

K-TRENT MOUNTAIN 76(1)A 1 of 7

1976 EXPLORATION ON B.C. COAL LIC.  
Z1 + Z2

E.W. BERESFORD

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APRIL 1977

OPEN FILE

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

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1 of 7

K-TENT MOUNTAIN 76(1)A  
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# OPEN FILE

B. C. REG. NO. - 436/75 - COAL ACT 1974

RECEIVED

COLEMAN COLLIERIES LIMITED

1976 EXPLORATION ON B. C. COAL LICENCES 21 AND 22

N. T. S. MAP REF. 82G/10E

By: E. W. Beresford, C.E.T.

April, 1977

APRIL, 1977

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- 1.0 Introduction
- 2.0 Exploration 1976
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- 5.0 Survey Procedure
- 6.0 Statement of Qualifications.

## A P P E N D I C E S

- I. Index Map Scale 1/50,000
- II. Geological Map Scale 1/50,000
- III. Topographical Map, showing Licences, Drill Holes. Scale 1" = 800 ft.
- IV. Adit Plans and Sections.
- V. Copy of Licence form - Valuation of Work 1976
- VI. Drill Hole Data 1976, Lithology, Seam Analyses, Gamma Ray Neutron Log Sidewall Density Log.
- VII. Topographic Map, Outcrops etc. Scale 1" = 400' and Cross-Sections (to be sent under separate cover)

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## I N T R O D U C T I O N

Tent Mountain is situated in the S.W. part of Alberta and straddles the inter-provincial boundary into S.E. British Columbia.

(See Index Map - Appendix 1)

Coleman Collieries Limited have coal licences Nos. 21 and 22 totalling 378 acres in British Columbia with exploration and mining agreements with Crows Nest Industries covering Licence 412 and Kaiser Resources Limited part Lot 4859.

At the present time the Company operates 2 Surface Mines on Tent Mountain, the No. 4 Pit wholly in Alberta and No. 3 Pit partly in Alberta and partly in British Columbia. (Mine Permit No. 108).

Extensive exploration work has been carried out since 1973 to date comprising core drilling, trenching, adit work and surface geological mapping. A total coal reserve of 85 million raw short tons has been proved down to the 2,000 ft. cover line, on the East Flank of Tent Mountain.

This coal reserve has a surface mine potential of some 35m tons, 22m B. C., 13m Alberta, the remainder being allocated for underground mining. A prospectus on the proposed development to extract these reserves at Tent Mountain was submitted to the British Columbia Department of Mines in March 1977 - and the Alberta-Energy Resources Conservation Board.

The following text outlines the exploration work carried out in British Columbia during the 1976 program, both on our own licences and adjacent licences. (See Plan App. 111)

2.0

## E X P L O R A T I O N - 1976

Following on from the 1975 program, surface mapping has been

(2)

Exploration - continued

extended from the Company's Licences 21 and 22 through to the Corbin Road.

Seam Nos. 2,4 and 5 as described in the 1976 Report were followed through the area and exposed by hand trenching and D6 Bulldozer.

Adits were driven in the No. 2 and No.4 Seams along strike to a distance of 186 ft. and 245 ft. respectively (See App. IV)

A bulk sample, approx. 7 to 10 tons, was taken from each seam, No. 2 Seam, 33.4 ft. true thickness, No. 4 Seam 18.4 ft. true thickness, and washed in the Birtley pilot washery in Calgary.

Proximate analyses were conducted on the raw and clean coal with samples being sent for carbonisation tests to U.S.A. and Japan.

The analyses were as follows, at a 1.60 sp. gravity with froth flotation to the -28 mesh fraction:-

<u>No. 2 Seam</u>	<u>Yield</u>	<u>Ash</u>	<u>F.S.I.</u>	<u>Sulphur</u>	<u>V.M.</u>	<u>Btu/lb.</u>
Raw	-	29.8	3	-	-	-
Clean	61.4	15.1	4	0.66	26.1	13,500

No. 4 Seam

Raw	-	29.6	3½	-	-	-
Clean	69.8	11.3	5½	0.56	24.8	13,400

A total of 1,980 yards (1.12 miles of new access road was made to gain access to the Adits and drill sites, with 0.12 being on the Company's licences.

A total of 13 drill holes comprising 12,473 ft. of NQ and HQ core drilling was carried out with 1,861 ft. (3 holes) on the Company's

(3)

Exploration - continued

licences and 10,612ft. on the adjacent Kaiser holdings.

Diamond drilling was contracted out to the Tonto Drilling Company, Vancouver using 38-1, 44-4 and 44-6 wireline skid-mounted drills.

All the holes were mechanically logged by Roke Oil, Calgary for Gamma Ray Neutron, and Sidewall Density tests.

Coal cores were sent to Warnock Hersey, Calgary for proximate analyses, the results tabulated with the drill hole data for each hole.

Detailed surface mapping of the area has been carried out and an up-dated geological interpretation made by our Consultant geologist Mr. P. Dyson.

Geological sections, structure maps and the topographical map are currently being drafted and will be forwarded within the next 2 weeks as an addendum to this report.

All the core is stored in the Coleman Plant site in 5 ft. x 1 ft. wooden boxes, marked with Hole and Box No.

3.0

E X P L O R A T I O N - 1977

Based on the proposed surface mining plan, a small program of infill drilling is anticipated this coming season, to determine seam structure details within the pit design. A further 2 adits in Seams No. 5 and No. 6 are planned to supplement the quality information obtained from drilling programs.

A supplemental plan of operations will be submitted within the next 2 weeks.

(4)

Exploration - 1977 continued

4.0

RESERVE ESTIMATE AND QUALITY

As outlined in the introduction, a total in-situ reserve of 85.16 million raw short tons has been estimated down to the 2,000 ft. cover line, split between Alberta 44.16m tons and British Columbia 41.0m tons with recoverable coal estimated at 29.0m and 30.8m tons respectively.

The estimated quality from each seam is given below:

RAW ANALYSIS

<u>SEAM NO.</u>	<u>Ash</u>	<u>F.S.I.</u>	
2	29.2	2.5	
4	28.0	3.0	
5	25.4	4.0	
6	23.0	5.5	----

Kaiser (Canada) Engineering are presently designing a Coal Preparation plant to effectively wash the seams to a metallurgical blend.

5.0

S U R V E Y   P R O C E D U R E

The area was mapped to a scale of 1" = 200' by photogrammetrical means, after survey control points were established by Burnett Resource Surveys Ltd. prior to flying.

The Universal Transverse Mercator grid, the Alberta Township Grid System and the #4 Pit Grid system are superimposed on the plans.

## Survey Procedure - continued

The British Columbia - Alberta inter-provincial boundary monuments established by R. W. Cautley D.L.S. in 1914 were used as the base lines for the Tent Mountain surveys. From these base lines a network of stations were established by:

- (a) triangulation
- (b) Distomat and Tellurometer
- (c) traverse surveys

All drill holes, trenches and road systems were traversed by theodolite from base lines and points plotted by co-ordinates.

Mile Post 6 of the McLatchie meridian has been tied in to the above grid system and this meridian line forms the west boundary line of Licences 21 and 22.

The local #4 Pit grid system is based on a grid north line of  $7^{\circ} 10' 00''$  West of Astro North with Monument 89F having coordinates of 1828.45 ft. east and 1751.02 ft. north with an elevation of 7,048.7 ft.

All cross-sections are drawn throughout the area on this #4 Pit Grid system at 500 ft. intervals.

The U.T.M. co-ords. for Monument 89F are 2,187,591.36 ft. east and 18,014,031.66 ft. north elevation 7,048.7 ft., with the U.T.M. north line being  $1^{\circ} 48' 00''$  east of Astro North.

## 6.0

STATEMENT OF QUALIFICATIONS

E. W. Beresford: Exploration Manager

Qualifications: Certified as Engineering Technologist (Mining) in Alberta.

Qualified Mining Surveyor (1956) with Higher National certificate (U.K.) Mining & Geology

City & Guilds Final in Surveying, Mining & Geology

(6)

Statement of Qualifications - continued

Surface Coal Mine Manager's Certificate (Alberta)

Coal Mine Surveyor's Certificate (Alberta)

Professional Engineer of Alberta (Pending examination)

Experience: From 1951 - 1969 working for the National Coal Board in various capacities as a Mining Surveyor and Mine Planning Engineer with main experience in underground mining but with some open-pit experience.

From 1969 - 1977 employed in the coal industry in Western Canada for McIntyre Mines Ltd. and Coleman Collieries Ltd. in Planning, Geological and Exploration work, including Environmental aspects of mining.

Experience in the coal industry amounting to 26 years.

C.A. Brazzoni - Geologist

Degree in Geology from University of Calgary (1974) and employed as Geological Assistant with Coleman Collieries since March, 1975. Previous experience in coal exploration and open-pit work with Kaiser Resources Ltd.

Professional Geologist of Alberta (Pending)

The compilation of this report including field and drilling supervision was carried out by Mr. E. W. Beresford with the assistance of Mr. C. Brazzoni.

The geological interpretation and final presentation was checked out and agreed by the Company's Geological Consultant Mr. P. Dyson.

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Statement of Qualifications - continued

Signed:

E.W. Beresford.

E. W. Beresford, P.E.T.  
Exploration Manager

April 11th, 1977





## DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

## APPLICATION TO EXTEND TERM OF LICENCE

1. I, Eric W. Beresford (Name)  
Box 118, (Address)  
Coleman, Alberta.

agent for Coleman Collieries Limited (Name)  
Box 640, (Address)  
Coleman, Alberta.

Valid FMC No. 151368

hereby apply to the Minister to extend the term of Coal Licences No(s). 21 and 22  
for a further period of one year.

2. I have performed, or caused to be performed, during the period January 26th, 1076 to  
April 1st, 1977, work to the value of at least \$ 250,649  
on the location of coal licences as follows:

## CATEGORY OF WORK

	Licence No(s).	Apportioned Cost
Geological mapping	- - -	<u>3,250</u>
Surveys: Geophysical	- - -	-
Geochemical	<u>Grouped</u>	-
Other	<u>21 and 22</u>	<u>2,240</u>
Road construction	- - -	<u>8,100</u>
Surface work	- - -	<u>5,200</u>
Underground work	- - -	<u>24,940</u>
Drilling	- - -	<u>38,129</u>
Logging, sampling, and testing	- - -	<u>19,088</u>
Reclamation	- - -	<u>2,150</u>
Other work (specify) Off property	- - -	<u>15,552</u> <u>132,000</u>

3. I wish to apply \$ 250,649 of this value of work on Coal Licence(s)\* 21 and 22

4. I wish to pay cash in lieu of work in the amount of \$ - on Coal Licence(s)  
No(s). -

5. I wish to apply \$ - of this value of work to claim a refund of cash in lieu of work in  
the amount of \$ - which was paid to extend the term of Coal Licence(s) No(s).  
from -  
to -, 19-. Mining Receipt No. -

for prior payment of cash in lieu of work is attached for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled -

Exploration Program 1976 - Licences 21 and 22

E.W. Beresford  
(Signature and Appliance)

Exploration Manager

(Date)

\* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

## FOR DEPARTMENTAL USE ONLY

Value of work reported \$ \_\_\_\_\_ Value of work applied on licences \$ \_\_\_\_\_  
Value of work approved \$ \_\_\_\_\_ Value of credit remaining \$ \_\_\_\_\_

Work performed. Yes  No

The program of operations detailed hereunder was carried out during the period from January 25, 1976 to April 1st, 1977. Total costs are \$ 250,649, an average of \$ 663 per acre.

GEOLOGICAL MAPPING Yes  No  Cost \$ 3,250

	Area (Acres)	Scale	Time
Reconnaissance	-		
Detail: Surface	378	1" = 200'	July - Dec. 1976
Underground	-	-	
Other (specify)	Kaiser/C.N.I.	Licences adjacent	

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes  No  Cost \$ -

Method Line miles

OTHER SURVEYS Yes  No  Cost \$ 2,240

Grid Universal Transvers Topographic Photo-mapping Other Traverse surveys  
Mercator

ROAD CONSTRUCTION Yes  No  Cost \$ 8,100

Length: On Licences 0.12 Access (off licences) 1.0 Mile

SURFACE WORK Yes  No  Cost \$ 3,200

	Length	Licence Number(s)
Trenching	-	)
Seam tracing	-	)
Crosscutting	100 Yds.	Grouped 21 and 22
Other	Moving Drill Rigs/Snow Ploughing	

UNDERGROUND WORK Yes  No  Cost \$ 24,940

Test adits: Number 1 Average length 245 ft. Total footage 245 (#4 Seam)  
Other workings: Area C.N.I. Licence 412 Total footage 186 (#2 Seam)  
(Not included in cost above)

DRILLING Yes  No  Cost \$ 38,129

Core: Diamond <input checked="" type="checkbox"/>	Wireline <input checked="" type="checkbox"/>	Hole Size	Number of Holes	Total Footage	
Core: Diamond <input checked="" type="checkbox"/>	Wireline <input checked="" type="checkbox"/>	1 1/2 (2 1/2")	NQ (2")	3	1,861 ft.

Rotary: Conventional

Reverse circulation

Other

Contractor Tonto Drilling Co. Ltd. Where core stored Coleman, Alberta.

LOGGING, SAMPLING, AND TESTING (check) Yes  No  Cost \$ 19,088

Lithology: Drill samples  Core samples  Bulk samples

Logs: Gamma-Neutron  Density  Other

Testing: Prox. analysis  FSI  Washability

Carbonization  Petrographic  Plasticity  Other

OTHER WORK (specify details) Water truck, supervision Cost \$ 15,510  
Consultants

REPORTS:

Reclamation work (Permit No. 108) Detail of work 1976 Annual Report on

(1) Reclamation (submitted 7th March 1977 to Mr. J. D. McDonald)

(2) Prospectus - Tent Mountain concept March 1977 Cost \$ 2,100

OPERATIONS:

Work was supervised by E. W. Beresford Position Exploration Manager

Is this person a registered or licensed Professional Engineer in British Columbia? Yes  No

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

\* If reclamation work reported in separate report give details of report identification.

**VALUATION OF WORK: COST STATEMENT**  
 (Sec. 27, B.C. Reg. 436/75)

**ON-PROPERTY COSTS:** For period from January 25th 1976 to April 1st, 1977

**1. OPERATOR'S FEES, SALARIES, AND WAGES:**

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	\$105	32	6,720
Machine operators and support	1	\$ 92	35	3,220
Miners (+ Fireboss)	3	\$137	39	16,029
Other (Surveyors)	2	\$ 85	8	1,360
				Total operator's costs \$ 27,329

**2. CONTRACTORS AND CONSULTANTS:**

Name	Service	Contract Amount
Nohels Logging(Frenie)	D7 Cat Dozer	6,460
R. Johnson	D6 Cat. Dozer	2,080
Tonto Drilling Co. Ltd.	Dia. Drilling	37,540
P. Dyson Consultants	Geological Interpretation	2,500
Burnet Resource Surveys	Photogrammetry	2,000
Salloway Drafting	Drafting	1,500
		Total contractor and consultant costs \$ 52,080

**3. EQUIPMENT AND INSTRUMENTS USED: Owned \_\_\_\_\_ Rented \_\_\_\_\_**

Type	Rented From	Amount
Survey Instruments	Owned by Coleman Collieries Ltd	-
D8 Cat Dozer	Owned by " "	2,500
800 Ga. Water Truck (4 x 4)	" " "	7,020
3,000 c.f.m. compressor	Calgary Rentals	2,068

Total equipment and instrument rentals \$ \_\_\_\_\_

**4. FIELD CAMP COSTS:**

	Amount
Food	
Accommodation	
Fuel	
Other	N I L
	Total field camp costs \$ _____

**5. SAMPLING, ANALYSIS, AND TESTING:**

Service	Performed by	Amount
Analysis of Core Samples(Coal)	Warnock Hersey	2,890
Drill Hole Logging	Roke Oil Ltd.	2,698
Analysis of Bulk Adit Sample	Birtley Engineering	7,300
Pilot Wash	" " Calgary	
Carbonisation Testing	Eastern Research (Chicago)	6,200
	Totals, samplings, analysis, and testing \$ 19,088	

**6. SUPPLIES AND MATERIALS COSTS:**

	Amount
Process supplies	589
Operating and maintenance supplies	850
Office and technical supplies	600
Other supplies and materials	
	Total, supplies and materials \$ 2,039

**7. TRANSPORTATION COSTS (Ground transportation details):**

Vehicles	Owner	Rental Rate	Amount
1 - 4 x 4 GMC Truck	Coleman Collieries Ltd.	\$475. month	\$1,425
1 - 4 x 4 Ford Crew Cab	Rentway	\$475. month	\$ 950.

**Air support details:**

Aircraft Type	Owner	Charter
Helicopter	Banff Helicopters	\$1,200
		Total transportation costs \$ 3,575

**8. RECLAMATION WORK:**

Roads, berms, ditching, seeding, adit-clean-up, drill sites \$ 2,950

**9. TRAVEL EXPENDITURES (operator's costs only):**

Number of Personnel	Number of Trips	Amount
		Total travel expenditures \$
		Total costs \$ 118,649

(Sects. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from January 25th 1976 to April 1st 1977

Amount

- (a) Logistics and field support \$ -
- (b) Technical and feasibility studies Environmental & technical 102,000
- (c) Preparation of reports Prospectus - submitted March 1977 30,000
- (d) Supplies and services -
- (e) Mobilization and demobilization of equipment Included in drilling cost -
- (f) Travelling expenses (Itemize) -

Supporting Cost Statements Attached

Total \$ 132,000

Amount

Total supporting costs \$ -

**SUMMARY**

On-property costs	\$ 118,649
Off-property costs	\$ 132,000
	Total costs \$ 250,649

Statement of costs verified by E. Walton

201-675-8196

(Date)

(Signature and position)

Controller

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1976 EXPLOSIONS ON BC COAL LIC  
21 + 22

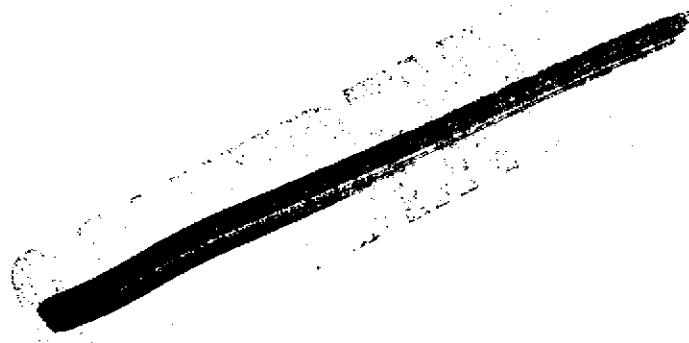
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Exploration - 1977 continued

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RESERVE ESTIMATE AND QUALITY

As outlined in the introduction, a total in-situ reserve of 85.16 million raw short tons has been estimated down to the 2,000 ft. cover line, split between Alberta 44.16m tons and British Columbia 41.0m tons with recoverable coal estimated at 29.0m and 30.8m tons respectively.

The estimated quality from each seam is given below:

SEAM NO.	RAW ANALYSIS		CLEAN - 1.60 Sp. gravity with froth Flotation of -100M					
	Ash	F.S.I.	Ash	F.S.I.	Sulphur	Vol.M.	B.T.U./lb.	Yield
2	29.2	2.5	14.40	4.0	0.65	26.1	12,500	62.3
4	28.0	3.0	13.30	4.5	0.52	25.4	13,000	63.0
5	25.4	4.0	9.00	5.5	0.33	25.9	14,000	67.70
6	23.0	5.5	6.88	7.5	0.34	27.7	13,800	82.63

Kaiser (Canada) Engineering are presently designing a Coal Preparation plant to effectively wash the seams to a metallurgical blend.

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S U R V E Y   P R O C E D U R E

The area was mapped to a scale of 1" = 200' by photo grammatical means, after survey control points were established by Burnett Resource Surveys Ltd. prior to flying.

The Universal Transverse Mercator grid, the Alberta Township Grid System and the #4 Pit Grid system are superimposed on the plans.

## MOUNTAIN

## 1976 DRILLING PROGRAM

LOCATION	COMPANY	HOLE No.	CO-ORDINATES			SEAM No.	COAL INTERVAL	POSSIBLE RECOVERY	ACTUAL RECOVERY	PERCENT RECOVERY	TOTAL DEPTH	COST \$
			LATITUDE	DEPARTURE	ELEVATION	GRID						
S. C. Licences	Tonto Drilling Ltd	TD-76-86 (90°)	14° 9' 93N 13875.6 N	2519.91E 88316.0 E	6664.4' U.T.M.	#4 Pit U.T.M.	104.2' - 149.5' 484.0' - 490.0' 495.3' - 587.5' 817.0' - 842.8'	45.3' 6.0' 92.2' 25.8'	42.4' 3.3' 65.1' 22.8'	93.6 55.0 70.6 88.4	855.5'	
		TD-76-96 (73° E)	1269.71N 13709.0 N	2808.65E 88634.6 E	6558.1' U.T.M.	#4 Pit U.T.M.	100.3' - 120.6'	20.3'	9.7'	47.8	129.0'	
		TD-76-98 (80° E) Az. 79° 47'	13709.1 N	88633.2 E	6559.1' U.T.M.	#4 Pit U.T.M.	110.2' - 129.7' 158.3' - 180.8' 233.8' - 246.9' 771.5' - 800.2'	19.5' 22.5' 13.1' 28.7'	16.6' 21.9' 10.1' 11.0'	85.1 92.3 77.1	876.0'	
		TD-76-99 (90°)	1572.8 N 13848.97N	1785.8 E 87577.01E	7007.7' U.T.M.	#4 Pit U.T.M.	281.0' - 296.0' 1164.5' - 1182.0' 1376.0' - 1391.0' 1471.0' - 1477.0' 1646.0' - 1698.5' 1835.0' - 1851.5'	15.0' 17.5' 15.0' 5.0' 52.5' 16.5'	14.3' 11.0' 11.3' 4.1' 34.4' 11.0'	95.3% 62.8% 75.3% 82.0% 65.5% 66.6%	1,879.0'	
		TD-76-100 (45° E) Az. 76° 04'	195.85N 12469.3 N	1660.45E 87667.8 E	6447.0' U.T.M.	#4 Pit U.T.M.	556.0' - 673.0' 842.0' - 852.8' 876.0' - 898.0'	117.0' 10.8' 22.0'	66.9' 8.2' 17.1'	57.2% 76.0% 77.1%	918.0'	

## MOUNTAIN

1976 DRILLING PROGRAM

LOCATION	COMPANY	HOLE No.	CO-ORDINATES				SEAM No.	COAL INTERVAL	POSSIBLE RECOVERY	ACTUAL RECOVERY	PERCENT RECOVERY	TOTAL DEPTH	COST \$	
			LATITUDE	DEPARTURE	ELEVATION	GRID								
E.C. Licences Continued	Tonto Drilling Ltd.	TD-76-102 (55° E) Az 82° 16'	147.89N	2160.69F	6525.4'	#4 Pit		158.7' - 239.6' 484.2' - 497.9' 920.8' - 949.0'	80.9' 13.7' 28.2'	70.6' 4.8' 14.8'	87.3% 35.0% 52.5%			
		TD-76-103 (90°)	-3820.57N 8259.8 N	106.66F 86759.0 F	5054.8'	#4 Pit U.T.M.							976.0'	
		TD-76-104 (90°)	-4238.1 N 8035.19N	1311.64F 88014.33F	5214.21'	#4 Pit U.T.M.							525.0'	
		TD-76-105 (70°) Az grid E.	951.2 N 13136.65N	1155.0 F 87050.8 F	6618.0'	#4 Pit U.T.M.		271.5' - 286.0'	14.5'	12.3'	84.8%		1,017.0'	
						Hole aborted at 1,255.0', rods stuck in hole.							1,255.0'	
		TD-76-106 (60° E)				Hole aborted at 106' due to poor drilling conditions restart on same location 106A (66° E).								106.0'
		TD-76-106A (66° E) Az 75° 18'	2936.59N 9342.7 N	1452.28F 87950.4 E	5536.3'	#4 Pit U.T.M.		488.0' - 495.0' 501.0' - 534.0' 1035.0' - 1064.8'	7.0' 33.0'	2.6' 12.1'	37.1% 36.6%		1,270.0'	

DEPT. OF STATE

### 1976 DRILLING PROGRAM

LOCATION	COMPANY	HOLE No.	CO-ORDINATES				SEAM No.	COAL INTERVAL	POSSIBLE RECOVERY	ACTUAL RECOVERY	PERCENT RECOVERY	TOTAL DEPTH	COST \$
			LATITUDE	DEPARTURE	ELEVATION	GRID							
E.C. Licences Continued	Tento Drilling Ltd.	TD-76-107 (60° E) Az. 78° 22'	-3586.39° 8739.7 N	1701.55° 88297.9 E	5504.3°	#4 Pit U.T.M.		280.5' - 308.0' 595.0' - 628.0'	27.5' 33.0'	17.7' 18.1'	64.3% 54.8%	796.0'	
		TD-76-107A (90°)			Hole aborted at 61'. Same site as TD-76-107							61.0'	
		TD-76-113 (60° E)	-1970.95 N 10316.2 N	1578.43 E 87924.5 E	5738.7'	#4 Pit U.T.M.		Hole aborted at 8' of casing. No water truck available.					
		TD-77-117 (60.5° E)	-4878.4 N 7438.8 N	1543.3 E 88342.9 E	5178.46'	#4 Pit U.T.M.						655.0'	
		TD-77-119 (63° E)	-1970.95 N 10316.2 N	1578.41 E 87924.5 E	5738.7'	#4 Pit U.T.M.	Note- This hole on location of TD-76-113	308.5' - 340.4' 363.5' - 373.7' 826.5' - 860.2'	31.9' 10.2' 33.7'	12.1' 8.3' 25.0'	37.9% 81.4% 74.2%	1,155.0'	

COLEMAN COLLIERIES LIMITED

TD-76-86 (90°)

August 31st, 1976.

0.0' - 14.0' No core (tricone casing)

14.0' - 42.0' Mudstone/siltstone, dark in color, few interbeds of lighter fine grained sandstone, fractured and weathered.

34.0' - B.C.A. - 28°

42.0' - 70.0' Interbedded dark mudstone/siltstone with lighter fine grained sandstone, X-bedding, whole zone is quite broken with weathering evident (iron staining).

B.C.A.'s approximately 20°

70.0' - 104.2' Sandstone, light grey color, fine-medium grained, interbeds of dark mudstone, X-bedding evident, hairline fractures with calcite infilling, core is generally broken with weathering evident.

85.0' - med.-coarse grained - B.C.A.'s - 10° - 15°

Last 1' of zone H.W. of coal, very broken gouge.

104.2' - 149.5' COAL ZONE

	Possible	Actual	Description
104.2' - 107.0'	2.8'	2.8'	Claro-durain
107.0' - 110.0'	3.0'	2.9'	First 1' hard claro-durain remaining slurry of coal and water
110.0' - 113.0'	3.0'	3.0'	broken claro-durain
113.0' - 116.5'	3.5'	3.5'	hard claro-durain pieces
116.5' - 119.5'	3.0'	3.0'	broken claro-durain
119.5' - 122.5'	3.0'	1.3'	remaining bone type coal slickensided
122.5' - 126.0'	3.5'	3.4'	hard claro-durain pieces
126.0' - 129.0'	3.0'	3.0'	hard claro-durain pieces
129.0' - 133.0'	4.0'	4.0'	claro-durain
133.0' - 138.0'	5.0'	5.0'	claro-durain, odd small vitrain parting
138.0' - 142.0'	4.0'	4.0'	broken claro-durain
142.0' - 145.5'	3.5'	3.2'	broken claro-durain
145.5' - 149.5'	4.0'	3.3'	broken claro-durain
	<u>45.3'</u>	<u>42.4'</u>	

Recovery 93.6%

149.5' - 182.0' Mudstone/siltstone, dark few laminae of lighter very fine grained sandstone interbedded, slickensided fractures, whole zone is generally heavily fractured, some carb. material.

151.0' - B.C.A. - 18°

182.0' - N.Q. core

182.0' - 189.0' Sandstone, light grey color, very fine - fine grained laminae, X-bedding.

188.0' - B.C.A. - 31°

- 189.0' - 197.0' Carbonaceous shale.
- 197.0' - 248.0' Mudstone/siltstone, dark color, few slickensided fractures, odd hairline fracture with calcite infilling, odd small carb. parting.
- 226.0' - lighter sandstone partings appearing
  - B.C.A. - 31
  - sandstone portion increasing down section
- 248.0' - 269.0' Sandstone, med. grey, very fine - fine grained, X-bedding, few hairline fractures with calcite infilling.
- 264.0' - sandstone lightens in color and coarsens to fine - medium grained - B.C.A. - 34
- 269.0' - 484.0' Mudstone/siltstone, dark color, hairline fractures with calcite infilling, odd slickensided fracture, bedded zones.
- 290.0' - zone becomes slightly sandy
  - 300.0' - small 4" coal parting Sept. 3/76
  - 303.0' - 304.0' - broken shattered core, sandy appearances tends to disappear
  - 325.0' - B.C.A. - 15
  - 329.5' - 330.5' - shattered core, numerous small fractures, calcite infilling
  - 338.0' - 344.0' - generally broken core, no shattering
  - 382.0' - sandstone partings and laminae appearing lighter colored, fine grained
  - 386.0' - sandstone disappears
  - 411.0' - 412.0' - broken core
  - 416.0' - 417.0' - badly broken core, increase in the number of hairline fractures with calcite infilling
  - 429.0' - few lighter fine-very fine sandstone laminae appearing - B.C.A. - 21
  - 445.0' - fracture with calcite infilling (1") with numerous associated hairline fractures above and below main break
  - 447.0' - numerous fractures with calcite infilling
  - 452.4' - fracture, calcite infilling (approx.  $\frac{1}{2}$ ")
  - 468.0' - small amounts of carb. material starting to appear

## 484.0' - 490.0' COAL ZONE

	Possible	Actual	Description
484.0' - 487.0'	3.0'	.8'	broken claro-durain with 2" shale piece
487.0' - 490.0'	3.0' 6.0'	2.5' 3.3'	broken claro-durain

Recovery 55.0%

490.0' - 495.3' Shale (carb.) split.

## 495.3' - 587.5' COAL ZONE

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
495.3' - 500.0'	4.7'	2.0'	broken (very) claro-durain
500.0' - 504.0'	4.0'	2.6'	claro-durain
504.0' - 507.0'	3.0'	2.6'	claro-durain
507.0' - 517.0'	10.0'	8.4'	shale split
517.0' - 519.0'	2.0'	1.6'	broken claro-durain
519.0' - 521.5'	2.5'	1.8'	broken claro-durain
521.5' - 523.5'	2.0'	1.8'	slurry of coal and water
523.5' - 527.0'	3.5'	2.9'	broken claro-durain, few hard pieces
527.0' - 530.0'	3.0'	1.7'	broken claro-durain, small 2" shale split
530.0' - 531.0'	1.0'	.4'	shale remaining
531.0' - 535.0'	4.0'	1.4'	slurry of coal and H <sub>2</sub> O
535.0' - 539.0'	4.0'	1.7'	hard pieces claro-durain remaining
539.0' - 540.5'	1.5'	1.3'	shale band first 1' rest claro-durain
540.5' - 546.0'	5.5'	4.2'	claro-durain (hard)
546.0' - 549.5'	3.5'	2.6'	broken claro-durain
549.5' - 554.5'	5.0'	2.9'	claro-durain
554.5' - 556.5'	2.0'	0.0'	—
556.5' - 557.5'	1.0'	.6'	shale and coal
557.5' - 560.0'	2.5'	1.6'	90% shale remaining
560.0' - 563.5'	3.5'	1.4'	claro-durain
563.5' - 568.5'	5.0'	4.7'	first 1' shale, rest claro-durain
568.5' - 571.0'	2.5'	2.5'	claro-durain
571.0' - 576.0'	5.0'	4.9'	claro-durain
576.0' - 578.5'	2.5'	2.4'	claro-durain
578.5' - 582.0'	3.5'	3.1'	claro-durain
582.0' - 584.0'	2.0'	2.0'	claro-durain, 3" shale split
584.0' - 586.5'	2.5'	1.6'	hard claro-durain
586.5' - 587.5'	1.0'	.4'	claro-durain
	<u>92.2'</u>	<u>65.1'</u>	

Recovery 70.6%

587.5' - 592.0' Mudstone, dark, few small coaly partings, slickensided fractures.

592.0' - 599.0' Sandstone and mudstone interbedding, X-bedding.

B.C.A. - 60° - few hairline fractures

599.0' - 630.0' Mudstone, dark, odd sandstone parting, very fine grained light grey, odd slickensided fracture, few coaly partings becomes silty down section.

603.0' - 603.5' - fractures with calcite infilling  $\frac{1}{4}$ " -  $\frac{1}{2}$ "

614.0' - 616.0' - badly broken core with coaly partings

626.0' - becoming sandy

Sept. 14/76.

630.0' - 640.0' Sandstone, medium grey color, very fine-fine grained with grain size increasing down section.

640.0' - 617.0' Sandstone, lighter grey than above, fine-medium grained, hairline fractures with calcite infilling, odd slickensided fracture, X-bedding.

665.0' - 667.0' - siltstone parting, dark color with calcite filled fractures, largest  $\frac{1}{2}$ "

673.0' - calcite filled fracture  $\frac{1}{2}$ " with associated hairline fractures

678.0' - B.C.A. - 32°

693.0' - 693.5' - numerous mudstone clasts, sand becomes coarse grained, with odd coaly (small) parting appearing

700.0' - coarse - very coarse grained

763.0' - B.C.A. - 39°, zones of medium grained sandstone interbedded but generally coarse - very coarse grained

795.0' - 803.0' - numerous coaly partings, few slickensided fractures

814.0' - B.C.A. - 43°

#### 817.0' - 842.8' COAL ZONE

	Possible	Actual	Description
817.0' - 821.0'	4.0'	2.9'	claro-durain, hard pieces
821.0' - 824.0'	3.0'	2.8'	claro-durain
824.0' - 826.0'	2.0'	1.2'	claro-durain, last .4' shale
826.0' - 828.0'	2.0'	1.9'	claro-durain
828.0' - 833.0'	5.0'	5.0'	first 1.0' shaley, rest claro-durain, quite hard
833.0' - 836.0'	3.0'	3.0'	hard durain
836.0' - 840.5'	4.5'	3.8'	claro-durain, hard pieces
840.5' - 842.8'	2.3'	2.2'	claro-durain, hard pieces
	<u>25.8'</u>	<u>22.8'</u>	

Recovery 88.4%

842.8' - 855.5' Mudstone, dark in color, odd slickensided fracture, few lighter colored very fine grained sandstone interbeds appearing down section.

852.0' - B.C.A. 36°

T.D. 855.5'

Warnock Hersey Professional Services Ltd.

COLEMAN COLLIERIES LTD.

Report of Analyses of:

Hole No. - TD ~ 76 - 86

Seam No. - 6

% Core Recovery - 93.6 %

% Raw Coal Ash - 17.0

Footage      From - 104.2

                To - 149.5 "

Lab No. - 76 - 9004

CLEAN COAL COMPOSITES - Analysis - % Dry Basis

Size	Separation	Weight	Ash	Volatile	Sulphur	FSI	Btu
(yield)							
X x 28 M							
28 X 100 M	1.60 Ft.	75.0	5.1	30.8	0.48	5½	14,294

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD - 76 - 86

Seam No. - 6

Lab. No. - 76 - 9004

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	70.7	19.2	70.7	19.2
28 mesh	100 mesh	21.4	11.0	92.1	17.3
100 mesh	-	7.9	13.5	100.0	17.0
<hr/>		<hr/>		<hr/>	
TOTAL		100.0	17.0		

**Wamock Hersey Professional Services Ltd.**

1423 D 45th Avenue NE Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries - Hole # TD - 76 - 86 Size fraction  $\frac{1}{4}$ " x 28 mesh  
Lab. No. (s) 76 - 9004 Wt % of head sample 70.7

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	73.8	4.1	7½	73.8	4.1		100.0	17.8	
1.40	1.50	4.9	18.2	1½	78.7	5.0		26.2	56.5	
1.50	1.60	1.7	26.5	1	80.4	5.4		21.3	65.3	
1.60		19.6	68.7	-	100.0	17.8		19.6	68.7	
Total -		100.0	17.8							



Wamock Heisley Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120

Sample Identification Coleman Collieries - Hole # TD - 76 - 86

Size fraction 28 m x 100 mesh

Lab. No. (s)

76 - 9004

Wt % of head sample 21.4

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	59.1	3.0	9	59.1	3.0		100.0	11.0	
1.40	1.50	22.1	5.1	7	81.2	3.6		40.9	22.5	
1.50	1.60	3.9	9.0	3½	85.1	3.8		18.8	51.8	
1.60		14.9	51.8	-	100.0	11.0		14.9	51.8	
<b>Total -</b>		<b>100.0</b>	<b>11.0</b>							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel: 264-9120

Sample Identification: Coleman Collieries - Hole # TD - 76 - 86 (104.2 to 149.5") Seam # 6

Lab. No(s). : 76 - 9004

Froth Flotation Tests

	<u>28 mesh x 0</u>				<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	
Froth 1 minute	33.5	6.8	9		58.6	8.6	7	
Froth 2 minutes	10.4	10.6	7		15.4	12.2	3	
Tailings	<u>56.1</u>	<u>14.7</u>	<u>6%</u>		<u>26.0</u>	<u>25.2</u>	<u>3</u>	
Total	100.0	11.6			100.0	13.5		

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

Warnock Hersey Professional Services Ltd.

COLEMAN COLLIERIES LTD.

Report of Analyses of;

Hole No. - TD - 76 - 86  
Seam No. - 5  
% Core Recovery - 70.6%  
% Raw Coal Ash - 36.1  
Footage      From - 495.3  
                To - 587.5

CLEAN COAL COMPOSITES - Analysis - % Dry Basis

Size	Separation	Weight	Ash	Volatile	Sulphur	FSI	Btu
(Yield)							
+28 mesh	1.60 Float						
		48.8	8.7	26.1	0.46	6	13,927
28 x 100 m	1.60 Float						

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD - 76 - 86

Seam No. - 5

Lab. No. - 76 - 1001

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Retained On</u>	<u>Elementary</u>		<u>Cumulative</u>	
		<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	64.4	41.5	64.4	41.5
28 mesh	100 mesh	23.4	26.6	87.8	37.5
100 mesh	-	12.2	25.7	100.0	36.1
<hr/>		<hr/>		<hr/>	
<b>TOTAL</b>		<b>100.0</b>	<b>36.1</b>		





Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Well #TD - 76 - 86 Seam 5 Size fraction 28 m x 100 m  
Lab. No. (s) 76 - 1001 Wt % of head sample 23.4

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> <u>F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	43.1	5.0	7½	43.1	5.0		100.0	26.6	
1.40	1.50	17.6	8.5	3½	60.7	6.0		56.9	43.0	
1.50	1.60	6.7	16.0	1½	67.4	7.0		39.3	58.4	
	1.60	32.6	67.1	n.d.	100.0	26.6		32.6	67.1	
<u>Total -</u>		<u>100.0</u>	<u>26.6</u>							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel: 264-9120

Sample Identification: Coleman Collieries - Hole # TD - 76 - 86 --- Seam 5

Lab. No (s). : 76 - 1001

Froth Flotation Tests

	<u>28 mesh x 0</u>				<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	
Froth 1 minute	46.6	15.0	6		38.9	18.5	3%	
Froth 2 minutes	11.9	23.5	3		21.2	19.1	4	
Tailings	<u>41.5</u>	<u>37.4</u>	<u>1½</u>		<u>39.9</u>	<u>36.2</u>	<u>1½</u>	
Total	100.0	25.3			100.0	25.7		

Conditions

    Solids Concentration = 10%

    Reagent Dosage = 0.50 lb / ton 3:1 diesel fuel/MIBC

    Conditioning = 1 minute

Warnock Hersey Professional Services Ltd.

COLEMAN COLLIERIES LTD.

Report of Analyses of:

Hole No. - TD - 76 - 86  
Seam No. - 4  
% Core Recovery - 88.4%  
% Raw Coal Ash - 29.9  
Footage From - 817.0  
To - 842.8

CLEAN COAL COMPOSITES - Analysis - % Dry Basis

Size	Separation	Weight	Ash	Volatile	Sulphur	FSI	Btu
(yield)							
+28 mesh	1.60 Float		55.6	12.8	24.1	0.54	3 13,216
28 x 100m	1.60 Float						

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD - 76 - 86

Seam No. - 4

Lab. No. - 76 - 1002

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Retained On</u>	<u>Elementary</u>		<u>Cumulative</u>	
		<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	67.9	32.8	67.9	32.8
28 mesh	100 mesh	22.3	25.2	90.2	30.1
100 mesh	-	9.8	20.9	100.0	29.9
<b>TOTAL</b>		<b>100.0</b>	<b>29.9</b>		



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120

Sample Identification Well #TD - 76 - 86 -- Seam 4 Size fraction  $\frac{1}{4}'' \times 28m$   
Lab. No. (s) 76 - 1002 Wt % of head sample 67.9

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	32.2	8.1	5½	32.2	8.1		100.0	32.6	
1.40	1.50	18.5	16.0	1½	50.7	11.0		67.8	44.2	
1.50	1.60	10.5	27.6	1	61.2	13.8		49.3	54.8	
1.60		38.8	62.2	n.d.	100.0	32.6		38.8	62.2	
Total -		100.0	32.6							



Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3      Tel. 264-9120

Sample Identification : Coleman Collieries - Hole # TD - 76 - 86 -- Seam 4

Lab. No (s) : 76 - 1002

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	52.4	14.9	4½		38.3	15.2	3
Froth 2 minutes	28.0	18.6	3		32.7	15.7	3
Tailings	<u>19.6</u>	<u>43.5</u>	<u>1</u>		<u>29.0</u>	<u>34.4</u>	<u>1½</u>
Total	100.0	21.5			100.0	20.9	

Conditions

- Solids Concentration - 10%  
Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning - 1 minute

TD-76-96

COLEMAN COLLIERIES LIMITED

TD-76-96 (73° E)

September 27, 1976.

0.0' - 24.0' No core (tricone - casing)

24.0' - 85.0' Sandstone, light grey on fresh surface, coarse grained, upper 10' heavily broken and fractured with weathering (iron staining) remaining rock fractured with few fractures showing weathering, odd carbonaceous clast and parting, zones very coarse - granular grained.

85.0' - 100.3' Mudstone/siltstone, dark grey color, odd sandy portion, fractures show weathering (iron staining) some carb. material.

100.3' - 120.6' COAL ZONE

	Possible	Actual	Description
100.3' - 102.0'	1.7'	1.1'	Dirty, oxidized coal
102.0' - 106.0'	4.0'	1.8'	Dirty, oxidized coal
106.0' - 111.0'	5.0'	2.6'	Dirty, oxidized coal, some shale
111.0' - 113.0'	2.0'	0.9'	50% shale remaining, rest dirty coal
113.0' - 115.0'	2.0'	0.8'	Mostly shale remaining
115.0' - 117.0'	2.0'	1.6'	Dirty broken coal
117.0' - 120.6'	3.6'	0.9'	Dirty broken coal
	<u>20.3'</u>	<u>9.7'</u>	
Recovery	47.8%		

120.6' - 123.0' Mudstone, dark grey, broken, some weathering, some carb. material.

123.0' - 123.5' Fault ? Drillers? (6" cavity)

123.5' - 129.0' Mudstone/siltstone, broken, dark grey.

T. D. 129.0'

TD-76-98

COLEMAN COLLIERIES LIMITED

TD-76-98 (80° E)

--- September 30/76.

0.0' - 31.0' No core (tricone - casing).

31.0' - 98.0' Sandstone - light grey color on fresh surface, zoned grain sizes from medium to very coarse, carbonaceous partings usually associated with the coarser zones, generally the whole zone is quite fractured with most fractures showing weathering (iron staining).

81.0' - 83.0' - mudstone split  
89.0' - B.C.A. - 42°

98.0' - 110.2' Sandstone - medium grey color, very fine - fine grained, few weathered fractures.

110.2' - 129.7'	COAL ZONE	Possible	Actual	Description
110.2' - 115.0'		4.8'	4.8'	Hard claro-durain pieces.
115.0' - 120.0'		5.0'	4.8'	Hard claro-durain pieces.
120.0' - 125.0'		5.0'	4.4'	Broken claro-durain with 2 shale splits .6' and .2'.
125.0' - 129.7'		4.7'	2.8'	Broken claro-durain.
Recovery 85.1%		19.5'	16.6'	

129.7' - 130.5' Shale carbonaceous.

130.5' - 145.0' Sandstone, light grey in color, medium-coarse grained, small carbonaceous partings and clasts.

140.0' - 141.0' - shale split.

145.0' - 157.0' Mudstone, dark grey color, some carb. material, very broken making for low recovery.

157.0' - 158.3' Shale carbonaceous.

158.3' - 180.8'	COAL ZONE	Possible	Actual	Description
158.3' - 160.0'		1.7'	1.7'	Broken claro-durain.
160.0' - 165.0'		5.0'	4.5'	Hard pieces claro-durain.
165.0' - 170.0'		5.0'	4.9'	90% shale.
170.0' - 180.8'		10.8'	10.8'	Generally a dirty broken claro-durain, odd portion shattered.
Recovery 97.3%		22.5'	21.9'	

180.8' - 233.8' Mudstone, dark grey color, some carb. material, few slickensided fractures, becomes silty downsection.

218.0' - 1' badly broken, slickensides predominant.

220.0' - 222.0' - badly broken, slickensided fractures evident.

<u>233.8'</u> - <u>246.9'</u> COAL ZONE	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
<u>233.8'</u> - <u>237.0'</u>	<u>3.2'</u>	<u>0.9'</u>	Mostly shaley fragments remaining.
<u>237.0'</u> - <u>241.0'</u>	<u>4.0'</u>	<u>3.7'</u>	First 1' shale, rest a dirty broken coal.
<u>241.0'</u> - <u>246.0'</u>	<u>5.0'</u>	<u>4.6'</u>	Dirty coal, broken appears to be some oxidization, 3" shale split near center of zone.
<u>246.0'</u> - <u>246.9'</u>	<u>0.9'</u>	<u>0.9'</u>	Broken dirty coal.
Recovery 77.1%	<u>13.1'</u>	<u>10.1'</u>	
<u>246.9'</u> - <u>249.5'</u>	Mudstone, dark grey, slickensided fractures.		
<u>249.5'</u> - <u>258.5'</u>	Sandstone/siltstone, medium grey color, sand very fine grained, slickensided fractures, odd carb. parting.		
	258.0' - B.C.A. - 40°.		
<u>258.5'</u> - <u>270.5'</u>	Sandstone, light grey, very fine-fine grained, some visible bedding.		
	265.0' - B.C.A. - 42°.		
<u>270.5'</u> - <u>289.0'</u>	Mudstone/siltstone, dark grey, odd slickensided fractures. Contact below (2') broken badly.		
<u>289.0'</u> - <u>419.0'</u>	Sandstone, light grey color, very fine-fine grained first 5', then medium grained with few coarse zones, few hairline fractures with calcite infilling, few slickensided fractures, zones containing carb. clasts and partings.		
	306.0' - few large mudstone clasts.		
	354.0' - B.C.A. - 46°.		
	355.0' - N.Q. core.		
<u>366.0'</u> - <u>376.0'</u>	- few mudstone (dark grey) partings 3" - 4" sandstone coarse grained with few zones very coarse to granular, carb. partings.		
<u>401.0'</u> - <u>419.0'</u>	- coarse-very coarse grained with few small conglomerate partings approximately 4", sandstone pebbles (1/8" - 1/4") in coarse sand matrix.		
	406.0' - B.C.A. - 31°.		
<u>419.0'</u> - <u>456.0'</u>	Mudstone/siltstone, dark grey color, generally quite dense except for odd zone containing interbedded laminae of lighter very fine grained sandstone.		
	449.0' - few hairline fractures with calcite infilling.		
	453.0' - 455.0' - quite fractured, some calcite infilling.		

- 456.0' - 738.5' Sandstone, light-medium grey color, very fine-fine grained, few hairline fractures, upper 40' has odd mudstone/siltstone parting.  
 491.0' - light grey, medium grained.  
 494.0' - coarse grained, few zones very coarse - granular odd carb. parting or clast.  
 558.0' - B.C.A. - 30°.  
 601.0' - 603.0' - badly broken sandstone.  
 615.0' - B.C.A. 32°.  
 632.0' - 636.0' - very fine grained sandstone/mudstone parting, dark grey color.  
 632.5' fracture 1/4" - 1/2" calcite infilled.  
 681.0' - B.C.A. - 47°.  
 686.0' - medium-fine grained, few laminae of darker mudstone, few hairline fractures with calcite infilling.  
 700.0' - medium-coarse grained.  
 724.0' - coarse grained, few hairline fractures and few coaly partings.
- 738.5' - 771.5' Mudstone/siltstone, dark color, slickensided fractures, few hairline fractures with calcite infilling, sandy laminae or partings (very fine-fine grained, light grey) some carb. material.

771.5' - 800.2'	COAL ZONE	Possible	Actual	Description
	771.5' - 776.0'	4.5'	0.5'	Couple hard pieces of claro-durain.
	776.0' - 780.0'	4.0'	1.0'	Few hard pieces of claro-durain.
	780.0' - 784.0'	4.0'	1.2'	Mostly shale remaining,
	784.0' - 786.0'	2.0'	0.8'	Shale and coal (small pieces)
	786.0' - 788.0'	2.0'	1.2'	1' shale, few small hard pieces of claro-durain.
	788.0' - 792.5'	4.5'		Sample taken by Techman Ltd. for gas tests.
	792.5' - 796.0'	3.5'	2.9'	Claro-durain 2' shale split.
	796.0' - 800.2'	4.2'	2.3'	Claro-durain.
		28.7'		

800.2' - 800.7' Mudstone - sandstone interbedded.  
 B.C.A. - 40°.

800.7' - 876.0' Sandstone, light grey color, medium grained, few coaly partings and/or shards, slickensided fractures, coarsens downsection.

820.0' - coarse grained.  
 840.0' - B.C.A. - 40°, 2" mudstone parting.  
 851.0' - 2" mudstone parting.

Wornock Hersey Professional Services Ltd.

COLEMAN COLLIERIES LTD.

Report of Analyses of:

Hole No. - TD - 76 - 98  
Seam No. - 4  
% Core Recovery - 85.1%  
% Raw Coal Ash - 37.5  
Footage      From - 110.2  
                To - 129.7

CLEAN COAL COMPOSITES - Analysis - % Dry Basis

Size	Separation	Weight	Ash	Volatile	Sulphur	FST	Btu
(yield)							
+28 mesh	1.60 Float		46.4	13.4	24.8	0.65	2%
28 x 100 m	1.60 Float						13,057

Wornock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD - 76 - 98

Seam No. - 4

Lab. No. - 76 - 1009

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
	<u>On</u>				
-	28 mesh	64.9	41.9	64.9	41.9
28 mesh	100 mesh	23.4	30.2	88.3	38.8
100 mesh	-	11.7	28.0	100.0	37.5
<hr/>		<hr/>		<hr/>	
TOTAL		100.0	37.5		



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Well # TD - 76 - 98 -- Seam 4 Size fraction 1/4" x 28 m  
Lab. No. (s) 76 - 1009 Wt % of head sample 64.9

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> <u>F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	23.0	7.6	4½	23.0	7.6		100.0	41.4	
1.40	1.50	16.3	16.5	1	39.3	11.3		77.0	51.5	
1.50	1.60	10.3	26.4	1	49.6	14.4		60.7	60.9	
1.60		50.4	67.9	n.d.	100.0	41.4		50.4	67.9	
<u>Total -</u>		<u>100.0</u>	<u>41.4</u>							



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264.9120

Sample Identification Well # TD - 76 - 98 -- Seam 4

Size fraction 28 m x 100 m

Lab. No. (s) 76 - 1009

Wt % of head sample 23.4

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	SCHAFER F.S.I.	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	30.4	6.1	6	30.4	6.1		100.0	30.2	
1.40	1.50	17.4	11.7	2	47.8	8.1		69.6	40.7	
1.50	1.60	13.0	21.4	1½	60.8	11.0		52.2	50.3	
1.60		39.2	59.9	n.d.	100.0	30.2		39.2	59.9	
<hr/>		Total -	100.0	30.2						

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel: 264-9120

Sample Identification: Coleman Collieries - Hole # TD - 76 - 98 — Seam 4

Lab. No (s): 76 - 1009

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	23.4	17.8	2½		51.6	20.2	2
Froth 2 minutes	12.0	20.3	2½		15.4	23.1	2
Tailings	<u>64.6</u>	<u>35.8</u>	<u>1½</u>		<u>33.0</u>	<u>42.5</u>	<u>2</u>
Total	100.0	29.7			100.0	28.0	

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

Warnock Hersey Professional Services Ltd.

COLEMAN COLLIERIES LTD.

Report of Analyses of;

Hole No. - TD - 76 - 98

Seam No. -

% Core Recovery - 97.3%

% Raw Coal Ash - 34.1

Footage From - 158.3

To - 180.8

CLEAN COAL COMPOSITES - Analysis - % Dry Basis

Size	Separation	Weight	Ash	Volatile	Sulphur	FSI	Btu
(yield)							
+28 mesh	1.60 Float						
		55.4	14.4	24.7	0.56	4	12,940
28 x 100 m	1.60 Float						

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD - 76 - 98.

Seam No. -

Lab. No. - 76 - 1010

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Elementary</u>		<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>
	<u>On</u>			
-	28 mesh	64.4	38.6	64.4
28 mesh	100 mesh	25.2	26.1	89.6
100 mesh	-	10.4	25.2	100.0
TOTAL		100.0	34.1	



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Well # TD - 76 - 98 Size fraction 1/4" x 28 m  
Lab. No. (s) 76 - 1010 Wt % of head sample 64.4

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> <u>F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	24.2	8.1	5	24.2	8.1		100.0	37.6	
1.40	1.50	23.6	17.1	1	47.8	12.5		75.8	47.0	
1.50	1.60	11.9	26.5	1	59.7	15.3		52.2	60.5	
	1.60	40.3	70.6	n.d.	100.0	37.6		40.3	70.6	
<u>Total -</u>		<u>100.0</u>	<u>37.6</u>							

**Wamock Hersey Professional Services Ltd.**

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Well # TD - 76 - 98 Size fraction 28 m x 100 m  
Lab. No. (s) 76 - 1010 Wt % of head sample 25.2

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>SO<sub>3</sub>PO<sub>4</sub>X</u> <u>F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	39.5	7.6	6	39.5	7.6		100.0	26.1	
1.40	1.50	15.2	14.2	1½	54.7	9.4		60.5	36.2	
1.50	1.60	12.8	21.6	1½	67.5	11.7		45.3	46.3	
1.60		32.5	56.0	n.d.	100.0	26.1		32.5	56.0	
<u>Total -</u>		<u>100.0</u>	<u>26.1</u>							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel 264-9120

Sample Identification : Coleman Collieries - Hole # TD - 76 - 98

Lab. No(s) : 76 - 1010

Froth Flotation Tests

	<u>28 mesh x 0</u>				<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	
Froth 1 minute	40.8	14.2	6		53.8	19.0	3	
Froth 2 minutes	18.7	19.4	3½		26.5	21.0	2	
Tailings	40.5	40.3	1		19.7	47.7	1½	
Total	100.0	25.7			100.0	25.2		

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3-1 diesel fuel/MIBC

Conditioning - 1 minute

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD 76 - 98

Seam No. - 4

Lab. No. - 76 - 11248

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	73.4	63.3	73.4	63.3
28 mesh	100 mesh	16.8	42.4	90.2	59.5
100 mesh	-	9.8	36.5	100.0	57.2
<hr/>		<hr/>	<hr/>	<hr/>	<hr/>
TOTAL		100.0	57.2		

**Warnock Hersey Professional Services Ltd.**

GLIFFE - Goleman Collieries

Sample Identification - TD - - 76 - 98

Lab. No. - 76 - 11248

Footage - 233.8' to 246.9'

		CLEAN - 1.60 Float	
<u>As Analyzed Basis</u>			
Moisture % (Inherent) -		0.9	
Ash % -		13.7	
Volatile Matter % -		25.1	
Fixed Carbon % -		60.3	
Total -		100.0	
Sulphur % -		0.82	
FSI -		2%	
Btu per lb. -		12,883	
Equilibrium Moisture % -		--	
Hardgrove Grindability -		--	
Specific Gravity (40 mesh) -		--	
<u>Dry Basis</u>			
Ash % -		13.8	
Volatile % -		25.3	
Btu per lb. -		12,996	
<u>Dry, Ash - Free Basis</u>			
Volatile % -		29.4	
Btu per lb. -		15,071	

Yield - 25.6% @ 13.8% ash



Warrick Hersey Professional Services

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

Sample Identification TD 76 - 98 Size fraction 1/4" x 28 m  
Lab. No. (s) 76 - 11248 Wt % of head sample 73.4

<u>Specific Gravity</u>		<u>FLOAT AND SINK ANALYSIS %</u>								
<u>Sink</u>	<u>Float</u>	<u>Elementary</u>			<u>Cumulative Float</u>			<u>Cumulative Sink</u>		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> <u>F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	20.0	12.1	3½	20.0	12.1		100.0	63.3	
1.40	1.50	1.3	19.2	1	21.3	12.5		80.0	76.1	
1.50	1.60	3.8	25.7	1	25.1	14.5		78.7	77.0	
1.60		74.9	79.6		100.0	63.3		74.9	79.6	
		—	—							
Total -		100.0	63.3							



Wannock Hersey Professional Services Ltd.

1423-D 45th Ave., N.E. Calgary Alberta

T2E 2P3

Tel. 254-8820 276 - 9138

Sample Identification: Coleman Collieries - Hole # TD 76 - 98

Lab. No(s): 76 - 11248

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>
Froth 1 minute	51.2	21.8	3		66.1	27.6
Froth 2 minutes	13.8	38.7	1½		19.3	41.7
Tailings	<u>35.0</u>	<u>66.2</u>	<u>1</u>		<u>15.6</u>	<u>67.9</u>
Total	100.0	39.7			100.0	36.5

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

TD-76-99

COLEMAN COLLIERIES LIMITED

TD-76-99 (V)

0.0' - 11.0' No core.

11.0' - 161.0' Sandstone, weathered, iron stained, broken, medium grey, medium/coarse grained, cross-bedded thin coaly particles at 25.0' - 27.0' 52.0' - 54.0'. Becoming coarse grained from 34.0' onwards. Badly shattered core with vertical mud band in the core at 83.0' - B.C.A. - 60°. From 147.0' - 160.0' thin coaly laminations and coal pieces squeezed into the cross-bedded core.

161.0' - 179.0' Siltstone, light grey, fine grained.

179.0' - 243.0' Sandstone. Massive coarse grained, light grey, some iron staining, X-bedded. Last iron stain in this section. Coal and carbonaceous particles squeezed into bedding between 205.0' - 225.0'.

243.0' - 255.0' Mudstone, dense, dark grey, slickensided broken zone from 243.0' - 247.0' and 250.0' - 250.5'. - B.C.A. - 45°

255.0' - 281.0' Siltstone with mud and sand interbedded but predominately fine grained siltstone - clean contact with coal.

281.0' - 296.0' COAL - #2 SEAM

	Possible	Actual	Description
281.0' - 283.5'	2.5'	2.4'	Structured coal
283.5' - 286.0'	2.5'	2.5'	Some vitrain but
286.0' - 289.0'	3.0'	2.6'	mainly clarain/durain
289.0' - 293.0'	4.0'	4.0'	
293.0' - 296.0'	3.0'	2.8'	
	<u>15.0'</u>	<u>14.3'</u>	

Recovery 95.3%

- B.C.A. - 45°

296.0' - 297.0' Sandstone, very clean contact break with coal.

297.0' - 303.0' Mudstone, dense, black. Structureless. Some coal mixed in with mudstone.

303.0' - 353.0' Silstone/mudstone, medium grey, fairly dense and massive in appearance. Soft mud band and slickensided at 336.0' - 337.0'. Iron stained at 352.0'.

353.0' - 427.5' Sandstone, coarse grained, light grey color, massive, regular bedding.

427.5' - 430.0' COAL. Hard, well formed. Dull in appearance, clean contact with sand.

430.0' - 760.0' Sandstone. Coarse grained, light grey, medium grained from 480.0'.  
- B.C.A. - 32°

At 520.0' change to NQ. Calcite stringers 526.0' onwards.

Coal/carbonaceous stringer at 586.0'. Mudstone/shale 648.0' - 650.0'.

Medium and fine grained sand from 660.0' on. Some cross bedding.

Kootenay sandstones to 700.0'. Passage beds to Fernie shale from 735.0' - 760.0'.

760.0' - 1089.0' Fernie Shale. Abundant calcite stringers, high angle fractures in the core. Very dark black in color, worm burrows.

1089.0' - 1164.5' Sandstone, light grey, medium grained, broken core, cross-bedded, calcite and carbonaceous material squeezed into bedding - odd patches of mudstone 6" to 1'0" in width.

1164.5' - 1182.0' COAL and shale. Slickensided shale and mudstone with coal.

	Possible	Actual	Description
1164.5' - 1167.0'	2.5'	2.0'	Coaly shale
1167.0' - 1170.0'	3.0'	1.0'	Shale recovered
1170.0' - 1172.0'	2.0'	2.0'	Coal
1172.0' - 1179.0'	7.0'	3.5'	Coal
1179.0' - 1182.0'	3.0'	2.5'	Mainly shale
	<u>17.5'</u>	<u>11.0'</u>	

Recovery 62.8%

- B.C.A. - 45°

1182.0' - 1188.0' Mudstone, dense - black.

1188.0' - 1245.0' Sandstone, fine/medium grained, light grey.

- B.C.A. - 30°

Calcite stringers, X-bedded.

1245.0' - 1254.5' Mudstone, dense, dark grey.

1254.5' - 1281.0' Sandstone, medium/coarse grained, calcite, light grey.

1281.0' - 1376.0' Mudstone, dark grey, some siltstone patches becoming sandy as zone progresses down.

	Possible	Actual	Description
1376.0' - 1381.0'	5.0'	3.2'	
1381.0' - 1383.0'	2.0'	1.8'	Hard coal
1383.0' - 1386.5'	3.5'	3.3'	
1386.5' - 1391.0'	4.5'	3.0'	
	<u>15.0'</u>	<u>11.3'</u>	

Recovery 75.3%

- B.C.A. - 55°

1391.0' - 1397.0' Mudstone/sandstone, intermixed fractured and high angle breaks in the core.

1397.0' - 1416.5' Sandstone, light grey, medium/fine grained. X-bedded.

1416.5' - 1425.0' Mudstone, very dark grey color, broken.

1425.0' - 1431.0' Sandstone, medium grained.

1431.0' - 1437.5' COAL and shale  
4.0' recovered, mainly shale.

1437.5' - 1461.0' Sandstone, fine/medium grained, light grey. Calcite stringers - mud band.

1461.0' - 1471.0' Mudstone - black - dense, broken up core.

1471.0' - 1477.0' COAL

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
1471.0' - 1472.5'	1.5'	1.0'	
1472.5' - 1474.0'	1.5'	1.0'	
1474.0' - 1477.0'	3.0'	2.1'	
	<u>5.0'</u>	<u>4.1'</u>	

Recovery 82.0%

1477.0' - 1487.5' Siltstone/sandstone.

1487.5' - 1493.0' COAL

1493.0' - 1640.0' Siltstone, light/medium grey with mudstone layers and calcite stringers.

1640.0' - 1646.0' Mudstone, dense, dary grey.

1646.0' - 1698.5' COAL - #5 SEAM

B.C.A. - 50°

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
1646.0' - 1649.0'	3.0'	2.0'	
1649.0' - 1653.0'	4.0'	4.0'	
1653.0' - 1659.0'	6.0'	3.1'	
1659.0' - 1662.0'	3.0'	2.4'	
1662.0' - 1664.0'	2.0'	1.0'	
1664.0' - 1666.0'	2.0'	1.8'	
1666.0' - 1668.0'	2.0'	1.0'	
1668.0' - 1676.0'	8.0'	7.2'	
1676.0' - 1678.0'	2.0'	2.0'	
1678.0' - 1681.0'	3.0'	2.5'	
1681.0' - 1685.0'	4.0'	1.4'	
1685.0' - 1693.0'	8.0'	4.0'	Shale
1693.0' - 1698.5'	5.5'	2.0'	
	<u>52.5'</u>	<u>34.4'</u>	

Recovery 65.5%

1698.5' - 1721.0' Sandstone/siltstone, fine grained.

1721.0' - 1788.0' Sandstone, medium grained to coarse grained, medium grey color.  
Calcite stringers, shattered zone 1766.0' - 1770.0'.

1788.0' - 1810.0' Mudstone.

1810.0' - 1831.0' Siltstone/sandstone, X-bedded.

1831.0' - 1835.0' Mudstone.

1835.0' - 1851.5' COAL - #4 SEAM

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
1835.0' - 1842.0'	7.0'	4.7'	
1842.0' - 1846.0'	4.0'	2.8'	
1846.0' - 1850.0'	4.0'	2.5'	B.C.A. = 40°
1850.0' - 1851.5'	1.5'	1.0'	
	<u>16.5'</u>	<u>11.0'</u>	

Recovery 66.6%

1851.0' - 1884.0' Mudstone, very silty, dary grey, dense.

T. D. 1,884.0'

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 99 -- Seam 2

Lab. No. - 77 - 1009

Footage - 281.0' to 296.0'

Recovery - 95.3%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	1.0	
Ash % -	16.1	
Volatile Matter % -	23.7	
Fixed Carbon % -	59.2	
Total -	100.0	
Sulphur % -	0.45	
FSI -	2	
Btu per lb. -	12,333	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	16.2	
Volatile % -	23.9	
Btu per lb. -	12,459	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	28.6	
Btu per lb. -	14,882.	

Yield - 46.0% @ 16.2% ash

**Warnock Hersey Professional Services Ltd.**

**Coleman Collieries Ltd.**

Hole No. - TD 76 - 99

Seam No. - 2

Lab. No. - 77 - 1009

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Size</u>	<u>Elementary</u>		<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>
	<u>On</u>			
-	28 mesh	61.2	41.7	61.2 41.7
28 mesh	100 mesh	25.5	28.7	86.7 37.9
100 mesh	-	13.3	24.6	100.0 36.1
<hr/>		<hr/>	<hr/>	<hr/>
<b>TOTAL</b>		<b>100.0</b>	<b>36.1</b>	



Wainock Hersey Professional Services Ltd

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

Sample Identification Coleman Collieries - TD 76 - 99 -- Seam 2 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1009 Wt % of head sample 61.2

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	23.6	9.7	3	23.6	9.7		100.0	41.7	
1.40	1.50	11.3	18.7	1	34.9	12.6		76.4	51.5	
1.50	1.60	17.7	28.4	1	52.6	17.9		65.1	57.2	
	1.60	47.4	68.0	N.D.	100.0	41.7		47.4	68.0	
<hr/>		<hr/>			<hr/>			<hr/>		
Total -		100.0	41.7							



Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E.    Calgary    Alberta

T2E 2P3              Tel. 264-9120

Sample Identification :    Coleman Collieries - Hole # TD 76 - 99 - - - Seam 2

Lab. No (s). :    77 - 1009

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>		<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	44.1	18.4	3		57.4	12.1	1½
Froth 2 minutes	6.4	22.8	1		6.3	32.1	1
Tailings	<u>49.5</u>	<u>36.9</u>	<u>1</u>		<u>36.3</u>	<u>43.1</u>	<u>1</u>
Total	100.0	27.8			100.0	24.6	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning             -    1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 99

Lab. No. - 77 - 1010

Footage - 1376.0' to 1391.0'

Recovery - 75.3%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	1.3	
Ash % -	5.3	
Volatile Matter % -	28.2	
Fixed Carbon % -	65.2	
Total -	100.0	
Sulphur % -	0.38	
FSI -	6½	
Btu per lb. -	14,105	
Equilibrium Moisture % -	- - -	
Hardgrove Grindability -	- - -	
Specific Gravity ( 20 mesh ) -	- - -	
<u>Dry Basis</u>		
Ash % -	5.4	
Volatile % -	28.6	
Btu per lb. -	14,292	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	30.2	
Btu per lb. -	15,102	

Yield - 71.6 % @ 5.4% ash

**Warnock Hersey Professional Services Ltd.**

**Coleman Collieries Ltd.**

Hole No. - TD 76 - 98

Seam No. - 6

Lab. No. - 77 - 1010

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Passing</u>	<u>Retained On</u>	<u>Elementary</u>		<u>Cumulative</u>	
		<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	55.6	15.0	55.6	15.0
28 mesh	100 mesh	30.5	9.5	86.1	13.0
100 mesh	-	13.9	9.6	100.0	12.6
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<b>TOTAL</b>		<b>100.0</b>	<b>12.6</b>		





Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3

Tel: 264-9120

Sample Identification: Coleman Collieries - Hole # TD 76 - 99 -- Seam

Lab. No(s): 77 - 1010

Froth Flotation Tests

	<u>28 mesh x 0</u>				<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>		<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	59.5	6.8	5		88.8	7.9	5
Froth 2 minutes	9.4	7.2	3		8.2	15.8	3½
Tailings	<u>31.1</u>	<u>14.2</u>	<u>1</u>		<u>3.0</u>	<u>44.8</u>	<u>1</u>
Total	100.0	9.1			100.0	9.6	

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT = Coleman Collieries Ltd.,

Sample Identification = TD - 76 - 99 - - - S Eam 5

Lab. No. = 77 - 1011

Footage = 1646.0' to 1698.5'

Recovery = 65.5%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.8	
Ash % -	7.1	
Volatile Matter % -	27.1	
Fixed Carbon % -	65.0	
Total -	100.0	
Sulphur % -	0.39	
FSI -	7	
Btu per lb. -	13,965	
Equilibrium Moisture % -	- - -	
Hardgrove Grindability -	- - -	
Specific Gravity ( 20 mesh ) -	- - -	
<u>Dry Basis</u>		
Ash % -	7.2	
Volatile % -	27.3	
Btu per lb. -	14,080	
<u>Dry, Ash - Free Basis</u>		
Ash % -	29.5	
Btu per lb. -	15,164	

Yield = 46.1% @ 7.2% ash

**Warnock Hersey Professional Services Ltd.**

**Coleman Collieries Ltd.**

Hole No. - TD 76 - 99

Seam No. - 5

Lab. No. - 77 - 1011

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	63.8	43.1	63.8	43.1
28 mesh	100 mesh	22.8	22.6	86.6	37.7
100 mesh	-	13.4	20.2	100.0	35.5
<b>TOTAL</b>		<b>100.0</b>	<b>35.5</b>		



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

Sample Identification Coleman Collieries - TD 76 - 99 -- Seam 5 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1011 Wt % of head sample 63.8

Specific Gravity		FLOAT AND SINK ANALYSIS %								
Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	34.7	4.5	6½	34.7	4.5		100.0	43.1	
1.40	1.50	8.3	14.2	1	43.0	6.4		65.3	63.6	
1.50	1.60	4.5	24.2	1	47.5	8.1		57.0	70.8	
1.60		52.5	74.8	N.D.	100.0	43.1		62.5	74.8	
Total -		100.0	43.1							



Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E.    Calgary    Alberta

T2E 2P3              Tel: 264-9120

Sample Identification:    Coleman Collieries - Hole # TD 76 - 99 - - - Seam 5

Lab. No(s). :    77 - 1011

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	58.5	14.5	7		82.3	15.8	6½
Froth 2 minutes	9.8	14.9	3½		12.7	36.7	1
Tailings	<u>31.7</u>	<u>38.6</u>	<u>2½</u>		<u>5.0</u>	<u>50.5</u>	<u>1</u>
Total	100.0	22.2			100.0	20.2	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning             -    1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 99 -- Seam 4

Lab. No. - 77 - 1012

Footage - 1835.0' to 1851.5'

Recovery - 66.6%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	1.0	
Ash % -	10.4	
Volatile Matter % -	24.4	
Fixed Carbon % -	64.2	
Total -	100.0	
Sulphur % -	0.52	
FSI -	4	
Btu per lb. -	13,356	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	10.5	
Volatile % -	24.7	
Btu per lb. -	13,494	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	27.5	
Btu per lb. -	15,066	

Yield - 48.1% @ 10.5% ash

**Warnock Hersey Professional Services Ltd.**

**Coleman Collieries Ltd.**

Hole No. - TD 76 - 99

Seam No. - 4

Lab. No. - 77 - 1012

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Size</u>	<u>Retained On</u>	<u>Elementary</u>		<u>Cumulative</u>	
		<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	65.6	41.2	65.6	41.2
28 mesh	100 mesh	23.1	24.7	88.7	36.9
100 mesh	-	11.3	25.8	100.0	35.6
<hr/>		<hr/>		<hr/>	
TOTAL		100.0	35.6		



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries- TD 76 - 99 -- Seam 4 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1012 Wt % of head sample 65.6

Specific Gravity

Sink	Float	FLOAT AND SINK ANALYSIS %							
		Elementary			Cumulative Float			Cumulative Sink	
		Weight	Ash	S.O.C.K.O.D. F.S.I.	Weight	Ash	Sulphur	Weight	Ash
	1.40	31.1	7.3	4 1/2	31.1	7.3		100.0	41.2
1.40	1.50	10.1	14.9	1	41.2	9.2		68.9	56.4
1.50	1.60	8.3	22.2	1	49.5	11.3		58.8	63.6
	1.60	50.5	70.4	N.D.	100.0	41.2		50.5	70.4
Total -		100.0	41.2						



Warnock Hersey Professional Services Ltd.

1423-D 45th Ave, N.E.    Calgary    Alberta

T2E 2P3              Tel. 264-9120

Sample Identification :    Coleman Collieries - Hole # TD 76 - 99 - - - Seam 4

Lab. No (s) :    77 - 1012

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>		<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	57.2	16.0	4		78.6	19.4	1½
Froth 2 minutes	8.1	18.3	1½		6.6	34.6	1
Tailings	34.7	42.4	0		14.8	55.8	1
Total	100.0	25.3			100.0	25.8	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning             -    1 minute

TD-76-100

COLEMAN COLLIERIES LIMITED

TD-76-100 (45° E)

- 0.0' - 10.0' No core.
- 10.0' - 55.0' Sandstone, Kootenay Formation, medium grey color.  
Badly broken - weathered, iron stained, some silt and mudstone,  
thin intercalations, calcite stringers.  
- B.C.A. 68
- 55.0' - 58.0' Mudstone, dense, very dark grey/black.
- 58.0' - 105.0' Sandstone, silty with mudstone bands, soft mud band at 61.5' - 62.0'
- 105.0' - 139.5' Shale - sandstone interbedded. Fernie shale formation at 105.0'.  
Broken core - iron stained.
- 139.5' - 161.0' Sandstone, interlaced with mudstone and carbonaceous material.  
Badly fractured between 134.0' - 139.5'  
- B.C.A. - 65°  
Transition stage Kootenay/Fernie at 139.5'.  
Clean sandstone medium to coarse grained, light grey color, from  
150.0' onwards.
- 161.0' - 165.0' COAL. Clean break with sandstone, fine - no piece bigger than  $\frac{1}{4}$ ".  
2'0" Recovery 50%. Some vitrain mainly durain.
- 165.0' - 195.5' Sandstone, medium grained, X-bedded, some silt and mudstone squeezed  
between main sand bed. High angle breaks with the core axis.  
- Av. B.C.A. - 25°  
182.0' - 183.0' - shattered mudstone band  
Calcite cemented between sand generally a twisted, distorted section.
- 195.5' - 230.0' Siltstone - fine grained with light grey color. Some sand intermixed,  
mud pebble conglomerate effect at 215.0' - 224.0'.  
- B.C.A. - 70°
- 230.0' - 235.3' COAL SEAM. Very shaly, dull in appearance.  
231.0' - 232.5' - shale  
Rec. 4.5'.
- 235.3' - 260.5' Mudstone - medium grey color with interbedded sand and silt.
- 260.5' - 268.0' COALY SHALE. Coal is very dull, mixed with mud and shale.  
- B.C.A. - 55°.
- 268.0' - 291.0' Siltstone with some sand interbedded, mudstone between 274.0' - 280.0'  
and coaly shale at 285.0' - 286.0'
- 291.0' - 408.0' Sandstone, very fine grained, light grey, becoming medium grained  
at 306.0' and coarse grained at 316.0'. Large mud pebble conglomerate at 323.0' - 326.0' and 338.0' - 342.0'. Some high angle  
joint pattern and splits in the sandstone core.  
Change to NQ from 331.0'. Coarse sandstone grading back to fine  
grained from 368.0' into siltstone.

408.0' - 420.0' Siltstone, fine grained, some interbedded fine sand and calcite, light grey color.

420.0' - 527.0' Sandstone, dark grey, interbedded silt - heavy bands of calcite, interwoven and cross-bedded with slickensided mudstone at 430.0' - 452.0'.

- Av. B.C.A. - 60°.

527.0' - 556.0' Mudstone, dark grey/black color. Some sand interbedded, dense and mainly structureless from 537.0'.

- B.C.A. - 70°.

556.0' - 673.0' COAL ZONE - #5 SEAM

	Possible	Actual	Description
556.0' - 566.0'	10.0'	3.5'	
566.0' - 572.0'	6.0'	3.0'	
572.0' - 576.0'	4.0'	4.0'	
576.0' - 580.0'	4.0'	3.0'	
580.0' - 585.0'	5.0'	3.2'	
585.0' - 588.0'	3.0'	1.2'	Shale
588.0' - 593.0'	5.0'	4.2'	
593.0' - 601.0'	8.0'	5.0'	Shale and mudstone
601.0' - 606.0'	5.0'	2.3'	
606.0' - 614.5'	8.5'	5.5'	
614.5' - 626.0'	11.5'	6.3'	Shale
626.0' - 630.0'	4.0'	1.0'	
630.0' - 633.0'	3.0'	2.6'	
633.0' - 646.0'	13.0'	3.5'	Some shale recovered
646.0' - 649.0'	3.0'	2.0'	
649.0' - 660.0'	11.0'	6.0'	Shale with coal pieces
660.0' - 663.0'	3.0'	3.0'	Shale
663.0' - 665.0'	2.0'	2.0'	
665.0' - 667.0'	2.0'	1.1'	
667.0' - 673.0'	5.0'	4.5'	Mainly coal some shale pieces
	<u>117.0'</u>	<u>66.9'</u>	

Recovery 57.2%

673.0' - 680.0' Mudstone, very dark grey/black color. Dense.

680.0' - 765.0' Siltstone with fine interbedded sand - medium/dark grey. Broken core 740.0' - 742.0'.

- B.C.A. 68°.

765.0' - 831.0' Sandstone, medium-coarse grained light grey. Calcite stringers and mud bands 1" thick towards base of unit.

- B.C.A. - 60°.

831.0' - 842.0' Mudstone, dense, dark grey/black broken into pieces no bigger than 2". Good joint pattern.

842.0' - 852.8' COAL

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
842.0' - 844.0'	2.0'	1.3'	
844.0' - 847.0'	3.0'	2.0'	
847.0' - 848.0'	1.0'	0.9'	
848.0' - 852.8'	4.8'	4.0'	
	<u>10.8'</u>	<u>8.2'</u>	

Recovery 76%

852.8' - 866.0' Sandstone, medium/fine grained, light grey.

866.0' - 876.0' Mudstone, dark grey/black, dense

876.0' - 898.0' COAL

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
876.0' - 882.0'	6.0'	5.0'	
882.0' - 885.0'	3.0'	2.1'	
885.0' - 889.0'	4.0'	2.6'	
889.0' - 894.0'	5.0'	3.6'	
894.0' - 898.0'	4.0'	3.8'	Mainly hard coal - claro-durain, some vitrain pieces.
	<u>22.0'</u>	<u>17.1'</u>	

Recovery 77.7%

898.0' - 900.0' Mudstone, dark grey/black, very silty.

900.0' - 920.0' Sandstone, very fine grained, almost siltstone in appearance, some mudstone interbedded in thin laminations - medium grey color.

- B.C.A. - 72°.

T. D. 920.0'

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 100 -- Seam 5

Lab. No. - 77 - 1006

Footage - 556.0' to 673.0'

Recovery - 57.2%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	1.2	
Ash % -	7.6	
Volatile Matter % -	27.4	
Fixed Carbon % -	63.8	
Total -	100.0	
Sulphur % -	0.35	
FSI -	6½	
Btu per lb. -	13,719	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	7.7	
Volatile % -	27.7	
Btu per lb. -	13,888	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	30.0	
Btu per lb. -	15,041	

Yield - 42.2% @ 7.7 % ash

Warnock Hersey Professional Services Ltd.

Coteman Collieries Ltd.

Hole No. - TD 76 - 100

Seam No. - 5

Lab. No. - 77 - 1006

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Elementary</u>			<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>
	<u>On</u>				
-	28 mesh	60.8	51.1	60.8	51.1
28 mesh	100 mesh	25.6	21.6	86.4	42.4
100 mesh	-	13.6	28.1	100.0	40.4
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<b>TOTAL</b>		<b>100.0</b>	<b>40.4</b>		



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries-TD 76 - 100 -- Seam 5 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1006 Wt % of head sample 60.8

Specific Gravity

## FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	27.8	5.8	5½	27.8	5.8		100.0	51.1	
1.40	1.50	6.8	14.9	2	34.6	7.6		72.2	68.5	
1.50	1.60	3.4	25.4	1	38.0	9.2		65.4	74.1	
	1.60	62.0	76.8	N.D.	100.0	51.1		62.0	76.8	
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Total -		100.0	51.1							



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120

Sample Identification Coleman Collier es-TD 76 -100 - Seam 5

Size fraction 28 mm x 100 m

Lab. No. (s) 7 1006

Wt % of head sample 25.6

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	59.9	4.4	7½	59.9	4.4		100.0	21.6	
1.40	1.50	12.1	9.5	4½	72.0	5.2		40.1	47.4	
1.50	1.60	2.6	17.0	2	74.6	5.7		28.0	63.7	
	1.60	25.4	68.5	N.D.	100.0	21.6		25.4	68.5	
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Total -		100.0	21.6							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave., N.E.    Calgary    Alberta

T2E 2P3

Tel: 264-9120

Sample Identification:    Coleman Collieries - Hole # TD 76-100 --- Seam 5

Lab. No(s). :    77 - 1006

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	50.6	13.0	7		61.1	17.9	4½
Froth 2 minutes	11.8	16.4	3½		7.8	23.0	2½
Tailings	<u>37.6</u>	<u>47.2</u>	<u>1</u>		<u>31.1</u>	<u>49.3</u>	<u>1</u>
Total	100.0	26.3			100.0	28.1	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning            -    1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 100 -- Seam 4

Lab. No. - 77 - 1007

Footage - 842.0' to 852.8'

Recovery - 76.0%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.8	
Ash % -	12.0	
Volatile Matter % -	25.0	
Fixed Carbon % -	62.2	
Total -	100.0	
Sulphur % -	0.45	
FSI -	4½	
Btu per lb. -	13,079	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	12.1	
Volatile % -	25.2	
Btu per lb. -	13,183	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	28.7	
Btu per lb. -	14,990	

Yield - 48.2% @ 12.1% ash

Coleman Collieries Ltd.

Hole No. - TD 76 - 100

Seam No. - 4

Lab. No. - 77 - 1007

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Elementary</u>			<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>
	<u>On</u>				
-	28 mesh	64.3	41.1	64.3	41.1
28 mesh	100 mesh	24.5	23.7	88.8	36.3
100 mesh	-	11.2	20.6	100.0	34.5
<hr/>					
<b>TOTAL</b>		<b>100.0</b>	<b>34.5</b>		



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries-TD 76 - 100 -- Seam 4

Size fraction 1/4" x 28 m

Lab. No. (s)

77 - 1007

Wt % of head sample 64.3

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur F.S.I.	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	23.5	7.4	6	23.5	7.4		100.0	41.1	
1.40	1.50	14.7	15.3	1	38.2	10.4		76.5	51.4	
1.50	1.60	10.5	24.2	1	48.7	13.4		61.8	60.1	
	1.60	51.3	67.4	N.D.	100.0	41.1		51.3	67.4	
<hr/>										
Total -		100.0	41.1							



Warnock Hersey Professional Services Ltd

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification	Coleman Collieries-TD 76 - 100 -- Seam 4	Size fraction	28 m x 100 m
Lab. No. (s)	77 - 1007	Wt % of head sample	24.5

Specific Gravity

## FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	40.7	6.2	7	40.7	6.2		100.0	23.7	
1.40	1.50	12.3	11.1	3½	53.0	7.3		59.3	35.7	
1.50	1.60	15.8	16.0	2	68.8	9.3		47.0	42.2	
	1.60	31.2	55.4	N.D.	100.0	23.7		31.2	55.4	
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Total -		100.0	23.7							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel. 264-9120

Sample Identification : Coleman Collieries - Hole # TD 76 - 100 -- Seam 4

Lab. No (s). : 77 - 1007

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	78.2	16.3	4½	90.4	18.4	3
Froth 2 minutes	4.5	20.4	2½	3.8	24.3	1½
Tailings	<u>17.3</u>	<u>49.9</u>	<u>1</u>	<u>5.8</u>	<u>52.8</u>	<u>1</u>
Total	100.0	22.3		100.0	20.6	

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 100

Lab. No. - 77 - 1008

Footage - 876.0' to 898.0'

Recovery - 77.7%

	CLEAN - 1.00 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.8	
Ash % -	12.5	
Volatile Matter % -	24.8	
Fixed Carbon % -	61.9	
Total -	100.0	
Sulphur % -	0.47	
FSI -	3	
Btu per lb. -	12,996	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	12.6	
Volatile % -	25.0	
Btu per lb. -	13,098	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	28.6	
Btu per lb. -	14,988	

Yield - 53.5% @ 12.6% ash

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD 76 - 100

Seam No. -

Lab. No. - 77 - 1008

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
	<u>On</u>				
-	28 mesh	63.3	36.5	63.3	36.5
28 mesh	100 mesh	25.5	20.9	88.8	32.0
100 mesh	-	11.2	19.4	100.0	30.6
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TOTAL		100.0	30.6		



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries-TD 76 - 100 - - Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1008 Wt % of head sample 63.3

Specific Gravity		FLOAT AND SINK ANALYSIS %								
Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	27.2	8.4	4	27.2	8.4		100.0	36.5	
1.40	1.50	19.7	16.1	1	46.9	11.6		72.8	47.0	
1.50	1.60	9.0	25.4	1	55.9	19.9		53.1	58.4	
	1.60	44.1	65.2	N.D.	100.0	36.5		44.1	65.2	
<hr/>		<hr/>								
Total -		100.0	36.5							



Wainock Hersey Professional Services Ltd

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries-TD 76 - 100 - -

Size fraction 28 m x 100 m

Lab. No. (s)

77 - 1008

Wt % of head sample 25.5

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>SCHMIDT</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	37.2	6.0	6	37.2	6.0		100.0	20.9	
1.40	1.50	16.2	12.0	1½	53.4	7.8		62.8	29.8	
1.50	1.60	17.7	16.0	1	71.1	9.9		46.6	36.0	
	1.60	28.9	48.2	N.D.	100.0	20.9		28.9	48.2	
<hr/>		<hr/>								
Total =		100.0	20.9							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E.    Calgary    Alberta

T2E 2P3              Tel: 264-9120

Sample Identification :    Coleman Collieries - Hole # TD 76 - 100 - - - Seam

Lab. No (s). :    77 - 1008

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>S</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	49.3	15.5	3		88.4	16.0	2
Froth 2 minutes	11.8	15.8	2½		3.7	25.4	1
Tailings	<u>38.9</u>	<u>30.4</u>	<u>1</u>		<u>7.9</u>	<u>55.1</u>	<u>1</u>
Total	100.0	21.3			100.0	19.4	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning             -    1 minute

TD-76-102

COLEMAN COLLIERIES LIMITED

TD-76-102

December 21/76.

0.0'	- 9.0'	No core - tricone for casing.		
9.0'	- 35.0'	Sandstone, light grey on fresh surface, medium-coarse grained, some weathering visible (iron staining), X-bedding, carbonaceous clasts and partings, few mudstone clasts bedded within sands, few calcite stringers infilling hairline fractures.		
18.0'	- 20.0'	= very broken.		
35.0'	- 68.0'	Siltstone/very fine sandstone - medium grey color, well bedded, small scale X-bedding, few hairline fractures.		
68.0'	- 115.0'	Sandstone - light grey color, medium grained, well bedded (defined by darker laminae) numerous fractures with calcite infilling, odd fracture showing some weathering, odd carbonaceous shard.		
115.0'	- 118.0'	Mudstone/siltstone - dark color on fresh surface, very broken ground with visible weathering.		
118.0'	- 157.0'	Sandstone - medium grey, fine grained, laminae and bands of darker mudstone, sand is quite dirty with silts and muds, odd carb. clast, X-bedding, few hairline fractures with calcite infilling.		
146.0'	- B.C.A. - 58°			
157.0'	- 158.7'	Mudstone, dark, quite dense.		
158.7'	- 239.6'	COAL ZONE		
		Possible      Actual	Description	
158.7'	- 163.0'	4.3'	4.3'	Claro-durain, few hard pieces 2" shale at 160.7 ft.
163.0'	- 168.0'	5.0'	3.6'	First 1.5' dirty with 3" of shale, rest claro-durain, hard pieces
168.0'	- 173.0'	5.0'	4.4'	Hard claro-durain.
173.0'	- 178.0'	5.0'	4.4'	Hard claro-durain.
178.0'	- 182.0'	4.0'	3.6'	Claro-durain.
182.0'	- 187.0'	5.0'	4.8'	Claro-durain.
187.0'	- 191.0'	4.0'	3.1'	Claro-durain, with 2" shale in last foot.
191.0'	- 195.0'	4.0'	3.6'	First 2' claro-durain .5" shale split .9" claro-durain
195.0'	- 199.0'	4.0'	3.6'	Shale and coal, 60% shale
199.0'	- 202.0'	3.0'	3.0'	Shale
202.0'	- 207.0'	5.0'	4.0'	First .8" shaley, rest claro-durain
207.0'	- 212.0'	5.0'	4.4'	First 1" hard pieces claro-durain, rest ground coal.

212.0' - 217.0'	5.0'	5.0'	80% shale
217.0' - 222.0'	5.0'	4.8'	.4' shale, then claro-durain
222.0' - 227.0'	5.0'	4.9'	Claro-durain with .5' shale split near center of zone
227.0' - 232.0'	5.0'	4.0'	First 1' shale, rest claro-durain
232.0' - 236.0'	4.0'	2.7'	Claro-durain
236.0' - 239.6'	3.6'	2.4'	Claro-durain
	<u>80.9'</u>	<u>70.6'</u>	

Recovery 87.3%

239.6' - 246.0' Mudstone, dark, carbonaceous.

246.0' - 253.0' Mudstone/siltstone, dark grey color, odd slickensided fracture, few hairline fractures.

253.0' - 423.0' Sandstone/siltstone, medium grey color, few interbeds of darker mudstone, quite inhomogeneous, few sandier portions, odd slickensided fracture, few hairline fractures with calcite infilling.

254.0' - B.C.A. - 55°

400.0' - B.C.A. - 60°

405.0' - 4" broken recemented zone

Grades below

423.0' - 480.0' Sandstone, light grey, medium-coarse grained, upper 10' has mudstone clasts as well as few shards of carb. material - similar zones down section, odd hairline fracture.

457.0' - B.C.A. - 55°

Grades below last 10'

480.0' - 484.2' Mudstone, dark - quite dense.

484.2' - 497.9' COAL ZONE

	Possible	Actual	Description
484.2' - 489.0'	4.8'	2.0'	50% shale and claro-durain remaining.
489.0' - 497.0'	8.0'	1.9'	Mostly shale with odd piece of claro-durain
497.0' - 497.9'	.9'	.9'	Claro-durain
	<u>13.7'</u>	<u>4.8'</u>	

Recovery 35.0%

497.9' - 501.0' Mudstone - dark, dense carbonaceous.

501.0' - 514.0' Sandstone, siltstone, medium grey color, few hairline fractures.

506.0' - B.C.A. - 56°

514.0' - 542.0' Mudstone/siltstone, some carb. material, few hairline fractures with calcite infilling.

542.0' - 543.5' Mudstone, dark, dense.

543.5' - 550.0' Coal and shale bands.

550.0' - 551.0' Mudstone, dark dense.

551.0' - 585.0' Sandstone, siltstone, medium grey, few lighter sandier portions, X-bedding.

570.0' - B.C.A. - 60°

585.0' - 696.0' Sandstone, light grey, medium grained, few coarse portions with sandstone clasts and carb. clasts, well bedded, some X-bedding.

616.0' - B.C.A. - 64°

649.0' - 651.0' - numerous large clasts of mudstone bedded within sand

676.0' - 677.0' - similar 649.0' - 651.0'

681.0' - B.C.A. - 62°

696.0' - 727.0' Mudstone/siltstone, medium grey color, few zones with interbeds of lighter fine grained sandstone.

727.0' - 907.6' Sandstone, light grey, medium grained, sand tends to coarsen downsection, odd slickensided fracture.

732.0' - B.C.A. - 60°

837.0' - appearance of coal shards and partings, odd mudstone clast

890.0' - B.C.A. - 60°

907.6' - 920.8' Mudstone, dark dense except for coal bands - largest approx. 1'

920.8' - 949.0' COAL ZONE

	Possible	Actual	Description
920.8' - 922.0'	1.2'	.6'	Claro-durain
922.0' - 927.0'	5.0'	4.7'	Claro-durain, broken
927.0' - 930.0'	3.0'	.6'	Shale remaining
930.0' - 934.0'	4.0'	2.0'	Claro-durain left
934.0' - 937.0'	3.0'	1.6'	Claro-durain left
937.0' - 939.0'	2.0'	.7'	Claro-durain left
939.0' - 945.0'	6.0'	2.8'	Claro-durain with 2" shale at bottom of zone
945.0' - 947.0'	2.0'	1.1'	Claro-durain left
947.0' - 949.0'	2.0'	.7'	Claro-durain left
	28.2'	14.8'	

Recovery 52.5%

949.0' - 976.0' Sandstone, light grey, medium grained, appears to have some leaching in zones, odd slickensided fracture.

T. D. 976.0'

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 102 - - Seam 5

Lab. No. - 77 - 1004

Footage - 158.7' to 239.6'

Recovery - 87.3%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	1.1	
Ash % -	8.3	
Volatile Matter % -	27.0	
Fixed Carbon % -	63.6	
Total -	100.0	
Sulphur % -	0.37	
FSI -	6	
Btu per lb. -	13,665	
Equilibrium Moisture % -	- - -	
Hardgrove Grindability -	- - -	
Specific Gravity ( 20 mesh ) -	- - -	
<u>Dry Basis</u>		
Ash % -	8.3	
Volatile % -	27.3	
Btu per lb. -	13,810	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	29.7	
Btu per lb. -	15,066	

Yield - 46.6% @ 8.3% ash

**Wamock Hersey Professional Services Ltd.**

**Coleman Collieries Ltd.**

Hole No. - TD 76 - 102

Seam No. - 5

Lab. No. - 77 - 1004

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Size</u>	<u>Elementary</u>			<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u> <u>On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>
-	28 mesh	59.6	42.8	59.6	42.8
28 mesh	100 mesh	26.0	23.0	85.6	36.8
100 mesh	-	14.4	25.9	100.0	35.2
<b>TOTAL</b>		100.0	35.2	—	—



Wainock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries - TD 76 - 102 -- Seam 5 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1004 Wt % of head sample 59.6

<u>Specific Gravity</u>		FLOAT AND SINK ANALYSIS %								
<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>SOXHOK F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	36.8	5.9	6	36.8	5.9		100.0	42.8	
1.40	1.50	8.0	17.2	1	44.8	7.9		63.2	64.2	
1.50	1.60	3.7	27.0	1	48.5	9.4		55.2	71.0	
	1.60	51.5	74.2	N.D.	100.0	52.8		51.5	74.2	
		<hr/>	<hr/>							
Total -		100.0	42.8							



Wamock Hersey Professional Services Ltd.  
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

Sample Identification Coleman Collieries-TD 76 - 102 -- Seam 5 Size fraction 28 m x 100 m  
Lab. No. (s) 77 - 1004 Wt % of head sample 26.0

Specific Gravity		FLOAT AND SINK ANALYSIS %								
<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	45.6	4.1	7½	45.6	4.1		100.0	23.0	
1.40	1.50	11.0	9.1	3½	56.6	5.1		54.4	38.8	
1.50	1.60	11.3	13.1	2½	67.9	6.4		43.4	46.4	
	1.60.	32.1	58.1	N.D.	100.0	23.0		32.1	58.1	
<hr/>		<hr/>								
Total -		100.0	23.0							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave, N.E., Calgary Alberta

T2E 2P3

Tel. 264-9120

Sample Identification : Coleman Collieries - Hole # TD 76 - 102 - - - Seam 5

Lab. No(s). : 77 - 1004

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	67.7	14.4	6	83.3	21.0	4
Froth 2 minutes	4.6	23.5	1	4.3	32.8	1
Tailings	<u>27.7</u>	<u>48.2</u>	<u>0</u>	<u>12.4</u>	<u>56.7</u>	<u>1</u>
Total	100.0	24.2		100.0	25.9	

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 76 - 102 -- Seam 2

Lab. No. - 77 - 1005

Footage - 920.8' to 949.0'

Recovery - 52.5%

	CLEAN - 1,60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.8	
Ash % -	14.5	
Volatile Matter % -	25.7	
Fixed Carbon % -	59.0	
Total -	100.0	
Sulphur % -	0.47	
FSI -	4½	
Btu per lb. -	12,724	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	14.6	
Volatile % -	25.9	
Btu per lb. -	12,823	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	30.3	
Btu per lb. -	15,017	

Yield - 50.2% @ 14.6% ash

**Warnock Hersey Professional Services Ltd.**

Coleman Collieries Ltd.

Hole No. - TD 76 - 102

Seam No. - 2

Lab. No. - 77 - 1005

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	61.5	36.2	61.5	36.2
28 mesh	100 mesh	25.3	24.7	86.8	32.8
100 mesh	-	13.2	22.6	100.0	31.5
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TOTAL		100.0	31.5		



Warrick Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

Sample Identification Coleman Collieries - TD 76 - 102 -- Seam2 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1005 Wt % of head sample 61.5

Specific Gravity

Sink	Float	FLOAT AND SINK ANALYSIS %								
		Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	19.9	8.2	5½	19.9	8.2		100.0	36.2	
1.40	1.50	19.3	17.2	1½	39.2	12.6		80.1	43.1	
1.50	1.60	15.7	25.6	1	54.9	16.3		60.8	51.3	
	1.60	45.1	60.3	N.D.	100.0	36.2		45.1	60.3	
		—	—							
Total		100.0	36.2							



Wainock Hersey Professional Services

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120

Sample Identification Coleman Collieries-TD 76 - 102 -- Seam 2 Size fraction 28 m x 100 m  
Lab. No. (s) 77 - 1005 Wt % of head sample 25.3

<u>Specific Gravity</u>		FLOAT AND SINK ANALYSIS %								
<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	27.5	6.3	7	27.5	6.3		100.0	24.7	
1.40	1.50	29.2	12.7	4	56.7	9.6		72.5	31.7	
1.50	1.60	7.9	18.9	2½	64.6	10.7		43.3	44.5	
	1.60	35.4	50.2	N.D.	100.0	24.7		35.4	50.2	
Total -		100.0	24.7							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3

Tel: 264-9120

Sample Identification: Coleman Collieries - Hole # TD 76 - 102 - - - Seam 2

Lab. No (s): 77 - 1005

Froth Flotation Tests

	<u>28 mesh x 0</u>				<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	S	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	51.4	17.0	5½		91.5	20.3	3½
Froth 2 minutes	9.2	18.3	3		3.7	33.2	1
Tailings	<u>39.4</u>	<u>33.8</u>	<u>1½</u>		<u>4.8</u>	<u>57.9</u>	<u>1</u>
Total	100.0	23.7			100.0	22.6	

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

TD-76-103

COLEMAN COLLIERIES LIMITED

TD-76-103 (v)

0.0' - 7.0' No core.

7.0' - 525.0' Fernie Shale Formation. Siltstone, thinly laminated with mudstone, slickensides and bony surfaces, worm burrows, polished surfaces are common throughout. Colour - dark and light grey banded.

B.C.A. 75° at 102'

B.C.A. 65° at 240'

B.C.A. 70° at 520'

T. D. 525.0'

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TD-76-104

COLEMAN COLLIERIES LIMITED

TD-76-104 (90°)

0.0' - 42.0' No core (tricone for casing).

42.0' - 138.0' Fernie Shales, worm burrows, numerous calcite stringers, slickensided fractures.

57.0' - very broken (small pieces 2" - 3")

72.0' - B.C.A. - 45°

131.0' - B.C.A. - 64°

138.0' - 364.0' Sandstone - light grey, medium grained, few carb fossils.

162.0' - B.C.A. - 62°

206.0' - B.C.A. - 60°

232.0' - B.C.A. - 60°

252.0' - Sandstone darkens to medium grey and fines (fine grained)

263.0' - B.C.A. - 71°

306.0' - B.C.A. - 70°

317.0' - B.C.A. - 70° - dark fine grained Sandstone

358.0' - B.C.A. - 70°

364.0' - 1017.0' Fernie Formation

364.0' - 1' very broken ground

392.0' - B.C.A. - 71°

422.0' - B.C.A. - 73°

437.0' - 523.0' - very broken ground, B.C.A.'s erratic (70° - 10°)  
numerous slickensided fractures

552.0' - B.C.A. - 64°

655.0' - B.C.A. - 55°

707.0' - B.C.A. - 74°

803.0' - B.C.A. - 72°

992.0' - B.C.A. - 67°

T. D. 1,017.0'

TD-76-105

COLEMAN COLLIERIES LIMITED

TD-76-105 (70° E)

0.0' - 21.0' No core.

21.0' - 271.5' Sandstone. Medium to coarse grained. Iron stained, very little broken core.

B.C.A. - 75°.

Coal pieces and carbonaceous material 50.0' - 52.0' and 96.0' - 110.0'. Small coal seam at 86.0' - 87.0'. Mudstone and badly shattered core at 102.0' - 103.0'.

Coarse grained from 39.0' - 227.0'.

Medium/fine grained 227.0' - 250.0' then becoming very silty.

Coal pieces and carbonaceous plant remains from 222.0' - 227.0' - and large mud pebble. Very silty from 250.0' - 271.5'.

B.C.A. - 65°.

271.5' - 286.0' COAL #2 Seam - Clean contact with sandstone/siltstone.

	Possible	Actual	
271.5' - 277.0'	5.5'	4.8'	
277.0' - 281.5'	4.5'	3.7'	Hard coal. Small shale bands.
281.5' - 286.0'	4.5'	3.8'	
	<u>14.5'</u>	<u>12.3'</u>	

Recovery 84.8%

286.0' - 306.0' Mudstone. Dense - very dark grey/black with small coal pieces.

306.0' - 347.0' Siltstone/sandstone, light grey, fine grained and interbedded.  
B.C.A. - 75°.

347.0' - 351.0' COAL SEAM

Badly broken up and only small pieces of claro/durain recovered.  
Recovery 30%

351.0' - 374.0' Siltstone. Medium grey, very thinly laminated, grading locally to a very fine sandstone.

374.0' - 416.0' Sandstone. Medium/coarse grained, light/medium grey color.  
Carbonaceous partings.  
B.C.A. - 52° at 375.0'.

416.0' - 422.0' COAL

Poor recovery - durain pieces.  
B.C.A. - 60°.

422.0' - 697.0' Sandstone. Light grey, medium/coarse grained. Massive becoming banded towards base, carbonaceous zones with passage beds, gradational to Fernie shale from 650.0' - 697.0'.

- 697.0' - 1,043.5' Fernie Shale. Mixture of dark siltstones and mudstones, very thinly laminated with fine sandstone, giving a light and dark planar effect. Hairline fractures infilled with calcite. Minor folds and faults present towards the base of this unit.  
Av. B.C.A.'s - 50°.
- 1,043.5' - 1,124.0' Sandstone. Kootenay formation. Medium grained - light grey color. Major fault zone from 1,043.5' - 1,065.0' comprising high angle breaks in the core, distorted bedding and interbedded calcite, highly polished and sheared zone. Sandstone grading through to a fine siltstone at bottom of unit with mud band at 1,083.0' - 1,085.0'.
- 1,124.0' - 1,151.0' Mudstone. Dark grey, broken core with coal and shale partings and calcite pieces.  
B.C.A. - 50°.
- 1,151.0' - 1,159.0' COAL  
Recovered 3'0" from 8'0" - broken up coal pieces and mud, difficult to log.
- 1,159.0' - 1,207.0' Mudstone. Dense, dark grey, some silt interbedded.
- 1,207.0' - 1,240.0' Siltsone. Medium grey, fine grained with frequent layers of darker mudstone and slickensided pieces.  
B.C.A. - 45°.

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD-77-407-105 (70° E)

Lab. No. - 77-1015

Footage - 271.5' to 286.0'

Recovery - 84.8%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.7	
Ash % -	18.7	
Volatile Matter % -	22.9	
Fixed Carbon % -	57.7	
Total -	100.0	
Sulphur % -	0.46	
FSI -	3	
Btu per lb. -	12,088	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	18.9	
Volatile % -	23.1	
Btu per lb. -	12,172	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	28.4	
Btu per lb. -	15,003	

Yield - 49.6% @ 18.9% ash

**Warnock Hersey Professional Services Ltd.**

**Coleman Collieries Ltd.**

Hole No. - TD 77 - ~~107~~ 105 ( $70^{\circ}E$ )

Seam No. -

Lab. No. - 77 - 1015

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	67.5	36.7	67.5	36.7
28 mesh	100 mesh	21.4	25.9	88.9	34.1
100 mesh	-	11.1	25.8	100.0	33.2
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<b>TOTAL</b>		100.0	33.2		





Wainock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

105

Sample Identification Coleman Collieries - TD 77 - 407 Size fraction 28 m x 100 m  
Lab. No. (s) 77 - 1015 Wt % of head sample 21.4

Specific Gravity

## FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	21.1	7.3	6	21.1	7.3		100.0	25.9	
1.40	1.50	25.7	15.7	2	46.8	11.9		78.9	30.8	
1.50	1.60	15.1	21.4	1	61.9	14.2		53.2	38.2	
	1.60	38.1	44.8	N.D.	100.0	25.9		38.1	44.8	
<hr/>		<hr/>			<hr/>			<hr/>		
Total -		100.0	25.9							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave, N.E., Calgary Alberta

T2E 2P3      Tel. 264-9120

Sample Identification :    Coleman Collieries - Hole # TD 77 - <sup>105</sup> ~~107~~

Lab. No(s) : 77 - 1015

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	42.3	19.5	4½	84.0	22.0	2
Froth 2 minutes	8.7	22.3	1	4.8	32.2	1
Tailings	<u>49.0</u>	<u>32.5</u>	<u>1</u>	<u>11.2</u>	<u>51.7</u>	<u>1</u>
Total	100.0	26.1		100.0	25.8	

Conditions

- Solids Concentration - 10%  
Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning - 1 minute

TD-76-106

COLEMAN COLLIERIES LIMITED

TD-76-106 (60° E)

0.0' - 18.0' No core.

18.0' - 48.5' Sandstone, coarse grained, light grey, iron stained, weathered,  
broken core.  
B.C.A. - 55°.

48.5' - 91.0' Fault Zone. Mudstone, shattered, no piece larger than  $\frac{1}{2}$ " -  
slickensided, soft mud, some silty pieces.

T. D. 91.0'

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Note: Hole abandoned due to very difficult drilling through mud and fault zone.

New hole started on a 66° angle from same set-up - TD-76-106A (66° E).

TD-76-106A

COLEMAN COLLIERIES LIMITED

TD-76-106A (66° E)

N.Q.

- 0.0' - 132.0' No core. N.Q.  
Drilled through fault zone.
- 132.0' - 147.0' Mudstone, badly broken and slickensided core with soft mud bands.  
Very dark grey color.
- 147.0' - 468.0' Sandstone, medium/coarse grained to 230.0' then medium grained, light grey color.  
Fractured broken core to 160.0', at 165.0' - B.C.A. - 50°  
HQ core and cased to 228.0'  
Broken core 266.0' - 269.0' (no piece larger than 1") and at 308.0' - 335.0' with slickensides.  
Calcite stringers beginning at 250.0'  
Coarse grained from 380.0'  
3" coal band at 433.0'  
B.C.A. varies from 80° - 45°
- 468.0' - 488.0' Mudstone, dark grey/black, dense.
- 488.0' - 495.0' COAL
- |                 | <u>Possible</u> | <u>Actual</u> |      |
|-----------------|-----------------|---------------|------|
| 488.0' - 492.0' | 4.0'            | 1.8'          |      |
| 492.0' - 495.0' | 3.0'            | 0.8'          | Coal |
|                 | <u>7.0'</u>     | <u>2.6'</u>   |      |
| Recovery        | 37.1%           |               |      |
- 495.0' - 501.0' Mudstone, dark grey/black, dense, some coaly material.
- 501.0' - 534.0' COAL
- |                 | <u>Possible</u> | <u>Actual</u> |  |
|-----------------|-----------------|---------------|--|
| 501.0' - 505.0' | 4.0'            | 0.9'          |  |
| 505.0' - 508.0' | 3.0'            | 0.6'          |  |
| 508.0' - 511.0' | 3.0'            | 0.3'          |  |
| 511.0' - 514.0' | 3.0'            | 0.8'          |  |
| 514.0' - 518.0' | 4.0'            | 2.0'          |  |
| 518.0' - 522.0' | 4.0'            | 2.1'          |  |
| 522.0' - 525.0' | 3.0'            | 0.7'          |  |
| 525.0' - 528.0' | 3.0'            | 1.1'          |  |
| 528.0' - 531.0' | 3.0'            | 2.4'          |  |
| 531.0' - 534.0' | 3.0'            | 1.2'          |  |
|                 | <u>33.0'</u>    | <u>12.1'</u>  |  |
| Recovery        | 36.6%           |               |  |
- 534.0' - 685.0' Sandstone, medium/coarse grained, light grey color with a few calcite stringers.  
B.C.A. - 40° at 540.0'  
Mudstone band - slickensided pieces at 666.0' - 667.0'.  
Some cross-bedding and high angle bedding at 668.0' - 672.0'.
- 685.0' - 718.0' Siltstone, medium grey color with fine sand and mudstone interbedded,  
some broken core. B.C.A. - 50°

718.0' - 739.0' Mudstone, dark grey/black.

739.0' - 864.0' Sandstone, medium grained, light grey, with siltstone and mudstone layers, becoming coarse grained from 812.0'. Coal pieces (squeezed and broken) carbonaceous stringers from 828.0' - 840.0'.

864.0' - 873.0' Siltstone.

873.0' Sandstone, light grey, coarse grained. Large mud pebbles at 875.0'. Some thin coal partings from 885.0' - 893.0'. B.C.A. - 40° Generally coarse grained, however zones of medium-fine grained sand as well as odd dark shaly parting zones of sand with carb. partings.

931.5' - 973.0' - very coarse grained, odd granular portions carb partings, odd mudstone clast

979.0' - 986.0' - light grey, medium grained - fine grained, well bedded with mudstone laminae

977.0' - B.C.A. - 50°

986.0' - 1025.0' Mudstone, dark carbonaceous, odd carb. parting, few slickensided fractures, few hairline fractures, small zones with light grey very fine grained sandstone laminae.

1018 - B.C.A. - 55°

1025.0' - 1035.0' Shale - carbonaceous, slickensided fractures.  
Note - only 5' recovery in this zone - possibly coal

1035.0' - 1064.8' COAL ZONE

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
1035.0' - 1037.0'	2.0'	0.5'	Shale remaining
1037.0' - 1040.0'	3.0'	0.2'	Shale remaining
1040.0' - 1043.0'	3.0'	0.5'	Very broken shale and coal
1043.0' - 1047.0'	4.0'	1.5'	Broken claro-durain few hard pieces
1047.0' - 1048.0'	1.0'	0.8'	Claro-durain, last .1' shale
1048.0' - 1051.0'	3.0'	2.5'	Claro-durain
1051.0' - 1053.0'	2.0'	0.8'	Few hard pieces claro-durain
1053.0' - 1054.5'	1.5'	0.9'	Few hard pieces claro-durain
1054.5' - 1057.0'	2.5'	1.6'	Broken claro-durain
1057.0' - 1060.0'	3.0'	1.5'	Broken claro-durain
1060.0' - 1061.0'	1.0'	0.7'	Claro-durain pieces
1061.0' - 1063.0'	2.0'	1.5'	Claro-durain pieces
1063.0' - 1064.8'	1.8'	1.1'	Claro-durain pieces, few small shaley partings

1064.8' - 1065.5' Shale - dark carbonaceous.

1065.5' - Sandstone, light grey, coarse-medium grained, few small carb. partings.

1082.0' - B.C.A. - 50°

1084.0' - 1086.0' - very broken

1120.0' - darkens in color medium grey, medium grained

1141.0' - 1144.0' - network of hairline fractures with calcite infilling

1208.0' - B.C.A. - 57° - fine grained, few hairline fractures with calcite infilling, odd slicken-sided fracture

1249.0' - heavily bedded, few partings of mudstone

1268.0' - B.C.A. - 58°

TD-76-107

COLEMAN COLLIERIES LIMITED

TD-76-107 (60° E)

- 0.0' - 11.0' No core.
- 11.0' - 59.0' Sandstone  
11.0' - 15.0' badly broken.  
Coarse grained, light grey.  
B.C.A. - 40°
- 59.0' - 64.0' Mudstone, medium grey, some silt - broken core.
- 64.0' - 245.0' Sandstone, coarse, medium grey, salt & pepper effect, slickensided pieces at 81.0' - 82.0'.  
B.C.A. - 55°  
Thin carbonaceous material interlayered.  
118.0' - 126.0' - mud pebble conglomerate and calcite stringers.  
B.C.A. - 45°  
6" mud bands at 159.0' - 159.5'  
170.0' - 170.5'  
Change to NQ 183.0'  
Back to HQ at 196.0'  
Coaly intercalations 198.0' - 206.0' with thin silty layers,  
massive sandstone at 235.0' - B.C.A. - 80°.
- 245.0' - 271.5' Mudstone - dense, dark grey.  
Change to NQ at 265.0'.
- 271.5' - 274.0' COAL  
Recovery 1.0' from 3.5' - B.C.A. - 75°
- 274.0' - 280.5' Mudstone, dense, dark grey.
- 280.5' - 308.0' COAL
- |                 | Possible     | Actual       |                        |
|-----------------|--------------|--------------|------------------------|
| 280.5' - 284.0' | 3.5'         | 1.2'         |                        |
| 284.0' - 288.0' | 4.0'         | 3.1'         |                        |
| 288.0' - 296.0' | 8.0'         | 3.0'         |                        |
| 296.0' - 298.0' | 2.0'         | 2.0'         | Hard - mainly durain.  |
| 298.0' - 300.0' | 2.0'         | 1.5'         | Clarkein               |
| 300.0' - 304.0' | 4.0'         | 3.1'         |                        |
| 304.0' - 306.0' | 2.0'         | 1.8'         | ) Some shale with coal |
| 306.0' - 308.0' | 2.0'         | 2.0'         |                        |
|                 | <u>27.5'</u> | <u>17.7'</u> |                        |
- Recovery 64.3%
- 308.0' - 309.0' Mudstone
- 309.0' - 573.0' Sandstone, medium/coarse grained, medium/light grey. Thin coal and carbonaceous material interbedded, generally massive sand. B.C.A. - 65°  
Broken silt and mudstone core at 384.0' - 385.0'  
Some calcite pieces. Some cross-bedding evident becoming fine grained almost silty from 435.0' - 475.0' and 564.0' - 570.0'. Some broken and mud core at 553.0' - 554.0'.

573.0' - 580.0' Siltstone - medium grey, fine sand and mudstone interbedded.

580.0' - 595.0' Mudstone, coal and carbonaceous material interbedded plant remains.  
Dense. B.C.A. - 75° - 80°.

595.0' - 628.0' COAL

	<u>Possible</u>	<u>Actual</u>	
595.0' - 596.0'	1.0'	Nil	
596.0' - 600.0'	4.0'	1.0'	
600.0' - 603.0'	3.0'	Nil	
603.0' - 605.5'	2.5'	1.5'	
605.5' - 607.5'	2.0'	1.2'	
607.5' - 611.0'	3.5'	0.6'	Mainly hard durain like
611.0' - 613.0'	2.0'	1.0'	coal recovered.
613.0' - 616.0'	3.0'	2.4'	
616.0' - 620.0'	4.0'	3.3'	
620.0' - 624.0'	4.0'	3.3'	
624.0' - 628.0'	4.0'	3.8'	
	<u>33.0'</u>	<u>18.1'</u>	

Recovery 54.8%

628.0' - 796.0' Sandstone - Clear contact with coal, coarse/medium grained, light grey,  
some coal and interbedded to 645.0'  
B.C.A. - 60°  
High angle bedding and cross-bedding 693.0' - 700.0'  
Salt and pepper effect 726.0' - 753.0'  
Clean regular sand at T.D.  
Average B.C.A. - 75°.

T.D. 796.0'

**Wamock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD 77 - 107

Lab. No. - 77 - 1013

Footage - 280.5' to 308.0'

Recovery - 64.3%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.8	
Ash % -	13.6	
Volatile Matter % -	25.9	
Fixed Carbon % -	59.7	
Total -	100.0	
Sulphur % -	0.49	
FSI -	5	
Btu per lb. -	12,909	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	13.7	
Volatile % -	26.2	
Btu per lb. -	13,012	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	30.3	
Btu per lb. -	15,079	

Yield - 57.3% @ 13.7% ash

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD 77 - 107

Seam No. -

Lab. No. - 77 - 1013

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Elementary</u>			<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>
		<u>On</u>			
-	28 mesh	64.2	30.0	64.2	30.0
28 mesh	100 mesh	24.0	22.6	88.2	28.0
100 mesh	-	11.8	25.8	100.0	27.7
		—	—	—	—
TOTAL		100.0	27.7		



Warrick Hersey Professional Services Ltd

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120

Sample Identification Coleman Collieries - TD 77 - 107 - - Seam Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1013 Wt % of head sample 64.2

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	36.4	9.0	5	36.4	9.0		100.0	30.0	
1.40	1.50	12.4	19.0	2½	48.8	11.5		63.6	42.0	
1.50	1.60	14.5	26.9	1	63.3	15.1		51.2	47.5	
	1.60	36.7	55.7	N.D.	100.0	30.0		36.7	55.7	
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Total -		100.0	30.0							



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120

Sample Identification Coleman Collieries - TD 77 -107 -- Size fraction 28 m x 100 m  
Lab. No. (s) 77 - 1013 Wt % of head sample 24.0

<u>Specific Gravity</u>		FLOAT AND SINK ANALYSIS %								
<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	44.8	6.9	8	44.8	6.9		100.0	22.6	
1.40	1.50	12.5	12.8	4	57.3	8.2		55.2	35.3	
1.50	1.60	11.9	18.9	3	69.2	10.0		42.7	41.9	
	1.60	30.8	50.8	N.D.	100.0	22.6		30.8	50.8	
<hr/>		<hr/>								
Total -		100.0	22.6							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave., N.E.    Calgary    Alberta

T2E 2P3              Tel. 264-9120

Sample Identification :    Coleman Collieries - Hole # TD - 77 - 107 - - - Seam

Lab. No (s). :    77 - 1013

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>			
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>		<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	47.4	20.6	5		77.7	20.2	3½
Froth 2 minutes	17.4	22.6	3		6.5	36.0	1
Tailings	<u>35.2</u>	<u>34.0</u>	<u>1</u>		<u>15.8</u>	<u>49.4</u>	<u>1</u>
Total	100.0	25.7			100.0	25.8	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3-1 diesel fuel/MIBC  
Conditioning             -    1 minute

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.,

Sample Identification - TD - 77 - 107

Lab. No. - 77 - 1014

Footage - 595.0' to 628.0'

Recovery - 54.8%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.7	
Ash % -	14.4	
Volatile Matter % -	26.2	
Fixed Carbon % -	58.7	
Total -	100.0	
Sulphur % -	0.53	
FSI -	7	
Btu per lb. -	12,800	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	14.5	
Volatile % -	26.3	
Btu per lb. -	12,889	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	30.8	
Btu per lb. -	15,070	

Yield - 44.3% @ 14.5% ash

Warnock Hersey Professional Services Ltd.

Coleman Collieries Ltd.

Hole No. - TD 77 - 107

Seam No. -

Lab. No. - 77 - 1014

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	66.0	41.3	66.0	41.3
28 mesh	100 mesh	22.8	25.7	88.8	37.3
100 mesh	-	11.2	25.0	100.0	35.9
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TOTAL		100.0	35.9		



Wamock Hersey Professional Services Ltd

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries - TD 77 - 107 -- Seam Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 1014 Wt % of head sample 66.0

Specific Gravity

Sink	Float	FLOAT AND SINK ANALYSIS %								
		Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	<del>F.S.I.</del>	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	24.5	10.0	6	24.5	10.0		100.0	41.3	
1.40	1.50	9.0	19.5	2	33.5	12.6		75.5	51.4	
1.50	1.60	12.2	27.0	1	45.7	16.4		66.5	55.7	
	1.60	54.3	62.2	N.D.	100.0	41.3		54.3	62.2	
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Total -		100.0	41.3							



Winnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 264-9120

Sample Identification Coleman Collieries -- TD 77 - 107Size fraction 28 m x 100 mLab. No. (s) 77 - 1014Wt % of head sample 22.8Specific Gravity

FLOAT AND SINK ANALYSIS %										
<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>ZOKKUK F.S.I.</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
1.40		31.6	6.0	8½	31.6	6.0		100.0	25.7	
1.40	1.50	20.1	12.1	4	51.7	8.4		68.4	34.9	
1.50	1.60	10.3	19.0	3	62.0	10.1		48.3	44.3	
1.60		38.0	51.2	N.D.	100.0	25.7		38.0	51.2	
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Total -		100.0	25.7							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel 264-9120

Sample Identification · Coleman Collieries - Hole # TD 77 - 107

Lab. No (s). : 77 - 1014

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	42.0	18.5	4½	84.0	19.8	5½
Froth 2 minutes	11.6	19.2	1½	4.2	27.3	1
Tailings	<u>46.4</u>	<u>34.8</u>	<u>1</u>	<u>11.8</u>	<u>61.1</u>	<u>1</u>
Total	100.0	26.1		100.0	25.0	

Conditions

Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

TD-76-107A

COLEMAN COLLIERIES LIMITED

TD-76-107A (V)

- 0.0' - 36.0' No core.
- 36.0' - 48.0' Sandstone. Shattered, fault zone from 38.0'.
- 48.0' - 52.0' Badly broken. Mudstone - some coal pieces.  
Recovery very poor.
- 52.0' - 61.0' Sandstone. Iron stained, weathered, broken core.
- T. D. 61.0'
-

TD-77-117

COLEMAN COLLIERIES LIMITED

TD-77-1; N. 60°, 5° E)

- 0.0' - 10.0' No core (tricore for cutting)
- 10.0' - 295.0' Sandstone - light grey, medium-coarse grained, fractures in upper portion of zone show iron staining, X-bedding large and small scale evident.
- 36.0' - B.C.A. - 60°
- 60.0' - sandstone darkens to a medium grey, medium grained
- 116.0' - appears to be grading into Passage Beds, few mudstone, siltstone partings (dark color) with odd slickensided fracture, few hairline fractures with calcite infilling.  
B.C.A.'s - 60° - 90°
- 156.0' - B.C.A. - 80° - 90°
- 295.0' - 633.5' Fernie Formation - dark mudstone, with few laminae of lighter fine graded sandstone, numerous slickensided fractures, hairline fractures with calcite infilling, worm burrows.
- 310.0' - B.C.A. - 80°
- 326.0' - B.C.A. - 80°
- 470.0' - B.C.A. - 76°
- 501.0' - B.C.A. - 75° - 80°
- 564.0' - B.C.A. - 75°
- 628.0' - 628.5' - very broken core - shattered and ground



COLEMAN COLLIERIES LIMITED

TD-77-119 (60° E)

0.0' - 9.0' No core (tricone for casing)

9.0' - 140.0' Sandstone - very coarse grained, massive with salt and pepper effect, light/medium grey, iron stained and weathered.

High angle B.C.A. 15° - 20°

50.0' - 57.0' - small pieces and very badly broken core  
67.0' - B.C.A. - 55°

Thin carbonaceous plant remains in sandstone

74.0' - 78.0' - fault-broken zone with mudstone and 6" soft mud patch

137.0' - 140.0' - same as 74'-78'

140.0' - 165.5' Siltstone/sandstone - medium grey, badly shattered broken core, no piece larger than 1". Some mudstone and coaly material mixed in with the general rock type.

165.5' - 181.0' Siltstone/mudstone - medium grey. B.C.A. - 60°. interbedded in thin layers 1/8" thick, iron-staining still evident at 178'

180.5' - 3" soft mud band.

181.0' - 300.0' Sandstone - medium grey, very coarse grained, some X-bedding, salt and pepper effect.

185.0' - thin coal layers/laminations 1/4" thick

217.0' - N.Q. core

223.0' - 226.0' - broken core only 2' recovered

289.0' - B.C.A. 49°

300.0' - 308.5' Mudstone/siltstone - dark grey/black, slickensided fractures.

308.5' - 340.4' COAL ZONE

	Possible	Actual	Description
308.5' - 311.0'	2.5'	0.0'	--
311.0' - 314.0'	3.0'	1.2'	Claro-durain
314.0' - 315.5'	1.5'	.2'	Shale remaining
315.5' - 317.5'	2.0'	1.1'	Claro-durain, some bone and shale
317.5' - 321.0'	3.5'	0.9'	Claro-durain
321.0' - 323.0'	2.0'	0.0'	--
323.0' - 327.0'	4.0'	1.0'	Shattered claro-durain
327.0' - 330.0'	3.0'	0.0'	--
330.0' - 331.5'	1.5'	0.8'	Claro-durain
331.5' - 333.0'	1.5'	0.7'	Mostly bone remaining
333.0' - 334.0'	1.0'	0.4'	Slurry of coal and water
334.0' - 335.0'	1.0'	1.0'	Slurry of coal and water
335.0' - 336.0'	1.0'	0.6'	Slurry of coal and water
336.0' - 338.0'	2.0'	1.8'	First .1' shale rest broken claro-durain
338.0' - 340.0'	2.0'	2.0'	Claro-durain
340.0' - 340.4'	0.4'	0.4'	Coal and shale
	<u>31.9'</u>	<u>12.1'</u>	

340.4' - 359.0' Mudstone/siltstone/sandstone - few calcite stringers, few carb. partings (small) - obscure bedding, few slickensided fractures.

359.0' - 360.5' Sandstone - light grey, medium grained.

360.5' - 363.5' Mudstone - dark in color, heavily fractured - slickensides.

363.5' - 373.7' COAL ZONE

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
363.5' - 367.5'	4.0'	3.8'	Claro-durain
367.5' - 372.0'	4.5'	3.1'	Claro-durain
372.0' - 373.7'	1.7'	1.4'	Claro-durain
	<u>10.2'</u>	<u>8.3'</u>	

Recovery - 81.4%

373.7' - 441.0' Siltstone - medium grey, odd slickensided fracture, few calcite stringers, sandy laminae appearing downsection.

396.0' - B.C.A. - 47°  
417.0' - B.C.A. - 55°

441.0' - 466.0' Sandstone - light grey, medium-coarse grained, few carb. partings, odd mudstone clast.

466.0' - 488.0' Mudstone/siltstone, dark, few slickensided fractures, few hairline fractures with calcite infilling.

475.0' - 1' very broken

488.0' - 506.0' Sandstone - light grey, very fine grained, few calcite stringers.

490.0' - B.C.A. - 52°

506.0' - 532.0' Sandstone, light grey, medium-coarse grained (zoned) slickensided fractures, appears to be some massive cross-bedding.

530.0' - B.C.A. - 50°

532.0' - 536.0' Mudstone/siltstone, dark grey, slickensided fractures.

536.0' - 588.0' Siltstone, medium grey, few hairline fractures with calcite infilling, lighter, very fine sandstone laminae, grades below.

588.0' - 635.0' Sandstone, light grey, fine grained, well bedded.

590.0' - B.C.A. - 50°

593.0' - medium grained

603.0' - coarse grained, portions very coarse to granular, little carb. material - partings or clasts, calcite stringers.

635.0' - 661.0' Mudstone/siltstone - dark grey, few slickensided fractures, hairline fractures with calcite infilling.

661.0' - 791.0' Sandstone - light grey, fine grained, well bedded zones.

657.0' - medium grained

676.0' - B.C.A. 51°

690.0' - 695.0' - coaly shards and partings

695.0' - zones of coarse - very coarse sandstone

762.0' - B.C.A. - 49°

791.0' - 826.5' Mudstone - dark grey color, odd slickensided fracture.

826.5' - 860.2' COAL ZONE

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
826.5' - 835.0'	8.5'	5.9'	Claro-durain with 1.0' of shale near middle of zone
835.0' - 837.5'	2.5'	2.3'	Claro-durain pieces
837.5' - 840.0'	2.5'	2.5'	Broken claro-durain
840.0' - 842.0'	2.0'	1.4'	Claro-durain
842.0' - 845.0'	3.0'	1.1'	Claro-durain
845.0' - 846.0'	1.0'	0.7'	Claro-durain
846.0' - 848.0'	2.0'	1.2'	Claro-durain hard pieces
848.0' - 851.0'	3.0'	2.4'	Claro-durain
851.0' - 853.0'	2.0'	1.3'	Claro-durain
853.0' - 855.0'	2.0'	2.0'	Claro-durain
855.0' - 858.0'	3.0'	2.4'	Claro-durain
858.0' - 860.2'	2.2'	1.8'	Claro-durain
	<u>33.7'</u>	<u>25.0'</u>	

Recovery - 74.2%

860.2' - 1128.0' Sandstone - light grey, medium grained, few carb. shards in upper 10 feet and partings, few hairline fractures with calcite infilling.

864.0' - 864.5' - coal stringer

873.0' - B.C.A. - 58°

918.0' - B.C.A. - 49°

930.0' - B.C.A. - 50°

998.0' - B.C.A. - 49°

1041.0' - sandstone darkens to medium grey, and fines to fine grained, few partings  
--of darker mudstone/siltstone  
(numerous calcite stringers)

1071.0' - B.C.A. - 50°

1093.0' - B.C.A. - 64°

grades below

1128.0' - 1155.0' Fernie Formation, hairline fractures (calcite infilling)  
slickensided fractures, worm burrows, shale and very fine sand interbeds.

1132.0' - B.C.A. - 51°

T. D. 1,155.0'.

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries Ltd.

Sample I.D. - Well # 77 - 119

LAB. NO: - 77 - 3075

**RAW COAL SIZE/ASH DISTRIBUTION**

<u>Size</u>	<u>Elementary</u>			<u>Cumulative</u>		
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	
	<u>On</u>					
-	28 mesh		79.6	53.6	79.6	53.6
28 mesh	100 mesh		12.9	35.9	92.5	51.1
100 mesh	-		7.5	34.0	100.0	49.8
<b>TOTAL</b>			<b>100.0</b>	<b>49.8</b>		

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries

Sample Identification - Well # 77 - 119

Lab. No. - 77 - 3075

Footage - 308.5 to 340.4

Recovery - 37.9%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	1.3	
Ash % -	16.8	
Volatile Matter % -	26.5	
Fixed Carbon % -	55.4	
Total -	100.0	
Sulphur % -	0.47	
FSI -	5	
Btu per lb. -	12,249	
Equilibrium Moisture % -	---	
Hardgrove Grindability -	---	
Specific Gravity ( 20 mesh ) -	---	
<u>Dry Basis</u>		
Ash % -	17.0	
Volatile % -	26.9	
Btu per lb. -	12,404	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	32.4	
Btu per lb. -	14,938	

Yield - 38.3 % @ 16.7% Ash



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries - Well # 77 - 119 Size fraction 1/4" x 28 m  
Lab. No. (s) 77 - 3075 Wt % of head sample 79.6

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	XOXPXK F.S.I.	Weight	Ash	Sulphur	Weight	Ash	Sulphur
1.60		40.6	16.7	3½	40.6	16.7		100.0	53.9	
1.60		59.4	79.3	1	100.0	53.9		59.4	79.3	
<hr/>		<hr/>			<hr/>			<hr/>		
Total -		100.0	53.9							



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification	Coleman Collieries - Well # 77 - 119	Size fraction	28 m	x	100 m
Lab. No. (s)	77 - 3075	Wt % of head sample	12.9		

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
1.60		46.4	16.4	4½	46.4	16.4		100.0	35.9	
1.60		53.6	52.8	1	100.0	35.9		53.6	52.8	
Total -		100.0	35.9							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3 Tel: 276 - 9138

Sample Identification : Coleman Collieries - Hole # Well # 77 - 119

Lab. No(s). : 77 - 3075

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	45.7	20.2	3½	88.7	31.8	1½
Froth 2 minutes	6.4	26.2	3	3.6	36.2	1½
Tailings	<u>47.9</u>	<u>49.2</u>	<u>1</u>	<u>7.7</u>	<u>57.8</u>	<u>1</u>
Total	100.0	34.5		100.0	34.0	

Conditions

- Solids Concentration - 10%  
Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC  
Conditioning - 1 minute

Warnock Hersey Professional Services Ltd.

CLIENT ~ Coleman Collieries Ltd.,

Sample I.D. ~ Well # 77 - 119

LAB. NC. ~ 77 - 3076

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	84.6	24.1	84.6	24.1
28 mesh	100 mesh	11.0	24.6	95.6	24.2
100 mesh	-	4.4	22.4	100.0	24.1
<hr/>		<hr/>	<hr/>	<hr/>	<hr/>
TOTAL		100.0	24.1		

**Warnock Hersey Professional Services Ltd.**

CLIENT - Coleman Collieries

Sample Identification - Well # 77 - 119

Lab. No. - 77 - 3076

Footage - 363.5 - to - 373.7

Recovery - 81.4%

<u>CLEAN</u> - 1.60 Float	<u>RAW</u> <u>COAL</u>
<u>As Analyzed Basis</u>	
Moisture % ( Inherent ) -	0.8
Ash % -	14.6
Volatile Matter % -	26.9
Fixed Carbon % -	57.7
Total -	100.0
Sulphur % -	0.47
FSI -	4½
Btu per lb. -	12,796
Equilibrium Moisture % -	---
Hardgrove Grindability -	---
Specific Gravity ( 20 mesh ) -	---
<u>Dry Basis</u>	
Ash % -	14.7
Volatile % -	27.1
Btu per lb. -	12,904
<u>Dry, Ash - Free Basis</u>	
Volatile % -	31.8
Btu per lb. -	15,127

Yield - 76.2% @ 14.5% Ash



Wamock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification	Coleman Collieries - Well # 77 - 119	Size fraction	1/4" x 28 m
Lab. No. (s)	77 - 3076	Wt % of head sample	84.6

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur F.S.I.	Weight	Ash	Sulphur	Weight	Ash	Sulphur
1.40		40.8	9.7	6	40.8	9.7		100.0	24.5	
1.40	1.50	31.9	17.2	2	72.7	13.0		59.2	34.7	
1.50	1.60	7.7	27.6	1	80.4	14.4		27.3	55.2	
1.60		19.6	66.1	-	100.0	24.5		19.6	66.1	
<hr/>		<hr/>			<hr/>			<hr/>		
Total -		100.0	24.5							



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries - Well # 77 - 119 Size fraction 28 m x 100 m  
Lab. No. (s) 77 - 3076 Wt % of head sample 11.0

Specific Gravity

FLOAT AND SINK ANALYSIS %

<u>Sink</u>	<u>Float</u>	Elementary			Cumulative Float			Cumulative Sink		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u> F.S.I.	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>
	1.40	35.5	12.6	5½	35.5	12.6		100.0	24.6	
1.40	1.50	28.4	16.4	3	63.9	14.9		64.5	31.2	
1.50	1.60	10.7	22.5	2	74.6	15.5		36.1	42.8	
	1.60	25.4	51.4	-	100.0	24.6		25.4	51.4	
<hr/>		<hr/>								
Total -		100.0	24.6							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E.    Calgary    Alberta

T2E 2P3              Tel: 276 - 9138

Sample Identification :    Coleman Collieries - Hole # Well # 77 - 119

Lab. No (s) :    77 - 3076

Froth Flotation Tests

	<u>28 mesh x 0</u>			<u>100 mesh x 0</u>		
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>Weight %</u>	<u>Ash %</u>	<u>FSI</u>
Froth 1 minute	74.2	17.7	4	98.8	22.4	4
Froth 2 minutes	4.5	27.1	I.S.	0.6	I.S.	I.S.
Tailings	<u>21.3</u>	<u>38.7</u>	<u>2</u>	<u>0.6</u>	<u>I.S.</u>	<u>I.S.</u>
Total	100.0	22.6		100.0	22.4	

Conditions

- Solids Concentration    -    10%  
Reagent Dosage            -    0.50 lb / ton 3-1 diesel fuel/MIBC  
Conditioning            -    1 minute

Warnock Hersey Professional Services Ltd.

CLIENT - Coleman Collieries Ltd.,

Sample I.D. - Well # 77 - 119

LAB. NO: - 77 - 3077

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	81.4	32.6	81.4	32.6
28 mesh	100 mesh	12.6	25.4	94.0	31.6
100 mesh	-	6.0	25.0	100.0	31.2
<hr/>		<hr/>		<hr/>	
TOTAL		100.0	31.2		

Warnock Hersey Professional Services Ltd.

CLIENT - Coleman Collieries

Sample Identification - Well # - 77 - 119

Lab. No. - 77 - 3077

Footage - 826.5 to 860.2

Recovery - 74.2%

	CLEAN - 1.60 Float	RAW COAL
<u>As Analyzed Basis</u>		
Moisture % ( Inherent ) -	0.7	
Ash % -	14.6	
Volatile Matter % -	26.9	
Fixed Carbon % -	57.8	
Total -	100.0	
Sulphur % -	0.50	
FSI -	5	
Btu per lb. -	12,753.	
Equilibrium Moisture % -	- - -	
Hardgrove Grindability -	- - -	
Specific Gravity ( 20 mesh ) -	- - -	
<u>Dry Basis</u>		
Ash % -	14.7	
Volatile % -	27.1	
Btu per lb. -	12,844	
<u>Dry, Ash - Free Basis</u>		
Volatile % -	31.8	
Btu per lb. -	15,076	

Yield - 58.1% @ 14.5% Ash





Warnock Hersey Professional Services Ltd

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.264-9120

Sample Identification Coleman Collieries - Well # 77 - 119 Size fraction 28 m x 100 m  
Lab. No. (s) 77 - 3077 Wt % of head sample 12.6

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur FSI:	Weight	Ash	Sulphur	Weight	Ash	Sulphur
	1.40	39.4	8.1	7	39.4	8.1		100.0	25.4	
1.40	1.50	19.6	16.7	3½	59.0	11.0		60.6	36.7	
1.50	1.60	8.2	23.4	1½	67.2	12.5		41.0	46.3	
	1.60	32.8	52.0	-	100.0	25.4		32.8	52.0	
<hr/>		<hr/>			<hr/>			<hr/>		
Total -		100.0	25.4							

Warnock Hersey Professional Services Ltd.

1423-D 45th Ave. N.E. Calgary Alberta

T2E 2P3

Tel: 276 - 9138

Sample Identification : Coleman Collieries - Hole # Well # 77 - 119

Lab. No (s). : 77 - 3077

Froth Flotation Tests

	<u>28 mesh x 0</u>		<u>100 mesh x 0</u>	
	<u>Weight %</u>	<u>Ash%</u>	<u>FSI</u>	<u>Weight %</u>
Froth 1 minute	59.6	15.6	5½	82.2
Froth 2 minutes	1.7	21.8	4	8.9
Tailings	<u>38.7</u>	<u>36.4</u>	<u>2</u>	<u>8.9</u>
Total	100.0	23.8		100.0
				25.0

Conditions

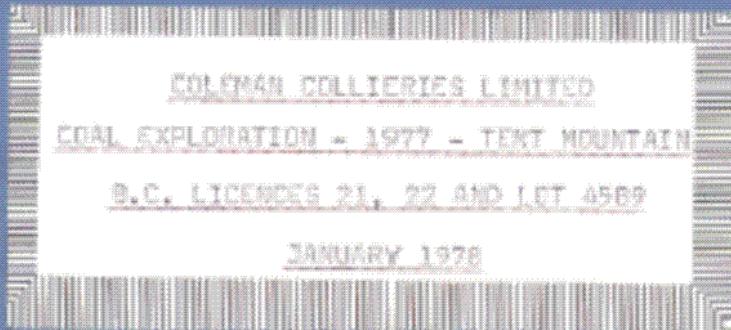
Solids Concentration - 10%

Reagent Dosage - 0.50 lb / ton 3:1 diesel fuel/MIBC

Conditioning - 1 minute

K-TENT MOUNTAIN

70(3)A



Addendum

OPEN FILE

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

00 450

3 of 7

76(3)A

ID-77-117

COLEMAN COLLIERIES LIMITED

TD-77-117 (60.5° E)

- 0.0' - 10.0' No core (tricore for casing)
- 10.0' - 295.0' Sandstone - light grey, medium-coarse grained, fractures in upper portion of zone show iron staining, X-bedding large and small scale evident.
- 36.0' - B.C.A. - 60°  
60.0' - sandstone darkens to a medium grey, medium grained  
116.0' - appears to be grading into Passage Beds, few mudstone, siltstone partings (dark color) with odd slickensided fracture, few hairline fractures with calcite infilling.  
B.C.A.'s - 60° - 90°  
156.0' - B.C.A. - 80° - 90°
- 295.0' - 633.5' Fernie Formation - dark mudstone, with few laminae of lighter fine graded sandstone, numerous slickensided fractures, hairline fractures with calcite infilling, worm burrows.
- 310.0' - B.C.A. - 80°  
326.0' - B.C.A. - 80°  
470.0' - B.C.A. - 76°  
501.0' - B.C.A. - 75° - 80°  
564.0' - B.C.A. - 75°  
628.0' - 628.5' - very broken core - shattered and ground

**ROKE**

GAMMA RAY NEUTRON LOG

K-TENT MOUNTAIN T-7 (3) A.  
**OIL ENTERPRISES LTD.** **CALGARY, ALBERTA**  
FILE NO. **COLEMAN OILFIELD LTD.**

LSD  
SEC  
TYP  
RGE  
W  
M

WELL  
TD - 77 - 117 - (60° EAST)  
LOCATION TENT MOUNTAIN  
FIELD COLEMAN

PROVINCE BRITISH COLUMBIA  
GROUND LEVEL ELEV.  
LOG TYPE K.G. C.S.G.  
Log Measured from RIG FLOOR  
Well Depth Measured from G.L.

Other Services:

NONE

K.G.

C.S.G.

G.L.

# STRATIGRAPHIC LOG

K-TENT MOUNTAIN 77(3) A.

DRILL HOLE TD - 77 - 117 AREA Tent Mountain

COMPANY Coleman Collieries Ltd.

COORDINATES \_\_\_\_\_

GROUND ELEVATION \_\_\_\_\_ TOTAL DEPTH 655

MECHANICAL LOGS RUN Gamma Ray Neutron - Sidewall Density

DRILLING METHOD Diamond drill - wire line

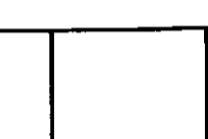
HOLE SIZE HQ - NQ DATE OF COMPLETION January 19, 1977

LOGGED BY Eric Beresford - Colin Brazzoni

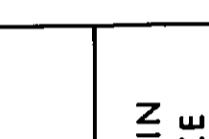
REMARKS Hole Angle (60.5° E.)

**450** 3/7  
MAP A

## LITHOLOGIC SYMBOLS



Breccia



Conglomerate



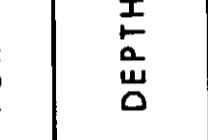
Sandstone



Calcareous sandstone



Shale



Coal



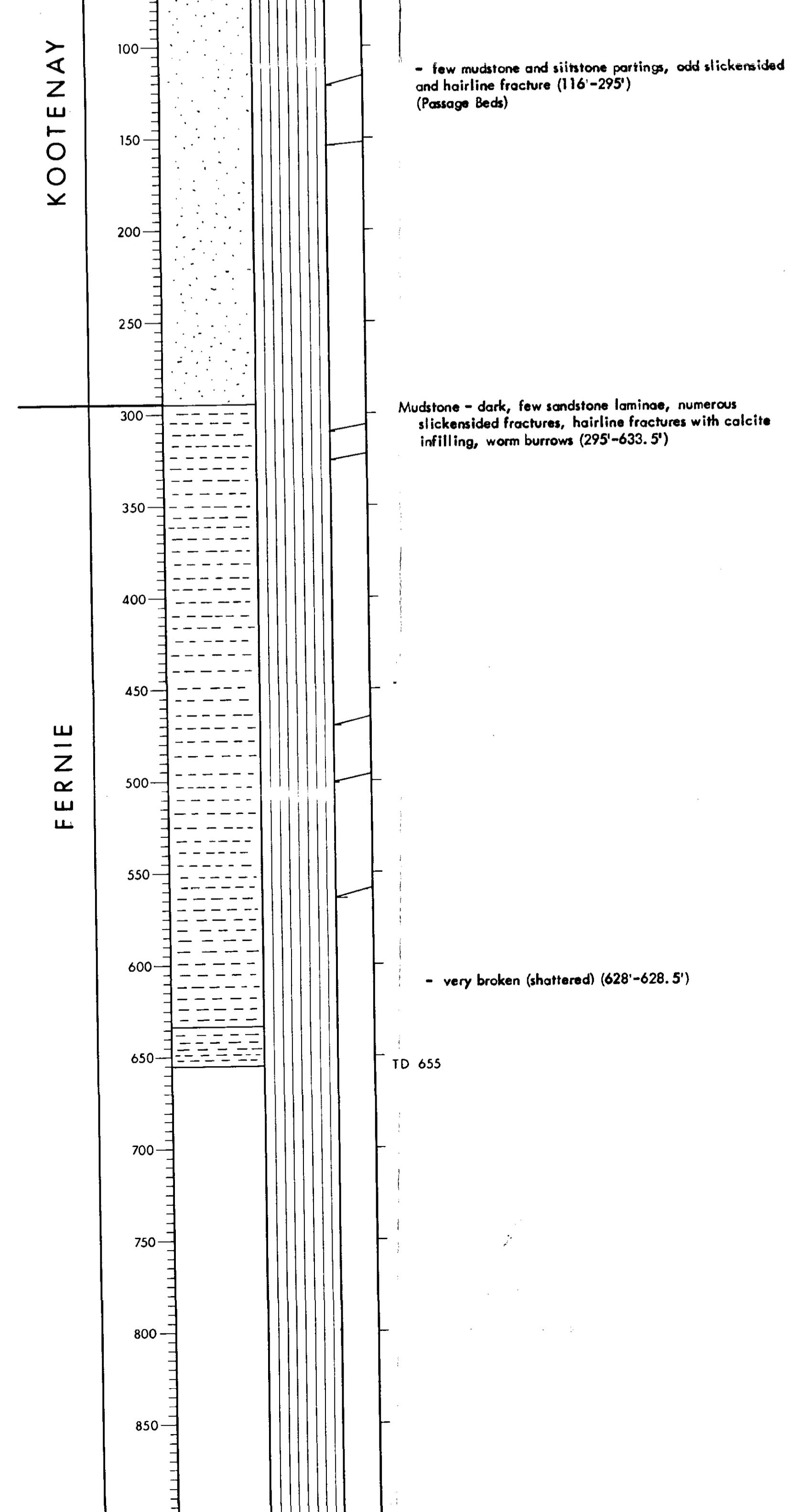
Sandstone beds with shale partings



Siltstone



Mudstone or massive claystone



TD-77-119

COLEMAN COLLIERIES LIMITED

TD-77-119 (60° E)

0.0' - 9.0' No core (tricone for casing)

9.0' - 140.0' Sandstone - very coarse grained, massive with salt and pepper effect, light/medium grey, iron stained and weathered.

High angle B.C.A. 15° - 20'

50.0' - 57.0' - small pieces and very badly broken core  
67.0' - B.C.A. - 55

Thin carbonaceous plant remains in sandstone

74.0' - 78.0' - fault-broken zone with mudstone and 6" soft mud patch

137.0' - 140.0' - same as 74'-78'

140.0' - 165.5' Siltstone/sandstone - medium grey, badly shattered broken core, no piece larger than 1". Some mudstone and coaly material mixed in with the general rock type.

165.5' - 181.0' Siltstone/mudstone - medium grey. B.C.A. - 60°. interbedded in thin layers 1/8" thick, iron-staining still evident at 178'

180.5' - 3" soft mud band.

181.0' - 300.0' Sandstone - medium grey, very coarse grained, some X-bedding, salt and pepper effect.

185.0' - thin coal layers/laminations 1/4" thick  
217.0' - N.Q. core

223.0' - 226.0' - broken core only 2' recovered

289.0' - B.C.A. 49°

300.0' - 308.5' Mudstone/siltstone - dark grey/black, slickensided fractures.

308.5' - 340.4' COAL ZONE

	Possible	Actual	Description
308.5' - 311.0'	2.5'	0.0'	--
311.0' - 314.0'	3.0'	1.2'	Claro-durain
314.0' - 315.5'	1.5'	.2'	Shale remaining
315.5' - 317.5'	2.0'	1.1'	Claro-durain, some bone and shale
317.5' - 321.0'	3.5'	0.9'	Claro-durain
321.0' - 323.0'	2.0'	0.0'	--
323.0' - 327.0'	4.0'	1.0'	Shattered claro-durain
327.0' - 330.0'	3.0'	0.0'	--
330.0' - 331.5'	1.5'	0.8'	Claro-durain
331.5' - 333.0'	1.5'	0.7'	Mostly bone remaining
333.0' - 334.0'	1.0'	0.4'	Slurry of coal and water
334.0' - 335.0'	1.0'	1.0'	Slurry of coal and water
335.0' - 336.0'	1.0'	0.6'	Slurry of coal and water
336.0' - 338.0'	2.0'	1.8'	First .1' shale rest broken claro-durain
338.0' - 340.0'	2.0'	2.0'	Claro-durain
340.0' - 340.4'	0.4'	0.4'	Coal and shale

31.9'

12.1'

Recovery - 37.9%

340.4' - 359.0' Mudstone/siltstone/sandstone - few calcite stringers, few carb. partings (small) - obscure bedding, few slickensided fractures.

359.0' - 360.5' Sandstone - light grey, medium grained.

360.5' - 363.5' Mudstone - dark in color, heavily fractured - slickensides.

363.5' - 373.7' COAL ZONE

	<u>Possible</u>	<u>Actual</u>	<u>Description</u>
363.5' - 367.5'	4.0'	3.8'	Claro-durain
367.5' - 372.0'	4.5'	3.1'	Claro-durain
372.0' - 373.7'	1.7'	1.4'	Claro-durain
	<u>10.2'</u>	<u>8.3'</u>	

Recovery = 81.4%

373.7' - 441.0' Siltstone - medium grey, odd slickensided fracture, few calcite stringers, sandy laminae appearing downsection.

396.0' - B.C.A. - 47°  
417.0' - B.C.A. - 55°

441.0' - 466.0' Sandstone - light grey, medium-coarse grained, few carb. partings, odd mudstone clast.

466.0' - 488.0' Mudstone/siltstone, dark, few slickensided fractures, few hairline fractures with calcite infilling.

475.0' - 1' very broken

488.0' - 506.0' Sandstone - light grey, very fine grained, few calcite stringers.

490.0' - B.C.A. - 52°

506.0' - 532.0' Sandstone, light grey, medium-coarse grained (zoned) slickensided fractures, appears to be some massive cross-bedding.

530.0' - B.C.A. - 50°

532.0' - 536.0' Mudstone/siltstone, dark grey, slickensided fractures.

536.0' - 588.0' Siltstone, medium grey, few hairline fractures with calcite infilling, lighter, very fine sandstone laminae, grades below.

588.0' - 635.0' Sandstone, light grey, fine grained, well bedded.

590.0' - B.C.A. - 50°

593.0' - medium grained

603.0' - coarse grained, portions very coarse to granular, little carb. material - partings or clasts, calcite stringers.

635.0' - 661.0' Mudstone/siltstone - dark grey, few slickensided fractures, hairline fractures with calcite infilling.

661.0' - 791.0' Sandstone - light grey, fine grained, well bedded zones.

657.0' - medium grained

676.0' - B.C.A. 51°

690.0' - 695.0' - coaly shards and partings

695.0' - zones of coarse - very coarse sandstone

762.0' - B.C.A. - 49°

791.0' - 826.5' Mudstone - dark grey color, odd slickensided fracture.

826.5' - 860.2' COAL ZONE

	Possible	Actual	Description
826.5' - 835.0'	8.5'	5.9'	Claro-durain with 1.0' of shale near middle of zone
835.0' - 837.5'	2.5'	2.3'	Claro-durain pieces
837.5' - 840.0'	2.5'	2.5'	Broken claro-durain
840.0' - 842.0'	2.0'	1.4'	Claro-durain
842.0' - 845.0'	3.0'	1.1'	Claro-durain
845.0' - 846.0'	1.0'	0.7'	Claro-durain
846.0' - 848.0'	2.0'	1.2'	Claro-durain hard pieces
848.0' - 851.0'	3.0'	2.4'	Claro-durain
851.0' - 853.0'	2.0'	1.3'	Claro-durain
853.0' - 855.0'	2.0'	2.0'	Claro-durain
855.0' - 858.0'	3.0'	2.4'	Claro-durain
858.0' - 860.2'	2.2'	1.8'	Claro-durain
	<u>33.7'</u>	<u>25.0'</u>	

Recovery - 74.2%

860.2' - 1128.0' Sandstone - light grey, medium grained, few carb. shards in upper 10 feet and partings, few hairline fractures with calcite infilling.

864.0' - 864.5' - coal stringer

873.0' - B.C.A. - 58°

918.0' - B.C.A. - 49°

930.0' - B.C.A. - 50°

998.0' - B.C.A. - 49°

1041.0' - sandstone darkens to medium grey, and fines to fine grained, few partings of darker mudstone/siltstone (numerous calcite stringers)

1071.0' - B.C.A. - 50°

1093.0' - B.C.A. - 64°

grades below

1128.0' - 1155.0' Fernie Formation, hairline fractures (calcite infilling) slickensided fractures, worm burrows, shale and very fine sand interbeds.

1132.0' - B.C.A. - 51°

Warnock Hersey Professional Services Ltd.

CLIENT - Coleman Collieries Ltd.

Sample I.D. - Well # 77 - 119

LAB. NC: - 77 - 3075

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>	<u>Elementary</u>			<u>Cumulative</u>	
	<u>Passing</u>	<u>Retained</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>
	<u>On</u>				
	28 mesh	79.6	53.6	79.6	53.6
28 mesh	100 mesh	12.9	35.9	92.5	51.1
100 mesh	-	7.5	34.0	100.0	49.8
<b>TOTAL</b>		<b>100.0</b>	<b>49.8</b>		

Warnock Hersey Professional Services Ltd.

CLIENT - Coleman Collieries Ltd.,

Sample I.D. - Well # 77 - 119

LAB. NC. - 77 - 3076

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	84.6	24.1	84.6	24.1
28 mesh	100 mesh	11.0	24.6	95.6	24.2
100 mesh	-	4.4	22.4	100.0	24.1
<b>TOTAL</b>		<b>100.0</b>	<b>24.1</b>		

Warnock Hersey Professional Services Ltd.

CLIENT - Coleman Collieries Ltd.,

Sample I.D. - Well # 77 - 119

LAB. NO: - 77 - 3077

RAW COAL SIZE/ASH DISTRIBUTION

<u>Size</u>		<u>Elementary</u>		<u>Cumulative</u>	
<u>Passing</u>	<u>Retained On</u>	<u>Wt%</u>	<u>Ash%</u>	<u>Wt%</u>	<u>Ash%</u>
-	28 mesh	81.4	32.6	81.4	32.6
28 mesh	100 mesh	12.6	25.4	94.0	31.6
100 mesh	-	6.0	25.0	100.0	31.2
<hr/>		<hr/>		<hr/>	
<b>TOTAL</b>		<b>100.0</b>	<b>31.2</b>		

**ROKE**

## SIDEWALL DENSILOG

K-TENT

MOUNTAIN

77 (3)

FILE NO.

OIL ENTERPRISES LTD.

CALGARY,

ALBERTA

LSD

SEC

TYP

RGE

W

M

LOCATION

TENT MOUNTAIN

FIELD

COLEMAN

WELL

TD - 77 - 119

(60° BATT)

PROVINCE

BRITISH COLUMBIA

Other Service:

GRN

GENERAL

DEPTH'S

SPEED

FT/MIN

T.C.

SEC.

SENS

SETTINGS

ZERO

DIV.L OR R

API G.R. UNITS

PER LOG DIV.

T.C.

SEC.

SENS

SETTINGS

ZERO

DIV.L OR R

CPS/ DIV

3

500

2,53R

27.26

**ROKE**

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA  
FILE NO. K-TENT COUNTDOWN 72-34.  
LSD COMPANY COLEMAN COLLECTIVES LIMITED  
SEC TD - 77 - 119 (60° EAST)  
TWP WELL  
RGE LOCATION TENT MOUNTAIN  
W FIELD COLEMAN

PERMANENT DIA. BRITISH COLUMBIA  
GROUNDED LEVEL 1 FT. Above Perm. Dia.  
LOG MEASURED from RIG FLOOR  
WEIR DEPTH MEASURED from GL.

PROVINCE  
TOOL MODEL NO. 11/16  
DIAMETER  
DETECTOR MODEL NO.  
TYPE SCINTILLATION  
LENGTH 4 INCH  
DISTANCE TO N. SOURCE 6.7 FT.  
GENERAL  
HOIST TRUCK NO. 33  
INSTRUMENT TRUCK NO.  
TOOL SERIAL NO. R GRN 169-002

Other Services:  
DRILLING  
KSC  
GL.

## EQUIPMENT DATA

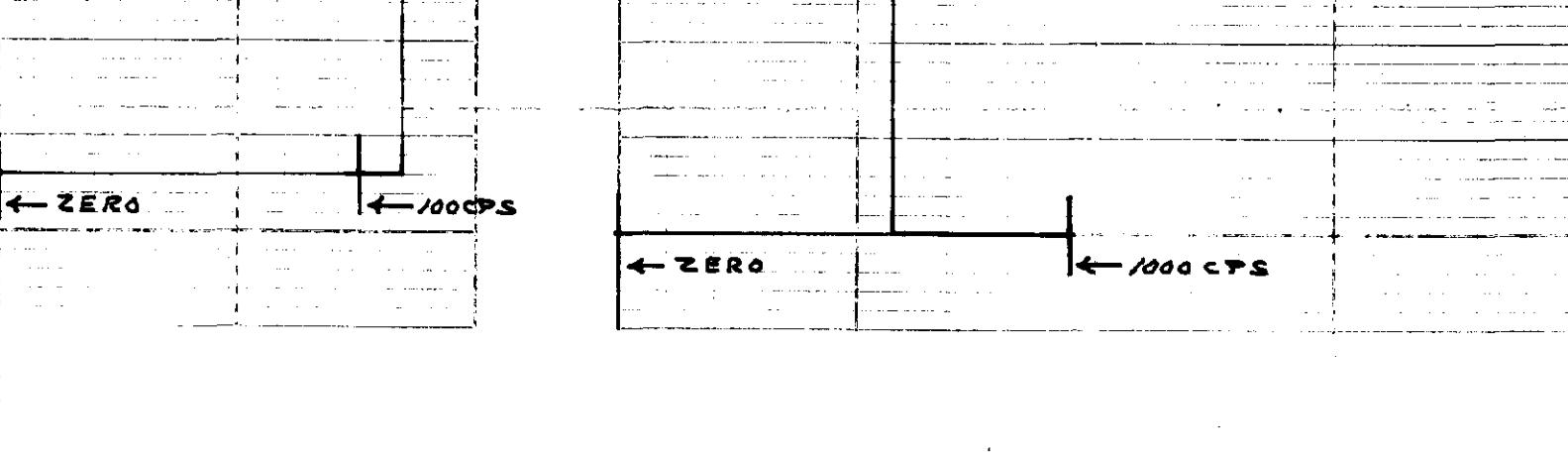
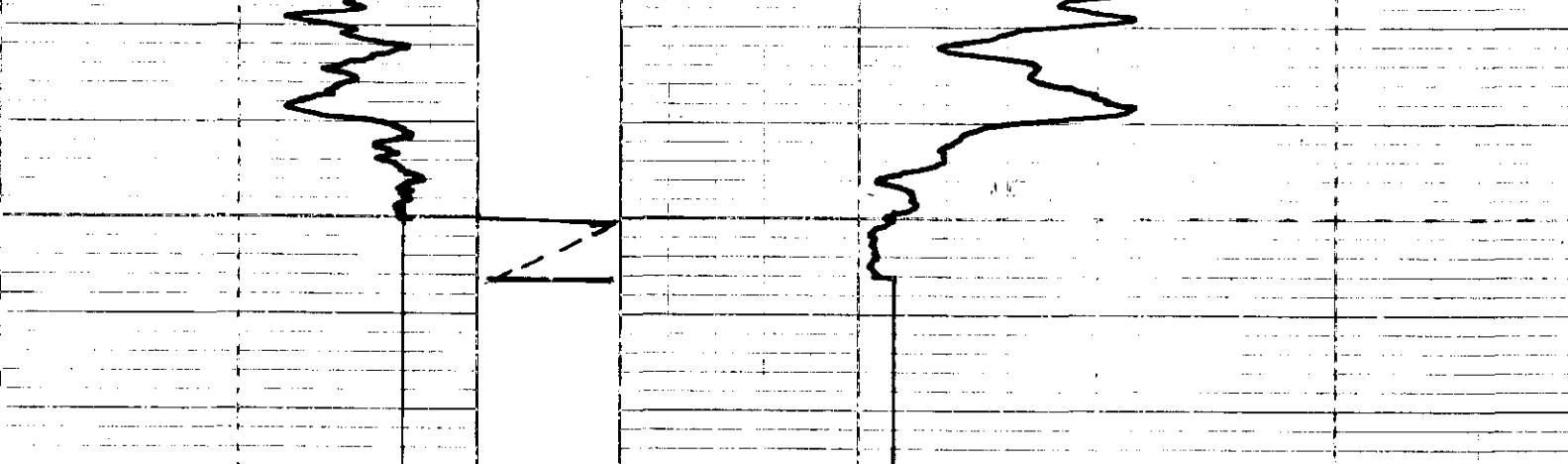
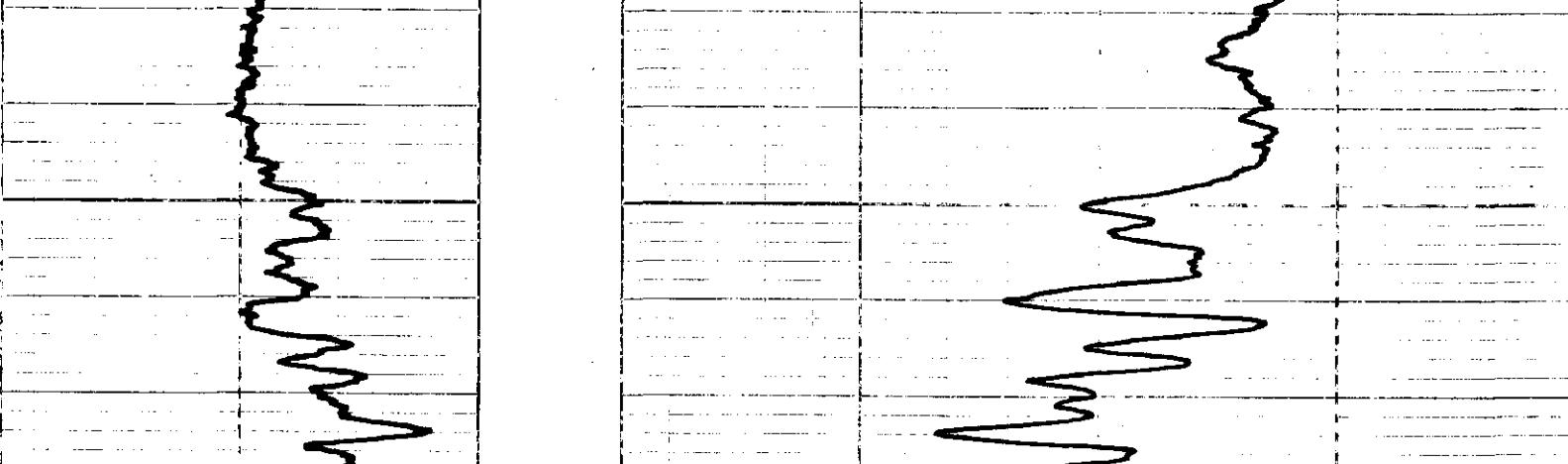
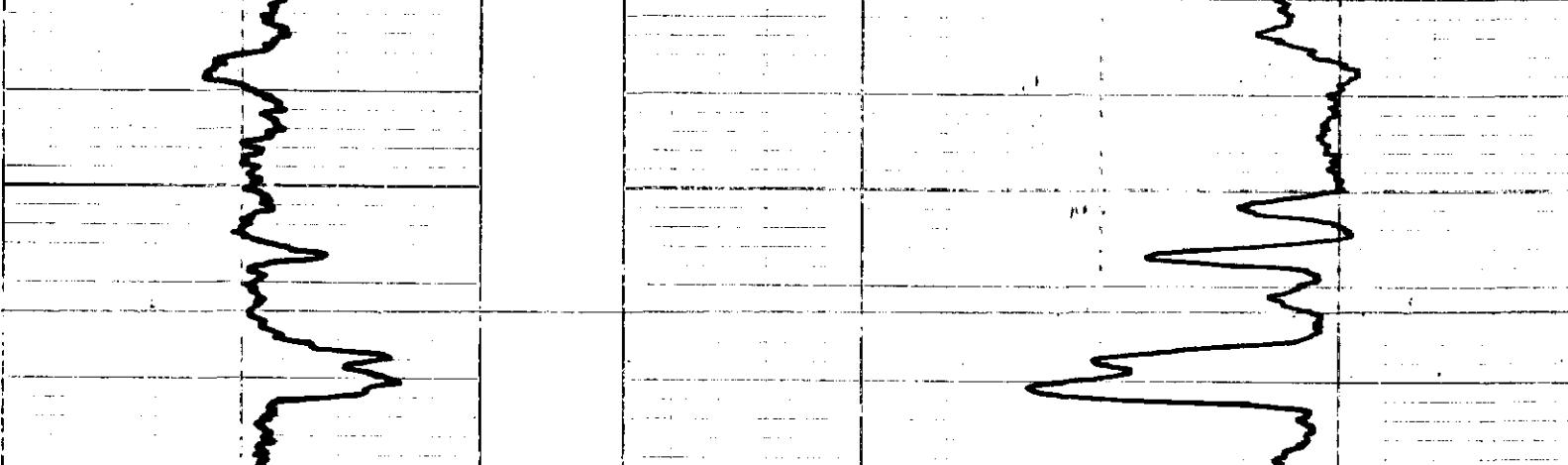
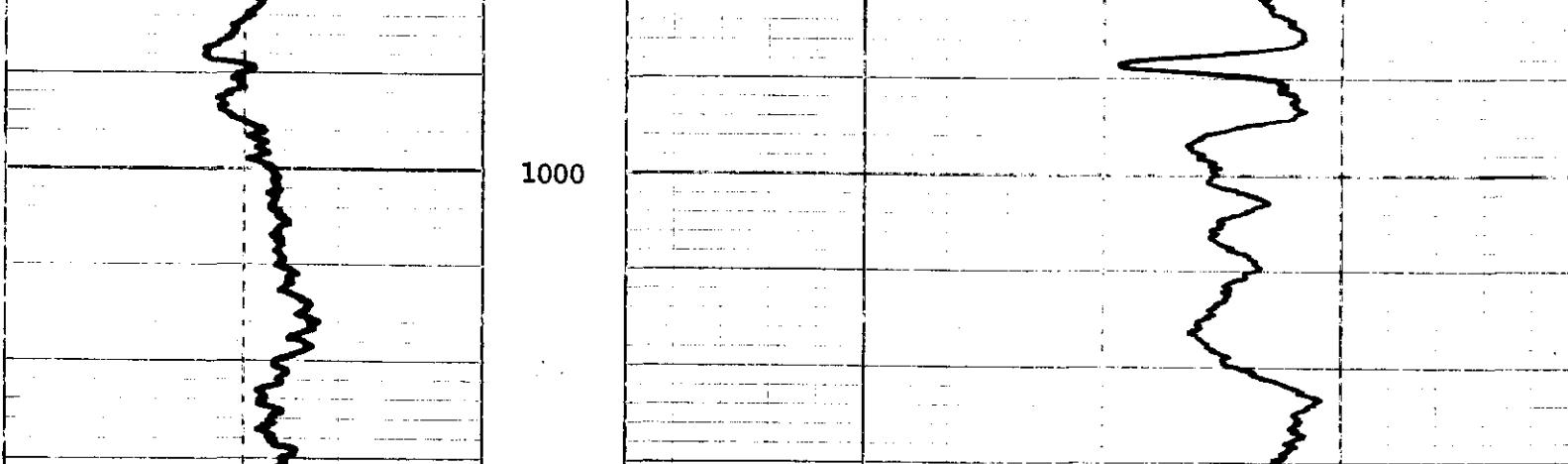
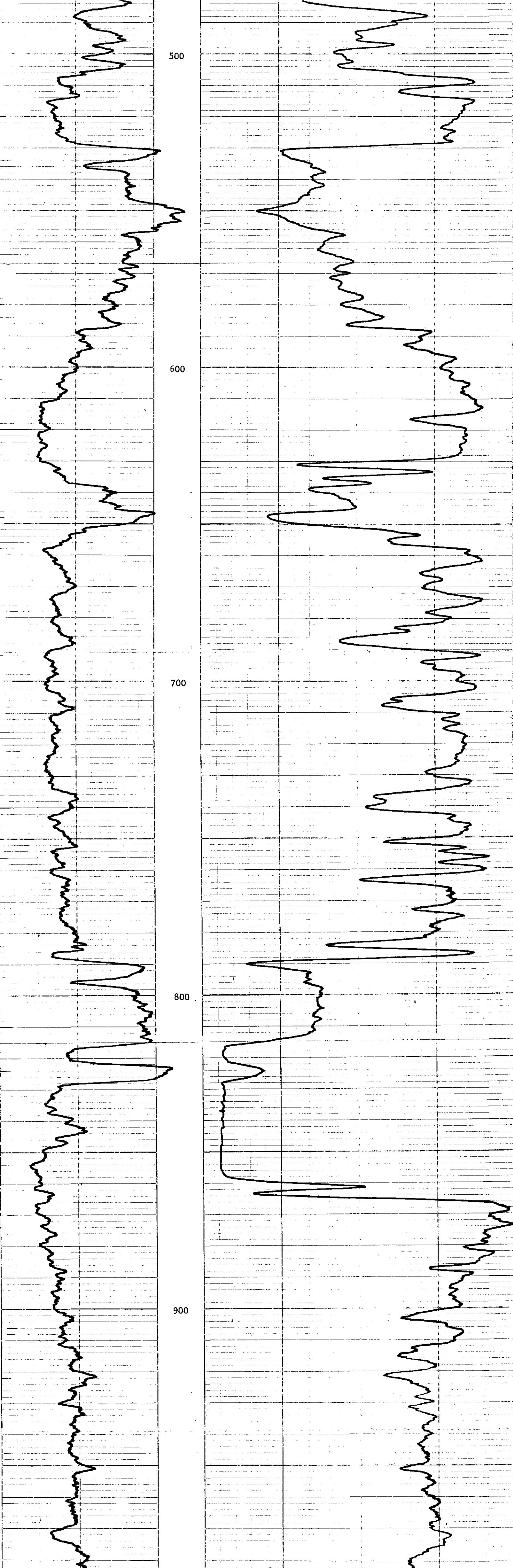
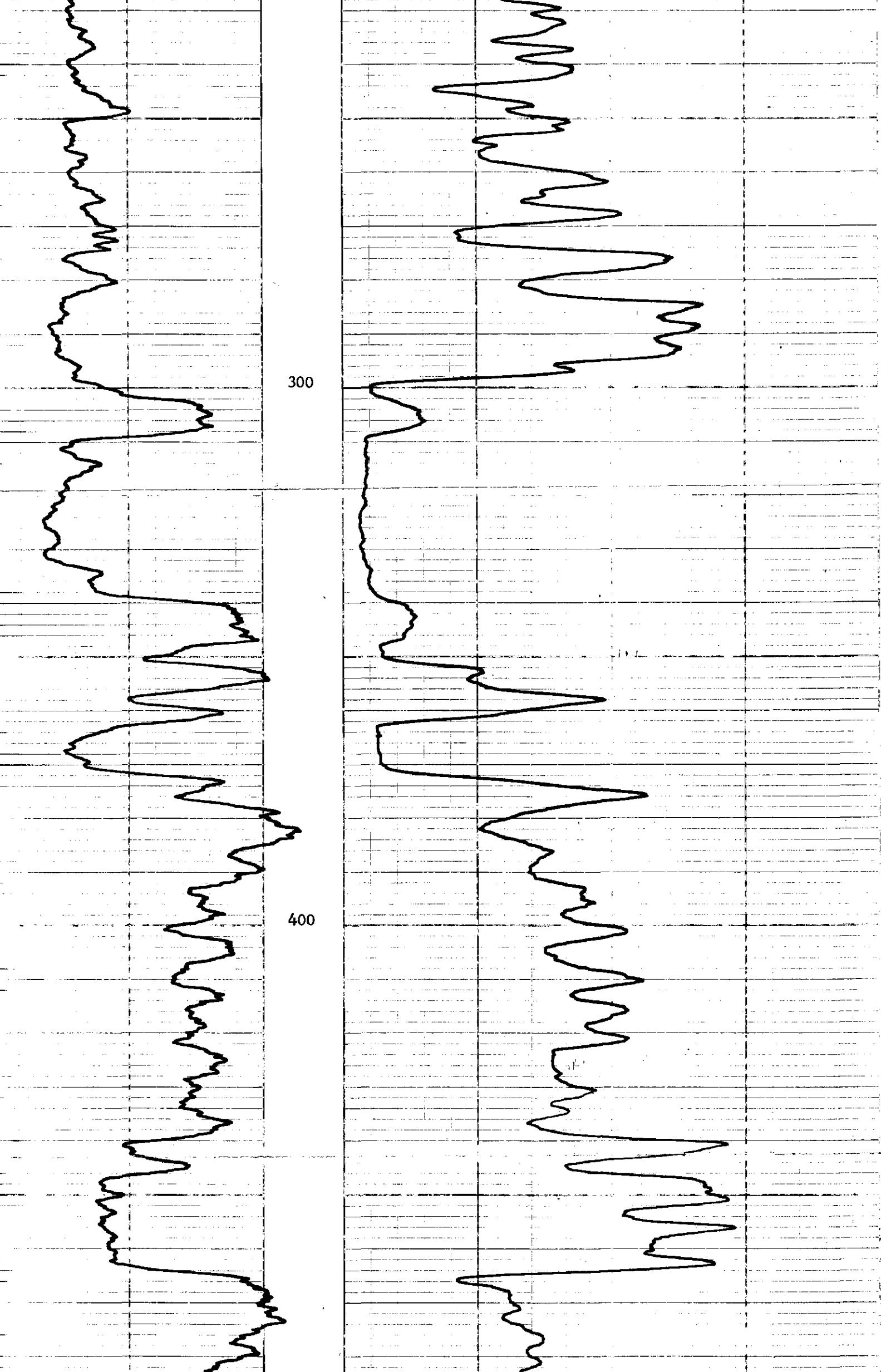
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	1 11/16	TOOL MODEL NO.	1 11/16
DETECTOR MODEL NO.		DIAMETER	
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	4 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	6.7 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
		SERIAL NO.	187
		SPACING	17 INCH
		TYPE	AmBe
		STRENGTH	3 CURIES

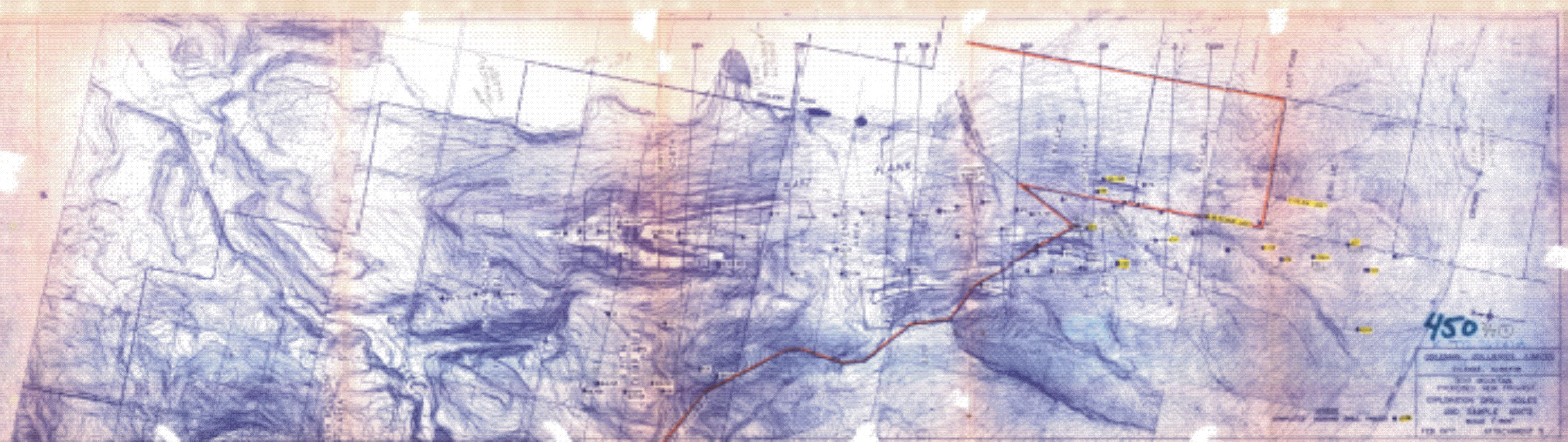
## LOGGING DATA

RUN NO.	GENERAL			GAMMA RAY			NEUTRON				
	DEPTH	FROM	TO	SPEED	T.C.	SENS.	ZERO	API G. R. UNITS	ZERO	API N. UNITS	
1	0	1156	12	5	100	OL	12	3	500	OL	140

REMARKS LOGGED THROUGH NO DRILL ROD

HO CASING (0 - 347)





# STRATIGRAPHIC LOG

K-TENT MOUNTAIN 77(2) A.

DRILL HOLE TD - 77-119 AREA Tent Mountain

COMPANY Coleman Collieries Ltd.

COORDINATES

GROUND ELEVATION TOTAL DEPTH 1155

MECHANICAL LOGS RUN Gamma Ray Neutron - Sidewall Density

DRILLING METHOD Diamond drill - wire line

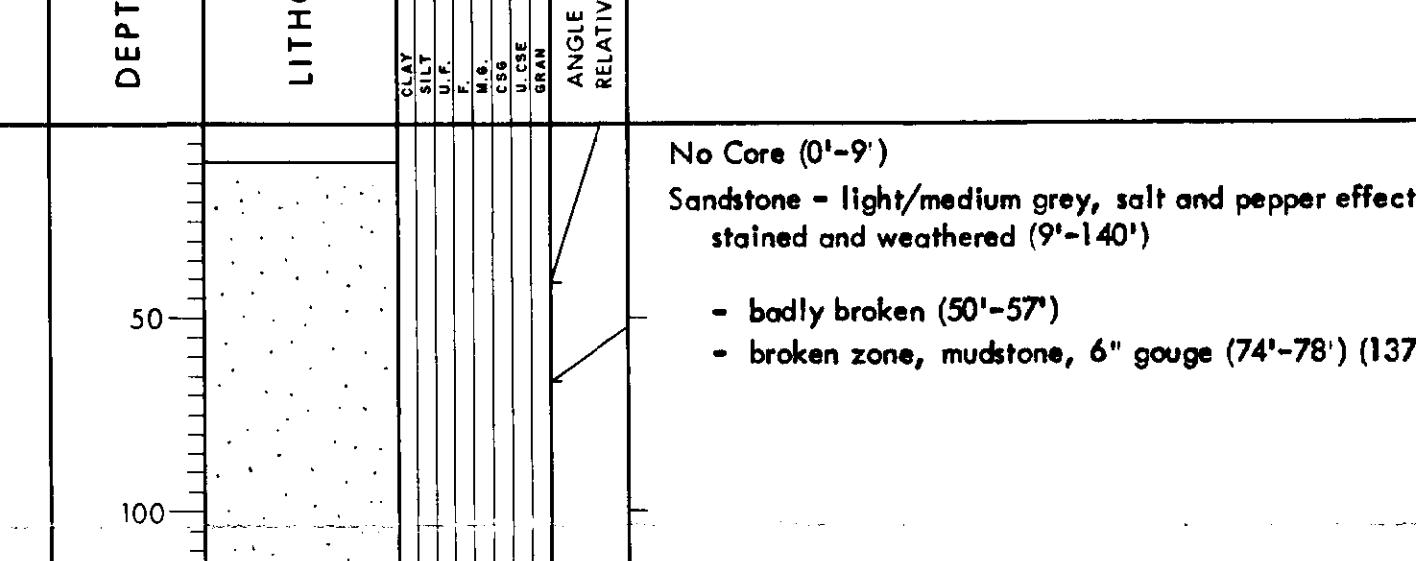
HOLE SIZE HQ - NQ DATE OF COMPLETION February 9, 1977

LOGGED BY Eric Beresford - Colin Brazzoni

REMARKS Hole Angle (63° E.)

**450** 3/72

## LITHOLOGIC SYMBOLS



FORMATION	DEPTH	LITHOLOGY	GRAIN SIZE	ANGLE OF BEDDING RELATIVE TO BORE HOLE	DESCRIPTION	
					CLAY	SILT
KOOTENAY	50				No Core (0'-9')	
					Sandstone - light/medium grey, salt and pepper effect, iron stained and weathered (9'-140')	
					- badly broken (50'-57')	
					- broken zone, mudstone, 6" gouge (74'-78') (137'-140')	
	100					
	150					
	200					
	250					
	300					
	350					
	400					
	450					
	500					
	550					
	600					
	650					
	700					
	750					
	800					
	850					
	900					
	950					
	1000					
	1050					
	1100					
	1150					
FERNIE	1200					
	1250					