STURT PLATEAU BITUMEN (SPB) PROJECT

FINAL REPORT EL’S 25596 – 25599

Owner: Dunmarra Energy Pty Ltd (100%)
Operator: Dunmarra Energy Pty Ltd (100%)
Prepared by: Ian Matthews
Date: 14 October 2009
Distribution: Dunmarra Energy Pty Ltd (1)

NT Department of Primary Industries and Fisheries (1)
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1 SUMMARY

EL’s 25596 – 25599 were applied for by Dunmarra Energy Pty Ltd on the basis of ‘coal’ being struck during drilling of a water bore. The material was later found to be bitumen, most likely grahamite.

The major work program for the 2008/2009 season was to drill a number of investigation holes within 500 m of the original discovery water bore.

A core drilling program of four holes with a maximum depth of 75 m was originally planned. However, lack of available drill rigs and concerns with core recovery using standard diamond drilling methods resulted in the use of reverse circulation down-hole-hammer drilling with large diameter (100 mm) diamond tails being implemented. A total of six holes for 352 m were completed.

Drilling results were poor. Multiple, very thin bitumen seams were struck in SPBP No.3, 500 m south-west of discovery water bore, RN 32962. SPBP No.3, 18 m north of the discovery bore struck less than 0.2 m of total bitumen over a 3 – 4 m section of highly fractured and weathered/leached basalt. Due to the poor results, no coring was undertaken.

Although there is evidence that the bitumen within the basalt is widespread, it is likely to be difficult to determine effective targeting techniques.

If the Velkerri Formation is the source rock as postulated, it follows that bitumen may also have been trapped at the base of the Antrim Plateau Volcanics. Once again, target generation would be difficult.

Further interpretation of the existing geochemical data sets may help determine the source rock.
2 INTRODUCTION

2.1 REPORTING PERIOD FOR ACTIVITIES
This report covers exploration activities undertaken by Dunmarra Energy Pty Ltd as operator of EL’s 25596 – 25599 during the reporting period of September 2008 – October 2009.

2.2 LOCATION, ACCESS & PHYSIOGRAPHY
The contiguous EL’s are located 50 – 100 km west to south-west of Mataranka in an area generally known as the Sturt Plateau. Access is by the NT government maintained Gorrie Road and Western Creek Road and by numerous station tracks. The nominated area is also traversed by the Alice Springs to Darwin railway line. The permits lie on the Larrimah 1:250 000 geological map sheet.

Figure 1 indicates the location of the EL’s and the location of the discovery bore RN32962.

The terrain at the Sturt Plateau Bitumen Project is typical of the Sturt Plateau and generally consists of extensive plains formed over flat-lying Cretaceous age strata. Relief variation is less than 20 m metres and the area is, on average 250 metres above sea level. There are no principal drainage channels in the area.

The area has an arid, temperate climate with hot summers and short, mild winters. There are essentially two seasons, ‘wet’ and ‘dry’. Minimum and maximum mean temperatures in winter are 18ºC and 30ºC. Minimum and maximum mean temperatures in summer are 25ºC and 35ºC. Average rainfall is approximately 800 mm, the majority of this falling in summer (October through April).

2.3 TENEMENT STATUS
EL’s 25596 – 25599 were granted to Dunmarra Energy Pty Ltd on 1 September 2007 for a period of 5 years.

2.4 PREVIOUS EXPLORATION
There has been very little previous mineral exploration in the region. Regional gravity surveys were used to define coal targets in the 1970’s with subsequent drilling determining that prospects for the area were poor.
Figure 1

LOCALITY
(base imagery Google Earth)
3 2008 - 2009 EXPLORATION RESULTS

3.1 DRILLING METHODOLOGY

Investigations revealed that standard diamond drilling techniques may not be suitable for coring of low-density, brittle bitumen. Discussions with experienced geologists involved with the central Queensland coal fields suggested that reverse circulation down-hole-hammer drilling with large diameter core tails would be the preferred approach. The advantages included:

- Better ability to cope with possible lost circulation or groundwater inflows;
- Faster penetration rate, particularly through the overlying basalt;
- Core diameters up to 100 mm;
- Reduced meterage rates, and;
- Small, mobile, all-wheel drive equipment.

At the same time, H2O Mineral Drilling could not guarantee that the nominated rig would be repaired prior to commencement of the 2008 Wet season. Accordingly, Wizard Drilling Pty Ltd (Bundaberg, Queensland) was contracted to provide drilling services. Wizard Drilling has significant experience at various mines throughout the central Queensland coal fields and was highly recommended by other operators.

Drilling commenced on Friday, 17th October 2008 and was completed on Friday, 24th October 2008.
4 RESULTS OF DRILLING

4.1 PROPOSED PROGRAM

With the change in drilling techniques, it was planned to drill up to 4 holes. The bore hole sites were nominally 500 m north, west, south and south-west of the discovery water bore. All holes would be vertical and be subjected to geophysical logging including gamma and SP/SPR.

For at least the first site, it was planned to drill an investigation hole with RC down-hole-hammer to the base of the bitumen and then twin the hole approximately 10 m away and core from just above to just below the bitumen section.

Due to changes with drilling methods and results, the following holes were completed:

<table>
<thead>
<tr>
<th>Site Identifier</th>
<th>Easting (m) UTM Zone 53L (GDA 94)</th>
<th>Northing (m) UTM Zone 53L (GDA 94)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPBP No. 1</td>
<td>259,899</td>
<td>8,312,953</td>
</tr>
<tr>
<td>SPBP No. 2</td>
<td>259,761</td>
<td>8,313,927</td>
</tr>
<tr>
<td>SPBP No. 3</td>
<td>259,345</td>
<td>8,313,440</td>
</tr>
<tr>
<td>SPBP No. 4</td>
<td>260,285</td>
<td>8,313,208</td>
</tr>
<tr>
<td>SPBP No. 5</td>
<td>259,707</td>
<td>8,313,657</td>
</tr>
<tr>
<td>SPBP No. 6</td>
<td>259,841</td>
<td>8,313,463</td>
</tr>
<tr>
<td>Discovery Water Bore RN 32962</td>
<td>259,844</td>
<td>8,313,447</td>
</tr>
</tbody>
</table>

A short description of each hole follows and geological logs are available in the Appendices. See Figure 2 for a bore location map.
Figure 2
BORE LOCATION PLAN
(base imagery Google Earth)
4.2  **SPBP NO. 1**

This hole was located 2 m west of the access track along the Adrail corridor fence line, 500 m south of water bore RN 32962.

The bore struck fractured and cavernous silcrete from 18.5 – 23 m and airlifted approximately 5 L/s from this zone. Drilling was temporarily abandoned at 36 m due to the water flow. Extra surface casing was obtained and set to 24 m. Completely weathered basalt was encountered under the calcrete and gradually become less weathered. Fresh brown basalt was struck at 53 m and drilling ceased at 59 m. No bitumen was encountered.

4.3  **SPBP NO.2**

This hole was located 20 m west of the access track along the Adrail corridor fence line, 520 m north of water bore RN 32962.

The bore struck mixed sands and clay with some hard silcrete bands to 9 m overlying soft, white and cream, sandy clay of the Mullaman Beds through to the TD of 32 m. The hole was abandoned at this depth due to instability of the unusually thick Cretaceous sediments at this location.

4.4  **SPBP NO.3**

This hole was located 500 m due west of the discovery bore, along an existing fence line/track (see Plate 1).

Soft sandy clays with minor hard silcrete were encountered to 11 m. Completely weathered basalt was encountered through to 32 m with a gradual lessening of weathering through to 48 m. From 48 – 52 m, extremely fractured basalt with prominent green and white vein fill was struck. Drilling continued through moderately weathered basalt to the TD of 81 m. No bitumen was encountered.
4.5 SPBP NO. 4

This hole was located east of the railway corridor, 500 m south-east of the discovery bore.

Typical white, soft sandy clay and hard silcrete was struck above completely weathered basalt at 16 m. Drilling continued through weathered basalt to 48 m. From 48 – 52 m, blue-grey fractured basalt with thinly interbedded bitumen was encountered. A number of very thin seams (a few millimetres at most) were struck through this section. The bitumen was first noted as thin, black mica-like plates floating on top of the returns (see Plate 2).

The thickest section encountered was at around 51.5 m and likely less than 5 cm thick. The largest chips were less than 10 mm (see Plate 3). Towards the base of the bitumen section, minor red/brown, fine to medium grained, meta-sandstone was also encountered (see Plate 4). Drilling was abandoned at 58 m in hard red basalt.

4.6 SPBP NO. 5

This hole was drilled to replace SPBP 2 and was located 230 m north-west of the discovery bore.

Typical Cretaceous sediments were struck to 24 m above completely weathered basalt. Fresh basalt was encountered at 57 m and drilling ceased at 59 m. No bitumen was struck.

4.7 SPBP NO. 6

This hole was drilled 17 m north of the discovery bore in an effort to obtain a sufficiently thick section of bitumen to make coring worthwhile.

Typical Cretaceous sediments were struck to 10 m above completely weathered basalt. The first trace of bitumen was encountered at 46 m, with a minor amount of fine black platelets floating on the discharge stream. Weathered and leached basalt (see Plate 5) with a few very thin interbeds of bitumen was struck to 56 m. From 56 – 58.5 m, fractured and weathered basalt with perhaps 5% bitumen vein fill was drilled. The largest veins appear to be no more than 5 cm thick with individual chips no more than 15 mm (see Plate 6). Drilling ceased at 63 m in slightly weathered basalt.

Due to the poor results, the drilling program was terminated.
It was not possible to geophysically log any of the holes as the equipment was damaged during forwarding from the Brisbane base.
Plate 5
FRACTURED, WEATHERED/LEACHED BASALT, SPBP No. 6
4.8 REHABILITATION

The two cleared drill pads have been rehabilitated and all holes have been plugged and abandoned with the exception of SPBP No.1. The PVC surface casing was capped and left in SPBP No.1 as the pastoralist expressed interest in re-constructing the hole for stock use.

5. CONCLUSIONS

The results of the drilling program were disappointing. It is thought that the total section in the discovery hole was 2 – 3 m thick, while the maximum seam thickness in SPBP No. 6, only 18 metres to the north was probably not more than 0.1 m and the total thickness less than 0.2 m.

It would appear that the bitumen has been emplaced under high pressure. There were numerous very thin bands of bitumen associated with calcite (?) filled fractures within the weathered basalt in SPBP No. 3.

Although there is anecdotal evidence of the bitumen being widespread within the basalt (McMasters, pers com 2002 and Wade, 1924) determining an effective targeting method may be difficult.

If the Velkerri Formation was the source rock, it is likely that a greater proportion of the expelled bitumen would become trapped below the Antrim Plateau Volcanics, rather than intercalated, as identified in this project. Identification of specific drill targets would be extremely difficult.

It is considered that the bitumen is a result of vigorous expulsion from the Velkerri Formation. Further interpretation of the geochemical data from the 1980’s and 1990’s and that undertaken for this project (Fuentes and Volk, 2006 and Gong et al, 2008) would appear to be warranted at this stage. Confirmation of this hypothesis would enable a better estimate of potential volumes.

The basalts of the Antrim Plateau Volcanics are not typical at this location. All other times the author has drilled this basalt, there has only ever been a very thin (<5 m) weathered section. Typical basalt is generally fresh and hard within a few meters of the contact and penetration rates with down-hole hammers are usually less than 6 m/hour. The base of weathering was usually more than 55 m in this area, and at SPBP No. 3, minor weathering was still evident when drilling ceased at 81 m.
Equipment and personnel from Wizard Drilling performed extremely well. If the anticipated geology had been encountered, the combination of down-hole-hammer with diamond tails would have proved effective.
6 REFERENCES


APPENDIX A

DRILLING LOG SPBP NO.1
MATERIAL DESCRIPTION

0
SANDY CLAY, firm, yellow, becomes soft and slightly moist from 4m

4
SILCRETE, hard, brittle, white and tan with some sandy clay as above

8
SANDY CLAY, white, gravelly with fragments of coarse white calcrite to 15 mm diameter, soft, slightly moist

12
SILCRETE, hard, brittle, white, cream and tan, cavernous from 18m with strong water flow (5 L/s)

16
SANDY CLAY, very light yellow brown with minor light green rock fragments, completely weathered basalt?, minor silcrete fragments

20
BASALT, HW, red/brown, medium yellow brown to purple brown clay, minor green alteration

24
BASALT, HW / MW, dark red brown, fine grained clayey cuttings with chips of weathered basalt that have black staining / mottle

28
BASALT, HW / MW, blue/green, fine grained clayey cuttings with chips of weathered basalt

32
BASALT, HW / MW, dark red/brown, fine grained clayey cuttings with chips of weathered basalt, with minor light green amygdales

36
BASALT, MW, dark red/brown, fresher with depth, larger chips of weathered basalt

40
BASALT, MW, brown, fine grained clayey cuttings with chips of weathered basalt, common green amygdales

44
BASALT, red/brown, minor weathering

48
BASALT, hard, brown, fresh

52
Mullaman Beds

56
Antrim Plateau Volcanics

60

APPENDIX B

DRILLING LOG SPBP NO.2
<table>
<thead>
<tr>
<th>DEPTH (mbGL)</th>
<th>MATERIAL DESCRIPTION</th>
<th>STRATIGRAPHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CLAY, stiff, grey</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SILTY CLAY, yellow, soft</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>SILCRETE, hard, brittle, white and tan with some sandy clay as above</td>
<td>Mullaman Beds</td>
</tr>
<tr>
<td>8</td>
<td>SANDY CLAY, white, soft, slightly moist, tan to cream from 9m, 10% red/brown rounded ironstone pebbles from 11m</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>SANDY CLAY, cream and white, minor silcrete fragments, tan and cream with 10% rounded ironstone pebbles from 16m</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>SANDY CLAY, cream and white, with minor, very fine grained, well rounded, sandstone, opaque grains, some black chert from 23m</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>SANDSTONE, cream, soft, clayey, very fine grained</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>SANDSTONE, very soft, white plastic lay, loss of circulation and hole collapse below 30 m</td>
<td></td>
</tr>
</tbody>
</table>

**LOG OF BORE NO.:** SPBP No.2

**BLOODWOOD DOWNS PROSPECT**

**MATERIAL DESCRIPTION**

**STRATIGRAPHY**
APPENDIX C

DRILLING LOG SPBP NO.3
### Material Description

<table>
<thead>
<tr>
<th>Depth (mBG)</th>
<th>Clay, grey, hard, stiff, plastic and sticky with depth</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>Silty Clay, light yellow, sandy, hard, stiff and plastic</td>
</tr>
<tr>
<td>8</td>
<td>Silcrete, cream and tan, hard, brittle</td>
</tr>
<tr>
<td>12</td>
<td>Sandy Clay, white, medium to coarse grained, minor silcrete fragments, moderately plastic when wetted, slightly moist</td>
</tr>
<tr>
<td>16</td>
<td>Clay, tan, moist with minor rounded red/brown ironstone pebbles to 10 mm</td>
</tr>
<tr>
<td>20</td>
<td>Basalt, CW, light brown, medium yellow/brown clay</td>
</tr>
<tr>
<td>24</td>
<td>Basalt, CW, yellow, fine grained sandy cuttings, clayey</td>
</tr>
<tr>
<td>28</td>
<td>Basalt, CW, yellow, clayey, bright light green fine grained alteration material</td>
</tr>
<tr>
<td>32</td>
<td>Basalt, HW, dark red brown, fine grained clayey cuttings with chips of weathered basalt</td>
</tr>
<tr>
<td>36</td>
<td>Basalt, MW, tan fine grained clayey cuttings</td>
</tr>
<tr>
<td>40</td>
<td>Basalt, MW/SW, dark brown, with minor white cacite veinfill</td>
</tr>
<tr>
<td>44</td>
<td>Basalt, MW, dark red/brown to dark grey, minor dark grey infill on joint surfaces</td>
</tr>
<tr>
<td>48</td>
<td>Basalt, MW, dark red/brown to dark grey, minor white and dark green infill on joint surfaces</td>
</tr>
<tr>
<td>52</td>
<td>Basalt, MW/SW, dark red/brown to dark grey, minor white and dark green infill on joint surfaces, harder than above</td>
</tr>
<tr>
<td>56</td>
<td>Basalt, MW, dark red/brown, fractured, increased white and green veinfill</td>
</tr>
<tr>
<td>60</td>
<td>Basalt, EW, soft, light grey/green, minor fractures</td>
</tr>
<tr>
<td>64</td>
<td>Basalt, red brown, amygdaloidal with green amygdale infills</td>
</tr>
<tr>
<td>68</td>
<td>Basalt, brown, fresh, hard</td>
</tr>
<tr>
<td>72</td>
<td>Basalt, dark grey, fresh, hard</td>
</tr>
<tr>
<td>76</td>
<td>Basalt, SW, red/brown and red, red fracture fill material</td>
</tr>
<tr>
<td>80</td>
<td>Basalt, SW, brown and red</td>
</tr>
<tr>
<td>84</td>
<td>Basalt, SW, light brown, with green amygdales</td>
</tr>
</tbody>
</table>

### Stratigraphy

- **Mullaman Beds**
- **Antrim Plateau Volcanics**
APPENDIX D

DRILLING LOG SPBP NO.4
<table>
<thead>
<tr>
<th>DEPTH (mbGL)</th>
<th>MATERIAL DESCRIPTION</th>
<th>STRATIGRAPHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CLAY, black, hard when dry</td>
<td>Mullaman Beds</td>
</tr>
<tr>
<td>4</td>
<td>SILTY CLAY, light yellow brown, sandy, hard / stiff, plastic &amp; sticky when wetted, fine</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>SANDY CLAY, white, medium - coarse grained, coarse massive silcrete fragments, moderately plastic when wetted, very slightly moist</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>SANDY CLAY, white, soft, slightly moist</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>SANDSTONE, tan and cream, hard, brittle</td>
<td>Antrim Plateau Volcanics</td>
</tr>
<tr>
<td>20</td>
<td>SANDSTONE, white, very fine grained, very soft with soft, white plastic clay</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>SANDSTONE, white, very fine grained, firm, sticky, yellow sandy clay</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>CLAY, CW basalt?, very light yellow brown, soft, plastic, numerous fragments of bright light green coloured rock, gravelly</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>BASALT, CW, light brown, medium yellow brown to purple brown sandy clay, minor green alteration</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>CLAY, CW basalt?, very light yellow brown, soft, plastic, numerous fragments of bright light green coloured rock, gravelly</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>BASALT, CW, dark brown, clayey, with minor hard brown chert</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>BASALT, EW, dark brown, clayey, minor limonite on fracture planes and some light green fine grained alteration material</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>BASALT, CW, tan, fine grained clayey cuttings with chips of weathered basalt and minor silcrete</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>BASALT, HW / MW, dark brown, some light green fine grained alteration</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>BASALT, HW / MW, grey/blue, with minor green amygdales</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>BASALT, HW / MW, grey/blue, with minor green amygdales, minor pyrite</td>
<td></td>
</tr>
</tbody>
</table>
LOG BORE NO.: SPBP No.5  
CHIP LOGGED BY: Ian Mathews  
CHECKED BY: Peter Evans  
REGISTERED NO: NA  
DATE STARTED:  
DATE COMPLETED:  
DRILLING CONTRACTOR: Wizard Drilling  
TOTAL DEPTH:  
REFERENCE POINT: Ground Surface  
DRILLING METHOD: Rotary - Air  
NATURAL SURFACE ELEVATION (mAH): 177  
DRILLING EQUIPMENT: Modified Jacro 500 - Top drive  
SWL (mGL): NA  
Measurement Date: NA  
SAMPLING METHOD: Disturbed  
EASTING: 259707  
NORTHING: 8313657  
Coord Sys: MGA94 z53

**MATERIAL DESCRIPTION**

- **DEPTH** (mGL)
- **0**  
  - SILTY CLAY, light yellow brown, hard / stiff, dry
- **4**  
  - SILTY / SANDY CLAY, yellow, hard / stiff
- **8**  
  - SANDY CLAY, white, gravelly with fragments of coarse white silcrete to 15 mm diameter, soft, slightly moist
- **12**  
  - SILCRETE, tan, yellow and cream, hard and brittle
- **16**  
  - SANDY CLAY, very light yellow and cream, with minor red/brown, rounded, ironstone pebbles to 5 mm
- **20**  
  - SILCRETE, tan, yellow and cream, hard and brittle
- **24**  
  - SANDY CLAY, very light yellow and cream, with minor red/brown, rounded, ironstone pebbles to 5 mm
- **28**  
  - BASALT, CW, light brown, medium yellow brown to purple brown clay, minor green alteration
- **32**  
  - BASALT, CW, light brown, medium yellow/brown to brown sandy clay, minor bright, light green alteration
- **36**  
  - BASALT, HW / MW, dark red brown, fine grained clayey cuttings with chips of weathered basalt that have black staining / mottle
- **40**  
  - BASALT, HW / MW, dark grey, minor amygdales, minor fractures
- **44**  
  - BASALT, MW, dark grey and minor red/brown, minor black staining on fracture planes
- **48**  
  - BASALT, SW, dark red/brown, minor green amygdales

**STRATIGRAPHY**

- Mullaman Beds
- Antrim Plateau Volcanics
APPENDIX F

DRILLING LOG SPBP NO.6
**MATERIAL DESCRIPTION**

- **SILTY CLAY**, light yellow brown, hard / stiff, dry
- **SILTY CLAY**, light yellow brown, hard / stiff, dry, with a few thin bands of grey silty clay and a few thin bands of white silcrete
- **SILCRETE**, white, tan and yellow, hard, brittle, with thin bands of grey and yellow clay
- **SANDY CLAY**, white, gravelly with red/brown, rounded ironstone pebbles, soft, slightly moist
- **GRAVELLY CLAY** = CW basalt?, light yellow brown sandy clay with numerous fragments of bright light green coloured rock
- **SANDY CLAY**, very light yellow brown with minor light green rock fragments = CW basalt, minor and ironstone chert fragments
- **GRAVELLY CLAY** = CW basalt, light yellow brown with numerous fragments of bright light green coloured rock
- **BASALT**, CW light brown, medium yellow brown to purple brown sandy clay, minor green alteration
- **BASALT**, CW, light brown, yellow/brown to purple brown clay, minor green alteration
- **BASALT**, EW, dark red brown, clayey, some light green fine grained alteration material
- **BASALT**, EW, dark red brown, clayey, some light green fine grained alteration material, slightly less weathered
- **BASALT**, HW, dark blue/grey, fine grained clayey cuttings with chips of weathered basalt
- **BASALT**, HW / MW, dark red brown, fine grained clayey cuttings with chips of weathered basalt, with minor & thin light grey green infill on joint surfaces
- **BASALT**, MW, dark grey/green, with minor & thin light grey green infill on joint surfaces, very minor black floating bitumen flakes
- **BASALT**, MW, dark red brown, with minor green amygdales
- **BASALT**, grey/green/brown, fresh, hard, finer grained than above
- **BASALT**, MW, firm, light tan basalt with prominent feldspar, minor black mineralisation on fracture planes
- **BASALT**, MW, firm, light tan, leached?, common black mineralisation on fracture planes
- **BASALT**, MW, firm, light tan, leached?, common black mineralisation on fracture planes, with a few floating bitumen plates
- **BASALT**, MW, firm, light tan, leached?, common black mineralisation on fracture planes
- **BASALT**, MW, heavily leached?, firm, heavily fractured with black mineralisation on fracture planes, moderate amount of bitumen, chips to 15 mm
- **BASALT**, dark red/brown, firm, with green amygdales
- **BASALT**, red/brown, hard, with minor green amygdales
- **BASALT**, red brown, fresh, hard

**STRATIGRAPHY**

- **Mullaman Beds**
- **Antrim Plateau Volcanics**