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SML 273

TOOLABY

COMBINED FIRST PROGRESS / FINAL REPORT TO LICENCE SURRENDER FOR THE PERIOD 24/2/1969 TO 23/11/1969

Submitted by
CRA Exploration Pty Ltd
1969

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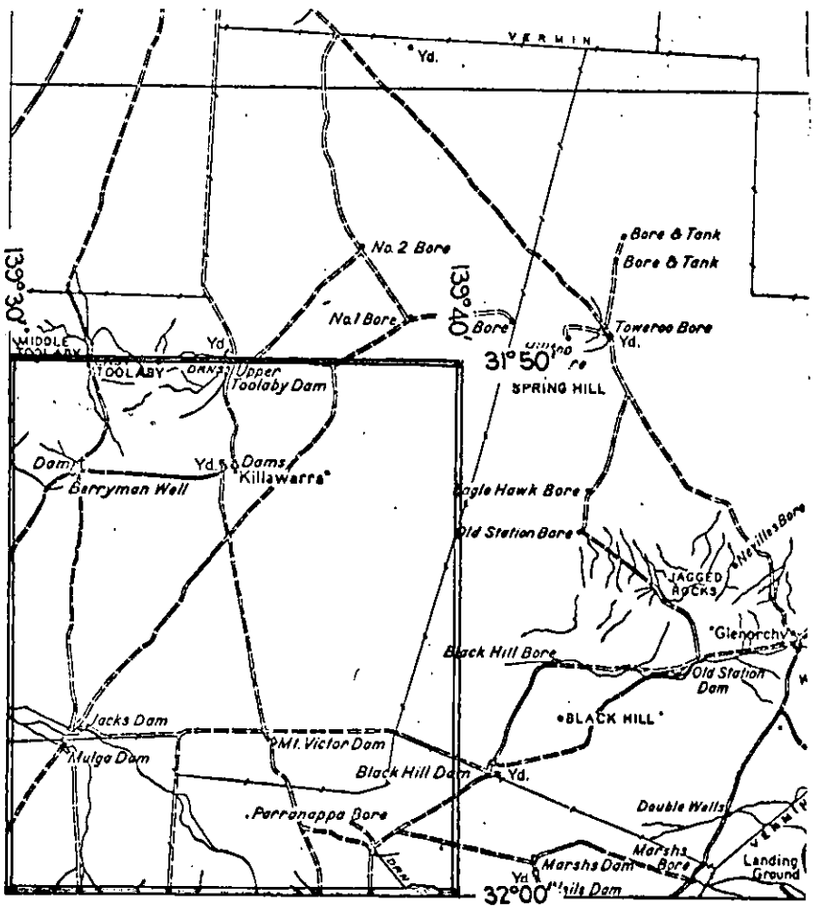
Government of South Australia
Primary Industries and Resources SA



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LESSEE: C.R.A. EXPLORATION PTY. LTD.

DOCKET D.M. 135/69 AREA 100 SQ MILES

1:250000 PLANS . CURNAMONA

LOCALITY TOOLABY

S.M.L. No. 273 EXPIRY DATE 23-11-69

1250

C.R.A. EXPLORATION PTY. LIMITED

6 th October, 1969.

Memorandum to: A. F. McQUEEN

Copy: C. L. Knight

From: G. F. Pigott

Rotary Drilling in Special Mining Lease 273 Toolaby, South Australia

SUMMARY

A rotary drilling programme was carried out during the period September 9th to 20th, 1969. Eleven holes were drilled with the object of locating a channel or sandstone deposit containing uranium of Mesozoic or Tertiary age, formed by waters draining an area of uraniferous mineralised rocks. Sample cuttings were examined, and the holes logged to measure the natural gamma ray radioactivity and electrical properties of the section encountered.

The area is formed of Quaternary silts, sands and clays overlying deeply weathered basement rocks of the Proterozoic Adelaidean System. The natural gamma ray radioactivity was only of background values and no uranium deposits were found.

INTRODUCTION

The Lake Frome Embayment, South Australia is of interest as a possible uranium province in which solution front type of uranium deposits may occur. The southern part of the Frome Embayment, that is, south of Lake Frome to the Olary Block, is a partially closed basin containing Mesozoic and Tertiary deposits of restricted continental clastic sedimentation. The basin is bounded by rocks of the Proterozoic Adelaidean System to the west and south, and to the east by uraniferous rocks of the Carpentarian System. The outcropping rocks of the Carpentarian System have the form of an arc open to the west. It was across the mouth of this arc that the drilling programme was carried out.

LOCATION AND ACCESS

Special Mining Lease 273 covers and area 100 square miles with an elevation of 500 to 600 feet above sea level. The lease area lies 50 miles north of Yunta which lies on the Broken Hill to Adelaide main road and railway, and 10 miles east of the Gidgealpa to Adelaide natural gas pipeline.

The country is flat-lying, and, as it lies astride three sheep properties, access to any part is fairly easy. The area lies within the Curnamona 1:250,000 sheet area (SH 54-14).

GENERAL GEOLOGY

The southern end of the Frome Basin is bounded by metamorphic rocks of the Precambrian Olary Block. In the basin, borehole and geophysical data indicate that undifferentiated Mesozoic and Cainozoic sedimentary rocks exist overlying an irregular basement with downwarps and ridges. The area held under S.M.L. 273 lies on the southern edge of the basin in the form of a local embayment in the Precambrian Block.

Proterozoic: Rocks of the Carpentarian System outcrop to the east of the area held under lease, and have the form of an arc open to the west. The rocks form part of the Willyama Block which consists of granitised metasediments and gneisses intruded by adamellites, granites and pegmatites. Widespread uranium mineralisation in the form of davidite occurs in sheared pegmatite veins.

Rocks of the Adelaidean System outcropping in the lease area are part of the Sturtian Series which include tillites, dolomitic siltstones and black laminated silty shales. The metamorphic grade is very low with fine mica and calcite being developed, and one cleavage is present.

The rocks of these systems may be separated by a northwest trending reverse fault which hades to the east, passing just east of the area under lease. No rocks representing Palaeozoic or Mesozoic eras outcrop in the area.

Recent silts, sands and clays overlie the Precambrian basement where it is seen in outcrop.

HISTORY OF WORK DONE

In February of this year a regional geochemical reconnaissance programme was carried out in that region of the Frome Embayment adjacent to uraniferous mineralised basement in the Flinders Ranges and the Olary Block. Drainage sediment samples, rock samples and bore water samples were collected and assayed for uranium. Bore water samples collected from the southern edge of the Frome Embayment were found to contain anomalous amounts of uranium. A Special Mining Lease was applied for in order to carry out prospecting.

NATURE OF EXAMINATION

A programme of rotary drilling, using a WW1 Failing 1500, was carried out under contract by the Department of Mines of South Australia. Eleven holes were drilled with a total footage of 1,611 feet. The drilling was done using air, with water and mud being used whenever the occasion warranted. Two lines of boreholes, with an approximate north-south trend, were drilled to test for the possible existence of a channel sand deposit formed from the weathering of the Proterozoic uraniferous rocks, which outcrop to the east. Samples representing ten feet intervals were collected, and examined with the aid of a Seiwa 'Correct' Binocular microscope. Samples were tested for the presence of phosphate using nitric acid and ammonium molybdate solution. The boreholes were logged electrically to measure the spontaneous potential and resistivity of the drilled section, and radiometrically to measure the natural gamma ray emission. Logging was carried out under contract by the Department of Mines of South Australia. Samples were scanned with a Scintrex BGS, 1S scintillometer. Samples of water located by the drilling were sent to Broken Hill for analysis for uranium.

RESULTS

The section encountered in drilling may be described generally as silt, sand and clay intermixed in parts with calcrete, overlying silcrete and pebble beds. This section of unconsolidated sediments is underlain by deeply weathered basement material. The lithological logs of the bores are included in this report.

In boreholes TY 1 to TY 9, calcrete horizons occur at the present ground level and above the pebble bed and are associated with silt and clay. Generally, white nodular carbonate occurs throughout the sequence. The pebble bed is silicified with a distinct silcrete horizon above it. This must represent an old land surface, rounded oval maghemite and faceted quartz pebbles being the main clasts.

The western section bores TY 10 to TY 14, contain less sand and more clay than the eastern section. Gypsum, anhydrite and calcite are present associated with interbedded clays, silts and sands. Pebble beds occur at two horizons in TY 10 and TY 14. The first occurs beneath a thin veneer of interbedded sands and clays with calcrete, and the other directly above the weathered basement. The sediments between the pebble horizons are red ferruginised silts and clays. No pebble beds were encountered in TY 12. The thickest section of sediments encountered above the weathered basement is 142 feet and is found in TY 13. The section is made up of coarse sands and gravels below a thin veneer of Recent interbedded calcified silts, clays and sands. Water was struck in this bore at 90 feet. It is estimated that the flow rate is 500 gals. per hour. The dissolved solid content is 1650 ppm (measured on a portable 'dionic' conductivity tester). It is concluded that TY 13 is located in a river channel which is cut down into the weathered basement.

Weathered basement material was encountered in all the holes drilled. It varied in thickness from 167 feet in TY 1 to 127 feet in TY 4, and 86 feet in TY 13. The top 10 feet immediately underlying the silicified pebble bed is a mixture of weathered basement material and quartz sand grains, partially leached and ferruginised. The underlying material is a brown, red or grey powdery silty clay, the colour depending on the degree of calcification and ferruginisation.

A sample of this weathered material was sent to The Australian Mineral Development Laboratories from TY 4, 150 to 160 feet, and was described in Report MP 3/1/6/0 as follows:

> "...the sample consists mainly of clay minerals and quartz and it can thus properly be described as a clay. The clay minerals are kaolin and illite/mica in roughly equal amounts. Quartz is present to the extent of approximately 40%."

The boundary between the weathered material and the basement is sharp. A section of diamond drill core was drilled in TY 4 to find out the exact lithology of the basement; it is a fine grained, black weathering to brown, calcareous, micaceous semi pelite. It is finely bedded with a slatey cleavage developed and resembles the micaceous siltstones and shales seen in outcrop in the Toolaby Hills.

CONCLUSIONS

The area of S.M.L. 273 is comprised of shallow basement rocks of the Adelaidean System with a thin covering of Recent alluvium. A water-bearing sand horizon was located indicating a subsurface channel cut down into the weathered basement with the detrital material probably derived from the same source.

This environment is not known to be radioactive and no anomalous radiometric results were obtained.

GFP:jm

G. F. Pigott

PLANS

		Scale
S.A. 108	Borehole TY 1	
S.A. 109	" TY 2	
S.A. 110	" TY 4	
S.A. 111	" TY 6	
S.A. 112	" TY 7	
S.A. 113	" TY 8	
S.A. 114	" TY 10	
S.A. 115	" TY 11	
S.A. 116	" TY 12	
S.A. 117	" TY 13	
S.A. 118	" TY 14	
	Geological Survey of South Australia Map of "Glenorchy".	1 : 63,360

C.R.A. EXPLORATION PTY. LIMITED. 00008

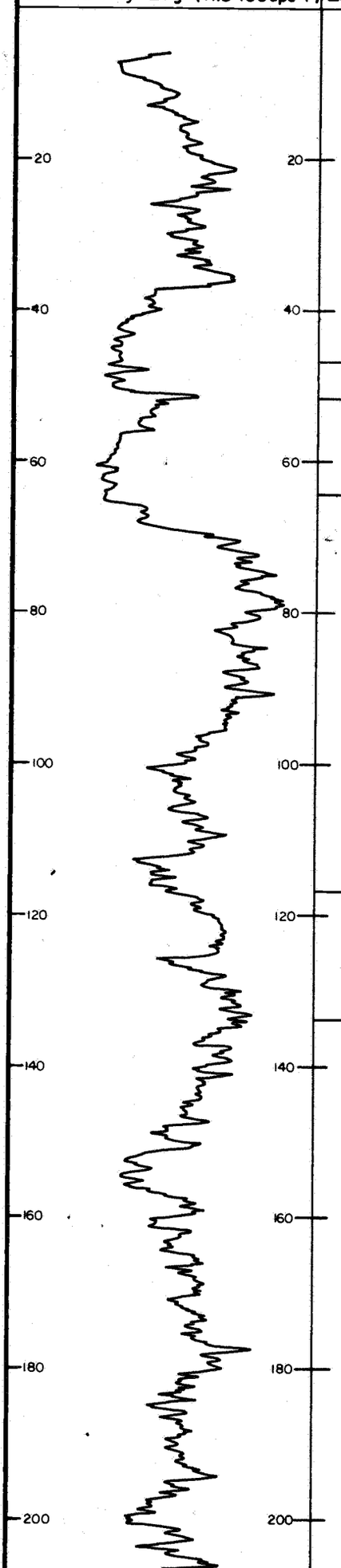
SPECIAL MINING LEASE 273 TOOLABY. S.A.

ROTARY DRILLHOLE TY 1

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 206 feet. VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Description

Brown, medium-coarse grained, poorly sorted calcareous sand. Sand grains are: rounded-subrounded vein, crystal and ferruginous quartz; rounded oval maghemite; subangular cleaved schist; dark feldspathic gneiss. Clay and silt occur in interbedded beds.
(i) Brown, fine sand grained rounded Fe quartz in a slightly calcareous clay matrix.
(ii) White, quartz grains in a very calcareous fine grained cement.
(iii) White, quartz grains in a cherty-silicified cement.

Brown, calcareous, silicified, coarse sand and pebbles. Pebbles: subangular vein quartz, and ferruginous weathered granite?, dark red rounded maghemite with black magnetic pebbles.

Brown calcareous, poorly sorted clay-silt-sand pebbles. Sand grains mainly fine grained, rounded ferruginous quartz. Clay and silt: buff coloured, soft weathered, foliated aggregates. Grey, finely bedded clay aggregates - damp.

Light brown, calcareous clay silt. Rounded Fe quartz and mica recognisable. Material occurs in brown, soft, partially consolidated foliated fragments. Leached and weathered basement material.

Red clay silt. Partially consolidated fragments stained and mottled with red iron oxide.

Grey clay silt with a powdery texture, non-calcareous. Grey partially consolidated foliated clay-silt fragments - slightly micaceous. White rounded fine sand and silt quartz grains present.

Black, calcareous, micaceous cleaved semi-pelitic schist.

PLAN: S.A.108

C.R.A. EXPLORATION PTY. LIMITED. 00009

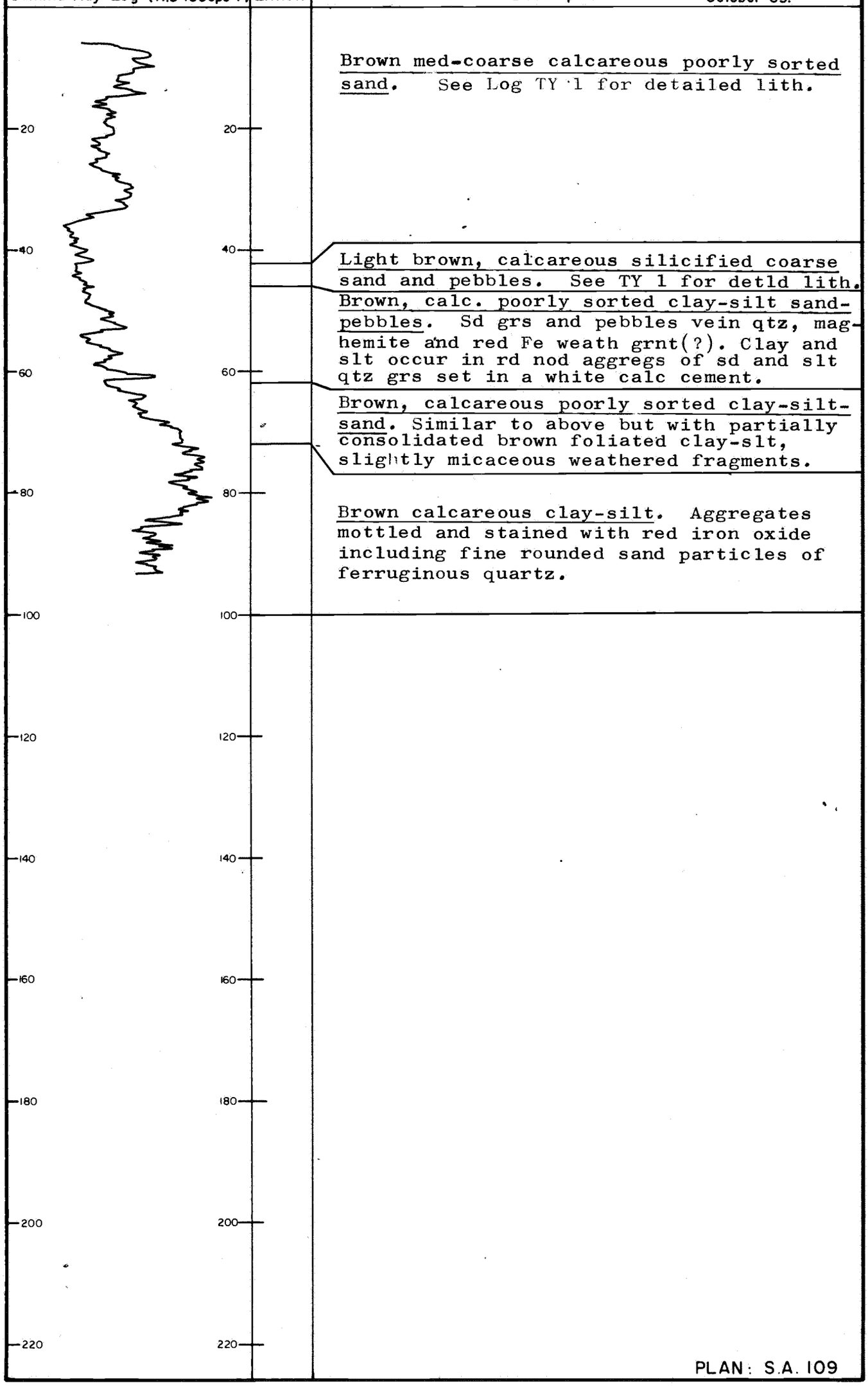
SPECIAL MINING LEASE 273 TOOLABY. S.A.

ROTARY DRILLHOLE T Y 2

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 100 feet. VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



PLAN: S.A. 109

C.R.A. EXPLORATION PTY. LIMITED.

00010

SPECIAL MINING LEASE 273 TOOLABY. S.A.

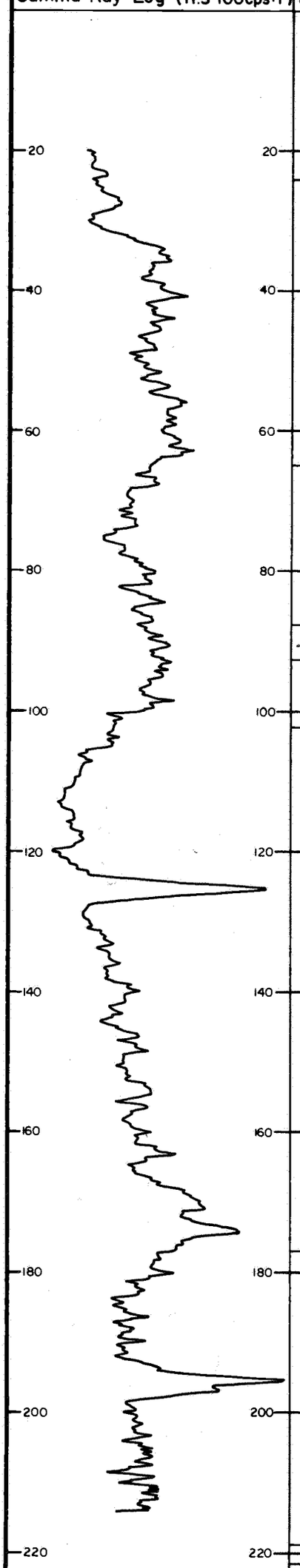
ROTARY DRILLHOLE TY 4

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 221 ft. 8 inches.

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Description

Brown, fine-coarse grained calcareous sand. Sd.grs. coarse subrd vein qtz, med-fine, rd Fe qtz subang. mica schist, amphibolite(? a foliated dk fld gneissose rock). White calc frags encl sd grs. Brown calc clay aggregs encl red fine gr rd sd grains.

Brown fine-med. grained non-calcareous silty sand. Sand grains generally well rounded vein quartz, mica schist, cream feldspar and amphibolite(?). The clay and silt fraction occurs in soft red clay aggregates enclosing fine sand and silt size rounded Fe quartz and oval 'ironstone' grains.

Brown, fine-medium grained silty sand. Similar to above and white calcareous cemented sand aggregates.

Brown, calcareous, silicified coarse sand and pebbles.

White, non-calc p. srtd sdy slt and powdery clay. Sd grs rd, red Fe quartz.

Light grey silty clay. Sample taken from 150' - 160' (146' - 156') described by Amdel Report No. MP3/1/60 as a clay made up of:

quartz	40%
kaolin	20%-30%
illite/mica	30%-40%

Fine sand-silt rounded Fe quartz grains occur.

Dark grey, semi-consolidated micaceous cleaved quartzose semi pelite fragments. Rounded fine Fe quartz sand grains and med. clear crystal quartz grains.

Low grade, black, cleaved, calcareous semi pelite.

PLAN: S.A. 110

C.R.A. EXPLORATION PTY. LIMITED.

00011

SPECIAL MINING LEASE 273 TOOLABY. S.A.

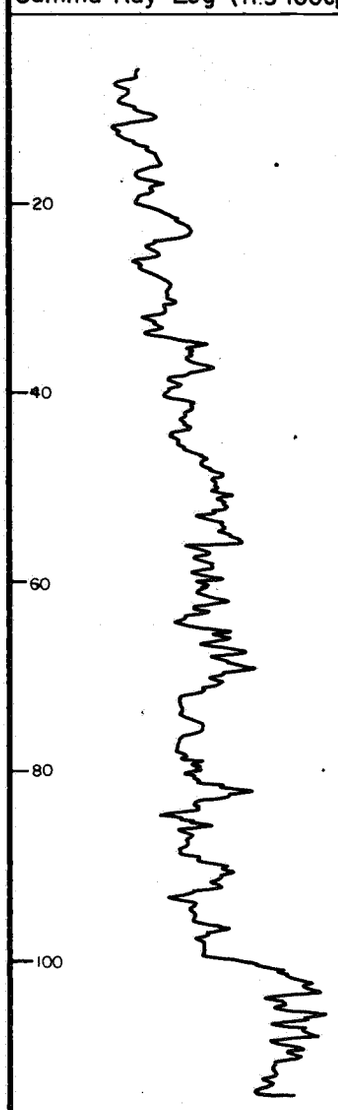
ROTARY DRILLHOLE TY 6

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 120 feet.

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT.
October 69.



Description

Brown, fine-coarse grained, poorly sorted calcareous sand. Sd lith of TY 1. Slt clay aggregs. 1. Brown, fine gr sd and slt qtz grs in a calc clay matrix. 2. White, fine sd and slt grs in a white calc cement.

Brown fine-medium non-calcareous sand with occasional pebbles. Sand grains subangular vein quartz, rounded Fe quartz subangular black micaceous semi pelite, quartz-mica-feldspar gneiss and red ferruginous - possibly granitic rock.

Brown, silicified coarse sand and pebbles. Lithology cf. TY 1.

Brown, poorly sorted silty sand with pebbles. Silt occurs in weathered foliated aggregs.

Light brown calcareous silty clay from leached and weathered partially consolidated micaceous quartzose semi pelite.

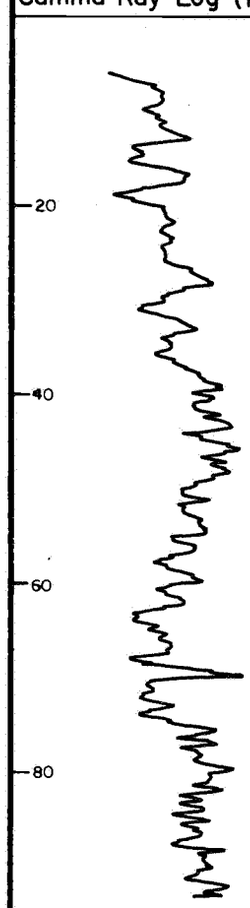
PLAN: S.A. III

C.R.A. EXPLORATION PTY. LIMITED. 00012

SPECIAL MINING LEASE 273 TOOLABY. S.A.
ROTARY DRILLHOLE TY 7
LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 100 feet. VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Description

Brown medium-coarse grained, poorly sorted calcareous sand. Coarse sand grains sub-rounded crystal quartz, black micaceous semi pelite and angular gypsum. Medium sand grains, rounded Fe quartz, white quartzite, black well rounded magnetic and non-magnetic oval grains. Clay-silt aggregate.

(i) Brown, medium Fe quartz grains in a calcareous clay matrix.

(ii) White, Fe quartz grains in a fine white, very calcareous cement.

Brown, poorly sorted, calcareous pebble sand.

White, very calcareous poorly sorted pebble sand and white silt and clay.

Light grey, powdery silty clay, cf. TY 4 for detailed lithology.

PLAN: S.A. 112

C.R.A. EXPLORATION PTY. LIMITED.

00613

SPECIAL MINING LEASE 273 TOOLABY. S.A.

ROTARY DRILLHOLE TY 8

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 60 feet.

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT.
October 69.

Gamma Ray Log (H.S 100cps:1")	Lithol.	Description
	20	Brown, very calcareous medium grained sand. Sd grs rd vein qtz, Fe qtz, ang cream felspar, black mic semi pelite. Slt clay aggregs occur. 1. Brown calc clay encl well rd sd and slt qtz grains. 2. White v. calc cemented sand grains.
	40	Brown, calcareous sandy silt occurs in aggregates, the outside of which are red Fe oxide stained and the centre white and leached. White calcareous sand in a calcite cement is present
	60	Brown, poorly sorted calcareous pebble sand and calcareous partially silicified frags. Light brown silty clay. Weathered schistose basement.
	80	
	100	
	120	
	140	
	160	
	180	
	200	
	220	

PLAN: S.A. 113

C.R.A. EXPLORATION PTY. LIMITED.

00014

SPECIAL MINING LEASE 273 TOOLABY. S.A.

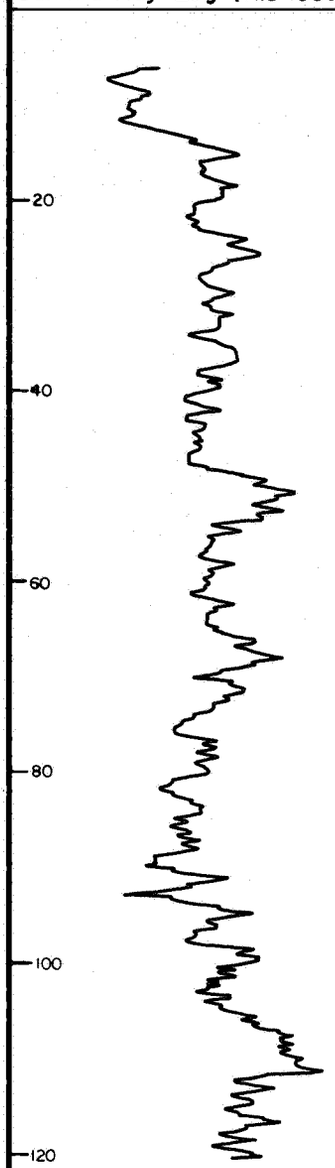
ROTARY DRILLHOLE TY 10

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 140 feet.

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Lithol.	Description
20	Brown, medium-fine grained calcareous sand. With brown calcareous clay and silt, and white, very calcareous cemented silt aggregates.
40	Brown, poorly sorted pebble, silt and clay sand, calcareous.
	Brown cobbles-pebbles, well rd and faceted clear qtz;red Fe subang grnt? pebbles;well rd oval maghemite and black non-magnetic pebbles and Fe qtz and mica coarse sand grs
60	Brown, poorly sorted pebble silty sand. Pebbles subangular vein quartz and oval rounded micaceous semi pelitic schist. Sand grains quartz, ferruginous weathered granite?, mica, semi pelite, feldspar gneiss and gypsum.
80	Brown silty sand. Sand well sorted med-coarse subang crystal qtz mica schist. Ferrug grnt?, cream fld,mica. Slt is red - mainly Fe qtz with white calc cementing material.
	White, leached silt with iron staining.
100	Brown med-coarse gr sand. Sd grs clear, white and Fe qtz, mica schist, ferrug mic gneiss, subang. Calcite cemented fine sand silt aggregates are present.
	Red medium-coarse grained pebble sand with Fe red oxide silt-clay aggregates.
120	Light brown, silty clay. Some aggregates mottled stained with red Fe oxide. Weathered basement material.
140	
160	
180	
200	
220	

PLAN: S.A. 114

C.R.A. EXPLORATION PTY. LIMITED. 00015

SPECIAL MINING LEASE 273 TOOLABY. S.A.

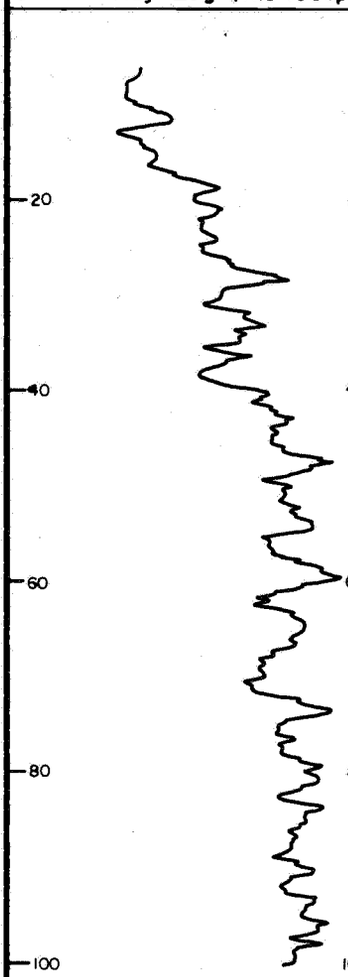
ROTARY DRILLHOLE TY II

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 100 feet

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Description

Brown, fine-coarse gr calc clay-slty sd. Consisting of sds interbed w clays. Sd grs well rd xl qtz, Fe qtz, mic semi pelite, red ferrug weath grnt? The clays & slts occur as: 1. Brown, calc clay as a matrix for slt & fine sd. 2. White calc cement encl qtz fine sd and slt grs. 3. White slightly calc silicified clay-silt.

Brown fine grained micaceous sand.

Brown, poorly srtd cobble sd w silic slty clay.

Light brown calcareous silty clay. Slightly micaceous. Soft, weathered Fe red oxide stained and mottled basement material. Includes fine sand size red well rounded quartz.

PLAN: S.A. 115

C.R.A. EXPLORATION PTY. LIMITED.

SPECIAL MINING LEASE 273 TOOLABY. S.A. 00016

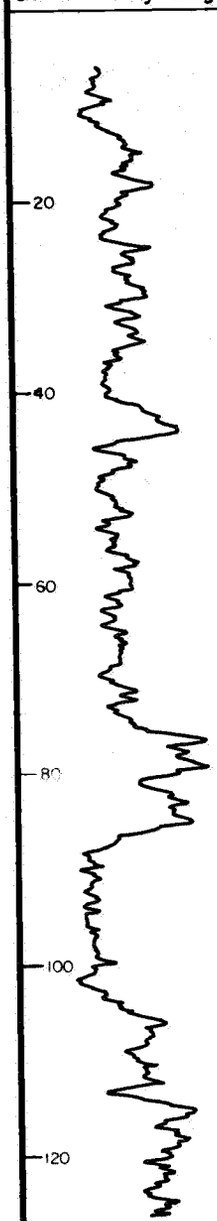
ROTARY DRILLHOLE TY 13

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 230 feet.

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Lithol.

Description

Brown poorly sorted interbedded gravels, medium-coarse sands, silts and clays with evaporites. Pebbles: angular white and clear quartz, black micaceous semi pelite, ferruginous weathered granite, feldspar gneiss. Sand grains: medium-coarse, white crystal and Fe quartz, rounded maghemite and black non-magnetic ironstone. Evaporites: gypsum and anhydrite(?). Silt and clay: calc. clay matrix containg qtz slt grs

Light brown calcareous fine-medium grained silty sand. Medium sand grains subrounded clear quartz and red, buff and black semi pelite clasts. Fine sand grains are rounded Fe quartz and black rounded magnetic grains Coarse evaporite crystals are present.

Brown, very coarse pebble sand with white clays and gravel beds

WATER. 500 gals./hour approx.
Dissolved solids content 1650 ppm.

Brown, very coarse sand gravel beds. White clay horizons. Pebbles and sand grains are from an igneous-metamorphic provenance white, crystal and Fe quartz, black fine grained amphibolite with the feldspars augens weathered out, black foliated semi pelite and ferruginous weathered granite.

White-light grey silty clay of Amdel description TY 4.

Weathered basement.

Cleaved, black, calcareous micaceous semi pelite.

PLAN: S.A. 117

C.R.A. EXPLORATION PTY. LIMITED.

SPECIAL MINING LEASE 273 TOOLABY. S.A.

00017

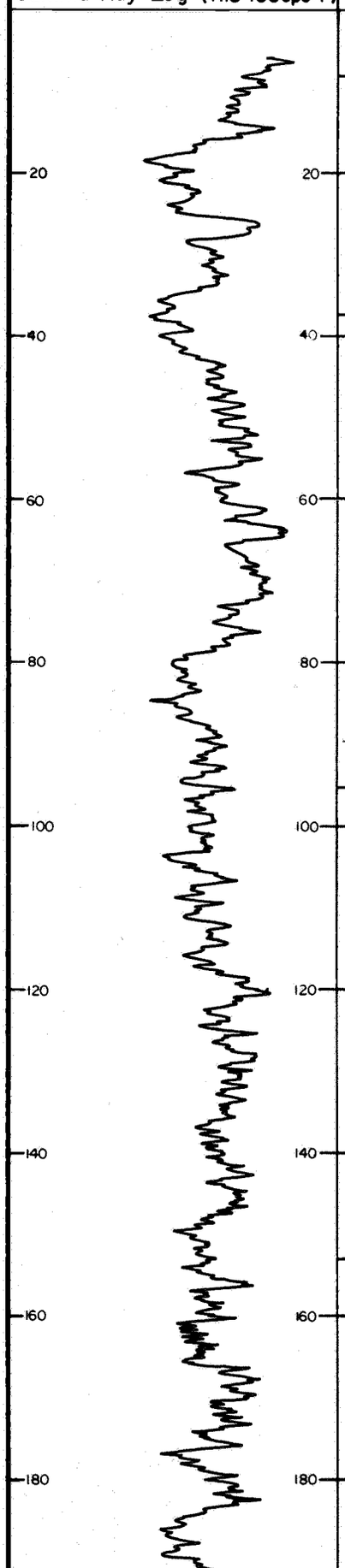
ROTARY DRILLHOLE TY 12

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 200 feet.

VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Description
Brown, poorly sorted calcareous clay-silt sand, includes red Fe oxide stained silicified silt horizon. WATER.
Grey, finely bedded non-calcareous clay. Some beds stained with red iron oxide. Medium-fine well rounded quartz sand grains and coarse subangular gypsum crystals are present.
Brown, poorly sorted calcareous sandy silty clay. Red stained micaceous clay quartzose silt, black weathering to brown micaceous fine grained foliated semi pelite, white, leached saccharoidal textured silt. Reworked weathered basement material. Sand grains fine-medium grained rounded Fe quartz and brown-black semi pelite grains.
Brown-red calcareous and ferruginous clayey silt. The parent material appears to be red fine grained (clay) ferruginous material cementing poorly defined very soft brown fine blebs and silt size quartz. The brown blebs have an angular outline and the material may be a deeply weathered granite.
Light brown silty clay, containing fine-medium grained sand size quartz and mica and consolidated fragments of black calcareous semi pelitic schist.

PLAN: S.A. 116

C.R.A. EXPLORATION PTY. LIMITED.

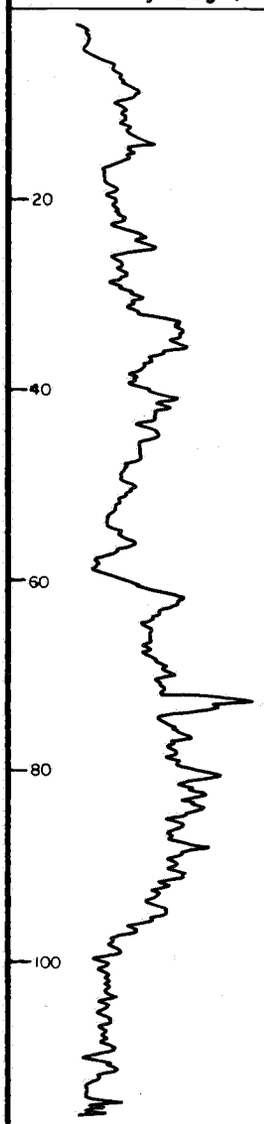
SPECIAL MINING LEASE 273 TOOLABY. S.A. 00018

ROTARY DRILLHOLE TY 14

LITHOLOGICAL AND GAMMA RAY LOGS

DEPTH : 120 feet. VERTICAL SCALE 1" = 20 ft.

G. PIGOTT. October 69.



Lithol.	Description
0–20	Light brown calcareous sandy silt and clay. Sand grains fine-medium-coarse vein quartz, mica and pelitic fragments. The silt occurs in hard packed, calcareous clay cemented aggregates.
20–40	Brown, very coarse sand and pebbles.
40–60	Light brown calcareous sandy silt and clay of 0' to 17' above. Clay occurs in grey finely bedded iron impregnated bands.
60–80	Brown calcareous silty sand very micaceous. Sand grains fine-medium size. Subrounded vein and Fe quartz, subangular black semi pelite and oval, rounded red and black 'ironstone' grains. The silt is red, brown and white in colour - probably reworked weathered basement. Includes white damp clay. TRACE WATER.
80–82	Pebble bed - red ferruginous granite?
82–84	White clay.
84–120	Red-white silty clay inc. red ferruginous weathered granite, white saccharoidal quartz silt - possibly weathering quartzite black-brown, weathered semi pelite.

PLAN: S.A. 118

019

S.M.L. 273.

TOOLABY HILLS

EAST TOOLABY HILL

Psi

Killawarren H.S. (Toolaby)

SPRING HILL

BLACK HILL

As

Qrs

Ty 1 ○
Ty 2 ○
Ty 3 ×
Ty 4 ○
Ty 5 ×
Ty 6 ○
Ty 7 ○
Ty 8 ○
Ty 9 ×
Ty 10 ○
Ty 11 ○
Ty 12 ○
Ty 13 ○
Ty 14 ○

130
170
76

31° 50'
31° 55'
32°

35'
40'

Ty 2 ○ Bore holes drilled.
× Bore holes not drilled.
130 • Bore water Uranium assay in p.p.b.

From Glenorchy 1 mile 1:63360 Geological Sheet

ENV 1250-1