.
12' - 24'	8' 5"	Grey, buff sandy clay, ironstained.
24' - 30'6"	5' 0"	Brown and white sands.
30'6" - 42'6"	Not cored	Brown quartzite.
42'6" - 46'	2' 10"	Brown quartzite with 1' seam of brown, cream clay.
46' - 62'	13' 0"	Grey, ironstained quartzite.
Total 62'	52' 3"	Samples stored.

Recovery - 84%

F I N I S H

Total Footage - 1,921'6"

3) Drill Records of Austral Geoprospectors

Fayling 200 Rig.

(SGP)

CUMULATIVE FOOTAGE: 27'4"

DRILLHOLE NUMBER SGP 1 (99.095E/100.500N)

Commenced 1.00 p.m. 17/10/68; finished 10.00 a.m. 18/10/65

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'5"	Not cored.	
3'5" - 4'5"	5"	Ironstained fine white sandstone.
4'5" - 5'5"	9"	Severe red stained white sandstone.
5'5" - 6'5"	6"	Hard white quartzite, fine black specking.
6'5" - 7'5"	7"	Sillimanite quartzite, lower part soft sand ironstained.
7'5" - 8'5"	8"	Hard fine gained white quartzite.
8'5" - 9'5"	4"	Fine grained sandstone with hard ¼" grey green band.
9'5" - 10'5"	10"	Fine white sandstone with green staining in fractures.
10'5" - 20'8"	Drilled off	Very hard quartzite - chip samples, with buff sandy clay.
20'8" - 27'4"	5' 0"	Very hard white quartzite, iron staining in fractures.
Total 27'4"	19' 9"	Samples stored.

Recovery - 72.5%

CUMULATIVE FOOTAGE: 70'10"

DRILLHOLE NUMBER SGP 2 (98,625E/100,500N)

Commenced 12.00 p.m. 18/10/68; finished 12.00 p.m. 19/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'6"	Not cored	Red laterite soil
3'6" - 4'6"	5"	Weathered micaceous brown sand.
4'6" - 5'6"	7"	Mica, quartz sand.
5'6" - 6'6"	1' 0"	Mica, quartz schist (weathered)
6'6" - 7'6"	1' 0"	-do-
7'6" - 8'6"	10"	-do-
8'6" - 9'6"	6"	-do-
9'6" - 18'6"	2' 10"	-do-
18'6" - 24'0"	1' 6"	-do-
24'0" - 26'0"	9"	-do-
26'6" - 30'0"	3' 0"	Hard micaceous quartz schist.
30'0" - 35'0"	4' 6"	-do-
35'0" - 40'0"	5' 0"	-do-
40'0" - 43'6"	2' 10"	-do-
Total 43'6"	28' 3"	Samples stored.

Recovery - 65%

CUMULATIVE FOOTAGE: 151'10" 116

DRILLHOLE NUMBER SGP 3 (98,170E/101,000N)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 2'	Not cored	
2' - 4'7"	1' 0"	Red brown clay subsoil, softish white sandstone.
4'7" - 5'7"	1' 0"	Hard white sandstone with mica.
5'7" - 6'7"	1' 0"	-do-
6'7" - 8'7"	1' 6"	-do-
8'7" - 9'7"	10"	-do-
9'7" - 11'7"	1' 0"	-do-
11'7" - 14'7"	2' 3"	-do-
14'7" - 17'7"	1' 3"	-do-
17'7" - 18'7"	8"	-do-
18'7" - 18'11"	4"	-do-
18'11" -19'11"	6"	-do-
19'11"- 22'1"	1' 8"	-do-
22'1" - 23'1"	6"	-do-
23'1" - 24'3"	1' 0"	-do-
24'3" - 29'3"	3' 0"	-do-
29'3" - 30'8"	1' 3"	-do-
30'8" - 40'8"	7' 10"	-do-
40'8" - 49'8"	8' 7"	-do-
49'8" - 58'3"	7' 6"	-do-
58'3" - 60'10"	1' 0"	-do-
60'10"- 62'2"	8"	Quartz vein
62'2" - 63'1"	6"	Quartz fragments and yellowstained sandstone.
63'1" - 68'3"	10"	-do-
68'3" - 71'	1' 8"	Hard white quartzite.
71' - 76'	2' 9"	-do-
76' - 81'	4' 10"	-do-
Total 81'	57' 11"	Samples stored

Recovery - 72%

CUMULATIVE FOOTAGE: 192'5"

DRILLHOLE NUMBER SGP 4 (98,170E/100,900N)

Commenced 16.30 22/10/68; finished 16.30 23/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 2'6"	Not cored	Light brown topsoil and ironstained clay.
2'6" - 3'6"	9"	White sand brown stained.
3'6" - 5'3"	10"	White sand.
5'3" - 6'3"	1' 0"	-do-
6'3" - 7'	9"	-do-
7' - 8'	1' 0"	-do-
8' - 9'	10"	-do-
9' - 10'	1' 0"	-do-
10' - 12'	1' 2"	White talcose sand clay.
12' - 13'	8"	White sandstone.
13' - 14'	6"	-do-
14' - 15'	4"	-do-
15' - 16'	9"	-do-
16' - 17'	1' 0"	-do-
17' - 18'	1' 0"	-do-
18' - 19'	1' 0"	White sandstone buff ironstaining.
19' -20'	10"	White sandstone.
20' - 21'	9"	-do-
21' - 22'	8"	-do-
22' - 24'	1' 7"	-do-
24' - 27'7"	3' 0"	Thin ironstained clay band at 27', white sandstone.
27'7" - 30'7"	2' 6"	White massive quartzite.
30'7" - 40'7"	7' 9"	-do-
Total 40'7"	31' 5"	6 - 15'0" sampled and quartered; other samples stored.

Recovery - 77.5%

CUMULATIVE FOOTAGE: 253'0"

DRILLHOLE NUMBER SGP 5 (98,275E/100,500N)

Commenced 16.30 23/10/68; finished 11.00 24/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 2'	Not cored	Overburden.
2' - 3'	7"	Light brown sandy clay.
3' - 4'	1' 0"	-do-
4' - 5'	1' 0"	Brown micaceous sandy clay.
5' - 6'	1' 0"	-do-
6' - 7'	1' 0"	-do-
7' - 8'	1' 0"	-do-
8' - 10'	1' 9"	-do-
10' - 12'	2' 0"	-do-
12' - 20'9"	8' 8"	-do-
20'9" - 30'1"	8' 0"	Massive brown micaceous quartzite.
30'8" - 37'8"	7' 6"	-do-
37'8" - 39'8"	2' 0"	-do-
39'8" - 48'7"	5' 7"	-do-
48'7" - 58'7"	10' 0"	-do-
58'7" - 60'7"	1' 10"	-do-
Total 60'7"	46' 11"	Samples stored.

Recovery - 77%

CUMULATIVE FOOTAGE: 304'4"

DRILL HOLE NUMBER SGP 6 (98,000E/99,750N)

119

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 2'6"	Not cored	Red brown clay soil.
2'6" - 4'6"	2' 0"	White clayey sand.
4'6" - 6'6"	1' 11"	White clayey sandstone.
6'6" - 8'6"	2' 0"	Hard white micaceous sandstone with clay veins.
8'6" - 10'6"	2' 0"	Soft white clayey sandstone.
10'6" - 18'6"	6' 0"	White to grey clay sandstone.
18'6" - 20'6"	1' 9"	White sandstone buff coloured lower part.
20'6" - 25'9"	3' 10"	White sandstone.
25'9" - 29'3"	3' 0"	Buff and white sandstone.
29'3" - 32'10"	3' 5"	-do-
32'10"- 36'11"	3' 10"	White sandstone with thin black bands.
36'11"- 40'10"	3' 3"	-do-
40'11"- 46'8"	5' 8"	-do-
46'8" - 51'4"	4' 2"	Hard massive white quartzite.
Total 51'4"	45' 4"	Samples stored.

Recovery - 88.5%

CUMULATIVE FOOTAGE: 435'7" 120

DRILLHOLE NUMBER SGP 7 (99,200E/101,086N)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 1'5"	Not cored	
1'5" - 3'5"	1' 6"	Buff friable clay sandstone.
3'5" - 5' 5"	1' 9"	-do-
5'5" - 7'5"	1' 3"	White clay sandstone.
7'5" - 9'5"	2' 0"	-do-
9'5" - 11'5"	2' 0"	-do-
11'5" - 20'6"	6' 0"	1' white clay sandstone, rest buff sandstone.
20'6" - 30'6"	3' 0"	White clay sandstone.
30'6" - 39'6"	2' 1"	-do-
39'6" - 41'6"	2' 2"	White clay sandstone with light brown ironstained bands.
41'6" - 43'6"	1' 2"	-do-
43'6" - 44'9"	1' 2"	-do-
44'9" - 46'9"	2' 0"	-do-
46'9" - 48'4"	1' 7"	White clay sandstone, .
48'4" - 50'4"	2' 2"	White clay sandstone, ironstained bands
50'4" - 60'5"	4' 9"	-do-
60'5" - 62'5"	1' 10"	Soft white clay sandstone, ironstained bands.
62'5" - 64'5"	2' 3"	White friable clay sandstone.
64'5" - 66'5"	1' 6"	White clay sandstone, buff staining.
66'5" - 68'5"	1' 9"	-do-
68'5" - 70'6"	1' 10"	-do-
70'6" - 72'7"	1' 7"	-do-
72'7" - 74'7"	1' 6"	-do-
74'7" - 76'7"	1' 11"	-do-
76'7" - 86'7"	3' 8"	-do-
86'7" - 90'7"	3' 2"	Buff, white clay sandstone.
90'7" - 93'10"	1' 3"	-do-
93'10"- 100'9"	4' 7"	-do-
100'9" - 105'10"	4' 6"	-do-
105'10"- 110'11"	3' 0"	-do-
110'11"- 116'0"	4' 0"	-do-
116' - 121'	4' 10"	-do-
121' - 129'	6' 6"	Off white clay sandstone, slight ironstaining.
129' - 131'3"	2' 2"	Off white clay sandstone.
Total 131'3"	87' 10"	Samples stored.

Recovery - 67%

CUMULATIVE FOOTAGE: 472'3"

121

DRILLHOLE NUMBER SGP 8 (99,000E/101,050N)

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 1'6"	Not cored	
1'6" - 2'0"	6"	Red clay
2' - 4'	1' 0"	-do-
4' - 6'	2' 0"	Buff sandy clay
6' - 8'	1' 1"	Yellow sand.
8' - 10'	2' 0"	-do-
10' - 12'	2' 0"	Yellow, buff sand.
12' - 14'	2' 0"	Cream sand.
14' - 16'	2' 0"	Buff sand.
16' - 18'	1' 2"	Cream sand
18' - 20'	2' 0"	Off white, buff sand
20' - 22'	2' 0"	Yellow sand, thin quartz seam.
22' - 27'	1' 0"	Buff sand.
27' - 30'8"	1' 8"	Buff sandstone with layers of needle crystals, becoming micaceous quartzite.
30'8" - 34'11"	4' 3"	Brown micaceous quartzite, needle crystals.
34'11"-36'8"	1' 9"	Massive grey quartzite.
Total 36'8"	27' 11"	Samples stored.

Recovery - 76%

CUMULATIVE FOOTAGE: 499'0"

122

DRILLHOLE NUMBER SGP 9 (98,780E/101,050N)

DEPTH DRILLED	CORE RECOVERIES	REMARKS
0 - 1'	Not cored	
1' - 2'	1' 0"	Grey sand and red brown clay.
2' - 4'	1' 9"	Red brown clay underlain by hard white clay sandstone.
4' - 6'	2' 0"	Hard, white and cream clay sandstone.
6' - 8'	1' 9"	Off white and buff sandy clay.
8' - 10'	2' 0"	White sandstone.
10' - 15'	5' 0"	-do-
15' - 18'8"	2' 9"	Off white sandstone
18'8" - 23'3"	3' 0"	-do-
23'3" - 24'9"	1' 6"	Buff-grey clay
24'9" - 26'9"	1' 7"	Off white quartzite.
Total 26'9"	23' 4"	Samples stored.

Recovery 87%

CUMULATIVE FOOTAGE: 557'10"

DRILLHOLE NUMBER SGP 10 (98,200E/101,400N)

123

Finished 4/11/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 1'	Not cored	
1' - 2'	1' 0"	Red sand and clay
2' - 4'	1' 0"	Buff sand.
4' - 6'	1' 5"	Cream clay sand
6' - 8'	2' 0"	Cream sand.
8' - 10'	2' 0"	Cream, off white sand.
10' - 20'6"	4' 6"	Off white, buff sand and sandstone.
20'6" - 24'6"	1' 10"	Buff sandstone.
24'6" - 40'10"	8' 4"	-do-
40'10"- 50'10"	2' 9"	Buff, brown micaceous sand.
50'10"- 54'10"	1' 0"	-do-
54'10"- 58'10"	6"	-do-
Total 58'10"	27' 4"	Samples stored.

Recovery - 46.5%

F I N I S H

Total Footage - 227'10"

4) Drill records of Price Anderson
Odgers Rig.

(PA)

CUMULATIVE FOOTAGE: 42'6"

125

DRILLHOLE NUMBER PA 1 (98,875E/100,500N)

Commenced 14.30 27/9/68; finished 2/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 2'6"	Not cored	Brown overburden with quarts fragments.
2'6" - 5'0"	7"	Medium hard buff sandstone.
5'0" - 7'0"	1' 5"	Firm buff sandstone becoming soft and friable in lower part.
7'0" - 15'0"	1' 11"	Buff coloured soft sandstone with some plasticity.
15'0" - 18'6"	3' 6"	Upper part: Buff friable sandstone. Middle part: Buff-hard sandstone with thin white banks and black flecking.
18'6" - 23'6"	1' 11"	Buff friable sandstone in upper part. Middle and lower part - buff and pale green clayey sandstone. Some iron spotting.
23'6" - 27'0"	1' 9"	Green micaceous sandstone - hard off-white sandstone green veining.
27'0" - 29'6"	2"	Hard off-white sandstone with black flecking and green veining.
29'6" - 33'0"	2' 3"	Green and grey sandstone with green and brown veining, some clay patches.
3.30 p.m. 28/9/68 30/9/68 - 2/10/68		
33'0" - 34'6"	4"	Massive off-white quartzite.
34'6" - 39'6"	2"	Massive off-white quartzite.
39'6" - 41'0"	1' 6"	Massive off-white quartzite.
41'0" - 42'6"	1' 0"	Massive off-white quartzite
Total 42'6"	19' 0"	Samples stored.

Recovery - 44.5%

CUMULATIVE FOOTAGE: 88'6"

DRILLHOLE NUMBER PA2 (100,000E/100,859N)

126

Commenced 14.00 hours 3/10/68; finished 11.30 7/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 2'6"	Not cored	Overburden.
2'6" - 5'0"	1' 3"	4" yellow brown sand and clay - remainder white, grey, red and brown clay.
5'0" - 6'0"	10"	Grey and brown clay. Lower part hard sandstone with black flecking.
6'0" - 11'0"	3' 9"	1' hard clay sandstone. Remainder soft clay sandstone with patches of light brown. Clay content high in bottom and middle parts.
4/10/68		
11'0" - 13'3"	2' 2"	Medium hard clayey sandstone. Top 5" bad iron staining.
13'3" - 17'0"	2' 5"	Medium hard clayey sandstone. Lower part soft.
17'0" - 22'0"	3' 4"	Medium soft clayey sandstone with white clay veining.
22'0" - 25'0"	3' 0"	As above with abundant clay veins.
25'0" - 29'6"	4' 1"	Clayey sandstone iron stained (yellow orange).
29'6" - 32'0"	1' 5"	As above. Less iron staining.
32'0" - 35'0"	8"	Medium soft clayey sandstone with iron staining.
5/10/68		
35'0" - 29'0"	3' 0"	Hard green quartzite with thin brown bands.
39'0" - 41'0"	1' 8"	Massive hard white quartzite green and red staining.
41'0" - 42'0"	1' 0"	Hard massive quartzite becoming iron stained and sandy in lower part.
7/10/68		
42'0" - 46'0"	1' 6"	Grey green quartzite iron stained.
Total 46'0"	32' 7"	Sampled 11'0" - 25' Rest of samples stored.

Recovery - 71%

CUMULATIVE FOOTAGE: 151'6"

DRILLHOLE NUMBER PA 3 (100,625E/100,500N)

D. 127

Commenced 13.00 7/10/68; finished 12.00 9/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 5'6"	Not cored	Red lateritic overburden.
5'6" - 9'6"	4' 0"	Hard clay sandstone with brown mottling.
9'6" - 13'6"	3' 10"	Hard grey sandstone with clay veining and some iron staining.
13'6" - 17'	3' 5"	Medium hard clayey sandstone with clay veining. Cream coloured with green colouration in central part.
17' - 19'6"	2' 2"	White friable sandstone with 1" quartz vein.
19'6" - 22'0"	2' 2'	Soft white clay sandstone, slight iron staining last 1".
22'0" - 24'6"	2' 6"	2' badly ironstained clay, last 6" dry sandstone with dark mineral banding.
24'6" - 29'6"	4' 6"	Variable stained dry sandstone with clay veining, friable.
29'6" - 34'6"	2' 5"	Dark brown clayey sandstone.
34'6" - 37'6"	2' 0"	Soft brown clay.
37'6" - 41'	3' 6"	Variable stained friable sandstone with quartz veining.
41' - 44'6"	2' 9"	1' white dry sandstone. Remainder badly stained.
44'6" - 47'6"	3' 0"	Brown - buff sandy clays.
47'6" - 50'6"	2' 0"	Soft brown sand clay.
50'6" - 59'6"	3' 6"	Soft brown and greenish white clays.
59'6" - 62'0"	1' 3"	Cream brown sandy clays.
62'0" - 63'0"	1' 0"	Hard sandy quartzite.
Total 63'0"	49'6"	Samples stored.

Recovery - 79%

CUMULATIVE FOOTAGE: 192'6"

DRILLHOLE NUMBER PA 4 (99250E/100,000N)

Commenced 15.30 9/10/68; finished 13.00 10/10/68

DEPTH DRILLED	CORE RECOVERED	REMARKS
0 - 3'3"	Drilled off	
3'3" - 5'6"	2' 8"	Hard buff silicified sandstone with white felspar veining.
5'6' - 10'6"	4' 8"	-do-
10'6" - 15'6"	6' 2"	-do-
15'6" - 20'6"	2' 5"	White and brown mottled clay sandstone, buff mottled white clay sandstone.
20'6" - 24'6"	2' 7"	As above
24'6" - 27'0"	2' 10"	As above
27'0" - 28'0"	1' 0"	As above
28'0" - 29'6"	1' 4"	As above.
29'6" - 32'6"	1' 4"	White sandy clays some iron staining.
32'6" - 35'0"	2' 0"	Brown stained white clay sand matrix.
35'0" - 37'0"	1' 5"	Stained brown clay sand.
37'0" - 41'0"	1' 0"	As above.
Total 41'0"	23'6"	Samples stored.

Recovery - 58%

5) Records of Trenches dug by Roche Bros.

Back Hoe

RECORDS OF TRENCHES DUG BY ROCHE BROS. 19 R.B. BACK HOE

5 lb sample taken from each five foot section and stored.

TRENCH R.B.1. (99,000E/99,750N) - 17/10/68 9.05a.m. - 10.00 a.m.

DEPTH	REMARKS
0 - 5'	Brown sandy top soil. Lower part badly stained grey clay.
5' - 10'	White talcose clay, patchy ironstaining.
10' - 15'	-do-
15' - 19'6"	White-cream talcose clay.

TRENCH R.B.2. (99,100E/99,550N) - 17/10/68 10.15 a.m. - 12.50 p.m.

DEPTH	REMARKS
0 - 5'	Brown sandy topsoil. Lower part grey clay, severely stained.
5' - 10'	White clay, some iron staining, quartz veins.
10' - 15'	White clay ironstained, patch of dark grey soft material.
15' - 19'6"	-do-

TRENCH R.B.3 (99,200E/99,750N) - 17/10/68 1.00 p.m. - 2.10 p.m.

DEPTH	REMARKS
0 - 5'	Brown sandy topsoil, off-white clay badly stained.
5' - 10'	Grey clay, hard and very sandy.
	Too hard to continue.

TRENCH R.B.4. (99,300E/99,750N) - 17/10/68 2.10 p.m. - 3.50 p.m.

DEPTH	REMARKS
0 - 5'	Grey buff sandy clay under topsoil.
5' - 10'	White medium hard quartzite.
10' - 15'	Schists and grey buff quartzite, ironstained.
15' - 19'	Hard grey quartzite with sillimanite.

TRENCH R.B.5. (98,900E/99,750N) - 17 & 18/10/68

DEPTH	REMARKS
0 - 5'	Brown topsoil, then white and grey clay, badly stained.
	Too hard to continue.

TRENCH R.B.6. (98,850E/99,750N) - 18/10/68

DEPTH	REMARKS
0 - 5'	Brown grey topsoil, white cream ironstained clay.
5' - 10'	Brown stained white, cream hard clay, schistose.
10' - 15'	White hard clay, badly stained.
15' - 20'	-do-

TRENCH R.B.7. (98,750E/99,750N) - 18/10/68

DEPTH	REMARKS
0 - 5'	Light brown topsoil with micaceous brown sand beneath.
5' - 10'	Brown sandy micaceous schist.
10' - 15'	White clay and interlaminated sandy mica schists.
15' - 20'	Brown, white clay schist with ironstaining.

TRENCH R.B.8. (99,100E/100,000N) - 18 & 19/10/68

DEPTH	REMARKS
0 - 5'	Light brown top soil, white grey clay, badly stained.
5' - 10'	Cream buff sandy clay, some iron staining.
10' - 15'	Cream buff sandy " " "
15' - 19'6"	Hard sandy sillimanite quartzite.

TRENCH R.B.9. (99,200E/100,000N) - 19/10/68

DEPTH	REMARKS
0 - 5'	Light brown sandy topsoil. Lower part hard sillimanite quartzite.
5' - 7'	Hard sillimanite quartzite.
	Too hard to continue.

TRENCH R.B.10 (99,300E/100,000N) - 19/10/68

DEPTH	REMARKS
0 - 5'	Light brown topsoil. Lower part hard white Quartzite.
5' - 10'	Hard white quartzite.
10' - 15'	Hard buff, white quartzite.
	Too hard to continue.

TRENCH R.B.11 (99,400E/100,000N) - 19/10/68

DEPTH	REMARKS
0 - 5'	Brown orange sticky clay.
5' - 7'	Hard white, buff quartzite.
	Too hard to continue.

TRENCH R.B.12 (98,800E/100,000N) - 19/10/68

DEPTH	REMARKS
0 - 5'	Light brown topsoil, white grey badly stained clay.
5' - 10'	" " " " "
10' - 15'	Buff sand
15' - 19'6"	" "

TRENCH R.B.13 (98,700E/100,000N) - 19/10/68

DEPTH	REMARKS
0 - 5'	Light brown topsoil to orange, yellow sand.
5' - 10'	Yellow sand.
10' - 15'	Kight grey schistose clay.
15' - 20'	Iron stained sandy schist.

6) Records of Bulldozed Trenches
Nos. 1, 2, 3 and 4.

RECORDS OF BULLDOZED TRENCHES NOS.1, 2, 3 and 4

Trenches numbers 1, 2 and 3 were sited by R.C. Sprigg of Geosurveys of Australia Pty. Ltd., Adelaide, consulting geologist to Australian Blue Metal Pty. Ltd. The report, dated October 1968, contains detailed descriptions and geological section plans for each open cut.

For the purpose of this report the results have been summarised as follows:-

TRENCH 1

0 - 5'	Red lateritic overburden.
5' - 30'	White, off-white sandy clay
30' - 65'	Variably stained brown sandy clays. (Auger hole in bottom of trench)

TRENCH 2

0 - 5'	Red lateritic overburden.
5' - 25'	Variably stained white clay sandstone.

TRENCH 3

0 - 2'6'	Red lateritic overburden
2'6" - 3'6"	White siliceous cap rock.
3'6" - 12'0"	White, off-white clay-bearing sandstone.

TRENCH 4

0 - 2'6"	Red brown lateritic overburden.
2'6" - 3'6"	White siliceous cap rock.
3'6" - 10'0"	White, off-white medium hard sandstone with small proportion of clay.

GRAPHICAL RECORD OF DRILL LOGS OBTAINED FROM DRILLING ON SPECIAL MINERAL LEASE 174, MT. CRAWFORD, S. AUSTRALIA.

KEY


Overburden, usually red lateritic soils and subsoils


White and off-white clays, sandy clays and clayey sandstones


Pale yellow and grey clays, sandy clays and clayey sandstones


Pink, brown and variably stained clays and sandy clays

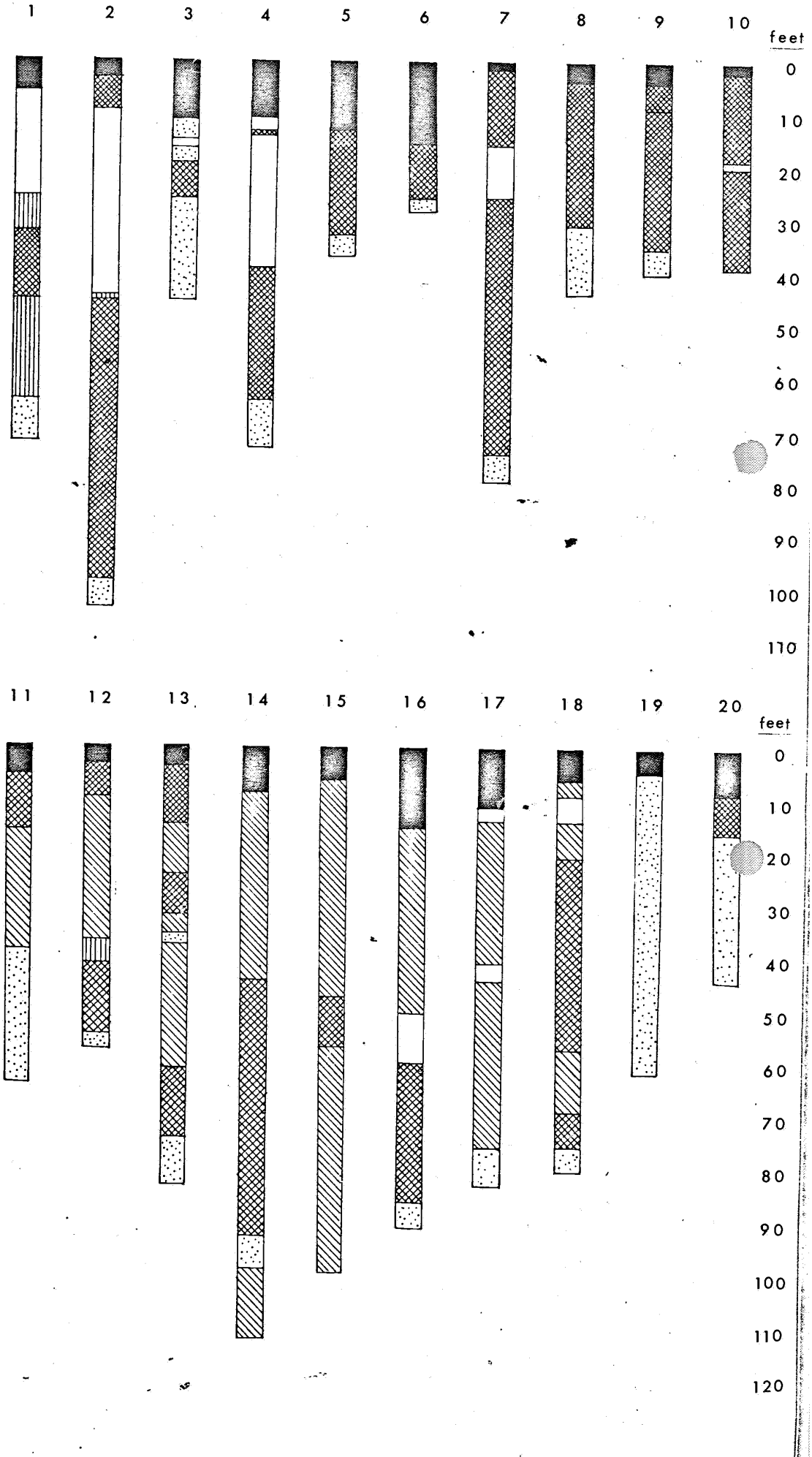

All green clays, sandy clays and clayey sandstones


Massive banded quartzites and mica quartzites

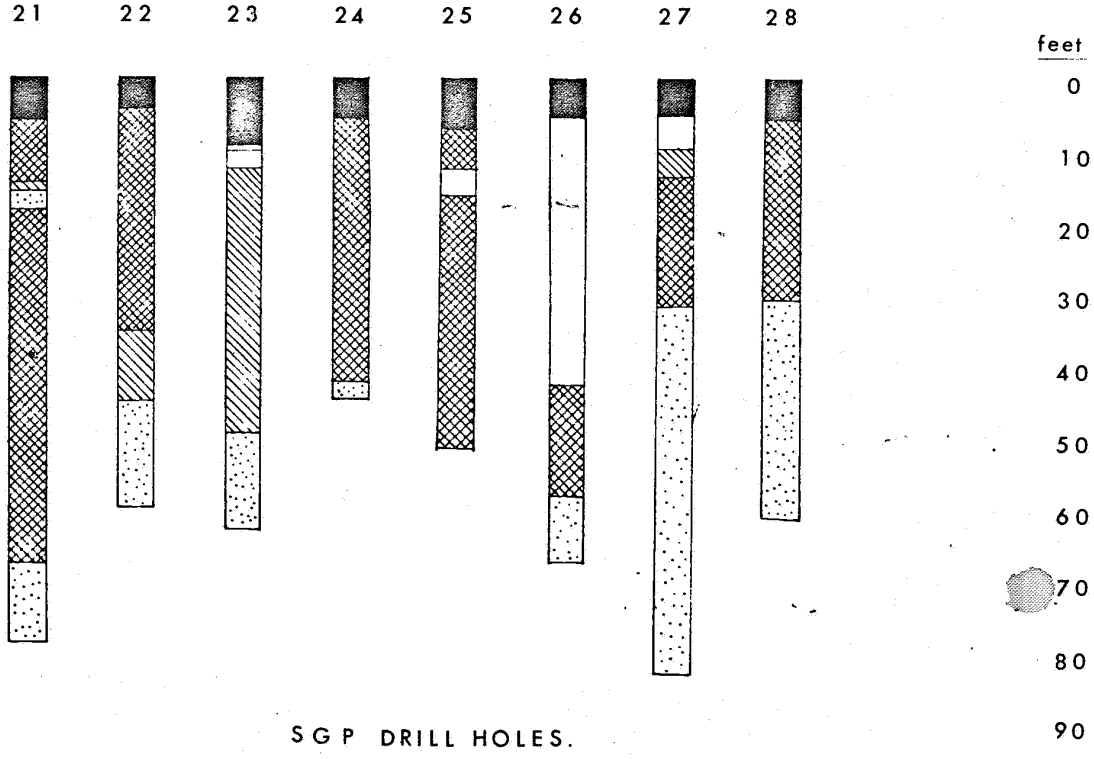
For detailed information refer to actual drill logs.

Scale in the following logs 1cm = 10 feet.

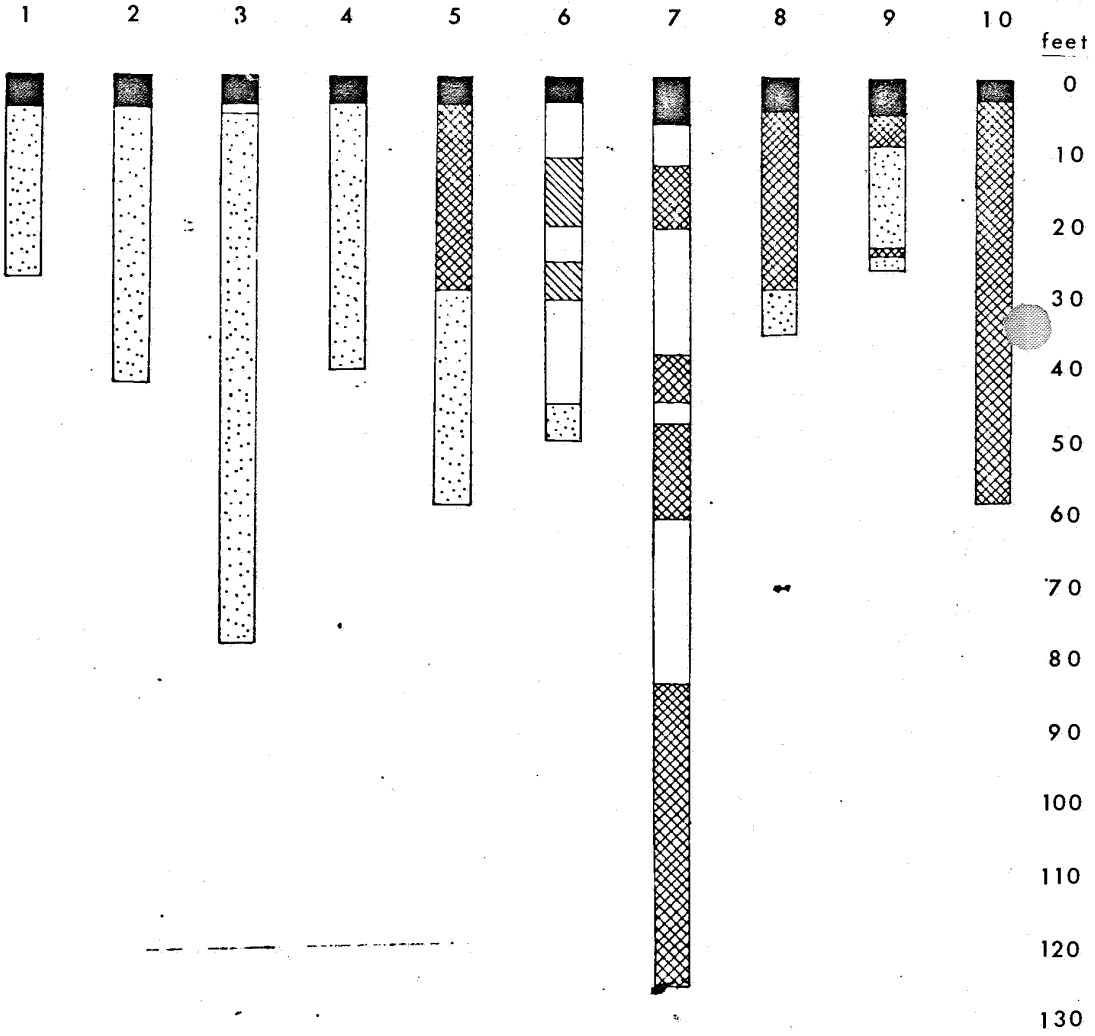
AGP DRILL HOLES.



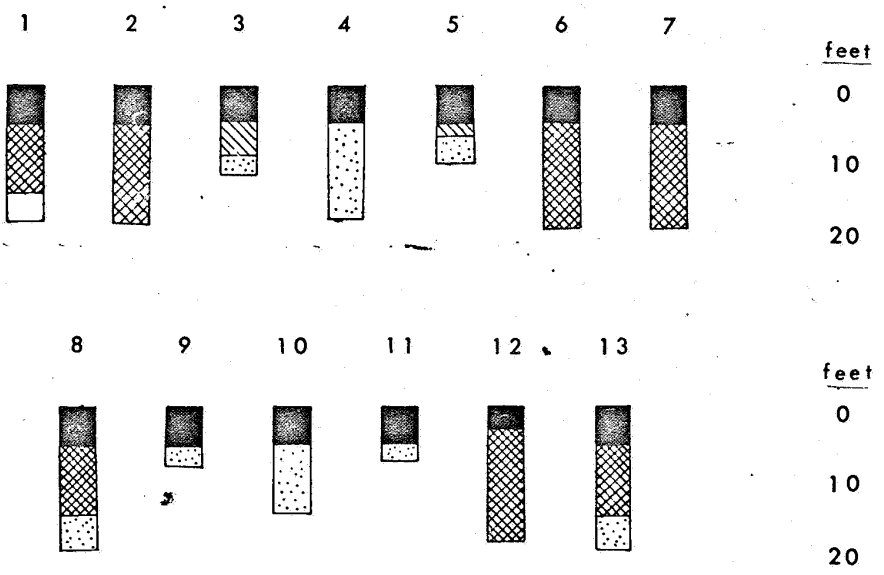
AGP DRILL HOLES.



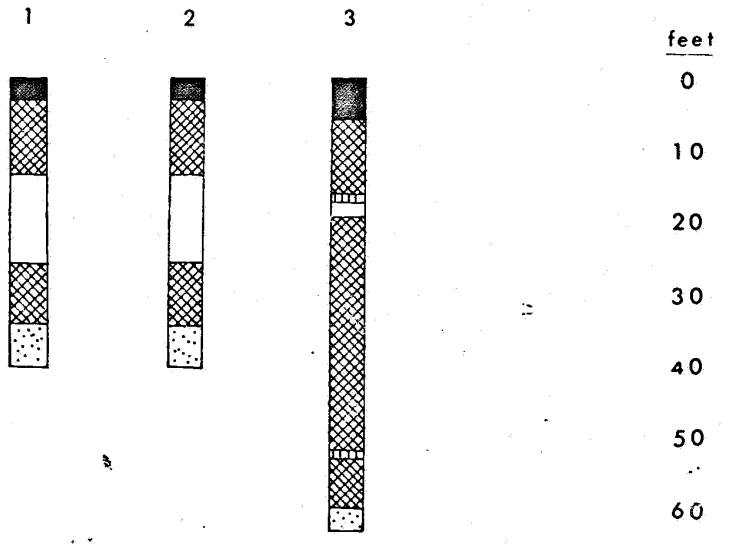
SGP DRILL HOLES.



RB TRENCHES



PA DRILL HOLES.



BULLDOZED TRENCHES.