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REPORT ON GEOLOGICAL
MAPPING IN THE DOUGLAS
AND DENISON VALLEYS
EL 5/61, GRAY

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REPORT ON GEOLOGICAL MAPPING IN THE DOUGLAS

AND DENISON VALLEYS, EL 5/61 GRAY

by P.W.SANSOM

Hobart,
October, 1979

ABSTRACT

A field mapping programme was undertaken in part of EL 5/61 (Gray) during July and August, 1979.

Overlying Permian marine sediments is a sequence of Upper Triassic fluviatile and lacustrine carbonaceous sandstones, mudstones and coal seams, at least 300 metres thick.

In Jurassic times dolerite intruded the Triassic sequence in the form of dykes and sheets, resulting in both transgressive and concordant contacts with the Triassic rocks.

The Triassic is exposed mainly in creek and river valleys; elsewhere the dolerite capping and scree derived from the dolerite forms an extensive cover obscuring the Triassic coal measures. The restricted exposure and lack of marker beds within the Triassic prevents correlation of many of the outcrops and the position of, and amount of, displacement on the numerous faults that are inferred to be present in the area.

Several coal seams of varying thickness and quality are present but until complete stratigraphic sections from boreholes are obtained, only tentative correlation can be made with the seams in the Dalmayne area.

Several recommendations are made regarding both the proposed drilling program and further ground work.

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1.3 METHODS USED IN THE INVESTIGATION

Mapping at a scale of 1:20000 commenced following study of aerial photographs, previous maps and reports on the area.

The major constraint on the accurate mapping of geological boundaries is the dolerite scree which, apart from the coastal plain, river and creek beds, forms an extensive cover over almost the entire area.

As geophysical methods were not used in this investigation, the location of the dolerite/Triassic contact is generally not known accurately. However an inferred boundary has been drawn from aerial photograph interpretation (Encl.1) . Only faults for which there is reasonable evidence have been shown on the map. Numerous lineations have been noted on the air photographs. All of these have been recognised by Layton and Associates in their fracture study of the area which used both aerial photographs and Landsat imagery. Verification in the field of these lineations as representing faults was undertaken with limited success.

2. GEOLOGY OF THE AREA

2.1 STRATIGRAPHY

Within the east coast region, Permian marine sediments lie unconformably on a granite or Mathinna Beds basement. Overlying the Permian are freshwater sandstones, mudstones and coals of Triassic age which have been intruded by Jurassic dolerite.

Permian

No Permian sediments were observed to outcrop in the area mapped, but to the north of Seymour recent mapping by the Mines Department indicates that Permian sediments dipping gently in a general southerly direction are overlain, probably disconformably, by Triassic sandstones. From the dip of the Permian it can be expected that the Permian occurs subsurface within the area mapped, and this is confirmed by the presence of Permian sediments in Seymour Borehole 4 and Mines Department Boreholes 5 and 10 (Encl. 2,3)

In Borehole 5 about 265 metres of fossiliferous siltstones with limestone, sandstone and conglomerate horizons were recorded. In the remaining boreholes at least 165 metres of similar sediments are present.

Triassic

Disconformably overlying the Permian sediments are Triassic coal measures consisting of quartz sandstones, lithic sandstones, mudstones and coal seams.

The thickness of the Triassic sequence in this area is difficult to determine because of non-continuous exposure and minor faulting. East of Lookout Hill outcrops of Triassic occur to at least 350 metres A.S.L. while a further 100 metres have been recorded

below sea level in the nearby Seymour Borehole No.4. The thickest Triassic section recorded in the recent Shell drilling program to the northwest of the area mapped was 386 metres in GY9. The presence of up to 450 metres of Triassic in this area therefore probably does not represent a true stratigraphic thickness but rather is a result of minor faulting which has given rise to an apparent thicker sequence.

A flora obtained from the Denison River, and in close proximity to several major coal seams, has given an Upper Triassic age for rocks in this area. Among the species so far identified (tentatively) are Dicroidium dubium var. dubium and D.ondontopteriodes var. obtusifolium (Bacon, pers.comm.).

The Triassic rocks exposed consist of greenish-grey coloured sandstones with variable bedding characteristics. Some have closely spaced bedding planes while others tend to be more massive. Cross-bedding is common within some of the units. Mudstone units occur within the sandstones but form only a minor component of the sequence. Both the sandstones and mudstones frequently contain carbonaceous partings, streaks and small lenses of coal. Plant fossils are common in the mudstone units while silicified pieces of wood up to 2 metres in length are occasionally found within the sandstones. Scattered pebbles, generally of quartzite, are also present and local concentrations of these pebbles and cobbles may represent former channel deposits.

Correlation of outcrops between creeks is made difficult by the absence of marker beds. Lateral variations in the thickness of units and facies changes, both of which would be expected to occur in a fluvial

depositional environment, also hamper correlation of individual units. In the Dalmayne area to the north, a persistent pebble conglomerate band near the top of the sequence has been recognised in boreholes. This band, referred to as the Dalmayne Conglomerate, has proved to be a useful marker horizon in that area. Within the area mapped a horizon of similar thickness and lithological composition has been observed at three localities. Rounded quartzite pebbles occasionally found scattered on the ground surface may represent the remnants of this horizon following its erosion and that of the surrounding sandstone units. Alternatively, they could be pebbles derived from lenses within the sandstones.

Drilling should reveal whether the conglomerate outcrops observed represent localised depositional features or whether they are part of a horizon that may be of considerable lateral extent. In the latter case it would prove invaluable as a marker bed for correlation purposes both within the area mapped and, if it can be shown to be a correlate of the Dalmayne Conglomerate, for correlation with the sequence to the north.

Occasionally found scattered on the ground surface eg. east of Lookout Hill, are fragments of hornfels and quartzite which are thought to have been produced by the thermal metamorphism of mudstones and sandstones. Similar baked rocks are seen in outcrop at a gravel pit 1.5 kilometres northwest of the Douglas River bridge where an intrusive contact between dolerite and Triassic rocks is exposed.

Coal outcrops are common throughout the area with seams or lenses less than 15 centimetres in thickness

being frequent. Thicker seams up to 2.5 metres have been recorded at several localities. The coal seams are found within the carbonaceous greenish-grey sandstones. Grey mudstone units frequently occur within close stratigraphic proximity of the coal seams.

Jurassic

Dolerite has intruded the Permo-Triassic rocks and is considered to have formed a large sheet of variable thickness over the entire region. However subsequent fluvial erosion has removed the dolerite capping to expose the underlying Triassic rocks in the Douglas, Apsley and Denison valleys.

The nature of the contact between the dolerite and Triassic is variable throughout the entire area with both concordant, transgressive and faulted contacts. In the Bedgood Hill area, upper Douglas valley, Denison and Apsley valleys, steep transgressive contacts appear to be associated with feeders and dykes that have been recognised in Leaman's (1978) gravity survey. Dykes, up to 5 metres in width and with variable orientations, are present in the middle Douglas valley area and are probably associated with the Nichols Cap feeder.

The base of the dolerite rises away from the coast where at several localities it occurs at elevations of about 50 metres A.S.L. Five kilometres inland the base of the dolerite occurs at approximately 300 metres A.S.L. in the Douglas valley. Accurate mapping of the dolerite/Triassic contact has been prevented by the covering of scree so these elevations must be regarded as only approximate. Apart from the dykes exposed in the Douglas River, there is only

one other locality in the area where an intrusive contact is exposed (the gravel pit, 1.5 kilometres northwest of the Douglas River bridge).

Apart from thick dolerite expected to be encountered in the feeders on Bedgood Hill, Nichols Cap and Mt. Allen, dolerite thicknesses appear to be within the range of 100 to 200 metres. However, west of the middle Douglas valley, gravity results suggest a substantial thickening of the dolerite.

Without the aid of geophysical methods the relationship of the dolerite to the Triassic coal measures in the middle Denison valley is not clear at present. As the Triassic appears to be enclosed by dolerite it could imply an irregular base to the dolerite in this area. Alternatively, the dolerite separating the two areas of Triassic outcrop in the Denison valley is a large dyke connected to the Mt. Allen feeder. (Encl.5). If dolerite, apparently surrounded by Triassic 2 kilometres southeast of Mt. Allen, is a dyke, then it seems that sizable dykes are associated with the Mt. Allen feeder and these could account for the distribution of the Triassic and dolerite within the Denison valley. Unfortunately the contacts are not exposed but the presence of fine-grained dolerite nearby does support an intrusive rather than a faulted contact.

Quaternary

Scree, consisting of blocks and columns of dolerite up to 15 metres in length, covers a large part of the area mapped and prevents the accurate mapping of geological contacts and faults. Closely spaced joints within the dolerite facilitate its mechanical weathering by root penetration. Frost action during

the Pleistocene would have made a significant contribution to the formation of scree, but present day frost action is not severe enough to make a significant contribution to the breakdown of the dolerite.

The scree covering the ground surface has originated from the erosion of the overlying dolerite cap with the resultant blocks of dolerite forming a lag deposit, and the transport of material eroded from the face of the retreating escarpment. This material is distributed further by landslides, some of which are still active on the steep slopes above the Douglas River.

Alluvial sands and gravels up to 5 metres in thickness are mainly restricted to the lower reaches of the Douglas, Denison and Apsley rivers. Local concentrations of sands and gravels are occasionally found in the creeks that drain the area. Colluvial deposits are also frequent and colluvial fans are commonly present at the base of the hills rising from the coastal plain. These colluvial deposits are largely composed of fragments of dolerite derived from scree that has been washed into the stream channels.

Wind blown sands are common along the coast where they form dunes which at present are generally stabilised by vegetation. A thin covering of sand derived from weathered Triassic sandstone and marine sands covers the coastal plain. Sands and gravels at elevations close to 20 metres A.S.L. eg. just south of the Douglas River bridge, are remnants of a Last Interglacial higher sea level.

2.2 SUBSURFACE DATA

Data obtained from boreholes near Seymour and from recent Mines Department drilling has partly revealed the subsurface stratigraphy of the eastern and southern margins of the area mapped. Tentative correlation of some of the coal seams in these boreholes has been made and these correlations have been used to infer the presence of faults between several of the boreholes, for example, Seymour boreholes 3 and 4. (Encl.8).

Apart from a seam exposed near the base of Seymour Borehole 5, the absence of seams in this hole cannot be satisfactorily explained geologically. Seams present in the nearby Douglas River and other boreholes in the vicinity should have been intersected by Seymour 5. The absence of seams in this hole ~~may~~ possibly be due to non-recovery of core. A proposed borehole near Nichols Cap should intersect most of the Triassic sequence and thus permit correlation with Seymour Borehole 5.

The Mines Department Borehole 3A, which is not yet completed, is of interest as it contains numerous coal seams up to 1.5 metres in thickness in the upper half of the hole. While some of the seams have been tentatively correlated with those in the Dalmaine area, until the hole is fully logged to the base of the Triassic the position of the hole in the Triassic sequence is not clear. If a borehole is drilled to the north of the Apsley valley (recommendation 4.1.5) then correlation of the sequence in Borehole 3A with that in the proposed boreholes both south and north of the Douglas River may be possible. If correlation can be established then it should be possible to determine what variation there is, if any, in seam quality, thickness and extent, over the entire area.

2.3 STRUCTURE

The Triassic sediments show a regional dip of 1° to 10° in a south to southeast direction but local variations are common. Fault-bounded blocks can have dips of up to 25° , while adjacent to the fault dips may increase to as much as 45° .

Faults within the area have been difficult to locate due to the poor exposure and lack of marker beds, however, at several localities within the Douglas valley faults can be seen in outcrop. In Possum Creek, dolerite is downthrown against a coal seam which exhibits a marked drag dip of up to 45° . One and a half kilometres to the northeast a fault is exposed within the Triassic with a resistant sandstone unit being upthrown against another coal seam. Further faults can be recognised or inferred by the abrupt termination of recognisable units and the occurrence of the same coal seam at different elevations. The amount of displacement on these faults is often difficult to determine but some displacements have been noted to range from only several centimetres to at least 50 metres.

Stratigraphic sections obtained from future drilling should enable better correlation of the coal seams and hence accurate displacements should be able to be determined. There is no convincing field evidence at present for the eastern major north-south fault recognised in the Dalmayne area continuing south to the Douglas River. Proposed drilling may, however, detect its presence. The western graben fault is considered from air-photo interpretation to continue in a south westerly direction to at least as far as Possum Creek.

The faults that have been detected in the field are also generally recognised by Layton's fracture study. However it has not been possible to show that the numerous other lineations outlined by Layton are faults.

As these frequently occur solely within a major lithological unit eg. the Jurassic dolerite or Triassic coal measures, their presence is not easily detected on the ground. Drilling may show whether some of these lineations visible on the Landsat imagery and air-photos, especially in the dolerite country south of the Douglas River, are faults.

Thus within the exposed area of Triassic sediments both proven and inferred faults are present although the accurate location of many of the faults is not known. Some major faults are exposed in the middle Douglas valley while minor faulting is considered prevalent throughout the entire area. Further faults will probably be detected in the future drilling program, especially those concealed at present beneath the dolerite south of the Douglas River.

Cross sections illustrate the possible structure in the Douglas River and Denison Rivulet areas (Encl.5-9.) The cross sections represent an interpretation of the structure based on present knowledge and will probably need to be modified when future boreholes provide more subsurface data. Subsurface interpretation is more accurate toward the coast where data obtained from boreholes can be used for stratigraphic control and to infer the existence of faults. Elsewhere the structure has been determined from outcrop patterns and from structural relationships in the area to the north.

3. COAL RESOURCES OF THE AREA

Coal outcrops are common within the area mapped but only those seams greater than 50 centimetres in thickness are plotted on the map. General sections and details of the main seams are given in Report No. CEPR 16/78 and Encl.2-4.

The most promising seam in the Douglas valley is exposed at three localities at elevations of 80 metres, 100 metres and 155 metres A.S.L. which suggests faults are present between the outcrops. The location of the faults is unknown. This seam, on the basis of its thickness and quality, is probably the equivalent of the Delta seam recorded in the Dalmayne area. A sandstone roof is present at all localities. Seams of poorer quality coal are present in Possum Creek, the Mayson River, Coal Creek, and various unnamed creeks within the Douglas valley. Tentative correlation of some of the seams in the creeks has been made.

In the Denison valley to the south, several coal seams of variable thickness and quality are present in outcrop and in subsurface workings. Lack of seam continuity suggests minor faulting is again present. The extent of the seams within the Denison valley may be limited if the dolerite in the vicinity is in the form of dykes.

Thus within the area mapped, coal seams of varying thickness and quality are present. Tentative correlation of one of the seams with the Delta seam of the Dalmayne area has been made, however the relationship of the other seams to those in the Dalmayne area is not certain. Full stratigraphic sections obtained from future boreholes will, however, permit firmer correlations and more detailed descriptions of the seams.

From the results of surface mapping it appears that seams of sufficient thickness and quality for mining extend south to at least the Denison valley. Continuity of the seams is expected to be seriously disrupted by minor faulting.

4. RECOMMENDATIONS

4.1 DRILLING

In the drilling program importance must be attached to:

- 1) determining if the conglomerate band is a marker horizon suitable for correlation purposes.
- 2) confirming that the inferred major faults are present and, if so, the amount of displacement.
- 3) determining the extent of minor faulting.
- 4) siting the boreholes so as to penetrate the whole Triassic sequence with as little penetration of dolerite as possible so as to save both time and money. In this respect several of the proposed drill sites should be moved:

(a) proposed hole at 020770 to be moved to 013778

(b) proposed hole at 020750 to be moved to 013758

both moves will enable a fuller Triassic section to be obtained.

(c) proposed hole at 980750 to be moved to 980753 this will prevent the unnecessary penetration of 150 metres of dolerite.

- 5) consideration should be given to placing two boreholes south of the Denison Rivulet at 010670 and 990670 so as to determine whether or not the seams present in the Denison valley continue through to the Apsley valley where mining by adit entry would be feasible. These boreholes would also show whether pronounced air photo lineations in the Mt. Andrew area are major faults.

4.2 GROUND WORK.

- 1) further mapping utilising geophysical methods should be undertaken to define the extent of the Triassic in the Denison valley. Initially a magnetometer survey should be undertaken to show whether there is continuity of dolerite from Mt. Allen to the dolerite ridge south of the Denison valley. If drilling results from the area to the north and northwest are favourable in regard to coal seam

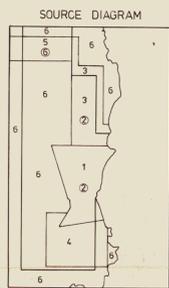
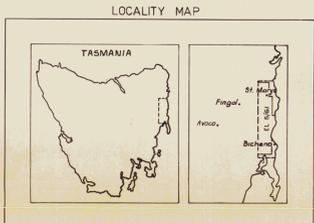
thickness, quality and extent, then a detailed gravity survey of the Denison valley would be justified. This would define whether the dolerite present in the Denison valley is part of a dyke system associated with the Mt. Allen feeder, or whether the Triassic exposed in the valley occurs at the base of a dolerite sheet. If the former is found to be the case then the lateral extent of the coal measures in the immediate area is therefore going to be restricted.

- 2) spot checks need to be made with a magnetometer to confirm the inferred dolerite/Triassic boundary throughout the area.
- 3) when better access into the Possum Creek area is obtained, more accurate mapping of the Triassic rocks and faults west of the middle Douglas valley area needs to be undertaken to confirm the present interpretation.

Reference

Leaman, D.E. 1978. East Coast coal project gravity survey. Preliminary report. Part 1. Survey details and qualitative interpretation. Tas. Dept of Mines unpub. report 1978/79

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Unpublished mapping by:
 1. P. Sansom (Shell)
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 3. C. Colver (Tas. Dept. of Mines)
 4. C. Bacon (Geology Dept. of University of Tas.)
 5. H. King (Shell)
 6. D. Leaman (East Coast coal project gravity survey, Part I, Tas. Dept. of Mines, Unpubl. Report 1578/33)

Major Source 1
 Minor Source 2

LEGEND

- Qs } QUATERNARY aeolian sand, marine sand and gravel
- Qa } alluvial sand and gravel, swamp deposits
- Qs } scree
- Tb } TERTIARY basalt
- Tg } gravels
- Jdl } JURASSIC dolerite
- R } TRIASSIC undifferentiated sandstones, mudstones, coal
- P } PERMIAN undifferentiated conglomerate, sandstone, mudstone, limestone
- Dg } DEVONIAN undifferentiated granitic rock
- Sm } SILURO-DEVONIAN Mathinna Beds, quartzite, slate, siltstone
- } geological boundary (approx. position)
- ?-? } geological boundary (inferred)
- } fault
- ?-? } fault (inferred)
- ✳ } dolerite feeder
- } coal outcrop
- } adit (abandoned)
- G32 ⊕ } Shell borehole drilled
- G32 ○ } Shell borehole proposed
- MDS ⊕ } Mines Dept. Bicheno borehole
- S2 ⊕ } Seymour borehole

SCALE 1:40 000

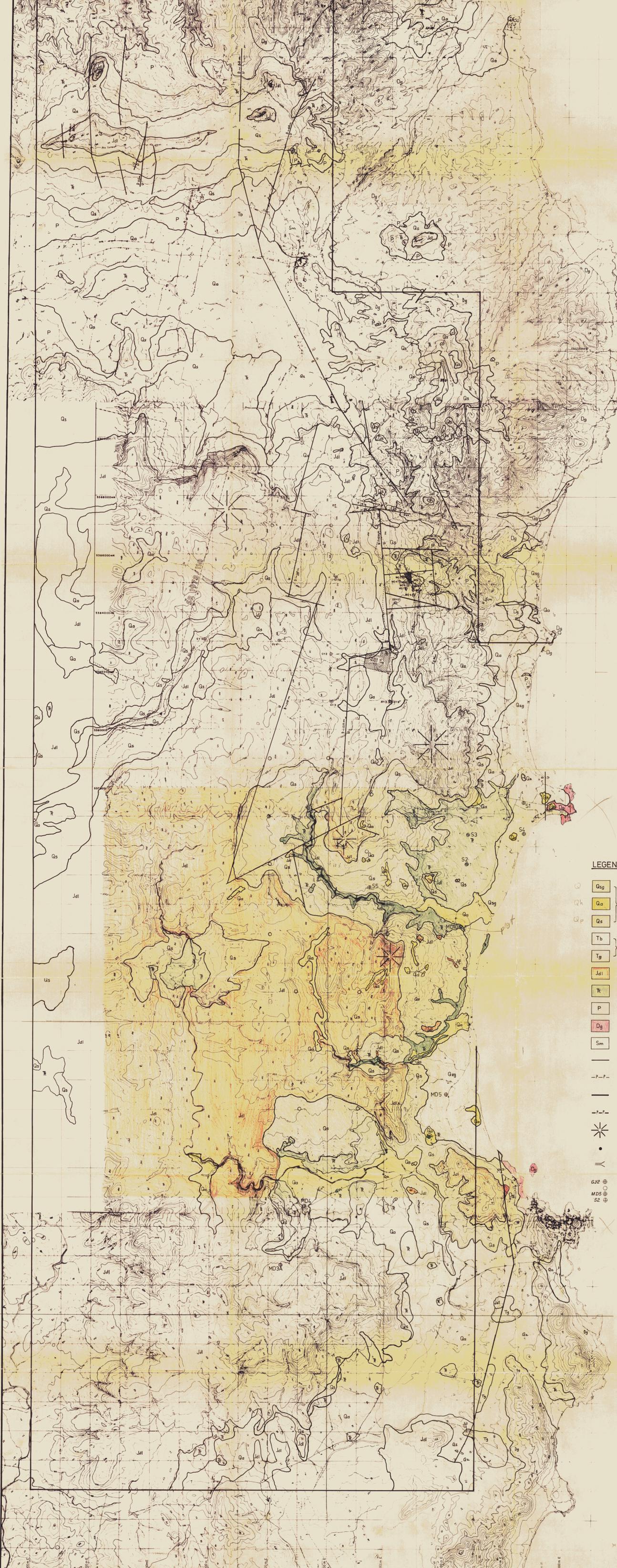


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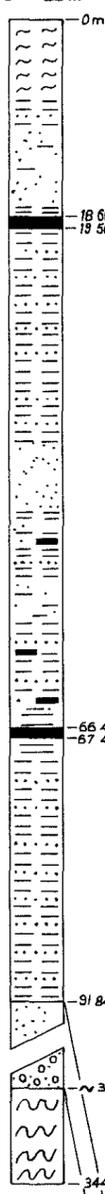
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TASMANIA BASIN TASMANIA
 SHELL-IMI EL 5/61 GRAY
 GEOLOGICAL MAP
 EL 5/61

Scale 1:40 000
 Author: P. SANSON Date: October 1978
 Report No. 5746 3/78 Drawing No. 557 Encl. 1



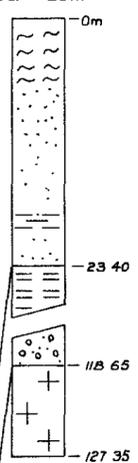
MD 10
R.L. ~ 20m



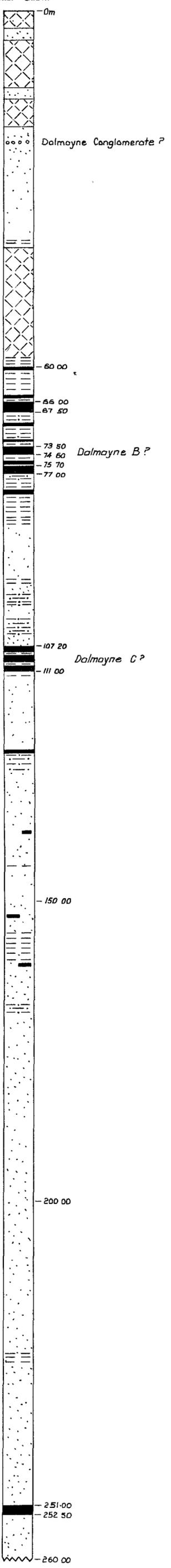
MD 5
R.L. ~ 5m



MD 4
R.L. ~ 80m

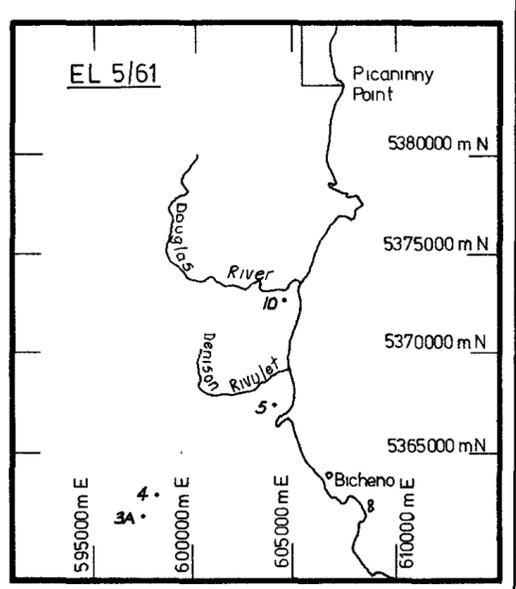
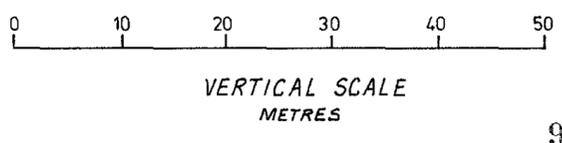
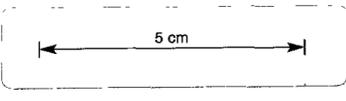


MD 3A
R.L. ~ 300m



LEGEND

- surficial deposits
- 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
- granite
- Mathinna beds (quartzites and siltstones)



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TASMANIA BASIN TASMANIA
SHELL - IMI EL 5/61 GRAY
GENERALISED BOREHOLE LOGS
Dept. of Mines, Bicheno Boreholes
MD 10, 5, 4, 3A
Scale 1:500

Author: P SANSOM	Date: October 1979	Encl. 2
Report No: CEPR 31/79	Drawing No: 1548	

935021

SEYMOUR NO. 5 BORE
DOUGLAS RIVER

RL ~ 100 m



SEYMOUR NO. 4 BORE

RL ~ 5m



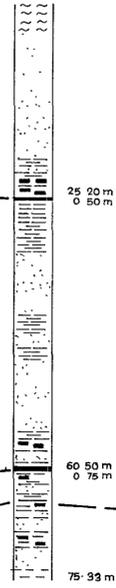
SEYMOUR NO. 2 BORE

RL ~ 25m



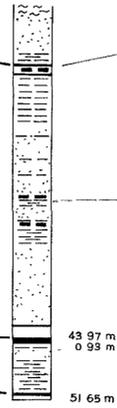
SEYMOUR NO. 3 BORE

RL ~ 40m



SEYMOUR NO. 1 BORE

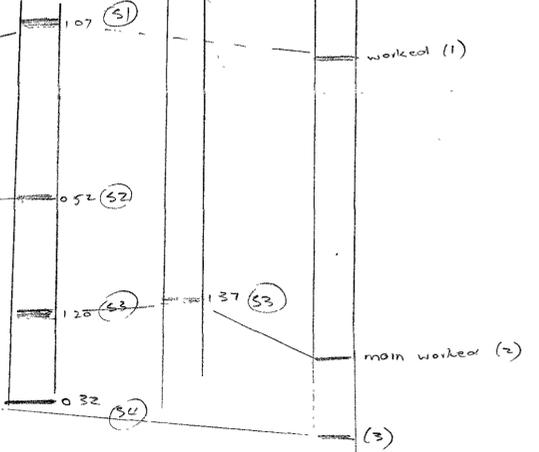
RL ~ 5m



1945/1

1945/2

SHAFT

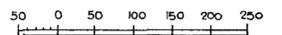


LEGEND

- ALLUVIUM
- GRAVEL, DETRITUS, RUBBLE, SHINGLE CONGLOMERATE
- DETRITUS & SAND
- SANDSTONE
- SILTSTONE
- SANDSTONE & MUDSTONE
- SANDSTONE, BANDS OF MUDSTONE, ETC.
- SANDSTONE, COAL TRACES, COAL VEINS ETC.
- MUDSTONE & SANDSTONE
- MUDSTONE, BANDS OF SANDSTONE ETC.
- MUDSTONE
- MUDSTONE, COAL BANDS, VEINS ETC.
- COAL & MUDSTONE
- SHALE
- CARBONACEOUS SHALE
- MUDDY COAL, CARBONACEOUS
- BANDED COAL
- COAL
- LIMESTONE
- IRONSTONE
- DOLERITE
- GRANITE

24.
48.
12

48



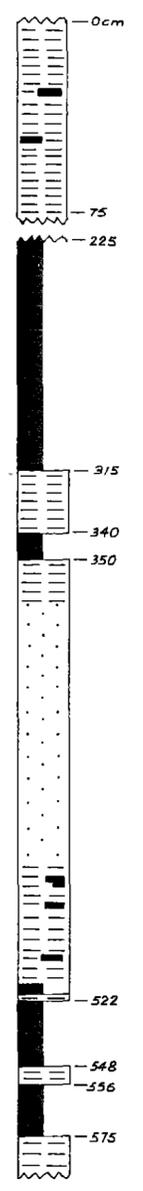
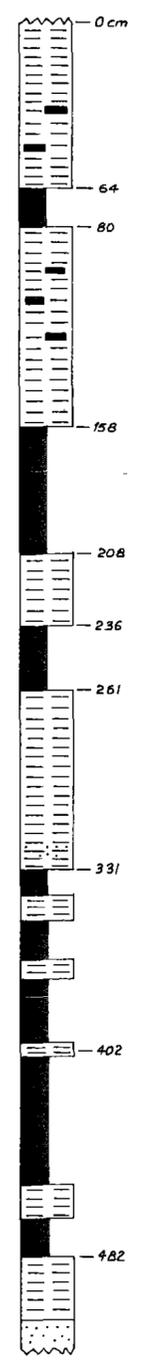
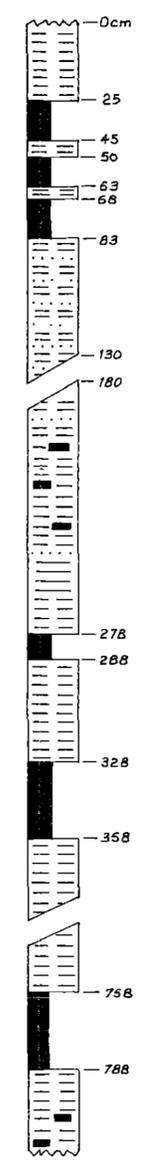
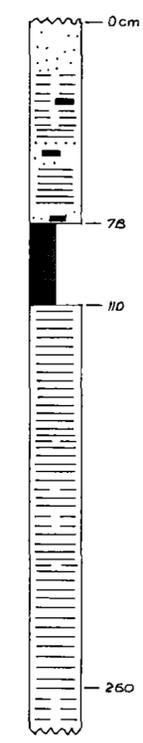
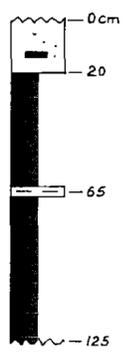
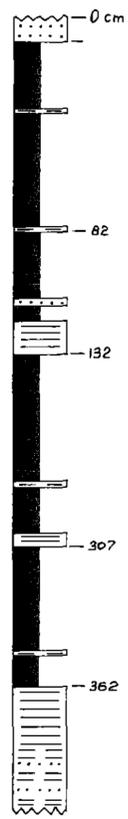
SCALE 1:500



935022

THE SHELL COMPANY OF AUSTRALIA LTD.
EAST COAST AREA, TASMANIA
GRAY EL 5/61
SEYMOUR BOREHOLES 1-5
LITHOLOGICAL PLOTS
POSSIBLE CORRELATION
Scale 1:500
Author: P. SENNI Date: APRIL '78
Report No: CEPR 31/79 Drawing No: C1167 Encl. 3

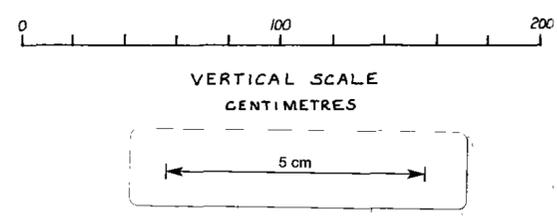
Douglas River R.L. ~ 100m Denison Rivulet R.L. ~ 85m Mayson River R.L. ~ 155m Coal Creek R.L. ~ 90m Douglas River R.L. ~ 80m Possum Creek R.L. ~ 270m Denison Rivulet R.L. ~ 100m Denison Valley R.L. ~ 120m



----- Dalmayne D seam -----

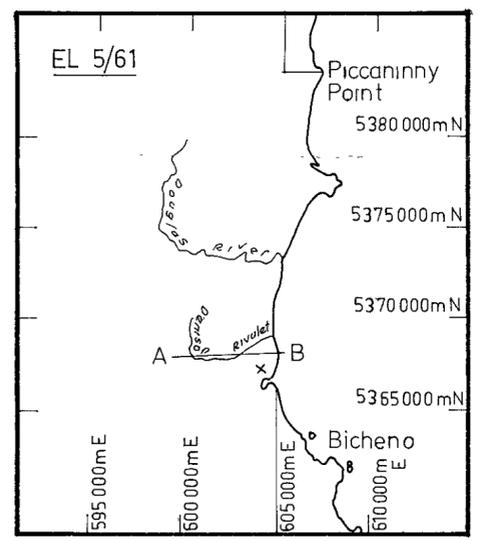
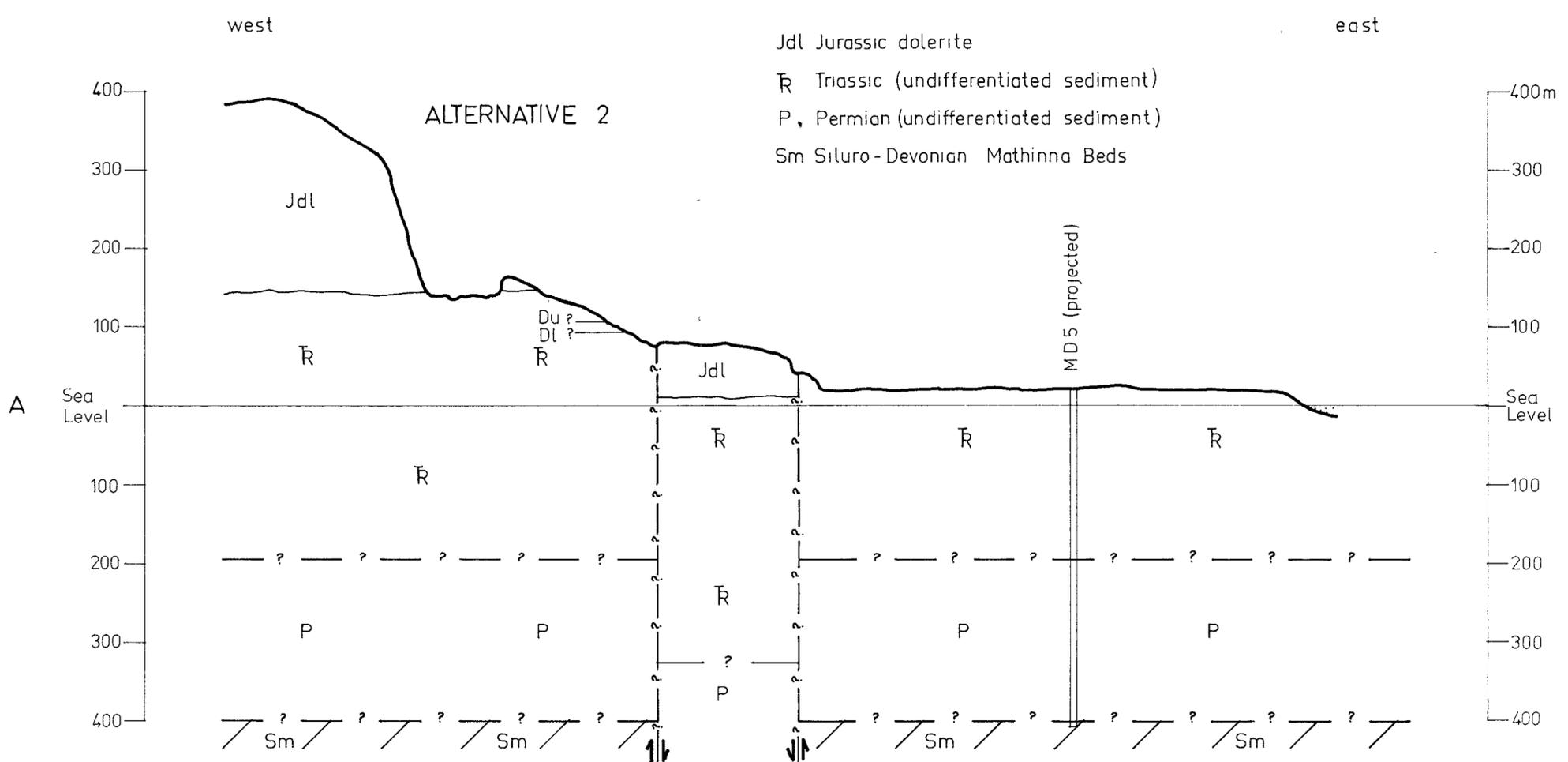
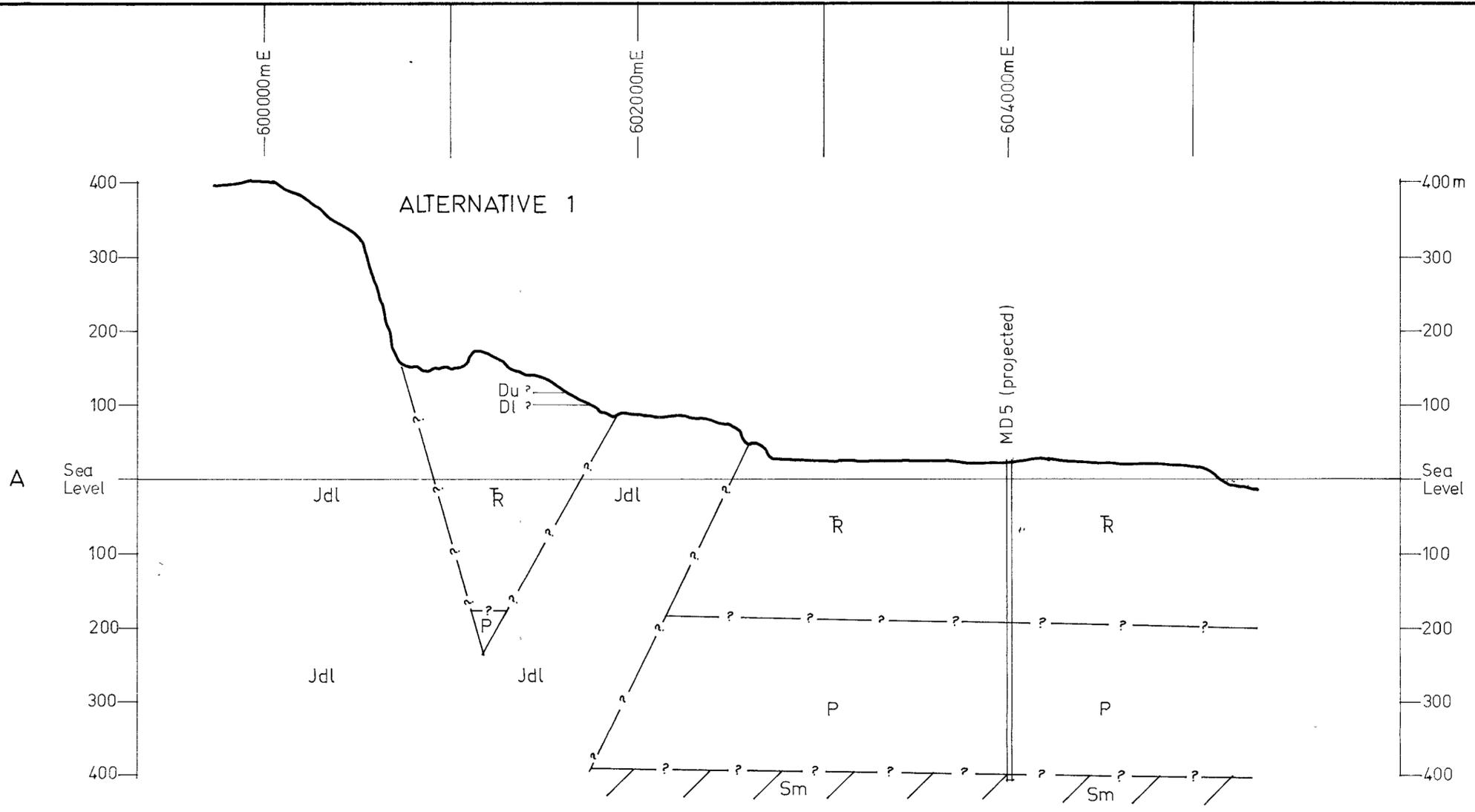
LEGEND

-  sandstone
-  sandstone with mudstone bands
-  sandstone with coal traces, coal veins, coal bands
-  mudstone
-  mudstone with sandstone bands
-  mudstone with coal bands
-  carbonaceous mudstone
-  dull coal with scattered thin bright bands



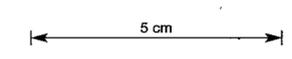
935023

 THE SHELL COMPANY OF AUSTRALIA LTD.		
TASMANIA BASIN TASMANIA SHELL-IMI EL 5/61 GRAY		
SEAM OUTCROP SECTIONS DOUGLAS & DENISON VALLEYS		
Scale 1:20		
Author: P SRNSDM	Date: October 1979	Encl 4
Report No: CEPR 31/79	Drawing No: 1549	



x MD 5 (Mines Dept Borehole 5)

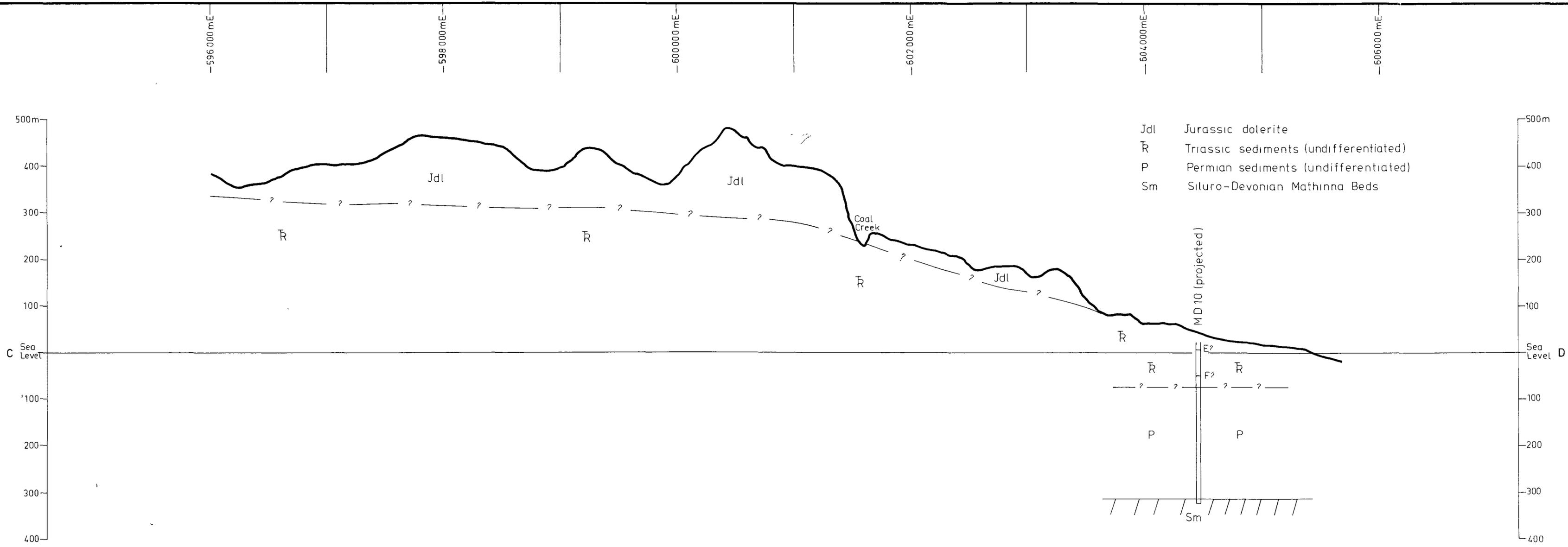
935024



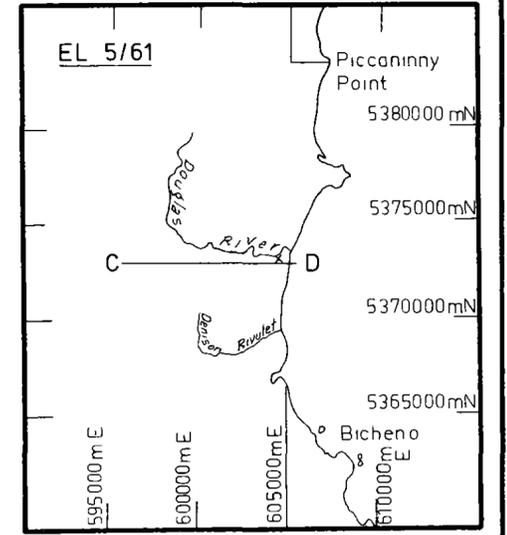
THE SHELL COMPANY OF AUSTRALIA LTD.

TASMANIA BASIN TASMANIA
 SHELL-IMI EL 5/61, GRAY
GEOLOGICAL CROSS SECTION
 DENISON RIVULET AREA
 LINE 999684-052687
 Scale 1:20,000

Author: P Sansom	Date: October 1979	Encl. 5
Report No: CEPR 31/79	Drawing No: 1550	



- Jdl Jurassic dolerite
- R Triassic sediments (undifferentiated)
- P Permian sediments (undifferentiated)
- Sm Siluro-Devonian Mathinna Beds



x MD 10 (Mines Dept Borehole 10)

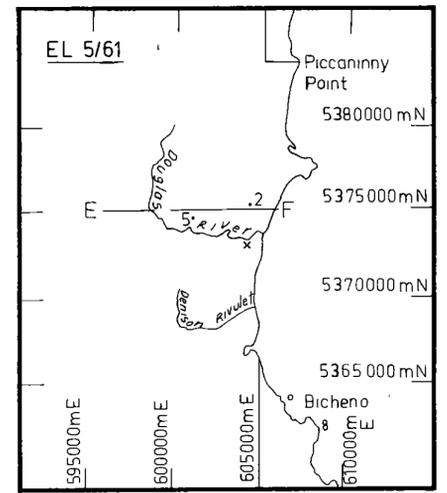
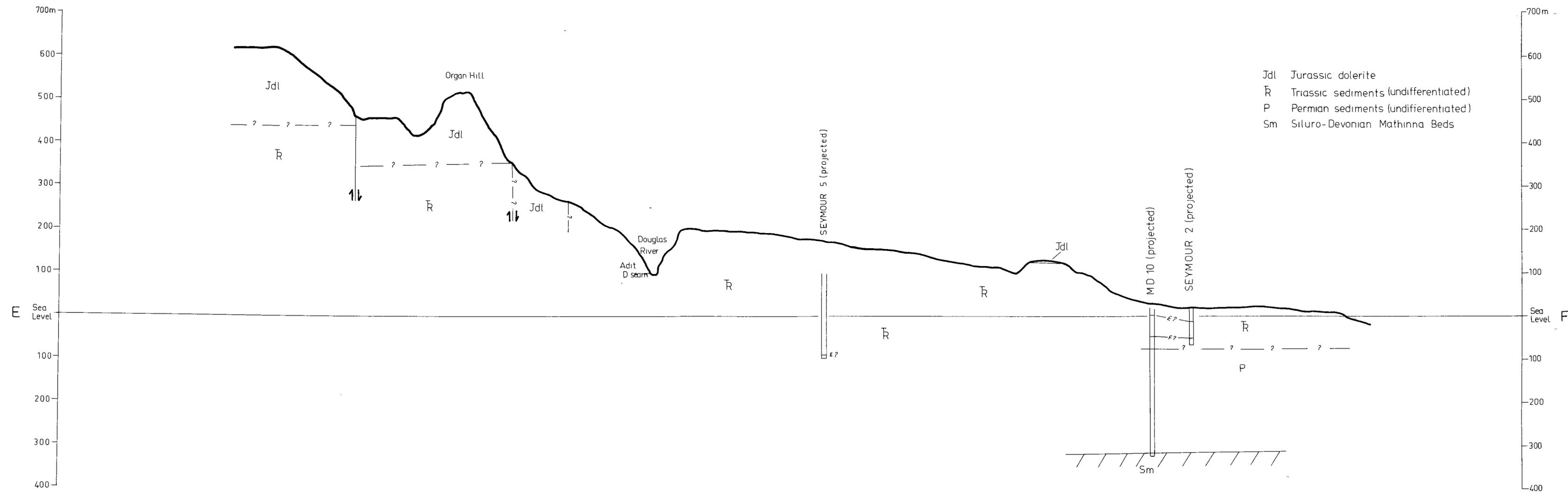
925025

5 cm

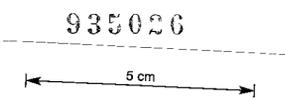
THE SHELL COMPANY OF AUSTRALIA LTD.

TASMANIA BASIN TASMANIA
 SHELL-IMI EL 5/61, GRAY
GEOLOGICAL CROSS SECTION
 DOUGLAS RIVER AREA
 LINE 5 373 000mN
 Scale 1 20,000

Author P. Sansom	Date October 1979	Encl. 6
Report No. CEPR 31/79	Drawing No. 1551	

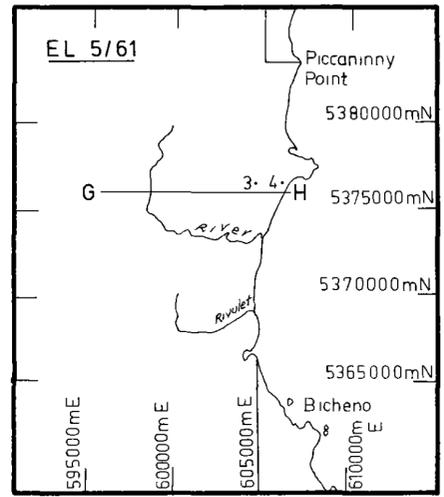
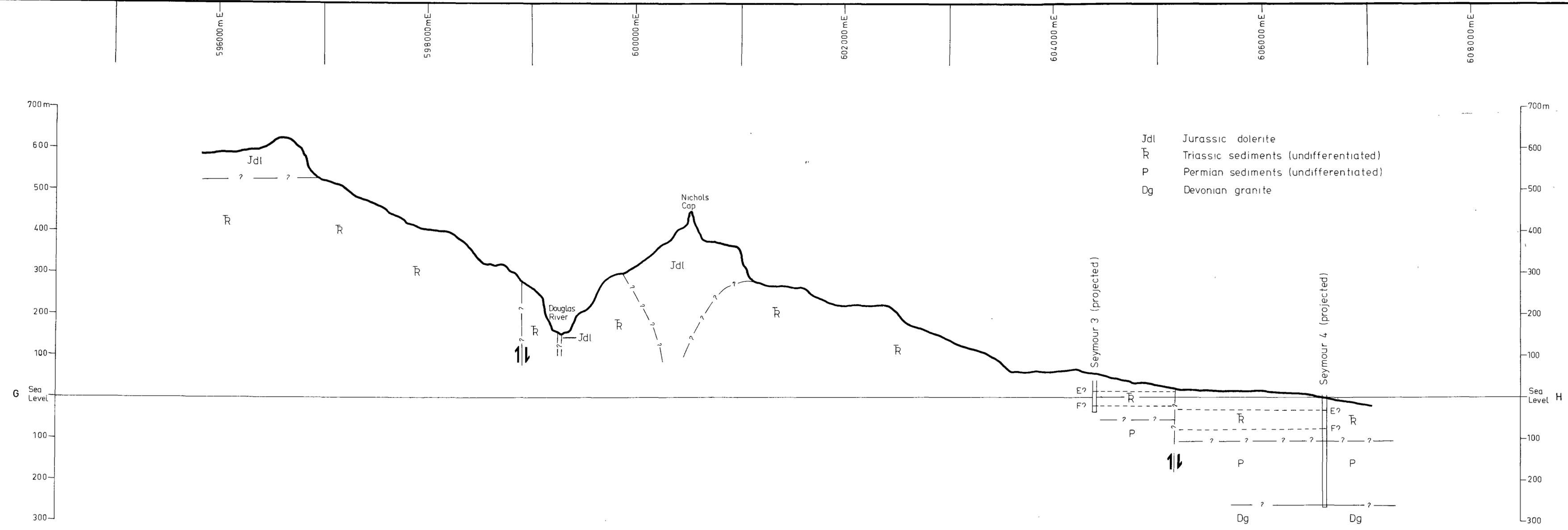


- x MD 10 (Mines Dept. Borehole 20)
- .2 Seymour Borehole 2
- 5 Seymour Borehole 5



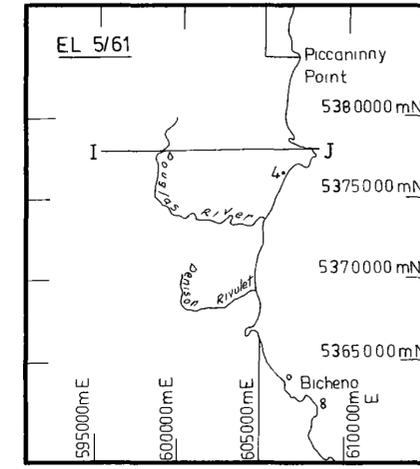
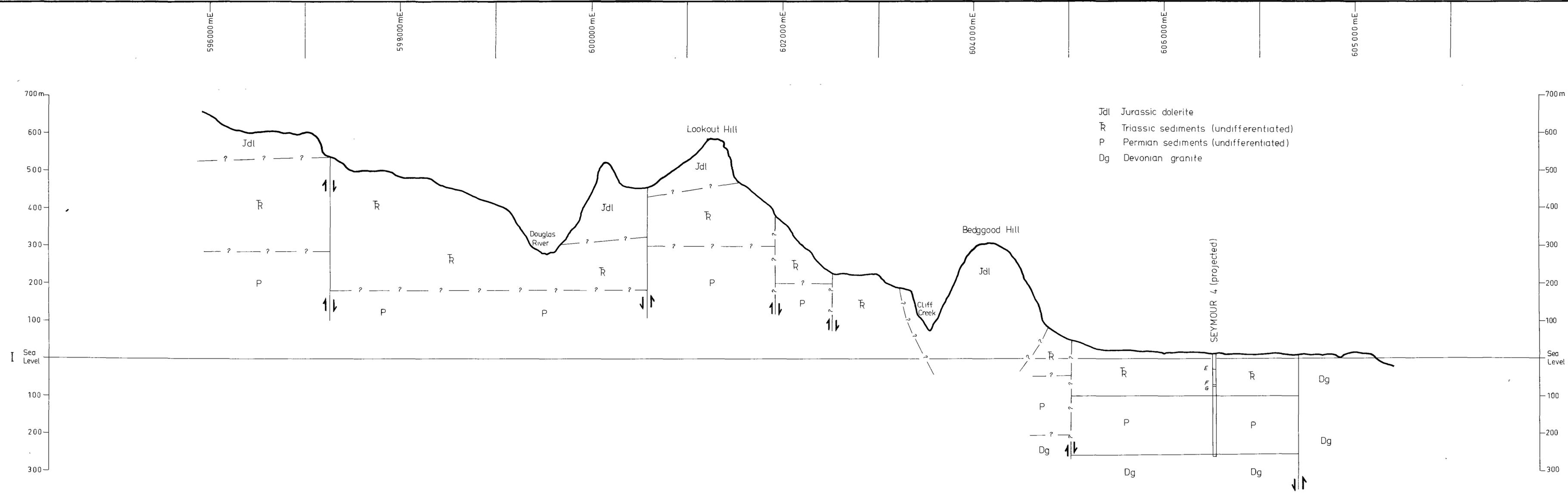
THE SHELL COMPANY OF AUSTRALIA LTD.
 TASMANIA BASIN TASMANIA
 SHELL-IMI EL 5/61, GRAY
GEOLOGICAL CROSS SECTION
 DOUGLAS RIVER AREA
 LINE 5375000m N
 Scale 1:20000

Author: P. Sansom	Date: October 1979	Encl. 7
Report No: CEPR 31/79	Drawing No: 1552	

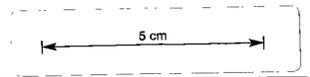


3. Seymour Borehole 3
4. Seymour Borehole 4

THE SHELL COMPANY OF AUSTRALIA LTD.
 TASMANIA BASIN TASMANIA
 SHELL-IMI EL 5/61, GRAY
GEOLOGICAL CROSS SECTION
 DOUGLAS RIVER AREA
 LINE 5376000 mN
 Scale 1:20000
 Author P Sansom Date October 1979
 Report No. CEPA 31/79 Drawing No. 1553 **Encl. 8**



4. Seymour Borehole 4



THE SHELL COMPANY OF AUSTRALIA LTD.
 TASMANIA BASIN TASMANIA
 SHELL-IMI EL 5/61, GRAY
GEOLOGICAL CROSS SECTION
 DOUGLAS RIVER AREA
 LINE 5378000 m N
 Scale 1 20 000
 Author P Sansom Date October 1979
 Report No. LEP 31/79 Drawing No. 1534 Encl. 9

935028