Coal River Working Party  
C/- School of Liberal Arts  
University of Newcastle  
University Drive  
CALLAGHAN NSW 2308

Attention: Dr Erik Eklund

Dear Sir

RE: INVESTIGATION OF CONVICT COAL MINE WORKINGS  
BENEATH COLLIER'S POINT, NEWCASTLE EAST  
RESULTS OF DRILLING INVESTIGATION

1. INTRODUCTION

After two years of effort to arrange all necessary permits from the State, Federal and Local Governments, the drilling to confirm the existence of the first coal mine in Australia and probably the Southern Hemisphere was carried out on 26 September 2005.

The position of the boreholes were to coincide with the locations of the three drift entries identified by the surveyors, Monteath & Powys Pty Ltd, from an early plan of Flag Staff Hill Newcastle (1856) Archives Authority Map No. 4604.

The drilling was carried out by Pugsley Blasting Services using an Ingersoll Rand LM690 percussion drilling machine. The drilling rig uses air to flush the cuttings from the hole. This particular drilling rig was chosen due to;

- The rig's ability to drill holes efficiently at any angle;
- The rig's ability to drill through all materials including concrete, soil, rock and coal;
- The rig using air to flush the cuttings from the hole (a highly desirable process to avoid wetting or disturbing the existing condition of these heritage facilities);
- The rig's ability to drill to a depth of up to 25m in a short time (20 minutes);

As a precaution against encountering explosive gases in the mine workings Col Donegan of Coalmine Pty Ltd volunteered to check methane levels during the progress of the drilling. A representative of the Department of Mineral Resources was also present during the drilling. Workforce International provided Traffic Control around the worksite.

Viewing of the boreholes using a CCTV down hole camera was arranged for 30 September 2005. The equipment consisted of a Pierpoint camera, supplied by Coates Hire. The camera's lens is surrounded by LEDs, which can provide sufficient light in a confined space, but supplementary lights are required for large spaces;

Media coverage on both occasions was organised by Gionni Di Gravio.
2. RESULTS OF DRILLING

2.1 Drift 1, Borehole BH1

The first borehole, BH1, was located at the southern most entry, Drift 1, where the coal seam was expected to be below the road level of Fort Drive. BH1 was drilled at a height of 1.35m above road level and up the concrete ramparts angle down at 21° to the horizontal;

The drill penetrated about 0.5m of concrete, then about 2m of weathered Siltstone before encountering COAL that continued for a distance of 4.2m from the entry point;

At 4.2m the drill encountered a VOID through which the drilling rods could penetrate without the need for the percussion drilling techniques used for drilling through hard material for a total distance of 8.9m from the surface of the rampart;

The methane gas level in the borehole was found to be only 0.1% methane that indicates no significant risk of the presence of explosive gases;

The drill had exposed the coal mine, which had been concealed for 120 year after the entries were sealed in 1885 during construction of the lower ramparts of Fort Scratchley;

The log of the borehole is attached and a section through the boreholes is shown on Figure 1;

The coal seam is essentially horizontal and after correcting for the angle of dip of the BH1 (21°) the void would be about 1.4m high with about 0.6m of coal left in the roof. This agrees with historical and nearby Borehole records that indicate that the coal seam was about 2m high and that only the lower 1.4m was mined. It was reported that the upper 0.6m was inferior coal and was generally not mined;

The borehole was cased for a distance of 3.5m to support the hole and allow access to the void by a down the hole video camera.

2.2 Drift 2, Borehole BH2 and BH3

Flushed with the success of encountering the mine workings in the first hole the rig was moved to the location of Drift 2;

BH2 at Drift 2 was drilled at an angle of 17° from a height of 1.6m above road level;

The drilling encountered about 0.5 of concrete before penetrating about 4m of fill and siltstone. Coal was encountered at about 8m from the face and extended to 8.7m where a void was encountered. The void was less than 2m wide before reaching refusal to push from the drilling rig. The void appeared to be partly full of debris. Again the coal seam was about 2m thick with the elevation of the seam being similar to that of the nearby borehole. This is illustrated of Figure 2 attached;

BH3 was drilled at a steeper angle of 28° in an attempt to intersect the void closer to the face. Again a small void was encountered at a similar elevation as at BH2, but closer to the face of the ramparts;

Casing was inserted into both boreholes to maintain the hole until the video camera was available.

2.3 Drift 3, Borehole BH4 and BH5

BH4 at Drift 3, the most northerly drift near the roundabout was drilled at an angle of 17°. The borehole encountered a small coal seam, but since some doubt remained as to its correct identification the borehole was continued to a total length of 25m without encountering another coal seam. The borehole had apparently passed through the base of the coal seam;
BH5 was designed to be a low angle (8°) borehole drilled from a height of 2.1m to intersect the coal seam over a considerable horizontal distance;

The coal seam was first encountered at a distance of 3.5m and continued to about 10.4m where a void was encountered apparently about 1m wide. The geometry of these two boreholes is illustrated in Figure 3;

Casing was inserted into BH5 but since no void was encountered in BH4 the entry hole was grouted up.

3. **VIEWING OF BOREHOLES WITH CCTV CAMERA**

The camera was first inserted into BH1, but instead of finding open void the workings appeared to have been filled with soil and rock. The borehole however did encounter some voids. The borehole appears to be aligned adjacent to and parallel with the northern (right) side of the drift where the filling is incomplete or the fill has settled away from the roof and sides. The material in the roof and on the right side of the borehole appears to be intact coal. The edge of the workings do not appear to be vertical, but are undercut possibly in an attempt to extract the better quality lower coal. The camera was able to penetrate for a distance of 8.7m where the drill encountered the coal left in the floor of the seam. The geometry of the drilling findings confirms that the borehole penetrated to the floor of the 2m coal seam at a similar level as that found in the nearby borehole RCA1;

The camera in BH2 also found that the mine workings had been extensively filled with backfill with some voids present adjacent to the edge of the workings. The camera broke into a void that appeared to be a bord or working extending off to the left. Again the borehole appears to indicate that the right side contain some intact material suggesting that the centre of the drift is to the left;

Unfortunately in BH3 the casing was blocked with debris that precluded entry of the camera or light to attempt to better establish the extent of the workings in the area;

In BH5 the void was 10.4m inside the hill at a low angle (8°) and the void was more extensive and again appeared to extend towards the left. Intact coal with clay seams could be viewed directly ahead of the camera with some intact coal in the roof.

4. **CONCLUSIONS**

The drilling and camera viewing of the boreholes indicates that:

- Extensive workings are present in the coal seam beneath Fort Scatchley (Colliers’ Point);
- The coal seam has been identified as the Upper Split of the Dudley (or Dirty) Seam;
- The coal seam is 2m thick and generally the lower 1.4m of the coal seam was mined;
- Workings were encountered at the three identified drift locations;
- The workings have been backfilled with fill brought into the mine from outside, probably as part of the sealing of the workings in 1885, to provide support for the fortifications of Fort Scatchley;
- The filling appears, at least in the Drift 3 location, to extend at least about 10m in from the entry;
- The extent of the filling within the workings is unknown, but complete filling of all the workings
was probably not possible and extensive voids probably remain under the majority of the hill;

• Further investigations consisting of drilling low angle to horizontal holes from Fort Drive could establish the extent of void.

Drilling vertical holes from within Fort Scratchley or in Nobby Road could also be carried out to assess the extent of the mining and remaining voids.

It is interesting to note that the workings may extend to the west beneath Nobbys Road since it has recently become known that a void was encountered during the drilling of some of the pier holes beneath the units on the western side of Nobbys Road.

Further research and field investigations are required to expand our knowledge of these important workings.

5. ACKNOWLEDGEMENTS

The successful drilling program would not have been possible without the support and enthusiasm of many of our suppliers and supporters including:

• Pugsley Blasting Services – Daniel Broadridge – Supplier of the LM690 percussion drilling rig;

• Coates Hire – Supplier of the CCTV down hole video camera;

• Workforce International – Supply of Traffic Management Plan for the traffic control;

• Coalmine Consulting - Colin Donegan –For carrying out the gas monitoring during the drilling of the boreholes;

• Monteath & Powys Pty Ltd – Research and survey of the drift entries and the boreholes;

• Industrial Heritage – Bob Cook – for video recording the drilling and camera work;

• Newcastle City Council for their cooperation on the day of the drilling;

• Our friends from the media including ABC Radio, NBN Television, Daily Telegraph and Newcastle Herald;

• Department of Mineral Resources – Graham Cowan;

• Members and supporters of the Coal River Working Party particularly:

  ° Erik Eklund who determinably drove through the approval process;

  ° Gionni Di Gravio who managed the media exposure before, during and after the drilling and camera work allowing us to proceed with the onsite work.

• Staff of Coffey Geosciences Pty Ltd who donated their time to this exciting project.

• Many other supporters too numerous to mention individually
If you have any questions regarding this matter please contact the undersigned.

For and on behalf of
COFFEY GEOSCIENCES PTY LTD

ARTHUR LOVE

APPENDICES
A  Notes on Video Recording
B  Logs of Boreholes
C  Photos – Pages 1 to 3

DRAWINGS
N08709/01-1
Figures 1 to 3

DISTRIBUTION:

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APPENDIX A

Notes on Video Recording
# NOTES ON VIDEO RECORDING

<table>
<thead>
<tr>
<th>TIME</th>
<th>METRES</th>
<th>NOTES ON VIDEO COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>DRIFT</td>
<td>BH1 Introduction, Gionni Di Gravio, Sam Mackenzie, Arthur Love</td>
</tr>
<tr>
<td>0.30</td>
<td>-4.2</td>
<td>First penetration of Camera into pipe gets stuck on join in light probe.</td>
</tr>
<tr>
<td>0.41</td>
<td></td>
<td>Looks coaly from end of casing all the way in (fractured by drilling not smeared).</td>
</tr>
<tr>
<td>0.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.10</td>
<td>+0.2</td>
<td>At end of pipe with light pole ahead. Pushing through debris in hole (hole is only 110mm diameter).</td>
</tr>
<tr>
<td>2.20</td>
<td>2.1</td>
<td>Roof looks like intact, laminated in situ coal.</td>
</tr>
<tr>
<td>2.25</td>
<td>2.3</td>
<td>Breaking into larger void with overhang on right. Power cable looped into void. Looks like edge of intact material. Horizontal bedding angled at 30° to viewing direction. Light ahead shows crack/gap between wall and fill material in void.</td>
</tr>
<tr>
<td>3.2</td>
<td>2.8</td>
<td>Withdrawing light through crack adjacent to debris filled void.</td>
</tr>
<tr>
<td>4.10</td>
<td></td>
<td>Into void with slabs of rock possibly in situ.</td>
</tr>
<tr>
<td>6.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.07</td>
<td></td>
<td>Viewing termination of drill hole with coal exposed at end.</td>
</tr>
<tr>
<td>7.29</td>
<td>4.0</td>
<td>Close up of end of borehole.</td>
</tr>
<tr>
<td>7.48</td>
<td></td>
<td>Slabs of rock at top and right side, could be fill.</td>
</tr>
<tr>
<td>8.40</td>
<td></td>
<td>Void on left appears to continue upwards.</td>
</tr>
<tr>
<td>8.52</td>
<td></td>
<td>Back in loose void with overhand on right, roof appears intact.</td>
</tr>
<tr>
<td>9.17</td>
<td></td>
<td>Overhang on right appears to be intact coal in pillar side. Roof also appears intact.</td>
</tr>
<tr>
<td>11.10</td>
<td>DRIFT</td>
<td>BH2. Into good void with intact material in roof. Drive appears to go off to left. Withdrawn. Possible intersecting joints in roof.</td>
</tr>
<tr>
<td>12.20</td>
<td></td>
<td>Back into void extends to left.</td>
</tr>
<tr>
<td>12.35</td>
<td></td>
<td>Look at roof appears intact.</td>
</tr>
<tr>
<td>13.04</td>
<td>5.4</td>
<td>Void extends off to right.</td>
</tr>
<tr>
<td>15.37</td>
<td>5.5</td>
<td>Point where drill rods refused.</td>
</tr>
<tr>
<td>16.10</td>
<td>5.6</td>
<td>Back in void. Void extend to left. Roof appears intact. Maybe some cracks.</td>
</tr>
<tr>
<td>18.20</td>
<td>6.5</td>
<td>In void on left. Looks like drill path.</td>
</tr>
<tr>
<td>19.07</td>
<td></td>
<td>Out from furthest point of drilling. Fill material loose and clayey.</td>
</tr>
<tr>
<td>19.45</td>
<td></td>
<td>Back into void.</td>
</tr>
<tr>
<td>20.35</td>
<td></td>
<td>Zero depth indication.</td>
</tr>
<tr>
<td>TIME</td>
<td>METRES</td>
<td>NOTES ON VIDEO COMMENTS</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>21.25</td>
<td>10.5</td>
<td>End of casing with coal present.</td>
</tr>
<tr>
<td>22.39</td>
<td>11.8</td>
<td>Housing in void with intact coal ahead. Clay partings visible in coal. Bright coal. Roof looks intact??</td>
</tr>
<tr>
<td>23.39</td>
<td>12.1</td>
<td>Void with coal and clay seams chucks of coal on floor.</td>
</tr>
<tr>
<td>24.2</td>
<td></td>
<td>Going back in after clearing lens.</td>
</tr>
<tr>
<td>24.34</td>
<td></td>
<td>End of casing.</td>
</tr>
<tr>
<td>25.00</td>
<td></td>
<td>Back into void.</td>
</tr>
<tr>
<td>25.35</td>
<td>(13.9m loose line).</td>
<td></td>
</tr>
<tr>
<td>26.13</td>
<td></td>
<td>Coal falling from roof.</td>
</tr>
<tr>
<td>26.42</td>
<td>END</td>
<td>END</td>
</tr>
</tbody>
</table>
### Engineering Log - Borehole

**Client:** COAL RIVER WORKING PARTY  
**Principal:**  
**Project:** COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE  
**Borehole Location:** REFER TO DRAWING

**Drill Model and Mounting:** Percussion Drill LM690  
**Drill Diameter:** 100 mm  
**Easting:**  
**Northing:**  
**Slope:** -21.2°  
**R.L. Surface:** 13.90

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Material Substance</th>
<th>Notes, Samples, Tests</th>
<th>Support</th>
<th>Consistency/Density Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FILL: CONCRETE, grey.</td>
<td>D</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FILL: Gravelly Clayey SAND, grey to pale brown.</td>
<td>M</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Grading into rock?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>COAL: Black.</td>
<td>F</td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

**Borehole Terminated due to end of void.**  
Borehole BH 1 terminated at 8.9m

---

**Method:** auger screwing  
**Support:** M mud N nil  
**Notes, Samples, Tests:** U9d, UD9d, D, U96, UD96, N, N*  
**Classification Symbols and Soil Description:** based on unified classification system  
**Consistency/Density Index:** Moisture: VS very soft, S soft, F firm, St stiff, VSf very stiff, Hv hard

---

**Date Started:** 26.9.2005  
**Date Completed:** 26.9.2005  
**Logged By:** SJK  
**Checked By:**
**Engineering Log - Borehole**

**Client:** COAL RIVER WORKING PARTY  
**Principal:**  
**Project:** COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE  

**Borehole Location:** REFER TO DRAWING

**Drill model and mounting:** Percussion Drill LM690  
**Easting:**  
**slope:** -16.8°  
**R.L. Surface:** 13.35

**Drilling Information**

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Notes, Samples, Tests</th>
<th>Material Substance</th>
<th>Moisture Condition</th>
<th>Consistency/Density Index</th>
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</thead>
<tbody>
<tr>
<td>LM690</td>
<td>C</td>
<td></td>
<td>FILL: CONCRETE, grey.</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FILL: Clayey SAND.</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sandy SILTSTONE pale grey.</td>
<td>D/M</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>COAL: Black.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NO CORE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Loose gravel?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Support:** M mud N nil  
**Notes, Samples, Tests:** U<sub>50</sub> undisturbed sample 50mm diameter, U<sub>63</sub> undisturbed sample 63mm diameter, D disturbed sample, N standard penetration test (SPT), N<sup>*</sup> SPT - sample recovered, Nc SPT with solid cone, V<sub>p</sub> vane shear (kPa), P pressuremeter, Bs bulk sample, E environmental sample, R refusal

**Classification Symbols and Soil Description**

**Classification Symbols:**  
**Soil Description:** based on unified classification system

**Consistency/Density Index:**  
**Moisture:**  
**V<sub>S</sub>** very soft  
**S** soft  
**F** firm  
**St** stiff  
**V<sub>St</sub>** very stiff  
**H** hard  
**F<sub>b</sub>** friable  
**V<sub>L</sub>** very loose  
**L** loose  
**M<sub>d</sub>** medium dense  
**D** dense  
**V<sub>D</sub>** very dense

**Additional Observations:**  
**Void:**

**Support Notes:**

- Water inflow
- Water outflow
- Gas inflow
- Gas outflow

**Consistency/Density Index:**

- D dry
- M moist
- W wet
- W<sub>p</sub> plastic limit
- W<sub>L</sub> liquid limit
null
Percussion Drill LM690 100 mm

Easting: -16.8°

R.L. Surface: 13.35

NO CORE: (continued)

Borehole terminated due to end of void.
Borehole BH 2 terminated at 10.5m

RCA2 RL 10.2m

Borehole terminated due to end of void.
Borehole BH 2 terminated at 10.5m
<table>
<thead>
<tr>
<th>Borehole No.</th>
<th>BH 4</th>
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<tr>
<td>Sheet</td>
<td>1 of 3</td>
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<tr>
<td>Office Job No.</td>
<td>N08709/01</td>
</tr>
<tr>
<td>Date started:</td>
<td>26.9.2005</td>
</tr>
<tr>
<td>Date completed:</td>
<td>26.9.2005</td>
</tr>
<tr>
<td>Logged by:</td>
<td>SJK</td>
</tr>
<tr>
<td>Checked by:</td>
<td></td>
</tr>
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</table>

**Engineering Log - Borehole**

**Client:** COAL RIVER WORKING PARTY

**Principal:**

**Project:** COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE

**Borehole Location:** REFER TO DRAWING

<table>
<thead>
<tr>
<th>drill model and mounting:</th>
<th>Percussion Drill LM690</th>
</tr>
</thead>
<tbody>
<tr>
<td>hole diameter:</td>
<td>100 mm</td>
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<table>
<thead>
<tr>
<th>depth metres</th>
<th>material substance</th>
<th>material</th>
<th>structure and additional observations</th>
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</thead>
<tbody>
<tr>
<td>RL</td>
<td>notes, samples, tests</td>
<td>soil type: plasticity or particle characteristics, colour, secondary and minor components.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>moisture condition</td>
<td>consistency/density index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>density index</td>
<td>moisture condition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>method</th>
<th>support</th>
<th>notes, samples, tests</th>
<th>material</th>
<th>consistence/density index</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>M mud</td>
<td>nil</td>
<td>FILL: CONCRETE, grey.</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>C casing</td>
<td></td>
<td>FILL: Gravelly Clayey SAND, dark cuttings with some hard grey bands.</td>
<td>M</td>
</tr>
<tr>
<td>AD</td>
<td>W washbore</td>
<td></td>
<td>COAL: black.</td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>drill model and mounting:</td>
<td>Percussion Drill LM690</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>blank bit</td>
<td></td>
<td>SANDSTONE: grey.</td>
<td>D7M</td>
</tr>
<tr>
<td>DT</td>
<td>V bit</td>
<td></td>
<td>Cuttings pale brown</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>blank bit</td>
<td></td>
<td>Cuttings grey.</td>
<td></td>
</tr>
</tbody>
</table>

**Soil description**

- **FILL: CONCRETE, grey.**
- **FILL: Gravelly Clayey SAND, dark cuttings with some hard grey bands.**
- **COAL: black.**
- **SANDSTONE: grey.**

**Notes:**

- Cuttings pale brown
- Cuttings grey.

**Support:**

- M mud
- C casing
- D disturbed sample
- N standard penetration test (SPT)
- V vane shear (kPa)
- P pressuremeter
- Bs bulk sample
- E environmental sample
- R refusal

**Classification symbols and consistency/density index:**

- **Moisture:**
  - VS: very soft
  - S: soft
  - F: firm
  - St: stiff
  - H: hard
  - Fb: friable
  - VL: very loose
  - L: loose
  - MD: medium dense
  - D: dense
  - VD: very dense

- **Consistency/density index:**
  - VS: very soft
  - S: soft
  - F: firm
  - St: stiff
  - H: hard
  - Fb: friable
  - VL: very loose
  - L: loose
  - MD: medium dense
  - D: dense
  - VD: very dense

**Additional observations:**

- Water inflow
- Water outflow
- Water level
- Rock type
- Soil type
- Plasticity or particle characteristics
- Colour
- Secondary and minor components
- Undisturbed sample
- Disturbed sample
- Standard penetration test (SPT)
### Engineering Log - Borehole

**Client:** COAL RIVER WORKING PARTY  
**Principal:**  
**Project:** COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE

**Borehole Location:** REFER TO DRAWING

<table>
<thead>
<tr>
<th>Hole Diameter: 100 mm</th>
<th>Northing</th>
<th>Easting</th>
<th>Slope</th>
<th>R.L. Surface</th>
<th>Datum</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mm</td>
<td></td>
<td></td>
<td>-17°</td>
<td>12.10</td>
<td>AHD</td>
</tr>
</tbody>
</table>

**Drilling Information**

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Notes, Samples, Tests</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percussion Drill LM690</td>
<td></td>
<td></td>
<td>SANDSTONE: grey. (continued)</td>
</tr>
</tbody>
</table>

**Material Substance**

- **Soil Type:** Plasticity or particle characteristics, colour, secondary and minor components.

**Support:**  
- M mud  
- N nil  
- C casing  
- D drilling  
- E auger drilling  
- F hand auger  
- H diabase  
- V V-bit  
- T TC bit  

**Notes:**  
- U undisturbed sample 50mm diameter  
- unS undisturbed sample 63mm diameter  
- D disturbed sample  
- SPT-S sample recovered  
- Nw SPT with solid cone  
- V vane shear (kPa)  
- P pressuremeter  
- W moisture  
- Wp water  
- Wp plastic limit  
- W L liquid limit  

**Consistency/Density Index:**  
- VS very soft  
- S soft  
- F firm  
- St stiff  
- ST very stiff  
- H hard  
- VL very loose  
- L loose  
- MD medium dense  
- D dense  
- VD very dense  

**Drill Model and Mounting:** Percussion Drill LM690  
**Easting:**  
**Nothing:**  
**Slope:** -17°  
**R.L. Surface:** 12.10  
**Datum:** AHD

---

**Additional Observations:**  
- None Observed  
- Water inflow  
- Water outflow  
- Undisturbed sample 50mm diameter  
- Undisturbed sample 63mm diameter  
- Disturbed sample  
- Standard penetration test (SPT)  
- SPT sample recovered  
- SPT with solid cone  
- Vane shear (kPa)  
- Pressuremeter

---

**Logging Details:**  
- **Borehole Location:** REFER TO DRAWING
- **Date Started:** 26.9.2005  
- **Date Completed:** 26.9.2005  
- **Logged By:** SJK  
- **Checked By:**
### Engineering Log - Borehole

**Client:** COAL RIVER WORKING PARTY  
**Principal:**  
**Project:** COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE

#### Borehole Location: REFER TO DRAWING

<table>
<thead>
<tr>
<th>Drill model and mounting:</th>
<th>Percussion Drill LM690</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole diameter:</td>
<td>100 mm</td>
</tr>
</tbody>
</table>

#### Drilling Information

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Depth (metres)</th>
<th>Notes, Samples, Tests, etc</th>
<th>Classification Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM690</td>
<td>M</td>
<td>21</td>
<td>None Observed</td>
<td>Sandstone: grey</td>
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<tr>
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<tr>
<td></td>
<td></td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Borehole BH 4 terminated at 25m**

---

**NOTES:**  
- Water inflow  
- Water outflow  
- 10/1/98 Water level on date shown  
- No resistance ranging to refusal  
- SPT with solid cone  
- SPT - sample recovered  
- Very dense  
- UD undisturbed sample 50mm diameter  
- UD undisturbed sample 63mm diameter  
- N Standard penetration test (SPT)  
- Stiff  
- Very soft  
- Undisturbed sample  
- Wet  
- Plastic limit  
- Very loose  
- Moist  
- Liquid limit  
- Soft  
- Firm  
- Dry  
- SPT with refuse  
- Loose  
- Medium dense  
- Very dense  

---

**Classification Symbols and Consistency/Density Index:**

- VS = very soft  
- S = soft  
- F = firm  
- St = stiff  
- VSSt = very stiff  
- H = hard  
- Fb = friable  
- VL = very loose  
- L = loose  
- MD = medium dense  
- D = dense  
- VD = very dense
## Engineering Log - Borehole

**Client:** COAL RIVER WORKING PARTY  
**Principal:**  
**Project:** COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE  
**Logged by:** SJK

**Borehole No.** BH 5  
**Date started:** 26.9.2005  
**Date completed:** 26.9.2005  
**Checked by:**  

### Borehole Location

**Refer to Drawing**

<table>
<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
<td><strong>Notes, Samples, Tests</strong></td>
</tr>
<tr>
<td>LM690</td>
<td>1 2 3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Drilling Information

- **Drill model and mounting:** Percussion Drill LM690  
- **Easting:**  
- **Northing:**  
- **Depth (m):**  
- **Hole diameter:** 100 mm  
- **R.L. Surface:** 12.60

### Material Substance

- **Soil Type:** Plasticity or particle characteristics, colour, secondary and minor components.  
- **Moisture Condition:**  
- **Consistency/Density Index:**  

### Additional Information

- **Noted Observations:** No observations noted.
<table>
<thead>
<tr>
<th>Borehole No.</th>
<th>BH 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client:</td>
<td>COAL RIVER WORKING PARTY</td>
</tr>
<tr>
<td>Principal:</td>
<td></td>
</tr>
<tr>
<td>Project:</td>
<td>COAL RIVER, MINE WORKING, FORT DRIVE, NEWCASTLE</td>
</tr>
<tr>
<td>Borehole Location:</td>
<td>REFER TO DRAWING</td>
</tr>
<tr>
<td>Sheet</td>
<td>2 of 2</td>
</tr>
<tr>
<td>Office Job No.:</td>
<td>N08709/01</td>
</tr>
<tr>
<td>Date started:</td>
<td>26.9.2005</td>
</tr>
<tr>
<td>Date completed:</td>
<td>26.9.2005</td>
</tr>
<tr>
<td>Logged by:</td>
<td>SJK</td>
</tr>
<tr>
<td>Checked by:</td>
<td></td>
</tr>
</tbody>
</table>

**Percussion Drill LM690**

**Easting:**

**Northing:**

**Slope:** -8.5°

**R.L. Surface:** 12.60

**Datum:** AHD

<table>
<thead>
<tr>
<th>hole diameter:</th>
<th>100 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support:</td>
<td>M mud</td>
</tr>
<tr>
<td>Water inflow:</td>
<td></td>
</tr>
<tr>
<td>Water outflow:</td>
<td></td>
</tr>
</tbody>
</table>

**COAL:** black. (continued)

**NO CORE:**

**VOID:**

**END VOID**

Borehole terminated due to end of void. Borehole BH 5 terminated at 11.35m

**Material Substance:**

- Soil type: plasticity or particle characteristics, colour, secondary and minor components.
- Moisture condition: dry, moist, wet, plastic limit, liquid limit
- Consistency/density index: VS very soft, S soft, F firm, St stiff, VSSt very stiff, H hard, Fb friable, VL very loose, L loose, MD medium dense, D dense, VD very dense

**Drilling Information:**

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Notes, Samples, Tests</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>M mud</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td>water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>C casing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RR</td>
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</tr>
</tbody>
</table>

**Classification Symbols and Soil Description:**

- Consistency/density index: VS very soft, S soft, F firm, St stiff, VSSt very stiff, H hard, Fb friable, VL very loose, L loose, MD medium dense, D dense, VD very dense
- Moisture: dry, moist, wet
- Plasticity: plastic limit, liquid limit
- Particle characteristics: sand, silt, clay
- Colour:
- Secondary and minor components:

**Notes:**

- Drill model and mounting: Percussion Drill LM690
- Hole diameter: 100 mm
- Water inflow
- Water outflow
- No observations
- Borehole terminated due to end of void.
- Borehole BH 5 terminated at 11.35m

**Additional Observations:**

- Notes, samples, tests
- Undisturbed sample 50mm diameter
- Undisturbed sample 63mm diameter
- Standard penetration test (SPT)
- SPT - sample recovered
- SPT with solid cone
- Vane shear (kPa)
- Pressuremeter
- Bulk sample
- Environmental sample
- Refusal

**Reference:**

- REфер TO DRAWING
APPENDIX C

Photos – Pages 1 to 3
DRIFT 1 – After completion of Drilling

DRIFT 2 – Drilling of Second Borehole (BH3)
DRIFT 2 – Testing for Explosive Gas in Borehole

DRIFT 3 – Drilling of Borehole
DRIFT 2 – Coal Mine working in BH3 as reviewed with CCT Camera

DRIFT 3 – Intact coal in BH 5 as reviewed CCT Camera