

AE 38  
DEAD FRIARS BH2  
APRIL 1973

MS 7307

NS 7307

DEED PRIARS

BORNHOLE NO. 2

WEAUDALE

Submitted to: Acrin Exploration N.L. Ltd.  
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Sydney,  
N.S.W. 2000  
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London  
April, 1973

## Borehole No. 2 Dead Friars

1. Borehole No. 2 at Dead Friars was drilled from the same location as borehole 1 and set at an inclination of  $63^{\circ}$  so as to intersect the High Flat mineralisation within the Great Limestone 20 ft. on the north-west side of presumed extension of the Boltshurn Vein. Drilling was started on 6th February and was completed on 22nd February.

### Steering of the Hole

2.

<u>Depth in feet</u>	<u>Inclination in degrees</u>
100	62
200	63
300	65
Wedge set at 302 ft. 4 in.	
400	69
500	71
600	73
700	75
800	75
Final depth 887 ft.	

### Results

- 3.a) The stratigraphy of borehole 2 differed only in detail from borehole 1 and showed an apparent dip of  $5^{\circ}$  to the north west.
- b) The Little Limestone showed some replacement mineralisation but with insignificant quantities of galena.
- c) The Boltshurn fault zone was intersected from 767-0 to 784-3 within mudstones and siltstones. This establishes, by comparison with the fault zone intersection in borehole 1, that the Boltshurn Vein is almost vertical between the Little Limestone and the Three Yard Limestone in this area.
- d) The Great Limestone was intersected from 818-9 to 890-3. Mineralisation was most strongly developed between 835-0 and 858-0; this corresponds with the expected location of the High Flat within the Great Limestone.

### Sampling

4. The most strongly mineralized core section of 23 ft. within the Great Limestone was split into six sections as follows, with the assay results shown:-

<u>Sample No.</u>	<u>From ft.in.</u>	<u>To ft.in.</u>	<u>Thickness ft.in.</u>	<u>Pb%</u>	<u>Zn%</u>
2/01	835-0	839-0	4-0	5.87	0.18
2/02	839-0	842-0	3-0	0.62	0.13
2/03	842-0	844-9	2-9	18.33	0.40
2/04	844-9	850-0	5-3	1.70	0.88
2/05	850-0	852-9	2-9	11.76	0.43
2/06	852-9	858-0	5-3	1.01	0.30

5. Weighted averages for the complete 23 foot intersection are 5.28% and 0.42%, lead and zinc respectively.

### Conclusion

6. The hole was then cemented back to 597 ft. and a wedge set to achieve a downward deflection with the intention of intersecting the Boltsburn Vein within the Great Limestone.

7. Day-to-day core logging and supervision of the drilling were taken over by Mr. E. H. Jack of ACME on Thursday 8th March when the deflected hole had reached 755 feet 3 inches, still short of the Great Limestone. The deflection was completed, and an intersection similar to the above has been sampled and is being assayed, but the results are not yet to hand. The Boltsburn Vein itself was apparently not intersected and a second deflection was attempted but ran into difficulties and was abandoned. Borehole 3 was then sited by Mr. Jack and was being drilled at the date of this report.



London  
April 1973

E. H. Fitch  
Mackay & Schnellmann Limited

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb %	Zn %	Fe %	%	
		865-1	865-7	100	100	Calena, quartz vein								
		865-7	869-3		100	Limestone, weak lead sulphide mineralisation	3/11	865-6	869-0					
		869-3	871-6		100	Vuggy limestone with lead sulphide, quartz and dolomite veining	3/12	869-6	871-0					PART
		871-6	877-3		100	Chert with some quartz and dolomite veining weak lead sulphide	3/13	871-6	877-0					OF GREAT
		877-3	878-3		100	Vein at 30° to core. Two inch lbs one inch dolomite six inches quartz. dolomite and a few chert fragments in breccia	3/14	877-0	878-3					LINESTONE
		878-3	878-6		100	Sheared, shaley, cherty limestone								
		878-6	883-3		100	Fossiliferous limestone, vuggy quartz vein at 880-6 to 880-9 shearing and brecciation 883-3 to 883-8 very weak zinc sulphide mineralisation at 883-9 to 883-11								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	831-0	833-0	100	100	Limestone									Part of Great Limestone
	833-0	833-0	100	100	Shaley limestone with large blocs up to 1/2 inch in diameter of zinc sulphide.									
	833-6	835-0	100	100	Limestone with weak zinc sulphide mineralisation	3/02	833-0	835-6						
	835-0	835-6	100	100	black, shaley limestone									
	835-6	840-6	100	100	Limestone, weak lead sulphide mineralisation	3/03	835-6	840-6						
	840-6	848-0	100	100	Limestone, moderate lead sulphide mineralisation	3/04	840-6	845-6						
	848-0	854-6	100	100	Cralline limestone, weak lead sulphide mineralisation, also some quartz and fluorite.	3/05	845-6	850-0						
						3/06	850-0	852-6						
						3/07	852-6	855-0						
	854-6	858-0	100	100	Limestone minor lead sulphide mineralisation	3/08	855-0	858-0						
	858-0	859-0	100	100	Quartz, fluorite, galena mineralisation in limestone									
	859-0	860-0	100	100	Quartz, fluorite vein with minor galena	3/09	858-0	860-0						
	860-0	865-6	100	100	Weakly lead sulphide mineralised fossiliferous limestone with some dolomite veining. Few specks of chalcopyrite at 861-0	3/10	860-6	865-6						

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale	From	To	From					To	%	%	%	%			
	717-0	718-0	NQ	100	Firm, dark, dense ferruginous oolitic mudstone with abundant marine fossil debris										
	713-0	735-3		100	Hard, pale, generally fine grained partially silicified sand stone with occasional dark micaceous or mudstone partings scattered marine fossil debris. Some dark, carbonaceous plant material at the top. Some thin dolomite and siderite veining.										Verticality test at 727 ft. Inclination 77° Azimuth 344°
	735-3	755-3		100	Firm, dark grey micaceous mudstone. Scattered infrequent plant debris. Fossiliferous at 749-0.										
	755-3	761-0		100	Mudstone, coaly shale bands for last 0-6										
	761-0	762-0		100	Fossiliferous mudstone										
	762-0	763-0		100	Hard mudstone, slightly limey										
	763-0	770-0		100	Limestone										Little Limestone
	770-0	771-0		100	Mudstone										
	771-0	771-2		100	Thin coal band										
	771-2	776-0		100	Mudstone, probably fault in this section but very poor										

Graphic Log	Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	%	%	%		%
	666-0	672-9	N2	100	Rather hard, grey silty micaceous mudstone with some paler siltstone laminations or bands scattered marine fossil debris silty mudstone passes into									Verticality test at 670-0 Inclination 75° Azimuth 329°
	672-9	673-6		100	Hard, pale, micaceous siltstone passing into									
	673-6	706-0		95	Firm, dark grey micaceous occasionally pyritic mudstone rather silty in the upper half scattered infrequent plant debris above 695-0 and marine fossil debris at the base.									
	706-0	707-0		100	Hard, dark, dense ferruginous oolitic mudstone with some marine fossil debris passing into									
	707-0	708-6		100	Hard, pale medium grained partially silicified ganister with occasional dark carbonaceous or micaceous partings abundant plant material at the top. Some thin dolomite veining.									
	708-6	717-6		100	Firm, dark grey micaceous mudstone with scattered infrequent marine fossil debris. Ironstone band at 714-6.									

Graphic Log	Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	%	%	%		%
	640-3	648-6	NQ	100	Hard, pale, fine grained sandstone with thin, dark micaceous mudstone bands.									
	648-6	656-6		100	Firm, dark grey, occasionally pyritic, micaceous mudstone with some harder, paler silty mudstone sections at the top scattered marine fossil debris. Some poorly developed pyritic ironstone nodules and bands.									
	656-6	666-0		100	Hard, pale, medium grained sandstone with occasional dark micaceous or carbonaceous partings. Scattered calcareous marine fossil debris.									
	666-0	669-3		100	Firm dark grey micaceous mudstone									Wedge set at 669-3
	669-3	655-6		100	Firm, dark grey micaceous mudstone									
	655-6	666-0		100	Hard, pale generally medium grained sandstone with occasional dark micaceous or carbonaceous partings, scattered infrequent marine fossil debris.									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
				ND		calcareous, marine fossil debris.								
		627-9	628-0		100	Firm, dark grey micaceous mudstone.								
		628-0	631-0		100	Firm, grey, silty micaceous mudstone with pale siltstone laminations and bands and some dark mudstone bands. Several bands of calcareous marine fossil debris.								
		631-0	633-0		100	Hard, pale, generally medium grained sandstone with dark, carbonaceous or micaceous partings and abundant dark, carbonaceous plant material at the top.								
		633-0	634-3		100	Firm, dark grey micaceous mudstone.								
		634-3	646-3		100	Hard, pale, generally medium grained, partially silicified micaceous sandstone with occasional dark, micaceous partings. Some dark carbonaceous plant material at the top fracture (FAO <sup>o</sup> ) lined with quartz and pyrite from 634-3 to 635-3. Sandstone becomes finer grained and passes into								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale	From	To	From					To	%	%	%	%			
	617-6	618-0	NQ	100	Hard, pale siltstone with silty micaceous mudstone bands, passing into										
	618-0	618-0		100	Hard pale, fine grained micaceous sandstone with dark micaceous partings.										
	618-6	619-3		100	Hard pale, fine grained sandstone with dark, micaceous partings, and at the top and the base. Thin, dark silty mudstone bands.										
	619-3	620-3		100	Hard, pale, fine grained sandstone with dark micaceous partings.										
	620-3	623-0		100	Firm, grey silty micaceous mudstone with some harder thin pale siltstone bands scattered infrequent plant debris. Some coaly partings silty mudstone passes into										
	623-0	624-3		100	Hard, pale, fine grained sandstone with dark micaceous partings and at the base a thin band of calcareous marine fossil debris. Sandstone passes into										
	624-3	627-0		100	Firm, grey, silty, micaceous mudstone with pale siltstone bands and several bands of										

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	599-6	599-0	NQ	100	Hard, grey, bioclastic limestone									)
	599-0	599-3		100	Firm, dark grey, calcareous mudstone.									)
	599-3	601-0		100	Hard, grey, bioclastic limestone									)
	601-0	601-3		100	Firm, dark grey calcareous mudstone.									) Crag Limestone
	601-3	602-3		100	Hard, grey, bioclastic limestone argillaceous and with dark mudstone bands at the top and the base.									)
	602-3	603-0		100	Firm, dark grey, micaceous calcareous mudstone with abundant calcareous, marine fossil debris.									)
	603-0	606-9		100	Hard, pale, fine grained ganister, silicified at the top.									)
	606-9	617-6		100	Hard, generally medium grained partially silicified, micaceous sandstone with occasional micaceous partings. Some thin dolomite veining from 608-0 to 609-3 and quartz and dolomite veining from 612-3 to 613-9. Vein of dolomite half inch thick from 616-0 to 616-9 sandstone passes into									) Verticality test at 615-0 Inclination 73° Azimuth 343°

MACKAY & SCHNELLMANN LTD

ADMIN EXPLORATION  
(U.K.) LIMITED

WEARDALE

Co-ordinates 396816E  
541095N

Elevation 1533 ft.

Inclination 73°-78°

Drill BBS 20

Geologist Neil Scott

Date Started 24.2.73

Hole No. 2a

Bearing

Final Depth 887-3

Drillers Mick Brown & Charles Reilly

Date Stopped

Sheet No. 1

Graphic Log	Depth		Bit Size/Type	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	%	%	%		%
		552-6	1 1/2		See borehole No.2 base of wedge set at 565-0									
		552-6	596-3	95	Hard, pale, generally coarse grained, micaceous, feldspathic sandstone with occasional dark micaceous, carbonaceous or coaly partings. Dolomite, calcite and quartz on fracture from 578-3 to 579-3. Fracture angle to core axis (FA) 0°. Traces of pyrite (FA 50°) at 579-6, witherite, dolomite and pyrite (FA 20°) at 581-3 and 582-3, dolomite, witherite, quartz and pyrite (FA 15°) at 583-6 and 586-6 to 588-0, pyrite and calcite (FA 20°) from 590-3 to 593-0, dolomite and pyrite (FA 10°) at 593-3.									
		596-3	597-0	65	Brown, friable, broken mudstone.									
		597-0	598-3	65	Black, carbonaceous mudstone smeared, friable and broken.									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		892-6	893-3	NQ	100	Hard, pale siltstone with dark mudstone laminations and bands, passing into								
		893-3	896-0		100	Firm, dark grey, micaceous mudstone with some thin, hard siltstone bands. Scattered, infrequent plant debris.								
		896-0	897-0		100	Hard, pale, micaceous sandstone with some dark, carbonaceous material at the top.								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb %	Zn %	%	%	
		863-0	872-0	HQ	100	Hard, grey, bioclastic limestone with some stylolites. Thin vein of dolomite, quartz and calcite (FA O <sup>0</sup> ) from 864-0 to 871-0								)
		872-0	879-0		100	rather dark, hard, fragmented, bioclastic, cavitous, mineralised limestone. Cavities thickly lined with quartz and chalcedony mineralisation as well as small amounts of dolomite. Some galena on fracture surfaces.								)
		879-0	883-3		100	Hard, grey, bioclastic limestone with stylolites.								)
		883-3	884-6		100	Hard, dark grey, mineralised limestone with galena and sphalerite as replacement mineralisation and quartz and fluorite as thin veins, or encrustations along partings.								) Part of Great Limestone.
		884-6	885-6		100	Hard, dark grey, cavitous limestone.								)
		885-6	890-3		100	Hard, grey, bioclastic limestone with stylolites. Pyritic at the base.								)
		890-3	891-9		100	Firm, grey, micaceous, pyritic mudstone with calcareous debris at the top.								)
		891-0	892-6		100	Hard, pale, fine grained, micaceous sandstone.								)

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	Pb %	Zn %	%	%		
		839-0	844-6	102	90	Hard, fragmented, slightly greenish, mineralised, bioclastic limestone galena, dolomite, fluorite and quartz as thin veins, cavity encrustation, fracture lining and replacement mineralisation.	2/02	839-0	842-0						)
							2/03	842-0	844-9						)
		844-6	844-9		100	Vein of galena, fluorite, dolomite and quartz.									)
		844-9	850-0		100	Hard, greenish, mineralised, bioclastic limestone. Galena, dolomite, fluorite, quartz and sphalerite as replacement mineralisation, cavity infilling and encrustation, thin veins and fracture linings.	2/04	844-9	850-0						)
															)
		850-0	858-6		100	Hard, grey, mineralised, coral limestone. Galena, dolomite, fluorite and quartz (including chalcedony) as replacement mineralisation, cavity encrustations, thin veins and fracture linings. Mineralisation most strongly developed at the top.	2/05	850-0	852-9						)
							2/06	852-9	858-0						)
		858-6	863-6		100	Hard, dark, weakly calcareous limestone, cavitous in parts, with occasional dark, carbonaceous partings. Sparsely mineralised with galena and fluorite as cavity encrustations. Dark limestone passes into									)

) Part of Great Limestone.

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	Pb %	Zn %	%	%	%	
		828-0	830-0	100	100	Hard, grey, clean, bioclastic limestone, passing into									)
		830-0	832-0		100	Firm, dark grey, mudstone with abundant calcareous marine fossil debris, passing into									)
		832-0	833-0		100	Hard, grey, clean, bioclastic limestone with stylolites, passing into									)
		833-0	834-9		100	Firm, dark grey mudstone with abundant calcareous marine fossil debris.									)
		834-9	837-6		100	Hard, broken, slightly greenish, mineralised, bioclastic limestone. Galena and fluorite as cavity infilling and encrustation, thin veins and replacement mineralisation. Limestone passes into	2/01	835-0	839-0						)
		837-6	837-9		100	Firm, dark grey mudstone with some calcareous marine fossil debris.									)
		837-9	838-9		100	Hard, fragmented, slightly greenish mineralised bioclastic limestone. Galena, fluorite and dolomite as thin vdns, lining fractures and as replacement mineralisation.									)
		838-9	839-0		100	Fragmented vein of dolomite, fluorite and quartz with traces of galena.									)

Part of Great Limestone.

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		803-0	817-0	NQ	100	Firm, dark grey, micaceous, rather broken mudstone with a few hard, pale siltstone bands at the top scattered infrequent plant debris some shearing, base highly pyritic.									Verticality test at 800 ft. Inclination 75° Azimuth 235°
		817-0	818-9		100	Coal, hard and bright pyritic in parts.									
		818-9	819-9		100	Firm, grey mudstone.									
		818-9	821-0		100	Hard grey, bioclastic limestone with an argillaceous band towards the top passing into									
		821-0	822-0		100	Hard, grey, rather argillaceous limestone with dark, thin mudstone bands, passing into									
		822-0	823-6		100	Hard grey bioclastic limestone, passing into									
		823-6	824-0		100	Dark grey, calcareous mudstone with abundant calcareous marine fossil debris, passing into									
		824-0	828-3		100	Hard, grey bioclastic limestone, argillaceous at the base, passing into									
		828-3	828-6		100	Firm, dark grey calcareous mudstone with abundant calcareous marine fossil debris, passing into									

PART OF GREAT LIMESTONE

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		761-0	768-0	100	100	Hard, greenish, fragmented cavitous extensively mineralised, bioclastic limestone. Replacement mineralisation of dolomite, calcite, galena, fluorite, spualerite and pyrite. Replacement most developed from 761-0 to 766-0.									Little Limestone
		768-0	784-3		85	Firm, but friable, grey micaceous silty mudstone and siltstone breccia extensively brecciated and at the top invaded with dolomite veins with subsidiary calcite, fluorite, pyrite and galena mineralisation. Fragmented throughout with numerous harder siltstone fragments. Siltstone sometimes faulted against mudstone breccia.									Fault zone, Boltsburn vein.
		784-3	788-3		100	Hard, pale, fine grained micaceous sandstone with occasional dark, micaceous partings fragmented from 784-3 to 786-3 with some sections faulted against mudstone breccia. Some thin quartz and dolomite veining.									
		788-3	789-0		100	Firm, grey, silty micaceous mudstone.									
		789-0	793-0		100	Hard pale, fine grained, micaceous sandstone with occasional dark micaceous or carbonaceous partings some thin dolomite veining.									

Project Weardale

Hole No. 2

Sheet No. 19

Project Weardale

Hole No. 2

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		702-3	710-0	N2	100	Hard, pale, medium grained ganister with abundant dark, carbonaceous plant material at the top, some thin dolomite veining.									
		710-0	720-6		95	Firm, dark grey micaceous occasionally pyrite mudstone with scattered infrequent marine fossil debris passing into									
		720-6	721-3		100	Firm, dark grey, dense, ferruginous oolitic, sparsely pyritic mudstone with abundant marine fossil debris.									
		721-3	737-6		100	Hard, pale, fine grained partially silicified sandstone with occasional dark, micaceous or carbonaceous partings, some dark carbonaceous plant material at the top scattered calcareous, marine fossil debris. Fracture surface (FA 20°) lined with quartz at 721-9, quartz and calcite (FA 30°) at 730-9.									
		737-6	760-3		100	Firm, dark grey micaceous mudstone scattered, infrequent plant debris some shearing at the base.									
		760-3	761-0		100	Rather hard, dense ferruginous dark grey mudstone with abundant marine fossil debris.									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale	From	To	From					To	%	%	%	%			
	633-6	634-0	NO	100	Firm, dark grey, micaceous mudstone, scattered plant debris.										
	634-0	647-6		100	Hard, pale, partially silicified, medium grained, micaceous sandstone with occasional micaceous partings. Quartz and pyrite on fracture (FA 30 <sup>o</sup> ) at 636-3, calcite and quartz (FA 30 <sup>o</sup> ) at 641-3, pyrite and quartz at 643-6.										
	647-6	657-0		100	Firm, dark grey, pyritic micaceous mudstone with scattered marine fossil debris particularly above 651-6.										
	657-0	667-6		100	Hard, generally medium grained, partially silicified sandstone with scattered calcareous, marine fossil debris, occasional dark micaceous partings.										
	667-6	707-3		100	Firm, dark grey micaceous occasionally pyritic mudstone with paler, silty mudstone bands. Scattered marine fossil debris in the upper half and at the base, with plant debris in the lower half. Some dolomite and calcite veining from 674-0 to 676-3.										Verticality test at 700 ft. Inclination 75 <sup>o</sup> Azimuth 343 <sup>o</sup>
	707-3	708-3		100	Rather hard, grey oolitic, ferruginous mudstone with abundant calcareous marine fossil debris, passing into										

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type		Depth		Assay/Test Results				REMARKS
Scale		From	To						From	To	%	%	%	%	
		627-3	628-0	NO	100	of pyrite on vertical fractures. Silty mudstone passes into									
		628-0	728-6		100	Hard, pale, fine grained, micaceous sandstone. Slump structures against overlying silty mudstone.									
		628-6	629-0		100	Firm, dark grey micaceous mudstone passing into									
		629-0	629-6		100	Rather hard, grey, silty micaceous mudstone, passing into									
		629-6	629-9		100	Firm, dark grey, micaceous mudstone. Abundant calcareous marine fossil debris at the base.									
		629-9	630-3		100	Rather hard, grey, silty micaceous mudstone, passing into									
		630-3	631-6		100	Hard, pale, micaceous siltstone with abundant calcareous marine fossil debris, passing into									
		631-6	633-6		100	Rather hard, grey, silty micaceous mudstone with abundant calcareous fossil debris.									
						Hard, pale, generally medium grained micaceous sandstone with abundant dark, carbonaceous plant material at the top.									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		602-3	606-0	100	100	Hard, pale, generally fine grained micaceous gneiss with vertical plant rootlets in situ, passing into								
		606-0	620-0		100	Hard, pale, fine grained, partially silicified, micaceous sandstone with occasional dark, micaceous partings. Traces of pyrite on fracture (FA 15 <sup>o</sup> ) at 606-6, quartz and pyrite (FA 20 <sup>o</sup> ) at 607-6 and 610-6, dolomite and galena (FA 10 <sup>o</sup> ) at 612-9. Sandstone passes into								
		620-0	621-3		100	Hard, pale, micaceous siltstone with dark, micaceous mudstone laminations and partings, passing into								
		621-3	624-3		100	Father hard, grey, silty micaceous mudstone with hard, pale, siltstone laminations and thin bands scattered plant debris. Silty mudstone passes into								
		624-3	625-6		100	Father hard, grey, micaceous siltstone with darker silty mudstone laminations. Some thin bands of marine fossil debris. Siltstone passes into								
		625-6	627-3		100	Father hard, grey, micaceous silty mudstone with scattered marine fossil debris and some thin bands of calcareous fossil debris. Traces								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
						at 578-0, traces of pyrite and quartz 578-6 to 579-6, calcite and pyrite (FA 30°) at 584-0, calcite, pyrite, dolomite and quartz (FA 5°) at 586-3, dolomite and witherite (FA 30°) at 587-6, calcite dolomite and pyrite (FA 10°) at 590-0.								
		597-0	598-0	NQ	100	Hard, dark grey, bioclastic limestone with stylolites.								
		598-0	598-3		100	Firm, dark grey, micaceous, pyritic mudstone with calcareous, marine fossil debris.								
		598-3	600-3		100	Hard, dark grey, bioclastic limestone, passing into								
		600-3	600-9		100	Firm, dark grey, calcareous, micaceous mudstone with hard, argillaceous limestone bands and abundant calcareous, marine fossil debris, passing into								Crag Limestone. Verticality test at 600 feet. Inclination 73° Azimuth 334°
		600-9	601-3		100	Hard, dark grey, argillaceous, bioclastic limestone, passing into								
		601-3	602-3		100	Firm, dark grey, calcareous micaceous mudstone with abundant calcareous marine fossil debris, passing into								

Graphic Log	Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	%	%	%		%
	491-0	491-9	NO	100	Hard, rather dark siltstone with dark micaceous mudstone bands, passing into									
	491-9	495-0		100	Firm, dark grey, micaceous mudstone with some harder, siltier bands some coaly partings. Scattered plant debris.									
	495-0	495-3		100	Hard, pale, fine grained sandstone with dolomite and quartz veining.									
	495-3	496-6		100	Firm, grey, micaceous, silty mudstone.									
	496-6	597-0		100	Hard, pale, generally coarse grained, micaceous, feldspathic sandstone with occasional dark micaceous, carbonaceous or coaly partings. Medium grained above 502-2, some sections conglomeratic. Witherite, dolomite, quartz and pyrite veining at the top and along fracture surface (FA 0°) from 498-3 to 499-3, witherite quartz, pyrite and calcite (FA 35°) at 508-9, dolomite calcite and pyrite (FA 30°) at 510-9, pyrite and dolomite (FA 30°) at 515-9, pyrite calcite and quartz (FA 15°) at 519-6, quartz witherite and pyrite (FA 20°) 522-0 to 523-0, quartz (FA 25°) at 524-0, dolomite, quartz and pyrite (FA 30°) at 529-0, quartz and calcite (FA 20°) at 540-3, quartz (FA 30°) at 545-6, traces of pyrite at 554-3, dolomite and pyrite (FA 15°)									Verticality test at 500 ft. Inclination 71° Azimuth 345°

Project

Hole No.

Sheet No.

Project Wardale

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		440-0	473-3	NO	100	Hard, pale, generally coarse grained, micaceous, feldspathic sandstone with occasional dark, micaceous partings. Sphalerite on fracture (FA 25 <sup>o</sup> ) at 441-0, quartz (FA 30 <sup>o</sup> ) at 488-9, calcite and quartz (FA 20 <sup>o</sup> ) at 452-0 and 456-6, quartz and talc (FA 0 <sup>o</sup> ) at 461-3, quartz (FA 35 <sup>o</sup> ) at 465-6 and (FA 20 <sup>o</sup> ) at 471-6 and 472-9.								
		473-3	485-6		100	Firm, dark grey, micaceous mudstone with scattered plant debris above 485-0, more abundant below. Some shearing with pyrite and talc on shear surfaces. Some sections oolitic. Mudstone becomes black and carbonaceous towards the base with some coaly partings at 485-3.								
		485-6	487-6		100	Hard, pale, medium grained, micaceous sandstone with dark, micaceous partings, passing into								
		487-6	488-6		100	Firm, dark grey, micaceous mudstone with some plant debris and coaly partings.								
		488-6	491-6		100	Hard, pale, medium grained, micaceous sandstone with occasional dark, micaceous partings. Some black, carbonaceous plant debris at the top. Sandstone passes into								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		380-0	418-6	NO	100	<p>from 370-6 to 372-0, sphalerite (FA 20°) at 378-0, quartz (FA 30°) at 382-6, quartz and pyrite (FA 10°) 385-6 to 387-0, sphalerite (FA 35°) at 388-0 and quartz (FA 15°) at 389-0.</p> <p>Hard, pale, generally coarse grained, micaceous, feldspathic sandstone with occasional dark, micaceous, carbonaceous or coaly partings. Quartz on fracture (FA 30°) at 384-0, pyrite and quartz from 386-0 to 387-6, sphalerite (FA 35°) at 388-0, quartz and pyrite (FA 30°) at 390-6, quartz (FA 30°) at 391-9, 393-0 and 394-0, quartz and pyrite (FA 30°) at 398-0, quartz (FA 50°) at 404-6 and (FA 30°) at 406-0 and 407-0, quartz and calcite (FA 40°) at 409-0, quartz (FA 30°) at 409-9, 412-9 to 414-6.</p>								<p>Wedge set at 392-4.</p> <p>Verticality test at 400 ft. Inclination 69° Azimuth 338°</p>
		418-6	427-6		100	Rather hard, dark grey, micaceous mudstone with scattered plant debris, passing into								
		427-6	439-6		100	Hard, pale, fine grained, micaceous sandstone with some bands of finer grained siltstone.								
		439-6	447-0		100	Dark grey, micaceous mudstone, some plant debris.								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		354-6	355-0	NO	100	Firm, black, carbonaceous mudstone.									
		355-0	355-3		100	Fragmented coal.									
		355-3	355-9		100	Firm, black, carbonaceous mudstone with thin coal bands.									
		355-9	356-6		100	Hard, grey, silty micaceous mudstone with thin, dark, carbonaceous mudstone bands.									
		356-6	356-9		100	Firm, black carbonaceous mudstone with thin coal bands.									
		356-9	357-6		100	Hard, grey, silty, micaceous mudstone.									
		357-6	357-9		100	Firm, dark grey, micaceous mudstone with some plant debris.									
		357-9	358-9		100	Hard, grey, micaceous, silty mudstone with pale, fine grained sandstone bands.									
		358-9	359-3		100	Firm, grey, micaceous mudstone.									
		359-3	392-4		100	Hard, pale, generally coarse grained, micaceous, feldspathic sandstone with occasional dark, micaceous partings. Highly micaceous band at 371-6. Some mudstone partings at the top, occasional dark, carbonaceous or coaly partings. Dolomite on fracture (FA 30°) at 366-6, dolomite, quartz and talc (FA 0°)									

cont

Project Weardale

Hole No.

2

Sheet No.

Project Weardale

Graphic Log		Depth		Bit No.	Recover, %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		265-0	266-0	100	100	Firm, dark grey, micaceous mudstone with pale, fine grained sandstone laminations and bands. Siltier towards the base. Slump structures.								
		266-0	267-0	100	100	Firm, dark grey, micaceous mudstone.								
		267-0	319-0	100	100	Hard, pale, generally medium grained micaceous sandstone with dark, micaceous partings above 285-0. Dolomite on fracture surface (FA 40°) at 273-6, calcite and pyrite (FA 0°) at 279-0, (FA 30°) at 283-6 and (FA 40°) at 286-0, dolomite (FA 0°) 293-0 to 297-3, quartz (FA 40°) at 299-6 and (FA 30°) at 309-0, dolomite (FA 110°) at 311-6. Some coaly partings and mudstone fragments at the base.								Verticality test at 300-0 Inclination 65° Azimuth 340°
		319-0	331-0	100	100	Firm, dark grey, micaceous, slightly silty mudstone with scattered, infrequent plant debris, passing into								
		331-0	331-6	100	100	Hard, pale, fine grained sandstone with dark, micaceous laminations.								
		331-6	332-0	100	100	Hard, pale, fine grained sandstone with a dark, micaceous mudstone band								
		332-0	354-6	100	100	Firm, dark grey, micaceous mudstone with infrequent plant debris above 338-0 and marine fossil debris from 351-3 to 352-0. Some harder siltier bands.								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		235-9	237-9	NC	100	Hard, pale, micaceous ganister, passing into								
		237-9	246-9		100	Hard, pale, fine grained, micaceous sandstone with occasional dark, micaceous partings. Iron staining along fracture surfaces. Sandstone passes into								
		246-9	248-3		100	Hard, pale, fine grained, micaceous sandstone with some thin, dark, micaceous mudstone bands, passing into								
		248-3	251-9		100	Hard, pale, fine grained, micaceous sandstone with dark, micaceous mudstone cross laminations, passing into								
		251-9	254-0		100	Dark grey, micaceous, silty mudstone with pale, fine grained sandstone cross laminations or thin bands. Infrequent plant debris, passing into								
		254-0	261-4		100	Firm, dark grey, micaceous mudstone with scattered plant debris.								
		261-4	261-6		100	Fragmented coal.								
		261-6	262-3		100	Firm, grey fireclay.								
		262-3	265-0		100	Firm, dark grey, micaceous mudstone with scattered plant debris, passing into								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type		Depth		Assay/Test Results				REMARKS
Scale		From	To						From	To	%	%	%	%	
		213-3	215-9	NO	100	Hard, pale, fine grained, micaceous sandstone. Fractured, with dolomite on fracture surfaces.									
		215-9	221-6		100	Firm, dark grey, micaceous mudstone with some siltstone bands above 219-0. Scattered, infrequent plant debris. Mudstone passes into									
		224-6	228-3		100	Rather hard, dark grey, micaceous, calcareous mudstone with abundant calcareous marine fossil debris. Some limonitic deposition along near vertical fracture surface. Calcareous mudstone passes into									
		228-3	229-0		100	Hard, grey, argillaceous, bioclastic limestone.									
		229-0	232-9		100	Rather hard, dark grey, micaceous calcareous mudstone with abundant calcareous marine fossil debris and occasional thin, hard, argillaceous limestone bands. Mudstone passes into									
		232-9	233-3		100	Hard, grey, argillaceous, bioclastic limestone, passing into									
		233-3	235-9		100	Hard, grey, clean, bioclastic limestone with occasional slightly argillaceous bands. Some limonitic deposition on fracture surfaces.									Upper felltop Limestone.

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		196-9	197-3	NQ	100	Firm, dark grey, micaceous mudstone.									
		197-3	197-6		100	Hard, pale, fine grained, micaceous sandstone band.									
		197-6	198-9		100	Firm, grey, micaceous, silty mudstone.									
		198-9	199-9		100	Hard, pale, fine grained, micaceous sandstone, fracture surface (FA 15°) lined with partially oxidised (limonitic) dolomite.									
		199-9	208-6		90	Firm, grey, micaceous. Slightly silty mudstone with occasional harder siltstone bands. Some thin dolomite veining.									Verticality test at 200 ft. Inclination 63° Azimuth 343°
		208-6	211-9		100	Hard, pale, fine grained, micaceous sandstone with occasional dark, micaceous partings or thin mudstone partings. Fractures (FA 30°) lined with dolomite and traces of pyrite.									
		211-9	212-6		100	Firm, dark grey, micaceous mudstone band.									
		212-6	213-0		100	Hard, pale, fine grained, micaceous sandstone.									
		213-0	213-3		100	Firm, dark grey, micaceous mudstone.									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		143-6	177-9	NQ	100	Hard, pale, generally fine grained, micaceous sandstone, some fracture surfaces (FA 0-40°) iron stained. Occasional dark, micaceous partings. Thin dolomite vein at 176-0.									
		177-9	178-3		100	Dark grey, micaceous mudstone band.									
		178-3	189-3		100	Hard, pale, generally fine to medium grained micaceous sandstone with occasional dark, micaceous partings. Fracture surfaces (FA 0-30°) iron stained. Fragmented 185-6 to 186-6.									
		189-3	190-3		100	Rather hard, dark grey, micaceous mudstone.									
		190-3	192-9		100	Hard, pale, generally medium to fine grained, micaceous sandstone with dark, micaceous partings. Fracture surfaces iron stained.									
		192-9	193-3		100	Firm, dark grey, micaceous mudstone band, some plant debris.									
		193-3	196-9		100	Hard, pale, generally medium to fine grained, micaceous sandstone with occasional dark micaceous partings.									
		196-9	197-3		100	Firm, dark grey, micaceous mudstone									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	132-0	135-3	NQ + NQ	60	Firm, dark grey, slightly pyritic, micaceous mudstone									
	135-3	136-0	NQ	100	Hard, grey, argillaceous, bioclastic limestone, partially limonitised along near vertical fracture surface.									Grindstone Limestone.
	136-0	139-0	NQ	100	Firm, dark grey, micaceous mudstone, broken with fracture surfaces iron stained.									
	139-0	141-6	NQ	100	Hard, pale, silicified sandstone with dark, carbonaceous plant material. Broken, with fracture surfaces iron stained.									
	141-6	143-6		100	Firm, pale, silty, micaceous mudstone with some dark, carbonaceous plant debris, passing into									
	143-6	146-6		75	Hard, pale, fine grained, partially silicified sandstone with dark, carbonaceous plant material. Fractured with traces of dolomite and pyrite on near vertical fracture surfaces. Sandstone passes into									
	146-6	148-6		100	Hard, pale, micaceous siltstone with some dark, carbonaceous partings and coaly bands, passing into									

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
						debris toward the base. Fracture surfaces iron stained and lined with traces of quartz and pyrite.								
		123-6	125-3	H	100	Firm, grey, rather crumbly, oolitic mudstone, some shearing. Mudstone passes into								
		125-3	127-3		100	Rather hard, grey, micaceous, partially silicified siltstone with some dark, carbonaceous partings, passing into								
		127-3	127-9		100	Firm, grey, silty, micaceous mudstone, passing into								
		127-9	128-9		100	Rather hard, grey, micaceous siltstone.								
		128-9	129-3		100	Firm, grey, micaceous mudstone, crushed throughout.								
		129-3	131-9		100	Firm, dark grey, slightly pyritic, micaceous mudstone with dolomite septaria in thin ironstone bands. Broken throughout. Pyritic at the base with calcareous marine fossil debris.								
		131-9	132-9		100	Hard, dark grey, argillaceous, bioclastic limestone, partially limonitised along fracture surface (FA 35 <sup>o</sup> ) and in a small cavitous section.								

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		97-9	105-9	II	100	Firm, dark grey, micaceous, very slightly pyritic mudstone, silty above 98-6. Marine fossil debris at 102-4 with scattered plant debris below. Mudstone broken, passing into									Verticality test at 100 ft. Inclination 62° Azimuth 343°
		105-9	106-6		100	Firm, black, carbonaceous mudstone with abundant plant debris and, at the base, pyritic with thin coal bands and partings.									
		106-6	110-3		100	Firm, grey fireclay with abundant plant debris. Broken.									
		110-3	112-0		100	Firm, dark grey mudstone with abundant calcareous marine fossil debris.									
		112-0	112-6		100	Hard, dark grey, argillaceous. Bioclastic limestone.									
		112-6	114-0		100	Firm, dark grey mudstone with abundant calcareous marine fossil debris, passing into									
		114-0	118-9		100	Firm, grey, crumbly, colitic mudstone with scattered plant debris. Some shearing. Mudstone passes into									
		118-9	123-6		100	Hard, pale, partially silicified, micaceous sandstone with dark carbonaceous partings and plant									

cont./..

Graphic Log		Depth		Bit No.	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		74-3	84-0	H	100	Firm, grey, micaceous mudstone with scattered, infrequent plant debris and marine fossil debris 83-3 to 84-0. Some hard, thin, ironstone bands. Mudstone fragmented with some ferruginous staining on fracture surfaces.								
		84-0	84-6		100	Soft, black fireclay.								
		84-6	87-0		100	Firm, grey, micaceous, slightly silty mudstone with abundant plant debris.								
		87-0	89-0		100	Firm, weathered, iron stained, medium grained micaceous sandstone with some black carbonaceous plant debris, passing into								
		88-0	93-9		100	Hard, pale, fine grained sandstone with dark micaceous mudstone cross laminations and partings. Fractures (FA 15°) iron stained or with traces of dolomite. Sandstone passes into								
		93-9	96-6		100	Firm, grey, micaceous mudstone with pale, fine grained sandstone cross laminations or thin bands.								
		96-6	97-9		100	Rather hard, pale, generally fine grained, micaceous sandstone, siltier towards the top.								

MACKAY & SCHNELLMANN LTD

CLIENT: MINI EXPLORATION (UK) LTD PROJECT: WEARDALE

Co-ordinates 3569100  
9446053

Elevation 1533ft.  
Bearing 341°

Inclination 62°-75°  
Final Depth 897-0

Drill BBS 20

Geologist Neil Scott

Date Started 6.2.73

Hole No. 2

Drillers Colin Beardsley, Charles Reilly  
and Mick Brown

Date Stopped 22.2.73

Sheet No. 1

Graphic Log	Depth		Bit Size/Type	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS				
	Scale	From					To	From	To	%	%	%		%			
		0	7-0	B	Nil												
		7-0	59-0		100	Rather hard, weathered, generally coarse grained, micaceous, feldspathic sandstone with occasional weathered, micaceous partings, and one or two thin coaly partings. Some conglomeratic bands. Iron stained. Ferruginous deposition on some fracture surfaces.											
		59-0	67-0		100	Firm, dark grey, micaceous mudstone, broken throughout. Marine fossils 64-6 to 66±0.											
		67-0	68-6		65	Firm, pale fireclay with abundant plant debris. Crushed.											
		68-6	71-0		100	Firm, greenish, silty, micaceous mudstone.											
		71-0	72-9		100	Firm, grey, micaceous mudstone, broken.											
		72-9	74-3		100	Firm, slightly greenish, silty, micaceous mudstone. Fracture surfaces iron stained.											

**AE 38  
PROGRESS REPORT  
JUNE 1973**

**MS 7313**

NS 7313

PROGRESS REPORT

NEARDALE PROJECT,

JUNE 1973

Submitted to:

ACMIN Explorations N.L. Ltd.,  
6-10 O'Connell Street,  
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By:

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London  
June 1973

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3. Boreholes Nos. 3, 3a and 4
4. Trenching
5. Recommendations

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2. Locations of Boreholes Nos. 1 to 4
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- 5-8. Trench profiles across fault zone
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### APPENDICES

Correlog of Boreholes Nos. 2b, 3, 3a and 4

NOTE

Horeholes have been renumbered in this report so that all holes drilled from a single site have the same number, whereas the drillers numbered each hole in sequence. The corresponding numbers are shown below:

<u>Drillers' Number</u>	<u>Number in this Report</u>
2	2
3	2a
4	<u>2b</u>
5	<u>3</u>
5A	3a
6	<u>4</u>

PROGRESS REPORT  
WEARDALE PROJECT,  
JUNE 1973

1. BORHOLE NO. 2a

1.01 Borhole No. 2a was a deflection from borehole No. 1, inclined to intersect the Boltburn fault within the Great Limestone (fig. 1). Drilling began on 24th February, 1973 and was completed early in March.

1.02 Steepening of the Hole

<u>Depth in feet</u>	<u>Inclination in Degrees</u>
Started coring at 552'6"	
615	73
669	75
Wedge set at 669'3"	
727	77
820	78
Final depth 887'3"	

1.03 Results The core was logged by Mr. R. H. Jack of JCMIL. Details are recorded in the core logs appended to report No. 73-7.

1.04 Sampling Heavily to moderately mineralised sections within the Great Limestone were sampled. Sample section thicknesses and assay results were as follows:

Sample No.	From		To		Thickness		Pb	Zn	P
	ft.	in.	ft.	in.	ft.	in.	%	%	%
3/01	827	0	828	6	1	6	0.47	10.63	2.43
3/02	833	0	835	6	2	6	0.22	1.47	0.10
3/03	835	6	840	6	5	0	0.88	0.027	0.17
3/04	840	6	845	6	5	0	3.61	0.005	1.77
3/05	845	6	850	0	4	6	4.35	0.015	0.90
3/06	850	0	852	6	2	6	0.15	0.016	0.28
3/07	852	6	855	0	2	6	3.49	0.012	1.82

Sample No.	From		To		Thickness		Pb %	Zn %	F %
	ft.	in.	ft.	in.	ft.	in.			
3/08	855	0	858	0	3	0	0.27	0.30	0.72
3/09	858	0	860	0	2	0	2.83	0.018	3.56
3/10	860	6	865	6	5	0	0.18	0.005	0.17
3/11	865	6	869	6	4	0	0.96	0.005	0.77
3/12	869	6	871	6	2	0	15.08	0.010	1.32
3/13	871	6	877	0	5	6	0.76	0.14	0.76
3/14	877	0	878	3	1	3	18.71	0.086	8.50

1.05 Weighted averages for the mineralised section 833'0" to 878'3" are: Lead 2.68%, zinc 0.13%, and fluorine 1.12%.

## 2. BOROHOLE NO. 2b

2.01 Borohole No. 2b was a second deflection from Borohole No. 2 at 422'6" (Fig. 1), flattening the angle with the intention of intersecting the mineralised Great Limestone north of the intersection in Borohole No. 2a. Efforts to get a further wedge at 619'6" proved unsuccessful due to caving, and the hole was subsequently abandoned on the instructions of Dr. F. H. Jack. Drilling began on 13th March and was completed on 26th March, 1973.

## 2.02 Steepening of the hole

<u>Depth in feet</u>	<u>Inclination in degrees</u>
Deflection started at 422'6"	
488	70
Wedge set at 490'	
588	71
Final depth 619'6"	

2.03 Results The stratigraphy was virtually identical with that in Borohole No. 2. Apparent dips of bedding were of the order of 5 degrees. The hole was abandoned at 619'6" near the base of the Limestone Pill. No significant visible mineralisation was intersected.

2.04 Sampling No samples were taken.

3. BORHOLES NOS. 3, 3a and 4

3.01 Borehole No. 3 was cased by Mr. E. H. Jack at 278 feet to the south-southeast of and perpendicular to a point 1385 feet east of the old workings along the strike projection of the Holtburn Vein (Fig. 2). The inclination was set at 66 degrees in order to intersect the presumed eastward extension of the vein as located in Boreholes Nos. 1 and 2 (Fig. 3).

3.02 Attempts to set a wedge at 601'6" in Borehole No. 3 as requested on 6th April were unsuccessful due to caving. On rearing NX casing through the fault, the borehole deviated slightly from its former course and coring was continued from 421'0" on 13th April to a final depth of 698'4" on 19th April. This continuation from Borehole No. 3 is numbered 3a in this report.

3.03 Borehole No. 4 was inclined at 75 degrees from the same site as Borehole No. 3, aimed at the intersection of the Holtburn Vein and Great Limestone in the light of information from Borehole No. 3. Borehole No. 4 was started on 25th April and completed on 4th May at a depth of 936'6".

3.04 Steering of the Holes

Borehole No. 3

<u>Depth</u>	<u>Inclination in degrees</u>
106'0"	67
230'0"	66
330'0"	69
408'0"	70
507'0"	71
Failed to set wedge at 601'6"	

Borehole No. 3a

<u>Depth</u>	<u>Inclination in degrees</u>
439'9"	70
522'3"	70
673'1"	72
809'9"	72
886'0"	72
Final depth 936'4"	

Borehole No. 4

115'6"	74
216'6"	76
314'6"	77
412'6"	79
506'6"	81
731'11"	82
906'6"	81
Final depth 936'6"	

3.05 Results

- a) The stratigraphical succession was broadly similar to that in Boreholes Nos. 1 and 2, with apparent dips of 0 to 5 degrees.
- b) The Coalclough Coal was absent in both boreholes.
- c) The Cras Limestone, 3'5" of argillaceous limestone in borehole No. 4, was represented by 2'0" of poorly consolidated brown silt in Borehole No. 3. This may represent either a wash-out or some other local feature of the Rogerley Transgression.
- d) The Holtburn fault was intersected from 391'7" to 419'7" in black mudstones in Borehole No. 3.

3.06 Assuming that the Boltburn fault has a near-vertical attitude, as indicated in the previous boreholes about 1000 feet to the west, the fault in this locality lies about 150 feet south-southeast of its projected extension from Boreholes Nos. 1 and 2 at the level of the Great Limestone.

3.07 A zone of brecciated sandstone and black mudstone intersected between 500'5" and 506'8" in Borehole No. 4 has been doubtfully identified as the Boltburn fault. If this is correct, the fault has assumed an average dip of about 73 degrees between Boreholes Nos. 3 and 4, probably due to refraction through the less competent beds.

3.08 Sampling No significant visible mineralisation was intersected in these boreholes. However, the following sections were sampled to see whether they would provide some geochemical indication of the proximity of mineralisation.

Boreholes Nos. 3 and 3a

- 298'5" to 301'1" buff micaceous sandstone with pink colouration indicating possible zinc.
- 391'7" to 400'7" Boltburn fault, sampled in six sections.
- 649'9" to 651'9" Brown silt (equivalent to Crag Limestone) with traces of sphalerite.
- 902'2" to 923'11" Great Limestone, sampled in five sections.

Sample No.	From		To		Thickness		Fe ppm	Zn ppm	Cu ppm
	ft.	in.	ft.	in.	ft.	in.			
B5-1	298	5	301	1	2	3		24	
B5-2	391	7	394	10	3	3		30	
B5-3	394	10	397	6	2	8		13	
B5-4	397	6	401	6	4	0	Leads	52	Leads
B5-5	401	6	404	6	3	0	than	16	than
B5-6	404	6	405	6	1	0	26	<10	0.3%
B5-7	405	6	410	7	5	1		26	
B5A-1	902	2	906	2	4	0		24	
B5A-2	906	2	910	4	4	2	40	40	
B5A-3	910	4	914	0	4	5	55	23	
B5A-4	914	0	919	0	4	3	56	41	
B5A-5	919	0	923	11	4	11	52	38	
B5A-6	649	0	651	9	2	0	30	0.15%	

#### Borehole No. 4

500'5" to 506'8" Fault zone, sampled in two sections.  
584'2" to 590'1" Feldspathic sandstone with sphalerite.  
860'0" to 885'6" Great Limestone, sampled in five sections.

Sample No.	From ft.	in.	To ft.	in.	Thickness ft.	in.	Pb ppm	Zn ppm	CaF <sub>2</sub> %
B6-1	500	5	504	8	4	4	< 20	1.32%	)
B6-2	504	9	506	8	1	11	< 20	92	)
B6-3	584	2	590	1	5	11	< 20	0.31%	)
B6-4	860	0	863	10	3	10	61	26	) less
B6-5	863	10	869	6	5	8	72	28	) than
B6-6	869	6	875	8	6	2	55	16	) 0.3%
B6-7	875	8	880	8	5	0	52	13	)
B6-8	880	8	885	6	4	10	52	12	)

3.09 Conclusions The intersection of the Holtzburn Vein and the Great Limestone was not located, due to refraction of the former in less competent strata. Should significant mineralisation be present in the Great Limestone in this area, it is evidently sufficiently far from Borehole No. 4 to provide no geochemical expression in samples from the level of the mineralized flats in Borehole No. 2.

3.10 On the other hand, the assay value of 1.32 percent zinc from the fault zone between the High and Low Grit Sills in Borehole No. 4 may indicate mineralisation of the Holtzburn fault at higher levels in the direction of the possible intersection with the White Vein, in which the mineralisation is predominantly in the Grit Sills.

#### 4. TRENCHING

4.01 A trench 90 feet long was dug on 8th April along a line perpendicular to and south of the projection of the Holtzburn Vein, 1356 feet east of the old workings (fig. 4). The purpose was to locate any surface expression of the Holtzburn fault.

4.02 Results The fault was located about 170 feet northwest of the site of Boreholes Nos. 3 and 4 vertically above the fault intersection in the former (figs. 5-6). A second trench, 20 feet long, was dug 20 feet west of the first, to investigate the fault in more detail.

4.03 Sampling Twelve samples of sand and mudstone were collected from six points at 10-foot intervals along the first trench, and a sample of silicified ferruginous sandstone was collected from the fault zone in the floor of each trench (fig. 2). The object was to investigate the possibility of tracing any eastward extension of the vein at surface by conventional geochemical sampling. The results of atomic absorption analysis of these samples were as follows:

<u>Sample No.</u>	<u>Rock Type</u>	<u>Pb</u> <u>ppm</u>	<u>Zn</u> <u>ppm</u>
TC 1	Mudstone	20	7
1A	Sand	28	12
2	Mudstone	47	15
2A	Sand	22	11
3	Mudstone	50	19
3A	Sand	21	25
4	Mudstone	40	13
4A	Sand	13	11
5	Mudstone	41	22
5A	Sand	15	17
6	Mudstone	38	10
6A	Sand	23	28
7	Sandstone (Trench 1)	18	18
8	Sandstone (Trench 2)	35	8

4.04 Conclusions Although some higher values do occur in the fault, they are neither obviously anomalous nor isolated (fig. 3). Few of the values rise much above the average background contents of lead and zinc in sandstones and mudstones given in 'Geochemistry in Mineral Exploration' by Mackay and Cobb, and sampling over a wider span across the fault would therefore probably not show these values to be any more significant than they appear from the trench samples.

## 5. RECOMMENDATIONS

5.01 Although the most direct way of seeking extensions of the Boltzurn Vein, extensive and time-consuming deep drilling has been shown by experience to be unsatisfactory in this area because of the unavoidable deflection of boreholes and the difficulty of correcting this by wedging. A fracture of the Boltzurn fault in beds of differing competence also makes prediction of the location of its intersection with the Great Limestone difficult, involving the further expense of drilling deflections. Further deep drilling should therefore be postponed until cheaper and more rapid methods of seeking any extension have been investigated more closely.

5.02 The objective should now be to trace the Boltzurn fault at surface to its possible intersection with the White Vein and to resume deep drilling only if and when this favourable location has been identified.

5.03 Available methods are trenching and geochemical sampling. The former appears to be satisfactory and should be applied at 400-foot intervals across the trend of the Boltzurn fault, infilling to 200-foot intervals, especially if identification of the structure is in doubt in the more widely spaced trenches. Trench walls and/or floors should be sampled for geochemical assay, to assist in building up a geochemical picture and especially to test the idea of vertical exhalation from mineralisation in depth that resulted from the work on Edmondshyers Gully.

5.04 Geochemistry has acquired a bad reputation in this area. Therefore no full-scale geochemical work is recommended, but the method is relatively cheap, and further tests are recommended to see whether this reputation is justified. In addition to the continued sampling of trenches recommended above, orientation traverses, say three in number, should be made across the presumed outcrop of the Boltzurn fault above the old mine workings and should be carried out far enough to permit background to be calculated. Assays should be for lead, zinc, and mercury and assaying for fluorine should also be considered.

5.05 The previous geochemical sampling showed anomalous values east of Tufon Burn on the trend of the Poltsburn fault. Photogeology has shown that the fault may extend between there and the recent drillsites, and has indicated a possible intersection with the White Vein west of the head of Tufon Burn. Published geological maps tend to confirm this location for the intersection. A further visit to the Institute of Geological Sciences, Leeds, is recommended to see whether they can add anything to this information from their unpublished records.

5.06 The period from early July to August 11th would be suitable for this work, as this bridges the gap between breeding of the grouse in the area and the start of the shooting season.

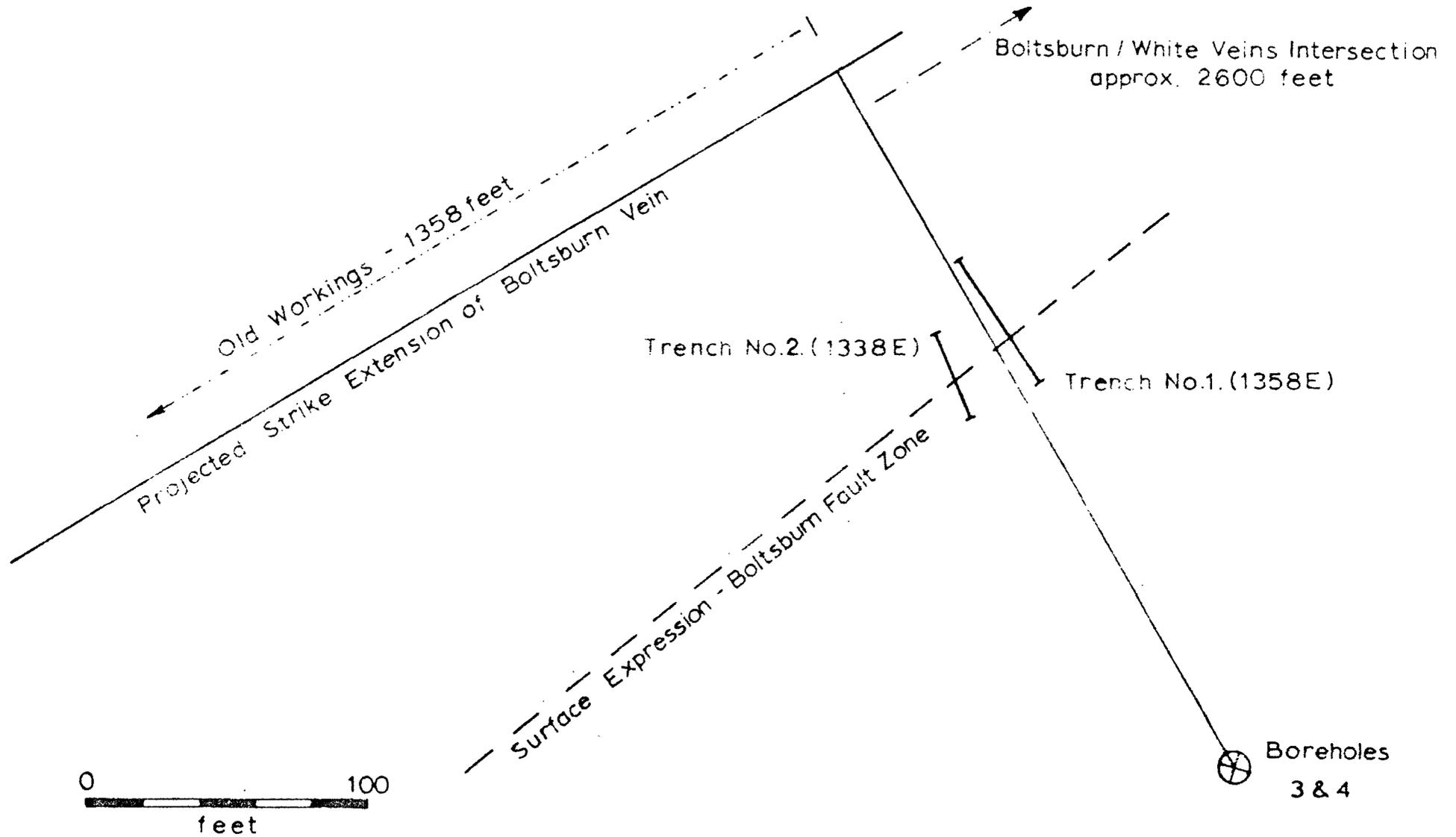
London  
June 1973



F. H. PITCH  
Director  
Mackay & Schnellmann

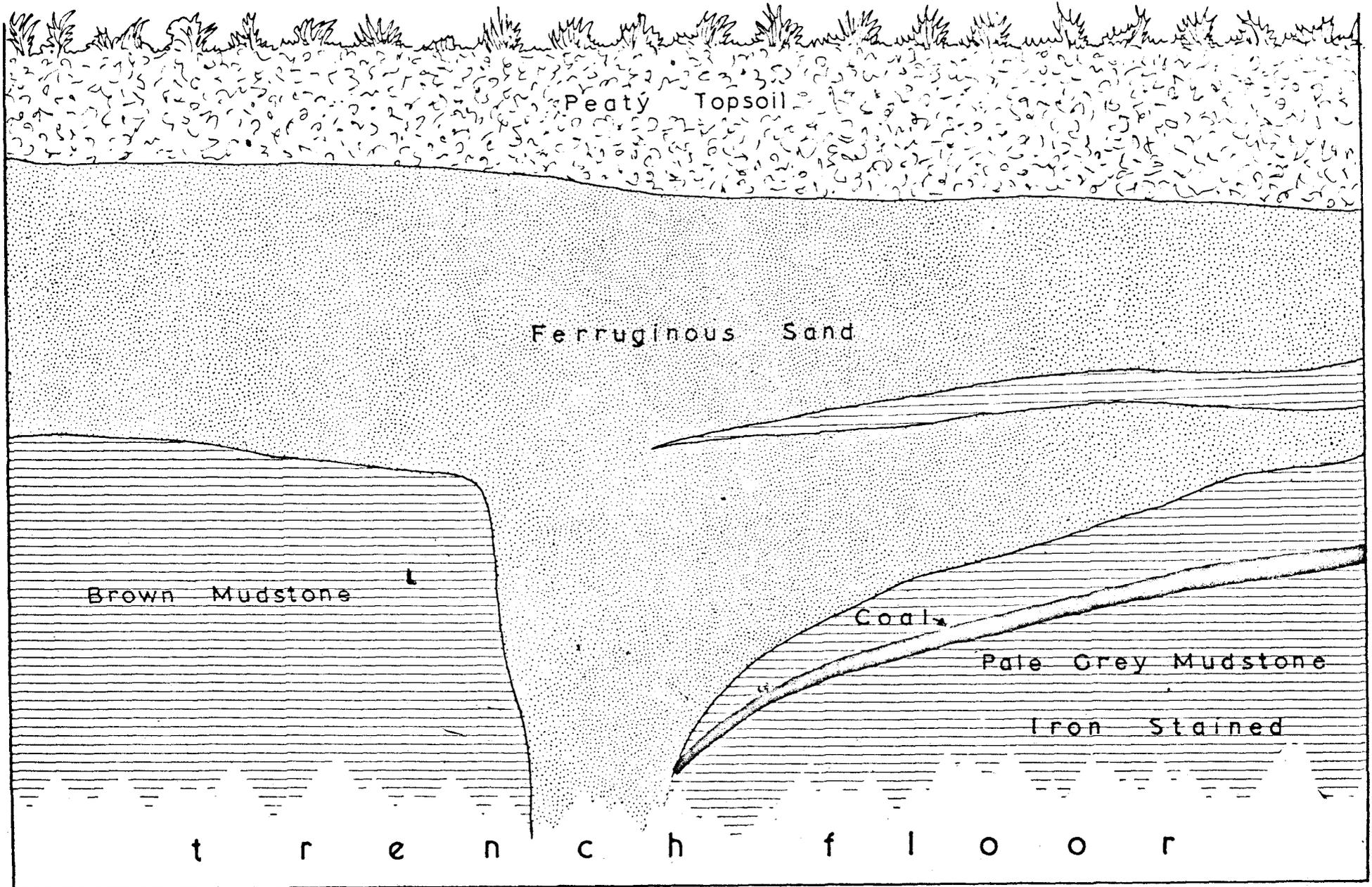
# Plan Showing Location of Trenches

Fig. 4.



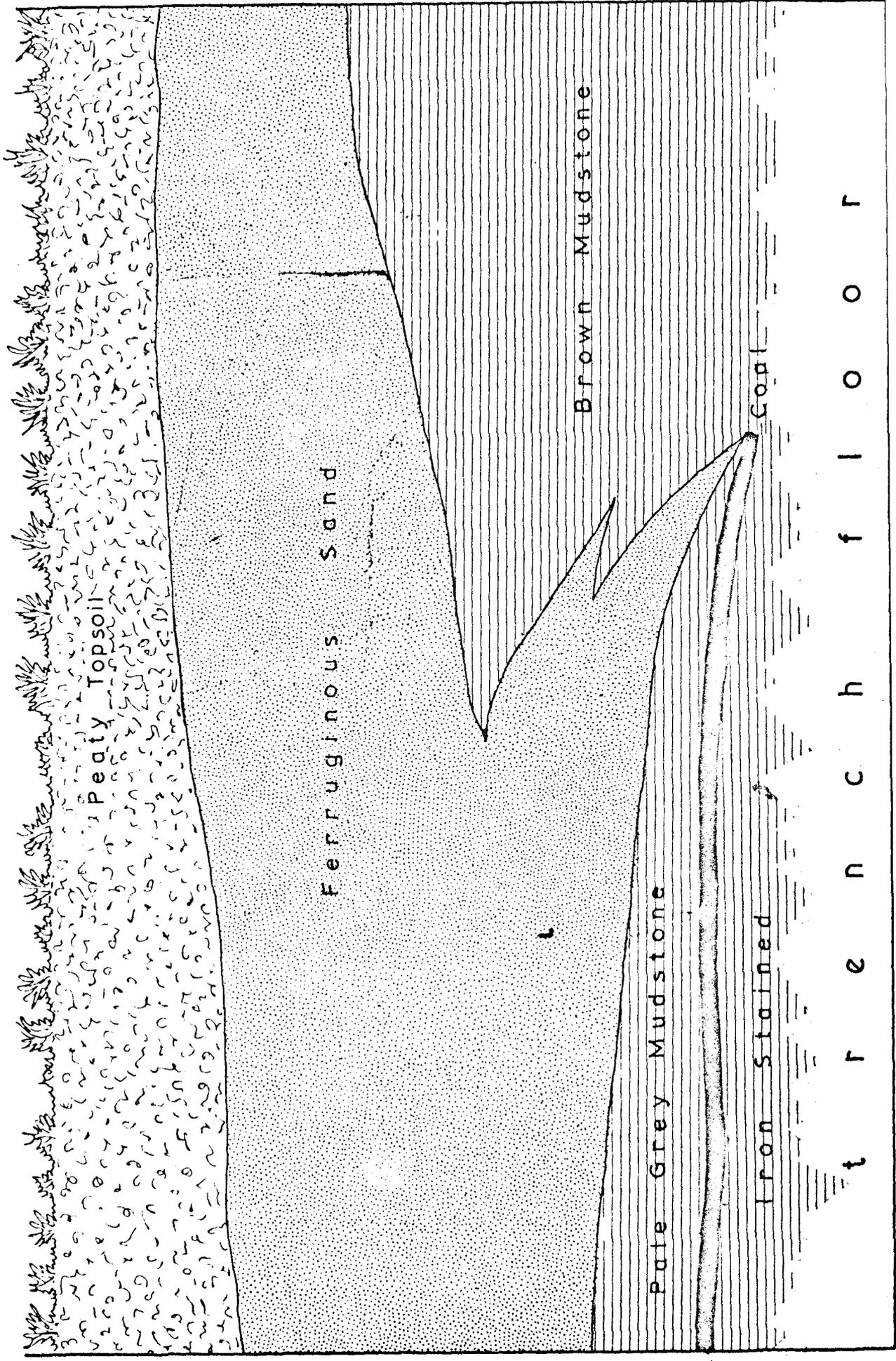
Trench Profile Across Fault Zone - Dead Friars  
Line 1358E (E. side)

Scale Fig.6  
1 5  
feet



Trench Profile Across Fault Zone - Dead Friars  
 Line 1358E(W. side) Fig. 5.

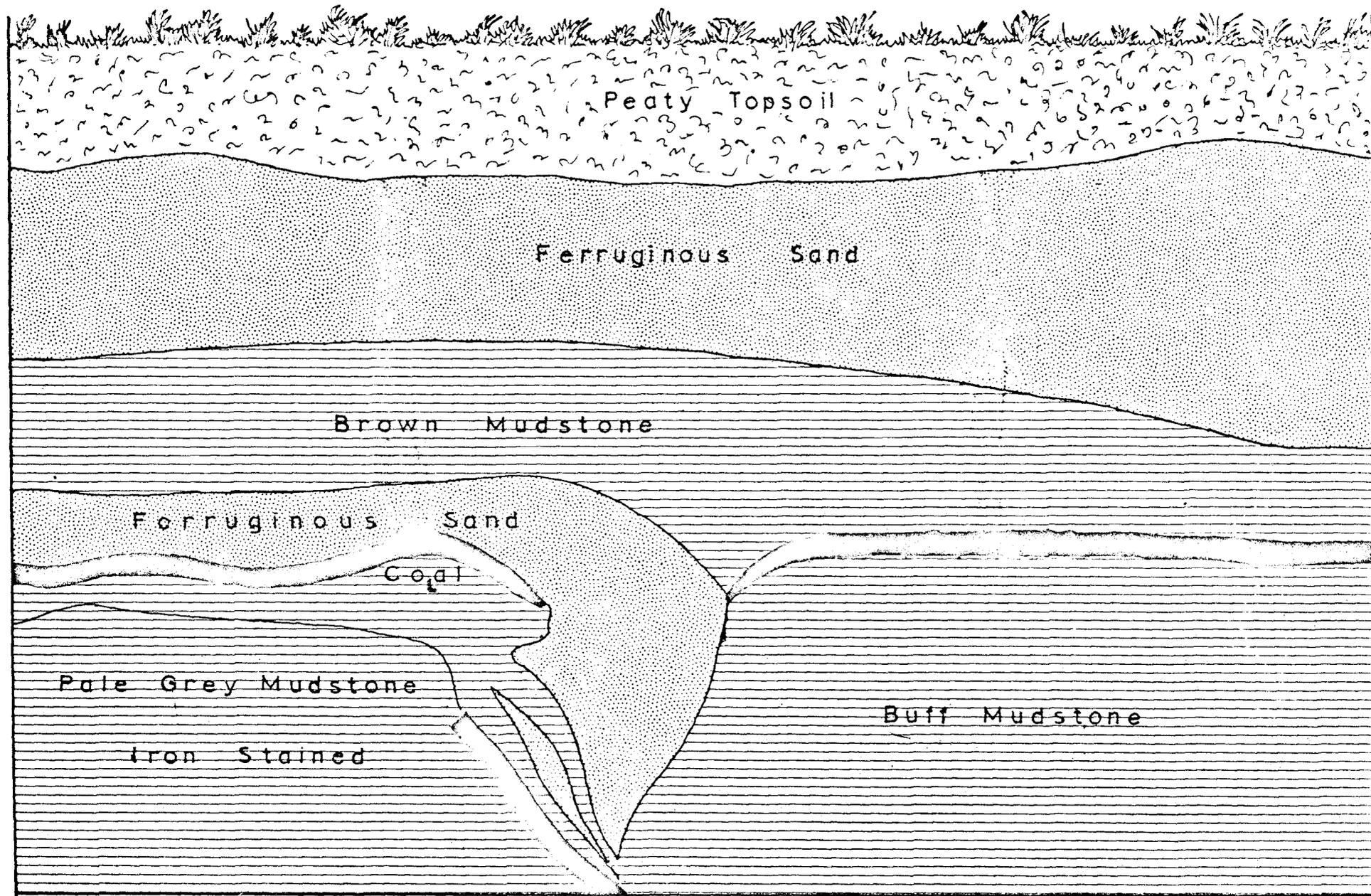
Scale  
 5 feet



t r e n c h f i o o r

Trench Profile Across Fault Zone - Dead Friars  
Line 1338E(W. side)

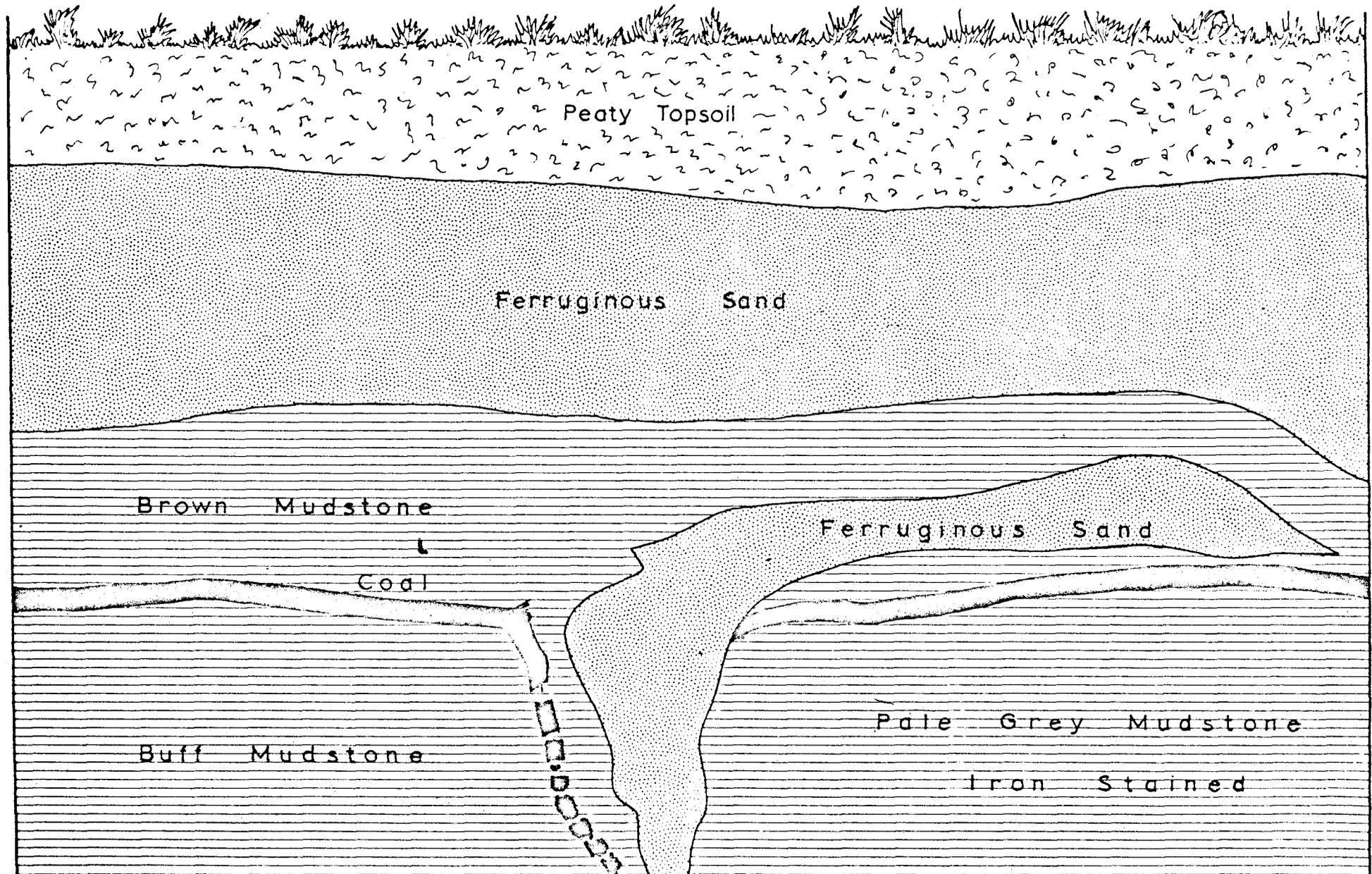
Scale Fig. 7  
1 5  
feet



Trench Profile Across Fault Zone - Dead Friars  
Line 1338E (E. side)

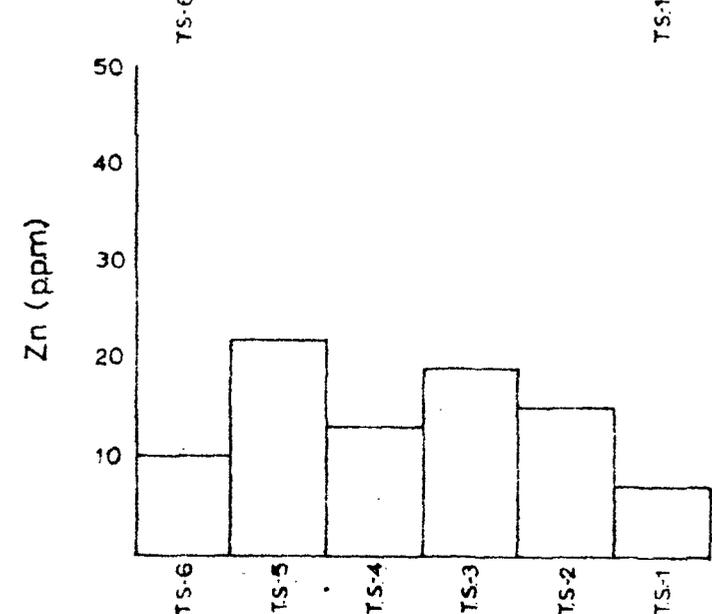
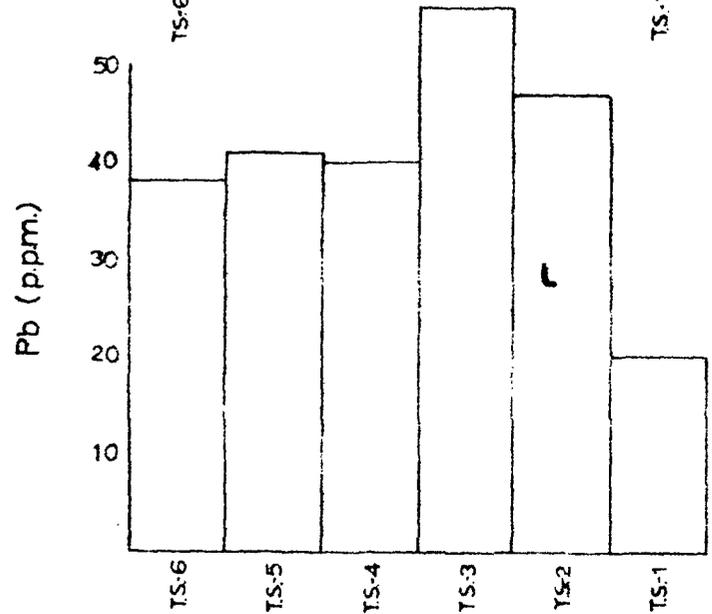
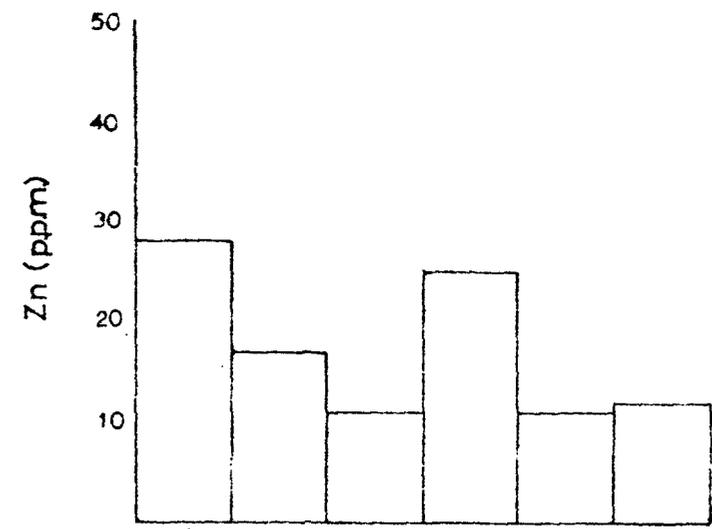
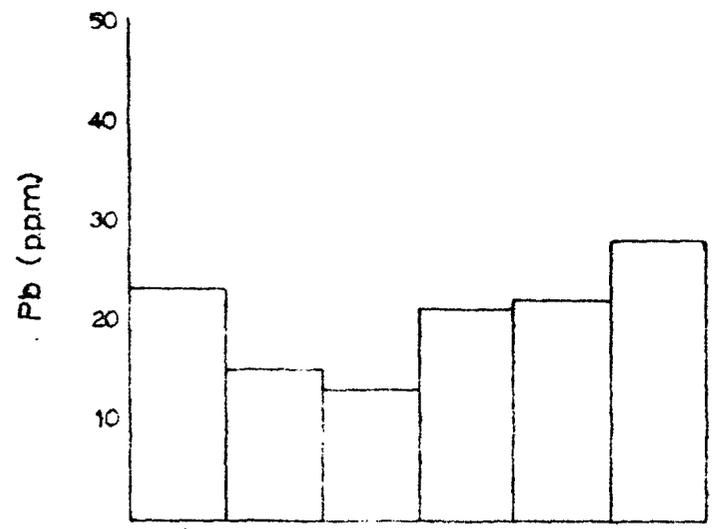
Fig. 8

Scale



# Lead and Zinc Values in Trench Samples - 1358E.

Fig. 9.



Pb & Zn in sand

Pb & Zn in mudstone

Plan view of trench 1358E and sample locations



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CLIENT ACMIN (U.K.) LTD

PROJECT WEARDALE

Co-ordinates Nat. Grid Ref  
NY968448

Elevation 1533ft  
Bearing 341°

Inclination 70-71° Drill BBS 20  
Final Depth 4226-619'6 Drillers DPI

Geologist R. Jack &  
N. Henbest

Date Started 13.3.73  
Date Stopped 20.3.73

Hole No. 2B  
Sheet No. 1

Lithologic Unit	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
	From	To					From	To	%	%	%	%	
	422'6	426'5			Firm black mudstone with occasional siltstone and silty mudstone intersections. Plant debris, near vertical fractures, passes into soft mottled buff to pale grey fireclay with fine carbonaceous partings, irregular carbonaceous debris. Plant remains. Fracture at 427' (F.A. 45°) micaceous and silty towards base, passes into hard pale to medium grey crystallised siltstone, micaceous in part with paler intercalations with carbonaceous debris - between 430'0-430-7. Rare dark grey silty mudstone intercalation - 430-7. Occasional dark carbonaceous laminations + debris, - plant debris. Fractures 428'6 (F.A. 5°) to pyrite 428'9 (F.A. 45°) - sphalerite 429'4 (F.A. 30°) - quartz, dolomite, to galena. 431'0 (F.A. 30°) silicified breccia - i.e. movement. Numerous fractures - 2 sets - 15° - 30° generally latter with quartz, passes into								
	426'5	428'0											
	428'0	433'11											

Graphic Log Scale	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	From	To					From	To	%	%	%	%		
	433'11	438'2			Hard pale grey micaceous siltstone with irregular muddy intercalations. Occasional black and dark grey carbonaceous laminations and partings. Calcite infilling fracture - 434'6 (F.A. 30°). Numerous fractures (c.F.A. 30°) passes into									
	438'2	438'5			Firm dark grey carbonaceous mudstone with buff siltstone intercalation. Plant debris.									
	438'5	439'5			Hard white to pale grey fine grained sandstone with dark micaceous banding, irregular dark micaceous mudstone and carbonaceous mudstone intercalations increasing towards base as passes into									
	439'5	440'0			Firm black finely micaceous silty mudstone with buff siltstone intercalations - especially towards top of unit. Fractures (F.A. 45°)									
	440'0	474'6			Hard white medium-course grained. recrystallised micaceous feldspathic sandstone, fine grained above 446'9 Occasional grit and pebble bands. Dark and buff micaceous banding - particularly at top. Black micaceous mudstone and carbonaceous laminations rare coal, carbonaceous and plant debris									

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS		
Scale		From	To					From	To	%	%	%	%				
						Fractures 442'2 (F.A. 40°) pyrite, sphalerite - possible movement. 442'8 (F.A. 30°) quartz, tr. pyrite. 447'1 (F.A. 10°) Witherite 471'11 (F.A. 30°) quartz, sphalerite, pyrite. Numerous fractures (30°-40°) usually lined with quartz and often calcite. Firm, medium grey silty micaceous mudstone with some carbonaceous debris. passes into Firm, dark grey mudstone fireclay with carbonaceous debris, plant debris, passes into Firm medium grey silty micaceous mudstone, passes into Firm medium grey micaceous recrystallised felspathic siltstone with some carbonaceous debris. Near vertical dolomite veinlets. passes into Firm medium to dark grey mudstone fireclay with copious carbonaceous debris, plant debris. Occasional silty mudstone intercalations. Generally darkening towards base. Near vertical fractures. tr. pyrite, passes into Firm black mudstone shale with plant debris. Hard white to buff recrystallised fine grained micaceous felspathic sandstone with black micaceous mudstone laminations, some carbonaceous, increasing towards base. Fracture 486'0 (F.A. 0-5°) quartz, tr. pyrite, chalcocite and galena, unit passes into											
		474'6	475'0														
		475'0	475'6														
		475'6	475'7														
		475'7	476'0														
		476'0	483'9														
		483'9	485'8														
		485'8	488'0													Tro-pary survey at 488'-70°/339°	

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	488'0	488'3				Hard dark grey micaceous siltstone-muddy with carbonaceous partings, passes into								
	488'3	489'0				Firm black silty mudstone with carbonaceous partings and plant debris.								
	489'0					WEDGE								
	477'7	484'4				Firm to soft crumbly medium to dark grey mudstone fireclay with copious carbonaceous partings and debris. Plant debris - rarely pyritised. passes into								
	484'4	485'5				Firm black mudstone with carbonaceous intercalations with plant debris. Near vertical intersecting veins - some quartz, passes into								
	485'5	487'10				Hard white recrystallised fine grained feldspathic micaceous sandstone with black micaceous mudstone laminations.								
	487'10	488'4				Firm to hard black muddy siltstone with fine coal bands. passes into								
	488'4	488'9				Firm black mudstone with black carbonaceous laminations- plant debris. White sandstone intercalation at 488'6.								
	488'9	491'10				Hard white to buff fine grained micaceous feldspathic sandstone with numerous micaceous carbonaceous mudstone laminations. Becomes muddy and grain size decreases towards base to muddy siltstone as passes into								
	491'10	494'6				Firm black carbonaceous mudstone with several dark grey siltstone intercalations. Plant debris, thin coal laminations. Fractures (10°) with tr. pyrite. Passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		494'6	496'0			<p>Hard, medium grey micaceous felspathic fine grained sandstone muddy at top and increasing grain size towards base. Black micaceous carbonaceous mudstone laminations.</p> <p>495'1 - Fracture (F.A.15°) quartz, dolomite. Numerous fractures, irregular below 495'1 with solution cavities.</p> <p>Hard white recrystallised micaceous felspathic sandstone of varying grain size, generally fine to medium grained with coarse grit and pebble beds more numerous towards base of unit. Dark micaceous, black micaceous mudstone - occasionally carbonaceous, laminations. Rare carbonaceous debris.</p> <p>Fractures 489'9 (F.A.30°) pyrite  503'1 (F.A.c. 80°) pyrite  506'0 (F.A.30°) witherite, tr. pyrite  506'40 (F.A.30°) galena, fibrous calcite, pyrite.  508'8 (F.A.30°) Siderite, pyrite tr.  510'10 (F.A.30°) quartz, pyrite, galena.  513'6 (F.A.30°) siderite, pyrite, tr. chalcopyrite.</p> <p>Numerous other fractures (F.A.15° and some F.A.30°) quartz and pyrite, some calcite. Towards base numerous near vertical fractures with kaolin infill.</p>								<p>Pro-pary survey at 558' 71°/332°.</p>
		496'0	597'1											

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		597'15	597'3			Shattered black mudstone shale with carbonaceous partings.								CRAG LIMESTONE
		597'3	601'8			Hard dark grey recrystallised muddy crinoidal bioclastic micrite. Few intercalations of black mudstone with calcareous debris.								
		601'8	602'6			Firm black mudstone shale with calcareous partings and shell prints calcareous debris - generally in bands with fine micrite intercalations								
		602'6	604'8			passes into Hard dark grey micaceous sandstone ganister with copious carbonaceous laminations and debris decreasing towards base where sandstone is buff to pink colour. Some crinoidal debris passes into								
		604'8	607'10			Hard buff to medium grey micaceous sandstone ganister with irregular carbonaceous partings. Traces of pyrite on irregular fracture at 606'2 (F.A.45°) Unit becomes paler towards base with some dark buff micaceous banding as passes into								
		607'10	619'6			Hard white recrystallised fine grained micaceous feldspathic sandstone with dark micaceous banding, black mudstone, micaceous laminations all of which increase towards base. Some irregular carbonaceous laminations and debris. Fracture at 610'0 (F.A.15°) quartz, pyrite.								
						END OF BOREHOLE								

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CLIENT MINERAL (PVT) LTD PROJECT MINERAL

Co-ordinates 17° 11' 00" S 28° 11' 00" E Elevation 174 Incline 3-71° Drill 1000 Geologist G. H. Hest Date Started 27.8.73 Hole No. 2  
17011007 Bearing 311° Final Depth 31' 0" Drillers (Bill Horton, Mick Brown, Charley Teale) Date Stopped 1.1.73 Sheet No. 1

Graphic Log	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	%	%	%		%
		15'0			Open Hole									
		15'0			Fractured dark grey fissile micaceous mudstone. Heavily iron-stained, particularly cleavage.									
		19'0			Soft pale grey brecciated fireclay. Iron stained.									
		19'0			Fine pale green to buff micaceous siltstone. Iron stained along irregular fractures (N.A. 45°), passes into									
		21'1			Hard medium grey fissile micaceous mudstone with few pale siltstone laminations, passes into									
		21'7			Fractured black mudstone with micaceous bands. Iron stained along cleavage and irregular fractures (N.A. 45-70°) broken between 21'7 to 22'6 and 25'1 to 31'0. Pale buff fireclay at 28'11. Plant debris.									
		31'0			Fine broken greenish grey fireclay. Plant debris.									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		31'3	33'1			Hard pale grey green siltstone. Iron stained fractures (F.A.25°). Tr. pyrite throughout.								
		33'1	36'0			Broken pale grey mudstone. Rare plant debris. Iron stained.								
		36'0	38'10			Firm black fissile micaceous mudstone. Thin coal bands. Rare plant debris. passes into.								
		38'10	41'1			Broken pale grey to buff fireclay with few carbonaceous partings. Abundant plant debris. weak iron staining.								
		41'1	55'9			Firm black fissile mudstone with occasional micaceous bands. Broken between 41'1 to 42'6, and 46'2 to 46'7. Shattered below 51'0. Some plant debris. Tr. pyrite throughout. Black fireclay from 45'4 to 47'6, passes into.								
		55'9	60'10			Hard pale green grey micaceous sandstone. Fractured (F.A.35°), passes into.								
		60'10	61'11			Firm black fissile mudstone with micaceous partings, passes into								
		61'11	62'10			Firm buff micaceous siltstone, passes into								
		62'10	58'1			Firm black fissile micaceous mudstones with micaceous laminations.								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		136'1	136'8			Hard white to buff medium to coarse grained partially recrystallized micaceous feldspathic sandstone. Some grit bands. Few micaceous partings. Occasional carbonaceous laminations and debris. Thin coal bands at 132'8, 136'7. Numerous fractures (P.A.10-75°).								Dip-slip survey at 106'0 Deflection 57° Azimuth 329°
		136'8	138'11			Firm black mudstone. Plant debris. Broken between 136'8 and 137'5, passes into								
		138'11	139'4			Firm black calcareous mudstone with much shell debris. Sandy towards base, passes into								
		139'4	145'6			Hard pale grey green siltstone with micaceous partings. Calcareous towards top, black mudstone intercalations towards base of unit. passes into								
		145'6	150'1			Firm black mudstone with micaceous intercalations, passes into								
		150'1	157'5			Firm black micaceous mudstone. Some plant debris. Authigenic pyrite. Calcareous below 157'1, passes into								
		157'5	159'1			Firm black calcareous mudstone with much calcareous shell debris								
		159'1	159'6			Firm black micaceous mudstone. Some plant debris. Calcareous partings. Quartz Vein. 159'1 (V.A.50°). passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		159'8	165'6			Hard pale grey green siltstone with copious micaceous mudstone intercalations. Calcareous above 160'7, passes into									
		160'6	172'9			Hard pale buff micaceous siltstone with numerous black carbonaceous mudstone intercalations particularly towards base. Dolomite vein 171'10 (V.A.35°). unit passes into									
		172'9	176'3			Firm black fissile mudstone with plant debris, shell prints and authigenic pyrite, passes into									
		176'3	176'11			Firm black fireclay, plant debris, passes into									
		176'11	178'6			Firm black fissile mudstones with plant debris, authigenic pyrite. Numerous fire quartz veinlets (V.A.70°), passes into									
		178'6	181'9			Firm buff fireclay with some carbonaceous partings, plant debris, shell prints. passes into									
		181'9	183'8			Firm black mudstone with some plant debris. Some pyrite, passes into									
		183'8	186'1			Firm black calcareous mudstone with much calcareous shell debris. Dolomite vein 185'7 (V.A.25°)									
		186'1	190'11			Firm dark grey micaceous siltstone ganister. Plant debris. Numerous fractures (F.A.20°)- pyrite and dolomite, passes into									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		190'11	203'5			Firm black mudstone with numerous septarian nodules. Rare plant debris. Some pyrite. Dolomite vein 191'5 (V.A. 30°), passes into								
		203'5	204'11			Firm black calcareous mudstone with much calcareous crinoid and shell debris, passes into								
		204'11	205'10			Firm black mudstone with calcareous partings, passes into								
		205'10	207'11			Hard medium grey muddy limestone (calclutite) with argillaceous intercalations towards top of unit. pyrite throughout.								Crinidstone Limestone
		207'11	210'6			Firm dark grey mudstone with septarian nodules, authigenic pyrite particularly towards base, passes into								
		210'6	215'5			Hard dark grey silty mudstone with pale grey siltstone intercalations - some slightly calcareous. Tr. pyrite throughout, passes into								
		215'5	218'1			Hard medium grey micaceous siltstone with occasional black carbonaceous partings. tr. pyrite, fractures (F.A. 20-50°), passes into								
		218'1	220'7			Hard medium grey micaceous siltstone with carbonaceous partings, occasional coal bands - tr. pyrite, passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		220'7	224'11			Hard medium grey muddy micaceous siltstone with black carbonaceous mudstone intercalations, occasional coal bands and debris - some pyrite, numerous dolomite veinlets parallel to bedding, passes into									
		224'11	229'3			Hard dark grey micaceous siltstone with carbonaceous intercalations at top of unit, micaceous mudstone laminations Carbonaceous debris throughout, tr. pyrite, passes into									
		229'3	232'11			Hard dark grey muddy micaceous siltstone with black mudstone laminations, occasional coal bands, pale grey micaceous siltstone laminations. Tr. pyrite in mudstone bands, passes into									Tro-pari survey at 230' Deflection 66° Azimuth 337°
		232'11	235'1			Firm black micaceous silty mudstone with pale buff siltstone intercalations. Rare coal bands and carbonaceous laminations with tr. pyrite, fractures (E.A.10°), passes into									
		235'1	236'1			Hard pale grey fine grained sandstone with black mudstone laminations-tr. pyrite									
		236'1	236'10			Firm black mudstone with pale buff sandstone intercalations, some pyrite.									
		236'10	237'1			Hard, buff fine grained micaceous sandstone with occasional carbonaceous laminations - some pyrite.									

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		237'1	237'2			Firm black mudstone									
		237'3	238'0			Hard buff fine grained sandstone with dark micaceous mudstone laminations. pyrite throughout.									
		238'0	248'2			Firm black micaceous mudstone with pale siltstone and occasional sandstone intercalations, carbonaceous laminations and occasional coal bands. some pyrite in siltstones.									
		248'2	248'9			Hard pale buff fine grained sandstone with carbonaceous laminations.									
		248'9	250'2			Firm black micaceous mudstone with pale siltstone and sandstone intercalations. Some pyrite.									
		250'2	254'7			Hard white fine grained sandstone with black micaceous mudstone laminations. occasional carbonaceous debris.									
		254'7	255'3			Firm black micaceous mudstone with buff siltstone intercalations									
		255'3	255'8			Hard pale grey micaceous sandstone with black carbonaceous mudstone laminations, some pyrite									
		255'8	257'1			Firm black micaceous mudstone with siltstone laminations at top of unit, fractures (F.A.25°).									
		257'1	257'3			Hard pale grey micaceous sandstone with few carbonaceous laminations, some pyrite									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	257'3	257'6				Firm black micaceous mudstone with pale siltstone laminations.								
	257'6	257'9				Hard pale grey micaceous sandstone with carbonaceous laminations - some pyrite								
	257'9	258'2				Firm black mudstone with few paler silty laminations.								
	258'2	259'0				Hard pale grey sandstone with black micaceous mudstone laminations. Pyrite throughout.								
	259'0	259'5				Firm black micaceous mudstone.								
	259'5	261'3				Hard pale grey fine grained sandstone with black micaceous mudstone laminations particularly towards base. pyrite throughout.								
	261'3	263'0				Firm black micaceous mudstone with few pale grey siltstone laminations, rare carbonaceous partings - tr. pyrite, dolomite vein 262'11 (V.A.20°).								
	263'0	264'0				Hard pale buff fine grained sandstone with carbonaceous partings. Dolomite vein (V.A.15°) tr. chalcopryite and galena.								
	264'0	264'7				Firm black micaceous mudstone								
	264'7	265'2				Hard buff fine grained sandstone with carbonaceous mudstone laminations.								

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		265'2	267'3			Firm black micaceous mudstone with pale buff siltstone laminations particularly towards base. Fractures (F.A.70°) tr. pyrite.								
		267'3	268'4			Hard pale buff fine grained sandstone with black carbonaceous mudstone laminations particularly at base. some pyrite.								
		268'4	271'7			Firm black micaceous mudstone with pale grey to buff siltstone laminations. some pyrite.								
		271'7	276'3			Hard white fine grained sandstone with numerous dark micaceous carbonaceous laminations. Occasional mudstone intercalations. Pyrite at base. Fractures 273'7 (F.A.25°) - steatite, 274'3 (F.A.15°) - pyrite.								
		276'3	276'11			Hard black micaceous mudstone with buff sandstone intercalations at top.								
		276'11	277'4			Hard white to buff fine grained sandstone with micaceous carbonaceous mudstone intercalations. Some pyrite associated with mudstones.								
		277'4	277'11			Firm black micaceous mudstone with occasional silty mudstone intercalations.								
		277'11	278'4			Hard buff fine grained sandstone with black mudstone laminations. Pyrite at top of unit.								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		278'4	283'6			Firm black micaceous mudstone with irregular buff sandstone intercalations. Some pyrite. Rare plant debris. Black clay at 279'10 ± 280'0. Dolomite vein (V.A.35°) at 282'0, unit passes into								
		283'6	289'0			Firm black fissile mudstone with abundant plant debris, some pyritised numerous septarian nodules. Several dolomite veinlets (V.A.30°).								
		289'0	292'6			Hard medium grey argillaceous bioclastic limestone, much crinoid and shell debris, some pyritised. Calcite vein at 289'9 (V.A.25°) tr. pyrite.								
		292'6	293'8			Hard dark grey partially recrystallised limestone. Fractures (F.A.20°)								Upper Felltop
		293'8	295'1.0			Hard medium grey fine grained argillaceous bioclastic limestone. Basal section recrystallised. Calcite vein at 295'6 (V.A.20°). pyrite encrustation.								Limestone
		295'10	296'6			Hard medium grey recrystallised medium grained limestone. Occasional calcite veinlets (V.A.30°).								
		296'6	297'2			Hard medium grey partially recrystallised argillaceous crinoidal limestone.								
		297'2	298'5			Hard medium grey slightly calcareous conister. Abundant plant remains, some pyritised. Thin coal bands. Fractures (F.A.10°)								

Graphic Log	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	Pb %	Zn %	%		%
	298'5	301'3			Hard pink to buff fine grained micaceous sandstone with carbonaceous mudstone laminations. Irregular mudstone laminations. Much pyrite at top of unit. Much plant debris in carbonaceous laminations - septarian nodules, passes into	B5-1	298'5	301'1	ppm < 20	ppm 24	ppm 2	< 0.3		
	301'3	303'9			Hard buff fine grained partially silicified sandstone with micaceous mudstone laminations at top of unit. Dolomite vein at 303'0 (V.A.30°) with pyrite.									
	303'9	306'9			Hard white to buff fine grained sandstone with copious black carbonaceous mudstone laminations and intercalations. Some pyrite.									
	306'9	316'11			Firm black carbonaceous mudstones with numerous hard buff siltstone intercalations. Pyrite throughout. Fracture 308'6 (F.A.20°) dolomite, pyrite, unit passes into									
	316'11	318'1			Firm fissile black mudstones with pyrite infilling irregular fractures.									
	318'1	319'0			Firm dark grey micaceous siltstone with abundant carbonaceous partings, plant debris. Irregular fine pyrite stringers at base, passes into									
	319'0	321'2			Firm black mudstones with pale buff siltstone laminations. Dolomite veinlets									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		321'2	328'2			some pyrite near top. Septarian nodules at base, passes into								
		328'2	329'9			Hard medium grey micaceous mudstones with irregular buff siltstone laminations particularly towards base. Some pyrite at top of unit. Fracture 323'8 (F.A. 10°) - tr. pyrite.								
		329'9	330'8			Hard white-buff fine grained sandstone with black micaceous mudstone laminations. Some plant debris, passes into								
		330'8	333'6			Hard black micaceous mudstone with buff siltstone laminations, passes into								Tro-pari survey at 330' Deflection 69° Azimuth 349°
		333'6	333'10			Hard fine grained buff sandstone with copious black micaceous mudstone laminations particularly towards base. Fracture 331'10 (F.A. 20°) calcite.								
		333'10	333'10			Hard black mudstone with irregular white to buff siltstone laminations.								
		333'10	369'3			Hard white fine grained micaceous sandstone with dark micaceous banding. Occasional black micaceous mudstone, laminations, carbonaceous debris, plant debris. Fracture 361'4 (F.A. 40°) dolomite.								
		369'3	371'0			Hard black micaceous mudstone with occasional dark brown micaceous siltstone intercalations. Fracture 370'8 (F.A. 70°) - Gouge, passes into								

Project

Weardale

Hole No.

3

Sheet No.

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Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb %	Zn %	CaF <sub>2</sub> %	%	
		371'0	376'4			Hard white to pale buff fine grained sandstone with infrequent black micaceous mudstone laminations. Fracture 373'0 (F.A.10°) - dolomite, pyrite, transitional base with								
		376'4	385'6			Firm black silty micaceous mudstones with infrequent pale buff siltstone and sandstone intercalations. Carbonaceous partings. Numerous fractures (F.A.10-30°) some with dolomite. passes into								
		385'6	391'7			Firm fissile black mudstones with abundant plant debris. Basal section shattered. Septarian modules. Numerous fractures, dolomite, calcite, tr. pyrite.								
		391'7	410'7			Brecciated Fault Zone								
		391'7	394'10			Brecciated black mudstone cemented by gouge. Shattered between 392'3-393'0, more competent. Occasional septarian modules - shattered, tr. pyrite	B5- 2	391'7	394'10	<20	30	<0.3		
		394'10	397'6			Shattered black mudstone	B5- 3	394'10	397'6	<20	18	<0.3		
		397'6	403'11			Firm brecciated black carbonaceous mudstone cemented by gouge. More competent sections shattered. Some coal. 401'9 shattered dolomite vein.	B5- 4	397'6	401'0	<20	52	<0.3		
		403'11	404'6			tr. chalcopyrite. Firm black shattered mudstone.	B5- 5	401'0	404'6	<20	16	<0.3		
		404'6	405'6			Hard dark grey silstone. Fractures	B5- 6	404'6	405'6	<20	10	<0.3		

Project

Weardale

Hole No.

3

Sheet No.

13

Graphic Log	Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
	Scale	From					To	From	To	Pb %	Zn %	%		%
					infilled by dolomite (F.A.45°).					ppm	ppm	Car	2	
	405'6	408'1			Firm <del>to</del> dark grey brecciated mudstone. More competent sections shattered. Dolomite veins, tr. pyrite.	25-7	405'6	410'7	20	26	0.3			Tro-pari survey at 408'
	408'1	410'7			Firm brecciated black carbonaceous mudstone cemented by gouge. Fine dolomite veinlets.									Deflection 70°
	410'7	411'8			Firm black carbonaceous mudstone with rare siltstone laminations. Occasional plant debris. passes into									Azimuth 338°
	411'8	414'2			Firm dark grey to black silty mudstone with rare plant debris, carbonaceous partings. Fine dolomite vein (V.A.15°) at 413'6, passes into									
	414'2	419'4			Firm black mudstone with irregular siltstone laminations. Brecciated between 414'2-414'5 and 415'0-415'5. Dolomite vein (V.A.20°) at 415'10, tr. pyrite.									
	419'4	420'2			Hard white to buff micaceous siltstone with black carbonaceous mudstone intercalations.									
	420'2	423'2			Firm black mudstone with copious buff silty laminations. Occasional white sandstone intercalation. Fractures of varying inclinations - dolomite tr. pyrite.									

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		23	421'0			Hard white fine grained sandstone with dark micaceous banding towards the base. Fracture (F.A. 30°) dolomite.									
		424'0	432'0			Firm black micaceous mudstone with irregular micaceous siltstone and sandstone intercalations. Several fractures (F.A. 15°) dolomite, pyrite									
		432'0	437'0			Hard white medium grained partially recrystallised sandstone with fine solution cavities and occasional micaceous carbonaceous partings.									
		437'0	439'2			Firm black carbonaceous mudstone with plant debris, some coal bands.									
		439'2	445'11			Hard white to pale buff medium to coarse grained partially recrystallised felspathic sandstone with micaceous banding, with carbonaceous and coal partings. Several fractures (F.A. 0-15°) quartz, dolomite.									
		445'11	447'0			Coal									
		447'0	453'11			Hard white medium to coarse grained felspathic sandstone with micaceous banding, carbonaceous and coal laminations. Fractures (F.A. 30°) quartz, pyrite.									
		453'11	455'0			Firm black mudstone with rare plant debris.									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		456'1	460'3			Hard white medium grained partially recrystallised felspathic sandstone with occasional micaceous partings. carbonaceous laminations. Fracture 460'3 (F.A.10 <sup>o</sup> ) quartz, tr. pyrite.									
		460'5	471'9			Firm black mudstone with buff micaceous siltstone intercalations, plant debris. Quartz vein 460'7 (V.A.5 <sup>o</sup> ). several fractures (F.A.15-20 <sup>o</sup> ) dolomite, tr. pyrite.									
		471'9	472'1			Firm black fractured carbonaceous mudstone, some coal, passes into									
		472'1	473'9			Firm dark grey mudstone carbonaceous in part and silty towards base. Some pyrite, plant debris.									
		473'9	475'3			Hard white to pale grey fine grained micaceous sandstone, muddy towards base, passes into									
		475'3	476'4			Firm black mudstone silty and micaceous towards base, passes into									
		476'4	477'4			Hard white to buff micaceous siltstone with copious carbonaceous laminations particularly towards base.									
		477'4	477'6			Firm black carbonaceous mudstone									
		477'6	480'0			Hard white fine grained recrystallised sandstone with micaceous banding, occasional micaceous carbonaceous mudstone laminations. Black mudstone inter-									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		480'0	481'0			calation between 478'10-479'2. Fracture 479'2 (F.A.10°) dolomite, quartz, ty, pyrite								
		481'8	526'5			Firm black micaceous mudstone with micaceous silty mudstone laminations.  Hard white to buff fine to medium grained sandstone with micaceous bandings. carbonaceous mudstone intercalations, coal laminations and debris particularly towards top of unit. Grain size increases towards base. Numerous fractures (F.A.10-20°), quartz, pyrite, often dolomite.								Tro-pari survey at 507' Deflection 71° Azimuth 334°
		526'5	533'3			Firm black carbonaceous mudstone with few micaceous siltstone intercalations especially towards base. Abundant plant remains, some pyritised. some coal particularly between 532'3-532'10. Fracture 531'3 (F.A.25°) dolomite. tr. pyrite.								
		533'3	537'10			Hard white to buff fine to medium grained micaceous felspathic sandstone with dark micaceous banding. some carbonaceous mudstone laminations. some pyrite. fractures (F.A.20°) of tin lined with quartz. Dolomite vein (V.A.15°), unit passes into.								
		537'10	540'7			Firm black mudstone with numerous carbonaceous parting and plant remains, silty towards base. Dolomite vein 538'6, (V.A.25°) fractures (F.A.15°) tr. pyrite, passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		540'7	541'6			Hard pale gray fine grained sandstone with copious dark micaceous mudstone laminations, some carbonaceous debris. passes into								
		541'6	601'6			Hard white micaceous feldspathic sandstone, varying grain size. Coarse grained below 564'7. Occasional grit bands. Dark micaceous banding particularly at top of unit. Some coal debris. Numerous fractures (F.A. 15-20°) pyrite, calcite/dolomite, often quartz, tr. sphalerite at 569'9½								

Mackay & Schnellmann Ltd

CLIENT ACHIN (U.K.) LTD.

PROJECT WEARDALE

Co-ordinates Nat. Grid Ref.

Elevation 1564.5A.O.D. Incline 70°-72°

Drill BBS 20

Geologist N.G.HENBEST

Date Started 13.4.73

Hole No. 3A

NY 97044497

Bearing 329°

Final Depth 421'0-988'4 Drillers D.P.I. (Mick Brown, Charley Reiley

Date Stopped 19.4.73

Sheet No. 1

Bill Gordon

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		421'0	421'2	NQ LY 456790	100	Hard white to buff fine grained micaceous sandstone. Micaceous banding.								
		421'2	423'1		100	Firm black silty mudstone with irregular buff silt intercalations, carbonaceous partings, some plant debris.								
		423'1	423'4		100	Hard white to buff fine grained micaceous sandstone.								
		423'4	424'1		100	Firm black micaceous mudstone with buff siltstone intercalations.								
		424'1	425'5		100	Hard whitish buff fine grained sandstone with grey micaceous banding. Dolomite vug. at 424'6 tr. pyrite.								
		425'5	427'4		100	Firm black silty mudstone with numerous irregular buff siltstone intercalations. Plant debris, carbonaceous partings. Dolomite veinlet at 426'2 (V.A. 15°) tr. pyrite.								
		427'4	427'5		100	Hard white to buff fine grained micaceous sandstone with occasional carbonaceous laminations.								
		427'5	428'5		100	Firm black micaceous mudstone with fine buff siltstone laminations, intercalation of white sandstone, some carbonaceous debris.								
		428'5	428'8		100	Hard white to buff micaceous sandstone.								

Graphic Log	Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS			
	From	To					From	To	%	%	%	%					
	428'8	429'10		100	Firm black silty mudstone with irregular siltstone intercalations. Passes into												
	429'10	430'9		100	Firm black mudstone with fine silty laminations, rare plant debris. Fracture 430'5 (F.A.30°) dolomite, tr. pyrite.												
	430'9	431'0		100	Hard white to buff fine grained recrystallised micaceous sandstone.												
	431'0	431'9		100	Firm black micaceous mudstone with irregular micaceous sandstone intercalations. Shattered zone at base of unit. Rare plant debris.												
	431'9	432'1		100	Hard white to buff fine grained micaceous sandstone muddy at top of unit. Fracture 431'11 (F.A.20°) pyrite.												
	432'1	432'2		100	Firm black mudstone.												
	432'2	432'8		100	Hard white to buff, medium grained micaceous sandstone.												
	432'8	433'3		100	Firm black carbonaceous mudstone with irregular cross bedded micaceous sandstone at top of unit. Some coal, plant debris.												
	433'3	460'11		100	Hard, white medium to course grained partially silicified feldspathic sandstone pebbly in part with dark micaceous banding. Occasional black mudstone laminations, numerous thin coal bands. Some plant debris, septarian nodules. Numerous fractures (F.A.10-20°) quartz, siderite, tr. pyrite. Dolomite at 437'0, fluorite at 448'6												Tro pari survey at 439'9 Deflection - 70° Azimuth 331°

Graphic Log	Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
	From	To					From	To	%	%	%	%	
	460'11	470'11		100	Firm black fissile mudstone with buff silty micaceous intercalations, irregular towards the top of the unit. 469'6-469'9 - Buff siltstone. Fractures (F.A. 5-10°) tr. pyrite. Dolomite vein 463'3 to 465'9 (V.A.5-10°) Traces of galena in siltstone at 469'7								
	470'11	472'5		100	Firm black mudstone with few silty laminations. Plant debris. Some authigenic pyrite. Dolomite veinlet (V.A. 20°) at 472'3.								
	472'5	472'7		100	Coal.								
	472'7	474'6		100	Firm dark grey silty mudstone with occasional black carbonaceous partings and irregular pale grey clay laminations. Much plant debris. Passes into								
	474'6	476'1		100	Hard grey to buff fine grained sandstone with micaceous mudstone laminations towards base. Dolomite vein 474'8 (V.A.25°) tr. pyrite and galena. Passes into								
	476'1	476'9		100	Black micaceous mudstone with plant debris.								
	476'9	478'10		100	Firm dark grey silty mudstone with siltstone and sandstone intercalations. Occasional black mudstone intercalations. Passes into								
	478'10	480'2		100	Hard white to buff fine to medium grained sandstone with buff micaceous banding. 479'6-479'10. - Black mudstone intercalation with occasional micaceous partings. Dolomite vein 479'2 (V.A.20°).								
	480'2	482'1		100	Firm black fissile sandstone with irregular buff siltstone intercalations.								

Graphic Log Scale	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
	From	To					From	To	%	%	%	%	
	482'1	527'1		100	Hard white sandstone of varying grain size, generally medium grained and partially recrystallised. General coarsening of sandstone towards base. Numerous black mudstone intercalations, particularly between 482'4-483'0. Carbonaceous laminations and debris. Numerous fractures. (F.A. 15-30°) - quartz, tr. dolomite, pyrite. 482'3 (F.A. 10°) quartz, dolomite, tr. pyrite, galena. 526'11 (F.A. 25°) quartz, dolomite, pyrite, tr. galena. Tr. sphalerite 522'1-523'2. tr. pyrite 526'1.								Tro pari survey at 522'3 Deflection - 70° Azimuth 330°
	527'1	530'1		100	Firm dark grey mudstone with rare silty intercalations. Some small septarian nodules and rare plant remains. 528'8 slickensided surface. Several fractures (F.A. 25°). Passes into								
	530'1	534'2		100	Firm black mudstone with abundant pyritised plant debris. Numerous small shatter zones with dolomite infill eg. (F.A. 75°) Several fractures (F.A. 15°) tr. pyrite. Coal, carbonaceous mudstone intercalation. 533'5 to 533'9. Becomes silty towards base.								
	534'2	538'8		100	Hard, white fine to medium grained sandstone with dark micaceous banding. Few irregular mudstone partings. Ganister at base of unit. Pyrite at 536'1. Passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb % ppm	Zn %	CaF <sub>2</sub> %	%	
		538'8	541'6		100	Firm black mudstone with occasional siltstone intercalations particularly towards base. Plant debris. Passes into								
		541'6	649'9		100	Hard, white, partially recrystallised sandstone of medium to coarse grain size, generally coarsens towards base, occasional pebble bands. Dark micaceous banding throughout, Rare black mudstone laminations and occasional irregular thin carbonaceous and coal bands. Numerous fractures (F.A.5-20°) quartz, tr. pyrite, some calcite, dolomite. 554'10 (F.A.5°) Dolomite, quartz, tr. pyrite, sphalerite. 571'4 (F.A. 30°) Quartz, tr. sphalerite 619'0 to 619'10 (F.A.10°) calcite, quartz, sphalerite, tr. pyrite. Dolomite vein (V.A.35°) at 543'2. tr. pyrite throughout.								
		649'9	651'9		100	Firm dark brown unconsolidated silt. Dolomite vein (V.A.25°) at 651'0. Sphalerite grains? detrital. Passes into	B5A-6	649'9	651'9	30	0.18	<0.3		
		651'9	652'5		100	Soft black micaceous mudstone. Fractured at 651'11 (F.A.55°)-gouge.								
		652'5	654'6		55	Hard silicified dark siltstone ganister with some coal. 553'8 dolomite Vein (V.A. 0-10°).								
		654'6	670'4		100	Hard pale grey to white fine grained sandstone with dark micaceous banding and some mudstone partings. Some carbonaceous and plant debris. Numerous fractures (F.A.10-20°) quartz, coal/...								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		670'4	674'5		100	tr. pyrite, some dolomite. Numerous dolomite veins (V.A. 10-15°) Pyrite at 654'6. Passes into Hard dark grey micaceous siltstone ganister with irregular carbonaceous debris. Passes into									Tro-pari survey at 673'1 Deflection 72° Azimuth 331°
		674'5	678'10		100	Hard buff siltstone with numerous black mudstone and micaceous carbonaceous laminations. 677'10-678'7-(black silty mudstone. Unit passes into									
		678'10	680'11		100	Hard black mudstone with pale siltstone intercalations particularly towards base. Fracture 679'7 (F.A.10°). dolomite. Passes into									
		680'11	681'10		100	Hard white to pale grey fine grained sandstone with irregular carbonaceous debris.									
		681'10	683'8		100	Firm black mudstone with fine buff siltstone laminations.									
		683'8	683'11		100	Hard dark grey to black calcareous silt. Passes into									
		683'11	684'7		100	Hard dark grey argillaceous bioclastic limestone with calcareous mudstone intercalations. Passes into									
		684'7	685'7		100	Hard black calcareous siltstones. Passes into									
		685'7	685'11		100	Hard dark grey argillaceous bioclastic limestone. Passes into									
		685'11	686'4		100	Hard dark grey calcareous siltstones.									
		686'4	687'3		100	Hard medium grey slightly calcareous siltstone with occasional irregular mudstone partings. Calcareous shell debris leached to leave solution cavities at top of unit. Numerous fine dolomite veinlets. Passes into									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		687'3	688'0		100	Firm black mudstone with grey siltstone intercalations at top of unit. Sandstone laminations at base as passes into								
		688'0	698'9		100	Hard pale grey fine grained recrystallised sandstone with micaceous and black mudstone partings. Fracture 692'8 (F.A.25°) Dolomite, passes into								
		698'9	703'9		100	Hard pale grey recrystallised siltstone with micaceous banding, some dark mudstone intercalations. Calcareous shell debris at 703'5 leached to leave solution cavities.								
		703'9	708'6		100	Firm black mudstone with buff siltstone intercalations, particularly towards top of unit. Calcareous shell debris leached from top of unit. Much authigenic pyrite throughout. Fracture 707'3 (F.A.25°) pyrite. passes into								
		708'6	714'1		100	Firm black mudstone with authigenic pyrite, occasional septarian nodules, rare shell debris, some pyritised.								
		714'1	724'5		100	Hard medium grey micaceous siltstone ganister with occasional mudstone partings. Calcareous shell debris leached from top of unit. Several fractures (F.A.15-30°) tr. pyrite, some dolomite, quartz. Dolomite veins 715'0 (V.A.15°).								
		724'5	749'2		100	Firm black mudstone with copious buff siltstone intercalations, occasional septarian nodules, some authigenic pyrite. Irregular sandstone intercalations at top of unit. cont/...								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
						Slightly calcareous with shell debris. Rare coal partings. Numerous fractures (F.A.15-30°) tr. pyrite, witherite. Passes into								
		749'2	763'4		100	Firm black mudstone with numerous septarian nodules, rare plant remains.								
		763'4	766'7		100	Hard pale grey siltstone ganister, much carbonaceous debris. Occasional brachiopods.								
		766'7	776'1		100	Firm black fissile mudstone with few buff siltstone intercalations, authigenic pyrite, occasional septarian nodules. Some plant debris. Fractures (F.A.10-15°).								
		776'1	776'11		100	Hard medium grey sandstone with black mudstone intercalations. Pyrite throughout. Passes into								
		776'11	796'2		100	Hard pale to medium grey recrystallised fine grained sandstone with irregular micaceous carbonaceous mudstone laminations particularly towards base. Few black calcareous mudstone intercalations, crinoidal and shell debris leached. Basal 3'8-ganister, calcareous shell debris leached to leave solution cavities. Several fractures (F.A.10-30°) dolomite. Fracture 778'11-782'4 (F.A.10°) dolomite infill. tr. galena between 780'4-780'7. Dolomite vein (V.A.20°) 793'5.								
		796'2	820'7		98	Firm black mudstone with fine buff siltstone laminations, authigenic pyrite, septarian nodules. Some plant remains, shell debris. Dolomite vein at 799' (V.A.20°) Passes into								

Tro pari survey at  
809'9  
Deflection 72°

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		820'7	822'6		100	Firm black bioclastic limestone with argillaceous partings, particularly at top of unit. Passes into								Little Limestone
		822'6	833'6		100	Hard medium grey limestone, grain size coarser towards base. Much broken shell and crinoid debris. Numerous argillaceous bioclastic intercalations between 825'8-830'0 Calcite vein (V.A.20°) at 823'10. Dolomite vein (V.A.10°) at 833'2.								
		833'6	838'7		100	Firm black micaceous mudstone with irregular buff siltstone and occasional sandstone intercalations. Carbonaceous partings and thin coal bands at top of unit. Some plant debris. Authigenic pyrite in mudstones, fine dissemination in sandstones in sandstones.								
		838'7	860'5		100	Hard pale, grey micaceous felspathic sandstone of varying grain size with dark micaceous banding and black mudstone intercalations. Some pyrite. Numerous fractures (F.A.10-20°) dolomite, tr. pyrite. Dolomite vein 840'7 (V.A.15°). Unit passes into								
		860'5	866'0		100	Firm black mudstone with buff micaceous silt intercalations. Fine dolomite veinlets. Pyrite throughout. Shell casts. Passes into.								
		866'0	884'3		100	Firm black fissile mudstone with occasional thin siltstone laminations at top of unit, copious septarian nodules. Some pyrite. Plant remains. Dolomitised and pyritised shell debris at base. Passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		884'3	886'1		100	Coal, some plant debris, fine dolomite veining.								
		886'1	886'11		100	Firm pale grey to buff fireclay with thin carbonaceous and coal partings. Some plant debris. Passes into.								Tro pari survey at 886'0 Deflection 72° Azimuth 334°
		886'11	887'4		100	Firm black carbonaceous mudstone with thin coal bands, some plant debris. Passes into								
		887'4	887'8		100	Hard dark grey to black bioclastic limestone with much shell debris and argillaceous laminations. Passes into								
		887'8	888'9		100	Hard medium grey medium grained predominantly crinoidal limestone. Fine calcite veinlets. Passes into								
		888'9	890'2		100	Hard dark grey to black argillaceous bioclastic limestone. Pyrite at 888'9 Some replacement of calcareous debris. Passes into								
		890'2	891'2		100	Hard medium grey fine grained partially recrystallised limestone with occasional argillaceous partings. Calcite vein 891'2 (V.A.15°). Passes into								
		891'2	891'9		100	Firm black argillaceous bioclastic limestone. Pyrite at 891'3. Passes into								
		891'9	895'8		100	Hard medium grey recrystallised crinoidal limestone. Argillaceous below 893'3. Calcite vein 892'11 (V.A.15°). Passes into								
		895'8	896'7		100	Hard black argillaceous bioclastic limestone								
		896'7	898'3		100	Hard medium grey partially recrystallised limestone. Fine calcite veinlet 898'1 (V.A.20°) Passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb *	Zn *	%	%	
		898'3	898'9		100	Hard black crinoidal bioclastic limestone. Pyrite at 898'4. Passes into								
		898'9	899'10		100	Firm black calcareous mudstone with much shell and crinoid debris. Passes into								PART OF
		899'10	900'7		100	Hard medium grey coarse grained predominantly crinoidal limestone. Argillaceous at top and base of unit. Pyrite at 900'3.								
		900'7	901'10		100	Firm black calcareous mudstone with much shell and crinoidal debris, some pyrite replacement of calcareous shell debris. Passes into								
		901'10	902'2		100	Hard black argillaceous bioclastic limestone. Pyrite, some replacement of shell debris. Passes into								
		902'2	905'3		100	Hard medium to dark grey recrystallised limestone, tr. pyrite. Calcite vein 903'7 (V.A.15°).	B5A-1	902'2	906'2	< 20	24	< 0.3		THE
		905'3	906'2		100	Hard black argillaceous bioclastic limestone. Passes into								
		906'2	919'0		100	Hard medium grey medium grained recrystallised limestone. Numerous black argillaceous bioclastic intercalations. Numerous fine calcite veins throughout (V.A.20°)	B5A-2 B5A-3 B5A-4	906'2 910'4 914'9	910'4 914'9 919'0	40 55 56	40 23 41	< 0.3 < 0.3 < 0.3		
		919'0	923'11		100	908'0 (V.A.80°) Calcite, fluorite. 908'1 (V.A.85°) calcite, tr. pyrite. Hard medium grey partially recrystallised coral limestone with argillaceous bioclastic intercalations. Stylolites.	B5A-5	919'0	923'11	52	38	< 0.3		GREAT LIMESTONE

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		923'11	962'6		100	Hard medium to dark grey fine to medium grained partially recrystallised limestone. Numerous argillaceous bioclastic intercalations. Numerous stylolites. Numerous calcite veins (V.A.5-20°), some fluorite, dolomite. Tr. pyrite throughout. Pyrite replacement of calcareous shell debris at base of unit.									PART OF GREAT  LIMESTONE
		962'6	962'9		100	Hard medium grey recrystallised calcarenite. Pyrite throughout.									
		962'9	965'6		100	Hard pale grey to buff siltstone with numerous dark micaceous bands, black mudstone and occasional white sandstone intercalations. Tr. pyrite throughout. Calcite vein 963'6 (V.A.15°) Passes into									
		965'6	968'5		100	Hard buff micaceous siltstone with black mudstone intercalations. Tr. pyrite, fine calcite veins. Fracture 968'0 (F.A.5°) calcite, pyrite.									
		968'5	973'7		100	Hard white to pale grey fine grained partially recrystallised slightly calcareous sandstone with dark micaceous banding and occasional black mudstone intercalations. Fine calcite veins (V.A.15°)									
		973'7	987'1		100	Firm black mudstone with occasional buff siltstone laminations and calcareous black micaceous siltstone intercalations. Some crinoid and shell debris. Crinoidal limestone intercalation between 982'7 - 982'9. Fractured setarian nodules. Much pyrite particularly at top of unit. Dolomite vein 980'2 (V.A.80°) Calcite vein 981'9 (V.A.70°) Calcite vein 981'5 (V.A.15°)									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		987'1	987'6		100	Hard medium grey calcilutite with shelly limestone intercalation at 987'3. Passes into								
		987'6	988'4		100	Hard medium grey argillaceous crinoidal calcarenite., with black mudstone lamination at 987'9.								
		988'4				END OF BOREHOLE								

Mackay & Schnellmann Ltd

CLIENT ACMIN (U.K.) LTD

PROJECT WEARDALE

Co-ordinates Nat. Grid. Ref  
NY 97044497

Elevation 1564.5'A.O.D Inclination 74°-82°  
Bearing 329° Final Depth 936'6"

Drill BBS 20

Geologist N.G. Herbest

Date Started 25.4.73

Hole No. 4

Drillers D.P.I. (BILL GORDON, MICK BROWN,  
Charley Bailey)

Date Stopped 4.5.73

Sheet No. 1

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		0	10'0	Rock Bit HT	Nil	Open hole								
		10'0	12'9		100	Firm black fractured mudstone. Broken to 12'5. Heavily iron-stained fractures, -near vertical, and along cleavage.								
		12'9	17'6		100	Hard pale green micaceous siltstone. Top section fractured with mudstone inclusions. some carbonaceous. 14'8 and 16'4 fractures (F.A.5°) thick limonite encrustations. Iron stained (limonite) throughout Muddy towards base as passes into								
		17'6	27'4		85	Firm black micaceous, mudstone, broken 17'9 to 20'0 much limonite staining. Interbedded greenish siltstone laminations at top of unit. Iron staining along irregular and near vertical fractures.								
		27'4	28'5		100	Soft pale greenish grey fireclay - partially weathered. Some limonite staining towards base.								
		28'5	30'3		100	Hard green siltstone with near vertical fractures - iron stained. Fine buff mudstone laminations. 1/4" ironstone band at top of unit, passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		30'3	30'10		100	Firm dark grey broken mudstone with interbedded green siltstone bands at top of unit, passes into								
		30'10	31'5		100	Soft pale greenish grey fireclay, fractured and weathered. Passes into								
		31'5	31'9		100	Firm dark grey broken mudstone partially weathered, passes into								
		31'9	35'5		100	Firm black broken mudstone, carbonaceous laminations.								
		35'5	40'0		100	Soft mottled greenish grey fireclay with carbonaceous laminations. Weathered 36'1 - 36'7, and basal 3". Broken below 37'10.								
		40'0	42'9		100	Firm black shattered mudstone.								
		42'9	45'6		100	Hard greenish micaceous siltstone-ganister with irregular fine black carbonaceous partings and rare plant debris. Dark carbonaceous mudstone intercalations at top of unit. Some iron staining on irregular fractures. passes into								
		45'6	47'8		100	Firm dark grey-black mudstone with numerous brown septarian nodules and a few siltstone laminations at top of unit. Plant debris. Occasional near vertical irregular fractures, passes into								
		47'8	51'1		100	Firm black moderately fissile mudstone. Plant remains. Fracture at 49'4 (F.A. 20°), passes into								
		51'1	51'4		100	Firm dark grey to black silty mudstone with dark carbonaceous inclusions.								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	51.4	57:8			100	Hard green micaceous siltstone with micaceous partings, intense green colouration towards base of unit . Carbonaceous partings and inclusions 54'6-54'10 Black mudstone intercalation at 55'6-55'8. 55'11-56'1 - soft black clay-gouge. Near vertical fractures, passes into								
	57'8	59'7			100	Firm black mudstone with fine buff micaceous siltstone laminations. Near vertical fractures. Irregular silty base as passes into								
	59'7	60'9			100	Firm grey-buff siltstone with fine micaceous partings and some carbonaceous matter. Basal 1" of unit-soft fireclay.								
	60'9	61'4			100	Firm dark brown micaceous siltytone passes into								
	61'4	62'8			100	Firm dark brown micaceous mudstone passes into								
	62'8	63'1			100	Firm black mudstone with fine buff siltstone laminations increasing towards base as passes into								
	63'1	63'4			100	Firm buff siltstone with fine micaceous mudstone laminations.								
	63'4	63'7			100	Hard pale green fine grained sandstone with micaceous and mudstone partings passes into								
	63'7	64'0			100	Firm black micaceous mudstone with pale siltstone and sandstone laminations.								
	64'0	129'8	101'6		100	Hard white to pale grey micaceous felspathic sandstone of varying grain size generally medium to coarse micaceous banding, rare micaceous								

cont/...

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		129'8	131'5		100	mudstone and siltstone laminations. Some carbonaceous debris. Iron stained throughout, except 64'0-67'8; 96'8-99'0; 108'110'8; 116'6-119'1; 119'10-120'3; 126'7-129'0. Sharp boundaries.								Tro-pari survey at 115'6. Deflection 74° Azimuth 336°
		131'5	131'10		100	Firm black mudstone with limonite stained fractures at top of unit. Shattered at 130'0 (F.A.55°) and 131'5 (F.A.75°) passes into								
		131'10	133'8		100	Hard medium grey to buff recrystallised calcilutite - shell debris basly visible. Black mudstone intercalations at top of unit, stylolites.								
		138'8	142'9		100	Hard pale green course siltstone partially recrystallised. Copious micaceous laminations below 134'3. Buff silty mudstone intercalations in basal 18" of unit. Near vertical fractures some iron staining. Calcareous at top of unit.								
		142'9	146'8		100	Firm buff fissile micaceous mudstones with copious green (course) and pale buff (fine) silt intercalations. Narrow shatter zones at 139'11 and 140'7. Pyrite - as partial granular replacement of green siltstone bands. passes into								
					100	Firm dark grey to black fissile micaceous mudstone with buff fine siltstone laminations. Pyrite throughout - generally as replacement in siltstone laminations. Several fractures (F.A.10°), passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		146'8	148'11		100	Firm black fissile mudstone some authigenic pyrite.								
		148'11	150'1		100	Firm black calcareous mudstone with much shell debris, passes into								
		150'1	150'10		100	Firm black argillaceous limestone sandy at base. Broken crinoid and shell debris. Pyrite - replacement of calcareous debris. passes into								
		150'10	151'0		100	Firm black calcareous mudstone passes into								
		151'0	157'7		100	Hard white to pale grey siltstone with dark micaceous banding - x-bedding etc. Top 10" - muddy-ganister. Irregular carbonaceous laminations. Fracture 152'4 (F.A. 10°) calcite, tr. pyrite 153'3 (F.A. 40°) pyrite. Dolomite vein 153'1 (V.A. 20°), unit passes into								
		157'7	158'10		100	Hard pale grey siltstone with copious dark micaceous bands, passes into								
		158'10	160'4		100	Hard pale grey siltstone with numerous black mudstone and dark micaceous laminations, passes into								
		160'4	161'8		100	Hard grey siltstone with numerous black mudstone intercalations. Some pyrite in siltstones, passes into								
		161'8	169'3		100	Firm, black fissile mudstones rare authigenic pyrite. Occasional buff siltstone laminations. Fracture 162'0 (F.A. 35°) - Pyrite. Several fractures (F.A. 15°).								
		169'3	174'0		100	Firm light grey to buff fireclay with rare carbonaceous laminations and plant debris. Top 2" weathered. passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		175'0	177'6		100	Firm dark grey calcareous mudstone with some broken calcareous debris. Fracture 177'3 (F.A.30°) passes into								
		177'6	177'8		100	Hard grey siltstone with occasional black mudstone partings.								
		177'8	178'4		100	Firm medium grey fireclay with some carbonaceous partings, plant debris. Dolomite vein (V.A.20°) at 176'7 passes into								
		178'4	180'5		100	Dark grey fireclay with carbonaceous partings, passes into								
		180'5	182'5		100	Firm black silty mudstone with occasional buff siltstone laminations. Fracture (F.A.40°) at 182'3. passes into								
		182'5	192'11		100	Firm black mudstone with septarian nodules and authigenic pyrite. Occasional light grey siltstone intercalations particularly at top of unit. passes into								
		192'11	193'4		100	Firm black calcareous mudstone with abundant crinoidal and shell debris - some pyrite replacement. passes into								
		193'4	194'3		100	Hard medium grained recrystallised limestone. Black argillaceous limestone towards top of unit with abundant shell debris, some pyrite replacement.								Grindstone limestone
		194'3	195'8		100	Firm black fissile mudstone with occasional calcareous bands, passes into								
		195'8	196'3		100	Firm black calcareous mudstone. Some pyrite replacement in calcareous debris bands. passes into								
		196'3	197'10			Firm medium grey to buff recrystallised limestone. Argillaceous sections.								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale	From	To	From					To	%	%	%	%		
	197'10	200'6			100	Firm dark grey mudstones with numerous septarian nodules, passes into								
	200'6	204'4			100	Firm dark grey mudstones with irregular white-buff siltstone intercalations. Some pyrite replacement in siltstones. Fracture F.A. (30°) at 202'0								
	204'4	207'7			100	Hard dark grey micaceous siltstone with irregular carbonaceous debris. Authigenic granular pyrite throughout passes into								
	207'7	209'1			100	Hard dark grey siltstone with irregular white sandstone intercalations. Carbonaceous and micaceous laminations increasing towards base. Rare pyrite - generally associated with carbonaceous debris.								
	209'1	209'5			100	Hard green pisolitic silicified mudstone. some authigenic pyrite.								
	209'5	210'4			100	Hard pale greenish grey siltstone with mudstone and carbonaceous laminations, numerous towards base as passes into								
	210'4	210'10			100	Firm black silty mudstone passes into								
	210'10	211'9			100	Hard dark grey siltstone with white siltstone intercalation and carbonaceous debris, passes into								
	211'9	212'4			100	Hard white to fine grained recrystallised sandstone with dark micaceous banding and occasional carbonaceous laminations.								
	212'4	222'3			100	Hard dark grey siltstone micaceous towards base with black mudstone laminations and carbonaceous partings. Irregular white sandstone intercalations towards base. Fractures at 216'6 (F.A. 20°) and 217'0 (F.A. 40°), unit passes into								Tro-pari survey at 216'6" Deflection 76° Azimuth 339°

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		222'3	223'2		100	Hard white fine grained recrystallised sandstone with dark micaceous banding. Pyritic at base. passes into								
		223'2	223'7		100	Firm black silty mudstone- some authigenic pyrite. Passes into								
		223'7	224'0		100	Hard medium grey siltstone with black mudstone laminations. Authigenic pyrite - near vertical fractures.								
		224'0	224'5		100	Firm black mudstones - irregular silty inclusions at top of unit, near vertical fracture - some dolomite.								
		224'5	224'10		100	Hard white to buff siltstone with black mudstone laminations increasing towards base. Some authigenic pyrite in mudstone. Passes into								
		224'10	226'9		100	Firm black mudstone with copious pale buff siltstone laminations. Some authigenic pyrite.								
		226'9	227'2		100	Hard medium grey sandstone with copious dark micaceous bands. Some authigenic pyrite.								
		227'2	235'6		100	Firm black mudstone with irregular pale buff siltstone intercalations. Rare pyrite. Plant debris.								
		235'6	235'10		100	Hard medium grey fine grained recrystallised siltstone with dark micaceous banding. Fracture 235'8 (F.A.20°) tr. pyrite.								
		235'10	236'6		100	Hard medium grey fine grained recrystallised siltstone with dark micaceous banding. Numerous black micaceous mudstone intercalations, passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		236'6	236'9		100	Hard white fine-grained micaceous feldspathic sandstone.									
		236'9	237'2		100	Firm black silty mudstone with rare fine buff laminations									
		237'2	237'8		100	Hard white fine grained sandstone with dark mudstone laminations. Tr. pyrite associated with mudstone partings. Mudstone increases towards base.									
		237'8	241'9		100	Hard white fine grained sandstone with dark micaceous banding. Rare carbonaceous partings and debris.									
		241'9	242'5		100	Firm dark grey silty mudstone with buff siltstone intercalations increasing towards base as passes into									
		242'5	243'3		100	Hard white medium grained sandstone with micaceous partings. Near vertical fractures - tr. pyrite.									
		243'3	244'2		100	Firm black mudstone with fine buff siltstone laminations. Fracture at 242'7 (F.A.40°)									
		244'2	244'6		100	Hard white to buff medium grained recrystallised sandstone with occasional black mudstone laminations.									
		244'6	244'9		100	Firm black mudstone with buff siltstone laminations. Sandstone intercalation at 244'8.									
		244'9	244'11		100	Hard white to buff medium grained recrystallised sandstone.									
		244'11	245'4		100	Firm black mudstone with buff siltstone intercalations									
		245'4	245'8		100	Hard buff medium grained recrystallised feldspathic sandstone.									
		245'8	246'0		100	Firm black mudstone Fracture (F.A.15°) tr. pyrite.									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		246'0	246'2		100	Hard white fine grained sandstone with dark micaceous and carbonaceous partings some pyrite as replacement in siltstone.								
		246'2	246'6		100	Hard medium grey siltstone with numerous dark micaceous mudstone laminations. Passes into								
		246'6	246'8		100	Hard white medium grained sandstone with dark micaceous banding.								
		246'8	249'4		100	Firm black micaceous silty mudstone with irregular white siltstone intercalations. Less silty towards base with carbonaceous laminations and plant debris. Authigenic pyrite throughout. Fracture 247'1 (F.A.45°) tr. pyrite, dolomite.								
		249'4	250'1		100	Hard white fine grained recrystallised sandstone with few dark micaceous bands. Pyrite replacement along carbonaceous partings. Fracture 249'9 (F.A.10°) pyrite.								
		250'1	251'10			Firm black mudstone with few white siltstone laminations and carbonaceous partings with plant debris. Occasional sandstone intercalations. Fractures 250'7 (F.A.40°) 251'4 (F.A.5°) - calcite, pyrite.								
		251'10	254'1		100	Hard white fine grained micaceous felspathic sandstone with some micaceous banding and carbonaceous partings. Fracture 252'11 (F.A.15°) - pyrite.								
		254'1	254'7		100	Hard whitish grey fine grained sandstone with numerous black silty mudstone intercalations at top of unit. Pyrite associated with mudstones.								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		254'7	256'7		100	Hard black silty mudstone with dark carbonaceous partings, occasional white siltstone and sandstone intercalations - some pyrite. Fracture 255'0 (F.A.30°) pyrite Black clay at 256'0									
		256'7	261'10		100	Hard white fine grained micaceous sandstone with micaceous and carbonaceous bands, especially at top of unit. Some dark grey clay intercalations. Fractures 258'6 (F.A.25°) pyrite, dolomite 258'10 (F.A.20°) - pyrite, dolomite 261'9 (F.A.10°)									
		261'10	269'10		100	Firm black slightly micaceous mudstones with occasional pale grey siltstone and sandstone intercalations. 263'4-263'5 Dark grey clay. Fractures 264'4 (F.A.10°) witherite, pyrite. 266'11 (F.A.25°) pyrite 268'10 (F.A.5°) witherite, tr. pyrite.									
		269'10	274'10		100	Firm black fissile mudstone with septarian nodules - calcareous between 272'0-272'2. Some authigenic pyrite. Some plant debris. Numerous fine calcite veins - near horizontal. Fractures 272'10 (F.A. 55°) calcite.									
		274'10	281'0		100	Hard dark grey argillaceous bioclastic limestone with some paler recrystallised limestone bands. Numerous crinoidal fragments and shell debris. Pyrite at top of unit replacements of calcareous debris. Fractures 276'0 (F.A.10°) pyrite 278'1 (F.A. 10°) pyrite. unit passes into									Part of Upper Felltop Limestone.

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		281'0	281'7		100	Hard grey, medium grained recrystallised limestone, diffuse crinoidal debris. Near vertical fracture tr. pyrite. Passes into									
		281'7	282'1		100	Hard dark grey fine grained argillaceous crinoidal bioclastic limestone. Sandy towards base as passes into									
		282'1	283'9		100	Hard dark grey fine grained recrystallised argillaceous calcarenite with much crushed <del>to</del> recrystallised calcareous debris. Some carbonaceous inclusions.									Part of Upper Felltop Limestone
		283'9	284'10		100	Hard buff micaceous siltstone with much irregular carbonaceous debris and partings. Plant debris, pyrite throughout. Passes into									
		284'10	287'3		100	Hard buff micaceous siltstone with carbonaceous laminations especially at top of units. Micaceous banding towards base, calcareous between 285'0-286'5. Plant debris. Pyrite throughout. Passes into									
		287'3	289'5		100	Hard white to buff fine grained sandstone with dark buff micaceous banding, carbonaceous laminations decrease towards base.									
		289'5	289'9		100	Firm black fissile mudstone with buff sandstone intercalations. Plant debris. Some authigenic pyrite. Passes into									
		289'9	290'2		100	Hard white fine grained sandstone with dark micaceous banding. Some black mudstone intercalations at top of unit. Passes into									

Graphic Log		Depth		Bit Type/Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS	
Scale		From	To					From	To	%	%	%	%			
		290'2	301'11		100	Firm black mudstone, silty in part, with numerous white to buff sandstone intercalations and buff siltstone laminations, generally irregular. Pyrite throughout, particularly at top and base of unit, generally in siltstones. Some authigenic pyrite in mudstones. Carbonaceous partings, plant debris. Fractures 297'2 (F.A. 30°) pyrite 298'11 (F.A. 25°) dolomite, pyrite. 299'10 (F.A. 20°) dolomite, pyrite.										
		301'11	303'1		100	Firm dark buff micaceous siltstone with irregular carbonaceous and coal partings. Plant debris. Pyrite replacement of carbonaceous matter. passes into										
		303'1	304'9		100	Firm dark grey siltstone with much carbonaceous debris and partings. Plant remains. Passes into.										
		304'9	307'2		100	Firm black carbonaceous mudstone with irregular buff to pink micaceous siltstone intercalations. Much plant debris. Passes into										
		307'2	313'2		100	Hard fine grained sandstone with numerous micaceous bands, mudstone laminations.										
		313'2	313'9		100	Firm black micaceous mudstone with copious white sandstone laminations. Some carbonaceous debris.										
		313'9	314'6		100	Hard whitish fine grained sandstone with dark micaceous banding and mudstone partings.										
		314'6	315'10		100	Firm black silty mudstone with few buff siltstone laminations. Dark grey clay at 315'2. Passes into										

Tro-pari Survey at  
314'6"  
Deflection 77°  
Azimuth 335°

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		315'10	317'5		100	Hard black muddy siltstone with irregular buff sandstone intercalations at base of unit.									
		317'5	317'8		100	Hard white fine grained calcareous sandstone with dark micaceous banding and rare mudstone partings. Passes into									
		317'8	318'2		100	Hard white micaceous sandstone with black mudstone laminations. Passes into									
		318'2	319'5		100	Hard white to buff fine grained recrystallised micaceous sandstone with dark micaceous banding and some mudstone laminations. Some carbonaceous debris at base as passes into									
		319'5	319'8		100	Firm black carbonaceous mudstone with buff siltstone laminations. Dark clay at 319'6. Passes into									
		319'8	320'5		100	Hard white to buff feldspathic micaceous sandstone with irregular carbonaceous mudstone intercalations and debris. Plant debris. Passes into									
		320'5	323'1		100	Hard white fine grained recrystallised micaceous feldspathic sandstone, with dark micaceous banding and some carbonaceous laminations - particularly towards base, passes into									
		323'1	349'10		100	Hard white recrystallised fine grained micaceous sandstone with carbonaceous debris scattered throughout. Numerous coal partings and micaceous carbonaceous laminations at base. Marker calcareous sections:- 327'3-328'9; 331'6-332'11 344'8 - light grey clay. Fractures (F.A.30°) passes into									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		349'10	351'2		100	Firm dark muddy siltstone with black micaceous mudstone intercalations, especially towards base. Dolomite infilling fractures at 350'2 and 350'9 (F.A.45°)									
		351'2	351'8		100	Hard buff felspathic sandstone with numerous black mudstone intercalations.									
		351'8	352'7		100	Firm black mudstone with buff siltstone laminations. Silty mudstone towards base as passes into									
		352'7	353'9		100	Hard white to pale grey fine grained micaceous felspathic sandstone with black micaceous mudstone partings towards base as passes into									
		353'9	354'1		100	Firm black mudstone with silty mudstone laminations. Fracture at 353'10 (F.A.45°) passes into									
		354'1	355'1		100	Hard white fine grained micaceous felspathic sandstone with dark micaceous banding, some black mudstone laminations at top of unit.									
		355'1	355'7		100	Hard, pale grey fine grained micaceous sandstone with numerous carbonaceous partings increasing towards base as passes into									
		355'7	356'11		100	Moderately hard medium grey muddy micaceous siltstone with black mudstone laminations and pale buff micaceous banded sandstone intercalations. Becomes progressively muddy towards base as passes into									
		356'11	359'11		100	Firm black fissile mudstone with silty mudstone laminations and sandstone lenses. Plant debris, passes into									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		359'11	361'10		100	Firm dark grey to black silty mudstone with dark argillaceous intercalations. passes into									
		361'10	366'9		100	Firm black mudstones with silty mudstone laminations. Heavy black clay at 362'7-362'9. Fracture 363'10 (F.A.45°) pyrite. 364'8 (F.A.40°) dolomite, pyrite. passes into									
		366'9	381'6		100	Firm dark grey to black fissile mudstone. Septarian nodules. Authigenic pyrite - particularly towards base. Passes into									
		381'6	382'3		100	Moderately hard medium grey muddy siltstone with occasional black mudstone laminations - increasing towards base.									
		382'3	382'9		100	Hard pale grey fine grained sandstone with buff micaceous banding. Muddy at base.									
		382'9	384'5		100	Firm black mudstone with carbonaceous laminations and plant debris, becomes silty towards base as passes into									
		384'5	388'11		100	Firm dark grey to black mudstones and silty mudstone with buff siltstone intercalations, carbonaceous laminations, plant debris. passes into									
		388'11	390'7		100	Moderately hard medium grey muddy siltstones with carbonaceous mudstone intercalations. Sandstone lenses. Passes into									
		390'7	394'10		100	Firm dark grey to black mudstones and silty mudstones, sandstone lenses, carbonaceous partings. Plant debris. passes into									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		394'10	396'3		100	Moderately hard dark grey muddy siltstones with black mudstone intercalations, carbonaceous partings, plant debris increasing towards base as passes into									
		396'3	396'7		100	Firm black carbonaceous mudstone with plant debris, fine coal bands, siltstone lenses. Passes into									
		396'7	397'0		100	Moderately hard dark grey muddy siltstones with carbonaceous partings, plant debris. Muddy towards base as passes into									
		397'0	399'9		100	Firm black mudstone with carbonaceous debris, plant remains. Numerous irregular buff siltstones and white micaceous sandstone intercalations.									
		399'9	399'11		100	Hard white fine grained sandstone with buff micaceous banding.									
		399'11	400'5		100	Firm black mudstones with buff siltstone intercalations and white micaceous sandstone lens.									
		400'5	400'10		100	Hard white fine grained feldspathic sandstone with buff micaceous banding.									
		400'10	401'4		100	Firm black mudstone with irregular white feldspathic sandstone intercalation at top of unit.									
		401'4	401'6		100	Hard white fine grained recrystallised micaceous feldspathic sandstone.									
		401'6	401'9		100	Firm medium grey siltstone with copious black mudstone laminations.									
		401'9	402'4		100	Hard white fine grained sandstone with dark micaceous banding. Near vertical fracture - tr. pyrite.									
		402'4	403'1		100	Firm black finely micaceous mudstone with buff siltstone laminations and white sandstone intercalations.									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		403'1	403'6		100	Hard white medium grained recrystallised feldspathic sandstone with micaceous banding.								
		403'6	404'0		100	Irregularly interbedded hard white micaceous sandstone (prominent) with black carbonaceous mudstone. Passes into								
		404'0	404'4		100	Firm black mudstone with fine buff siltstone laminations.								
		404'4	404'8		100	Hard white feldspathic sandstone with micaceous banding;								
		404'8	404'10		100	Firm black mudstone with fine buff siltstone laminations.								
		404'10	404'11		100	Hard white recrystallised micaceous feldspathic sandstone.								
		404'11	405'2		100	Firm black mudstone. Fracture (45°)								
		405'2	406'11		100	Hard white medium grained recrystallised micaceous feldspathic sandstone with black mudstone intercalations and irregular carbonaceous debris. Fracture								
		406'11	407'8		100	405'6 (F.A.15°) pyrite. Firm black mudstone with irregular white sandstone intercalation.								
		408'8	438'2		100	Hard white medium to coarse feldspathic micaceous sandstone with some grid bands. Dark micaceous banding, carbonaceous debris, thin coal bands. Rare black mudstone intercalations.- 421'2-421'3. Dark grey clay. Fracture 430'7 (F.A.10°) Quartz. tr. pyrite.								
		438'2	446'8		100	Firm black mudstone with buff siltstone intercalations and occasional pale grey micaceous sandstone intercalations. Plant debris and copious carbonaceous partings. Passes into								

Tro-pari survey at  
412'6  
Deflection - 79°  
Azimuth 334°

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS	
Scale		From	To					From	To	%	%	%	%			
		446'8	448'2		100	Firm black mudstone with buff siltstone laminations. Some plant debris. Fine coal band at base. Passes into										
		448'2	449'4		100	Firm dark grey mudstone with black carbonaceous partings and plant debris. Buff fireclay at 448'10. Passes into										
		449'4	453'10		100	Hard dark grey siltstone with occasional black micaceous mudstone laminations towards base. Some carbonaceous partings. Irregular paler sandstone intercalations throughout. Hard white feldspathic sandstone with micaceous banding - 451'11-452'2; 453'1-453'6 - occasional fine coal bands. Muddy towards base as passes into										
		453'10	454'3		100	Firm black mudstone with buff siltstone intercalations. Carbonaceous partings.										
		454'3	456'8		100	Hard white recrystallised fine grained sandstone with dark micaceous banding - black micaceous mudstone laminations with occasional carbonaceous partings and plant debris. Fracture (F.A. 10°) at 454'8. Passes into										
		456'8	456'9		100	Firm black carbonaceous mudstone										
		456'9	456'11½		100	Hard white fine grained recrystallised feldspathic sandstone with buff micaceous banding.										
		456'11½	457'5		100	Firm black micaceous mudstone with carbonaceous partings and plant debris. Firm black clay at 457'1.										
		457'5	500'5		100	Hard white recrystallised fine to medium grained feldspathic sandstone coarsening towards base. Occasional black carbonaceous mudstone intercalations										

cont/....

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb %	Zn %	CaF <sub>2</sub> %	%	
		500'5	504'9		100	Rare carbonaceous debris, plant remains. Numerous dark micaceous bands and micaceous mudstone laminations. Numerous fractures (F.A.20-30°) quartz, often tr. pyrite.	B6-1	500'5	504'9	<20	1.32%	<0.3		
		504'9	506'8		100	hard fine grained recrystallised white felspathic sandstone, heavily fractured. 500'5-500'9 - Brecciated sandstone with medium grey flinty inclusions. Cavitous, tr. sphalerite, dolomite, siderite, fluorite. 500'9-501'10 - sphalerite throughout as encrustation of fractures. 501'10-503'4 - Broken, traces of pyrite and sphalerite throughout. From 503'4, fractures lined with quartz, pyrite and sphalerite, mudstone intercalations.	B6-2	504'9	506'8	<20	92	<0.3		
		506'8	508'6		100	Firm brecciated black mudstone. More competent 504'10-506'0. Carbonaceous towards base with some coal. Passes into firm black carbonaceous mudstone with copious plant remains. Thin coal at top of unit. Silty towards base as passes into								
		508'6	511'8		100	Firm black carbonaceous mudstone with copious plant remains. Thin coal at top of unit. Silty towards base as passes into								
		511'8	512'2		100	Hard white to buff micaceous felspathic fine grained sandstone with numerous black carbonaceous mudstone and coal partings. Passes into firm to hard medium grey muddy micaceous siltstone with black carbonaceous mudstone intercalations. White sandstone lense at 511'9. Mudstone increase towards base as passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb. ppm %	Zn %	CaF <sub>2</sub> %	%	
		512'2	512'7		100	Firm black carbonaceous mudstone with copious plant debris. Passes into								
		512'7	512'9		100	Firm dark grey silty micaceous mudstone, passes into								
		512'9	515'11		100	Firm black carbonaceous mudstone. Plant debris. Thin coal bands at top of unit. Passes into								
		515'11	516'7		100	Hard pale grey felspathic micaceous sandstone with copious black micaceous mudstone laminations.								
		516'7	617'11		100	Hard white fine to coarse grained felspathic micaceous sandstone with micaceous banding coarse towards base. Occasional grid and pebble bands. Rare black mudstone intercalations. Fine carbonaceous laminations and debris throughout. Numerous fractures (F.A. 10°-30°) with quartz, tr. pyrite. Few (F.A. 75-85°) quartz, pyrite. Disseminated sphalerite; 556'0-557'8; 584'2-584'8; 589'4-590'1- Possibly detrital	B6-3	584'2	590'1	<20	0.31	<0.3		
		617'11	618'0		100	Firm black carbonaceous mudstone, calcareous towards base as passes into								
		618'0	621'5		100	Hard dark grey fine grained recrystallised argillaceous shelly limestone with numerous mudstone bands towards base. Stylolites. Passes into								
		621'5	622'1		100	Firm dark mudstone, slightly calcareous, plant debris : Calcite at 621'10. Passes into								

Tro pari survey at 586'6  
Deflection - 31°  
(Azimuth suspect as reading taken near wedge drive left in BH/3.  
Azimuth 340°

Crag Limestone

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		622'1	623'3		100	Hard medium grey micaceous ganister with copious irregular carbonaceous partings. Coal bands at 622'2 and 622'8.									
		623'3	625'2		100	Hard buff recrystallised fine grained sandstone with rare carbonaceous partings. Passes into									
		625'2	638'6		100	Hard white to pale grey recrystallised fine grained sandstone with dark micaceous banding, micaceous black mudstone, carbonaceous mudstone and coal laminations.									
		638'6	641'8		100	Hard medium grey micaceous siltstone ganister, felspathic towards base. Irregular micaceous carbonaceous laminations. Fracture 640'2 (F.A.15°) pyrite, passes into									
		641'8	643'6		100	Hard dark grey micaceous ganister with copious micaceous carbonaceous laminations and partings. Dolomite infilling vug at 642'8, passes into									
		643'6	647'1	Change at 646'1 456788	100	Firm medium grey to buff siltstone with copious black mudstone laminations occasional black mudstone intercalations particularly towards base. Some pyrite. passes into									
		647'1	648'11		100	Firm dark muddy siltstone with numerous black mudstone intercalations. Irregular sandstone intercalations at base. Some authigenic pyrite throughout.									
		648'11	650'4		100	Hard medium grey to buff siltstone with dark micaceous banding and black mudstone intercalations. Fracture 649'3 (F.A.20°) Dolomite, galena 650'1 (F.A.5°) Dolomite, galena									

Project

Weardale

Hole No.

4

Sheet No.

22

43

20

Graphic Log	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS	
	From	To					From	To	%	%	%	%			
	650'4	650'11		100	Firm black micaceous mudstone. Passes into										
	650'11	651'0		100	Firm dark grey silty mudstone. Passes into										
	651'0	651'1		100	Hard medium grey fine grained shelly limestone, argillaceous towards base.										
	651'1	651'5		100	Firm black slightly calcareous mudstone.										
	651'5	652'1		100	Hard medium to dark grey recrystallised micrite with thin argillaceous laminations. Calcite vein 651'9 (F.A.O-5°).										
	652'1	653'4		100	Firm black slightly calcareous mudstone with copious buff siltstone laminations.										
	653'4	654'11		100	Hard medium grey micaceous sandstone ganister with copious carbonaceous partings. Solution cavities at top of unit where calcareous shell debris has been leached. Passes into										
	654'11	655'6		100	Hard white to pale grey sandstone with micaceous banding and occasional black mudstone laminations.										
	655'6	656'0		100	Firm black slightly micaceous mudstone.										
	656'0	660'3		100	Hard medium grey recrystallised sandstone. Irregular mudstone laminations, particularly towards top of unit. Passes into										
	660'3	666'5		100	Hard pale grey to buff recrystallised fine grained sandstone, feldspathic at base. Dark micaceous banding, occasional black mudstone laminations. Carbonaceous debris. Dolomite Vein 662'1 (V.A.O-5°) passes into										

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		666'5	671'6		100	Hard pale grey recrystallised fine grained sandstone with copious dark micaceous bands. Black silty mudstone intercalations towards base, near vertical fractures. Passes into								
		671'6	671'9		100	Hard buff muddy siltstone with some calcareous shell debris.								
		671'9	671'11		100	Hard buff fine grained recrystallised sandstone - solution cavities due to leaching of calcareous debris.								
		671'11	674'2		100	Firm black mudstone with silty mudstone intercalations - former calcareous shell debris leached to leave cavities. Brachiopod castes, some calcareous debris. Carbonaceous and coal partings. Authigenic pyrite throughout. Passes into								
		674'2	680'7		100	Firm black mudstone with some calcareous debris, shell castes. Occasional septarian nodules - partially replaced by pyrite. Authigenic pyrite throughout.								
		680'7	691'4		100	Hard medium grey micaceous sandstone ganister with copious irregular black carbonaceous laminations with dolomitised crinoidal and shell remains - leached at 688'11, tr. chalcopryite, sphalerite in cavity. Near vertical fractures.								
		691'4	713'8		100	Firm black mudstone with grey and buff siltstone laminations. Plant debris. Numerous near vertical fractures in some pyrite. Passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS
Scale		From	To					From	To	%	%	%	%		
		713'8	729'3		100	Firm black fissile mudstone with rare silty laminations. Numerous septarian nodules. Numerous near vertical fractures.									
		729'3	732'4		100	Hard medium grey micaceous sandstones ganister with irregular carbonaceous partings. Some calcareous debris - crinoid and shell fragments. Some pyrite. Calcite vein 730'4 (V.A.O-5 <sup>o</sup> ) Particularly carbonaceous at top of unit.									
		732'4	742'0		100	Firm black mudstone with much authigenic pyrite. Buff sandstone intercalations at base - some pyrite. Brachiopod castes, numerous fractures (F.A.10-20 <sup>o</sup> ) with carbonaceous film and tr. pyrite. Sandy base passes into									
		742'0	759'4		100	Hard white to pale grey recrystallised fine grained micaceous sandstone with numerous irregular carbonaceous and mudstone partings and laminations - particularly towards base. Crinoid and shell debris dolomitised, some leached. Numerous fractures (F.A.10-15 <sup>o</sup> ) with quartz, siderite, tr. pyrite. Some pyrite towards base. Passes into									
		759'4	769'9		100	Firm black fissile mudstone with occasional buff siltstone and silty mudstone laminations, septarian nodules, authigenic pyrite - particularly in siltstone bands. Numerous fractures (F.A.10 <sup>o</sup> ). Passes into									

Tro pari survey at 731'11  
Deflection - 82<sup>o</sup>  
(Azimuth - suspect a reading taken near core barrel).

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		769'9	781'9		100	Firm black mudstone, numerous septarian nodules. Plant debris, some shell castes. Some authigenic pyrite. Numerous fractures (F.A. 30°) with carbonaceous film and tr. pyrite. Passes into								
		781'9	781'11		100	Firm black calcareous mudstone with much calcareous shell debris. Passes into.								
		781'11	782'4		100	Hard black argillaceous bioclastic limestone. Passes into								
		782'4	782'7		100	Firm black calcareous mudstone with copious calcareous crinoids. Shell and coral debris. Passes into.								
		782'7	783'9		100	Hard medium grey partially recrystallised bioclastic limestone with argillaceous intercalations. Calcite veins (V.A. 15°). Passes into.								
		783'9	793'6		100	Hard dark grey recrystallised medium to coarse grained crinoidal bioclastic limestone, coarsening in grain size towards base. Occasional argillaceous intercalations. Few calcarenite bands.								Little Limestone
		793'6	794'3		100	Hard buff fine grained micaceous sandstone ganister with irregular carbonaceous partings and debris. Calcareous towards top, crinoidal debris.								
		794'3	794'6		100	Firm black carbonaceous mudstone with numerous fine coal bands.								
		794'8	795'5		100	Hard medium grey micaceous fine grained sandstone - ganister with copious irregular carbonaceous partings and fine coal bands. Passes into								

Depth			Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS	
Scale	From	To					From	To	%	%	%	%		
	795'5	795'7		100	Hard dark grey to black fine grained muddy sandstone with carbonaceous intercalations. Passes into									
	795'7	799'1		100	Hard buff micaceous sandstone ganister with numerous irregular carbonaceous partings and debris. Numerous carbonaceous mudstone and silty mudstone intercalations. Greenish septarian nodules. Some pyrite towards base. Passes into									
	799'1	799'7		100	Firm black carbonaceous mudstone with sandstone intercalation at 799'2. Some authigenic pyrite. Plant debris.									
	799'7	803'9		100	Hard medium grey medium grained recrystallised micaceous felspathic sandstone with dark micaceous banding, black mudstone intercalations, carbonaceous mudstone laminations. Some carbonaceous debris at top of unit. Fractures 801'1 (F.A.10°) quartz, dolomite, tr. pyrite.									
	803'9	816'6		100	802'7 (F.A.0-5°) Witherite. Hard white-buff fine grained recrystallised micaceous felspathic sandstone with dark micaceous banding, black mudstone intercalations and laminations. Fractures 807'3 (F.A.5°) Dolomite and steatite.									
	816'6	820'2		100	813'0 (F.A.0-5°) - quartz. 816'0 (F.A.10°) - quartz, tr. galena. unit passes into. Hard medium grey fine grained recrystallised micaceous felspathic sandstone with micaceous banding and fine black mudstone laminations: cont/...									

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		820'2	827'6		100	Some pyrite generally associated with mudstones. Passes into Firm black mudstone with buff micaceous sandstone and siltstone intercalations. Authigenic pyrite throughout. Passes into								
		827'6	842'5		100	Firm black fissile mudstone with plant debris, shell castes. Numerous septarian nodules and much authigenic pyrite. Pyritised crinoidal debris at base.								
		842'5	844'4		100	Coal, pyrite at top.								
		844'4	845'6		100	Firm dark buff fireclay with fine carbonaceous partings, plant debris. Some pyrite. Calcareous at base, some shell debris.								
		845'6	846'5		100	Hard dark grey recrystallised argillaceous bioclastic micrite, numerous argillaceous partings. Much crinoid and shell debris. Near vertical calcite veins. Passes into								
		846'5	847'1		100	Hard dark grey recrystallised bioclastic micrite with few argillaceous partings. Passes into								
		847'1	848'4		100	Hard dark grey to black argillaceous crinoidal bioclastic limestone with calcareous mudstone intercalation at 847'6. Passes into								GREAT LIMESTONE
		848'4	849'7		100	Hard medium gray recrystallised micrite with irregular argillaceous laminations Passes into								
		849'7	850'0		100	Firm black calcareous mudstone with much crinoidal and shell debris. Passes into								

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	Pb %	Zn %	%	%	
		850'0	853'10		100	Hard dark grey recrystallised crinoidal micrite. Some irregular argillaceous partings. Numerous calcite veins. (V.A.10 <sup>0</sup> ). Passes into								
		853'10	855'0		100	Hard black recrystallised. Argillaceous bioclastic micrite with calcareous mudstone intercalation at 854'2. Some pyrite. Passes into								
		855'0	856'5		100	Hard dark grey recrystallised fine to medium grained shelly limestone. Calcite veins (V.A. 10 <sup>0</sup> ) Some pyrite. Passes into								
		856'5	856'10		100	Hard black argillaceous bioclastic micrite. Some pyrite. Passes into								
		856'10	857'11		100	Firm black mudstone with calcareous partings and crinoidal and shelly debris. Authigenic pyrite. Fracture 857'6 (F.A.40 <sup>0</sup> ) - calcite. Passes into								
		857'11	858'6		100	Hard medium to dark grey medium grained partially recrystallised crinoidal bioclastic limestone, argillaceous partings. Some pyrite as replacement of calcareous debris and as granular dissemination. Passes into								Part of Great Limestone
		858'6	860'0		100	Firm black mudstone with calcareous partings and much crinoidal and shell debris, particularly towards base. Some pyrite authigenic and as replacement of calcareous debris. Passes into								
		860'0	860'4		100	Hard dark grey recrystallised argillaceous bioclastic micrite with much crinoidal debris. Tr. pyrite throughout. Passes into	36-4	860'0	863'10	61	26	0.3		

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	SiO <sub>2</sub> %	CaO %	CaF <sub>2</sub> %	%	
		850'4	863'1		100	Hard medium grey recrystallised shelly micrite, rare argillaceous partings - particularly at top of unit. Calcite Veins (V.A.10°).								
		863'1	863'10		100	Moderately hard black argillaceous bioclastic limestone with copious argillaceous laminations.								
		863'10	875'8		100	Hard medium to dark grey recrystallised fine to medium grained limestone, crinoidal, shelly debris. Numerous dark argillaceous bioclastic intercalations. Occasional black mudstone intercalations, stylolites	B6-5	863'10	869'6	72	28	<0.3		
						some fine coal bands, plant debris. tr. pyrite throughout. Calcite vein (V.A.30°). Passes into	B6/6	869'6	875'8	55	16	<0.3		
		875'8	875'10		100	Hard black argillaceous bioclastic micrite with carbonaceous intercalations at base, as passes into	B6-7	875'8	880'8	52	18	<0.3		
		875'10	878'10		100	Hard dark grey coral limestone micrite with argillaceous partings and stylolites. Some irregular calcarenite intercalations. Irregular fractures with calcite infill. Some calcite veins at top of unit (V.A.50°), vug at 877'0 traces chalcopryrite and fluorite. Argillaceous towards base as passes into								PART OF GREAT LIMESTONE
		878'10	917'3		100	Hard dark grey recrystallised medium grained limestone. Crinoidal and shell debris, numerous argillaceous bioclastic intercalations, calcareous carbonaceous mudstone, and coal laminations. Stylolites. Numerous calcite veins (V.A. (10-20°). cont/..	B6/8	880'8	885'6	52	12	<0.3		

Graphic Log	Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results					REMARKS	
	Scale	From					To	From	To	%	%	%	%		
		917'3	917'5	100	Near vertical dolomite vein between 907'1-909'6. Pyrite towards base, some replacement of calcareous debris. Hard buff micaceous sandstone with copious fine black mudstone laminations and calcareous debris towards top. Tr. pyrite. Passes into										Tro pari survey at 906'6 Deflection 81° Azimuth 332° Part of Great Limestone
		917'5	917'7	100	Hard buff siltstone with buff mudstone and black carbonaceous laminations. Pyritic throughout. Passes into										
		917'7	917'10	100	Hard white micaceous medium grained calcareous sandstone, with micaceous banding. Carbonaceous debris. Passes into										
		917'10	918'7	100	Hard buff fine grained micaceous sandstone with black mudstone intercalation. Some carbonaceous debris. Much pyrite. Passes into										
		918'7	919'2	100	Hard white medium grained calcareous <del>carbonaceous</del> sandstone with dark micaceous banding, near vertical calcite veins. Passes into										
		919'2	920'1	100	Hard white medium grained sandstone calcareous in part with numerous dark micaceous bands, black mudstone laminations. Some pyrite. Passes into										
		920'1	921'3	100	Hard buff to pale grey siltstone with micaceous laminations and black mudstone intercalations. Much pyrite. Passes into										
		921'3	923'3	100	Fine black mudstone with micaceous buff siltstone intercalations. Some pyrite. Calcareous debris near base.										

Graphic Log		Depth		Bit Type/ Size	Recovery %	DESCRIPTION	Sample Number and Type	Depth		Assay/Test Results				REMARKS
Scale		From	To					From	To	%	%	%	%	
		923'3	927'8		100	Hard fine grained white micaceous feldspathic recrystallised sandstone, calcareous, particularly below 926'11. Dark micaceous banding, carbonaceous debris particularly towards base. Occasional dolomitised crinoid debris. Dolomite vein 925'6 (V.A.15 <sup>o</sup> ). Tr. pyrite.								
		927'8	936'6		100	Firm black fissile mudstone with buff siltstone laminations and silty mudstone intercalations. Bands of calcareous debris. Numerous shell castes. Much pyrite. Numerous fractures (F.A.50 <sup>o</sup> )								
		936'6				END OF BOREHOLE.								

# Mackay & Schnellmann Ltd

GEOLOGICAL AND MINING CONSULTANTS

AC 38

FRANCIS JOHN FID (Lond) MIMM MAIME (Chairman)  
FRANCIS JOHN FID MIMM MCIMM (Mining)  
FRANCIS JOHN FID BSc MIMM MAustIMM  
FRANCIS JOHN FID BSc MIMM MIQ  
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Secretary  
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Western Australia 6000

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Cables: Pyrochlore London

Telex: LDN 268703

Attention Mr. Lees

5th February 1973

Department of Trade & Industry,  
Thames House South,  
Millbank,  
London SW1P 4QJ.

Dear Sirs,

ACMIN Explorations (U.K.) Limited  
Drilling at Dead Friars near Edmondbyers

The deep drill-hole designed to intersect the Boltsburn Vein in the Great Limestone below Dead Friars was unfortunately deflected from its designed inclination by variations in the hardness of the strata intersected and missed its target by something like 100 feet.

Efforts to bring the hole back on course by the use of wedges failed to achieve their purpose but added considerably to the time spent on the hole.

It is now being grouted with cement prior to abandonment and, on the instructions of our client, we are now starting a second hole at a shallower inclination to allow for expected deflection but still achieve the required target in the Great Limestone.

The unexpectedly protracted nature of this drilling is regretted, from every point of view, but we shall continue to do our best to minimise inconvenience to those who have other interests in the area.

Yours faithfully,



F.H. Fitch.

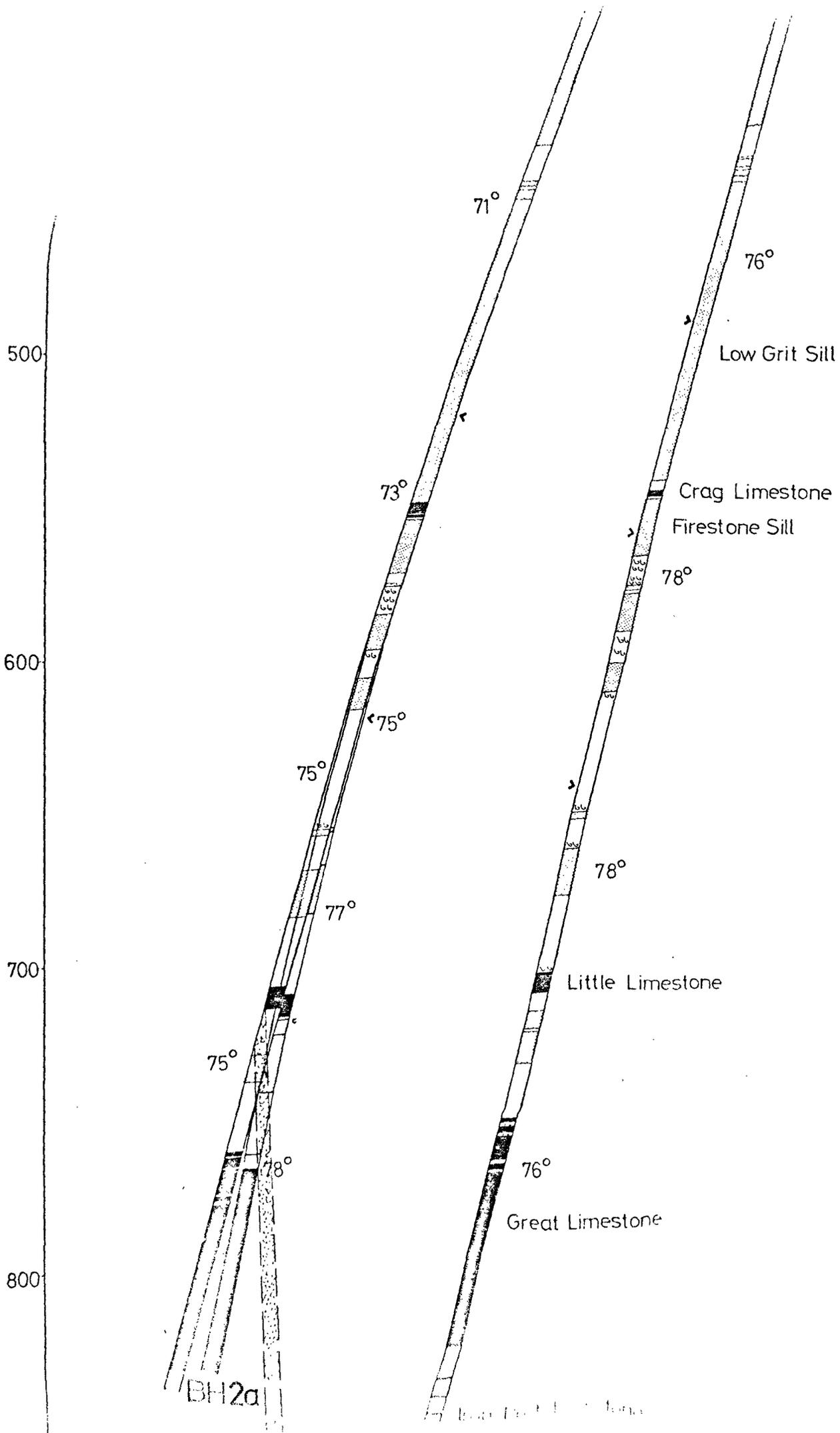


Fig. 2.

Location of Boreholes Nos. 1-4

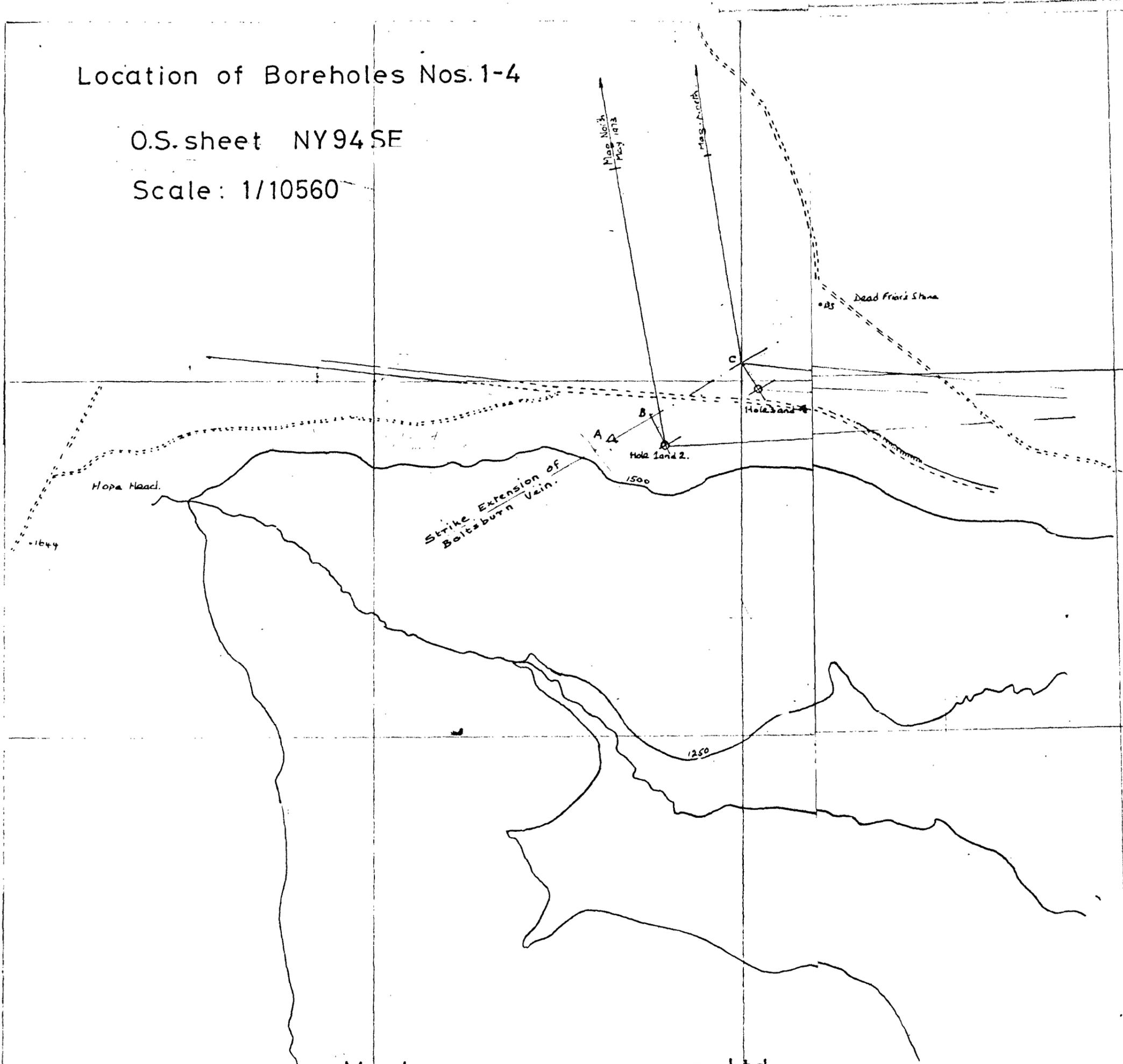
O.S. sheet NY94 SE

Scale: 1/10560

545 000

44

42



AB = 400 ft.  
 BC = 952 "  
 C-B = 218 "  
 Bearing AC = 59° True.  
 " C-B = 149° "  
 Grid holes 314, 1564.5, 1564.5

Mackay and Schnellmann Ltd.

May 1973

Scale: 1/10560

3 96 000

97

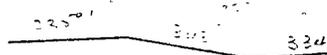
98



Plan View of Borehole BH1



Plan View of Borehole BH2



0

100

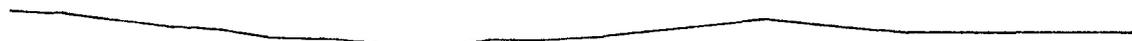
Horizontal Scale in Feet

Mackay and Schnellmann Ltd

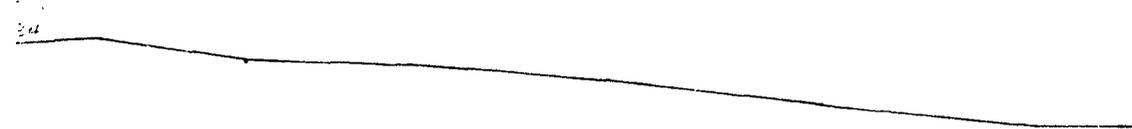
-  Mudstone and Silty Mudstone
-  Sandstone and Siltstone
-  Limestone
-  Quartz Dolerite
-  Fault Breccia
- c Coal
- bb Marine Fossils
- aa Plant Fossils
- 70° Inclination in Degrees
-  Target
- > Wedge

Boltsburn Vein  
Limestone

of Borehole BH1



of Borehole BH2



100

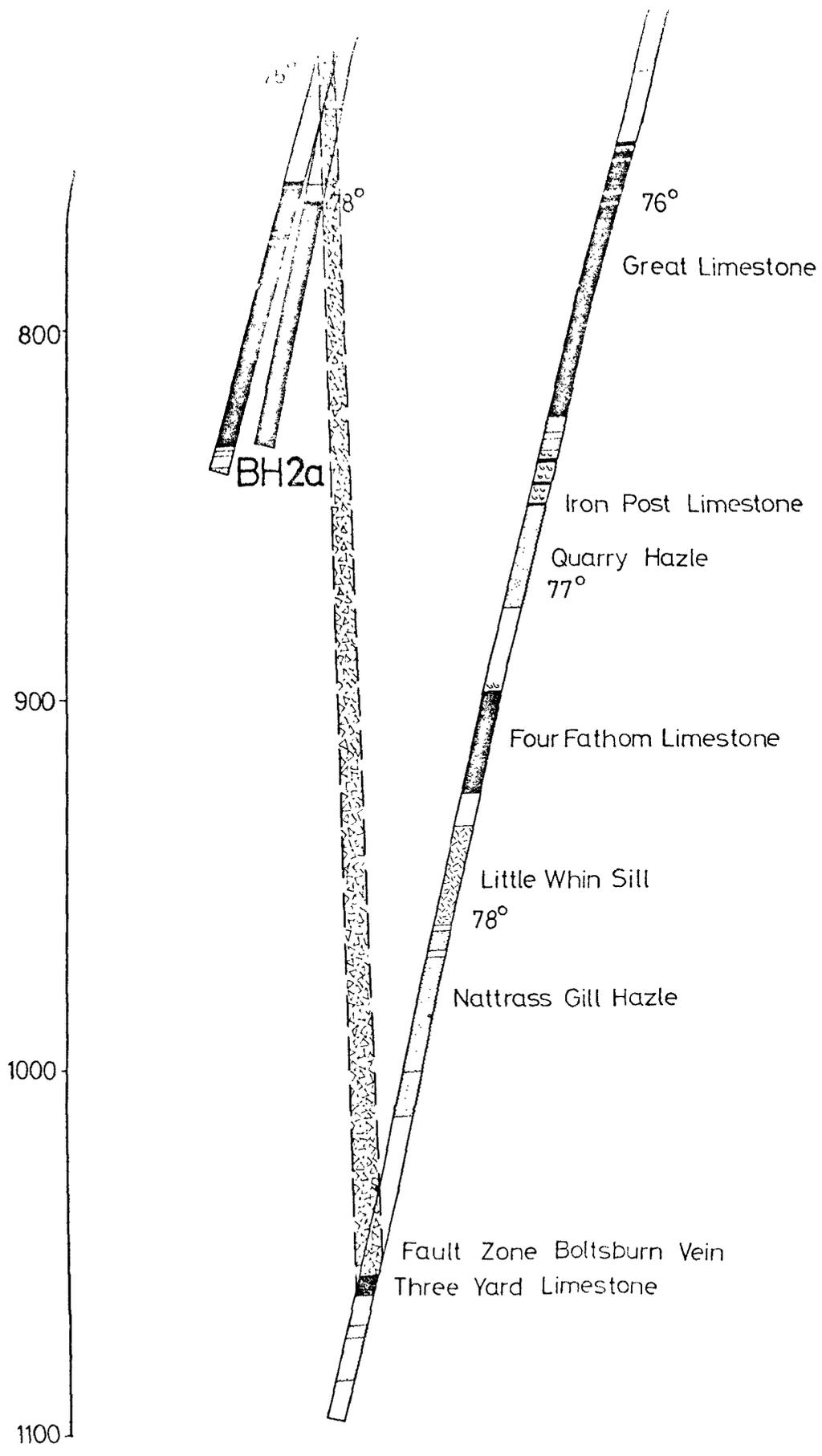
200

300

Scale in Feet

n Ltd

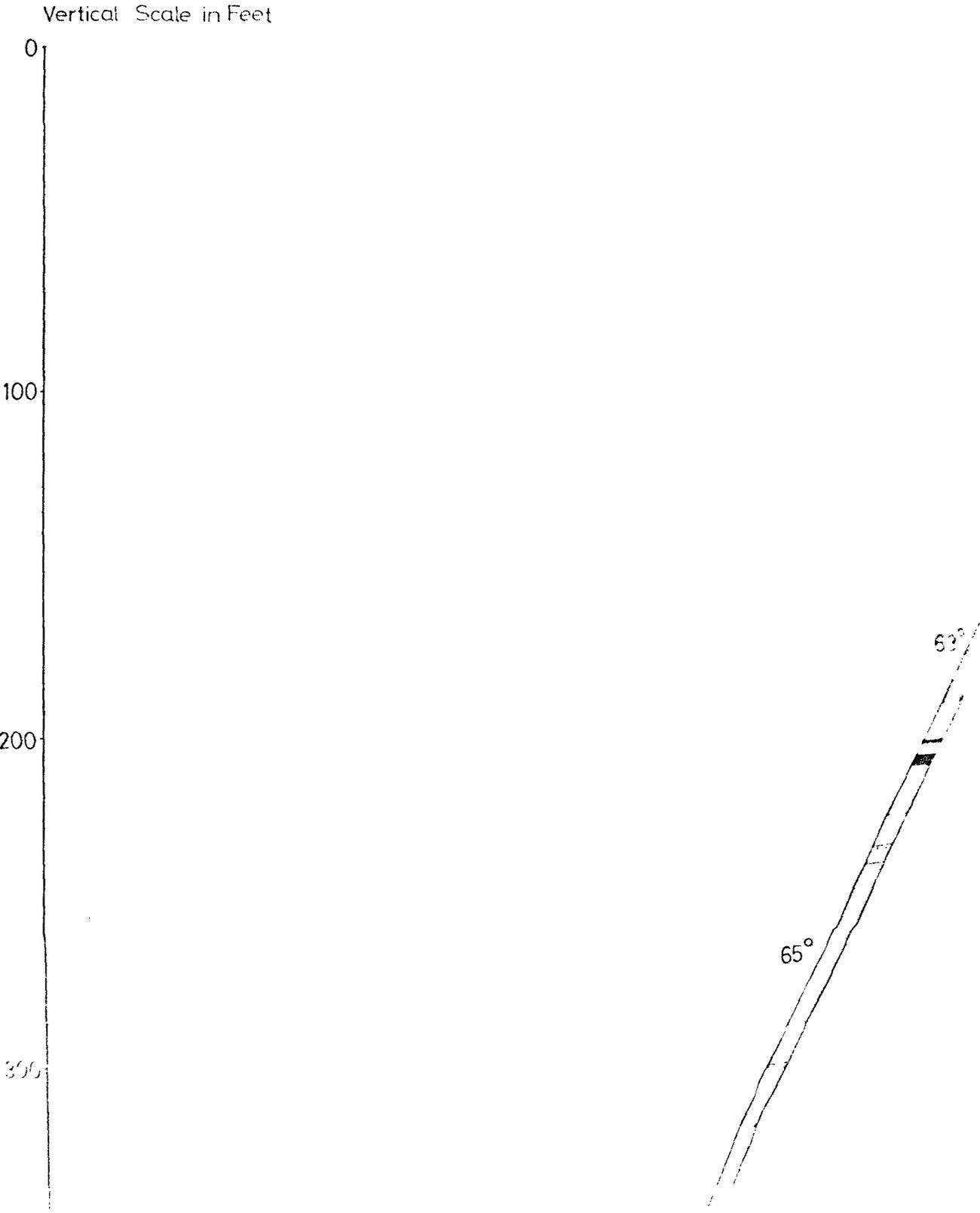
March 1973

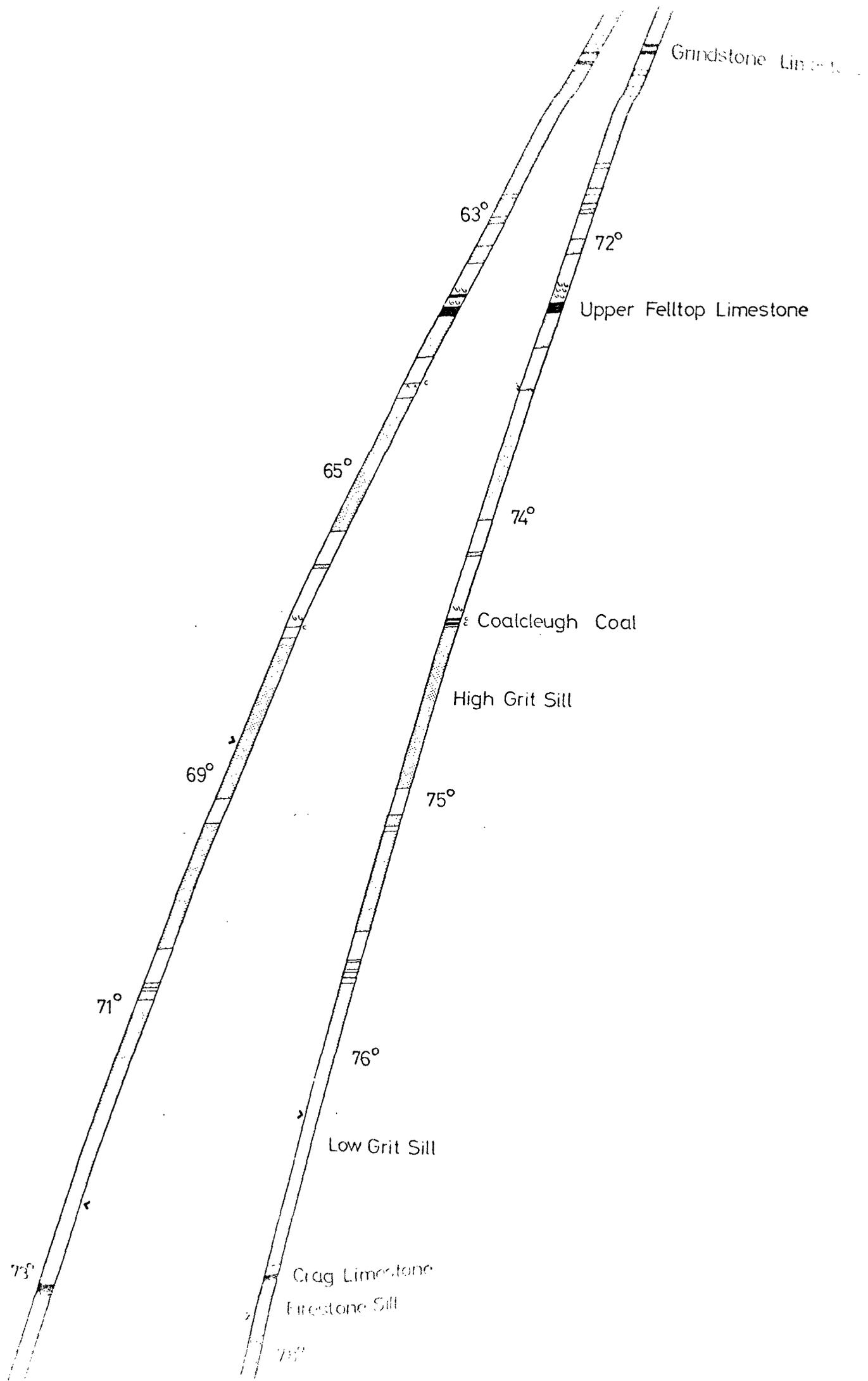


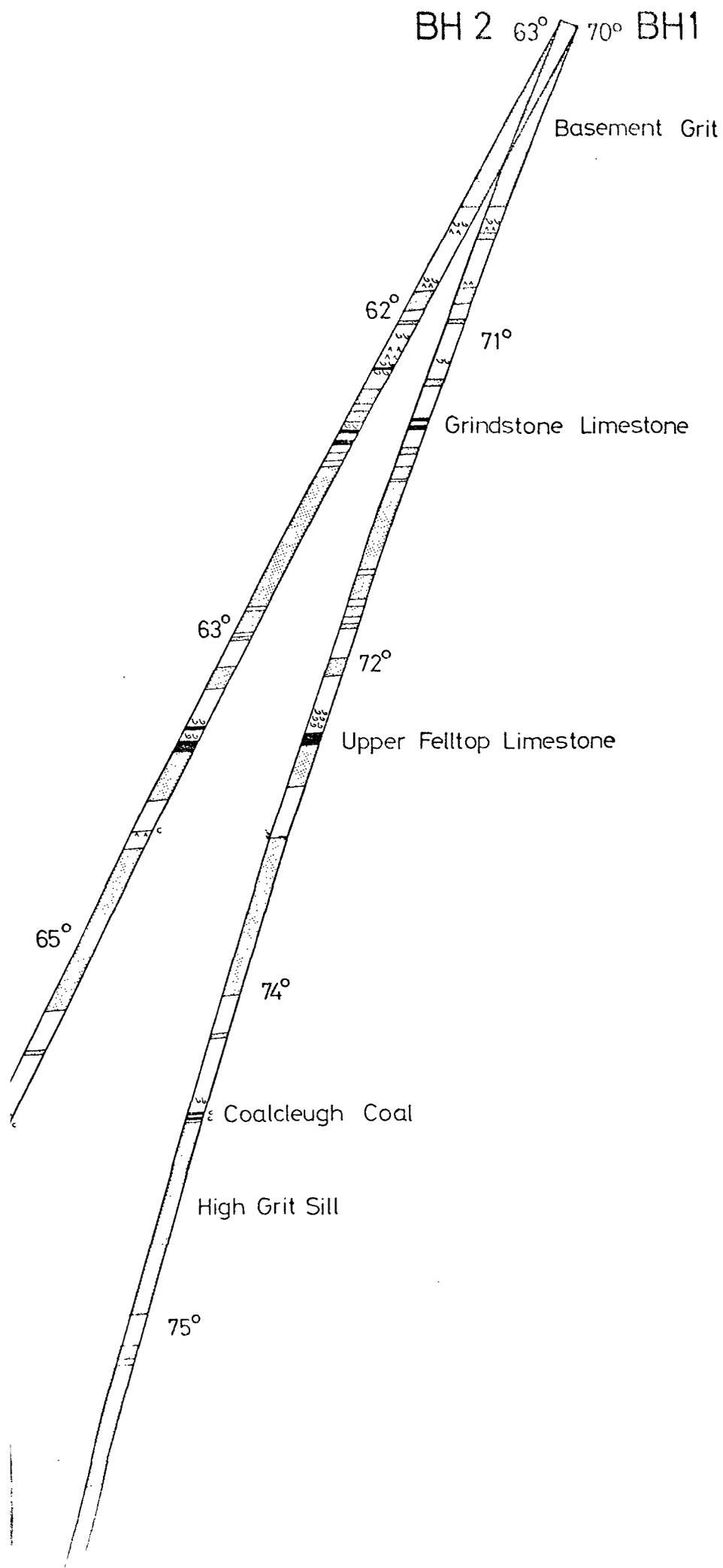
Plan View of Borehole BH1

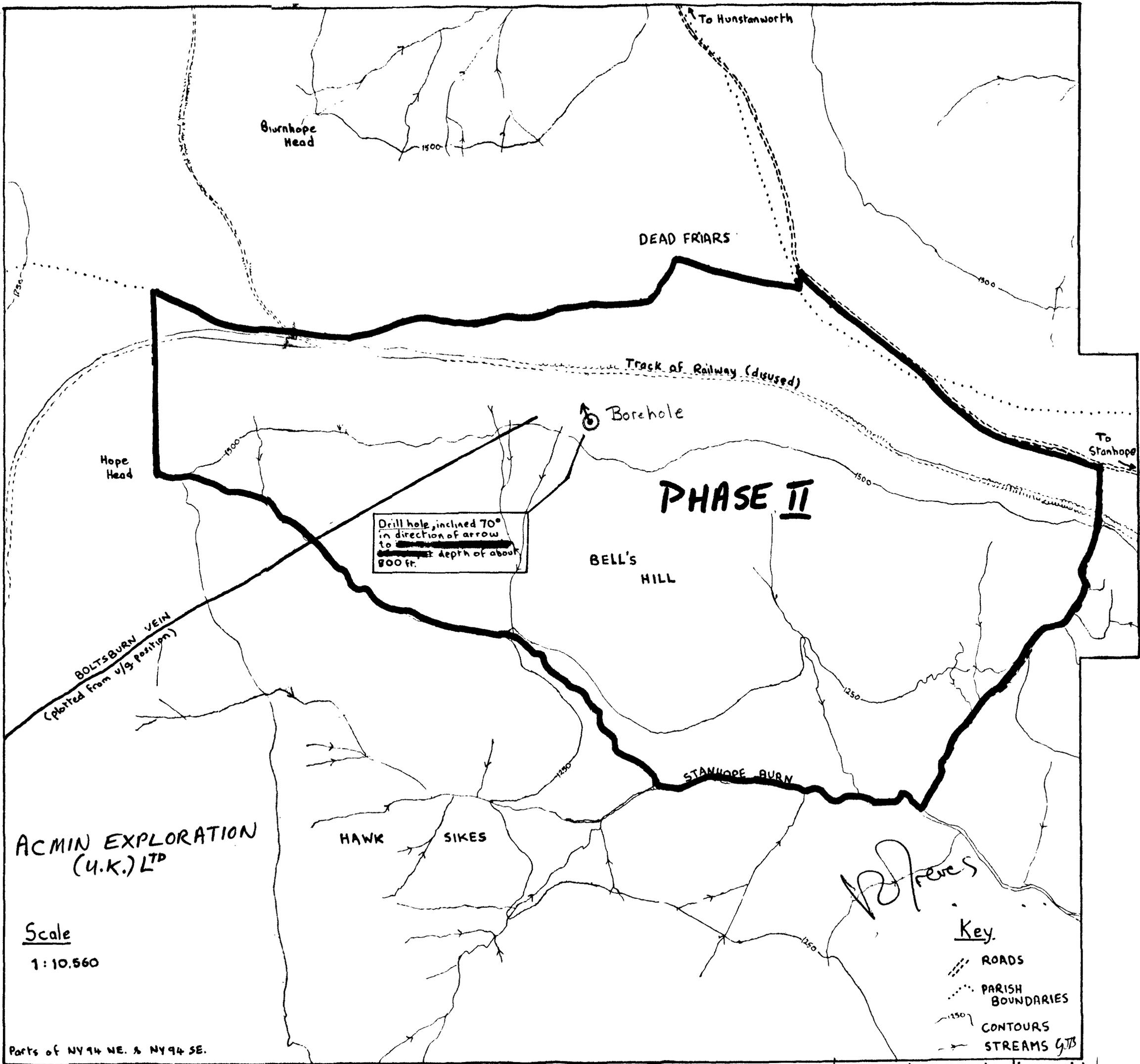
# Simplified Graphic Log of Boreholes BH1, BH2, BH3

Acmin Exploration (UK) Ltd









Drill hole, inclined 70°  
 in direction of arrow  
 to [redacted]  
 depth of about  
 800 ft.

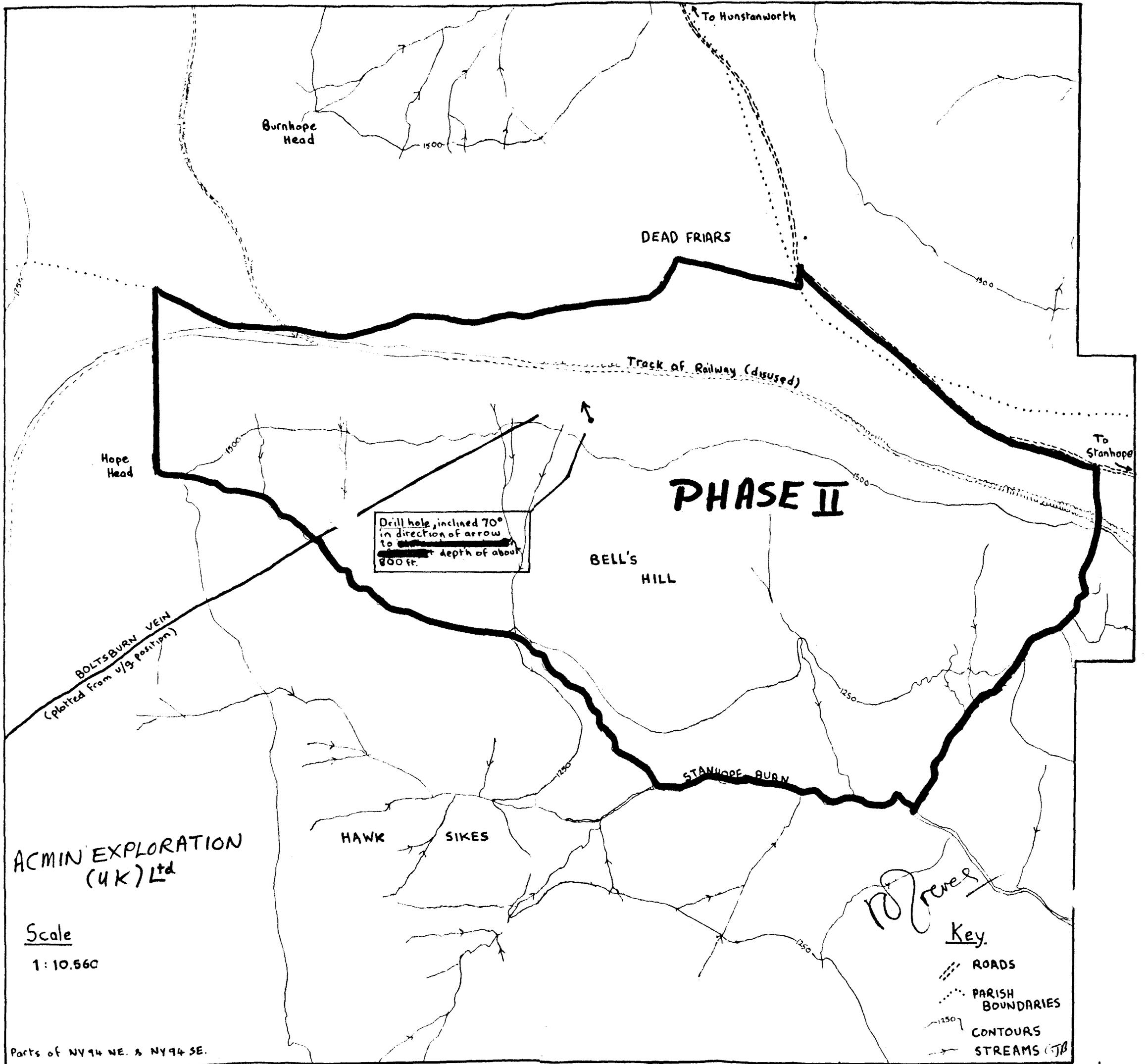
ACMIN EXPLORATION  
 (U.K.) LTD

Scale  
 1:10,560

Parts of NY 94 NE. & NY 94 SE.

- Key.
- ROADS
  - ..... PARISH BOUNDARIES
  - ~150~ CONTOURS
  - > STREAMS G.T.B.

Prepared by Mackay + Schnellmann Ltd



ACMIN EXPLORATION  
(UK) Ltd

Scale  
1:10,560

Parts of NY94 NE. & NY94 SE.

Drill hole, inclined 70°  
in direction of arrow  
to [redacted]  
depth of about  
800 ft.

**PHASE II**

- Key.
- ROADS
  - PARISH BOUNDARIES
  - CONTOURS
  - STREAMS (JP)

Prepared by Mackay + Schnellmann Ltd.

Simplified Graphic Log of Boreholes BH1, BH2, BH3

Acmin Exploration (UK) Ltd

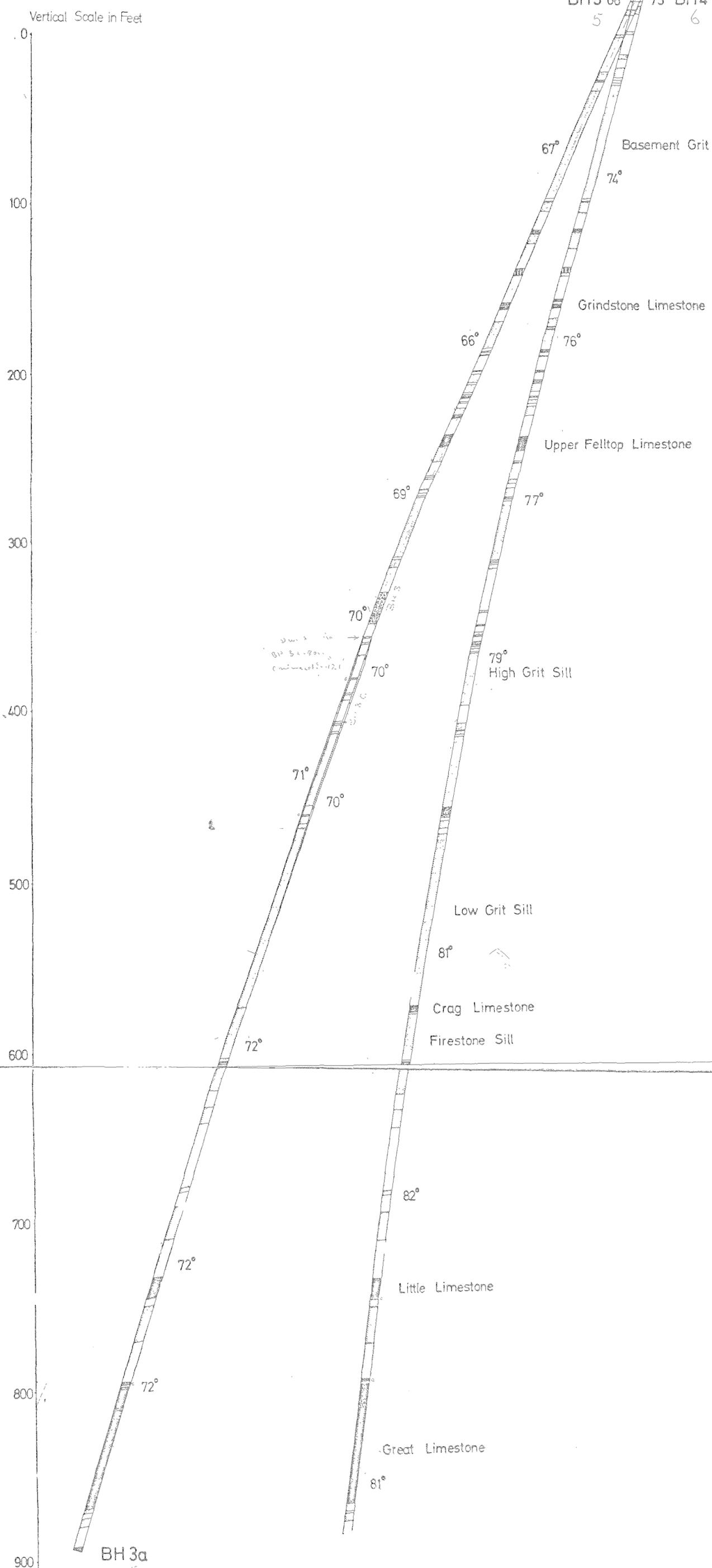
Collar Elev = 1538.5m



Simplified Graphic Log of Boreholes BH3, BH4

Acmin Exploration (UK) Ltd

Fig. 3.



- Calcareous Mudstone
- Sandstone and Silty Mudstone
- Sandstone and Siltstone
- Limestone
- Fault Breccia
- Coal
- 70° Inclination in Degrees
- Target

Plan View of Borehole BH3



Plan View of Borehole BH4



Fig. 3.

CONFIDENTIAL

ACMIN HEARDALE PROJECT, PHASE ONE

REPORT BY I C BURGESS

In September and October 1972, a series of eight, shallow bores was put down by D.I.I. for Acmin Ltd, the consultant being Dr Fitch of Messers Mackay and Schnellman Ltd. The bores were sited on two geochemical anomalies on the ridge between Feldon Burn and Budon Burn, west of the Stanhope to Edmondbyers road. No significant macroscopic mineralisation was encountered and the project has been suspended. However, geochemical tests on the cores had revealed interesting variations in trace element distribution, and for this reason, two of the borehole cores, one from each site (C37 and D66), were split lengthwise and half sent to Mr D Ostle of the Geochemical Division for further study.

The borehole cores were logged at I.G.S. Leeds by I C Burgess. The more southerly group of five bores commenced in the shales between the Basement and Second Grits of the Durham Grit Group, and passing through the Basement Grit, proved the strata down to the top of the Grindstone Hill. The second group of three bores began some metres above the Grindstone Hill and two of them were drilled down to the Upper Bell Top Limestone. The bores thus together provide a continuous sequence through this seldom-exposed set of strata. The fauna was collected by Miss D Gregory, and specimens were taken for palynological examination.

The strata above the Basement Grit were largely sandstone, thinly-bedded and ripple-cross-bedded. Marine mudstones were present at two horizons, 13m and 7m above the top of the Grit. The Basement Grit (14m thick) is of massive, pale grey to white medium to coarse-grained feldspathic sandstone, with sporadic thin siltstone bands, which could not be correlated between neighbouring bores. The base of the Grit is sharp and slightly erosive. Three marine bands were recorded in the underlying beds. The top-most of these, immediately underlying the Grit, contained fragmentary goniatites including Reticuloceras stubblefieldi (R<sub>1b</sub>) and may correlate with the Millhouse Limestone of the Woodland Rev. hole. The intermediate bed, which in the southerly bores included 0.35m of muddy limestone, appeared only poorly fossiliferous in the northerly bores, possibly as a result of the intense weathering to which the latter had been subjected. The lowest, and thickest of the marine beds, consisted of up to 9m of mudstone, siltstone and sandstone with plant debris and variable quantities of shelly debris. These strata were thinner in the more northerly bores, less fossiliferous, and in the lower part, much more

sandy. Again, the apparent paucity of fauna may reflect the intense weathering and resulting difficulty of collection. The strata lie on or about the horizon of the Grindstone Limestone. The underlying Grindstone Sill (13m thick) is much finer grained than the Basement Grit, and throughout is characterized by ripple-drift cross bedding. As in the Basement Grit, siltstone partings are present at several levels, but again could not be correlated from bore to bore despite the close spacing. The strata above the Upper Fell Top Limestone are a uniform sequence of black siltstones and mudstones, coarser grained at top, with sporadic plant debris, and a few shells. They grade down into calcareous mudstone and muddy limestone at base, resting on the Upper Fell Top Limestone, typically developed as a pale to mid grey bioclastic limestone less than 1m thick, with scattered algal ("Girvanella") haloes. It rests directly on a thin bed of arenaceous sandstone, shortly underlain by mudstone with Lingula, a common occurrence at this horizon. Beneath is the Hipple Hill, proved to 5m, massive, pale grey, slightly micaceous sandstone.

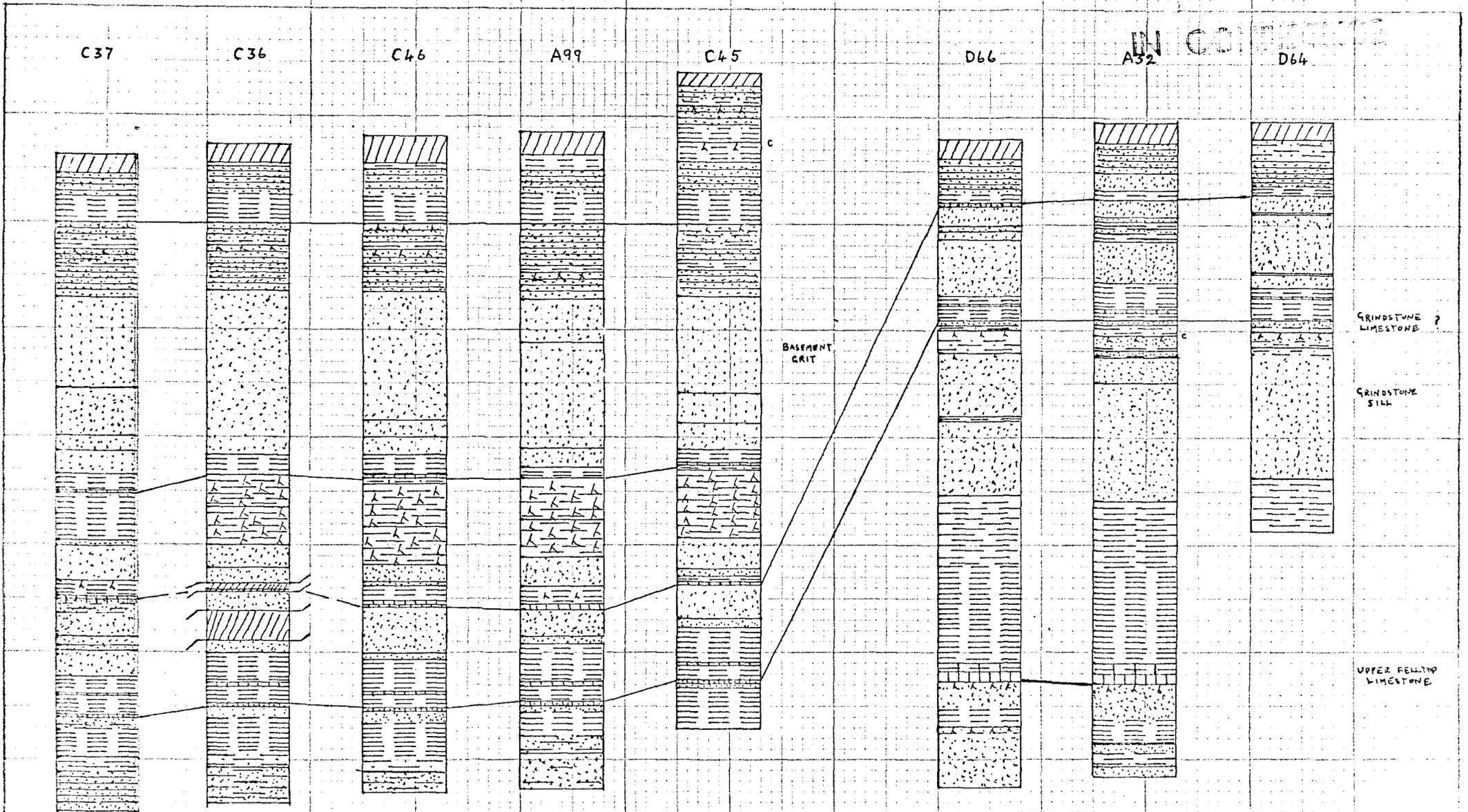
ICB

I C Burgess

5 December 1972

ACMIN WEARDALE PROJECT : PHASE ONE

COMMERCIAL



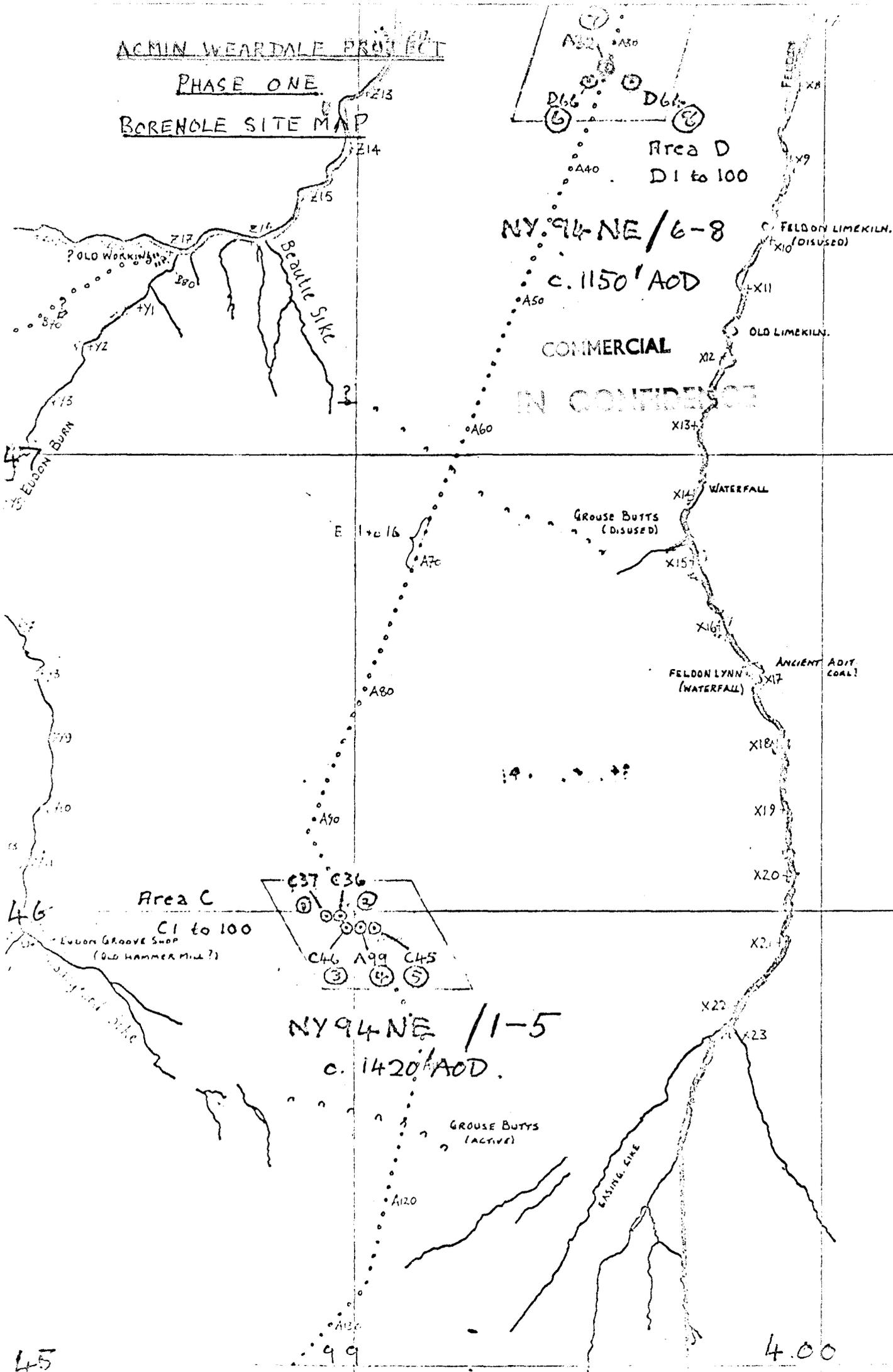
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John P. Burgess  
6/12/72

ADMIN WEARDALE PROJECT

PHASE ONE

BORENHOLE SITE MAP



NY 94 NE / 6-8

COMMERCIAL

IN CONFIDENCE

Area C

NY 94 NE / 1-5

c. 1420' AOD.

STATION - COORDINATES - NY 94 NE

**RECORD OF SHAFT OR BORE FOR MINERALS**

NT94HE/1

Name of Shaft or Bore given by Geological Survey: **COMMERCIAL IN**

**CONFIDENTIAL**

~~Asda Hoardale 057~~

Name and Number given by owner: **Asda Hoardale 057**

Nat. Grid Reference

For whom made: **Asda**

**NT9994 4599**

Town or Village: **Edmondbyers** County: **Durham**

1" N.S. Map No.	1" O.S. Map No.	Confidential or not
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Exact site: **See map**

{ Attach a tracing from a map, or a sketch-map, if possible.

<b>26</b>	<b>84</b>	
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Purpose for which made: **Minerals**

Ground Level at <sup>shaft</sup>bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by: **DPI** Date of sinking: **Sept. 1972**

Information from: **Cores** Date received: **Nov. 1972**

Examined by: **I.C. Burgess**

SPECIMEN NUMBERS AND ADDITIONAL NOTES

**Core split and half sent to D. Ostle, Geochemical Division.**

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT.	IN.	FT.	IN.
	<b>Earth</b>	2	0	2	0
	<b>Clay, brown with sandstone fragments</b>	4	0	6	0
	<b>Sandstone, fine grained, ripple-cross bedded, micaceous; grades to</b>	7	0	13	0
	<b>Mudstone, silty at top, weathered; sporadic shells especially towards base</b>	8	3	21	3
	<b>Sandstone, fine grained with plant roots grades to</b>	0	9	22	0
	<b>Sandstone, greenish, micaceous, silty, grades to</b>	3	9	25	9
	<b>Mudstone, dark grey, silty, micaceous, sharp base</b>	3	3	29	0
	<b>Sandstone, grey, pyritous, with roots, grades to</b>	0	9	29	9
	<b>Siltstone, grey, fissile, micaceous with sandstone laminae and scattered plant debris, sharp base</b>	4	9	34	6
	<b>Sandstone, pale grey, fine grained micaceous with ripple-drift bedding grades to</b>	9	0	43	6
	<b>Sandstone, pale grey, medium grained feldspathic, micaceous on partings with some carbonaceous debris; sub vertical</b>			43	6

Name and Number of Shaft or Borehole:

**Assin Waardale C37**

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft	IN	Ft	IN
BASEMENT GRIT	Brought Forward			43	6
	..... joints iron stained; sharp base	28	3	71	9
	<del>Siltstone</del> , dark grey with plant debris	0	3	72	0
	<del>Sandstone</del> , as at 74/9; sharp base	13	9	85	9
	<del>Sandstone</del> , grey, fissile, silty, micaceous; sharp base	5	0	90	9
	<del>Sandstone</del> , as at 71/9; sharp base	6	6	97	3
	<del>Mudstone</del> , dark grey, fissile with shells	5	3	102	6
	<del>Limestone</del> , dark grey, shells	0	6	103	0
	<del>Mudstone</del> , dark grey, silty, fissile, with sandstone laminae at top; plant debris	14	3	117	3
	<del>Sandstone</del> , dark grey, silty, micaceous on partings, grades to	1	6	118	9
	<del>Sandstone</del> , pale grey massive, fine grained with micaceous partings, grades to	3	3	122	0
	<del>Sandstone</del> , medium grained, feldspathic, with dark micaceous partings; sharp base	7	9	129	9
	<del>Mudstone</del> , dark grey, silty in part, with plant debris and roots; shells at base; grades to	4	9	134	6
	<del>Limestone</del> , dark grey, silty	0	6	135	0
	<del>Mudstone</del> , dark grey with abundant shell debris; grades to	0	6	135	6
	<del>Sandstone</del> , pale grey, fine grained; calcareous with shells in top 1/0; siltstone partings and disturbed, with rootlets below; sub-vertical joints with siderite and calcite; grades to	4	6	140	0
	<del>Sandstone</del> , pale grey, medium-grained, feldspathic, with sporadic micaceous partings; sharp base	6	6	146	6
	<del>Mudstone</del> , grey, silty, micaceous	0	9	147	3
	<del>Sandstone</del> , as at 146/6; sharp base	2	0	149	3
	<del>Mudstone</del> , grey, silty, micaceous	0	3	149	6
	<del>Sandstone</del> , as at 146/6; sharp base	1	3	150	9
	<del>Sandstone</del> , fine grained, silty in part, ripple cross-bedded, with micaceous partings; grades to	2	0	152	9
	<del>Sandstone</del> , pale grey medium grained micaceous, feldspathic; sharp base	6	0	158	9
<del>Mudstone</del> , dark grey fissile with sporadic shells; grades to	5	9	164	6	
			164	6	

G/F

Name and Number of Shaft or Borehole:

Alma Weardale 037

National Grid

Reference

NY9894 4599

3

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			164	6
	<u>Limestone, dark grey, sandy, shelly</u>	0	6	165	0
	<u>Siltstone, dark grey micaceous with laminae of fine grained ripple-cross bedded and bioturbated sandstone; grades to</u>	0	9	165	9
	<u>Mudstone, dark grey, silty, with plant debris and sporadic shells</u>	4	9	170	6
	<u>Limestone, dark grey, sandy, with shells, grades to calcareous sandstone at base; passes into</u>	1	0	171	6
	<u>Sandstone, fine grained, ripple cross bedded, with siltstone laminae; bioturbated in part; grades to</u>	3	6	175	0
	<u>Mudstone, dark grey, silty, with sporadic shells; grades to</u>	8	6	183	6
	<u>Sandstone, grey, micaceous, silty, with siltstone partings; bioturbated above 186/0; sporadic plant debris; grades to</u>	3	6	187	0
	<u>Sandstone, pale grey, fine grained, micaceous, ripple-cross-bedded, with micaceous siltstone laminae; bioturbated in part; sharp base</u>	10	6	197	6
	<u>Sandstone, pale grey, fine grained, micaceous on partings, massive</u>	2	6	200	0
	Base of borehole				

**RECORD OF SHAFT OR BORE FOR MINERALS**

Name of Shaft or Bore given by Geological Survey: ADMIN WEARDALE 036

NY94NE/2

COMMERCIAL IN CONFIDENCE

Name and Number given by owner:

Nat. Grid Reference

Admin Weardale 036

NY 9897 4599

For whom made: Admin

Town or Village: Edmondbyers

County: Durham

Exact site: See map

{ Attach a tracing from a map, or a sketch-map, if possible.

1" N.S. Map No.

1" O.S. Map No.

Confidential or not

26

84

C

Purpose for which made: Minerals

Ground Level at <sup>shaft</sup> relative to O.D. 9. 1420'

If not ground level give O.D. of beginning of <sup>shaft</sup> bore

Made by: DPI

Date of sinking: Sept. 1972

Information from: Coras

Date received: Nov. 1972

Examined by: I.C. Burgess

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft.	IN.	Ft.	IN.
	<u>Peat</u>	1	6	1	6
	<u>Clay, yellow-brown at top, grey below with brown-weathered sandstone fragments</u>	4	0	5	6
	<u>Siltstone, black, micaceous, weathered</u>	0	6	6	0
	<u>Sandstone, greenish, fine grained, weathered, with open vertical joints iron-stained; ripple cross-bedded; micaceous on bedding planes, with grey micaceous siltstone partings; grades to</u>	8	9	14	9
	<u>Siltstone, grey, micaceous with thin sandstone bands; grades to</u>	1	3	16	0
	<u>Sandstone, dark grey, silty, micaceous with plant debris at top; slightly calcareous at base with shells</u>	8	0	24	0
	<u>Sandstone, grey, silty at top with rootlets, passing down into sandstone with micaceous siltstone partings; grades to</u>	3	6	29	6
	<u>Siltstone, dark grey, silty, micaceous with plant debris</u>	2	0	31	6
	<u>Sandstone, pale grey, hard, ganiateroid with rootlets; grades to</u>	1	0	32	6
	<u>c/r</u>			32	6

Name and Number of Shaft or Borehole:

Admin Weardale 036

6-in Map

Registration No.

NY94NE/2

National Grid

Reference

WI 9897 4599

Page

2

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
BASEMENT GHT	Brought Forward			32	6
	<del>Sandstone</del> , light grey, micaceous, ripple cross-bedded, with interbedded dark grey micaceous siltstone bands	12	6	45	0
	<del>Sandstone</del> , massive, pale grey to white, medium to coarse grained, feldspathic; sporadic thin dark grey micaceous siltstone partings; some sub-vertical joints iron stained; sharp erosive base	50	0	95	0
	<del>Sandstone</del> , dark grey, blocky with shells in bottom 2/0	6	9	101	9
	<del>Siltstone</del> , carbonaceous	0	6	102	3
	<del>Siltstone</del> , grey, blocky, unbedded with plant roots throughout; some fine sandstone laminae; possible break at 110/5, muddier with more roots below; grades over bottom 6 inches to	20	6	122	9
	<del>Sandstone</del> , pale grey, medium grained feldspathic; sporadic micaceous partings; coarser, with shale pebbles at base; sharp base	6	3	129	0
	<del>Siltstone</del> , grey, roots	1	0	130	0
	<del>Sandstone</del> , pale grey, fine grained with dark micaceous partings; sharp base	4	3	134	3
	<del>FAULT GOUGE</del> , clay, sheared with coaly debris	2	9	137	0
	<del>Sandstone</del> , fine to medium grained, dark grey, silty at top becoming paler below; many strong sub-vertical joints and fractures; ?siderite on fracture faces	5	3	142	3
	<del>FAULT GOUGE</del> , clay and sandstone, crushed; sandstone with siderite-lined fractures	9	3	151	6
	<del>Sandstone</del> , pale grey; medium grained, strongly jointed with siderite on joints sharp base	3	6	155	0
	<del>Sandstone</del> , dark grey silty, blocky, slightly micaceous; sporadic shells; (two loose sandstone fragments from gouge above)	9	3	164	3
	<del>Limestone</del> , muddy, shaly	1	0	165	3
<del>Sandstone</del> dark grey, silty, sporadic sandstone wisps; fossiliferous at base	5	6	170	9	
<del>Sandstone</del> , pale grey, calcareous with shells in top 0/3; grades to	1	0	171	9	
			171	9	

O/P

Name and Number of Shaft or Borehole: .

Levin Weardale 036

6-in Map  
Registration No. FY94NE

National Grid  
Reference FY9897 4599

Page

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GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			171	9
	<del>Sandstone, pale grey fine grained ripple-</del> <del>cross-bedded with micaceous partings</del> becoming more abundant towards base; grades to	3	9	173	6
	<del>Mudstone, grey, silty in part with some</del> <del>pyritous plant debris; shells in lower</del> <del>part; grades to</del>	9	6	185	0
	<del>Sandstone, fine grained, mid to dark grey</del> <del>with micaceous siltstone laminae in</del> <del>varying proportions; thinly bedded,</del> <del>ripple cross bedded in part, with some</del> <del>bioturbation grades to</del>	5	0	190	0
	<del>Sandstone, pale grey, medium grained with</del> <del>micaceous siltstone partings less</del> <del>abundant than above,</del>	10	0	200	0
	Base of Borehole				

**RECORD OF SHAFT OR BORE FOR MINERALS**

Name of Shaft or Bore given by Geological Survey:

Acorn Weardale C46

**COMMERCIAL IN CONFIDENCE**

MT94RE/3

Name and Number given by owner:

Acorn Weardale C46

Nat. Grid Reference

**NY 9898 4597**

For whom made Acorn

Town or Village Edmondbyers

County Durham

Exact site See map

{ Attach a tracing from a map, or a sketch-map, if possible.

1" N.S. Map No.

**26**

1" O.S. Map No.

**84**

Confidential or not

**C**

Purpose for which made Minerals

Ground Level at <sup>shaft</sup> relative to O.D. c. 1420'

If not ground level give O.D. of beginning of <sup>shaft</sup> bore

Made by D.P.I.

Date of sinking Sept. 1972

Information from Cores

Date received Nov. 1972

Examined by I.C. Burgess

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT.	IN.	FT.	IN.
	<u>Peat</u>	1	3	1	3
	<u>Clay, grey-brown, firm</u>	6	9	8	0
	<u>Siltstone, grey, broken and weathered</u>	2	0	10	0
	<u>Sandstone, pale yellow grey, fine grained, ripple cross bedded, micaceous, with darker grey silty micaceous siltstone laminae; grades to</u>	8	3	18	3
	<u>Siltstone, dark grey, blocky, micaceous on partings with thin sandstone laminae grades to</u>	4	3	22	6
	<u>Sandstone, dark grey, silty at top calc. with shells in basal 1/0</u>	4	6	27	0
	<u>Sandstone, silty, blocky with rootlets in top 3/0; fine-grained, ripple-cross-laminated, micaceous below; grades to</u>	6	3	33	3
	<u>Siltstone, dark grey micaceous with plant debris</u>	1	0	34	3
	<u>Sandstone, yellow-grey; granular with rootlets in top 0/6; fine to medium grained, ripple-cross laminated below; becoming siltier, darker grey towards base.</u>	5	9	40	0

Name and Number of Shaft or Borehole:

**Amia Wardale C46**

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
<b>BASEMENT GCRIT</b>	Brought Forward			40	0
	<del>Sandstone, greenish grey, micaceous, fine to medium grained, ripple cross bedded, with strong sub-vertical joints; grades to</del>	7	6	47	6
	<del>Sandstone, pale grey, medium to coarse grained; cross-bedded in part; sporadic dark grey siltstone partings; iron-stained on joints; sharp base</del>	39	6	87	0
	<del>Sandstone, fine to medium grained, ripple cross-bedded, with partings of micaceous siltstone</del>	5	0	92	0
	<del>Sandstone, pale grey, massive, medium to coarse grained; sharp base</del>	5	3	97	3
	<del>Mudstone, dark grey, silty with plant debris at top, calcareous with shells at base; small ironstone nodules</del>	6	3	103	6
	<del>Limestone, muddy, shelly</del>	0	9	104	3
	<del>Siltstone, dark grey with abundant plant debris; sandy in part, micaceous</del>	2	3	106	6
	<del>Siltstone, dark grey, sandy, blocky, unbedded; sporadic plant remains; grades to</del>	12	0	118	6
	<del>Siltstone, dark grey, abundant plant remains slicked</del>	1	0	119	6
	<del>Siltstone, dark grey, sandy, blocky unbedded, sporadic plant remains; shaly, slicked in basal 1/3</del>	11	6	131	0
	<del>Sandstone, pale grey medium to coarse grained feldspathic with mudstone fragments; rootlets in top 1/0; marked stylolites; sharp base</del>	5	0	136	0
	<del>Sandstone, fine grained, dark grey, silty</del>	0	6	136	6
	<del>Sandstone, pale grey, medium to coarse grained; plant debris, feldspathic sharp base</del>	1	0	137	6
	<del>Siltstone, grey, blocky; muddy at top with plant roots, sandy in part below, grades down to mudstone with roots below 140/0; shells sporadically at base</del>	4	6	142	0
	<del>Limestone, muddy</del>	0	9	142	9
<del>Mudstone, dark grey, calcareous, fossiliferous</del>	0	6	143	3	
			143	3	

C/F

Name and Number of Shaft or Borehole:

Aspin Weardale C46

6-in Map

Registration No.

NT94NE/3

National Grid

Reference

NY 9808 4597

Page

3

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			143	3
	<u>Limestone</u> , muddy	0	6	143	9
	<u>Sandstone</u> , fine grained, dark grey with roots in top 0/6, becoming medium-grained, pale grey, feldspathic below; massive down to 156/9; finer, with micaceous partings below. Sharp base	14	0	157	9
	<u>Mudstone</u> , dark grey, micaceous	0	6	158	3
	<u>Sandstone</u> , pale grey, medium grained with plant debris	1	3	159	6
	<u>Mudstone</u> , dark grey slightly micaceous with sporadic shells	9	9	169	3
	<u>Limestone</u> , dark grey silty crinoidal	0	9	170	0
	<u>Mudstone</u> , dark grey, silty in part with sandstone wisps and laminae; sporadic shells	4	6	174	6
	<u>Limestone</u> dark grey silty, grading down to calcareous shelly sandstone; grades to	1	0	175	6
	<u>Sandstone</u> , pale grey medium grained with sporadic shells	2	9	178	3
	<u>Sandstone</u> , pale grey with black carbonaceous streaks and rootlets	1	0	179	3
	<u>Mudstone</u> , dark grey, silty with thin sandstone bands at top to 182/0; shells in lower part; grades to	9	6	188	9
	<u>Sandstone</u> , dark grey, silty, ripple-cross bedded; with interlaminated dark grey micaceous siltstone bands in varying proportions; plant debris sporadically especially at top; grades to siltstone at base	4	9	193	6
	<u>Sandstone</u> , pale grey fine to medium grained with grey micaceous siltstone partings; some plant debris	6	6	200	0
	Base of Borehole				

**RECORD OF SHAFT OR BORE FOR MINERALS**

Name of Shaft or Bore given by Geological Survey:

Asma Yeardale 199

**COMMERCIAL IN CONFIDENCE**

NY94NE/4

Name and Number given by owner:

Asma Yeardale 199

Nat. Grid Reference

NY 9902 4597

For whom made

Asma

Town or Village

Edenclayes

County

Durham

Exact site

See map

Attach a tracing from a map, or a sketch-map, if possible.

1" N.S. Map No.

26

1" O.S. Map No.

84

Confidential or not

Purpose for which made

Minerals

Ground Level at <sup>shaft</sup> ~~bore~~ relative to O.D. a 1420'

If not ground level give O.D. of beginning of shaft bore

Made by

D.P.I.

Date of sinking

Sept. 1972

Information from

Cores

Date received

Nov. 1972

Examined by

I.G. Burgess

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT.	IN.	FT.	IN.
	<u>Peat</u>	2	6	2	6
	<u>Clay, yellow-brown</u>	1	0	3	6
	<u>Mudstone, fragmented</u>	1	6	5	0
	<u>Clay, yellow brown</u>	2	0	7	0
	<u>Siltstone, dark grey, weathered</u>	5	0	12	0
	<u>Sandstone, greenish-yellow, micaceous; sub-vertical joints, grades to</u>	7	0	19	0
	<u>Mudstone, dark grey, silty at top with fine sandstone laminae; sporadic shells at base</u>	9	0	28	0
	<u>Sandstone, pale greenish grey, with rootlets in top 2/6, strong sub vertical joints; micaceous, silty towards base</u>	15	0	41	0
	<u>Siltstone, dark grey, plant debris, carbonaceous at base</u>	1	9	42	9
	<u>Sandstone, greenish grey, fine grained with rootlets in top 1/0; ripple-cross bedded, micaceous with sporadic siltstone partings. Strong sub-vertical joints, iron-stained grades to</u>	8	3	51	0
	<u>Sandstone, pale grey, fine to medium grained with micaceous partings ripple cross bedded in part</u>	14	0	65	0
				28	0

Name and Number of Shaft or Borehole:

Audin Weardale 499

6-in Map

Registration No.

HY94NE/A

National Grid

Reference

HY 9902 4997

Page

2

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			65	0
BASEMENT GRIT	Sandstone, pale grey, massive, medium grained feldspathic, strong sub-vertical joints with iron-staining and thin glauconite encrustation at 84/0; some micaceous partings	32	0	97	0
	Sandstone, fine grained, micaceous with dark grey siltstone partings	1	0	98	0
	COBB LOST	2	3	100	3
	Sandstone, pale grey medium grained massive with strong sub vertical joints, iron-stained; sharp base	3	0	103	3
	Mudstone, dark grey, blocky with sporadic shells at top becoming more abundant towards base	2	9	106	0
	Siltstone, dark grey, sandy at top, with carbonaceous streaks and abundant plant debris grades to	2	3	108	3
	Siltstone, pale greenish grey, blocky with sporadic roots to 118/0; less massive, with more abundant plant remains below, grades to	19	9	128	0
	Siltstone, as above, with thin sandstone ribs grades to	1	9	129	9
	Siltstone, as above at 128/0	1	9	130	6
	Sandstone, massive, medium grained feldspathic pale grey with coaly fragments; sub vertical joints sharp base	8	3	138	9
	Mudstone, dark grey silty with plant debris; sharp base	0	9	139	6
	Siltstone, seat earth with roots grades to	3	3	142	0
	Mudstone, with sporadic shells; some roots at top	2	0	144	0
	Limestone, muddy	0	6	144	6
	Mudstone, grey calcareous	0	9	145	3
	Limestone, muddy	0	6	145	9
	Sandstone, medium grained, feldspathic, massive; sub-vertical joints sharp base	9	9	154	6
	Sandstone, dark grey, silty, finely laminated with siltstone partings and coaly fragments, sharp base	2	0	156	6
Mudstone, dark grey, silty, fissile with sporadic plant debris and shells; ironstone nodules	11	9	168	3	
				168	3

c/y

Name and Number of Shaft or Borehole:

Austin Weardale 199

6-in Map  
Registration No.

NY948E/4

National Grid  
Reference

NY 9902 4597

Page

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GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			168	3
	<del>Limestone</del> , dark grey, muddy	1	0	169	3
	<del>Siltstone</del> , dark grey, fissile; thin sandstone laminae; sporadic shells	4	6	173	9
	<del>Limestone</del> , dark grey, silty	0	3	174	0
	<del>Limestone</del> , dark grey, sandy with shells, grades to	1	0	175	0
	<del>Sandstone</del> , pale grey, calcareous, medium grained with silty partings towards base; grades to	2	0	177	0
	<del>Siltstone</del> , dark grey, with a varying amount of sandstone as fine laminae and thin ribs usually bioturbated; sporadic plant debris and shells grades to	7	6	184	6
	<del>Sandstone</del> , mid grey, silty with siltstone bands and plant debris grades to	4	6	189	0
	<del>Siltstone</del> , dark grey micaceous, fissile sharp base	0	9	189	9
	<del>Sandstone</del> , pale grey, massive, ripple cross-bedded in part, fine to medium grained with 1/2 inch siltstone parting at 200/6	11	3	201	0
	Base of Borehole				

**RECORD OF SHAFT OR BORE FOR MINERALS**

NT948E/5

Name of Shaft or Bore given by Geological Survey: **COMMERCIAL IN CONFIDENCE**  
**Amin Weardale 045**

Name and Number given by owner:  
**Amin Weardale 045**

For whom made: **Amin**

Town or Village: **Hindleyburn** County: **Durham**

Exact site: **See map**

{ Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made: **Minerals**

Ground Level at ~~shaft~~ bore relative to O.D. **c. 1420'** If not ground level give O.D. of beginning of shaft bore

Made by: **D.F.I.** Date of sinking: **Oct. 1972**

Information from: **Coren** Date received: **Nov. 1972**

Examined by: **I.C. Burgess**

Nat. Grid Reference		
<b>NT 9905 4597</b>		
1" N.S. Map No.	1" O.S. Map No.	Confidential or not
<b>26</b>	<b>84</b>	

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft.	IN.	Ft.	IN.
	<del>Peak</del>	2	3	2	3
	<del>Clay, yellow-brown</del>	1	9	4	0
	<del>Sandstone, yellow thinly bedded micaceous ripple-cross-bedded with interlaminated micaceous siltstones, grading down to broken mudstone at base</del>	6	0	10	0
	<del>Coarser sandstone, grades to</del>	0	9	10	9
	<del>Sandstone, yellow, thinly bedded, micaceous, ripple-cross-bedded with micaceous siltstone partings, silty towards base; grades to</del>	5	9	16	0
	<del>Siltstone, grey, micaceous with ripple-cross-bedded sandstone laminae grades to</del>	3	0	19	0
	<del>Mudstone, dark grey, slightly micaceous</del>	2	0	21	0
	<del>Coal, broken</del>	0	3	21	3
	<del>Siltstone, seatearth with roots throughout grades to</del>	4	9	26	0
	<del>Mudstone, silty, sporadic shells</del>	1	0	27	0
	<del>Ironstone, silty</del>	0	3	27	3
	<del>Siltstone, grey, micaceous</del>	0	3	27	6
	<del>Sandstone, greenish grey fine to medium grained micaceous with rootlets in top</del>				
	<del>2/6 and silty micaceous partings in lower</del>	c/7		27	6

Name and Number of Shaft or Borehole:

Aspin Weardale 045

6-in Map  
Registration No.

BY 9432/5

National Grid  
Reference

NY 9905 4397

Page

5

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			151	0
	<del>Mudstone, grey crushed (plant debris)</del>	0	9	151	9
	<del>Sandstone, pale grey medium grained with rocklets; strong sub vertical joints with siderite</del>	2	9	153	6
	<del>Mudstone, grey, fossiliferous</del>	1	6	154	0
	<del>Limestone, grey with shells</del>	0	8	154	8
	<del>Mudstone, grey, calcareous</del>	0	4	154	0
	<del>Limestone, hard, grey, sandy, silicified</del>	0	6	154	6
	<del>Sandstone, medium grained, pale grey, massive, becoming coarse grained, calcareous, towards base</del>	9	9	163	3
	<del>Sandstone, silty, thinly bedded, micaceous with carbonaceous streaks and partings; sharp base</del>	3	3	166	6
	<del>Mudstone, dark grey, blocky with sporadic shells</del>	10	6	176	0
	<del>Limestone, dark grey, muddy in top 0/3, grades to</del>	1	0	177	0
	<del>Mudstone, dark grey with silty partings grades to</del>	4	3	181	3
	<del>Limestone, dark grey, muddy, grades to</del>	0	6	181	9
	<del>Limestone, dark grey, sandy, passing down into calcareous sandstone</del>	0	9	181	6
	<del>Sandstone, pale grey, medium grained,</del>	0	9	181	3
	<del>Siltstone, dark grey, muddy with laminae of pale grey sandstone, ripple cross bedded and bioturbated; grades to</del>	3	0	184	3
	<del>Mudstone, dark grey, silty, blocky with sporadic shells</del>	9	9	193	0
	Base of Borehole				

Name and Number of Shaft or Borehole:

Admin Weardale 045

6-in Map  
Registration No.

NY94NB/5

National Grid  
Reference

NY 9905 4597

Page

2

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			27	6
	part. grades to	9	0	36	6
	Siltstone, dark grey micaceous with sandstone wisps and laminae; plant debris;				
	grades to	4	6	41	0
	Mudstone, dark grey, silty, sporadic fossils	4	6	45	6
	Limestone, dark grey, very silty, sandy				
	towards base grades to	0	6	46	0
	Sandstone, mid to dark grey, blocky, silty with plant roots in top 3/0 micaceous				
	in lower part; grades to	5	0	51	0
	Siltstone, dark grey, muddy; plants, sharp base	2	3	53	3
	Sandstone, greenish grey, fine grained ripple cross bedded with rootlets at top; dark grey, micaceous with plant debris				
	below; grades to	3	9	57	0
	Siltstone, dark grey, blocky, micaceous with plant debris; grades to mudstone				
	in bottom 0/6; sharp base	3	6	60	6
	Sandstone, mid grey, fine grained ripple cross-bedded, micaceous with silty				
	micaceous partings	7	6	68	0
BASEMENT GRT	Sandstone, pale grey, massive, feldspathic, slightly micaceous with sporadic micaceous silty partings. Medium to coarse grained with strong sub-vertical joints at intervals; black siltstone 0/3 at 107/3, black siltstone 0/3 at 97/9				
	Large mudstone fragments in basal 0/6 which is very coarse; sharp base	47	0	115	0
	Mudstone, dark grey, silty with sporadic shells	4	0	119	0
	Limestone, muddy, sporadic shells and crinoid debris; sandy at base	0	9	119	9
	Mudstone, dark grey, silty, fissile with plant debris	2	3	122	0
	Siltstone, dark greenish grey, blocky with rootlets and plant debris; core lost 2/10 at 132/10 sharp base	19	6	141	6
	Sandstone, medium-grained, pale grey with rootlets in top 2/0, even or ripple-cross-bedded below, some carbonaceous				
	fragments, sub-vertical joints with siderite	9	6	151	0
				151	0

C/F

RECORD OF SHAFT OR BORE FOR MINERALS

6-inch Map Registered No.

NY 94NE/6

Name of Shaft or Bore given by Geological Survey:

Acmin Weardale D66

COMMERCIAL

IN CONFIDENCE

Name and Number given by owner:

Acmin Weardale D66

Nat. Grid Reference

NY 9449 4782

For whom made Acmin

Town or Village Edenbyers

County Durham

Exact site See map

{ Attach a tracing from a map, or a sketch-map, if possible.

1" N.S. Map No.

1" O.S. Map No.

Confidential or not

26

84

Purpose for which made Minerals

Ground Level at shaft relative to O.D. 0. 1150

If not ground level give O.D. of beginning of shaft bore

Made by D.L.I.

Date of sinking Aug. 1972

Information from Cores

Date received Nov. 1972

Examined by I.C. Burgess

SPECIMEN NUMBERS AND ADDITIONAL NOTES

Core split and half sent to D. Oatle, Geochemical Division

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft.	IN.	Ft.	IN.
	<u>Peat</u>	0	9	0	9
	<u>Clay with sandstone, blocky, yellow</u>	5	3	6	0
	<u>Sandstone, yellow-brown, fine grained, ripple-cross bedded with interlamated micaceous siltstone; sub-vertical joints iron stained grades to</u>	11	0	17	0
	<u>Sandstone, gray, weathered; sporadic shells</u>	1	9	18	9
	<u>Sandstone, pale yellow, fine to medium grained, decalcified and iron-stained at top, with shells</u>	5	3	24	0
	<u>Siltstone, brown, crushed</u>	0	3	24	3
	<u>Sandstone, pale grey, micaceous with pale grey siltstone bands 0/9 at 26/3, 0/6 at 28/0 and 0/3 at 30/9; sub-vertical joints, iron stained</u>	6	6	30	9
	<u>Sandstone, pale grey, fine to medium grained, micaceous, feldspathic towards base grades to</u>	7	3	38	0
	<u>Sandstone, fine to medium grained, feldspathic; sharp base</u>	9	9	47	9
	<u>O/P</u>			47	9

Name and Number of Shaft or Borehole:

Irwin Woodale D66

6-in Map

Registration No.

NY 9448/6

Page

National Grid

Reference

NY 9949 4782

2

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft	IN	Ft	IN
	Brought Forward			47	9
	Mudstone, dark grey, slightly micaceous with some plant debris and sporadic shells; 0/2 muddy limestone at 50/0; badly broken	8	3	55	0
	Sandstone, pale grey, fine grained iron stained at top; sporadic roots; siltstone partings at base; sharp base	3	0	59	0
	Siltstone, greenish grey, blocky with roots; grades below 62/6 to dark grey fissile sandy micaceous siltstone with plant debris; sharp base	8	0	67	0
	Sandstone, pale brown, fine grained, ripple cross bedded, massive with micaceous partings	7	0	74	0
	NO CORE	4	6	78	6
	Sandstone as above sharp base	6	6	85	0
	Siltstone, grey micaceous with bioturbated sandstone ribs in part	1	6	86	6
	Sandstone, as above	13	6	100	0
	Sandstone, micaceous, fissile	0	9	100	9
	Sandstone, pale brown, fine to medium grained, with sporadic micaceous partings; basal 1/0 with abundant carbonaceous fragments; sharp base	8	3	109	0
	Siltstone, dark grey with some plant debris grades to	21	0	130	0
	Mudstone, dark grey, silty	30	0	160	0
	Mudstone, dark grey, calcareous, fossiliferous with ribs and nodules of muddy limestone	2	9	162	9
UPPER FELT TOP LIMESTONE	Limestone, grey, bioclastic, muddy at base grades to	3	1	165	10
	Sandstone, pale grey, granular with rootlets; grades to	1	5	167	3
	Sandstone, pale grey, fine grained, ripple cross bedded with dark micaceous partings and siltstone laminae grades to	7	3	174	6
	Mudstone, dark grey, silty, micaceous with sporadic Lingule at base	5	0	179	6
	Sandstone, dark grey, silty, micaceous with rootlets and carbonaceous plant debris; grades to				
	Siltstone, pale grey, fine grained, massive micaceous partings	18	4	197	10

Base of borehole

16581/64410 3M 11/70 84X 1A, 3639

**RECORD OF SHAFT OR BORE FOR MINERALS**

(For Survey use only)

6-inch Map Registered No.

NY94NE/7

**CONFIDENTIAL**

Name of Shaft or Bore given by Geological Survey: COMMERCIAL IN  
Amin Weardale A32

Name and Number given by owner:  
Amin Weardale A32

For whom made Amin

Town or Village Edmondbyers County Durham

Exact site see map { Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Minerals

Nat. Grid Reference

NY9953 4786

1" N.S. Map No.	1" O.S. Map No.	Confidential or not
26	84	

Ground Level at <sup>shaft</sup> ~~bore~~ relative to O.D. c.1150 If not ground level give O.D. of beginning of <sup>shaft</sup> ~~bore~~

Made by D.P.I. Date of sinking Aug. 1972

Information from Cores Date received Nov. 1972

Examined by I.C. Burgess

SPECIMEN NUMBERS AND ADDITIONAL NOTES

Core shows marked weathering extending below 70ft  
Shaly beds generally fragmented with iron staining on bedding planes.

(For Survey use only)

GEOLOGICAL CLASSIFICATION

DESCRIPTION OF STRATA

THICKNESS

DEPTH

Ft.

IN.

Ft.

IN.

<u>Peat</u>	0	9	0	9
<u>Clay, yellow with siltstone dabrils</u>	5	0	5	9
<u>Sandstone, yellow, weathered, fine grained, ripple cross bedded with micaceous siltstone laminae; sub-vertical joints iron stained; grades to</u>	9	6	15	3
<u>Sandstone, yellow, medium-grained, with sub-vertical joints, iron stained; sharp base</u>	5	6	20	9
<u>Mudstone, yellow, deeply weathered and fragmented</u>	2	9	23	6
<u>Sandstone, yellow, medium grained, sub-vertical joints, iron stained; sharp base</u>	5	3	28	9
<u>Sandstone, yellow-brown, fine-grained, silty micaceous; sharp base</u>	1	6	30	3
<u>Siltstone, white, micaceous, deeply weathered</u>	2	0	32	3
<u>Sandstone, yellow, fine grained, micaceous, silty</u>	2	3	34	6
<u>Siltstone, dark grey, fissile; weathered and iron stained</u>	1	9	36	3
C/F			36	3

Name and Number of Shaft or Borehole: .

Acwin Weardale A32

6-in Map

Registration No. NY94NE/7

Page

National Grid

Reference NY9953 4786

2

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			36	3
	<u>Sandstone</u> , yellow-brown, fine grained, micaceous, becoming feldspathic towards base; grades to	8	6	44	9
	<u>Sandstone</u> , yellow, medium grained, feldspathic; sharp base	4	3	49	0
	<u>Mudstone</u> , dark grey where fresh; mainly weathered and fragmented; sporadic shells	8	3	57	3
	<u>Limestone</u> , dark grey, silty	0	6	57	9
	<u>Mudstone</u> , dark grey, sporadic shells	3	0	60	9
	<u>Sandstone</u> , pale yellow, decalcified at top; sub vertical joints, iron stained.	1	6	62	3
	<u>Sandstone</u> , pale grey, silty, ripple cross bedded, with silty carbonaceous micaceous laminae;	3	0	65	3
	<u>Coal</u>	0	1	65	4
	<u>Sandstone</u> , yellow-grey, hard, with plant roots down to 68/0; grades to dark grey siltstone at base; sharp base	4	8	70	0
	<u>Sandstone</u> , yellow-grey, ripple-cross-bedded with irregular micaceous and carbonaceous partings; sub-vertical joints iron stained	1	8	71	8
	<u>Siltstone</u> , grey, micaceous; sharp base	0	4	72	0
	<u>Sandstone</u> , pale brown, fine grained, ripple cross-bedded down to 76/0 with silty micaceous partings; more massive, medium grained below	8	0	80	0
	<u>Mudstone</u> , dark grey, silty, micaceous	0	3	80	3
	<u>Sandstone</u> , pale brown, fine grained, ripple cross-bedded, with micaceous partings and sporadic micaceous siltstone laminae, sharp base	35	6	115	9
	<u>Siltstone</u> , dark grey, micaceous with sporadic thin sandstone ribs and laminae, becoming muddier towards base; plant debris; grades to	19	3	135	0
	<u>Mudstone</u> , dark grey, silty with sporadic plant debris, grades to	30	6	165	
	<u>Mudstone</u> , dark grey calcareous, erinoid with bands of muddy limestone	3	0	168	6
	<u>Limestone</u> , mid grey, bioclastic, muddy at base; grades to	3	0	171	6
	C/F			171	6

UPPER  
FELLTOP  
LIMESTONE

160581/644410 JM 11/70 B&M Ltd. 3639



**RECORD OF SHAFT OR BORE FOR MINERALS**

Name of Shaft or Bore given by Geological Survey: Amin Weardale D64 **COMMERCIAL IN CONFIDENCE** **NY9488/B**

Name and Number given by owner: Amin Weardale D64

For whom made Amin

Town or Village Edmondbyera County Durham

Exact site See map { Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Minerals

Ground Level at <sup>shaft</sup> ~~bore~~ relative to O.D. 0.1150' If not ground level give O.D. of beginning of <sup>shaft</sup> ~~bore~~

Made by DPI Date of sinking Sept. 1972

Information from Cores Date received Nov. 1972

Examined by I.C. Burgess

Nat. Grid Reference		
NY9959 4782		
1" N.S. Map No.	1" O.S. Map No.	Confidential or not
26	B4	

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft.	IN.	Ft.	IN.
	<u>Peat</u>	1	0	1	0
	<u>Clay, grey-brown</u>	4	0	5	0
	<u>Siltstone, yellow, sandy, micaceous, deeply weathered and broken; grades to</u>	5	6	10	6
	<u>Sandstone, greenish, silty, ripple-cross-bedded with thin micaceous partings weathered and iron-stained; grades to</u>	5	6	16	0
	<u>Sandstone, yellow, fine grained, micaceous, blocky; sub-vertical joints iron stained; grades to</u>	1	0	17	0
	<u>Sandstone, greenish, silty, micaceous with plant debris; grades to</u>	3	6	20	6
	<u>Mudstone, yellow-grey, silty, with sporadic shells; deeply weathered and fragmented</u>	1	6	22	0
	<u>Sandstone, pale yellow, fine grained, massive with sharp base; sub-vertical joints iron stained</u>	5	6	27	6
	<u>Siltstone, micaceous; sheared by drilling in top 9/61; white, blocky below</u>	1	0	28	6
	<u>Sandstone, pale brown, fine to medium grained with sporadic micaceous partings;</u>			28	6

Name and Number of Shaft or Borehole:

Acacia Weardale D64

6-in Map  
Registration No. NY94EE/8

National Grid  
Reference NT9959 4782

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GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN	FT	IN
	Brought Forward			<del>22</del>	6
	<del>coarser, more calcareous towards base;</del> sharp base	17	6	46	0
	<del>Siltstone, dark grey, fragmented;</del> sharp base	1	0	47	0
	<del>Sandstone, medium grained, micaceous,</del> folds pathic; sharp base	4	0	51	0
	<del>Mudstone, dark grey, fragmented;</del> sporadic shells and plant debris; 0/2 sandy limestone at 53/4	10	0	61	0
	<del>Sandstone, grey, decalcified at top grades to</del> <del>Siltstone, dark grey with pale laminae of</del> micaceous sandstone	2	0	63	0
	<del>Mudstone, black, fragmented</del>	0	3	64	3
	<del>Siltstone, dark greenish grey, blocky,</del> imbedded with plant roots; grades to	3	3	67	6
	<del>Sandstone, dark grey, fine grained</del> ripple-cross-bedded with micaceous siltstone partings and carbonaceous debris; grades to sandy micaceous siltstone at base; sharp base	1	6	69	0
	<del>Sandstone, fine grained, ripple-cross-</del> bedded with micaceous siltstone partings; grades to	2	6	71	6
	<del>Sandstone, yellow-grey, fine to medium</del> grained, with ripple-drift bedding in part; micaceous on bedding planes and with sporadic silty micaceous partings; sharp base	37	3	108	9
	<del>Siltstone, dark grey, micaceous with</del> plant debris and with thin ribs of pale grey bioturbated sandstone; grades to	12	3	120	0
	<del>Siltstone, dark grey, micaceous with</del> plant debris	6	0	126	0
	Base of borehole				

Horizontal projection of Baltshan Ben vein at  
 Sur face. as extrapolated from two inclined in BH 3, 4  
 would be 270' from collar

From BH 2 BH 1 = 308'

BH 1 and 2 indicate Baltshan vein dipping 88°  
 on strike of.

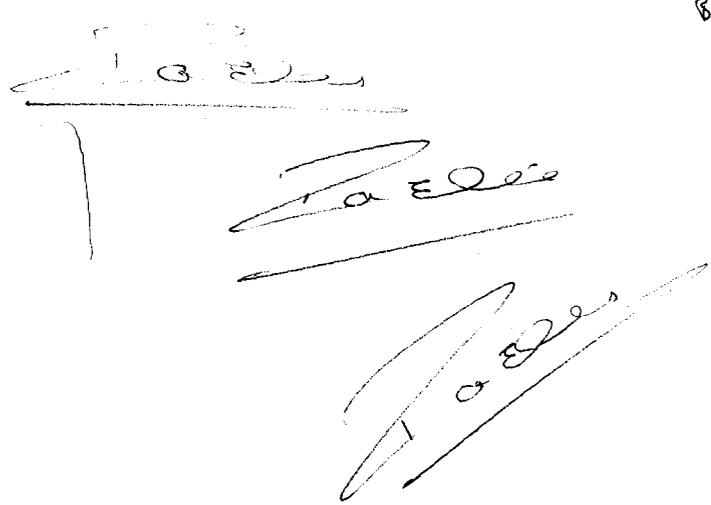
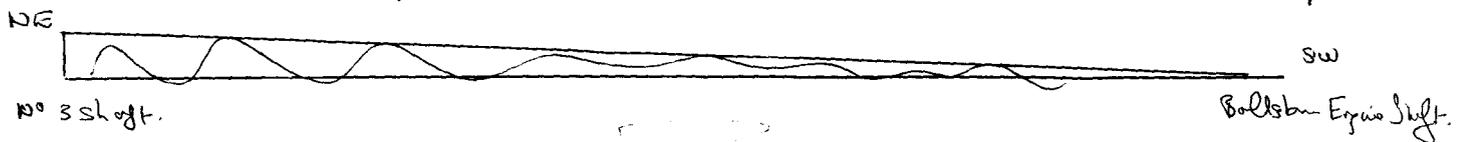
BH 3 and 4 - on strike 950 ft to NE.  
 similar dip inclination  
 - fault attitude dips of 70°.

Distance of fault zone fault. = > 150 & 300' respectively, for BH 3A & BH 4  
 is little clue of depth, mineralization of Baltshan vein  
 Ref- 3.09.

Baltshan vein NE of Rock Lake.

Watts level works extend 10,950 feet NE from  
 Baltshan Engine Shaft. (9335 4295) at 908' O.D.  
 4 shafts. along strike to NE. N° 3 shaft bottom level = 770' O.D.

= Drop of 140' in 3650 yds. = fall of 26  
 ∴ gradient of Watts level from SW → NE = 1 in 78.



## ADMIN II

1. Costs. - OK.
2. Geolgy, info - OK
3. Summary of work.
4. Conclusions.
5. Recommendations - Program supported but future work = further handling.

The geologic info. submitted with this claim <sup>concern</sup> ~~state~~ <sup>state</sup> the second phase of ~~ACMUS~~ <sup>ACMUS</sup> ~~work~~ <sup>work</sup> ~~project~~ <sup>project</sup> on ~~state~~ <sup>state</sup> which ~~is~~ <sup>is</sup> ~~involved~~ <sup>involved</sup> in a deep-dilly ~~project~~ <sup>project</sup> completed at ~~Edinburgh~~ <sup>Edinburgh</sup>. The investigation ~~is~~ <sup>is</sup> ~~concerned~~ <sup>concerned</sup> with ~~the~~ <sup>the</sup> ~~economic~~ <sup>economic</sup> ~~investigation~~ <sup>investigation</sup> in the ~~Ballston~~ <sup>Ballston</sup> ~~area~~ <sup>area</sup>, ~~and~~ <sup>and</sup> ~~is~~ <sup>is</sup> ~~concerned~~ <sup>concerned</sup> with ~~the~~ <sup>the</sup> ~~work~~ <sup>work</sup> ~~of~~ <sup>of</sup> ~~Edinburgh~~ <sup>Edinburgh</sup>.

The accompanying report ~~provides~~ <sup>provides</sup> ~~information~~ <sup>information</sup> ~~concerning~~ <sup>concerning</sup> the ~~work~~ <sup>work</sup> ~~of~~ <sup>of</sup> ~~Edinburgh~~ <sup>Edinburgh</sup> ~~MS. 7302~~ <sup>MS. 7302</sup> ~~which~~ <sup>which</sup> we have not yet received. ~~But~~ <sup>But</sup> ~~we~~ <sup>we</sup> ~~are~~ <sup>are</sup> ~~able~~ <sup>able</sup> to ~~see~~ <sup>see</sup> ~~the~~ <sup>the</sup> ~~report~~ <sup>report</sup> ~~with~~ <sup>with</sup> ~~this~~ <sup>this</sup> ~~claim~~ <sup>claim</sup> ~~MS. 7313~~ <sup>MS. 7313</sup>, ~~is~~ <sup>is</sup> ~~well~~ <sup>well</sup> ~~detailed~~ <sup>detailed</sup> ~~copies~~ <sup>copies</sup> ~~with~~ <sup>with</sup> ~~1:3~~ <sup>1:3</sup>. The report ~~submitted~~ <sup>submitted</sup> with this claim ~~however~~ <sup>however</sup> ~~fully~~ <sup>fully</sup> ~~conforms~~ <sup>conforms</sup> with ~~the~~ <sup>the</sup> ~~proper~~ <sup>proper</sup> ~~standards~~ <sup>standards</sup> and ~~conforms~~ <sup>conforms</sup> with ~~the~~ <sup>the</sup> ~~higher~~ <sup>higher</sup> ~~standards~~ <sup>standards</sup> of a ~~higher~~ <sup>higher</sup> ~~standard~~ <sup>standard</sup>.



ADMIN. RECORDS - STAGE II.

BH 1. - proposed in Application dated 18.12.72.  
Failure to intersect B.V. in G.L. by c. 100'  
- hole was advanced for further 250' before the  
B.V. was intercepted in the 3rd. interval.

BH 2 was then set on a shallower angle from the  
same collar to intersect G.L. and B.V. intersection  
- missed again by a matter of a few feet.  
although significant mineralisation was detected in  
in the core immediately above the G.L. in the  
B.V.

Provision for BH 1 not in the Decense application  
but requested subsequently in Feb. '73 - quoted figure of 15000  
to cover cost of extra hole. - supplied by  
MR GORE → Arthur Todd. 16.2.73.

Drilling is v. expensive. - due to time taken in deflection across  
meanings down etc etc.

2B.	422' 6"	→	619' 6"	=	197'
3.	0'	→	601' 6"	=	601'
3A.	421' 0"	→	988' 0"	=	567'
4.	0'	→	936'	=	936' 6"
1					1140' (No logs)
2					897' (No logs)
2A.	556' 4"	→	887' 3"		331' (No logs)

Edmondbyers Common Drilling Total **4670** feet.

" " " Costs £23887

Costs are thus approximately £5 per foot = acceptable.

Middlewich Common Drilling - 1972.

Eight shallow bores, c. 150' each. Hole completed - test,  
geochemical anomalies located in the possible junction  
zone of the white vein and Bolt's bar vein extension

Total footage = ~~1500~~ feet Total cost £6275  
= Approximately £4.20 per foot.  
[ Original Drilling Budget £14300 ]

5.7  
546  
331

CODE 18-75

BH 1 DEAD FRIARS.

Batho.v. Predicted

Actual.

BH 3 collar.

collar = 1550'

Allowing for deflection of 4°  
has. should intersect GL/B.V.  
at. c 850'

615'  
670'  
400' intersect

GL/B.V. intersect predicted  
allowing for sag of 4° of drill-hole.

719'

870'

