1982 CORE PROGRAM

QUINSAM COAL PROPERTY

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DATE: AUGUST, 1982

FILE NO: 0053

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1. SUMMARY

During the period August 2 - 14, 1982, a total of 7 testholes were completed on the Quinsam Property: 3 holes in Pit 3N and 4 holes in Pits 1, 2-3S. The total of 1017 feet (310 metres) is broken down as follows:

Overburden Drilling and Casing -	136 feet (41.3 metres)
Rock Drilling -	679.2 feet (207.1 metres)
Coring -	201.9 feet (61.4 metres)

These holes were designed to augment existing coal quality data with respect to chemical composition of clean coal ash, ash fusibility characteristics, and hardgrove grindability characteristics in the area of the first five years of mining. In addition, washability tests run on the samples would supply a useful check with the data generated in previous years by Luscar Ltd.

Total cost of the program was $32,000. This figure does not include any costs associated with laboratory testing or reporting of analytical work.

Drilling and coring operations were undertaken by Ken's Drilling Ltd., of Victoria, B. C. Laboratory testing and analytical work was conducted by General Testing Laboratories Ltd., (a division of Superintendence Company Ltd.), Vancouver, B.C.

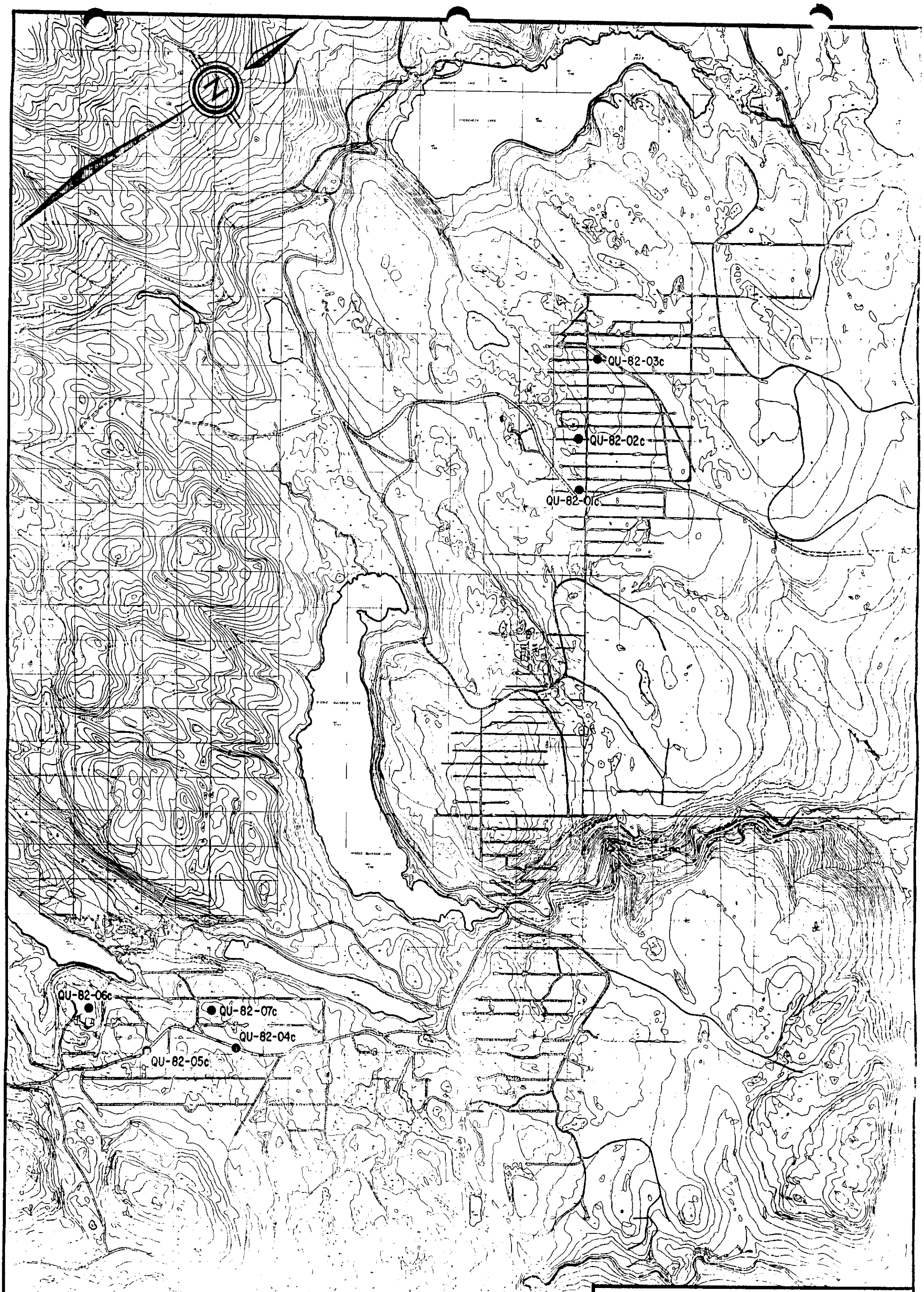
The work was performed on Coal Licences 3670 and 6870 both of which are situated within Comox Land District.

The specific National Topographic Series location is 92 F 13 and 94 F 14 with an approximate latitude and longitude of 49° 54' and 125° 28' respectively.

The present owner of the coal licences is Weldwood of Canada Limited.

This report was originally submitted in August, 1983.

FIGURE 1: LOCATION MAP, 1982 COREHOLES



1982 DRILL & TEST PROGRAM
1-555-0053

COREHOLE LOCATIONS

TABLE 1: 1982 COREHOLES, QUINSAM PROPERTY

HOLE NO.	GRID LINE (ft.)	LOCATION (ft.)	COLLAR ELEVATION (ft.)	TILL DEPTH (ft.)	NO. 3 SEAM DEPTH/THICKNESS (ft.)	NO. 2 SEAM DEPTH/THICKNESS (ft.)	NO. 2 RIDER DEPTH/THICKNESS (ft.)	NO. 1 RIDER DEPTH/THICKNESS (ft.)	NO. 1 SEAM DEPTH/THICKNESS (ft.)	NO. 1 BASAL DEPTH/THICKNESS (ft.)	TOTAL DEPTH (ft.)
QU-82-01C	147 + 50	250' Lt.	1060	29	-	50.1/2.45	66.0/1.60	-	128.3/11.15 ft.	-	141.5
QU-82-02C	157 + 50	250' Lt.	1079	18	-	33.7/3.55	-	-	115.0/11.90 ft.	-	130.0
QU-82-03C	172 + 50	250' Rt.	1089	44	-	63.6/3.63	-	-	147.3/11.25 ft.	-	162.6
QU-82-04C	41 + 00	6760' Lt.	1166	-	-	167.0/3.90	-	-	217.3/9.65 ft.	-	230.0
QU-82-05C	40 + 00	8465' Lt.	1179	5	-	59.0/3.80	-	-	105.4/10.04 ft.	114.2/5.05 ft.	125.0
QU-82-06C	48 + 00	9550' Lt.	1161	2	-	-	-	-	40.0/15.40 ft.	-	60.0
QU-82-07C	47 + 50	7250' Lt.	1147	15	-	86.9/4.85	-	-	151.0/10.25 ft.	161.3/5.85 ft.	168.0

2. METHOD OF OPERATIONS

2.1 TYPES OF EQUIPMENT USED

2.1.1 Drilling Equipment

One Bucyrus-Erie T-7000 drilling rig mounted on a tandem Mack truck was employed for all drilling and coring operations. This rig is powered by a 425 H.P. caterpillar diesel and is fully hydraulic with air over hydraulic controls. It uses compressed air as a circulating fluid which is delivered out of an 825 c.f.m./250 p.s.i. Gardner-Denver compressor. The rig is a top-head hydraulic drive and is mounted with a top-head casing hammer for overburden work. For rock drilling a Mission 5315 downhole percussion hammer is employed.

2.1.2 Coring Equipment

A standard 10 foot long core barrel manufactured by Christiensen Diamond Products Ltd., was used. This barrel has an outside diameter of $5\frac{1}{2}$ inches and cuts P.Q. size core (3 inches in diameter). The inner tube is a split-type stainless steel tube which opens lengthways to allow the core to be retrieved. Insert-type core bits were used. Standard 5 foot long wooden core boxes were used for core storage.

2.2 DRILLING AND CORING OPERATIONS

Drilling and coring operations commenced on each hole with overburden drilling and the setting of metal casing into bedrock. This insures that no loose pebbles or dirt material falls down into the hole from the mantle of glacial till overlying the bedrock. Overburden drilling in Pit 3N is particularly difficult because of the great amount of very hard basaltic and granitic boulders present in the till layer, which averages 25 to 30 feet (7.6 to 9.1 metres) thick over the pit area. While these boulders only average about 2 feet (.6 metres) in diameter, they are numerous and cause the bit to drill a crooked hole. In the Pit 3N area, the casing hammer was used to set the casing. The method used is to drill a slightly smaller hole just below the bottom of the casing with a tricone rock bit. The casing hammer forces the casing down behind the bit as the hole is being drilled. The casing is equipped with a heavy duty drive shoe at the bottom to take the force of the pounding. The drive shoe actually cracks the boulders or pushes them off to the side as the casing is driven down. Care must be taken however, to drill only a few inches below the drive shoe at any one time or the hole will tend to deviate from vertical. Also, so much pressure can be mounted on the casing that the drive shoe can collapse or partially collapse, which may make retrieval of the bit impossible and necessitate the abandonment of the hole.

In pit 1, 2-3 S, where the overburden is usually less than 20 feet, the open-hole method of setting casing is used. A much larger hole (ususally 8 3/4 inch) than the outside diameter of the casing (6 inch) is drilled directly into the bedrock, then the casing is lowered into it. The casing hammer is not needed.

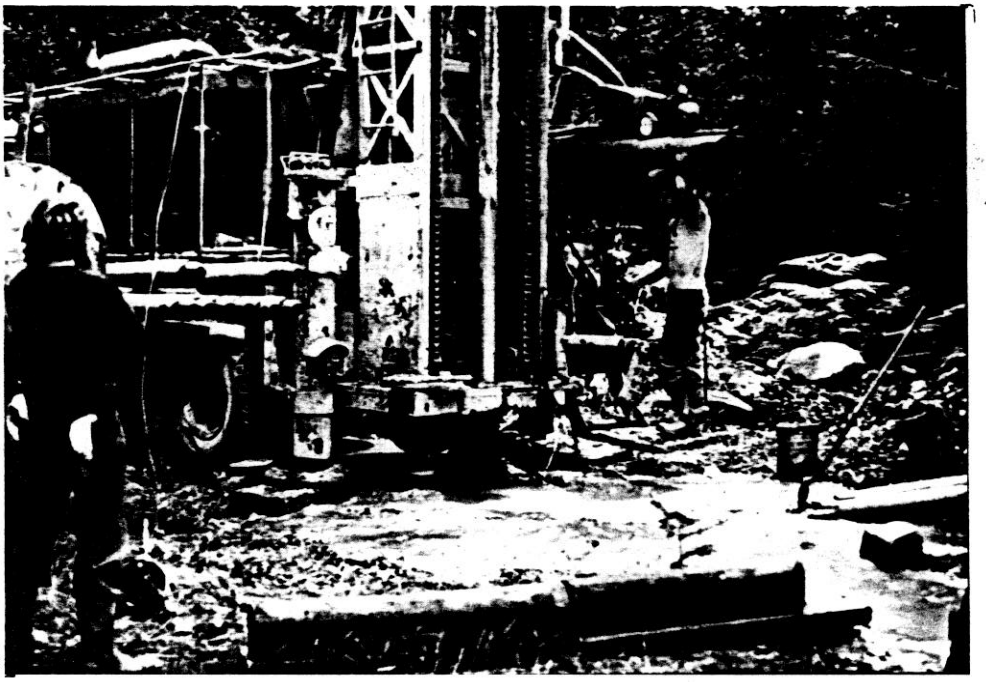


PLATE I: CP-T-7000 Drilling Rig Drilling Through Bedrock to Corepoint, Pit 1, 2-3S.

PLATE I: Chicago-Pneumatic T-7000 Drilling Rig Drilling Through Bedrock to Corepoint, Pit 1,2-3S.

PLATE II: Retrieval of Core Barrel Upon Completion of One 10 Foot Run.

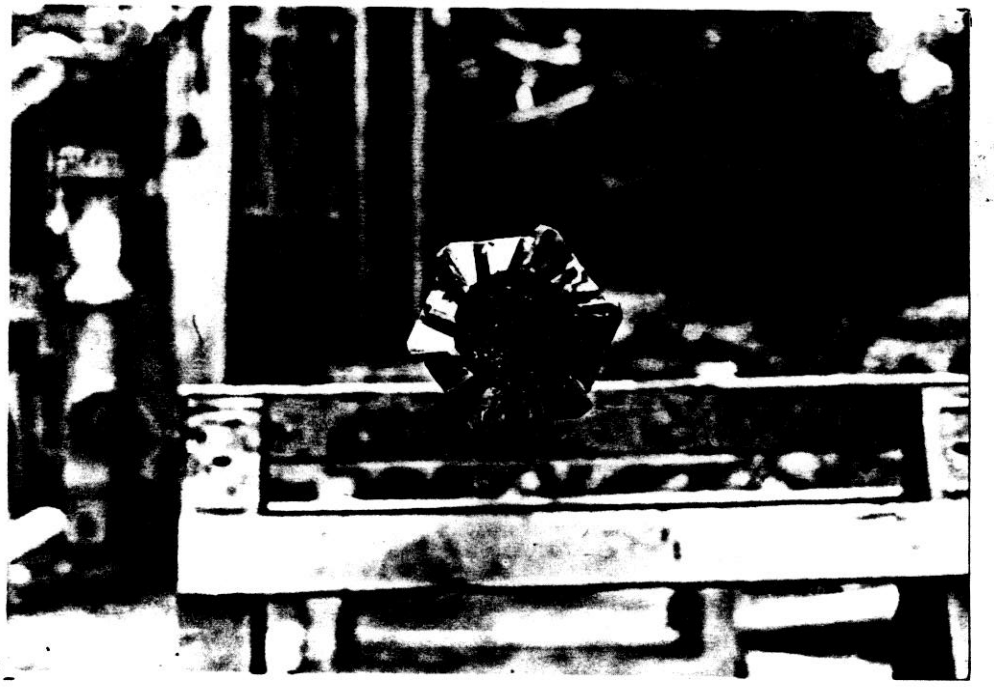


PLATE III: Bottom of Core Assembly Showing Insert-Type Core Bit with Retrieved Core in Center.

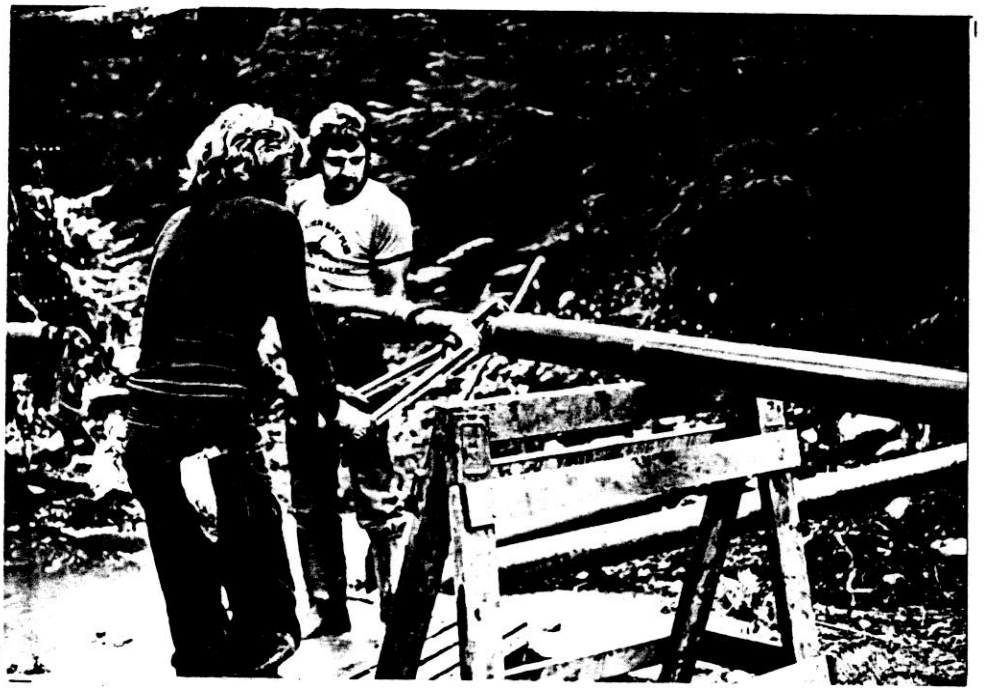


PLATE IV: Breaking Down Core Assembly in Order to Remove Inner Barrel and Core.

PLATE V

PLATE VI

PLATES V and VI: Inner Barrel Removed from Assembly and Split Open for Removal of No. 2 Seam Core.

Once the casing is set, the drill pipe is fitted with the downhole percussion hammer which is driven by compressed air. The compressed air is forced down the inside of the drill rods through the hammer and returns up the outside of the drill pipe bringing with it the rock cuttings. This method of rock drilling is employed until the depth of the first core-point is reached. The drilling tools are then tripped out of the hole and the coring equipment is assembled.

Coring is carried out only through the coal seams and through the immediate roof and floor of the seams which is usually mudstone. Normal insert bits are adequate for this fairly soft material. These bits are equipped with high carbon steel inserts.

Wherever possible, coring is terminated in mudstone or rock bands which are harder than the actual coal. This enables the driller to 'jam' up the barrel, thus ensuring that none of the fractured or loose coal falls out the bottom of the barrell as it is being retrieved.

2.3 SAMPLING METHODS

2.3.1 Drill Cutting Samples

Samples of the drilling cuttings were collected as the rock drilling progressed to core point. Individual samples were taken over intervals of 10 feet in the sandstone formation overlying the No. 2 seam and over intervals of 5 feet in the siltstones and mudstones between the No. 1 seam and No. 2 seam. The samples were placed in plastic bags labelled with the hole number and footage interval and stored in the Brinco trailer at B. C. Forest Products Camp 8.

2.3.2 *Core Samples*

Upon the completion of each core run, the inner tube is opened and the core is measured in order to determine the recovery. The core is then slid out of the barrel into the wooden core boxes, with styrofoam spacers inserted if core losses occurred. The core is then photographed. Detailed measurements of each lithological change and description of rock types, textures etc. are completed.

The coal seams are then sampled according to the following criteria:

(a) Coal: Coal seams are sampled directly on the rock-coal contacts on both the roof and floor of each seam. These intervals include all parting material 1 foot or less in thickness. In some instances where the No. 1 seam is comprised of two separate entities, these entities are sampled individually. This occurs in Pit 3N where upper and lower plies of the No. 1 seam are separated by a major rock band greater than 1 foot in thickness, and in Pit 1, 2-3S where a dirty basal zone of the No. 1 seam occurs.

(b) Partings and Dilution: In-seam partings greater than 1 foot in thickness are sampled individually. Floor dilution samples of a thickness outlined in the 1982 feasibility study (0.30 feet for the No. 1 seam and 0.20 feet for the No. 2 seam) are sampled individually.

If a considerable amount of roof and floor material is present in the core, styrofoam spacers are inserted to represent the coal sample intervals and the box is then capped and stored. If there is only a small amount of roof and floor material, this material is removed from the corebox and stored in a properly labelled sample bag.

3. DURATION OF THE PROGRAM

The 1982 core program was conducted between August 2 and 14, 1982. Prior to August 2, a week of extremely high fire hazard necessitated the postponement of the projected start-up date. Seven coreholes were completed as a result of the program. Table 2 illustrates the footage breakdown:

Hole No.	Overburden Drilling ft. (m.)	Bedrock Drilling ft. (m.)	Coring ft. (m.)	Total ft. (m.)
QU-82-01C	29 (8.8)	78 (23.8)	34.5 (10.5)	141.5 (43.1)
QU-82-02C	18 (5.5)	87 (26.5)	25.0 (7.6)	130.0 (39.6)
QU-82-03C	44 (13.4)	84.5 (25.8)	34.1 (10.4)	162.6 (49.6)
QU-82-04C	5 (1.5)	200 (61.0)	25.0 (9.1)	230.0 (70.1)
QU-82-05C	10 (3.0)	85 (25.9)	30.0 (9.1)	125.0 (38.1)
QU-82-06C	10 (3.0)	30 (9.1)	20.0 (6.1)	60.0 (18.3)
QU-82-07C	20	114.7 (35.0)	33.3 (10.1)	168.0 (51.2)
Totals	**136 (41.3)**	**679.2 (207.1)**	**201.9 (61.4)**	**1017.1 (310)**

Table 2. - Footage Breakdown, 1982 Core Program

4. IMPORTANT ASPECTS OF THE PROGRAM

4.1.1 Cost

At an overall cost of $31.34 per foot, the program was fairly costly but within acceptable limits. Jobs of a short duration are usually more expensive on a per foot basis. Longer jobs provide chances of greater concentration of equipment eg. two or three rigs v.s. one, wider choice of equipment etc.

TABLE 3 - COST SUMMARY

Mobilization:	2,500.00
Site Moves:	1,650.00
Overburden Drilling:	3,762.00
Rock Drilling:	7,513.00
Coring:	5,025.00
Downhole Consumables:	3,180.00
Supervision:	5,400.00
Vehicle Rent:	640.00
Fuel:	197.00
Crew Accomodation:	1,600.00
Field and Sampling Equipment:	403.00
TOTAL	**$31,870.00**

4.1.2 Equipment Application

The Bucyrus-Erie T-7000 is not one of the best rigs for this type of work, but is versatile enough and large enough that coring and drilling work to depths of 1000 feet (300 m.) can be undertaken with confidence. However, the rig performs best in setting casing in glacial overburden and rock, which is what this particular rig is designed for. The rig's biggest drawback is its very slow trip time. This is a function of the top-head hydraulic drive. Most exploration and coring rigs are designed with a rotary break-out table and a cable drum for winching the drill or core pipe out of the hole. this rig has neither and the time spent in tripping pipe is of major consequence in its overall performance.

The conventional core system where the entire core assembly is a fixed part of the drilling string, is acceptable in this case where only small intervals (maximum 30 feet) are to be cored, however the ten foot core barrel is too small for even this type of work. A minimum barrell length of 15 feet would recover the thickest seam (No. 1 Seam) in only one run, rather than the two that the 10 foot barrel has to make.

4.1.3 Core Recovery

In general, core recoveries were acceptable. Recoveries usually averaged greater 95% but in one of the holes only reached 76.6%. This hole was located in the Pits 1, 2-3S areas and the lower recovery can be attributed to physical characteristics of the coal rather than equipment malfunctioning.

4.1.4 Hole Positioning

Existing quality information in the pit areas allowed for proper placement of coreholes with respect to information gain, however the absence of geophysical logging equipment on the program necessitated the positioning of the coreholes close to old drillholes sites where geophysical logs were available in 6 cases out of 7. The only hole where a geophysical log was not available proved to be an unfortunate example of why geophysical logs are both desirable and necessary. This hole (QU-82-04C) showed the poorest core recovery and without a geophysical curve the identification of the type of material lost and the interval of loss occurred is both difficult and questionable.

5. GEOLOGY

In general, the new coreholes did not reveal anything about the geology of the area than was already known!! The stratigraphy and characteristics of the coal seams is well documented as a result of the some 500 holes that have been drilled in the mining area. Complete descriptions of the drilled and cored intervals, and graphic logs are contained in the Appendix. However, a few comments about the physical characteristics of the coal seams and other observations that may be pertinent to the mining plan are in order.

5.1 Pit 3N

The glacial till over the pit area consists of a sandy clay with a considerable amount of hard basaltic or granitic boulders, rounded to sub-rounded in appearance and closely-spaced, especially in the top 3 metres (10 feet). The boulders are usually .3 to 1 metre (1 to 3 feet) in diameter but larger boulders could be encountered. The thickness of this boulder till varies from 0 to greater than 30 metres (100 feet) but in most areas of the pit averages from 6.1 to 9.1 metres (20 to 30 feet).

The sandstone overlying the No. 2 seam appears dark grey and in medium to very fine grained - even to the point of siltstone.

The No. 2 seam is generally characteriezed in Pit 3N by a dirty coal zone at its upper contact .06 metres to .19 metres thick (.20 to .62 feet). A certain amount of this dirty coal material will be lost during mining operations.

The main part of the seam is characterized by a very hard uniform coal section with one or two very thin dirt bands (see graphic log). Pyrite material is quite visible throughout the seam on the cleat surfaces. In addition, occasional solid bands of fine-grained pyrite material up to one-half inch thick can be noted. The bands are lenticular and vary in thickness. They probably do not extend more than a few tens of feet in any direction before they disappear, but new ones higher or lower in the section could then appear. It is probable that most of this banded material could be separated from the coal in the preparation plant during the screening process, but, in order to liberate the pyrite material on the cleat surfaces and on the bedding planes, the coal would have to be ground to a fine fraction.

The No. 2 rider seam, of which only 1 core was taken, appeared dirty over its entire thickness, with thin mudstone laminations throughout. Also calcite and pyrite material was abundantly visible. The pyrite material included lenses and nodules of very fine grained pyrite and a large pyritic band .015 metres thick (.6 inches).

The No. 1 seam consists of bright, hard fairly clean coal in both the upper and lower plies, although in some cases the lower ply, while being thicker can contain several thin mudstone bands. The upper ply usually contains only one thin hard mudstone band. The parting separating the two plies consists of softer, flaggy mudstone in its upper half and hard competent siltstone in its lower part. Sometimes the softer mudstone is not present. Calcite material as veinlets and on cleat surfaces and bedding planes is common in the No. 1 seam.

5.2 Pit 1, 2-3S

The most important observation made in Pit 1, 2-3S is that both seams of coal in this area appear more fractured, softer and lighter in weight. This fact is evident by the poorer recoveries that were experienced here as compared to Pit 3N.

The till layer is minimal in most cases, although hole QU-82-07C encountered 15 to 20 feet of till with some boulders in the section.

The No. 2 seam in Pit 2-3S usually has 2 to 3 mudstone partings, some of which are very soft and crumbly. It is overlain by a massive, hard, coarse to medium grained salt and pepper sandstone, but usually a thin brown mudstone layer .15 metres to 1 metre thick (.5 to 3 feet) forms the immediate roof. Pyrite material in the No. 2 seam is of similar appearance as the No. 2 seam in Pit 3N.

The No. 1 seam while thicker in Pit 1, 2-3S than Pit 3N is inherently dirtier, even in the main part of the seam. The lower basal unit (not present in pit 3N) consists of a sequence of finely interbedded and interlaminated bright coal dull coal and rock material (siltstone or mudstone) which makes it very hard. The amount of coal material present in this basal zone varies with location. In all the holes in Pit 1, 2-3S the main part of the No. 1 seam appeared more fractured and softer than the holes in Pit 3N, as well as lighter in weight. In some cases fracture planes exhibited slickensided surfaces, which indicate some degree of structural stress or movement.

The immediate roof and floor of the No. 1 seam consists of a mudstone which is variable in texture - in some cases these mudstones are quite silty and hard, while in other locations they are soft and flaggy and would rapidly break down when exposed to air and water.

6. BIBLIOGRAPHY

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2. Quinsam Project - Pit 2 North, Appendix III, Sections 72 + 50 to 120 + 00.
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7. Quinsam East, 1978 - Drill Holes and Geophysical Logs of Holes 327 - 353.
8. Geology of the Coal Reserves in the Area of Pit 2 North and Pit 2 North Extension - by R. Ronaghan and S. Gardner.
9. Geology of the Coal Reserves in the Area of Pit 3 North - by R. Ronaghan and S. Gardner.
10. Proposed Pits 1, 2, 3, 4, 5, 6 - by R. Ronaghan and S. Gardner.
11. Geology of the Coal Reserves in the Area of Pit 7 - by R. Ronaghan.
12. Geology of the Coal Reserves in the Area of Quinsam East - by R. Ronaghan.

APPENDIX I

TABLE 4: SAMPLE INVENTORY

TABLE 4: CORE SAMPLE INVENTORY, 1982 CORE PROGRAM

COREHOLE	SAMPLE No.	SAMPLE THICKNESS ft.	(m.)	SEAM THICKNESS ft.	(m.)	SAMPLE DESCRIPTION
QU-82-01C	1	2.45	(.75 m.)	2.47	(.75 m.)	Seam No. 2
"	2	0.20	(.06 m.)			Seam No. 2 - Floor Dilution
"	3	1.60	(.49 m.)	1.62	(.49 m.)	Seam No. 2 Rider
"	4	0.20	(.06 m.)			No. 2 Rider - Floor Dilution
"	5	11.15	(3.40 m.)	11.26	(3.43 m.)	Seam No. 1
"	6	0.30	(.09 m.)			Seam No. 1 - Floor Dilution
QU-82-02C	1	3.55	(1.08 m.)	3.56	(1.09 m.)	Seam No. 2
"	2	0.20	(.06 m.)			Seam No. 2 - Floor Dilution
"	3	11.90	(3.63 m.)	12.05	(3.67 m.)	Seam No. 1
"	4	0.30	(.09 m.)			Seam No. 1 - Floor Dilution
QU-82-03C	1	3.625	(1.10 m.)	3.625	(1.10 m.)	Seam No. 2
"	2	0.20	(.06 m.)			Seam No. 2 - Floor Dilution
"	3	4.80	(1.46 m.)	4.80	(1.46 m.)	Seam No. 1 - Top Ply
"	4	0.30	(.09 m.)	0.30	(.09 m.)	Top Ply - Floor Dilution
"	5	0.90	(.27 m.)	0.90	(.27 m.)	Seam No. 1 - Middle Parting
"	6	6.45	(1.97 m.)	6.67	(2.03 m.)	Seam No. 1 - Bottom Ply
"	7	0.30	(.09 m.)			Bottom Ply - Floor Dilution
QU-82-04C	1	3.90	(1.19 m.)	4.10	(1.20 m.)	Seam No. 2
"	2	0.20	(.06 m.)			Seam No. 2 - Floor Dilution
"	3	7.55	(2.30 m.)	9.32	(2.84 m.)	Seam No. 1
"	4	0.30	(.09 m.)			Seam No. 1 - Floor Dilution
QU-82-05C	1	3.80	(1.16 m.)	3.95	(1.20 m.)	Seam No. 2
"	2	0.20	(.06 m.)			Seam No. 2 - Floor Dilution
"	3	8.80	(2.68 m.)	9.39	(2.86 m.)	Seam No. 1 - Main Unit
"	4	5.05	(1.54 m.)	5.05	(1.54 m.)	Seam No. 1 - Basal Unit
"	5	0.30	(.09 m.)			Seam No. 1 - Floor Dilution

TABLE 4 (cont'd.) CORE SAMPLE INVENTORY, 1982 CORE PROGRAM

COREHOLE	SAMPLE No.	SAMPLE THICKNESS ft.	(m.)	SEAM THICKNESS ft.	(m.)	SAMPLE DESCRIPTION
QU-82-06C	1	14.40	(4.39 m.)	15.32	(4.67 m.)	Seam No. 1
"	2	0.30	(.09 m.)			Seam No. 1 - Floor Dilution
QU-82-07C	1	4.85	(1.48 m.)	4.87	(1.49 m.)	Seam No. 2
"	2	0.20	(.06 m.)			Seam No. 2 - Floor Dilution
"	3	10.25	(3.12 m.)	10.28	(3.13 m.)	Seam No. 1 Main Unit
"	4	5.85	(1.78 m.)	5.85	(1.78 m.)	Seam No. 1 - Basal Unit
"	5	0.30	(.09 m.)			Seam No. 1 - Floor Dilution

APPENDIX II

COREHOLE LOGS AND DESCRIPTIONS

QUINSAM COAL LIMITED

COREHOLE LOG

metric period in

HOLE NUMBER: QU-82-01c

PAGE 1 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	49.0	58.8	9.8				
	14.9	17.9	3.0	0.90		SANDSTONE: Medium to fine grained; dark grey; abundant silty mudstone bands throughout; massive; many large light grey coarser grained sandstone clasts; large pyritic nodule 1 cm. in diameter.	
				0.27			
				0.10		COAL: in thin bands and mixed with bands of grey sandstone; 50% coaly	
				0.03			
				0.10		MUDSTONE: Medium brown; clayey texture; hard but would disintegrate upon	
				0.03		exposure to air and water.	
				0.70		COAL: Hard; massive and unbroken; clean, but has some very thin mudstone	
						laminae near top; blocky and bright;	
						abundant pyrite on cleat surfaces;	
				0.05		MUDSTONE: As above	
				0.02 1.25		COAL: clean, bright and blocky;	
				0.38		hard and massive; abundant	
						visible pyrite on cleats;	
				0.05		MUDSTONE: As above	
				0.02 0.20		COAL: As above but slightly dirtier	
				0.06 0.25		BONE COAL: Harder; dark brown to black;	
						abundant shale or mudstone material as	
						fine laminae throughout.	
				0.53		MUDSTONE: Dark brown to grey;	
				0.08		carbonaceous with thin bands of coal	
						throughout; 20% coaly material; less	
						carbonaceous near base.	
				5.60	9.7	SILTSTONE: Medium grey; hard but fractured	
				1.71	3.0	some flaggy sections; thin coal stringers throughout	
	TOTALS				9.7	÷ 9.8 NR x 100 = 99 % REC. No. 2 SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

SAMPLE No. 1 No. 2 Seam SAMPLE THICKNESS 2.45 ft. 0.75

0.20 .06 SAMPLE No. 2 FLOOR DILUTION

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-0

PAGE 2 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
2	58.8	68.8	10.0				
	17.92	20.97	3.05	1.20		SILTSTONE: Medium to dark grey; variable	
				2.19		composition: sandy & muddy sections;	
						cross-bedding and load casts evident;	
						small brachiopod shells throughout;	
						abundant thin coal bands near base	
				.45		COAL: Dark brown to black; abundant	
				0.14		mudstone material throughout; 50% coaly	
				1.15		COAL: No. 2 Rider Seam; dirty and	
				0.35		bony throughout; hard; abundant	
						calcite; pyritic material in lenses	
						and nodules (fine-grained) — at base	
						a large pyrite band up to .05 ft. thick	
				.15		SILTSTONE: Medium grey; hard; small	
				1.09		amount of coaly material.	
				.35		MUDSTONE: Medium to dark brown	
				0.11		carbonaceous — abundant thin coal	
						laminae throughout.	
				.55		SILTSTONE: Medium to dark grey; thin	
				0.17	9.85	coal bands near top; hard and unbroken;	
3	127.0	135.5	8.5		7.00		
	38.7	41.3	2.59	1.30		MUDSTONE: Dark greenish grey; hard but	
				1.10		with thin flaggy sections near base;	
						slightly fissile	
				2.10		COAL: Hard; clean and bright;	
				0.64		one major fracture at 45° to core axis	
						filled with calcite; other minor calcite	
						veining throughout.	
				.10		MUDSTONE: Dark brown; hard; clayey	
				3.15		COAL: Hard; clean, bright and blocky.	
	TOTALS			0.96		7.25 ÷ 10.0 x 100 = 98.5 % REC. No. 2 RIDER SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

Sample No. 3 — No. 2 RIDER SEAM — SAMPLE THICKNESS 1.60 ft. — 0.49

Sample No 4 — 0.20 — FLOOR DILUTION — .00

Sample No. 5 — No. 1 SEAM — SAMPLE THICKNESS 11.15 — 35

LUNSAR COAL LIMITED

COREHOLE LOG

HOLE NUMBER LU-82-01c

PAGE 3 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						minor calcite.	
				.20		SILTSTONE: Medium brown; hard; some thin coal bands throughout; milled by core action on upper contact — small amount of core lost here.	
				1.55	8.40	COAL: As above	
4	135.5	141.5		[illegible]	2.96		
	41.3	[illegible]		1.00		COAL: Hard; bright and blocky; clean; unbroken; abundant calcite	
				[illegible]			
				.05		MUDSTONE: Black; very hard; carbonaceous	
				[illegible]			
				2.40		COAL: As above; massive; hard; clean; some calcite and amber visible.	
				[illegible]			
				.60		COAL: Softer; dirtier, with small mudstone laminae; platy.	
				[illegible]			
				1.90	5.95	MUDSTONE: Medium brownish grey; soft; incompetent and broken; easily erodable; slightly carbonaceous near top.	
				[illegible]	1.81		
	TOTALS					3.40 ÷ 3.50 x 100 = 99 % REC. No. 1 SEAM	
						5.95 ÷ 6.0 x 100 = 99 % TOTAL REC. No. 1 SEAM(S)	

Sample No. 5 No. 1 SEAM

Sample No. 6 2.30 m POOR DILUTION

LUNSPAN COAL LIMITED

COREHOLE LOG

HOLE NUMBER: au-82-02c

PAGE 1 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	33.7	43.7	10.0				
	3.3	13.3	3.05	.30		COAL: Dull with bright sections; hard; abundant thin bony laminae throughout blebs of pyritic material.	
				.09			
				.05		SILTSTONE: Medium to dark grey; lenticular carbonaceous mudstone throughout.	
				.02			
				.25		COAL: Bright and blocky; hard; abundant lenticular clasts of siltstone up to .5cm. thick.	
				.09			
				2.45		COAL: Bright and blocky; hard; massive; very thin mudstone laminae at top; abundant pyritic material throughout, especially on cleat surfaces; bony section at base.	
				.15			
				.05		MUDSTONE: Medium brown; some low angle fracturing filled with coal stringers; high clay content but hard.	
				.35		COAL: Slightly dirty at top; abundant pyrite material on cleat surfaces in bottom half; hard; blocky	
				.11			
				.90		MUDSTONE: Dark brown to grey; highly carbonaceous near top, grading to only slightly carbonaceous in middle; bottom section slightly soft and flaggy, remainder hard; thin coal laminae throughout.	
				.27			
				.30		LOST CORE	
				.09 1.50		MUDSTONE: Medium brownish grey;	
				.46		fairly hard; some coal bands throughout	
	TOTALS					÷ x 100 = % REC. SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

Sample 1 No. (No. 2 SEAM) SAMPLE THICKNESS: 3.55 1.02

Sample 2 No. (0.90 m.) FLOOR DILUTION .06

QUINSAM
COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-92-02C
PAGE 2 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						especially at base; thick bands of pyritic material up to 1.5 cm. near base.	
				3.70	9.95	SILTSTONE: Medium grey; hard and unbroken; pyrite blebs and coal stringers near top; sandy in upper section - fining downward.	
				1.13	.03		
2	115.0	123.0	8.0				
	36.05	37.5	[illegible]	1.70		COAL: Clean bright and blocky; light; no visible pyrite; some calcite	
				[illegible]			
				.15		MUDSTONE: Medium brown; thin black carbonaceous laminae throughout.	
				.15			
				3.20		COAL: As above; with one major high angle fracture; .15 ft. bony band near base.	
				[illegible]			
				.30		MUDSTONE: Black to medium brown; highly carbonaceous at top - decreasing towards base; soft and flaggy.	
				[illegible]			
				.40		MUDSTONE: Dark greenish grey; silty; harder; more competent; thin black coaly streaks near base	
				[illegible]			
				1.10	7.85	COAL: As above.	
3	123.0	130.0	7.0	[illegible]	[illegible]		
	37.49	39.62	2.13	3.15		COAL: As above; hard; clean but some thin dirty bands near top; calcite veining evident.	
				[illegible]			
				.15		MUDSTONE: Dark brown to black; silty; carbonaceous.	
				.05			
				.15		COAL: Hard; blocky, fairly clean	
				.10 [illegible]		COAL AND MUDSTONE BANDS: 50% coaly	
	TOTALS			[illegible]		9.95 ÷ 10.0 x 100 = 99.5 % REC. No. 2 SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

Sample No. 3 (No. 2 SEAM) SAMPLE THICKNESS: 11.90' 3.63

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER QU-82-02C

PAGE 3 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
				.50		COAL : As above	
				.15			
				.30		MUDSTONE : Greenish grey ; silty ; hard ;	
				.09		plant impregnations and thin coaly	
						wisps throughout.	
				.20		MUDSTONE : Medium grey ; soft ;	
				.16		clayey ; wet ; pliable.	
				1.10		MUDSTONE : Medium to dark brown ;	
				.33		slightly carbonaceous ; becoming more	
						carbonaceous at base ; hard ; competent.	
				1.30	6.95	SILTSTONE : Medium grey ; sandy in	
				.40	2.12	places ; some calcareous shell	
						fragments ; smoothed fracture	
						surfaces evident.	

TOTALS			14.90 ÷ 15.0 x 100 = 98.7 % REC. No. 1 SEAM
			÷ x 100 = % TOTAL REC. SEAM(S)

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Q4-82-03c
PAGE 1 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	59.0	68.5	9.50				
	18.0	20.9	2.90	4.35		SILTSTONE : Dark greenish grey ; some fine sandy sections ; massive and fairly hard ; coaly wisps in bottom 1.5 ft. increasingly evident towards base	
				1.33			
				.20		SILTSTONE : Dark greenish grey ; bands of clean coal up to .05 ft thick ; ~40% coal in composition	
				.07			
				.50		COAL : Hard with thin bands of siltstone visible finely disseminated pyrite in thin laminae . 80% coal .	
				.15			
				1.30		COAL : Massive ; hard ; fairly clean but with silty clasts and thin silty and pyritic bands ; also blobs of fine grained pyritic material	
				.100			
SAMPLE No. 1 (No. 2 SEAM) SAMPLE THICKNESS 3.625 ft.							
1.10				.015		MUDSTONE : Carbonaceous ; dark brown ; hard ; very coaly ;	
				.12			
				1.10		COAL : Massive and unbroken ; hard ; clean ; pyrite blebs up to .5cm. in diameter ; visible pyrite is both fine grained and coarse granular .	
				.23			
				.15		MUDSTONE : Light brown to grey ; soft, wet and pliable ; high clay content .	
				.05			
				.50	.15	COAL : As above but slightly softer	
SAMPLE No. 2 (NO. 2 SEAM) SAMPLE THICKNESS 2.20 ft.				1.45	9.675	MUDSTONE : Dark brown ; fairly soft ; some fissility ; small percentage of coal material in thin bands .	68.5
.06				.06	2.93		
	TOTALS						

1.625 ÷ 9.50 x 100 = 101 % REC. No. 2 SEAM

÷ x 100 = % TOTAL REC. SEAM(S)

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-03c

PAGE 2 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
2	133.0	145.1	7.1				
	42.[illegible]	44.[illegible]	2.1[illegible]	.45		SILTSTONE: Dark grey; hard; lenticular plant fragments throughout.	
				.10		COAL: Hard with bony bands throughout; ripple marks on base of contact - displaced plant material.	
				2.50		SILTSTONE: Dark grey; hard and massive; plant impregnations and coaly bands at base	
				1.00		SILTSTONE: Carbonaceous; dark brown to black; coal bands throughout; 30% coaly material.	
				.30			
				.30		SILTSTONE: Medium grey; hard; small amount of coaly material present.	
				1.10		SILTSTONE: Dark grey to brown; abundant coaly material throughout but decreasing near base.	
				1.70	7.15	SILTSTONE: Medium grey; hard; coaly wisps at top.	145.1
3	145.1	153.6	8.5				
	44.23	46.82	2.5	1.50		MUDSTONE: Medium to dark grey; hard; massive; coal clasts near base; plant fragments throughout.	
				.40		MUDSTONE: Dark grey to black; abundant coaly material especially at base; silty	
				.30		SILTSTONE: Dark grey to black; sandy texture near base; carbonaceous throughout	
				4.30		COAL: Hard; massive; clean; visible calcite; no visible pyrite;	
	TOTALS					÷ x 100 = % REC. SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

sample no 3 seam (HW) sample thickness 4.30 ft. 1.46

QUINSAM
COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-82-03
PAGE 3 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						some thin bone coal layers near base	
				.40		MUDSTONE: Medium brown; softer;	
				.15		slightly fissile; some coaly material.	
				.30	8.20	SILTSTONE: Medium grey; hard;	
				.90	.90	slightly muddy	153.6
4	153.6	162.6	9.0				
	153.6	155.6		2.00		COAL: Hard; massive; clean; unbroken;	
						abundant calcite material	
				.05		MUDSTONE: Black; carbonaceous; shaly	
				.75		COAL: As above; some visible pyrite	
				.22		material; abundant calcite	
				.15		MUDSTONE: Medium brown; carbonaceous;	
				.40		hard but probably breaks down with	
						moisture.	
				.55		COAL: As above but with thin mudstone	
				.17		laminae near base.	
				.15		MUDSTONE: As above but with slightly	
				.15		less coaly material.	
				1.85		COAL: Hard; massive; clean; but	
				.56		has a slightly honey texture in some	
						sections; abundant calcite material near	
						base (veins and blebs).	
				.10		MUDSTONE: Medium brown; only slightly	
				.13		carbonaceous; hard but slippery when	
						wetted.	
				.85		COAL: As above; abundant calcite;	
				.26		very blocky at base.	
				.15		MUDSTONE; Dark grey to black; highly	
				.04		carbonaceous; some fissility.	
				.20		MUDSTONE: Light greenish grey; high clay	
	TOTALS			.00		16.9 ÷ 17.5 x 100 = 96.6 % REC. No. 1 SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

09
3 ft. Dilution (Sample No. 4)
.1 Ft. In-seam parting (Sample No. 5)
.39

Sample No. 6 No. 1 Seam Bottom Plg 2.4 ft. 1.9"

3 ft. Dilution (Sample No. 7)

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-82-03

PAGE 4 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						content and will break down when exposed	
						to air and moisture.	
				.60		MUDSTONE: Medium brown; numerous	
				.10		thin coaly bands and abundant	
						plant impregnations.	
				1.30	5.10	SILTSTONE: Medium grey; muddy	
				.40	5.5	texture; fairly uniform with	
						abundant plant impregnations.	
TOTALS						÷ x 100 = % REC.	SEAM
						÷ x 100 = % TOTAL REC.	SEAM(S)

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-92-04c

PAGE 1 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	166.0	176.0	10.0				
	55.5	58.5	3.05	1.00		MUDSTONE: Dark greenish gray; fairly soft; easily crushed and broken; several high angle joint planes evident with slickensided surfaces; thin coal laminae throughout.	
				0.35			
				.40		COAL: Bright and dull banded with interbeds of mudstone; some blocky sections; pyrite and amber material evident.	
				1.05		COAL: Fairly clean but with thin mudstone and silty laminae near top; extremely light with both blocky and platy fracture; broken.	
				.25			
				.10		PYRITIC MATERIAL: very fine grained pyrite in a silty matrix deposited in a lenticular band; coaly.	
				.03			
				.10		MUDSTONE: Black; very soft and crumbly; highly carbonaceous.	
				.03			
				.90		COAL: As above; with high angle fracture planes; slickensided surfaces on these fractures indicate movement within the coal.	
				.27			
				.05		MUDSTONE: Black; soft; fissile; highly carbonaceous;	
				.02			
				1.30		COAL: As above; slightly harder; bottom .10 ft. dirty and bone.	
				.10			
				.20		MUDSTONE: Dark brown to medium brown; carbonaceous with hard and soft layers.	
				.06			
				.60		MUDSTONE: Medium brown; silty; very	
	TOTALS			15		÷ x 100 = % REC. SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

Sample No. 1 SEAM No. 2 SAMPLE THICKNESS: 3.90 ft. 1.19

Quinsam COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-04c

PAGE 2 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						hard; some bands of clean coal.	
				.20		MUDSTONE: Medium to dark grey; mixed	
				.06		with coal; Coal is mostly of bright	
						and dull banded variety but some	
						thin clean bands present; abundant	
						large pyrite blebs in mudstone;	
						abundant pyrite in coal on cleat	
						surfaces.	
				3.00	9.5	SILTSTONE: Dark greenish grey;	
				.91	5.00	thin coaly wisps and plant	
						impregnations throughout; fairly	
						competent;	
2	215.0	225	10.0				
	69.9	68.5	3.15	2.30		SILTSTONE: Dark greyish brown; muddy	
				.70		texture but hard and competent.	
						Light to medium brown bands throughout	
						abundant pyrite stringers near base	
						and on 1/2 sec contact	
				4.35		COAL: Fairly clean but with some	
				.33		thin shaly sections; light; badly	
						broken and fractured; soft; Water	
						Small amount of visible pyrite.	
				.85		COAL: Black to dark brown; very	
				.26		dirty and brown; bright and dull	
						banded; 20-30% dirt material	
				.40	1.9	COAL: Completely crushed and	
				.12	3.4	powdered in core tube; some	
						mudstone material mixed in.	
				2.10		LOST CORE	
3	225.0	230.0	5.0	.64			
	68.58	70.10	1.52	.60		COAL: Very hard; dirty with abundant	
	TOTALS			.18		÷ x 100 = % REC.	SEAM
				9.5		9.5 ÷ 10.0 x 100 = 95 % TOTAL REC.	No. 2 SEAM(S)

0.20 Sample #2 Section .06

SAMPLE No. 3 (No. 1 SEAM) SAMPLE THICKNESS 7.55 ft 23

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-04c

PAGE 3 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						sandstone material; visible pyrite on cleats; 80% coaly;	
				.35		COAL: Soft and badly broken; dirty	
				1.00		COAL: Hard but fractured; pyrite on cleats; bright and dull banded sections;	
				.30		dirty	
				2.85	4.90	MUDSTONE: Dark brown to black;	
				.57	1.46	highly carbonaceous; very hard but	
						some minor flaggy sections; minor	
						thin bright and dull banded coaly	
						sections throughout;	
TOTALS						7.55 ÷ 9.85 x 100 = 76.6 % REC. No. 1 SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

SAMPLE No. 4 0.30 ft. FOR DILUTION

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-82-05

PAGE 1 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	59	69	10.0				
	17.98	21.03	3.05	.45		COAL: Slight capping of shaly mudstone as M. on top; bright and blocky; clean but abundant pyrite on cleats	
				.10		PYRITE: Solid pyrite band in a silty matrix; coaly;	
				.03			
				1.45		COAL: As above; with some fracturing; fairly clean but some very thin mudstone bands visible; abundant pyrite on cleats	
				.10			
				.15		MUDSTONE: Dark grey; soft and crumbly; fissile; slightly carbonaceous	
				.10			
				.60		COAL: As above; hard and unbroken	
				.15/.05		PYRITE: Pyritic material in a solid lenticular band.	
				.02			
				.25		COAL: As above; large pyrite blebs visible; hard; unbroken	
				.26			
				.05		MUDSTONE: Medium brown; fairly soft and flaggy	
				.12			
				.10		COAL: Fairly soft and broken	
				5.83	9.6	SILTY MUDSTONE: Medium to dark brown at top; grading to medium greenish grey; coally stringers and large pyritic blebs in top half; bottom half contains lenses of sandstone light greenish grey in colour;	
				1.77	2.93		
	TOTALS				9.6	÷ 10.0 x 100 = 96.0 % REC. No. 2 SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

SAMPLE No. 1
SEAM No. 2
SAMPLE THICKNESS 3.80 ft.

SAMPLE No. 2
9.20 ft.
FLOOR DILUTION

QUINSAM
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COREHOLE LOG

HOLE NUMBER: Qu-82-05c
PAGE 2 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
2	105	115	10.0				
	32	35	3.05	.35		MUDSTONE: Medium to dark grey;	
				.11		slightly carbonaceous; hard	
				.12		COAL 1: Blocky but broken;	
				.03		shaly mudstone pieces in section	
						LOST CORE?	
				.15		COAL: Hard; bonny; dirty with	
				.05		visible pyrite.	
				2.14		COAL: Massive; bright and	
				.11		blocky but with some thin	
						mudstone and pyritic laminae	
						throughout; also pyrite on	
						cleat surfaces; calcite evident	
				.90		COAL: Softer and broken; clean;	
				.27		light; bright and blocky; iron	
						staining on cleats; large	
						high angle fracture through	
						middle: LOST CORE?!	
				3.25		COAL: More competent but abundant	
				.11		high angle fractures throughout;	
						abundant pyrite material on cleats;	
				.10		BONE COAL: Dirty; fractured;	
				.03		abundant pyrite material throughout;	
				1.00		COAL: Massive; bright and blocky	
				.13		with some minor dirty zones;	
						abundant calcite on cleats; dirtier	
						near base.	
				.20		MUDSTONE: Medium brown; very	
				.01		hard; carbonaceous	
TOTALS						÷ x 100 = % REC. SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

SAMPLE No. 3
No. 1 SEAM
MAIN PART
SAMPLE
THICKNESS = 8.80M.

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-82-05c

PAGE 3 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
				.60	2.75	COAL: Hard; clean; massive; bright and blocky with abundant calcite and pyrite;	
				.9			
3	115	125	10.0				
	35.05	35.1	3.05	.40		COAL: Hard; clean; bright and blocky; abundant pyrite	
				.3			
				.30		MUDSTONE: Dark brown; very hard; abundant thin bright coal laminae throughout; 30% coal	
				.3			
				.15		COAL: Clean; bright and blocky; abundant calcite on cleats	
				.3			
				1.95		MUDSTONE: Dark brown to black; very hard; highly carbonaceous with thin platy coal laminae throughout; 50% coal	
				.5			
				.10		COAL: Clean; bright and blocky;	
				.03		some pyritic material	
				.95		COAL: Bright and dull banded coal sections with a large percentage of mudstone material throughout; very hard	
				.20			
				.10		COAL: Clean; bright and blocky; light	
				.25 .40		COAL: Bright and dull banded; high	
				.12		percentage of mudstone material	
				.15		COAL: Clean; bright and blocky	
				1.05 1.15		COAL: Bright and dull banded with	
				.35		some fairly clean sections but generally a high percentage of mudstone material	
				1.70		MUDSTONE: Medium to dark brown;	
				.15		very hard; abundant very thin coal bands	
	TOTALS			÷ 0	x 100 =	% REC.	SEAM
				÷	x 100 =	% TOTAL REC.	SEAM(S)

SAMPLE No.4 No. 2 SEAM (BASAL UNIT) SAMPLE THICKNESS: 5.05'

SAMPLE No.5 2.3± ft. [illegible]

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-05c

PAGE 4 OF 4

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						throughout; 20% coal.	
				.80		MUDSTONE: Light brownish grey;	
				.24		high silt content; very hard.	
				.45		MUDSTONE: Dark brown; carbonaceous	
				1.50	1.90	CONGLOMERATE: Light brownish grey with	
				.46	1.49	large green clasts; very fine sandy	
						matrix; clasts are angular to	
						sub-rounded - basal conglomerate member.	
	TOTALS					19.65 ÷ 20.0 x 100 = 93.3 % REC. No. 1 SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-82-06c

PAGE 1 OF 2

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	40	50	10.0				
	12'9	15.8	3.02	1.55		COAL: Clean; light; bright and blocky;	
				.47		abundant pyrite on cleat surfaces	
				.20		COAL: Rocky; dirty; abundant	
				.06		mudstone material and some silty	
						bands.	
				4.95		COAL: Clean and bright; blocky;	
				.51		competent and reasonably hard;	
						abundant calcite on cleats, especially	
						near base; one fracture at 45°	
						to core axis near base - fracture	
						surfaces are smooth and slickensided.	
				.20		COAL: Very soft and crushed;	
				.06		some dirt material within	
				2.00		COAL: Clean; bright and blocky;	
				.61		abundant calcite and some pyrite	
						visible; minor bony lenses near	
						base;	
				.05		COAL: Soft; crushed and powdery;	
				.02		dirty.	
				.20		MUDSTONE: Dark brown to black;	
				.06		hard; highly carbonaceous (75% coaly)	
				.65	7.30	COAL: Fairly clean; bright and	
				.20	3.0	blocky but minor dirt inclusions;	
						light, broken	
2	50	60	10.0				
	15.20	18.29	3.05	2.25		COAL: Bright and blocky; clean but with	
				.09		minor thin dirty coal bands; abundant	
						calcite on cleats; some fracturing	
				.15		COAL: Soft; crushed and powdery;	
	TOTALS			.05		÷ x 100 = % REC. SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

(No. 1 SEAM)
SAMPLE THICKNESS: 14.45' 4.4

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-06c

PAGE 2 OF 2

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						disintegrated in core barrell.	
				1.00		LOST CORE	
				1.83		COAL: Clean; bright and blocky; calcite	
				.50		veining and calcite on cleats; some	
						visible pyrite on cleats; fracture at 45°	
						to core axis on upper contact; other	
						minor fractures throughout.	
				.25		COAL: Fairly clean but badly broken	
				.08		and crushed;	
				.30		COAL: Clean, bright and blocky but	
				.09		some minor dirty bands.	
				.40		MUDSTONE: Light to medium grey;	
				.12		soft and badly crushed; slickensided	
						fracture surfaces	
				.25		LOST CORE	
				.30		MUDSTONE: Dark brown to grey; harder	
				.09		and more competent; carbonaceous	
				2.30		MUDSTONE: Medium brown to grey; hard	
				0.7		and unbroken; silty clasts throughout;	
						coaly wisps and plant fragments also	
				.25		COAL: Fairly clean; platy fracture;	
				0.06		bright but some dull sections	
				.10		MUDSTONE: Medium brown; slightly	
				.03		carbonaceous	
				.80	9.0	COAL: Slightly dirty but some	
				.24	2.14	bright sections; 20% mudstone	
	TOTALS			19.55 ÷ 20 x 100 = 92.8 % REC. No. 1 SEAM			
				÷ x 100 = % TOTAL REC. SEAM(S)			

SAMPLE No. 2 FLOOR DILUTION 0.30 ft.

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-07c

PAGE 1 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
1	75	84.3	6.30	6.30		SANDSTONE: Medium grey; coarse grained; salt and pepper appearance; hard and abrasive	
	23.77	25.169	1.92	1.92			
2	84.3	94.3	10.00	2.00		MUDSTONE: Dark grey; hard; competent; light greenish grey 1.0 siltstone clasts throughout	
	25.70	28.N	3.05	.61			
				.55		MUDSTONE: As above only abundant bands of clean coal throughout;	
				.17		pyritic material near base.	
				1.30		COAL: Clean; hard; bright and blocky;	
				.40		abundant large lenses of pyritic material; pyrite on cleat surfaces also;	
				.10		MUDSTONE: Medium brown to black;	
				.03		highly carbonaceous;	
				1.05		COAL: As above; abundant	
				.32		pyritic lenses and calcite veining;	
				.10		MUDSTONE: Soft; flaggy; medium	
				.03		to dark brown; slightly carbonaceous	
				.80		COAL: As above	
				.24			
				.20		COAL: Dirty with some clean sections;	
				.06		abundant mudstone material in bands	
						up to .05 ft. thick.	
				.60		COAL: Clean bright and blocky;	
				.18		hard; some thin pyritic lenses.	
				.10		MUDSTONE: Medium to light brown;	
				.03		fairly soft and flaggy; easily crushed;	
				.10		COAL: As above	
				.13		MUDSTONE: Medium brown; hard; carbonaceous	
				.35		COAL: Slightly dirty but blocky; some	
				.05		mudstone material; abundant pyrite.	
	TOTALS			÷	x 100 =	% REC.	SEAM
				÷	x 100 =	% TOTAL REC.	SEAM(S)

SAMPLE No. 1 (NO. 2 SEAM) SAMPLE THICKNESS (4.85 ft.)

QUINSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: Qu-82-07c

PAGE 2 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
				.10		MUDSTONE: Dark brown; hard; carbonaceous	
				.03 2.45	9.95	MUDSTONE: Dark grey; coaly lenses at	
				.76	3.33	top with abundant pyrite material;	
						thin pyrite bands evident throughout.	
3	151.0	161.1	10.10				
	46.0	49.10	3.06	1.75		COAL: Hard; clean; bright and blocky;	
				.53		some thin silty pyritic bands; small	
						amount of pyrite material on cleats.	
				.15		MUDSTONE: Medium brown; soft; flaggy	
				.05 .20		MUDSTONE: Dark brown; harder but	
				.06		fractured; carbonaceous with dull	
						and bright banded coal material.	
				.10		COAL: Bright and blocky; clean	
				.03 .20		MUDSTONE: Dark brown; very hard;	
				.06		carbonaceous	
				4.30		COAL: Hard; clean; bright and blocky;	
				.31		abundant calcite as veins and on	
						cleat surfaces;	
				.15		MUDSTONE: Black; extremely soft;	
				.05		pliable; carbonaceous;	
				.10		COAL: Soft; powdery and crushed.	
				.03 3.10	10.05	COAL: Hard; clean but some thin	
				.94	3.06	bony sections near top; bright and	
						blocky; abundant calcite.	
4	161.1	168.0	6.90				
	49.1	51.2	2.10	.20		COAL: Hard; clean; bright and blocky;	
				.06		calcite on cleats	
				.10		MUDSTONE: Very hard; dark grey; coaly	
				.05		laminae throughout;	
				1.15	.35	COAL: Hard; generally clean but	
	TOTALS					÷ x 100 = % REC. SEAM	
						÷ x 100 = % TOTAL REC. SEAM(S)	

SAMPLE No.2
0.20 FL
FLOOR DILUTION
.06

SAMPLE No.3
SEAM No.1
(MAIN PART)
SAMPLE
THICKNESS: 10.25'
3.12

GUNSAM COAL LIMITED

COREHOLE LOG

HOLE NUMBER: QU-82-07c

PAGE: 3 OF 3

CORE No.	CORE FOOTAGES DRILLED FROM	TO	TOTAL	RECOVERED SECTION	TOTAL	GEOLOGICAL DESCRIPTION (LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.)	TRUE DEPTH
						bright and dull banded minor sections; predominently bright and blocky.	
				1.30		COAL: Very hard; abundant rock material throughout; mostly dull with	
				.39		some bright bands; increasing bright	
						coal bands towards base;	
				.50		COAL: Clean; hard; bright and blocky.	
				2.80 (15)		COAL: Dull with some bright bands; (85)	
				.85		very hard; abundant silty mudstone	
						material throughout; 50% coal.	
				.30		MUDSTONE: Dark brown; very hard;	
				.09		carbonaceous with thin bright coal	
						laminae throughout; clean coal band	
						at base .05 ft. thick.	
				.55	6.90	MUDSTONE: Medium to dark grey;	
				.17	2.1	very hard; silty; massive;	

SAMPLE No. 4 (No. 2 SEAM BASAL ZONE) SAMPLE THICKNESS: 5.35 ft. 163

SAMPLE No. 5 0.30 ft. FLOOR [illegible]TION .09

TOTALS					
				9.95 ÷ 10.0 x 100 = 99.5 % REC. No. 2	SEAM
				16.95 ÷ 17.0 x 100 = 99.7 % TOTAL REC. No. 1	SEAM(S)

APPENDIX III

GRAPHIC LOGS

QUINSAM COAL LIMITED

Hole Number: D-89-21 Pit Number: PIT 3N

Location: Line 147150 : 250' Lt. of B/L Elevation: 1060 ft.

Page 1 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			15			
SANDSTONE : Dark grey ; med. to fine grained COAL : In this bedded mixed with sandstone : 50% only MUDSTONE : Medium brown ; blocky texture					.27 m. .03 m. .03 m.	
COAL : Hard, massive ; bright ; blocky ; abundant pyrite .31 m. mudstone .01 m. mudstone	SAMPLE No. 1 (No. 2 Seam)	.75 m. (2.45 ft.)			.21 m. .01 m. .38 m.	99%
COAL : Dirty and bony coal (.13 m.) MUDSTONE : Dark brown ; carbonaceous	SAMPLE No. 2 (FLOOR DILUTION (.06 m.)		16		.01 m .06 m .09 m .15 m	
SILTSTONE : Medium grey ; some sloppy sections but generally hard ; thin coal stringers throughout.			17		1.71 m.	
SILTSTONE : Medium to dark grey ; variable composition - sandy and muddy sections			18			
			19		2.19 m.	
COAL : Dark brown to black, very dirty	SAMPLE No. 3 (No. 2 RIDER SEAM)	.49 m (1.60 ft.)	20		.14 m. .35 m.	98.5%
MUDSTONE : Medium to dark brown ; carbonaceous SILTSTONE : Medium to dark grey ; hard ; thin coal bands near top.	SAMPLE No. 4 FLOOR DILUTION (.06 m)				.15 m. .17 m.	
			21			
			22			

QUINSAM COAL LIMITED

Hole Number: QU-92-01c Pit Number: PIT 3N

Location: Line 147+50 250' Lt. of B/L Elevation: 1060

Page 2 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			38			
MUDSTONE: Dark greenish grey; slightly fissile						
COAL: Hard; clean and bright; calcite veining			39		.40 m.	
MUDSTONE: Dark brown; hard					.64 m	
COAL: Hard; clean; bright and blocky	SAMPLE No. 5 (No. 1 SEAM)	3.40 m. (11.15 ft.)	40		.03 m.	
SILTSTONE: Medium brown; hard; some lost core?					.96 m	99
COAL: Hard; bright and blocky; clean					.06 m.	
MUDSTONE: Black; very hard; carbonaceous			41		.78 m.	
COAL: Hard; clean, massive; some calcite					.02 m.	
COAL: Softer; mudstone laminae throughout; platy			42		.73 m.	
MUDSTONE: Medium brownish grey; soft; incompetent	SAMPLE No. 6 FLOOR DIVISION (0.30 ft.)				.18 m.	
			43		.58 m.	
			44			

QUINSAM
COAL LIMITED

Hole Number: QU-92-02c Pit Number: PIT 3N

Location: Line 157+50 250 ft. Lt. of B/L Elevation: 1079

Page 1 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			10			
COAL: Dull with bright sections; hard; blebs of pyrite SILTSTONE: Carbonaceous COAL: Hard; bright and blocky; siltstone clasts COAL: Hard; bright and blocky; abundant pyrite throughout on cleats; 1" bonny at base MUDSTONE: Medium brown; hard; coaly stringers COAL: Hard; blocky; abundant pyritic material MUDSTONE: Dark brown to grey; hard with softer sections near bottom. LOST CORE MUDSTONE: Medium brownish grey; fairly hard; thick bands of pyritic material. SILTSTONE: Medium grey; hard; massive; pyritic blebs & coal stringers near top; sandy near top - fining downward.	SAMPLE No.1 (No.2 SEAM) SAMPLE No.2 FLOOR DILUTION 0.20 m.	1.08 m. (3.55 ft.)	11 12 13 14		.09 m. .02 m. .08 m. .75 m. .05 m. .11 m. .27 m. .09 m. .46 m. 1.13 m.	99.5

QUINSAM
COAL LIMITED

Hole Number: QU-87-02c Pit Number: PIT 3N

Location: Line 157+50 250 ft. Lt. of B/L. Elevation: 1079'

Page 2 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			34			
			35			
COAL: Clean; bright and blocky; light					.52 m.	
MUDSTONE: Medium brown; carbonaceous					.05 m.	
COAL: Clean; bright and blocky; one major fracture.	SAMPLE No.3 (No.1 SEAM)	3.63m. (11.90 ft.)	36		.98 m.	98.7
MUDSTONE: Black to medium brown; soft, flaggy;					.09 m	
MUDSTONE: Dark greenish grey; silty; hard;					.12 m.	
COAL: Hard; clean; bright and blocky; calcite veining; minor dirty sections;			37		1.60 m.	
			38			
MUDSTONE: Dark brown to black; silty; carbonaceous					.05m.	
COAL; Hard; blocky; fairly clean.					.03m.	
COAL AND MUDSTONE MIXED; interbedded; 50% coal	SAMPLE No.4 FLOOR DILUTION (0.30 ft.)				.03m.	
COAL: Hard; blocky; fairly clean					.16m.	
MUDSTONE: Greenish grey; silty; hard					.09 m.	
MUDSTONE: Soft, wet, friable; clayey					.06 m.	
MUDSTONE: Medium to dark brown; hard; carbonaceous			39		.34 m.	
SILTSTONE: Medium grey; sandy sections					.40m.	
			40			

QUINSAM
COAL LIMITED

Hole Number: QU-82-03c Pit Number: PIT 3N

Location: Line 172+50 250 ft. Rt. of B/L Elevation: 1089'

Page 1 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			17			
			18			
SILTSTONE: Dark greenish grey; some fine sandy sections; massive and fairly hard; coaly wisps increasing towards base;					1.33m.	
			19			
SILTSTONE: Dark greenish grey; 40% coaly					.06m.	
COAL: Hard; with thin siltstone bands; visible finely disseminated pyrite; 80% coal					.15m.	
COAL: Hard; massive; fairly clean but with silty clasts and pyritic bands;	SAMPLE No. 1 (No. 2 SEAM)	1.10m (3.625 ft)			.40m.	101
MUDSTONE: Hard; carbonaceous;			20		.02m.	
COAL: Hard; massive; clean; large pyritic blobs up to .5cm.					.34m.	
MUDSTONE: Light brown; soft, wet; friable	SAMPLE No. 2 FLOOR DILUTION (@ 20 ft.)				.05m.	
COAL: As above but slightly softer.					.15m.	
MUDSTONE: Dark brown; fairly soft, some fissility.					.44m.	
			21			

QUINSAM COAL LIMITED

Hole Number: QU-82-03c Pit Number: Pit 3N

Location: Line 172+50 250 ft. Rt. of B/L Elevation: 1089'

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			42			
SILTSTONE: Dark grey; hard;					.14 m.	
COAL: Hard with bony bands; ripple marks					.03 m.	
SILTSTONE: Dark grey; hard; massive;					.76 m.	
SILTSTONE: Dark brown to black; carbonaceous; coal bands throughout;			43		.30 m.	
SILTSTONE: Medium grey; hard; some coaly material;					.09 m.	
SILTSTONE: Dark grey to brown;					.34 m.	
SILTSTONE: Medium grey; hard;			44		.52 m.	
MUDSTONE: Medium to dark grey; hard; coal clasts near base;					.46 m.	
MUDSTONE: Dark grey to black; silty; coaly					.12 m.	
SILTSTONE: Dark grey to black; sandy textured near base					.09 m.	
			45			
COAL: Hard; massive; clean; visible calcite no visible pyrite;	SAMPLE No. 3 No. 1 SEAM (TOP PLY)	1.46 m (11.50 ft.)			1.46 m.	
			46			
MUDSTONE: Medium brown; soft; slightly fissile;	SAMPLE No. 4 FLOOR ELEVATION 0.30 ft.					
SILTSTONE: Medium grey; hard; slightly muddy;	SAMPLE No. 5 In-Seam Parting	.27 m. (0.90 ft.)			.12 m.	96.6
COAL: Hard; massive; clean; abundant calcite material					.24 m.	
			47			
MUDSTONE: Black; carbonaceous; shaly	SAMPLE No. 6 No. 1 SEAM BOTTOM PLY	1.97 m. (6.45 ft.)			.61 m.	
COAL: Hard; massive; clean; abundant calcite					.01 m.	
MUDSTONE: Black; shaly; slightly carbonaceous					.23 m.	
COAL: As above; thin mudstone laminae at base					.05 m.	
MUDSTONE: As above; slightly carbonaceous					.17 m.	
			48			
COAL: Hard; massive; clean but bony sections; abundant calcite near base;					.05 m.	
MUDSTONE: Medium brown; hard; slightly carbonaceous					.56 m.	
COAL: As above; abundant calcite; blocky at base					.03 m.	
MUDSTONE: Dark grey to black; highly carbonaceous;	SAMPLE No. 7 FLOOR ELEVATION (0.30 ft.)				.26 m.	
MUDSTONE: Light greenish grey; clayey;					.05 m.	
MUDSTONE: Medium brown; coaly					.06 m.	
			49		.18 m.	
SILTSTONE: Medium grey; muddy texture; uniform					.40 m.	

QUINSAM
COAL LIMITED

Hole Number: Q11-82-04c Pit Number: PITS 1, 2-3 5

Location: Line 41+00 6780 ft. Lt. of B/L. Elevation: 1166'

Page 1 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			50			
MUDSTONE: Dark greenish grey; easily crushed; slickensided fracture surfaces					.30 m.	
COAL: Bright and dull banded with interbedded mudstone					.12 m.	
COAL: Fairly clean but with thin mudstone laminae near top; extremely tight			51		.32 m.	
PYRITIC MATERIAL: very fine grained pyrite in silty matrix	SAMPLE No. 1	1.19 m.			.03 m.	95
MUDSTONE: Black; carbonaceous; very soft and readily crushed.	No. 2 SEAM	(3.90 ft.)			.03 m.	
COAL: As above; slickensided high angle fractures					.27 m.	
MUDSTONE: Black; soft; fissile; highly carbonaceous					.01 m.	
COAL: As above; slightly harder					.40 m.	
MUDSTONE: Hard and soft layers; carbonaceous	SAMPLE No. 2 FLOOR SECTION (0.20 ft.)		52		.06 m.	
MUDSTONE: Medium brown; silty; very hard; clean coal bands					.18 m.	
MUDSTONE: Medium to dark grey; dull and bright bands of coal; abundant pyritic material					.24 m.	
SILTSTONE: Dark greenish grey; competent; coaly wisps and plant fragments throughout;			53		.91 m.	
			54			
			55			

Quinsam
COAL LIMITED

Hole Number: QU-87-04c Pit Number: PITS 1, 2-3 S

Location: Line 4+00 6780 ft. N. of B/L Elevation: 1166'

Page 2 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			65			
SILTSTONE: Dark greyish brown; muddy texture but hard and competent; abundant pyritic stringers near base.			66		.70 m.	
COAL: Fairly clean but some thin shaly sections; light; badly broken and fractured; soft;	SAMPLE No. 3 (No. 1 seam)	2.30 m. (7.55 ft.)	67		1.33 m.	76.6
COAL: Black to dark brown; bony and dirty; bright and dull banded					.26 m.	
COAL: Completely crushed and powdered; some mudstone material mixed in;					.12 m.	
LOST CORE			68		.64 m.	
COAL: Very hard; dirty with abundant mudstone material; visible pyrite on cleats					.18 m.	
COAL: Soft and badly broken; dirty.					.11 m.	
COAL: Hard but fractured, dirty; bright & dull banded			69		.30 m.	
MUDSTONE: Dark brown to black; highly carbonaceous very hard but some minor 'flaggy' sections, minor thin bright and dull banded coaly sections throughout.	SAMPLE No. 4 Floor sampled (0.30 ft.)				.87 m.	
			70			
			71			

Quinsam
COAL LIMITED

Hole Number: QU-82-05c Pit Number: PITS 1, 2-3 S

Location: Line 4+00 2465 ft. Lt. of B/L Elevation: 1179'

Page 1 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			17			
COAL: Clean; abundant pyrite on cleats PYRITE: Solid pyritic band in a silty matrix; COAL: As above; some fracturing; some very thin mudstone bands visible. MUDSTONE: Dark grey; soft; fissile COAL: As above; hard and unbroken PYRITE: Pyritic material in a solid lenticular band. COAL: As above; large blebs of fine-grained pyrite visible; hard; unbroken MUDSTONE: Medium brown; fairly soft and flaggy. COAL: Fairly soft and dirty	SAMPLE No. 1 No. 2 SEAM	1.16 m. (3.80 ft.)	18		.14m .03m .44m. .05m .18m. .02m .26m. .02m .03m	96
	SAMPLE No. 2 FLOOR DILUTION (0.20 ft.)		19			
SILTY MUDSTONE: Medium to dark brown at top, grading to medium greenish grey; bottom contains sandy lenses;			20		1.77m.	
			21			
			22			

QUINSAM COAL LIMITED

Hole Number: 01-82-05C Pit Number: PITS 1, 2-3, 5

Location: Line 40+00 246 ft. Lt. of B/L Elevation: 1179'

Page 2 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			32			
MUDSTONE : Medium to dark grey ; hard ; carbonaceous					.11m.	
COAL : Blocky but broken ; shaly mudstone partings ;					.03m.	
COAL : Hard, bony ; dirty with visible pyrite ;					.05m.	
COAL : Massive ; bright and blocky ; thin mudstone and pyritic laminae throughout ;					.64m.	
LOST CORE :	SAMPLE No. 3	2.68m				
	No. 1 SEAM (MAIN)	(8.80ft.)	33		.38m.	
COAL : Softer and broken ; clean ; light ; large high angle fracture through middle.					.27m.	
COAL : More competent but abundant high angle fractures ; abundant pyrite on cleats.					.99m.	93.3
			34			
BONE COAL : Dirty ; fractured ; abundant pyrites					.03m.	
COAL : Massive ; bright and blocky ; abundant calcite on cleats ; dirtier near base.					.30m.	
MUDSTONE : Medium brown ; very hard ; carbonaceous					.06m.	
COAL : Hard ; clean ; unbroken.					.18m.	
COAL : As above ; abundant pyrite			35		.12m.	
MUDSTONE : Dark brown ; very hard ; 30% coaly					.09m.	
COAL : Clean ; bright and blocky.					.05m.	
MUDSTONE : Dark brown to black ; very hard ; 50% coaly	SAMPLE No. 4	1.54m.			.56m.	
COAL : Clean ; bright and blocky	No. 1 SEAM (BASAL ZONE)	(5.05ft.)				
COAL : Bright and dull banded coal sections with mudstone material throughout			36		.03m.	
COAL : clean ; bright and blocky					.26m.	
COAL : Bright and dull banded.					.03m.	
COAL : Clean, bright and blocky.					.12m.	
COAL : Bright and dull banded with some fairly clean sections.					.04m.	
	SAMPLE No. 5 FLOOR DILUTION (0.30ft.)				.35m.	
MUDSTONE : Medium to dark brown ; very hard ; coaly beds throughout			37		.57m.	
MUDSTONE : Light brownish grey ; silty					.24m.	
MUDSTONE : Carbonaceous grey ;					.14m.	
CONGLOMERATE : Light brownish grey with large greenish clasts ; very fine sandy matrix					.46m.	

QUINSAM
COAL LIMITED

Hole Number: QU-82-066 Pit Number: PIT 1 S

Location: Line 48+00 9550 N. Lt. of B/L Elevation: 1161

Page 1 of 1

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			12			
COAL: Clean; light; bright & blocky;					.47m.	
COAL: Bony; dirty; mudstone and silt bands					.06 m.	
COAL: Clean, bright; hard; abundant calcite on cleats; one slickensided fracture plane at 45° to core axis.	SAMPLE No. 1 (No. 1 seam)	4.39m. (14.4oft)	13		1.50m.	
COAL: Very soft and crushed; dirty			14			93.6
COAL: Clean; bright & blocky; minor bony lenses near base					.06m.	
COAL: Soft; crushed; powdery; dirty					.61 m.	
MUDSTONE: Dark brown to black; carbonaceous					.02m.	
COAL: Fairly clean and bright with minor dirt bands			15		.06m. .20m.	
COAL: As above					.69m.	
COAL: Soft; crushed and powdery					.05m.	
LOST CORE			16			
COAL: Clean; bright and blocky; calcite abundant;					.30m.	
COAL: Fairly clean but badly broken					.50m.	
COAL: Clean; bright and blocky	SAMPLE No. 2 FLOOR DILUTION (0.30ft.)				.08 m.	
MUDSTONE: Light to medium grey; soft and badly crushed			17		.09 m. .12 m.	
LOST CORE					.08 m.	
MUDSTONE: Dark brown to grey; harder					.09 m.	
MUDSTONE: Hard; silty clasts throughout					.70m.	
COAL: Bright but some dull sections; platy fracture						
MUDSTONE: Medium brown; slightly carbonaceous			18		.08m. .03m.	
COAL: 20% mudstone; some bright sections					.24m.	
			19			

QUINSAM COAL LIMITED

Hole Number: Q-82-07c Pit Number: P.I 1, 2-3 S

Location: Lic. 4745n 725m ft. Lt. of B/L Elevation: 1147

Page 1 of 2

DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			23			
SANDSTONE : Medium grey ; coarse grained ; salt and pepper appearance ; hard and abrasive.			24		1.92 m	
			25			
MUDSTONE : Dark grey ; hard ; competent ; siltstone clasts throughout						
MUDSTONE : As above, with abundant clean coal bands throughout			26		.61 m.	
COAL : Clean ; hard ; bright and blocky ; abundant large lenses of pyrite material ;					.17m.	
MUDSTONE : Carbonaceous	SAMPLE No. 1 (No. 7 SEAM)	1.48 m. (4.85ft.)			.40 m.	
COAL : As above ; pyritic lenses and calcite veining			27		.03 m.	
MUDSTONE : Carbonaceous ; soft ; flaggy					.32 m.	99.5
COAL : As above.					.03m.	
COAL : Dirty with some clean sections					.24 m.	
COAL : Clean ; bright & blocky					.06 m.	
MUDSTONE : Soft ; flaggy					.18m.	
COAL : As above.					.03 m.	
MUDSTONE : Carbonaceous	SAMPLE No. 2		28		.03 m.	
COAL : Slightly dirty ; abundant pyrite	FLOOR DILUTION (0.20 ft.)				.05 m.	
MUDSTONE : Carbonaceous					.11 m.	
MUDSTONE : Coaly lenses at top ; pyritic bands throughout					.03m	
					.75m.	
			29			

QUINSAM COAL LIMITED

Hole Number: QU-82-07c Pit Number: Pit 1, 2-3 S.

Location: Line 47+50 7250 ft. Lt. of B/L Elevation: 1147

Page 2 of 2

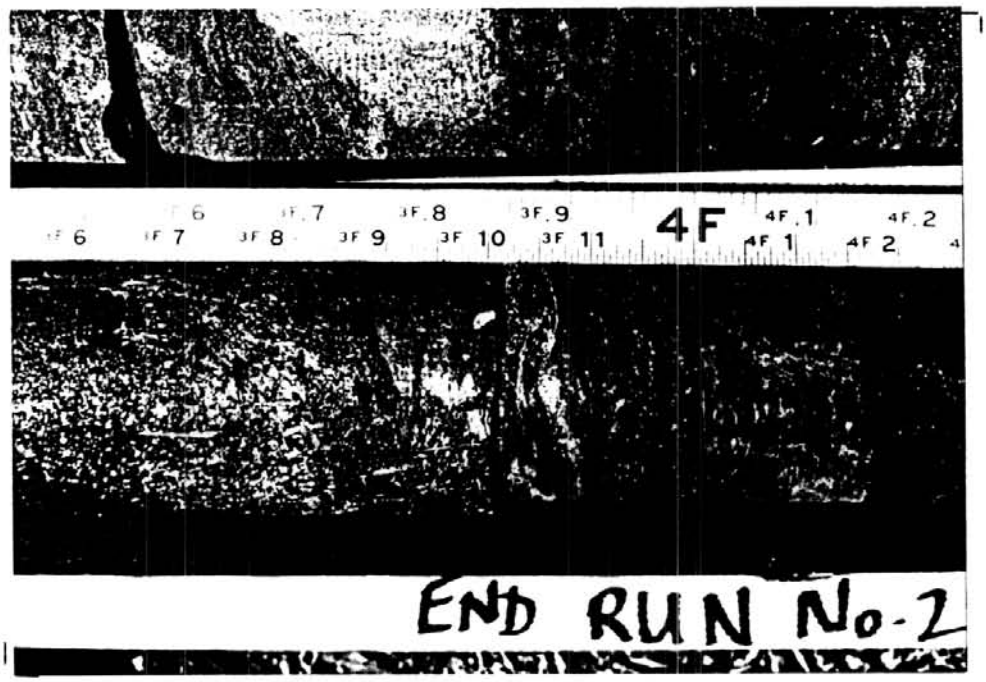
DESCRIPTION	SAMPLE INTERVAL	CORE RECOVERED	DEPTH (m)	LITHOLOGY	THICKNESS (m)	% REC.
			45			
COAL: Hard; clean; bright & blocky; some thin silty pyritic bands;			46		.53m.	
MUDSTONE: Soft; flaggy MUDSTONE: Harder but fractured; carbonaceous COAL: clean; bright; blocky MUDSTONE: Very Hard; carbonaceous	SAMPLE No. 3 (No. 1 SEAM MAIN)	3.12m (10.25 ft.)			.05m. .06m. .03m. .06m.	
COAL: Hard; clean; bright; blocky			47		1.31m.	99.7
MUDSTONE: Very soft; friable; carbonaceous COAL: Soft; powdery; crushed			48		.05m .03m.	
COAL: Hard; clean; bright; blocky					1.00m.	
MUDSTONE: Very hard; coaly laminae throughout COAL: Hard; generally clean but bright and dull banded minor sections.			49		.03m. .35m.	
COAL: Very hard; abundant rock material throughout increasing, bright coal bands towards base COAL: Clean, hard; bright; blocky COAL: Dull with some bright bands; 5% coaly	SAMPLE No. 4 (No. 1 SEAM BASAL ZONE)	1.78m. (5.85 ft.)	50		.40m. .15m. .85m.	
MUDSTONE: Dark brown; very hard; carbonaceous MUDSTONE: Very hard; silty; massive	SAMPLE No. 5 FLOOR DILUTION (0.30 ft.)		51		.09m. .17m.	
			52			

APPENDIX IV

PLATES

PLATE VII: No. 2 Seam

PLATE VIII: No. 2 Rider Seam



PLATES VII and VIII: Close-up of No. 2 Seam and No. 2 Rider Seam Showing Bands of Fine-Grained Pyritic Material in Coal.

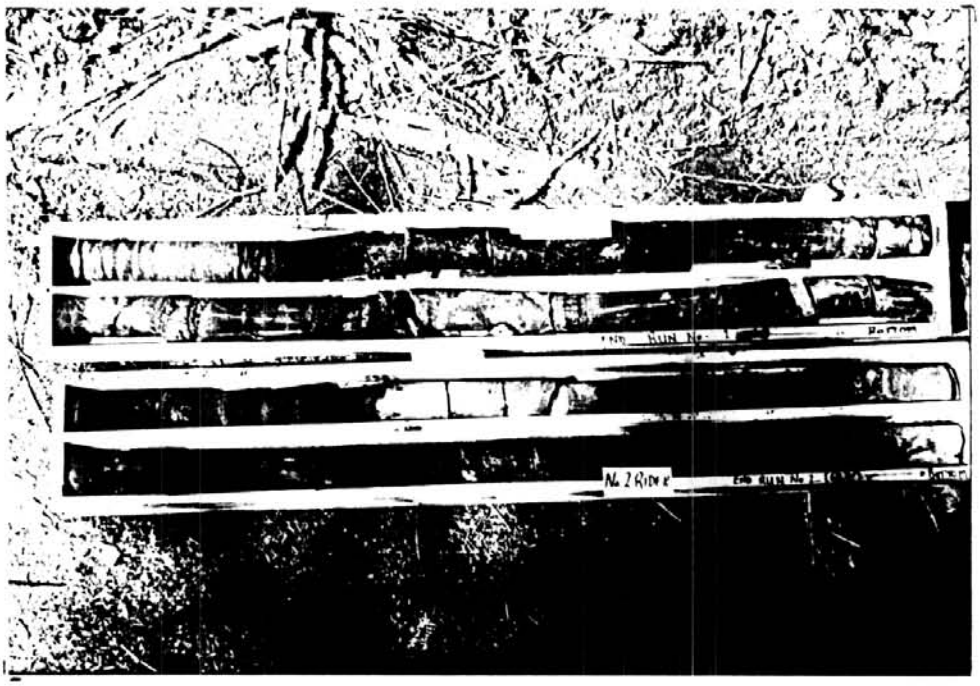


PLATE IX: Hole QU-82-01C: Run No. 1 and 2
Interval: 49.0 - 68.8 feet
Seam No. 2 and No. 2 Rider Seam

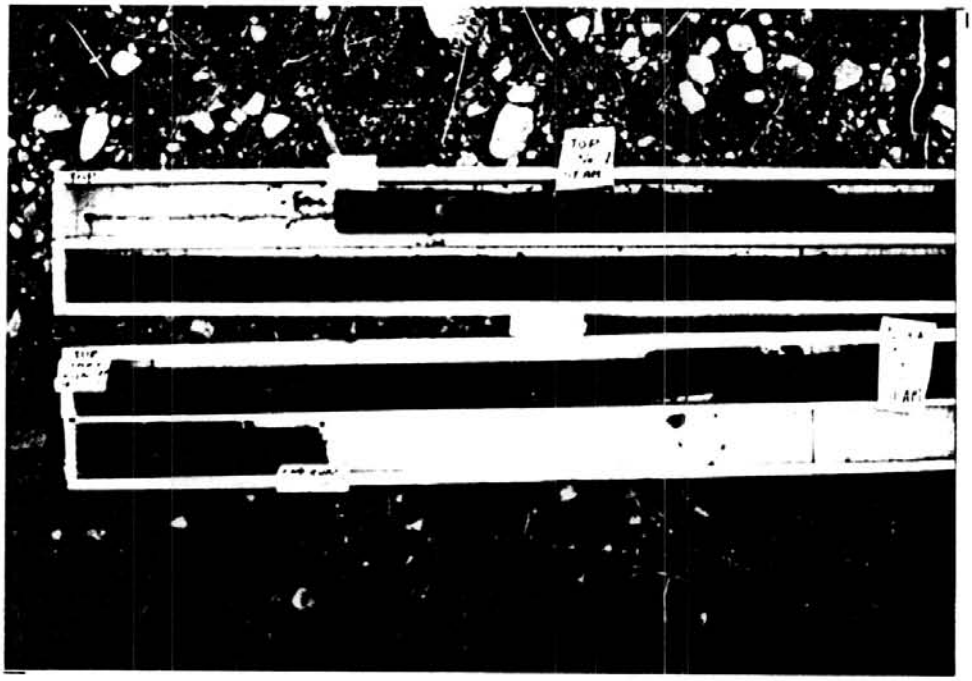


PLATE X: Hole QU-82-01C: Run No. 3 and 4
Interval: 127.0 - 141.5 feet
No. 1 Seam

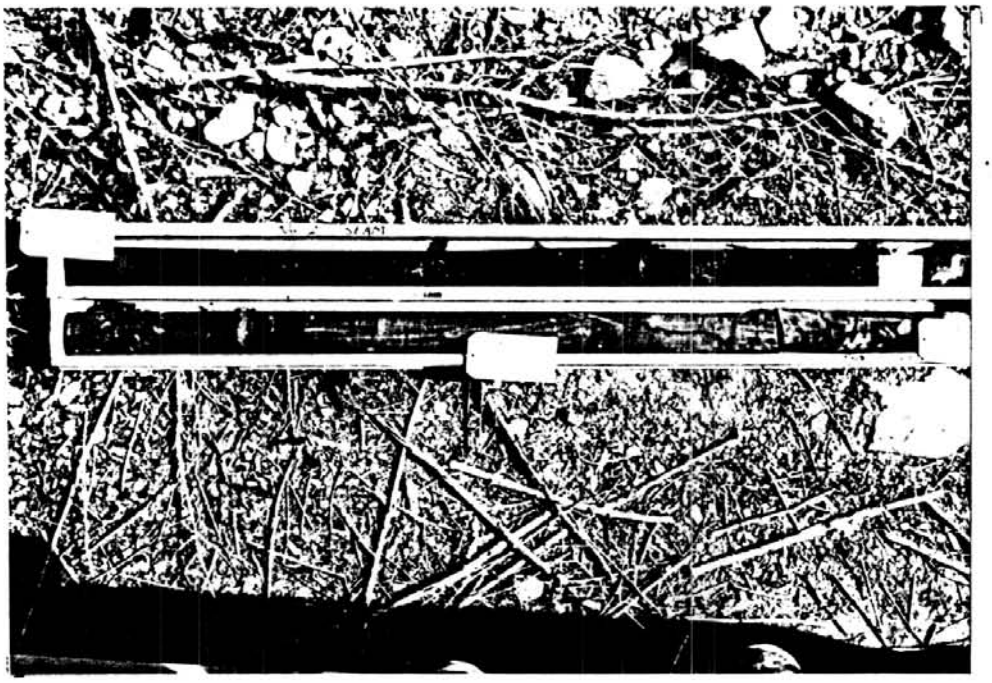


PLATE XI: Hole QU-82-02C: Run No. 1
Interval: 33.7 - 43.7 feet
Seam No. 2

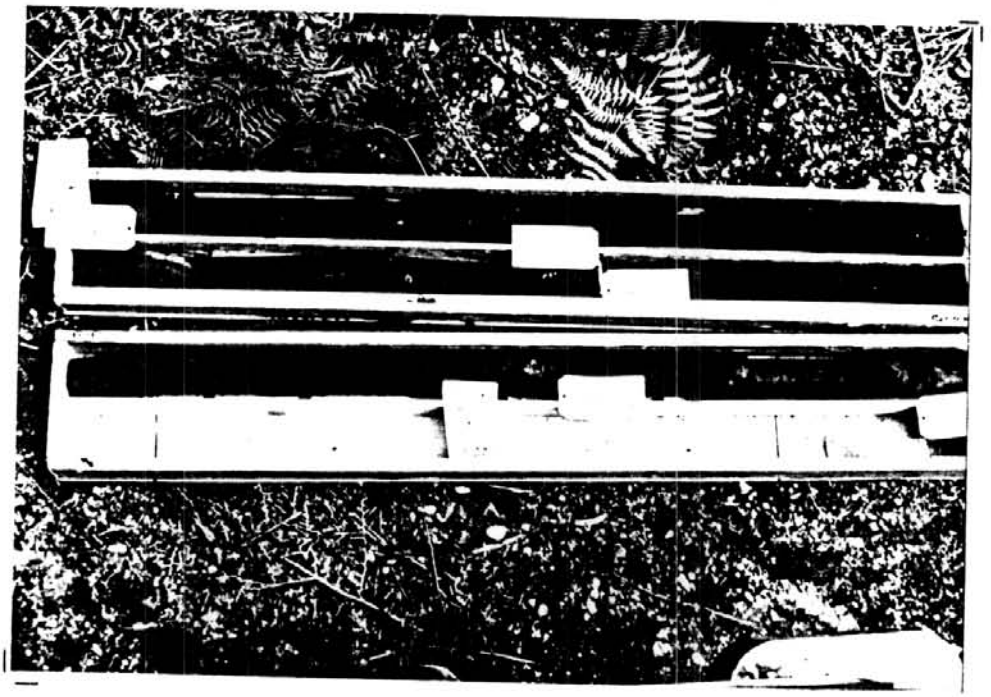


PLATE XII: Hole QU-82-02C: Run No. 2 and 3
Interval: 115.0 - 130.0 feet
No. 1 Seam

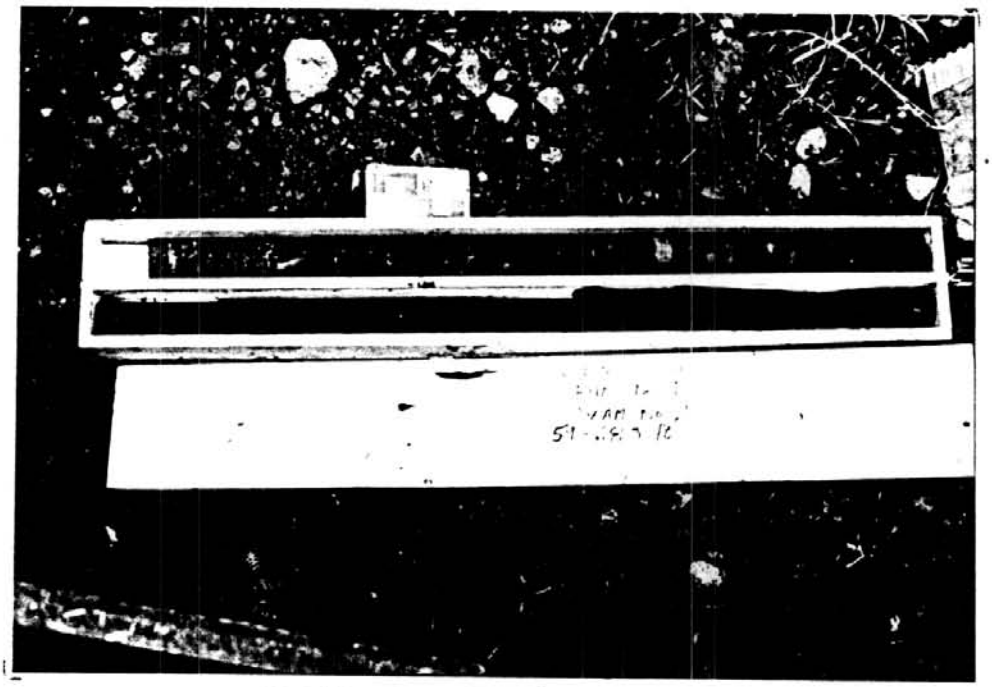


PLATE XIII: QU-82-03C: Run No. 1
Interval: 59.0 - 68.5 feet
Seam No. 2

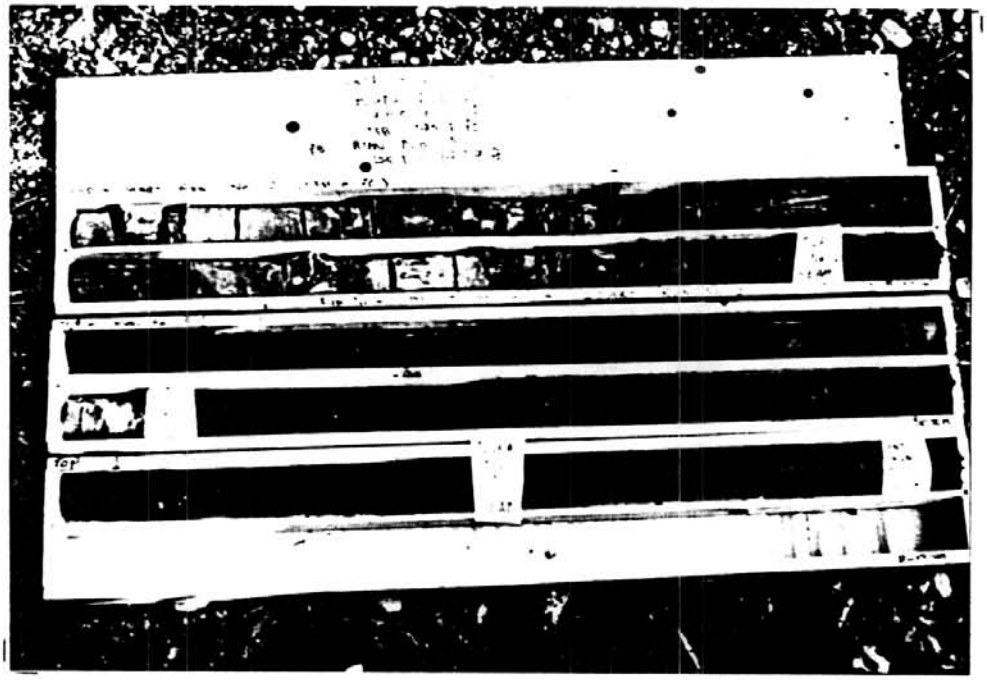


PLATE XIV: QU-82-03C: Runs 2, 3 and 4
Interval: 138.0 - 162.6 feet
No. 1 Seam

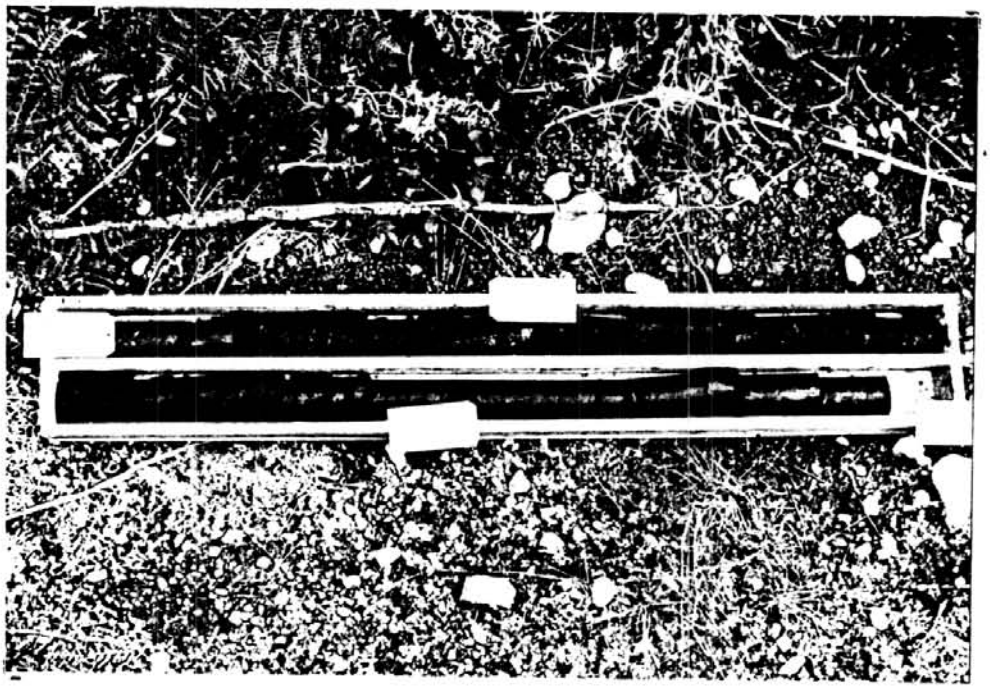


PLATE XV: QU-82-04C: Run No. 1
Interval: 166.0 - 176.0 feet
No. 2 Seam

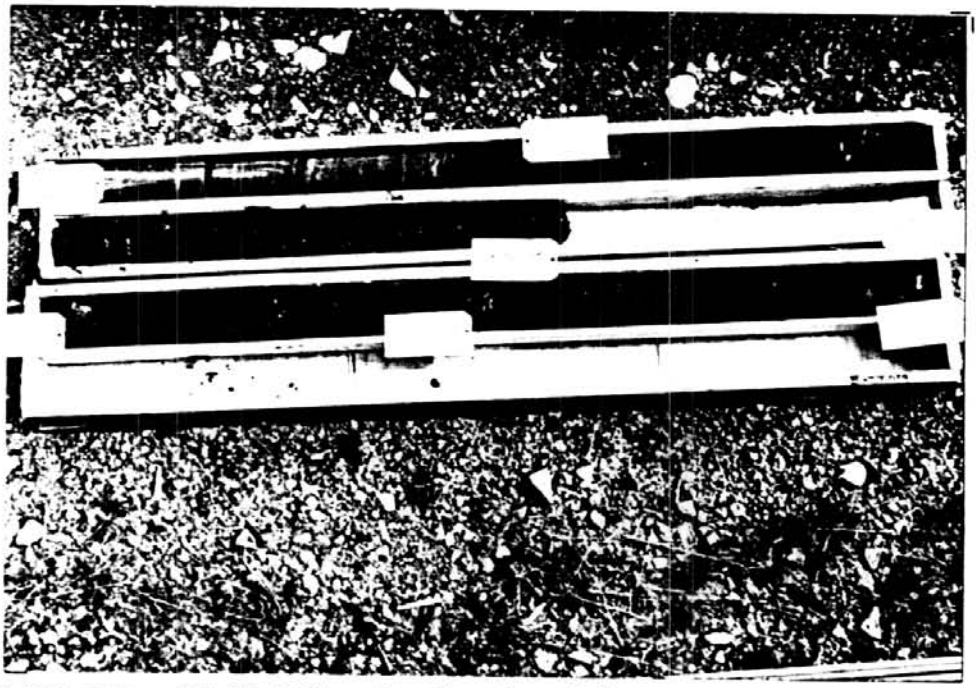


PLATE XVI: QU-82-04C: Run No. 2 and 3
Interval: 215.0 - 230.0 feet
No. 1 Seam

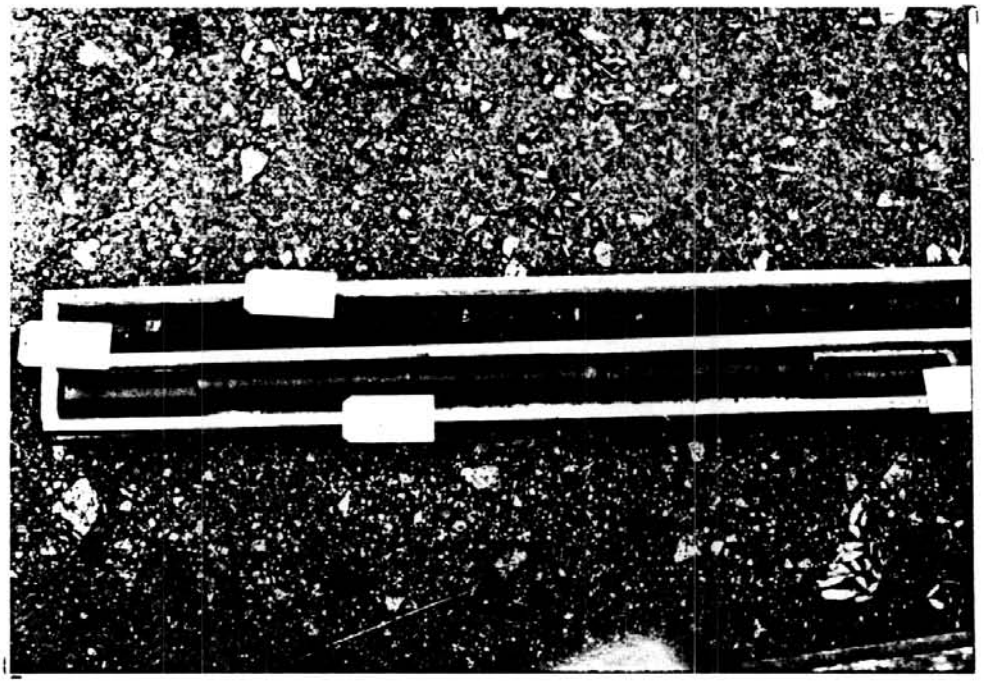


PLATE XVII: QU-82-05C: Run No. 1
Interval: 59.0 - 69.0 feet
No. 2 Seam

PLATE XVIII: QU-82-05C: Run No. 2 and 3
Interval: 105.0 - 125.0 feet
No. 1 Seam and Basal Unit

PLATE XIX: QU-82-06C: Run No. 1 and 2
Interval: 40.0 - 60.0 feet
No. 1 Seam

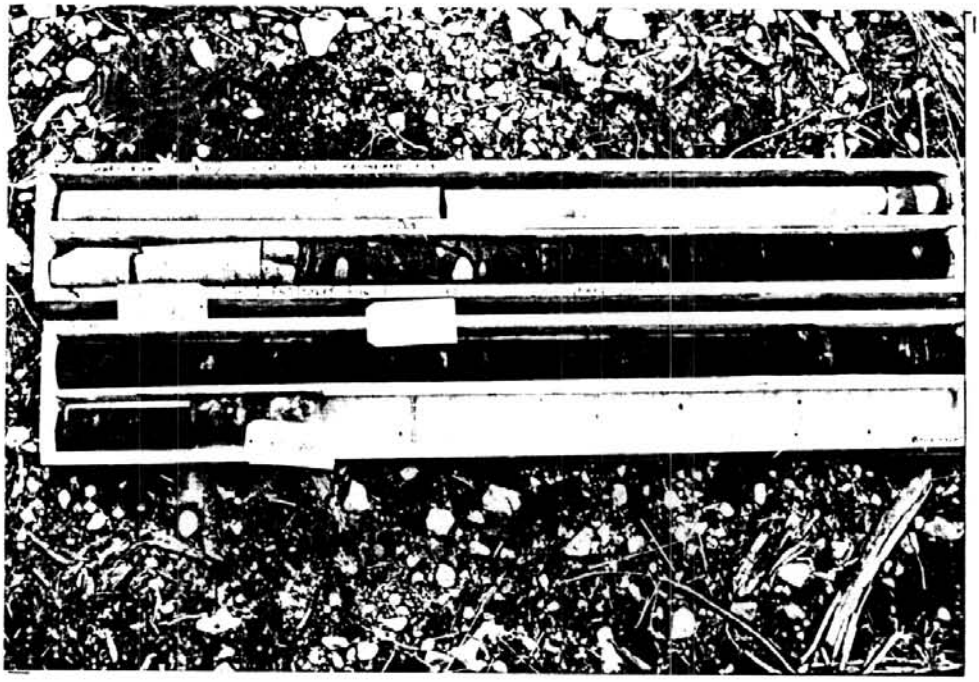


PLATE XX: QU-82-07C: Run No. 1 and 2
Interval: 78.0 - 94.3 feet
No. 2 Seam

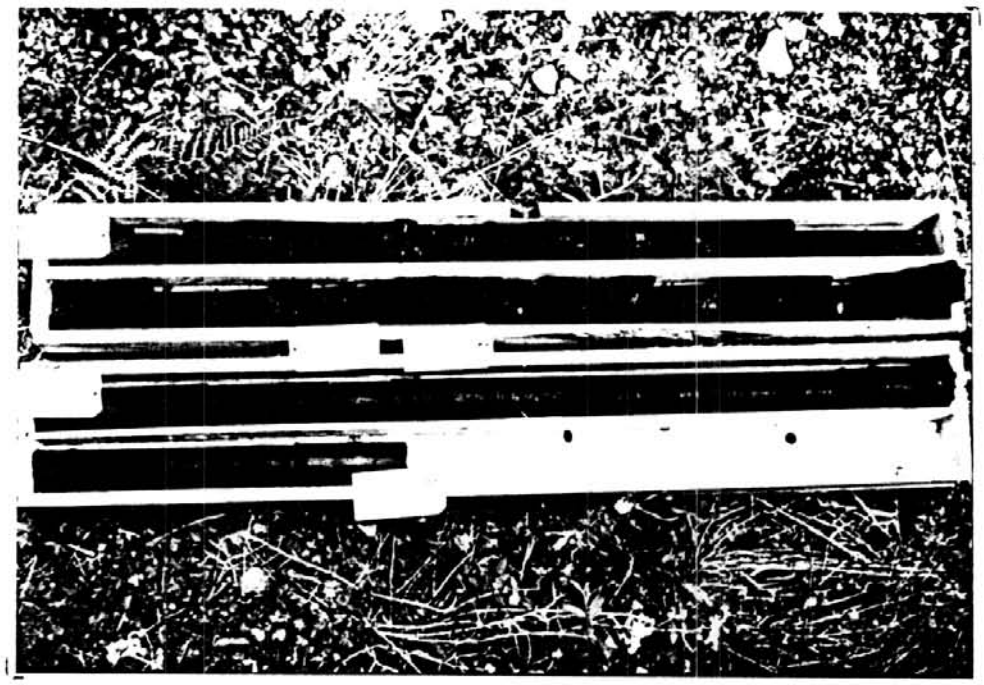


PLATE XXI: QU-82-07C: Run No. 3 and 4
Interval: 151.0 - 168.0 feet
No. 1 Seam and Basal Unit

APPENDIX V

FREEHOLD AND COAL LICENCES

HELD BY QUINSAM

ESSO RESOURCES

CANADIAN OCCIDENTAL PETROLEUM LIMITED

POWER LAKE MINERALS

CANDEL OIL LIMITED

WELDWOOD

OPEN 07/82

Proposed Coal Lease

Freehold Coal Rights

Coal Licence

U.T.M. Co-ordinates (Typical)
320000mE
5520000mN

NTS 92F/13, 92F/14

DRWG. No.	REFERENCE	No.	DATE	REVISIONS	BY	ISSUED FOR ABOVE PURPOSE	REV.	DATE	APP'D

7310 (1)

Brinco MINING LIMITED
2000 - 1055 WEST HASTINGS ST., VANCOUVER, B.C. V6E 3V3
(604) 688-2511 TELEX 04-508664

PROJECT: QUINSAM COAL LIMITED

LOCATION: CAMPBELL RIVER, BRITISH COLUMBIA

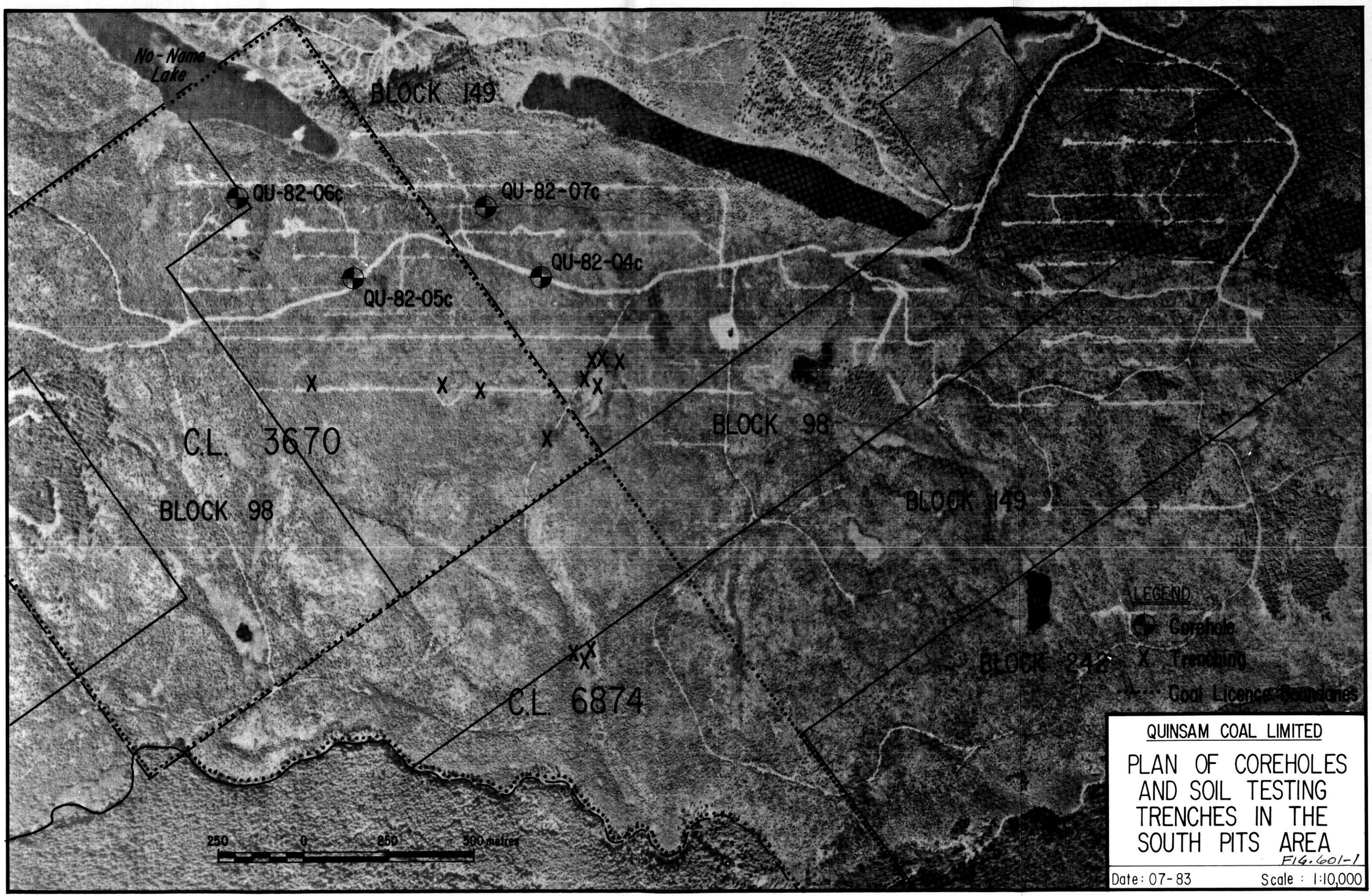
TITLE: (M1)

FREEHOLD AND COAL LICENCES HELD BY QUINSAM

DRAWN BY: e.j.d.	DATE: 07-06-82	CHECKED BY:	DATE:
DRAFTED BY: e.j.d.	DATE: 07-06-82	APPROVED BY:	DATE:
SECTION:		PROJECT No. 1-555	
SCALE: 1: 50,000	DWG. No. 0601-00101		REV.

APPENDIX VI

PLAN OF COREHOLES AND SOIL TESTING TRENCHES IN THE SOUTH PITS AREA

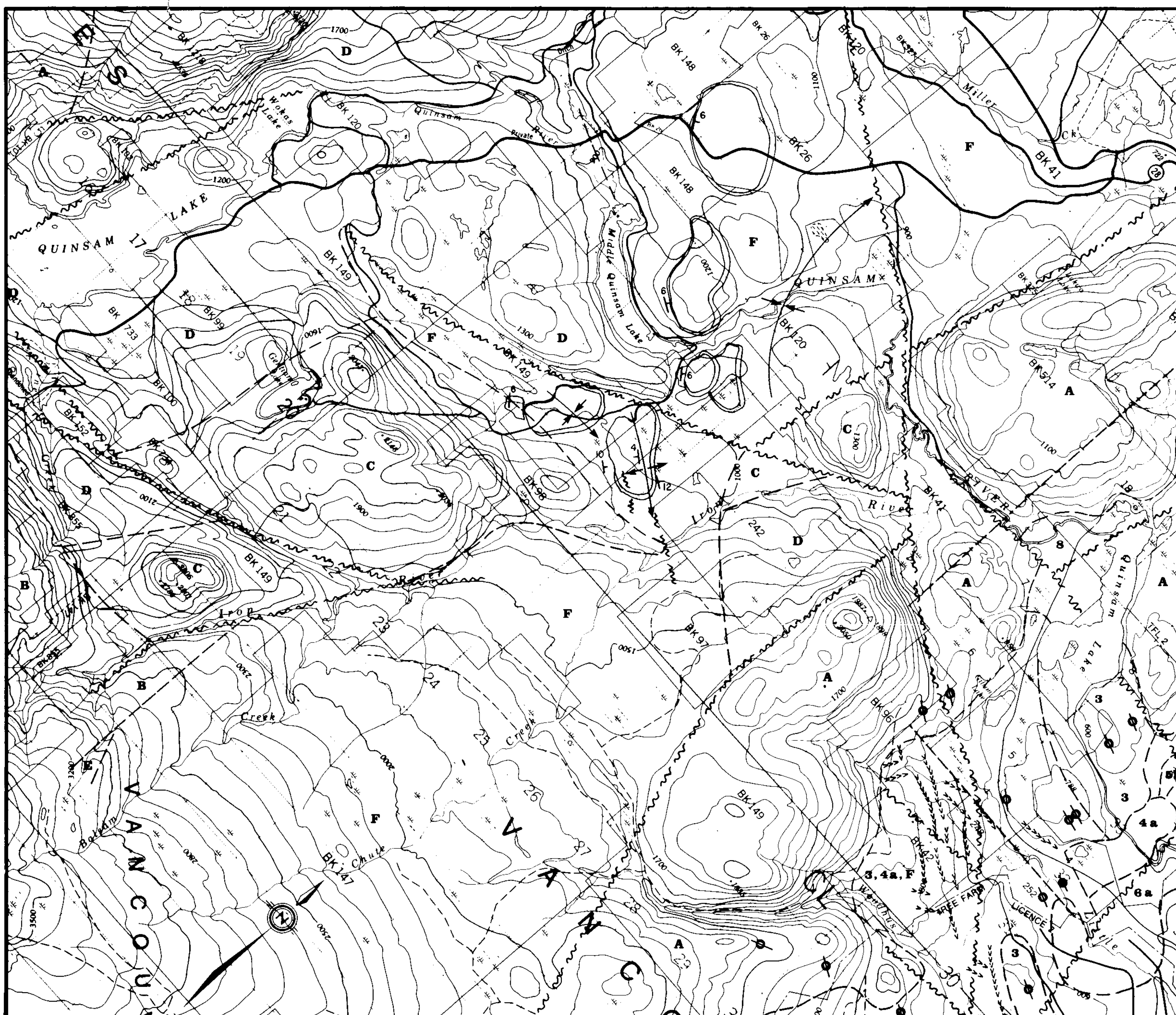


QUINSAM COAL LIMITED

PLAN OF COREHOLES AND SOIL TESTING TRENCHES IN THE SOUTH PITS AREA

FIG. 601-1

Date: 07-83 Scale : 1:10,000



8	SHORE, DELTAIC AND FLUVIAL DEPOSITS: gravel, sand, silt, clay, peat
7	VALLEY ALLUVIUM AND COLLUVIUM: boulders, gravel, sand, silt, clay
6	CAPILANO - TERRACED FLUVIAL DEPOSITS: 6a Deltaic gravel, sand 6b Floodplain and channel: gravel, sand, silt
5	CAPILANO - MARINE AND GLACIO - MARINE DEPOSITS: 5a silt, clay, stoney clay b sand, pebbly sand c gravel, sandy gravel d stoney, gravelly and sandy marine - veneer e stoney, loamy and clayey marine - veneer
4	VASHON - GLACIO - FLUVIAL DEPOSITS: 4a Hummocky, knob - and - kettle and ridged: gravel, sand, till lenses 4b Terrace and pitted: gravel, sand, till lenses
3	VASHON - GROUND MORAINE DEPOSITS: till, gravel, sand and silt lenses
2	PRE VASHON: gravel, sand, silt, clay, peat
F	UPPER CRETACEOUS - COMOX FORMATION: sandstone, pebbly sandstone, minor conglomerate, shale, coal
E	UPPER CRETACEOUS: boulder conglomerate, minor lithic sandstone
D	JURASSIC AND (?) CRETACEOUS - COAST INTRUSIONS: granodiorite, minor quartz diorite
C	TRIASSIC AND (?) JURASSIC - VANCOUVER GROUP: tuff, andesitic volcanic breccia and lava: argillite, siltstone
B	UPPER TRIASSIC - VANCOUVER GROUP: limestone, calcerous shale
A	UPPER TRIASSIC - VANCOUVER GROUP: massive basalt, pillow basalt, minor tuff, volcanic breccia Aa limestone, calcerous siltstone, shale - interbedded in A

0 1 2 3km

>>>>>>>>> Eskers

Dip / Strike Symbol

Fault, assumed

Geological Boundary

Syncline (plunging)

Anticline (plunging)

Drumlinoid Ridges, Crag and Tail Hills

NTS REFERENCE 92F/13 & 92F/14

Brinco MINING LIMITED
2080 - 1055 WEST HASTINGS ST., VANCOUVER, B.C. V6E 3V3
(604) 688-2511 TELEX 04-508664

PROJECT: QUINSAM COAL LIMITED

LOCATION: CAMPBELL RIVER, B.C.

TITLE:

REGIONAL GEOLOGY MAP

FIG. 3.2-1

DRAWN BY:	DATE:	CHECKED BY:	DATE:
DRAFTED BY:	DATE:	APPROVED BY:	DATE:
SECTION:		PROJECT No.	
SCALE: 1:50,000	DWG. No.		REV

EM&PR

QUINSAM COAL 1982

DRILL CORE SAMPLES

TEST & ANALYTICAL WORK

QUINSAM COAL LTD.
2000-1055 W. HASTINGS ST. - VANCOUVER, B.C.- V6E 3V3
MGR. ENG. : T.E. MILNER, P. ENG.

CC. SIMON CARVES OF CANADA LTD.
FOOTHILLS PLACE
120-4TH AVENUE S.E. - CALGARY, ALBERTA - T2G 0C4
ATTN. D.G. OSBORNE, P. ENG.

ANALYTICAL WORK PERFORMED BY :
GENERAL TESTING LABORATORIES
A DIVISION OF SGS SUPERVISION SERVICES INC.
1707 FRANKLIN ST - VANCOUVER B.C. V5L 1P6
PHONE : 254 - 2148
CHIEF CHEMIST : L.M. LAKOSIL

QUINSAM
COAL LIMITED

NOTES ON DRILL CORE SAMPLE PREPARATION AND ANALYSIS

Cores from boreholes of circa. 75 mm diameter.

Contents:

Quinsam
COAL LIMITED

Notes on Procedure for Sampling and Analysis

Cores from Boreholes of c. 75 mm diameter.

1.0 Composition of the Samples

Coal samples, previously prepared by the Project Geologist will be supplied in plastic sample bags each clearly marked with sample identification tags. Coal samples emanating from two of the three seams ie. No. 1, and 2, will be presented for testing and analysis. These coal samples will contain coal separated directly on the rock-coal contacts at both roof and floor of the seam and as such will contain all in-seam parting material one foot or less in thickness.

In-seam partings that are greater than one foot thick will have been excluded from the coal interval and sampled separately.

Floor dilution samples will also be taken separately and retained for possible future analytical work. The dirty coal zone occasionally present at the base of the No. 1 Seam will be sampled in two bore-hole core samples and these samples will be identified accordingly. The purpose for this is to obtain separate float-sink test data in order that the impact of the basal zone on the washability and quality of the overall seam may be assessed. The remaining holes to be drilled will be sampled as normal ie. main part of seam

and basal zone sampled as a unit. Because some of the coal samples obtained will contain only a relatively small amount of sample material (ie. the No. 2 seam in some cases and the No. 1 or No. 2 rider seam) the flowsheet will therefore be required to be modified as described.

2.0 Procedure on Receipt of Samples

Refer to the attached flowsheet 1.

The individual seam samples should be collected together still bagged and then carefully checked to ensure that no bags are missing or misplaced.

The total sample should then be combined and air-dried before weighing.

After weighing, the total sample should be hand fed to a jaw crusher with setting adjusted to 25 mm. 1"

When all the sample has been passed through the crusher a circa. 10% split should be removed by cone and quartering to enable the raw coal analytical work described to be carried out.

The remainder of the sample should then be sized as instructed and the resulting size distribution and corresponding incremental masses obtained should

be reported to QUINSAM before proceeding to the fractional analysis or float-sink testing.

Following clearance with QUINSAM the specified FOUR size fractions should be produced ie. 25 x 6.7 mm; 6.7 x 0.6 mm; 0.6 x 0.15 mm; and 0.15 x 0 mm. All but for the latter of these should then be used for float-sink testing as described in Flowsheet 1.

In all instances emphasis should be placed upon urgently completing the compositing and subsequent analysis of the simulated product coal sample arising from the combination of the 1.7 R.D. float fractions. In crushing the 1.7 R.D. float fraction to 2.38 mm (ie. 8 mesh Tyler) it is assumed that sufficient material will be obtained to conduct a Hardgrove Grindability Index test without impairment. If this is uncertain the sample material must be crushed to the ASTM specified top size ie. 4.75 mm (ie. 4 mesh). After completion of this determination, the HGI test sample material should be returned to the original sample and both thoroughly mixed before pulverizing. The same two machines used for the crushing and pulverizing steps should be used throughout the work.

Instruction to proceed to the incremental float-sink analytical work should first be obtained from QUINSAM so as to ensure that this work is carried out in the desired order.

QUINSAM
COAL LIMITED

Attention is drawn to the three footnotes on the flowsheet.

Generally for a sample to be suitable for the full program of work as specified to be carried out at least kg. of sample would be needed. In cases where close to this amount is obtained (ie. >80%) it should be possible to proceed with the program reporting any low masses or suspect analytical values in the work report. In those cases where insufficient sample is obtained the split may be omitted and the separation made at 1.7 R.D. only (after reference to QUINSAM).

3.0 Reporting of Results

All analytical results will be carried out to the appropriate ASTM standard.

Float-sink test results will be reported on a DRY-BASIS and therefore analytical work should include moisture determination in order to provide for this.

All Calorific Determinations will be as analysed (ie. not calculated from regression analysis) and results will be reported as Gross and Net and stated on a dry-basis in k.Cal/kg.

Every QUINSAM core sample (coal, floor and parting) will be number coded

and each seam sample will have an appropriate sub-code number. This numbering system is described in attachment . All sample preparation work, test work and analytical work report sheets should include the QUINSAM seam sub-code number assigned to the sample. QUINSAM may require to include data sheets in study reports and reference to their numbering system is therefore desirable.

If specific company (SGS) procedures are adopted in any part of the sample preparation, test work or analytical work, these should be described in the final report for future reference. Also, a brief description of all major items of equipment used to carry out the work should be included, eg. Calorific Value determination: Parr Adiabatic Bomb Calorimeter, etc. NB. Attachment of a standard company brochure describing such would suffice if this information is included. Statement of Normal (SGS) procedures adopted to ensure the required level of repeatability of sample analysis for each parameter determined should be included in the final report, together with a description of any internal or inter-laboratory analytical check procedures usually adopted.

4.0 Specific Analytical Work Requirements

All analytical requirements envisaged for this program of work have been incorporated into the flowsheets but further comment may elucidate the specific QUINSAM requirements.

4.1 Petrography

Petrographic work on raw coal samples may be required but the decision to proceed with this work will be partly based upon the composite product coal analytical data. Petrographic work will be carried out by D.E. Pearson and Associates under the direction of SGS if it is decided to proceed.

4.2 Chlorine

Determination of chlorine content is to be carried out on raw coal in order to eliminate risk of contamination by organic liquids.

4.3 Carbon Dioxide

CO_2 determination is included to provide for assessment of weathered/oxidized coal measures in conjunction with residual moisture content.

4.4 Forms of Sulphur

Sulphur forms are required to provide an assessment of potential for beneficiation by removal of pyrite during coal cleaning and also to allow mineral matter content to be determined by use of the Modified Parr formula.

4.5 Free Swelling Index

Although FSI has not been requested, if when analysing float-sink fractions an indication of agglomerating character is obtained during the determination of volatile matter content, analysis for FSI should proceed with the sample and the result obtained should be reported.

4.6 Ash Analysis

Only the normal ten components should be analysed, ie. SiO_2, Al_2O_3, TiO_2, Fe_2O_3, CaO, MgO, Na_2O, K_2O, P_2O_5, and SO_3.

4.7 Specific Gravity (Relative Density)

The standard bottle method should be used for the determination of specific gravity.

4.8 Others

All other analyses should be carried out to ASTM using standard procedures as specified. They are required for inclusion in the QUINSAM Project quality data base.

5.0 Work Conducted by Third Parties

Analytical work to be carried out by a Third Party should be requested in writing and accompanied by this procedural document in all cases where more than a single quality parameter is to be determined. Reported data from Third Parties should be appended to the Final Report in addition to being incorporated into the body of the reported results. Authorization by QUINSAM is required for Petrographic work for which a formal estimate would be required prior to your dispatch of sample material to the Third Party.

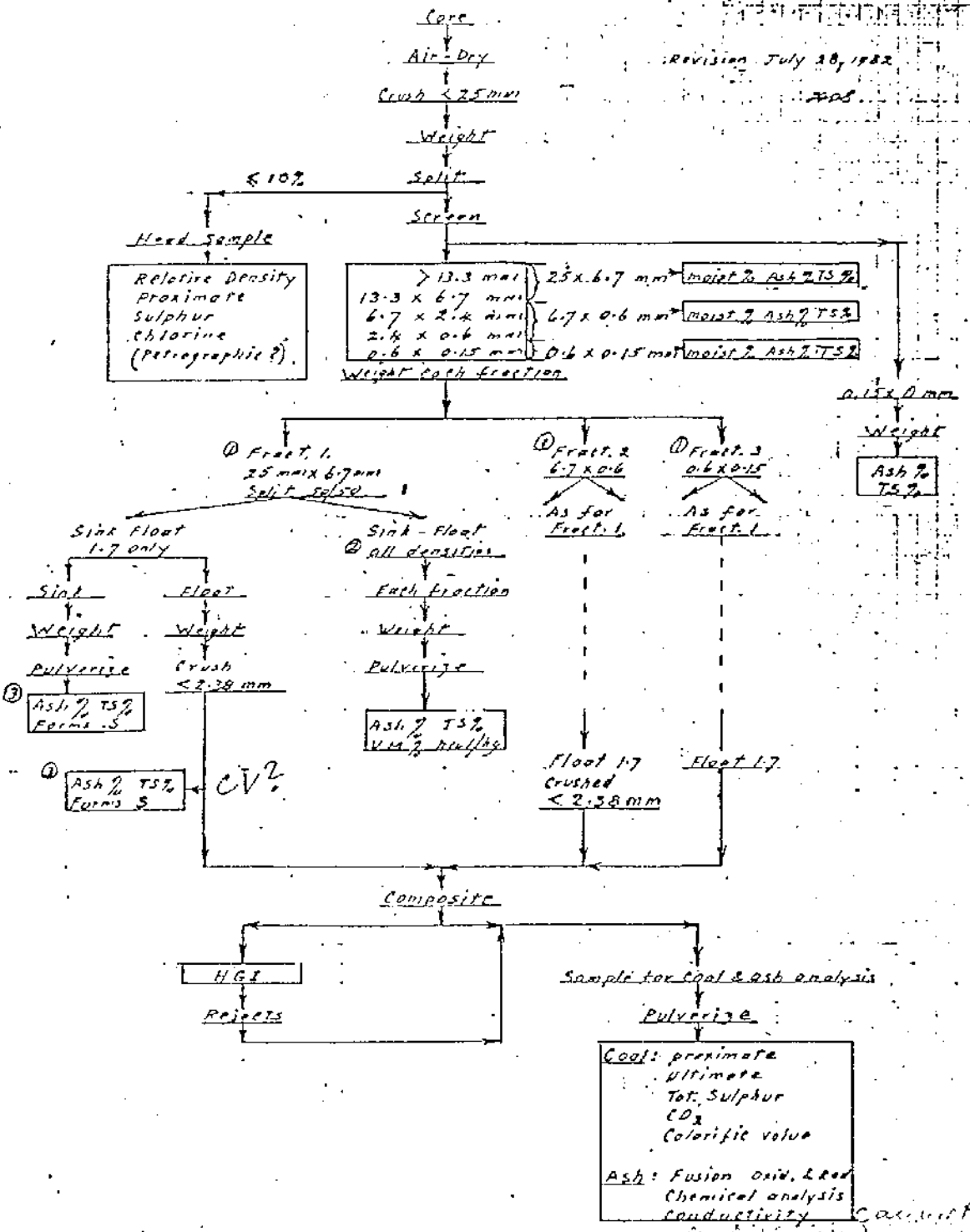
6.0 Retention of Sample Material

Residual amounts of powdered coal sample should be retained for future reference in an air-tight stoppered bottle. If possible, a minimum of 100 g of each analysis sample should be kept and a listing should be provided in the Final Report of all such samples.

QUINSAM DRILLING PROGRAM AUGUST 1982

FLOWSHEET No 1. COAL SEAM SAMPLES (Including BASAL SECTION No1. SEAM)

Revision July 28, 1982



Comments H. WHALEY PROKOPUK

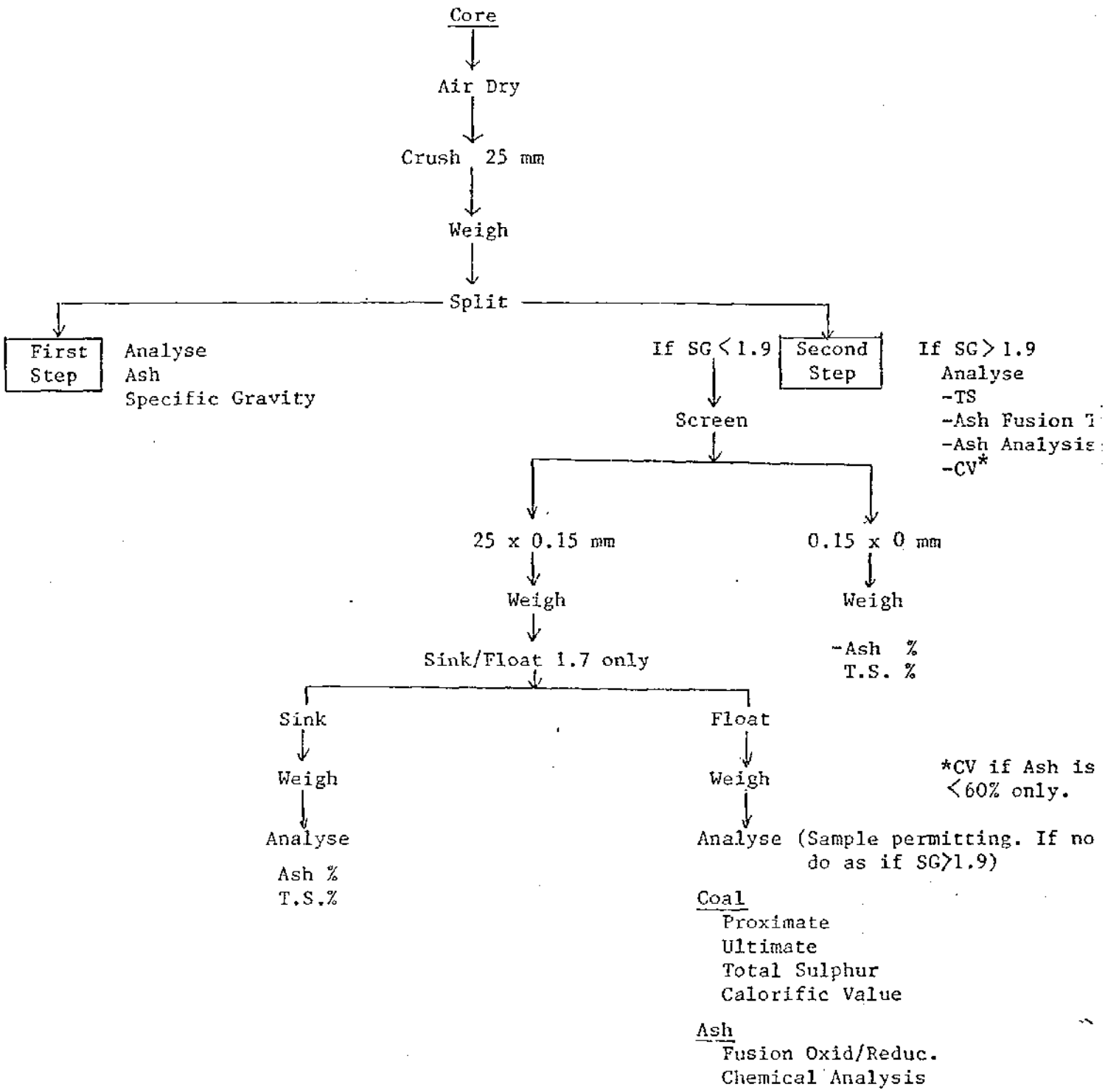
Note 1: For samples too small, the split may be omitted and the separation made at 1.7 only.

Note 2: Sink-float densities 1.3, 1.5, 1.7, 1.9. These separations and analyses may be delayed. It is urgent to proceed with the composites and the final detailed analyses for clean coal and ash.

Note 3: These analyses may be delayed. It is urgent to proceed with the composites and final detailed analyses for clean coal and ash.

QUINSAM DRILLING PROGRAM AUGUST 1982

FLOWSHEET 2 DILUTION SAMPLES/IN-SEAM PARTINGS
(but not including Basal Section No. 1 Seam)



NB1. Moisture determination of all samples will be required to express results on a dry basis.

[illegible]

RAW COAL - Proximate, Total Sulphur, Chlorine, Specific Gravity
Screen Yields

SAMPLE NO	BASIS	R.M. %	ASH %	V.M. %	F.C. %	T.S. %	Cl %	S.G.
1	A.D.	2.47	16.35	37.47	43.20	5.41	0.05	1.42
	DRY	-	17.29	38.42	44.29	5.54	0.05	-
3	A.D.	2.69	17.34	36.87	43.09	1.71	0.02	1.39
	DRY	-	17.83	37.88	44.29	1.80	0.02	-
4	A.D.	2.01	58.47	21.25	18.25	0.28	0.01	1.85
	DRY	-	59.68	21.69	18.63	0.29	0.01	-

CODE	FRACTION MM	CODE	FRACTION MM
A	25.0 X 13.3	D	2.4 X 0.6
B	13.3 X 6.7	E	0.6 X 0.15
C	6.7 X 2.4	F	0.15 X 0

BASIS : DRY

SAMPLE NO	A %	B %	C %	D %	E %	F %
1	28.59	33.09	19.00	12.12	4.04	1.36
3	26.75	35.11	19.40	11.93	4.11	2.20
4	21.97	35.52	19.99	12.68	5.01	2.87

[illegible]

RAW FEED - [illegible]

SAMPLE NO : 1

FRACTION MM			YIELD %	ASH %	T.S. %
25.0	X	6.7	51.30	17.41	5.76
6.7	X	0.6	31.12	17.13	5.65
0.6	X	0.15	4.54	22.35	4.30
0.15	X	0	2.56	31.41	4.55

SAMPLE NO : 3

FRACTION MM			YIELD %	ASH %	T.S. %
25.0	X	6.7	53.40	17.14	1.72
6.7	X	0.6	31.23	16.50	1.70
0.6	X	0.15	4.71	18.63	4.31
0.15	X	0	2.20	25.65	4.56

SAMPLE NO : 4

FRACTION MM			YIELD %	ASH %	T.S. %
25.0	X	6.7	57.79	6.71	0.25
6.7	X	0.6	30.65	55.21	0.22
0.6	X	0.15	5.09	45.91	0.50
0.15	X	0	3.37	50.50	0.75

GUINEA — GU-82-05-C

DILUTION SAMPLES - Forms of Sulfur
(Total, Sulphate, Pyritic, Organic)

SAMPL.	BASIS	R.M. %	T.S. %	S.S. %	P.S. %	O.S. %
2	A.D.	1.19	1.65	0.02	1.31	0.32
	D.	-	1.67	0.02	1.32	0.33
5	A.D.	1.24	0.11	0.00	0.06	0.05
	D.	-	0.11	0.00	0.06	0.05

[illegible] -- [illegible]

RAW COAL - Proximate, Total Sulphur, Chlorine, Specific Gravity
Screen Yields

SAMPLE NO	BASIS	R.R. %	A.H. %	V.M. %	F.C. %	T.S. %	Cl %	S.G.
1	A.D.	8.58	30.40	34.55	42.51	0.92	0.01	1.41
	DRY	-	33.23	35.45	43.62	0.95	0.01	-

CODE	FRACTION MM	CODE	FRACTION MM
A	25.0 X 13.2	D	2.4 X 0.6
B	13.2 X 6.7	E	0.6 X 0.15
C	6.7 X 2.4	F	0.15 X 0

BASIS : DRY

SAMPLE NO	A %	B %	C %	D %	E %	F %
1	18.92	34.35	22.37	15.39	5.40	2.77

[illegible] -- [illegible]

RAW FEED - Yield, Ash, Total Sulphur

SAMPLE NO : 1

FRACTION MM			YIELD %	ASH %	T.S. %
25.0	X	6.7	50.37	18.79	1.06
6.7	X	0.6	33.30	10.77	1.04
0.6	X	0.15	5.60	18.77	0.96
0.15	X	0	2.77	20.42	1.01

QUINSAM - QU-82-06-C

DILUTION SAMPLES : Residual Moisture, Ash, Total Sulfur, Calorific Value
Specific Gravity

SAMPL. NO	BASIS	R.M. %	ASH %	T.S. %	C.V. CAL/G	S.G. G/CM3
2	A.D.	1.36	79.07	0.04	-	2.34
	DRY		80.17	0.05		

DILUTION SAMPLES - Forms of Sulfur
(Total, Sulphate, Pyritic, Organic)

SAMPL.	BASIS	R.M. %	T.S. %	S.S. %	P.S. %	O.S. %
2	A.D.	1.35	0.05	0.01	0.03	0.01
	D.	-	0.05	0.01	0.03	0.01

APPENDIX VIII

STATEMENT OF AUTHOR'S ACADEMIC AND PROFESSIONAL QUALIFICATIONS

EM#12

STATEMENT OF QUALIFICATIONS

I, Stephen L. Gardner, am a registered Professional Geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 1977.

I have a 4 year BSc(Geology) Degree (1974) from the University of Alberta, Edmonton.

I have been an independent contract coal geologist for 5 years. I have been working in coal exploration on a continuous basis since 1975.

I authored the report entitled "1982 Exploration Program, Quinsam Property" and supervised the 1982 field operations.

My current place of residence is 274 Westwood Rd., R.R. #3, Site 'S', Nanaimo, B.C.

Dated this 6th day of December, 1983.

Signed,

Stephen L. Gardner

Stephen L. Gardner, P.Geol.

STATEMENT OF QUALIFICATIONS

STEPHEN L. GARDNER, B. Sc. Geology, P. Geol.

274 Westwood Road,
R.R. #3, Site 'S',
Nanaimo, British Columbia,
V9R-5K3
Telephone: 604/754-2278

PERSONAL INFORMATION

DATE OF BIRTH :	July 20, 1952
PLACE OF BIRTH:	Brighton, Sussex, United Kingdom
CITIZENSHIP :	Canadian

EDUCATION

Four year Bachelor of Science Degree specializing in soft-rock geology from the University of Alberta, Edmonton, Alberta, Canada (1974).

PROFESSIONAL STATUS

Active member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 1977.

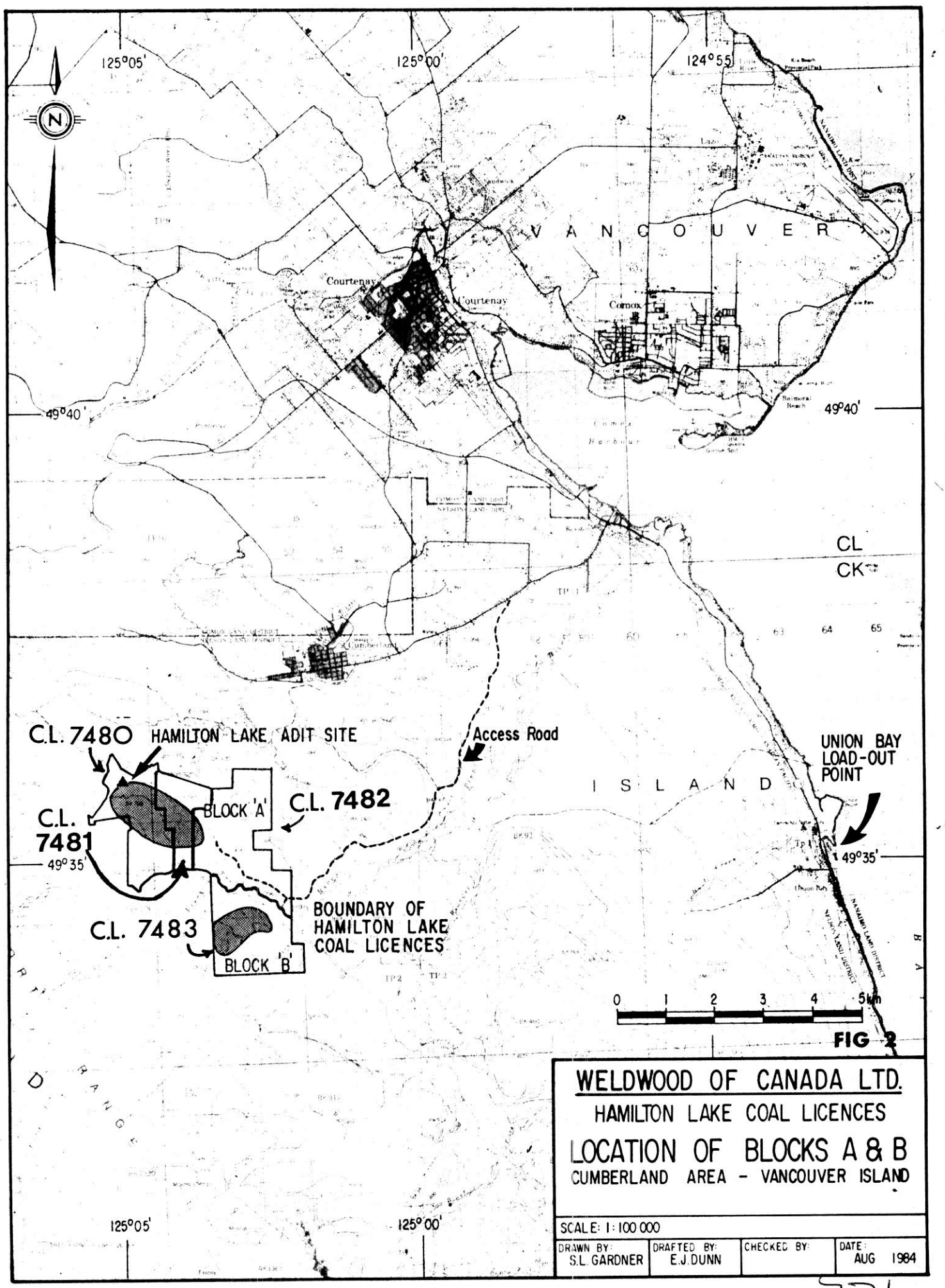
WORK EXPERIENCE

One year with the Department of the Environment, Provincial Government of Alberta as a Junior Groundwater Geologist. Responsible for field operations of two groundwater testing rigs on rural water development programs and buried channel investigations. 1974 - 1975

One year with a major Canadian coal producing company, Luscar Ltd. of Edmonton, Alberta as Plains Geologist, responsible for exploration and development work in new areas and at producing mines in Alberta and Saskatchewan. 1975 - 1976

Two years with Quinsam Coal Ltd., a Luscar Ltd. - Weldwood of Canada Limited Joint Venture Partnership, as Project Geologist, responsible for exploration and in-fill drilling and coring within the boundaries of the Quinsam Joint Venture Area. 1976 - 1978

Six years as an independent coal exploration consultant in western Canada and the western United States. -1978 to present-



WELDWOOD OF CANADA LTD.

HAMILTON LAKE COAL LICENCES

LOCATION OF BLOCKS A & B

CUMBERLAND AREA - VANCOUVER ISLAND

SCALE: 1:100 000			
DRAWN BY: S.L. GARDNER	DRAFTED BY: E.J.DUNN	CHECKED BY:	DATE: AUG 1984

731

APPE[illegible]VI

[illegible]UAL ANALYSES

731(2)

QUINSAM — BULK CLEAN COAL

CLEAN COAL - Proximate, Calorific value, Carbon dioxide
Forms of Sulphur(i.e. Total, Sulphate, Pyritic and Organic)

SAMPLE NO	BASIS	R.M. %	ASH %	V.M. %	F.C. %	C.V. GROSS CAL/G	C.V. NET CAL/G	CO2 %
SEAM 1N	A.D.	3.65	8.80	36.36	51.19	6780	6358	1.77
	DRY	-	9.13	37.74	53.13	7036	6599	1.84
SEAM 1S	A.D.	2.90	13.51	35.68	47.90	6482	6087	1.27
	DRY	-	13.91	36.74	49.75	6675	6269	1.31
SEAM 2	A.D.	3.23	9.65	38.80	48.32	6839	6408	0.82
	DRY	-	9.97	40.10	49.93	7067	6621	0.85

SAMPLE NO	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
SEAM 1N	DRY	0.37	0.00	0.07	0.30
SEAM 1S	DRY	1.03	0.01	0.34	0.68
SEAM 2	DRY	2.76	0.02	1.51	1.23

QUINSAM – BULK CLEAN COAL

CLEAN COAL : Ultimate analysis

SAMPLE NO	BASIS	R.M. %	ASH %	CARBON %	HYDROGEN %	NITROGEN %	SULFUR %	OXYGEN %
SEAM 1N	AIR DRY	3.65	8.80	70.00	4.95	0.94	0.36	14.95
	DRY	-	9.13	72.65	4.71	0.98	0.37	12.16
SEAM 1S	AIR DRY	2.90	13.51	66.07	4.58	0.70	1.00	14.14
	DRY	-	13.91	68.04	4.38	0.72	1.03	11.92
SEAM 2	AIR DRY	3.23	9.65	69.93	5.01	0.89	2.67	11.85
	DRY	-	9.97	72.26	4.80	0.92	2.76	9.29

*) Oxygen is calculated by difference
H and O on air dry basis include H and O in sample moisture

QUINSAM - BULK CLEAN COAL

CLEAN COAL - Ash analysis

COMP. NO	SIO2 %	AL2O3 %	TIO2 %	FE2O3 %	CAO %	MGO %	NA2O %	K2O %	P2O5 %	SO3 %
SEAM 1N	31.39	25.86	1.64	4.24	27.13	0.52	0.33	0.04	0.86	2.73
SEAM 1S	45.34	30.85	1.22	4.81	11.89	0.38	0.21	0.07	0.63	2.33
SEAM 2	30.79	22.70	1.24	22.91	14.22	0.47	0.27	0.11	0.69	5.06

CLEAN COAL - Slagging & Fouling indices

COMP. NO	SLAGGING	FOULING	ACID/BASE RATIO
SEAM 1N	0.20	0.18	0.54
SEAM 1S	0.23	0.05	0.22
SEAM 2	1.92	0.19	0.69

QUINSAM - BULK CLEAN COAL

CLEAN COAL - Fusibility of coal ash

ASH FUSION TEMPERATURE DEG.F

COMP. NO.	ATMOSPHERE	INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
SEAM 1N	REDUCING	2304	2345	2356	2396
	OXIDIZING	2358	2381	2390	2415
SEAM 1S	REDUCING	2570	2579	2594	2640
	OXIDIZING	2639	2642	2650+	2650+
SEAM 2	REDUCING	2261	2363	2430	2450
	OXIDIZING	2515	2532	2549	2558

ASH FUSION TEMPERATURE DEG.C

COMP. NO.	ATMOSPHERE	INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
SEAM 1N	REDUCING	1262	1285	1291	1313
	OXIDIZING	1292	1305	1310	1323
SEAM 1S	REDUCING	1410	1415	1423	1448
	OXIDIZING	1448	1450	1454+	1454+
SEAM 2	REDUCING	1238	1295	1332	1343
	OXIDIZING	1379	1388	1398	1403

[illegible] -- [illegible]

1.70 FLOAT/SINK

1.70 F - Ash, Calorific value
Forms of Sulphur(i.e. Total, Sulphate, Pyritic and Organic)

1.70 S - Ash, Forms of Sulphur

SAMPLE NO	FRACTION MM			F/S	BASIS	R.M. %	YIELD %	ASH %	GROSS C.V. CAL/G
1	25.0	X	6.7	F	A.D.	2.15	-	11.03	6875
					DRY		83.31	11.27	7026
				S	DRY		16.69	58.91	
	6.7	X	0.6	F	A.D.	2.03	-	9.42	7036
					DRY		87.82	9.62	7181
				S	DRY		12.18	61.83	
	0.6	X	0.15	F	A.D.	2.01	-	11.03	6799
					DRY		80.02	11.26	6939
				S	DRY		19.98	59.55	

SAMPLE NO	FRACTION MM			F/S	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
1	25.0	X	6.7	F	A.D.	2.58	0.01	1.18	1.39
					DRY	2.63	0.01	1.20	1.42
				S	DRY	19.65	0.67	18.42	0.56
	6.7	X	0.6	F	A.D.	2.43	0.01	1.03	1.39
					DRY	2.49	0.01	1.05	1.42
				S	DRY	13.16	0.33	12.49	0.34
	0.6	X	0.15	F	A.D.	3.43	0.02	2.08	1.33
					DRY	3.50	0.02	2.12	1.35
				S	DRY	4.31	0.07	3.39	0.85

QUINSAM -- QU-82-05

1.70 FLOAT/SINK

1.70 F - Ash, Calorific value
Forms of Sulphur(i.e. Total, Sulphate, Pyritic and Organic)

1.70 S - Ash, Forms of Sulphur

SAMPLE NO	FRACTION MM			F/S	BASIS	R.M. %	YIELD %	ASH %	GROSS C.V. CAL/G
3	25.0	X	6.7	F	A.D.	2.18	-	12.62	6735
					DRY		90.26	12.90	6885
				S	DRY		9.74	59.38	
	6.7	X	0.6	F	A.D.	2.02	-	11.33	6820
					DRY		88.91	11.57	6960
				S	DRY		11.09	59.26	
	0.6	X	0.15	F	A.D.	2.64	-	7.40	7066
					DRY		79.95	7.60	7257
				S	DRY		20.05	59.94	

SAMPLE NO	FRACTION MM			F/S	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
3	25.0	X	6.7	F	A.D.	1.48	0.01	0.49	0.98
					DRY	1.52	0.01	0.50	1.01
				S	DRY	4.12	0.05	3.57	0.50
	6.7	X	0.6	F	A.D.	1.41	0.01	0.58	0.82
					DRY	1.44	0.01	0.58	0.84
				S	DRY	3.03	0.03	2.57	0.43
	0.6	X	0.15	F	A.D.	1.24	0.00	0.19	1.05
					DRY	1.27	0.00	0.19	1.07
				S	DRY	3.92	0.02	3.48	0.42

QUINSAM - QL-82-05

1.70 FLOAT/SINK

1.70 F - Ash, Calorific value
Forms of Sulphur(i.e. Total, Sulphate, Pyritic and Organic)

1.70 S - Ash, Forms of Sulphur

SAMPLE NO	FRACTION MM			F/S	BASIS	R.M. %	YIELD %	ASH %	GROSS C.V. CAL/G
4	25.0	X	6.7	F	A.D.	1.87	-	29.76	5077
					DRY		19.73	30.33	5174
				S	DRY		80.27	68.16	
	6.7	X	0.6	F	A.D.	2.06	-	19.55	6002
					DRY		29.30	19.96	6128
				S	DRY		70.70	69.80	
	0.6	X	0.15	F	A.D.	2.08	-	10.64	6796
					DRY		42.62	10.86	6940
				S	DRY		57.38	70.74	

SAMPLE NO	FRACTION MM			F/S	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
4	25.0	X	6.7	F	A.D.	0.51	0.00	0.06	0.45
					DRY	0.52	0.00	0.06	0.46
				S	DRY	0.30	0.00	0.13	0.17
	6.7	X	0.6	F	A.D.	0.59	0.00	0.05	0.54
					DRY	0.60	0.00	0.05	0.55
				S	DRY	0.20	0.00	0.07	0.13
	0.6	X	0.15	F	A.D.	0.63	0.00	0.05	0.58
					DRY	0.65	0.00	0.05	0.60
				S	DRY	0.51	0.01	0.43	0.07

QUINSAM - QU-82-05

COMPOSITE NO = 1

FRACTION : 25.0 X 6.7 MM
SCREEN YIELD % : 61.68

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	16.20	4.62	44.33	51.05	2.06	7696
1.50	66.25	10.29	40.21	49.50	2.92	7111
1.70	5.97	29.23	35.66	35.11	4.61	5360
1.90	0.91	47.09	28.06	24.85	5.65	3605
****	10.67	63.38			14.55	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	16.20	4.62	44.33	51.05	2.06	7697	2.0
1.50	82.45	9.18	41.02	49.80	2.75	7226	2.0
1.70	88.42	10.53	40.66	48.81	2.88	7100	2.0
1.90	89.33	10.90	40.53	48.57	2.90	7065	2.0
****	100.00	16.50			4.14		

FRACTION : 6.7 X 0.6 MM
SCREEN YIELD % : 31.12

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	35.97	3.82	44.56	51.62	4.43	7698
1.50	42.92	9.76	39.52	50.72	2.68	7147
1.70	6.76	28.63	34.80	36.57	1.86	5360
1.90	2.10	41.01	31.20	27.79	6.95	3970
****	12.25	64.00			14.11	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	35.97	3.82	44.56	51.62	4.43	7698	1.5
1.50	78.89	7.05	41.82	51.13	3.48	7398	1.5
1.70	85.65	8.75	41.26	49.99	3.35	7238	1.5
1.90	87.75	9.53	41.02	49.45	3.44	7159	1.5
****	100.00	16.20			4.74		

GUNDAM — [illegible]

COMPOSITE NO = 1

FRACTION : 0.0 X 0.15 MM
SCREEN YIELD % : 4.64

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	28.99	2.64	42.91	54.45	1.63	7825
1.50	38.52	7.54	39.86	52.59	2.26	7269
1.70	7.46	22.62	38.05	39.33	2.89	6197
1.90	2.28	47.80	16.46	35.72	4.11	3174
****	22.75	64.38			10.29	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	28.99	2.64	42.91	54.45	1.63	7826	3.0
1.50	67.51	5.44	41.17	53.39	1.99	7508	2.0
1.70	74.97	7.15	40.86	51.99	2.08	7378	2.0
1.90	77.25	8.35	40.14	51.51	2.14	7254	0.0
****	100.00	21.10			3.99		

QUINGAM -- QU-92-05

COMPOSITE NO : 3

FRACTION : 25.0 X 6.7 MM
SCREEN YIELD % : 68.16

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	18.61	4.08	40.56	55.36	1.23	7729
1.50	59.50	11.17	37.85	50.98	1.47	6987
1.70	10.82	33.06	31.72	35.22	1.76	4951
1.90	5.86	50.80	26.20	23.00	1.02	3453
****	5.21	68.12			4.71	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	18.61	4.08	40.56	55.36	1.23	7729	2.0
1.50	78.11	9.48	38.50	52.02	1.41	7164	1.5
1.70	88.93	12.35	37.67	49.98	1.46	6895	1.5
1.90	94.79	14.73	36.96	48.31	1.43	6682	1.5
****	100.00	17.51			1.59		

FRACTION : 6.7 X 0.6 MM
SCREEN YIELD % : 31.33

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	29.95	3.26	40.23	56.51	1.17	7658
1.50	47.50	11.70	37.64	50.66	1.42	6859
1.70	10.82	33.13	32.16	34.71	1.97	4890
1.90	5.75	49.41	27.02	23.57	1.58	3408
****	5.98	64.94			3.71	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	29.95	3.26	40.23	56.51	1.17	7658	2.0
1.50	77.45	8.44	38.64	52.92	1.32	7193	1.5
1.70	88.27	11.46	37.85	50.69	1.40	6911	1.5
1.90	94.02	13.78	37.18	49.04	1.41	6697	1.5
****	100.00	16.84			1.55		

GUINDAM -- GU-SD-05

COMPOSITE NO : 3

FRACTION : 0.6 X 0.15 MM
SCREEN YIELD % : 4.31

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	30.96	2.53	41.74	55.73	1.21	7779
1.50	42.12	8.68	35.96	55.35	1.17	7178
1.70	10.91	34.79	25.47	39.72	1.42	4891
1.90	1.28	55.10	21.40	23.48	5.88	1813
****	14.73	64.94			3.52	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	30.96	2.53	41.74	55.73	1.21	7780	2.5
1.50	73.08	6.08	38.41	55.51	1.19	7430	1.5
1.70	83.99	9.81	36.73	53.46	1.22	7100	1.5
1.90	85.27	10.49	36.50	53.01	1.29	7021	0.0
****	100.00	18.51			1.61		

QUINSAM - QUI-NE-05

COMPOSITE NO : 4

FRACTION : 25.0 X 6.7 MM
SCREEN YIELD % : 57.79

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	0.15	3.72	40.00	56.28	1.36	7204
1.50	7.08	14.75	34.94	50.31	0.64	6333
1.70	12.74	36.82	27.99	35.19	0.53	4629
1.90	22.84	52.56	23.63	23.81	0.36	3241
****	57.19	73.23			0.22	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	0.15	3.72	40.00	56.28	1.36	7205	1.5
1.50	7.23	14.52	35.04	50.44	0.65	6352	1.5
1.70	19.97	28.75	30.54	40.71	0.58	5253	0.5
1.90	42.81	41.45	26.86	31.69	0.46	4180	0.0
****	100.00	59.63			0.32		

FRACTION : 6.7 X 0.6 MM
SCREEN YIELD % : 33.65

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	3.31	3.22	36.43	60.35	0.75	7664
1.50	15.97	10.65	34.51	54.84	0.68	6894
1.70	9.21	36.15	28.58	35.27	0.53	4616
1.90	15.08	52.68	24.29	23.03	0.37	3192
****	56.43	73.71			0.20	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	3.31	3.22	36.43	60.35	0.75	7664	1.0
1.50	19.28	9.37	34.84	55.79	0.69	7027	1.0
1.70	28.49	18.03	32.82	49.15	0.64	6247	0.5
1.90	43.57	30.02	29.87	40.11	0.55	5190	0.5
****	100.00	54.68			0.35		

QUINSAM — QU-82-05

COMPOSITE NO : 4

FRACTION : 0.6 X 0.15 MM
SCREEN YIELD % : 5.69

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	4.97	3.10	39.26	57.64	1.27	7591
1.50	35.28	7.72	35.08	57.20	0.66	7257
1.70	5.10	43.96	33.11	22.93	0.65	4004
1.90	8.52	44.54	21.22	34.23	0.22	3800
****	46.13	74.05			0.58	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	4.97	3.10	39.26	57.64	1.27	7591	1.0
1.50	40.25	7.15	35.60	57.25	0.74	7293	1.0
1.70	45.35	11.29	35.32	53.39	0.73	6928	1.0
1.90	53.87	16.55	33.09	50.36	0.65	6434	0.0
****	100.00	43.07			0.61		

QUINSAM – QU-02-05

CLEAN COAL - Proximate, Calorific value
Carbondioxide, Phosphorous, Grindability
Forms of Sulphur(i.e. Total, Sulphate, Pyritic and Organic)

SAMPLE NO	BASIS	R.M. %	ASH %	V.M. %	F.C. %	C.V. GROSS CAL/G	C.V. NET CAL/G	CO2 %	P %	HGI
1	A.D.	1.98	10.62	39.38	48.02	6936	6488	1.03	0.01	53
	DRY	-	10.83	40.18	48.99	7076	6619	1.05	0.01	-
3	A.D.	2.03	12.04	38.68	47.25	6778	6348	1.03	0.04	50
	DRY	-	12.29	38.48	48.23	6918	6480	1.05	0.04	-
4	A.D.	2.05	23.71	32.49	41.75	5641	5269	1.72	0.07	62
	DRY	-	24.21	33.17	42.62	5759	5379	1.76	0.07	-

SAMPLE NO	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
1	DRY	2.55	0.00	1.24	1.31
3	DRY	1.44	0.00	0.55	0.89
4	DRY	0.51	0.00	0.07	0.44

QUINSAM – QU-82-05

CLEAN COAL - Ash analysis

COMP. NO	SIO2 %	AL2O3 %	TIO2 %	FE2O3 %	CAO %	MGO %	NA2O %	K2O %	P2O5 %	SO3 %
1	30.18	25.85	0.66	16.45	17.13	0.56	0.23	0.10	0.34	5.68
3	43.44	27.81	0.84	9.15	13.94	0.14	0.20	0.07	0.76	3.17
4	50.40	32.31	0.84	2.29	10.74	0.14	0.18	0.07	0.68	1.13

CLEAN COAL - Slagging & Fouling indices

COMP. NO	SLAGGING	FOULING	ACID/BASE RATIO
1	1.55	0.14	0.60
3	0.47	0.07	0.32
4	0.08	0.03	0.16

QUINSAM - QU-82-05

CLEAN COAL - Fusibility of coal ash

COMP. NO.	ATMOSPHERE	ASH FUSION TEMPERATURE DEG.F INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
1	REDUCING	2264	2349	2388	2433
	OXIDIZING	2360	2514	2538	2552
3	REDUCING	2570	2596	2602	2640
	OXIDIZING	2596	2614	2630	2650+
4	REDUCING	2626	2650+	2650+	2650+
	OXIDIZING	2650+	2650+	2650+	2650+

QUINSAM - QU-82-05

CLEAN COAL - Fusibility of coal ash

COMP. NO.	ATMOSPHERE	ASH FUSION TEMPERATURE DEG.C INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
1	REDUCING	1240	1287	1308	1333
	OXIDIZING	1293	1378	1392	1400
3	REDUCING	1410	1424	1427	1448
	OXIDIZING	1424	1434	1443	1454+
4	REDUCING	1441	1454+	1454+	1454+
	OXIDIZING	1454+	1454+	1454+	1454+

QUINSAM - QU-82-05C

DILUTION SAMPLES - Fusibility of coal ash

COMP. NO.	ATMOSPHERE	ASH FUSION TEMPERATURE DEG.C INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
2	REDUCING	1454+	1454+	1454+	1454+
	OXIDIZING	1454+	1454+	1454+	1454+
5	REDUCING	1454+	1454+	1454+	1454+
	OXIDIZING	1454+	1454+	1454+	1454+

(2)

(15)

GUINSAM — GUI-82-05

1.7 SILT - Ash analysis

COMP. NO	SIO2 %	AL2O3 %	TIO2 %	FE2O3 %	CAO %	MGO %	MN3O %	K2O %	P2O5 %	SO3 %
1	18.25	15.63	0.74	55.68	5.69	0.14	0.13	0.13	1.10	1.51
3	51.02	29.52	1.22	6.61	8.28	0.33	0.17	0.20	0.16	0.49
4	59.31	35.00	1.14	1.32	1.91	0.05	0.13	0.10	0.05	0.32

GUINSAM PROJECT

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QUINSAM - [illegible]

1.70 FLOAT/SINK

1.70 F - Ash, Calorific value
Forms of Sulphur (i.e. Total, Sulphate, Pyritic and Organic)

1.70 S - Ash, Forms of Sulphur

SAMPLE NO	FRACTION MM			F/S	BASIS	R.M. %	YIELD %	ASH %	GROSS C.V. CAL/G	
1	25.0	X	6.7	F	A.D.	1.82	-	15.43	6437	53.27
					DRY		91.74	15.72	6556	
				S	DRY		8.26	54.91		
	6.7	X	0.6	F	A.D.	1.98	-	12.35	6723	32.1 -
					DRY		90.55	12.60	6859	
				S	DRY		9.05	54.21		
	0.6	X	0.15	F	A.D.	2.35	-	9.16	6869	3.40
					DRY		80.61	9.38	7034	
				S	DRY		19.39	56.42		

SAMPLE NO	FRACTION MM			F/S	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
1	25.0	X	6.7	F	A.D.	0.97	0.00	0.45	0.52
					DRY	0.99	0.00	0.46	0.53
				S	DRY	1.01	0.00	0.97	0.04
	6.7	X	0.6	F	A.D.	0.84	0.00	0.28	0.56
					DRY	0.86	0.00	0.29	0.57
				S	DRY	2.38	0.01	2.03	0.34
	0.6	X	0.15	F	A.D.	0.68	0.00	0.12	0.56
					DRY	0.70	0.00	0.12	0.58
				S	DRY	1.91	0.01	1.62	0.28

GUNNAM -- QLI-83-06.

COMPOSITE NO = 1

FRACTION : 25.0 X 6.7 MM
SCREEN YIELD % : 53.27

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	27.04	4.45	40.11	55.44	0.73	7651
1.50	45.61	12.73	36.89	50.38	0.92	6777
1.70	19.99	33.63	31.07	35.30	1.03	4787
1.90	5.41	48.68	25.87	25.45	1.35	3446
****	1.95	63.32			2.54	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	27.04	4.45	40.11	55.44	0.73	7652	2.0
1.50	72.65	9.65	38.09	52.26	0.85	7103	1.5
1.70	92.64	14.82	36.57	48.61	0.89	6603	1.5
1.90	98.05	16.69	35.98	47.33	0.91	6429	1.5
****	100.00	17.60			0.94		

FRACTION : 6.7 X 0.6 MM
SCREEN YIELD % : 38.36

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	32.12	3.27	39.92	56.81	0.72	7739
1.50	43.75	11.22	36.31	52.47	0.88	6954
1.70	15.00	33.81	30.82	35.37	0.94	4838
1.90	5.83	48.11	26.88	25.01	1.21	3458
****	3.30	60.72			3.75	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	32.12	3.27	39.92	56.81	0.72	7739	2.0
1.50	75.87	7.85	37.84	54.31	0.81	7287	1.5
1.70	90.87	12.14	36.68	51.18	0.83	6883	1.5
1.90	96.70	14.31	36.09	49.60	0.86	6670	1.5
****	100.00	15.84			0.95		

GLENSAM – GLI-SUP-OC.

COMPOSITE NO : 1

FRACTION : 0.6 X 0.15 MM
SCREEN YIELD % : 5.60

Float/Sink

FRACTIONAL

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G
1.30	32.06	2.32	39.94	57.74	0.67	7652
1.50	39.04	9.09	35.31	55.60	0.72	7233
1.70	13.27	29.11	30.78	40.09	0.70	5212
1.90	6.50	41.68	35.94	22.38	0.42	4200
****	9.13	63.66			1.92	

CUMULATIVE

S.G.	YIELD %	ASH %	V.M. %	F.M. %	S %	C.V. CAL/G	FSI
1.30	32.06	2.32	39.94	57.74	0.67	7653	2.0
1.50	71.10	6.04	37.40	56.56	0.70	7423	1.5
1.70	84.37	9.67	36.36	53.97	0.70	7075	1.5
1.90	90.87	11.96	36.33	51.71	0.68	6869	1.0
****	100.00	16.68			0.79		

QUINSAM -- QU-92-05.

CLEAN COAL - Proximate, Calorific value
Carbondioxide, Phosphorous, Grindability
Forms of Sulphur(i.e. Total, Sulphate, Pyritic and Organic)

SAMPLE NO	BASIS	R.M. %	ASH %	V.M. %	F.C. %	C.V. GROSS CAL/G	C.V. NET CAL/G	CO2 %	P %	HGI
1	A.D.	1.92	14.40	35.78	47.90	6563	6105	1.23	0.03	48
	DRY	-	14.68	36.48	48.84	6691	6224	1.25	0.03	-

SAMPLE NO	BASIS	T.S. %	S.S. %	P.S. %	O.S. %
1	DRY	0.91	0.00	0.44	0.47

QUINSAM - QU-82-06

CLEAN COAL - Ash analysis

COMP. NO	SIO2 %	AL203 %	TIO2 %	FE203 %	CAO %	MGO %	NA20 %	K20 %	P205 %	SO3 %
1	42.11	33.86	0.73	6.02	11.87	0.41	0.15	0.09	0.47	3.39

CLEAN COAL - Slagging & Fouling indices

COMP. NO	SLAGGING	FOULING	ACID/BASE RATIO
1	0.22	0.04	0.24

QUINSAM — QU-82-06

CLEAN COAL - Fusibility of coal ash

ASH FUSION TEMPERATURE DEG.F

COMP. NO.	ATMOSPHERE	INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
1	REDUCING	2616	2637	2645	2650+
	OXIDIZING	2650+	2650+	2650+	2650+

GUINSAM - QU-32-06

CLEAN COAL - Fusibility of coal ash

COMP. NO.	ATMOSPHERE	ASH FUSION TEMPERATURE DEG.C INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
1	REDUCING	1435	1447	1451	1454+
	OXIDIZING	1454+	1454+	1454+	1454+

QUINSAM – QU-82-06C

DILUTION SAMPLES - Fusibility of coal ash

ASH FUSION TEMPERATURE DEG.C

COMP. NO.	ATMOSPHERE	INITIAL DEFORMATION	SOFTENING	HEMISPHERICAL	FLUID
2	REDUCING	1454+	1454+	1454+	1454+
	OXIDIZING	1454+	1454+	1454+	1454+

QUINSAM – QU-82-06

1.7 SINK - Ash analysis

COMP. NO	SIO2 %	AL2O3 %	TIO2 %	FE2O3 %	CAO %	MGO %	NA2O %	K2O %	P2O5 %	SO3 %
1	47.11	29.93	0.98	4.41	13.19	0.09	0.11	0.13	0.11	1.40

QUINSAM PROJECT

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