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CANADIAN ISLAND CREEK COAL LTD
Conox Coal Field
TSOLUM RIVER
Preliminary Evaluation

VOLUME 1
November, 1980

CONFIDENTIAL

November 14, 1980

R. A. Swaren, P. Geol.

(Drafting - Lynn McKellar)

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SUMMARY AND RECOMMENDATIONS

SUMMARY

The Tsolum River property appears to hold good underground potential and together with Buckley Bay gives Canadian Occidental Petroleum Ltd., a possible 20% of the Comox coal fields reserves of underground mineable coal.

The following points summarize the Tsolum River property so described in the following sections in the report:

- A) Located near tidewater, near existing infrastructure in an area of year round moderate climate.
- B) Underground mining was carried out 2 miles south of the property from 1888 until the early 1950's. Luscar/Weldwood plan a surface mine 5 miles northwest of the property at Quinsam Lake.
- C) Should be at least one mineable seam of 5.0 foot thickness with a strong possibility of there being an additional mineable seam in most areas.
- D) Coal is underground mineable with depths ranging from 100 to 1300 feet in the shallowest areas (in the west) to 850 to 1650 feet in the deeper areas (in the east). Seams dip from 10° to 1° to the northeast.
- E) Reserves are in the order of 243.4 million short tons in place. These are in the speculative category using one 5.0 foot seam
- F) Average quality from the limited information available should be as follows for raw coal.

Moisture	=	2.0%
Ash	=	14.8%
F.C.	=	57.17%
V.M.	=	26.35%
Sulfur	=	1.4%
B.T.U.'s/lb.	=	12,356

RECOMMENDATIONS

These are as follows:

- A) That Canadian Occidental Petroleum Ltd., be prepared to carry out an exploration program in 1981. This program will involve drilling 23 holes and 3 core holes for a cost of approximately \$600,000.
- B) After the program the property should be re-evaluated; unprospective areas dropped, open crown land to the east applied for if feasible and a further program developed for 1982 if results are favourable.

INTRODUCTION

This report deals with the Tsolum River property on Vancouver Island. Canadian Occidental Petroleum Ltd., applied for the coal licences on this acreage in July, 1980, in order to block off an underground mineable reserve of coal in the Comox coal field. This report supplied the backup information for the application.

PURPOSE AND SCOPE

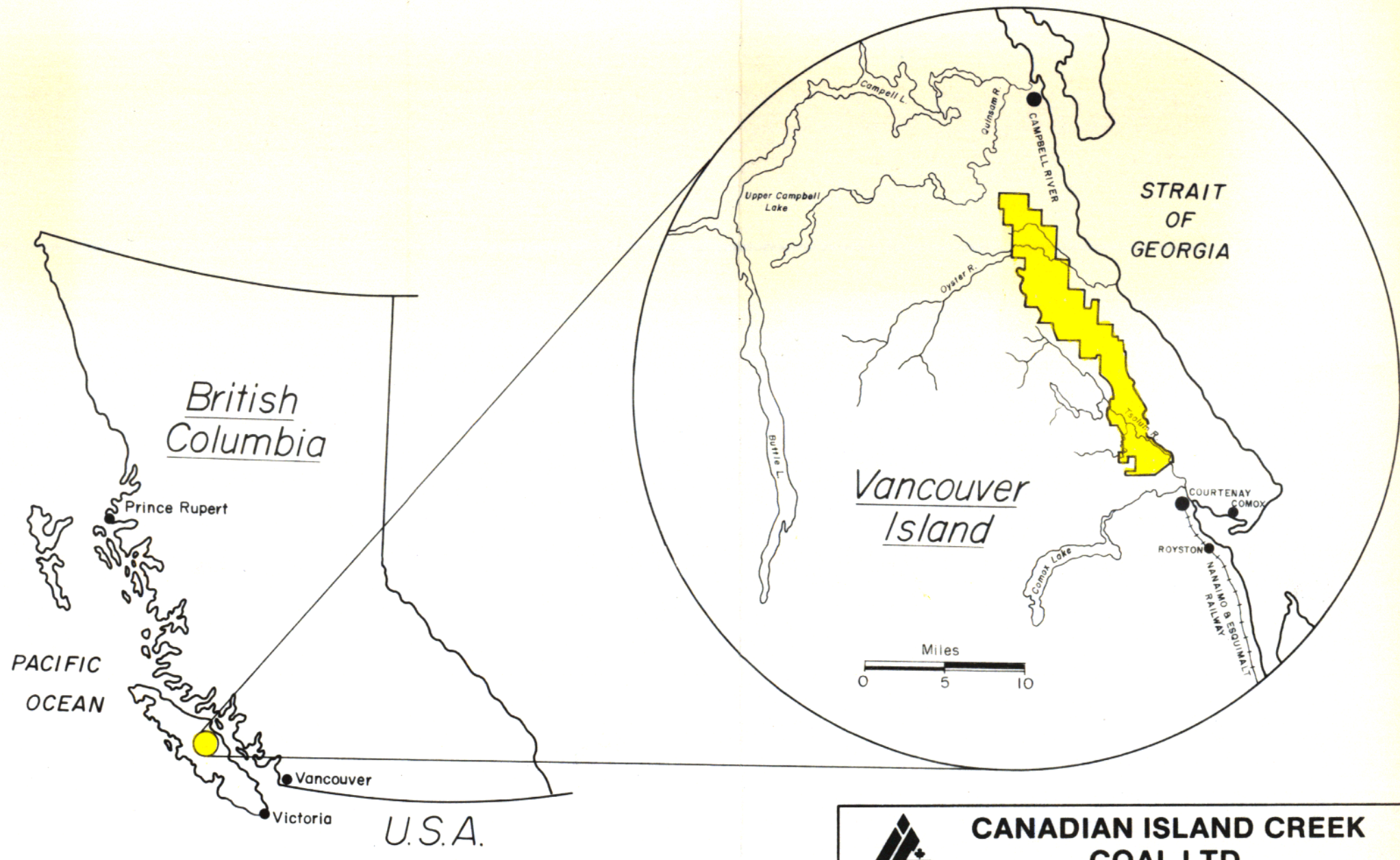
The purpose of this report is as follows:


- A) To construct cross-section and geologic maps of the area from all available data. Includes information gained from the preliminary reconnaissance done by Canadian Island Creek Coal Ltd.
- B) To evaluate the possible reserve potential and quality of the coal in the Tsolum River property.
- C) To devise a preliminary exploration program on the property for 1981.
- D) To make recommendations as to any additional acreage which should be acquired in the area with which the report deals.

LOCATION AND ACCESS

The 30,380 acres (12,296 hectares) of land which comprised the Tsolum River property is located on the east coast of Vancouver Island approximately $\frac{1}{2}$ way up the Island (Map 1). The property is approximately 20 miles in length and 3 to 4 miles in width and extends north from the town of Courtenay almost to the town of Campbell River. The eastern property boundary is approximately 3 miles inland from the strait of Georgia (tidewater).

The property is readily accessible by Highway 19 which parallels the eastern property boundary as well as by many smaller paved roads, gravelled lumbering roads and the B.C. hydro power line (Map 3 and 9).



 CANADIAN ISLAND CREEK COAL LTD.		
COMOX COAL FIELD TSOLUM RIVER Location Map		
Map No. 1		
DATE: September '80	N.T.S. NO. 92F/14	COMPILED BY: R.A. Swaren
DRAWING NO:	DRAWN BY: L.M.	

The Esquimalt and Nanaimo railway terminates at the town of Courtenay, approximately 2 miles south of the southern property boundary (Map 1).

INFRASTRUCTURE

There are numerous small towns and villages but the nearest major towns are Comox and Courtenay, 2 miles south of the property and Campbell River, approximately 7 miles north of the property (Map 1). The major industries which support these towns are lumbering, fishing and tourism. A coal mine could be easily absorbed by the existing infrastructure and Campbell river has been chosen as the living quarters for the proposed Luscar/Weldwood Quinsam Lake mine.

PHYSIOGRAPHY

The topography is of very low relief with elevations varying from 100 feet above sea level in the east to 300 feet in the west. The land therefore slopes gently to the east.

Two major rivers provide drainage on the property. These are the Oyster River in the northern portion and the Tsolum River in the south. Both of these flow east into the Strait of Georgia.

The climate is mild and precipitation is moderate varying from 30 to 60 inches per year. The area very seldom gets any snowfall in the winter months.

HISTORY

Coal was first reported by natives of Vancouver Island in 1835. This coal was found in the Suquash coal field on the very northern end of the Island. (Map 6)

In 1849 the Hudson's Bay Company imported a hundred miners from England to mine coal in the Suquash field to supply fuel for steamships. In the same year (1849) Indians reported finding coal in the Nanaimo area of Vancouver Island. The Hudson's Bay Company operated mines in the Nanaimo field from 1852 until 1902 when they sold their holdings to the Vancouver Coal Mining and Land Company. They mined until 1902 when they sold out to the Western Fuel Company of California. This company operated until 1928 when they were purchased by Canadian Collieries (Dunsmuir) Ltd.

Canadian Collieries (Dunsmuir) Ltd., also controlled all of the other coal mines on the Island and in 1888 the first coal mine was started up in the Comox coal field. This company then controlled all the coal lands in the east coast of Vancouver Island under the Esquimalt and Nanaimo land grant.

In the productive years from 1836 to 1968, a total of about 74,650,000 short tons of coal was produced from Vancouver Islands' coal fields. Of this total, approximately 22,000 tons was produced from Suquash, 54,087,860 tons from the Nanaimo field and 20,540,100 tons from the Comox coal field.

In the Comox field 3 workable seams occur, and these have been mined in several mines in the Cumberland and Tsable River area.

Two of the Cumberland mines were located only 2 miles south of the Tsolum River property boundary (Map 8), and these mined two of the three seams. Also, a surface mine is planned 5 miles northwest of the northern boundary of Tsolum River. This mine will be operated by Luscar/Weldwood, will surface mine the three seams and is located at Quinsam Lake.

Thus the Tsolum River property is situated in a portion of the Comox coal field which has had in the past and has in the future, mineable coal reserves.

REGIONAL GEOLOGY

STRATIGRAPHY

The Upper Cretaceous sediments of the Nanaimo group outcrop along the east coast of Vancouver Island from south of Nanaimo for 125 miles to a point north of Campbell River (Map 2). The coal bearing Nanaimo group comprises a succession of lithologies, which, with the exception of coal seams, are clastic and range from boulder conglomerate to shale with most of the intervening lithologic spectrum presented.

There are five clearly defined basins composed of the Nanaimo group of sediments. These are; from south to north; Cowichan, Nanaimo, Comox, Suquamish and Alberni. All the basins have some indications for coal, but only the Comox and Nanaimo basins have coal reserves of economic importance (Map 2).

The sediments of the Nanaimo group rest unconformably on ^{the} metavolcanics and argillites of Jurassic and Triassic Vancouver group. The main formation of this group in the Comox coal field being the basic volcanic rocks of the Triassic . . . Karmutsen formation. This formation forms the western boundary of the Comox basin and the basement.

The Nanaimo group is about 7000 feet thick in the Nanaimo coal basin and 2000 feet in the Comox coal basin. Within this thickness of sediments are two formations which are coal bearing. These formations are the Comox and Extension-

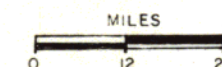


CANADIAN ISLAND CREEK COAL LTD.




TSOLUM RIVER COAL FIELDS AND COAL BEARING FORMATIONS OF VANCOUVER ISLAND

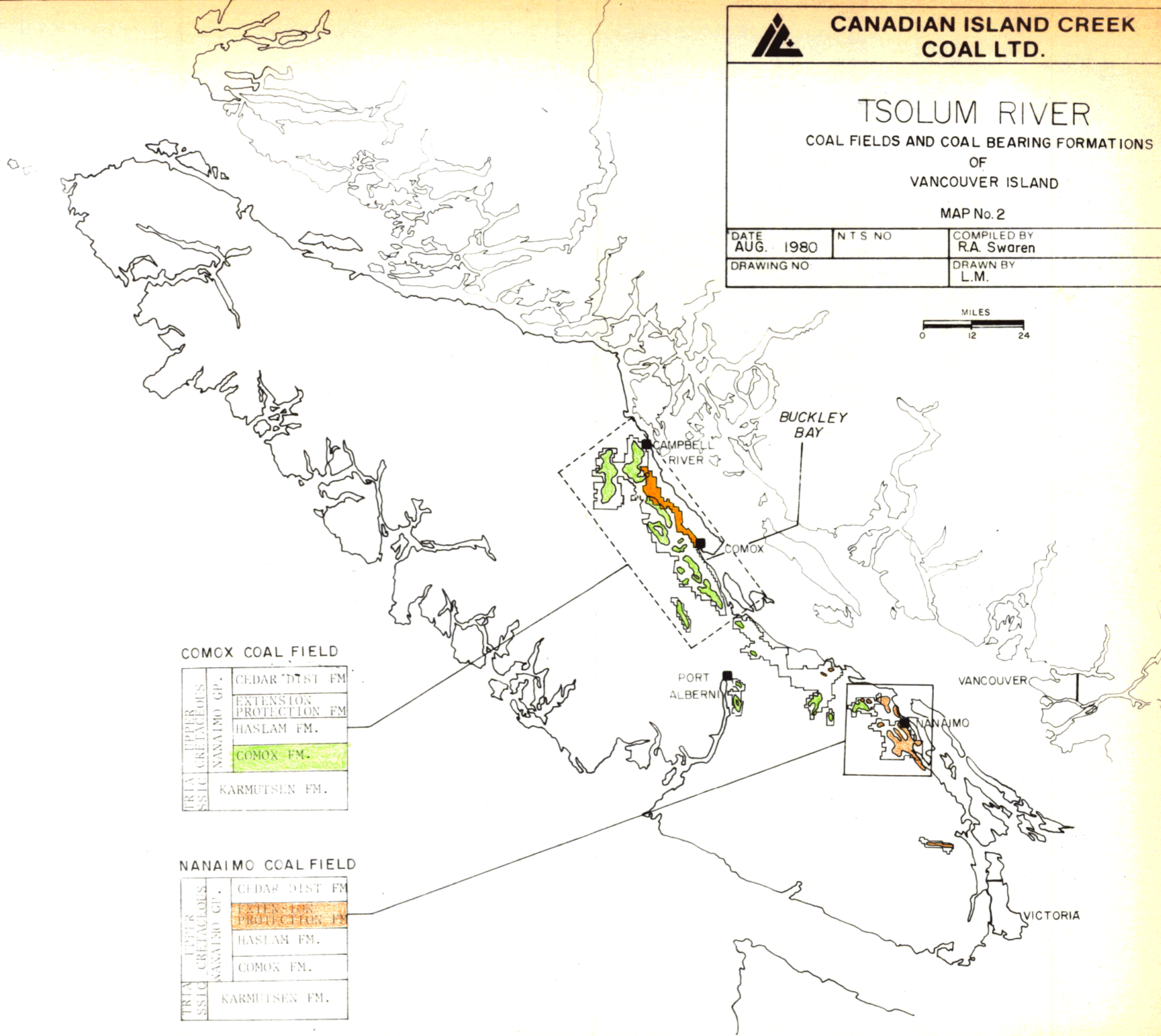
MAP No. 2

DATE AUG. 1980	N.T.S. NO	COMPILED BY R.A. Swaren
DRAWING NO		DRAWN BY L.M.



LEGEND

-  Coal Licences (Competitors)
-  Canadian Occidental (Tsolum River Property)
-  Coal Bearing Formations



COMOX COAL FIELD

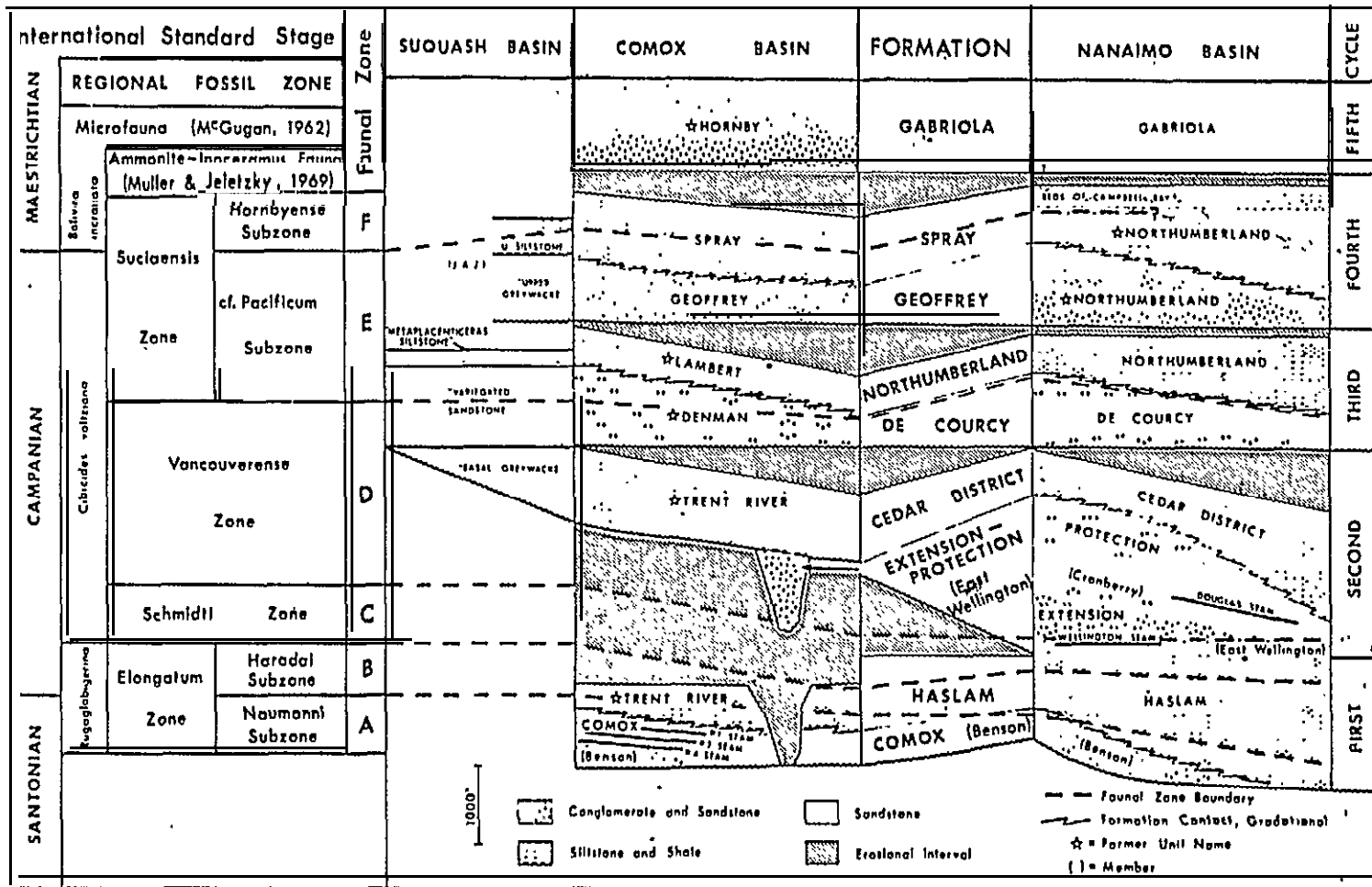
UPPER CRETACEOUS	NANAIMO GP.	CEDAR DIST FM
		EXTENSION PROTECTION FM
TRIA SSIC		HASLAM FM.
		COMOX FM.
		KARMUTSEN FM.

NANAIMO COAL FIELD

UPPER CRETACEOUS	NANAIMO GP.	CEDAR DIST FM
		EXTENSION PROTECTION FM
TRIA SSIC		HASLAM FM.
		COMOX FM.
		KARMUTSEN FM.

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FIGURE 1



Biochronological and lithological divisions of Nanaimo Group (alter Muller and Jletzky, 1970).

protection formations. Both are found in the Nanaimo and Comox coal fields but only the former is coal bearing in the Comox field and the latter in the Nanaimo. Although both are of late Cretaceous age, the Extension-protection is younger than the Comox (Figure 1).

It is with the middle 1/3 of the Comox coal field that we are concerned in this report and therefore the Comox formation (colored green on map).'

The Nanaimo group seams were probably deposited in a paralic-basin (ie. a coal basin formed in a coastal lowland area), and the environment was probably a lagoon, separated from the sea by sand bars. (Mieller.- 1971)

It is these coal seams in the Comox formation that are overlain by the Tsolum River property.

STRUCTURE

The Nanaimo strata in the Comox coal field are contained by down faulting, depression and tilting to the Northeast. They dip northeastwards at an average of 5 to 7 degrees; younger formations outcropping progressively eastwards.

Linear faults trend northeast and northwest with oblique faults of intermediate trends. The dominant faults are linear.

These linear faults have greater displacement overall, and they exerted major control of the distribution of outcrops. The tectonic pattern is one of block faulting in response to the prevailing northeast tilt.

The dips of beds tend to be variable in the Western portions of the field where faulting also appears to be most intense. To the east where sediments are thicker, faulting is less prevalent to non-existent and dips are uniformly shallow at about 5° to the northeast. It is in this eastern area that Tsolum River falls (Map 3).

TSOLUM RIVER GEOLOGY

SURFICIAL DEPOSITS

The Tsolum River property falls mainly in the east coast lowlands of Vancouver Island and as prevails over most of these lowlands stratified sands and gravels of up to 150 feet thickness overly the bedrock.

As can be seen on the Geologic Map (Map 3) the areas colored in grey indicates gravel deposits greater than 50 feet thick. The western and northwestern portions of the property is where the gravel deposits are thinnest and the most outcrops occur.

Drilling will therefore have to be the major exploration tool in this area.

STRATIGRAPHY

In the Tsolum River area of the Comox coal field, the Upper Cretaceous, coal bearing, Comox formation was deposited directly upon the pre-Cretaceous unconformity. This unconformity is the Karmutsen volcanics which forms the basement and the western boundary of the Comox coal field. (Map 3).

The Comox formation seems to vary in thickness from between 600 and 1200 feet stratigraphically. From the cross-sections in Appendix III it can be seen that the formation thins going from south to north. It may also thin to the east as at Buckley Bay to the south, but not enough information is available to refute this.

The Comox formation is composed of coal, sandstone and minor shales and conglomerates. (Figure 2). In the north, near Oyster River (section 9, appendix II), a basal boulder conglomerate, named the Benson conglomerate is in evidence. This is another unit of the Comox formation, found in some areas of the Comox coal field and it is barren of coal. Its' thickness is variable and it pinches out to the east. The Comox formation (not counting the Benson conglomerate) is the formation we are concerned with in this report, since it contains the economically mineable seams of coal.

Lying directly above the Comox formation and varying from between 400 and 700 feet in thickness, is the Haslam formation which is barren of coal and consists of siltstones and shales.

The Comox and Haslam formations are the only known sedimentary formation which outcrop on the Tsolum River property.

On the Geologic Map (Map No. 3) and on sections 4 and 5 (Appendix III), it can be seen that on Weldwood's land to the east, Tertiary volcanics have come to the surface and flowed over the older Comox formation. On Constitution Hill these volcanics are greater than 500 feet thick.

- CANADIAN ISLAND CREEK COAL LTD.
Comox Coal Field
TSOLUM RIVER

TABLE OF FORMATIONS

- Figure 2

FORMATION	LITHOLOGY	THICKNESS
	Thick Gravels	
-----Erosional Interval-----		
Haslam (Trent River)	Siltstone and Shale	400' - 700'
.....		
Comox	Coal, Sandstone Minor conglomerates	600' - 1200'
-----Unconformity-----		
KARMTSEN VOLCANICS		

Where the volcanics come into close proximity with the coal seams, the coal has probably been altered quality wise, cooked and upgraded.

Fortunately, these areas are far enough from the Tsolum River property, so the coals here wouldn't be affected.

STRUCTURE

The structure in the central portion of the Comox coal field is on the average moderately complex. The coal bearing Comox formation is contained in down faulted blocks of strata which are generally tilted to the northeast (Map 3) (Sections 1-10). Dips are variable from 7° to 25° in the west, on Weldwoods acreage, shallowing out to 5° to 10° on the western edge of the Tsolum River property. As you go further east the dips shallow out to almost flat in the central and eastern portions of Tsolum River. This can be seen on the cross-sections. The shallower dips in the east seem to indicate simpler structure and the field reconnaissance did not show any faulting or change in the shallow dips to the northeast on the Tsolum River property. This eastern portion of the field would probably pose the least structural problems for underground mining.

Weldwoods' acreage to the west shows much faulting and intrusions of Tertiary volcanics.

COAL SEAMS

The exact number and thickness of coal seams in this portion of the Comox coal field is, because of the lack of information generally unknown. Two miles south of the property 2 seams were mined in the past by underground methods. These

were the Nos. 2 and 4 seams. Logs for these holes are found in Volume 2.

Although only one 50 foot seam or the deepest seam was used when calculating reserves. Due to the paucity of outcrops and drill holes, it was thought best to be more conservative even though in some areas there is the likelihood of an upper seam of comparable thickness which also may be mineable.

In the drill hole summary sheets of Weldwood drill holes it can be seen that an attempt was made to match up E-logs and identify seams. Approximately 5 to 8 seams were identified. These are of varying thicknesses and the intervals between them vary also. Therefore it is thought that extrapolation of this data over to the Tsolum River property could be misleading.,

For that reason this report will not attempt to number or identify seams but rather, broadly point out expected number coal seams and possible thicknesses by describing each cross-section. All the drill hole information is located in Volume 2, the E-logs are on file in the Red Deer office and cross-sections and Map 3 are in the back of this volume. The following is a brief description of possible coal by cross-section.

Section 1 - On this section, Hole 107 was drilled in 1911, approximately 4200 feet west of the Tsolum River property boundary. Only a 2.0 foot and 3.5 foot seam was encountered. It may be that a high in the basement has caused the non-development of the basal seam. This would seem to be the case since the Comx formation is only 500 feet thick in this hole. Further to the east on the Tsolum River acreage there is a good possibility of thicker seams and probably 2 seams. The

description of section 2 which follows supports this hypothesis.

Section 2 - This section is only 4300 feet north of section 1. Drill hole 105, drilled in 1911, encountered approximately 6 coal seams. The hole is on the Tsolum River property and is 3000 feet east of the western property boundary. Here the Comox formation is 300 feet thicker than on section 1. One seam, the basal one is almost 6.0 feet thick and two of the others are about 3.0 feet thick. There seems to be more coal development as far as thickness and number of seams is concerned, from section 1 to section 2.

Section 3 - In this section, the Comox formation is getting thicker, at 1100 feet as are the coal seams. Hole No. 120, drilled in 1911, and 3000 feet west of the Tsolum River property encountered 5 coal seams and never reached basement. Therefore there is the possibility of more coal at greater depth. There are two thick seams (possibly the same ones as section 2). Here they are thicker; with the basal seam being 6.0 feet and the upper one 5.5 feet thick. Again, only one seam was calculated into reserves.

Section 4 - This section is $2\frac{1}{2}$ miles north of section 3. The headquarters No. 1 hole was drilled here in 1975 by Weldwood. It is located approximately 4000 feet west of Tsolum River. As can be seen on the cross-section it was drilled too short and did not encounter any significant thicknesses of coal. Since it appears that the Comox is about 1000 feet thick here as on section 3, the upper thick coal seam should only be a couple of hundred feet deep than where they terminated their hole.

Section 5 and 6 - On these two sections there is no drill hole information, available. From dips and outcrops observed during the field reconnaissance it would appear that from Section 3 to Section 6 there will be at least one thick seam, probably at the base of the Comox and possibly one more thick seam approximately 250 feet above this seam. The lack of information makes drilling the major exploration tool in this central area. Out crops of the coal bearing Comox formation were found in the area of these 3 sections.

Section 7 - On this section the information from Weldwood's Tsolum River No. 1 drill hole of 1975 may not be indicative of what we will find on the Tsolum River property 5000 feet to the east. Two coal seams of 4 and 5 foot thickness were found near the base of the Comox formation. Unfortunately where they drilled, the Comox formation was partially eroded off and they only drilled the basal 300 feet. This together with the fact that they drilled in a different fault block, further west, may make it difficult to reliably extrapolate these seams onto our Tsolum River property. It would still be fairly reasonable to say that there is at least one thick seam on our property. One old Weldwood hole drilled in 1979 was found within 1000 feet of our property boundary and there was coal in the cuttings.

The next cross-section (section 8) which is a further 2½ miles north indicates that there should be one and possible 2 or 3 thicker coal seams on the Tsolum River property.

Section 8 - On this section the 1975 drill hole of Weldwood's (Tsolum River No. 2) encountered 2 seams of 5 foot and 4 foot thickness in the middle of the Comox formation. Unfortunately they did not drill down to the basement and there is a possible 300 feet of Comox which may contain seams in the basal portion as evidenced on Section 7.

Therefore, there is a distinct possibility of at least one more seam in the basal part of the Comox.

Section 9 - Here it appears that the coal may be thinning out again. Hole No. 13, drilled in the early 1900's encountered two thicker seams of 4.0 feet and 2.5 feet in the basal 500 feet of the Comox formation. This hole is 3000 feet west of our property and the coal may thicken to the east as evidenced in section 8, 2½ miles to the south. At least there is one seam which may reach mineable thickness.

Section 10 - This section is 3½ miles north of Section 9. One 1975 drill hole of Weldwoods (Oyster No. 2) encountered on seam with 9 feet of coal over 16 feet of sediments. This hole is however over 7,500 feet west of our property boundary and it is hard to tell exactly what we will find on the Tsolum River acreage.

In summary, information is quite limited, especially on the central cross-sections (No. 4, 5, and 6), but there are good indications that there is at least one lower? seam of 5.0 foot average thickness and the possibility of an upper seam situated approximately halfway stratigraphically through the Comox formation which may also be of mineable thickness.

Reserves in the following section were calculated using only the basal seam and are still of high enough potential to warrant an exploration program as soon as licences are granted on the Tsolum River property.

RESERVES

RESERVE POTENTIAL OF VANCOUVER ISLAND

The remaining reserve potential of Vancouver Island is mainly unknown. This is due to the lack of coal exploration since the closure of the Tsable River Mine in 1967. An attempt has been made to compile the remaining in place reserve potential on Vancouver Island. As can be seen on Map No. 4, most of these reserves are in the speculative category which means that there is little or no information to base the figures on, but that information from the nearest source has been extrapolated into unknown areas.

As can be seen on Map No. 4, total underground potential of all categories on Vancouver Island is in the order of 1.5 billion short tons in place. Of this reserve potential only 100 millions short tons in place could possibly remain in the Nanaimo coal field. The Suquash coal field and other outlying areas have been considered unmineable and the Comox coal field holds the bulk of the reserve with 1.4 billion short tons of underground mineable in place coal.

Of this large reserve, Weldwood and the Weldwood/Luscar acreage covers 70% of the reserve; Canadian Occidental Petroleum Ltd., controls 20% and others such as ESSO and Stephen L. Gardner control a further 10%

Therefore, the prime coal field on Vancouver Island is the Comox and Canadian Occidental is a possible second in reserves within this field. Canadian Occidentals' reserves are found on the Buckley Bay and Tsolum River properties (Map No. 4).

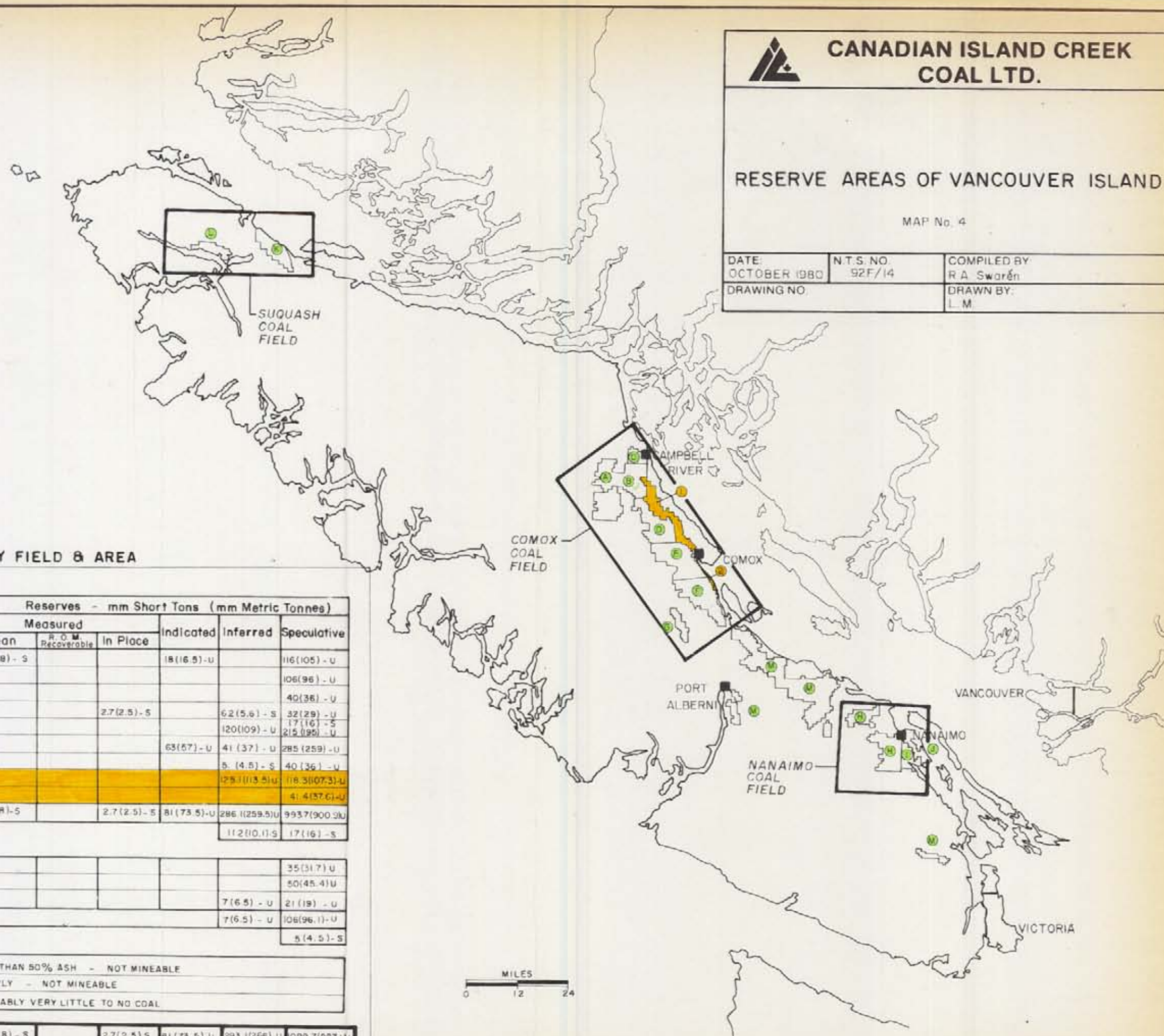


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RESERVE AREAS OF VANCOUVER ISLAND

MAP No. 4

DATE: OCTOBER 1980	N.T.S. NO. 92F/14	COMPILED BY R.A. Swarén
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- Coal Reserve Areas
- Open Crown Reserve Areas
(Applied For By Canadian Occidental Petroleum)

RESERVE POTENTIAL OF VANCOUVER ISLAND BY FIELD & AREA

COMOX COAL FIELD

AREA	Area Name	Licencee	No. of Seams	Average Coal Thickness Ft. (Meters)	Reserves - mm Short Tons (mm Metric Tonnes)					
					Measured			Indicated	Inferred	Speculative
					Clean	R.O.M. Recoverable	In Place			
A	QUIMSAM LAKE	WELDWOOD / LUSCAR	3	23 (7.0)	20 (18) - S			18 (16.5) - U	116 (105) - U	
B	CAMPBELL RIVER	WELDWOOD / LUSCAR	3	25 (7.0)					106 (96) - U	
C	MCIVOR LAKE	ESSO RESOURCES	2-3	18 (5.6)					40 (36) - U	
D	ANDERSON LAKE	WELDWOOD	1	7 (2.1)			2.7 (2.5) - S	62 (5.6) - S	32 (29) - U	
E	CUMBERLAND	WELDWOOD	2-3	9 (2.7)				120 (109) - U	17 (16) - S	
F	T'SABLE RIVER	WELDWOOD / ESSO (P)	2	9 (2.7)				63 (57) - U	41 (37) - U	
G	PORT ALBERNI	STEVE L. GARDNER	1-2	9 (2.7)				5 (4.5) - S	40 (36) - U	
H	TSOLUM RIVER	CANADIAN OCCIDENTAL	1	5.5 (1.7)				129 (113.5) - U	118 (107.3) - U	
I	BUCKLEY BAY	CANADIAN OCCIDENTAL	1-3	5.5 (1.7)					41 (37.6) - U	
Sub Total					20 (18) - S		2.7 (2.5) - S	81 (73.5) - U	286 (259.5) - U	993.7 (900.3) - U
								112 (10.1) - S	17 (16) - S	

NANAIMO COAL FIELD

J	NETHERLANDS	NETHERLANDS/FILTROL	1	5.5 (1.7)					35 (31.7) - U
K	HASLAM CREEK	ESSO RESOURCES	1	5.5 (1.7)					50 (45.4) - U
L	WESTLAND'S	MAYO CONSTRUCTION	1	6.0 (1.8)				7 (6.5) - U	21 (19) - U
Sub Total								7 (6.5) - U	106 (96.1) - U
									5 (4.5) - S

OTHERS

N	SUQUASH	RAMM / FILTROL	SEAMS VERY DIRTY & MORE THAN 50% ASH - NOT MINEABLE						
O	COAL HARBOUR	STEVE L. GARDNER	SEAMS THIN AND DIP STEEPLY - NOT MINEABLE						
M	SPECULATIVE	B.P. MAINLY	FOLLOWING TRENDS - PROBABLY VERY LITTLE TO NO COAL						

TOTAL OF ALL AREAS					20 (18) - S		2.7 (2.5) - S	81 (73.5) - U	293.1 (266) - U	1099.7 (997.1) - U
									112 (10.1) - S	22 (20.5) - S

Note: U - Underground S - Surface Mineable



TSOLUM RIVER RESERVES

The Tsolum River reserves are in the inferred to speculative category. They are inferred if there is a drill hole very close or on the section for which the reserves were calculated. This is quite optimistic and the actual category of all the reserves is speculative. The inferred only shows that more information is known on these sections than on the others.

As can be seen on Map No. 4A, the southern and northern sections of the property are inferred so have more information than the central sections which are categorized as speculative.

Depths to the bottom seam vary from 100 to 1300 feet in the shallowest areas of the property (in the west) and from 8.50 to 1650 feet in the deepest areas of the property (in the east). (Figure 3) and (Sections 1-10, Appendix III).

The following assumptions were used in calculations:

1. Reserves were calculated from the 1"=500 foot cross-sections in Appendix III.
2. The lowest seam (presumably the No. 4) was used in calculations. It was taken, on an average, of being 5.0 feet thick.
3. A cubic yard of coal was taken as one short ton of coal. (actual S.G. was not used due to a lack of information)
4. All reserves are raw coal in place.
5. The coal was calculated by area of influence of each cross-section. The cross-section numbers represent the reserve areas on Map No. 4A and in Figure 3.

Figure 3
 Comox Coal Field
 Tsolum River
 Reserves by Cross-Section

Section No.	Average Seam Thickness (feet)	Depth on property boundary West East (feet)	Reserves (millions of short tons)	Category
1	4.0	700 1000	13.9	Inferred
2	5.5	800 1200	15.7	Inferred
3	6.0	1250 1300	19.4	Inferred
4	5.0	1300 1500	19.8	Speculative
5	5.0	1100 1500	17.2	Speculative
6	5.0	1200 1550	21.7	Speculative
7	5.5	700 1650	39.0	Speculative
8	5.0	100 1000	43.6	Inferred
9	4.0	1100 1300	32.5	Inferred
10	5.0	700 850	20.6	Speculative

TOTAL = 243.4

6. Calculations used were:

Short tons of coal = length of influence X thickness of Coal
X length of coal downdip.

Where: length of influence is the influence of each cross-section. Lengths were taken from halfway points between sections on the 1:50,000 topographic map (Map No 4A)

Length of coal downdip is length from the western property boundary to the eastern from each cross-section.

The calculations are rough but so is the quality and quantity of information on the property.

From the reserve area calculations as shown in Figure 3 and Map No. 4A, the total reserve potential on the Tsolum River property, in both categories could be in the order of 243.4 million short tons of coal in place.

The reserve figure could be conservative since only one seam was used in the calculations in each area, whereas in some areas of the property there is an additional 5.0 foot seam above this one. This could be the No. 2 seam and where thick enough could be mineable.

Also, if the coal seams remain thick enough to the east of the property boundary (on crown land) it would be wise for Canadian Occidental to apply for more coal licences and increase their acreage and reserve potential.

This could be done if the proposed 1981 exploration program verifies mineable coal to the east.

QUALITY

The coals of Vancouver Island are classified as being high volatile A Bituminous in rank.

As can be seen on Map No. 5 there is a distinct lack of data concerning the coal quality in the Tsolum River area.

As was previously explained in the geology section, the number of coal seams is not known. Therefore the outcrop samples indicated on the map could be the same or different seams. Also, if the outcrops are too close to the Tertiary intrusives the quality could change and would not be indicative of that on the Tsolum River property.

Quality could vary considerably from area to area and from seam to seam at Tsolum River therefore, the average quality that follows is only an averaging of certain seam samples. Whether they are or are not the same seam is unknown as is their reliability. The quality points from Map No. 4 which were used, because of their nearness to Tsolum River are: Hole No. 113, Dove Creek outcrop, Tsolum River outcrop, Black creek outcrop, and the Oyster River seam outcrop. The following is the average raw quality analysis from these 5 quality points:

Average Raw Quality (seam unknown)

Moisture	= 2.0%
Ash	= 14.8%
Fixed-Carbon	= 57.17%
Volatile Matter	= 26.35%
Sulfur	= 1.4%
B.T.U.'s/lb	= 12,356

Ash is fairly high, but could hopefully be cleaned to acceptable levels. Sulfur would have to be reduced to below 1%, but since in the Comox field it is mainly pyritic in nature, it should be able to be floated out fairly easily.

This average quality is of course a ball park figure and as can be seen a great amount of quality work will be required during exploration.

MARKETS AND TRANSPORTATION

Since the renewal of interest in the coal reserves of Vancouver Island which started in the early to mid 1970's, the marketability of this coal has become more obvious to industry.

The location, on tidewater negates the \$12.50 to \$15.00 per ton rail charge in shipping similar quality coal from southern Alberta on the Coalspur coal field of Alberta. This makes it possible to operate a mine on the Island despite higher mining costs due to higher sulfur contents and thinner seams.

The absence of rail costs together with the year round moderate climate and excellent infrastructure and related service facilities makes this area, including Tsolum River attractive for coal development.

In the last few years the -Pacific rim countries, especially the Japanese have become aware of this advantage and are expressing great interest in the potential of Vancouver Island.

Luscar/Weldwood's Quinsam Lake surface mine which has been slated for a 1983 startup are presently negotiating with Denmark for a 1 million ton/year contract. This contract would extend for 12 years and supply thermal coal to that Scandinavian country.

Canadian Island Creek Coal Ltd., has made Toyo Menka aware of Oxy's applications at Tsolum River and they are very interested. The Buckley Bay property in addition to the potential reserves on that property could be used as a lever, along with Tsolum River in gaining a partnership with Weldwood, the largest holders of land and reserves in the Comox coal field.

In summary, the market potential of any economically mineable coal on Vancouver Island is excellent.

LAND LEASE

The interest and subsequent applications for coal licences on Vancouver Island has increased dramatically over the last 2½ years.

Up until 1978 only Weldwood of Canada and Weldwood/Luscar freehold, both coloured in blue on Map No. 6, were owners of coal on Vancouver Island. These were both in the Comox coal field. As can also be seen on Map No. 6, many companies have since been applying for licences, although most of this new acquisition has occurred in the Nanaimo coal field, between the Nanaimo and Comox coal fields and in the Suquash coal field.

The applications between the Nanaimo and Comox coal field were done strictly on speculation by British Petroleum and ESSO. There has not been a known coal occurrence in this area in the past and it is quite unlikely than any economical reserves of coal are to be found in this area.

The Nanaimo field has been covered by Netherlands Pacific, ESSO, and Westland Resources. A separate report will deal with this field and will outline any prospective areas of acquisition for Occidental Petroleum. Reserves here are much smaller than the Comox field and the high concentration of population adds to the difficulty of exploring for and developing mineable reserves of coal.

The Suquash field in the Northern end is mainly controlled by Filtrol Corporation of the U.S.; they have optioned both Ramm Ventrues and Stephen L.



**CANADIAN ISLAND CREEK
COAL LTD.**

TSOLUM RIVER

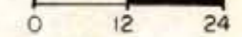
Major Coal Licence Holders
of

VANCOUVER ISLAND
















MAP No. 6

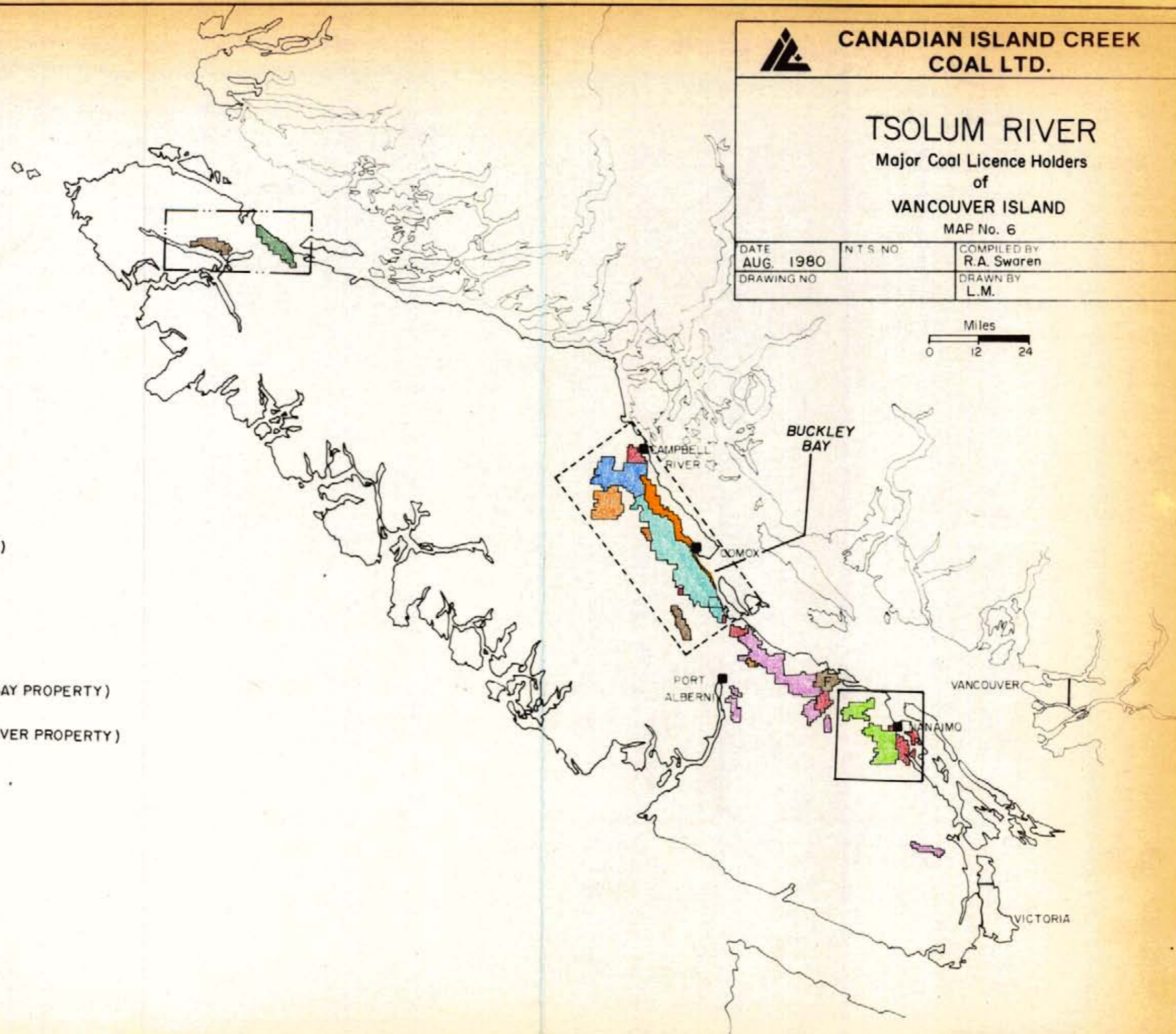
DATE AUG. 1980	N.T.S. NO.	COMPILED BY R.A. Swaren
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Miles



LEGEND

-  WELDWOOD / LUSCAR
-  WELDWOOD OF CANADA LTD.
-  ESSO RESOURCES CANADA LTD.
-  NETHERLANDS PACIFIC (+FILTRON)
-  BRITISH PETROLEUM
-  STEPHEN L. GARDNER
-  STEPHEN L. GARDNER (FOR FILTRON)
-  CANDEL OIL LTD.
-  WESTLAND RESOURCE IND. LTD.
-  RAM VENTURES (+FILTRON)
-  CANADIAN OCCIDENTAL (BUCKLEY BAY PROPERTY)
-  CANADIAN OCCIDENTAL (TSOLUM RIVER PROPERTY)
-  SUQUASH COAL FIELD
-  NANAIMO COAL FIELD
-  COMOX COAL FIELD



Gardner's properties and have done exploration work in 1980 on the former. Their results were negative and the coal uneconomic.

In the summer of 1980, Occidental Petroleum made application on the Buckley Bay property and the Tsolum River property.

The particulars of the Buckley Bay acreage is outlined in another report and will not be described in this one. Rather, the following is a summary of what has transpired with regards to the Tsolum River property.

On July 14, 1980, Canadian Occidental Petroleum Ltd., through the offices of Canadian Island Creek Coal Ltd., made application for 51 coal licences covering 30,381 acres of land on Vancouver Island. The application for this acreage, the Tsolum River property, was accepted by the B.C. government on July 15, 1980.

Subsequently, the necessary advertising was carried out in a local newspaper and in the B.C. Gazette. This advertising was completed for 4 consecutive weeks and the necessary form filled out and sent to the B.C. government on September 3rd of 1980.

The coal licence area is outlined on Map No. 7 and a legal description of land is included in Schedule A on the next page.

As is the case of Vancouver Island, the coal licences probably won't be granted for at least one year from the date of application. Therefore, exploration work can not be done until the winter of 1981.

SCHEDULE A

TSOLUM RIVER

MAP 92 F/11 E

<u>Licence #</u>	<u>Approx. Acreage</u>	<u>Hectares (acres x. 4047)</u>	<u>Land Description</u>
1	760	308	Comox Land District All of Section 22, Tp.9 including all of Lot 131.
2	710	287	Comox Land District Lot 142, Lot 154 and section 28, Tp. 9 excluding those por- tions of Lot 39 within this section.
3	6 4 0	259	Comox Land District Lot 119 and Lot 120 and the remaining portion of section 27, Tp.9.
4	550	223	Comox Land District 'Lot S.73 , Lot S.74 and all of section 23, Tp. 9 not divided into Lots.
5	642	260	Comox Land District All of 5.39, Lot S.38 Lot S.37 , Lot S.59, Lot s.57, Lot S.58 and Lot 121.
6	706	286	Comox Land District All of Lot 122, Lot 28, Lot 108 Lot 36, Lot 37 , Lot 29, Lot 30, Lot 40, Lot 44, Lot 35, and Lot 31.
MAP 92. F/11 E & MAP 92 F/14 E			
3	640	25%	Comox Land District Those portions of sections 4 and 5, Tp, 6, not diided into Lots

MAP 92 F/11 E

<u>Licence #</u>	<u>Approx. Acreage</u>	<u>Hectares (acres x. 4047)</u>	<u>Land Description</u>
8	405	164	Comox Land District All of Lot 33, Lot 38, Lot 39, Lot 41 , Lot 42, Lot 43, Lot 45 and Lot 34.
9	415	168	Comox Land District Block 29 , Lot 33 and Lot 32
	MAP 92 F/11 E and Map 19 F/14 E		
10	520	210	Comox Land District All of Lot 19, Lot 20, Lot 21, Lot 22, Lot 23, Lot 24, Lot 25, Lot 26, and Lot 27.
		MAP 92 F/14 E	
11	663	268	Comox Land District All of Lot 197, Lot 198 Lot 199.
12	522	211	Comox Land District All of Lot 9, Lot 10, Lot 13, Lot 14, Lot 15, Lot 16, Lot 17, and Lot 18.
13	344	139	Comox Land District All of Lot S.81, Lot 11 and Lot 12.
14	545	221	Comox Land District All of Lot 7, Lot 8, Lot 9, Lot 10, Lot 11, Lot 12, and Lot 13.
15	723	293	Comox Land District All of Lot 1, Lot 2, Lot 3, Lot 4, Lot 5, Lot 6, Lot 161 and Lot 167.
16	683	276	Comox Land District All of Lot 1, Lot 2, Lot 3, Lot 4, Lot 5, Lot 7 and Lot 8.
17	674	273	Comox Land District All of Lot 102, Lot 232, Lot 101 and that portion of section 19, Tp. 6 not divided into Lots.

<u>Licence #</u>	<u>Approx. Acreage</u>	<u>Hectares (acres x. 4047</u>	<u>Land Description</u>
18	515	208	Comox Land District All of Lot 14, Lot 100 , Lot 226 and Lot 88 .
19	484	196	Comox Land District All of 123 and Lot 124.
20	610	247	Comox Land District Section 34, Tp. 7 including all portions of block 29 falling within this section.
21	640	259	Comox Land District Section 35, Tp. 7 including all portions of block 29 and Lot 182 falling within this section.
22	640	259	Comox Land District All of section 2, Tp, 4 including all portions of Block 29 and Lot 182 falling within this section.
23	640	259	Comox Land District All of section 3, Tp. 4 including all por- tions of Block 29 and Lot 182 falling within this section.
24	640	259	Comox Land District All portions of section 4 and 5, Tp. 4 including all por- tions of Block 29 falling within these 2 sections, but excluding those por- tions falling within Weldwood of Canada's freehold acreage.
25	640	259	Comox Land District All of section 36, Tp. 7 including all portions of Block 29 falling within this section.

<u>Licence #</u>	<u>Approx. Acreage</u>	<u>Hectares(acres x. 4047)</u>	<u>Land Description</u>
26	640	259	Comox Land District All section 25, Tp. 7 including all por- tions of Block 29 falling within this section.
27	320	130	Comox Land District All of the southern $\frac{1}{2}$ of section 1, Tp. 4 including all por- tions of Block 29 falling within this section.
28	640	259	Comox Land District All of section 31, Tp.6 including all portions of Block 29 falling within this section.
29	640	259	Comox Land District All portions of sections 29,30 and 32 Tp. 6 including all portions of Block 29 which fall within these sections, but excluding all portions included in preceeding licence application numbers 17 and 18.
30	70	28	Comox Land District All portions of sec- tions 19 and 20, Tp. 6 including all portions of Block 29 falling within these sections, but excluding all por- tions included in preceeding licence application numbers 14, 15, 17 and 18.
	MAP 92 F/14 E and 92 F/14 W		
31	640	259	Comox Land District All portions of section 30, Tp. 4 including all portions of Block 29 which fall within this section.

<u>Licence</u>	<u>#</u>	<u>Approx. Acreage</u>	<u>Hectares (acres x. 4047)</u>	<u>Land Description</u>
32		640	259	Comox Land District All portions of section 31, Tp. 4 including all portions of Block 29 which fall within this section.
			MAP 92 F/14 E	
33		640	259	Comox Land District All of section 29, Tp. 4 including all portions of Block 29 which fall within this section.
34		640	259	Comox Land District All of section 32, Tp. 4 including all portions- of Block 29 which fall within this section.
35		640	259	Comox Land District All of section 28, Tp. 4 including all portions of Block 29 which fall within this section.
36		640	259	Comox Land District All of section 33, Tp. 4 including all portions of Block 29 which fall within this section.
37		640	259	Comox Land District All of section 20, Tp. 4 including all portions of Block 29 which falls within this section.
38		640	259	Comox Land District All of section 21, Tp, 4 including all portions of Block 29 included within this section.
39		640	259	Comox Land District All of section 17, Tp. 4 including all por- tions of Block 29 falling in this section.

<u>Licence #</u>	<u>Approx. Acreage</u>	<u>Hectares (acres x. 4047)</u>	<u>Land Description</u>
40	640	259	Comox Land District All of section 16, Tp. 4 including all portions of Block 29 falling in this section.
41	640	259	Comox Land District All of section 8, Tp. 4 including all por- tions of Block 29 falling in this section.
42	640	259	Comox Land District All of section 9, Tp. 4 including all portions of Block 29 falling in this section.
43	640	259	Comox Land District All of section 10 Tp.4 including all portions of Block 29 included within this section.
44	640	259	Comox Land District All of section 11, Tp. 4 including all portions of Block 29 falling in this section.
-45	640	259	Comox Land District All of section 22, Tp. 4 including all portions of Block 29 falling within this section.
46	640	259	Comox Land District All of section 15, Tp. 4 including all portions of Block 29 falling within this section.
47	640	259	MAP 92 F/14 W Comox Land Distract All of section 12, Tp. 2 including all portions of Block 27 falling within this section.

<u>Licence #</u>	<u>Approx. Acreage</u>	<u>Hectares (acres x. 4047)</u>	<u>Land Description</u>
48	320	130	Comox Land District All of the east $\frac{1}{2}$ of section 1, Tp. 2 including all portions of Block 27 falling within this section.
			MAP 92 F/14 E and 92 F/14 W
49	640	259	Comox Land District Campbell River District Municipality. All of section 7, Tp. 1.
50	640	259	Comox Land District Campbell River District Municipality All of section 6, Tp.1.
			MAP 92 F/14 E
51	640	259	Comox Land District Campbell River District Municipality. All of section 5, Tp.1.
TOTAL	<u>30,38/acres</u>	<u>12,296 hectares</u>	

EXPLORATION TO DATE

As was stated in the section on History, coal mining was first started in the Comox coal field in 1888. This mining began in the vicinity of Cumberland which is located 2 miles south of the Tsolum River property. Mining continued until the 1950's in this area. These mines were operated by underground methods.

The mines closest to the Tsolum River property are the No. 7, No. 4 and No. 8 mines. They mined the No. 2 and 4 seams as shown on Map No. 8.

From 1889 until the 1950's, during the operation of these mines, 43 diamond core holes were drilled in the southern area near the Tsolum River property. Another two were drilled in the central portions and a further 17 were drilled in the northern area near Campbell River (Map No. 8). The core logs are included in Volume 2 of this report.

In 1975 Weldwood drilled and E-logged 14 rotary holes in the southern area, 4 in the central portions and 5 holes in the north near Campbell River. Summaries of these holes are also included in Volume 2 and their locations are on Map 6.

In 1979 Weldwood carried out a further exploration program. It is not known as to how many holes were drilled, nor do we have information on those holes. However, 3 holes were located in the central portions of the property during our field reconnaissance. Coal was found in the cuttings at all three locations.

In mid-September of 1980, Canadian Island Creek Coal Ltd., carried out a preliminary one week field reconnaissance of the Tsolum River property. Field notes are located in Appendix I and all the field outcrops are located on Map No. 3..

The next stage of exploration in this area will be carried out by Oxy, probably in late 1981. These holes will be drilled on the Tsolum River property. Their locations and depths will be described in detail in the next section of this report.

PROPOSED EXPLORATION

The following exploration program will be necessary, not only for the further evaluation of the Tsolum River property, but also in order to meet the work requirements as set out in British Columbia's coal policy.

The exploration will not begin until the coal licences have been granted. This means that it will probably commence in October or November of 1981.

Of course we would be actively engaged in gaining exploration approvals from the government as well as access rights from the surface land owners 3 or 4 months prior to startup.

The first years work commitment is set at \$7.50/hectare as per the B.C. coal policy. This would equate to a minimum required exploration expenditure of \$95,000 for the first years work commitment on Tsolum River. If our program exceeds this amount it is subtracted from the subsequent years work commitments and we would not have to do work in the 2nd or 3rd years if our first years expenditures were large enough.

This program would be done in conjunction with the Buckley Bay program to cut down mobilization and demobilization costs.

The proposal outlined below is an approximate total cost for the size

of program we would envisage. This program is designed to evaluate the Tsolum River property so that unprospective acreage could be dropped and also so that any prospective acreage further to the east on open crown land could be applied for. It would also give us a preliminary reserve estimate, tell us of any possible structural disturbances and give us a broad insight into the quality of the coal.

As can be seen on Map No. 9, a total of 23 holes and 3 core holes have been proposed. The core holes could be moved to wherever the best coal was encountered. The core holes would also be placed so that the seams to be cored would be as shallow as possible.'

All of the drill holes are placed at the maximum depth required in order to pass through the entire Comox formation and terminate in the volcanic basement rocks.

All of the holes are plotted on existing access and are accessible using wheeled rigs. Downhole hammer rigs would be most feasible for the program. They would have to be equipped with casing hammers because of thick gravel deposits in most areas of the property.

The holes would be E-logged and surveyed in at the end of the program

Crews would be staying in nearby towns and would be the same crews and rigs as used on the Buckley Bay program

Two rigs would be required and the program should take 2 months working 24 hours per day..

The following is a list of the proposed drill holes as located on Map No. 9.

Hole	Maximum depth (Feet)
81-1	1200
81-2	1200
al-3	1500
81-4	1200
al-5	1500
81-6	1800
al-7	1800
81-8	2000
81-9	1600
al-10	2000
81-11	1800
81-12	1500
81-13	1000
al-14	1500
81-15	2000
81-16	1400
al-17	1600
81-18	1800
al-19	1500
al-20	1600
al-21	1800
al-22	2000
al-23	1500

TOTAL = 36,800

Note 3 core holes at 1200 feet each = 3,600 feet of additional drilling.

Total footage of drilling would be a maximum of 36,800 with an additional 3,600 feet of coring.

The following is a very rough breakdown of possible exploration costs:

23 holes for 36,800 feet @ 10/foot	=	\$368,000
3 core holes for 3,600 feet @ \$15/foot	=	54,000
1 logging unit for 2 months	=	30,000
Surveying	=	10,000
Reclamation	=	5,000
Hotel Accomodation	=	20,000
Casing and consumables	=	25,000
Permitting access	=	5,000
Mobilization - demobilization	=	4,000
Quality Analysis	=	10,000
Miscellaneous	=	40,000
	TOTAL	<u>\$571,000</u>

On top of this \$571,000 cost would be expenditures for supervision, report writing and overhead which could add on another \$29,000 which would bring the total to approximatley \$600,000.

This program cost is a rough figure but costs should be in this ball park with a plus or minus 15%.

After this program we should have a good idea of possible reserve potential, quality, geology, areas to be dropped and possible areas where we should apply for more licences on the open crown land to the east.

This program would hold the property for about 3 years without any further exploration work required as per the coal policy. If the property looks attractive we will follow up with another stage of exploration as soon as possible in 1982.

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Paper 68-50.

TSOLUM RIVER

Reconnaissance Field Notes

- O.C. 1 Comox Formation - Medium to thinly bedded sandstones. Medium hard, fine grained, weathering buff. Fresh colour greenish to dark brown. Located on the north side of the Oyster river where Crown Zellerbach forestry road crosses bridge. Outcrop forms cliffs 40 feet in height and extending over 200 feet laterally. Orientation $55^{\circ}/10^{\circ}$. (one photos)
- O.C. 2 Comox Formation - Massive hard fine grained sandstone. Fresh colour is medium grey weathering light grey green to dark brown. Outcrop extends from O.C. 1 to this point and downstream to O.C. 3. Orientation and dip of beds stays the same. Excellent outcrop. $55^{\circ}/12^{\circ}$. (2 photos)
- O.C. 3 Comox Formation - Same as O.C. 2. This outcrop extends for another 500 feet downstream Orientation $55^{\circ}/10^{\circ}$.
- O.C. 4 Comox Formation - Good outcrop located near culvert on creek which crosses Crown Zellerbach's lumbering road. Very hard massive sandstone, fine to medium grained, fresh colour medium grey to rusty weathering buff to light grey. Stratigraphic thickness is 10 feet and lateral extent to 60 feet. Orientation $345^{\circ}/13^{\circ}$.
- O.C. 5 Haslam Formation - Silty shales, fairly soft weathering light grey to buff. Fresh colour dark grey. Good outcrop exposed in the bed of a creek where highway crosses over bridge. Outcrop extends 100 feet downstream from culvert and is approximately 5 feet stratigraphically thick.
Beds are flat at $0^{\circ}-10^{\circ}$. Unable to obtain strike.
- O.C. 6 Haslam Formation - Same lithology as O.C. 5. Located in creek bed under water. No orientation possible but looks to be flat lying'.
- O.C. 7 Haslam Formation - Same lithology as O.C. 5 and 6. Also flat lying in creek bed.
- O.C. 8 Comox Formation - Located near a 1979 Weldwood drill hole. Coal chips were observed in the cuttings from the hole. Outcrop is of fine grained sandstone which is thinly bedded. Fresh colour is dark brown weathering light tan to buff. Fairly good outcrop. Orientation is $52^{\circ}/14^{\circ}$.
- O.C. 9 Comox Formation - Located on old forestry road south of O.C. 8. Same lithology as O.C. 8. Orientation $55^{\circ}/14^{\circ}$.

- O.C. 10 Comox Formation - Thinly bedded to massive fine grained sandstone. Fresh colour is medium grey brown weathering rusty to buff. Thinly interbedded siltstones also present which has a fresh colour of medium grey weathering rusty. Located above road on east side in dugout. Another Weldwood hole drilled in 1979 is located 200 feet south of this outcrop. Coal chips are also present in the drill cuttings. Lateral extent is 60 feet and stratigraphic thickness is 5 feet. Orientation is 40°/17°.
- O.C. 11 Comox Formation - Medium to thickly bedded sandstones, fine to medium grained. Fresh colour medium grey brown weathering buff to rusty. Extends ¼ mile laterally and 10 feet stratigraphically thick. Orientation 60°/11°.
- O.C. 12 Comox Forantion - Massive bedded fine to medium grained sandstone. No orientation possible. Located beside a 1979 Weldwood drill hole with coal chips in the drill cuttings.
- O.C. 13 Comox Formation - Massive, same lithology as O.C. 12. Orientation is 46°/6°. Located where road crosses powerline...
- O.C. 14 Comox Formation - Thin to-medium bedded, fine grained sandstone. Light grey. fresh colour weathering buff. Located on powerlines. Orientation 40°/15°.
- O.C. 15 Comox Formation - Sandstones. same lithnloov as O.C 14. Located on Powerline. No orientation possible, top massive.
- O.C. 16 Comox Formation - Thin to medium bedded, fine grained, sandstone. Fresh colour medium grey weathering buff. Small outcrop on lumbering road just off the powerline. Orientation 45°/15°.
- O.C. 17 Formation - Fine grained sandstone, fairly soft and thin to medium bedded. Fresh colour medium grey, weathering buff. Good outcrop on the Oyster River. Orientation 55°/10°.



PLATE 1

O. C. 1. Looking to the N.E. downstream on the Oyster River. Sandstones of the Comox formation form a cliff dipping at 10° to the northeast.



PLATE 2

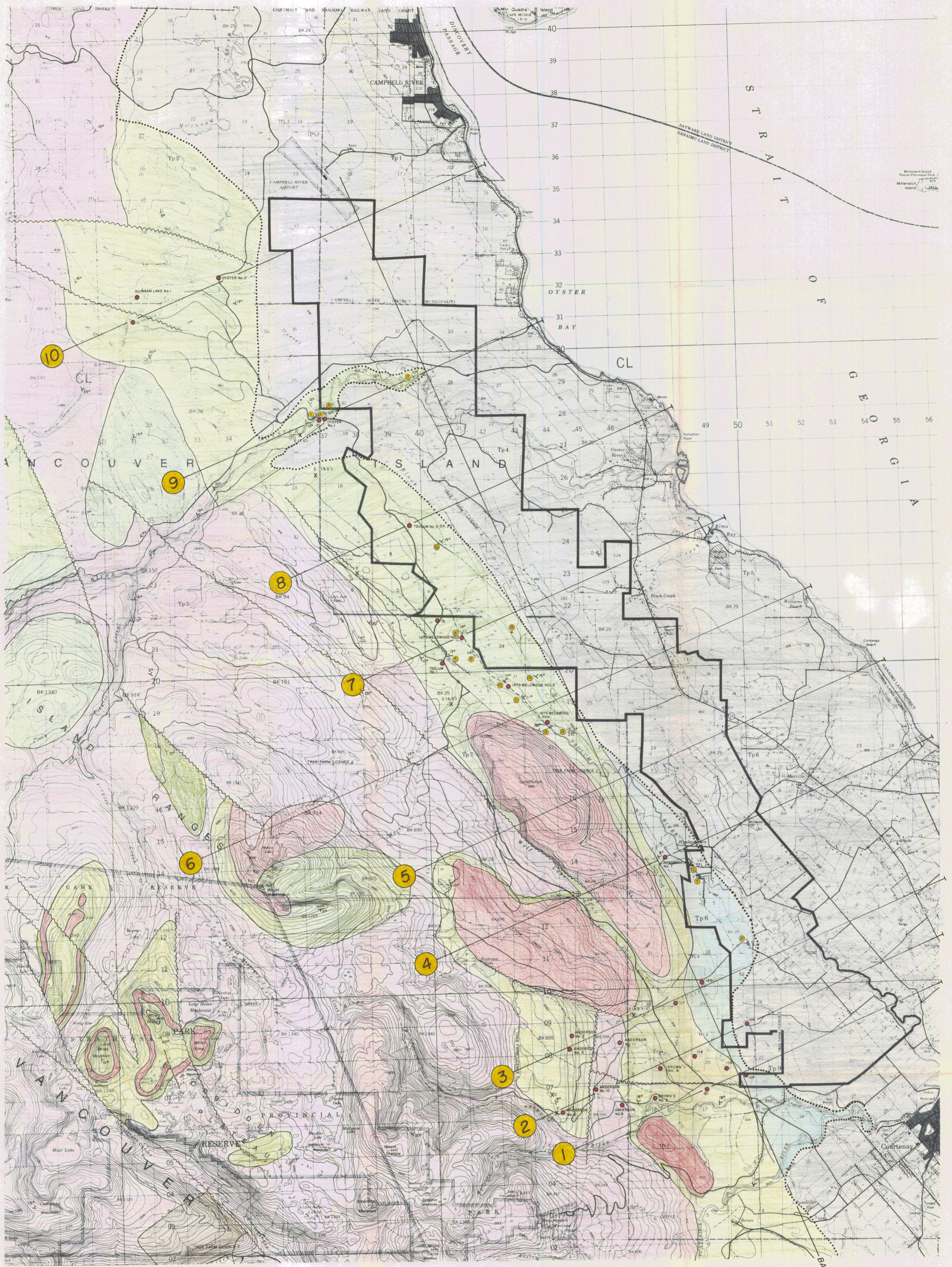
O. C. 2. Canyon formed in the Comox formation by the Oyster River. Note exsolution holes forming in sandstone. Photo looks downstream Beds dipping 12° to the northeast.



PLATE 3

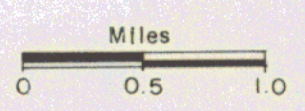
O.C. 3. The final exposures of the Comox formation on the Oyster River. This photo also taken looking downstream to the N.E. Dips of bedding stay much the same from O.C. 1 downstream to O.C. 3.

#228



LEGEND

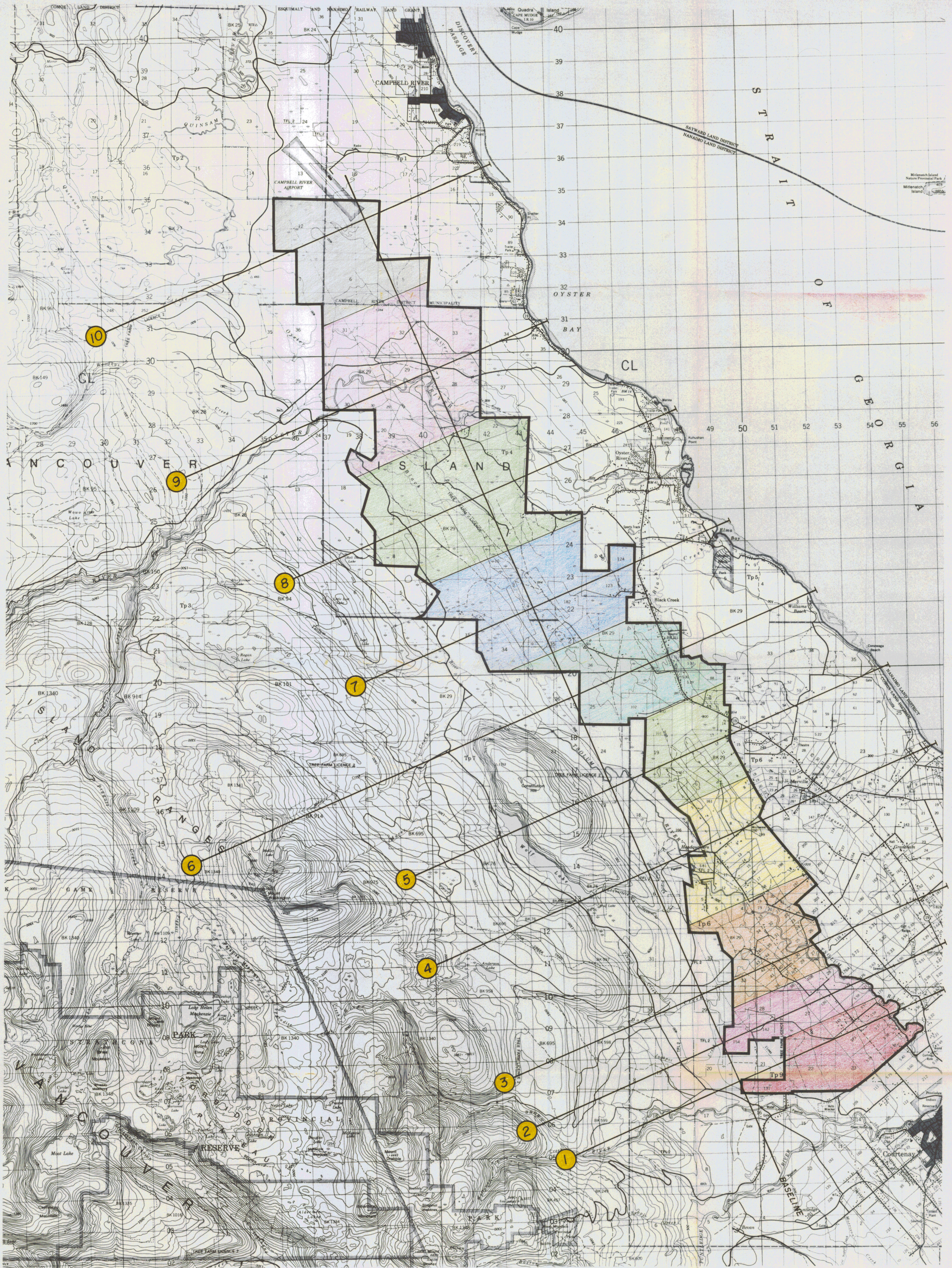
- Glacial and Alluvial Deposits (Greater than 50 Ft. Thick)
- Porphyritic Hornblende diorite, Fine-Grained Quartz Diorite, Related Breccias
- Haslam Formation Shale, Silty Shale, Minor Shaly Sandstone
- Comox Formation Sandstone, Pebbly Sandstone, Minor Conglomerate, Shale, Coal
- Boulder Conglomerate, Minor Lithic Sandstone
- Granodiorite, Minor Quartz Diorite
- Karmutsen Formation, Massive, Partly Amygdaloidal Basalt, Pillow Breccia, Minor Tuff, Volcanic Breccia
- DIP, DIP DIRECTION
- FORMATION CONTACT
- THICK TILL BOUNDARY
- COAL OUTCROP
- FAULT (Sept. Field Reconnaissance)
- CANADIAN ISLAND CREEK OUTCROP
- OLD DRILL HOLE
- CROSS SECTION LOCATION
- CANADIAN OCCIDENTAL PETROLEUM APPLICATION



CANADIAN ISLAND CREEK COAL LTD.

COMOX COAL FIELD
Tsolum River Property
GEOLOGIC MAP
Map No. 3

DATE	NTS. NO.	COMPILED BY
NOV '80	92F/14	R.A. Sworen
DRAWINGS NO.		DRAWN BY
		L. MacKellar



LEGEND

RESERVE AREAS (Millions of Short Tons)

- Section 1 (Inferred) 13.9
- Section 2 (Inferred) 15.7
- Section 3 (Inferred) 19.4
- Section 4 (Speculative) 19.8
- Section 5 (Speculative) 17.2
- Section 6 (Speculative) 21.7
- Section 7 (Speculative) 39.0
- Section 8 (Inferred) 43.6
- Section 9 (Inferred) 32.5
- Section 10 (Speculative) 20.6

TOTAL 243.4

- Section Line
- Tsolum River Property Boundary



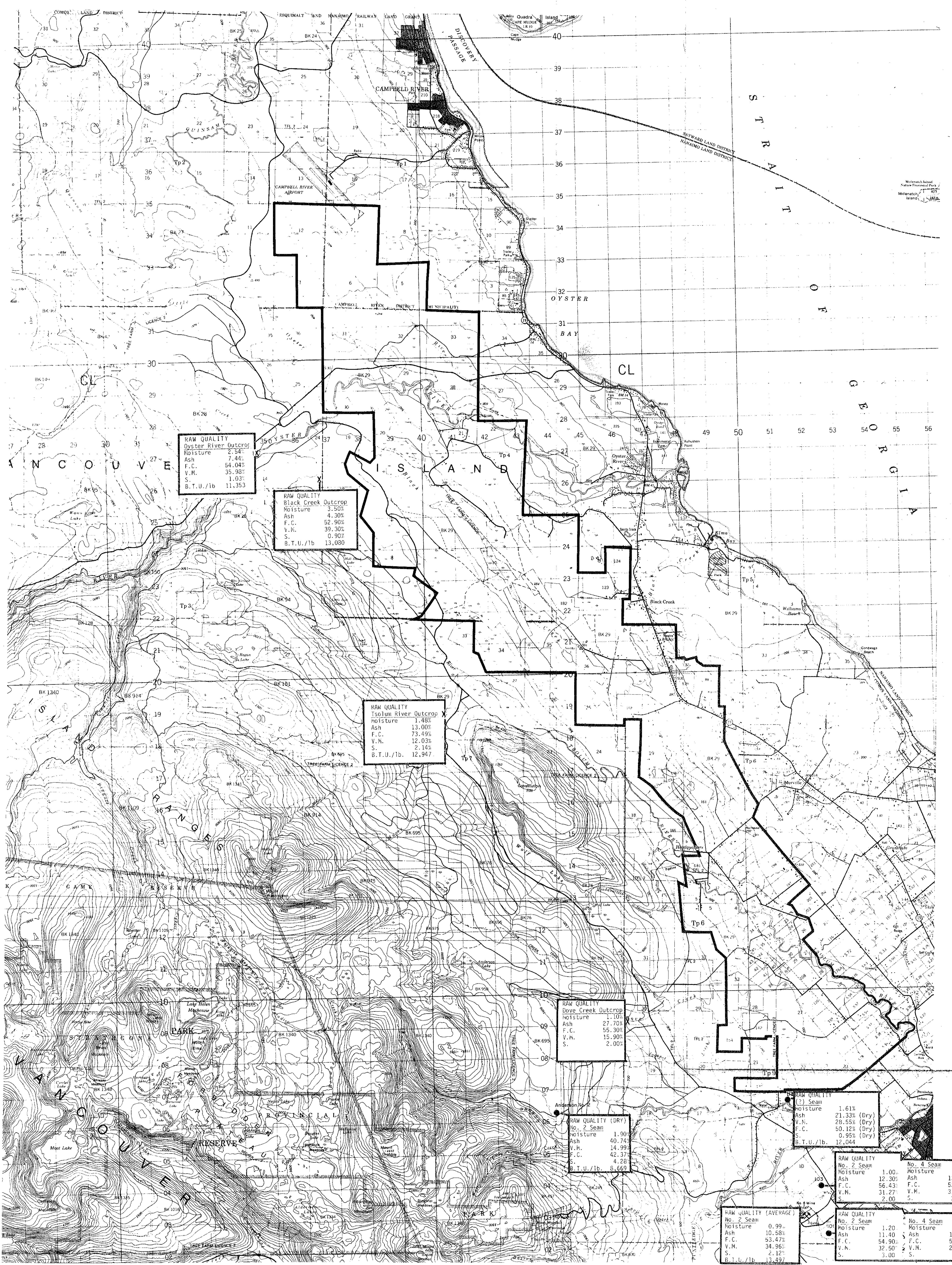
**CANADIAN ISLAND CREEK
COAL LTD.**

**COMOX COAL FIELD
Tsolum River Property
RESERVES BY CROSS SECTION**

MAP No. 4A

DATE Nov 1980	N.T.S. NO. 327/14	COMPILED BY R. A. Swaren
DRAWING NO.	DRAWN BY L. MacRellar	

#822



RAW QUALITY
Oyster River Outcrop

Moisture	2.54%
Ash	7.44%
F.C.	54.04%
V.M.	35.98%
S.	1.03%
B.T.U./lb	11,353

RAW QUALITY
Black Creek Outcrop

Moisture	3.50%
Ash	4.30%
F.C.	52.90%
V.M.	39.30%
S.	0.90%
B.T.U./lb	13,080

RAW QUALITY
Tsolum River Outcrop

Moisture	1.45%
Ash	13.00%
F.C.	73.49%
V.M.	12.03%
S.	2.14%
B.T.U./lb	12,947

RAW QUALITY
Dove Creek Outcrop

Moisture	1.10%
Ash	27.70%
F.C.	55.30%
V.M.	15.90%
S.	2.00%

RAW QUALITY (DRY)
No. 2 Seam

Moisture	1.90%
Ash	40.74%
F.C.	42.37%
V.M.	4.28%
S.	8.66%

RAW QUALITY
No. 2 Seam

Moisture	1.61%
Ash	21.33% (Dry)
F.C.	28.55% (Dry)
V.M.	50.12% (Dry)
S.	0.95% (Dry)
B.T.U./lb	12,044

RAW QUALITY
No. 2 Seam

Moisture	1.00%
Ash	12.30%
F.C.	56.43%
V.M.	31.27%
S.	2.00%

RAW QUALITY
No. 4 Seam

Moisture	1.00%
Ash	13.90%
F.C.	53.80%
V.M.	31.30%
S.	3.80%

RAW QUALITY (AVERAGE)
No. 2 Seam

Moisture	0.99%
Ash	10.58%
F.C.	53.47%
V.M.	34.96%
S.	2.12%
B.T.U./lb	13,497

RAW QUALITY
No. 2 Seam

Moisture	1.20%
Ash	11.40%
F.C.	54.90%
V.M.	32.50%
S.	3.00%

RAW QUALITY
No. 4 Seam

Moisture	1.00%
Ash	17.79%
F.C.	53.13%
V.M.	29.08%
S.	1.10%

LEGEND

- Canadian Occidental Petroleum Ltd. (Application)
- X Coal Outcrop (Sampled)
- ⚡ Coal Mine (Sampled)
- Drill Hole With Quality



CANADIAN ISLAND CREEK COAL LTD.

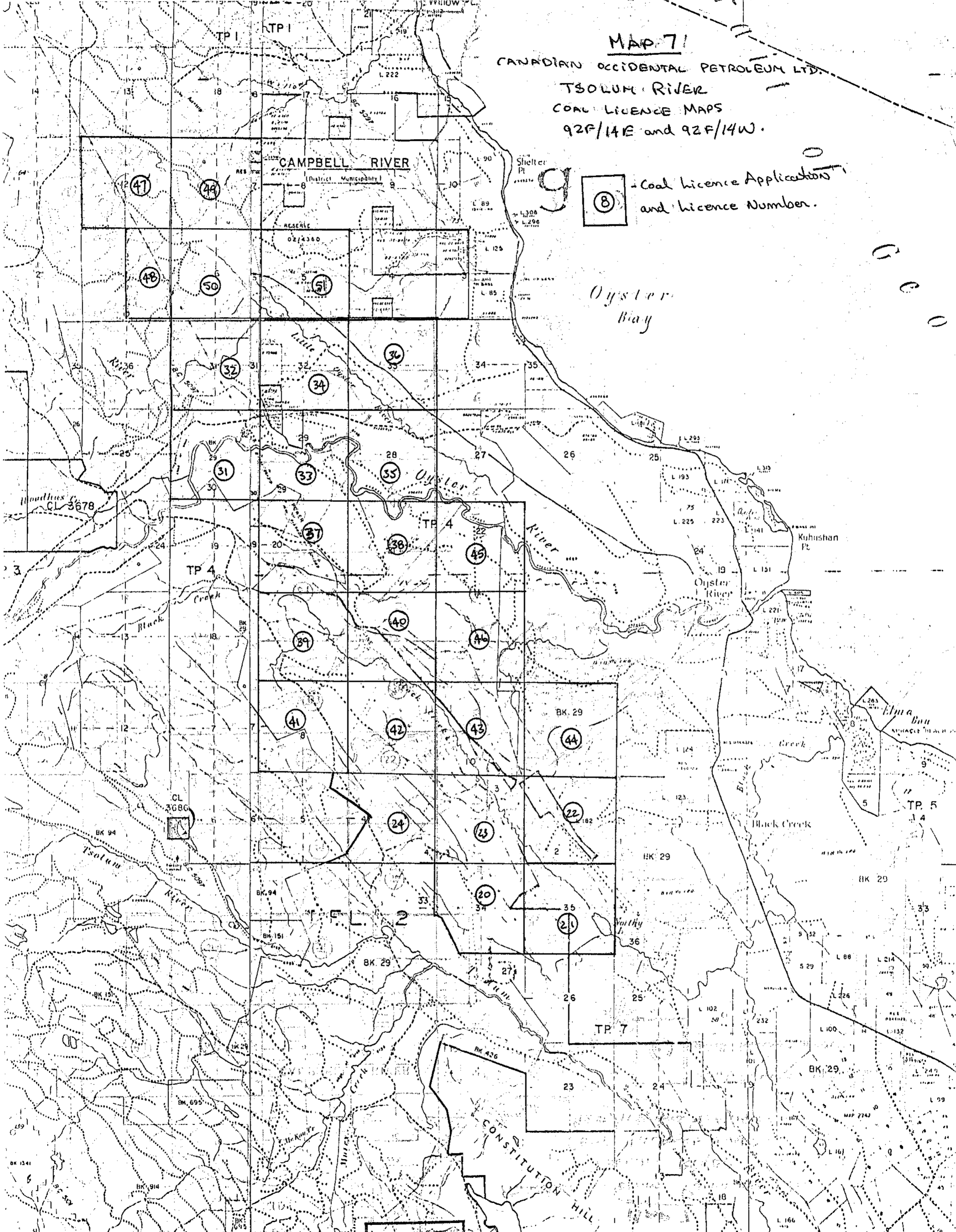
COMOX COAL FIELD
Tsolum River Property
COAL QUALITY

Map No. 5

DATE	NOV '80	PLANS NO	92 F/14	COMPILED BY	R.A. Sworen
DRAWING NO				DRAWN BY	L. Mac Kellar

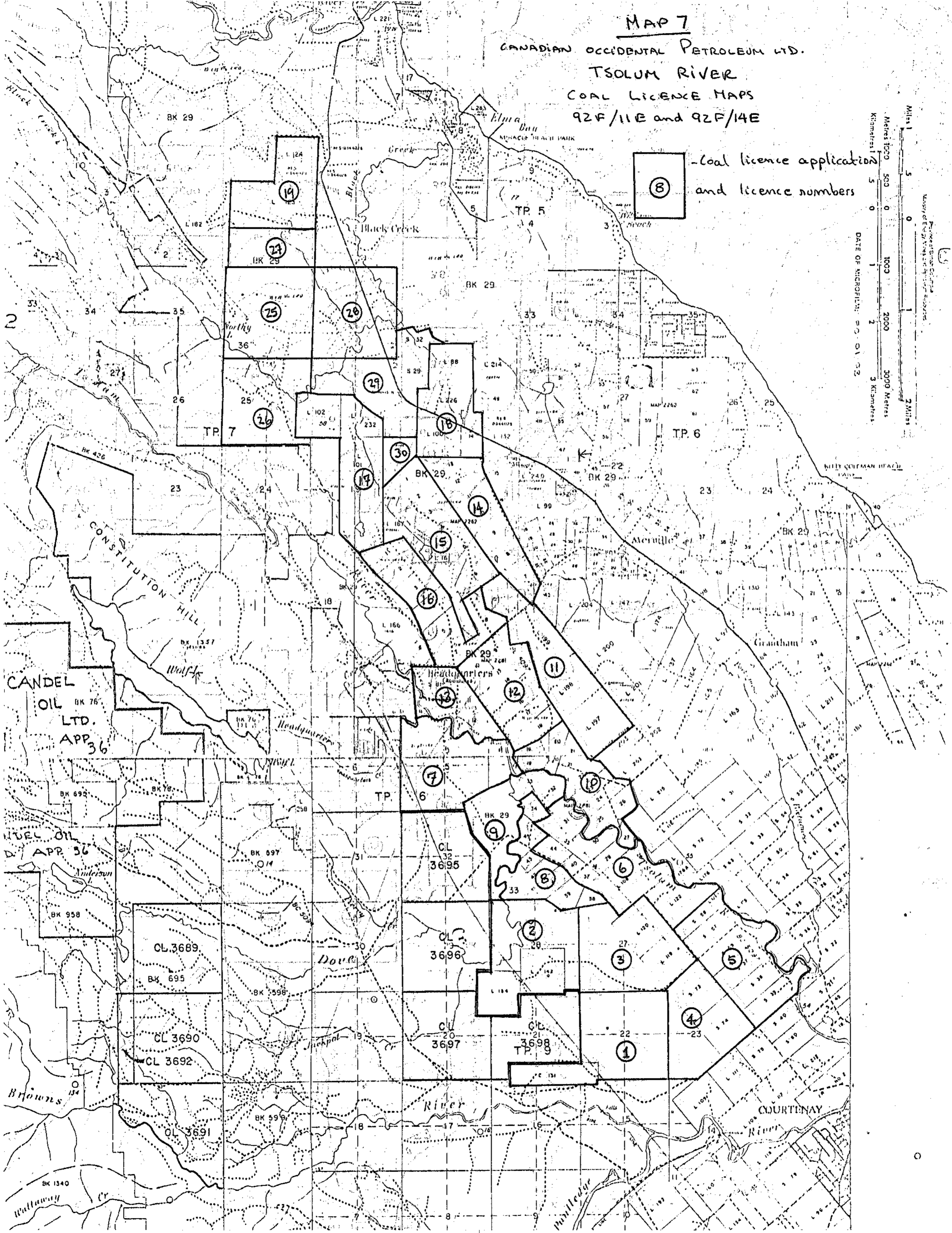
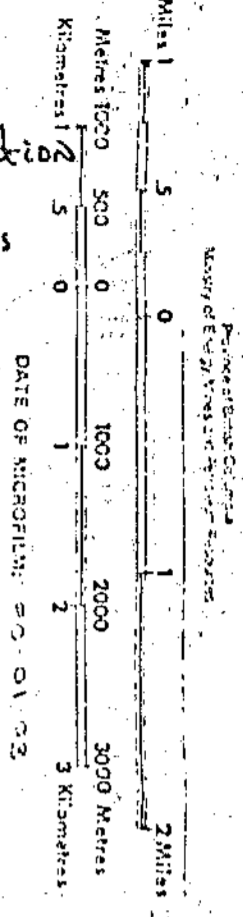
MAP 71
CANADIAN OCCIDENTAL PETROLEUM LTD.
TSOLUM RIVER
COAL LICENCE MAPS
92F/14E and 92F/14W.

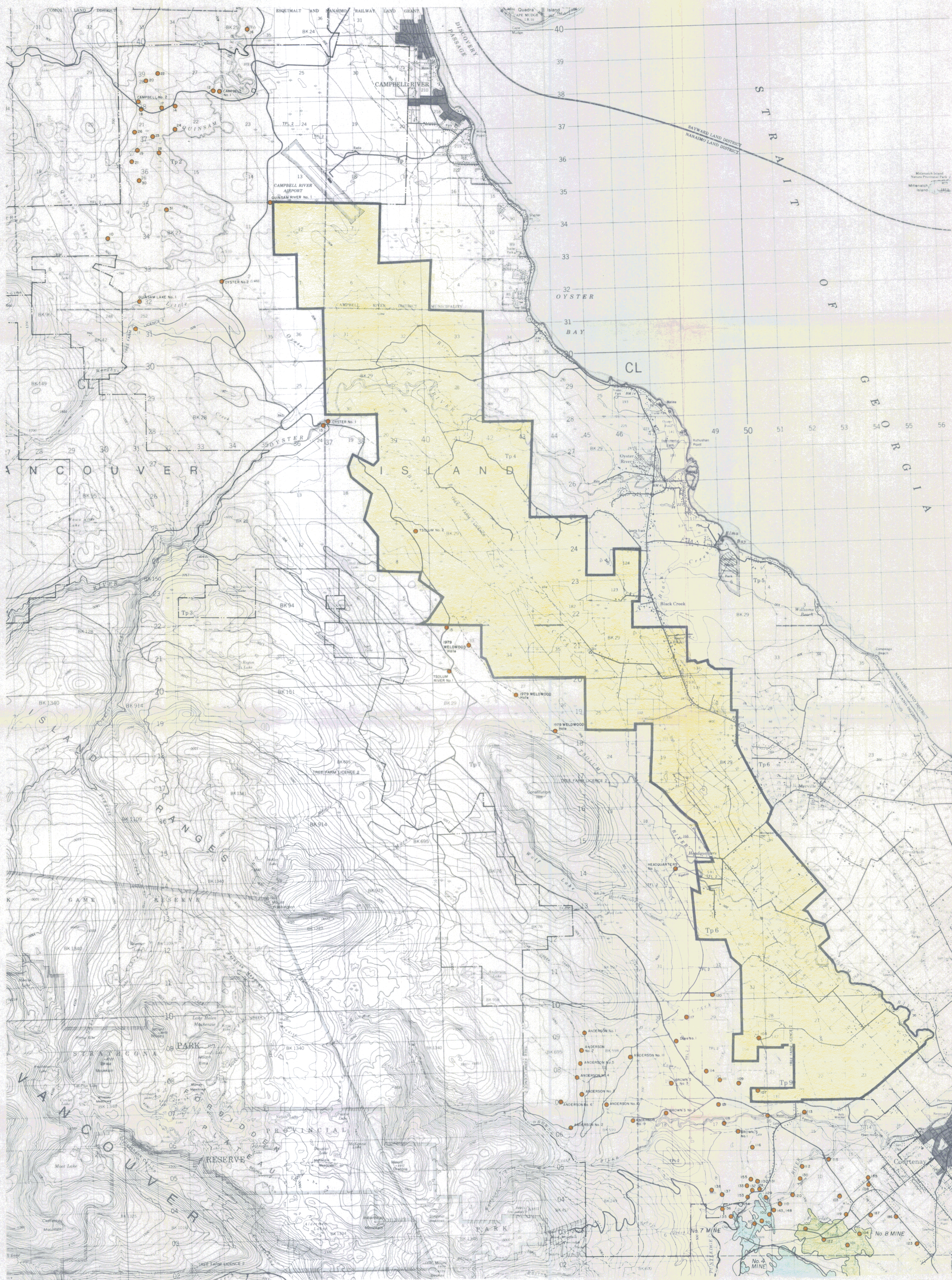
8 - Coal licence Applications
and licence Number.








MAP 7
 CANADIAN OCCIDENTAL PETROLEUM LTD.
 TSOLUM RIVER
 COAL LICENCE MAPS
 92F/11E and 92F/14E

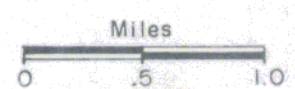
Coal licence application
 and licence numbers



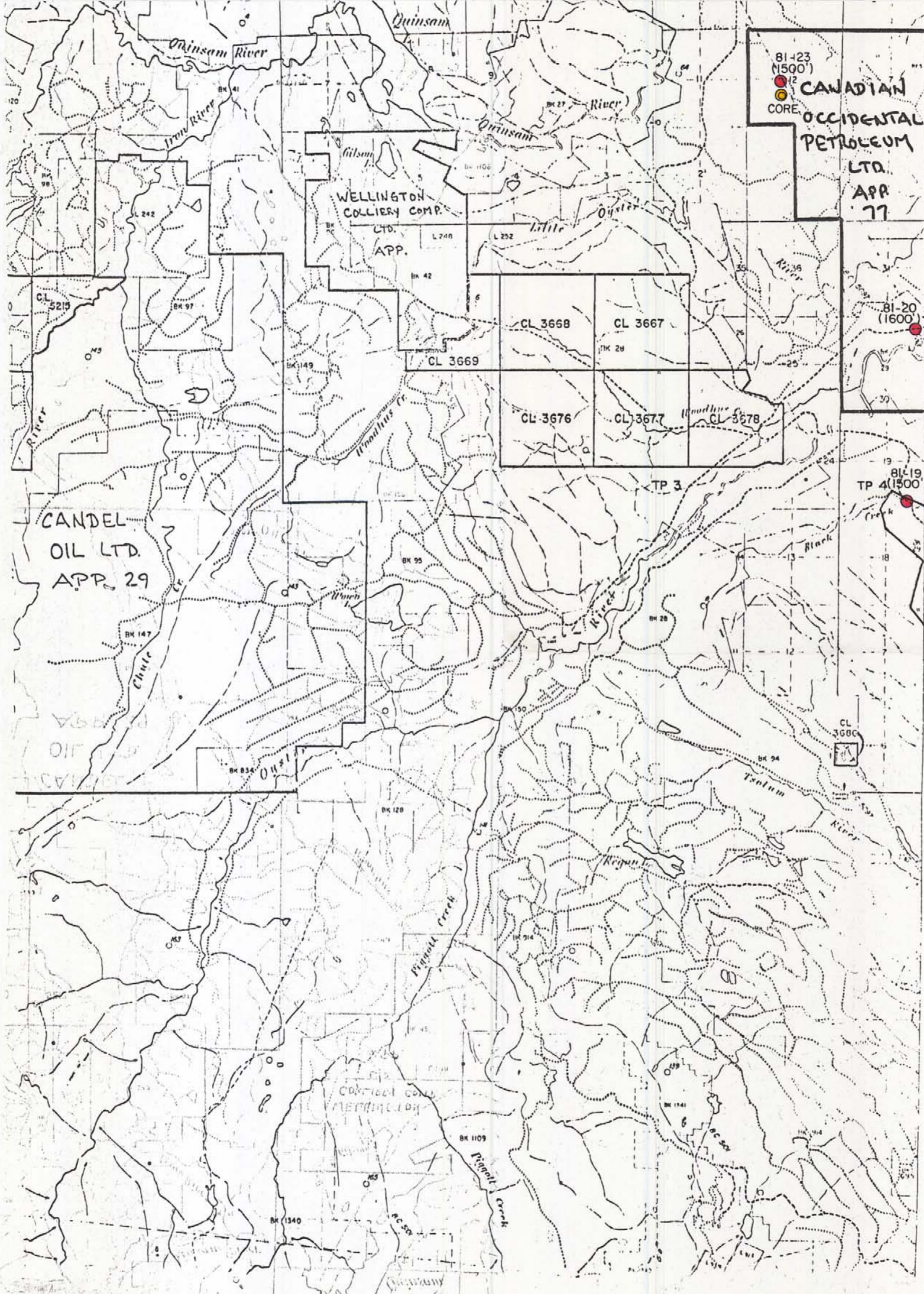


LEGEND

-  Competitors Coal Licences
-  Canadian Occidental Petroleum Ltd. (Licence Applications)
-  Worked Out Area, No. 2 Seam
-  Worked Out Area, No. 4 Seam
-  Old Drill Hole



CANADIAN ISLAND CREEK COAL LTD.		
COMOX COAL FIELD Tsolom River Property		
UNDERGROUND WORKINGS AND DRILL HOLES		
Map No. 8		
DATE OCT 1980	REV. NO. 92F/14	DRAWN BY L.M.
		COMPILED BY R.A. Sworen



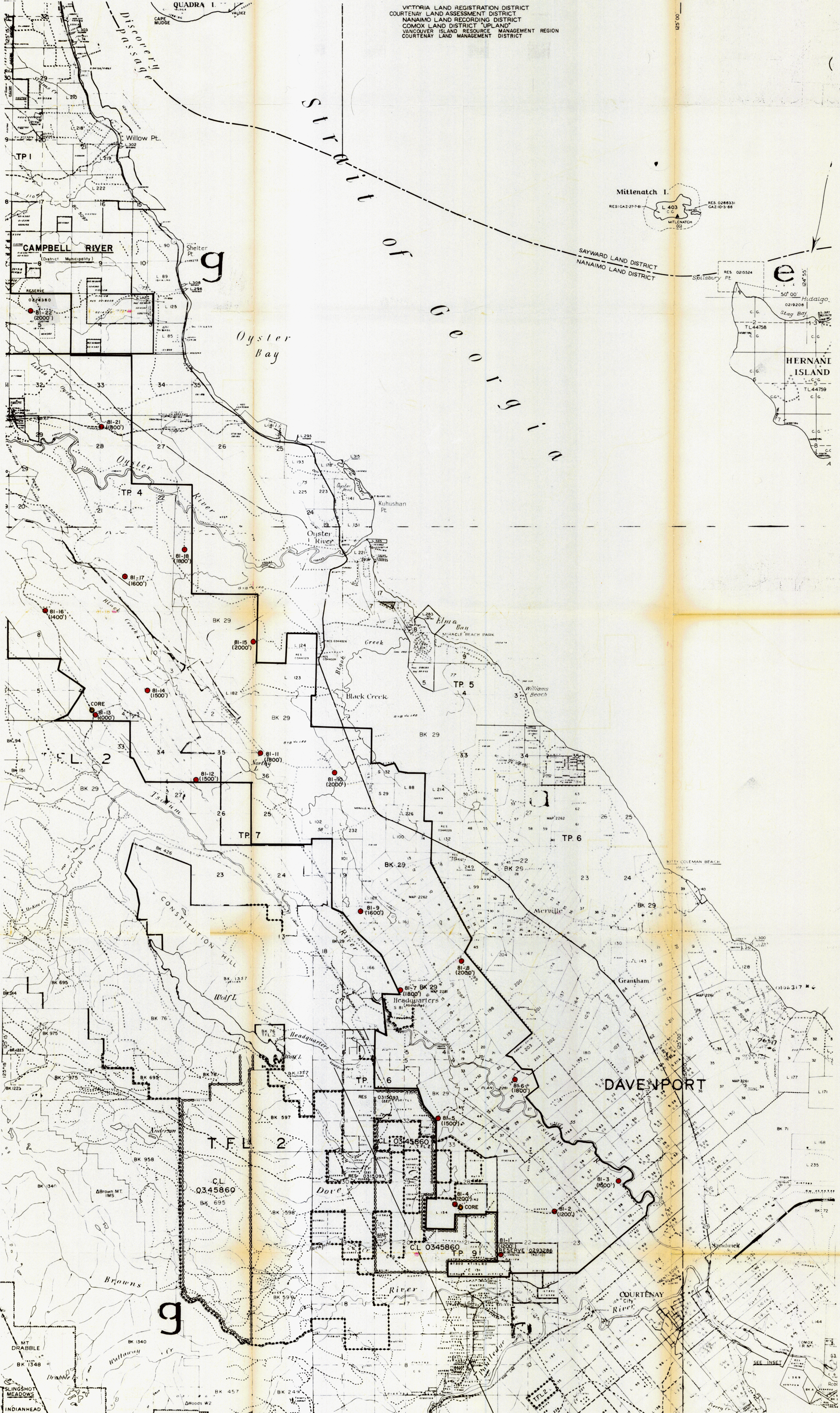
81-23
(1500')
CORE
CAVADIAN OCCIDENTAL PETROLEUM LTD.
APR 77

81-20
(1600')
TP 4(1500')


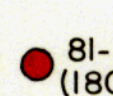
TO EAST SEE MAP 92 F14 E

VICTORIA LAND REGISTRATION DISTRICT
 COURTENAY LAND ASSESSMENT DISTRICT
 NANAIMO LAND RECORDING DISTRICT
 COMOX LAND DISTRICT "UPLAND"
 VANCOUVER ISLAND RESOURCE MANAGEMENT REGION
 COURTENAY LAND MANAGEMENT DISTRICT

125 000



LEGEND

-  CANADIAN OCCIDENTAL PETROLEUM (LICENCE APPLICATION)
-  PROPOSED 1981 DRILL HOLE AND MAXIMUM DEPTH

0.5
 0.25 0.50



CANADIAN ISLAND CREEK COAL LTD.
 COMOX COAL FIELD
 Tsolum River Property
 PROPOSED EXPLORATION - 1981
 Map No 9

DATE	D.T.S. NO.	COMPILED BY
NOV. '80	81/14	R.A. Seaman
DRAWING NO.		DRAWN BY
		L. MacKellar