711

REPORT ON

EXPLORATION AND GEOLOGY OF THE

MOUNT JACKSON PROJECT

OMINECA MINING DIVISION

NORTHWEST BRITISH COLUMBIA

July and August, 1985

NTS 104 A/16
(McEvoy Flats)

Latitude: 56° 46' N to 56° 52' N
Longitude: 128° 06' W to 128° 16' W
(Cassiar Land District)

Prepared By:

Suncor Inc. Coal Group

Owner and Operator Of Coal Licences

7352 to 7364 Inclusive
7369 to 7374 Inclusive
7544 to 7549 Inclusive

October, 1985

Submitted:

Contributing Authors:

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Owen Cullingham
Kevin Brown
Janet Kerr

PROFESSIONAL VERIFICATION OF REPORT

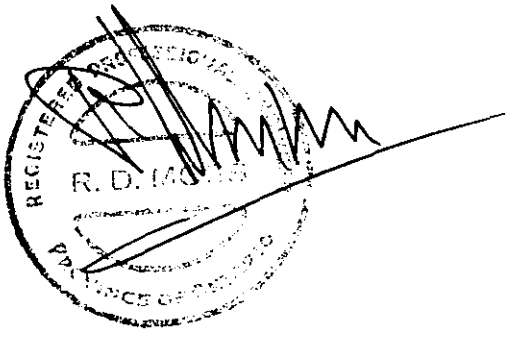
ENTITLED: EXPLORATION AND GEOLOGY OF THE MOUNT JACKSON PROSPECT, OMINECA MINING DIVISION, NORTHWEST BRITISH COLUMBIA, JULY AND AUGUST, 1985 BY JOHN FISHER et al.

Mr. John Fisher planned and directed the geological exploration program on the Mount Jackson Coal Licences held and operated by SUNCOR INC. He also supervised preparation of this report.

JOHN FISHER, B.Sc., graduated in geology from the University of Calgary in 1974. His experience in Western Canadian coal exploration since 1974 includes positions with:

SPENCE TAYLOR & ASSOC. LTD., Calgary, Alberta
SHELL CANADA RESOURCES LTD., Calgary, Alberta
CROWS NEST RESOURCES LTD., Calgary, Alberta
SUNCOR INC., Calgary, Alberta

I consider JOHN FISHER to be well qualified to undertake the responsibilities which were assigned to him on this project. I am satisfied that the attached report has been competently prepared and justly represents the information obtained from this project.



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1.0 SUMMARY

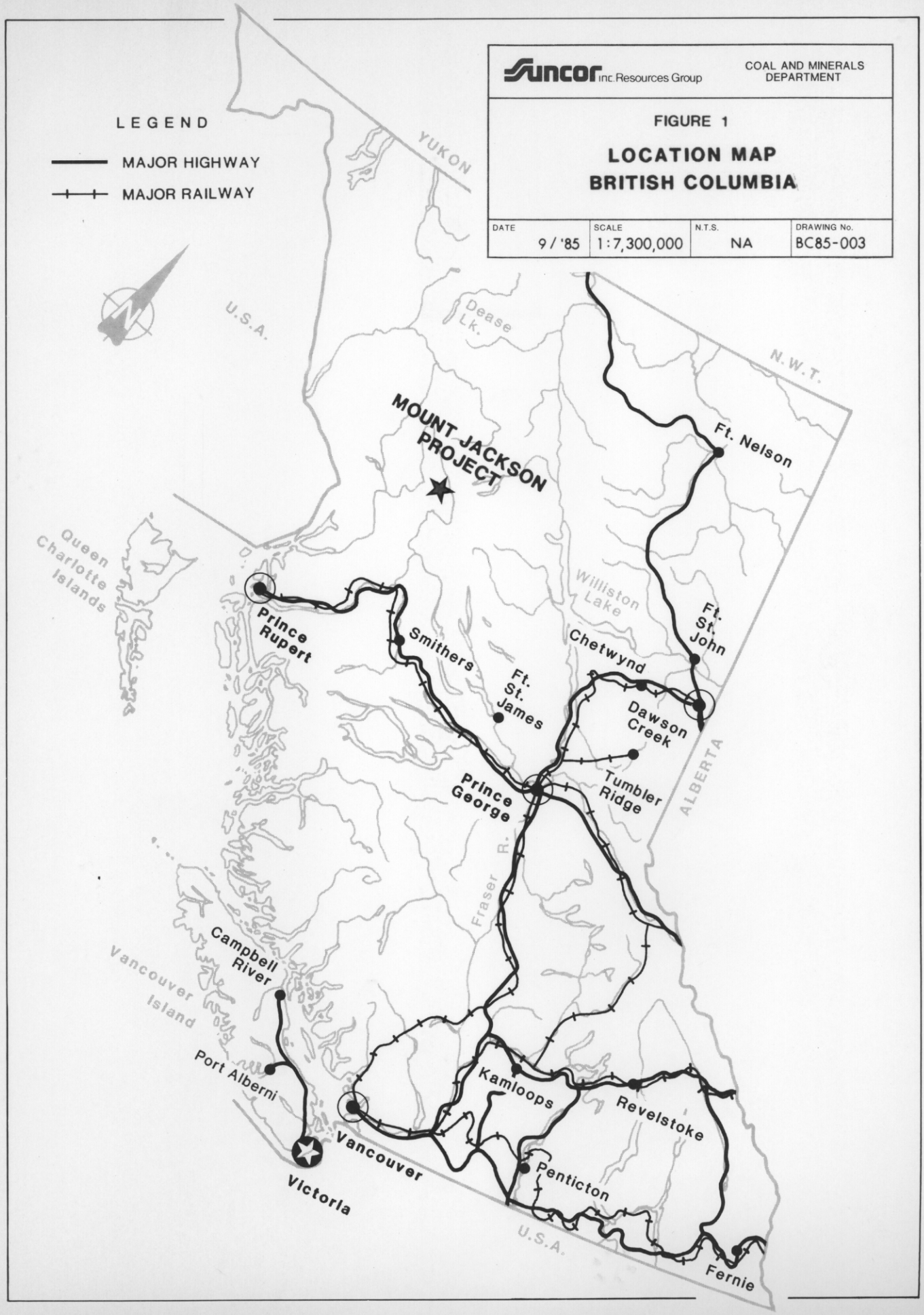
The coal licences held by Suncor Inc. are on the southern edge of the Groundhog coalfield in northwest British Columbia (Figure 1). The property is comprised of 25 coal licences for a total area of 5,911 hectares.

During the period of August 1-25th Suncor personnel carried out a program of geological exploration and mapping in an effort to better define the geologic structures present in the licenced area. There was also a major effort to extend the property by prospecting for coal on adjacent lands where structural conditions might be conducive to mining using conventional techniques.

A mantle of overburden and very dense forest cover masks the bedrock over most of the licenced area. The heavy cover restricts exploration to the beds and banks of the swiftly flowing streams running off of the mountains. The only open areas are those above the tree line and on the exposed cliffs of the south-facing slopes.

Field work conducted during the 1985 season succeeded in extending the known coal occurrences to the west and to the south where it had been postulated that coal should be present. The geological structures involved lend encouragement to the possibility of there being a substantial deposit present.

Work carried out also allows recommendations to be made that will enable us to divest ourselves of more than 1,300 hectares of land of poor potential. These areas contain coal which is not considered to be mineable because of unfavourable structural conditions or poor quality coal which could not be mined economically.


Suncor Inc. Resources Group
COAL AND MINERALS DEPARTMENT
FIGURE 1
LOCATION MAP
BRITISH COLUMBIA
DATE 9/'85
SCALE 1:7,300,000
N.T.S. NA
DRAWING No. BC85-003
LEGEND
MAJOR HIGHWAY
MAJOR RAILWAY
YUKON
U.S.A.
Dease Lk.
N.W.T.
MOUNT JACKSON PROJECT
Ft. Nelson
Queen Charlotte Islands
Williston Lake
Prince Rupert
Smithers
Ft. St. James
Chetwynd
Ft. St. John
Dawson Creek
Tumbler Ridge
ALBERTA
Prince George
Fraser R.
Campbell River
Vancouver Island
Port Alberni
Kamloops
Revelstoke
Vancouver
Victoria
Penticton
U.S.A.
Fernie

Discoveries of coal also allow us to recommend that additional licences should be applied for. These licences would greatly increase the probability of the company having a coal deposit that is mineable.

2.0 CONCLUSIONS AND RECOMMENDATIONS

There is sufficient coal present within, and adjacent to, Suncor's licenced area at Mount Jackson to support a mining venture. The major obstacle at this time is the problem of defining the geological structures involved and their effect upon the mineability of the deposit. Most of the area is heavily mantled by overburden and dense forest. The only bedrock exposures to be found are around the peaks and ridges and along the few, widely-spaced watercourses. These few exposures give us tantalizing glimpses of mineable thicknesses of good quality coal. The problem confronting us is that almost all of the potential mineable area is masked by overburden and therefore subject to conjecture.

Those bedrock exposures which it is possible to examine, mainly along watercourses, demonstrate structural complexity. It is possible that the structural deformities seen are local in nature as many of the watercourses appear to be fault controlled.

Coal is present in the valley of CURRIER CREEK and beneath the lower slopes of MOUNT JACKSON and MOUNT McEVOY. Coal is also found to outcrop in virtually all of the streams flowing into this valley, from a small unnamed creek west of MICHELE MARIE CREEK on the east, to AUGUSTINE CREEK on the west.

Coal is also present, adjacent to our licences, on the southeast slope of Groundhog Mountain. The coal outcropping here is in an area of permafrost and has been severely worked by frost action. These exposures were trenched and sampled in mid-August. The depth of the trenches was limited to approximately 60 cm at which point permafrost was encountered.

The southern area is not large enough to sustain a mine, but could be a valuable satellite to a mine in the JACKSON FLATS area.

Recommendations arising from the 1985 exploration program are:

° Coal licences should be applied for along the valley of CURRIER CREEK from the western boundary of our present Licences to a point west of the mouth of Davea Creek. Application for coal licences covering the southern area where coal outcrops are present, adjacent to our present licences on MOUNT FALCONER, should also be considered. Table 2 lists the recommended licence applications. The recommended changes to licences are illustrated on Plate 2.

° A drilling program should be carried out along the valley of CURRIER CREEK and the adjacent slope of MOUNT JACKSON to:

- establish the stratigraphic succession and basis of correlation;
- establish the number and thickness of coal seams;
- establish coal quality from unweathered samples;
- better define structure in order to ascertain the potential for a mineable coal deposit.

° Mechanical trenching or blasting should be carried out on the southern coal outcrops to enable us to penetrate the zone of permafrost and reach unaltered coal. For economic reasons this should be done only after the drilling recommended above.

° Suncor Inc. should surrender selected coal licences to the crown due to structural conditions which render them unmineable and/or containing insufficient or poor quality coal. These licences are listed in Table 1 below.

TABLE 1

RECOMMENDED LICENCES FOR SURRENDER

NTS SHEET 104 A/16

Licence No.	Lot No.	Area (ha)	Rental Fee ($6.00/ha/1986)
7355	L138	264	$1,584
7358	L984	264	1,584
7547		284	1,704
7548		284	1,704
7549		284	1,704
5 Licences	Containing	1 380 ha	8,280

TABLE 2

RECOMMENDED LICENCE APPLICATIONS

Block	Block Numbers	Hectares	Licence Fee ($25.00/ Licence)	Rental ($6.00/ha/1986)
NTS SHEET 104 A/9				
Block I	65-66-75-76	284	$25	$1,704
	67-68-77-78	284	25	1,704
	69-70-79-80	284	25	1,704
	85-86-95-96	284	25	1,704
	87-88-97-98	284	25	1,704
	89-90-99-100	284	25	1,704
NTS SHEET 104 A/16				
Block A	7-8-17-18	284	25	1,704
	9-10-19-20	284	25	1,704
Block B	1-2-11-12	284	25	1,704
Block C	67-68-77-78 (except lots 981 & 992)	78	25	468
	69-70-79-80	284	25	1,704
	85-86-95-96 (except lots 991-992-993)	10	25	60
	87-88-97-98 (except lot 992)	84	25	504
	89-90-99-100	284	25	1,704

Block	Block Numbers	Hectares	Licence Fee	Rental ($6.00/ha/1986)
Licence Lot Numbers				
	981	264	25	1,584
	982	264	25	1,584
	983	264	25	1,584
	990	264	25	1,584
	991	264	25	1,584
	992	264	25	1,584
Comprising 20 Licences containing		4,880 ha	$500	$29,280

3.0 OBJECTIVES

3.1 The objectives of the 1985 field season were to:

- Look for coal, of mineable thickness and quality, to the west and south of Suncor's coal licences in an area where geological structure may be conducive to mining by conventional methods.

- Enhance our knowledge of the geologic structures on the property.

- Enhance our knowledge of the potential of the licence area mineability and saleable quality of the coal.

- Gather sufficient data to allow decisions to be made with respect to future work on the property.

4.0 LOCATION

4.1 Geographic Location

The approximate centre of the property is at 128°11' West and 56°48' North and most of the area is on NTS map sheet 104 A/16 (McEvoy Flats).

Mount Jackson is approximately 230 km north-northwest of Smithers and 140 km northeast of Stewart, British Columbia. The property is at the confluence of the Skeena and Kluatantan Rivers. (Figure 2).

4.2 Licence Tenure

Suncor Inc. holds 25 coal licences in the Mount Jackson area for a total of 5,911 hectares. (Table 3) All of these licences are in good standing. (Plate 1)

Work to the value of $156,000 was performed on this property during 1985. With respect to monies spent on exploration, it is believed that the government of British Columbia will drop it's work requirements in the very near future.

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

FIGURE 2

LOCATION & INFRASTRUCTURE MAP NW BRITISH COLUMBIA

DATE	SCALE	N.T.S.	DRAWING No.
9/'85			BC85-001

RAILWAY (existing)
RAILWAY (proposed)
HIGHWAY (paved)
HIGHWAY (gravel)

20 0 20 40 60 80 100
Kilometres

130°00' 128°00' 126°00' 124°00'

56°00'

54°00'

GULF'S MT KLAPPAN PROJECT

SPATSIZI PLATEAU WILDERNESS PARK

TATLATUI PARK

MT. JACKSON PROJECT

Nass R.

Skeena R.

Thutade Lake

Finlay R.

CHIPMUNK CK (end of rail)

BCR

ROUTE

Williston Lake

Proposed Road

Alternate Proposed Road

Bell-Irving R.

CANADA

U.S.A.

STEWART

Omineca R.

W.A.C. Bennett Dam

Bulkley House

Takla Lake

MACKENZIE

Babine R.

Kispiox R.

37

New Hazelton

Kitwanga

Nass R.

Portland Canal

BABINE MTS. R.A

Nation Lakes

CARP LAKE PARK

Carp L.

SMITHERS

Telkwa

Babine Lake

Stuart Lake

Salmon R.

FT. ST. JAMES

HECATE STRAIT

TERRACE

16

PRINCE RUPERT

CNR

Skeena River

Houston

Burns Lake

Vanderhoof

Francois Lake

Morice Lake

KITIMAT

Fraser Lake

Fraser R.

PRINCE GEORGE

Queen Charlotte Islands

Kitimat Arm

Ootsa L.

TWEEDSMUIR PARK

Tahtsa Lake

Nechako R.

Knewstubb Lake

TABLE 3

MOUNT JACKSON COAL LICENCES

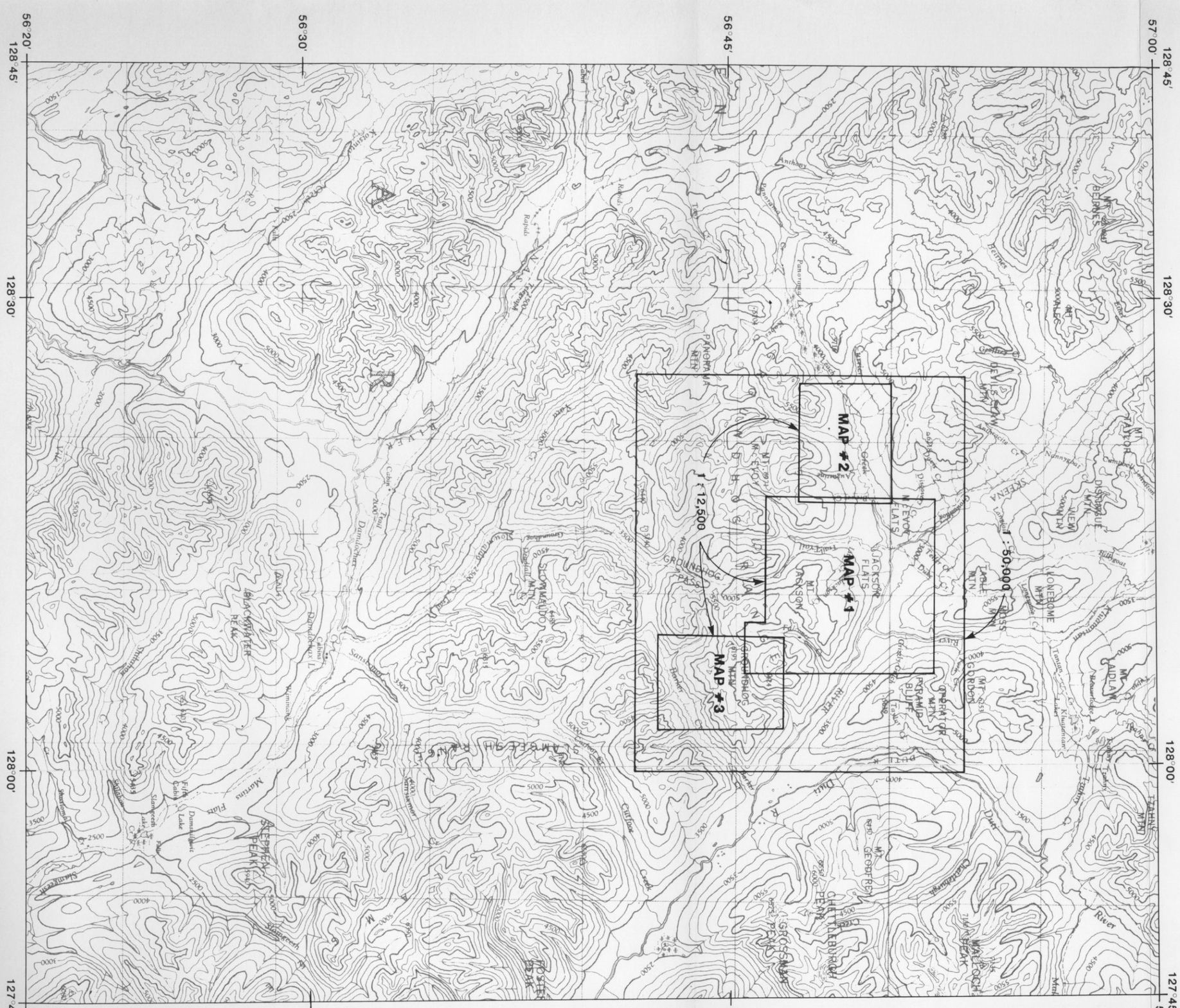
Licence No.	Date Issued	Map Area		Units/Lot	Hectares
7369	Feb. 19/82	104-A-16	Blk. B	45, 46, 55 & 56	284
7370	Feb. 19/82	104-A-16	Blk. B	47, 48, 57 & 58	284
7371	Feb. 19/82	104-A-16	Blk. B	65, 66, 75 & 76	284
7372	Feb. 19/82	104-A-16	Blk. B	67, 68, 77 & 78 (except Lot 987)	176
7373	Feb. 19/82	104-A-16	Blk. B	85, 86, 95 & 96 (except Lots 986 & 987)	12
7374	Feb. 19/82	104-A-16	Blk. B	87, 88, 97 & 98 (except Lots 985, 987 & 988)	7
7352	Feb. 19/82	104-A-16	Blk. B,C,F&G	Lot 135	264
7353	Feb. 19/82	104-A-16	Blk. B & G	Lot 136	264
7354	Feb. 19/82	104-A-16	Blk. B & G	Lot 137	264
7355	Feb. 19/82	104-A-16	Blk. G	Lot 138	264
7356	Feb. 19/82	104-A-16	Blk. G	Lot 139	264
7357	Feb. 19/82	104-A-16	Blk. F & G	Lot 140	264
7358	Feb. 19/82	104-A-16	Blk. B & C	Lot 984	264
7359	Feb. 19/82	104-A-16	Blk. B	Lot 985	264
7360	Feb. 19/82	104-A-16	Blk. B	Lot 986	264
7361	Feb. 19/82	104-A-16	Blk. B	Lot 987	264
7362	Feb. 19/82	104-A-16	Blk. B	Lot 988	264
7363	Feb. 19/82	104-A-16	Blk. B & C	Lot 989	264
7364	Feb. 19/82	104-A-16	Blk. B & G	Lot 994	264
7544	Feb. 19/83	104-A-16	Blk. B	83 & 84 (Except Lot 986)	12
7545	Feb. 19/83	104-A-16	Blk. B	63, 64, 73 & 74	284
7546	Feb. 19/83	104-A-16	Blk. B	43, 44, 53 & 54	284
7547	Feb. 19/83	104-A-16	Blk. B	41, 42, 51 & 52	284
7548	Feb. 19/83	104-A-16	Blk. B	21, 22, 31 & 32	284
7549	Feb. 19/83	104-A-16	Blk. A	29, 30, 39 & 40	284
25 Licences					5911 ha

4.3 Physiography (Figure 3)

The property lies within the Skeena Mountain range of north-central British Columbia. Maximum relief is of the order of 1,000 metres, with peaks over 1,800 metres and the valley bottoms at 800 metres above sea level. The highest elevations within the licence block are Falconer Mountain and Mount Jackson. From these areas, the ground slopes down to the Skeena Valley with trends from west-northwest to east-southeast through the property. Most of the relatively level ground occurs in the McEvoy/Jackson Flats areas, at the confluence of the Skeena River and Currier Creek, and along the valley of Currier Creek.

The principal river of the area is the Skeena, which has its source approximately 40 km to the northwest. It flows in a southeasterly direction through the property, before turning south and west to enter the Pacific Ocean at Prince Rupert.

Four principal creeks drain the property. The largest of these is Currier Creek which flows from the west and converges with the Skeena at McEvoy Flats. About 1 km to the north of the Jackson Flats is Discovery Creek, the lower part of which traverses Suncor's licences. The northerly-flowing Trail Creek enters Currier Creek just above its confluence with the Skeena. It drains the western slopes of Mount Jackson and has three small tributaries. The last creek worthy of mention is Jackson Creek which originates near the summit of Mount Jackson. It is entirely contained within the licences and enters the Skeena at the eastern end of Jackson Flats.



Suncor Inc. Resources Group	COAL AND MINERALS DEPARTMENT

FIGURE 3

INDEX & PHYSIOGRAPHIC MAP
MT JACKSON PROJECT

DATE	SCALE	N.T.S.	DRAWING No.
9/'85	1:250,000		BC85-065

LEGEND

1 : 50,000 Scale Map

COAL LICENCE LOCATION MAP

1 : 12,500 Scale Maps

MAP #1 : PRESENT HOLDINGS

MAP #2 : PROPOSED WEST EXTENSION

MAP #3 : PROPOSED S. EXTENSION

N

Scale 1 : 250,000

Miles 0 5 10 Miles

Kilometres 5 0 5 10 Kilometres

The higher slopes and ridge tops above the tree line, (about 1,500 metres), are sparsely vegetated. Lower slopes and most valley bottoms are densely covered by spruce, balsam, cottonwood and birch. Considerable quantities of deadfall make traversing a slow and labourious task. The only open areas covered by grassland and berry-bearing shrubs are around McEvoy and Jackson Flats and those areas above the treeline.

4.4 Access

At the time of writing the only feasible means of access to the property is by air. A good airstrip, capable of taking a DC3 or a Cariboo aircraft, is located at the confluence of the Skeena and Kluatantan Rivers. From this point the property is five minutes flight-time by helicopter.

The British Columbia Railway's Dease Lake rail-line runs by the northeast corner of the property. Though the actual trackage ends at Chipmunk Creek, some 30 km to the south the road-bed is graded up to the Kluatantan River (Figure 2).

4.5 Reclamation

No Mechanical work was performed on the licences in 1985.

The base camp was at the confluence of the Skeena and Kluatantan Rivers on a site which was originally utilized during the construction of the B.C. Rail line through the area. Our camp utilized tent frames which were built by Imperial Metals Co. for their exploration of the area. These tent frames are presently owned by the Love Bros., Outfitters, of Smithers, B.C.

At the conclusion of activities in the area the camp was cleaned up, garbage pit filled in, and all traces of our presence removed.

4.6 Drainage

The major river of the area is the Skeena which has its headwaters some 40 km to the north. Several tributaries to the Skeena drain the area. They are the Kluatantan River and Currier, Trail, Jackson and Falconer Creeks.

The Skeena is a fourth order stream at this location (Strahler, 1957) while Kluatantan, Currier and Falconer are third order streams. Jackson Creek is a second order stream. Two others, Davea and Michele Marie Creeks are first order streams and drain the north-facing slopes of Mount Jackson.

Calculated flows for study area tributaries are shown in Table 4. [1] The data shows that the Kluatantan River is the major tributary with an estimated mean annual flow of 15 cubic metres per second (cms), followed by Currier (4.4 cms), Trail (1.8 cms) and Falconer (.81 cms) Creeks respectively. Maximum monthly discharge in study area tributaries likely occurs in June owing to snowmelt; flows decrease thereafter.

1 Envirocon study p. 9.

TABLE 4

Estimated Discharges for Streams in the Mount Jackson Study Area

Tributary	Area (km^2)	Discharges		
		Mean Annual (cms)	Maximum Monthly (cms)	Minimum Monthly (cms)
Jackson Creek	7.3	0.21	0.74	0.021
Falconer Creek	28.0	0.81	2.9	0.081
Trail Creek	62.0	1.8	6.4	0.18
Currier Creek	150.0	4.4	16.0	0.44
Kluatantan River	510.0	15.0	53.0	1.50

4.7 Climate

The climate is characterized by short, cool summers and cold winters. This is due to the frequent influxes of continental arctic air and the occurrences of moist Pacific air. Precipitation is relatively light by comparison with coastal regions. Precipitation is distributed fairly evenly throughout the year.

Four Ministry of Environment (MOE) stations have been selected to provide an indication of the Mount Jackson climate. These stations, with their locations, elevations, periods of record and the type of data collected are shown in Table 5. Monthly average minimum and maximum temperatures and average monthly precipitation data for each station are shown in Table 6.[1] The data shown are predicted long-term averages (30 year normals), calculated by the MOE; long term extremes are not available. The data indicates that climatic conditions in the study area can be expected to conform to the general description given above.

As is evident from Table 6, no data is available for such climatic factors as wind, solar radiation, cloud, fog, precipitation intensity or evapotranspiration either for the region or the study area.

TABLE 5

Climate Stations Used to Indicate Regional Climatic Conditions

Station	Latitude	Longitude	Elevation	Distance From Study Area	Period of Record (yr)
Kluatantan	56°52'N	128°14'W	811	10 km N.	3
Chipmunk	56°42'N	127°50'W	723	25 km S.E.	3.5
Mosque Cr.	56°31'N	127°35'W	655	45 km S.E.	3.5
Didene	57°17'N	128°52'W	1,343	70 km N.W.	6

1 Envirocon study. pg. 7.

4.8 Wildlife

The project area is known to contain moose, deer, cariboo, wolves and grizzly and black bears.

During the 1985 season black bears were the only form of large wildlife seen. A yearling black bear came into our base camp on several occasions.

Though the bulk of our work was done below the treeline no animals were seen along the streams or on the slopes within the work area.

5.0 WORK DONE ON MOUNT JACKSON PROJECT AREA

5.1 History

The earliest reference to coal occurrences in the region was in 1899 by V.H. Dupont of the Federal Department of Railways. In 1900 a Geological Survey report announced the possibility of large volumes of anthracitic coal of Cretaceous age in the area.

TABLE 6

Predicted Long Term Average Temperature and Precipitation Data for Four Northern B.C. Climate Stations (30 Year Normals)

Station	J	F	M	A	M	J	J	A	S	O	N	D
Kluatantan												
Average monthly temperature (°C)												
Max.	-	-	-	8.2	13.8	16.9	19.3	17.8	13.3	6.6	-	-
Min.	-	-	-	-1.7	1.2	3.8	5.5	5.1	2.4	-.1	-	-
Mean	-	-	-	3.2	7.5	10.3	12.4	11.5	7.8	3.2	-	-
Average monthly Precipitation (mm)	-	-	-	-	20.3	29.2	29.2	32.0	28.7	-	-	-
Chipmunk												
Average monthly temperature (°C)												
.	-21.2	-6.6	-1.0	6.0	12.5	16.1	18.8	17.2	11.9	4.1	-4.7	-10.5
Min.	-14.3	-15.2	-11.0	-5.0	-1.3	3.0	5.1	4.7	1.0	-2.9	-8.7	-15.4
Mean	-17.8	-10.9	6.0	.2	5.6	9.5	12.0	11.0	6.5	.6	-6.7	-13.0
Average monthly Precipitation (mm)	-	-	-	-	-	-	-	-	-	-	-	-
Moseque Creek												
Average monthly temperature (°C)												
Max.	-	-	-	6.5	13.2	17.0	19.8	18.1	12.6	4.6	-4.5	-
Min.	-	-	-	-5.2	-.7	3.0	5.3	4.8	.8	-3.1	-8.5	-
Mean	-	-	-	.6	6.2	10.0	12.6	11.5	6.7	.7	-6.5	-
Average monthly Precipitation (mm)	-	-	-	-	30.2	43.4	43.6	47.7	42.9	76.4	-	-
Didene												
Average monthly temperature (°C)												
Max.	-12.4	-6.7	-2.2	3.9	9.8	13.8	14.5	14.5	9.9	3.3	-4.6	-9.9
Min.	-20.5	-16.1	-12.7	-6.5	-2.4	.9	2.7	2.2	-.7	-4.3	-11.6	-17.4
Mean	-16.5	-11.4	-7.4	-1.3	3.7	7.4	9.1	8.3	4.6	-0.5	-8.1	-13.6
Average monthly Precipitation (mm)	26.1	24.1	22.7	16.6	23.2	35.7	43.0	41.1	37.3	30.6	27.0	29.6

In 1903 J. McEvoy explored the area for possible commercial coal occurrences and found a 2 m seam on Discovery Creek. On the strength of this exposure and other indications, he staked claims covering 14 square miles. The following year W.W. Leach staked an additional 16 square miles on behalf of the Western Development Company. Further large claims were acquired by the B.C. Anthracite Company between 1909 and 1912. In 1911 and 1912, G.S. Malloch of the Geological Survey examined the coal field and a summary of his report is to be found in "Coal Fields of British Columbia", 1915. He measured three sections, including one on Mount Jackson where he recorded 17 separate coals ranging from 0.3 m to 2 m thick.

Little further work was done on the area until 1948 when a Geological Survey party under A.F. Buckham and B.A. Latour mapped the coal field. The results of this survey are published in G.S.C. Bulletin 16 - "The Goundhog Coalfield, British Columbia". Over 60 separate coal localities were recorded throughout the coal field, several of which included more than one seam. The coal-bearing strata were assigned to the Upper Jurassic-to-Lower Cretaceous Hazelton Group.

In 1968 Coastal Coal Ltd. sent a party of geologists to examine claims staked two years previously. The following year Placer Development, Quintana Minerals and the National Coal Corporation mapped 200 square miles and drilled 6 holes. They concluded that the possible reserves could total 4 billion tons.

In 1973, 1976 and 1979 the Geological Survey initiated work in the Groundhog area and Bowser Basin in general. This work was of a regional reconnaissance nature, primarily investigating depositional and structural trends and included only minor work on the coal.

5.2 Previous Work By Suncor

During 1981 John Davies (a project geologist with Suncor) appraised the potential of the Groundhog Coalfield and examined the probability of acquiring coal licences. The appraisal culminated in a recommendation to apply for coal licences in the Mount Jackson area. Further to the recommendation 29 licences covering 6903 hectares were issued to Suncor February 19, 1982.

During the summer of 1982 reconnaissance mapping was carried out over the licence area from fly camps established at weekly intervals from a base camp at Bear Lake approximately 110 km to the southeast. The programme accomplished mapping of the principal drainage areas and establishing the location of coal outcrops and the collection of coal samples for analysis.

During August, 1983 Suncor's field personnel moved their camp from Bear Lake to the Mount Jackson project area. A base camp was established adjacent to the airstrip at the confluence of the Skeena and Kluatantan Rivers.

The bulk of the field work consisted of geological mapping. The mapping was done using aerial photographs which had been enlarged to scale 1:5,000. Data placed on these photographs was later posted to maps.

Field personnel were lifted onto the work area by helicopter daily and geological mapping was carried out on all of Suncor's coal licences. Sixteen trenches, for a total of 102.4 m were dug on licences 7363, 7369, 7370 and 7371. Stratigraphic sections were constructed based on data gathered on traverses on the exposed south-facing slopes of Mount Jackson and Falconer Mountain.

5.3 Work Performed in 1985

On August 1, 1985, Suncor's field personnel moved into camp at the mouth of the Kluatantan River. The camp had been constructed during the previous week by VAN ALPHEN EXPLORATION SERVICES LTD. of Smithers, B.C. The exploration party consisted of:

John Fisher	Project Geologist
Owen Cullingham	Geologist and Party Chief
Kevin Brown	Geologist and Deputy Party Chief
Janet Kerr	Geologist
Greg Cave	Geological Assistant
Arliss collins	Geological Assistant
Joe Meier	Helicopter Pilot
Suzanne Perrault	Cook
Henk Van Alphen	Expeditor

The movement of personnel was made using a Bell 206B helicopter to take the personnel out on traverses in the morning, and to pick them up and return them to camp in the evening. During the first half of August our helicopter was requisitioned by the B.C. Department of Forests to assist in forest fire fighting. As a result of this we were obliged to share a helicopter with two other exploration parties, each being at least forty air miles distant. The net result was less than satisfactory; we seldom had the helicopter for more than forty minutes per day. This influenced the planning as to which traverses could be done to fully utilize our personnel.

The bulk of the work consisted of traverses and reconnaissance mapping to the south and west of our existing licences in an effort to find coal where the structure would be conducive to conventional mining techniques.

Wherever coal was found it was trenched and sampled. Coal samples were sent to Birtley Coal and Minerals Testing in Calgary for analysis. Results of analysis are attached as Appendix B.

As well as exploring for coal occurrences personnel considered the advisability of maintaining licences where the geologic structure appeared extremely complex and/or the coal was of inferior quality. This resulted in a recommendation that some of our licences be allowed to lapse.

Coal occurrences found elsewhere have led to a recommendation that 20 more licences be applied for in an area adjacent to our present holdings. The geologic structure to the west appears less complex than other areas of the holdings. If so, this area would add significantly to the potential of the Mount Jackson property.

Thanks to the sharp eye of Mr. Kevin Brown an old portal was found where we had not previously found any worthwhile coal outcrops. The portal was some 10 metres above the creek bed on Augustine Creek approximately 100 metres from its confluence with Currier Creek. An old adit site not previously found was located along Trail Creek by Janet Kerr and Arliss Collins.

6.0 GEOLOGY

6.1 Regional Stratigraphy

The Mount Jackson property is situated at the southern margin of the Groundhog coal field which lies in the northeastern section of the Bowser Basin.

The Bowser Basin developed from the Hazelton trough. During the Middle Jurassic, uplift of the east-northeasterly trending Skeena arch divided the Hazelton trough to form the Bowser Basin to the North and Nechako Basin to the South, (Tipper and Richards, 1976). Concurrently, uplift of the Stikine arch to the north of the basin, and the initial uplift of the Omineca Crystalline Belt to the east, resulted in a depositional basin that opened westward.

Uplift and subsidence during the middle Jurassic and Early Cretaceous, resulted in the deposition and accumulation of marine and non-marine sedimentary rocks and minor basic volcanic rocks. Sediment source was primarily from the Skeena arch and the Stikine arch. At the Groundhog coal field, the major sedimentary source was predominately from the east or northeast, (Bustin and Moffat, 1983).

Environments of deposition range from fluvial through deltaic to pro-delta slope which were all accompanied by a slow rate of subsidence, (Davies, 1982).

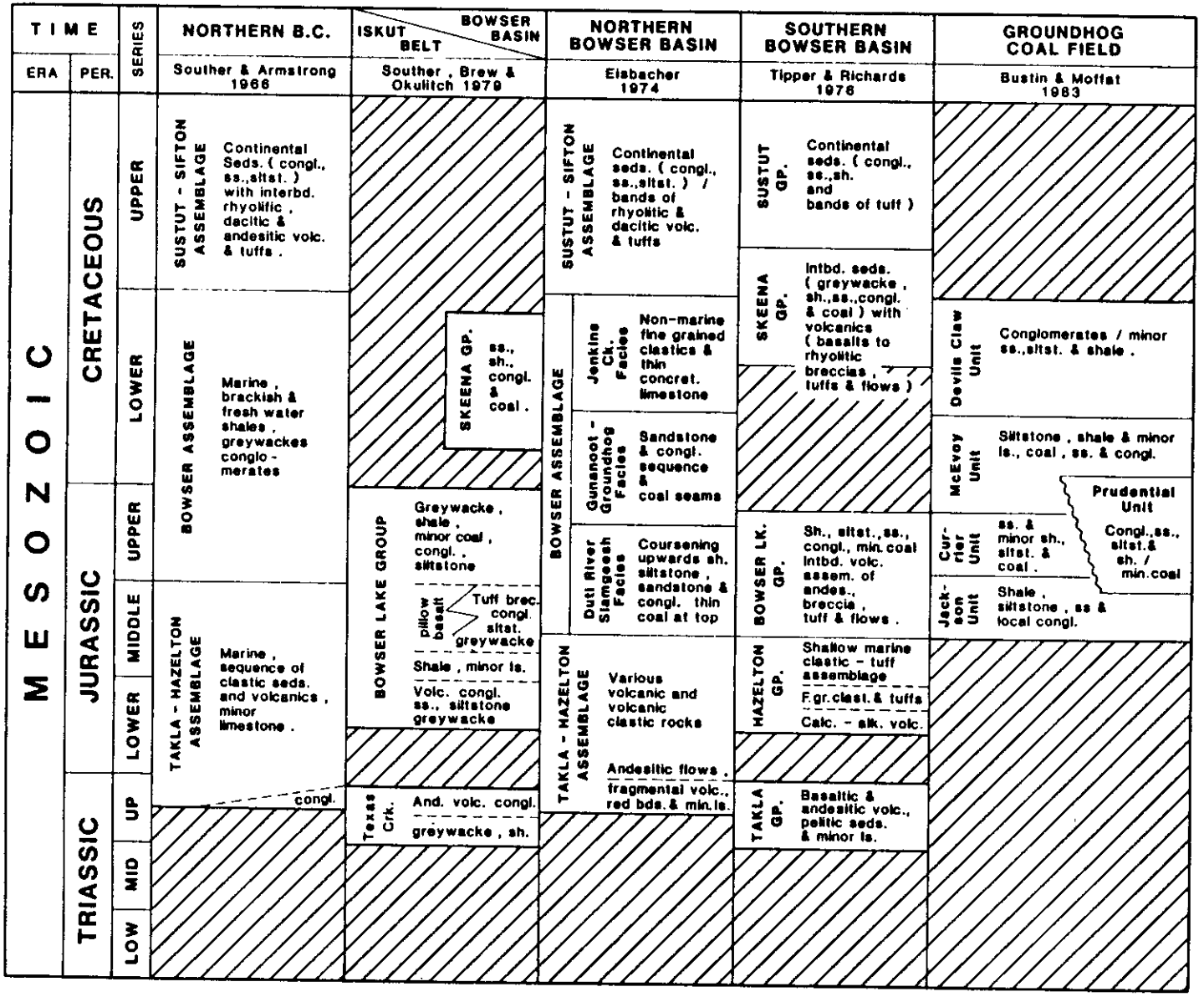
The strata which accumulated in the Bowser Basin initially were called the Bowser Assemblage and were thought to range in age from Upper Jurassic to Lower Cretaceous, (Souther and Armstrong, 1966). Later studies of the Bowser Basin show that Middle Jurassic sediments are also present, (Eisbacher, 1974).

Further studies by Tipper and Richards,(1976), resulted in the subdivision of the Bowser Basin stratigraphy into two groups: the Bowser Lake Group and the Skeena Group.

The Middle Jurassic-to-Upper Jurassic Bowser Lake Group is characterised by regressive, alluvial-deltaic slope sedimentation, (Tipper and Richards, 1976). It is unconformably overlain by the Early-to-late Cretaceous Skeena Group. The table of formations, (Table 7), illustrates the relationship between the various nomenclature used in former studies.

In the Groundhog coal field, the stratigraphic sequence differs from the surrounding Bowser Basin. Bustin and Moffat (1983), note that strata equivalent to the Bowser Lake Group are overlain by a succession of non-marine strata that are dissimilar to the Skeena Group. Bustin and Moffat, (1983), divide the strata of the Groundhog coalfield into four units which are: the Jackson, Currier, McEvoy and Devils Claw unit. The Jackson unit and Currier unit are of Middle and Upper Jurassic age, respectively, and are considered to be equivalent to the Bowser Lake Group.

TABLE OF FORMATIONS - BOWSER BASIN (NW BRITISH COLUMBIA)



File No. BC85-009

These units are overlain by the McEvoy and Devils Claw units which are of Lower Cretaceous age. Bustin and Moffat, (1983), also note that a fifth unit, the Prudential Unit, can also be found within the Groundhog coalfield. This unit is believed to be a coarser equivalent of the Currier unit.

Of the four main units, only the Jackson unit is regionally extensive. The Currier, McEvoy, and Devil's Claw units are restricted to the Groundhog coalfield, (Bustin and Moffat, 1983).

The Mount Jackson unit unconformably overlies the volcanic rocks of the Takla-Hazelton assemblage. Bustin and Moffat, (1983), suggest that the Jackson unit is predominately marine but progressively coarsens upwards. The unit is comprised of shale, siltstone, minor sandstone and, locally, conglomerate.

The Currier unit gradationally overlies the Jackson unit and is the main coal bearing unit in the Goundhog field. The unit consists of thin-to-thickly bedded sandstone, minor shale, siltstone, and coal and is considered to be primarily fluvial in origin, (Bustin and Moffat, 1983).

Conformably overlying the Currier unit is the McEvoy unit which is comprised of a thickly interbedded sequence of siltstone, shale, minor limestone, coal, sandstone and conglomerate.

Strata within the lower sequence suggest both a marine and non-marine environment. The occurrence of belemnites in the lower part of the sequence suggests that the strata are marine. The remaining upper sequence is thought to be lacustrine in origin, (Bustin and Moffat, 1983).

The final unit in the stratigraphic sequence is the Devils Claw unit. This unit conformably overlies the McEvoy unit and is primarily comprised of massive conglomerate with minor shale, siltstone and sandstone. The unit generally coarsens upwards and is considered to be fluvial to alluvial fan and plain deposits characteristic of braided streams.

6.2 Local Stratigraphy

The stratigraphic units as defined by Bustin and Moffat (1983), have been accepted and adopted by Suncor. Of the four main units, the Jackson and Currier units are exposed on the Mount Jackson property.

The Jackson unit is present on the eastern part of Mount Jackson and extends to Falconer Mountain, and east of Tent Peg Creek. The Currier unit primarily extends along the North Slope of Mount Jackson and downslope to Currier Creek and the Jackson-McEvoy Flats area. Exposures of the Currier unit also are found on the south-western face of Falconer Mountain and to the west of Tent Peg Creek.

The Jackson unit and Currier unit are designated as the non-coal bearing or barren unit, and the coal bearing unit respectively. The occurrence of coal marks the base of the Currier unit.

The Jackson unit is well exposed on the southern face of Mount Jackson and displays a coarsening upward sequence which is gradational with the overlying Currier unit. Elsewhere, faulting separates the two units.

Correlation of individual stratigraphic units or coal seams cannot be made with any certainty. Overburden and dense vegetation limit outcrop exposure to above treeline or along creeks. Correlation is further complicated by the lack of significant marker beds and structural deformation.

On the property the Jackson unit is comprised of marine to transitional marine shale, siltstone and sandstone. Evidence showing that the Jackson unit is in part marine can be found in outcrop on the Skeena River upstream from the confluence with the Kluatantan River. The outcrop contains numerous bivalves indicative of a marine origin.

The upper section of the Jackson unit becomes progressively coarser as it grades into the overlying Currier Unit. This section is interpreted to be a transitional marine, deltaic depositional environment.

Stratigraphic sequences identified by Bustin and Moffat, (1983), as Lower Currier, outcrop in creeks on the north slope of Mount Jackson from Jackson Creek to Augustine Creek. Several exposures of coal occur as thin seams averaging less then one metre thick, and as coal bloom. These coal exposures overlie a sedimentary sequence in which thinly interbedded dark to medium grey mudstones and siltstones coarsen upwards to light-to-medium grey, fine-to-medium grained sandstone.

Bustin and Moffat, (1983), suggest that the coarsening upward sequence represents prodelta, delta front, and delta plain sediments in which the coal and associated sediments are interpreted to be overbank and backswamp deposits.

The idea that the coarsening upward sequence is capped by coal may have been considered in past exploration. Near the confluence of Augustine and Currier Creeks is a stratigraphic sequence of thinly bedded mudstone grading upwards into a thickly bedded, medium grained sandstone. Above the sandstone, no coal or coal bloom is exposed; yet, an adit was discovered which appears to enter this apparently barren sequence. On further examination, small blocks of coal were found near the adit. It may be possible that, even though no coal was exposed at the surface, the sequence was recognized to have the potential for being capped by coal.

6.3 Regional Structure

Uplift of the Coastal Crystalline Complex during the Cretaceous and Tertiary caused extensive folding and faulting within the Groundhog coalfield.

The structural grain of the area is reflected by the region's drainage system. The Nass and Skeena River Valleys generally follow the northwest-to-southeast trend of the region. Eastward and westward flowing tributaries further divide the area breaking it into rectilinear blocks.

These regional linear expressions are believed to be fault controlled or follow subparallel to major synclinal axes.

Two significant synclinal structures pass through the region: the Skeena Syncline, and the Mt. Beirnes Syncline.

The Skeena Syncline trends southeast to northwest, following the Skeena River Valley. The synclinal axis generally follows the Skeena River, but becomes indistinct near the McEvoy Flats area. This could indicate closure of the Skeena syncline. Downstream from the McEvoy Flats area, the Skeena River follows the Skeena fault.

The Mt. Beirnes Syncline lies between the Nass and Skeena River valleys and trends northwest to southeast. This broad, open fold is well exposed in the McEvoy and Devils Claw units, (Bustin and Moffat, 1983).

The Skeena and Nass River valleys are also thought to be associated with thrust faulting. Bustin and Moffat, (1983), find that there is no evidence of major stratigraphic separation. Thrust faulting with major displacement is not evident in the area although large scale thrust faulting does occur. An example is the Groundhog thrust fault which is situated 2 miles west of the Skeena River and extends northwards from Currier Creek, (Thompson, 1977). This fault is also referred to as the Mt. Beirnes - Devils Claw thrust, (Davies, 1982).

The Skeena fault, extending along the Skeena River downstream from McEvoy Flats, is also thought to be a thrust or high angle reverse fault, (Davies, 1982). An additional fault, called the Deformation fault, splays from the Skeena fault and is considered to mark the boundary between the coal and non-coal bearing strata.

Small scale thrust faults, associated with numerous anticline syncline pairs, are also present, particularly in the Currier unit.

The structural style, or intensity and type of folding is related to the competency of the different lithologic units. The competent Devils Claw and Upper McEvoy units are characterized by broad, low amplitude folding. Less competent units, such as the Jackson unit have tight, high amplitude, short wave length folding.

The contrast in competency of the various units causes folding in which a broad gentle syncline can be underlain by intensely folded strata. This may be occurring on a large scale whereby the relatively incompetent Jackson unit is used to accomodate for the structural forces.

Overturned folds within the limbs of the Beirnes and Skeena synclines illustrate folding on a large scale. To the west of the Beirnes synclinal hinge, folding is overturned to the southwest and appears as large scale folds. Northeasterly overturned folds, to the east of the hinge appear as tighter folds. This tends to give validity to the interpretation of major fold structures in the area as opposed to faulting.

The Jackson unit, and other less competent units, are subject to the most overturned folding whereas the most competent units, like the McEvoy and Devils Claw, would display the broader, regional, synclinal structures.

6.4 Local Structure

Intensive folding and insufficient outcrop on the property makes it difficult to determine the local structure and its continuity. Strike and dip directions are very variable and suggest a complex structure; however, the variation is probably more of a result of local deformation masking a structure which conforms to the regional pattern.

Folding generally follows a northwest - southeast trend. The folding is often intense and tight but can also be broad and open. Tight folding is particularly noticeable in the Jackson Unit in which anticline - syncline pairs and related thrust faulting are common.

Bustin and Moffat, (1983), note that, regionally, both the Currier and Jackson Units are tightly folded and may represent drag or parasitic folding, that is associated with buckling and bedding plane slip of a mega-structure. The Currier and Jackson units would reflect the compressional and tensional forces. More competent units, such as the Devils Claw would define the mega-structures.

The tight folding in the southern slope of Mount Jackson might be interpreted as reflecting the tensional and compressional forces of a larger structure such as the southern closure of the Skeena Syncline.

Competency contrast, and associated variation in fold style, is displayed on the southwestern face of Falconer Mountain where an open gently plunging syncline is underlain by the tightly folded strata of the Jackson Unit. Other examples of intensive folding of the Jackson Unit are exposed on the southeast face of Mount Jackson and on the north face of Falconer Mountain.

The drainage system is generally controlled by thrust or block faulting. Some faults define the coal/non-coal bearing boundary such as Deformation fault, and at an unnamed fault on Tent Peg Creek. Tight folding, particularly in the Jackson Unit, is very intense adjacent to these faults.

In some areas the coal in the units has undergone extensive shearing and deformation. Elsewhere, the coal is structurally thickened within the axis of tight folds. An example of this can be seen at station GH-85-75 located west of Tent Peg Creek. At this station is a zone of structurally thickened coal, approximately 14 metres thick, that is situated in the hinge of a large overturned anticline.

The area west of, and adjacent to, the Mount Jackson property was examined and appears structurally attractive as a mining situation. The area surrounds the confluence of Currier and Davea Creeks and is found to be in an open, generally flat, valley. Limited outcrops here display very gently dipping beds. The location and structure would appear to be favourable for mining.

7.0 COAL

7.1 Areal Distribution and Continuity

The preponderance of coal outcrops on the Mt. Jackson property are centred around the peak of the mountain and along the ridge which trends east-west from the peak. The reasons for the disproportionately high number of outcrops in this area, when compared to the property as a whole, is not that the good coal is restricted to the higher areas but rather that:

- The area is above the treeline in an alpine environment where vegetation is sparce-to-nonexistant.

- The main coal exposures are associated with a hard, cliff-forming, sandstone/siltstone sequence.

- The southern face, where most of the coal seams are seen, forms the northern wall of a valley which is the result of faulting, and where the coal measures have been uplifted.

- The majority of the coal exposures are on a south-facing slope and therefore not covered by vegetation as are the north facing slopes. This is a result of climatic and topographic environmental factors which favour moisture retention and, therefore, growth on north-facing slopes.

- Glacial debris and surficial material have been eroded from the upper slopes and deposited on the lower, more gently dipping, slopes and flatlands.

- The higher elevations, where the coals are seen, are still being actively eroded. The prime erosional factors are frost action and snowmelt runoff which expose the coalbearing bedrock.

The conditions mentioned above have resulted in many more coals being seen to outcrop at the higher elevations than on the lower slopes and in the valleys.

The coal outcrop situation is almost entirely reversed on the lower slopes of Mt. Jackson and the flatlands between Michele Marie and Augustine Creeks.

The small number of outcrops seen in the lower areas are the result of the following factors:

- The lower slopes and flatlands are mantled by glacial debris and outwash material eroded from the higher elevations.

- Below approximately 1,500 metres A.S.L. the slopes and flatlands are covered by an exceedingly dense growth of spruce, balsam, cottonwood and birch that is almost impenetrable.

- Outcrops of rock of any kind may only be seen intermittently along the banks and beds of the swiftly flowing streams and very rarely in the forest covered portions between them.

When one considers all of the above factors it becomes evident that the paucity of coal outcrops seen in the area of the lower slopes and flatlands does not indicate a lack of coal but simply a lack of outcrop.

The conclusion drawn from all data presently in hand is that the coals seen in outcrop above the peak of Mt. Jackson are also seen along Trail, Jackson and Michele Marie Creeks. They are almost certainly present under most or all of the north-facing slope of Mt. Jackson and probably a portion of the lower slopes of Mt. McEvoy. They should also be present under Jackson and McEvoy Flats and extend for some distance up the valley of Currier Creek. This would give an area of some 14 km^2.

An outlier of the Mt. Jackson coals is also to be found on the southern extremity of our licences. This coal exposure has been worked severely by frost action. Attempts to trench this coal were frustrated when permafrost was encountered at a depth of approximately 60 cm.

We have reached a point in the exploratory process whereby we must proceed with a drilling program on the lower slopes and flatlands. This would enable us to prove or disprove the presence of a coal deposit of sufficient volume and in a mineable attitude.

Exposed coal seams along the ridge at Mt. Jackson cannot be traced along strike for more than a hundred metres before they disappear under a mantle of drift.

Wherever practicable, (that is where coal seams were exposed sufficiently well to distinguish stratigraphy), coal seams were logged and sampled. Stratigraphic sections of these exposures, and corresponding sample analyses, are shown on, "Stratigraphic and Analytical Sections", in Appendix A. The location of all coal seams sampled in 1983 and 1985 are shown on, "Sample Location and Analysis Plan", Plates 9 to 11.

7.2 Coal Quality and Analyses

Analyses carried out on 36 grab and trench coal samples, (1983 and 1985), indicate that the rank of coal varies between subbituminous and anthracite, (astm - determined using fixed carbon, volatile matter and heating value). The preponderance of samples analyse in the low volatile bituminous to semi-anthracite classes. Table 8 illustrates the distribution of classification and Figure 4 graphically demonstrates the range of analyses.

It should be noted here that the variation in coal rank is, to some degree, suspect. These coals of lower rank are generally from outcrops which are at the highest elevations. These coals are not only oxidized but have also been subjected to permafrost action and an untold number of freeze-thaw cycles.

TABLE 8

Variance in Rank Distribution (ASTM)

Rank	Pre-1985		1985		Combined	
	Raw	Clean	Raw	Clean	Raw	Clean
Anthracite	2	2	3		5	
Semi-Anthracite	3	7	5		8	
Low Vol. Bituminous	3	6	4		9	
Med. Vol. Bituminous	4	2	2		6	
High Vol. A Bituminous						
B Bituminous						
C Bituminous		1			1	
Subbituminous A	2		2		4	
B	1				1	
C	3		2		5	

It should be noted that all samples analyzed as subbituminous occur above treeline and are wholly or partially weathered and, therefore, rank determination using volatile/fixed carbon/heating value parameters are suspect. As coal weathers molecular degradation sets in owing to, in part, chemisorption of oxygen and the formation of carboxyl and hydroxyl compound groups. This has the effect of decreasing fixed carbon, increasing volatiles and decreasing heating value and thereby producing false rank determinations.[1] The best indicators of coal rank are from unweathered and/or good quality outcrop samples. These samples suggest an anthracite to low volatile bituminous rank coal for the Mt. Jackson property. Six samples were selected for ultimate analysis. Figure 5 shows rank determination from carbon/oxygen ratio and hydrogen/carbon ratio. These results tend to support a low volatile bituminous to anthracite rank for Mount Jackson coal.

John Davies, in his report on the 1982 exploration program, recognized the problem of rank determination on the weathered and oxidized samples and, therefore, used reflectance of vitrinite as an indication of rank. By these analyses the rank of coal was established as anthracite. Vitrinite reflectance for rank determination for the higher rank coals should be used with caution owing to the effects of metamorphism. There is the possibility of confusion in distinguishing vitrinite from the other macerals.

1 Berkowitz, N. Personal communication of Oct. 11, 1985 and "An Introduction to Coal Technology "Academic Press 1979.

In all exploration programmes the rank of coal has been shown to be slightly higher in the Jackson and McEvoy Flats area than on Mount Jackson possibly indicating an increase in age from Mount Jackson down to the Flats, or, indicating the local effects of metamorphism caused by igneous activity.

Owing to poor exposures, of outcrop and along trenches, coal seam thicknesses are not established well. Adjusting for dip, most seams appear to fall in the range of 0.5 to 1 m with few seams up to 3 m and one seam, (which occurs approximately 3,000 m southeast of the summit of Groundhog Mountain), with a possible true thickness of approximately 8 m. Other exposures, variously measured in outcrop and in old coal workings, are documented to range between 1 and 2 m. (1)&(2)

Raw coal ash ranges from 15.5% to 43.6% with much of the ash in the higher ash coals tending to be intrinsic; this may be indicated by poor yield on samples washed at a specific gravity of 1.55, s.g. (Figure 6).

1 Buckham A.F. & Latour, B.A. "The Goundhog Coalfield, British Columbia" Geological Survey of Canada Bulletin 16, 1950 pg. 66.

2 Malloch, G.S. "Reconnaissance on The Upper Skeena River, Between Hazelton and The Groundhog Coalfield, B.C." Summary Report of Geological Survey of Canada, 1911 pg. 88.

Heating value varies uniformly with ash from approximately 3,500 cal/g for a high ash coal to 6,500 cal/g for a 15% ash coal, (Figure 7), determined on a dry basis. On a moist, mineral-matter free basis heating values vary from approximately 4,500 cal/g to 8,000 cal/g, (Table 9).

Sulphur content of raw coal samples is variable but within acceptable limits, i.e. less than 0.8%. A plot of sulphur against ash (Figure 8) shows random scatter of points with no discernable trend.

Coal samples taken during the 1983 exploration program were crushed to minus 6 mm and subjected to float/sink analysis at 1.55 s.g. Figure 6 graphically shows the relationship between raw coal ash and yield at this s.g. separation. Note that at relatively high raw coal ash levels the yield is low. This relationship precipitated washing selected samples, from the 1985 program, at 0.05 s.g. increments from 1.55 s.g. to 1.70 s.g. in an attempt to improve yield whilst maintaining a moderate ash product, i.e. less than 12% ash.

TABLE 9

Sample Analyses Corrected To
Dry or Moist Mineral-Matter Free Basis
Using Parr Formulas

Sample #	Sample Location	Vol. (dry mm-free)	F.C.	BTU (moist mm-free)	Cal/g
1985					
84 3281	Augustine Creek	8.85	91.15	13,941	7,751
84 3282	Mt. Jackson	35.28	64.72	10,543	5,862
84 3283	Mt. Jackson	47.63	52.37	9,272	5,155
84 4706	Groundhog Mt.	23.56	74.45	12,028	6,688
84 4701	Groundhog Mt.	30.46	69.54	11,312	6,289
84 4702	Groundhog Mt.	32.03	67.97	10,902	6,062
84 4705	Groundhog Mt.	47.23	52.76	9,102	5,061
84 4703	Groundhog Mt.	14.30	85.70	13,456	7,482
84 4707	Mt. Jackson	7.75	92.25	14,244	7,920
84 3238	Trail Creek	11.70	88.30	13,574	9,215
84 3239	Trail Creek	8.26	91.74	13,004	7,230
84 3240	Trail Creek	18.48	81.52	13,370	7,434
84 3241	Trail Creek	8.57	91.43	13,573	7,547
84 3242	Currier Creek	9.97	90.03	14,184	7,886
84 3243	Currier Creek	7.39	92.61	14,207	7,899
84 3244	Currier Creek	5.71	94.29	14,813	8,236
84 3245	Jackson Creek	20.48	79.52	12,671	7,045
84 3246	Jackson Creek	8.32	91.68	13,344	7,419
84 3247	Jackson Creek	15.93	84.07	12,970	7,211
84 3250	Trail Creek	5.02	94.98	14,180	7,884
84 3259	Groundhog Mt.	43.20	56.80	9,372	5,211
84 3260	Groundhog Mt.	33.57	66.43	10,608	5,898
1983					
1442&1443		29.92	70.08	11,511	6,400
1444		9.19	90.81	14,340	7,973
1447		22.97	77.03	12,141	6,750
1448&49&50		31.81	68.19	11,182	6,217
1528&29&30		28.62	71.38	11,334	6,302
1930		17.30	82.70	13,269	7,378
1933		56.29	43.71	8,676	4,824
1935		39.94	60.06	10,089	5,609
1939		51.78	48.22	7,987	4,441
1942		50.62	49.38	8,444	4,695
1943		20.13	79.87	12,715	7,070
1945		18.07	81.93	13,182	7,329
1946		23.82	76.18	12,002	6,673
1948		31.43	68.57	11,181	6,217
1952		11.75	88.25	14,111	7,846
1954		6.15	93.85	14,376	7,993
1957		11.85	88.15	14,325	7,965
1961		5.20	94.80	14,005	7,787

Determination of coal rank on clean coal samples shows a preponderance of analyses indicating semi-anthracite-to-low volatile bituminous coal, (Figure 9), calculated using a fixed carbon/volatile ratio and heating value, (ASTM). At 1.55 s.g.$_1$ average clean coal ash was 9.85% and average yield was 38.8%. By washing to 1.70 s.g.$_2$ the average clean coal ash was increased to 11.86%; however, the yield improved only to an average of 59.34%. There are two reasons for the poor results:

1. the coal may have a high intrinsic ash content and/or

2. the float/sink analyses may be detrimentally affected by weathered or oxidized coal.

Figures 10 & 11 show the relationship of s.g. and ash, and s.g. and yield, respectively. Note the large amount of scatter about the best fit curve. It must be remembered that these samples are widely spaced and represent more than one seam.

Heating value of the clean coal product is concentrated about a mean of 6,800 cal/g, (dry basis), washed at 1.55 s.g., to an average ash of 9.85%, (Figure 12). When washed at 1.7 s.g.$_2$ to an average 11.86% ash level the heating value is concentrated about a mean of 6,862 cal/g, (Figure 13).

1 1983 and 1985 samples.

2 1985 samples only.

The sulphur content of a clean coal product varies between 0.4% and 0.65% and appears to increase with ash, (Figure 14). This preceived trend is nominal with a correlation coefficient of only 0.18.

To better determine coal rank and washability analysis unweathered samples provided by core drilling are essential.

Sample location points and coal analyses are shown on Plates 9 to 11, "Sample Location and Analysis Plan", for 1983 and 1985.

All samples were analysed by Birtley Coal and Minerals Testing and the results are attached as Appendix B.

MOUNT JACKSON
1985

STATEMENT OF EXPENDITURES

CATEGORY OF WORK	
Geological Mapping	43 465
OTHER EXPENSES	
Accommodation and Food	7 354
Travel - Vehicles	54
Travel - Commerical Aircraft	9 305
Freight	452
Fixed Wing Charters	37 086
Supplies	8 368
Consultants	139
Helicopter	15 403
Fuel	10 467
Rentals	7 725
Anyalsis	1 911
Communications	603
Expediting and Storage	5 168
OFF PROPERTY EXPENSES	
Management, Travel, Drafting, etc.	29 500
	177 000

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FIGURE 4

MT. JACKSON PROJECT

RAW COAL

VOLATILE MATTER vs FIXED CARBON

MM - FREE BASIS

File No BC85-054

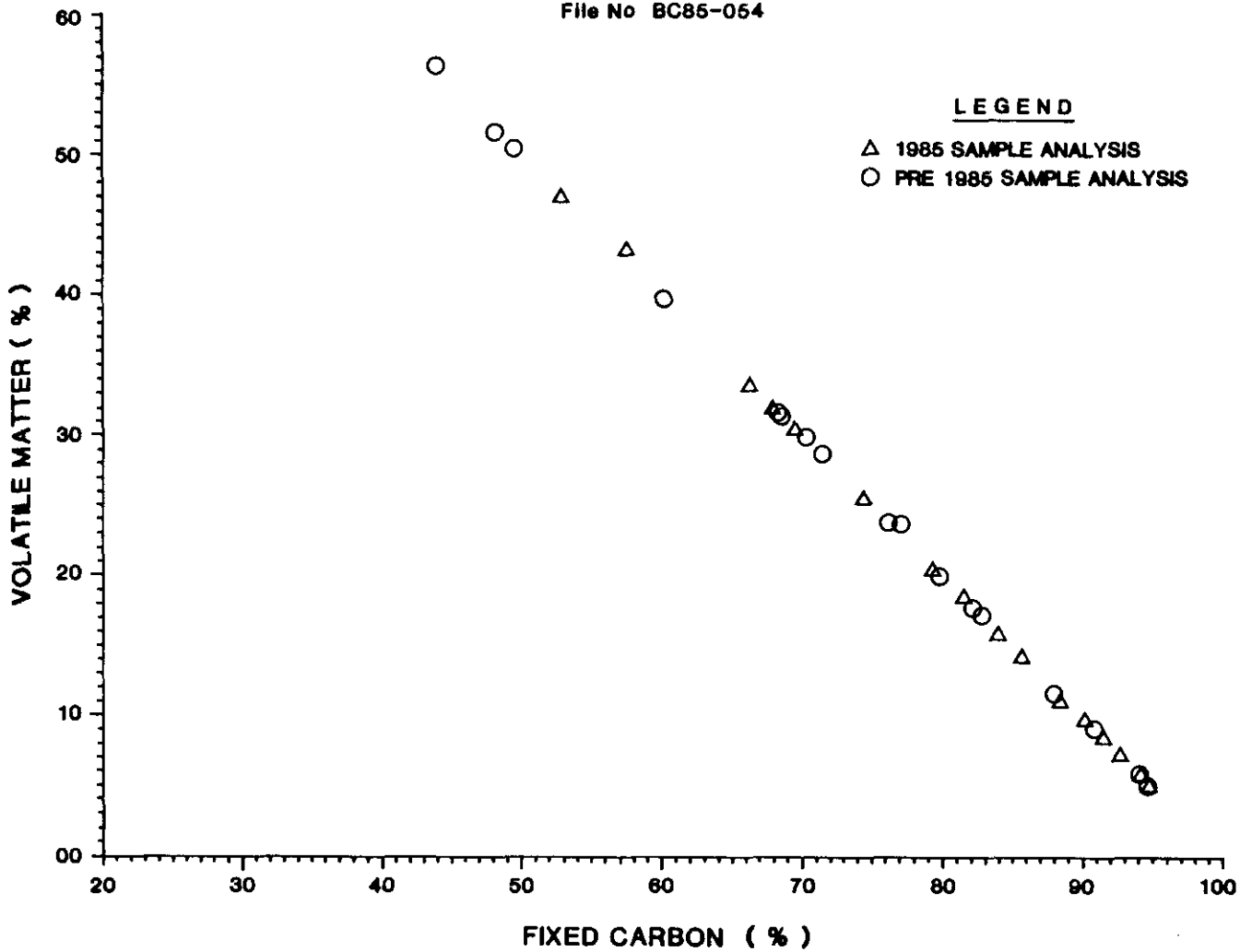


FIGURE 5

MT. JACKSON PROJECT

RAW COAL

ULTIMATE ANALYSIS PLOTS

dmmf BASIS

File No BC85-062

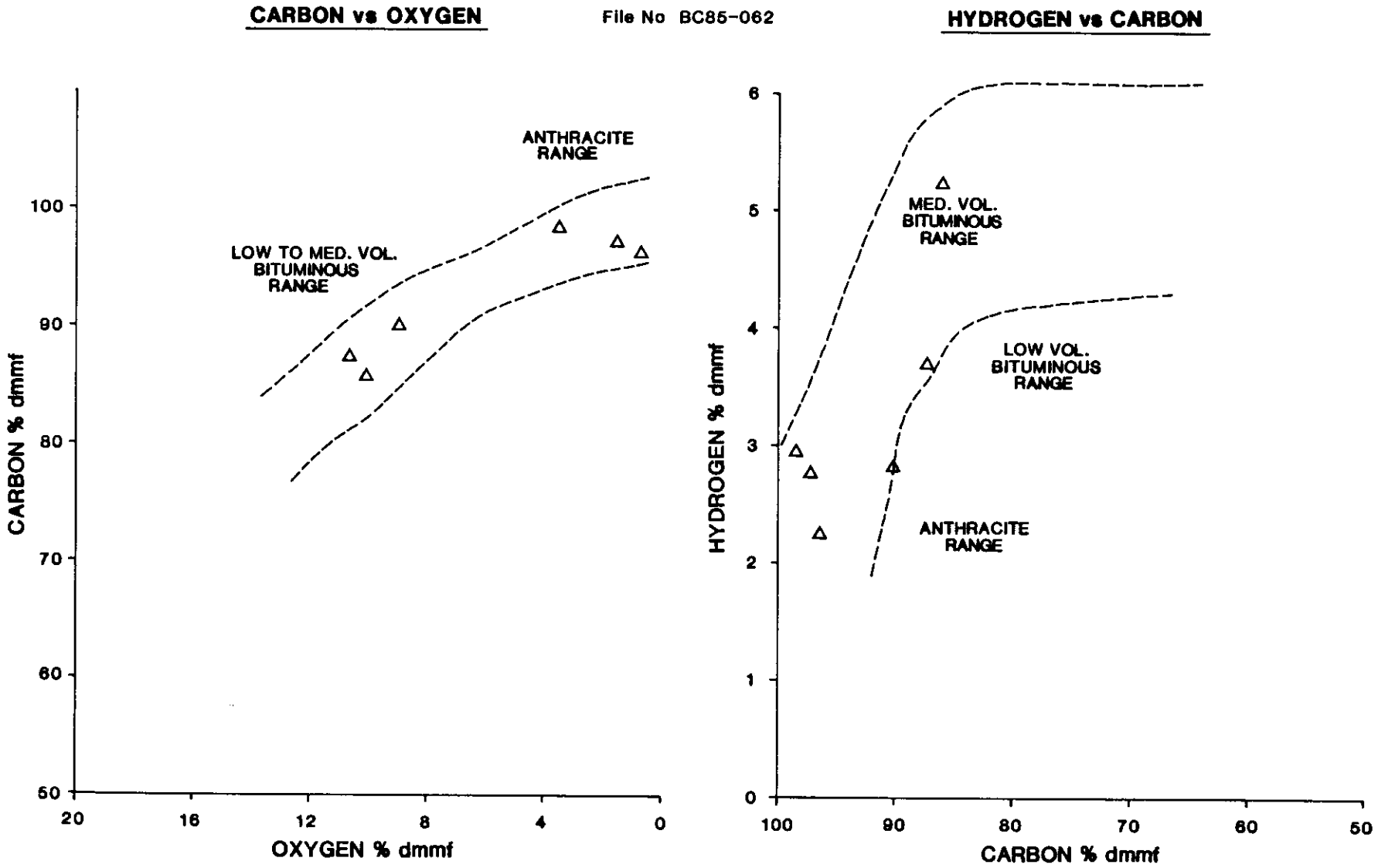


FIGURE 6

MT. JACKSON PROJECT

YIELD (WT. %) vs RAW ASH

@ 1.55 s.g.

File No BC85-052

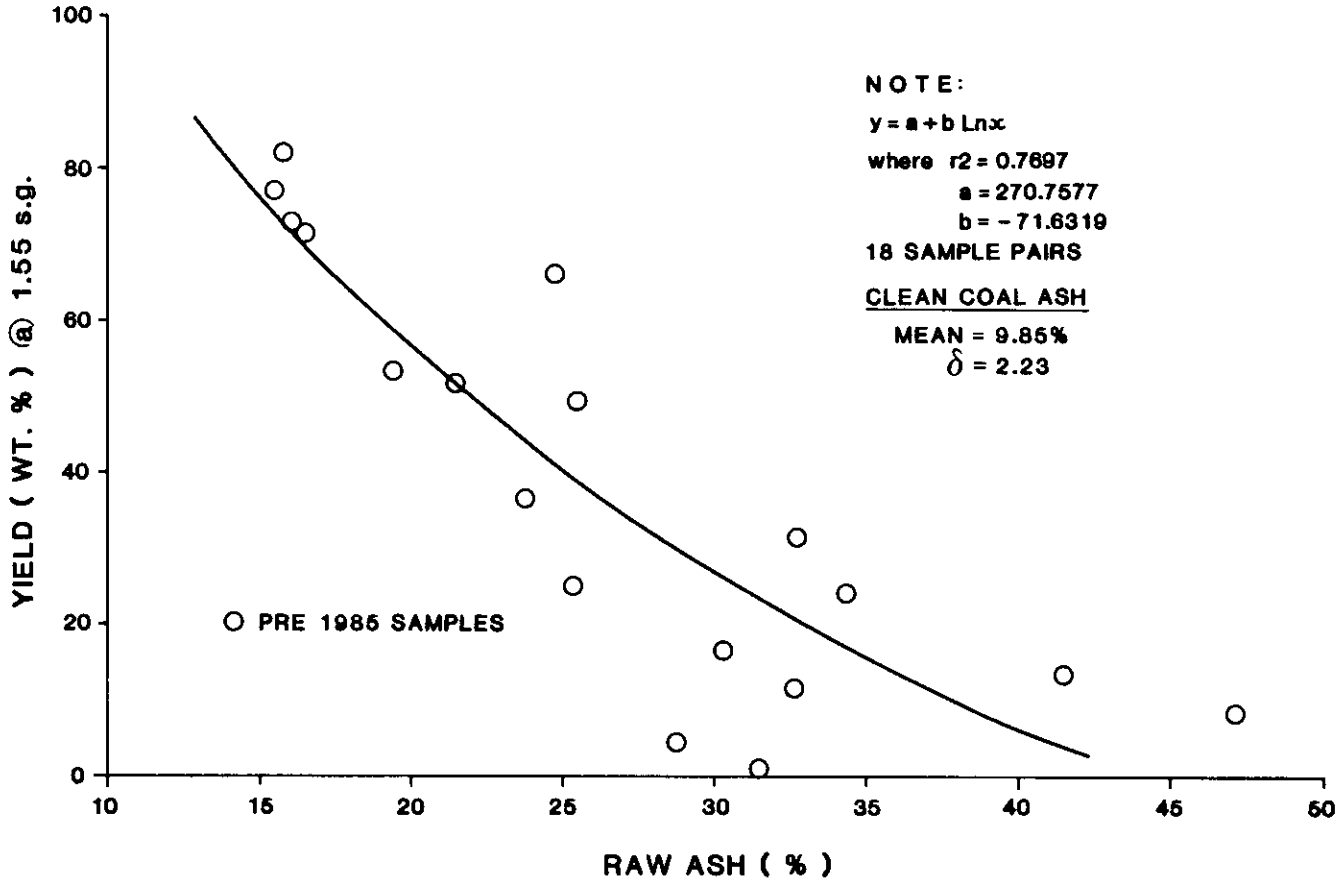


FIGURE 7

MT. JACKSON PROJECT

RAW COAL
HEATING VALUE vs ASH
DRY BASIS

File No BC85-055

1985
y = 7788.4963 - 91.0318x r2 = 0.8207 18 SAMPLE PAIRS

PRE 1985
y = 8213.5984 - 115.0445x r2 = 0.6925 18 SAMPLE PAIRS

COMBINED
y = 7946.3997 - 100.6083x r2 = 0.7114 36 SAMPLE PAIRS

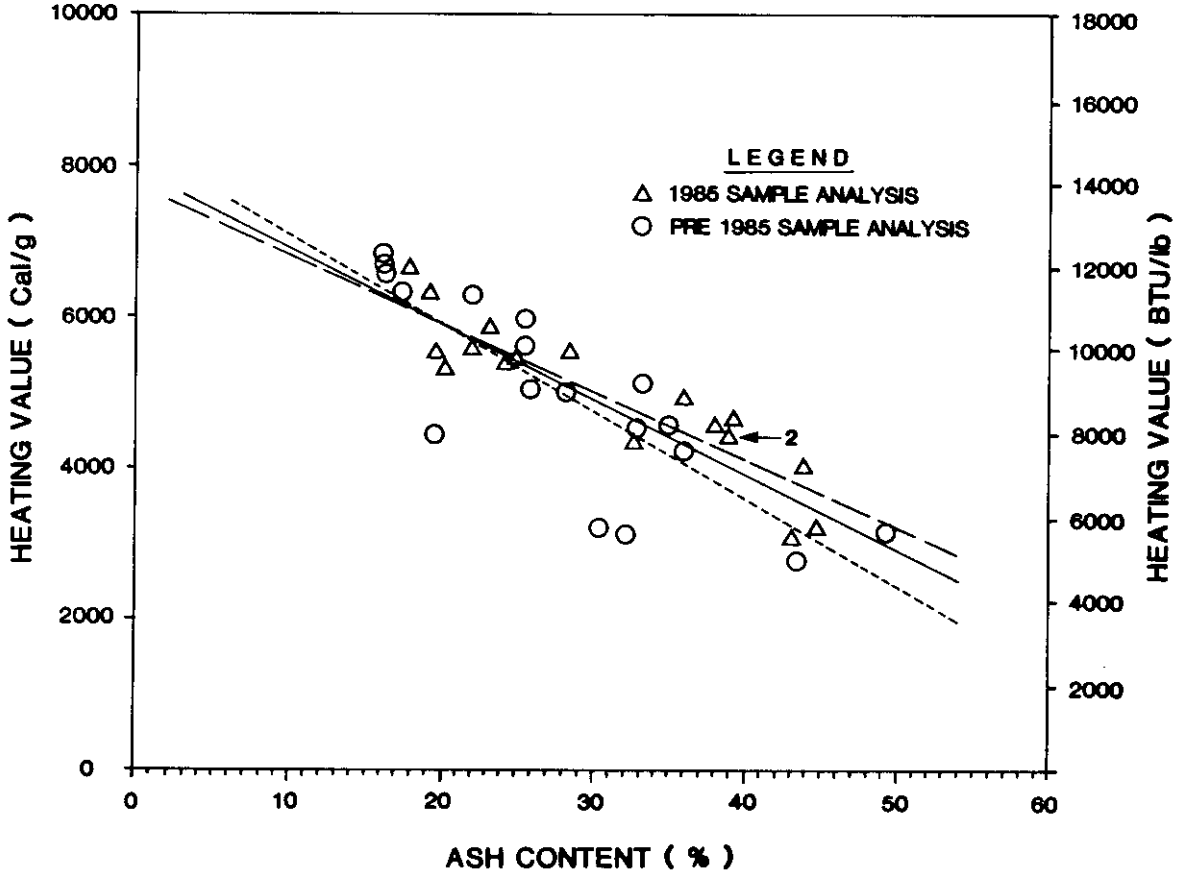


FIGURE 8

MT. JACKSON PROJECT

RAW COAL

SULPHUR vs ASH

DRIED BASIS

File No BC85-053

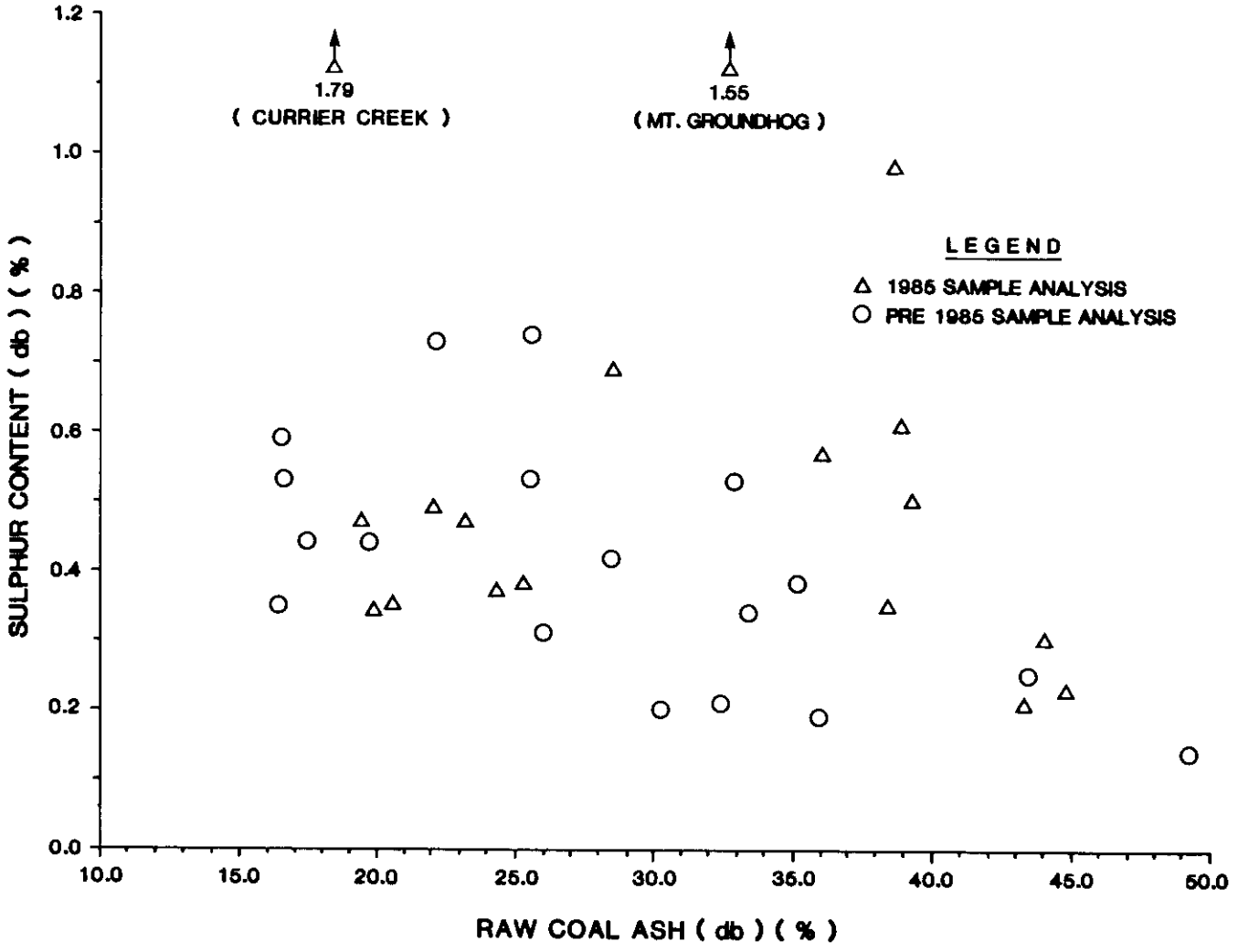


FIGURE 9

MT JACKSON PROJECT

CLEAN COAL @ 1.55 s.g.

VOLATILE MATTER vs FIXED CARBON

MM - FREE BASIS

File No BC85-056

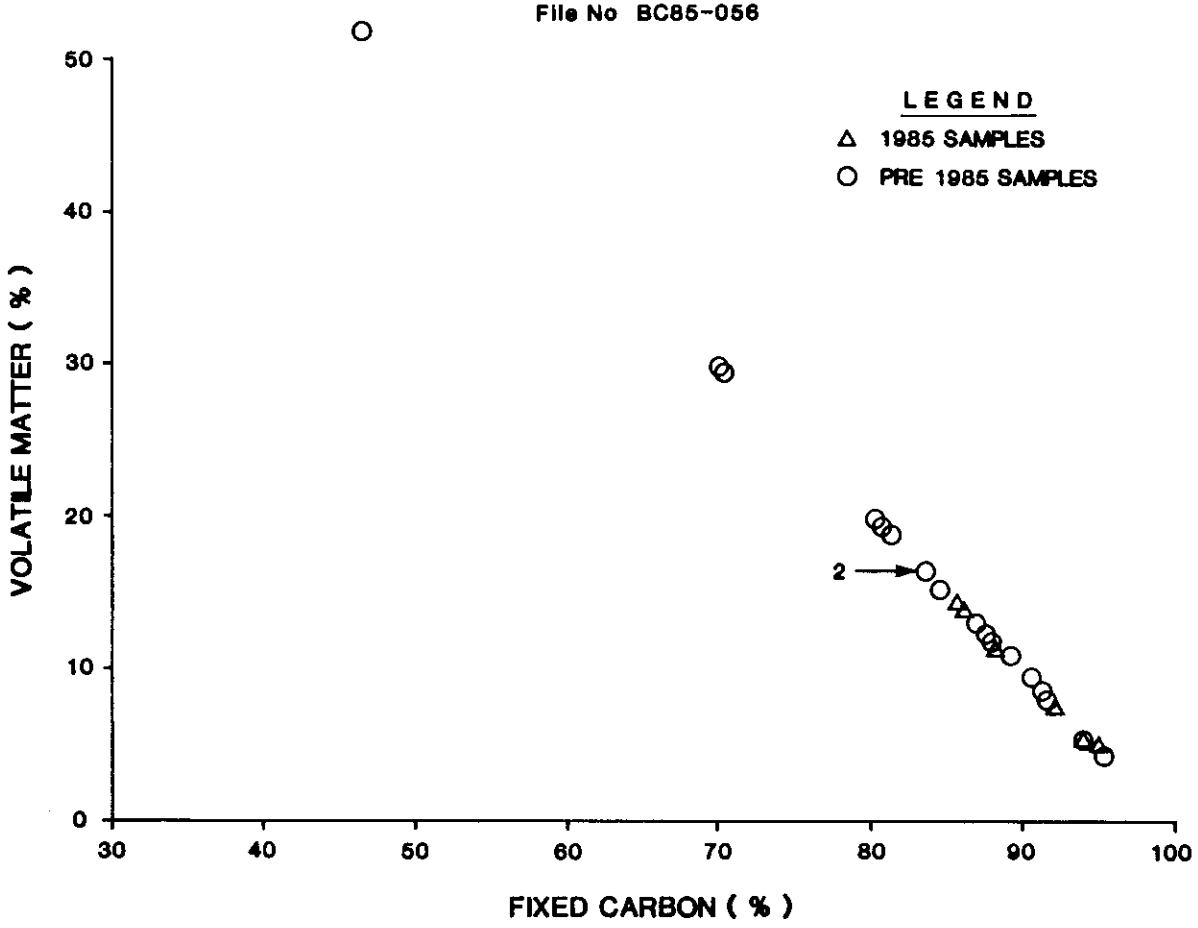


FIGURE 10

MT. JACKSON PROJECT

CLEAN COAL

SPECIFIC GRAVITY vs CUMULATIVE ASH

DRY BASIS

File No BC85-063

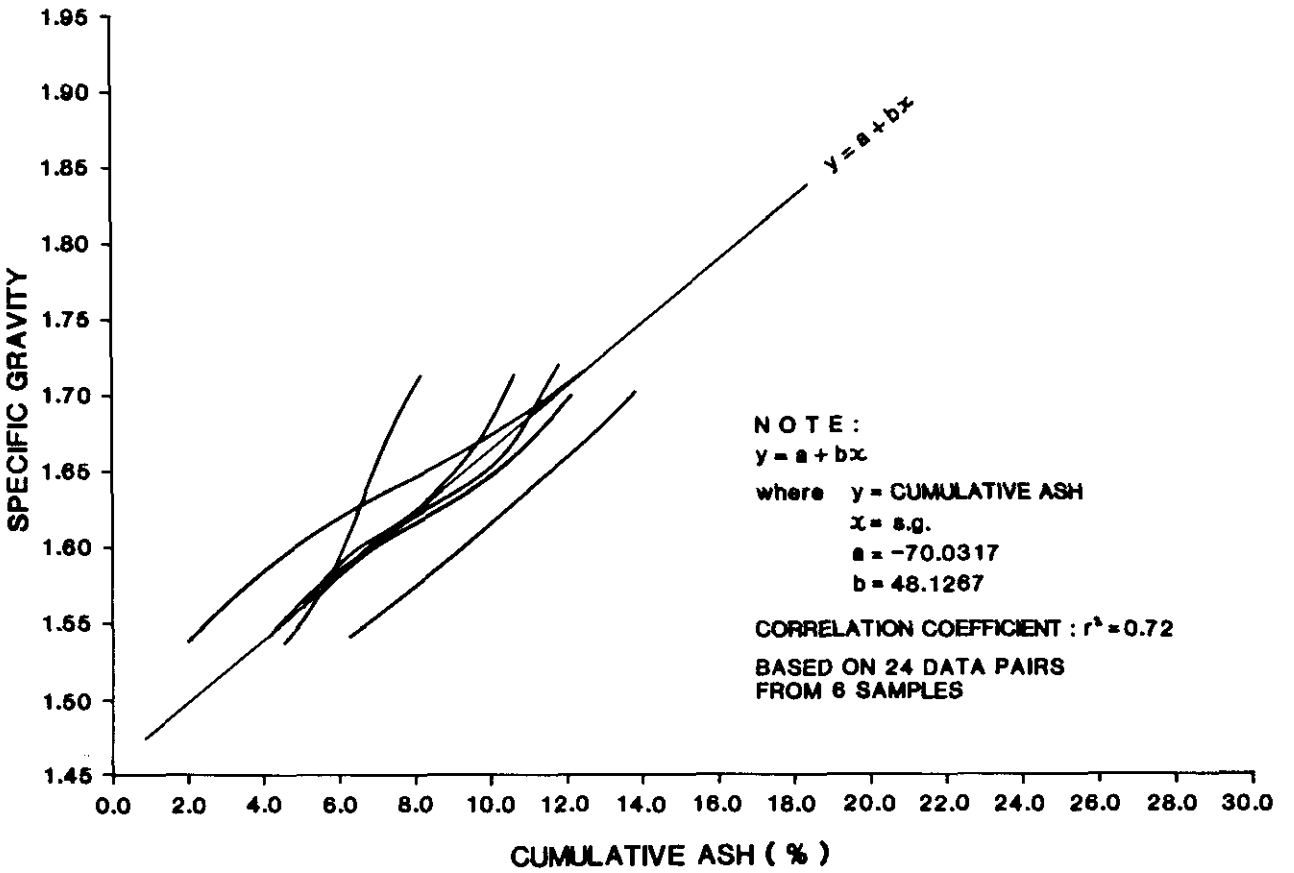


FIGURE 11

MT. JACKSON PROJECT

CLEAN COAL

SPECIFIC GRAVITY vs YIELD (WT %)

File No BC85-064

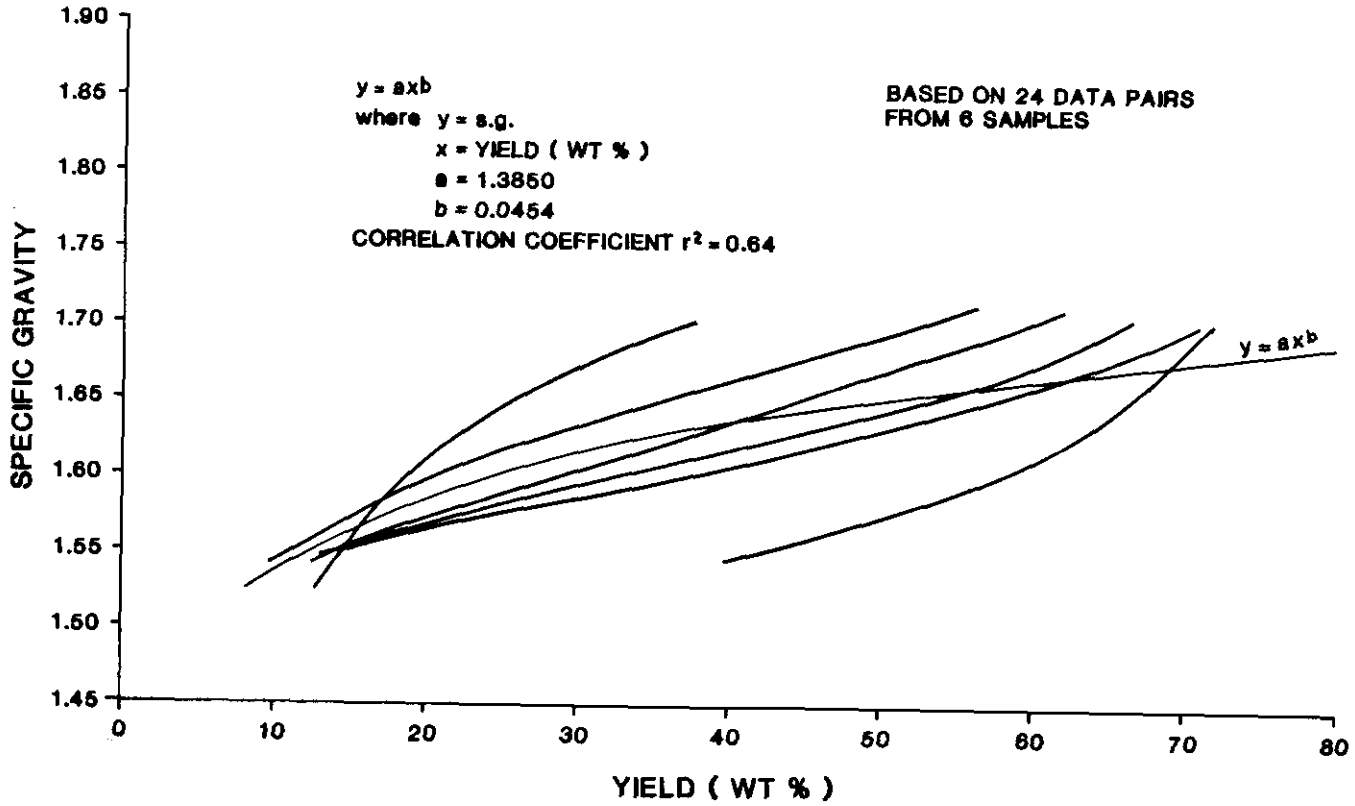


FIGURE 12

MT JACKSON PROJECT

CLEAN COAL @ 1.55 s.g.

HEATING VALUE vs ASH

DRY BASIS

File No BC85-057

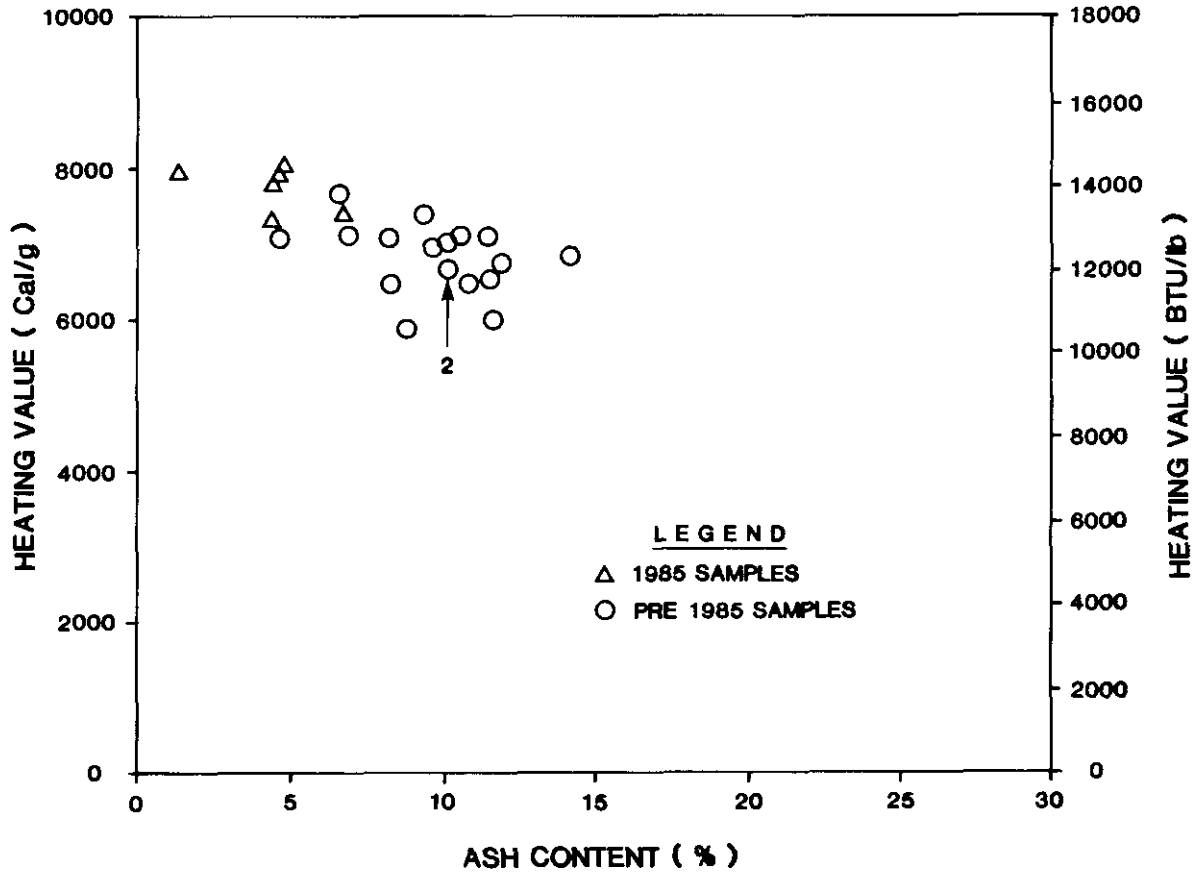


FIGURE 13

MT. JACKSON PROJECT

CLEAN COAL @ 1.70 s.g.

HEATING VALUE vs ASH

DRY BASIS

File No BC85-072

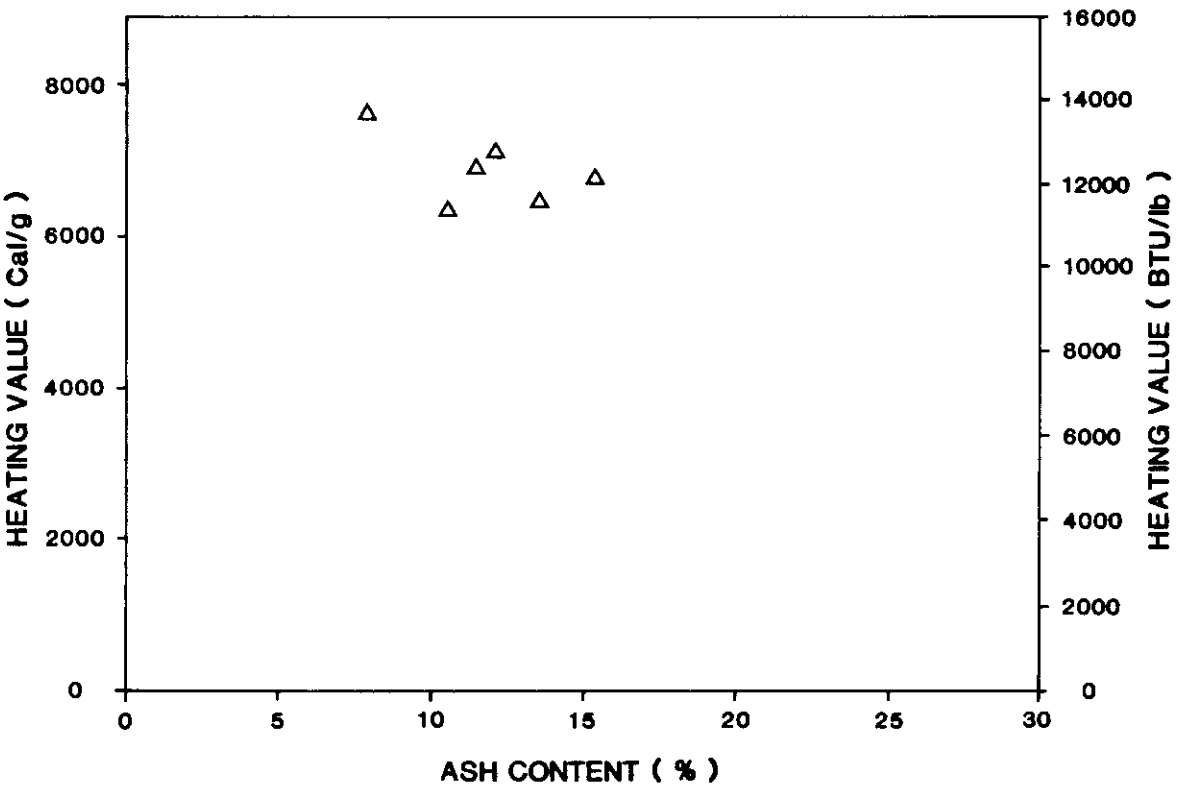


FIGURE 14

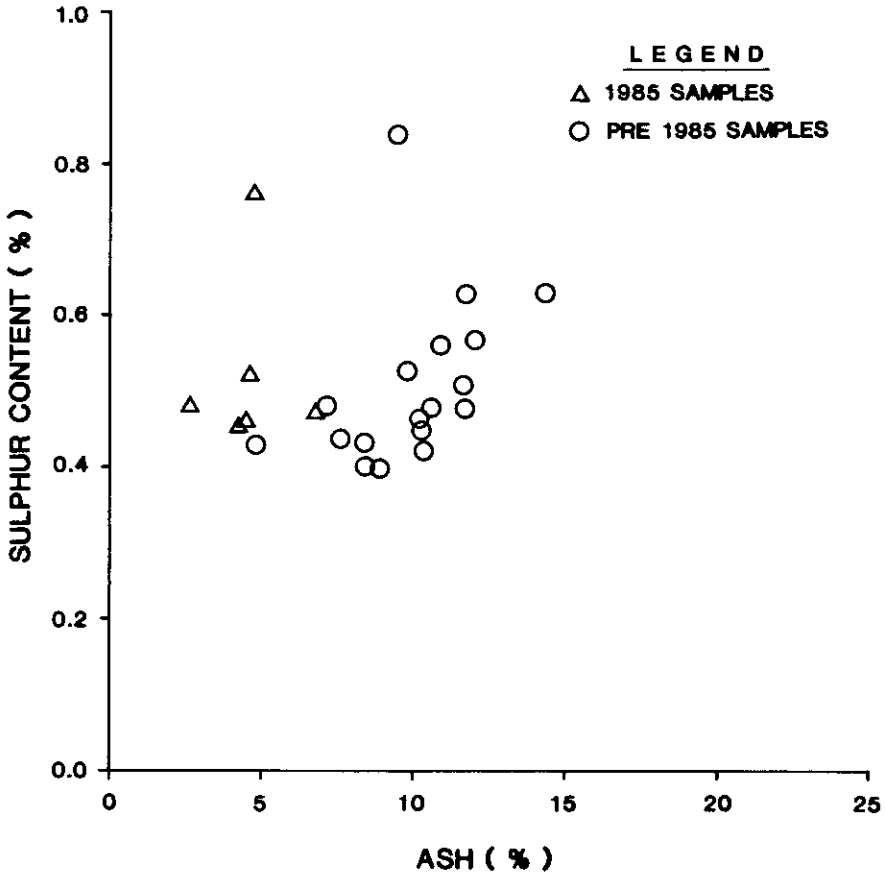
MT JACKSON PROJECT

CLEAN COAL @ 1.55 s.g.

SULPHUR vs ASH

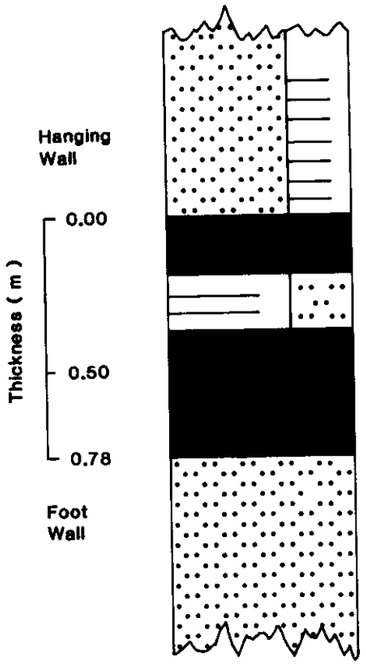
DRY BASIS

File No BC85-058



APPENDIX A

711



DESCRIPTION	Incremental Thickness (m)	Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
				RAW COAL ANALYSIS							
siltst - muddy , soft , rubbly , highly weathered											
Coal - shiny , lntbd , soft , clean , locally stained orange , blocky	0.20	0.20	3239	6.70	2.90	27.70	8.00	61.40	0.67	5369	adb
			B3-2		9.41	25.84	7.46	57.29	0.63	5010	arb
						28.53	8.24	63.23	0.69	5529	db
Mdst - silty , med bd , minor thin (.2mm) microbands of coal	0.20										
Coal - very soft , lntbd shiny layers (.2-.5cm) and dull thin layers (.1-.2cm) - light , clean	0.23	0.38	3238	7.90	2.60	22.70	10.50	64.20	0.46	5691	adb
			B3-1		10.29	20.91	9.67	59.13	0.42	5241	arb
						23.31	10.78	65.91	0.47	5842	db
Coal - w/s - orangy red , blocky , lntbd , light , mod. clean , bedding 275/15	0.15										
siltst - massive , mod. soft , sheared											

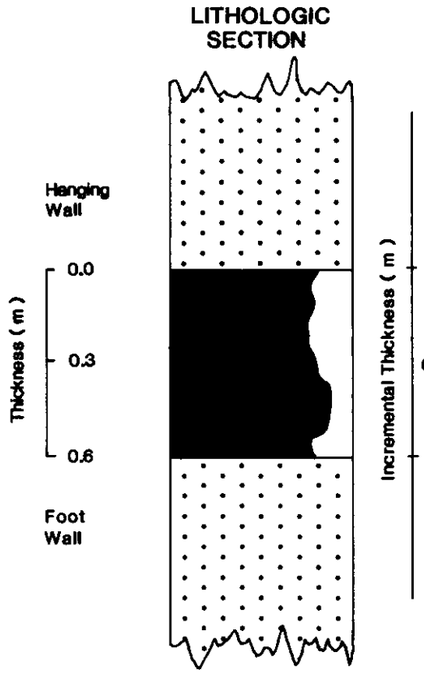
File No BC85-037

SCALE 1 : 20

MT JACKSON PROJECT Trench B3

STRATIGRAPHIC and ANALYTICAL SECTION

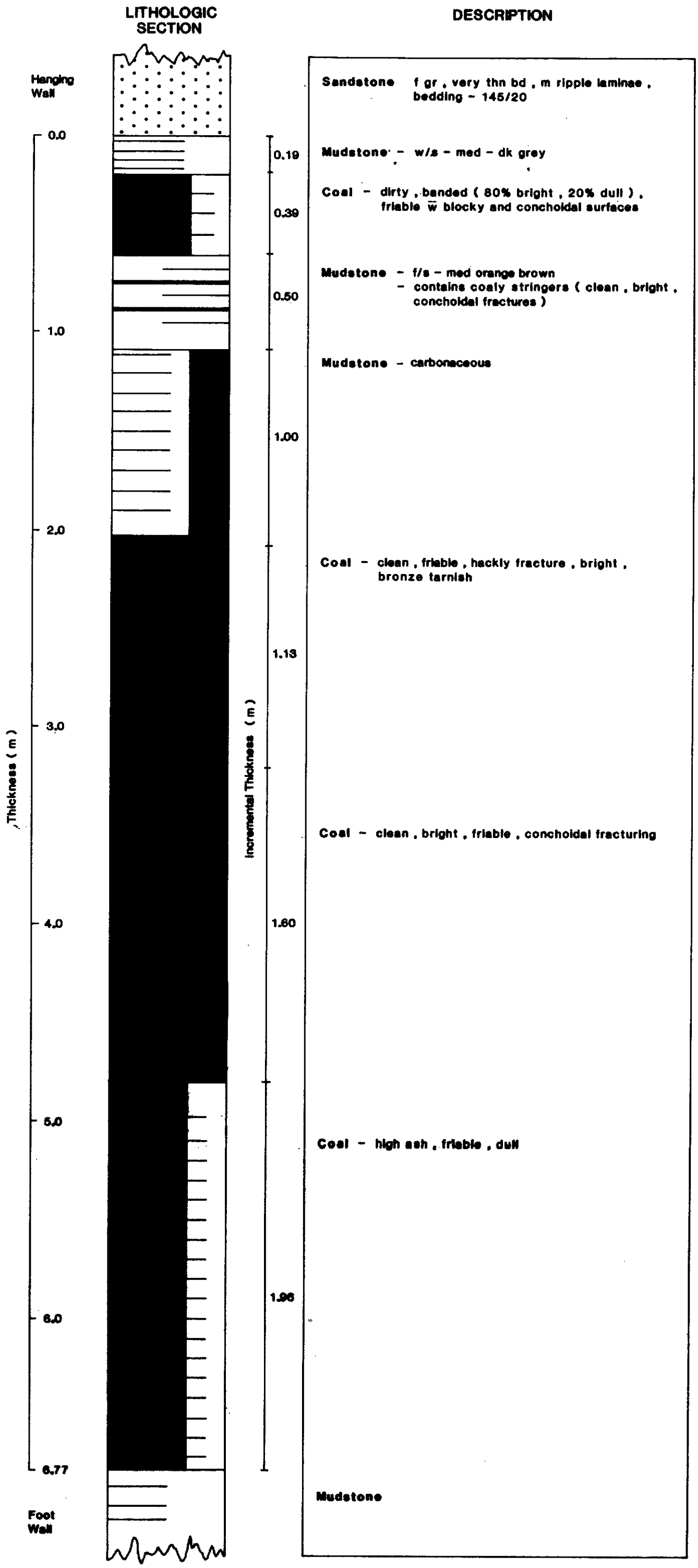
711



DESCRIPTION	Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
Sandstone – poorly sort. , bedding 270/65 – f – c gr , thn – med bd w/s – buff , f/s – med grey										
Coal – poorly exposed , soft , shiny , locally blocky – m orange staining	0.6	3242 K77	7.90	1.20 9.01	19.20 17.68 19.43	8.40 7.74 8.50	71.20 65.58 72.06	0.46 0.42 0.47	6244 5751 6319	adb arb db
Sandstone – poorly sort. , bedding 270/65 f – c gr , thn – med bd w/s – buff , f/s – med grey										

File No BC85-036
SCALE 1 : 20

MT JACKSON PROJECT Trench K77
STRATIGRAPHIC and ANALYTICAL SECTION



File No BC85-028
SCALE 1 : 20

MT JACKSON PROJECT
Trench 85-69
STRATIGRAPHIC SECTION

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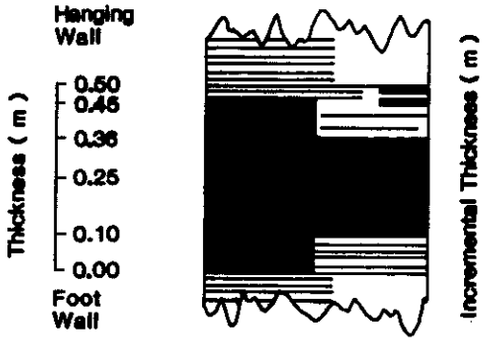
LITHOLOGIC SECTION



DESCRIPTION

Mdst - thinly bedded
Carbonaceous Mdst - thin coaly stringers
Coal-shaly - dirty coal , w/qtz veinlets, lim.stn.on sur.
Coal - clean , bright , blocky frac. , min. qtz veinlets
Coal - thnly banded 40/60 , blocky fracture , intruded by qtz veinlets
Coal-shaly - dirty to high ash , banded 50/50 limonite on weathered surface
Mdst - thinly bedded

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
0.50	3246	6.40	2.10	43.00	5.90	49.00	0.29	3970	adb
			8.37	40.25	5.52	45.86	0.27	3716	arb
				43.92	6.03	50.05	0.30	4066	db

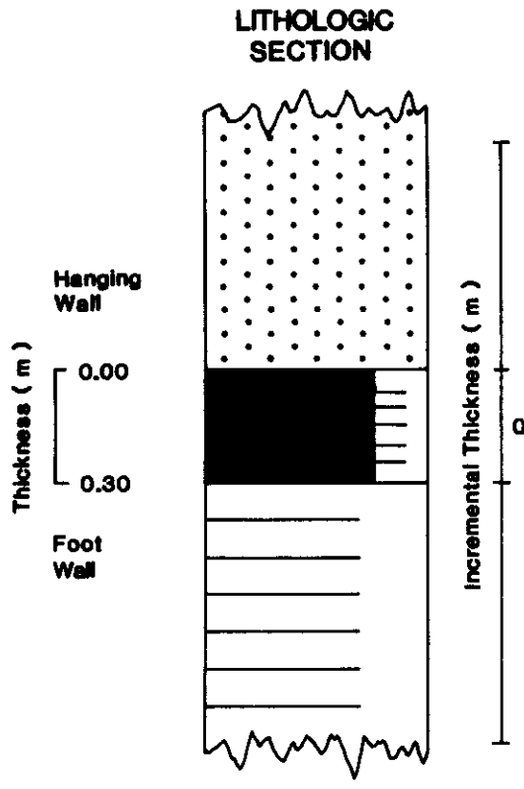
File No BC85-031

SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-21

STRATIGRAPHIC and ANALYTICAL SECTION

711



LITHOLOGIC SECTION

DESCRIPTION

Sandstone – poorly sorted , f – m gr , med bd

Coal – poorly defined , banded , shiny , dirty , heavy

Mudstone – sheared , thn to thk bd
– m ss/mdst/siltst intbd , bedding 80/30

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
0.30	3243	5.10	2.00	35.30	5.60	57.10	0.56	4879	adb
	K79		7.00	33.50	5.31	54.19	0.53	4630	arb
				36.02	5.71	58.27	0.57	4978	db

File No BC85-073

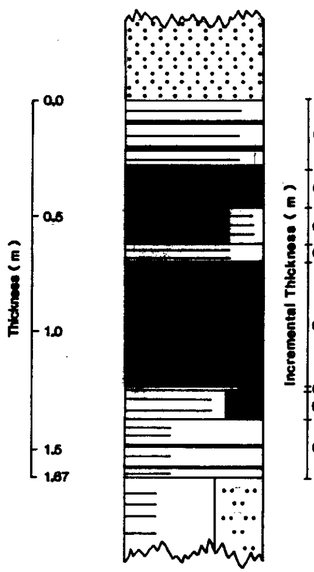
SCALE 1 : 20

MT JACKSON PROJECT Trench K79

STRATIGRAPHIC and ANALYTICAL SECTION

711

LITHOLOGIC SECTION



DESCRIPTION	Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
Sandstone – w/s + fs – light brown , well sort , v.f. laminated , soft										
– overlain by 20cm band of more resistant f. gr. ss.										
Mudstone – min. coaly stringers (bright , blocky , friable) incr. in number towards base.										
– black with m. limonite stained bands										
Coal – clean , bright , with blocky friable fracturing bronze tarnish on surface										
Coal – clean to high ash , banded 20/80 , fracturing in larger blocks , hackly.										
Mudstone – med. – dk. grey										
Coal – clean , blocky fracture w/s – brown metallic lustre , occassional limonitic weathering.	0.93	3247	9.60	3.40	24.40	10.40	61.80	0.37	5306	adb
				12.67	22.06	9.40	55.87	0.33	4797	arb
					25.26	10.77	63.98	0.38	5493	db
Mudstone – dk grey , with coaly whisps										
Coaly Mudstone – dk grey										
Mudstone – light grey – contains coaly stringers.										
Silty Mudstone – w/s + f/s – light grey , thin bd.										

RAW COAL ANALYSIS

CLEAN COAL ANALYSIS (Air Dried Basis)

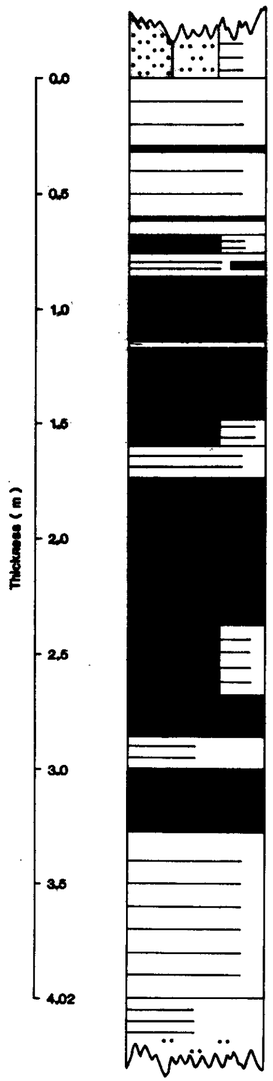
S.G. Fraction	INCREMENTAL WT %	INCREMENTAL RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	CUMULATIVE RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float–1.55	11.10	1.18	2.57	6.53	89.72	0.48	7779	11.10	1.18	2.57	6.53	89.72	0.48	7779
1.55–1.60	8.98	1.18	7.24	8.31	83.27	0.43	7191	19.98	1.18	4.65	7.32	86.85	0.46	7515
1.60–1.65	15.95	1.19	12.96	9.04	76.81	0.43	6650	35.93	1.18	8.34	8.06	82.89	0.45	7132
1.65–1.70	16.78	1.66	17.78	9.39	71.17	0.38	6108	52.71	1.33	11.34	8.50	78.82	0.42	6806
1.70–Sink	47.29	2.49	38.96	10.98	47.57	—	—	100.00	—	24.40	—	—	—	—

File No BC85-033

SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-26

STRATIGRAPHIC and ANALYTICAL SECTION



DESCRIPTION	Incremental Thickness (m)	Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
ss/siltst/mdst - thn. lam.,w/s + f/s - med. grey	0.70										
Mudstone - dk grey , soft , friable , m. coaly stringers											
Coal - high ash , hard , polished conchoidal fracture	0.07										
Mudstone - carb. , black	0.09										
Coal - clean , bright , friable with polished slickensided surfaces	0.30										
Parting - muddy , w/s - orange	0.02										
Coal - clean , friable , polished slickensided surfaces	0.30										
Coal - clean - dirty , banded (30:70) , hard , - w/s - med. orangish - brown	0.13										
Mudstone - dk grey	0.12										
Coal - clean , bright , banded , blocky polished slickensided surfaces hard	0.66	2.56	4706	6.90	6.50 12.96	22.70 21.13 24.28	14.70 13.69 15.72	56.10 52.23 60.00	0.35 0.33 0.37	6045 4697 5396	adb arb db
Coal - dirty , friable	0.30										
Coal - clean , banded (90:10) , hackly , friable , min. conchoidal fracture , bronze tarnish	0.18										
Mdst - f/s - med. grey , w/s - rust stain , hard breaks into large blocks	0.14										
Coal - clean , banded (40:60) , blocky friable	0.26										
Mudstone - f/s - dk grey w/s - rusty orange soft	0.76										
Mudstone - w/s + f/s - light grey , blocky fracture, grades into sandy siltst, bedding - 176/34 w											

CLEAN COAL ANALYSIS (Air Dried Basis)

S.G. Fraction	INCREMENTAL WT %	INCREMENTAL RM %	INCREMENTAL Ash %	INCREMENTAL Vol %	INCREMENTAL F.C. %	INCREMENTAL S %	INCREMENTAL HV Cal/g	CUMULATIVE WT %	CUMULATIVE RM %	CUMULATIVE Ash %	CUMULATIVE Vol %	CUMULATIVE F.C. %	CUMULATIVE S %	CUMULATIVE HV Cal/g
Float-1.55	14.44	1.40	6.72	10.26	81.62	0.47	7206	14.44	1.40	6.72	10.26	81.62	0.47	7206
1.55-1.60	14.17	1.48	11.68	9.58	77.26	0.55	6707	28.61	1.44	9.18	9.92	79.46	0.51	6956
1.60-1.65	15.40	1.87	15.53	13.83	68.77	0.34	6060	44.01	1.59	11.40	11.29	75.72	0.45	6651
1.65-1.70	14.87	2.64	19.35	16.56	61.45	0.32	5419	58.88	1.86	13.41	12.62	72.12	0.42	6340
1.70-Sink	41.12	3.27	37.74	15.67	43.32	—	—	100.00	—	23.41	—	—	—	—

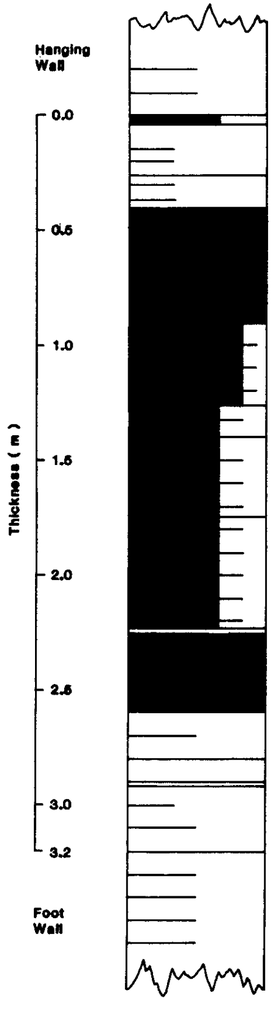
711

File No BC85-032

SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-74

STRATIGRAPHIC and ANALYTICAL SECTION



Incremental Thickness (m)	DESCRIPTION
	Mudstone – 0.6m exposed bedding 321/25
0.03	**Coal Parting** – dirty , banded , dull , w/s – brown
0.38	**Mudstone** – light grey , trace coaly wisps , soft
0.50	**Coal** – clean , bright , blocky fracturing , hard w/s – brown tarnish
0.34	**Coal** – clean – dirty , banded (70/30) friable with blocky fracturing
0.14	**Coal** – dirty
0.36	**Coal** – high ash , sheared , friable , trace clean partings
0.49	**Coal** – dirty , high ash , highly sheared , v smooth polished slickensided surface
0.02	**Muddy Parting** – dark grey
0.35	**Coal** – banded (60/40) , clean , blocky conchoidal fracturing , friable , moderate shearing
0.60	**Mudstone** – coaly stringers
	Mudstone – med grey – sheared with polished surfaces bedding 324/40

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	CV Cal/g	Basis
2.19	844707	8.90	2.50	22.90	5.30	69.30	0.38	5955	adb
			11.16	20.86	4.83	63.13	0.35	5425	arb
				23.49	5.44	71.08	0.39	6108	db

CLEAN COAL ANALYSIS (Air Dried Basis)

S.G. Fraction	INCREMENTAL WT %	INCREMENTAL RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	CUMULATIVE RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float–1.55	14.28	1.62	4.62	4.00	89.76	0.45	7737	14.28	1.62	4.62	4.00	89.76	0.45	7737
1.55–1.60	18.46	1.34	5.69	4.80	85.17	0.43	7297	32.74	1.46	6.91	4.45	87.17	0.44	7489
1.60–1.65	19.95	1.22	15.08	4.70	78.05	0.41	6696	52.69	1.37	9.99	4.64	84.10	0.43	7189
1.65–1.70	12.84	1.50	20.01	5.20	73.29	0.37	6206	65.53	1.40	11.95	4.87	81.98	0.42	6997
1.70–Sink	34.47	1.76	44.84	5.94	47.46	–	–	100.00	–	23.29	–	–	–	–

711

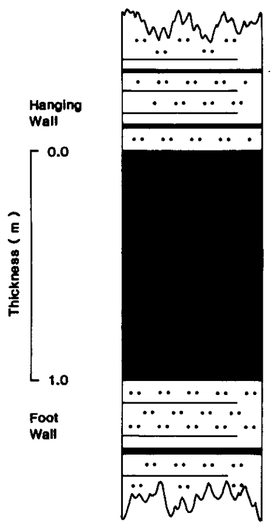
File No BC85-030

SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-91

STRATIGRAPHIC and ANALYTICAL SECTION

711



LITHOLOGIC SECTION

DESCRIPTION

siltst/mdst – thnly intbd , min. carb. bands slightly meta.

Coal – thnly bd , soft , shiny , black
- homogeneous , concholdal fracture
- contains small calcite vein (1/2 cm thk)
- bedding 140/20

siltst/mdst – thnly intbd , min. carb. bands slightly meta.

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
1.0	3244	9.30	0.70	18.10	6.00	75.20	1.78	6595	adb
	K83		9.93	16.42	5.44	68.21	1.61	5981	arb
				18.23	6.04	75.73	1.79	6641	db

CLEAN COAL ANALYSIS (Air Dried Basis)

S.G. Fraction	INCREMENTAL WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float-1.55	41.13	0.56	4.83	12.99	81.62	0.76	7865	41.13	0.56	4.83	12.99	81.62	0.76	7865
1.55-1.60	16.92	0.54	9.16	3.71	86.59	0.73	7452	58.05	0.55	6.09	10.29	83.07	0.75	7745
1.60-1.65	7.70	0.70	13.41	4.37	81.52	1.08	6996	65.75	0.57	6.95	9.59	82.89	0.79	7657
1.65-1.70	5.91	1.10	17.77	5.03	76.10	1.00	6541	71.66	0.61	7.84	9.22	82.33	0.81	7565
1.70-Sink	28.34	0.63	44.87	12.00	42.50	—	—	100.00	—	18.34	—	—	—	—

File No. BC85-034

SCALE 1 : 20

MT JACKSON PROJECT Trench K83

STRATIGRAPHIC and ANALYTICAL SECTION

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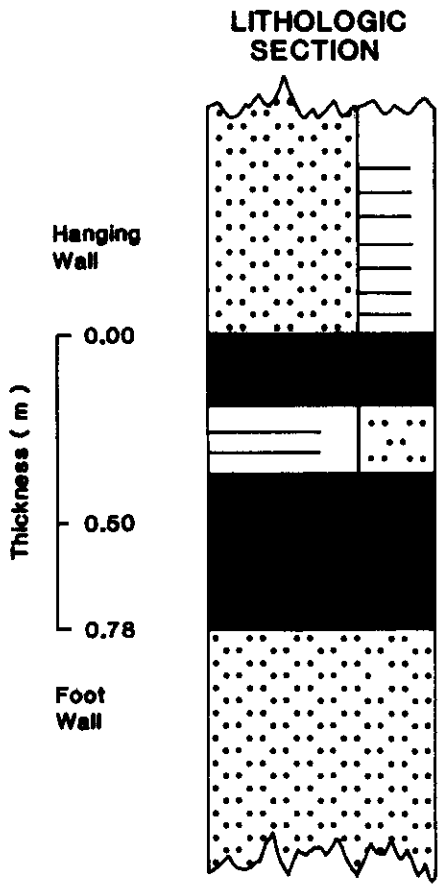
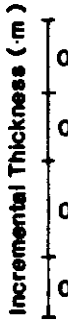


LITHOLOGIC SECTION



DESCRIPTION	Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
siltst - muddy , soft , rubbly , highly weathered										
Coal - shiny , intbd , soft , clean , locally stained orange , blocky	0.20	3239	6.70	2.90	27.70	8.00	61.40	0.67	5369	adb
		B3-2		9.41	25.84	7.46	57.29	0.63	5010	arb
					28.53	8.24	63.23	0.69	5529	db
Mdst - silty , med bd , minor thin (.2mm) microbands of coal										
Coal - very soft , intbd shiny layers (.2-.5cm) and dull thin layers (.1-.2cm) - light , clean	0.38	3238	7.90	2.60	22.70	10.50	64.20	0.46	5691	adb
		B3-1		10.29	20.91	9.67	59.13	0.42	5241	arb
					23.31	10.78	65.91	0.47	5842	db
Coal - w/s - orangy red , blocky , intbd , light , mod. clean , bedding 275/15										
siltst - massive , mod. soft , sheared										

RAW COAL ANALYSIS

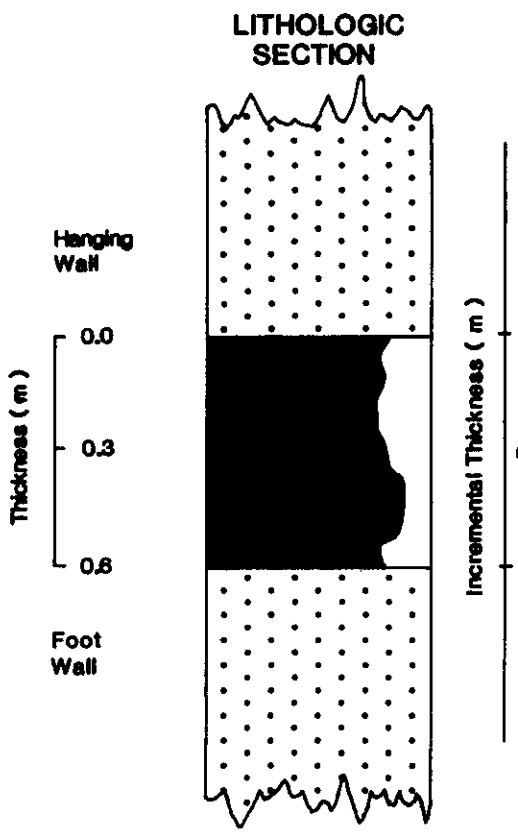
File No BC85-037

SCALE 1 : 20

MT JACKSON PROJECT Trench B3

STRATIGRAPHIC and ANALYTICAL SECTION

711



DESCRIPTION

Sandstone – poorly sort. , bedding 270/65
– f – c gr , thn – med bd
w/s – buff , f/s – med grey

Coal – poorly exposed , soft , shiny , locally blocky
– m orange staining

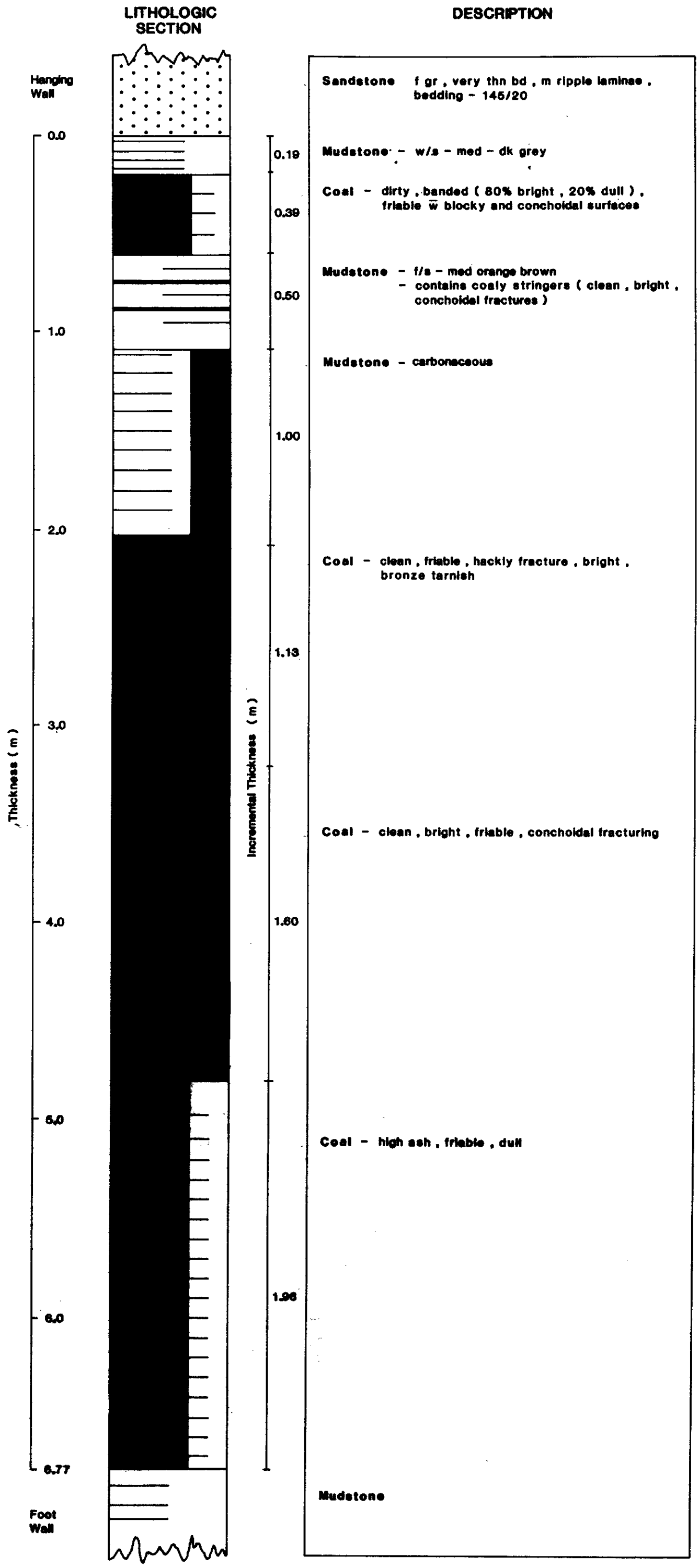
Sandstone – poorly sort. , bedding 270/65
f – c gr , thn – med bd
w/s – buff , f/s – med grey

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
0.6	3242	7.90	1.20	19.20	8.40	71.20	0.46	6244	adb
	K77		9.01	17.68	7.74	66.58	0.42	5751	arb
				19.43	8.50	72.06	0.47	6319	db

File No BC85-036
SCALE 1 : 20

MT JACKSON PROJECT Trench K77
STRATIGRAPHIC and ANALYTICAL SECTION



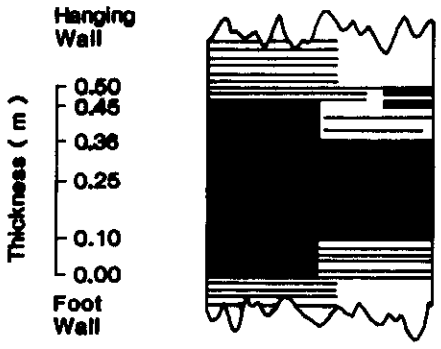
File No BC85-028
SCALE 1 : 20

MT JACKSON PROJECT
Trench 85-69
STRATIGRAPHIC SECTION

117

711

LITHOLOGIC SECTION



DESCRIPTION

Mdst - thinly bedded
Carbonaceous Mdst - thin coaly stringers
Coal-shaly - dirty coal , w/qtz veinlets, lim.stn.on sur.
Coal - clean , bright , blocky frac. , min. qtz veinlets
Coal - thnly banded 40/60 , blocky fracture , intruded by qtz veinlets
Coal-shaly - dirty to high ash , banded 50/50 limonite on weathered surface
Mdst - thinly bedded

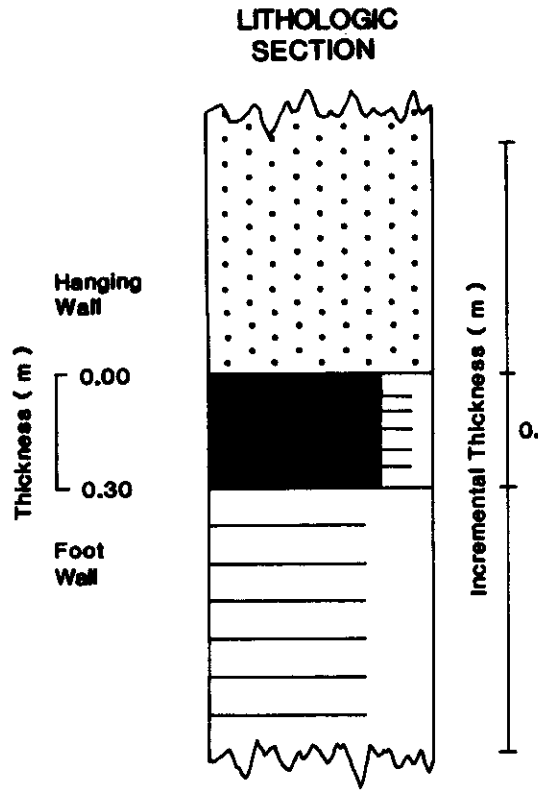
RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
0.50	3246	6.40	2.10	43.00	5.90	49.00	0.29	3970	adb
			8.37	40.26	5.52	45.86	0.27	3716	arb
				43.92	6.03	50.05	0.30	4056	db

File No BC85-031
SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-21
STRATIGRAPHIC and ANALYTICAL SECTION

711



DESCRIPTION

Sandstone – poorly sorted , f – m gr , med bd

Coal – poorly defined , banded , shiny , dirty , heavy

Mudstone – sheared , thn to thk bd
– m ss/mdst/siltst intbd , bedding 80/30

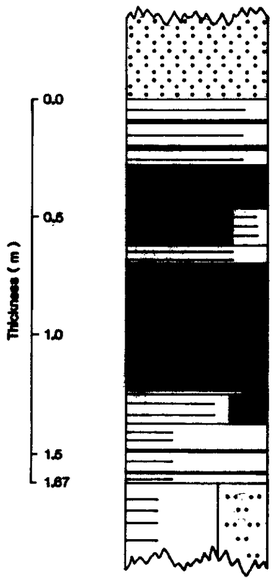
RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
0.30	3243	5.10	2.00	35.30	5.60	57.10	0.56	4879	adb
	K79		7.00	33.50	5.31	54.19	0.53	4630	arb
				36.02	5.71	58.27	0.57	4978	db

File No BC85-073
SCALE 1 : 20

MT JACKSON PROJECT Trench K79
STRATIGRAPHIC and ANALYTICAL SECTION

LITHOLOGIC SECTION



DESCRIPTION

Sandstone – w/s + fs – light brown , well sort , v.f. laminated , soft
– overlain by 20cm band of more resistant f. gr. ss.

Mudstone – min. coaly stringers (bright , blocky , friable) incr. in number towards base.
– black with m. limonite stained bands

Coal – clean , bright , with blocky friable fracturing bronze tarnish on surface

Coal – clean to high ash , banded 20/80 , fracturing in larger blocks , hackly.

Mudstone – med. – dk. grey

Coal – clean , blocky fracture w/s – brown metallic lustre , occassional limonitic weathering.

Mudstone – dk grey , with coaly whisps

Coaly Mudstone – dk grey

Mudstone – light grey
– contains coaly stringers.

Silty Mudstone – w/s + f/s – light grey , thin bd.

RAW COAL ANALYSIS

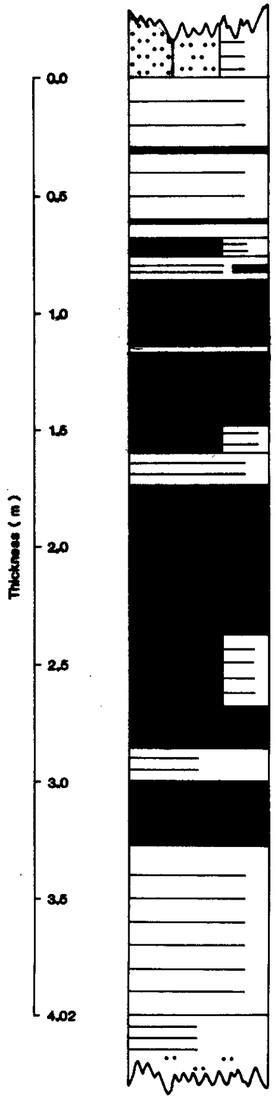
Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
0.93	3247	9.60	3.40	24.40	10.40	61.80	0.37	5306	adb
			12.67	22.06	9.40	55.87	0.33	4797	arb
				25.26	10.77	63.98	0.38	5493	db

CLEAN COAL ANALYSIS (Air Dried Basis)

S.G. Fraction	INCREMENTAL WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float-1.55	11.10	1.18	2.57	6.53	89.72	0.48	7779	11.10	1.18	2.57	6.53	89.72	0.48	7779
1.55-1.60	8.98	1.18	7.24	8.31	83.27	0.43	7191	19.98	1.18	4.65	7.32	86.85	0.46	7518
1.60-1.65	15.95	1.19	12.96	9.04	76.81	0.43	6650	35.93	1.18	8.34	8.08	82.39	0.45	7132
1.65-1.70	16.78	1.66	17.76	9.39	71.17	0.38	6108	52.71	1.33	11.34	8.50	78.82	0.42	6806
1.70-Sink	47.29	2.49	38.96	10.98	47.57	—	—	100.00	—	24.40	—	—	—	—

File No BC85-033
SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-26
STRATIGRAPHIC and ANALYTICAL SECTION



Thickness (m)	Incremental Thickness (m)	DESCRIPTION
		ss/sltst/mdst – thn. lam.,w/s + f/s – med. grey
	0.70	Mudstone – dk grey , soft , friable , m. coaly stringers
	0.07	Coal – high ash , hard , polished conchoidal fracture
	0.09	Mudstone – carb. , black
	0.30	Coal – clean , bright , friable with polished slickensided surfaces
	0.02	Parting – muddy , w/s – orange
	0.30	Coal – clean , friable , polished slickensided surfaces
	0.13	Coal – clean – dirty , banded (30:70) , hard , – w/s – med. orangish – brown
	0.12	Mudstone – dk grey
	0.65	Coal – clean , bright , banded , blocky polished slickensided surfaces hard
	0.30	Coal – dirty , friable
	0.18	Coal – clean , banded (90:10) , hackly , friable , min. conchoidal fracture , bronze tarnish
	0.14	Mdst – f/s – med. grey , w/s – rust stain , hard breaks into large blocks
	0.26	Coal – clean , banded (40:60) , blocky friable
	0.76	Mudstone – f/s – dk grey w/s – rusty orange soft
4.02		Mudstone – w/s + f/s – light grey , blocky fracture, grades into sandy sltst, bedding – 176/34 w

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
2.56	4706	6.90	6.50	22.70	14.70	56.10	0.35	5045	adb
			12.95	21.13	13.69	52.23	0.33	4697	arb
				24.28	15.72	60.00	0.37	5396	db

CLEAN COAL ANALYSIS (Air Dried Basis)

S.G. Fraction	INCREMENTAL WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float–1.55	14.44	1.40	6.72	10.26	81.62	0.47	7206	14.44	1.40	6.72	10.26	81.62	0.47	7206
1.55–1.60	14.17	1.48	11.68	9.58	77.26	0.55	6707	28.61	1.44	9.18	9.92	79.46	0.51	6959
1.60–1.65	15.40	1.87	15.53	13.83	68.77	0.34	6060	44.01	1.59	11.40	11.29	75.72	0.45	6651
1.65–1.70	14.87	2.64	19.35	16.56	61.45	0.32	5419	58.88	1.86	13.41	12.62	72.12	0.42	6340
1.70–Sink	41.12	3.27	37.74	15.67	43.32	—	—	100.00	—	23.41	—	—	—	—

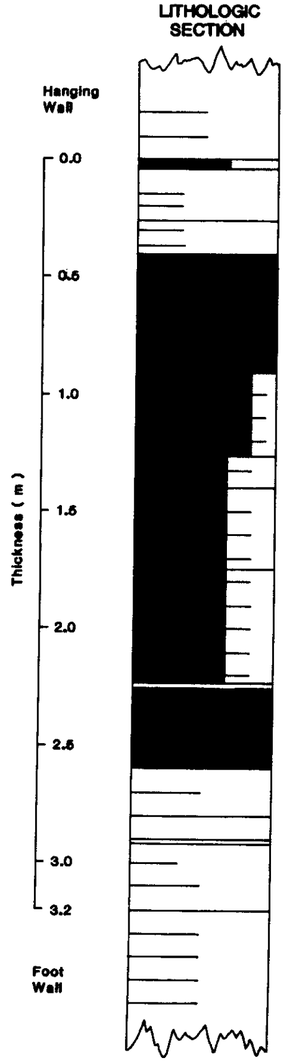
711

File No BC85-032

SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-74

STRATIGRAPHIC and ANALYTICAL SECTION



Incremental Thickness (m)	DESCRIPTION
	Mudstone – 0.6m exposed bedding 321/25
0.03	**Coal Parting** – dirty , banded , dull , w/s – brown
0.38	**Mudstone** – light grey , trace coaly wisps , soft
0.50	**Coal** – clean , bright , blocky fracturing , hard w/s – brown tarnish
0.34	**Coal** – clean – dirty , banded (70/30) friable with blocky fracturing
0.14	**Coal** – dirty
0.35	**Coal** – high ash , sheared , friable , trace clean partings
0.49	**Coal** – dirty , high ash , highly sheared , v smooth polished slickensided surface
0.02	**Muddy Parting** – dark grey
0.35	**Coal** – banded (60/40) , clean , blocky conchoidal fracturing , friable , moderate shearing
0.60	**Mudstone** – coaly stringers
	Mudstone – med grey – sheared with polished surfaces bedding 324/40

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	CV Cal/g	Basis
2.19	844707	8.90	2.50	22.90	5.30	69.30	0.38	5955	adb
			11.16	20.86	4.83	63.13	0.35	5425	arb
				23.49	5.44	71.08	0.39	6108	db

CLEAN COAL ANALYSIS (Air Dried Basis)

S.G. Fraction	INCREMENTAL WT %	INCREMENTAL RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	CUMULATIVE RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float–1.55	14.28	1.62	4.62	4.00	89.76	0.45	7737	14.28	1.62	4.62	4.00	89.76	0.45	7737
1.55–1.60	18.46	1.34	8.69	4.80	86.17	0.43	7297	32.74	1.46	6.91	4.45	87.17	0.44	7489
1.60–1.65	19.95	1.22	15.03	4.70	79.05	0.41	6696	52.69	1.37	9.99	4.64	84.10	0.43	7189
1.65–1.70	12.84	1.50	20.01	5.20	73.29	0.37	6206	65.53	1.40	11.95	4.87	81.98	0.42	6997
1.70–Sink	34.47	1.76	44.84	5.94	47.46	–	–	100.00	–	23.29	–	–	–	–

711

File No BC85-030

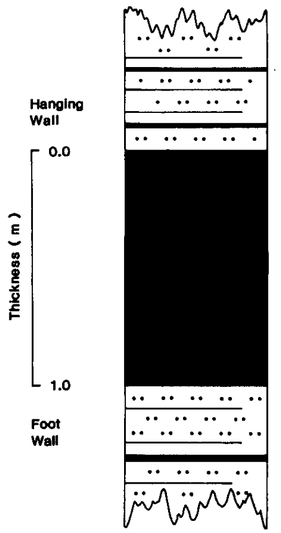
SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-91

STRATIGRAPHIC and ANALYTICAL SECTION

711

LITHOLOGIC SECTION



DESCRIPTION

siltst/mdst – thnly intbd , min. carb. bands slightly meta.

Coal – thnly bd , soft , shiny , black
- homogeneous , conchoidal fracture
- contains small calcite vein (1/2 cm thk)
- bedding 140/20

siltst/mdst – thnly intbd , min. carb. bands slightly meta.

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist %	Ash %	Vol. %	F.C. %	S %	HV Cal/g	Basis
1.0	3244	9.30	0.70	18.10	6.00	75.20	1.78	6595	adb
	K83		9.93	16.42	5.44	68.21	1.61	5981	arb
				18.23	6.04	75.73	1.79	6641	db

CLEAN COAL ANALYSIS (Air Dried Basis)

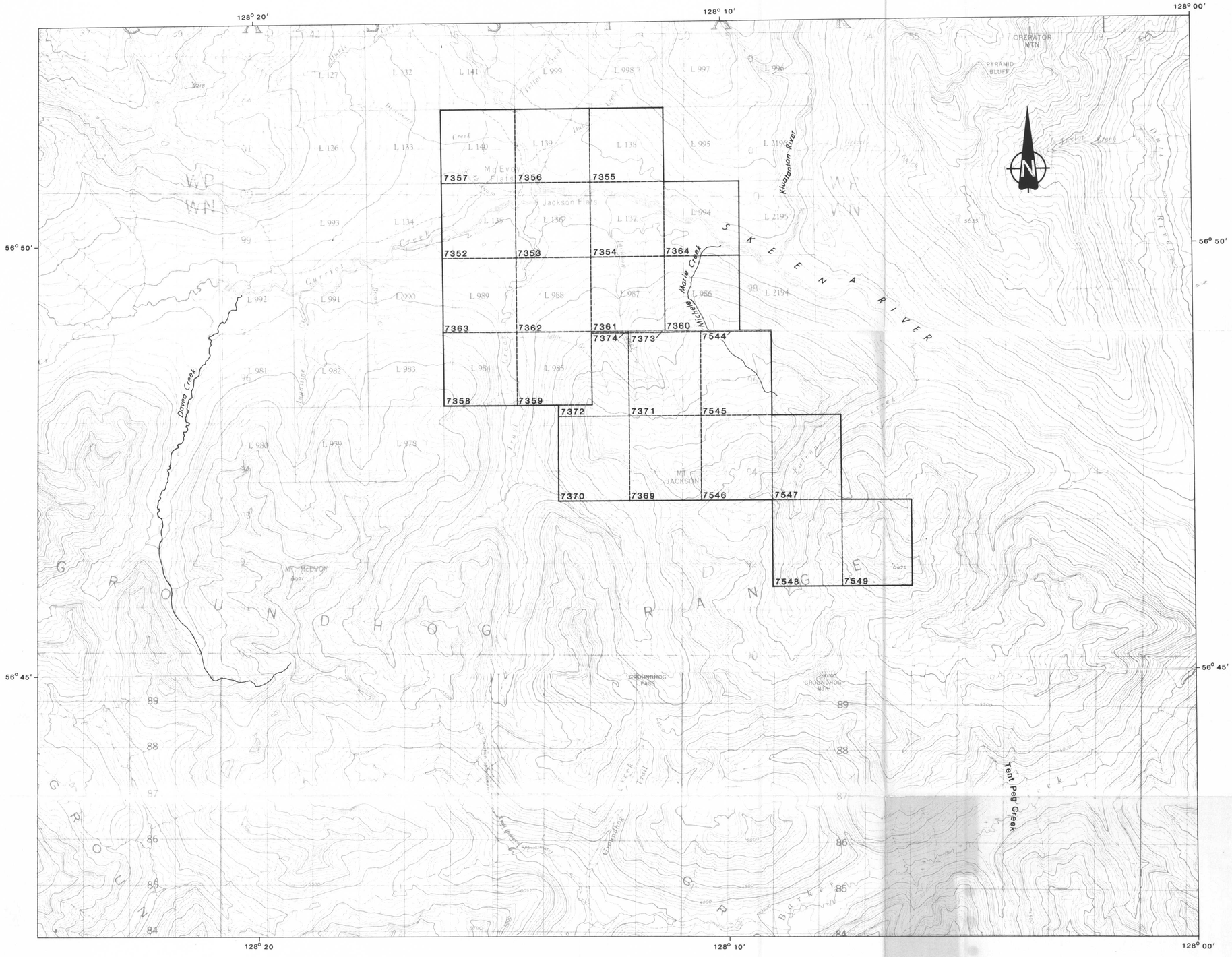
S.G. Fraction	INCREMENTAL WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g	CUMULATIVE WT %	RM %	Ash %	Vol %	F.C. %	S %	HV Cal/g
Float-1.55	41.13	0.56	4.83	12.99	81.62	0.76	7865	41.13	0.56	4.83	12.99	81.62	0.76	7865
1.55-1.60	16.92	0.54	9.16	3.71	86.59	0.73	7452	58.05	0.55	6.09	10.29	83.07	0.75	7745
1.60-1.65	7.70	0.70	13.41	4.37	81.52	1.08	6996	65.75	0.57	6.95	9.59	82.89	0.79	7657
1.65-1.70	5.91	1.10	17.77	5.03	76.10	1.00	6541	71.66	0.61	7.84	9.22	82.33	0.81	7565
1.70-Sink	28.34	0.63	44.87	12.00	42.50	—	—	100.00	—	18.34	—	—	—	—

File No. BC85-034

SCALE 1 : 20

MT JACKSON PROJECT Trench K83

STRATIGRAPHIC and ANALYTICAL SECTION



LEGEND:

——— PROPERTY OUTLINE

-------- COAL LICENCE BOUNDARY

7357 COAL LICENCE NUMBER

Scale 1 : 50,000

Miles 0 1 2 Miles

Metres 1000 0 1000 2000 Metres

Suncor Inc. Resources Group — COAL & MINERALS DEPARTMENT

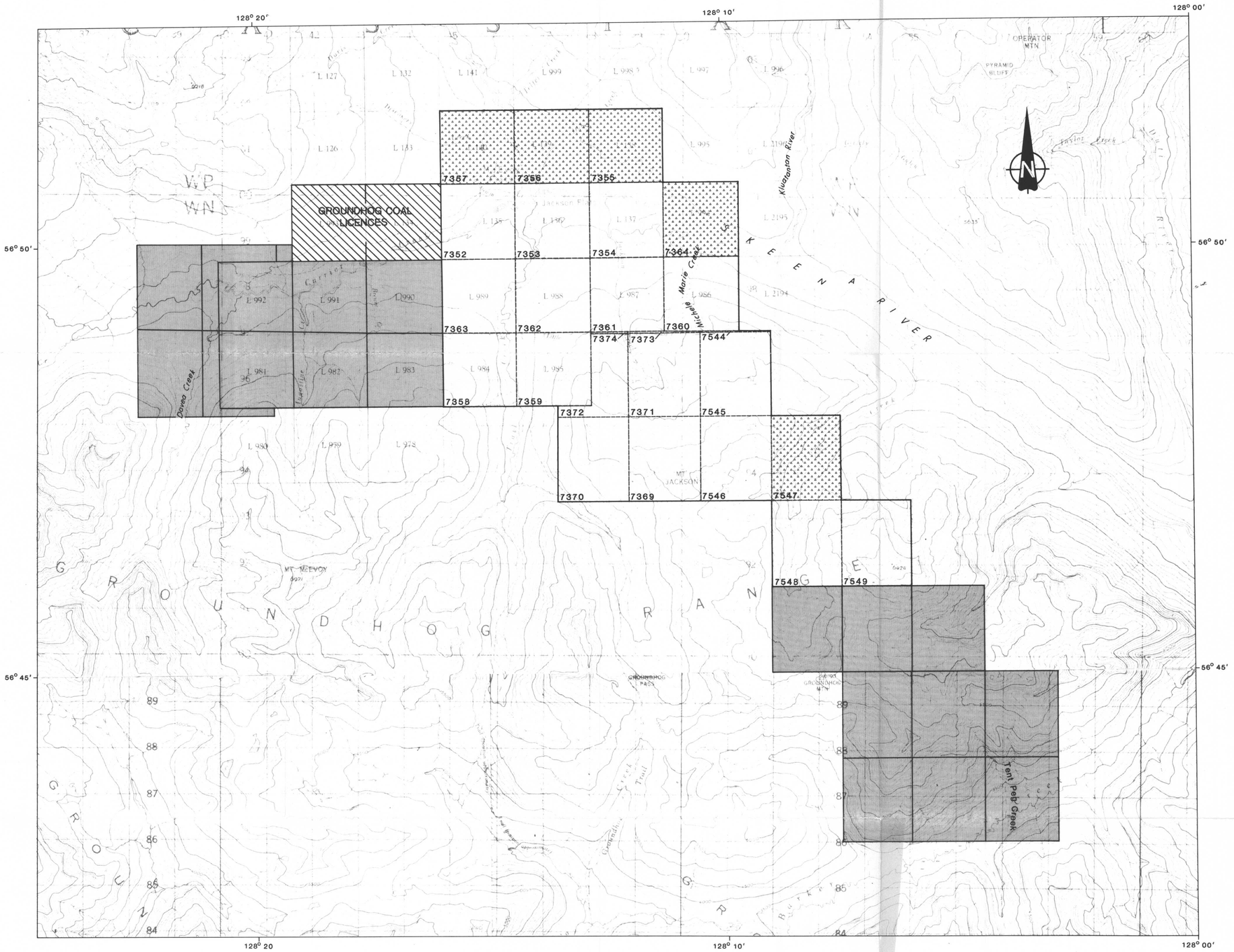
PLATE # 1

MT JACKSON PROJECT , NW BRITISH COLUMBIA

COAL LICENCE LOCATION MAP

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 50,000	104A/9 & 16	BC85-007A

711



LEGEND:

- PROPERTY OUTLINE
- COAL LICENCE BOUNDARY
- 7357 COAL LICENCE NUMBER
- GROUNDHOG COAL LIMITED LICENCES
- PROPOSED LICENCE EXTENSION
- LICENCES TO BE SURRENDERED

Scale 1 : 50,000

Miles 0 1 2 Miles

Metres 1000 0 1000 2000 Metres

Suncor Inc Resources Group — COAL & MINERALS DEPARTMENT

PLATE #2

MT JACKSON PROJECT , NW BRITISH COLUMBIA

PROPOSED COAL LICENCE EXTENSIONS

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 50,000	104A/9 & 16	BC85-007B

711

711

Suncor Inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #3

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 1 OF 3

TRAVERSE & STATION LOCATION MAP FOR 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-066

INDEX — MAP #1, MAP #2, MAP #3

L 132 L 141 L 999 L 998 L 997 L 996
L 133 L 140 L 139 L 138 L 995 L 2196
L 134 L 135 L 136 L 137 L 994 L 2195
L 990 L 989 L 988 L 987 L 986 L 2194
L 983 L 984 L 985
L 978

Telfer Cr
Discovery Creek
Duke Creek
McEvoy Flats
Abraham Cr
Jackson Flats
Little Creek
Telfer Creek
Gully Creek

SKEENA RIVER
KLUATANTAN RIVER
MICHELE MARIE CREEK
CURRIER CREEK

KLUATANTAN CAMP & AIR STRIP

MT JACKSON

GH 76-77 KB/GC/AC 85/08/13
K77-K82 JK/AC 85/08/07
B1-B13 JK/AC 85/08/04
GH85 23-28 KB/GC 85/08/06
Trench GH85-28
GH85 13-22 KB/GC 85/08/05
GH85 90-96 KB/GC/AC 85/08/15
GH85 01-12 OC/KB/GC 85/09/04

128°15' 128°13' 128°10' 128°07'
56°52' 56°50' 56°48' 56°46'

Legend

Field Personnel Abbreviations

OC Owen Cullingham
KB Kevin Brown
JK Janet Kerr
GC Greg Cave
AC Arliss Collins

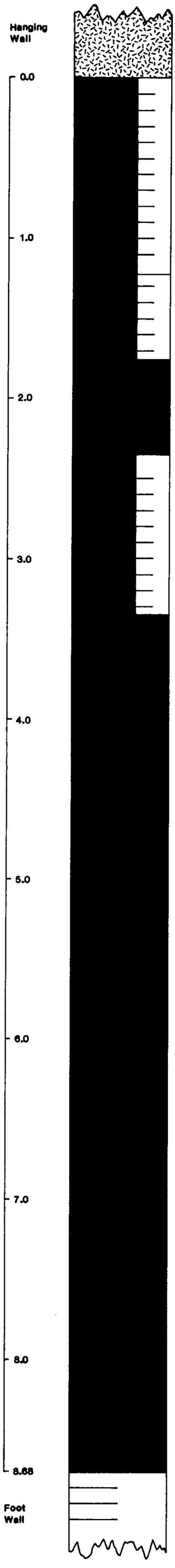
05 — Traverse Route Station Identifier

Trench

(H) Helicopter landing site

N

6424



LITHOLOGIC SECTION

Incremental Thickness (m)	DESCRIPTION
	???? undeterminable - coal bloom and overburden
1.20	Coal dirty , high ash , rubbly , powdery
0.52	Coal dirty , dull , rubbly with minor blocky fractures
0.60	Coal clean , banded (70/30) blocky and hackly fracture
1.00	Coal dirty , dull , blocky fracture
4.00	Coal clean , powdery , blocky fracturing , v soft , friable , sheared , polished slickensided surfaces
1.36	Coal clean , banded with massive marcasite , hard , blocky with minor conchoidal fracture
	Mudstone w/s - med grey with limonite stain on surface bedding 120/68

711

RAW COAL ANALYSIS

Sample Thk. (m)	Sample No.	Adm. %	Moist. %	Ash %	Vol. %	F.C. %	S %	CV Cal/g	Basis
8.68	844705	11.50	17.40	27.00	18.40	37.20	1.28	3585	adb
			26.90	33.90	16.28	32.92	1.13	3173	arb
				32.69	22.28	45.04	1.55	4340	db

File No BC85-029

SCALE 1 : 20

MT JACKSON PROJECT Trench GH-85-97

STRATIGRAPHIC and ANALYTICAL SECTION

128°07' 128°05' 128°03'

56°46' 56°45' 56°44'

EALCONER PEAK
6424

GROUNDHOG MTN
6105

85/08/10 JK/AC B20-23

85/08/19 KB/JM A-Z

85/08/19 KB/JM HELI REC

85/08/10 KB/JK TR01-02

85/08/10 KB/GC GH85-47-55

85/08/17 KB/GC/AC GHTR-97

GHTR 8597

GHTR 8774

TR75

85/08/12 KB/GC/AC GH 98-75

85/08/19 GC/AC GH 14-117

85/08/18 KB/GC/AC GH85/98-118

TENTPEG CREEK

BARKER CREEK

INDEX MAP

MAP #1 MAP #2 MAP #3

Legend

OC Owen Cullingham
KB Kevin Brown
JK Janet Kerr
GC Greg Cave
AC Arliss Collins
JM Joe Meier

———— Traverse Route

Trench

(H) Helicopter landing pad

711

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

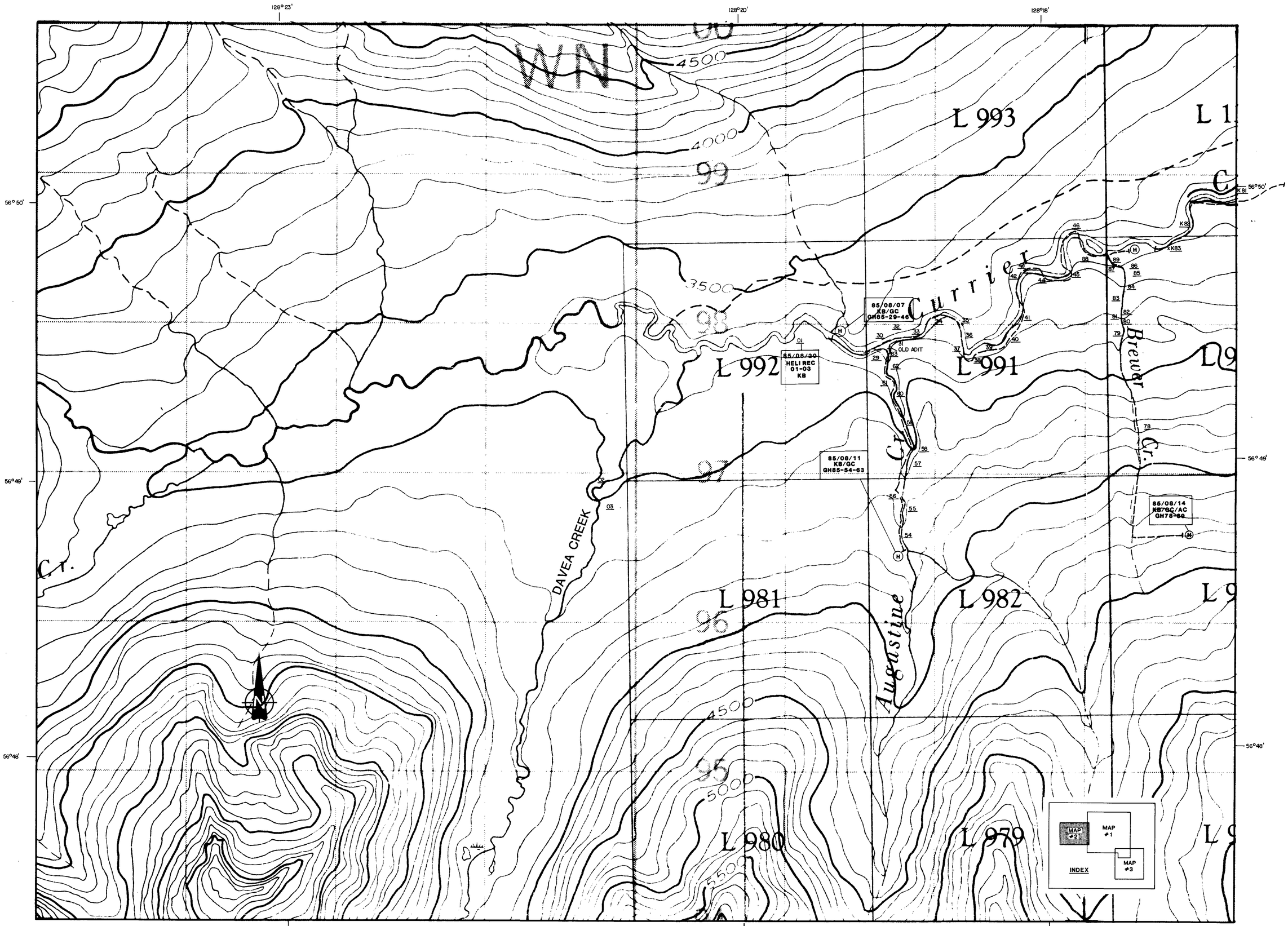
PLATE #5

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 3 OF 3 - SOUTHERN EXTENSION

TRAVERSE & STATION LOCATION MAP FOR 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-068



711

Legend

FIELD PERSONNEL ABBREVIATIONS

OC Owen Cullingham
KB Kevin Brown
JK Janet Kerr
GC Greg Cave
AC Arliss Collins

Traverse Route
Adit
Trench
(H) Helicoopter landing site

Suncor Inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #4

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 2 OF 3 - WESTERN EXTENSION

TRAVERSE & STATION LOCATION MAP FOR 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-067

711

Suncor Inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #6

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 1 OF 3

GEOLOGY MAP FOR 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-069

INDEX — MAP #1, MAP #2, MAP #3

Skeena Syncline

Beirnes Syncline

Deformation Fault

Skeena Fault

Falconer Fault

MICHELE MARIE CREEK

KLUATANTAN RIVER

KLUATANTAN CAMP & AIR STRIP

MT JACKSON

FALCONER MTN

McEvoy Flats

Jackson Flats

JKc

JKmj

NO OUTCROP

COVERED

Legend

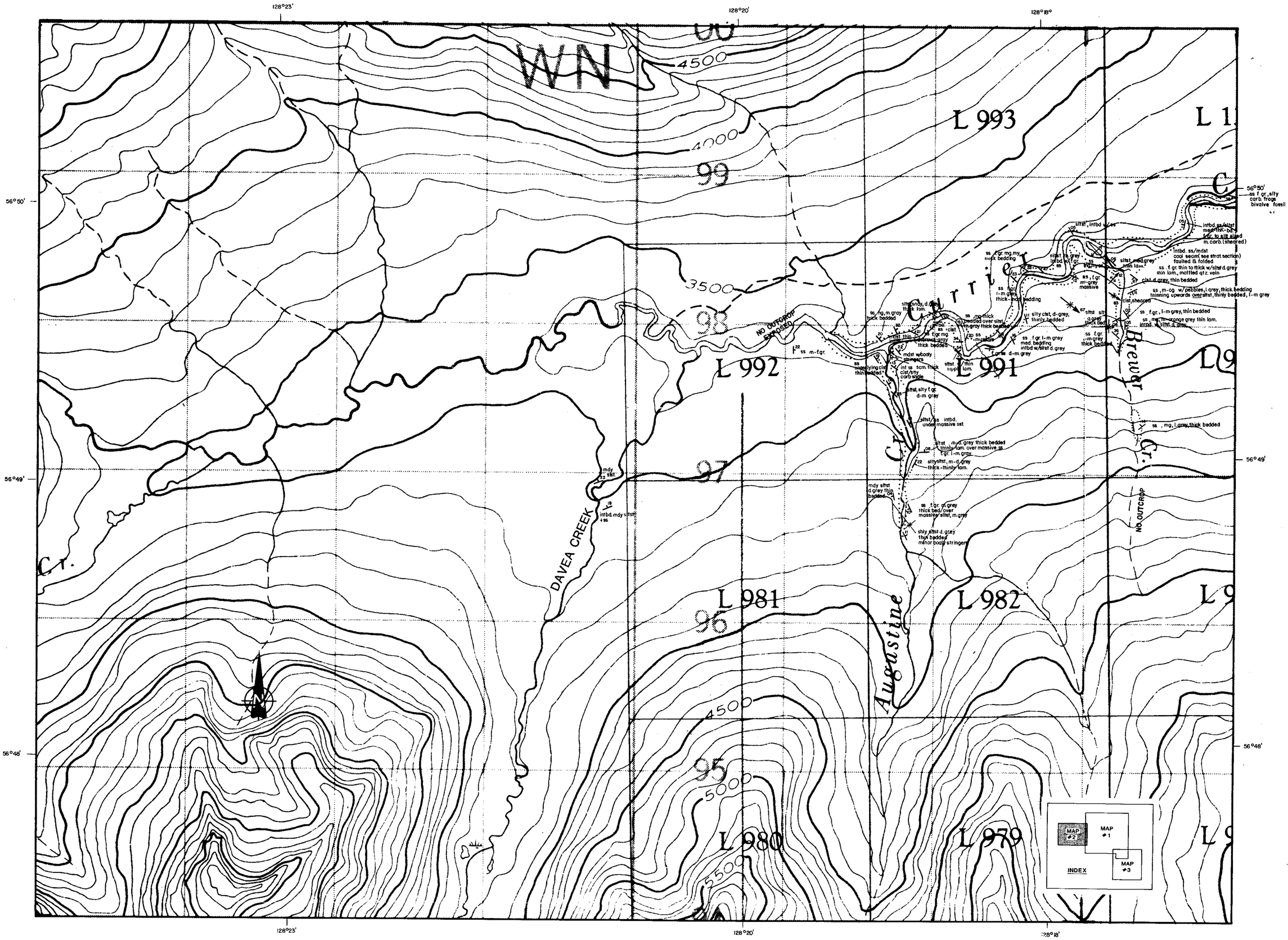
- Strike & Dip — Horizontal / Vertical
- Trench
- Syncline/Anticline with Plunge Direction
- Overturned Syncline/Anticline
- Joint
- Fault
- Unit Boundary Assumed
- Outcrop/Overburden Border
- Key Bed (air photo interpretation)
- Alignment of Probable Geological Significance
- Cb/● Coal Bloom
- CF Coal Float
- JKc Currier Unit
- JKmj Mount Jackson Unit
- ✷ Coal Outcrop

SS Sandstone
SLTST Siltstone
MDST Mudstone

References :

Fisher , et al , 1983

Davies , et al , 1982



Legend

- Strike & Dip ⊕ horizontal † vertical
- Trench
- Syncline/Anticline with plunge direction
- Overturned Syncline / Anticline
- Joint
- Fault
- Unit Boundary Assumed
- Outcrop/Overburden Border
- Alignment of Probable Geological Significance
- Coal Outcrop
- Coal Bloom
- JKc — Currier Unit
- JKmj — Mount Jackson Unit
- Adit

711

Suncor Inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #7

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 2 OF 3 - WESTERN EXTENSION

GEOLOGY MAP

FOR 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-070

128° 07'
128° 05'
128° 03'
56° 46'
56° 45'
56° 44'
FALCONER MTN
GROUNDHOG MTN
TENTPEG CREEK
BARKER CREEK
Creek
JKmJ
JKc
N G E
91
90
89
88
87
86
5000
5500
6000
4500
4000
3500
mdst, faulted sheared
ss, mg/fg
carb mdst recently sheared coal
coal, sheared 20 cm.
sandstone int. f gr.
coal - 40 cm.
coal bloom and and clean coal 40cm. thick
carb mdst w/coaly stringers
coal in sheared zone
ss mg
ss / siltst intbd
ss, f gr intbd
siltst, d grey
ss f gr m bedded
f gr ss thinly bedded
mdst dk grey w/coaly partings to 3 cm.
ss mdst
pencil shale
siltst, intbd
siltst, ss
ss f gr m grey thin bedded
siltst, shly m grey
ss, f gr, sheared, coal, 25 cm.
coal, 32 m.
pencil shale d grey m/hard coal bloom
ss, silicified w/qtz stringers
ss f gr m grey
ss f gr m grey
ss f gr, f grey thin bedded
ss siltst thin bedded
ss mg/mx
ss f gr, f-g grey thin bedded
clst, shly, d grey intbd.
coaly sh.
ss, mg, l grey thin - thick
clst l grey thin bedded
ss f gr orange buff thin bedded
carby siltst, d grey thinly beddad. ver ss vf g-l grey v. thin
siltst m thin intbd
sheared mudstone polished slick surface minor coaly stringers
siltst, shly m grey
siltst, m grey thin bedded
coal sheared zone 1m thick
coal
ss f gr m-dk grey thin bedded
ss f gr, m-d grey
siltst d grey thick bedded
siltst m grey thinly bedded
siltst, mdy, m grey thinly bedded
ss sltst m. grey
Thin bedded
MAP #2
MAP #1
MAP #3
INDEX

Legend

- Strike & Dip ⊕ Horizontal † Vertical
- Trench
- Syncline/Anticline with plunge direction
- Overturned Syncline/Anticline
- Joint
- Fault
- Unit Boundary Assumed
- Outcrop/Overburden border
- Alignment of Probable Geological Significance
- Coal outcrop
- Coal Bloom
- Coal seam of notable thickness
- JKc — Currier Unit
- JKmj — Mount Jackson Unit

711

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #8

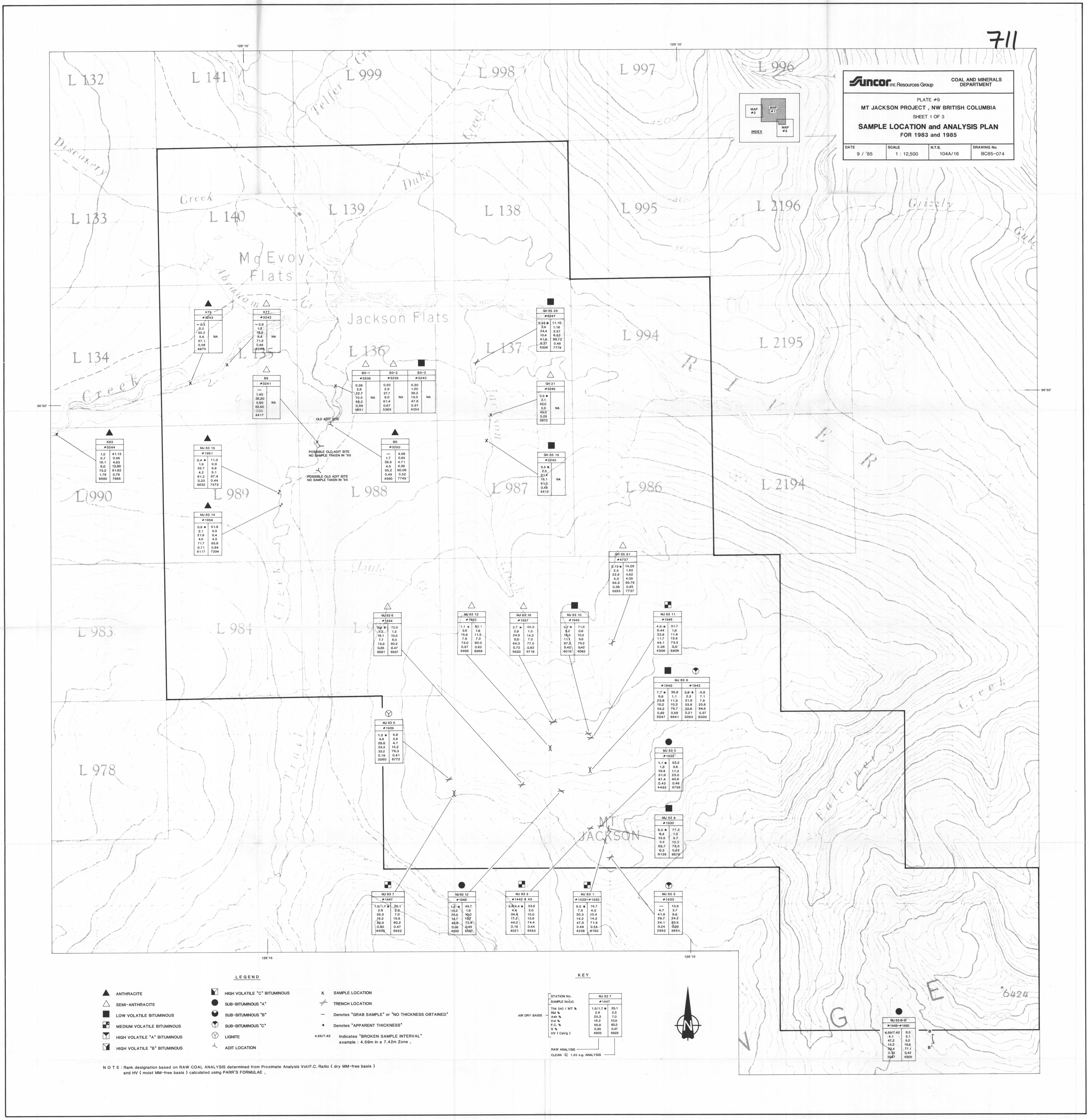
MT JACKSON PROJECT, NW BRITISH COLUMBIA

SHEET 3 OF 3 - SOUTHERN EXTENSION

GEOLOGY MAP

FOR 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-071


711
Suncor inc. Resources Group
COAL AND MINERALS DEPARTMENT
PLATE #9
MT JACKSON PROJECT , NW BRITISH COLUMBIA
SHEET 1 OF 3
SAMPLE LOCATION and ANALYSIS PLAN
FOR 1983 and 1985
DATE 9 / '85
SCALE 1 : 12,500
N.T.S. 104A/16
DRAWING No. BC85-074
MAP #2
MAP #1
MAP #3
INDEX
128°15'
128°10'
56°50'
L 132
L 141
L 999
L 998
L 997
L 996
L 133
L 140
L 139
L 138
L 995
L 2196
L 134
L 135
L 136
L 137
L 994
L 2195
L 990
L 989
L 988
L 987
L 986
L 2194
L 983
L 984
L 978
Discovery Creek
Telfer Creek
Duke Creek
Abraham Creek
Grizzly Gulch
Mc Evoy Flats
Jackson Flats
Little Creek
Falconer Creek
RIVER
RANGE
MT JACKSON
4500
3500
6424
K79 #3243: ~0.3, 2.0, 35.3, 5.6, 57.1, 0.56, 4879 | NA
K77 #3242: ~0.6, 1.2, 19.2, 8.4, 71.2, 0.46, 6244 | NA
B9 #3241: —, 1.40, 38.30, 6.90, 53.40, 3.60, 4417 | NA
B3-1 #3238: 0.38, 2.6, 22.7, 10.5, 64.2, 0.46, 5691 | NA
B3-2 #3239: 0.20, 2.9, 27.7, 8.0, 61.4, 0.67, 5369 | NA
B3-3 #3240: 0.30, 1.20, 38.2, 13.0, 47.6, 0.97, 4354 | NA
GH 85 28 #3247: 0.93 *, 3.4, 24.4, 10.4, 61.8, 0.37, 5306 | 11.10, 1.18, 2.57, 6.53, 89.72, 0.48, 7779
GH 21 #3246: 0.5 *, 2.1, 43.0, 5.9, 49.0, 0.29, 3970 | NA
GH 85 19 #3245: 0.5 *, 2.5, 21.4, 15.1, 61.0, 0.48, 5412 | NA
K83 #3244: 1.0, 0.7, 18.1, 6.0, 75.2, 1.78, 6595 | 41.13, 0.56, 4.83, 12.99, 81.62, 0.76, 7865
MJ 83 15 #1961: 0.4 *, 1.9, 32.7, 4.2, 61.2, 0.33, 5032 | 11.3, 0.9, 6.6, 5.1, 87.4, 0.44, 7573
MJ 83 14 #1954: 0.9 *, 2.1, 21.6, 4.6, 71.7, 0.71, 6117 | 51.8, 0.5, 9.4, 4.5, 85.6, 0.84, 7334
B6 #3250: —, 1.7, 38.6, 4.5, 55.2, 0.49, 4590 | 4.56, 0.85, 4.71, 4.38, 90.06, 0.52, 7749
OLD ADIT SITE
POSSIBLE OLD ADIT SITE NO SAMPLE TAKEN IN '85
POSSIBLE OLD ADIT SITE NO SAMPLE TAKEN IN '85
GH 85 91 #4707: 2.19 *, 2.5, 22.9, 5.3, 69.3, 0.38, 5955 | 14.28, 1.62, 4.62, 4.00, 89.76, 0.45, 7737
MJ 83 6 #1444: 0.3 *, 1.3, 16.1, 7.7, 74.9, 0.35, 6581 | 72.9, 1.3, 10.5, 8.0, 80.2, 0.47, 6937
MJ 83 13 #1952: 1.1 *, 3.6, 15.8, 7.6, 73.0, 0.57, 6498 | 82.1, 1.6, 11.5, 7.0, 80.0, 0.62, 6968
MJ 83 16 #1957: 2.7 *, 2.9, 24.8, 8.0, 64.3, 0.72, 5820 | 66.5, 1.3, 14.2, 7.0, 77.5, 0.62, 6716
MJ 83 10 #1945: 5.7 *, 5.2, 16.5, 11.1, 67.2, 0.42, 6018 | 71.6, 0.8, 10.2, 9.8, 79.2, 0.42, 6043
MJ 83 11 #1946: 4.9 *, 6.44, 32.8, 11.7, 49.1, 0.36, 4306 | 31.7, 1.8, 11.4, 13.6, 73.2, 0.5, 6406
MJ 83 9 #1943: 7.7 *, 6.8, 23.8, 10.2, 59.2, 0.49, 5247 | 36.8, 1.1, 11.9, 10.3, 76.7, 0.56, 6641
MJ 83 9 #1942: 3.9 *, 2.3, 31.6, 33.6, 32.5, 0.21, 3093 | 0.9, 7.1, 7.8, 20.6, 64.5, 0.37, 6000
MJ 83 8 #1939: 1.3 *, 4.8, 28.8, 33.2, 33.2, 0.19, 3060 | 4.8, 3.8, 4.7, 15.2, 76.3, 0.41, 6772
MJ 83 5 #1935: 1.1 *, 1.3, 19.4, 31.9, 47.4, 0.43, 4433 | 53.2, 3.6, 11.3, 23.0, 40.6, 0.46, 5756
MJ 83 4 #1930: 5.0 *, 6.4, 15.5, 9.4, 68.7, 0.5, 6136 | 77.2, 1.5, 9.7, 10.3, 78.5, 0.52, 6876
MJ 83 7 #1447: 1.5/1.7 *, 2.6, 25.3, 16.2, 55.9, 0.30, 4903 | 25.1, 2.3, 7.0, 10.5, 80.2, 0.47, 6922
MJ 83 12 #1948: 1.8 *, 10.2, 25.5, 14.7, 49.6, 0.38, 4502 | 49.7, 1.9, 10.0, 15.7, 72.4, 0.45, 6537
MJ 83 3 #1442 & 43: 3.4/4.4 *, 4.4, 34.4, 17.2, 44.0, 0.18, 4021 | 23.9, 2.0, 10.0, 13.6, 74.4, 0.44, 6553
MJ 83 1 #1528-#1530: 6.0 *, 7.6, 30.3, 14.2, 47.9, 0.49, 4236 | 16.7, 4.0, 10.4, 14.2, 71.4, 0.54, 6190
MJ 83 2 #1933: —, 4.7, 41.5, 29.7, 24.1, 0.24, 2662 | 13.6, 3.7, 8.6, 24.2, 63.5, 0.39, 5641
MJ 83 B-B' #1448-#1450: 4.59/7.42, 4.1, 47.2, 15.3, 33.4, 0.13, 3047 | 8.3, 2.1, 8.2, 12.6, 77.1, 0.42, 6909
B
B'
LEGEND
ANTHRACITE
SEMI-ANTHRACITE
LOW VOLATILE BITUMINOUS
MEDIUM VOLATILE BITUMINOUS
HIGH VOLATILE "A" BITUMINOUS
HIGH VOLATILE "B" BITUMINOUS
HIGH VOLATILE "C" BITUMINOUS
SUB-BITUMINOUS "A"
SUB-BITUMINOUS "B"
SUB-BITUMINOUS "C"
LIGNITE
ADIT LOCATION
X SAMPLE LOCATION
TRENCH LOCATION
— Denotes "GRAB SAMPLE" or "NO THICKNESS OBTAINED"
* Denotes "APPARENT THICKNESS"
4.59/7.42 Indicates "BROKEN SAMPLE INTERVAL" example : 4.59m in a 7.42m Zone .
KEY
STATION No. MJ 83 7
SAMPLE No(s). #1447
AIR DRY BASIS
Thk (m) / WT % 1.5/1.7 * 25.1
RM % 2.6 2.3
Ash % 25.3 7.0
Vol % 16.2 10.5
F.C. % 55.9 80.2
S % 0.30 0.47
HV (Cal/g) 4903 6922
RAW ANALYSIS
CLEAN @ 1.55 s.g. ANALYSIS
N
N O T E : Rank designation based on RAW COAL ANALYSIS determined from Proximate Analysis Vol/F.C. Ratio (dry MM-free basis) and HV (moist MM-free basis) calculated using PARR'S FORMULAE .

128°20'

56°50'

L 993

L 1

L 992

L 991

L 981

L 982

L 980

L 979

Currier

Brewer

Augustine

Cr.

OLD ADIT SITE

K83	
#3244	
1.0	41.13
0.7	0.66
18.1	4.83
6.0	12.99
75.2	81.62
1.78	0.76
6595	7865

GH 85 63	
#3281	
—	
3.00	
25.50	
5.80	NA
65.70	
0.98	
5802	

MAP #2 MAP #1 MAP #3 INDEX

LEGEND

- ANTHRACITE
- SEMI-ANTHRACITE
- LOW VOLATILE BITUMINOUS
- MEDIUM VOLATILE BITUMINOUS
- HIGH VOLATILE "A" BITUMINOUS
- HIGH VOLATILE "B" BITUMINOUS
- HIGH VOLATILE "C" BITUMINOUS
- SUB-BITUMINOUS "A"
- SUB-BITUMINOUS "B"
- SUB-BITUMINOUS "C"
- LIGNITE
- ADIT LOCATION
- X SAMPLE LOCATION
- TRENCH LOCATION
- — Denotes "GRAB SAMPLE" or "NO THICKNESS OBTAINED"
- * Denotes "APPARENT THICKNESS"
- 4.59/7.42 Indicates "BROKEN SAMPLE INTERVAL" example : 4.59m in a 7.42m Zone .

KEY

AIR DRY BASIS

STATION No.	MJ 83 7	
SAMPLE No(s).	#1447	
Thk (m) / WT %	1.5/1.7 *	25.1
RM %	2.6	2.3
Ash %	25.3	7.0
Vol %	16.2	10.5
F.C. %	55.9	80.2
S %	0.30	0.47
HV (Cal/g)	4903	6922

RAW ANALYSIS

CLEAN @ 1.55 s.g. ANALYSIS

NOTE : Rank designation based on RAW COAL ANALYSIS determined from Proximate Analysis Vol/F.C. Ratio (dry MM-free basis) and HV (moist MM-free basis) calculated using PARR'S FORMULAE .

711

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #10

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 2 OF 3 - WESTERN EXTENSION

SAMPLE LOCATION and ANALYSIS PLAN FOR 1983 and 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16	BC85-075

IM 42

128°05'

56°45'

6424

6105

GROUNDHOG MTN

BARKER CREEK

Creek

6290000mN

6285000mN

552000mE

555000mE

557000mE

12°10'

MJ 83 B-B'	
#1448 – #1450	
4.59/7.42	8.3
4.1	2.1
47.2	8.2
15.3	12.6
33.4	77.1
0.13	0.42
3047	6909

GRAB	
#3262	
—	
6.10	
30.80	
20.00	NA
43.30	
0.15	
3924	

B 21	
#3283	
—	
5.20	
43.20	
22.70	NA
17.90	
0.25	
4750	

GH TR 1	
#3260	
—	
2.8	
43.6	
18.5	NA
35.1	
0.22	
5611	

K84	
#3259	
—	
6.1	
40.7	
21.4	NA
31.8	
0.2	
5252	

GH 85 97	
#4705	
6.68 *	
17.4	
25.0	
18.4	NA
37.2	
1.28	
3585	

GH 85 67	
#4703	
—	
7.5	
37.7	
9.1	NA
50.7	
0.34	
4431	

GH 85 75		
#4701	4701-2	#4702
14.4x1/2*	10.48	14.4x1/2*
8.7	8.58	9.1
18.2	4.31	18.8
17.3	8.54	18.0
55.8	81.67	54.1
0.31	0.45	0.32
5051	7233	4829

GH 85 74	
#4706	
2.56 *	14.44
8.5	1.40
22.7	6.72
14.7	10.26
56.1	81.62
0.35	0.47
5045	7296

MAP #2 | MAP #1 | MAP #3 | INDEX

LEGEND

- ANTHRACITE
- SEMI-ANTHRACITE
- LOW VOLATILE BITUMINOUS
- MEDIUM VOLATILE BITUMINOUS
- HIGH VOLATILE "A" BITUMINOUS
- HIGH VOLATILE "B" BITUMINOUS
- HIGH VOLATILE "C" BITUMINOUS
- SUB-BITUMINOUS "A"
- SUB-BITUMINOUS "B"
- SUB-BITUMINOUS "C"
- LIGNITE
- ADIT LOCATION
- X SAMPLE LOCATION
- TRENCH LOCATION
- — Denotes "GRAB SAMPLE" or "NO THICKNESS OBTAINED"
- * Denotes "APPARENT THICKNESS"
- 4.59/7.42 Indicates "BROKEN SAMPLE INTERVAL" example : 4.59m in a 7.42m Zone .

KEY

AIR DRY BASIS	STATION No.	MJ 83 7	
	SAMPLE No(s).	#1447	
	Thk (m) / WT %	1.5/1.7 *	25.1
	RM %	2.6	2.3
	Ash %	25.3	7.0
	Vol %	16.2	10.5
	F.C. %	55.9	80.2
	S %	0.30	0.47
	HV (Cal/g)	4903	6922

RAW ANALYSIS

CLEAN @ 1.55 s.g. ANALYSIS

N O T E : Rank designation based on RAW COAL ANALYSIS determined from Proximate Analysis Vol/F.C. Ratio (dry MM-free basis) and HV (moist MM-free basis) calculated using PARR'S FORMULAE .

711

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

PLATE #11

MT JACKSON PROJECT , NW BRITISH COLUMBIA

SHEET 3 OF 3 - SOUTHERN EXTENSION

SAMPLE LOCATION and ANALYSIS PLAN FOR 1983 and 1985

DATE	SCALE	N.T.S.	DRAWING No.
9 / '85	1 : 12,500	104A/16 104A/9	BC85-076

APPENDIX B

CLIENT: SUNCOR INC.
PROJECT: RESOURCES GROUP NO. 84
TWENTY-ONE SAMPLES RECEIVED AUGUST 4, 1985
LAB NO: 7212-7232
DATE: AUGUST 28, 1985

ANALYSIS OF COAL, air dried basis

LAB NO:	SAMPLE ID	ADM%	MOIST%	ASH%	VOL%	F.C.%	S%	HV BTU/LB	BASIS
7212	3238	7.90	2.60	22.70	10.50	64.20	0.46	10235	adb
	B3-1		10.29	20.91	9.67	59.13	0.42	9426	arb
				23.31	10.78	65.91	0.47	10508	db
7213	3239	6.70	2.90	27.70	8.00	61.40	0.67	9657	adb
	B3-2		9.41	25.84	7.46	57.29	0.63	9010	arb
				28.53	8.24	63.23	0.69	9945	db
7214	3240	3.20	1.20	38.20	13.00	47.60	0.97	7831	adb
	B3-3		4.36	36.98	12.58	46.08	0.94	7580	arb
				38.66	13.16	48.18	0.98	7926	db
7215	3241	3.80	1.40	38.30	6.90	53.40	0.60	7944	adb
	B9		5.15	36.84	6.64	51.37	0.58	7642	arb
				38.84	7.00	54.16	0.61	8057	db
7216	3242	7.90	1.20	19.20	8.40	71.20	0.46	11230	adb
	K77 AUG 7/85		9.01	17.68	7.74	65.58	0.42	10343	arb
				19.43	8.50	72.06	0.47	11366	db
7217	3243	5.10	2.00	35.30	5.60	57.10	0.56	8775	adb
	K79		7.00	33.50	5.31	54.19	0.53	8327	arb
				36.02	5.71	58.27	0.57	8954	db
7218	3244	9.30	0.70	18.10	6.00	75.20	1.78	11861	adb
	K83		9.93	16.42	5.44	68.21	1.61	10758	arb
				18.23	6.04	75.73	1.79	11945	db
7219	3245	10.70	2.50	21.40	15.10	61.00	0.48	9733	adb
	GH 85119		12.93	19.11	13.48	54.47	0.43	8692	arb
				21.95	15.49	62.56	0.49	9983	db
7220	3246	6.40	2.10	43.00	5.90	49.00	0.29	7140	adb
	GH #21		8.37	40.25	5.52	45.86	0.27	6683	arb
				43.92	6.03	50.05	0.30	7293	db
7221	3247	9.60	3.40	24.40	10.40	61.80	0.37	9544	adb
	GH 85-28		12.67	22.06	9.40	55.87	0.33	8628	arb
				25.26	10.77	63.98	0.38	9880	db
7222	3250	5.80	1.70	38.60	4.50	55.20	0.49	8255	adb
	MINESAMPLE OLD		7.40	36.36	4.24	52.00	0.46	7776	arb
	AUG 5/85 ADIT TRAIL CRK			39.27	4.58	56.15	0.50	8398	db

CLIENT: SUNCOR INC.
PROJECT: TEN TRENCH SAMPLES RECEIVED SEPT. 5/85
LAB NO: 7337-7346
DATE: SEPTEMBER 10, 1985

RAW COAL ANALYSIS, air dried basis

LAB NO:	SAMPLE ID:	ADM%	MOIST%	ASH%	VOL%	F.C.%	S%	CV CAL/GM	BASIS
7337	GH-85-74	6.90	6.50	22.70	14.70	56.10	0.35	5045	adb
	AUG 13/85		12.95	21.13	13.69	52.23	0.33	4697	arb
				24.28	15.72	60.00	0.37	5396	db
7338	GH-85-75	7.10	8.70	18.20	17.30	55.80	0.31	5051	adb
	BOTTOM HALF		15.18	16.91	16.07	51.84	0.29	4692	arb
	AUG 13/85			19.93	18.95	61.12	0.34	5532	db
7339	GH-85-75	8.30	9.10	18.80	18.00	54.10	0.32	4829	adb
	TOP HALF		16.64	17.24	16.51	49.61	0.29	4428	arb
	AUG 13/85			20.68	19.80	59.52	0.35	5312	db
7340	GH-85-97	11.50	17.40	27.00	18.40	37.20	1.28	3585	adb
	MT. GROUNDHOG		26.90	23.90	16.28	32.92	1.13	3173	arb
	AUG 17/85			32.69	22.28	45.04	1.55	4340	db
7341	GH-85-67	6.40	2.50	37.70	9.10	50.70	0.34	4431	adb
			8.74	35.29	8.52	47.46	0.32	4147	arb
				38.67	9.33	52.00	0.35	4545	db
7342	GH-85-91	8.90	2.50	22.90	5.30	69.30	0.38	5955	adb
	MT. JACKSON		11.18	20.86	4.83	63.13	0.35	5425	arb
	AUG 16/85			23.49	5.44	71.08	0.39	6108	db

CLIENT: SUNCOR INC.
PROJECT: FLOAT-SINK ANALYSIS, air dried basis - COMPOSITE RAW COAL
SAMPLES CRUSHED TO PASS 6MM.
LAB NO: 7560-7562
DATE: OCTOBER 3, 1985

FLOAT-SINK ANALYSIS, air dried basis: COMPOSITE RAW COAL SAMPLES CRUSHED TO PASS 6MM.

LAB NO: 7562 COMPOSITE OF SAMPLE NOS: TRENCH GH-75 BOTTOM & TOP

S.G. FRACTION	WT%	RM%	ASH%	VOL%	FC%	S%	CV CAL/GM	CUMULATIVE WT%	CUMULATIVE ASH%
FLT. - 1.55	10.48	5.58	4.31	8.54	81.57	0.45	7233	10.48	4.31
1.55 - 1.60	26.22	2.46	7.73	16.34	73.47	0.42	6491	36.70	6.75
1.60 - 1.65	20.48	3.77	12.02	19.97	64.24	0.36	5704	57.18	8.64
1.65 - 1.70	13.39	5.89	16.46	21.33	56.32	0.33	4984	70.57	10.12
1.70 - SINK	29.43	3.86	43.71	17.32	35.11	0.19	3029	100.00	20.01

Birtley Coal
& Minerals Testing

CLIENT: SUNCOR INC. RESOURCES GROUP
PROJECT: FLOAT-SINK ANALYSIS, air dried basis: RAW COAL CRUSHED TO -6MM.
LAB NO: 7218,7221-22,7282-87,7289, 7337, 7342
DATE: OCTOBER 17, 1985

FLOAT-SINK ANALYSIS, air dried basis: RAW COAL CRUSHED TO MINUS 6MM.

LAB NO: 7337 SAMPLE NO: 844706

S.G. FRACTION	WT%	RM%	ASH%	VOL%	FC%	S%	CV CAL/GM	CUMULATIVE WT%	CUMULATIVE ASH%
FLOAT- 1.55	14.44	1.40	6.72	10.26	81.62	0.47	7206	14.44	6.72
1.55 - 1.60	14.17	1.48	11.68	9.58	77.26	0.55	6707	28.61	9.18
1.60 - 1.65	15.40	1.87	15.53	13.83	68.77	0.34	6080	44.01	11.40
1.65 - 1.70	14.87	2.64	19.35	16.56	61.45	0.32	5419	58.88	13.41
1.70 - SINK	41.12	3.27	37.74	15.67	43.32	—	—	100.00	23.41

LAB NO: 7342 SAMPLE NO: 844707

S.G. FRACTION	WT%	RM%	ASH%	VOL%	FC%	S%	CV CAL/GM	CUMULATIVE WT%	CUMULATIVE ASH%
FLOAT- 1.55	14.28	1.62	4.62	4.00	89.76	0.45	7737	14.28	4.62
1.55 - 1.60	18.46	1.34	8.69	4.80	85.17	0.43	7297	32.74	6.91
1.60 - 1.65	19.95	1.22	15.03	4.70	79.05	0.41	6696	52.69	9.99
1.65 - 1.70	12.84	1.50	20.01	5.20	73.29	0.37	6208	65.53	11.95
1.70 - SINK	34.47	1.76	44.84	5.94	47.46	—	—	100.00	23.29

CLIENT: SUNCOR INC. RESOURCES GROUP
PROJECT: FLOAT-SINK ANALYSIS, air dried basis: RAW COAL CRUSHED TO -6MM.
LAB NO: 7218,7221-22,7282-87,7289, 7337, 7342
DATE: OCTOBER 17, 1985

FLOAT-SINK ANALYSIS, air dried basis: RAW COAL CRUSHED TO MINUS 6MM.

LAB NO: 7218 SAMPLE NO: 843244

S.G. FRACTION	WT%	RM%	ASH%	VOL%	FC%	S%	CV CAL/GM	CUMULATIVE WT%	CUMULATIVE ASH%
FLOAT- 1.55	41.13	0.56	4.83	12.99	81.62	0.76	7865	41.13	4.83
1.55 - 1.60	16.92	0.54	9.16	3.71	86.59	0.73	7452	58.05	6.09
1.60 - 1.65	7.70	0.70	13.41	4.37	81.52	1.08	6996	65.75	6.95
1.65 - 1.70	5.91	1.10	17.77	5.03	76.10	1.00	6541	71.66	7.84
1.70 - SINK	28.34	0.63	44.87	12.00	42.50	—	—	100.00	18.34

LAB NO: 7221 SAMPLE NO: 843247

S.G. FRACTION	WT%	RM%	ASH%	VOL%	FC%	S%	CV CAL/GM	CUMULATIVE WT%	CUMULATIVE ASH%
FLOAT- 1.55	11.10	1.18	2.57	6.53	89.72	0.48	7779	11.10	2.57
1.55 - 1.60	8.88	1.18	7.24	8.31	83.27	0.43	7191	19.98	4.65
1.60 - 1.65	15.95	1.19	12.96	9.04	76.81	0.43	6650	35.93	8.34
1.65 - 1.70	16.78	1.66	17.78	9.39	71.17	0.38	6108	52.71	11.34
1.70 - SINK	47.29	2.49	38.96	10.98	47.57	—	—	100.00	24.40

LAB NO: 7222 SAMPLE NO: 843250

S.G. FRACTION	WT%	RM%	ASH%	VOL%	FC%	S%	CV CAL/GM	CUMULATIVE WT%	CUMULATIVE ASH%
FLOAT- 1.55	14.56	0.85	4.71	4.38	90.06	0.52	7749	14.56	4.71
1.55 - 1.60	4.40	0.95	11.62	4.92	82.51	0.55	7022	18.96	6.31
1.60 - 1.65	7.55	0.93	19.49	4.78	74.80	0.52	6283	26.51	10.07
1.65 - 1.70	10.99	1.08	27.71	4.83	66.38	0.55	5507	37.50	15.24
1.70 - SINK	62.50	1.31	51.47	4.40	42.82	—	—	100.00	37.88

CLIENT: SUNCOR INC.
PROJECT: THREE (3) COAL SAMPLES, 843281-843283, RECEIVED OCT. 4, 1985
LAB NO: 7776-7778
DATE: OCTOBER 11, 1985

RAW COAL ANALYSIS, air dried basis

LAB NO:	SAMPLE #	ADM%	MOIST%	ASH%	VOL%	F.C.%	S%	CV CAL/GM	BASIS
7776	843281	1.00	3.00	25.50	5.80	65.70	0.98	5602	adb
			3.97	25.25	5.74	65.04	0.97	5516	arb
				26.29	5.98	67.73	1.01	5775	db
7777	843282	14.20	6.10	30.60	20.00	43.30	0.15	3924	adb
			19.43	26.25	17.16	37.15	0.13	3367	arb
				32.59	21.30	46.11	0.16	4179	db
7778	843283	32.00	6.20	43.20	22.70	27.90	0.25	2750	adb
			36.22	29.38	15.44	18.97	0.17	1870	arb
				46.06	24.20	29.74	0.27	2932	db

Birtley Coal
& Minerals Testing

CLIENT: SUNCOR INC. RESOURCES GROUP
PROJECT: COAL SAMPLES RECEIVED AUGUST & SEPTEMBER, 1985
LAB NO: 7018,7218,7221-7222, 7284-85,7337/40/42, 7560
DATE: OCTOBER 23, 1985

ULTIMATE ANALYSIS, air dried basis - RAW COAL

LAB NO.	SAMPLE ID:	H20	C	H	N	S	ASH%	0 (BY DIFF)
7218	3244	0.68	76.24	1.80	0.89	1.78	18.14	0.47
7221	3247	3.36	62.75	1.98	0.90	0.37	24.40	6.24
7222	3250	1.72	54.90	1.66	0.68	0.49	38.62	1.93
7337	4706	6.48	59.78	2.53	0.90	0.35	22.68	7.28
7340	4705	17.42	45.25	2.77	0.98	1.28	26.96	5.34
7342	4707	2.51	70.23	1.99	0.92	0.38	22.89	1.08

CLIENT: SUNCOR INC.
PROJECT: RESOURCES GROUP NO. 84
THENTY-ONE SAMPLES RECEIVED AUGUST 4, 1985
LAB NO: 7212-7232
DATE: AUGUST 28, 1985

ANALYSIS OF COAL, air dried basis

LAB NO:	SAMPLE ID	ADM%	MOIST%	ASH%	VOL%	F.C.%	S%	HV BTU/LB	BASIS
7231	3259	20.60	6.10	40.70	21.40	31.80	0.20	5252	adb
	AU 9/85		25.44	32.32	16.99	25.25	0.16	4170	arb
	MUPSTON A(2)			43.34	22.79	33.87	0.21	5593	db
7232		17.60	2.80	43.60	18.50	35.10	0.22	5611	adb
			19.91	35.93	15.24	28.92	0.18	4623	arb
				44.86	19.03	36.11	0.23	5773	db

x CARBONATES PRESENT REPORTING CO2 TO VOLATILES MAKING ASH READING LOW.
xx PROBABLE WATER OF CRYSTALLIZATION LOSS FROM MINERALS DURING VOLATILE DETERMINATION @ 950 DEG. F.

Birtley Coal
& Minerals Testing