1. Introduction

C.4's Face is the third face to come into production in the Low Bright/Brinsley seam. The face is 230 yds long between the gate centres and extraction is 6.0ft yielding approximately 180-190 tons/strip. The workings are 1,500 ft below the surface. Coal clearance is by 42" trunk conveyors up the 1 in 5 drift to the High Main Skip Winding level. Manriding and materials transport are through the Return Drift - Clifton 3 rail transporter system. The district came into production in February 1975.

2. Equipment

2.1 Gate Conveyor  F.S.W. 120 HP 42" type 4 belting, running at 375'/min.
N.C.B. Spec. 42" tubular structure in 9' lengths.

2.2 Stage Loader  Mining Supplies Beam Type - 30", 65 HP
212'/min 0.5metre flight spacing. Elevated section - 66'
Total length - 110'. Traction - 4 x 5 ton pull rams
5" dia x 216" stroke. Coupling - 'Akwa' fill - STC 390.

2.3 Face Conveyor  A 30" Armoured Face Conveyor is in use.
Mark II line pans, bottom plated with inspection doors 1 in 5.
5" Ramp plates on face side.
AFC drives 150 HP at each end. Speed - 187 ft/min.
Parsons continuous chain. M.G. Headframe - Mining Supplies
20 ft radius. UMM chain tensioner fitted.
T.G. Headframe - Mining Supplies Mk.VII. 8 tooth x 2 piece sprockets.
' Akwa fill fluid couplings.

2.4 Power Loader  Two AB - 200 HP Ranging Drum Shearers operate
on a rack-a-track haulage system utilising horizontal pegs.
M.G. machine - AB 200 HP Mk.II ranger with 50" x 23" three start
spiral vane drum. 2 speed gearbox gives 30 rpm or 60 rpm.
T.G. Machine - AB 200 HP Mk.II fitted with extended F.I.D.D.
arm for Tail stable elimination. 58" x 23" drum. Picks heavy
duty Hall & Pickles HB 300 (Buttonlock) 1/2" x 1" x 5" reach.

2.5 Powered Supports  The face is equipped with Dowty 6 leg supports.
6 x 240 tons. The T.G. anchor unit consists of 2 - 4 x 200
supports over the T.G. AFC drive.
Supports are at 1.2 metre centres through the face. Range 56"-84".
Setting load - 12 tons. Yield - 40 tons/leg = 30% ratio.
Ram thrust 9.9 tons, pull 5.5 tons.
Operating pressure - 2,000 psi (136 Atms)
Hydraulic supply - 2-T50 Gullick pumps 20g.p.m.
FSW P-Pack - 30g.p.m. (Standby)
Feedlines - 1" ring main system. Twin returns - 1" each
2 x 120 gall Bolton tanks.

2.6. Power Supply
2.6 Power Supply A 3.3KV supply is fed to both gates, each having 500 KVA transformers. Face distribution for AFC and Shearers is at 1100V. In each gate is a freestanding TFA switch and flexible type 331 cable between TFA and transformer.

The Gate end boxes are Baldwin & Francis and in the Maingate are mounted on pantechnicons running on the gate belt receiving sections. A positive mechanical link to the stage loader is provided.

In the Tailgate the pantechnicon tollies are linked to the face AFC through a Dunns type snaker.

Face lighting is provided on alternate powered supports and is Gullick-Heyes of Wigan - Mini fluorescent 12 watt units.

Face communications are Winter type at 12 metre intervals incorporating the pre-start AFC and Stage loader alarms.

Face signals are Steadfast units at 6 metre intervals.

2.7 Roadways Both gates are 14' x 10' 4" x 4" section arches set in 18" Schwarz yield boxes.

The Maingate rip is conventional with packs on both sides of the Gate.

In the Tailgate a Dosco U.T.R. ripping machine is in use and it is expected to complete the ripping mechanism with a Becorit plough packer.

2.8 Manpower

<table>
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<tr>
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<td>M.G.Ripping</td>
<td>5</td>
</tr>
<tr>
<td>T.G.Ripping</td>
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<tr>
<td>Electrician</td>
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<td>Powered Supports</td>
<td>1</td>
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<tr>
<td>Officials</td>
<td>3</td>
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2.9 Results The district output is averaging 6,000 tons/week and the Face O.M.S. is 250.0 cwt. These performance figures are improving as the dirt band reduces in a Northerly direction.
1. The system installed in March 1975 operates on the bowstring/Brinsley Return Drift from the High Main to Brinsley seam levels. It comprises of an endless rope haulage operating with special carriages running on a three rail system with a midpoint passbye.

2. Technical Information

**Haulage Engine** - Needham & Brown, Endless, 350 H.P.
- 10" Ram brake
- Thrustor brake at gearbox output shaft for Emergency
- Normal overspeed & indicators
- Slow Banked for manriding & materials
- Sizer type gearbox
- Dual speed 2 mph or 8 mph

**Rope/Track** - Rope diameter, 1½" = 32 mm.
- Makers: British Ropes
- Specification: 175/1968 - 6 x 8 Construction Fibre
- 10 tons tensile load, Galvanised, R.H.
- Track: 3 rail system - 50 lb/ft rails at 4'6½" gauge
- Every 3rd set of rails anchored into the floor
- Retractable resilient landing platforms at top & bottom to counteract 1 yd. of rope stretch.

**Carriages** - Manufactured by Sheepbridge, 6 cars in each. Each car carries 1½ ton mine car or 24 men.
- Manriding Capacity - 144 men
- Journey Time - 8 mins.

**Electrical** - Motor 350 H.P. 3.3 KV. 960 RPM. 32.5 Amp. Star connection
- Squirrel cage type
- Drive is through a SCR 32 fluid drive scoop hand operated coupling
- Signals are transmitted from the cars by the guards
- An Inductophone signal and communication system to the haulage driver; signal stations are situated at both ends of each car.
- The system is operated on a carrier frequency of 110 KHz from No.1 car and 125 KHz from No.2 car.
- The communication path uses a frequency at 155 KHz the carrier frequency being used to facilitate a fail stop system for the haulage. Visual signals are provided at the engine house. Emergency stop signals and cables are provided on both sides of the roadway as well as track limit switches.

**Siding Details**
- 16' x 12' Three piece arches at 3' centres
- Total length of installation = 1000 metres
- Sections A to Top - 110 metres grade 1 in 25.
- Middle - 540 metres grade 1 in 5
- Transition bottom - 150 metres (4,000 ft radius)
- In Seam bottom 200 metres
Because of the high rate of advance and continuous working, a system of keeping to grade had to be devised which would not hold up work. At the time lasers were considered to be a possible health hazard and were discounted. (It was subsequently found that because of excessive ground movement they would not have proved successful).

In order to overcome the length of time required to establish grade lines using a level working on a 1 in 5 gradient it was decided to drive the entire project using vertical angles. Checks were to be carried out by normal levelling every 100 yds of advance.

The vertical angles were set out using a Watt's dial fitted to a special bracket which could be fastened to the arch leg with the collimation line of the instrument coincident with the grade line on the arch.

Subsequent checks by levellings proved the system accurate to within the required limit of accuracy.

The return drift was driven from top and bottom simultaneously, the thurling point being at the outbye end of the vertical curve.

The Area engineering branch stipulated a radius of 4000ft for the vertical curve, being that radius required to prevent the haulage rope lifting when in motion.

Having established the plan length of the drift thurling, the vertical fall and the radius of vertical curve required, it was decided to drive the curve as a series of chords of such length that the difference or offset from the chord to the arc of the curve could be readily accommodated when the track was laid, without excessive dint or fill being required. A calculation was then made to establish the co-ordinates and reduced level of each point where a change of grade occurred and all subsequent actual checks made by surveys were compared against this original.

The system was proved by the thurling which, when checked, showed an error in line of 2" and an error in grade of 2".

E.W.Pendleton
Unit Surveyor
18th December 1975
The red line indicates the floor of the roadway as it was actually driven. Driven to these grades the rate of drivage was not slowed down and because the changes of grades were tangents to the arc of the curve instead of chords: it was not necessary to drill when the track was installed but only to infill with ballast to form the curve.
The A.B. Single Ended Ranging Drum Shearer shares its basic operational feature, the Mk. II Gearhead, with the A.B. Double Ended Ranging Drum Shearer. This machine is being successfully applied in a number of different countries throughout the world, in seams varying between 3' 8" (1.1 m) and 9' 0" (2.7 m) with special arrangements having been supplied for extractions up to 11' 0" (3.3 m).

- Motors available up to 300 H.P.
- Alternative haulage systems to give up to 40 ft/min (12.2 m/min).
- Low overall height of 32" (813 mm) from floor to machine top can be provided.
- Gearhead readily rehanded.
- Low drum speeds available with extended boom—down to 42 r.p.m.
- Two-speed selection can be fitted for cutting drum.
- Three types of boom available according to need—power transmission, longer reach and stable elimination.
- For dust suppression, water fed through drum shaft.
- For gas dispersal, venturi available.
The Horizontal RACKATRACK system as illustrated is designed for use in all seam sections from 4' 0" upwards with either fixed drum or ranging drum shearer machines. A thin seam version is also being developed to cater for seams down to 3' 0" thick.