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THE SHELL COMPANY OF AUSTRALIA LIMITED

EXPLORATION LICENCE 18/77, AVOCA

PROGRESS REPORT 1980

by

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SUMMARY

This report presents the results of exploration activities during 1980 in Exploration Licence 18/77, Avoca.

Based on previous exploration work in this area four fully cored drillholes were completed in two areas of inferred prospectivity to delineate the extent of known coal seams. Results have indicated extensive transgression of coal measures by dolerite in three of the holes, with poor seam development in the fourth.

A subsequent field mapping review in conjunction with the results of a gravity survey completed by the Mines Department has put these results in perspective and provided a basis for the delineation of prospective targets for future exploration programmes.

1. INTRODUCTION

1.1 Scope

This report details the results of exploration carried out in Exploration Licence (EL) 18/77 AVOCA during 1980. Previous exploration by this company and by others is briefly reviewed, and the prospects for future exploration are discussed.

1.2 Tenure

EL 18/77 has been held by the Shell Company of Australia Limited since 26th January 1978, and has been progressively renewed with some relinquishments and additions until 26th January 1981. An application for a further six month renewal is current.

1.3 Location and Access

EL 18/77 occupies an area of 1473 km² in northeastern Tasmania within AMG co-ordinates 540000 mE - 590000 mE and 5350000 mN - 5390000 mN (enclosure 1).

The township of Avoca (population 207) lies within the EL while the larger centre of Cambell Town (population 936) straddles the southwestern EL boundary.

A network of mainly unsealed roads and numerous logging and farm roads provide reasonable access to most of the licence area. Access for drilling equipment to specific sites generally requires the construction of new roads, the maintenance of which is often difficult during periods of heavy rainfall.

A 1067 mm guage railway used only for freight purposes links the licence area with Hobart and the north coast centres of Bell Bay, Devonport and Burnie.

1.4 Topography and Climate

The topography of the EL is dominated by an extensive plateau with an average elevation of 650 m above sea level. River valleys, generally bounded by steep scarps, have been incised to elevations of 100-200 m above sea level. The basic topographic form of the

area reflects the widespread occurrence of thick hard dolerite cover which has been removed only where there has been strong and persistent fluvial erosion.

The temperature and rainfall are significantly influenced by the local topography. In the valleys rain falls on approximately 100 days per year, but on the plateau there are about twice as many rain fall days (Bureau of Meteorology, 1977). Almost all rain falls during the months May to November, the highest rain fall being during July and August. Average winter temperatures range from -5°C to 5°C , and snow-falls are common above 600 m from June to August.

Combined with rugged topography, the high rain fall increases the difficulty and cost of exploration operations during the winter months. Access can be maintained much more economically during summer and whenever practicable drilling is confined to the November to May period.

2. GEOLOGY

2.1 Regional Setting

The EL area lies within the Permo-Triassic Tasmania Basin which extends over most of the eastern half of Tasmania. Unconformably underlying the basin is a basement of Siluro-Devonian sediments and Upper Devonian granite. Intruded into the basin, but now effectively overlying it, are sheet dolerites emplaced during the Jurassic concurrent with an episode of major tensional faulting. Further tensional faulting during the Tertiary was accompanied by limited extrusion of basalts. Surficial deposits of alluvium and dolerite scree have accumulated during recent phases of topographic evolution.

2.2 Stratigraphy

2.2.1 Pre-Permian basement

The Siluro-Devonian basement in this area consists of the Mathinna Beds with dominant lithologies being quartzites, phyllites, siltstones and slates of Ordovician/Silurian to early Devonian age. The thickness of this sequence is unknown in this area but the lithologies indicate a deltaic or estuarine environment of deposition. Sedimentation was terminated by the Tabberabberan Orogeny during which folding of the sediments along a northwesterly axis occurred. During the late Devonian these sediments were intruded by granites and granodiorites, followed by a period of erosion extending to the late Carboniferous (Brown et al., 1968; Investigator Coal Exploration, 1978).

2.2.2 Permo-Triassic Tasmania Basin

The name Parmeener Super-Group (Banks, 1973) has been introduced to define sediments of essentially Permo-Triassic age but extending in age from the late Carboniferous to the late Triassic. This Permo-Triassic sequence contains two broad lithological units differentiated on the basis of depositional environments and includes a lower division of glacial and glaciomarine beds and an upper essentially freshwater sequence. This lithological

unit has been used in the past as the Permian-Triassic boundary but is not satisfactory due to insufficient fossil evidence (Forsyth et al., 1973).

The Permo-Triassic sequence in Tasmania can be correlated with the sedimentary sequences of the Hunter Valley and although the latter are much thicker, the lithological similarities indicate that Tasmania was structurally part of the Western shelf of the Newcastle Geosyncline (Brown et al., 1968).

The Lower Parmeener Super-Group has been subdivided into a 'Lower Marine sequence', a 'Lower Freshwater sequence' and an 'Upper Marine sequence', and the Upper Parmeener Super-Group into an 'Upper Freshwater sequence' and a 'Triassic' sequence (Forsyth et al., 1973).

The basal sediments of the Lower Parmeener Super-Group consist of the Wynyard Tillite, a unit unconformably overlying the basement but which does not occur in the exploration lease area. These tillites with interstratified sandstones and conglomerates occasionally contain marine fossils indicating that the ice must have reached sea level in places. Following the melting of the ice, mudstones, siltstones and thin limestones were deposited containing numerous marine fossils and erratic blocks indicating the presence of floating ice blocks.

During Late Artinskian times regional warping brought most of Tasmania out of the sea and wide areas were covered with sediments from a series of coalescing deltas (Brown et al.; 1968). The widespread conglomerates at the base of this sequence form the base of the Permo-Triassic sequence in the licence area, unconformably overlying the basement and varying in thickness from 1-5 m. In some parts of the area to the north outside the licence area this conglomerate is overlain by a freshwater sequence (part of the 'Lower Freshwater sequence' of Forsyth et al.) comprising

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the Mersey Coal Measures and consisting of fine to medium grained lithic sandstones, mudstones, carbonaceous mudstones and minor shaley coal. These measures vary in thickness between 0 and 15 m and the fossil assemblage indicates a correlation with the Greta Coal Measures of New South Wales (Brown et al., 1968). Overlying the conglomerate in the licence area are shallow water marine sediments including the Cascades and Ferntree Groups. The dominant lithologies are dark siltstones, mudstones, calcareous sandstones and limestones indicating local transgressions and regressions. Marine fossils are abundant in these sequences and although no complete section exists in outcrop it is regarded as being 100-150 m thick in this area.

The Upper Parmeener Super-Group consists of the 'Upper Freshwater sequence' at the base comprising the Cygnet Coal Measures which are not developed in the EL area. The contact between the Upper and Lower Parmeener Super-Groups within the licence area is represented by a conglomerate consisting of pebbles of quartz, quartzite, mudstone and volcanic material often in a sandy kaolinitic matrix. Overlying this conglomerate is a thick sequence of freshwater quartzose sandstones. They are well sorted, medium grained and have a low lithic content at the base increasing towards the top. Cross bedding can commonly be seen and this unit varies in thickness over the licence area from about 100 m in the east outside the EL to 60-80 m at Red Rock in the Royal George area.

The Upper 'Triassic' part of the sequence consists of interbedded lithic sandstones, siltstones, mudstones, carbonaceous shales and coal seams.

The Upper Parmeener Super-Group varies in thickness from a maximum of 350 m outside the licence area to the east at Coal Rivulet-Meadstone Saddle to approximately 300 m in the vicinity of Royal George and apparantly thinning further to the west. (Investigator Coal Exploration, 1978; Taylor, 1979).

2.2.3 Jurassic Dolerite

During the middle Jurassic the Upper Parmeener Super-Group and to a lesser extent the Lower Parmeener were intruded by dolerite in the form of sills, transgressive sills and dykes. A regional gravity survey by the Mines Department over parts of the licence area has indicated a complex intrusive history with numerous feeder centres (enclosure 1) and possible complete removal by dilation and erosion of the coal measure sequence of the Upper Parmeener Super-Group in numerous areas (Leaman & Richardson, 1980). The overall dip trend of the base of the dolerite is to the southwest in the Avoca area and to the southeast in the Royal George-Fingal area (Kind, 1978).

2.2.4 Cainozoic

The Cainozoic sequence consists of Tertiary sediments and basalts in the St. Paul's and South Esk Valleys and Quaternary sediments over most of the licence area.

The basalts consist of two flows, a lower vesicular flow and an upper homogenous flow, and is approximately 40 m in thickness.

Quaternary sediments occur in the river valleys as alluvium and on the valley slopes and plateaus as dolerite scree. The alluvium is considered to be up to 85 m thick and consists of silt and sand as well as swampy loam on the plateaus. The dolerite scree varies in thickness from a thin cover to an estimated 100 m on the northern slopes of Mount Foster (Investigator Coal Exploration, 1978).

2.3 Structure

The Mathinna Beds in this area are structurally complex being folded along a northwest axis. The basement surface is reported to be planar with a 1° dip or less to the south where the Mathinna Beds are exposed north of Fingal (Threader, 1968). In the vicinity

of Royal George where the basement consists of granite there was some residual relief during deposition of the Lower Parmeener Super-Group sediments.

The Lower Parmeener Super-Group in the Royal George-Fingal area appears to have a regional dip to the southeast of 3-4°. The overlying Upper Parmeener Super-group dips 3-5° to the southeast here although it dips to the southwest in the Avoca area. The dips are very variable and often reversed which can probably be attributed to the effects of the intrusion of the dolerite. In some areas, such as the Merrywood open-cut mine, steep dips are apparent near the dolerite contact.

No folding has been observed in the Permo-Triassic sequences apart from local warping due to dolerite intrusion. Faulting in the licence area is tensional and appears to have been associated with the intrusion of the dolerite and Tertiary block movements. The major structural feature in the area is the Castle Carey Fault north-east of Avoca with a down throw of approximately 500 m to the southwest. The throw apparently decreases further south along the fault line. In the Mt. Christie area where maximum movement is implied, Upper Parmeener Super-Group sediments have been brought in contact with Devonian granites. In the Royal George area there is a fault trending northeast - southwest extending from Meadstone Saddle through Red Rock and south of Royal George. The displacement in this feature has been attributed to Tertiary movements (Threader, 1968).

Numerous apparent faults and lineations have been identified on aerial photographs (enclosure 1), but verification in the field has been hampered by the extensive dolerite and dolerite scree cover (Kind, 1978).

3. PREVIOUS EXPLORATION AND MINING

3.1 Pre 1922

Hills and others in 1922 summarized exploration and mining activities in this area in their "Coal Resources of Tasmania" publication. The report deals in detail with the various exploration adits and mines as well as attempting some correlation of the coal seams.

Most of the early exploration and mining activities were concentrated around the Mount Christie and Bonneys Plains areas. A few shallow shafts and adits as well as a couple of boreholes were sunk in an area around Mt. Christie between Castle Carey Creek and Buffalo Creek and became known as the Buena Vista Mine although it never became productive.

An adit was also driven into a bed of coal (1.8 m thick) on the southern part of Greenstone Hill, and into a 2.7-3.6 m thick seam 80 m to the southwest. The latter seam was interrupted by a fault trending N 75°E and with a 18 m displacement downthrown to the east. A third inclined adit was driven on the eastern side of the fault and the seam eventually worked out to where it terminated against the Castle Carey Fault in the east. These workings were collectively known as the Mount Christie mine.

During the Mt. Christie exploration programme an adit was driven into an outcrop of coal in the Bonneys Plains area, but it was never worked.

In the Royal George area two adits were driven into seams in Rockhouse Creek. (AMG 577200 mE/5366200 mN St. Paul's 1:100000 sheet) and Stable Creek (AMG 573500 mE/5363800 mN St. Paul's 1:100000 sheet) both encountering 1.83 m thick seams. The only productive mine in this area was at Merrywood where a seam was worked at this time (Hills et al., 1922).

3.2 1922 - 1978

Operating mines within the licence area during this period consisted of the Merrywood and Stanhope mines.

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The Stanhope Colliery operated between 1931 and 1960 in two areas. The first or Old Stanhope mine included some of the old workings of the Buena Vista Mine where a seam was worked but soon abandoned due to faulting. Mining of a second seam was attempted but it was also abandoned due to dolerite dykes and dolerite filled faults paralleling the Castle Carey Fault. In the new Stanhope mine workings situated to the north of the old workings, mining activities were eventually terminated by faulting. During the operation of these mines two adits were driven in the Bonneys Plains area adjacent to the initial adit constructed during the Mt. Christie exploration programme. Both adits proved unsuitable for production purposes (Hughes, 1954).

At the Merrywood Mine the coal seam was extracted initially by open cut techniques although some underground operations were conducted at a later stage. The seam was reported to have been 3.38 m thick (maximum) with a working thickness of less than 2.74 metres. By the closure of the mine in 1961, 423 475 tonnes of coal had been removed (Investigator Coal Exploration, 1978).

Exploration work during the later part of this period included work done by Western Mining Corporation and Investigator Coal Exploration Pty. Ltd. In addition the Mines Department drilled some holes and commenced a regional gravity survey covering a portion of the licence area.

Western Mining Corporation's work consisted of mapping as well as drilling in the Bonneys Plains area in the northwestern part of the licence during 1976-1977. In their mapping of the area Western Mining Corporation differentiated the 'Permian' and 'Triassic' and divided the 'Triassic' sequence into the following facies:

- (a) The coal and carbonaceous shale facies.
- (b) The mudstone facies commonly associated with the coal and carbonaceous shale facies as well as the lithic sandstone and siltstone facies.

- (c) The lithic sandstone and siltstone facies which also occurs with the coal and carbonaceous shale facies at times and forms the roof of some of the seams in the area.
- (d) The quartzose sandstone facies which occurs towards the base of the 'Triassic' sequence but also interbedded with all the other facies (enclosure 1).

Nine chip drill holes were completed with a total metreage of 587.3 m and a maximum depth of 85 m. All of these holes were situated on the Bonneys Plains and Buffalo Plains areas with the exception of TAR 8 situated on the eastern boundary of the lease and north of Avoca (enclosure 1). Western Mining Corporation was aiming at delineating shallow open cut coal but only two of the nine holes intersected reasonable seams (holes TAR 2 and TAR 8, enclosure 1). Holes TAR 1 and TAR 3 (enclosure 1) intersected the coal and carbonaceous shale facies, whereas the rest of the holes were all within the lithic sandstone and siltstone or lower quartzose sandstone facies of the 'Triassic' sequence. All the holes were logged with a portable logging unit producing gamma-ray, resistivity and S.P. logs. Correlation proved difficult between holes.

Parts of the present exploration licence 18/77 were held by Investigator Coal Exploration Pty. Ltd. (I.C.E.) for 12 months up to the 23rd of December 1978 as EL 16/77 totalling 545 km². The area covered by this licence included the present northeastern and eastern parts of EL 18/77 both to the north and south of Royal George. Based on an initial mapping programme four potential target areas were delineated for drilling and four fully cored drillholes were completed (I.C.E. holes 1-4, enclosure 1). These holes intersected a total of 699 m of coal measures including 29 seams ranging in thickness from 0.3 to 2.2 m. Correlation was attempted but proved difficult due to extensive lateral variation of interseam sediments. I.C.E. holes 3 and 4 situated in the Merrywood area (enclosure 1) intersected significant coal seams including a 2.2 m seam in hole 4 and a 1.24 m seam in hole 3. Hole 2 intersected an approximately 3 m section of coal with a dirt parting and a 6 m section with two partings and hole 1 intersected a 2.01 m seam.

The Tasmanian Mines Department drilled two holes (DOM 18 and DOM 29, enclosure 1) within the present licence area.

Hole 18 situated north of Merrywood encountered 371.5 m of dolerite and 53.30 m of the Permo-Triassic sequence the lower 6.13 m being regarded as Permian of age (marine sediments). Hole 29 situated in the northeastern corner of the lease area encountered 346.0 m of dolerite and 85.43 m of Permo-Triassic with 6.83 m of marine siltstone at the base regarded as being Permian of age.

3.3 1978 - 1979 (Shell)

Initial exploration activities prior to the commencement of drilling consisted of a review of the area (Senini, 1978) as well as aerial photographic interpretation (Kind, 1978) and the construction of a geological map by consultants Layton and Associates from air photographs and Landsat-imagery. Layton and Associates also produced a fracture study of the area later in the year (Layton and Associates, 1978).

Drilling in the licence area commenced on the 2nd of May 1978 on a planned 18 hole drilling programme. This was a scout drilling programme and all the holes drilled in this period were situated south of Royal George and were concentrated predominantly in the Elizabeth River area. Constant problems with access aggravated by severe weather conditions hampered progress and resulted in the abandonment of hole AV 4. By the completion of the drilling programme in September, 9 holes were drilled (AV 1-9) totalling 3294.40 m with holes AV 1 to AV 7 situated in the present licence area (enclosure 1) and holes AV 8 and AV 9 situated in a relinquished portion of the initial licence area (Ivett, 1979). Drilling statistics are presented in Table 1.

TABLE 1 DRILLING STATISTICS

EL 18/77

BOREHOLE NO.	AV 1	AV 2	AV 3	AV 4	AV 5	AV 6	AV 7	AV 8	AV 9
Base of dolerite (m)	221.24	442.50*	269.57	155.60*	350.00*	201.00	299.00*	300.00*	298.60*
Thickness of dolerite and dolerite scree intersected (m)	221.24	344.80	269.57	155.60	350.00	201.00	299.00	300.00	298.60
Base of 'Triassic' coal measures (m)	355.87	-	512.98	-	-	452.00*	-	-	-
Base of quartzose sandstone (m)	458.00*	-	538.70*	-	-	-	-	-	-
Thickness of Upper Parmeener Super-Group intersected (m)	236.76	97.70	269.13	-	-	251.00	-	-	-
Thickness of Lower Parmeener Super-Group intersected (m)	-	-	-	-	-	-	-	-	-
Total depth (m)	458.00	442.50	538.70	155.60	350.00	452.00	299.00	300.00	298.60
Total Metreage									3294.40

*These depths are not the true base depths of the respective lithological units but rather the base of the hole within these units.

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All holes were sited on dolerite outcrop except AV 2 which encountered 97.70 m of coal measures before intersecting dolerite. This was the only occurrence of sediments overlying dolerite and must represent a rare uprafted section preserved from weathering.

Holes AV 1, 3 and 6 intersected the 'Triassic' coal measures while holes AV 4, 5, 7, 8 and 9 were terminated in dolerite.

Hole AV 3, intersecting 269.57 m of dolerite and 269.13 m of the Permo-Triassic sequence and terminated in the quartzose sandstone of the section encountered a 1.12 m thick seam between 355.72 m and 356.84 m. Other seams encountered were thinner and contained thick dirt partings. In hole AV 6 the seam development was thin, deep and of poor quality despite intersecting 251 m of the Permo-Triassic sequence.

Hole AV 1 intersected one seam thicker than 1 m between 250.69 m and 251.55 m with a roof of shale and mudstone and a floor of lithic sandstone and was the only seam analysed (Taylor, 1979).

At the end of this period it was still not clear to what extent the coal measures encountered by previous drilling and mapping work in the Mt. Christie and Royal George areas extended underneath the dolerite coverage. On the basis of the results from drillholes AV 8 and AV 9, parts of the original licence area were relinquished being regarded as having no exploratory potential (Ivett, 1979).

It was recommended at this stage to investigate the Northwest Avoca area to establish the extent of the coal measures there.

Areas considered as having low potential at this stage were north of Buffalo Brook and west to Kingston Plains in the northwestern part of the licence area, east of the Castle Carey Fault and south of the St. Pauls River due to the contact between the Permo-Triassic quartzose sandstones and dolerite and south of the South Esk River, and west of the Castle Carey Fault due to poor drilling results (Taylor, 1979).

4. 1980 EXPLORATION

4.1 Objectives

The 1980 exploration programme was designed to delineate the extent of coal seams and the extent of dolerite transgressions into the Permo-Triassic sequence in two areas regarded as having prospective potential.

Area 1. (Northwest of Avoca)

Previous mining activities in the Mt. Christie area and exploratory drilling by Western Mining Corporation indicated the presence of a few seams of reasonable thickness and quality to the north, east and west of a thick sheet of dolerite east of Bonneys Plains. At the three adits driven during the early stages of exploration in this area on the western edge of the dolerite coverage, the base of the dolerite is only 30 cm above the coal seams indicating the possibility of transgression of the coal seams by dolerite in this area. The quartzose sandstone at the base of the coal measures is, in addition, found in contact with dolerite and dolerite scree on the eastern side of Mount Christie adjacent to the Castle Carey Fault indicating either transgression or faulting at the contact.

On the basis of these considerations it was decided to drill one hole through the dolerite and the coal measure sequence in order to establish the extent of dolerite transgression in this area. This hole (AV 12) was situated on Turners Hill at AMG 555800 mE/5375300 mN (enclosure 1). A second hole (AV 13) was sited west of Bonneys Plains at AMG 548200 mE/5372800 mN in order to establish the extent of coal seams and dolerite transgression to the west.

Area 2. (South of Royal George)

Outcrops in Rockhouse and Stable Creeks of thick seams, as well as seams encountered in the Investigator Coal Exploration holes 1 and 2 indicated the presence of numerous coal seams within the exposed coal measure sequence beneath the dolerite capping. As there was no indication, due to the complete dolerite coverage, of the

southerly extent of these seams underneath the dolerite, two holes AV 10 and AV 11 were sited at AMG 583800 mE/5363700 mN and AMG 571000 mE/5363000 mN respectively in order to establish this. Reasonable road access to some extent influenced the placement of these holes.

4.2 Drilling

Holes AV 11, 12 and 13 required construction of access roads prior to commencement of drilling. Despite this, access problems were still encountered due to adverse weather conditions causing some delays in progress. All four holes drilled were fully cored and completed between the 31st of March and the 15th of July 1980. Selected samples of the dolerite cored and the complete section of all sediments cored have been retained and stored. The total metreage drilled during this period was 1702.74 m and Table 2 summarizes the drilling statistics. Enclosure 2 presents the generalised borehole logs graphically and the detailed logs are presented in Appendix 1.

TABLE 2 - Summary of Drilling Statistics

	AV 10	AV 11	AV 12	AV 13
Surface Elevation (m.a.s.l.)	300	825	480	500
Base of dolerite (m)	340.87	466.50	158.73	307.46
Base of coal measures (upper Permo-Triassic) (m)	-	-	426.00	-
Base of Quartzose sandstone (Permo-Triassic) (m)	-	-	483.34	-
Thickness of Lower Permo-Triassic marine sequence intersected (m)	45.34	-	6.99	-
Total thickness of Permo-Triassic intersected (m)	45.34	-	331.60	52.24
Total depth (m)	386.21	466.50	490.33	359.70
Total metreage drilled (m)				1702.74

Royal George area

Borehole AV 10 intersected 340.87 m of dolerite before encountering marine mudstones and sandstones of the lower Permo-Triassic sequence. The dolerite sequence consisted predominantly of unweathered medium grained rocks although the last 87 cm were a finer grained chilled margin. It is obvious that the upper coal measures of the Permo-Triassic sequence were removed at this point by transgressive dolerite intrusives (enclosure 4).

Borehole AV 11 was terminated in dolerite at 466.50 m indicating an extreme thickness of dolerite at this point as well as the steeply transgressive nature of the dolerite as hole AV 11 is situated only 2.1 km southwest of I.C.E. hole no. 1 which contained a substantial coal measure sequence and no dolerite.

Northwest Avoca area

Borehole AV 12, after passing through 158.73 m of dolerite encountered 331.60 m of the Permo-Triassic sequence of which 267.27 m consisted of the upper part of the sequence containing the coal measures. In this area this represents a complete or near complete section but despite this only a few coal beds ranging in thickness from 2 cm to 57 cm and ranging from dull to banded dull and bright coal were intersected. Due to the thickness of the sequence here the absence of coal seams must be attributed to non-deposition rather than removal by transgressive dolerite intrusives.

A pebble conglomerate overlying dark grey marine mudstones formerly regarded as being at the base of the Triassic sequence was intersected at 482.73 - 483.00 m.

Borehole AV 13 intersected 307.46 m of dolerite consisting mostly of homogeneous medium to coarse grained rock with a fine grained zone 8.96 m thick at the base. Below the dolerite 52.24 m of fresh water sediments consisting predominantly of sandstones with interbedded mudstones were encountered and the hole terminated at a depth of 359.70 m. The coal measure section of the Permo-Triassic sequence has apparently also been removed at this point (enclosure 3).

As no reasonable coal seams were intersected, no samples were taken for analysis.

4.3 Field Mapping Review

A review of previous mapping work in the licence area was undertaken during November and December 1980. This consisted mostly of field checking, at selected points of interest, the mapping of Western Mining Corporation and Investigator Coal Exploration.

Of particular interest during this exercise were the relative dolerite and coal measure elevations in order to clarify the transgressive nature of the dolerite. Areas of interest were:

- (a) Northwest of Avoca
- (b) The area around Merrywood and to the west and
- (c) The outcrops of coal measures south of Royal George.

Extensive coverage of slopes by dolerite scree hampered the accurate determinations of dolerite base elevations as well as obscuring outcrops below the dolerite, thus making accurate mapping work impossible. From a consideration of the relative dolerite base and coal measure outcrop elevations in the Northwest Avoca area, there appear to be two possible areas of thick coal measure accumulation. These are south of Mount Christie and west of the Castle Carey Fault and an area straddling Log Hut Gully to the west of borehole AV 12. In both these cases the possible effects of faulting along observed aerial photo lineations and the possible existence of transgressive dolerite sheets or feeders will have to be determined.

In both the Merrywood area and the area south of Royal George extensive dolerite and dolerite scree coverage necessitated a reliance upon the results of the gravity survey conducted by the Mines Department (Leaman and Richardson 1980) over these areas in delineating prospective target areas.

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4.4 Conclusions

(a) Northwest Avoca Area:

Bearing in mind the objectives of the 1980 drilling programme the two boreholes in this area (AV 12 and 13) contributed a great deal towards the clarification of the geology of this area. Borehole AV 12 is of particular interest as, despite containing a thick accumulation of the coal measure sequence, no significant coal seams were intersected indicating:

- (a) that the dolerite is not transgressive at all or to a small extent here, and
- (b) the 'patchy' nature of coal seam development in this area. This 'patchy' or lensoid seam development can also be seen in the old mine workings to the north with rapid thinning or disappearance of seams. Whether this is a depositional or erosional feature or even related to structural control of the depositional environment is not clear at present but has to be borne in mind in determining the prospectivity of this area.

Borehole AV 13 indicated the transgressive nature of the dolerite and the removal of the coal measures to the west of Bonneys Plains. In the absence at the present time of geophysical information on this area it must be regarded as poorly prospective. Further geophysical work over this Northwest Avoca area may delineate further areas of thin dolerite coverage.

(b) Royal George area:

An initial interpretation of boreholes AV 10 and AV 11 in this area indicates the apparent complete transgression and removal of the coal measure sequence below the dolerite south of the escarpment. Although this is true at these particular points, a consideration of the results of the gravity survey by the Mines Department indicates that on a broader scale the position is much more complex. On the basis of the results obtained during this survey a couple of feeder centres were identified in this area and it was

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suggested that areas with residual Bouguer anomalies in excess of +10 micrometres/s² would contain thick accumulations of dolerite and thin or absent coal measure sequences (Leaman and Richardson, 1980). As both holes AV 10 and AV 11 are situated on or near a +10 micrometers/s² line (Leaman and Richardson, 1980, figure 17) they seem to support this model. Borehole AV 11 and to a lesser extent AV 10 are situated in a belt of positive anomalies trending in an east-west direction immediately south of the escarpment and include a few areas of extreme positive anomalies indicating possible feeder centres. This belt of anomalies represent a dolerite dyke or steeply transgressive sill and would therefore severely restrict the extension of the coal measures to the south. The gravity survey has indicated areas of negative residual Bouguer anomalies to the south of this structure in the headwaters of the Swan River area and it is possible that the coal measures may still be preserved here. It is clear therefore that the entire area of the licence south of Royal George cannot be regarded as unprospective despite the discouraging results from the boreholes in this area, and that the dolerite does not exist as a single sill but rather as numerous sills and dykes with various feeder centres and therefore varying in thickness and angle of transgression.

5. FUTURE EXPLORATION

On the basis of the results from the exploration programme during 1980 and the results of the gravity survey by the Mines Department, prospective areas for future exploration may be delineated more effectively.

(a) Northwest Avoca area

Future activities in this area would be aimed at delineating areas of thin dolerite coverage predominantly. Additional work would involve an assessment of the effects of possible faulting in these areas on the coal measures.

(b) Royal George Area

(South of the St. Pauls River Valley and East of 557000 mE)

On the basis of suggestions in the report on the gravity survey by the Mines Department, areas with residual Bouguer anomalies less than -10 micrometers/s² have been isolated as having exploratory potential (enclosure 1). Future exploration work in this area would initially be directed towards these areas with possible later expansion into adjacent areas depending on results.

(c) Merrywood area

This area to the northwest of the old Merrywood Mine may, on the basis of the negative residual Bouguer anomaly, contain a significant coal measure sequence and possibly an extension of the seams worked at Merrywood, and would therefore warrant further exploratory work, particularly to determine the thickness of the dolerite.

(d) Other areas

These include a few small areas of negative anomalies and in particular one in the northeastern corner of the lease area near the Department of Mines borehole no. 29 which may warrant further work.

The rest of the licence area not covered by the gravity survey and in particular the western part with no drillhole information would require some geophysical work prior to any drilling in the future to delineate areas of thin dolerite coverage.

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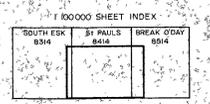
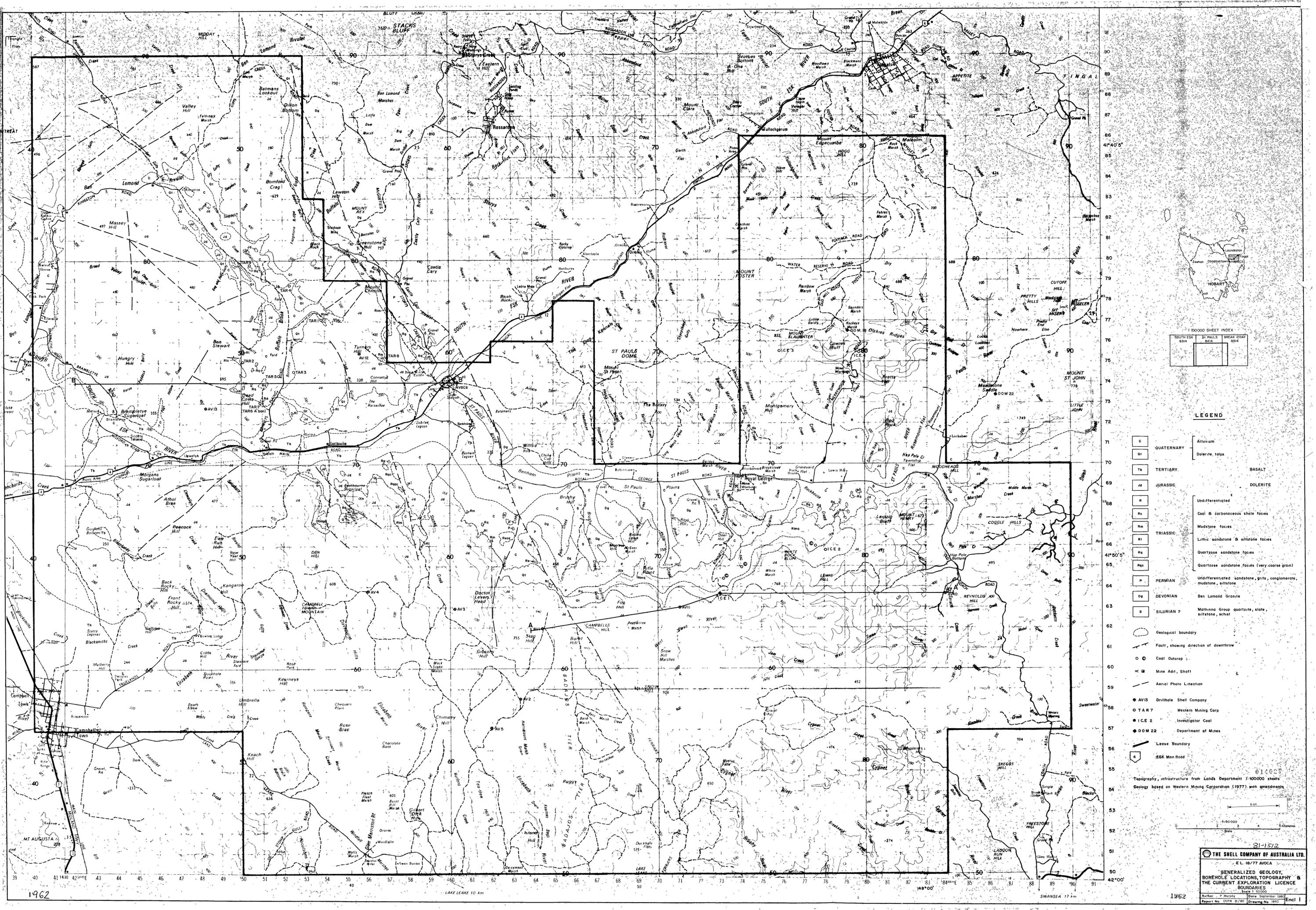
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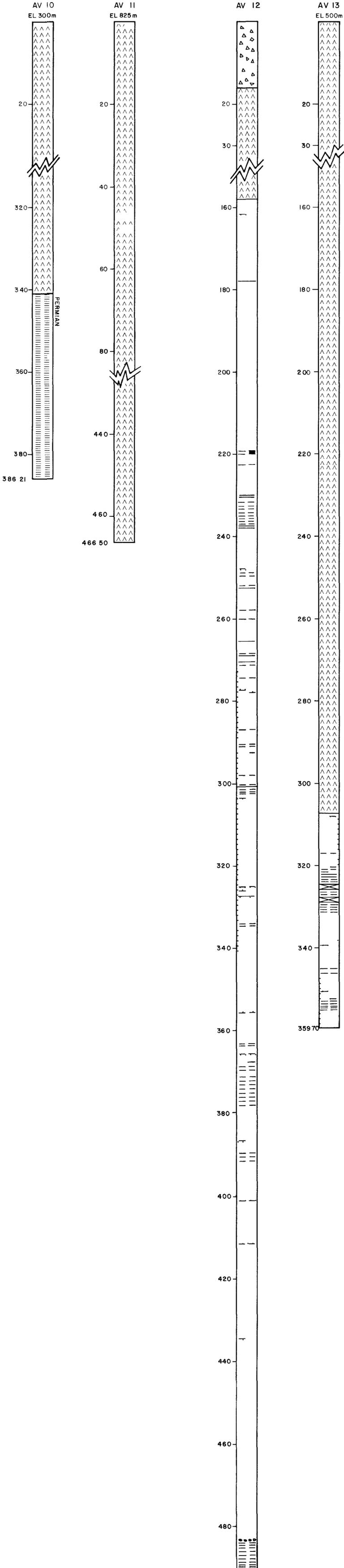
LEGEND

- | | | |
|--------------------------------|--|--|
| C | QUATERNARY | Aluvium |
| Q1 | | Dolerite, tuffs |
| Tb | TERTIARY | BASALT |
| Ju | JURASSIC | DOLERITE |
| R | TRIASSIC | Undifferentiated |
| Rc | | Coal & carbonaceous shale facies |
| Rm | | Mudstone facies |
| Rl | | Lithic sandstone & siltstone facies |
| Rq | | Quartzose sandstone facies |
| Rsc | Quartzose sandstone facies (very coarse grain) | |
| P | PERMIAN | Undifferentiated sandstone, grits, conglomerate, mudstone, siltstone |
| Dg | DEVONIAN | Ben Lomond Granite |
| S | SILURIAN ? | Maficma Group quartzite, slate, siltstone, schist |
| (Dashed line) | Geological boundary | |
| (Line with triangles) | Fault, showing direction of downthrow | |
| (Circle with dot) | Coal Outcrop | |
| (Square with dot) | Mine Adit, Shaft | |
| (Dashed line with cross-ticks) | Aerial Photo Lineation | |
| (Circle with dot) | AVIS Drillhole Shell Company | |
| (Circle with dot) | TAR 7 Western Mining Corp | |
| (Circle with dot) | I.C.E. 2 Investigator Coal | |
| (Circle with dot) | DOM 22 Department of Mines | |
| (Dashed line) | Lease Boundary | |
| (Line with cross-ticks) | ESK Main Road | |

Topography, infrastructure from Lands Department 1:100,000 sheets
 Geology based on Western Mining Corporation (1977) with amendments

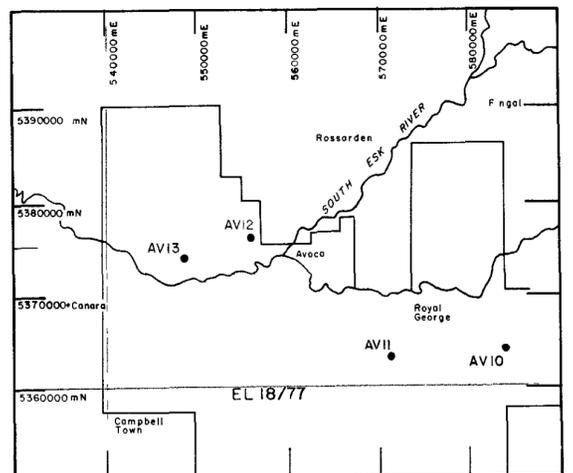
Scale: 1:50,000
 0 1 2 3 4 5 6 7 8 9 10 Kilometres

31-1572
THE SHELL COMPANY OF AUSTRALIA LTD.
 E.L. 16/77 AVOCA
 GENERALIZED GEOLOGY,
 BOREHOLE LOCATIONS, TOPOGRAPHY &
 THE CURRENT EXPLORATION LICENCE
 BOUNDARIES
 Scale 1:50,000
 Author: Murray Davis (approx. 1980)
 Report No. CEPR 2/80 Drawing No. 1510
 Encl 1

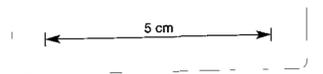


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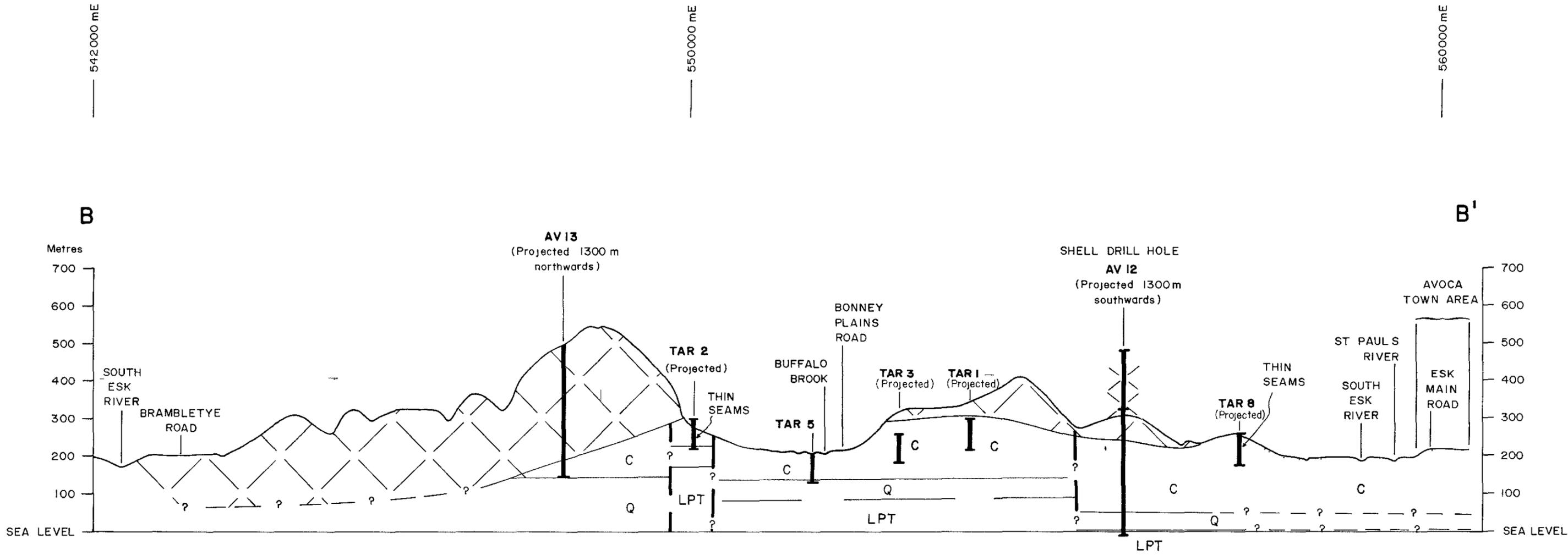
- Dolerite scree
- Conglomerate pebbly sandstone
- Sandstone
- Siltstone
- Sandstone with mudstone bands
- Sandstone with coal traces, coal veins, coal bands
- Mudstone
- Mudstone with sandstone bands
- Mudstone with coal bands
- Carbonaceous mudstone
- Coal
- Dolerite
- Core loss



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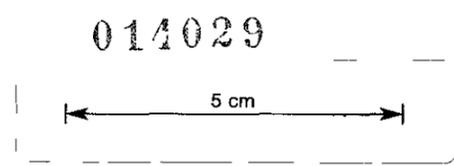
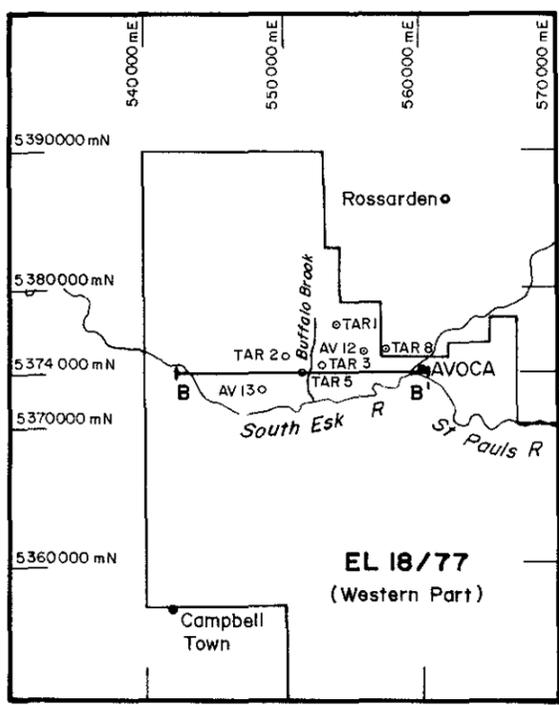


THE SHELL COMPANY OF AUSTRALIA LTD			
TASMANIA 81-1512			
GENERALISED BOREHOLE LOGS			
AV 10, 11, 12 & 13			
EL 18/77 AVOCA 1963			
Vertical Scale 1:500			
Author	Coal Division	Date	January 1981
Report No	CEPR 3/81	Drawing No	1839
			Encl 2



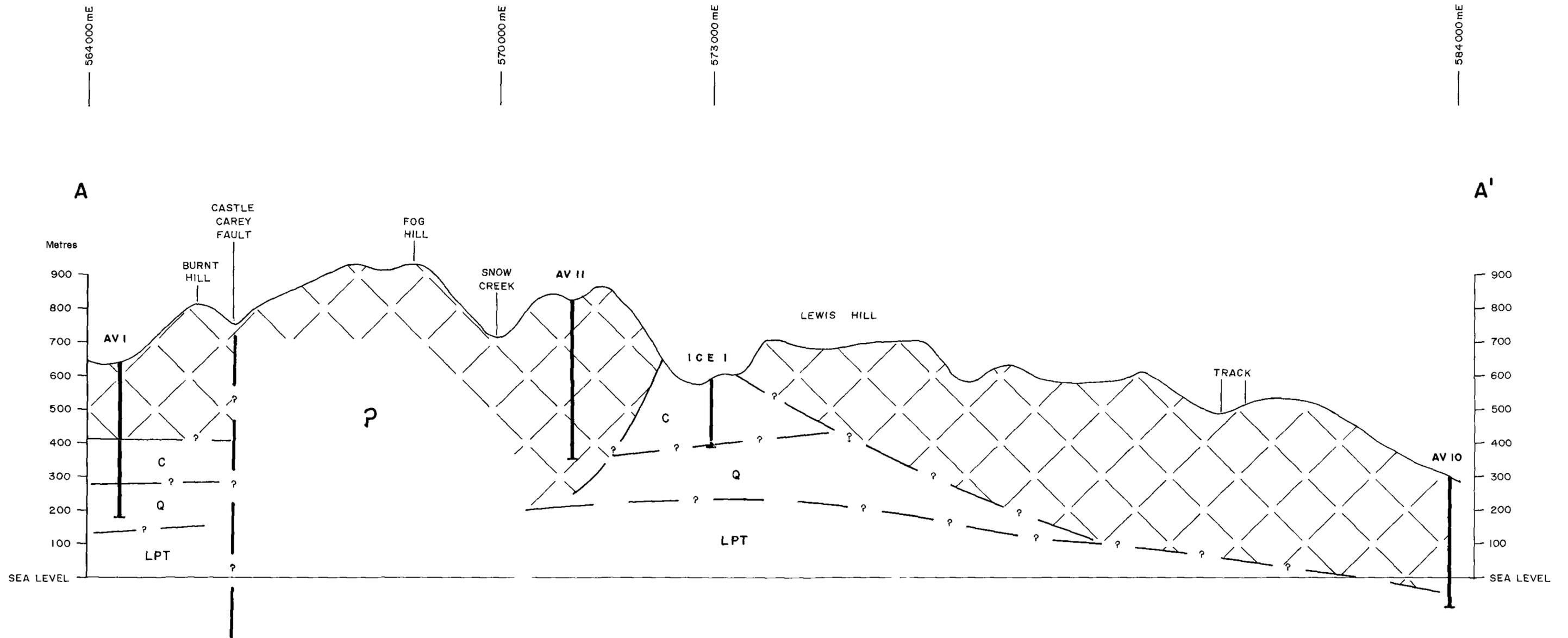
LEGEND

-  JURASSIC Dolerite
-  UPPER Coal Measures
-  PERMO-TRIASSIC Quartzose Sandstone
-  LOWER Sediments (Undifferentiated)
-  INFERRED FAULTS



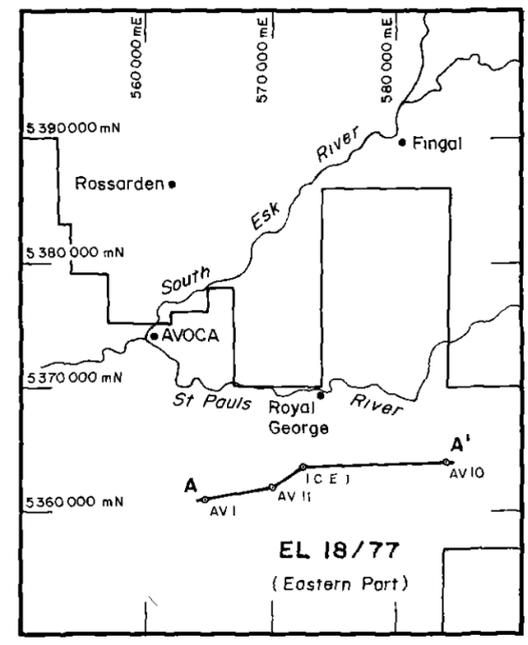
 THE SHELL COMPANY OF AUSTRALIA LTD		
NORTH WEST AVOCA AREA 1964		
EL 18/77 AVOCA TASMANIA		
GEOLOGICAL CROSS SECTION		
Vertical Scale 1 10 000 Horizontal Scale 1 50 000		
Author Coal Division	Date January 1981	81-1512 Encl 3
Report No CEPR 3/81	Drawing No 1838	

81-1512 Vol 1/2



LEGEND

- JURASSIC Dolerite
- UPPER Coal Measures
- PERMO-TRIASSIC Quartzose Sandstone
- LOWER Sediments (Undifferentiated)
- INFERRED FAULTS



014030
5 cm

THE SHELL COMPANY OF AUSTRALIA LTD		
ROYAL GEORGE AREA EL 18/77 AVOCA TASMANIA		1965
GEOLOGICAL CROSS SECTION		
Vertical Scale 1 10 000 Horizontal Scale 1 50 000		81-1512
Author Coal Division	Date January 1981	Encl 4
Report No CEPR 3/81	Drawing No 1837	

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014031

EXPLORATION LICENCE 18/77 AVOCA

TASMANIA

PROGRESS REPORT 1980

APPENDIX 1 - BOREHOLE LITHOLOGICAL LOGS



The Shell Company of Australia Limited

JANUARY 1981

COAL DIVISION

CEPR 3/81

VOL. 2

27

014032

APPENDIX 1

Borehole Lithological Logs AV 10 - AV 13.

(Provisional pending validation).

028

014033

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : 10 AV

DATE COMMENCED: 31/03/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

- 340.00	100	100% DOLERITE: MEDIUM GRAINED, GREY-GREEN, UNWEATHERED, VERY STRONG ROCK.
340.00 - 340.87	100	100% DOLERITE: GRADING TO, FINE GRAINED, GREY-GREEN, ① UNWEATHERED, VERY STRONG ROCK.
340.87 - 340.91	100	100% MUDSTONE: BAKED, GREY, MUDSTONE: BAKED, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
340.91 - 362.17	100	100% MUDSTONE: LIGHT GREY, WITH PYRITE ON JOINTS, UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY CLOSE JOINT SPACING, INFILLED WITH CALCITE, JOINTS DIP 70 DEG. OPEN, PLANAR, SMOOTH DISCONTINUITIES.
362.17 - 366.58	100	100% MUDSTONE: DARK GREY, WITH PEBBLY QUARTZ, UNWEATHERED, MODERATELY WEAK ROCK.
366.58 - 366.79	100	100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
366.79 - 376.35	100	100% MUDSTONE: PEBBLY, DARK GREY, WITH ROUNDED QUARTZ, UNWEATHERED, MODERATELY WEAK ROCK.
376.35 - 377.00	100	100% SANDSTONE: CONGLOMERATIC, POORLY SORTED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, WITH DISTURBED BEDDING.
377.00 - 386.21	100	100% MUDSTONE: PEBBLY, DARK GREY, WITH ROUNDED QUARTZ, UNWEATHERED, MODERATELY WEAK ROCK.

REMARKS

① DOLERITE/PERMIAN CONTACT

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PAGE 2

BOREHOLE LITHOLOGICAL LOGLEASE : AVOCA
BOREHOLE : 11 AV

DATE COMMENCED: 18/04/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

- 466.50 100 100% DOLERITE; MED.-COARSE GRAINED, GREY-GREEN,
UNWEATHERED, EXTREMELY WIDE JOINT SPACING
, OPEN, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH
CALCITE.

REMARKS

80% OF CORE IS UNJOINTED

 BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

-	16.00	85	100% DOLERITE; SCREE, GREY-GREEN, WEATHERED TO SOIL, STIFF.
16.00	- 40.20	100	100% DOLERITE; MED.-COARSE GRAINED, GREY-GREEN, HIGHLY WEATHERED, VERY STRONG ROCK, EXTREMELY WIDE JOINT SPACING, JOINTS DIP 70 DEG. ,TIGHT, PLANAR, SMOOTH DISCONTINUITIES ,INFILLED WITH CALCITE.
40.20	- 136.50	100	100% DOLERITE; MED.-COARSE GRAINED, GREY-GREEN, UNWEATHERED, VERY STRONG ROCK, EXTREMELY WIDE JOINT SPACING, JOINTS DIP 70 DEG. ,TIGHT, PLANAR, SMOOTH DISCONTINUITIES ,INFILLED WITH CALCITE.
136.50	- 158.73	100	100% DOLERITE; GRADING TO, FINE GRAINED, GREY-GREEN, MODERATELY WEATHERED, VERY STRONG ROCK, MODERATELY WIDE JOINT SPACING ,INFILLED WITH CLAY & TALC, JOINTS DIP 80 DEG. ,OPEN PLANAR, ROUGH DISCONTINUITIES ,INFILLED WITH CALCITE.
158.73	- 158.84	100	100% MUDSTONE; BAKED, BADLY BROKEN, PINK-BROWN, MODERATELY WEATHERED, WEAK ROCK.
158.84	- 160.14	100	100% MUDSTONE; BADLY BROKEN, PINK-BROWN, MODERATELY WEATHERED, WEAK ROCK.
160.14	- 160.25	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, SLIGHTLY WEATHERED, MODERATELY WEAK ROCK.
160.25	- 161.25	100	100% SANDSTONE; VERY FINE GRAINED, BADLY BROKEN, LIGHT GREY, SLIGHTLY WEATHERED, MODERATELY WEAK ROCK.
161.25	- 161.41	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
161.41	- 161.45	100	100% MUDSTONE; LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
161.45	- 161.84	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

PAGE 4

 BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

161.84 - 162.35	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
162.35 - 162.39	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
162.39 - 164.60	100	100% SANDSTONE; VERY FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
164.60 - 173.50	100	100% SANDSTONE, MEDIUM GRAINED; PINK-GREY, UNWEATHERED, MODERATELY STRONG ROCK.
173.50 - 177.44	100	100% SANDSTONE, MEDIUM GRAINED; BADLY BROKEN, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
177.44 - 174.76	100	100% MUDSTONE; LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
174.76 - 174.79	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
174.79 - 174.83	100	100% COAL, DULL;.
174.83 - 174.94	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
174.94 - 178.04	100	100% COAL, HEAVY DULL;.
178.04 - 178.21	100	100% COAL, DULL;.
178.21 - 178.55	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WHISPS.
178.55 - 178.69	100	100% COAL, DULL WITH FEW BRIGHT BANDS;.
178.69 - 180.17	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, WITH CARBONACEOUS WHISPS.
180.17 - 181.16	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
181.16 - 181.45	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
181.45 - 192.07	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

192.07 - 193.06	100	100% SANDSTONE, MEDIUM GRAINED; GREEN, UNWEATHERED, STRONG ROCK.
193.06 - 201.22	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
201.22 - 201.45	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
201.45 - 202.00	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
202.00 - 202.29	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
202.29 - 206.21	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
206.21 - 206.96	100	100% SANDSTONE; MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
206.96 - 207.95	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
207.95 - 213.26	100	100% SANDSTONE; MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
213.26 - 213.46	100	80% SANDSTONE; MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK, LAMINATED.
213.46 - 213.61	100	100% SANDSTONE; MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
213.61 - 214.74	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
214.74 - 220.06	100	100% SANDSTONE; MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
220.06 - 220.56	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WHISPS.
220.56 - 220.58	100	100% COAL, INTERBANDED DULL AND BRIGHT.
220.58 - 220.67	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP	BASE	%REC	LITHOLOGY
*** CORE DESCRIPTION ***			
220.67	- 220.75	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
220.75	- 220.86	100	100% CARBONACEOUS MUDSTONE: BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
220.86	- 221.89	100	100% SANDSTONE: VERY FINE GRAINED, BADLY BROKEN, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
221.89	- 223.19	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
223.19	- 223.30	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
223.30	- 227.90	100	100% SANDSTONE: VERY FINE GRAINED, BADLY BROKEN, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
227.90	- 228.53	100	100% SANDSTONE, MEDIUM GRAINED: BADLY BROKEN, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
228.53	- 229.98	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK.
229.98	- 230.02	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
230.02	- 230.23	100	100% MUDSTONE: CARBONACEOUS BANDS, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
230.23	- 230. ² 7	100	100% COAL, BRIGHT.
230. ² 7	- 230.31	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK.
230.31	- 230.35	100	100% COAL, DULL WITH FEW BRIGHT BANDS.
230.35	- 230.45	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
230.45	- 230.62	100	100% COAL, DULL: MUDSTONE LENSES.
230.62	- 230.67	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
230.67	- 230.75	100	100% COAL, DULL WITH FEW BRIGHT BANDS.
230.75	- 232.00	100	100% SANDSTONE: VERY FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

PAGE 7

BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

232.00	- 237.03	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
237.03	- 237.60	100	100% COAL, DULL WITH FEW BRIGHT BANDS.
237.60	- 237.62	100	100% SANDSTONE, MEDIUM GRAINED: BLACK, UNWEATHERED, STRONG ROCK.
237.62	- 237.64	100	100% COAL, DULL.
237.64	- 237.65	100	100% SANDSTONE, MEDIUM GRAINED: BLACK, UNWEATHERED, STRONG ROCK.
237.65	- 237.72	100	100% COAL, DULL.
237.72	- 237.76	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
237.76	- 238.62	100	100% SANDSTONE, FINE GRAINED: GREY, UNWEATHERED, MODERATELY STRONG ROCK.
238.62	- 240.23	100	100% SANDSTONE: VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
240.23	- 240.82	100	100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, UNWEATHERED, STRONG ROCK.
240.82	- 241.50	100	100% SANDSTONE, FINE GRAINED: GRADING TO, MEDIUM GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
241.50	- 247.50	100	100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, UNWEATHERED, STRONG ROCK.
247.50	- 247.73	100	100% CLAY: BROWN, UNWEATHERED, WEAK ROCK.
247.73	- 248.32	100	100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, UNWEATHERED, STRONG ROCK.
248.32	- 248.39	100	100% CARBONACEOUS MUDSTONE: BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
248.39	- 248.50	100	100% SANDSTONE, FINE GRAINED: BADLY BROKEN, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
248.50	- 249.85	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP	BASE	%REC	LITHOLOGY
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*** CORE DESCRIPTION ***

249.85 - 250.49	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
250.49 - 250.75	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS BANDS, BLACK, UNWEATHERED, STRONG ROCK.
250.75 - 250.94	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
250.94 - 252.31	100	65% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING, WITH CARBONACEOUS WHISPS.
252.31 - 252.45	100	100% MUDSTONE; CARBONACEOUS BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
252.45 - 252.61	100	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS.
252.61 - 257.05	100	60% SANDSTONE; VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
257.05 - 257.50	100	50% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
257.50 - 258.32	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
258.32 - 258.81	100	100% SANDSTONE, FINE GRAINED; DARK GREY, UNWEATHERED, MODERATELY STRONG ROCK.
258.81 - 259.07	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
259.07 - 260.26	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
260.26 - 260.78	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
260.78 - 260.82	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
260.82 - 262.00	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
262.00 - 265.33	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

265.33	- 265.50	100	100% COAL, DULL.
265.50	- 268.31	100	100% SANDSTONE, FINE GRAINED: LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, WITH CARBONACEOUS WHISPS, LAMINATED.
268.31	- 268.58	100	100% CARBONACEOUS MUDSTONE: BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY STRONG ROCK.
268.58	- 268.76	100	MUDSTONE: BROWN, UNWEATHERED, VERY WEAK ROCK.
268.76	- 269.06	100	100% COAL, DULL WITH FEW BRIGHT BANDS: BADLY BROKEN.
269.06	- 270.55	100	100% SANDSTONE: VERY FINE GRAINED, BADLY BROKEN, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
270.55	- 270.80	100	100% COAL, DULL: COARSE GRAINED BANDS, BLACK.
270.80	- 271.21	100	100% MUDSTONE: GREY-BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
271.21	- 271.53	100	100% MUDSTONE: GREY-BROWN, WITH ABUNDANT CALCITE, UNWEATHERED, MODERATELY WEAK ROCK.
271.53	- 271.73	100	100% MUDSTONE: GREY-BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
271.73	- 272.91	100	100% SANDSTONE, FINE GRAINED: DARK GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
272.91	- 274.08	100	100% SANDSTONE, MEDIUM GRAINED: FINE GRAINED SANDSTONE LENSES, GREY, UNWEATHERED, STRONG ROCK.
274.08	- 275.00	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
275.00	- 275.03	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
275.03	- 277.12	100	100% SANDSTONE, FINE GRAINED: GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
277.12	- 277.27	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
277.27	- 277.47	100	100% SANDSTONE: MED. TO FINE GRAINED, GREY, UNWEATHERED, STRONG ROCK, LAMINATED AND DISTURBED BEDDING.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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BOREHOLE LITHOLOGICAL LOG

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DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

277.74	- 277.80	100	100% SANDSTONE, FINE GRAINED; CARBONACEOUS, BLACK, UNWEATHERED, STRONG ROCK.
277.80	- 278.04	15	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
278.04	- 283.94	100	100% SANDSTONE, FINE GRAINED; MEDIUM GRAINED BANDS, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED AND DISTURBED BEDDING.
*	-	*	*SEE PILOT HOLE.
283.94	- 284.11	100	100% CARBONACEOUS MUDSTONE; COALY LENSES, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
284.11	- 285.90	100	100% SANDSTONE, FINE GRAINED; MEDIUM GRAINED BANDS, GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED AND DISTURBED BEDDING.
285.90	- 286.26	100	100% SANDSTONE; VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
286.26	- 286.91	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
286.91	- 287.00	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
287.00	- 287.56	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
287.56	- 288.98	100	100% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY WEAK ROCK, LAMINATED.
288.98	- 289.52	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
289.52	- 290.03	100	100% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
290.03	- 290.40	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
290.40	- 291.72	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

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BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC LITHOLOGY

*** CORE DESCRIPTION ***

291.72 - 292.86	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS, BLACK, UNWEATHERED, MODERATELY STRONG ROCK.
292.86 - 292.96	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
292.96 - 292.99	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS, BLACK, UNWEATHERED, STRONG ROCK.
292.99 - 293.24	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH BURROWING.
293.24 - 293.76	100	100% SANDSTONE; MED. TO FINE GRAINED, GREY, UNWEATHERED, STRONG ROCK, WITH BURROWING, LAMINATED.
293.76 - 294.17	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
294.17 - 294.73	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
294.73 - 296.68	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, 50% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING, LAMINATED.
296.68 - 296.97	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
296.97 - 297.43	100	100% SANDSTONE; VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
297.43 - 298.11	100	100% MUDSTONE; DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK, LAMINATED.
298.11 - 298.47	100	100% CARBONACEOUS MUDSTONE; COALY LENSES, BLUE - GREY, UNWEATHERED, MODERATELY WEAK ROCK.
298.47 - 298.84	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS BANDS, BROWN - BLACK, UNWEATHERED, STRONG ROCK, WITH BURROWING.
298.84 - 299.41	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
299.41 - 299.97	100	100% SANDSTONE, FINE GRAINED; GRADING TO, MUDSTONE, DARK GREY, UNWEATHERED, MODERATELY STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.
 BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

299.97 - 300.02	100	100% MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK, WITH MUD PELLETS.
300.02 - 300.20	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
300.20 - 300.77	100	100% MUDSTONE: COALY, FRAGMENTS, BROWN, UNWEATHERED, MODERATELY WEAK ROCK, WITH MUD PELLETS.
300.77 - 300.88	100	100% COAL, INTERBANDED DULL AND BRIGHT, UNWEATHERED.
300.88 - 300.92	100	100% CARBONACEOUS MUDSTONE: COALY LENSES, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
300.92 - 301.82	100	100% MUDSTONE: BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
301.82 - 303.04	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
303.04 - 303.27	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
303.27 - 304.50	100	100% SANDSTONE, FINE GRAINED: MEDIUM GRAINED BANDS, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
304.50 - 304.54	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
304.54 - 306.80	100	50% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, 50% SANDSTONE, FINE GRAINED, GREY, UNWEATHERED, MODERATELY STRONG ROCK, MODERATELY THIN BEDDING, LAMINATED.
306.80 - 309.66	100	70% SANDSTONE: VERY FINE GRAINED, DARK GREY, 30% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, VERY THIN BEDDING, LAMINATED.
309.66 - 309.81	100	100% SANDSTONE, FINE GRAINED: CARBONACEOUS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
309.81 - 310.60	100	100% SANDSTONE, FINE GRAINED: GREY, UNWEATHERED, MODERATELY STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

310.60 - 311.47	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
311.47 - 313.50	100	100% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY WEAK ROCK, LAMINATED AND CARBONACEOUS WHISPS.
313.50 - 315.23	100	50% SANDSTONE, FINE GRAINED; GREY, 50% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, VERY THIN BEDDING, LAMINATED AND CARBONACEOUS WHISPS.
315.23 - 315.91	100	100% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
315.91 - 316.74	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, WITH DISTURBED BEDDING.
316.74 - 319.57	100	100% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
319.57 - 321.71	100	100% SANDSTONE, FINE GRAINED; MEDIUM GRAINED LENSES, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
321.71 - 324.62	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS, BLACK, UNWEATHERED, STRONG ROCK, THIN BEDDING, WITH DISTURBED BEDDING.
324.62 - 325.23	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
325.23 - 325.41	100	100% MUDSTONE; COALY BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
325.41 - 325.70	100	100% SANDSTONE, MEDIUM GRAINED; CREAM, UNWEATHERED, STRONG ROCK.
325.70 - 325.85	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
325.85 - 326.10	100	100% SANDSTONE, MEDIUM GRAINED; CREAM, UNWEATHERED, STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

326.10 - 326.22	100	100% SANDSTONE, MEDIUM GRAINED; GRADING TO, CARBONACEOUS, CREAM, UNWEATHERED, MODERATELY STRONG ROCK.
326.22 - 326.50	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
326.50 - 326.68	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
326.68 - 326.80	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED.
326.80 - 327.27	100	100% MUDSTONE; CARBONACEOUS BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
327.27 - 327.47	100	100% COAL, HEAVY DULL; UNWEATHERED.
327.47 - 327.49	100	100% SANDSTONE, FINE GRAINED; CREAM, UNWEATHERED, MODERATELY STRONG ROCK.
327.49 - 327.68	100	100% COAL, DULL; UNWEATHERED.
327.68 - 327.73	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS LENSES, CREAM, UNWEATHERED, STRONG ROCK.
327.73 - 327.79	100	100% CARBONACEOUS MUDSTONE; ARENACEOUS LENSES, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
327.79 - 327.87	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
327.87 - 327.95	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
327.95 - 328.45	100	100% SANDSTONE, MEDIUM GRAINED; CARBONACEOUS BANDS, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WHISPS.
328.45 - 330.22	100	100% SANDSTONE, MEDIUM GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK.
330.32 - 333.10	100	70% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, 30% SANDSTONE, MEDIUM GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN REDDING, LAMINATED AND CARBONACEOUS WHISPS.

 BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

333.10 - 333.69	100	100% SANDSTONE, MEDIUM GRAINED; COALY, FRIABLE, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
333.69 - 335.27	100	100% MUDSTONE; ARENACEOUS BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
335.54 - 335.54	100	100% SANDSTONE, MEDIUM GRAINED; MUDSTONE LENSES, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
335.54 - 335.92	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
335.92 - 337.33	100	100% SANDSTONE, MEDIUM GRAINED; FINE GRAINED SANDSTONE LAMINAE, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
337.33 - 337.52	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
337.52 - 339.62	100	70% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, 30% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK, MODERATELY THIN BEDDING.
339.62 - 340.46	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
340.46 - 340.57	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
340.57 - 343.20	100	100% SANDSTONE, MEDIUM GRAINED; FINE GRAINED SANDSTONE BANDS, LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS.
343.20 - 344.88	100	100% SANDSTONE, FINE GRAINED; MEDIUM GRAINED BANDS, GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING.
344.88 - 352.21	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, VERY THICK BEDDING.
352.21 - 353.34	100	100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, WITH CARBONACEOUS WHISPS.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

353.34 - 354.12	100	100% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
354.12 - 354.20	100	100% SANDSTONE, MEDIUM GRAINED: CARBONACEOUS, BLACK, UNWEATHERED, STRONG ROCK.
354.20 - 355.06	100	100% SANDSTONE, FINE GRAINED: MEDIUM GRAINED LENSES, GREY-BROWN, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED AND BURROWING.
355.06 - 355.23	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK.
355.23 - 355.31	100	100% SANDSTONE: MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK, WITH POOR SORTING.
355.31 - 355.67	40	50% CARBONACEOUS MUDSTONE: BADLY BROKEN, BLACK, 50% SANDSTONE, MEDIUM GRAINED: CARBONACEOUS, BLACK, UNWEATHERED, WEAK ROCK, TIGHT PLANAR, ROUGH DISCONTINUITIES WITH SLICKENSIDES.
355.67 - 356.00	100	100% SANDSTONE: MED. TO FINE GRAINED, CARBONACEOUS, BLACK, UNWEATHERED, MODERATELY STRONG ROCK.
356.00 - 357.12	100	100% SANDSTONE, MEDIUM GRAINED: WHITE, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS AND BURROWING.
357.12 - 357.19	100	100% SANDSTONE, MEDIUM GRAINED: CARBONACEOUS, GREY, UNWEATHERED, STRONG ROCK.
357.19 - 357.26	100	100% SANDSTONE, MEDIUM GRAINED: CARBONACEOUS STREAKS, WHITE, UNWEATHERED, STRONG ROCK.
357.26 - 357.29	100	100% SANDSTONE, MEDIUM GRAINED: CARBONACEOUS, GREY, UNWEATHERED, STRONG ROCK.
357.29 - 358.56	100	100% SANDSTONE, MEDIUM GRAINED: WHITE, UNWEATHERED, STRONG ROCK, WITH CARBONACEOUS WHISPS AND BURROWING.
358.56 - 359.35	100	100% SANDSTONE, FINE GRAINED: GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING.
359.35 - 359.43	100	100% SANDSTONE, MEDIUM GRAINED: CREAM, UNWEATHERED, STRONG ROCK, WITH GRADED BEDDING AND CARBONACEOUS WHISPS.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

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TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

367.13 - 367.20	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
367.20 - 367.62	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
367.62 - 367.67	100	100% MUDSTONE; LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
367.67 - 368.33	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
368.33 - 368.42	100	100% SANDSTONE; VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
368.42 - 368.52	100	100% CARBONACEOUS MUDSTONE; BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
368.52 - 368.79	100	100% MUDSTONE; DARK GREEN, UNWEATHERED, MODERATELY WEAK ROCK.
368.79 - 369.57	100	100% MUDSTONE; GREY-GREEN, UNWEATHERED, MODERATELY WEAK ROCK.
368.57 - 369.69	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
369.69 - 370.31	100	100% SANDSTONE; MED.-COARSE GRAINED, GREEN-BROWN, UNWEATHERED, STRONG ROCK.
370.31 - 370.73	100	100% MUDSTONE; LIGHT GREEN, UNWEATHERED, MODERATELY WEAK ROCK.
370.73 - 370.90	100	100% MUDSTONE; LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
370.90 - 371.05	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.
371.50 - 371.50	100	100% SANDSTONE; VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY STRONG ROCK.
371.85 - 371.85	100	100% SANDSTONE; VERY FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
372.96 - 372.96	100	100% MUDSTONE; GREY, UNWEATHERED, MODERATELY WEAK ROCK.

 BOREHOLE LITHOLOGICAL LOG

LEASE : AVUCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP	BASE	%REC	LITHOLOGY
*** CORE DESCRIPTION ***			
372.96	373.26	100	100% MUDSTONE: GREY-GREEN, WITH GRANULAR PYRITE, UNWEATHERED, MODERATELY WEAK ROCK.
373.26	373.44	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
373.44	373.75	100	100% CARBONACEOUS MUDSTONE: BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
373.75	376.06	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK.
376.06	376.30	100	50% SANDSTONE: VERY FINE GRAINED, GREY, 50% MUDSTONE: GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING, BEDS DIP 0 DEG..
376.30	376.64	100	100% MUDSTONE: LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
376.64	377.78	100	100% MUDSTONE: GREY-GREEN, UNWEATHERED, MODERATELY WEAK ROCK.
377.78	378.37	100	100% SANDSTONE, FINE GRAINED: LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
378.37	378.50	100	100% SANDSTONE, MEDIUM GRAINED: CREAM, UNWEATHERED, STRONG ROCK.
378.50	378.64	100	100% SANDSTONE, FINE GRAINED: LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
378.64	378.89	100	85% MUDSTONE: GREY, 15% SANDSTONE, MEDIUM GRAINED: MUDSTONE, PEBBLY, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
378.89	379.40	100	100% SANDSTONE: VERY FINE GRAINED, GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING, BEDS DIP 0 DEG., LAMINATED AND DISTURBED BEDDING.
379.40	380.74	100	95% SANDSTONE, FINE GRAINED: DARK GREY, 5% SANDSTONE, FINE GRAINED: LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, LAMINATED AND DISTURBED BEDDING.

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THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL LOG

LEASE BOREHOLE : AVUCA AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

380.74 - 380.84	100	100% SANDSTONE, MEDIUM GRAINED; MUDSTONE BANDS, LIGHT GREY, UNWEATHERED, STRONG ROCK.
380.84 - 381.15	100	100% SANDSTONE: MED.-COARSE GRAINED, LIGHT GREY, UNWEATHERED, STRONG ROCK.
381.15 - 386.01	100	100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
386.01 - 386.08	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
386.08 - 386.17	100	100% MUDSTONE: BRECCIATED, GREY, UNWEATHERED, WEAK ROCK.
386.17 - 386.21	100	100% SANDSTONE: VERY COARSE GRAINED, WHITE, WITH CRYSTALLINE QUARTZ, UNWEATHERED, MODERATELY WEAK ROCK.
386.21 - 389.68	100	100% SANDSTONE, MEDIUM GRAINED; BADLY BROKEN, WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
389.68 - 392.11	100	100% MUDSTONE: BRECCIATED, BADLY BROKEN, GREY, UNWEATHERED, WEAK ROCK.
392.11 - 398.90	100	100% SANDSTONE, MEDIUM GRAINED; BADLY BROKEN, CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
398.90 - 401.52	100	100% SANDSTONE, MEDIUM GRAINED; BADLY BROKEN, CREAM, UNWEATHERED, MODERATELY WEAK ROCK, VERY THIN BEDDING, BEDS DIP 40 DEG..
401.52 - 402.80	100	100% MUDSTONE: BRECCIATED, BADLY BROKEN, RED-GREY, UNWEATHERED, WEAK ROCK.
402.80 - 403.90	100	100% SANDSTONE: MED. TO FINE GRAINED, BADLY BROKEN, CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
403.90 - 405.08	100	100% SANDSTONE: MED. TO FINE GRAINED, BADLY BROKEN, CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
405.08 - 407.98	100	100% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING, BEDS DIP 0 DEG..

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE REC

LITHOLOGY

*** CORE DESCRIPTION ***

407.98 - 411.63	100	100% SANDSTONE, MEDIUM GRAINED; MUDSTONE STREAKS, LIGHT GREY, UNWEATHERED, STRONG ROCK.
411.63 - 412.62	100	100% MUDSTONE; GREY-GREEN, UNWEATHERED, MODERATELY WEAK ROCK.
412.62 - 413.24	100	100% SANDSTONE, FINE GRAINED; GREY-GREEN, UNWEATHERED, MODERATELY STRONG ROCK.
413.24 - 416.30	100	90% SANDSTONE, MEDIUM GRAINED; CREAM, 10% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, STRONG ROCK, MODERATELY THIN BEDDING.
416.30 - 416.69	100	100% SANDSTONE, FINE GRAINED; GREY, UNWEATHERED, MODERATELY STRONG ROCK.
416.69 - 420.70	100	100% SANDSTONE; MED.-COARSE GRAINED, CREAM, UNWEATHERED, STRONG ROCK.
420.70 - 421.67	100	100% SANDSTONE, FINE GRAINED; LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK, THIN BEDDING.
421.67 - 425.50	100	100% SANDSTONE, COARSE GRAINED; LIGHT GREY, UNWEATHERED, STRONG ROCK.
425.50 - 434.43	100	100% SANDSTONE; MED. TO FINE GRAINED, QUARTZOSE, LIGHT GREY, WITH ABUNDANT MICA, UNWEATHERED, STRONG ROCK.
434.43 - 434.45	100	100% MUDSTONE; GREY-GREEN, UNWEATHERED, MODERATELY WEAK ROCK.
434.45 - 439.04	100	100% SANDSTONE, MEDIUM GRAINED; QUARTZOSE, LIGHT GREEN, UNWEATHERED, STRONG ROCK.
439.04 - 439.36	100	50% SANDSTONE, MEDIUM GRAINED; QUARTZOSE, LIGHT GREEN. 50% MUDSTONE; GREY-GREEN, UNWEATHERED, STRONG ROCK, MODERATELY THIN BEDDING, DEFORMED BASAL CONTACT, WITH DISTURBED BEDDING.
439.36 - 440.53	100	100% SANDSTONE, MEDIUM GRAINED; QUARTZOSE, LIGHT GREEN, UNWEATHERED, STRONG ROCK, MODERATELY THIN BEDDING, DEFORMED BASAL CONTACT.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

 TOP BASE %REC

LITHOLOGY

 *** CORE DESCRIPTION ***

440.53 - 440.81	100	100% SANDSTONE, FINE GRAINED: GREY-GREEN, UNWEATHERED, MODERATELY STRONG ROCK.
440.81 - 449.90	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, LIGHT GREEN, UNWEATHERED, STRONG ROCK.
449.90 - 450.07	100	100% MUDSTONE: SANDSTONE BANDS, GREY-GREEN, WITH ABUNDANT MICA, UNWEATHERED, MODERATELY STRONG ROCK.
450.07 - 450.20	100	100% SANDSTONE, MEDIUM GRAINED: MUDSTONE BANDS, LIGHT GREEN, UNWEATHERED, STRONG ROCK.
450.20 - 450.29	100	100% MUDSTONE: GREY-GREEN, UNWEATHERED, MODERATELY STRONG ROCK.
450.29 - 450.86	100	50% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, LIGHT GREEN. 50% MUDSTONE: PEBBLY, GREY-GREEN, UNWEATHERED, STRONG ROCK.
450.86 - 454.21	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, WITH ABUNDANT MICA, UNWEATHERED, STRONG ROCK.
454.21 - 454.54	100	100% SANDSTONE, FINE GRAINED: LIGHT GREEN, UNWEATHERED, STRONG ROCK.
454.54 - 467.16	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, WITH ABUNDANT MICA, UNWEATHERED, STRONG ROCK.
467.16 - 467.32	100	100% SANDSTONE: MED.-COARSE GRAINED, QUARTZOSE, BROWN, UNWEATHERED, VERY STRONG ROCK.
467.32 - 467.73	100	60% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, 40% MUDSTONE: PEBBLY, GREY, UNWEATHERED, STRONG ROCK.
467.73 - 467.87	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, UNWEATHERED, STRONG ROCK.
467.87 - 467.91	100	100% MUDSTONE: GREY, UNWEATHERED, MODERATELY WEAK ROCK.
467.91 - 476.48	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, WITH ABUNDANT MICA, UNWEATHERED, STRONG ROCK.
476.48 - 476.52	100	100% MUDSTONE: BROWN, UNWEATHERED, MODERATELY WEAK ROCK.

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BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : AV 12

DATE COMMENCED: 14/05/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

476.52 - 476.94	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, UNWEATHERED, STRONG ROCK.
476.94 - 478.81	100	100% SANDSTONE, COARSE GRAINED: QUARTZOSE, CREAM, WITH PYRITE ON FRACTURES AND ABUNDANT MICA, UNWEATHERED, VERY STRONG ROCK.
478.81 - 480.53	100	100% SANDSTONE: MED. TO FINE GRAINED, CREAM, UNWEATHERED, STRONG ROCK.
480.53 - 481.89	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, UNWEATHERED, STRONG ROCK.
481.89 - 482.14	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY STRONG ROCK.
482.14 - 482.46	100	100% SANDSTONE, MEDIUM GRAINED: QUARTZOSE, CREAM, UNWEATHERED, STRONG ROCK.
482.46 - 482.73	100	100% SANDSTONE, COARSE GRAINED: QUARTZOSE, CREAM, WITH ABUNDANT MICA, UNWEATHERED, VERY STRONG ROCK.
482.73 - 483.00	100	100% PEBBLE CONGLOMERATE: MUDSTONE, PEBBLY, CREAM, WITH GRANULAR FELDSPAR, UNWEATHERED, STRONG ROCK.
483.00 - 483.34	100	100% MUDSTONE: DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
483.34 - 490.33	100	100% SANDSTONE, FINE GRAINED: FOSSILIFEROUS, GREY, WITH GRANULAR QUARTZ AND DOLOMITE ON JOINTS, UNWEATHERED, STRONG ROCK.

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BOREHOLE LITHOLOGICAL LOG

LEASE 1 AVCCA
BOREHOLE 1 13 AV

DATE COMMENCED: 01/07/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

-	1.50	0	① CORE LOSS.
*	*		*SEE PILOT HOLE.
1.50	22.50	100	100% DIORITE; MED.-COARSE GRAINED, GREY-GREEN, SLIGHTLY WEATHERED, VERY STRONG ROCK, EXTREMELY WIDE JOINT SPACING, INFILLED WITH CALCITE, OPEN, NON-PLANAR DISCONTINUITIES, INFILLED WITH CLAY & TALC.
22.50	277.50		② 100% DIORITE; MED.-COARSE GRAINED, GREY-GREEN, UNWEATHERED, VERY STRONG ROCK, EXTREMELY WIDE JOINT SPACING. JOINTS DIP 80 DEG., TIGHT NON-PLANAR DISCONTINUITIES, INFILLED WITH CALCITE.
277.50	289.50		③ 100% DIORITE; GRADING TO, MEDIUM GRAINED, GREY-GREEN, VERY STRONG ROCK.
289.50	298.50		100% DIORITE; GRADING TO, FINE GRAINED, GREY-GREEN, VERY STRONG ROCK.
298.50	306.89		100% DIORITE; FINE GRAINED, GREY-GREEN, VERY STRONG ROCK.
306.89	307.46		100% DIORITE; VERY FINE GRAINED, GREY-GREEN, VERY STRONG ROCK.
307.46	307.50		④ 100% MUDSTONE; BAKED, GREY, VERY STRONG ROCK.
307.50	307.60		100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, STRONG ROCK.
307.60	307.81		100% MUDSTONE; LIGHT GREY, MODERATELY WEAK ROCK.
307.81	308.60		100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, STRONG ROCK.
308.60	308.65		100% MUDSTONE; LIGHT GREY, MODERATELY WEAK ROCK.
308.65	311.49		100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, STRONG ROCK.
311.49	311.98		100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, STRONG ROCK.
311.98	316.21		100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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 BOREHOLE LITHOLOGICAL LOG

LEASE 1 AVOCA
BOREHOLE 13 AV

DATE COMMENCED: 01/07/80

DEPTH UNIT: M

TOP	BASE	%REC	LITHOLOGY
*** CORE DESCRIPTION ***			
316.21	317.01		50% SANDSTONE: MED. TO FINE GRAINED, PEBBLY, LIGHT GREY, 50% MUDSTONE: PINK, STRONG ROCK.
317.01	318.14		100% MUDSTONE: PINK, MODERATELY STRONG ROCK, MODERATELY THIN BEDDING.
318.14	320.12		100% SANDSTONE: MED. TO FINE GRAINED, PINK, MODERATELY STRONG ROCK.
320.12	320.42		100% MUDSTONE: PINK-GREY, MODERATELY WEAK ROCK.
320.42	320.88		100% SANDSTONE: MED. TO FINE GRAINED, PINK, MODERATELY STRONG ROCK.
320.88	322.50		100% MUDSTONE: GREEN-BROWN, MODERATELY WEAK ROCK.
322.50	322.65		100% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, STRONG ROCK.
322.65	322.80	0	CORE LOSS.
322.80	323.54	100	100% MUDSTONE: BROWN, COMPLETELY WEATHERED, VERY WEAK ROCK.
323.54	324.15		100% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY STRONG ROCK.
324.15	324.50	0	CORE LOSS.
324.50	324.93	100	100% MUDSTONE: BADLY BROKEN, LIGHT GREY, MODERATELY WEAK ROCK.
324.93	326.10	0	CORE LOSS.
326.10	326.15	100	100% MUDSTONE: BADLY BROKEN, GREY-GREEN, WEAK ROCK.
326.15	326.50		MUDSTONE: PINK-BROWN, MODERATELY WEAK ROCK.
326.50	326.61		100% MUDSTONE: GREEN-BROWN, MODERATELY WEAK ROCK.
326.61	326.85		100% MUDSTONE: PINK-BROWN, MODERATELY WEAK ROCK.
326.85	327.04		100% MUDSTONE: GREEN-BROWN, WITH VIVIANITE, MODERATELY STRONG ROCK.
327.04	327.40		100% MUDSTONE: PINK-BROWN, WITH VIVIANITE, MODERATELY STRONG ROCK.
327.40	327.50		90% MUDSTONE: BADLY BROKEN, LIGHT GREY, 10% MUDSTONE: WAXY, FRAGMENTS, WHITE, WITH VIVIANITE, MODERATELY WEAK ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : 13 AV

DATE COMMENCED: 01/07/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

TOP	BASE	%REC	LITHOLOGY
327.50	327.60		100% CLAY: GREY, STIFF.
327.60	328.35	60	100% MUDSTONE: BADLY BROKEN, LIGHT GREY, MODERATELY WEAK ROCK.
328.35	329.50	0	CORE LOSS.
329.50	329.91	100	100% MUDSTONE: LIGHT GREY, MODERATELY WEAK ROCK.
329.91	330.23		100% SANDSTONE, FINE GRAINED: LIGHT GREY, MODERATELY STRONG ROCK.
330.23	330.32		100% CLAY: LIGHT GREY, STIFF.
330.32	330.61	0	CORE LOSS.
330.61	330.70	100	100% MUDSTONE: BADLY BROKEN, LIGHT GREY, MODERATELY STRONG ROCK.
330.70	332.18		100% MUDSTONE: CHLORITIC, GREY-GREEN, MODERATELY STRONG ROCK.
332.18	334.00		100% SANDSTONE, FINE GRAINED: LIGHT GREY, STRONG ROCK.
334.00	334.43		100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, STRONG ROCK.
334.43	337.97		100% SANDSTONE, FINE GRAINED: LAMINAE, LIGHT GREY, STRONG ROCK.
337.97	339.09		100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, MODERATELY STRONG ROCK.
339.09	339.49		60% MUDSTONE: PEBBLY, POORLY SORTED, GREY, 40% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, MODERATELY STRONG ROCK.
339.49	340.17		100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, STRONG ROCK.
340.17	340.61		50% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, 50% SANDSTONE, FINE GRAINED, MODERATELY STRONG ROCK.
340.61	344.56		100% SANDSTONE, MEDIUM GRAINED: LIGHT GREY, STRONG ROCK, WITH CARBONACEOUS WHISPS.
344.56	345.19		100% MUDSTONE: GREY, MODERATELY STRONG ROCK.
345.19	346.17		100% SANDSTONE, FINE GRAINED: GREY, STRONG ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.
 BOREHOLE LITHOLOGICAL LOG

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LEASE : AVOCA
 BOREHOLE : 13 AV

DATE COMMENCED: 01/07/80

DEPTH UNIT: M

TOP	BASE	%REC	LITHOLOGY
*** CORE DESCRIPTION ***			
346.17	346.99		100% MUDSTONE: GREY, MODERATELY STRONG ROCK.
346.99	347.08		100% CARBONACEOUS MUDSTONE: BLACK, MODERATELY STRONG ROCK.
347.08	348.96		100% SANDSTONE, FINE GRAINED: GREY, WITH TRACES OF PYRITE, MODERATELY STRONG ROCK.
348.96	349.73		50% SANDSTONE, FINE GRAINED: GREY, 50% SANDSTONE, FINE GRAINED: CARBONACEOUS, BLACK, WITH TRACES OF PYRITE, MODERATELY STRONG ROCK.
349.73	349.86		100% SANDSTONE, FINE GRAINED: GREY, STRONG ROCK.
349.86	350.07		100% MUDSTONE: CARBONACEOUS TRACES, GREY, MODERATELY WEAK ROCK.
350.07	350.49		50% SANDSTONE, FINE GRAINED: LIGHT GREY, 50% MUDSTONE: DARK GREY, MODERATELY STRONG ROCK, THIN BEDDING, WITH DISTURBED BEDDING.
350.49	350.98		100% MUDSTONE: FINE GRAINED SANDSTONE LENSES, DARK GREY, MODERATELY WEAK ROCK.
350.98	351.27		100% MUDSTONE: DARK GREY, VERY WEAK ROCK.
351.27	351.28		100% CARBONACEOUS MUDSTONE: ARENACEOUS LENSES, BLACK, MODERATELY WEAK ROCK.
351.28	351.35		100% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, MODERATELY STRONG ROCK, WITH CARBONACEOUS WHISPS.
351.35	351.44		100% SANDSTONE, FINE GRAINED: GREY.
351.44	351.97		55% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, 45% MUDSTONE: GREY, THIN BEDDING, WITH TROUGH CROSS BEDDING.
351.97	352.07		100% SANDSTONE, FINE GRAINED: GREY.
352.07	352.19		100% SANDSTONE: MED. TO FINE GRAINED, LIGHT GREY, MODERATELY STRONG ROCK, WITH CARBONACEOUS WHISPS.
352.19	352.36		100% MUDSTONE: FINE GRAINED SANDSTONE LAMINAE, GREY.
352.36	352.48		100% SANDSTONE: VERY FINE GRAINED, CARBONACEOUS, BLACK.
352.48	353.49		100% MUDSTONE: GREY, MODERATELY WEAK ROCK.

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THE SHELL COMPANY OF AUSTRALIA LTD.

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BOREHOLE LITHOLOGICAL LOG

LEASE : AVOCA
BOREHOLE : 13 AV

DATE COMMENCED: 01/07/80

DEPTH UNIT: M

TOP BASE %REC

LITHOLOGY

*** CORE DESCRIPTION ***

353.49 - 355.67	100	65% MUDSTONE; FINE GRAINED SANDSTONE LAMINAE, GREY, 35% SANDSTONE, FINE GRAINED; LIGHT GREY, STRONG ROCK, MODERATELY THICK BEDDING, WITH TROUGH CROSS BEDDING.
355.67 - 356.44		100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, STRONG ROCK, WITH CARBONACEOUS WHISPS.
356.44 - 356.49		100% SANDSTONE, FINE GRAINED; GREY, STRONG ROCK.
356.49 - 356.59		100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, STRONG ROCK.
356.59 - 356.69		100% MUDSTONE; FINE GRAINED SANDSTONE LAMINAE, GREY, STRONG ROCK.
356.69 - 356.76		100% SANDSTONE; MED. TO FINE GRAINED, LIGHT GREY, STRONG ROCK, WITH TROUGH CROSS BEDDING.
356.76 - 356.97		100% SANDSTONE; VERY FINE GRAINED, GREY, STRONG ROCK.
356.97 - 357.19		100% SANDSTONE, FINE GRAINED; LIGHT GREY, STRONG ROCK, WITH TROUGH CROSS BEDDING.
357.19 - 358.59		100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, VERY STRONG ROCK.
358.59 - 359.42		100% SANDSTONE, FINE GRAINED; QUARTZOSE, BADLY BROKEN, LIGHT GREY, VERY STRONG ROCK.
359.42 - 359.70		100% SANDSTONE, MEDIUM GRAINED; LIGHT GREY, VERY STRONG ROCK.

REMARKS

- ① SOIL COVER
- ② JOINT DIP IRREGULAR, NORMALLY >70 DEGREES
- ③ REDUCE TO NQ AT 201.00METRE. JOINTS AS ABOVE
- ④ SUB-OPHTIC TEXTURE