CX CHUTE CK 84(1-5)A
SULPETRO

COAL-EX CONSULTING LTD.
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1984 EXPLORATION DATA
SUMMARY FOR THE
CHUTE CREEK COAL PROPERTY

Coal Licence Nos. 6502 and 6503
Vancouver Island - Comox District
N. T. S. 92F/14
Latitude 49° 52' N
Longitude 125° 25' W
Licences Held by: Sulpetro Minerals Ltd.
Operator: Nuspar Resources Ltd.
Consultant: JHP Coal-Ex Consulting Ltd.
Author: John H. Perry, P. Geol.
Work Performed: May - July, 1984
Date Submitted: August 24, 1984

SUMMARY

The Chute Creek Coal Property consists of two coal licences located on Vancouver Island, British Columbia, within a few kilometres of the town of Campbell River. The property comprises an area of 512 hectares and is located to cover strata that are known to be coal-bearing.

Exploration during 1984 was conducted by Nuspar Resources Ltd., a public Vancouver-based mining company which recently acquired an option to purchase the property from the present owner, Sulpetro Minerals Ltd. Exploration prior to 1984 established that several coal seams were present on the property, one of which was considered to have open pit mining potential. The purpose of the July, 1984 field program was to obtain further thickness and quality data on this seam and to identify suitable target areas and access routes for a larger, upcoming exploration effort. This recent exploration consisted of geological mapping, trenching, road maintenance, reclamation, topographic mapping, sampling and testing for a total of $23,850.

The coal-bearing strata in the Campbell River region belong to the Upper Cretaceous Comox Formation. Many thin coal seams are present within the Chute Creek property. Most of these seams are only a few centimetres thick but several seams range between 0.5 to 1.5 metres in thickness. Only one seam is considered to be of economic interest at present. This seam, referred to as the Upper Seam, has been tentatively correlated over a down-dip distance of 1,400 metres. It ranges in thickness from 0.65 to 1.50 metres and lies close to the ground surface in the east-central portion of the property. Nothing is yet known about the lateral extent of this seam in either an easterly or westerly direction. The beds maintain a gentle to moderate (2° - 15°) dip to the north and, in conjunction

with the gradual northerly dip of the land surface, form a shallow dip-slope. No major structures have been identified on the property to date.

The occurrence of a coal seam approximately 1.5 metres thick near surface and in a shallow dip-slope setting, presents a potential mining situation. The limited amounts of data prevent any meaningful estimate of coal reserves but, if the seam maintains or increases its thickness and remains close to the surface into the west-central portion of the property, the possiblity exists for a small-scale open-pit development.

Analyses performed on trench samples indicate that the coal is of high volatile bituminous A or B rank. Raw ash and volatile contents are expected to range from 23.5 to 29.5% and 32.3 to 35.3% (dry basis), respectively. Sulphur values vary from 0.67 to 1.21% (d.b.). The heat contents determined from these samples vary from 8292 Btu/lb (dry basis, at 29.52% ash) to 12759 Btu/lb (d.b., at 10.39% ash). The coal from these trenches is considered to exhibit varying degress of oxidation. Unoxidized coal from this seam can, therefore be expected to yield higher thermal values than those reported here.

The property is well situated with regard to infrastructure, labour and transportation requirements. The potential product should be a high-quality thermal coal well suited to power generation, cement manufacture and domestic heating, or to blending with other coals to make them more acceptable to the market.

TABLE OF CONTENTS

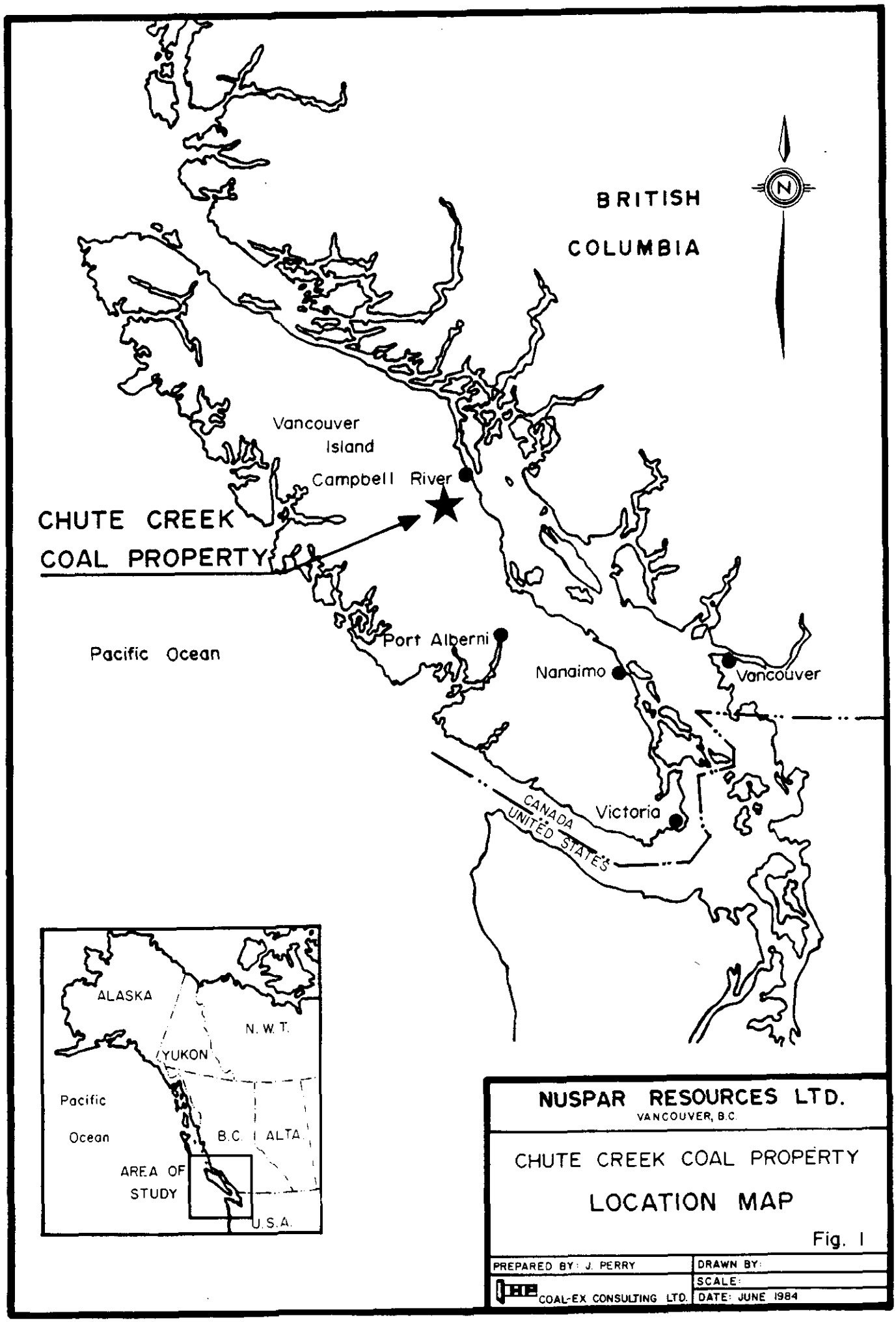
LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

The Chute Creek Coal Property is located on Vancouver Island, British Columbia (see Figure 1). Exploration of the property during 1984 has been conducted by Nuspar Resources Ltd. who have recently acquired an option to purchase the licences from the present owner, Sulpetro Minerals Ltd.

This report presents the results of geological exploration carried out on the property during the period August 2nd, 1983 to August 1st, 1984. Preliminary work began in May, 1984 while the main field work was conducted several weeks later in July. The focus of the exploration was to acquire further data on the quality of the coal seam that provides the main target for exploration on the property (Zone A - Upper Seam) and to identify specific areas and access routes for further exploration. Details of the property geology, resource potential and coal quality are presented in the following sections of this report.



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CHUTE CREEK COAL PROPERTY

LOCATION MAP

Fig. 1

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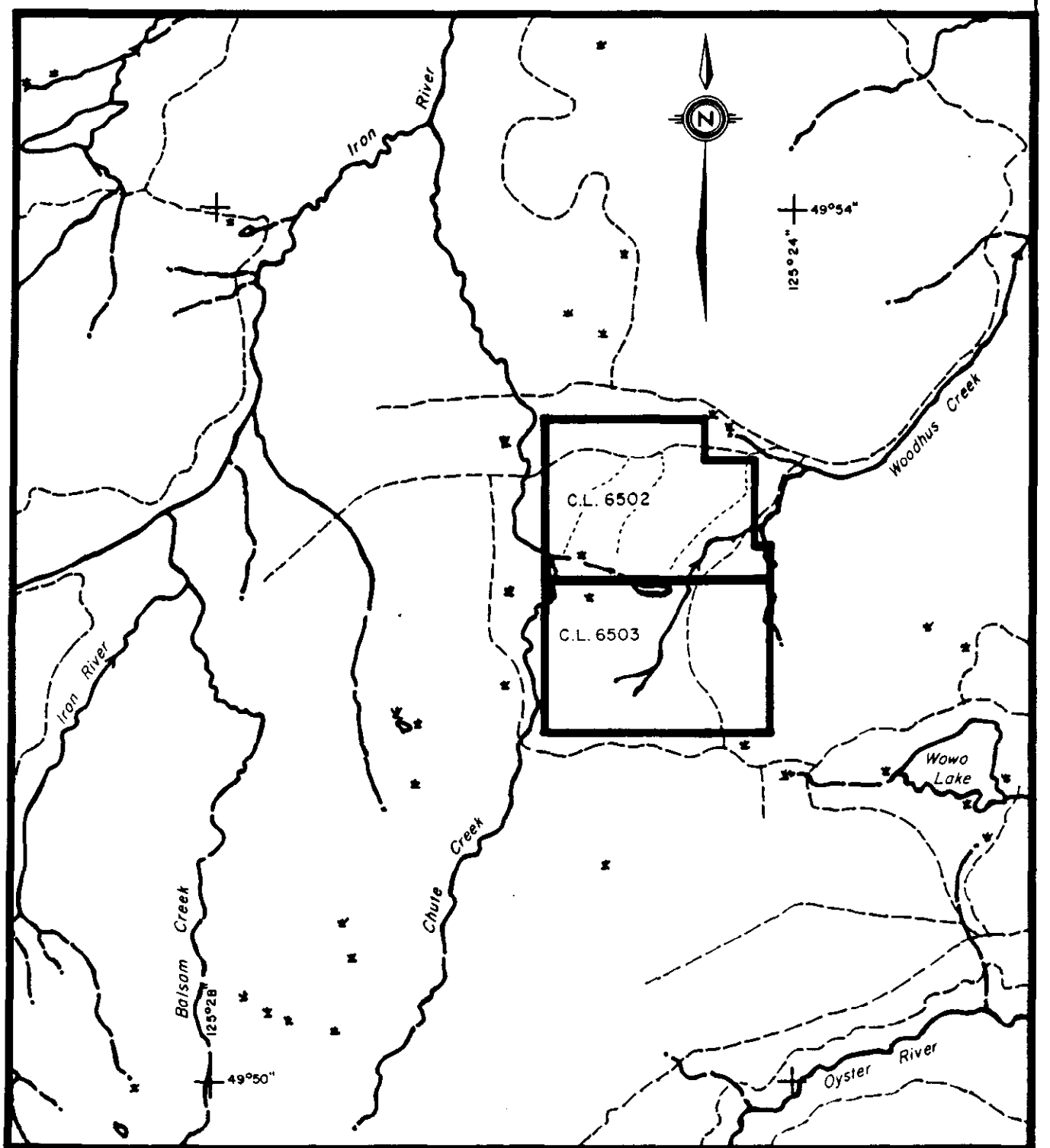
COAL-EX CONSULTING LTD.	SCALE:
	DATE: JUNE 1984

2.0 LOCATION, ACCESS and PHYSIOGRAPHY

The Chute Creek property is located on Vancouver Island approximately 17 kilometres southwest of Campbell River. The property consists of two coal licences which cover an area of 512 hectares and are centered on latitude 49° 52' N and longitude 125° 25' W (see Figure 2). The property lies in a region where coal mining was, for a long time, a major industry. Most of the mining took place approximately 30 kilometres southeast of Chute Creek in the Cumberland-Courtenay area. While no coal mines are operational in the Campbell River-Courtenay region at present, a major mine is planned in the Middle Quinsam Lake area (the one million tonne per year Quinsam Project) approximately six kilometres northwest of the Chute Creek licences.

Access to the property is good; a major unpaved, all-weather forestry road (the Iron River Road) extends from Highway 19 at Oyster Bay to just south of the licences. Branching off from this is a logging road which connects with a number of secondary logging roads and trails which cut across the eastern and northern portions of the licences. Other trails extend along, but lie just outside the southern and western property boundaries. Access to the central portions of the property can be provided by several overgrown trails which join the northernmost road.

The licences cover gently sloping uplands along the eastern flank of the Island Ranges. The topography slopes gradually to the north with wide expanses of flat ground; elevations range between 480 to 630 metres. Drainage is to the north along Chute Creek and a southern branch of the headwaters of Woodhus Creek. A small lake is present in the centre of the property. The flat ground in the vicinity of this lake and along its drainage channel into Chute Creek, is swampy.



LEGEND

- Creek or River
- Road or Trail
- Coal Licence boundary
- C.L.6502 Coal Licence number
- Swampy ground

0 1000 2500 metres

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CHUTE CREEK COAL PROPERTY

COAL LICENCE MAP

N.T.S. 92F/14 Fig. 2

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COAL-EX CONSULTING LTD.	SCALE: 1:50 000
	DATE: JUNE 1984

Most of the area is covered by forest. A large portion of the property was logged during the 1950s. The logged areas are now covered by plantation or second growth pine, fir and alder. No logging operations are being conducted within the immediate vicinity of the property at present.

3.0 COAL LICENCES

The Chute Creek property was once part of a much larger group of coal licences originally granted to CanDel Oil Ltd. in 1980. In May, 1981 Sulpetro Oil Ltd. acquired controlling interest in CanDel and later purchased all CanDel shares. On the basis of reconnaissance exploration, Sulpetro allowed most of the licences to revert to the Crown.

The property now consists of two coal licences which cover an area of 512 hectares. These licences are listed below and are shown in Figure 2.

Coal Licence	Hectares
6502	265
6503	247
TOTAL	512

The location of the licences as shown on the drawings which accompany this report has been taken from data believed to be reliable, but not personally certified by the author.

4.0 SUMMARY OF EXPLORATION WORK

4.1 Pre-1983 Exploration

To date, only reconnaissance exploration has been conducted in the Chute Creek area. In June 1981, CanDel undertook a limited exploration program on the original block of 22 licences. This program consisted of six rotary drill holes (totalling 610 metres) and geophysical logging; no mapping, trenching or sampling was done. The drilling was centred on and around the two licences that comprise the present property. Seven of the most southerly licences were subsequently dropped.

Between September 1981 and June 1982, Sulpetro undertook reconnaissance mapping along the creeks and roads within the remaining 15 licences. Coal outcrops were described in detail and samples were taken for analysis. Based on the results of this reconnaissance, the property was reduced in size to the present two licences.

Both the exploration efforts outlined above were designed to evaluate the potential for open-pit mining in the area; the potential for underground mineable coal was not addressed.

4.2 Exploration Activities: 1983-1984

A small, reconnaissance-style, exploration program was carried out on the property during July, 1984. Field-work consisted of geological mapping, road maintenance, trenching, sampling and reclamation with subsequent coal sample analysis and geological data handling. Preparations for this program began in mid-May with a site visit to determine access routes and to further evaluate the exploration potential of the property. Activities between mid-May and early-July focussed on general program organization, permitting and a review of the existing geological data.

The recently completed work has formed the preliminary phase of a much larger exploration effort which is planned for later in 1984. Consequently, the objectives of the July exploration were oriented towards providing data on access, coal seam development and coal quality to help define specific targets for the upcoming exploration phase.

A summary for each of the exploration activities is presented below.

4.2.1 Geological Mapping

As detailed topographic maps of the property were not available, the mapping was performed only on a reconnaissance scale. Data collection was carried out over an area of some 750 hectares, using aerial photographs in conjunction with enlargements (1:10,000) of existing 1:50,000 government maps. The data was later transferred to detailed (1:5,000) topographic maps once they became available. For the most part, the mapping was concentrated along the logging roads and trails which cross and surround the property. Wherever possible, outcrops described in previous reports were re-examined. Existing data from outcrops which were not re-examined have been incorporated onto the new maps.

4.2.2 Trenching

Eleven trenches were excavated using a backhoe with a 0.75 metre bucket. All trenches were positioned alongside existing roads to minimize surface disturbance. Four of the trenches (CCT-84-1 to 4) were completed by scraping down existing coal outcrops to remove loose and weathered material. Five trenches (CCT-84-6 to 10) were dug in the bottom of a dry roadside ditch, while the remaining two (CCT-84-5 and 11) were positioned along the roadside

opposite the drainage ditch. The average dimensions of the trenches constructed across existing outcrops were approximately 2 metres wide x 3 metres high x 1 metre deep, while the remaining trenches averaged approximately 1.5 metres wide x 2.5 metres long x 1 metre deep.

4.2.3 Road Maintenance

Several logging roads and trails cut across the Chute Creek property. The July exploration program was designed to take advantage of the existing access and to begin to re-open several overgrown trails which will be used to provide access for upcoming exploration. No new roads or trails were constructed.

To provide initial access to the property it was necessary to reopen the main logging road at its junction with the Iron River Road, 2.5 kilometres southeast of the licences. This road was recently blocked by MacMillan - Bloedel who had experienced significant theft of cedar from this area. Once the trenches had been filled a sturdy, single-bar, steel gate was erected. The posts were set in concrete and three trenches were dug along the east side of the road to prevent possible "end-runs" around the gate by 4 x 4 vehicles. General road maintenance was subsequently undertaken on the property and approximately 0.5 kilometres of overgrown trail was re-opened.

4.2.4 Reclamation

The exploration activities caused a minimum of surface disturbance. Six of the trenches dug along the roadside were filled in and the others will be reclaimed as part of the upcoming exploration program.

4.2.5 Topographic Mapping

A topographic map was produced from existing air-photographs which were flown by the British Columbia government in 1981. The map covers an area of some 1,000 hectares, is drawn to a scale of 1:5,000 and has contour intervals of 5 metres with projected contours at 2.5 metre intervals in areas of relatively flat terrain.

No ground surveys were carried out on the property. The map is based on limited ground control established from triangulation stations that appear on the 1:50,000 map (N.T.S. 92F/14). This method of reconnaissance type topographic mapping provides good relative, but uncertain absolute, elevation accuracy.

4.2.6 Coal Analysis

Samples obtained from the recent exploration program were subjected to a series of basic tests comprising, proximate analysis, heat and sulphur content and specific gravity determinations. The tests were performed on a raw basis only and the samples did not undergo any washability tests.

The results of the analyses are discussed in the "Coal Quality" section of this report and individual test results are presented in Appendix II.

4.2.7 Project Management and Primary Contractors

Geological services for program organization, supervision of field operations, data reduction and report preparation were provided by JHP Coal-Ex Consulting Ltd., Vancouver, British Columbia. The program was carried out under the direction of Mr. L. E. Sawyer, President, Nuspar Resources Ltd.

The primary contractors who performed the work on the property are listed below:

1. Geology and Project Supervision
   JHP Coal-Ex Consulting Ltd., Vancouver
2. Trenching and Road Maintenance
   R. Rauser Excavating, Campbell River
3. Gate Construction
   Oyster River Engineering (1984) Ltd., Black Creek
4. Concrete Supply
   Upland Ready Mix Ltd., Campbell River
5. Topographic Map Preparation
   McElhanney Surveying & Engineering Ltd., Vancouver
6. Truck Rental
   Airways Truck Rental & Leasing, Vancouver
7. Coal Analysis
   General Testing & Commercial Testing, Vancouver

Accommodation in Campbell River was obtained at the Island Inn.

4.2.8 Statement of Costs

Activity	Cost
Geological Mapping	$ 6,397.83
Road Maintenance	2,972.35
Surface Work (Trenching)	640.00
Photogrammetry	2,850.00
Sampling and Testing	1,517.00
Reclamation	340.00
Miscellaneous (pre-field organization, geological reports, drafting, reproduction)	8,338.61
Off-Property Costs (Communication, meetings, permitting)	794.70
TOTAL	$23,850.49

5.0 GEOLOGY

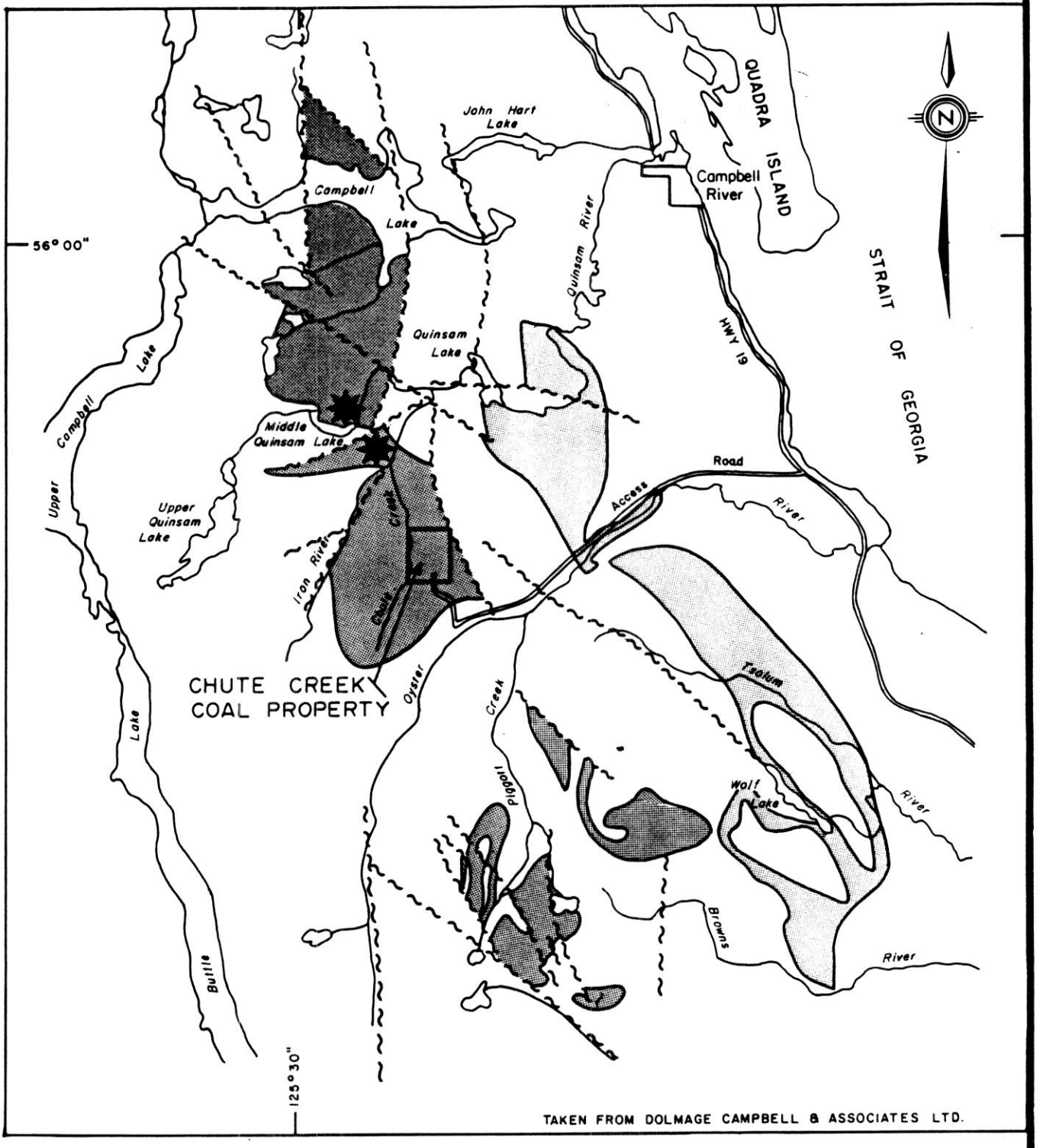
5.1 Regional Geology

The geology of this portion of Vancouver Island has been mapped and described by Muller (1977). Coal is found within the Comox Formation of the Upper Cretaceous Nanaimo Group. The Comox Formation is the lowest unit of this succession and is the only representative of the Nanaimo Group in the region. Overlying formations may be present beneath the deep overburden of the eastern coastal plain, but at higher elevations they have been removed by erosion. The regional distribution of the Comox Formation is shown in Figure 3.

The Upper Cretaceous strata of the Campbell River area have been separated into two "basins"; the Quinsam Basin and the Comox Basin (Dolmage Campbell, 1975). These basins do not necessarily correspond to original areas of deposition but are largely determined by post-Cretaceous faulting and preservation of the sediments within structurally depressed areas. The ground between these high angle faults forms a series of gently warped and tilted blocks. Nanaimo Group sediments within these fault blocks are often characterized by gently to moderately dipping beds.

In the Chute Creek area, Comox Formation lithologies unconformably overlie igneous, pyroclastic and sedimentary rocks of the Vancouver and Bonanza Groups and Island Intrusions. The Vancouver Group is Triassic in age while the Bonanza Group and Island Intrusions are both Jurassic. The generalized geology of the Chute Creek area is shown in Figure 4.

Immediately south of the property, along the northern slope of the Oyster River valley, the basal lithologies of the Comox Formation consist of thick conglomerate beds with interlayered



LEGEND

- Quinsam basin
- Comox basin (extends to Strait of Georgia under overburden cover) — Comox Formation
- ~~~ Fault
- —— Geological contact
- ═══ Road

Quinsam Coal Project (proposed pit locations)

0 8 16 km.

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CHUTE CREEK COAL PROPERTY

REGIONAL DISTRIBUTION OF COMOX FORMATION LITHOLOGIES

Fig. 3

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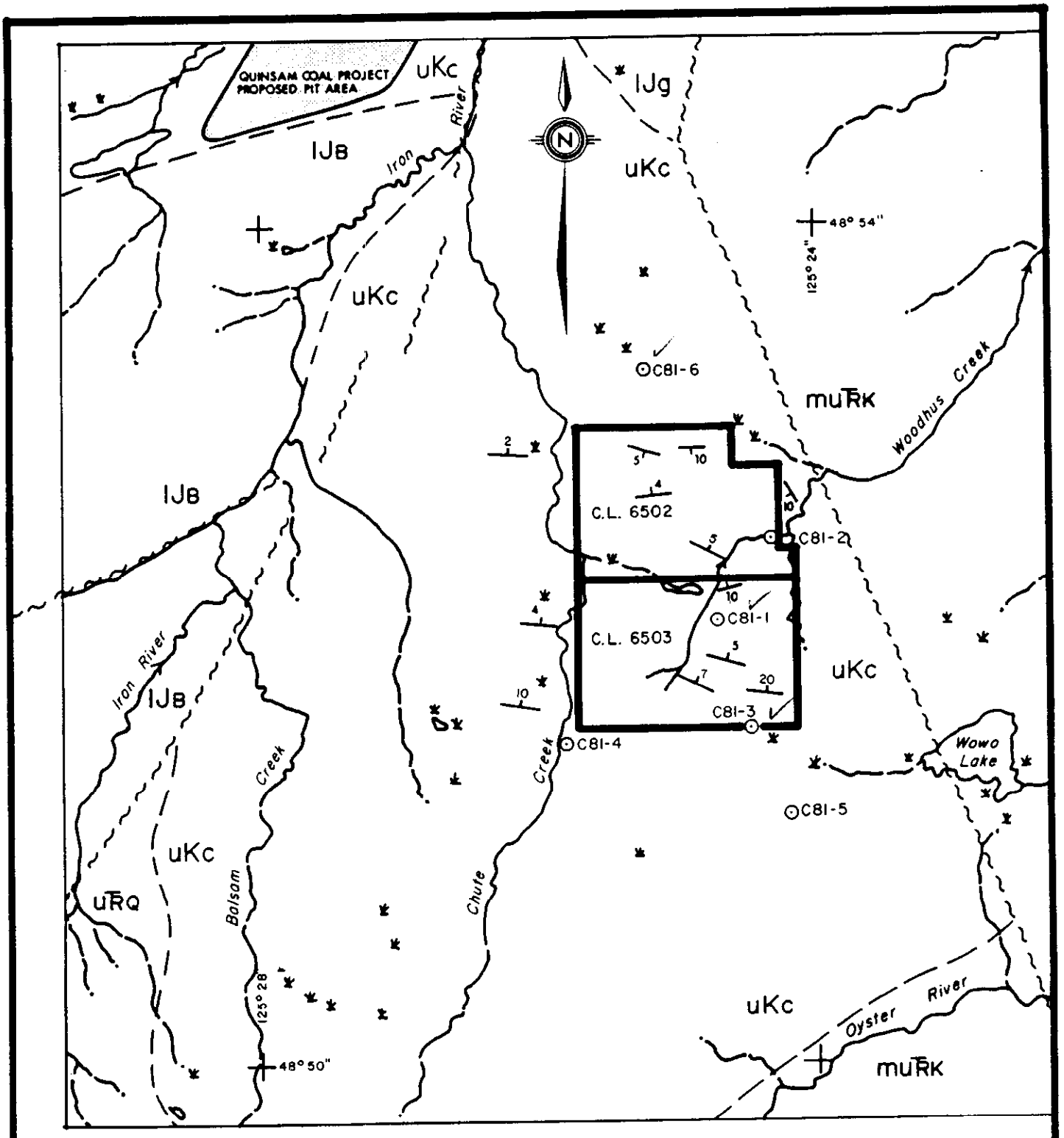
COAL-EX CONSULTING LTD.	SCALE: AS SHOWN
	DATE: JUNE 1984



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CHUTE CREEK COAL PROPERTY

LOCAL GEOLOGY AND DRILL HOLE LOCATIONS

Fig. 4

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	DATE: JUNE 1984

coarse-grained sandstone. This basal conglomerate is generally confined to the lowest points on the pre-Nanaimo Group land surface and, therfore, varies significantly in lateral extent. The old land surface exhibits considerable vertical relief; in the Cumberland area the lowest coal seam in the Comox Formation locally laps onto it. Overlying the conglomerates is a sequence of medium-to-fine-grained clastic sediments consisting mainly of interbedded fine to medium-grained sandstone and siltstone with occasional interbeds of shale and coal.

The coal is generally found in the lower half of the formation (Muller and Jeletzky, 1970). The seams are often quite variable in thickness and lateral extent. Individual seams may split, merge, pinch out into shale beds, or be replaced by sandstone. In the Middle Quinsam Lake area, just to the north of the property, drilling has intersected coal seams over a stratigraphic interval of 107 metres. Three of these seams have been shown to maintain their thickness over a sufficient area to warrant development of the deposit (the Quinsam Coal Project). Coal seams on the Chute Creek property have been described from outcrops, trenches and from drilling. The exploration potential for coal on the property is discussed below.

5.2 Property Geology and Coal Seam Development

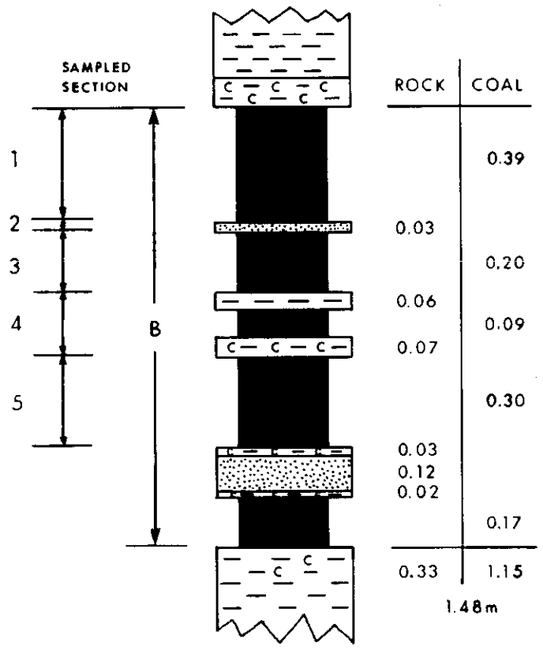
The entire Chute Creek property is underlain by Comox Formation lithologies (see Figure 5). While very little detail is available on the overall Comox Formation stratigraphy, it is apparent from outcrop and drill hole data that the licences cover the main coal-bearing portion of the sequence. Coal seams are present within drill holes C81-1, C81-2 and C81-3 and have been mapped in outcrop along some of the creeks and trails. Outcrop within the property is somewhat scattered and this,

combined with a general lack of relief and the low dip of the beds, provides few opportunities to examine extensive stratigraphic sections. Consequently, the most useful information regarding overall stratigraphy is obtained from the geophysical logs of the drill holes.

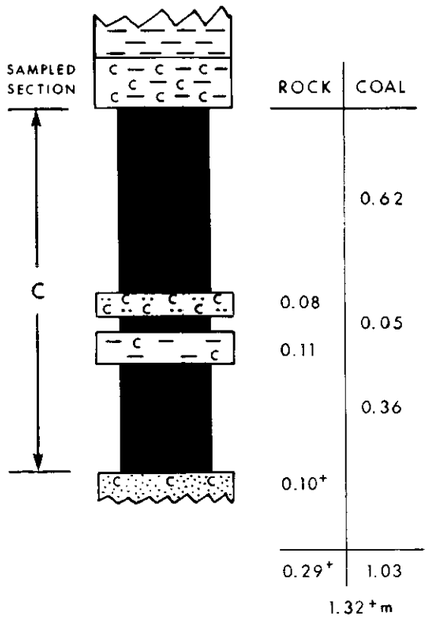
Due to the limited amount of stratigraphic and structural data available, correlation of the coal seams is somewhat problematical. Preliminary corelations have been proposed but several alternative interpretations are possible. However, if the lowest coal seam in each drill hole is correlative, the coal-bearing sequence is at least 85 metres thick (from hole C81-1). Most of the coal seams, however, are contained within an interval of some 50 to 60 metres. The coal seams range in thickness from a few centimetres to approximately 1.5 metres and often lie in close vertical proximity to one another to form "coal zones" up to 3 metres thick. Due to thickness, quality and depth parameters only one seam is considered to hold any development potential at present. This seam is found within Coal Zone A (Sulpetro, 1982) and is referred to here as the Upper Seam. Three backhoe trenches, spaced over 150 metres, have exposed this seam at a road-cut located between drill holes C81-1 and C81-2 (see Figure 5). The trenches were logged and sampled; the descriptive logs form Appendix I and the seam profiles are presented in Figure 6. While only one trench (CCT-84-2) exposed the entire seam, it is evident that the main coal splits and rock bands exhibit a relatively consistent development along the outcrop. The thickness of the Upper Seam at this locality is approximately 1.5 metres.

The Upper Seam is tentatively correlated with coal seams encountered in drill holes C81-1 and C81-3. These intersections have thicknesses of approximately 0.65 metres (C81-1) and 1.5 metres (C81-3) and represent, for each hole, the highest coal

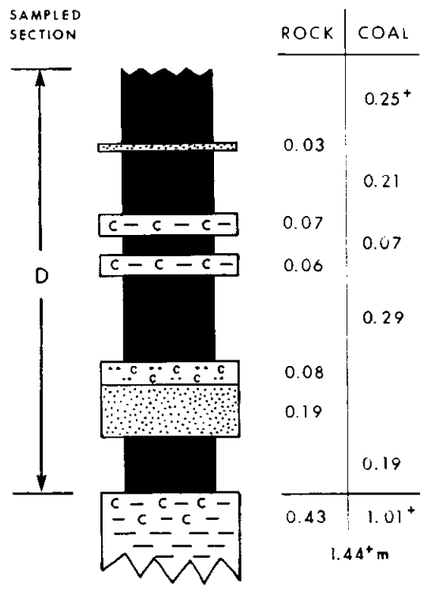
TRENCH CCT-84-2



TRENCH CCT-84-3



TRENCH CCT-84-4



LEGEND

- COAL
- CARBONACEOUS SHALE
- CARBONACEOUS SILTSTONE
- SHALE
- SANDSTONE

NOTE: Analytical data for sampled sections is presented in Appendix II.

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CHUTE CREEK PROJECT

SEAM PROFILES FOR ZONE A - UPPER SEAM

FIG. 6

Drawn: A.G.		Date: August 1984
Checked:	Client App.	Scale: 1:20
Author: J. Perry	Revised:	File No:
COAL-EX CONSULTING LTD.		Dwg. No.

seam of any reasonable thickness in the section. The floors of these seams were intersected at 30.5 metres and 8.7 metres for holes C81-1 and C81-3, respectively. Prior to the field program the presence of a seam at the top of hole C81-2 was suggested to the author on geophysical and field evidence. Such an intersection would have occupied the correct position in the stratigraphy for correlation with the Upper Seam. Trenching at this drill site failed to reveal any sign of coal, however, and bedrock was not encountered. A trench (CCT-84-7) located 100 metres southwest of C81-2 uncovered strata similar to that which lies several metres above the Upper Seam at the road-cut. If the Upper Seam lies below this trench then it can be traced approximately 1,400 metres down-dip from hole C81-3.

The number of coal seams present in the section distinctly increases from south to north across the property. A basal conglomerate sequence is present south of the property, while near the southern property boundary the predominant lithology is a coarse to medium-grained sandstone (C81-4 and 5). Coal seams are first encountered to the north in drill hole C81-3; further north more seams are intersected by hole C81-1 and more again by C81-2 over what is projected to be the same stratigraphic interval. Although correlations are only tentative, it appears that some of the coal seams present in C81-1 are represented in C81-3 by carbonaceous or coaly shale. A similar relationship appears to exist between coal seams in C81-2 and carbonaceous or coaly zones in C81-1. While there is no great thickening of individual coal seams from south to north, there is an overall thickening of coal zones.

Thus, it appears that the southern boundary of the Chute Creek property is located along the margins of the original coal-forming swamp, and that this swamp developed towards what is now north. This hypothesis is supported by the fact that

the Quinsam Project, located 6 kilometres northwest of the property, is being developed to mine three laterally extensive coal seams approximately 3 to 4 metres, 1.2 metres and 4.6 metres in thickness. These seams are found over a stratigraphic interval of some 60 metres. While it is not suggested that the Quinsam seams directly correlate to those in the Chute Creek area, it does indicate that more stable swamp conditions persisted in what is now a northerly direction. Although no coal seams were reported from hole C81-6, coal outcrops have been mapped approximately 1.3 kilometres to the northwest in Chute Creek (see Figure 4). Data from this drill hole is considered to be inconclusive as the drill cutting descriptions are generally unreliable and geophysical logging of the hole could not be completed due to caving.

The geologic structure on the property appears to be relatively straightforward. Bedding dips gently to moderately (2° to 15°) to the north (varying between north-northwest and northeast) and is generally parallel or sub-parallel to the topography, producing a dip-slope situation. Occasional dips to the south and southwest are found along the northern edge of the property. These beddings are found within coarse-grained, cross-bedded arkoses and may represent the edge of a major channel rather than be the result of deformation. Further work will be necessary to determine the precise cause of this apparent dip reversal.

6.0 RESOURCE POTENTIAL

Drilling and geological mapping to date indicate that a number of coal seams are present within the Chute Creek licences. While most of these are too thin to warrant further consideration the Upper Seam (Coal Zone A) does appear to be of sufficient thickness and quality to present a possible mining opportunity. Most of the data on this seam comes from the eastern portions of the property where it ranges in thickness between 0.65 and 1.5 metres, and has been tentatively correlated over a down-dip distance of 1,400 metres.

Further work is necessary before meaningful estimates can be made of the potential coal resources available for mining. The main target for future exploration on the licences is the dip-slope that extends across the northern half of the property west of Woodhus Creek. No data is available to confirm the presence of the Upper Seam in this area but if the seam is present and maintains or increases its thickness while remaining close to the surface, the possibility exists for shallow open-pit development.

The property is well situated for infrastructure and labour requirements in an area where a major coal mine is already proposed. A barge terminal soon to be constructed at Middle Bay, just north of Campbell River, could provide loading facilities for product coal. Utilization of this terminal would keep trucking costs to a minimum.

7.0 COAL QUALITY

Data on the quality of coal from the Chute Creek property has come from a number of trench samples taken from the Upper Seam (Zone A), supplemented by several samples taken across other seams in the area. The results indicate that the coal is of a high volatile bituminous rank (possibly A or B). This is consistent with rank determinations by previous workers in the Campbell River region (see Muller and Atchison, 1971) and with the reported rank (hvb A) for coal within the Quinsam property.

The results of the sample analyses are presented in Appendix II while the sampled intervals are marked on the descriptive logs (Appendix I) and illustrated, for the Upper Seam, in Figure 6. Only one trench (CCT-84-2) exposed the full thickness of the Upper Seam. The sample obtained (sample B) is low in sulphur (0.79%, dry basis) and exhibits ash and volatile contents of 23.46% and 35.28% on a dry basis, respectively. The heat content of sample B is 9194 Btu/lb (dry basis), which is low for a coal of high volatile bituminous A or B rank. This is considered to be the result of oxidation of the coal, as indicated by the relatively high air-dried moisture content (6.65%) and by field observations.

Neither samples C or D could be taken over the full thickness of the Upper Seam; trench 84-3 failed to expose the floor and trench 84-4 did not contain the topmost section of the coal seam (see Figure 6). The section sampled in CCT-84-4 most closely resembled the full seam sample obtained in trench 84-2, consequently the analytical results are similar. The ash content of sample D is somewhat higher (29.52%, d.b.) due to a thickening of the lowermost rock band and, possibly, to some contamination of the sample where the coal was in contact with the overlying soil. The sulphur (0.67%, d.b.) and volatile (32.28%, d.b.) contents are consistent with sample B as are the moisture (8.20%, d.b.)

and thermal (8292 Btu/lb, d.b.) values. This sample is also considered to be heavily oxidized. Sample C (trench 84-3) was taken from the roof of the seam to the top of the lowermost rock band. Consequently, the ash content is significantly lower (10.39%, d.b.) than the other samples. The low ash content explains, in part, the relatively high thermal value (12759 Btu/lb, d.b.) obtained from this sample. Another factor is that in this trench the Upper Seam exhibits much less oxidation than it does in the other two trenches. Part of the reason for this may be that at CCT-84-3, Coal Zone A is overlain by a thick, massive, competent sandstone which may have protected the coal seam from the effects of water permeating from the ground surface. This sandstone is not present above the coal zone at trenches 84-2 and 84-3, having been removed by erosion. It appears reasonable, therefore, that unoxidized coal from sections equivalent to samples B and D can be expected to yield heat contents significantly greater (by some 1,500 to 2,500 Btu/lb) than those reported above, for coal of similar ash content. The sulphur content of the Upper Seam in sample C is significantly higher than in the other samples. No explanation for this is offered here but unconfirmed reports indicate that coal seams in this region characteristically exhibit variations in sulphur content.

Prior to the main field program a series of samples were taken across the Upper Seam from a hand-trench at the same location as CCT-84-2. The analytical results from these samples are also presented in Appendix II and the sampled intervals (1 to 5) are indicated on Figure 6. This shallow trench failed to expose the floor of the seam and the sampled interval was taken to the top of the lowermost rock band, similar to sample C (CCT-84-3). The ash contents for the various coal splits vary between 9.38% to 12.78% (dry basis). These relatively low values are supported by the limited number of thin rock bands or laminae observed within the coal, (see Appendix I). Sulphur values are low.

Analytical data for samples from other seams in this stratigraphic sequence indicate that, relative to the Upper Seam, they contain less ash and have correspondingly higher thermal values. They also possess a similar volatile content but are significantly higher in sulphur (from 2.33 to 3.31%, dry basis).

8.0 REFERENCES

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1970: Geology of the Upper Cretaceous Nanaimo Group, Vancouver Island and Gulf Islands, British Columbia; Geol. Surv. Canada, Paper 69-25.

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Western Miner
1983: Quinsam Coal Project; May,1983, pp. 6 - 8. Western Miner Press Ltd., Vancouver.

9.0 STATEMENT OF QUALIFICATIONS

I, **J. H. PERRY,** DO HEREBY CERTIFY:

1. That I am a Consulting Geologist with a a business office at 806, 402 West Pender Street, Vancouver, British Columbia, V6B 1T6, and *am President of* ***JHP COAL-EX CONSULTING LTD.***;

2. That I hold a BSc (Hons) degree in Geology from Exeter University (1972) and that I undertook post-graduate study at the University of Calgary (1972-1976);

3. That I am a Registered Professional Geologist in the Association of Professional Engineers, Geologists and Geophysicists of the Province of Alberta:

4. That I am a Member of the Canadian Institute of Mining and Metallurgy, an Associate Fellow of the Geological Association of Canada and a Fellow of the Geological Society (London);

5. That I have practiced my profession as a Geologist for the past eight years.

J. H. Perry, P. Geol.

APPENDIX I

TRENCH DESCRIPTIVE LOGS

CHUTE CREEK TRENCH 84-1: Lower Seam - Coal Zone A

Logged: July 14th, 1984

True Thickness (Metres)	Sampled Section		Description
0.95		SHALE	- medium to dark grey; somewhat silty and carbonaceous in places. Thin siltstone interbands.
0.45	A	COAL	- hard, much vitrain, occasional thin carbonaceous claystone or bone coal laminae. Sharp contact at roof and floor.
0.17		SHALE	- dark grey, carbonaceous, with coal stringers.
0.33		SHALE	- medium grey, poorly fissile, many coal laminae, stringers and plant fragments.
0.12		COAL	- bright, hard.
0.30		SHALE	- as above.
		END OF TRENCH	

Bedding NO55/9° to 13°N

NOTE: The Lower Seam lies approximately seven metres below the Upper Seam.

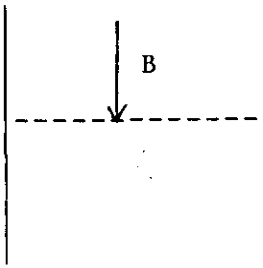
CHUTE CREEK TRENCH 84-2: Upper Seam - Coal Zone A

Logged: July 15th, 1984

True Thickness (Metres)	Sampled Section	Description
		SHALE - light grey, poorly fissile, ellipsoidal weathering in places.
0.10		CARBONACEOUS SHALE - dark grey, contains very thin coal bands.
0.39		COAL - bright on unweathered surfaces. Clay laminae near top. Gradational contact with overlying carb. shale. Well cleated.
0.03	B	SANDSTONE - orange, highly weathered, probably arkosic. Coarse grained feldspars are completely weathered out giving a somewhat oölitic appearance to the rock.
0.20		COAL - bright on unweathered surfaces. Well cleated.
0.06		SHALE - medium to dark grey, coal band in centre (0.01 m)
0.09		COAL - bright, friable, weathered.
0.07		CARBONACEOUS SHALE - dark grey, highly carbonaceous with many coal flecks and laminae.
0.30		COAL - bright, well cleated, weathered.
0.03	B	CARBONACEOUS SHALE - dark grey, highly carbonaceous, silty.
0.12		SANDSTONE - medium to dark grey, medium grained, orange weathering arkosic, feldspars weathered out, ellipsoidal weathering along outcrop. Unit thickens and thins along outcrop (up to 0.20 m).

Continued overleaf

CHUTE CREEK TRENCH 84-2 (Cont'd.)

True Thickness (Metres)	Sampled Section		Description
0.02		CARBONACEOUS SHALE -	as above.
0.17		COAL -	bright, well cleated, weathered. Sharp bottom contact.
		SHALE -	medium grey, poorly bedded with many plant fragments and coal laminae.

CHUTE CREEK TRENCH 84-3: Upper Seam -Coal Zone A

Logged: July 15th, 1984

True Thickness (Metres)	Sampled Section		Description
		SANDSTONE	- coarse grained, arkosic. Feldspars well weathered, orange in colour. Typical channel sand with abrupt basal contact.
0.75		SHALE	- grey, poorly bedded, friable. Carbonaceous at base.
0.20		COALY SHALE	- dark grey to black, highly carbonaceous with several 0.03 metre coal bands.
0.15		SHALE	- medium grey, poorly bedded, friable. Carbonaceous at base.
0.08		COAL	- friable, weathered.
0.15		CARBONACEOUS SHALE	- dark grey with thin coal bands.
0.90		SHALE	- light grey, some plant fragments. Ellipsoidal weathering.
0.17		CARBONACEOUS SHALE	- dark grey to black, highly carbonaceous and coaly.
0.62		COAL	- bright, very hard. Top contact somewhat gradational. Some staining but not as weathered as previous coal occurrences.
	C	Bedding N070°/11° N	
0.08		CARBONACEOUS SILTSTONE	- dark grey, has a 0.01 metre coal band in centre.

CHUTE CREEK TRENCH 84-3 (Cont'd)

True Thickness (Metres)	Sampled Section	Description	
0.05	C	COAL	- fairly bright, hard. As above.
0.11		SHALE	- dark grey, slightly carbonaceous.
0.36		COAL	- hard, as above. More cleated.
0.10+		SANDSTONE	- medium grey, coarse grained. Carbonaceous at top, otherwise arkosic.
		Base of Coal Seam not uncovered.	

CHUTE CREEK TRENCH 84-4: Upper Seam - Coal Zone A

Logged: July 16th, 1984

True Thickness (Metres)	Sampled Section	Description
		Soil directly in contact with the coal seam.
0.25+		COAL - highly weathered and friable. Well cleated. Gradational at top, into overlying soil. Probable sample contamination by soil at top.
0.03		SANDSTONE - orange, carbonaceous and arkosic. Highly weathered.
0.21		COAL - stained, harder than above. Well cleated.
0.07		CARBONACEOUS SHALE - dark grey to black, highly carbonaceous, coaly. Soft.
0.07		COAL - as before.
0.06	D	CARBONACEOUS SHALE - as above.
0.29		COAL - brighter and harder than before. Less weathered. Well cleated.
0.08		CARBONACEOUS SILTSTONE - dark grey, highly carbonaceous to coaly.
0.19		SANDSTONE - medium grained, grey to orange. Contains ovoid structures, possibly weathering phenomena. Ranges from 0.10 to 0.28 in thickness.
0.19		COAL - bright, some staining. Bottom contact somewhat gradational.
		CARBONACEOUS SHALE - dark grey, highly carbonaceous, some thin coal bands and laminae. Fissile.

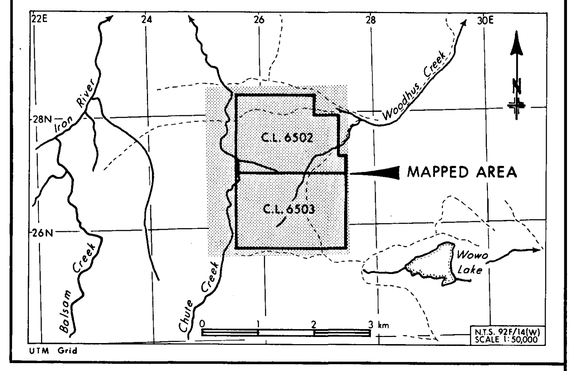
CHUTE CREEK TRENCH 84-2A: Upper Seam - Coal Zone A

(A hand-trench at the same location as the back-hoe trench 84-2)

Logged: May 17th, 1984

True Thickness (Metres)	Sampled Section	Description		
		SHALE	-	grey when fresh, weathers orange. Fissile.
0.10		COALY SHALE	-	dark grey to black. Highly carbonaceous shale with thin interbeds of shaley coal.
0.43	1	COAL	-	weathered and stained along cleat surfaces. No noticeable shale bands.
0.05	2	SANDSTONE	-	orange weathering, coarse grained, oölitic in appearance. Varies from 0.04 to 0.07 metres across outcrop.
0.20	3	COAL	-	as above.
0.20	4	COAL and SHALE	-	carbonaceous and coaly shale with thin coal bands.
0.28	5	COAL	-	as before.
		Carbonaceous shale underlain by sandstone.		

KEY MAP



LEGEND

- ukc — COMOX FORMATION
  - a — Coal with shale, siltstone and sandstone
  - e — Shale, siltstone and sandstone
  - f — Sandstone with conglomerate lenses
- muk — KARMUTSEN FORMATION
  - Volcanics

SYMBOLS

- Fault
- 10 — Bedding, strike and dip
- Outcrop
- ● — Rotary Drill Hole (1981)
- VAN 5 — Measured Section (1981)
- × CCT-84-1 — Trench (1984)
- Coal seam trace
- Property Boundary

COAL LICENCE 6502

COAL LICENCE 6503

0 500 m

PRELIMINARY RECONNAISSANCE TYPE MAPPING	
McElhanney REF. No. 40145-0	Compiled by THE McELHANNEY GROUP LTD. 1166 Alberni St, Vancouver, B.C., Canada from aerial photography at an approximate scale of 1:23,000 flown in 1981
	Scale 1:5,000 — Date JULY 1984
	Contour Interval 5 Metre with 2.5 metre auxiliary — Sheet No. 1 OF 1

NUSPAR RESOURCES LTD.

CHUTE CREEK PROJECT

GEOLOGY MAP 45

FIG. 5

Author: J. Perry	Scale: 1:5,000	Revised:	
Drawn: P. Hall	Date: August 1984	N.T.S. Grid: 92F/14 (W)	
Checked:	Client App:	File No:	
COAL-EX CONSULTING LTD.		Dwg. No:	

APPENDIX II

COAL QUALITY DATA

CONFIDENTIAL

00045 (2)

COMMERCIAL TESTING & ENGINEERING CO.

147 RIVERSIDE DRIVE, NORTH VANCOUVER, B.C. V7H 1T6, CANADA • AREA CODE 604 929-2228

Division of
GEO Vann Oilfield Services of Canada, Ltd.

SINCE 1908

GENERAL OFFICES:
1919 S. HIGHLAND AVE., SUITE 210-B
LOMBARD, ILLINOIS 60148
AREA CODE 312 953-9300

JHP COAL-EX CONSULTING LTD.
806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-1

Sample : Trench 1, Sample A

Lower Seam - Zone A

Specific Gravity 1.40

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	2.34	xxxxx
% Ash	13.81	14.14
% Volatile	36.38	37.25
% Fixed Carbon	47.47	48.61
	100.00	100.00
BTU/lb	11819	12102
% Sulphur	3.75	3.84

Respectfully submitted,

S. Morrin
Manager,

COMMERCIAL TESTING & ENGINEERING CO.
147 RIVERSIDE DRIVE, NORTH VANCOUVER, B.C. V7H 1T6, CANADA • AREA CODE 604 929-2228

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JHP COAL-EX CONSULTING LTD.
806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-2

Sample : Trench 2, Sample B

Upper Seam - Zone A

Specific Gravity 1.50

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	6.65	xxxxx
% Ash	21.90	23.46
% Volatile	32.93	35.28
% Fixed Carbon	38.52	41.26
	100.00	100.00
BTU/lb	8583	9194
% Sulphur	0.74	0.79

Respectfully submitted,

S. Morrin
Manager,

COMMERCIAL TESTING & ENGINEERING CO.
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806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-3

Sample : Trench 3, Sample C

Upper Seam - Zone A

Specific Gravity 1.36

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	2.36	xxxxx
% Ash	10.14	10.39
% Volatile	34.76	35.60
% Fixed Carbon	52.74	54.01
	100.00	100.00
BTU/lb	12458	12759
% Sulphur	1.18	1.21

Respectfully submitted,

S. Morrin
Manager,

COMMERCIAL TESTING & ENGINEERING CO.

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806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-4

Sample : Trench 4, Sample D

Upper Seam - Zone A

Specific Gravity 1.60

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	8.20	xxxxx
% Ash	27.10	29.52
% Volatile	29.63	32.28
% Fixed Carbon	35.07	38.20
	100.00	100.00
BTU/lb	7612	8292
% Sulphur	0.62	0.67

Respectfully submitted,

S. Morrin
Manager,

Original Copy Watermarked
For Your Protection

Charter Member

GENERAL TESTING LABORATORIES

A Division of SGS Supervision Services Inc.

1001 EAST PENDER STREET VANCOUVER, B.C. CANADA V6A 1W2
PHONE (604) 254-1647 TELEX 04-507514 CABLE ADDRESS: SUPERVISE

CERTIFICATE OF ANALYSIS

NUSPAR RESOURCES LTD.
Attn. MR. S. AIKINS
#305 - 535 THURLOW ST
VANCOUVER - B.C. - V6E 3L2

NO. : 8405-2257C
FILE :
DATE: MAY 31ST, 1981

WE HEREBY CERTIFY TO HAVE ANALYZED THE SUBMITTED SAMPLES AS FOLLOWS :

SAMPLE NO	BASIS	R.M. %	ASH %	V.M. %	F.C. %	SULFUR %	C.V. BTU/LB	S.G. G/CM3
1	AIR DRY	9.08	8.53	33.74	48.65	0.74	9825	1.47
	DRY	-	9.38	37.11	53.51	0.81	10806	-
2	AIR DRY	1.92	83.27	14.74	0.07	0.06	-	3.12
	DRY	-	84.90	15.03	0.07	0.06	-	-
3	AIR DRY	8.89	11.64	33.40	46.07	0.28	9281	1.48
	DRY	-	12.78	36.66	50.56	0.30	10197	-
4	AIR DRY	7.60	47.18	21.36	23.86	0.51	4430	1.89
	DRY	-	51.06	23.11	25.83	0.55	4795	-
5	AIR DRY	8.03	9.49	33.62	48.86	0.79	9613	1.46
	DRY	-	10.31	36.55	53.14	0.86	10452	-

per L.M. LAKOSIL - CHIEF CHEMIST, Coal div.
SIGNATURE AND TITLE

APPENDIX II

COAL QUALITY DATA

CONFIDENTIAL

COMMERCIAL TESTING & ENGINEERING CO.

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AREA CODE 312 953-9300

JHP COAL-EX CONSULTING LTD.
806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-1

Sample : Trench 1, Sample A

Lower Seam - Zone A

Specific Gravity 1.40

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	2.34	xxxxx
% Ash	13.81	14.14
% Volatile	36.38	37.25
% Fixed Carbon	47.47	48.61
	100.00	100.00
BTU/lb	11819	12102
% Sulphur	3.75	3.84

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JHP COAL-EX CONSULTING LTD.
806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-2

Sample : Trench 2, Sample B

Upper Seam - Zone A

Specific Gravity 1.50

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	6.65	xxxxx
% Ash	21.90	23.46
% Volatile	32.93	35.28
% Fixed Carbon	38.52	41.26
	100.00	100.00
BTU/lb	8583	9194
% Sulphur	0.74	0.79

Respectfully submitted,

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Manager,

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JHP COAL-EX CONSULTING LTD.
806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-3

Sample : Trench 3, Sample C

Upper Seam - Zone A

Specific Gravity 1.36

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	2.36	xxxxx
% Ash	10.14	10.39
% Volatile	34.76	35.60
% Fixed Carbon	52.74	54.01
	100.00	100.00
BTU/lb	12458	12759
% Sulphur	1.18	1.21

Respectfully submitted,

S. Morrin
Manager,

COMMERCIAL TESTING & ENGINEERING CO.

147 RIVERSIDE DRIVE, NORTH VANCOUVER, B.C. V7H 1T6, CANADA • AREA CODE 604 929-2228

Division of
GF ann Oilfield Services of Canada, Ltd.

SINCE 1908

GENERAL OFFICES:
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AREA CODE 312 953-9300

JHP COAL-EX CONSULTING LTD.
806 402 West Pender Street
Vancouver, B.C.
V6B 1T6

August 17,1984

Lab File # 64-21642-4

Sample : Trench 4, Sample D

Upper Seam - Zone A

Specific Gravity 1.60

Proximate Analysis

	Air Dry	Dry Basis
% Moisture	8.20	xxxxx
% Ash	27.10	29.52
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	100.00	100.00
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% Sulphur	0.62	0.67

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2	AIR DRY	1.92	83.27	14.74	0.07	0.06	-	3.12
	DRY	-	84.90	15.03	0.07	0.06	-	-
3	AIR DRY	8.89	11.64	33.40	46.07	0.28	9291	1.48
	DRY	-	12.78	36.66	50.56	0.30	10197	-
4	AIR DRY	7.60	47.18	21.36	23.86	0.51	4430	1.89
	DRY	-	51.06	23.11	25.83	0.55	4795	-
5	AIR DRY	8.03	9.49	33.62	48.86	0.79	9613	1.46
	DRY	-	10.31	36.55	53.14	0.86	10452	-

L.M. LAKOSIL - CHIEF CHEMIST, Coal div.
SIGNATURE AND TITLE