

Section of:

MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

Purpose:

COAL EXPLORATION

Exact Site:

NATIONAL GRID CO-ORDINATES

(Nat. Grid, Sheet & Qtr.) B/H REGD. NO.

SK 46 NE

55a (No.16)
55b (No.17)

E445744) Both holes
N368403)

Level at which bore commenced relative to
O.D. : 376.1 m
(Zero: floor of Clay Cross Soft)

Date of Boring: 1980-81

Borer: NATIONAL COAL BOARD

Cores examined by D.J. Green, N.C.B. Geologist

SK 46 NE / 44 +
50

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|-----|-------|----|
| | | m | cm | m | cm |
| | Top of borehole at | | | 146 | 54 |
| Siltstone | coarse, vaguely greenish; occasional siltstone medium layers; poorly laminated; rare roots throughout | 0 | 84+ | 145 | 70 |
| Siltstone | medium with occasional siltstone coarse layers (strong); common ironstone bands; poorly laminated | 0 | 90 | 144 | 80 |
| Siltstone | fine, poorly laminated; common plant debris | 0 | 54 | 144 | 26 |
| Siltstone | coarse, unlaminated; rare plant debris | 0 | 61 | 143 | 65 |
| Siltstone | medium with occasional siltstone fine and muddy layers, poorly laminated; occasional ironstone bands; rare plant debris | 1 | 50 | 142 | 15 |
| Siltstone | fine, poorly laminated; common ironstone nodules; occasional plant debris | 0 | 75 | 141 | 40 |



COMMERCIAL IN CONFIDENCE 2

SK 146 / NE / 44+
50

-- JUN 1982

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | silty, laminated; occasional ironstone bands. passage | 0 | 28 | 141 | 12 |
| Siltstone | medium, laminated; occasional plant debris | 0 | 61 | 140 | 51 |
| Mudstone | silty, laminated; rare ironstone bands; common plant remains including <u>Calamites</u> | 0 | 91 | 139 | 60 |
| Mudstone | silty, poorly laminated; common listric surfaces; common plant debris; common roots; occasional <u>Pinnularia</u> Sharp | 0 | 37 | 139 | 23 |
| Sandstone | fine and siltstone fine; locally common load and pouch structures; occasional dune sets; common ripples and minor erosion surfaces; common micaceous planty planes | 1 | 81 | 137 | 42 |
| Sandstone | medium; common micaceous planty planes above 134.50; common ripples above 134.80 | 5 | 14 | 132 | 28 |
| Siltstone | medium and sandstone fine; locally vaguely rippled; sub-vertical, calcite-mineralized joint throughout | 0 | 12 | 132 | 16 |
| Siltstone | medium, poorly laminated; sub-vertical, unmineralised joint throughout passage | 0 | 10 | 132 | 06 |
| Siltstone | fine, poorly laminated; common ironstone bands passage | 0 | 72 | 131 | 34 |
| Mudstone | silty, poorly laminated; common thin ironstone bands passage | 1 | 94 | 129 | 40 |
| Mudstone | dark, laminated; common ironstone bands; common worm tracks on some bedding planes | 0 | 34 | 129 | 06 |

COMMERCIAL IN CONFIDENCE
CORE ANALYSED 129.06 to 126.08

3



SK/46/NE / 44 +
50

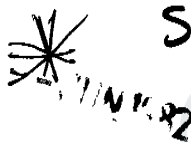
22 JUN 1982

| | | | | | |
|------------------------|--|---|----|-----|----|
| Mudstone | silty, ironstone bands; non-marine lamellibranchs | 0 | 25 | 128 | 81 |
| Mudstone | shaly, carbonaceous; non-marine lamellibranch impressions detached | 0 | 13 | 128 | 68 |
| <u>SECOND WATERLOO</u> | | | | | |
| | (Coal, bright 15) | | | | |
| Upper | (Coal, banded 24) fragments | | | | |
| Leaf | (Coal, mostly bright 38) | | | | |
| | Mudstone, laminated, rootlets 32 cylinders | | | | |
| | (Cannel 7) | | | | |
| Middle | (Coal and dirty coal 18) | | | | |
| Leaf |) fragments | | | | |
| | Seatearth; mudstone, grey 20) | | | | |
| Lower |) | | | | |
| Leaf | (Coal mostly bright 48) | | | | |
| | 202 cm | | | | |
| | Dip less than 2°, recovery 75% | 2 | 02 | 126 | 66 |
| Seatearth Mudstone | silty, grey, listric | 0 | 18 | 126 | 48 |
| Siltstone | fine, grey, with fine sandstone laminae, commoner in basal 0.14; ironstone root-nodules and common roots | 0 | 40 | 126 | 08 |
| Sandstone | fine with common siltstone medium laminae (60:40); local slump structures between 125.98 and 126.04; abundant roots | 0 | 30 | 125 | 78 |
| Siltstone | fine to medium; poorly laminated; common roots | 0 | 54 | 125 | 24 |
| Siltstone | fine to medium, occasional muddy layers, unlaminated; sporadic roots throughout passage | 1 | 39 | 123 | 85 |
| Sandstone | medium to fine, (strong), with occasional siltstone laminae; common poorly developed ripples; occasional micaceous planty planes | 0 | 47 | 123 | 38 |
| Siltstone | coarse, poorly laminated; common slurried layers; common plant debris including <u>Neuropteris</u> | 1 | 04 | 122 | 34 |



COMMERCIAL IN CONFIDENCE

4



SK/46/NE/44+
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine with occasional sandstone fine laminae and thin layers (80:20) towards base; common load casts in basal 0.05; occasional plant debris including <u>Calamites</u> and <u>Neuropteris</u> | 1 | 16 | 121 | 18 |
| Mudstone | locally slightly silty; poorly laminated; rare ironstone bands; common non-marine lamellibranchs in basal 0.10; very rare plant debris | 2 | 89 | 118 | 29 |
| Mudstone | carbonaceous, shaly | 0 | 09 | 118 | 20 |
| <u>COAL</u> | bright (cylinder) | 0 | 02 | 118 | 18 |
| Seatearth Mudstone | silty, unlaminated, brownish; abundant listric surfaces; abundant roots passage | 1 | 28 | 116 | 90 |
| Mudstone | silty, unlaminated, greenish; abundant irregular listric surfaces; occasional ironstone nodules; abundant roots | 2 | 97 | 113 | 93 |
| Siltstone | medium, unlaminated, greenish; common roots, becoming less common to base | 1 | 15 | 112 | 78 |
| Sandstone | fine to medium, locally vaguely greenish; rare discontinuous micaceous planty planes; rare comminuted plant debris | 1 | 48 | 111 | 30 |
| Siltstone | fine and sandstone fine, interlaminated; locally well developed ripples passage | 0 | 20 | 111 | 10 |
| Siltstone | fine to medium, poorly laminated | 0 | 50 | 110 | 60 |
| Siltstone | medium with common thin sandstone fine laminae (70:30); locally vaguely ripple bedded; occasional comminuted plant debris | 0 | 30 | 110 | 30 |

COMMERCIAL AND RESEARCH 5

Handwritten sketch of a star-like symbol

SK/46/NE/44+
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|-----------|------------|-----------|
| | | m | cm | m | cm |
| Siltstone | medium, poorly laminated; common slurried layers | 0 | 54 | 109 | 76 |
| Siltstone | fine, poorly laminated; common plant debris | 2 | 20 | 107 | 56 |
| Siltstone | fine and sandstone fine; occasional micaceous planty planes; rare ripples and minor erosion surfaces | 0 | 86 | 106 | 70 |
| Sandstone | medium, generally massive; rare discontinuous micaceous carbonaceous planes | 0 | 62 | 106 | 08 |
| Siltstone | fine with common thin sandstone fine laminae (60:40); occasional ripples; rare plant debris | 0 | 23 | 105 | 85 |
| Siltstone | fine, poorly laminated, with rare wispy thin sandstone fine laminae near the base; rare plant debris | 0 | 30 | 105 | 55 |
| Sandstone | medium, occasional micaceous carbonaceous planes; rare poorly developed ripples; rare plant remains erosional | 3 | 27 | 102 | 28 |
| Mudstone | silty, poorly laminated; rare plant debris | 0 | 80 | 101 | 48 |
| <u>COAL</u> | bright (fragments) | <u>0</u> | <u>24</u> | <u>101</u> | <u>24</u> |
| Seatearth Mudstone | silty, unlaminated; abundant irregular listric surfaces; abundant roots | 0 | 48 | 100 | 76 |
| Sandstone | fine to medium; occasional micaceous planty planes; occasional poorly developed ripples; occasional roots including <u>Stigmaria</u> | 0 | 81 | 99 | 95 |

COMMERCIAL IN CONFIDENCE
6
MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

SK/46/NE/44+
50

Section of:

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Seatearth Mudstone | silty, unlaminated, greenish; occasional fine siltstone passages; common roots | 1 | 31 | 98 | 64 |
| Siltstone | fine, unlaminated, greenish; common ironstone nodules; abundant roots | 0 | 88 | 97 | 76 |
| Siltstone | medium, unlaminated, grey; common ironstone nodules; coalified <u>Stigmara</u> , abundant roots | 0 | 40 | 97 | 36 |
| Mudstone | silty, unlaminated, greenish; occasional irregular listric surfaces; common roots | 0 | 32 | 97 | 04 |
| Siltstone | fine to medium, unlaminated, greenish; ironstone nodules; common roots | 1 | 04 | 96 | 00 |
| Siltstone | coarse, unlaminated, greenish, abundant roots | 0 | 74 | 95 | 26 |
| Siltstone | fine to medium, unlaminated; common roots, occasional root nodules near the base | 0 | 38 | 94 | 88 |
| Mudstone | silty, poorly laminated; common irregular listric surfaces; occasional iron-filled roots near base, occasional carbonaceous roots near top; occasional coalified plant remains, common well preserved <u>Neuropteris</u> leaves near top | 1 | 18 | 93 | 70 |
| Siltstone | fine to medium, poorly laminated; rare sandstone fine laminae in basal 0.50; occasional iron-rich patches; occasional sub-vertical unmineralised joints; occasional comminuted plant debris; occasional plant remains including <u>Calamites</u> and <u>Pinnularia</u> above 90.80 passage | 5 | 00 | 88 | 70 |
| Siltstone | fine to medium with occasional sandstone fine laminae and lenses (80:20); locally vaguely rippled; 45 degree fracture at 88.43 | 0 | 65 | 88 | 05 |



Section of:

MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

7
COMMERCIAL IN CONFIDENCE

SK46/NE/44+
50

JUN 1982

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine, locally muddy, laminated passage | 0 | 50 | 87 | 55 |
| Mudstone | silty with rare sandy laminae near the base; occasional iron-rich layers; occasional thin wormy ironstone bands; rare small non-marine lamellibranchs; rare plant remains | 3 | 32 | 84 | 23 |
| Siltstone | fine with occasional wispy thin sandstone fine laminae (95:5); occasional plant remains including <u>Neuropteris</u> towards the top | 0 | 39 | 83 | 84 |
| Siltstone | fine, locally muddy, poorly laminated; rare vague sandy laminae; occasional iron-rich patches | 1 | 04 | 82 | 80 |
| Mudstone | silty, poorly laminated | 0 | 95 | 81 | 85 |
| Siltstone | fine, unlaminated; common iron-rich patches. short passage | 0 | 85 | 81 | 00 |
| Mudstone | slightly silty, laminated passage | 1 | 54 | 79 | 46 |
| Mudstone | silty, slightly carbonaceous, laminated, shaly; becoming less carbonaceous towards top; occasional shelly ironstone bands up to 0.05 thick passage | 0 | 74 | 78 | 72 |
| Mudstone | highly carbonaceous, shaly, occasional ostracods; common non-marine lamellibranchs in basal 0.05, rare above | 0 | 15 | 78 | 57 |
| <u>COAL</u> | and dirt (fragments) | 0 | 30 | 78 | 27 |
| Seatearth Mudstone | locally silty, laminated; common listric surfaces, core completely fragmented; locally slightly carbonaceous; occasional rootlets sharp | 2 | 13 | 76 | 14 |

COMMERCIAL IN CONFIDENCE

8

SK/46/NE/44+
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|-----------|-----------|-----------|
| | | m | cm | m | cm |
| Siltstone | fine with common thin sandstone fine laminae (70:30); common micaceous carbonaceous planes | 0 | 75 | 75 | 39 |
| Sandstone | fine with rare siltstone fine laminae; vaguely ripple bedded; micaceous carbonaceous planes; occasional comminuted plant debris | 1 | 92 | 73 | 47 |
| Sandstone | fine and siltstone fine; common lenticular ripples; common micaceous planes; rare sand-filled burrows | 1 | 52 | 71 | 95 |
| Siltstone | fine to medium with common thin sandstone fine laminae (70:30); common plant debris | 1 | 37 | 70 | 58 |
| Siltstone | muddy, poorly laminated passage | 0 | 58 | 70 | 00 |
| Mudstone | silty, laminated, dark; common non-marine lamellibranchs in basal 0.10; scattered non-marine lamellibranch fragments throughout | 2 | 66 | 67 | 34 |
| <u>Ironstone</u> | shelly | <u>0</u> | <u>06</u> | <u>67</u> | <u>28</u> |
| Siltstone | fine, unlaminated; common <u>roots</u> in top 0.10, rare below | 1 | 58 | 65 | 70 |
| Siltstone | fine with common sandstone fine laminae and layers (60:40); slump structures at 63.70, 65.40; common <u>rootlets</u> 64.20 to 64.60; common plant fragments including <u>Neuropteris</u> 64.60 to 64.75 | 3 | 70 | 62 | 00 |
| Siltstone | muddy, laminated passage | 0 | 30 | 61 | 70 |
| Mudstone | silty, laminated; abundant non-marine lamellibranchs including <u>Naiadites</u> and <u>Anthracosia</u> | 0 | 90 | 60 | 80 |



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

9



SK/46/N E/44
50

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|--------------------------------------|--|-----------|----|-----------|-----------|
| | | m | cm | m | cm |
| Mudstone | carbonaceous, shaly; detached <u>Spirorbis</u> at 60.05; common non-marine lamellibranch fragments including <u>Naiadites</u> <u>CORE ANALYSED 59.79 TO 58.27</u> | 1 | 01 | 59 | 79 |
| Mudstone | silty; a few ironstone nodules | 0 | 53 | 59 | 26 |
| <u>SECOND</u> <u>ELL</u> | Coal, bright 80) fragments Coal, inferior bright 14) 94 cm Dip less than 2°. <u>Recovery</u> 60% (based on borehole recorder) | 0 | 94 | | |
| Seatearth Siltstone | medium, with a few bright coal laminae | 0 | 05 | <u>58</u> | <u>32</u> |
| Siltstone | muddy, poorly laminated, dark; common plant fragments including <u>Lepidodendron</u> | 0 | 07 | 58 | 27 |
| <u>Seatearth</u> <u>Siltstone</u> | muddy, unlaminated, abundant rootlets | 0 | 20 | 58 | 00 |
| Siltstone | fine, poorly laminated, thin irregular sandstone fine laminae in top 0.30, rootlets above 57.25 | 1 | 25 | 56 | 75 |
| Siltstone | fine with common thin sandstone fine laminae (70:30); burrows up to 0.08 deep; comminuted plant debris | 0 | 45 | 56 | 30 |
| Siltstone | fine, poorly laminated; common faultlets in basal 0.50 passage | 0 | 57 | 55 | 73 |
| Siltstone | muddy with irregular thin sandstone fine laminae 55.43 to 55.53 | 1 | 92 | 53 | 81 |
| Siltstone | fine with sandstone fine (70:30) slurried in parts | 0 | 25 | 53 | 56 |
| Siltstone | muddy, laminated, dark; isolated non-marine lamellibranch fragment at 53.40 | 0 | 18 | <u>53</u> | <u>38</u> |

COMMERCIAL IN CONFIDENCE

10



SK/46/NE/44+
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|---|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| | | | | 53 | 38 |
| <u>Seatearth</u> <u>Siltstone</u> | muddy, unlaminated, cheesy texture, ironstone nodules in top 0.10; abundant rootlets | 0 | 73 | 52 | 65 |
| Siltstone | fine with common sandstone fine laminae in basal 0.30; rare rootlets | 0 | 37 | 52 | 28 |
| Sandstone | fine with thin siltstone laminae; slurried in parts, common load casts throughout; contact inclined at 20 degrees | 4 | 91 | 47 | 37 |
| Siltstone | muddy to fine with common thin sandstone fine laminae in top 0.15 passage | 0 | 47 | 46 | 90 |
| Mudstone | silty laminated; common shelly ironstone to 43.02 passage | 5 | 75 | 41 | 15 |
| Siltstone | muddy, laminated, dark; common non-marine lamellibranchs passage | 1 | 50 | 39 | 65 |
| <u>CLAY CROSS</u> <u>MARINE BAND</u> | mudstone, silty, completely fragmented; cone-in-cone, canky ironstone 36.14 to 36.36; <u>Lingula</u> and <u>Dunbarella</u> fragments towards base; isolated <u>Lingula</u> at 37.46 (core from 34.65 to 36.14 broken, part lost) | 5 | 00 | 34 | 65 |
| Siltstone | muddy, cheesy texture | 0 | 10 | 34 | 55 |
| Siltstone | muddy to fine with common thin sandstone fine laminae, 33.65 to 34.05 | 1 | 10 | 33 | 45 |
| Mudstone | silty, laminated; wormy | 1 | 91 | 31 | 54 |
| Mudstone | silty, dark; common non-marine lamellibranch fragments; common <u>Geisina</u> in basal 0.02 | 0 | 25 | 31 | 29 |
| Siltstone | muddy to fine; thin sandstone laminae 29.90 to 30.08; poorly laminated; ironstone nodules in top 0.30; plant remains in top 0.30 | 2 | 19 | 29 | 10 |

COMMERCIAL IN CONFIDENCE ~~11~~

SK/46/NE 14x
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|-------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | silty, laminated | 0 | 75 | 28 | 35 |
| Siltstone | muddy, becoming siltstone fine upwards with rare sandstone fine laminae passage | 0 | 65 | 27 | 70 |
| Mudstone | silty, laminated, dark; shelly ironstone 27.00 to 27.12; abundant <u>Geisina</u> in basal 0.01 | 0 | 77 | 26 | 93 |
| <u>Seatearth</u> Mudstone | silty, dark, unlaminated, listric; abundant rootlets | 0 | 02 | 26 | 91 |
| Siltstone | fine with irregular thin sandstone fine laminae; cheesy texture; abundant rootlets | 0 | 46 | 26 | 45 |
| Siltstone | fine with common thin sandstone fine laminae; sandstone layer 24.58 to 24.83; common rootlets above 26.25 | 3 | 30 | 23 | 15 |
| Siltstone | muddy, poorly laminated passage | 1 | 05 | 22 | 10 |
| Mudstone | silty, laminated, wormy passage | 0 | 80 | 21 | 30 |
| Mudstone | silty, dark, abundant thick shelled non-marine lamellibranchs including <u>Carbonicola</u> ; abundant <u>Geisina</u> | 0 | 75 | 20 | 55 |
| <u>COAL</u> | (cylinder) | 0 | 02 | 20 | 53 |
| <u>Seatearth</u> Siltstone | fine, poorly laminated; common ironstone nodules; common rootlets | 0 | 73 | 19 | 80 |
| Siltstone | fine with common thin sandstone fine laminae; sporadic rootlets above 18.50 | 3 | 32 | 16 | 48 |
| Mudstone | silty, laminated | 1 | 18 | 15 | 30 |



COMMERCIAL IN CONFIDENCE

12



SK/46/NE/44+50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

JUN 1982

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | silty, laminated, dark; shelly ironstone band 15.25 to 15.30; abundant thick shelled non-marine lamellibranchs | 0 | 61 | 14 | 69 |
| <u>COAL</u> | and dirt (completely fragmented) | 0 | 10 | 14 | 59 |
| Seatearth Mudstone | silty, dark, unlaminated, cheesy texture; abundant rootlets (core fragmented) | 0 | 39 | 14 | 20 |
| Mudstone | silty, poorly laminated, common rootlets | 0 | 33 | 13 | 87 |
| Siltstone | muddy, laminated; common rootlets above 13.20 passage | 1 | 27 | 12 | 60 |
| Mudstone | silty, laminated passage | 0 | 65 | 11 | 95 |
| Mudstone | carbonaceous, shaly; <u>Geisina</u> at 11.65; common <u>Naiadites</u> fragments at 11.68 passage | 0 | 40 | 11 | 55 |
| Mudstone | silty, laminated; abundant non-marine lamellibranchs 10.50 to 10.70 | 1 | 50 | 10. | 05 |
| Markham No. 16 (upbore) | <u>Start of coring in upbore: 10.05 m</u> | | | | |
| <u>ORIGIN</u> | <u>Base of Clay Cross Soft Seam</u> | | | 0 | 00 |
| Markham No. 17 (downbore) | <u>Start of coring in downbore; 4.00 m</u> | | | | |
| | | | | 4. | 00 |
| Siltstone | fine with common thin sandstone fine laminae 70:30; common ripple sets, occasional minor erosion surfaces; rare comminuted plant debris | 0 | 44 | 4 | 44 |
| Siltstone | fine and sandstone fine; interlaminated and interlayered. Ripple bedded throughout, minor erosion surfaces | 0 | 19 | 4 | 63 |



COMMERCIAL IN CONFIDENCE

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

13
SK/46/NE / 44+
50
JUN '82

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|-----------------------------------|--|-----------|-----------|-----------|-----------|
| | | m | cm | m | cm |
| Sandstone | fine to medium with rare siltstone fine laminae; common micaceous planty planes. Local vague ripples | 1 | 25 | 5 | 88 |
| Siltstone | fine with common sandstone fine laminae, 70:30; becoming 60:40 towards base. Poorly developed ripples throughout Passage | 0 | 31 | 6 | 19 |
| Sandstone | fine with common siltstone fine laminae, 70:30. Common ripple sets; occasional ripple drift, common micaceous planes | 0 | 51 | 6 | 70 |
| Siltstone | fine and sandstone fine, complexly interlaminated and interlayered; ripple bedded throughout, occasional minor erosion surfaces. Locally developed minor load structures. Common micaceous planty planes. Rare iron-rich patches Sharp | 1 | 08 | 7 | 78 |
| Sandstone | fine to medium; core broken into 1 cm pieces though no sign of bedding sharp, erosional | 0 | 20 | 7 | 98 |
| Mudstone | silty, laminated. Common ironstone bands; rare worm tracks; rare plant debris | 1 | 12 | 9 | 10 |
| | Detached | | | | |
| <u>DEEP SOFT</u> <u>(part)</u> | Coal (fragments) 0.19 Detached Seatearth, silty mudstone, coal laminae (fragments) 0.16 Detached Coal and dirt (fragments) <u>0.08</u> <u>0.43</u> | | | | |
| | Detached | <u>0</u> | <u>43</u> | <u>9</u> | <u>53</u> |
| Seatearth Mudstone | silty, occasional coaly laminae. Abundant roots | 0 | 56 | 10 | 09 |
| <u>COAL</u> | and dirt (fragments and broken cylinders) | <u>0</u> | <u>43</u> | <u>10</u> | <u>52</u> |

COMMERCIAL IN CONFIDENCE

14

SK/46/NE/44 + 50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Seatearth Mudstone | silty, occasional coaly laminae; common roots | 1 | 22 | 11 | 74 |
| Siltstone | fine to medium, unlaminated, granular texture. Occasional roots | 0 | 79 | 12 | 53 |
| Ironstone | | 0 | 12 | 12 | 65 |
| Siltstone | fine to medium, poorly laminated, becoming muddy towards base. Occasional iron-rich patches; 0.11 ironstone band at base. Rare plant debris | 0 | 83 | 13 | 48 |
| Mudstone | silty, poorly laminated. Rare plant debris | 0 | 13 | 13 | 61 |
| Siltstone | medium, locally siltstone fine. Slurried texture near top. Poorly laminated; occasional faultlets. Occasional plant remains | 0 | 54 | 14 | 15 |
| Siltstone | fine, unlaminated with occasional siltstone medium passages. Slurried texture in basal 0.20. Common faultlets. Common plant remains including <u>Neuropteris</u> ; common comminuted plant debris | 0 | 43 | 14 | 58 |
| Mudstone | laminated | 0 | 06 | 14 | 64 |
| Siltstone | fine, locally muddy, unlaminated; abundant faultlets. Common ironstone bands. Single <u>Naiadites</u> at 15.97. Occasional plant debris | 2 | 29 | 16 | 93 |
| Siltstone | medium with common sandstone fine laminae, 70:30. Occasional ironstone patches. Occasional faultlets. Sub-vertical unmineralised joint in basal 0.20 Occasional plant debris | 0 | 40 | 17 | 33 |

COMMERCIAL REFERENCE 15

SK/46/NE/447
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine, locally muddy, unlaminated | 0 | 72 | 18 | 05 |
| Siltstone | coarse, poorly laminated | 0 | 48 | 18 | 53 |
| CORE LOST | | 0 | 47 | 19 | 00 |
| Mudstone | laminated, becoming slightly carbonaceous in basal 0.10. Core completely fragmented. Occasional ironstone bands; rare non-marine lamellibranch fragments. Rare guillemites. Common worm tracks on some bedding planes | 3 | 96 | 22 | 96 |
| COAL | (fragments) | 0 | 15 | 23 | 11 |
| Seatearth Mudstone | core completely fragmented | 0 | 29 | 23 | 40 |
| Siltstone | coarse, unlaminated; abundant roots | 0 | 25 | 23 | 65 |
| Sandstone | fine with rare wispy thin siltstone fine laminae, becoming more common towards base. Common micaceous carbonaceous planes. Common sand-filled roots passage | 0 | 35 | 24 | 00 |
| Siltstone | fine to medium with rare sandstone fine laminae. Occasional iron-rich patches. Common comminuted plant debris | 0 | 40 | 24 | 40 |
| Mudstone | silty, poorly laminated; common ironstone bands. Occasional roots | 0 | 25 | 24 | 65 |
| Siltstone | fine with occasional wispy sandstone fine microlenses, 90:10; occasional ironstone bands. Common comminuted plant debris. Rare roots in top 0.10 Passage | 0 | 60 | 25 | 25 |

COMMERCIAL IN CONFERENCE

16

SK/46/NE/44 +
50 *

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|---|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine, laminated; occasional thin ironstone bands. Occasional plant fragments passage | 0 | 35 | 25 | 60 |
| Mudstone | silty, laminated sharp | 0 | 29 | 25 | 89 |
| Sandstone | fine with rare siltstone fine laminae; vaguely ripple bedded. Common micaceous planty planes. Common comminuted plant debris | 0 | 09 | 25 | 98 |
| Mudstone | silty, laminated, core fragmented. Occasional ironstone bands. Occasional worm tracks; abundant burrows in top 0.05 Detached | 1 | 64 | 27 | 62 |
| <u>DEEP HARD</u> <u>(Upper Leaf)</u> | Coal (fragments) Detached | 0 | 27 | 27 | 89 |
| Seatearth Siltstone | fine to muddy, grey; common ironstone nodules; common roots | 0 | 51 | 28 | 40 |
| Siltstone | fine to medium, unlaminated; common ironstone bands and nodules, becoming rare below 29.20; common roots | 1 | 30 | 29 | 70 |
| Siltstone | medium with occasional sandstone fine laminae. Occasional iron-rich patches. Rare roots, rare plant debris | 0 | 20 | 29 | 90 |
| Siltstone | fine with common thin sandstone fine laminae and layers, variously inclined. Common plant debris | 2 | 20 | 32 | 10 |
| Mudstone | silty, laminated. Common worm tracks on some bedding planes | 0 | 90 | 33 | 00 |
| Siltstone | fine, locally muddy, laminated; iron-rich layers in basal 0.10 | 0 | 37 | 33 | 37 |



17

SK/46/NE/44+
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|--------------------------------------|--|---|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | laminated. Occasional plant debris | 0 | 09 | 33 | 46 |
| Siltstone | fine, poorly laminated, occasional medium siltstone passages. Occasional iron-rich layers. Rare plant debris | 0 | 44 | 33 | 90 |
| Mudstone | silty, laminated, fining downwards. Occasional ironstone bands. Common worm tracks. passage | 1 | 10 | 35 | 00 |
| Mudstone | laminated; core fragmented. Rare plant remains | 0 | 48 | 35 | 48 |
| Siltstone | fine, poorly laminated. Occasional iron-rich layers. Rare plant remains including <u>Lepidostrobos</u> . Vague worm tracks, locally common small burrows | 0 | 94 | 36 | 42 |
| | <u>CORE ANALYSED, 36.42 to 38.04</u> | | | | |
| Mudstone | silty, light grey | 0 | 31 | 36 | 73 |
| <u>DEEP HARD (Main Leaf)</u> | Coal, mostly bright Coal, inferior bright, pyritic Coal, bright Coal, inferior bright, pyritic Coal, mostly bright | 40) 19)cyl- 32)inders 3) 21) <u>115 cm</u> | | | |
| | <u>Dip less than 2° Recovery 100%</u> | 1 | 15 | 37 | 88 |
| Seatearth Mudstone | light grey | 0 | 16 | 38 | 04 |
| Mudstone | silty, grey, common roots | 0 | 26 | 38 | 30 |
| Siltstone | coarse, unlaminated. Common roots | 0 | 15 | 38 | 45 |

~~CONFIDENTIAL~~

18

SK/40/NE/44+50 + *

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine with common thin sandstone fine laminae, 70:30. Common roots | 0 | 57 | 39 | 02 |
| <u>Seatearth</u> | | | | | |
| Sandstone | fine with occasional root-disturbed siltstone fine laminae. Common micaceous planty planes. Common iron-rich patches. Occasional roots | 0 | 78 | 39 | 80 |
| Siltstone | fine with common thin sandstone fine laminae, 70:30. Common small load and pouch structures. Occasional roots | 0 | 15 | 39 | 95 |
| Siltstone | fine with rare sandstone fine laminae and lenses. Occasional roots. Occasional plant remains | 0 | 10 | 40 | 05 |
| Siltstone | fine, poorly laminated. Occasional roots passage | 0 | 35 | 40 | 40 |
| Mudstone | laminated; occasional ironstone bands | 0 | 20 | 40 | 60 |
| Siltstone | fine with common, variously inclined sandstone fine laminae and layers, 60:40. Ripple-bedded throughout. Common micaceous planty planes. Common sand-filled burrows | 0 | 60 | 41 | 20 |
| Siltstone | fine with occasional muddy passages; 0.18 slurried layer at 41.47. Common plant debris. Occasional small burrows. passage | 2 | 30 | 43 | 50 |
| Mudstone | silty, poorly laminated passage | 0 | 30 | 43 | 80 |
| Siltstone | fine, poorly laminated. Occasional iron-rich layers. Common worm tracks | 0 | 67 | 44 | 47 |
| Mudstone | laminated; common ironstone bands Detached | 1 | 43 | 45 | 90 |

COMMERCIAL IN CONFIDENCE

19

SK/46/NE/44+
50 *

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

-- JUN 1982

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|-----------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| <u>1ST PIPER</u> <u>(Part)</u> | Coal, dirty (fragments) Detached | 0 | 29 | 46 | 19 |
| Seatearth Mudstone | Core fragmented | 0 | 91 | 47 | 10 |
| Siltstone | fine, grey; common ironstone nodules Common roots | 0 | 44 | 47 | 54 |
| Mudstone | Core fragmented | 0 | 57 | 48 | 11 |
| Siltstone | fine with occasional muddy layers. Occasional ironstone nodules. Occasional roots. Common <u>Neuropteris</u> leaves below 48.50 | 0 | 59 | 48 | 70 |
| Siltstone | fine, poorly laminated; rare ironstone nodules. Abundant plant remains including <u>Mariopteris</u> ; <u>Calamites</u> ; <u>Neuropteris</u> and <u>Pinnularia</u> | 2 | 66 | 51 | 36 |
| Siltstone | medium, poorly laminated. Abundant burrows in top 0.10; rare plant debris passage | 0 | 84 | 52 | 20 |
| Siltstone | medium with common thin sandstone fine laminae, 70:30; occasional ripples and minor erosion surfaces, common micaceous planty planes passage | 1 | 55 | 53 | 75 |
| Sandstone | fine with common siltstone fine laminae, 70:30. Common ripples and minor erosion surfaces. Common micaceous planty planes | 1 | 37 | 55 | 12 |
| Siltstone | fine with common thin sandstone fine laminae, 60:40. Common ripples. Common micaceous planty planes | 0 | 28 | 55 | 40 |

COMMERCIAL IN CONFIDENCE

20

SK /46 /NE /44+
50



-- JUN 1982

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Sandstone | fine with common siltstone fine laminae. Vaguely ripple bedded. Common micaceous planty planes | 0 | 50 | 55 | 90 |
| Sandstone | medium, generally massive, rare discontinuous micaceous planty planes showing vague dune bedding; conglomerate between 61.75 and 61.82. Occasional thin fine siltstone layers. Common sub-vertical mineralised joints sharp | 6 | 87 | 62 | 77 |
| Siltstone | fine and sandstone fine, interlayered. Common ripples and minor erosion surfaces | 0 | 81 | 63 | 58 |
| Sandstone | medium, massive. Common sub-vertical unmineralised joints | 1 | 05 | 64 | 63 |
| Siltstone | fine and sandstone fine; interlayered; common mineralised joints. Common ripples, common micaceous planty planes passage | 1 | 57 | 66 | 20 |
| Siltstone | fine, poorly laminated, common listric surfaces. Common sub-vertical joints. Rare horizons with thin sandstone fine laminae. Rare plant debris. passage | 2 | 90 | 69 | 10 |
| Siltstone | medium, poorly laminated | 1 | 10 | 70 | 20 |
| Sandstone | fine with common siltstone fine laminae, 70:30. Occasional ripples. Detached | 0 | 86 | 71 | 06 |
| <u>COAL</u> | and dirt (broken cylinders) | 0 | 34 | 71 | 40 |
| Seatearth Mudstone | unlaminated; grey; rare coal streaks Detached | 0 | 13 | 71 | 53 |

COMMERCIAL REFERENCE

21

SK/46/NE 44 + 50 *
2-JUN-2027

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|-------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| <u>COAL AND DIRT</u> | Coal, bright 0.05 (cylinder) Coal and dirt 0.14 (broken cylinders 0.19 and fragments) | | | | |
| | Detached | 0 | 19 | 71 | 72 |
| Seatearth Mudstone | unlaminated, grey; abundant listric surfaces; abundant roots | 0 | 29 | 72 | 01 |
| Siltstone | fine, poorly laminated; abundant roots | 0 | 57 | 72 | 58 |
| Siltstone | fine, poorly laminated; rare ironstone nodules; rare roots; common plant debris | 0 | 42 | 73 | 00 |
| Mudstone | silty, poorly laminated, common listric surfaces; common roots | 0 | 82 | 73 | 82 |
| <u>Seatearth Mudstone</u> | grey, common coal streaks, abundant roots | 0 | 17 | 73 | 99 |
| Siltstone | medium, grey; occasional ironstone nodules, common roots | 0 | 45 | 74 | 44 |
| Sandstone | fine with common siltstone fine laminae, 60:40. Occasional ironstone nodules. Common roots in top 0.05; rare below. passage | 0 | 21 | 74 | 65 |
| Siltstone | fine, unlaminated; rare plant remains | 1 | 06 | 75 | 71 |
| Siltstone | fine with common sandstone fine laminae, 70:30. Common vague ripples. Common micaceous planty planes Sharp | 0 | 35 | 76 | 06 |
| Mudstone | silty, laminated; rare non-marine lamellibranchs | 0 | 14 | 76 | 20 |

COMMERCIAL REFERENCE

22

SK/46/NE/44+
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine, poorly laminated; rare plant debris passage | 0 | 60 | 76 | 80 |
| Mudstone | silty, poorly laminated; rare plant debris | 0 | 19 | 76 | 99 |
| Siltstone | fine, poorly laminated; occasional muddy passages; common small burrows | 1 | 99 | 78 | 98 |
| Mudstone | very weak, core completely fragmented; occasional ironstone bands | 3 | 65 | 82 | 63 |
| Mudstone | carbonaceous, shaly. Common ostracods. Rare plant remains including <u>Lepidodendron</u> and <u>Neuropteris</u> Attached | 0 | 26 | 82 | 89 |
| <u>COAL</u> | and dirt (cylinder) Attached | 0 | 04 | 82 | 93 |
| Mudstone | carbonaceous, shaly. Locally common ostracods. Locally common fish scales. Detached | 0 | 06 | 82 | 99 |
| Mudstone | and <u>Coal</u> . Abundant plant fragments (cylinder) Detached | 0 | 12 | 83 | 11 |
| Seatearth Mudstone | silty, unlaminated, grey, occasional irregular listric surfaces, abundant roots | 0 | 31 | 83 | 42 |
| Siltstone | fine, muddy, unlaminated, grey; occasional ironstone bands; common roots | 0 | 36 | 83 | 78 |
| Mudstone | silty with local muddy siltstone passages; core completely fragmented; common roots, becoming rare towards base sharp | 1 | 34 | 85 | 12 |
| Sandstone | medium; common micaceous planty planes; rare roots | 0 | 31 | 85 | 43 |



COMMERCIAL IN CONFIDENCE

23

SK46 NE / 44 +
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | laminated, fissile, core locally completely fragmented; occasional ironstone bands up to 0.04 thick; locally common worm tracks sharp | 0 | 77 | 86 | 20 |
| Mudstone | highly carbonaceous, shaly; core completely fragmented in top 0.22; common ostracods including <u>Geisina</u> | 0 | 40 | 86 | 60 |
| <u>CORE LOST</u> | | 0 | 60 | 87 | 20 |
| Mudstone | carbonaceous, poorly laminated in top 0.30, becoming shaly below; locally very weak. Locally common non-marine lamellibranchs, some with mineralised shells. Locally common ostracods including <u>Geisina</u> ; occasional ironstone bands up to 0.04 thick passage | 2 | 91 | 90 | 11 |
| Mudstone | laminated, very weak, occasional ironstone bands; occasional non-marine lamellibranchs near top | 0 | 96 | 91 | 07 |
| | <u>CORE ANALYSED 91.07 TO 93.07</u> | | | | |
| Mudstone | shaly with non-marine lamellibranch fragments | 0 | 11 | 91 | 18 |
| <u>TUPTON</u> | Coal, inferior bright 11 part fragmented Coal, mostly bright 28) Mudstone, grey 3) Coal, bright 10) cylinders Mudstone, dark grey 3) Coal, bright 96) Coal, bright 3 fragments Core lost, assumed coal 22 <u>176</u> cm | | | | |
| | Pull-out at 92.68. Dip less than 20 Recovery 85% (Based on borehole recorder) | 1 | 76 | 92 | 94 |
| Seatearth Mudstone | silty, light grey; ironstone nodules | 0 | 13 | 93 | 07 |

COMMERCIAL IN CONFIDENCE

24

SK/46/NE/44 +
50 *
-- JUN 1982

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|---------------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | medium, unlaminated, grey; abundant roots becoming common below 94.50; occasional root nodules below 94.70 | 1 | 83 | 94 | 90 |
| Siltstone | medium with occasional root-disturbed sandstone fine laminae 80:20, becoming 70:30 below 95.40; common root nodules; common roots sharp | 1 | 14 | 96 | 04 |
| Siltstone | medium, slurried texture | 0 | 30 | 96 | 34 |
| Siltstone | medium with rare sandstone fine wisps and micro-lenses; strong; rare root nodules; locally abundant small burrows towards base; rare plant debris passage | 2 | 01 | 98 | 35 |
| Siltstone | fine to medium with common sandstone fine laminae and lenses, 70:30; occasional micaceous planty planes; occasional minor erosion surfaces; occasional small load casts; common comminuted plant debris sharp | 0 | 87 | 99 | 22 |
| Mudstone | laminated, fissile, weak; occasional ironstone nodules; locally common worm tracks | 0 | 52 | 99 | 74 |
| Siltstone | fine with common sandstone fine laminae, 80:20 sharp | 0 | 08 | 99 | 82 |
| Mudstone | laminated, shaly, weak; occasional ironstone bands; locally common worm tracks | 0 | 42 | 100 | 24 |
| <u>CORE ANALYSED 100.24 to 101.40</u> | | | | | |
| Mudstone | light grey | 0 | 28 | 100 | 52 |
| <u>THREEQUARTER</u> | Coal, bright 72 cylinders Coal, bright 4 fragments <u>76 cm</u> | | | | |
| | Dip less than 2°, Recovery (based on borehole recorder) 99%. | 0 | 76 | 101 | 28 |



COMMERCIAL IN CONFIDENCE
Section of: MARKHAM NOS. 16 (DOWN)
17 (DOWN) UNDERGROUND BOREHOLES

25

SK/46/NE/44+
50
JUN '82

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Seatearth Mudstone | silty, grey | 0 | 10 | 101 | 38 |
| Siltstone | fine, grey | 0 | 02 | 101 | 40 |
| Siltstone | fine with common root-disturbed sandstone fine laminae, 60:40; abundant roots | 0 | 14 | 101 | 54 |
| Sandstone | fine with occasional discontinuous micaceous planty planes; common roots | 0 | 28 | 101 | 82 |
| Siltstone | medium with common sandstone fine laminae and layers, 70:30; common roots | 0 | 33 | 102 | 15 |
| Mudstone | with occasional ironstone bands. Core completely fragmented; occasional roots | 0 | 60 | 102 | 75 |
| Siltstone | fine, un laminated; common roots sharp | 0 | 41 | 103 | 16 |
| Sandstone | fine to medium with rare siltstone fine laminae; locally vaguely ripple bedded, well developed ripple sets in basal 0.20; common micaceous planty planes; occasional iron-rich patches; rare roots in top 0.50 sharp | 1 | 68 | 104 | 84 |
| Siltstone | fine to medium with rare wispy thin sandstone fine laminae in top 0.30; common worm tracks and small burrows; single non- marine lamellibranch at 105.63 | 1 | 04 | 105 | 88 |
| Siltstone | fine and sandstone fine; variously interlayered and inter laminated; occasional ripples; rare minor erosion surfaces; common micaceous planty planes | 0 | 36 | 106 | 24 |

COMMERCIAL IN CONFIDENCE

26

SK/46/NE/44 +
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Sandstone | fine with rare siltstone fine laminae; occasional iron-rich patches; occasional large load-and-pouch structures | 0 | 86 | 107 | 10 |
| Siltstone | medium with occasional sandstone fine laminae, 90:10; common minor load structures and isolated sandstone pouches in top 0.50 | 1 | 40 | 108 | 50 |
| Sandstone | fine and siltstone fine, interlayered and interlaminated; locally developed ripples with ripple sets, occasional minor erosion surfaces; common micaceous planty planes; occasional large load-and-pouch structures | 1 | 70 | 110 | 20 |
| Sandstone | fine with rare siltstone fine laminae; occasional discontinuous micaceous planty planes; vague ripple bedding throughout; occasional sand-filled burrows passage | 2 | 60 | 112 | 80 |
| Siltstone | fine with common sandstone fine laminae; 60:40, becoming 80:20 below 113.10; locally ripple-bedded; occasional sand-filled burrows; common micaceous planes passage | 0 | 40 | 113 | 20 |
| Siltstone | fine with rare sandstone fine laminae and isolated lenses; occasional sandstone dominant layers up to 0.03 thick; occasional sand-filled burrows; common comminuted plant debris in sand-dominant layers; single non- marine lamellibranch at 113.25. passage | 0 | 80 | 114 | 00 |
| Siltstone | fine to medium, poorly laminated; occasional plant debris; abundant burrows throughout. passage | 0 | 80 | 114 | 80 |
| Siltstone | fine, muddy, laminated; occasional thin ironstone bands, rare plant debris, common burrows | 0 | 26 | 115 | 06 |

COMMERCIAL IN CONFIDENCE

27

SK/46/NE / 44+
50

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

- JUN 1982



| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine with rare sandstone fine laminae and isolated lenses; occasional iron-rich patches; common sand-filled burrows sharp | 0 | 26 | 115 | 32 |
| Mudstone | silty, laminated; core completely fragmented below 117.00; occasional thin ironstone bands; common worm tracks on some bedding planes; locally common small burrows sharp | 2 | 23 | 117 | 55 |
| Siltstone | medium and sandstone fine, interlaminated and interlayered; strong; common micaceous planty planes; rare <u>roots</u> | 0 | 45 | 118 | 00 |
| Siltstone | fine, poorly laminated with rare sandstone fine wisps near the base; rare root nodules; rare <u>roots</u> | 0 | 67 | 118 | 67 |
| Sandstone | fine with rare siltstone fine laminae; common iron-rich layers; common micaceous planes; locally poorly developed ripples; common sand-filled burrows towards the base short passage | 0 | 68 | 119 | 35 |
| Siltstone | fine with common sandstone fine laminae and ripple marked lenses, 80:20; occasional iron-rich patches sharp | 0 | 27 | 119 | 62 |
| Sandstone | fine with occasional siltstone fine laminae and layers, 90:10; occasional small load structures; sub-vertical mineralised joint throughout | 0 | 45 | 120 | 07 |
| Siltstone | medium to fine, laminated; common burrows in top 0.05 | 0 | 83 | 120 | 90 |

COMMERCIAL IN CONFIDENCE

28

SK/46/NE/44+
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

10/10/82

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Sandstone | fine with occasional siltstone fine laminae and layers 90:10; occasional discontinuous micaceous planty planes. Inclined, erosional contact | 0 | 52 | 121 | 42 |
| Siltstone | medium to coarse with occasional sandstone fine pouches and layers 90:10; strong. sharp | 0 | 54 | 121 | 96 |
| Mudstone | silty, laminated; occasional thin ironstone bands, rare comminuted plant debris; locally common small burrows; single non-marine lamellibranch at 122.08 passage | 0 | 34 | 122 | 30 |
| Siltstone | fine, poorly laminated; occasional iron-rich patches; occasional small burrows near the base | 1 | 35 | 123 | 65 |
| Siltstone | medium with rare sandstone fine laminae and lenses; common burrows | 0 | 22 | 123 | 87 |
| Siltstone | coarse with occasional irregular sandstone fine laminae, strong | 0 | 25 | 124 | 12 |
| Siltstone | fine, locally muddy, poorly laminated; occasional ironstone bands; 45 degree polished break at 125.43; rare plant remains including <u>Calamites</u> | 2 | 26 | 126 | 38 |
| Mudstone | silty, laminated, occasional ironstone bands; locally common worm tracks | 1 | 54 | 127 | 92 |
| Mudstone | laminated, weak, core completely fragmented in parts | 0 | 53 | 128 | 45 |
| Mudstone | dark, slightly carbonaceous, shaly; rare fish remains including scales | 0 | 11 | 128 | 56 |

COMMERCIAL BORING LOG 29

SK/46/NE / 44+
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|---------------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | laminated, core completely fragmented | 0 | 19 | 128 | 75 |
| Mudstone | carbonaceous, shaly | 0 | 04 | 128 | 79 |
| Mudstone | laminated, dark; occasional thin ironstone bands | 1 | 34 | 130 | 13 |
| <u>CORE ANALYSED 130.13 TO 131.91</u> | | | | | |
| Mudstone | grey | 0 | 10 | 130 | 23 |
| <u>YARD</u> | Coal, inferior bright 5 cylinders Mudstone, grey, listric 14 fragments Mudstone, dark grey 5) Coal, inferior bright and dull 14) cylinders Coal, bright 51) Core lost, assumed coal 29) <u>118 cm</u> | | | | |
| | Dip less than 2°. Recovery (based on borehole recorder) 75%. Pull-out at 130.68 | 1 | 18 | 131 | 41 |
| Seatearth Siltstone | fine, light grey; a few ironstone lenses | 0 | 50 | 131 | 91 |
| Siltstone | fine, unlaminated, grey; occasional ironstone nodules; abundant roots | 0 | 29 | 132 | 20 |
| Siltstone | medium, unlaminated; common roots becoming rare to base; occasional root nodules. passage | 0 | 50 | 132 | 70 |
| Siltstone | fine, poorly laminated; common comminuted plant debris; rare roots passage | 0 | 40 | 133 | 10 |
| Siltstone | fine, muddy, laminated; rare roots and root nodules in top 0.10; 0.04 ironstone at base | 1 | 18 | 134 | 28 |



COMMERCIAL IN CONFIDENCE

30

SK/46/NE/447

50



Section of: MARKHAM NOS. 16 (UP)
17 (DOWN) UNDERGROUND BOREHOLES

JUN 1982

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Mudstone | dark, laminated; common worm tracks | 0 | 18 | 134 | 46 |
| Mudstone | carbonaceous, poorly laminated; occasional fish remains including spines and scales. detached, fitting | 0 | 04 | 134 | 50 |
| <u>BLACKSHALE 4TH LEAF</u> | Coal, dirty 5 cylinder Coal, bright 9 cylinder <u>14</u> detached, inclined | 0 | 14 | 134 | 64 |
| Seatearth Mudstone | silty, unlaminated; common inclined listric surfaces; common roots | 0 | 05 | 134 | 69 |
| Siltstone | fine, iron-rich; abundant roots | 0 | 20 | 134 | 89 |
| <u>CORE LOST</u> | | 0 | 35 | 135 | 24 |
| Mudstone | laminated, very weak; occasional ironstone bands; common worm tracks sharp | 0 | 65 | 135 | 89 |
| Siltstone | fine, locally muddy, poorly laminated; occasional ironstone bands; rare roots in top 0.20; locally vaguely wormy. passage | 1 | 11 | 137 | 00 |
| Siltstone | medium, unlaminated, barren | 0 | 60 | 137 | 60 |
| Siltstone | fine, locally muddy, poorly laminated; barren | 1 | 50 | 139 | 10 |
| Siltstone | medium, poorly laminated; occasional slurried layers; barren passage | 1 | 20 | 140 | 30 |
| Siltstone | fine, poorly laminated with occasional siltstone medium passages, very rare comminuted plant debris | 2 | 60 | 142 | 90 |

SK/46/NE/44+
50



COMMERCIAL IN CONFIDENCE

31

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

-- JUN 1982

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|---|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine with common thin sandstone fine laminae, 80:20 becoming 90:10 towards the base; occasional iron-rich layers; rare minor erosion surfaces; 0.04 ironstone band at base; common small sand-filled burrows | 0 | 76 | 143 | 66 |
| Mudstone | silty, laminated, very weak | 0 | 11 | 143 | 77 |
| Siltstone | fine, muddy, laminated; occasional ironstone bands up to 0.08 thick sharp | 1 | 18 | 144 | 95 |
| Mudstone | laminated, very weak; common worm tracks | 0 | 17 | 145 | 12 |
| <u>CORE ANALYSED 145.12 TO 146.67</u> | | | | | |
| Mudstone | shaly | 0 | 08 | 145 | 20 |
| <u>BLACKSHALE</u> <u>LEAVES 1 to 3</u> | Coal, bright 39 cylinders Coal, bright 7 fragments Coal, bright 14 cylinders Coal, bright 9 fragments Coal, bright; with 50° dip) slickensided breaks) 46 cylinders 115 cms | | | | |
| | Dip less than 2°. Recovery (based on borehole recorder) 90%. Pull-out at 145.88 | 1 | 15 | 146 | 35 |
| Seatearth Mudstone | dark grey | 0 | 01 | 146 | 36 |
| Siltstone | fine, light grey | 0 | 31 | 146 | 67 |
| Mudstone | silty, very weak, unlaminated, grey; abundant roots | 0 | 07 | 146 | 74 |
| Siltstone | medium to coarse, strong; unlaminated, grey; abundant roots | 0 | 22 | 146 | 96 |
| Siltstone | fine to medium, unlaminated, grey; abundant roots including <u>Stigmara</u> becoming common towards base; occasional root nodules below 147.25 | 0 | 54 | 147 | 50 |

COMMERCIAL IN CONFIDENCE

32

SK/46/NE/44+
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

22/11/1982

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | medium, unlaminated, with rare, diffuse siltstone coarse layers, strong; occasional roots in top 0.25; 0.04 septarian ironstone at base | 1 | 04 | 148 | 54 |
| Siltstone | fine with occasional siltstone medium passages, unlaminated; rare plant remains including <u>Neuropteris</u> sharp | 1 | 17 | 149 | 71 |
| Sandstone | fine with occasional irregular siltstone fine laminae, 90:10. Common large load-and-pouch structures | 0 | 42 | 150 | 13 |
| Siltstone | medium, unlaminated; barren | 0 | 19 | 150 | 32 |
| Sandstone | fine with common discontinuous micaceous planty planes; ripple bedded throughout with well developed ripple sets; occasional minor erosion surfaces inclined | 0 | 25 | 150 | 57 |
| Siltstone | fine with rare sandstone fine laminae and disconnected lenses | 0 | 38 | 150 | 95 |
| Sandstone | fine with rare highly disturbed siltstone fine laminae; complex load-and-pouch structures throughout | 0 | 46 | 151 | 41 |
| Siltstone | medium with occasional complex, isolated siltstone and sandstone pouches | 0 | 28 | 151 | 69 |
| Sandstone | fine with rare siltstone fine laminae; highly contorted bedding; common large load structures | 0 | 12 | 151 | 81 |
| Siltstone | fine to medium, laminated; common micaceous bedding planes | 0 | 73 | 152 | 54 |

COMMENTS: REFERENCE

33

SK/46/NE/441
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|--------|----|
| | | m | cm | m | cm |
| Siltstone | fine with common sandstone fine laminae and layers 70:30 becoming 60:40 towards base; locally well developed ripples; locally common ripple lenses below 156.00; common small scale load-and-pouch structures; common micaceous planty planes; rare minor erosion surfaces; mineralised joint between 155.34 and 155.58 Inclined, sharp | 5 | 56 | 158 | 10 |
| Sandstone | medium, generally massive; occasional siltstone fine laminae in top 0.50; occasional iron-rich layers showing vague dune bedding; sub-vertical mineralised joint in top 0.70; rare burrows towards base sharp | 11 | 64 | 169 | 74 |
| Siltstone | and sandstone interlaminated and inter-layered; common vague ripples; abundant plant debris; occasional sand-filled burrows sharp | 0 | 50 | 170 | 24 |
| Mudstone | slightly silty, poorly laminated ; dark; slightly carbonaceous, occasional plant debris | 0 | 33 | 170 | 57 |
| Mudstone | carbonaceous, shaly, cleated; locally abundant coalified plant debris | 0 | 26 | 170 | 83 |
| <u>COAL</u> | and dirt | 0 | 04 | 170 | 87 |
| Mudstone | dark, slightly carbonaceous, poorly laminated; common irregular listric surfaces; abundant plant debris in top 0.04 | 0 | 36 | 171 | 23 |
| Mudstone | carbonaceous, laminated; common guilielmites in top 0.10; rare <u>Naiadites</u> fragments; rare coalified plant fragments sharp; inclined | 0 | 27 | 171.50 | |
| Sandstone | fine with rare siltstone fine laminae, vague ripple bedding | 0 | 05 | 171 | 55 |

COMMONWEALTH

34

SK/46 / NE / 44+
50
✱

Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine and sandstone fine; ripple bedded throughout with well developed ripple sets; occasional minor erosion surfaces; common micaceous planty planes. | 0 | 21 | 171 | 76 |
| Siltstone | fine with occasional siltstone - with - sandstone layers; load structures within sandy layers | 0 | 20 | 171 | 96 |
| Siltstone | fine and sandstone fine, interlaminated and interlayered; common ripples throughout; common small sand-filled burrows. | 0 | 39 | 172 | 35 |
| Siltstone | fine with rare sandstone fine micro-lenses; occasional ironstone patches; sub-vertical mineralised joint below 172.80 rare plant debris | 1 | 12 | 173 | 47 |
| Sandstone | medium with common micaceous planty planes; vague ripple bedding. | 0 | 13 | 173 | 60 |
| Siltstone | fine with occasional sandstone fine laminae and lenses 90:10; occasional iron-rich patches | 0 | 70 | 174 | 30 |
| Siltstone | fine, laminated; occasional ironstone bands | 0 | 55 | 174 | 85 |
| Mudstone | laminated, common worm tracks | 0 | 55 | 175 | 40 |
| Mudstone | highly carbonaceous, shaly; barren | 0 | 68 | 176 | 08 |
| <u>Seatearth</u> | | | | | |
| Siltstone | medium with occasional highly disturbed sandstone fine laminae, 80:20, abundant roots | 0 | 57 | 176 | 65 |
| Siltstone | fine to medium, poorly laminated; common roots becoming rare to base; occasional root nodules; 0.05 "oolitic" ironstone band at base | 1 | 26 | 177 | 91 |

SK/46 NE/ 44+
50



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine to muddy, laminated; occasional ironstone patches; occasional plant debris including <u>Calamites</u> | 0 | 47 | 178 | 38 |
| Mudstone | laminated; core completely fragmented; 0.08 ironstone at base sharp | 0 | 52 | 178 | 90 |
| Mudstone | silty, laminated; core completely fragmented | 0 | 60 | 179 | 50 |
| Mudstone | dark, laminated; core completely fragmented | 0 | 78 | 180 | 28 |
| <u>CANNEL</u> | | 0 | 36 | 180 | 64 |
| Mudstone | laminated; occasional ironstone bands; core completely fragmented | 0 | 76 | 181 | 40 |
| Siltstone | fine, laminated; common ironstone bands | 0 | 50 | 181 | 90 |
| Siltstone | fine with common sandstone fine laminae and lenses, 80:20 becoming 70:30 in basal 0.20; local ripple bedding; rare minor erosion surfaces; rare sand-filled burrows; rare plant debris | 0 | 88 | 182 | 78 |
| Siltstone | fine with rare wispy thin sandstone fine laminae and disconnected lenses passage | 2 | 02 | 184 | 80 |
| Mudstone | silty laminated; | 0 | 32 | 185 | 12 |
| Siltstone | fine laminated; occasional ironstone bands | 0 | 61 | 185 | 73 |
| Mudstone | dark, laminated | 0 | 26 | 185 | 99 |
| Mudstone | highly carbonaceous, sub-canneloid; rare fish scales | 0 | 14 | 186 | 13 |

COMMERCIAL IN CONFIDENCE

36

SK/46/NE/444
50

-- JUN 1982



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|---|-----------|----|-------|----|
| | | m | cm | m | cm |
| <u>COAL</u> | bright (fusain in top 0.01) | 0 | 05 | 186 | 18 |
| Seatearth Mudstone | core completely fragmented | 0 | 02 | 186 | 20 |
| Sandstone | fine with rare highly disturbed siltstone fine laminae; abundant roots; occasional root nodules | 1 | 09 | 187 | 29 |
| Siltstone | fine to medium, poorly laminated; common roots and occasional root nodules sharp | 0 | 35 | 187 | 64 |
| Sandstone | fine with rare, locally highly disturbed siltstone fine laminae and thin layers; common micaceous planty planes; occasional large load-and-pouch structures; vague ripples below 88.40; rare roots in top 0.10 Sharp, slightly erosional | 2 | 80 | 190 | 44 |
| Siltstone | fine to medium with occasional sandstone fine laminae, 80:20; occasional small load structures; locally common small burrows passage | 0 | 36 | 190 | 80 |
| Siltstone | medium, poorly laminated | 1 | 02 | 191 | 82 |
| Mudstone | laminated | 0 | 16 | 191 | 98 |
| <u>COAL AND DIRT</u> | Coal, bright 3 Mudstone 1 Coal 4 Coal and dirt 2 | 0 | 10 | 192 | 08 |
| Seatearth Mudstone | core completely fragmented | 0 | 12 | 192 | 20 |



CONFIDENTIAL

37

SK/46/NE 199+
50

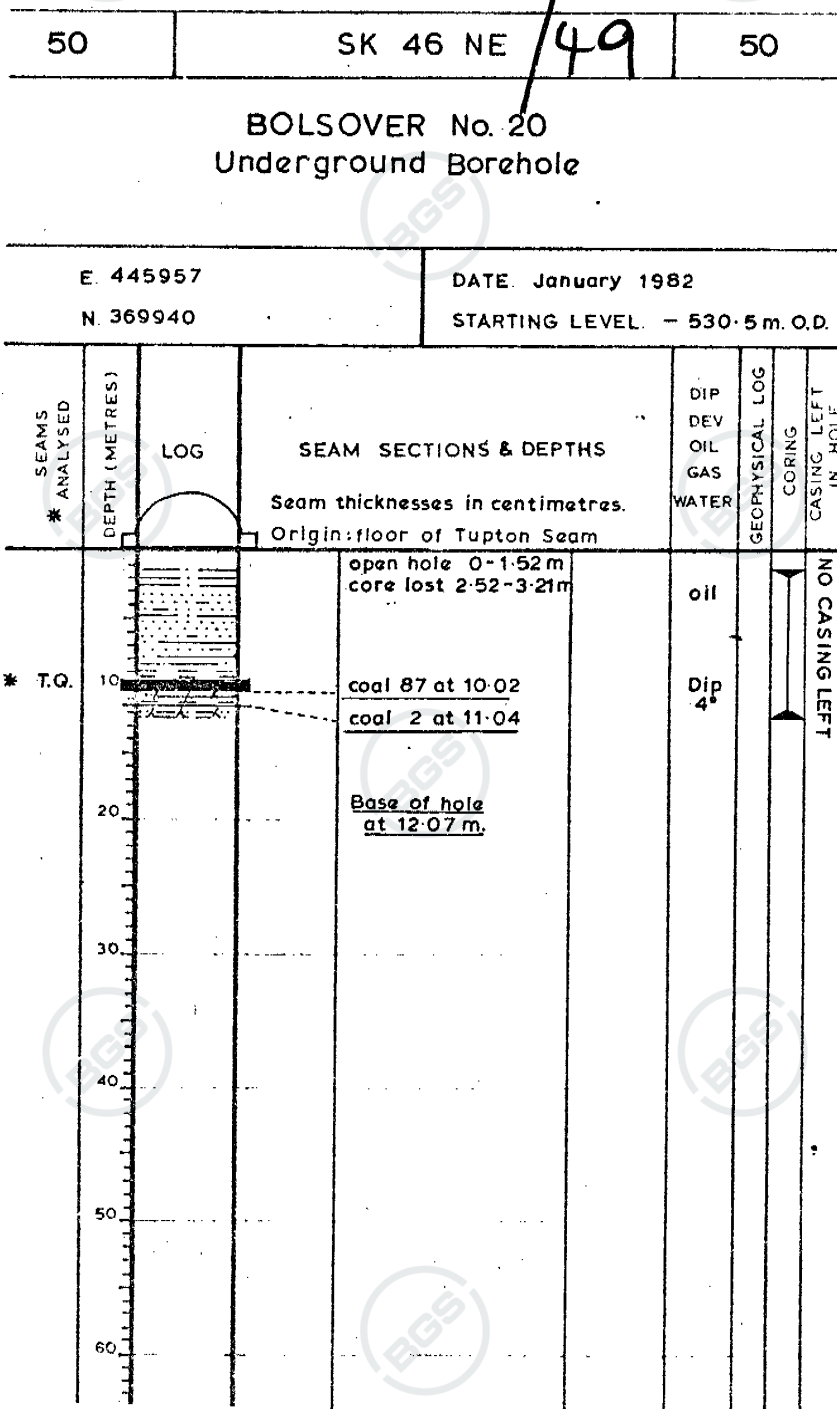
22 JUL 1982



Section of: MARKHAM NOS. 16 (UP) AND
17 (DOWN) UNDERGROUND BOREHOLES

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|-----|-------|----|
| | | m | cm | m | cm |
| Siltstone | fine with common highly disturbed sandstone fine laminae 70:30; common roots | 0 | 25 | 192 | 45 |
| Sandstone | fine with rare siltstone fine laminae; bedding highly disturbed by large load structures and occasional roots | 0 | 38 | 192 | 83 |
| Siltstone | fine with occasional sandstone fine laminae; 90:10 becoming 80:20 below 193.30; vague ripple bedding, rare minor erosion surfaces; common diffuse ironstone bands; rare roots; common comminuted plant debris in basal 0.30 | 1 | 22 | 194 | 05 |
| Siltstone | medium, poorly laminated, occasional diffuse ironstone bands; rare thin sandstone fine layers below 195.00 showing minor load and pouch structures; occasional faultlets; rare worm tracks and burrows | 3 | 51+ | 197 | 56 |

Base of borehole at 197.56





Section of: Bolsover No. 20 Underground
Borehole

Purpose: Coal Exploration

SK 46 NE / 49

Nat. Grid, Sheet & Qtr. B/H REGD. NO.

Exact Site: E.445 957
N.369 940
(D23 Main Gate)

SK46NE

50

Level at which bore commenced relative to O.D.:
530.5 m below O.D.
(origin in Tupton Seam workings)

Date of Boring: January 1982

Borer: National Coal Board
Cores examined by: P.K. Boam, N.C.B. Geologist

| GEOLOGICAL CLASSIFICATION | NATURE OF STRATA | THICKNESS | | DEPTH | |
|------------------------------|--|-----------|----|-------|----|
| | | m | cm | m | cm |
| Open Hole | <u>ORIGIN: FLOOR OF TUPTON SEAM</u> | | | 0 | 00 |
| | | 1 | 52 | 1 | 52 |
| Siltstone | <u>CORING FROM 1.52</u> | | | | |
| | medium, occasional rootlets | 1 | 00 | 2 | 52 |
| CORE LOST | | 0 | 69 | 3 | 21 |
| | | | | | |
| Sandstone | medium, micaceous planty planes; vertical breaks with oil | 0 | 30 | 3 | 51 |
| Sandstone | | | | | |
| | fine with siltstone fine, variously inclined laminae; micaceous planty planes, rare plant debris | 0 | 53 | 4 | 04 |
| Siltstone | | | | | |
| | medium, slurried; plant debris | 0 | 27 | 4 | 31 |
| Sandstone | | | | | |
| | medium with rare silty laminae; micaceous planty planes; sub-vertical breaks sharp | 2 | 00 | 6 | 31 |
| Siltstone | | | | | |
| | fine, laminated; wormy; vertical crinkled breaks | 0 | 15 | 6 | 46 |

| | | | | |
|------------------------|--|-------|-----------|--|
| | | 2 | SK46NE/49 | |
| Sandstone | medium, rare discontinuous siltstone laminae, rare coal laminae, micaceous planty planes | 0 69 | 7 15 | |
| Siltstone | fine laminated, rare disconnected sandstone fine ripples, iron rich patches passage | 1 57 | 8 72 | |
| Mudstone | dark; vaguely wormy, rare planty material | 0 30 | 9 02 | |
| | <u>CORE ANALYSED, 9.02 TO 10.31</u> | | 9 02 | |
| Mudstone | light grey | 0 13 | 9 15 | |
| <u>THREEQUARTER</u> | Coal mostly bright, clean (part core and fragments) Recovered 85% Dip 4° | 0 87 | 10 02 | |
| Seatearth Siltstone | fine to medium, becoming coarse downwards with fine sandstone laminae | 0 29 | 10 31 | |
| Siltstone | fine, rare sandy laminae; rootlets | 0 25 | 10 56 | |
| Siltstone | and sandstone fine; abundant rootlets | 0 33 | 10 89 | |
| Mudstone | laminated; rootlets | 0 13 | 11 02 | |
| <u>COAL</u> | bright | 0 02 | 11 04 | |
| Seatearth Siltstone | fine and sandstone fine; ironstone nodules | 0 97+ | 12 01 | |
| Core not seen | | 0 06 | 12 07 | |
| | <u>Base of hole at 12.07</u> | | | |

PKB/90272/Z73/PH.XI



NORTH DERBYSNIRE AREA

NATIONAL COAL BOARD

SK46NE/49

SURVEY DEPARTMENT

BOREHOLE DATA AND HISTORY

BOREHOLE NAME: **BOLSOVER N°20 UNDERGROUND BOREHOLE (D23^SM.9. JUNCTION) WITH 20^SS.9.**
Approximate Location: **1,150 METRES S 4½° W OF BOLSOVER SHAFT.**
National Grid Reference: **E 445957 N 369940**
6 inch sheet: **SK 46NE.**
Level of Origin: **530.5 M BELOW O.D.**
Date of Drilling: Commenced **8. 1. 82**
Finished **14. 1. 82**
Contractor's Name: **N. C. B.**
Name of Boremaster: **DRILLER IN CHARGE J. MOTTRAM.**

| Depth ^m (±0.1) | Diameter of Core ^{mm} (±0.1) | Diameter of Hole ^{mm} (±0.1) |
|--|--|--|
| 0 to 1.52 | OPEN HOLE FOR 'BX' CORE BARREL | 60 mm. |
| 1.52 to 12.07 | CORING WITH 'BX' CORE BARREL. | 48. 41 |
| RE - DRILLED SEAM WITH T65 CRAELIUS CORE BARREL. | | |
| 9.14 to 16.10.83. | T65 BARREL 66mm | 52. 14 mm. |
| | | |
| | | |

Drilling Difficulties: **FAILED TO RECOVER COAL SEAM WITH 'BX' BARREL SO REAMED DOWN TO SEAM, THEN USED T65 BARREL TO RECOVER ¾ SEAM.**

Method of Sealing Off Borehole: **BOREHOLE CEMENT FILLED WITH 127.5kg SHALLOW OIL WELL CEMENT MIXED WITH 68 LITRES OF FIRE MAIN WATER - BOREHOLE FILLED RIGHT TO THE TOP**

Purpose fulfilled by Borehole: **OBTAINED A CORE OF ¾ SEAM**

AS REQUIRED

Official Responsible for above Report:

A. Brown
1.1.82
1.1.82 Chief Driller (N.C.B.)

