GR. MT. JACKSON 83(1)A

CONFIDENTIAL

GEOLOGICAL REPORT
MOUNT JACKSON
BRITISH COLUMBIA

COAL LICENCES

7352 TO 7364 INCLUSIVE
7366 TO 7367 INCLUSIVE
7369 TO 7374 INCLUSIVE
7544 TO 7549 INCLUSIVE

CASSIAR LAND DISTRICT

NTS SHEET 104 A/16
(McEVOY FLATS)
128°06' West to 128°16'West
and
56°46' North to 56°51'30" North

LICENCES HELD AND OPERATED
BY
SUNCOR INC.
500 - 4th Avenue S.W.
CALGARY, Alberta

AUTHORS

J. FISHER AND J. BARTEK

FEBRUARY 18, 198[illegible]

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FEBRUARY 18, 1984

WORK PERFORMED DURING

AUG. 5, 1983 - AUG. 31, 1983

PROFESSIONAL VERIFICATION OF REPORT

ENTITLED: MOUNT JACKSON PROJECT, REPORT ON EXPLORATION, 1983 JOHN FISHER, AUTHOR

Mr. John Fisher planned and carried out the geological exploration and drilling program on the Mount Jackson Coal Licences held and operated by SUNCOR INC. He also prepared 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.

REGISTERED PROFESSIONAL ENGINEER
R. D. MOSS
PROVINCE OF ONTARIO

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1.0 SUMMARY

The coal property held by Suncor Inc. lies on the southern edge of the Groundhog Coal Field. The property is comprised of 27 licences for a total of 6439 hectares.

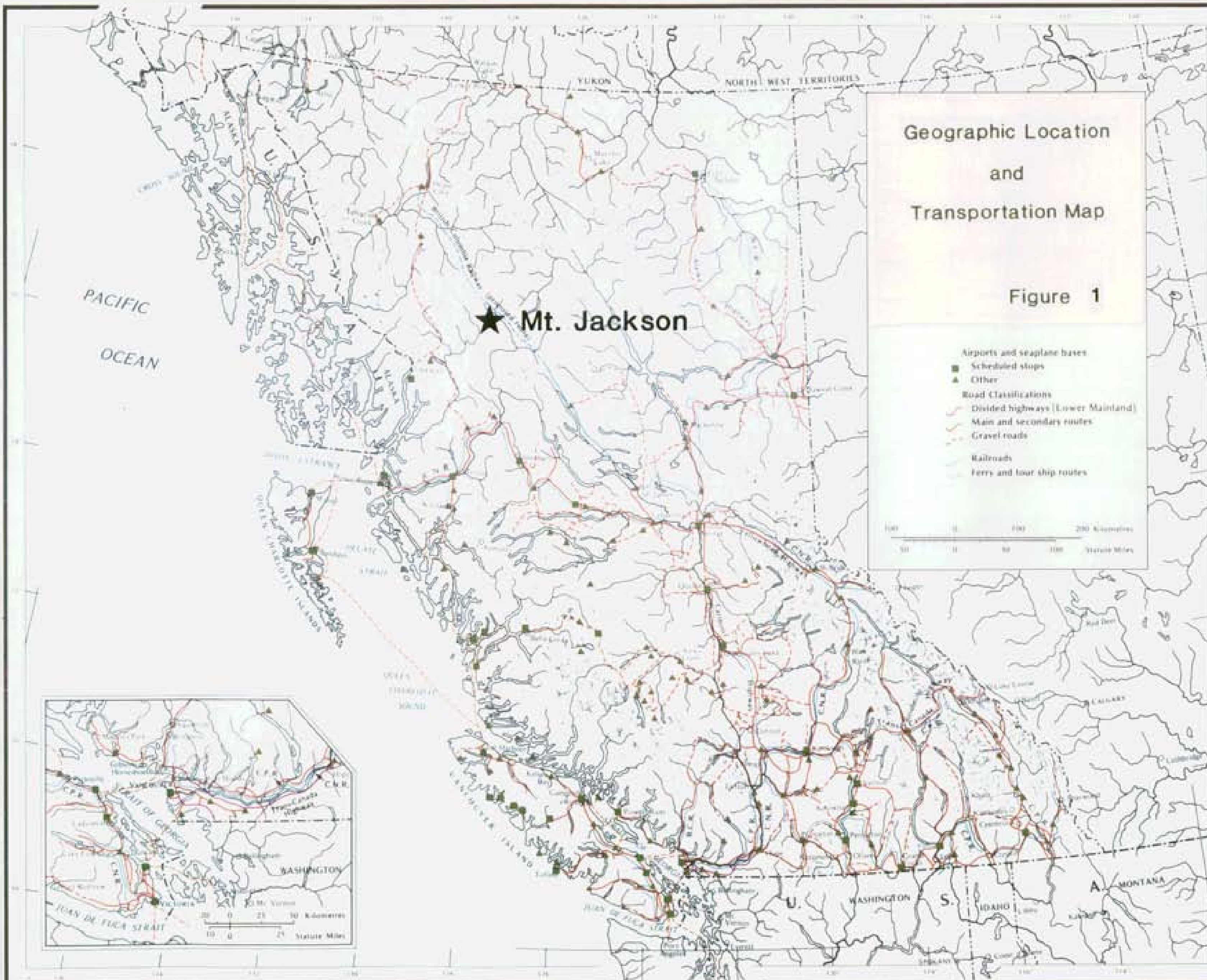
During the period of August 5th to September 3rd, 1983, a Suncor exploration party carried out a program of geological mapping and coal sampling. The property was examined and the geological data posted on air photograhps at a scale of 1:5,000. These data were later posted to maps 1:12,500.

All coal seams seen were sampled and their locations plotted on air photographs and subsequently transferred to maps.

There are two seams which were of mineable thickness at the top of Mount Jackson. The areal extent of these seams is not known at this time.

Very dense forest cover and overburden masks most of the north-facing dip slopes of Mount Jackson. The dense cover restricts exploration of most of the licences to the stream beds and banks of the swiftly flowing water courses running off the mountain. The exception to this is the top of Mount Jackson and the talus covered slopes of Mount Falconer where there are indications of coal being in a mineable altitude.

Geological mapping was carried out on Coal Licences numbers: 7352 to 7364 inclusive, 7366 to 7367 inclusive, 7369 to 7374 inclusive, 7544 to 7549 inclusive.



Geographic Location
and
Transportation Map
Figure 1
Mt. Jackson
PACIFIC
OCEAN
YUKON
NORTH WEST TERRITORIES
Airports and seaplane bases
Scheduled stops
Other
Road Classifications
Divided highways (Lower Mainland)
Main and secondary routes
Gravel roads
Railroads
Ferry and tour ship routes
Kilometres
Statute Miles
JUAN DE FUCA STRAIT
WASHINGTON
MONTANA
IDAHO
U.
S.
A.

2.0 CONCLUSIONS AND RECOMMENDATIONS

Coal should be present beneath the lower north-facing slopes of Mount Jackson and extend under Jackson Flats, McEvoy Flats and along strike from the abandoned adits off Trail Creek. Efforts should be made in the near future to determine the depth and attitude of this coal and whether or not it is economically mineable.

A small drilling program should be carried out on the lower slopes of Mount Jackson and the adjacent areas. This should ascertain the presence and nature of coal present and the feasibility of mining it economically.

3.0 OBJECTIVES

The objectives of the 1983 exploration were to map, sample and analyse the coal and to gather data which would enable us to make valid recommendations as to future work in this area.

4.0 LOCATION

4.1 Geographic Location

The approximate centre of the property is at 128°11' West and 56°48' North. The bulk of the licences are on Mount Jackson. The property may be found on NTS Sheet 104 A/16 (McEvoy Flats) (See Index Map, Fig. 2).

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.

4.2 Licence Tenure

Suncor Inc. holds 29 coal licences for a total of 6439 hectares. Of the 6439 hectres, 5007 were acquired on February 19, 1982 and the remaining 1432 hectares acquired on February 19, 1983 (see Table 1).

With the exception of licence numbers 7366 and 7367, which were surrendered to the Crown on February 18, 1984, all licences are in good standing.

Work to the value of $162,287 was performed on the licences during 1983. This gives a work credit valid until February of 1986 on all licences with the exception of licence numbers 7364 and 7370 which are covered until February of 1985 (see Table 2).

4.3 Physiography

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 1800 metres and the valley bottoms at 800 metres. The highest elevations within the licence block are attained at Falconer Mountain and Mount Jackson in the south. From these areas, the ground slopes steeply down to the Skeena Valley which trends from west-northwest to east-southeast through

MOUNT JACKSON, B.C. Feb. 18/84 H. M. F. TABLE 1

(February 18/84, Renewal & Work Summary

COAL LICENCE NOS. 7352 to 7364, 7369 to 7374 and 7544 to 7549

Licence Nos.	Date Issued	Map Area	Units	Hectares	Feb. 19/84 Rental $5.00/ha	App. Feb. 18/83 Work to Feb. 19/84 1st Term Work $7.50/ha	App. Feb. 18/83 Work to Feb. 19/84 2nd Term Work $12.50/ha	App. Feb. 18/83 & *84 Work to Feb. 19/85 3rd Term Work $12.50/ha	App. Feb. 18/84 Work to Feb. 19/86 4th Term Work $25.00/ha
		104-A-16, Blk. B							
7369	Feb. 19/82	"	45, 46, 55, 56	284	$1 420	-	-	**$3 550	$7 100
7370	"	"	47, 48, 57, 58	284	1 420	-	-	100.50 Cr. *3 449.50	322.50 Cr.
7371	"	"	65, 66, 75, 76	284	1 420	-	-	*3 550	7 100
7372	"	"	67, 68, 77, 78 (ext. Lot 987)	176	880	-	-	-	4 400
7373	"	"	85, 86, 95, 96 (ext. Lots 986 & 987)	12	60	-	-	-	300
7374	"	"	87, 88, 97, 98 (ext. Lots 985, 987, 988)	7	35	-	-	-	175
Lot Nos. in NTS 104-A-16, Blks. B, C, F & G									
		Lot No.							
7352	Feb. 19/82	135		264	1 320	-	-	-	6 600
7353	"	136		264	1 320	-	-	-	6 600
7354	"	137		264	1 320	-	-	-	6 600
7355	"	138		264	1 320	-	-	-	6 600
7356	"	139		264	1 320	-	-	-	6 600
7357	"	140		264	1 320	-	-	-	6 600
7358	"	984		264	1 320	-	-	-	6 600
7359	"	985		264	1 320	-	-	-	6 600
7360	"	986		264	1 320	-	-	-	6 600
7361	"	987		264	1 320	-	-	*3 300	6 600
7362	"	988		264	1 320	-	-	-	6 600
7363	"	989		264	1 320	-	-	-	6 600
7364	"	994		264	1 320	-	-	-	6 600
7366	Surrender Feb 18/54	2194						*3 300	-
7367	Surrender Feb 18/84	2195							

TABLE 1
Continued

Licence Nos.	Date Issued	Map Area	Units	Hectares	App. Feb. 18/84 Work to Feb. 19/84 Rental $5.00/ha	App. Feb. 18/83 Work to Feb. 19/84 1st Term Work $7.50/ha	App. Feb. 18/83 Work to Feb. 19/84 2nd Term Work $12.50/ha	App. Feb. 18/84 Work To Feb. 19/86 3rd Term Work $12.50/ha	
		104-A-16, Blk. B							
7544	Feb. 19/83		83, 84 (ex. Ptn. Lots 986, 2194)	12	60	90	150	150	-
7545	"		63, 64, 73, 74	284	1 420	2 130	3 550	3 550	-
7546	"		43, 44, 53, 54	284	1 420	2 130	3 550	3 550	-
7547	"		41, 42, 51, 52	284	1 420	2 130	3 550	3 550	-
7548	"		21, 22, 31, 32	284	1 420	2 130	3 550	3 550	-
		104-A-16, Blk. A							
7549	"		29, 30, 39, 40	284	1 420	2 130	3 550	3 550	
TOTAL - Hectares, Rental and Work Applied Feb. 18/84				5,911	$29,555	$10,740*	$17,900*	$35,049.50*	$98,597.50*
								$162,287* Total	

Suncor inc. COAL AND MINERALS DEPARTMENT (FEB. 1984) MT. JACKSON , B.C. (WORK CREDIT) Table 2

COAL LICENCES

LICENCE NO.	AREA	DATE OF CLAIM	HECTARES	1982	1983	1984	1985	1986
	104 - A - 16 - Blk. B	All issued 82 - 02 - 19						
7369	45, 46, 55, 56		284					
7370	47, 48, 57, 58		284				$ 223.50 Credit	
7371	65, 66, 75, 76		284					
7372	67, 68, 77, 78 (Ex. Ptn. Lot 985)		176					
7373	85, 86, 95, 96		12					
7374	87, 88, 97, 98 (Ex. Lots 985, 987, 988)		7					
	104 - A - 16 - Blks. B, C, F, & G							
7358	Lot No. 984		264					
7359	Lot No. 985		264					
7363	Lot No. 989		264					
7362	Lot No. 988		264					
7361	Lot No. 987		264					
7360	Lot No. 986		264					
7352	Lot No. 135		264					
7353	Lot No. 136		264					
7354	Lot No. 137		264					
7364	Lot No. 994		264					
7357	Lot No. 140		264					
7356	Lot No 139		264					
7355	Lot No. 138		264					
	104 - A - 16 - Blk. B	83 - 02 - 19						
7544	83, 84 (Ex. Ptn. Lots 986, 2194)		12					
7545	63, 64, 73, 74		284					
7546	43, 44, 53, 54		284					
7547	41, 42, 51, 52		284					
7548	21, 22, 31, 32		284					
	104 - A - 16 - Blk. A							
7549	29, 30, 39, 40		284					
		TOTAL	(5911)					

4.3 Physiography (Continued)

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.

The principal river of the area is the Skeena, which has its source some 40 km to the northwest. It flows in a southeasterly direction through the property, before turning south and westwards to enter the Pacific Ocean at Prince Rupert. To the east of the Skeena, within the licences, the principal tributary is the south flowing Kluatantan River which enters the Skeena about 1 km west of the property boundary.

To the south of the Skeena, four principal creeks effect drainage of the property. The largest of these is Currier Creek which flows from the southwest and converges with the Skeena at McEvoy Flats. About 1 km to the north of Jackson Flats is Discovery Creek, the lower part of which traverses Suncor's licences. The northerly-flowing Trail Creek enters Currier Creek just before its confluence with the Skeena. It drains the western slopes of Mount Jackson and has several small tributaries. The last creek worthy of mention is Jackson Creek which originates near the sumit of Mount Jackson. It is entirely contained within the licences and enters the Skeena at the east end of Jackson Flats.

Apart from the B.C. Rail bed and a microwave tower, there has been no large scale clearing within the property. The only activities currently taking place are sporadic bouts of coal exploration and some trapping. A former exploration camp at the Kluatantan airstrip has recently been purchased by a local outfitter and used as a base for hunting.

The higher slopes and ridge tops above the tree line (about 1500 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 laborious task. The only open areas covered by grassland and berry-bearing shrubs are around McEvoy and Jackson Flats.

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 Cariboo aircraft, is located at the confluence of the Skeena and Kluatantan Rivers. From this point the property is a few minutes flight-time by helicopter.

The British Columbia Railway's Dease Lake rail-line runs through the northeast corner of the property. Though the actual trackage ends at Chipmunk Creek, some 30 km to the south, the road-bed is in place and graded up to the Kluatantan River (see Geographic Location and Transportation Map, Fig. 1).

4.5 Reclamation

No mechanical work was performed on the licences in 1983.

The base camp was at the confluence of the Skeena and Kluatantan Rivers on a site which was originally built during the construction of the B.C. Rail line through the area. The camp utilized tent frames which were built by the 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 area 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, unnamed, first order streams drain the north-facing slopes at Mount Jackson (Fig. 3).

Calculated flows for study area tributaries are shown in Table 3. The data show 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 due to snowmelt and flows decrease thereafter with a small increase in October due to winter rains. March is likely the month of minimum monthly flows.

TABLE 3
Estimated Discharges for Streams
in the Mount Jackson Study ARea

Tributary	Drainage Area (km^2)	Discharges Mean Annual (cms)	Max. Monthly (cms)	Min. Monthly (cms)
Jackson Creek	7.3	.21	.74	0.021
Falconer Creek	28.0	.81	2.9	0.081
Trail Creek	62.0	1.8	6.4	0.18
Currier Creek	150.0	4.4	16	0.44
Kluatantan River	510.0	15	53	1.5

4.7 Climate

The climate is characterized by short, cool summer and cold winters. This is due to the frequent influexes of continental arctic air and the much less frequent occurrence of moist Pacific air. Precipitation is relatively light by comparison with coastal regions, with the wettest areas occurring on the west facing windward slopes of mountain ranges. 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 location, elevations, periods of records and the type of data collected are shown in Table 4. Monthly average minimum and maximum temperatures and average monthly precipitation data for each station are shown in Table 5. The data shown are predicted long-term averages (30 year normals) calculated by the MOE; long term extremes are not available. The data indicate that climatic conditions in the study area can be expected to conform to the general description given above.

As is evident from Table 5, no data are available for such climatic factors as wind, solar radiation, cloud, fog, precipitation intensity or evapotranspiration either for the region or the study area.

TABLE 4
Climate Stations Used to Indicate Regional Climatic Conditions

Station	Latitude	Longitude	Elevation (m)	Distance From Study Area	Period of Record (yr)
Kluatantan	56°52'N	128°14'W	811	10 km North	1
Chipmunk	56°42'N	127°50'W	723	25 km Southeast	1.5
Mosque Creek	56°31'N	127°35'W	655	45 km Southeast	1.5
Didene	57°17'N	128°52'W	1,343	70 km Northwest	4

4.8 Wildlife

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

During the 1983 season black bears were the only form of wildlife seen. A yearling black bear came into our base camp on several occasions.

Though the bulk of our work was done above the treeline no animals were seen in these open areas or on the slopes facing the work area.

TABLE 5

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)												
Max.	-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

5.0 WORK DONE ON MOUNT JACKSON PROJECT AREA

5.1 Previous Work in the Area

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.

In 1903 J. McEvoy explored the area for 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 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 remapped the coal field. The results of this survey are published in G.S.C. Bulletin 16 - "The Groundhog 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 Lower Cretaceous Hazelton Group (Fig. 4a).

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 instigated 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 Work Performed in 1983

On August 2nd, Suncor's field personnel began moving the 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 geological field staff on this project consisted of:

John Fisher	Projects Geologist
Shannon Wainwright	Party Chief and Geologist
Jiri Bartek	Geologist
Kevin Brown	Geologist
Greg Cave	Geological Assistant
Don Giddings	Field Assistant

On setting up the base camp we utilized tent frames present which were the property of Love Brothers of Smithers, B.C. The camp is on a site originally prepared for the work camp of personnel involved in the construction of the B.C. Rail Dease Lake extension.

The bulk of the field work consisted of geological mapping. The mapping was done using aerial photographs which had been enlarged to scale 1:5000. Data placed on these photographs was later posted to maps (see Fig. 5, 6).

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 104.2 m were dug on licences 7363, 7369, 7370 and 7371 (see Fig. 2, 6). Stratigraphic sections (see Fig. 6, 8), were constructed on traverses on the exposed south-facing slopes of Mount Jackson and Falconer Mountain.

Coal seams were sampled and the samples were flown to Calgary for analyses by Birtley Coal and Minerals Testing Ltd. (see Coal Analyses, Tables 7, 8).

Geological exploration and mapping was carried out until September 3rd when personnel struck camp and moved out of the area.

6.0 GEOLOGY

6.1 Regional Stratigraphy

The Mount Jackson property lies in the northeast part of the Mesozoic-Paleogene Bowser Basin. The regional geological map available was published by Buckham & Latour (1950) - (see Figures 4a, 4b). The Hazelton Group shown on this map is the equivalent of the lower Gunanoot Assemblage of Richards & Gilchrist (1979) and the Currier unit of Bustin & Moffat (1983?).

According to Eisbacher, (1981), the Bowser Lake Group was formed during the initial Mid Jurassic-to-Early Cretaceous marine and non-marine transitional stage reflecting the subsidence of the Stikine Terrane, the deformation and uplift of the Atline Terrane and the suturing of both terranes with the Omineca Belt. Coal sedimentation took place during the latest Jurassic - earliest Cretaceous when the uppermost part of the Bowser Lake Group, the Gunanoot Beds, was deposited.

The Gunanoot Beds form a southward prograding wedge of alluvial-paralic conglomerates, sandstones, mudstones and coals. They represent the sedimentary environment of a high-gradient channel system grading into paralic coal swamps and fine grained delta-channel and inter-channel deposits. The total thickness varies between 500-1,000 m. The Gunanoot Beds mark a significant uplift and shift of paleoslope inclination, from south to west-southwest, with deposition of the Skeena Group not occurring in the project area.

In contrast, Richard & Gilchrist, (1979), concluded that the coarse-grained channel facies around Mount Gunanoot, (about 60 km north-northwest of the property), thins and fines laterally eastward into overbank facies.

Bustin & Moffat, (1983?), reviewed the geology of the Groundhog coalfield as published by a number of geologists with the exception of Eisbacher, (1981). Their principal coal bearing unit in the coalfield is the Currier, 400-600 m thick, of Late Jurassic age.

6.0 GEOLOGY

6.2 Regional Structure

No systematic, broad-based, structural study of the area has been carried out. This makes it very difficult to get a clear picture of the tectonic setting of the area due to its intensive, tight, folding.

Richards & Gilchrist, (1979), succeeded in recognizing the Beirnes Syncline, extending to the north of the property, west of the Skeena River. It is a doubly plunging, open, northwest trending structure defined by a large percentage of conglomerates and sandstones. Most minor folds within and around the Beirnes Syncline show an easterly vergence. The valleys of the Skeena River and Currier Creek are usually interpreted as being fault controlled. Since the position of the faults is uncertain, we did not include them in our geological map.

6.3 Local Stratigraphy

Intensive folding, lack of significant marker beds, and poor outcrops make any attempt at establishing a local stratigraphic sequence very difficult.

The Jackson Unit, as defined by Busin & Moffat, (1983?), appears to us to only be present along the eastern part of Mount Jackson. It was designated as the "Barren (non coal-bearing) Unit", on our geological map (Fig. 5).

The base of the Currier Unit, "is placed at the first occurence of coal, (greater than 20 cm thick), and thick sandstone intervals", (Bustin & Moffat, 1983?). As opposed to the aforementioned authors, we feel that the Currier Unit, the "Coal-bearing Unit", in Fig. 5 of this report, occupies the remainder of Mount Jackson and not only the summit area. The reasons for this are;

- the first coal seam greater than 20 cm thick occurs 34.1 m above the base of measured section MJ-83-A-A', covering the entire south slope of Mount Jackson (Fig. 6, 8a);

- thick sandstones occur throughout the whole section including the strata below the lowest coal seam.

The Falconer Mountain area is mainly underlain by a thick unit of shales, siltstones and sandtones, the latter reaching mappable thickness on the western ridge of Falconer Mountain. The unit grades stratigraphically upwards to fine-grained sediments on the southwest slope.

For a more detailed description of the rock types see the list of reference points (Table 6, Figures 6, 7).

6.4 Local Structure

As mentioned in section 6.3, the overall structure is very complex due to intense folding. It can best be apprehended by examination of the southeast-facing cliffs of Mount Jackson, above Falconer Creek, and the north face of Falconer Mountain. Axes of folds are gently dipping toward the north and north-northwest, (Fig. 5). Nevertheless, we feel that the northwest slope of Mount Jackson is basically a dip slope. It is not a simple dip slope, copying one single set of strata, but a slope controlled to a great extent by the limbs of flat lying isoclinal folds. This idea is supported by the position of the sub-parallel key beds 2.5 km northwest of the summit of Mount Jackson. If this is so, the northwest slope of Mount Jackson would form the southern closure of the Beirness Syncline (or synclinorium), outlined by Richards & Gilchrist (1979).

A northwest trending, relatively open, syncline is well developed on the entire southwest slope of Falconer Mountain. It is remarkable that this fairly simple structure is underlain by an intensely tightly folded lower structural level, north and east of it. Another, although on a smaller scale, example of disharmonic folding can be observed within the lower structural level itself on the north face of Falconer Mountain, beneath reference points numbers 129, 130 and 132 (Fig. 6).

Schistosity sometimes dominates over bedding so much in this area that we preferred to not measure strike and dip unless we were able to find distinct sedimentary features on an outcrop.

Faults, of apparently local importance, with a displacement of several metres, slightly modify the attitude of the units. A fault zone of regional importance is indicated by a conspicuous series of faults, alignments and a straight stretch of the Skeena River 2 km above its confluence with Kluatantan River. The fault zone may be the one which controls the Skeena River valley north of our property, mentioned by Richards & Gilchrist (1979).

7.0 COAL

7.1 Areal Distribution

Our property is located on the southern perimeter of the Groundhog coalfield.

On Mount Jackson coal occurs mainly in the upper part of the stratigraphic sequence (Fig. 5, 6, 8a). Two thick seams outcrop around the summit of Mount Jackson. They were described in detail in trenches MJ-83-1, 3, 4 and 5 (Fig. 5, 6, 7). The lower seam is partially disturbed by soil creep in trench MJ-83-1 but the thickness appears to be at least 4 metres. It thins and ash content increases northwestwards as can be seen by comparison with trench MJ-83-3. The upper seam was exposed by trench MJ-83-4 with a thickness of 2.5 metres. It also deteriorates northwestward in terms of both thickness and coal quality (see trench MJ-83-5).

Another major concentration of coal seams occurs 750-1,500 m north to northwest of the summit of Mount Jackson. We believe that they are stratigraphically equivalent to those around the summit of Mount Jackson. The thickness of the coal seams in that area varies between 3.0 m (MJ-83-9) and 0.65 m (MJ-83-13) with a different coal quality.

Isolated coal seams of less significant thickness and coal quality are scattered over the western part of Mount Jackson and the adjacent banks of Trail Creek. Coal bloom can be found in many places over the north slope of Mount Jackson and the lower section of Trail Creek.

The third significant area of coal occurences is located 1 km southwest of the summit of Falconer Mountain. As on Mount Jackson, coal occurs in the stratigraphically uppermost section of local strata (Fig. 5). The only coal seam outcrop seen is shown by stratigraphic section MJ-83-B-B' (Fig. 8b). Total thickness of the seam is 7.42 m with 2.91 m of coaly shale, carbonaceous shale, shale, intermittent bentonite and minor siltstone. Immediately west of this seam there are a number of coal bloom showings with no traces of partings. Smaller amounts of coal bloom were found in other places around the same general area.

As far as we were able to observe on the surface, coal seams cannot be followed laterally for more than a few hundreds of metres. They pinch out, become increasingly shaly or disappear under Quarternary slope sediments.

With regard to the general geological structure of the north slope of Mount Jackson and geographic conditions, we find it reasonably justified to further explore for mineable coal east and west of the lower reaches of Trail Creek in a strike-wise extension of coal outcrops and the abandoned adits in the bank of the creek.

7.2 Coal Quality and Analyses

Raw coal samples were taken from all trenches and the stratigraphic section MJ-83-B-B'. Partings in thicknes of up to several cm were included. For clean coal, samples were crushed to 6 mm and float at 1.55 g/cm^3 was analyzed. Results are graphically presented in Coal Quality Diagrams - Figure 9a through 9c (raw coal), and 9d through 9f (clean coal). As expected, clean coal values are more concentrated than those for raw coal.

All assays were carried out by Birtley Coal & Minerals Testing in Calgary. Residual moisture was determined by drying 1 g of pulverized coal for 1 hour at a temperature of 105°C.

Ratios of volatile matter/fixed carbon as indicators of coal rank (Figures 9a, 9d), cover the range of bituminous coal through anthracite. Washed coal samples fall mostly within semi-anthracitic or anthracitic type of coal. It should be noted, however, that absolute values of volatile matter and fixed carbon are lower (often considerably), than those typical for coal of above mentioned ranks.

As Figures 9b and 9e show, calorific values of marketed clean coal can be expected to fluctuate between 5,500-7,500 cal/g (10,000-13,500 Btu/lb).

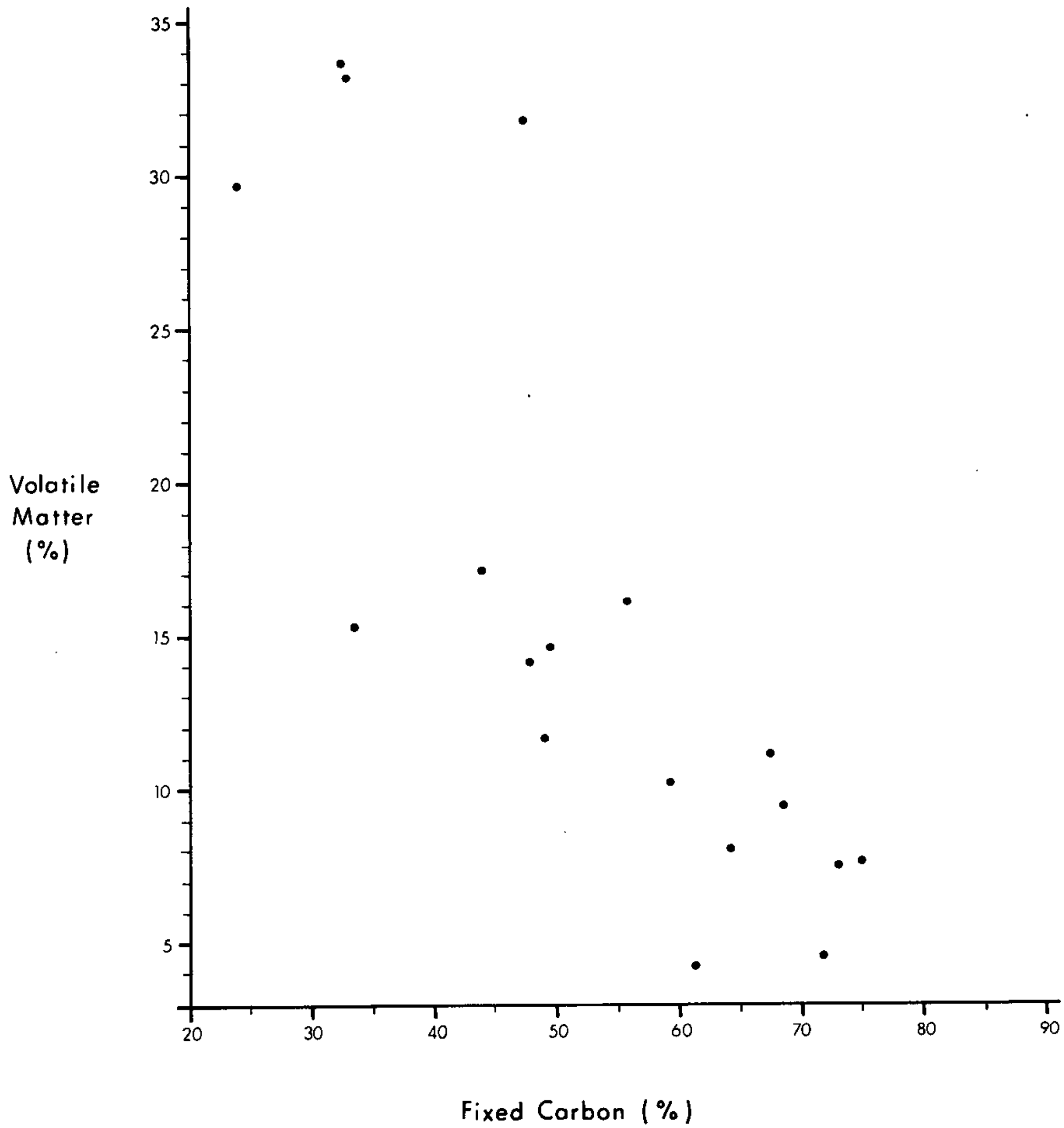
Sulphur content of raw and clean coal (Figures 9c, 9f) exhibits a trend indicating that sulphur-bearing minerals (pyrite?)

are finely disseminated in the coal matrix and cannot be substantially removed by washing. Nevertheless, sulphur content of clean coal is fairly low, between 0.35 and 0.6%.

The ash content of raw coal is 15-50% (Figures 9b, 9c). It has been significantly reduced by flotation in a 1.55 g/cm^3 fluid to 4.7-14.2% (Figures 9e, 9f).

Yield at 1.55 g/cm^3 occupies a wide range of 0.9-82.1%; individual values are evenly distributed over the entire range.

Aeromagnetic map 104A shows a large positive anomaly centred between Mount Jackson and Falconer Mountain. It is interpreted as a large intrusive body which could have increased coal rank.



Suncor inc Resources Group

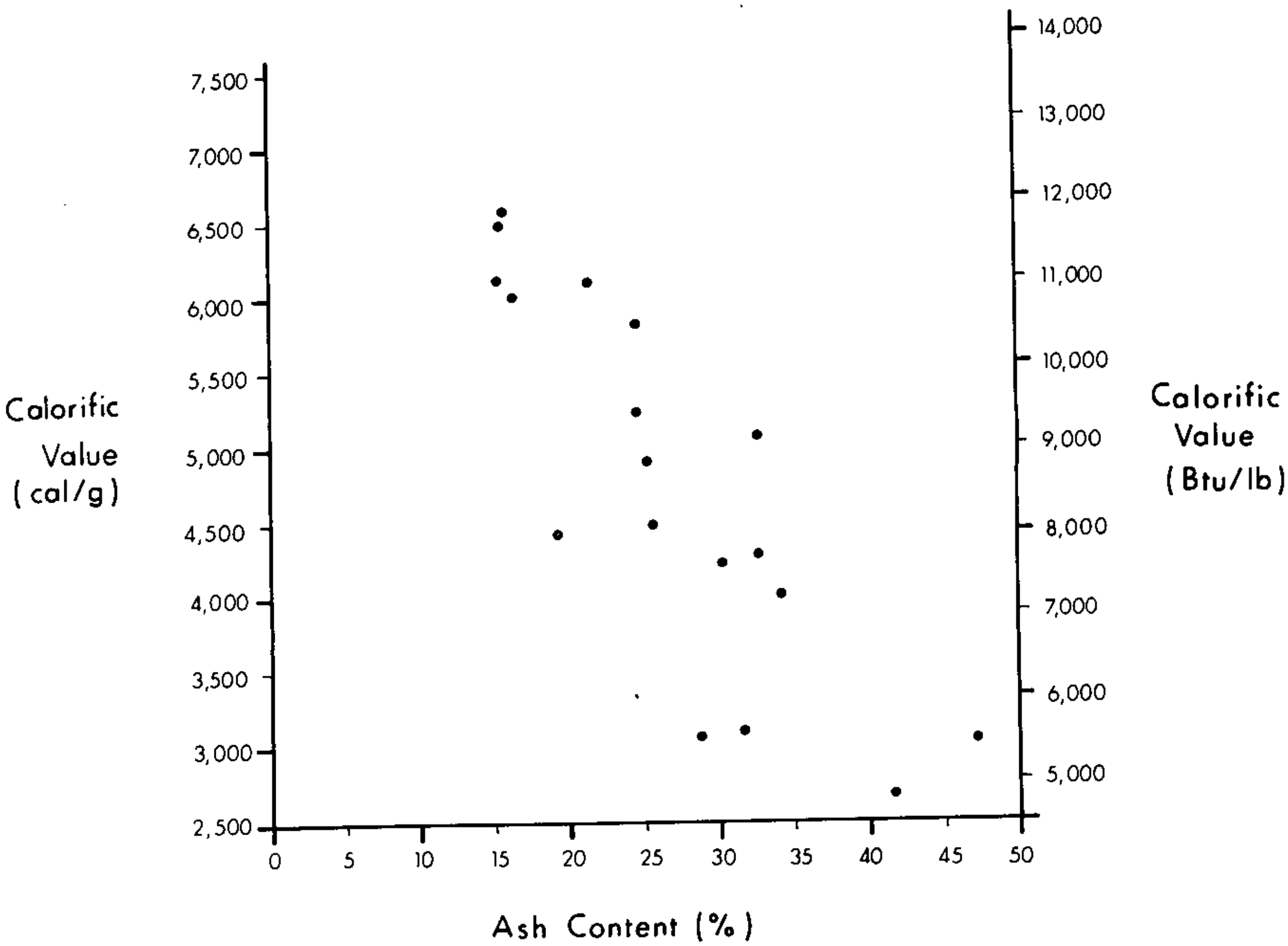
COAL AND MINERALS DEPARTMENT

COAL QUALITY DIAGRAM

Raw coal
Volatile matter/fixed carbon
Air dried basis

Mt. Jackson

DATE	SCALE	NTS	DRAWING No
84 - 02		104 A/16	Figure 9a



Suncor inc Resources Group

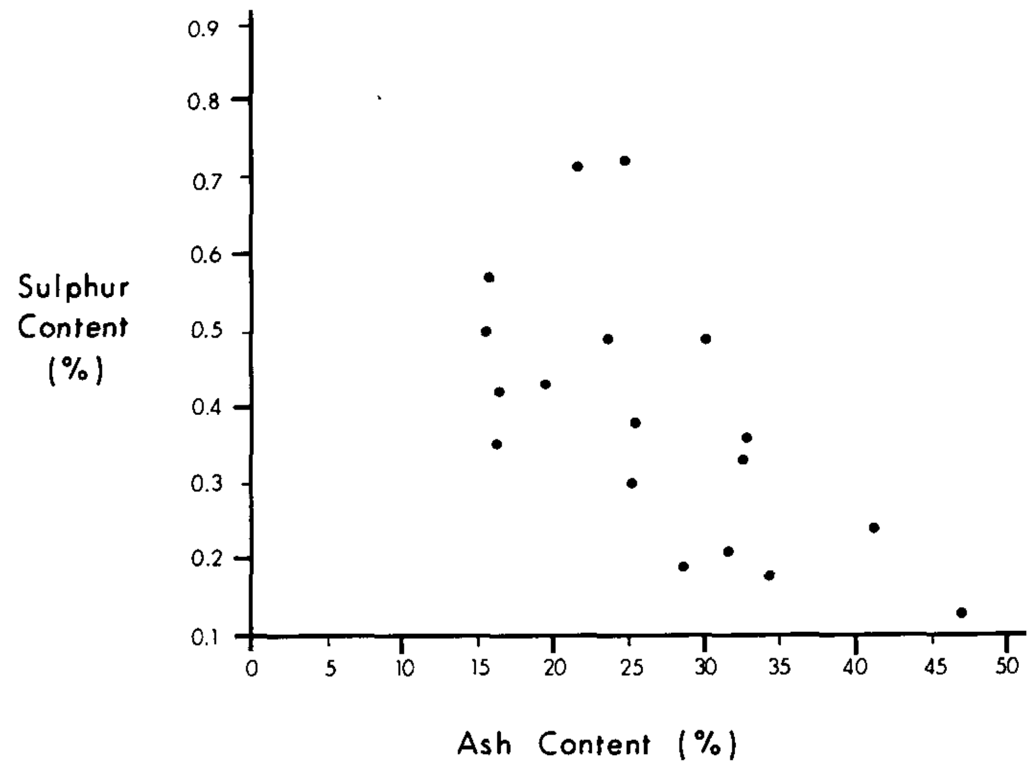
COAL AND MINERALS DEPARTMENT

COAL QUALITY DIAGRAM

Raw coal
Calorific value / ash content
Air dried basis

Mt. Jackson

DATE	SCALE	NTS	DRAWING No
84-02		104 A/16	Figure 9b



Suncor Inc. Resources Group

COAL AND MINERALS DEPARTMENT

COAL QUALITY DIAGRAM

Raw coal
Sulphur content/ash content
Air dried basis

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No.
84-02		104 A/16	Figure 9c

TABLE 7

RAW COAL QUALITY ANALYSES

LAB NO.	SAMPLE NO.	ADM%	MOIST %	ASH %	VOL. %	F.C.%	S%	CV CAL/GM	S.G.	BASIS
7111	1442+1443	17.80	4.40	34.40	17.20	44.00	0.18	4021	1.82	adb
			21.42	28.28	14.14	36.17	0.15	3305		arb
				35.98	17.99	46.03	0.19	4206		db
7112	1444	13.20	1.30	16.10	7.70	74.90	0.35	6581	1.57	adb
			14.33	13.97	6.68	65.01	0.30	5712		arb
				16.31	7.80	75.89	0.35	6668		db
7113	1447	17.50	2.60	25.30	16.20	55.90	0.30	4903	1.79	adb
			19.65	20.87	13.37	46.12	0.25	4045		arb
				25.98	16.63	57.39	0.31	5034		db
7114	1448+1449	20.10	4.10	47.20	15.30	33.40	0.13	3047	1.96	adb
	+1450		23.38	37.71	12.22	26.69	0.10	2435		arb
				49.22	15.95	34.83	0.14	3177		db
7136	1528+1529	11.50	7.60	30.30	14.20	47.90	0.49	4236	1.78	adb
	+1530		18.23	26.82	12.57	42.39	0.43	3749		arb
				32.79	15.37	51.84	0.53	4584		db
7143	1930	5.80	6.40	15.50	9.40	68.70	0.50	6136	1.57	adb
			11.83	14.60	8.85	64.72	0.47	5780		arb
				16.56	10.04	73.40	0.53	6556		db
7144	1933	14.40	4.70	41.50	29.70	24.10	0.24	2662	1.85	adb
			18.42	35.52	25.42	20.63	0.21	2279		arb
				43.55	31.16	25.29	0.25	2793		db
7145	1935	13.20	1.30	19.40	31.90	47.40	0.43	4433	1.68	adb
			14.33	16.84	27.69	41.14	0.37	3848		arb
				19.66	32.32	48.02	0.44	4491		db
7146	1939	23.60	4.80	28.80	33.20	33.20	0.19	3060	1.79	adb
			27.27	22.00	25.36	25.36	0.15	2338		arb
				30.25	34.87	34.87	0.20	3214		db
7147	1942	27.70	2.30	31.60	33.60	32.50	0.21	3093	1.82	adb
			29.36	22.85	24.29	23.50	0.15	2236		arb
				32.34	34.39	33.37	0.21	3166		db
7148	1943	11.70	6.80	23.80	10.20	59.20	0.49	5247	1.68	adb
			17.70	21.02	9.01	52.27	0.43	4633		arb
				25.54	10.94	63.52	0.53	5630		db

TABLE 7
(Continued)

RAW COAL QUALITY ANALYSES

LAB NO.	SAMPLE NO.	ADM%	MOIST %	ASH %	VOL. %	F.C.%	S%	CV CAL/GM	S.G.	BASIS
7149	1945	7.70	5.20	16.50	11.10	67.20	0.42	6018	1.64	adb
			12.50	15.23	10.25	62.03	0.39	5555		arb
				17.41	11.71	70.89	0.44	6348		db
7150	1946	9.10	6.40	32.80	11.70	49.10	0.36	4306	1.80	adb
			14.92	29.82	10.64	44.63	0.33	3914		arb
				35.04	12.50	52.46	0.38	4600		db
7151	1948	11.30	10.20	25.50	14.70	49.60	0.38	4502	1.72	adb
			20.35	22.62	13.04	44.00	0.34	3993		arb
				28.40	16.37	55.23	0.42	5013		db
7152	1952	7.90	3.60	15.80	7.60	73.00	0.57	6498	1.57	adb
			11.22	14.55	7.00	67.23	0.52	5985		arb
				16.39	7.88	75.73	0.59	6741		db
7153	1954	11.00	2.10	21.60	4.60	71.70	0.71	6117	1.70	adb
			12.87	19.22	4.09	63.81	0.63	5444		arb
				22.06	4.70	73.24	0.73	6248		db
7154	1957	10.80	2.90	24.80	8.00	64.30	0.72	5820	1.65	adb
			13.39	22.12	7.14	57.36	0.64	5191		arb
				25.54	8.24	66.22	0.74	5994		db
7155	1961	6.30	1.90	32.70	4.20	61.20	0.33	5032	1.79	adb
			8.08	30.64	3.94	57.34	0.31	4715		arb
				33.33	4.28	62.39	0.34	5129		db

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APPENDIX 1

SUNCOR INC. MOUNT JACKSON COAL LICENCES

NOS. 7352 to 7364 inclusive; 7366, 7367;
7369 to 7374, inclusive;
and 7544 to 7549, inclusive

FEBRUARY 19, 1984 Anniversary Date

EXPENDITURES

CATEGORY OF WORK

Geological Mapping (90% of Geological Staff Wages)	33,233	
Surface Work Trenching, (10% of Geological Staff Wages)	3,693	
Reclamation	850	
Other Work		
Supplies and Materials	5,600	
Fuel and Gas	13,484	
Fixed Wing Support	23,969	
Groceries	9,810	
Helicopter	22,918	
Propane	519	
Photo-Geological Interpretation	7,200	
Maps, Photos, Publications	1,200	
Training (First Aid)	90	
Communications (Radio-Telephones)	440	
Equipment Rental (Generator, etc.)	3,686	
Freight and Shipping	1,156	
Camp Construction	600	
Core Examination	206	
Staff Expense Accounts (Accommodation, Food etc.)	860	
Expediting and Storage	1,710	
Consultatns	4,015	135,239
Off-Property Costs		
Management, Travel, Drafting, etc.		27,048
TOTAL		162,287

APPROVAL COPY

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

APPLICATION TO EXTEND TERM OF LICENCE

I, R. D. MOSS (Name) agent for SUNCOR INC. (Name)

500 - 4 Avenue, SW (Address) 500 - 4 Avenue, SW (Address)

Calgary, Alberta Calgary, Alberta

Valid FMC No. 266379 Valid FMC No. 266374

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 7352 to 7364, inclusive; 7369 to 7374, inclusive; and 7544 to 7549, inclusive

for a further period of one year.

2. Property name MOUNT JACKSON

3. I am allowing the following Coal Licence(s) No(s). to forfeit 7366 and 7367

4. I have performed, or caused to be performed, during the period July 1, 1983 to September 3, 1983, work to the value of at least $162,287 on the location of coal licence(s) as follows:

CATEGORY OF WORK

	Licence(s) No(s).	Apportioned Cost
Geological mapping	All Licences, including	33,233
Surveys: Geophysical	7352 to 7364, inclusive;	Nil
Geochemical	7366 to 7367, inclusive;	Nil
Other	7369 to 7374, inclusive	Nil
Road construction	7544 to 7549, inclusive	Nil
Surface work		3,693
Underground work		Nil
Drilling		Nil
Logging, sampling, and testing		Nil
Reclamation		850
Other work (specify)		97,463
Off-property costs		27,048

5. I wish to apply $162,287 of this value of work on Coal Licence(s) No(s). 7352 to 7364, inclusi 7369 to 7374, inclusive; and 7544 to 7549, inclusive

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

7. The work performed on the location(s) is detailed in the attached report entitled MOUNT JACKSON EXPLORATION, 1983

January 23, 1984 (Date)

R. D. MOSS

Manager, Coal & Minerals (Position)

(FORMS AND REPORT TO BE SUBMITTED IN DUPLICATE)

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(2)

GEOLOGICAL MAPPING Yes ☒ No ☐

	Area (Hectares)	Scale	Duration
Reconnaissance	1839		1 week
Detail: Surface	4600		3 weeks
Underground			
Other* (specify)			

Total Cost $33,233

GEOPHYSICAL/GEOCHEMICAL SURVEYS Yes ☐ No ☒

Method

Grid

Topographic

Other* (specify)

Total Cost $

ROAD CONSTRUCTION Yes ☐ No ☒

Length Width

On Licence(s) No.(s)

Access to

Total Cost $

SURFACE WORK Yes ☒ No ☐

	Length	Width	Depth	Cost
Trenching	1024	50 cm	75 cm	3,693
Seam Tracing				
Crosscutting				
Other* (specify)				

Total Cost $ 3,693

UNDERGROUND WORK Yes ☐ No ☒

	No. of Adits	Maximum Length	No. of Holes	Total Metres	Cost
Test Adits					
Other workings*					

Total Cost $

DRILLING Yes ☐ No ☒

	Hole Size	No. of Holes	Total Metres	Cost
Core: Diamond				
Wireline				
Rotary: Conventional				
Reverse circulation				

Other* (specify)

Contractor

Where is the core stored?

Total Cost $

LOGGING, SAMPLING, AND TESTING Yes ☒ No ☐

Lithology: Drill samples ☐ Core samples ☐ Bulk samples ☐

Logs: Gamma-neutron ☐ Density ☐

Other* (specify) Trench samples

Testing: Proximate analysis ☒ FSI ☐ Washability ☐

Carbonization ☐ Petrographic ☐ Plasticity ☐

Other* (specify)

Total Cost $

RECLAMATION Yes ☒ No ☐

Details Total Cost $ 850

OTHER WORK (Specify details) Yes ☒ No ☐ Cost

Camp expenses, Helicopter, etc. (See Itemized Account) 97,463

Total Cost $ 97,463

OFF-PROPERTY COSTS Yes ☒ No ☐

Details Management, travel, camp, drafting, etc. Total Cost $ 27,048

Total Expenditures $ 162,287

January 23, 1984
(Date)

(Signature)
R. D. MOSS

Manager, Coal & Minerals
(Position)

PROFESSIONAL ENGINEER R. D. MOSS PROVINCE OF ONTARIO

*A full explanation of other work is to be included.

MT. JACKSON 1983

REFERENCE POINTS

1. Sandstone fine grained, well sorted, medium grey, medium-thick bedded, interbedded with shale; 80/36S, 76/62SE, 17/16W, 93/20S.

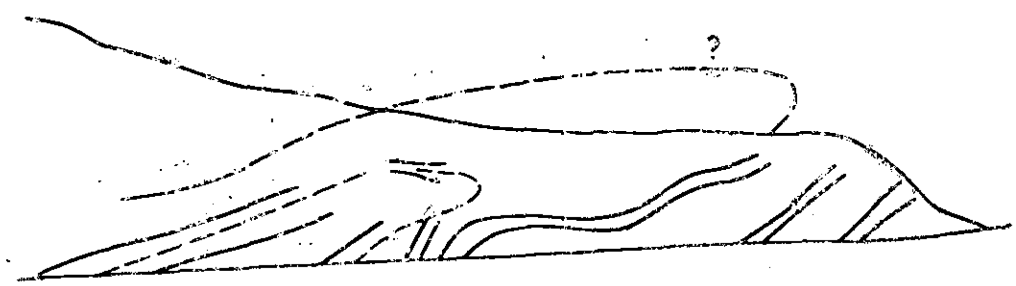
2. Sandstone and shale; 130/42NE.

3. Anticline plunging 5°SW.

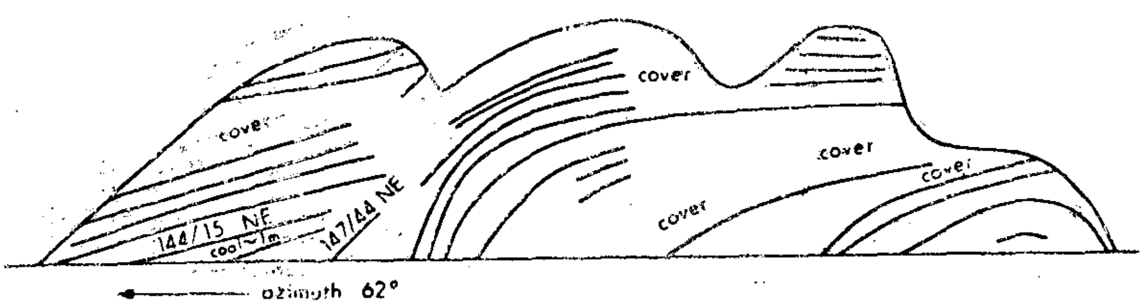
4. Cross-bedding in sandstone tops up; 126/68NE.

5. Sandstone and shale; 126/18SW.

6. Folded and faulted outcrop.



7. See sketch:



8. Sandstone and shale interbedded; 100/10N.

9. About 1 m of dirty coal below sandstone and shale cliff; 160/12NE.

10. Shale and coal in at least 2 seams (high on cliff) 0.4 and 0.2 m thick, cross-bedding tops up; 126/28NE.

11. Shale, black and brown; 140/24NE.

12. Shale cliff, laminated; 136/24NE.

13. Coal bloom above cliff forming shales with water fall.

14. Cliffs of shale on both sides of river, form falls and rapids; 160/18NE, 148/30NE.

15. Sandstone, siltstone and shale well bedded on high cliff; 130/38NE.

16. Shale, with poor bedding, cleaved.

17. Sandstone and shale on cliff; 160/34NE.

18. West bank: shale and about 0.5 m of coal, only floor exposed; 150/40NE.
East bank: same coal exposed further downstream below cabins, roof and floor exposed, slumped in between, estimated thickness is 1.8 m of coal; 160/30NE.

19. Coal bloom mixed up with shale debris.

20. Shale, dark grey, laminated; 106/26NE.

21. Coal seam 0.4 m thick above dark coaly shale, below there is dark grey siltstone, coal is clean and dirty, rusty weathering; 140/24NE.

22. Shale, dark grey, well laminated; 170/14E.

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*(1)

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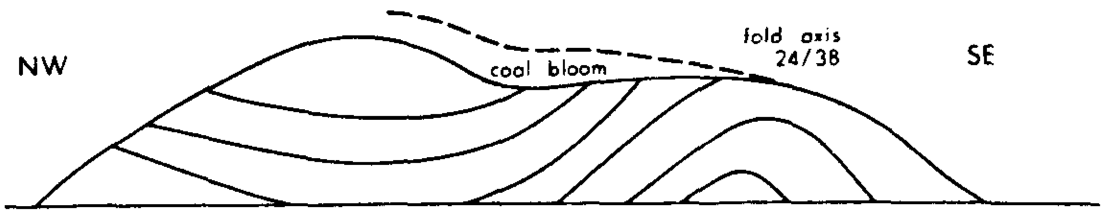
23. Coal bloom, see sketch.

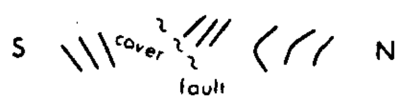


24. Sandstone, mostly thick bedded above fault, shale below fault is intensively veined; horizontal bedding along most of outcrop, gentle NE dips at extreme NE end of outcrop.

25. Shale carbonaceous, well laminated;
160/11NE.

26. Sandstone and shale, continuous outcrop on both sides of river;
092/28N, 108/26N, 100/30N.

27. West bank, see sketch:



East bank: shale with 2 coal seams less than 1 m thick.

28. Deformed outcrop intersected by several faults, intensively veined carbonaceous pods, well developed cleavage.

29. Sandstone, thick bedded above dark grey shale, interbedded with dirty coal more than 2 m thick, no roof exposed;
100/32N.

30. Sandstone, massive, thick bedded, horizontal attitude, on both sides of river, forming steps in the river bed and small cascades.

31. Shale, dark grey to black, interbedded with sandstone;
8/24W.

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*(1)

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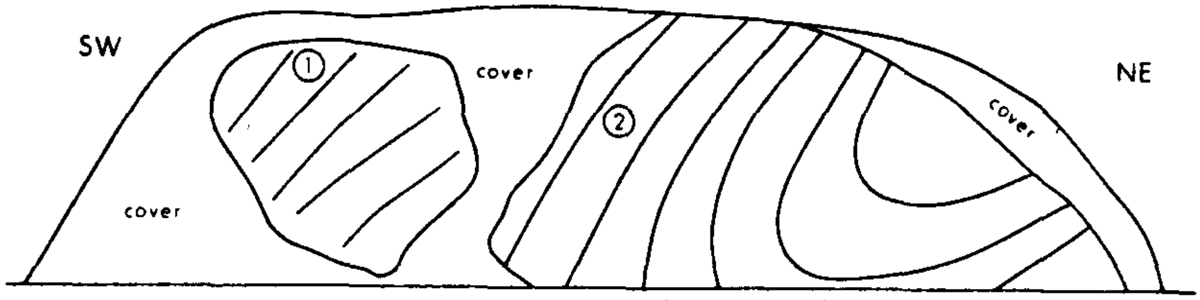
32. See sketch: at point No. 1 - sandstone and shale laminated; 158/37W.
at point No. 2 - sandstone and shale; 125/36W.



33. Sandstone silty, very fine grained, light-medium grey, well bedded, interlayered with siltstone; 130/15W.

34. Sandstone fine grained, thin bedded, medium brown, tan weathered with rusty areas, minor carbonaceous fragments occur in undercut bank;
150/5W.

35. Shale, medium grey, nodular, with belemnite fossils; 11/11E.

36. Shale, dark grey, hard, strong; 180/21W.

37. Coal in two seams 0.2 m (lower) and 0.1 m (upper) thick separated by shale, with sandstone below lower and above upper seam.

38. Sandstone and shale interbedded; 150/16SW.

39. Sandstone fine grained, medium-well sorted, light-medium brown;
176/15W.

40. Sandstone fine grained, dark grey, frequent quartz veins 1-5 cm thick;
155/75SW.
On west side of creek: mudstone, sheared; possibly fault running down stream.

41. Coal, 20-30 cm thick, clean and dirty, banded 70/30, blocky in places, adjacent to mudstone with coal whisps;
290/80NE.

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*(1)

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42. Shale; 150/34SW.

43. Sandstone fine grained, thick interbedded with siltstone, 290/32NE.
Shale, on west side of outcrop;
190/65W.

44. Shale, with abundant nodules; no attitude.

45. Mudstone shaly, friable, orange brown weathering, interbedded with siltstone;
349/15NE.

46. Sandstone fine to medium grained, interbedded with siltstone;
265/25N, 270/40N, 305/39NE.

47. Sandstone fine grained, 0.25-0.5 m thick bedding, interlayered with thin bedded siltstone;
350/40E.

48. Siltstone, interbedded with mudstone, poorly developed bedding;
350/24E.

49. Shale, thin interbedded with siltstone, both medium to dark grey;
315/20NE.

50. Sandstone fine grained, thin bedded, light grey, light brown grey weathered;
125/24SW.

51. Sandstone fine grained, well sorted, thin bedded, with 3-5 cm thick layers of massive siltstone;
120/20SW.

52. Sandstone fine grained, medium brown grey;
315/30NE.

53. Mudstone, dark grey;
305/15NE.

54. Sandstone fine grained, well sorted, medium brown grey, 1.0-1.5 m thick;
320/40NE.

55. Siltstone, thin bedded, brown grey to dark grey, interbedded with fine grained sandstone;
145/50SW.

56. Sandstone medium to fine grained, medium grey, with buff weathering, thin bedded;
147/40SW.

57. Sandstone fine grained, medium brown grey, interbedded with siltstone;
slicken sides 240/50, 290/75;
bedding 160/36SW, 140/35SW, 140/50SW, 184/51W, 180/60W, 194/56NW, 195/60NW.
West of sandstone is coaly shale interbedded with mudstone, black, thin bedded, intermittent coal seams 10-20 cm thick;
220/15NW.

58. Sandstone silty, very fine grained, thin bedded, dark grey and brown, interbedded with silty mudstone;
345/20NE.

59. Mudstone, interbedded with siltstone, thin bedded, sheared;
350/20E.

60. Siltstone and very fine grained sandstone, medium grey to brown weathering, thin bedded;
334/14NE.

61. Siltstone, dark grey, thin bedded, with thin bands of very fine grained sandstone;
316/14NE.

62. Siltstone, interbedded with silty very fine grained sandstone, thin bedded, planar bedding with minor variations of attitude;
309/38NE, 316/26NE;
coal seam on bank extends just below tree line.

63. Siltstone, interbedded with very fine grained sandstone;
295/20NE, 302/30NE, 310/35NE.

64. Sandstone fine to medium grained, dark grey, medium to thin bedded, well sorted, interlayered with thin layers of dark grey mudstone;
110/23NE.

65. Siltstone, medium brown grey, interlayered with thin layers of mudstone dark grey and thick layers of sandstone medium to fine grained, ochre and brown grey; schistosity domiantes over bedding;
317/12 axis of overturned anticline
173/20W lower 1/4 of outcrop
108/22N upper 3/4 of outcrop.

66. Sandstone medium grained, medium sorted, medium grey, thick bedded;
147/27SW;

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Mudstone silty, dark grey, with medium thick layers of fine grained sandstone - crossbedding indicates normal position;
120/13SW;
these two lithological units are separated by a fault moderately dipping W.

67. Mudstone silty, dark grey, without any different lithological units, therefore it is not certain whether thin disintegration is bedding or schistosity.

68. Following units are described in downward direction.
Sandstone medium to fine grained, light brown, moderately sorted, subangular grains, exposed in form of fragments.
Shale carbonaceous, 0.7 m thick. Shale coaly, with coal stringers, 0.2 m thick.
Shale carbonaceous, dark grey, 1.4 m thick.
Sandstone medium grained, light brown grey, relatively soft, medium to thick bedded, poorly sorted with angular grains, exposed thickness 0.8 m;
67/30NE.

69. Sandstone medium to fine grained, well sorted, thick bedded, interlayered with mudstone very thin bedded, dark grey;
124/48SW.

70. Sandstone medium to fine grained, rusty brown, poorly sorted, subangular grains, schistosity predominates over bedding;
145/40NE.

71. Sandstone fine grained, very thin grained, medium grey, thin bedded, interbedded with medium grey siltstone;
106/81N.

72. Siltstone, medium grey, thin bedded, with a layer 0.3 m thick of sandstone very fine grained, ochre;
36/23SE.

73. Mudstone, dark grey, very thin bedded, interbedded with sandstone very fine grained, thin bedded, medium grey;
87/4E anticlinal axis
49/7SE south limb
102/17N north limb.

74. Sandstone fine grained, light grey, well sorted, thin bedded;
148/14SW.

75. Mudstone, medium to dark grey, with dominant schistosity, interbedded with thick layers of massive siltstone;
92/29N east side
88/8N centre part of outcrop
104/43NE west side.

76. Sandstone fine grained, thin bedded, well sorted, light brown grey, with layers of medium bedded same sort of sandstone;
124/31SW.

77. Siltstone, light grey, thin bedded, with intermittent cherts and layers rich in plant debris;
64/42SE.

78. Siltstone, medium grey, very thin bedded, interbedded with thin bedded sandstone fine grained, well sorted, light grey;
150/43SW.

79. Mudstone, dark grey, pencil jointing, no indication of bedding.

80. Sandstone very fine grained, dark grey, thin to medium bedded, well sorted;
152/33SW.

81. Sandstone fine grained, medium grey, thin to medium bedded, well sorted;
10/21E.
Syncline between points 80 and 81:
166/9SE.

82. Mudstone, dark grey, thin bedded, interlayered with intermittent thin beds of siltstone;
171/6E.

83. Sandstone fine grained, well sorted, medium to dark grey, thin bedded;
18/28E.

84. Sandstone fine grained, well sorted, reddish brown, thin and very thin bedded;
111/26S.

85. Sandstone fine grained, well to moderately sorted, red brown, thin bedded;
139/46NE.

86. Mudstone silty, violet brown, very thin bedded;
112/31S.

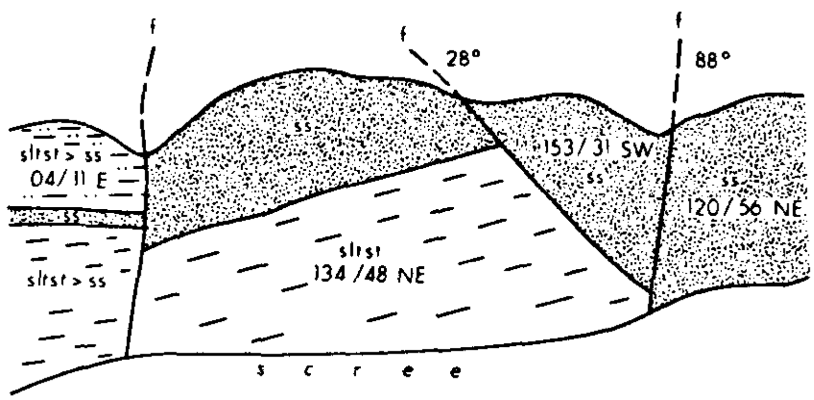
87. Sandstone fine grained, well sorted, thin bedded, medium to dark grey;
112/26N.

88. Sandstone fine grained, well sorted, brownish grey;
138/44NE.

89. Sandstone fine grained, medium grey, underlain by mudstone thin bedded, dark grey;
152/48NE.

90. Siltstone, interbedded with very fine grained ochre sandstone;
86/30S.

91. See sketch below:



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92. Sandstone fine grained, well sorted, subrounded grains, medium grained;
4/11E.

93. Mudstone, dark grey, very thin bedded, interbedded with medium thick layers of siltstone or very fine grained sandstone;
108/22S north end
177/79W south end.

94. Sandstone fine grained, moderately to well sorted, medium grey, medium to thick bedded;
113/36NE.

95. Sandstone very fine grained, well sorted, medium grey, medium bedded, interbedded with thin layers of siltstone and mudstone;
115/38N.

96. Sandstone, same as before, with frequent mudstone interlayers;
148/48NE.

97. Sandstone, same as before;
9/58W.

98. Sandstone fine and very fine grained, medium grey, thin bedded;
136/32SW.

99. Sandstone fine grained, well sorted, greenish grey, with rip-up clasts, medium to thin bedded, interlayered with thin mudstone rich in plant debris; two thin coal seams occur stratigraphically below sandstone; above sandstone there is mudstone with large ochre concretions resembling unit around coal seam immediately north of Mt. Jackson summit;
129/32NE.

100. Sandstone fine grained, medium grey, thin bedded, stratigraphically above mudstone;
116/24NE.
Mudstone, medium to dark grey, with large ochre weathered concretions; same unit as the one above sandstone on previous locality.

101. Sandstone, same as before, interbedded with very fine grained sandstone; some bedding surfaces show asymetric ripple marks in a normal position;
124/23NE.
Mudstone, with concretions, dark grey, stratigraphically below sandstone.

102. Mudstone cabonaceous and coaly, with thin layers of high ash and dirty coal with peacock colors;
169/43E.
Sandstone fine grained, poorly sorted, red brown, soft, thin bedded, underlying mudstone and coal.

103. Siltstone, dark grey, thin bedded, interlayered with sandstone fine grained, medium bedded, well sorted, brown grey;
171/6E.

104. Siltstone and sandstone same as before, their ratio is about 60:40, siltstone is intensively schistose;
175/21E.

105. Sandstone fine and very fine grained, medium grey, thin bedded, well sorted, schistose.
Siltstone, medium to dark grey, thin bedded, schistose, with rare large ochre stained concretions;
60/18SE.

106. Sandstone very fine grained, well sorted, dark grey, medium to thin bedded;
90/29N.

107. Mudstone, dark grey, thin bedded, with rare chert and siltstone layers;
95/26N SW part of outcrop
NE part of outcrop is tightly folded.

108. Mudstone, same as before, with higher proportion of cherts and intermittent thin layers of very fine grained sandstone;
22/36NW.

109. Mudstone, dark grey, with intermittent large ochre concretions in lower NE part of outcrop; grain size is fining stratigraphically upwards in SW direction;
166/24SW NE part
47/18NW SW part.

110. Mudstone silty, dark grey, with a layer rich in large ochre concretions and layers of siltstone;
164/48E.

111. Sandstone fine grained, well sorted, massive, thick bedded, probably a channel sandstone, occurs in 3 layers 1-2 m thick several m apart;
152/42NE.

112. Sandstone fine grained, poorly sorted, brown grey, relatively soft.
Mudstone, dark grey, thin bedded, underlies sandstone;
124/27NE.

113. Mudstone silty, dark grey, with a few large ochre nodules;
138/26SW.

114. Mudstone, dark grey, pencil jointed, interbedded with intermittent medium thick layers of siltstone and very fine grained sandstone;
49/56SE.

115. Mudstone, dark grey, with intermittent small round nodules and thin layers of fine grained sandstone and coaly shale;
11/46W.

116. Siltstone, interbedded with fine grained sandstone and minor layers of mudstone; tight anticline exposed in upper part of outcrop is underlain by uniformly dipping strata of cliff forming units;
176/20W.
Anticlinal axis: 155/24SE.

117. Sandstone fine and very fine grained, well sorted, medium grey, medium to thick bedded, with intermittent thin layers of dark grey siltstone thin bedded;
102/58N.

118. Sandstone, as before, about 5 m thick, overlying mudstone.
Mudstone, dark grey, very thin bedded, with frequent thin interlayers of siltstone or fine grained poorly sorted sandstone;
104/22N.

119. Mudstone, interlayered with siltstone (both thin layered, dark grey) and minor fine grained sandstone (poorly sorted, thin layered), exposed on scattered small outcrops;
58/42NW.

120. Sandstone very fine grained, grey, medium sorted, with frequent thin layers of dark grey mudstone;
126/26SW.
Northeast face of cliff exposes sandstone, siltstone and mudstone in layers several metres thick.

121. Slate, medium grey, slightly metamorphosed with silky lustre, micro folded, interlayered with fine grained sandstone; fault in place of anticlinal plane;
108/44NE east side
157/32SW west side.

122. Slate as before, frequent pencil jointing, no sandstone;
143/58SW.

123. Sandstone medium grained, well sorted, medium grey, thin to thick bedded;
114/50SW.

124. Shale, dark grey, chunky and pencil jointing;
156/32SW.

125. Sandstone medium to fine grained, medium grey, fine to thick bedded, with numerous rip-up clasts, well sorted;
142/23SW.

126. Shale, dark grey, interlayered with sandstone very fine grained, medium brown grey, fine bedding of sandstone resembles varves; schistosity often dominates over bedding;
188/20W.

127. Shale, dark grey, schistose, interlayered with sandstone several metres thick, medium grey, with gradational bedding;
176/19W.

128. Shale and siltstone, medium to dark grey, interlayered with thin layers of medium grained sandstone, thin layered, brown grey, poorly sorted;
5/26W.

129. Siltstone, medium grey, interbedded with shale and very fine grained sandstone;
155/69NE.

130. Sandstone fine grained, medium grey, thin bedded, well sorted;
160/22W.

131. Siltstone, medium to dark grey, thin bedded, interlayered with medium and fine grained sandstone, medium grey, well sorted, thick bedded and cross-bedded, with numerous shale laminae and rip-up clasts;
150/17SW.

132. Shale, medium to dark grey, thin bedded, limonite and Mn stain or color play on fractures;
119/36SW.

133. Siltstone, medium grey, thin bedded, thick limonite stain on bedding planes;
128/41SW.

134. Sandstone fine grained, medium grey, well sorted, thin to thick bedded;
20/10W.

135. Sandstone, same as before;
39/15NW.

136. Shale, dark grey, thin bedded, schistose, with siltstone and sandstone laminae, limonite stain on fractures and bedding planes;
163/16W.

137. Siltstone, dark grey, with thin layers of fine grained brownish sandstone; schistosity dominates over bedding;
162/6W.

138. Sandstone fine grained, medium grey, well sorted, massive, medium to thick bedded, strongly schistose; cross-bedding indicates normal position of this unit;
135/28SW.

139. Shale, medium to dark grey, thin bedded, coaly shale with coal stringers in scree;
100/20S.

140. Sandstone medium to fine grained, well sorted, medium grey, interlayered with thick layers of mudstone with pencil jointing;
98/22S, 110/13S.

141. Siltstone, medium grey, thin bedded, with intermittent layers of medium to fine grained sandstone;
72/5S.

142. Sandstone medium to fine grained, light grey, thin bedded, well sorted;
88/14S.

143. Shale, medium grey, with intermittent thin layers of fine grained sandstone, with dominant schistosity;
4/18W.

144. Siltstone, medium grey, with layers of very fine grained thin layered sandstone;
141/9NE.

145. Sandstone fine grained, well sorted, medium grey, thin bedded, with numerous whisps of mudstone;
139/30SW.

146. Mudstone, dark grey, thin bedded, interlayered with thin to medium thick beds of siltstone with whisps of mudstone; 120/44SW.

147. Sandstone fine to very fine grained, well sorted, thin to medium bedded, light grey;
91/34S.

148. Siltstone and silty mudstone, medium to dark grey, with intermittent short medium thick lenses of very fine grained sandstone, poorly sorted yellow brown;
60/34SE.

149. Siltstone, interbedded with numerous layers of mudstone and fine grained sandstone in thicknesses of 0.1-2.0 cm and numerous thin quartz veins following bedding;
122/28SW.

150. Sandstone medium and fine grained, well sorted, medium grey; some layers are poorly sorted, yellow brown and relatively soft; intermittent occurrence of dark grey mudstone 0.5-1.0 m thick;
124/35SW

151. Mudstone, dark grey, thin bedded, with numerous interlayers of siltstone and fine grained sandstone; outcrop exposes an overturned anticline:
140/54SW upper limb and general attitude
154/58NE lower limb
147/10 anticlinal axis.

152. Sandstone fine grained, well sorted, light grey, thin to thick bedded, thick beds are formed by massive sandstone; the whole unit is about 35 m thick; 70/30S.

153. Mudstone, dark grey, thin bedded, with intermittent thin layers of fine grained sandstone; 1/26W.

154. Sandstone fine grained, moderately sorted, medium grey, thin bedded; 106/36S.

155. Sandstone fine grained, well sorted, light grey, thin bedded; 106/70S.

156. Mudstone, dark grey, interbedded with medium thick layers of brown grey siltstone; 146/45SW.

157. Siltstone, brown grey, thin bedded, with intermittent layers of fine to very fine grained sandstone, medium grey, moderately sorted, thin bedded; 110/26S.

158. Sandstone medium grained, poorly sorted, tan brown, thin bedded, with numerous whisps of mudstone; 109/29N.

159. Sandstone medium to fine grained, poorly sorted, soft, red brown and brown grey; 140/32SW.

160. Siltstone, dark grey, with 1 layer of fine to very fine grained sandstone, poorly sorted, about 0.5 m thick; 137/40SW.

161. Sandstone fine grained, poorly sorted, brown grey, exposed in thickness of 0.3 m at top of outcrop. Mudstone, dark grey, thin bedded; 76/42N.

162. Sandstone fine to medium grained, brown, thin bedded, poorly sorted; 96/51N.

163. Sandstone, as before, about 1 m thick. Siltstone, above and below sandstone, dark grey, thin bedded, with lenses of sandstone; 90/54N.

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164. Siltstone, dark grey, interbedded with dark grey mudstone;
116/48N.

165. Mudstone, dark grey, very thin bedded;
60/20SE (north side), 10/17E.

166. Sandstone fine to medium grained, moderately sorted, thick bedded;
130/31SW.

167. Sandstone, as before;
135/43SW.

168. Mudstone, dark grey, thin bedded, interlayered with sandstone and siltstone lenses and overlain by sandstone (as before) in S part of outcrop;
78/50S.

169. Siltstone, dark grey, thin bedded, schistose, without any reliable bedding trace.

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Figure 7

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TRENCH DESCRIPTIONS

Legend

- clean coal (0-10% ash)
- dirty coal (10-30% ash)
- high ash coal (30-50% ash)
- coaly shale and coaly clay (50-70% ash)
- carbonaceous shale (70-90% ash)
- mudstone
- clay
- siltstone
- sandstone
- coal bloom
- overburden

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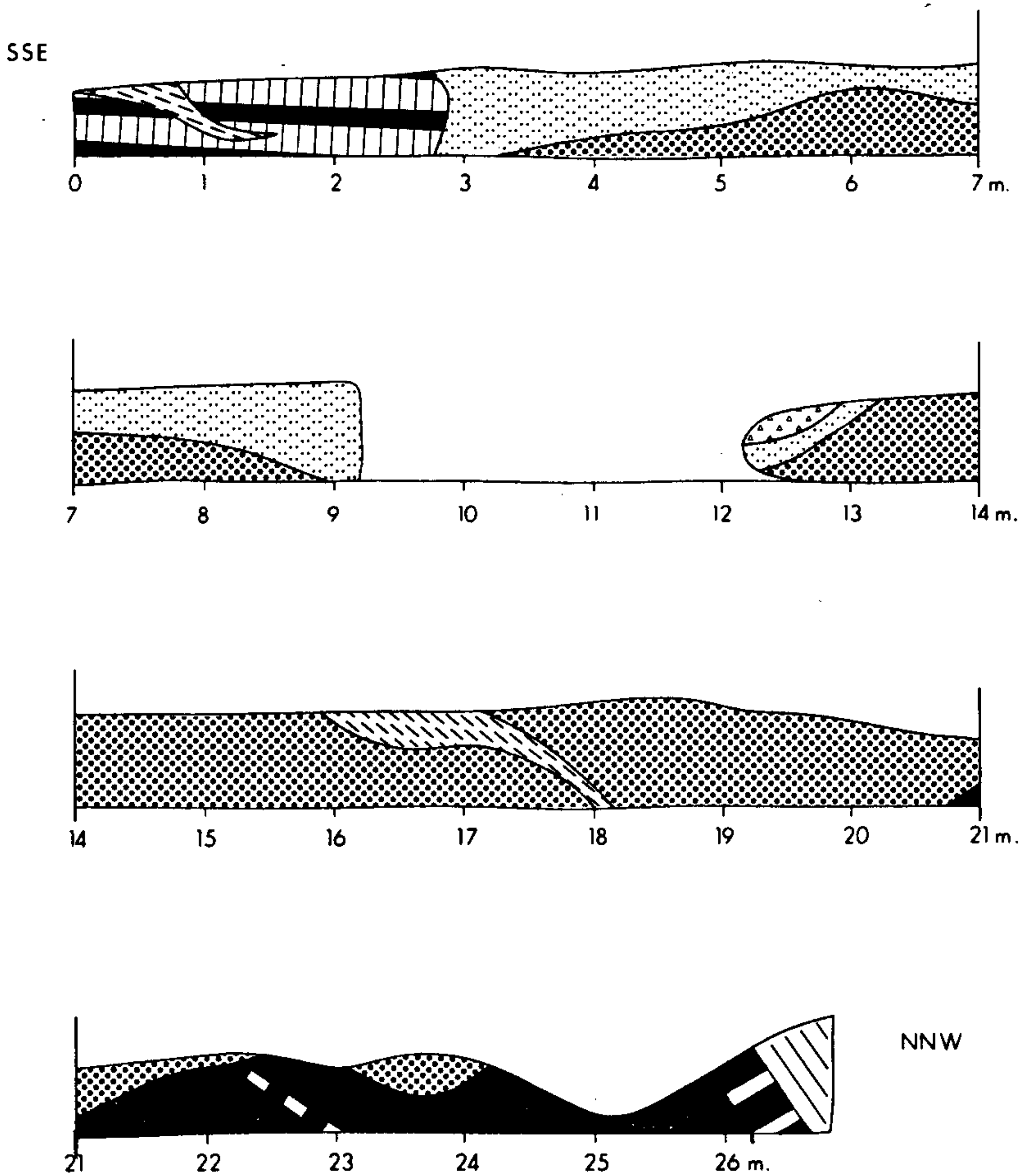
Trench MJ-83-1

August 11, 1983
Bartek, Cave

100m S of
Mt. Jackson Summit

azimuth: 159°
slope : 0°
scale : 1:50



GR. MT. JACKSON 83(3*)19 *(1)

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Trench MJ-83-1

August 11, 1983
Bartek, Cave

100m S of
Mt. Jackson Summit

azimuth: 159°
slope : 0°
scale : 1:50

0.0-0.8m	(upper perimeter) clay silty, tan brown
0.0-2.8m	shale coaly, weathered and reworked
2.8-3.2m	sandstone fine to medium grained, ochre, weathered and reworked
3.2-9.0m	coal bloom
12.2-12.9m	(upper perimeter) overburden
12.2-12.3m	same unit as at 2.8-3.2m
12.3-18.0m	coal bloom
18.0-18.15m	clay silty, greyish brown
18.15-20.7m	coal bloom
20.7-22.9m	coal clean, bright banded 70/30
22.9-23.1m	coal high ash
23.1-24.2m	(upper perimeter) coal bloom
23.1-26.2m	coal clean, bright; 119/33N
26.2-26.7m	coal dirty, dull
26.7-26.8m	mudstone silty, greenish brown

samples: 1527 (N end) palynology
1528 coal ┐
1529 coal │ analyzed as
1530 coal ┘ 1 sample

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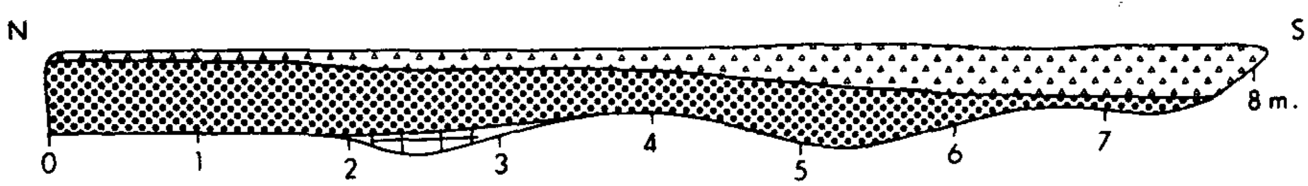
Trench MJ-83-2

August 12, 1983
Bartek, Cave

300m S of
Mt. Jackson Summit

azimuth: 5°
slope : 24°N
scale : 1:50



0.0-2.0m	coal bloom
2.0-3.4m	shale carbonaceous at the bottom of the whole trench; 128/32N
3.4-7.6m	coal bloom
7.6-8.1m	overburden
	samples: 1932 (2.0-3.4m) palynology 1933 coal

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Trench MJ-83-3

August 12, 1983
Bartek, Cave

200m WNW of
Mt. Jackson Summit

azimuth: 35°
slope : 12°SW
scale : 1:50

0.0-0.2m	mudstone, greenish grey
0.2-0.6m	mudstone, grey, interbedded with coaly clay
0.6-1.4m	coal dirty and high ash coal, interbedded with coaly clay; 110/39N
1.4-2.6m	coal clean, dull banded 20/80
2.6-2.7m	clay silty, grey
2.7-3.3m	coal dirty, weathered
3.3-4.2m	shale coaly; 113/38N
4.2-5.0m	coal high ash and dirty coal, dull banded 10/90
5.0-5.4m	shale coaly
5.4-5.8m	shale carbonaceous

samples: 1440 (0.0-0.2m) palynology
1441 (5.4-5.8m) palynology
1442 (0.6-2.6m) coal — analyzed as 1 sample
1443 (2.7-3.3m) coal (4.2-5.0m) — analyzed as 1 sample

MT. JACKSON 83(3*)A *(1)

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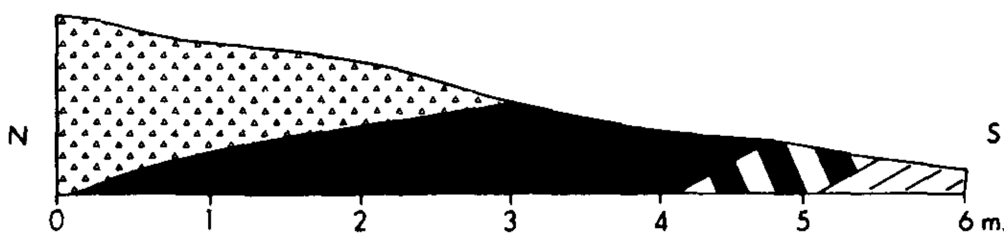
Trench MJ-83-4

August 12, 1983
Brown, Giddings

50m N of
Mt. Jackson Summit

azimuth: 340°
scale : 1:50



0.0-0.1m	overburden
0.1-4.0m	coal clean, bright, blocky with conchoidal fractures, shiny, brittle; at 2.6m lense of mudstone 3 cm thick, orange brown
4.0-5.1m	coal high ash and dirty, banded 80/20, block disintegration, with light grey mudstone wisps and minor calcite veining; floor 256/26NW
5.1-6.0m	mudstone to siltstone, medium to dark grey, medium grey weathering

samples: 1930 coal
1931 (5.1-6.0m) palynology

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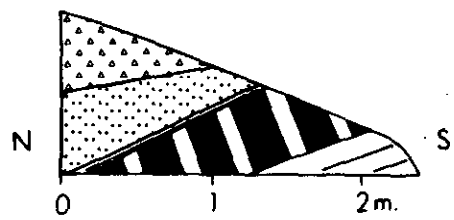
Trench MJ-83-5

August 12, 1983
Brown, Giddings

100m NW of
Mt. Jackson Summit

azimuth: 20°
scale : 1:50



0.0-1.0m	(upper perimeter) overburden
1.0-1.3m	(upper perimeter) sandstone, fine grained, moderately sorted, medium grey brown, with rusty orange weathering stain
0.0-0.1m	mudstone, light grey to orange brown, 4-5 cm thick, weathered
0.1-1.2m	coal dirty, banded 60/40, blocky, with discontinuous mudstone partings; at 0.9-1.0m possibly petrified wood, dark brown, weathered; roof 285/25N, floor 280/20N
1.2-2.4m	mudstone, light grey, reddish brown weathering along fractures

samples: 1934 palynology
1935 coal
1936 palynology
1937 palynology (petrified wood)

MT. JACKSON 83(3*)A *(1)

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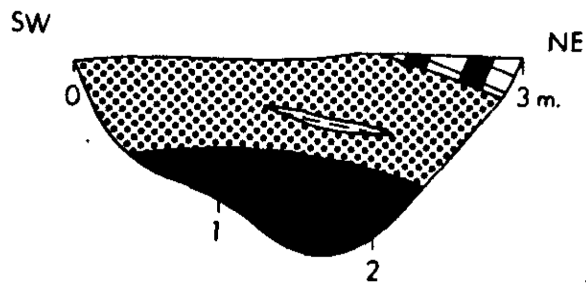
Trench MJ-83-6

August 13, 1983
Bartek, Cave

1,150m NW of
Mt. Jackson Summit

azimuth: 61°
slope : 20°SW
scale : 1:50



0.0-0.35m	coal bloom, mixed up with clay, with thin grey clay in the middle
0.35-2.3m	coal clean, bright banded 60/40, reworked, with a layer of grey clay
2.3-2.9m	same unit as at 0.0-0.35m
2.9-3.1m	coal and coaly clay, reworked
	sample: 1444 (1.9-2.1m) coal

MT. JACKSON 83(3*)A *(1)

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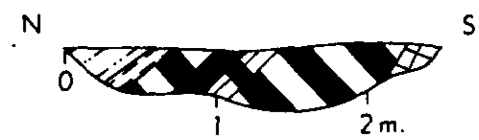
Trench MJ-83-7

August 13, 1983
Bartek, Cave

1,800m NW of
Mt. Jackson Summit

azimuth: 170°
slope : 29°S
scale : 1:50



0.0-0.3m	siltstone, medium grey, fissile
0.3-0.4m	clay silty, medium grey
0.4-0.7m	coal high ash, interbedded with numerous coaly shale partings
0.7-0.9m	coal clean, brittle
0.9-1.1m	coaly shale; 105/11N
1.1-2.1m	coal high ash
2.1-2.5m	shale carbonaceous

samples: 1445 (2.1-2.5m) palynology
1446 (0.0-0.3m) palynology
1447 (0.4-0.9m) (1.1-2.1m) coal

MT. JACKSON 83(3*)A *(1)

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Trench MJ-83-8

August 14, 1983
Brown, Giddings

1,900m NW of
Mt. Jackson Summit

azimuth: 50°
scale : 1:50

0.0-0.75m	(upper perimeter) mudstone silty, moderately to intensively weathered
0.0-0.1m	sandstone silty, very fine grained, orange-medium brown, 5 cm thick
0.1-0.6m	coal dirty, banded 80/20, blocky, with discontinuous minor partings of orange mudstone less than 1 cm thick and calcite veinlets; roof 280/40NE
0.6-1.0m	coal clean, bright banded 90/10, blocky, friable
1.0-1.05m	mudstone, light grey; 298/30NE
1.05-1.4m	coal clean, blocky, friable, with thin mudstone wisps; floor 305/35NE
1.4-1.6m	mudstone, medium grey, with minor brown staining

samples: 1938 palynology
1939 coal
1940 palynology

MT. JACKSON 83(3*)A *(1)

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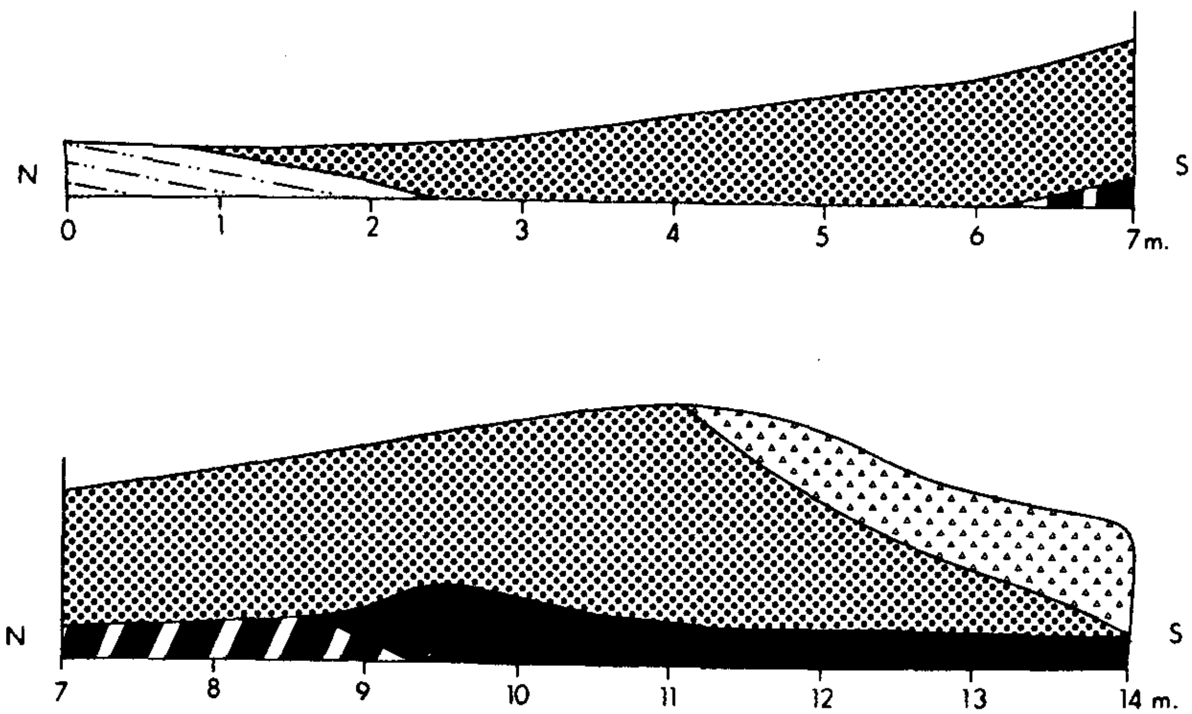
Trench MJ-83-9

August 16, 1983
Brown, Giddings

750m NNW of
Mt. Jackson Summit

azimuth: 0.0-12.3m 0°
12.3-14.0m 10°
scale : 1:50



0.0-2.4m	siltstone sandy, orange brown, intensively weathered, appears somewhat slumped; 70/7SE (estimated)	
2.4-6.3m	coal bloom, with disturbed and discontinuous siltstone partings	
6.3-9.3m	coal dirty, banded 80/20, friable	
9.3-14.0m	coal clean, bright banded 90/10, blocky, conchoidal fractures, roof undetermined	
11.0-14.0m	(upper perimeter) overburden	

samples: 1941 (0.0-2.4m) palynology
1942 (2.4-6.3m) coal
1943 (6.3-14.0m) coal

MT. JACKSON 83(3*)A *(1)

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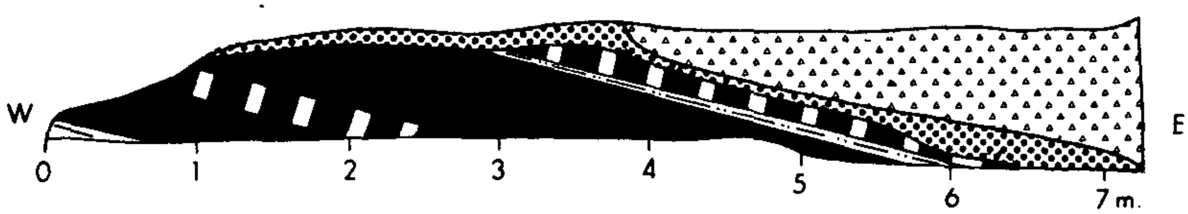
Trench MJ-83-10

August 17, 1983
Brown, Giddings

1,150m NNW of
Mt. Jackson Summit

azimuth: 110°
scale : 1:50



0.0-0.7m	mudstone, dark to medium grey
0.7-1.9m	coal clean, bright, friable, breaking into 3-6 cm fragments, with a lense of orange brown siltstone at 1.5m; floor 354/12E
1.9-2.7m	coal dirty and clean, banded 80/20, friable
2.7-5.9m	coal clean, banded 80/20, friable
3.8-7.3m	(upper perimeter) overburden
5.9-6.0m	siltstone, orange brown
6.0-6.4m	coal dirty, banded 60/40, blocky
6.4-7.3m	coal bloom

samples: 1944 (0.0-0.7m) palynology
1945 coal

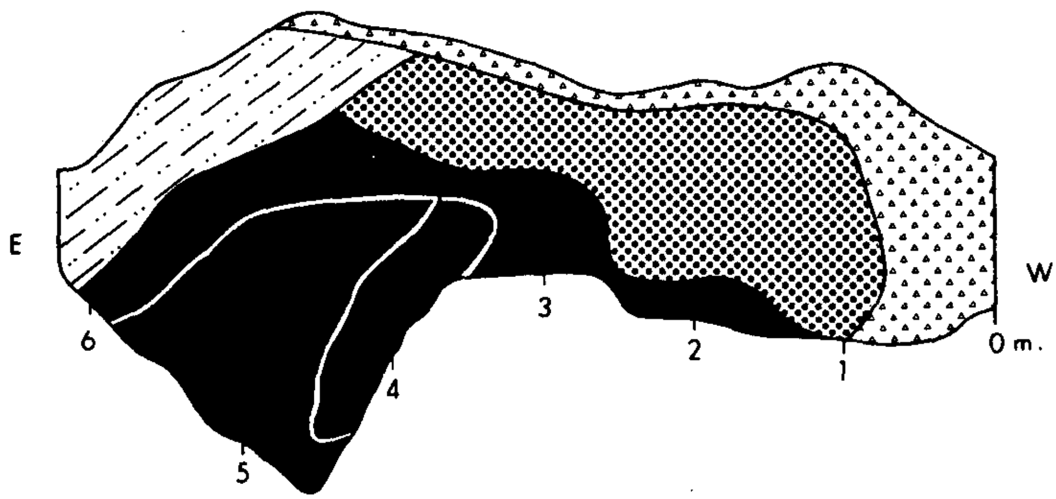
MT. JACKSON 83(3*)A *(1)

Trench MJ-83-11

August 18, 1983
Brown, Giddings

1,100m NNW of
Mt. Jackson Summit

azimuth: 79°
scale : 1:50



0.0-1.0m	overburden - clayey slump with cobbles
1.0-1.2m	coal bloom overlying clean coal, intensively sheared, bright, with polished fracture surfaces, moderate weathering, rusty stain, appears slightly slumped
1.2-3.5m	coal clean, banded 80/20, with weathered orange brown siltstone and light-medium grey mudstone discontinuous partings
3.5-4.2m	coal clean, banded 80/20, blocky, with metallic lustre
4.2-5.9m	coal clean and dirty, sheared and folded, with siltstone partings
5.9-6.1m	same unit as at 1.2-3.5m
6.1-6.2m	siltstone, medium brown grey

samples: 1946 coal
1947 palynology

MT. JACKSON 83(3*)A *(1)

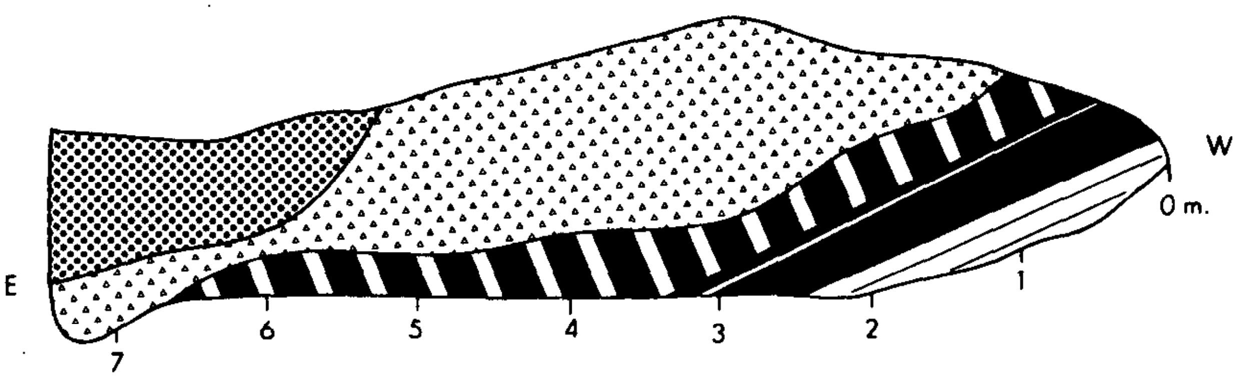
108

Trench MJ-83-12

August 20, 1983
Brown, Giddings

700m NW of
Mt. Jackson Summit

azimuth: 105°
slope : 10°W
scale : 1:50



0.0-2.4m	mudstone, light-medium grey
2.4-3.1m	coal clean, bright, friable, metallic lustre; floor 10/24E
3.1-3.15m	mudstone
3.15-3.4m	coal clean, banded 60/40, friable
3.4-6.7m	coal dirty, banded 80/20, with intermittent discontinuous orange brown siltstone partings
5.2-7.5m	(upper perimeter) overburden
6.7-7.5m	coal bloom

samples: 1948 coal
1949 palynology

MT. JACKSON 83(3*)A *(1)

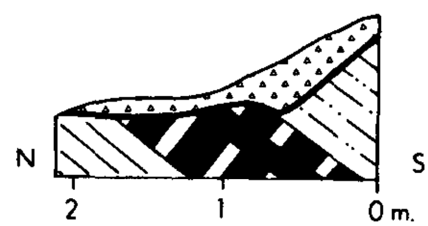
108

Trench MJ-83-13

August 20, 1983
Brown, Giddings

1,200m NW of
Mt. Jackson Summit

azimuth: 174°
slope : 20°N
scale : 1:50



0.0-0.1m	siltstone clayey, thin bedded, medium-light grey brown, with limonitic stain on weathered surfaces; 82/34S
0.0-2.0m	(upper perimeter) overburden
0.1-0.3m	coal dirty, banded 60/40, mainly blocky with conchoidal fractures, metallic lustre of bright bands, orange yellow limonitic stain on fractures
0.3-0.6m	coal clean, banded 80/20, blocky, bronze tarnish on fracturing surfaces
0.6-1.2m	coal dirty, banded 80/20, blocky, very hard, with green yellow powdery stain on minor fractures, intermittent calcite veinlets, smells after sulphur when struck with hammer
1.2-2.1m	mudstone, dark grey to black, thin bedded, with coal stringers

samples: 1950 palynology
1951 palynology
1952 coal

MT. JACKSON 83(3*)A (1*)

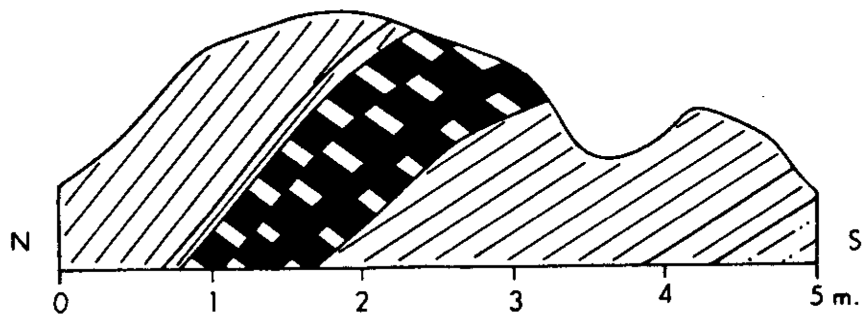
108

Trench MJ-83-14

August 21, 1983
Brown, Giddings

Trail Creek
850m SW of cabins

azimuth: 7°
slope : 0°
scale : 1:50



0.0-0.7m	mudstone silty, medium to dark grey, massive
0.7-0.8m	mudstone, hard, with bright coal stringers and accesory calcite
0.8-1.1m	coal dirty, banded 80/20, blocky, with distinct bronze tarnish and intensive limonitic weathering on surface; roof 290/40NE
1.1-1.3m	coal dirty, banded 60/40, with extensive limonitic staining and minor bronze tarnish on fractures, calcite veinlets parallel to bedding
1.3-1.5m	coal clean and dirty, blocky, with bright metallic lustre
1.5-1.7m	coal dirty, banded 70/30, slightly sheared, metallic lustre; floor 290/29NE
1.7-3.9m	mudstone, dark grey and yellowish grey, sheared and slightly folded (crenulated), with bright coal stringers
3.9-4.4m	mudstone silty, massive, with minor coal stringers
4.4-5.0m	siltstone, grey, orange brown weathering

samples: 1953 palynology
1954 coal
1955 palynology

MT. JACKSON 83(*3)A *(1)

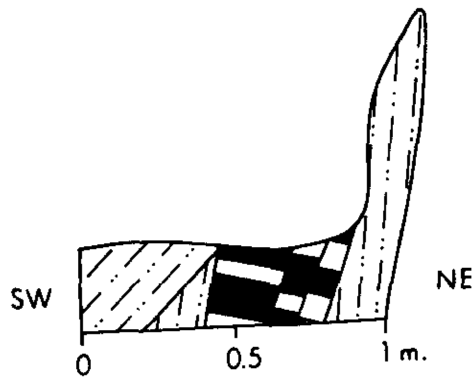
108

Trench MJ-83-15

August 21, 1983
Brown, Giddings

Trail Creek
700m SW of cabins

azimuth: 24°
slope : 0°
scale : 1:25



0.0-0.2m	siltstone, dark grey to black, with ripple marks tops up and minor coal stringers
0.2-0.4m	siltstone clayey, with coal stringers and rare pyrite, truncated by overlying unit
0.4-0.6m	coal dirty, banded 60/40, small-size blocky to hackly disintegration, sheared, slight bronze tarnish
0.6-0.7m	coal dirty, banded 50/50, blocky, with metallic lustre
0.7-0.8m	coal high ash, banded 60/40, hackly sheared, with slight bronze tarnish and accesory calcite
0.8-1.0m	siltstone, slightly sheared, with intermittent coal stringers and minor calcite veinlets

Note: coal appears to pinch out laterally after 2-3m

samples: 1959 palynology
1960 palynology
1961 coal

MT. JACKSON 83(*3)A *(1)

108

Trench MJ-83-16

August 25, 1983
Brown, Giddings

1,400m NNW of
Mt. Jackson Summit

azimuth: 68°
slope : 32°SW
scale : 1:25

0.0-0.1m	shale coaly, dark to medium grey, with limonitic staining
0.0-2.05m	(upper perimeter) overburden
0.1-0.3m	coaly dirty, banded 60/40, blocky to hackly, slightly sheared; roof 355/10E
0.3-0.6m	coal dirty, banded 60/40, blocky, with bronze tarnish
0.6-1.1m	coal clean, banded 50/50, blocky, sheared, with bronze tarnish
1.1-1.4m	coal clean, banded 80/20, blocky, sheared
1.4-1.7m	coal dirty, banded 60/40, blocky
1.7-1.75m	mudstone, with coal stringers
1.75-2.1m	coal dirty, banded 60/40, blocky
2.05-2.8m	(upper perimeter) coal bloom
2.1-2.6m	coal clean, banded 60/40, blocky
2.6-2.8m	coal dirty, banded 40/60, blocky, with minor calcite veinlets; floor 350/20E
2.8-3.0m	mudstone, black, with coal stringers

samples: 1956 palynology
1957 coal
1958 palynology

Province of
British Columbia

Ministry of
Energy, Mines and
Petroleum Resources

Parliament Buildings
Victoria
British Columbia
V8V 1X4

108

August 23, 1984

John Fisher
Project Geologist
Suncor Inc.
500-4th Avenue, S.W.
Calgary, Alberta
T2P 2V5

Dear Mr. Fisher:

The report of work entitled Mt. Jackson 1983 has been reviewed, however before final approval can be granted the report must be amended to comply with the following sections of the Coal Act Regulations:

✓ Section 7(6)a) (x) Title Page - Date work done
✓ c) (iv) List of licences on which work performed for each type of work (In introduction)

Delete from report? ← → Section 8 (7) figure 4A Coding must be by patterns or numbers - Colours not acceptable.
(NA - Map of BC) (8) figure 1 North Arrow.
(10) figure 2 Lat & Long

Your report will be held in abeyance pending submission of the amendments.

If you have any questions concerning the amendments, please contact Alex Matheson at (604) 387-1301.

Sincerely,

Kim Stone

Kim Stone

for Paul Hagen
Coal Administrator

kjs

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GEOLOGICAL REPORT
MOUNT JACKSON
BRITISH COLUMBIA

COAL LICENCES

7352 TO 7364 INCLUSIVE
7366 TO 7367 INCLUSIVE
7369 TO 7374 INCLUSIVE
7544 TO 7549 INCLUSIVE

CASSIAR LAND DISTRICT

NTS SHEET 104 A/16
(McEVOY FLATS)
128°06' West to 128°16' West
and
56°46' North to 56°51'30" North

LICENCES HELD AND OPERATED
BY
SUNCOR INC.
500 - 4th Avenue S.W.
CALGARY, Alberta

AUTHOR

J. FISHER

FEBRUARY 18, 1984

WORK PERFORMED DURING

AUG. 5, 1983 - AUG. 31, 1983

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1.0 SUMMARY

The coal property held by Suncor Inc. lies on the southern edge of the Groundhog Coal Field. The property is comprised of 27 licences for a total of 6439 hectares.

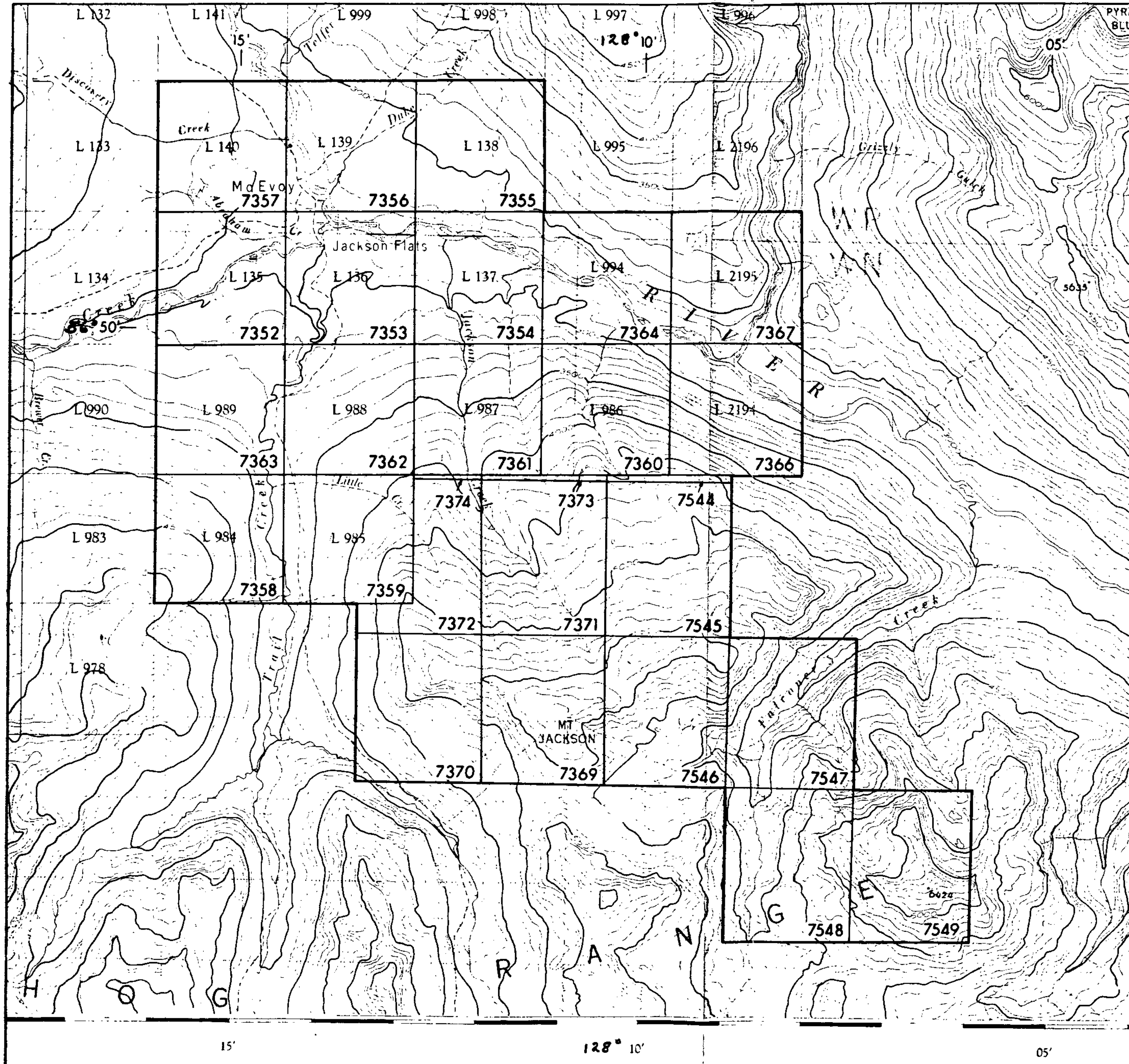
During the period of August 5th to September 3rd, 1983, a Suncor exploration party carried out a program of geological mapping and coal sampling. The property was examined and the geological data posted on air photograhps at a scale of 1:5,000. These data were later posted to maps 1:12,500.

All coal seams seen were sampled and their locations plotted on air photographs and subsequently transferred to maps.

There are two seams which were of mineable thickness at the top of Mount Jackson. The areal extent of these seams is not known at this time.

Very dense forest cover and overburden masks most of the north-facing dip slopes of Mount Jackson. The dense cover restricts exploration of most of the licences to the stream beds and banks of the swiftly flowing water courses running off the mountain. The exception to this is the top of Mount Jackson and the talus covered slopes of Mount Falconer where there are indications of coal being in a mineable altitude.

Geological mapping was carried out on Coal Licences numbers:
7352 to 7364 inclusive, 7366 to 7367 inclusive,
7369 to 7374 inclusive, 7544 to 7549 inclusive.



108

LEGEND

———	Property Outline
———	Coal Licence Boundary
7357	Coal Licence Number

0 1 2 mi.

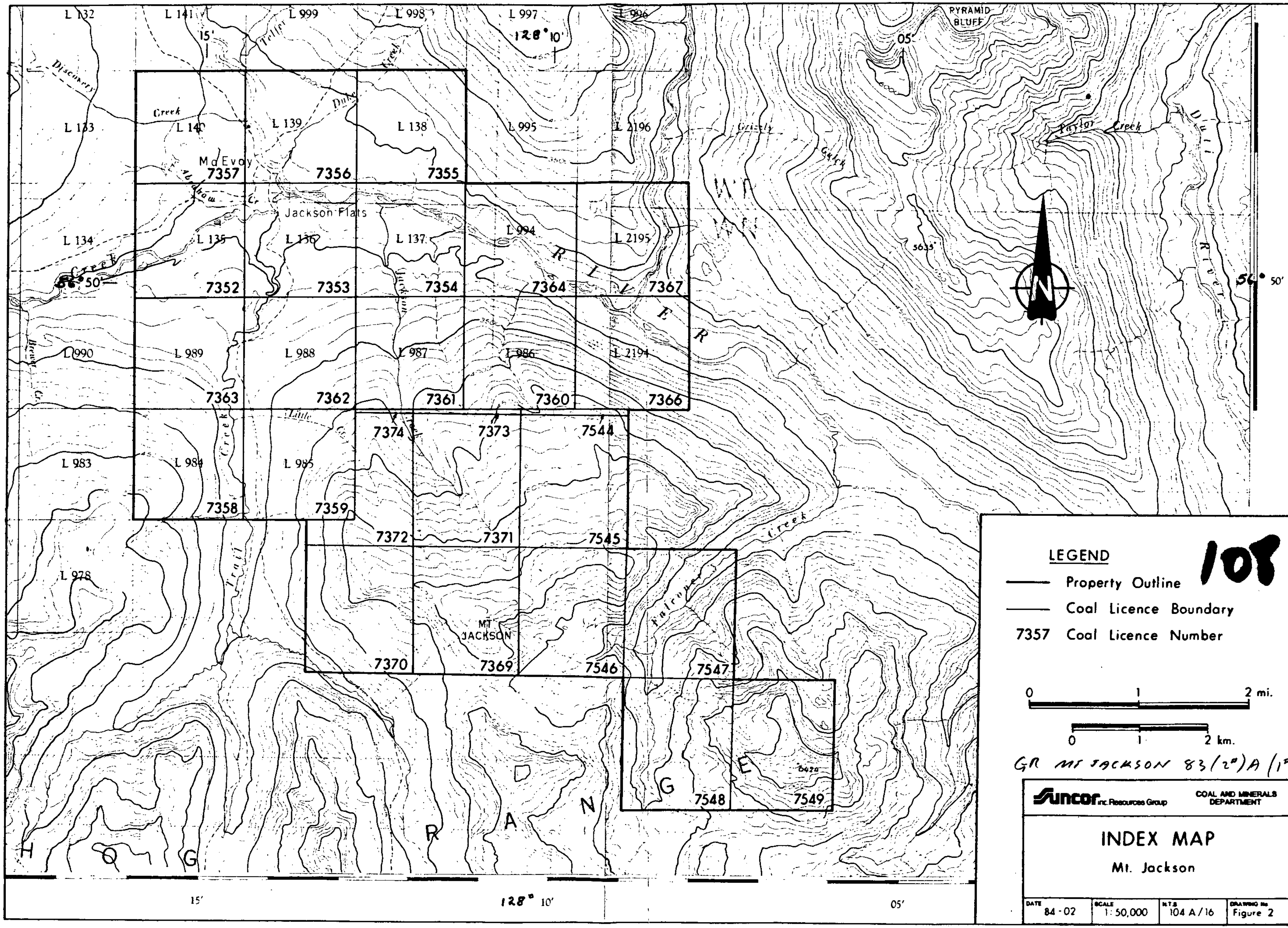
0 1 2 km.

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

INDEX MAP

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No
84-02	1: 50,000	104 A/16	Figure 2

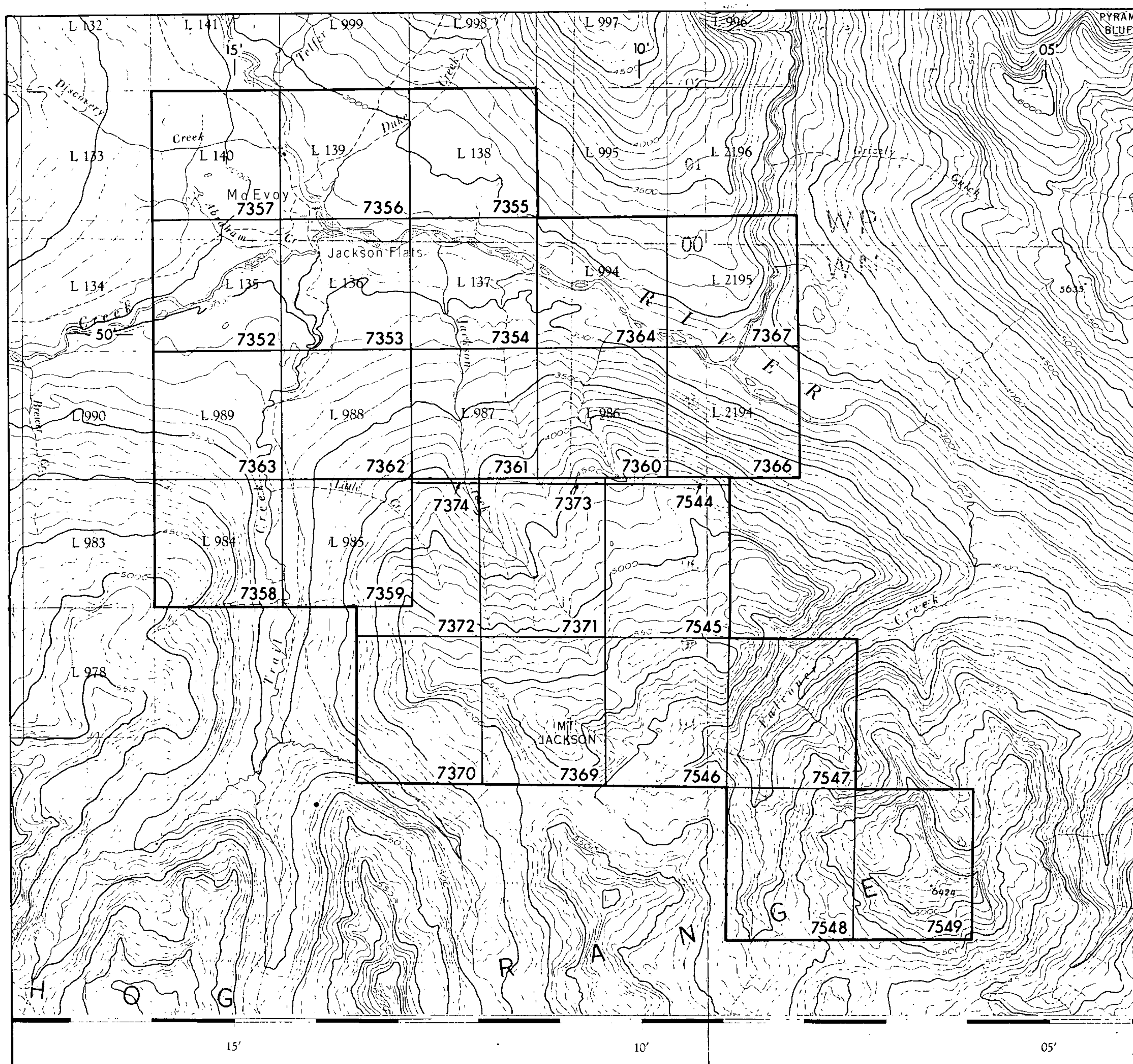


Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

INDEX MAP

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No.
84 - 02	1: 50,000	104 A / 16	Figure 2



LEGEND

- Property Outline
- Coal Licence Boundary
- 7357 Coal Licence Number

0 — 1 — 2 mi.

0 — 1 — 2 km.

108

GR-MT. JACKSON 83 (2*) A (*)

Suncor Inc. Resources Group — COAL AND MINERALS DEPARTMENT

INDEX MAP

Mt. Jackson

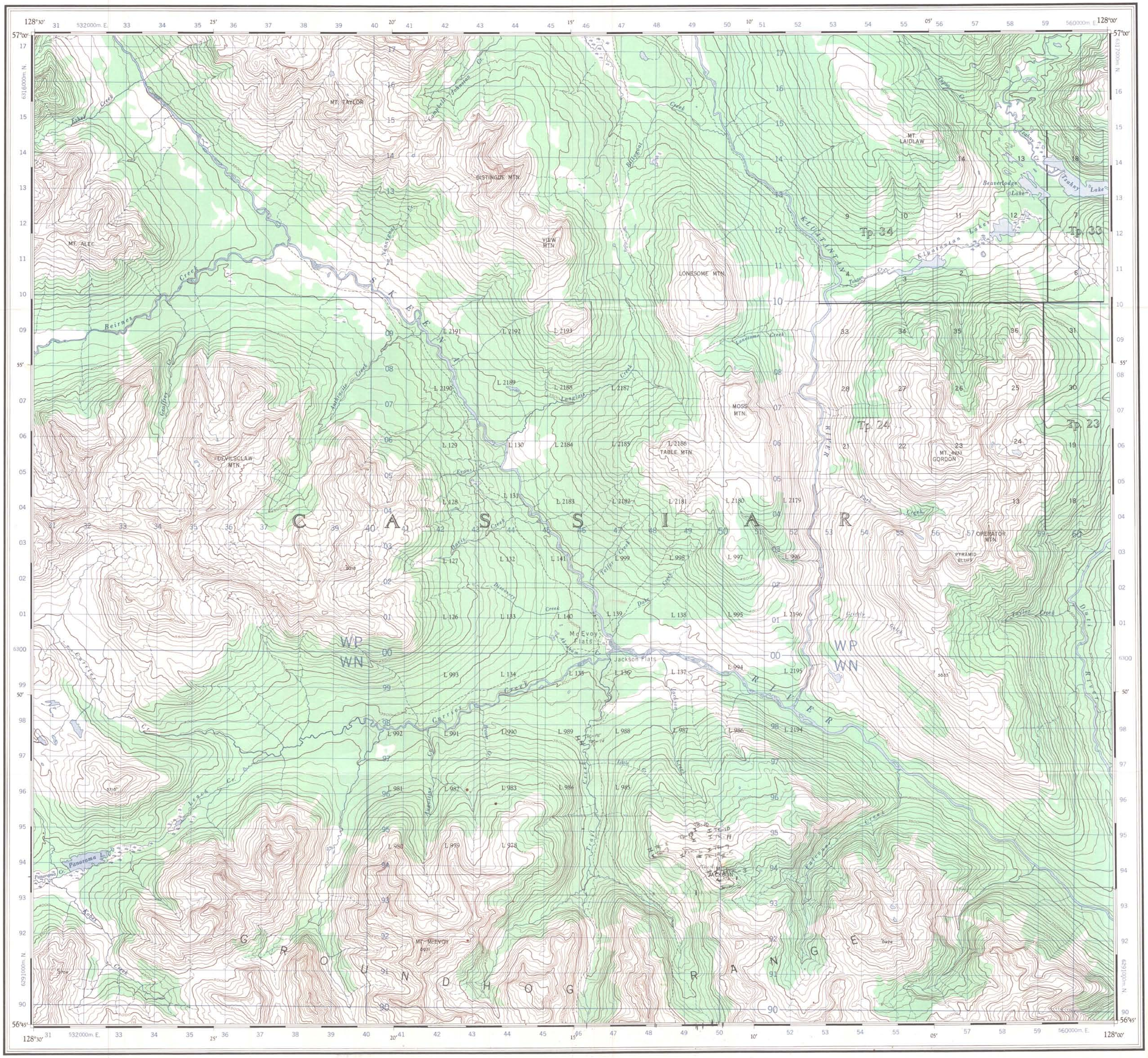
DATE	SCALE	N.T.S.	DRAWING No.
84 - 02	1 : 50,000	104 A/16	Figure 2

NATIONAL TOPOGRAPHIC SERIES

CANADA

FIRST EDITION

SHEET 104 A/16



Published 1950.

Compiled by the Topographical Survey in 1949 from photographs taken in 1948 by the Royal Canadian Air Force.

Converted from 1:63,360 to 1:50,000 without revision, by the Surveys and Mapping Branch, Department of Energy, Mines and Resources, Ottawa, in 1971.

Copies may be obtained from the Map Distribution Office, Department of Energy, Mines and Resources, Ottawa.

REFERENCE

Trail	
Boundary: township	
Section or lot line	
Lot number	L 139
Building	•
Height in feet above mean sea level	6218

McEVOY FLATS

BRITISH COLUMBIA

Scale 1:50,000 Échelle

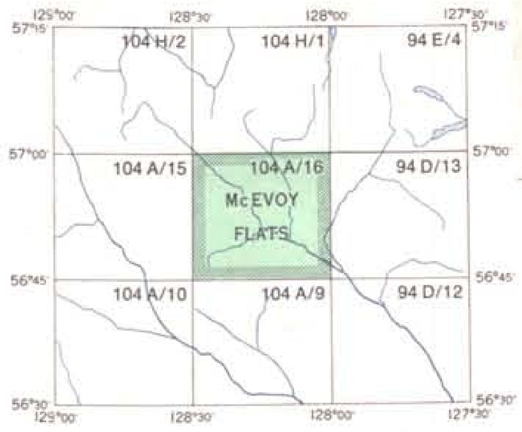
Miles 1 0 1 2 3 Milles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges

REFERENCE

Stream, intermittent	
Marsh or swamp	
Sand	
Contours, interval 100 feet	
Wooded area	



INDEX TO ADJOINING SHEETS

GR. MT. JACKSON 83(2*)A *(1)

108(1) H01

Suncor inc Resources Group — Coal & Minerals Department

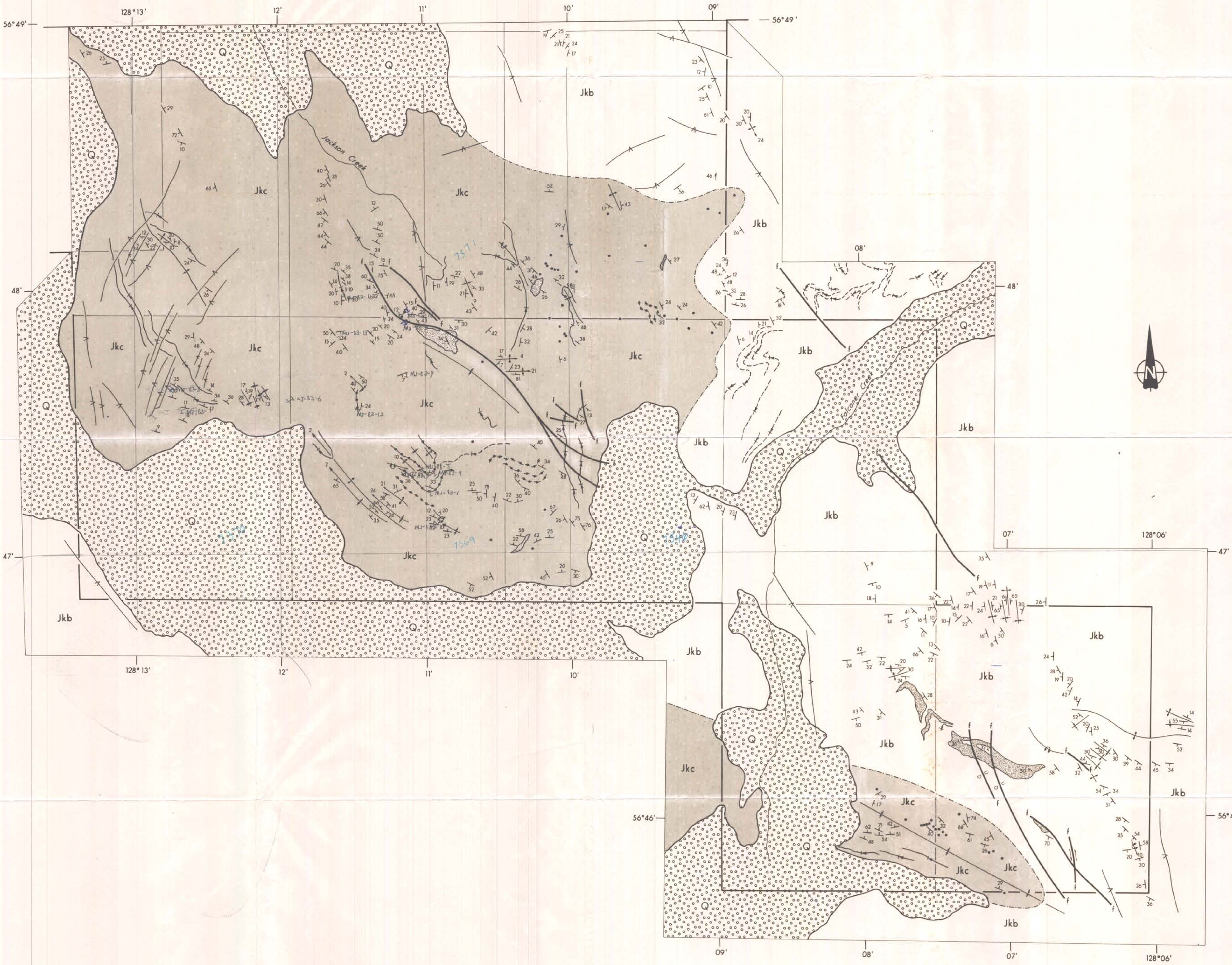
REGIONAL TOPOGRAPHIC MAP

Mt. Jackson

DATE	SCALE	N.T.S.	FIGURE
84-02	1:50,000	104 - A/16	3

CARTER MAPPING (1979) LTD.
1035 - 7th AVENUE S.W.
CALGARY, ALBERTA T2P 3E9
(403) 264-1230
TOPO 264-2515

M02



LEGEND

FORMATIONS

QUATERNARY

Q	Undivided (with isolated bedrock outcrops)

JURASSIC / CRETACEOUS

JKc	Coal-bearing unit
JKb	Barren (non coal-bearing) unit
	Sandstone of greater thickness

SYMBOLS

- Unit boundary (defined, assumed)
- Coal zone
- Coal bloom
- Strike and dip (with or without dip angle)
- Anticlinal axis
- Synclinal axis
- Overturned anticline
- Overturned syncline

(Anticlinal axis, Synclinal axis, Overturned anticline, Overturned syncline: with or without plunge arrow and angle)

- Fault
- Fault

(Faults: U - upthrown, D - downthrown side; arrows indicate direction of apparent horizontal movement)

- Alignment of probable geological significance
- Key bed
- Creek
- Property outline
- Coal licence boundary

0 1/2 1 mi.

0 1/2 1 km.

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GR-MT. JACKSON 83(*2)A (1*)

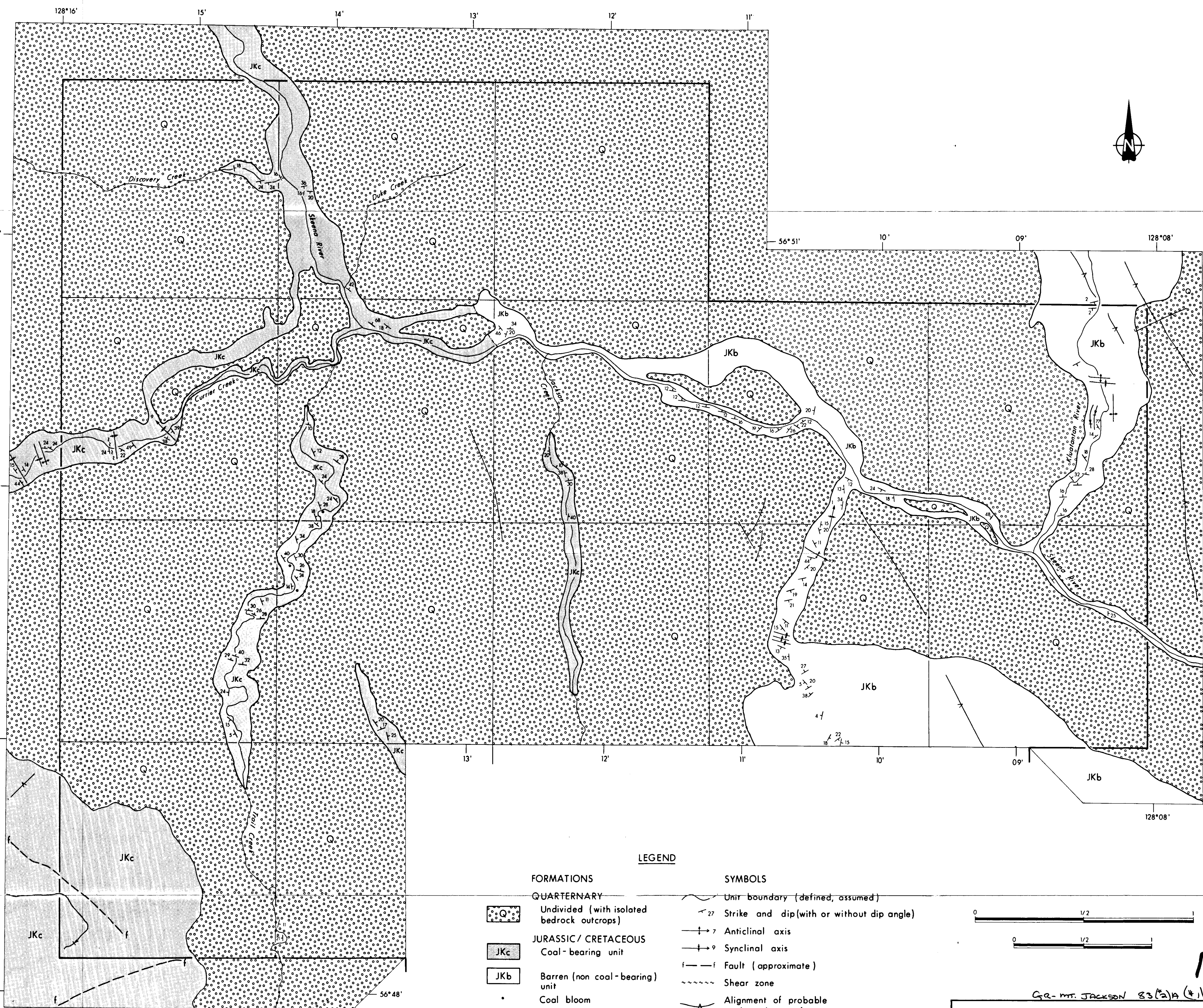
Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

GEOLOGICAL MAP
SOUTH SHEET

MT. JACKSON

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1:12,500	104 A/16	Figure 5

H03



LEGEND

FORMATIONS	SYMBOLS
QUARTERNARY	Unit boundary (defined, assumed)
Q — Undivided (with isolated bedrock outcrops)	Strike and dip (with or without dip angle)
JURASSIC/ CRETACEOUS	Anticlinal axis
JKc — Coal - bearing unit	Synclinal axis
JKb — Barren (non coal - bearing) unit	Fault (approximate)
• Coal bloom	Shear zone
	Alignment of probable geological significance
	Key bed
	River, creek
	Property outline
	Coal licence boundary

0 1/2 1

0 1/2 1

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GR- MT. JACKSON 83(?)A(#1)

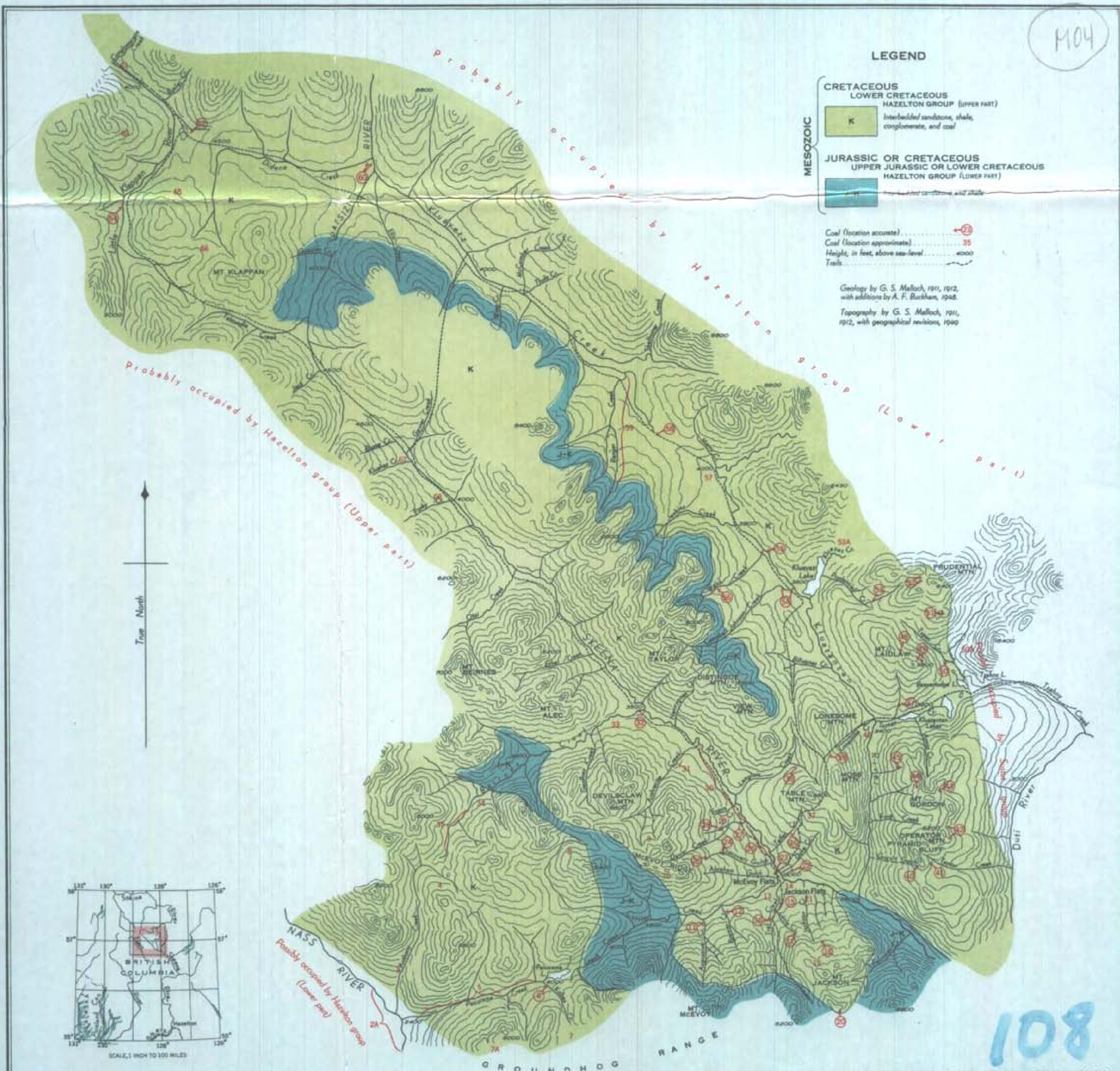
Suncor Inc. Resources Group — COAL AND MINERALS DEPARTMENT

GEOLOGICAL MAP
NORTH SHEET

MT. JACKSON

DATE	SCALE	N.T.S.	DRAWING No.
84 - 02	1 : 12,500	104 A/16	Figure 5

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA



MAP 106A
(REVISED 1949)

GROUNDHOG COALFIELD

CASSIAR DISTRICT
BRITISH COLUMBIA

Scale: 1 inch to 3 Miles = 1: 190,080

MILES

Suncor inc Resources Group — COAL AND MINERALS DEPARTMENT

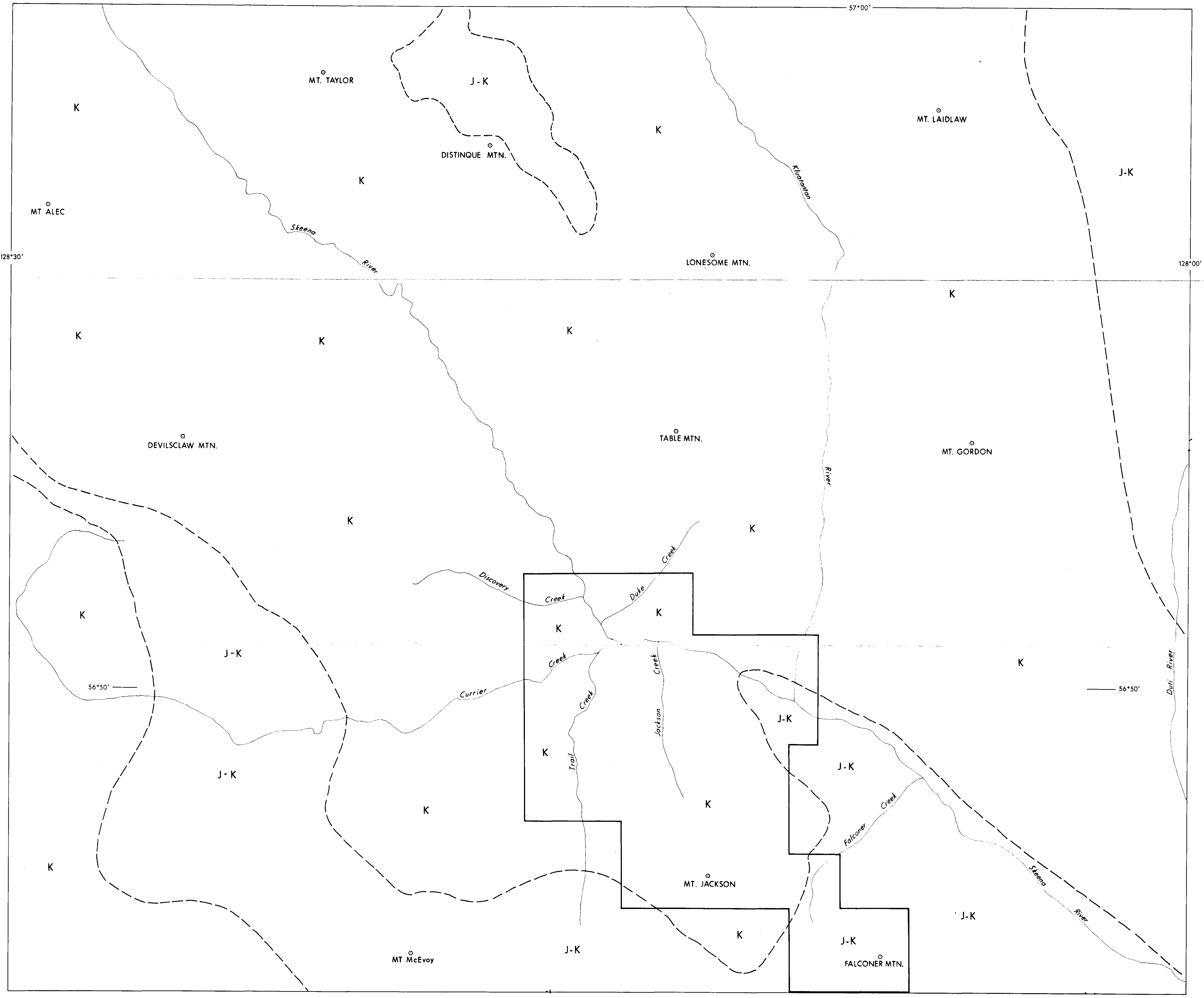
GR. MT. JACKSON 53(2nd)A (1st)

GEOLOGICAL COMPILATION MAP

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1:190,080	104	Figure 4a

MOS



0 1 2 3 4 5km

108

Gr- MT. JACKSON 83(2*)A (1*) ✓

LEGEND

FORMATIONS

J	CRETACEOUS HAZELTON GROUP (UPPER PART)
J-K	JURASSIC/CRETACEOUS HAZELTON GROUP (LOWER PART)

SYMBOLS

- UNIT BOUNDARY
- RIVER, CREEK
- MOUNTAIN SUMMIT
- PROPERTY OUTLINE
- 56°00' GEOGRAPHIC COORDINATE

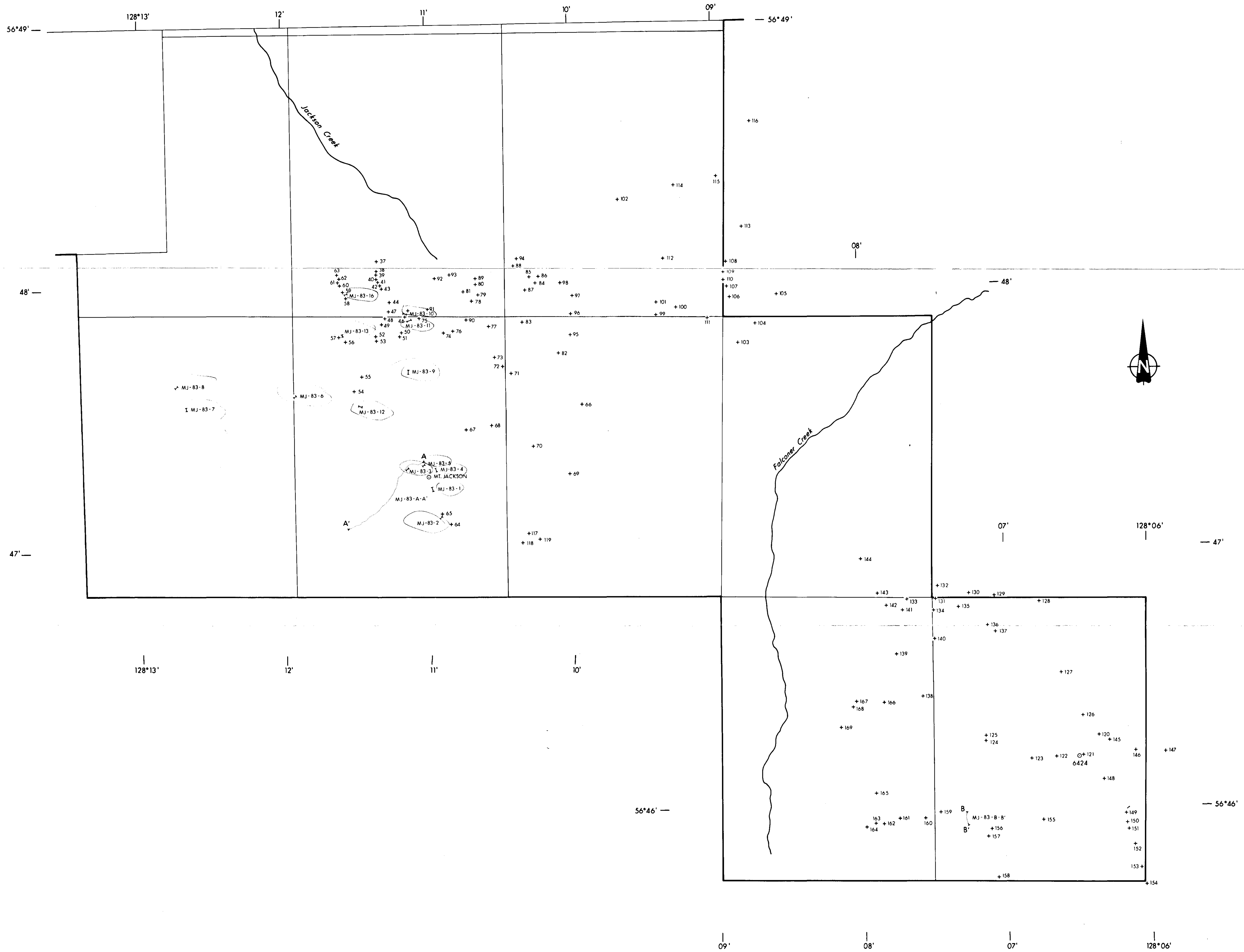
Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

GEOLOGICAL COMPILATION MAP

enlagement of Figure 4a

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1:47,520	104 A/16	Figure 4b



LEGEND

- Property outline
- Coal licence boundary
- River, creek
- ⊙ 6424 Mountain summit (elevation in feet)
- MJ-83-16 Trench
- + 121 Reference point
- A' A MJ-83-A-A' Stratigraphic section

0 1/2 1 mile

0 1/2 1 km.

GR. MT. JACKSON 83(5*)A *(1)

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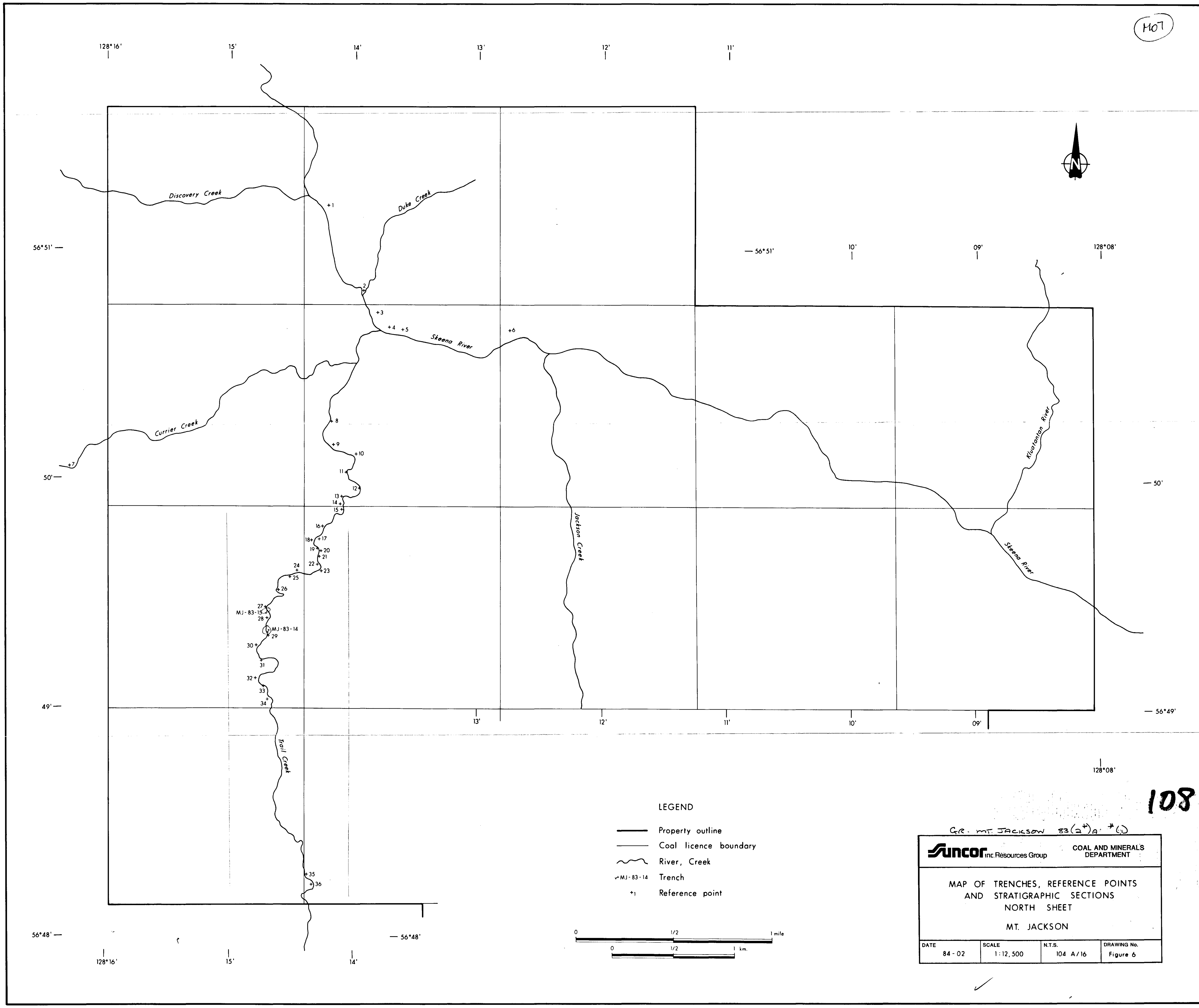
Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

MAP OF TRENCHES, REFERENCE POINTS AND STRATIGRAPHIC SECTIONS SOUTH SHEET

MT. JACKSON

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1: 12,500	104 A/16	Figure 6



H07
128°16'
15'
14'
13'
12'
11'
56°51'
10'
09'
128°08'
50'
49'
56°49'
56°48'
Discovery Creek
Duke Creek
Skeena River
Currier Creek
Jackson Creek
Kluatantan River
Trail Creek
MJ-83-15
MJ-83-14
LEGEND
Property outline
Coal licence boundary
River, Creek
Trench
Reference point
0
1/2
1 mile
1 km.
108
GR. MT. JACKSON
Suncor inc. Resources Group
COAL AND MINERALS DEPARTMENT
MAP OF TRENCHES, REFERENCE POINTS AND STRATIGRAPHIC SECTIONS NORTH SHEET
MT. JACKSON
DATE 84-02
SCALE 1:12,500
N.T.S. 104 A/16
DRAWING No. Figure 6

M08

108

GR - MT. JACKSON 83 (3*) A *(1)

Suncor inc. Resources Group — COAL AND MINERALS DEPARTMENT

STRATIGRAPHIC SECTION MJ-83-A-A′ PALINSPASTICALLY CORRECTED MT. JACKSON

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1:200	104 A/16	FIGURE 8a

GR - MT. JACKSON 83(3#)A *(1) 108

Suncor inc. Resources Group

COAL AND MINERALS DEPARTMENT

STRATIGRAPHIC SECTION MJ-83-A-A'

as measured in the field

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1 : 200	104 A/16	Figure 8a

108

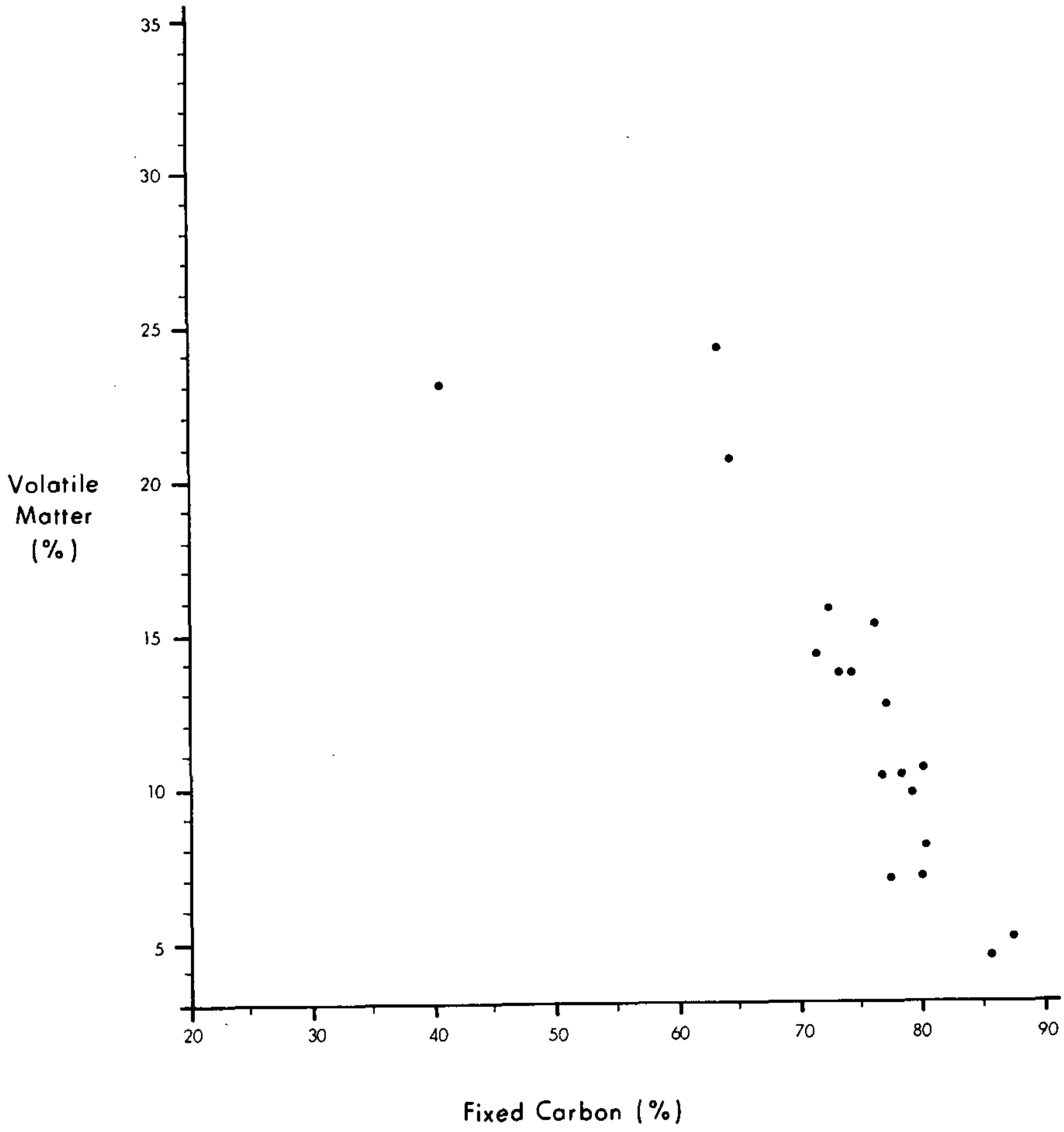
GR- MT. JACKSON 83(3*)A *(1)

Suncor inc. Resources Group

COAL AND MINERALS DEPARTMENT

STRATIGRAPHIC SECTION
MJ-83-B-B'
PALINSPASTICALLY CORRECTED
MT. JACKSON

DATE	SCALE	N.T.S.	DRAWING No.
84-02	1:10	104A/16	Figure 8b



CONFIDENTIAL

Suncor inc Resources Group — COAL AND MINERALS DEPARTMENT

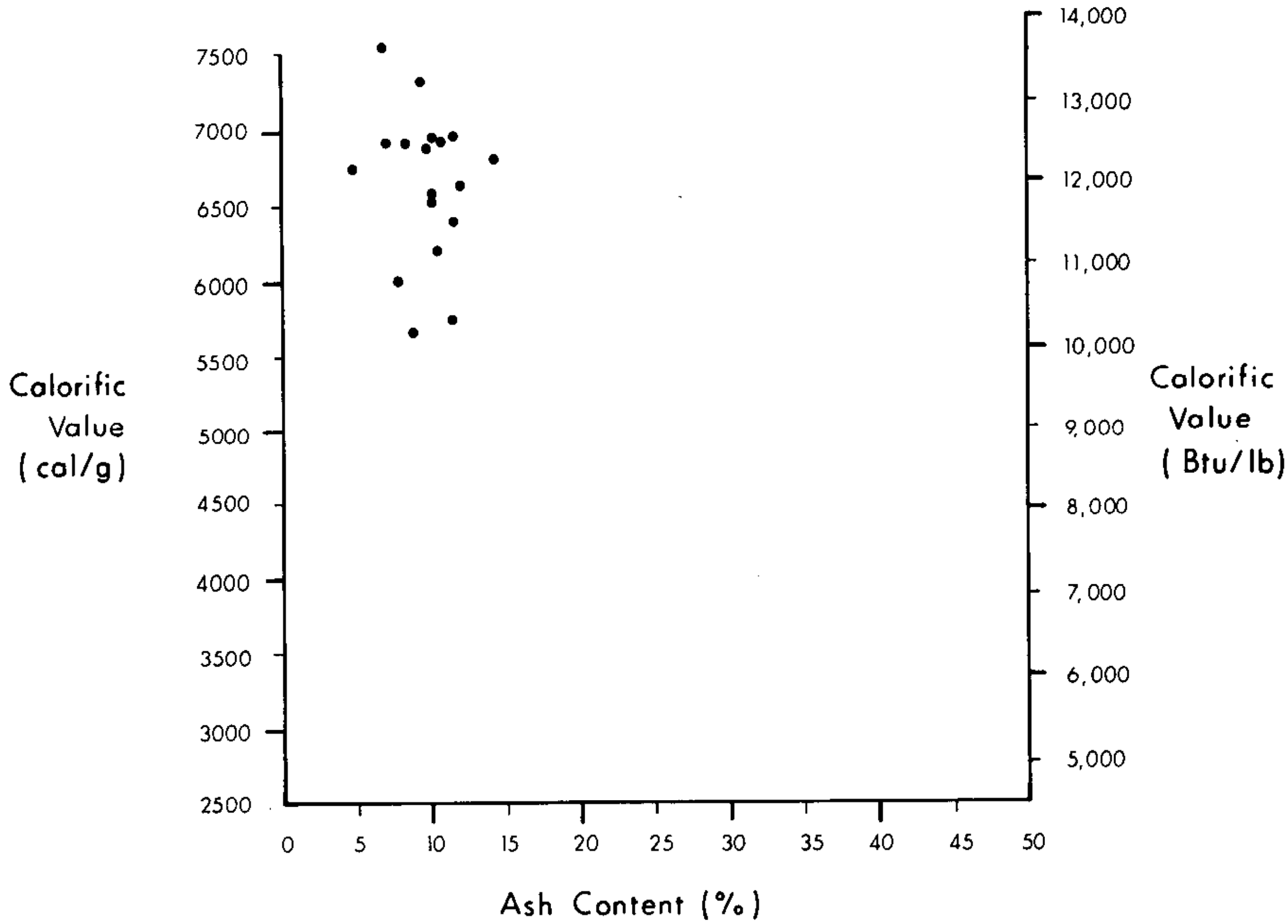
COAL QUALITY DIAGRAM

Clean coal
Volatile matter/fixed carbon
Air dried basis

Mt. Jackson

DATE	SCALE	N T S	DRAWING No
84-02		104 A/16	Figure 9d

00108 (2)



Suncor Inc. Resources Group

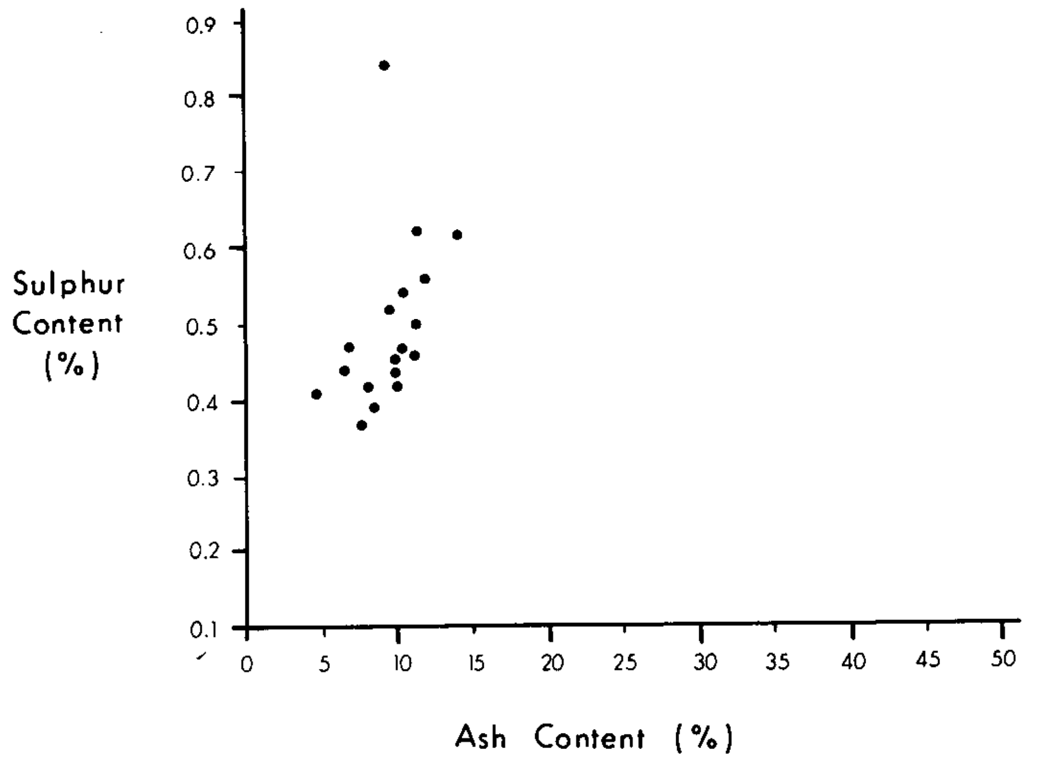
COAL AND MINERALS DEPARTMENT

COAL QUALITY DIAGRAM

Clean coal
Calorific value / ash content
Air dried basis

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No
84-02		104 A/16	Figure 9e



Suncor inc Resources Group

COAL AND MINERALS DEPARTMENT

COAL QUALITY DIAGRAM

Clean coal
Sulphur content/ash content
Air dried basis

Mt. Jackson

DATE	SCALE	N.T.S.	DRAWING No
84-02		104 A/16	Figure 9f

TABLE 8

CLEAN COAL QUALITY ANALYSES

LAB NO.	SAMPLE NO.	WT %	MOIST %	ASH %	VOL. %	F.C.%	S%	CV CAL/GM	BASIS
7111	1442+1443	23.9	2.00	10.00	13.60	74.40	0.44	6553	adb
				10.20	13.88	75.92	0.45	6687	db
7112	1444	72.9	1.30	10.50	8.00	80.20	0.47	6937	adb
				10.64	8.11	81.26	0.48	7028	db
7113	1447	25.1	2.30	7.00	10.50	80.20	0.47	6922	adb
				7.16	10.75	82.09	0.48	7085	db
7114	1448+1449+	8.3	2.10	8.20	12.60	77.10	0.42	6909	adb
	+1450			8.38	12.87	78.75	0.43	7057	db
7136	1528+1529+	16.7	4.00	10.40	14.20	71.40	0.54	6190	adb
	+1530			10.83	14.79	74.38	0.56	6448	db
7143	1930	77.2	1.50	9.70	10.30	78.50	0.52	6876	adb
				9.85	10.46	79.70	0.53	6981	db
7144	1933	13.6	3.70	8.60	24.20	63.50	0.39	5641	adb
				8.93	25.13	65.94	0.40	5858	db
7145	1935	53.2	3.60	11.30	23.00	40.60	0.46	5756	adb
				11.72	23.86	42.12	0.48	5971	db
7146	1939	4.8	3.80	4.70	15.20	76.30	0.41	6772	adb
				4.89	15.80	79.31	0.43	7040	db
7147	1942	0.9	7.10	7.80	20.60	64.50	0.37	6000	adb
				8.40	22.17	69.43	0.40	6459	db
7148	1943	36.8	1.10	11.90	10.30	76.70	0.56	6641	adb
				12.03	10.41	77.55	0.57	6715	db
7149	1945	71.6	0.80	10.20	9.80	79.20	0.42	6943	adb
				10.28	9.88	79.84	0.42	6999	db
7150	1946	31.7	1.80	11.40	13.60	73.20	0.50	6406	adb
				11.61	13.85	74.54	0.51	6523	db
7151	1948	49.7	1.90	10.00	15.70	72.40	0.45	6532	adb
				10.19	16.00	73.80	0.46	6659	db
7152	1952	82.1	1.50	11.50	7.00	80.00	0.62	6968	adb
				11.68	7.11	81.22	0.63	7074	db

TABLE 8
(Continued)

CLEAN COAL QUALITY ANALYSES

LAB NO.	SAMPLE NO.	WT %	MOIST %	ASH %	VOL. %	F.C.%	S%	CV CAL/GM	BASIS
7153	1954	51.8	0.50	9.40	4.50	85.60	0.84	7334	adb
				9.45	4.52	86.03	0.84	7371	db
7154	1957	66.5	1.30	14.20	7.00	77.50	0.62	6716	adb
				14.39	7.09	78.52	0.63	6804	db
7155	1961	11.3	0.90	6.60	5.10	87.40	0.44	7573	adb
				6.66	5.15	88.19	0.44	7642	db