1985 BRITISH COLUMBIA RECONNAISSANCE
BOWSER BASIN REPORT

NTS MAP SHEETS
93L, 93M, 94D, 103I, 103P, 104A, 104H

WORK COMPLETED BETWEEN JUNE 10 AND JULY 11, 1985
BY THE COAL DIVISION
OF ESSO RESOURCES CANADA LIMITED

Louise Klatzel Mudry
December, 1985

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NOTE: PLOTTING MAPS WITH BEDDING ORIENTATIONS ARE IN NTS FILE ~~93L~~ 104A and 103P - SOUTH BOWSER

LKM

SUMMARY

From June 10 to July 11, the Coal Division of Esso Resources conducted a reconnaissance coal exploration program in the southern and central areas of the Bowser Basin. The Bowser Basin is located in northwest British Columbia and has been interpreted as a successor Basin of the Columbian Orogen. Mineable coal seams are known to exist in the northeast corner of the Bowser Basin in the Groundhog Coalfield. Except for the Grounddhog area, much of the Bowser Basin is unexplored, and the stratigraphy unknown.

The Coal Department began exploration of this area in 1983. The first phase of the 1985 program concentrated on the remote central region of the Basin. The program was based on a remote lake 50 kilometres south of Meziadian junction (220 kilometres north of Terrace). The only access into the area is by helicopter. During the program approximately 900 square kilometres were explored on a reconnaissance basis. Because the stratigraphic nomenclature has not yet been defined in the Basin a depositional facies model was used as a mapping tool.

Coal seams were discovered in the eastern half of the Basin but are poorly developed.

Further work is not recommended in the southern Bowser Basin due to the paucity of coal seams and their associated stratigraphy. Detailed field mapping or joint venture assessment work in the Groundhog Coal field is recommended if Esso is interested in marketing anthracite coal. Geologic terrains surrounding the Bowser Basin should now be explored on a reconnaissance basis to determine their coal potential.

1.0 INTRODUCTION

1.1 1985 Program Objectives:

1) Evaluate the results of the 1983 and 1984 programs;

2) Continue mapping the Bowser Basin in areas not covered by the 1984 program; and

3) Assess the potential of coal mine development within the Basin.

1.2 Location and Access

The Bowser Basin is located in northwest British Columbia at approximately 55^{o} - 58^{o} N Latitude and 127^{o} - 130^{o} W Longitude.

The program was based at two camps and serviced from Terrace. The first camp was at Jigsaw Lake, 220 kilometres north of Terrace via Highway 37 and the Brown Bear logging road. The program began June 10 and concluded July 11.

Upon completion of field mapping activities at Jigsaw Lake, the camp was moved to Bell II on Highway 37 where reconnaissance mapping of the Bowser Basin continued along with detailed mapping of the Sweeny Prospect (see 1985 Sweeny Report, J. Stones).

Except for Highway 37 virtually no access exists into the Bowser Basin. The program was therefore supported by a Hughes 500D helicopter based in the camp.

The field crew consisted of eight geologists, a helicopter pilot and a cook.

The field area is in the Skeena Mountains where the terrain varies from rolling hills to rugged peaks and steep canyons. Treeline is approximately 4500 feet and many peaks reach over 6000 feet. Heavy bush is found in most valleys. Initially the traverses were conducted along ridges and creeks. But later in the program deeply incised valleys limited traverse possibilities along the creeks and restricted mapping to the ridges above treeline. Detailed stratigraphic sections were completed when possible. The traverses were spaced for maximum coverage of the Basin; approximately 900 square kilometres were explored on a reconnaissance basis (Figure 1).

Heavy winter snowfall combined with cool spring weather resulted in heavy snow cover over the entire reconnaissance area for the duration of the program.

1.3 Previous Work

Postulating that potentially economic coal seams may exist within the unmapped portions of the Bowser Basin, the Coal Department began reconnaissance mapping in 1983 and 1984. The 1983 program was based near the Bell Irving River in the northern portion of the Basin. Significant coal showings were found in the area of Sweeny Creek (see B.C. Bituminous Reconnaissance Program - Iskut 1983, R. Berg, A. Peach, B. Tamaki). The 1984 reconnaissance program was centred around Terrace, Hazelton and Smithers for two months and the Sweeny Creek area for one month. An area between Sweeny and Konigus Creeks was recommended for acquisitions at the end of the program. No significant coals were found in the southern Bowser Basin (See 1984 Southern Bowser Program by R. Berg).

A. Peach began the geologic compliation for this area in 1983 and emphasized the use of facies models in regional geologic mapping. Because formations have as yet not been defined in the Bowser Basin this method of field mapping has proven useful.

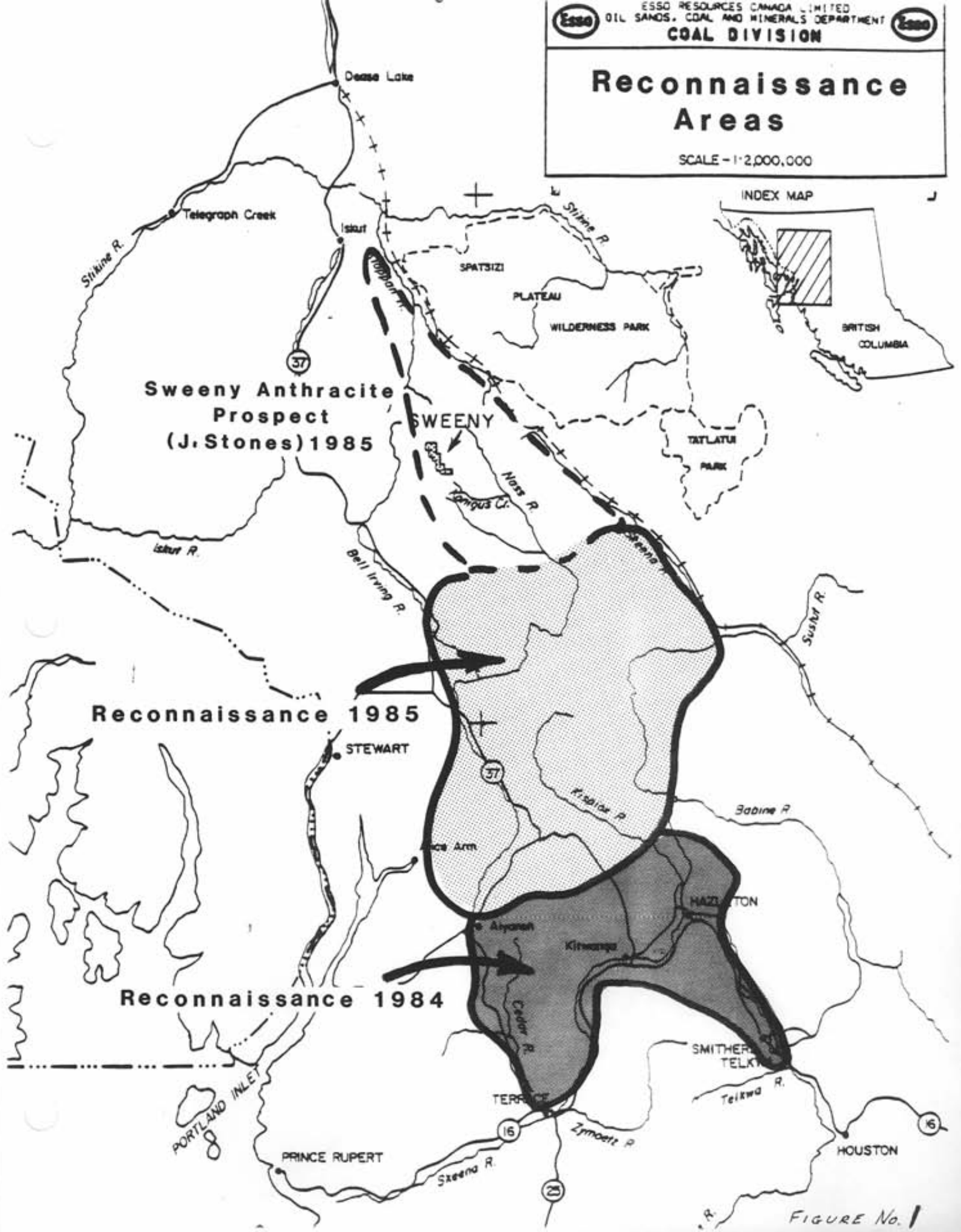
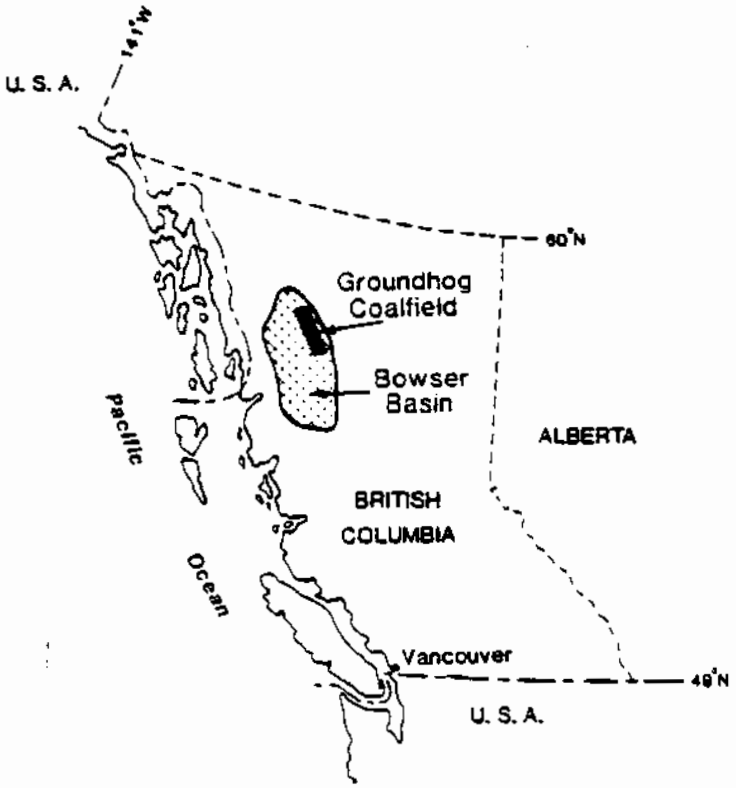

ESSO RESOURCES CANADA LIMITED
OIL SANDS, COAL AND MINERALS DEPARTMENT
COAL DIVISION
Reconnaissance Areas
SCALE - 1:2,000,000
INDEX MAP
BRITISH COLUMBIA
Dease Lake
Telegraph Creek
Stikine R.
Iskut
Stikine R.
SPATSIZI
PLATEAU
WILDERNESS PARK
TATLATUI
PARK
37
Sweeny Anthracite Prospect (J. Stones) 1985
SWEENY
Groundhog
Kotcho Cr.
Ness R.
Iskut R.
Bell Irving R.
Sustut R.
Reconnaissance 1985
STEWART
37
Kitsalas R.
Bowser Arm
Babine R.
HAZELTON
Kitwanga
Reconnaissance 1984
Cedar R.
SMITHERS
TELKWA
Telkwa R.
TERRACE
16
Zymoetz R.
HOUSTON
16
PORTLAND INLET
PRINCE RUPERT
Skeena R.
25

FIGURE No. 1

Other work conducted by Esso Resources in the Bowser Basin includes exploration for hydrocarbon source rocks by the Exploration Department (1968). In 1979 coal licenses in the Mt. Klappan area were prospected and mapped by the Coal Department. The licences were dropped in 1980 because of complex structure and stratigraphy. Gulf Canada Inc. now holds the licence block.

2.0 STRATIGRAPHY

2.1 Geologic Setting and Introduction



The Bowser Basin is a 325 X 160 kilometre successor Basin of the Columbian Orogen underlain by a diverse assemblage of sedimentary, volcanic and plutonic rocks. The sedimentary sequence comprises marine and continental sediments deposited from middle-late Jurassic to lower Cretaceous time.

Coal was discovered in the northeast corner of the Basin in the early 1900's. This area, known as the Groundhog Coalfield, contains large reserves of anthracite coal.

The purpose of our exploration was to determine if coal bearing sediments exist elsewhere in the Basin.

The stratigraphy of the Bowser Basin is complex due to the highly variable and time transgressive nature of the sediments. Many stratigraphers note rapid facies changes resulting in the juxtaposition of deltaic and marine facies. The variability of the facies has inhibited the definition of formations within the Basin.

The stratigraphic problems are well documented in last years report by R. Berg. This report will describe the stratigraphic sequences mapped and will not attempt to solve the complex stratigraphic and nomenclature problems within the Bowser Basin.

The sedimentary sequence can be broadly subdivided into marine, deltaic and fluvial depositional environments. Marine facies dominate the western half of the Basin. Transitional and continental sediments intertounge with the marine sediments along a north to northwest trend near Shelf Ridge, Mt. Tommy Jack, Stephen Peak and Blackwater Peak. Coal seams were found near Smokee Lake and the northern end of the Sicintine Range (Figure 2 in back pocket).

Figure 2 indicates the traverses completed in 1984 and 1985. It also indicates the deposition environment interpretations and displays the broad division between marine and deltaic or continental sediments.

1:250,000 and 1:50,000 geology maps accompany this report. Strikes and dips were plotted on to topographic survey NTS map sheets from field observations.

Three distinct units were mapped in the marine facies. The units comprised:

1) massive to thickly bedded dark grey sandstones and greywackes;

2) monotonous, thinly bedded to shaley, dark grey, mudstones with resistive occasional thin bedded, buff weathering calcareous mudstones; and

3) interbedded sandstones, siltstones and mudstones.

Sedimentary features are notably absent in the strata while bedforms are predominantly planar.

Near shore transitional and continental facies were not as abundant.

The transitional facies are generally olive grey to medium grey sandstones, siltstones and mudstones. Plant fragments are rare but worm burrows, rip up clasts, buchia and ostrea are common. The continental facies comprise rhythmically interbedded sandstones, siltstones and mudstones. The strata consist of fining upward, thin to medium bedded units. Carbonaceous mudstones and coals are rare but carbonaceous plants fragments are common. Two thin coal seams were found during the program, both seams (BIT 028, JLS 20) were under 1/3 metre thick.

2.2 DETAILED STRATIGRAPHY - Characteristics of the Sedimentary Units

2.2.1 Marine Environment

- mudstone and siltstone dominate
- the marine is typically indicated by recessive, dark grey shaley slopes
- this lithology is predominantly mudstone or siltstone; silty mudstones are common
- the unit is usually: dark to medium grey, may be ironstained, thinly bedded (10 cm. thick) or shaley and fissle
- within the unit calcareous mudstone interbeds occur
- these beds are resistive, 5-30 cm., brown to buff weathered (occasionally banded), medium grey on fresh surface, slightly concretionary, commonly occur in zones with individual beds .2 m to 1.5 m apart.
- sandstone interbeds also occur in the recessive mudstone/siltstone unit
- the sandstone interbeds are very fine to fine grained, interlaminated, dark to medium grey siliceous, poorly sorted, 1 cm. to 20 cm. thick
- thick, resistive sandstone units often form steep cliffs below the recessive units and therefore are thought to be stratigraphically lower than the recessive mudstones and siltstones

- this unit is fine to medium grained, siliceous, poorly sorted, dark to medium grey and greenish grey
- the beds are massive to thick bedded and average 1 to 3 metres thick, thin 10 cm. siltstone interbeds exist between the sandstone beds
- shallow marine turbidite sequences up to 20 metres thick were noted. The individual beds fine upward, are laminated and have well-preserved sedimentary features. The sections are mostly interlaminated siltstones and mudstones, tan to dark grey banded (Photo 5)
- in the western portion of the Basin these units could commonly be described as greywackes with grit lenses at the base of channels in fining upward cycles
- low angle cross bedding is evident
- the marine sequence known as the Ashman Formation is the only section of the Bowser Group given formational status. The Ashman Formation described by Tipper and Richards (1976) consists of sandstones, grits, arenites and minor shales in the Smithers type section. The results of our mapping suggests that the Ashman Formation is finer grained (muddier) in the central portion of the Basin
- Location of typical sections: Skeena River, Nass River, Highway 37.

2.2.2 Deltaic Environment

- comprises interbedded, interlaminated sandstones, siltstones and mudstones monotonously repeated in fining upward cycles
- light to medium olive grey sandstones with medium to dark grey silt/mudstones
- thin to medium bedded, .2 metres to 2 metres thick
- recessive siltstones, mudstones and resistant sandstones
- sandstones are poorly sorted, subangular to rounded, well cemented but not as siliceous as marine sandstones
- plant fragments are rare

- rip-up clasts are commonly siltstone and mudstone
- coquina horizons comprising buchia and ostrea occur in beds up to 2 metres thick. They are uncommon but are important markers in determining the depositional environment
- burrows are up to 1 cm in size and are usually seen in mudstones
- faint cross bedding and ripple laminations are present
- sandstones, siltstones and mudstones repetitively alternate in fining upward units
- carbonaceous mudstone beds are rare
- the near shore/deltaic facies are uncommon in the reconnaissance area. It maybe postulated that the depositional environment was not condusive to the preservation of this sedimentary facies
- location of typical sections: Mt. Tommy Jack, Blackwater Peak.

2.2.3 Continental Environment

- the facies comprise sandstones, siltstones, mudstones, carbonaceous mudstones, rare coals and conglomerates
- sandstones are very fine to course grained, light to medium grey, well sorted, well rounded (quartz, feldspar and rock fragments) and moderately indurated (clay matrix common)
- the continental facies comprise rhythmic fining upward cycles
- beds vary from 1/2 m to 5 m thick
- mudstones are dark grey and often carbonaceous. Weathered carbonaceous plant fragments sometimes form a white plant hash on bedding planes
- siltstones are rubbly weathered and often ironstained
- conglomerates are rare but were found up to 2 m thick. They are clast and matrix supported and consist of chert pebbles, mudstones and rarely volcanic rock fragments. The clasts are generally 1-5 cm but sometimes as long as 20 cm. (Photos 7 & 8)
- coals are rare and poorly developed (26 cm. thick). They are always associated with carbonaceous mudstones. Sample BIT 28 was analyzed for proximate analysis and vitrinite reflectance. Other outcrops JLS 34, TRV 008, MGB 14, BMW 49 and 51 were mostly carbonaceous mudstone with less than 10 cm. of coal

- sedimentary structures including soft-sediment deformation, small ripples, laminations and cross bedding are present
- location of typical section:
  - o Mt. Tommy Jack
  - o Blackwater Peak.

Photo 1 - Ridge near Mt. Skuyhil, note: heavy snow cover in late June, fold and fault on ridge in background.

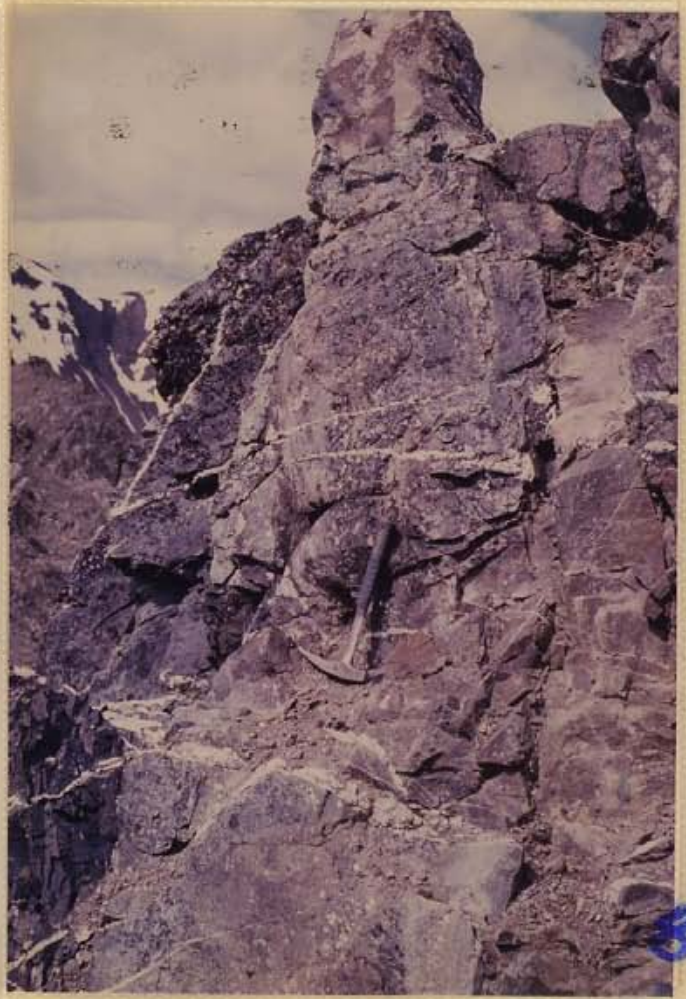
Photo 2 - Photo taken on Blackwater Peak looking south, Chevron fold with fault.

Photo 3 & 4 - Marine sequence with resistive sandstones (greywacke) at base of photo grading to recessive shaley mudstone. Note the resistant light coloured calcareaous mudstone beds in recessive mudstone unit.

Photo 5 - Graded bedding interpreted as a marine turbidite sequence.

Photo 6 - Small parasitic fold in marine siltstone unit.

Photo 7 & 8 - Siliceous sandstone with chert conglomerate in interbedded continental sequence on Blackwater Peak. Beds are near vertical to overturned; note calcite fracture filling.



3.0 Structure

The structural trend in the southern Bowser Basin is northwest-southeast (300^{o}-350^{o} AZ). Minor compression in a northeast-southwest direction later in the geologic history of the Basin is sometimes evident. Above tree line large scale folds and faults are spectacularly displayed on steep faces. In some cases, strata can be traced across several ridges along a fold axis. In other instances the strata cannot be easily correlated from one ridge to the next.

Folding is the major form of deformation. The structures vary from broad, gentle folds to steeply inclined chevron folds. Folds in competent sandstone units are faulted, presumably in response to ductility problems associated with the folding of competent beds (Photo 2). Marine mudstones were faulted but the displacements were not obvious due to the ductility of the beds.

3.1 Small Scale Structures

Most structural features were observed at individual outcrops. Jointing, cleavage, disharmonic folding, slickensides and calcite fracture filling were commonly observed (Photos 6 & 8).

Joint orientations were usually noted but not recorded in detail. Sometimes the jointing obliterated the bedding surface. The cleavage in some phyllitic shales was interpreted to be from the second stage folding.

Where small folds were observed, fractures, shearing and slickensiding were often noted. The marine mudstones were especially rubbly when structurally deformed.

Many siliceous greywackes and sandstones are brittle and therefore are heavily fractured.

4.0 Coal Quality

Coal rank within the Bowser Basin is variable. Samples from the 1984 program ranged in rank from semi-anthracite to anthracite. Many of the samples were weathered and sheared. One sample had an anomalously high reflectance of 6.57. This sample was highly anisotropic indicating that the coal was subjected to high shearing stresses where the percent Ro may have been elevated above normal coalification levels.

A number of thin coals and carbonaceous mudstones were discovered in the South Bowser area this year. The outcrop numbers are BIT 028, JLS 019, JLS 034, TRV 004, MGB 014, BMW 049, 051. Most of the coals were less than 10 cm. thick, however the coal at BIT 028 was 26 cm. thick (Figure 3). The sample BIT 028 was analyzed for proximate analysis; results are as follows:

Sample	H2O%	V.M. %	Ash %	% Ro. Max.
BIT 28	9.4	10.9	23.4	4.68

Additional samples were not analyzed because these appeared to be too high in ash to warrant proximate analysis (J. Allan, personal communication).

Sample BIT 28 was highly anisotropic and showed signs of weathering. The coalification rank may therefore be overprinted and elevated by high pressure effects (this reflectance value would not generally be elevated by more than one percent; J. Allan, personal communication).

Anthracite is generally found in the Groundhog Coalfield.

The average product at the Mt. Klappan coal project will be:

Size	R.M.%	Ash %	VM %	FC %	Cal. Val.
1 X 6 mm	1.1	8.9	5.4	84.6	7430 cal/g.
35 X 15 mm	1.9	4.2	6.5	87.4	7830 cal/g.

Exploration has also taken place in the Sustut Basin, a smaller, younger Basin on the eastern margin of the Bowser Basin. Coal from a Suncor exploraton drillhole had the following values:

Moisture %	Ash %	VM %	% RO
1.59	13.75	31.19	.75

This coal is significantly different from the Groundhog coal because it is vitrinite rich and lower rank. This would suggest that it has had a different burial history; ie., a shorter burial.

Only low volatile to anthracite coals have been found during our exploration of the southern Bowser Basin and the Sweeny prospect (in the northern portion of the Basin).

1985 Expenditures South Bowser Program

Helicopter:	
Contract Service	44,722.50
Fuel	7,500.00
Vehicles:	
Truck Rental	2,000.00
Fuel	1,350.66
Food and Kitchen Supplies	7,331,81
Propane	463.00
Field and Office Supplies	7,413.93
Expediting Service	2,000.00
Transportation (Airfare, Camp Mobilization)	11,613.44
Accommodation	802.66
Equipment Rental	567.35
Reprographics and Drafting	500.00
Sample Analysis	100.00
Salaries (February - November, 1985)	67,625.00
T O T A L	153,990.35

PERSONNEL

Louise Klatzel Mudry	-	Project Geologist
John Stones	-	Project Geologist (June 25 - July 12)
Brenda Wright	-	Esso Geologist
Bob Tamaki	-	Contract Geologist
Susan Derby	-	Assistant Geologist
Joanna Sharpe	-	Assistant Geologist
Fred Kurz	-	Assistant Geologist
Tim Vant	-	Assistant Geologist
Troy Brazzoni	-	Assistant Geologist
Carole Rubin	-	Cook
Tham Pham	-	Pilot

CONTRACTORS

Air Lift Helicopters P.O. Box 598 Pit Meadows, British Columbia V0M 1P0 (604) 465-8481	-	supplied Hughes 500 D Helicopter $400.00/hour plus fuel and oil
Jean Black 5124 McConnell Avenue Terrace, British Columbia V8G 4X1 (604) 638-8354	-	expeditor responsible for weekly food orders, radio schedule, etc.
Hank Van Aplen Smithers, British Columbia	-	contractor for shower and outhouse construction, Weatherport tent and freezer rental
Bell II Services Hazel and Ernie Kriez	-	supplied facilities (water, electricity), cabin rental at Bell II camp
John Brindle 4936 Brisebois Drive N.W. Calgary, Alberta T2L 2G5 (403) 282-4411	-	firearms safety instructor taught shotgun shooting course to staff
Hertz-Mid Canadian Industries 120 58 Avenue S.E. Calgary, Alberta T2H 0N7	-	truck rental: 1 crew cab 1 4 X 4 3/4 ton pickup

DISCUSSION AND RECOMMENDATIONS

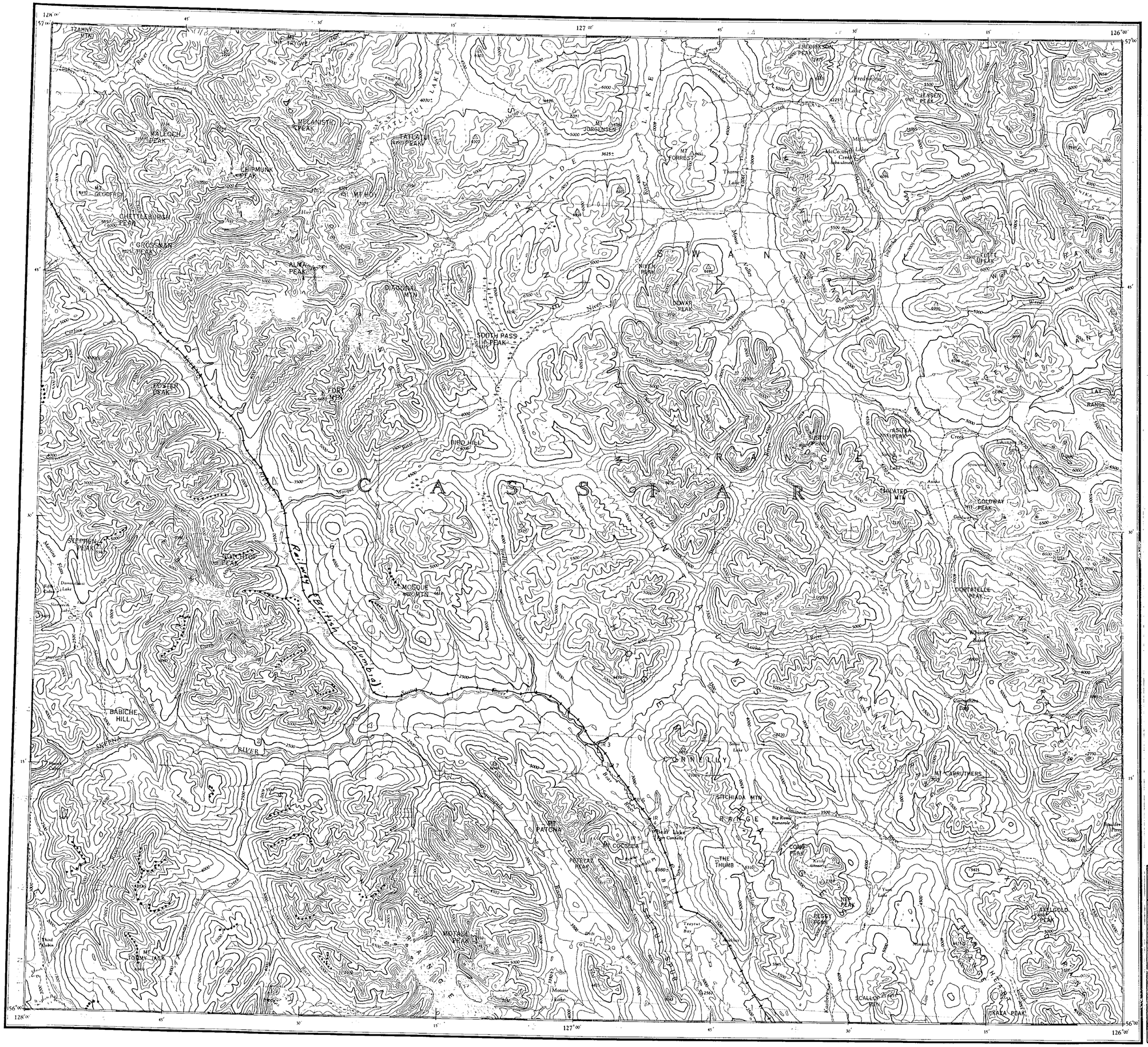
The Bowser Basin is a fascinating laboratory for sedimentological studies, but when prospecting for economic coal deposits, our objective is to distinguish potentially economic sequences from those with little potential. This year we again used facies environments to aid us in our work. Carbonaceous plant fragments, coaly mudstones and cyclic deltaic and fluvial sedimentary units were noted. We found that the peralic, deltaic and fluvial facies overlap and interfinger with each other, therefore, boundaries were drawn only between marine and nonmarine facies (Figure 2 roughly indicates this division). The western portion of the basin is essentially marine whereas continental and near shore/deltaic facies are confined to the eastern position of the Basin. The facies interfinger in the central portion of the Basin. The coal is thought to have been deposited in a wave dominated delta.

Heavy snow cover hampered field mapping activities in mountainous areas. Because of this many alternate traverses were necessary. Traverses were not completed in the Skeena Mountains northeast of camp due to the heavy snow cover, however, most of the area is considered marine, and on its own does not warrant additional follow up work.

The Bowser Basin has been extensively covered on a reconnaissance basis by the Coal Department. Little to no coal mining potential was found to exist in the areas mapped during the 1985 reconnaissance program, therefore, additional work in these areas is not recommended.

It may be concluded from the exploration conducted over the past three years that little coal potential exists outside the Groundhog Coalfield in the northern Bowser Basin. In the Southern Bowser significant coal showings have not yet been found. Geologic terrains outside the Bowser Basin should be explored in the coming field season. Although our exploration has been ongoing for a number of years, the variable geological settings in this vast area demand additional work before we may regard our work as a comprehensive review.

If the Coal Department is interested in marketing anthracite coal and maintaining a presence in this area, a joint venture project within the Groundhog Coalfield would be the most effective method of acquiring property. Although it is still uncertain whether coal in the Groundhog Coalfield can be economically mined, further assessment of the Groundhog area is recommended in light of the Mt. Klappan project.



MAP KEY

Roads:

hard surface, all weather	dual lane, freeway	more than 2 lanes
hard surface, all weather	2 lanes	less than 2 lanes
loose or stabilized surface, all weather	2 lanes or more	less than 2 lanes
loose surface, dry weather		
cart track		
trail or portage		

Bowser Lake Group
(10) Coal
Skeena Group
12△ Coal
1984 Traverse
1985 Traverse

Scale 1:250,000

Miles 5 0

Kilometres 5 0

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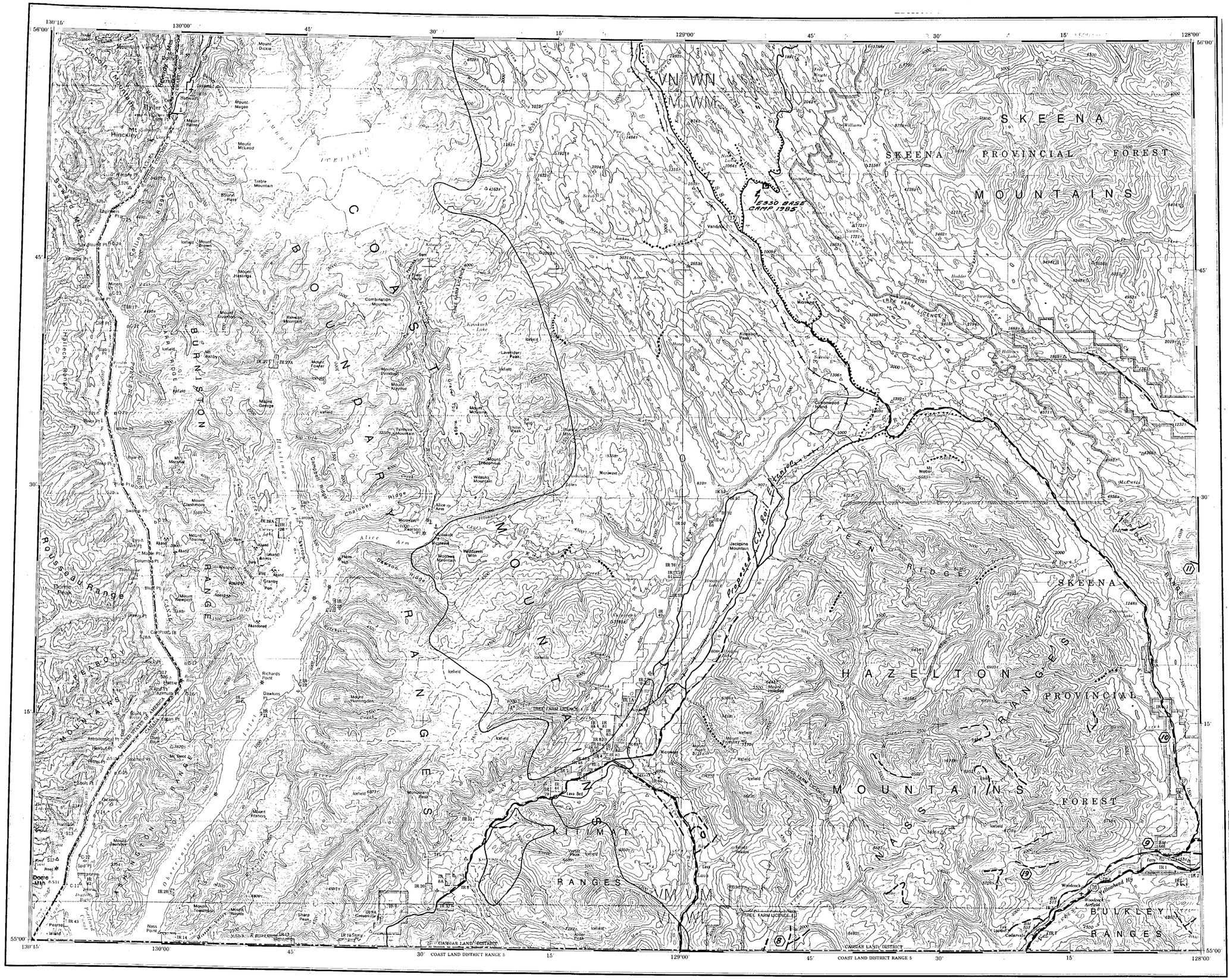
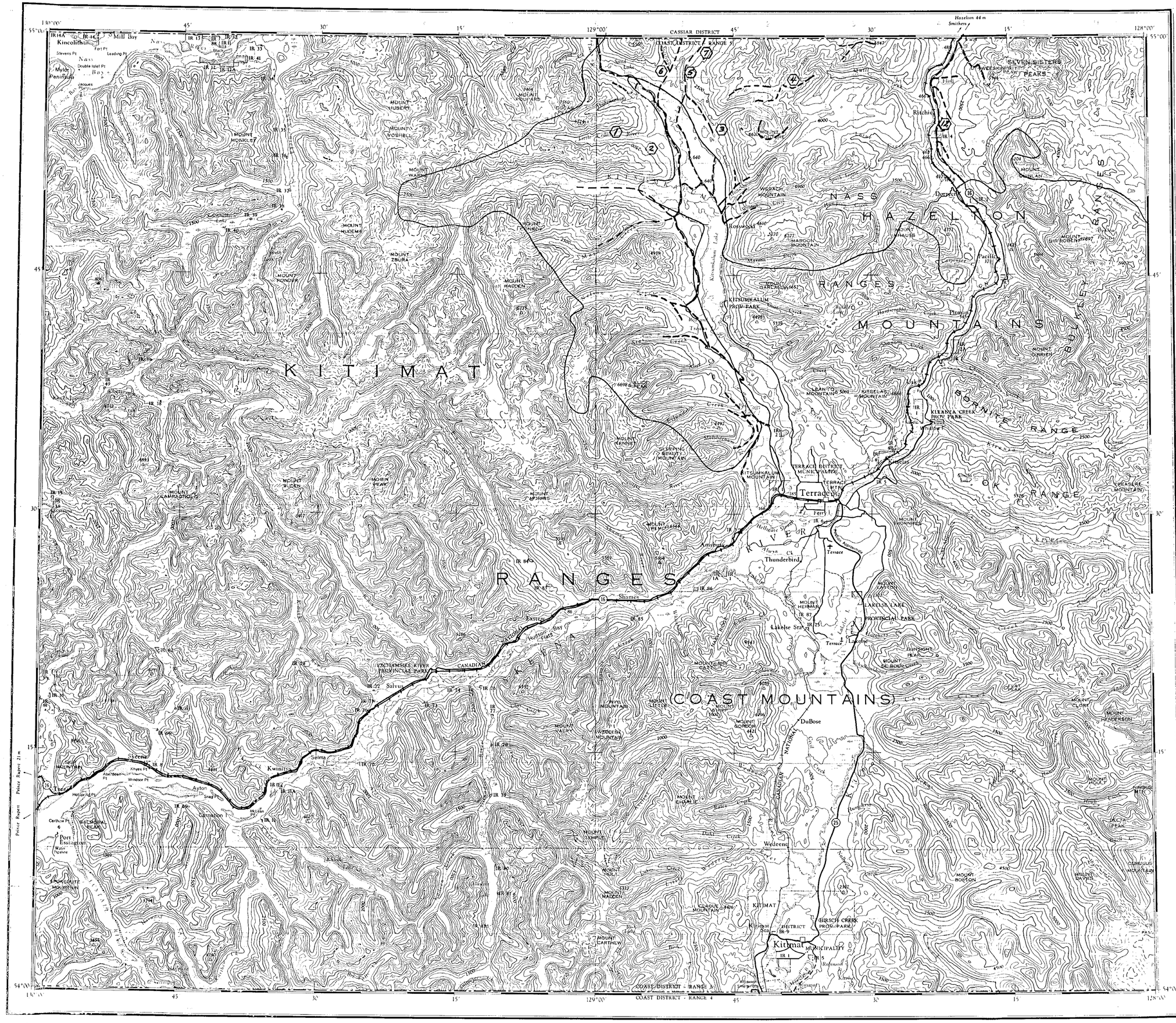
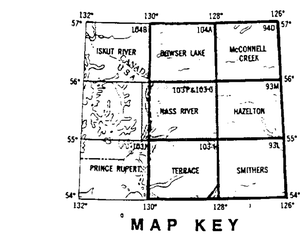
OIL SANDS-COAL DIVISION

SOUTH BOWSER AND SWEENY B.C.
FACIES AND TRAVERSE MAP
1984-1985

To Accompany A Report By


SKEENA
MOUNTAINS
SKEENA PROVINCIAL FOREST
HAZELTON MOUNTAINS PROVINCIAL FOREST
BULKLEY RANGES
ESSO BASE CAMP 1985
BOWSER LAKE GROUP
SKEENA GROUP
COAL
Bowser Lake
Kitsuns Creek
Kitsuns Lake
Kinskuch Lake
Kinskuch Peak
Combination Mountain
Mount Guanton
Mount Fowler
Mount Georges
Mount Clashmore
Mount Tsaytaysun
Mount Tricondilla
Mount McGuire
Tsaytaysun Mountain
Mount Hastings
Mount Brown
Mount Mulligan
Mount Kayoue
Mount Hickey
Mount Magee
Mount McLeod
Mount Dickie
Treble Mountain
Bronyn Pass
Hinckley Pk
Mt Hyller
Mt Ashby
Mt Marshall
Mount Newport
Mount Huntington
Mount Francis
Mount Jaundice
Mount Tsaytaysun
Mount Woods
Sharp Peak
Granby Pen
Granby Bench
Dawkins Pt
Richards Point
Nass Point
Pearse Island
Dome Peak
Dome Mtn
Bowser Lake
Iskut River
Nass River
Skeena River
Sweetin River
Kitsumkalum River
Kitsumgallum Lake
Swan Lake
Vandyke Lake
Hidden Lake
Hillions Lake
Woodcock Airfield
Telkwa
Cedarvale
Lookout
Ferry
Yellowhead Hwy
Alice Arm
Dawson Ridge
Chalmers Ridge
Campbell Ridge
Wilbanks Mountain
Jackpine Mountain
Mosquito Mountain
Woodcock Mtn
Mt Weber
Mt McDowell
Cottonwood Island
Kinskuch Peak
Lawrence Peak
Tchitin Peak
Tchitin Mountain
Mount Tricondilla
Wilbanks Mountain





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Bowser Lake Group
10 Cool
Skeena Group
12 Coal
1984 Traverse
1985 Traverse

Scale 1:250,000
Miles 5 0
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OIL SANDS-COAL DIVISION

SOUTH BOWSER AND SWEENY B.C.
FACIES AND TRAVERSE MAP
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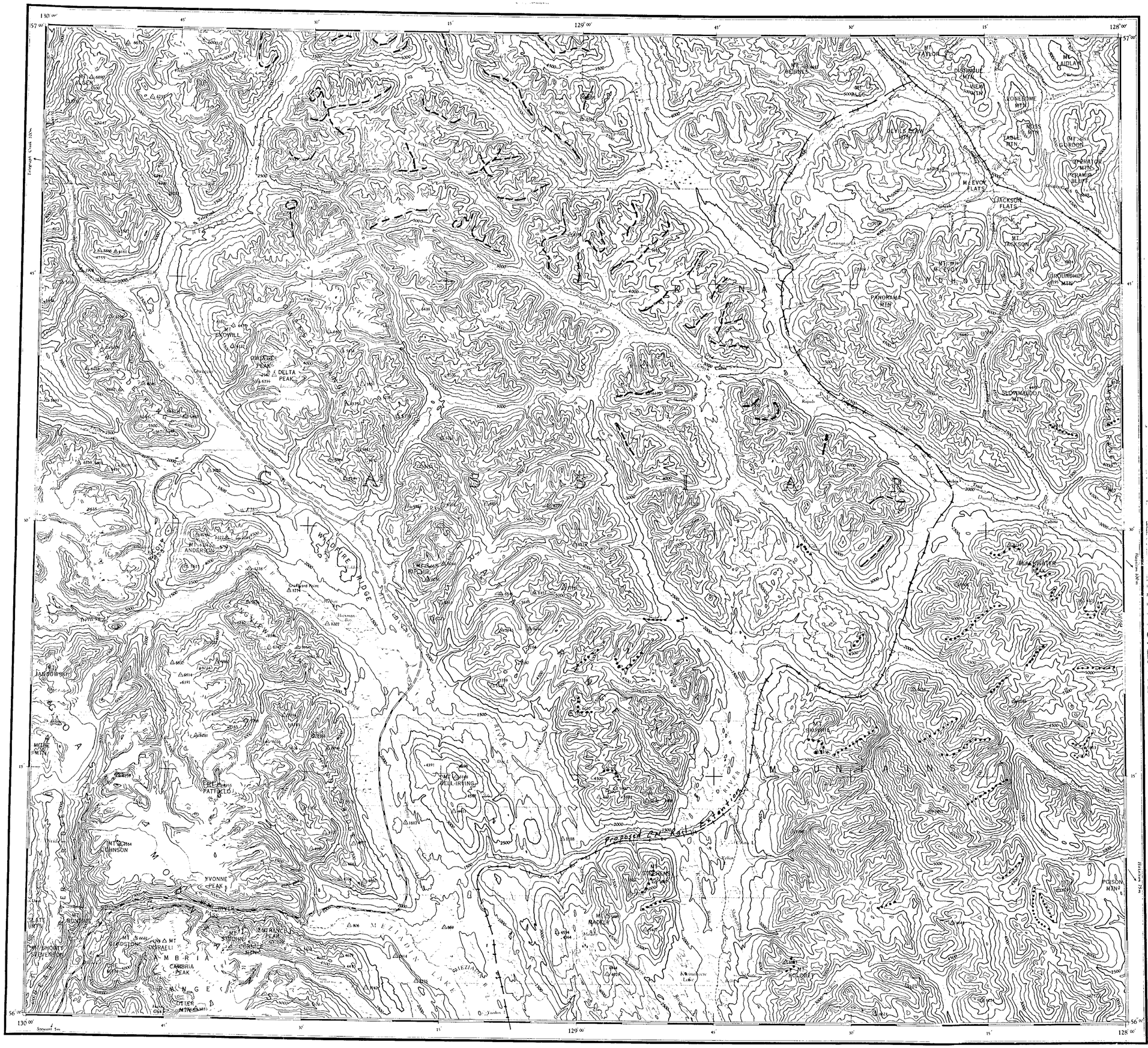
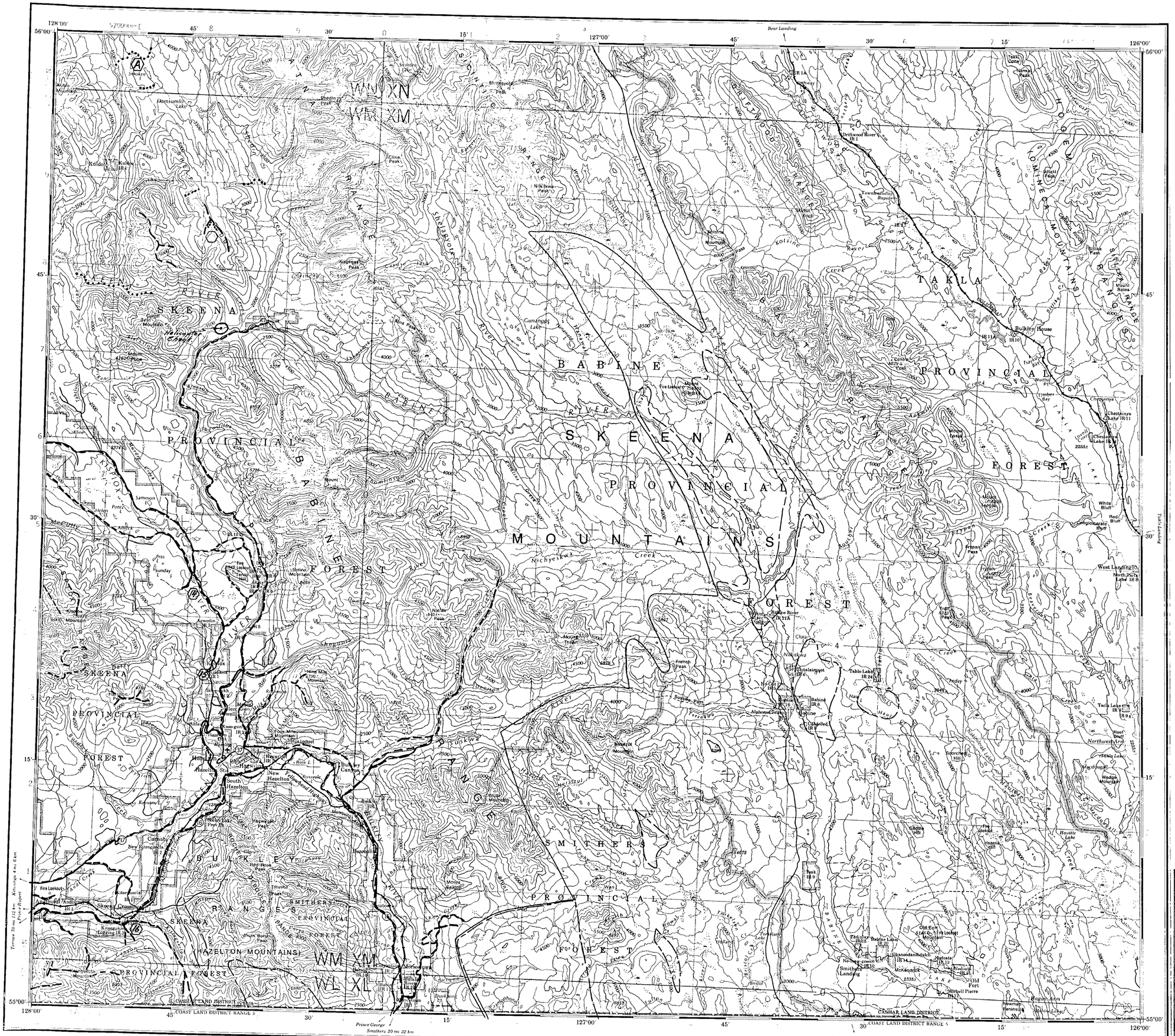
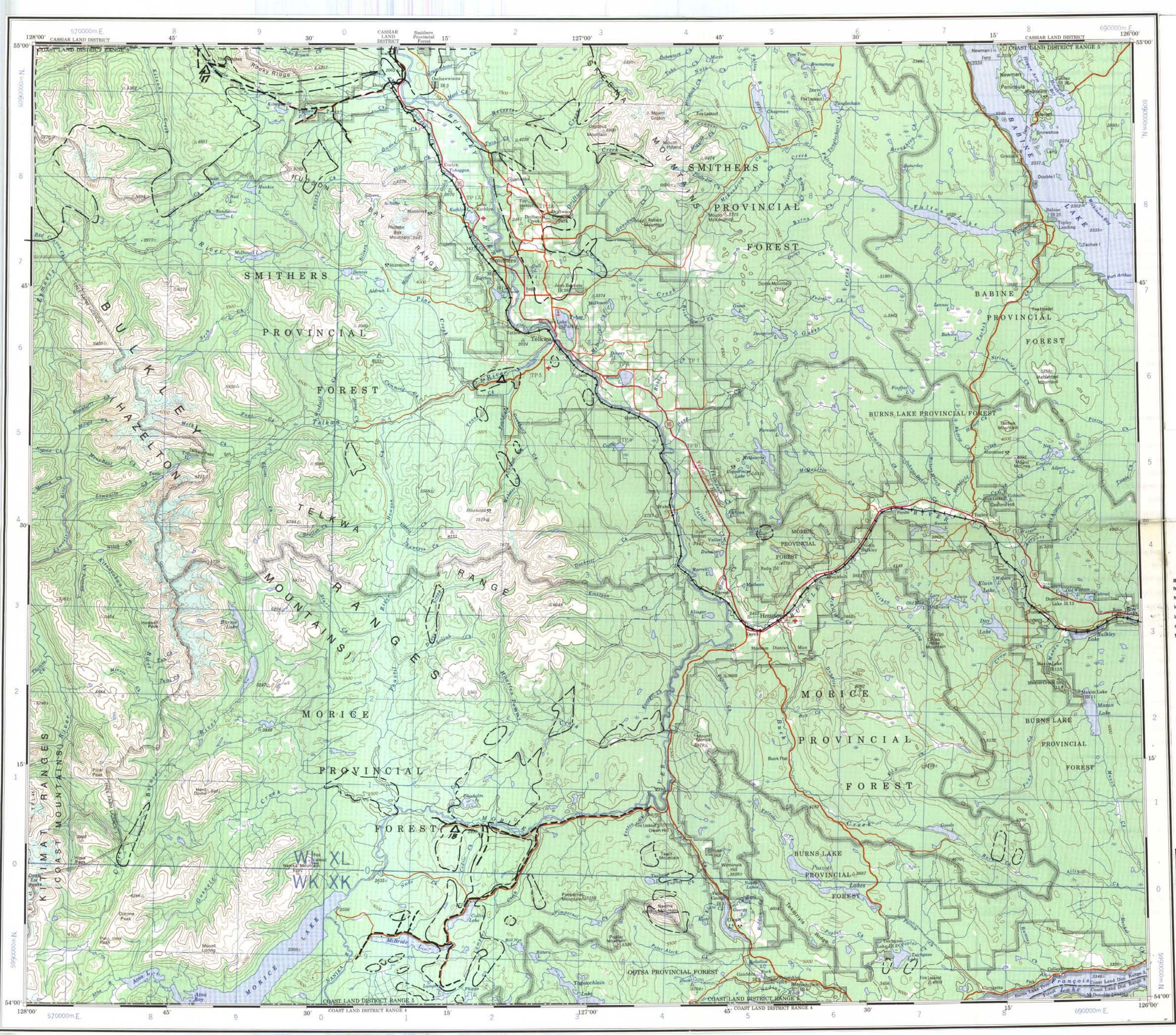
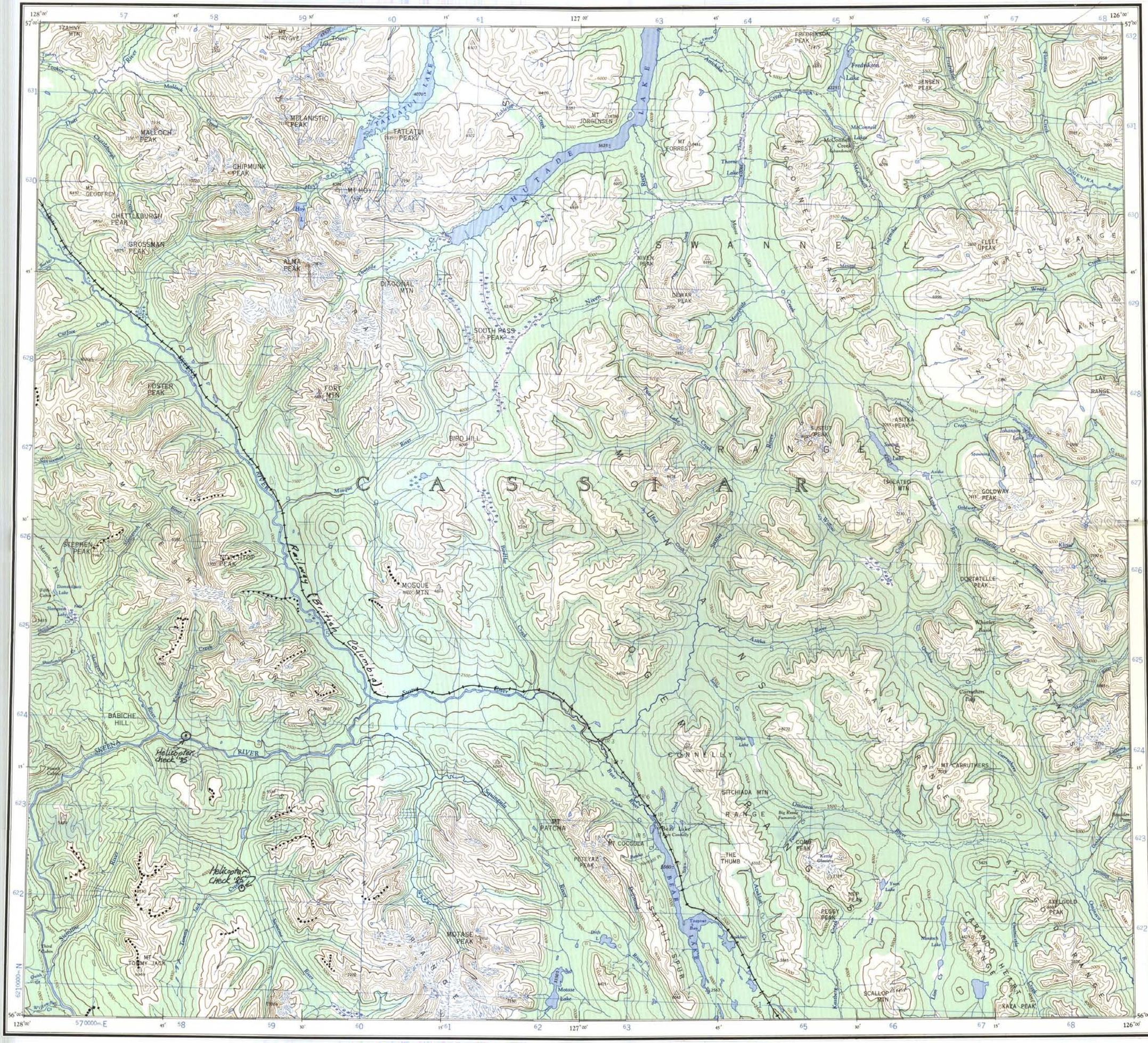
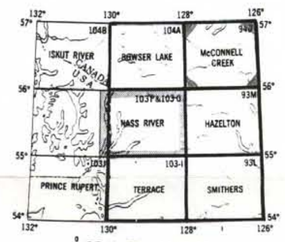

MT. TAYLOR
MT. BELDING
MT. AIDLAW
DISTINGUE MTN.
VIEW MTN.
BONEHOME MTN.
MOSS MTN.
TABLE MTN.
(MT. SIR GORDON)
GENERATOR MTN.
RAMP BLUFF
DEVILS ELBOW MTN.
McEVOY FLATS
JACKSON FLATS
MT. JACKSON
MT. McEVOY
SLOAN HILLS
PANORAMA MTN.
SLOAN MTN.
MT. EKOVILL
OWLEASE PEAK
DELTA PEAK
MT. ANDERSON
CRAFFORD POINT
MT. ARCHIE
MT. SWEENEY
MT. JAMIESON
MT. ROBINSON
YVONNE PEAK
MT. ROBSON
MT. SHORTY SILVERSON
MT. BURNUS
MT. HODGSON
MT. OSTRAELI
MT. STRUTHERS
ENTRANCE PEAK
CORNICE MTN.
CAMBRIA PEAK
OTTER MTN.
MT. PEIL-INFING
MT. PACKER
MT. McCLOSKEY
POISON MTN.
BLACKWATER PEAK
Proposed Railway Extension
Telegraph Creek 103I
Stewart 5m
Hazelton 93M
Babine 93L
Nechako River
Nechako Reservoir
Ootsa Lake
Whitesail Lake
Francois Lake
Fraser River
Parsnip River
Finlay River
Omineca Mountains
Cassiar Mountains
Hazelton Mountains
Nechako Plateau
Nechako Range
Cambria Range
Skeena Mountains
Bowser Basin
Groundhog Coal Basin
Telkwa Coal Basin
Sustut Coal Basin
Sustut Basin
Whitesail Basin
Bulkley Ridge
Swannell Ridge
Stikine Ridge
Owlease Ridge
Mezietah Ridge
Kidprice Ridge
Kidprice Creek
Mezietah Lake
Mezietah River
Kidprice Lake
Kidprice Creek
Kidprice Creek
Kidprice Creek


128°00'
56°00'
45'
30'
15'
127°00'
126°00'
5700000m E
Bear Landing
SKEENA
PROVINCIAL
FOREST
BABINE
MOUNTAINS
PROVINCIAL
FOREST
SKEENA
PROVINCIAL
FOREST
HAZELTON MOUNTAINS
PROVINCIAL FOREST
SKEENA
PROVINCIAL
FOREST
SKEENA
RANGES
PROVINCIAL
FOREST
BULKLEY
RANGES
SMITHERS
PROVINCIAL
FOREST
HOGEM
MOUNTAINS
SILVERTHRONE
PROVINCIAL
PARK
TAKLA
PROVINCIAL
FOREST
Kaldo
Kuldo IR1
Kispiox
Kispiox Peak
Hazelton
Old Hazelton
New Hazelton
South Hazelton
Two Mile Mountain
Gitanyow
Kitwanga
Kitwanga Fort
Kitwanga Mountain
Kitsegukla
Kitsegukla IR3
Kitsegukla Mountain
Gitsegukla
Gitsegukla IR2
Gitanmaax
Gitanmaax IR1
Hagwilget
Hagwilget IR1
Hagwilget Peak
Moricetown
Moricetown IR1
Moricetown Canyon
Bulkley Canyon
Telkwa
Telkwa Pass
Smithers
Smithers Landing
Driftwood River IR1
Driftwood Canyon
Bulkley House
IR10
IR11A
Babine Lake
Babine IR6
Babine River IR21A
Old Fort
Old Fort Mountain
Old Fort Mitchell Pierre IR12
Mitchell Pierre IR12
Nilkitkwa Lake
Nilkitkwa IR13
Tahlo Lake IR24
Tahlo Lake
Tachie Lake IR 9
Tachie Lake
Cheslatayut
Cheslatayut IR5
Cheslatayut Lake
Cheslatayut Mountain
Cheslatayut Peak
Chezainya
Chezainya Lake IR11
Chezainya Lake
Timber Bay
Wuttke Pit
Fraser Lake
Fraser Lake IR8
Fraser Lake Mountain
Fraser Lake Fire Lookout
Fraser Lake Fire Tower
Fraser Lake Fire Tower (Abandoned)
Fraser Lake Mountain
Fraser Lake Peak
Fraser Lake Peak IR9
Fraser Lake Peak IR9
Fraser Lake Peak IR9


128°00'
570000m.E.
CASSIAR LAND DISTRICT
COAST LAND DISTRICT RANGE 5
45'
30'
CASSIAR LAND DISTRICT
Smithers Provincial Forest
15'
127°00'
45'
30'
15'
CASSIAR LAND DISTRICT
126°00'
690000m.E.
55°00'
599000m.N.
45'
30'
54°00'
COAST LAND DISTRICT RANGE 5
COAST LAND DISTRICT RANGE 4
SMITHERS PROVINCIAL FOREST
BULKLEY HAZELTON MOUNTAINS
TELKWA RANGE
HUDSON BAY MOUNTAIN
SMITHERS
TELKWA
BABINE LAKE
BABINE PROVINCIAL FOREST
BURNS LAKE PROVINCIAL FOREST
MORICE PROVINCIAL FOREST
BURNS LAKE PROVINCIAL FOREST
OOTSA PROVINCIAL FOREST
KITIMAT RANGES (COAST MOUNTAINS)
MORICE
BURNS LAKE
Houston
Telkwa
Smithers
Driftwood Creek
Morice Lake Park
Decker Lake Park
Driftwood Park
Babine IR 25
Topley Landing
Tachek
Port Arthur
Newman Ferry
Newman Peninsula
Babine IR 26
Snowshoe
Granisle
Double I
Fulton Lake
Houston District Mun
Houston
Burns Lake
Burns Lake Prov. Forest
Francois Lake
Coast Land Dist. Range 5
McDonalds Landing
Fire Lookout
Tatuk Mountain
Mount Gingin
Mount Hyland
Mount McKendrick
Donne Mountain
Mount Mcrea
Mount Morice
Nadina Mountain
Owen Hill
Tsaeil Mountain
Nanika Mountain
Pimpernel Mountain
Poplar Mountain
Lamprey Mountain
Howson Peak
Herd Dome
Pillar Peak
Hope Peak
Corona Peak
Mount Loring
Mathahtzel Mountain
Tachek Mountain
Maxim Lake IR 11
Maxim Creek IR 11A
Maxim Lake IR 12A
Dustachich Lake IR 12
Tsaeil Lake IR 24
Tsaeil Lake IR 24A
Tsaeil Lake IR 24B
Tsaeil Lake IR 24C
Tsaeil Lake IR 24D
Tsaeil Lake IR 24E
Tsaeil Lake IR 24F
Tsaeil Lake IR 24G
Tsaeil Lake IR 24H
Tsaeil Lake IR 24I
Tsaeil Lake IR 24J
Tsaeil Lake IR 24K
Tsaeil Lake IR 24L
Tsaeil Lake IR 24M
Tsaeil Lake IR 24N
Tsaeil Lake IR 24O
Tsaeil Lake IR 24P
Tsaeil Lake IR 24Q
Tsaeil Lake IR 24R
Tsaeil Lake IR 24S
Tsaeil Lake IR 24T
Tsaeil Lake IR 24U
Tsaeil Lake IR 24V
Tsaeil Lake IR 24W
Tsaeil Lake IR 24X
Tsaeil Lake IR 24Y
Tsaeil Lake IR 24Z
Tsaeil Lake IR 25
Tsaeil Lake IR 26
Tsaeil Lake IR 27
Tsaeil Lake IR 28
Tsaeil Lake IR 29
Tsaeil Lake IR 30
Tsaeil Lake IR 31
Tsaeil Lake IR 32
Tsaeil Lake IR 33
Tsaeil Lake IR 34
Tsaeil Lake IR





MAP KEY

Roads:

hard surface, all weather	dual highway	more than 2 lanes
hard surface, all weather	2 lanes	less than 2 lanes
loose or stabilized surface, all weather	2 lanes or more	less than 2 lanes
loose surface, dry weather		
cart track		
trail or portage		

Bowser Lake Group
10 Coal
Skeena Group
12 Coal
1984 Traverse
1985 Traverse

796

Scale 1:250,000

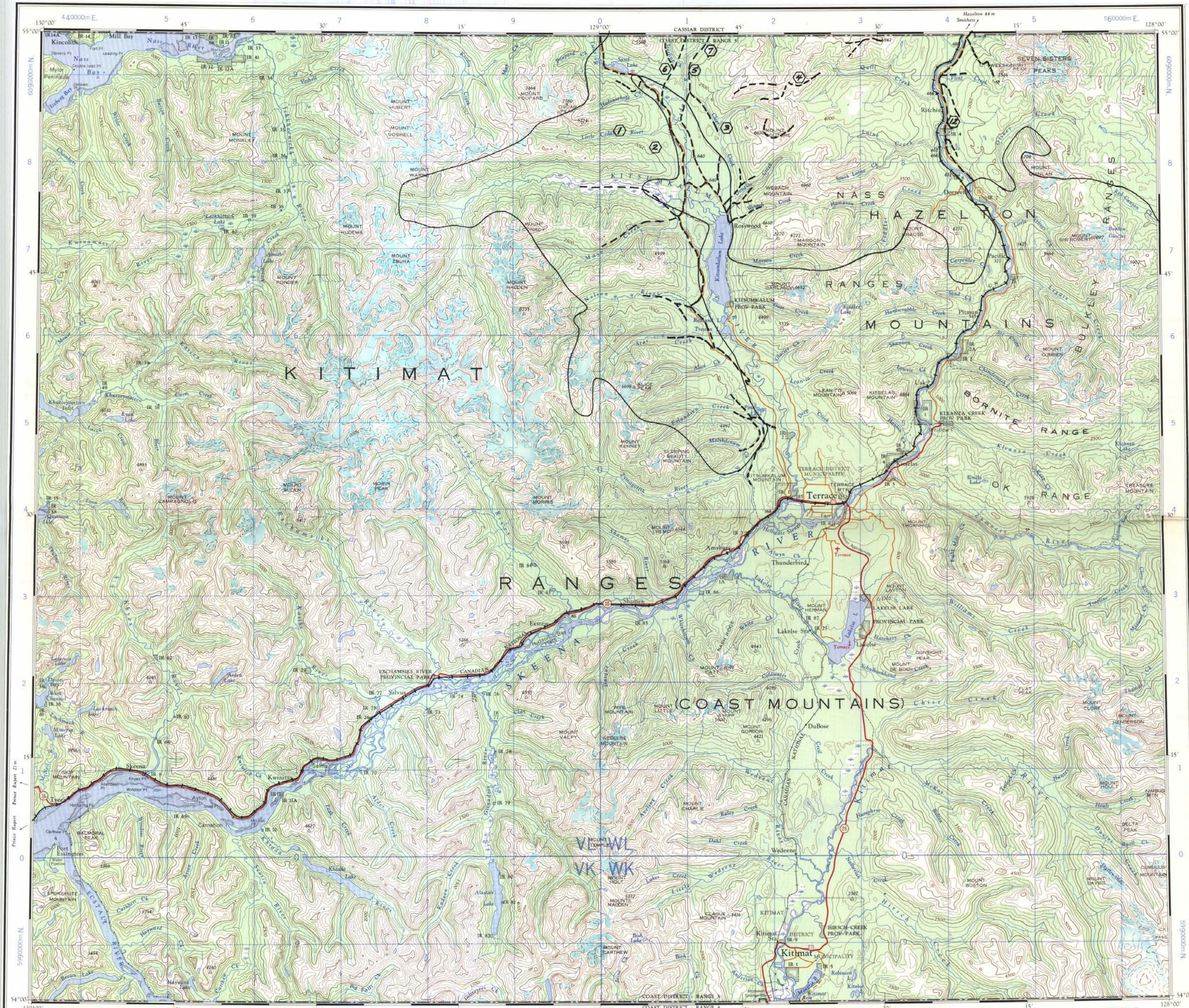
Miles 5 0

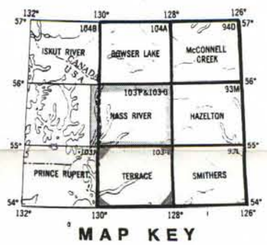
Kilometres 5 0

ESSO RESOURCES CANADA
OIL SANDS-COAL DIVISION

SOUTH BOWSER AND SWEENY B.C.
FACIES AND TRAVERSE MAP
1984-1985

To Accompany A Report By





MAP KEY

Roads:

hard surface, all weather	dual highway	more than 2 lanes
hard surface, all weather	2 lanes	less than 2 lanes
loose or stabilized surface, all weather	2 lanes or more	less than 2 lanes
loose surface, dry weather		
cart track		
trail or portage		

Bowser Lake Group
10 Coal
Skeena Group
12 Coal
1984 Traverse
1985 Traverse

796

Scale 1:250,000

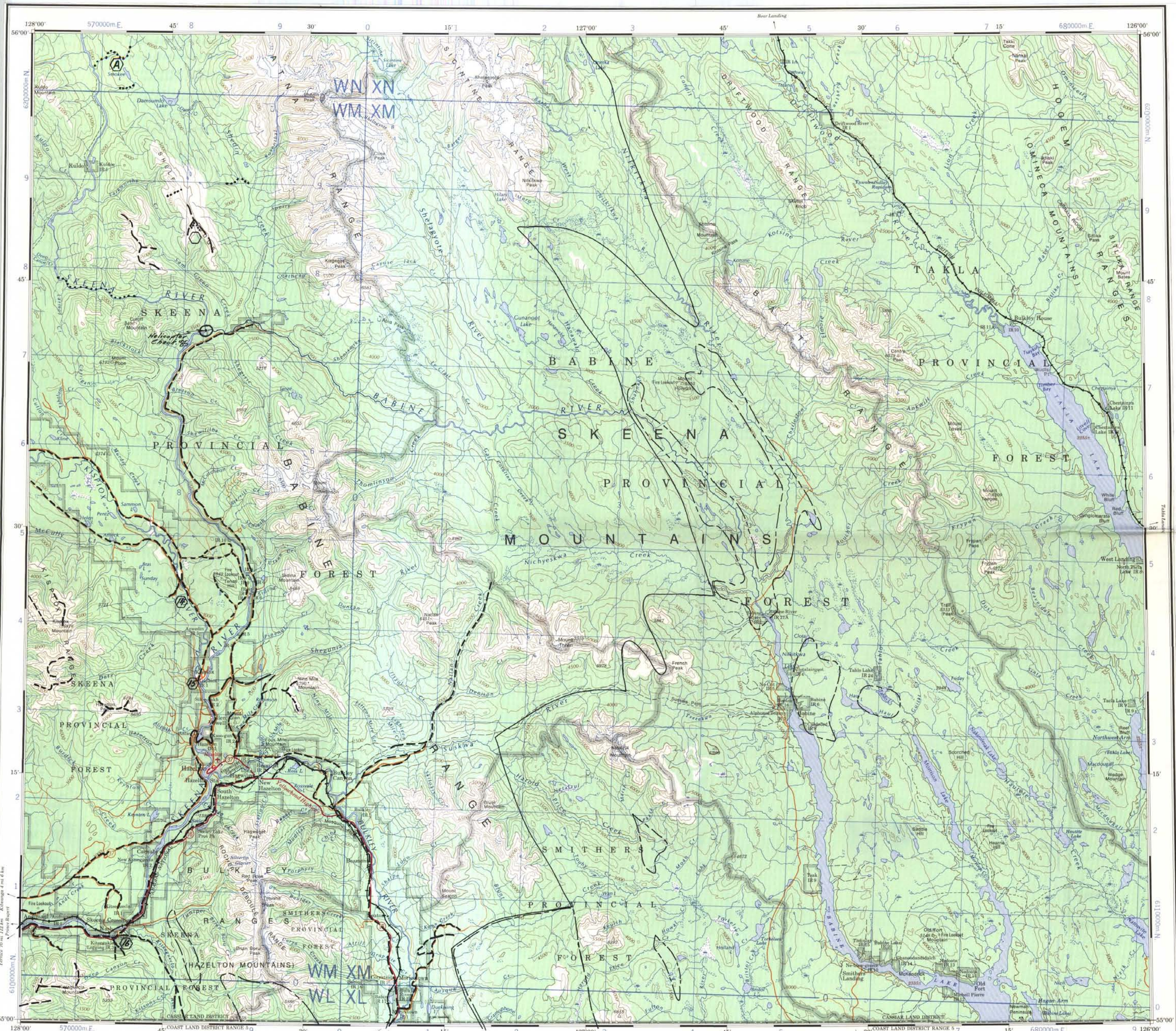
Miles 5 0

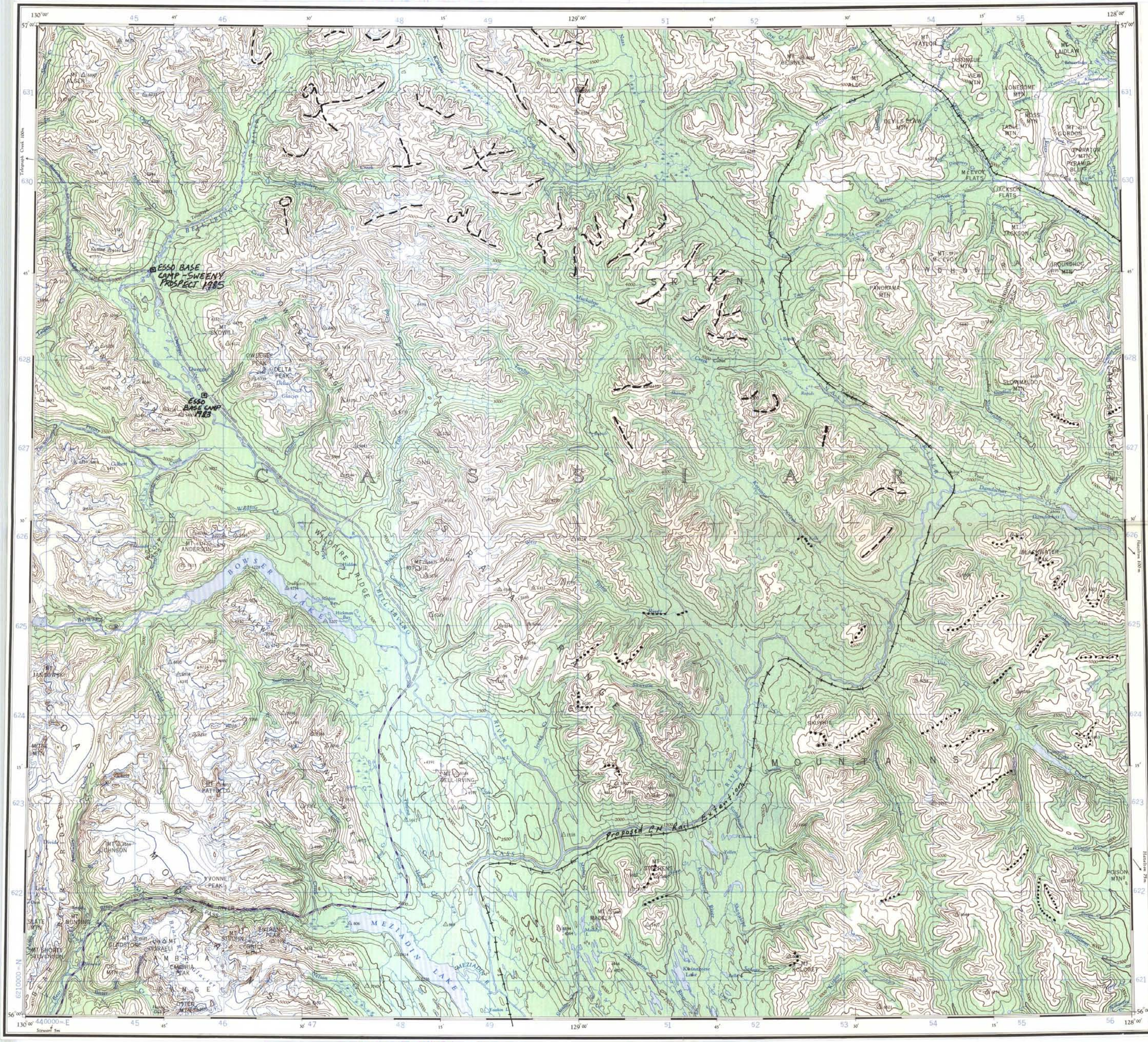
Kilometres 5 0

ESSO RESOURCES CANADA
OIL SANDS-COAL DIVISION

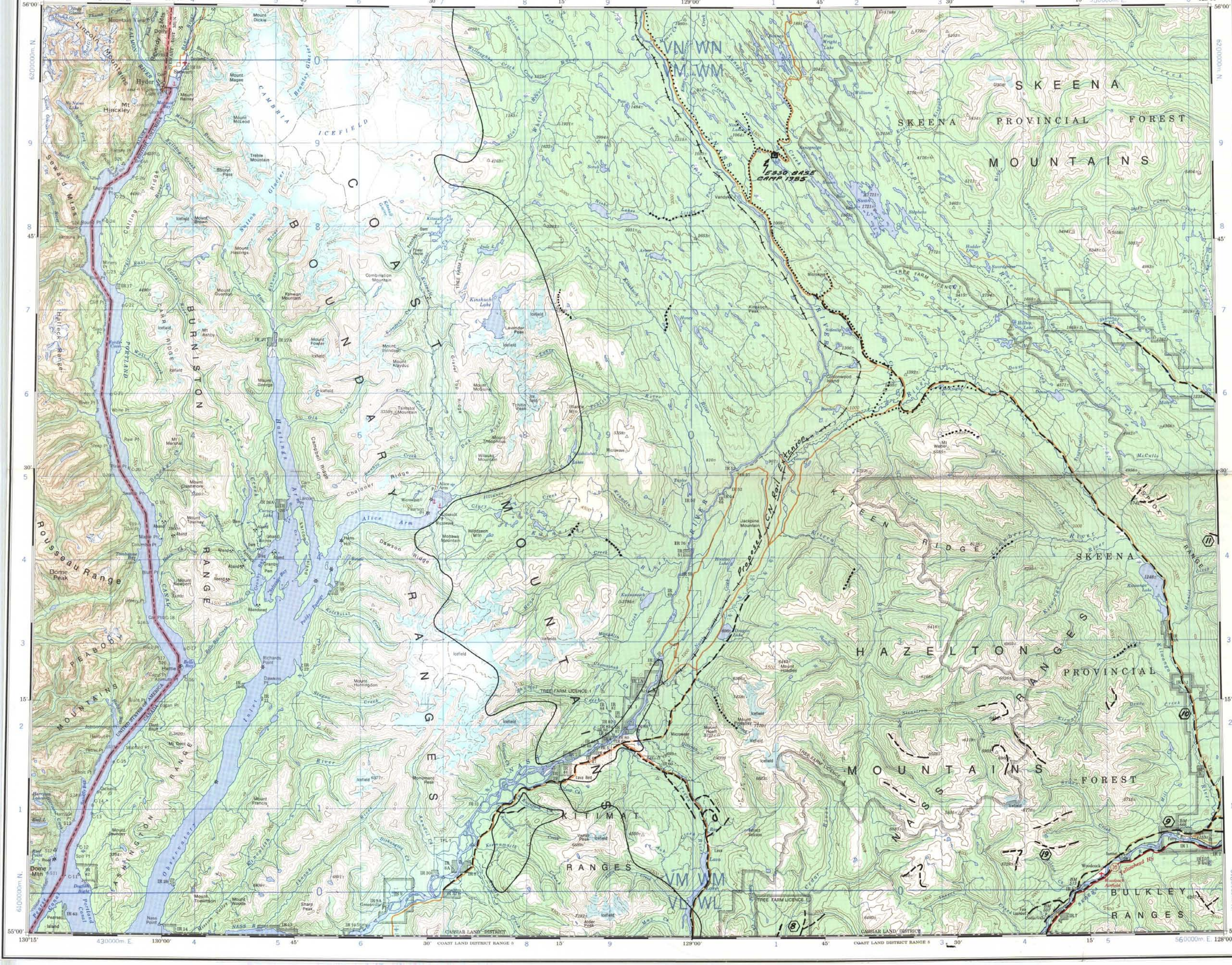
SOUTH BOWSER AND SWEENY B.C.
FACIES AND TRAVERSE MAP
1984-1985

To Accompany A Report By

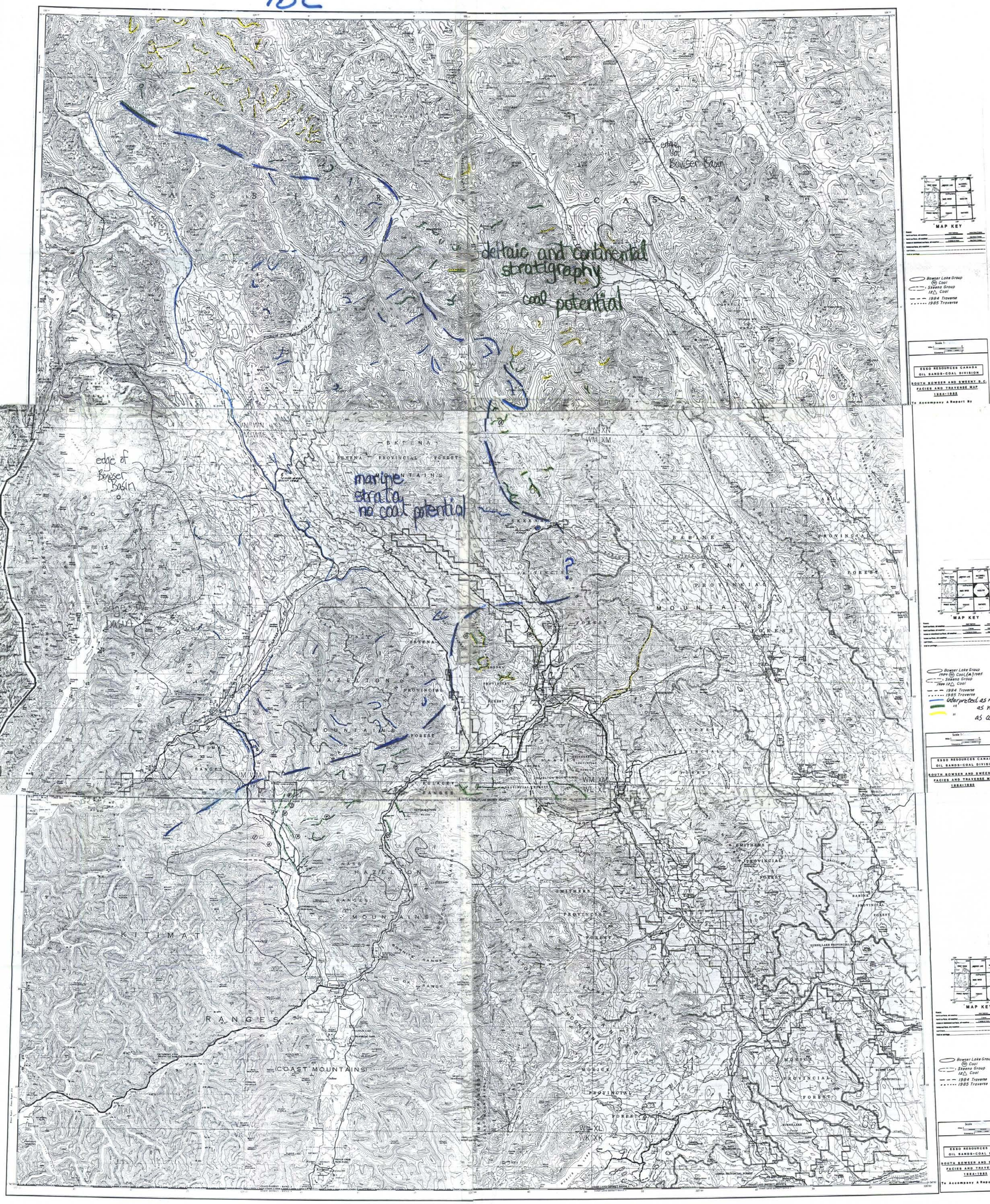

128°00'
570000m.E.
45'
30'
15'
127°00'
45'
30'
15'
680000m.E.
126°00'
56°00'
55°00'
620000m.N.
610000m.N.
WN XN
WM XM
WM XM
WL XL
SKEENA RIVER
BABINE RIVER
BULKLEY RIVER
SKEENA MOUNTAINS
HAZELTON MOUNTAINS
BABINE MOUNTAINS
SWANNELL RANGE
SHELF RANGE
SICINTINE RANGE
DRIFTWOOD RANGE
HOGEM RANGE
SILTKA RANGES
SUSKWA RANGE
SMITHERS RANGES
SKEENA PROVINCIAL FOREST
BABINE PROVINCIAL FOREST
TAKLA FOREST
SMITHERS FOREST
HAZELTON MOUNTAINS PROVINCIAL FOREST
TAKLA
Bear Landing
Smokee
Kuldo Mountain
Damsumlo Lake
Kuldo
Kuldo IR 1
Sicintine Lake
Shelagyote Peak
Cline Peak
Nitchiwe Peak
Hilani Lake
Kitgegas Peak
Alna Pass
Gunanoot Lake
Mount Pope
Cullon Peak
Helicopter Chart 96
Tanze
Mount Thomlinson
Sammon Lake
Helen Lake
Pentz
Bras
Sunday
Kispiox Mountain
Argenda IR 3
Kispiox IR 1
Kispiox IR 2
Nine Mile Mountain
Hagwilget IR 1
Hagwilget IR 2
Hazelton
Hazelton IR 1
Kuldo-gunaa IR 24
Four Mile Mountain
Fire Lookout
New Hazelton
South Hazelton
Rocher Deboule Mountain
Hagwilget Peak
Skeena Lake Prov Pk
Carnaby
New Kitwanga IR 2
Silverthorne Glacier
Red Rose Peak
Titbishai Peak
Kitsegukla IR 1
Kitseguecla IR 2
Skeena Crossing IR 3
Kitseguecla Lodging IR 3
Brian Boru Peak
Kispiox Glacier
Kispiox Mountain
Kispiox Range
Kitsumkalum Mountain
Kitsumkalum IR 1
Kitsumkalum IR 2
Kitsumkalum IR 3
Kitsumkalum IR 4
Kitsumkalum IR 5
Kitsumkalum IR 6
Kitsumkalum IR 7
Kitsumkalum IR 8
Kitsumkalum IR 9
Kitsumkalum IR 10
Kitsumkalum IR 11
Kitsumkalum IR 12
Kitsumkalum IR 13
Kitsumkalum IR

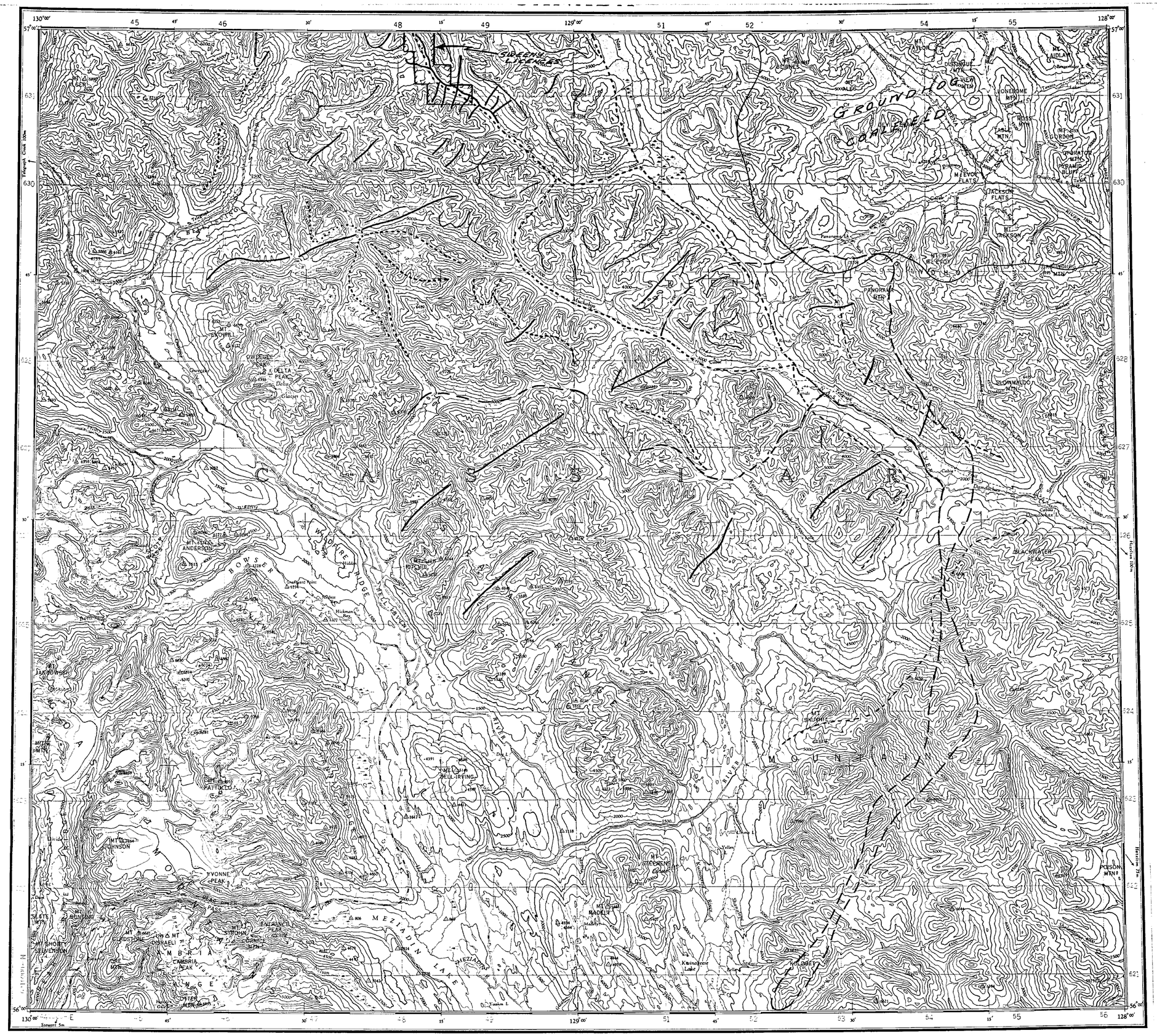

ESSO BASE CAMP - SWEENY PROSPECT 1985
ESSO BASE CAMP 1983
Proposed CN Rail Extension
MT. ALGER
MT. SKOWIL
OWEEGEE PEAK
DELTA PEAK
MT. ANDERSON
MT. JANOWSKI
MT. PATTULLO
MT. JOHNSON
YVONNE PEAK
MT. BELL-IRVING
MT. STEPHENS
MT. MADELY
MT. KOLORET
MT. BEINNES
MT. TAYLOR
DISTINGUE MTN.
VIEW MTN.
MT. LAIDLAW
LONESOME MTN.
DEVILS CLAW MTN.
ROSS MTN.
TABLE MTN.
MT. GORDON
OPERATOR MTN.
PYRAMID BLUFF
MEEVOK FLATS
JACKSON FLATS
MT. JACKSON
MT. MEEVOK
GROUNDHOG MTN.
GROUNDHOG RANGE
PANORAMA MTN.
SLOWMAUDO MTN.
SKULKWHITE
POISON MTN.
BLACKWATER PEAK
OWEEGEE RANGE
BOWSER LAKE
MEZIADIN LAKE
MEZIADIN RANGE
CAMBRIA RANGE
CAMBRIA PEAK
MT. SLADSTONE
MT. D'ISRAELI
MT. SHORTY SILVERSMITH
SLATE MTN.
MT. BUNNING
ORE MTN.
OTTER MTN.
MITRE MTN.
MT. JOHNSON
SKEENA MOUNTAINS
BOWSER LAKE GROUP
SKEENA GROUP
Bowser River
Skeena River
Meziadin River
Kinaskan Lake
Kinaskan Creek
Bell-Irving River
Groundhog Creek
Meeyok Creek
Jackson Creek
Panorama Creek
Slowmaudo Creek
Table Creek
Ross Creek
Gordon Creek
Operator Creek
Pyramid Creek
Distingue Creek
Laidlaw Creek
Beinnes Creek
Taylor Creek
Devils Claw Creek
Lonesome Creek
Bowser Lake
Meziadin Lake
Kinaskan Lake
Kinaskan Creek
Bell-Irving River
Skeena River
Meziadin River
Bowser River
Groundhog Range
Oweegee Range
Cambria Range
Skeena Mountains
Groundhog Pass
Meziadin Pass
Bowser Lake Group
Skeena Group
Coal
1984 Traverse
1985 Traverse
Scale 1:250,000
Miles 5
Kilometres 5
ESSO RESOURCES CANADA
OIL SANDS-COAL DIVISION
SOUTH BOWSER AND SWEENY B.C.
FACIES AND TRAVERSE MAP
1984-1985
To Accompany A Report By
796

MAP KEY
ISKUT RIVER
BOWSER LAKE
McCONNELL CREEK
NASS RIVER
HAZELTON
PRINCE RUPERT
TERRACE
SMITHERS
Roads:
hard surface, all weather
dual highway
more than 2 lanes
2 lanes
less than 2 lanes
hard surface, all weather
loose or stabilized surface, all weather
2 lanes or more
loose surface, dry weather
cart track
trail or portage

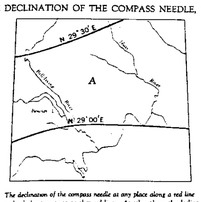

E330 BASE CAMP 1985
SKEENA
PROVINCIAL FOREST
SKEENA MOUNTAINS
COAST MOUNTAINS
BOUNDARY RANGES
HAZELTON MOUNTAINS
KITIMAT RANGES
BULKLEY RANGES
SKEENA RANGES
SKEENA
Proposed CN Rail Extension
TREE FARM LICENCE 1
ICEFIELD
Mount Hazelton
Mount Klappan
Mount Newton
Mount Tournay
Mount Francis
Mount Hoadley
Mount Hoehn
Mount Mulligan
Mount Thesophilus
Mount Wrottesley
Mount Dickie
Mount Magee
Mount Rainey
Mount McLeod
Mount Brown
Mount Hastings
Mount Fowler
Mount Evindsen
Mount Kayduc
Mount George
Mount McGuire
Mount Woods
Mount Townsend
Mount Huntingdon
Mount Francis
Mount Jauncey
Mount Clarmorre
Mount Marshall
Mount Weber
Mount Friendly
Mount Mulligan
Mt Hinckley
Mt Ashby
Mt Dent
Mt Dent Blair
Mt Marshall
Mt Weber
Dome Peak
Dome Mtn
Rousseau Range
Peabody Range
Seward Mtns
Halleck Ridge
Portland Canal
Observatory Inlet
Alice Arm
Dawson Ridge
Chaloner Ridge
Campbell Ridge
Fifteen Ridge
Kinskuch Lake
Kitsault Lake
Kitsault River
Nass River
Skeena River
Bowser Lake
Meziadin Lake
Scrub Lake
Vandyke Lakes
Swan Lake
Holder Lake
Fred Wright Lake
Williams Lake
Stephens Lake
Cottonwood Island
Kinskuch Peak
Lavender Peak
Mount Ashby
Mount Hastings
Mount Guenton
Kahwan Mountain
Combination Mountain
Mount Brown
Mount Magee
Mount McLeod
Treble Mountain
Mount Dickie
Mount Rainey
Mount Tournay
Mount Newton
Mount Francis
Mount Jauncey
Mount Clarmorre
Mount Marshall
Mount Weber
Mount Friendly
Mount Hoehn
Mount Hoadley
Mount Mulligan
Mount Thesophilus
Mount Wrottesley
Mount Dickie
Mount Magee
Mount Rainey
Mount McLeod
Mount Brown
Mount Hastings
Mount Fowler
Mount Evindsen
Mount Kayduc
Mount George
Mount McGuire
Mount Woods
Mount Townsend
Mount Huntingdon
Mount Francis
Mount Jauncey
Mount Clarmorre
Mount Marshall
Mount Weber
Mount Friendly
Mount Hoehn
Mount Hoadley

96t


edge of Bowser Basin
deltaic and continental stratigraphy
coal potential
edge of Bowser Basin
marine strata
no coal potential
?
edge of basin
SKEENA
MOUNTAINS
PROVINCIAL FOREST
HAZELTON
MOUNTAINS
BULKLEY RANGES
KITIMAT RANGES
COAST MOUNTAINS
BABINE MOUNTAINS
SMITHERS PROVINCIAL FOREST
MORICE PROVINCIAL FOREST
BURNS LAKE PROVINCIAL FOREST
Terrace
Kitimat
Houston
Smithers
Burns Lake
MAP KEY
Bowser Lake Group
(W) Coal
Skeena Group
12△ Coal
1984 Traverse
1985 Traverse
interpreted as marine
" as nearshore/trans.
" as continental
Scale 1:
ESSO RESOURCES CANADA
OIL SANDS-COAL DIVISION
SOUTH BOWSER AND SWEENY B.C.
FACIES AND TRAVERSE MAP
1984-1985
To Accompany A Report By



THE DECLINATION OF THE COMPASS NEEDLE, 1954



The declination of the compass needle at any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighbouring red lines; thus at the place marked A, the declination is between N 29°E. and N. 30°30'E. The easterly declinations of the compass needle are decreasing 4 minutes annually.

Surveyed and compiled by the TOPOGRAPHICAL SURVEY, DEPARTMENT OF MINES AND TECHNICAL SURVEYS *and the* SURVEYS AND MAPPING BRANCH, DEPARTMENT OF LANDS AND FORESTS, BRITISH COLUMBIA. *Produced by the* ARMY SURVEY ESTABLISHMENT R.C.E., 1950-54.

December 1964 - Additional detail shown by purple overprint may not be positioned as accurately as the original detail.

REFERENCE

	More than 2 Lanes: Road No.	2 Lanes
Road, Hard Surface, All Weather		
" Loose Surface, All Weather		2 Lanes, Wide or More
" " " Less than 2 Lanes	All Weather	Dry Weather
Cart Track, Trail	Cart Track	Trail
Railway, Multiple Track		
" Single Track		
Boundary, International		
" Province or State		
" County or District		
" Reservations, Indian, Military, etc.		

BOWSER LAKE

BRITISH COLUMBIA

Scale 1 : 250,000

1 Inch to 4 Miles Approximately

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilometres

Copies may be obtained from The Map Distribution Office, Dept. of Mines and Technical Surveys, Ottawa.

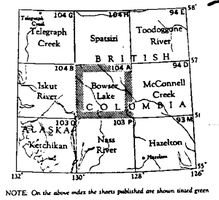
Contour interval 500 Feet

All Elevations in Feet above Mean Sea Level.

North American Datum 1927

REFERENCE

Horizontal Control Point	Spot Elevation, in feet 1234
Contours, Elevation 5500	Forest, undifferentiated
" Depression 4500 5000	Swamp or Marsh
" Approximate	
Glacier or Snowfield	
Stream, Intermittent	W. L. 125
Ferry	Mud
Dam	Lighthouse Sand
Falls	
Airfield ; on Land ; Water ; Landing Ground ; Anchorage	
Power Transmission Line	



NOTE. On the above index the sheets published are shown tinted green

ESSO RESOURCES CANADA
OIL SANDS-COAL DIVISION

NORTH BOWSER AND SWEENY B.C.
TRAVERSE MAP
1984-1985

Traverses
1984
1985
HELICOPTER TRAVERSE
1984 1985
To Accompany A Report By

Scale 1:250,000
NTS 104A

MAP KEY

BOWSER LAKE
SHEET 104 A
(Dec 1964) FIRST EDITION

796

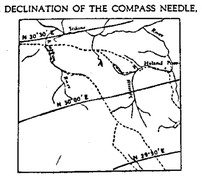
Military users, refer to this map as: Référence de la carte pour usage militaire:	SERIES A 502 SERIE MAP 104 H CARTE EDITION 2 MCE EDITION

GRID ZONE DESIGNATION 9V 100 000 m SQUARE IDENTIFICATION	TO GIVE A STANDARD REFERENCE FOR THIS SHEET TO NEAREST 1000 METRES SAMPLE POINT HORIZONTAL CONTROL POINT

ESSO RESOURCES CANADA
OIL SANDS-COAL DIVISION

NORTH BOWSER AND SWEENY B.C.
TRAVERSE MAP
1984-1985

THE DECLINATION OF THE COMPASS NEEDLE, 1954



The declination of the compass needle at any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighbouring red lines; thus at the place marked A, the declination is between N. 30°00' E. and N.30°30' E. The westerly declinations of the compass needle are decreasing 4.5 minutes annually.

Surveyed, compiled, drawn and printed by the ARMY SURVEY ESTABLISHMENT R.C.E., 1940-54
Aerial photography by the R.C.A.F. 1940-50

Universal Transverse Mercator Projection.

Interim Corrections 1974

REFERENCE

Road, Hard Surface, All Weather	More than 2 Lanes (4) Four No. 2 Lanes
" Loose Surface, All Weather	2 Lanes wide or more
" " " Less than 2 Lanes	All Weather / Dry Weather
Cart Track, Trail	Cart Track / Trail
Railway, Multiple Track	
" Single Track	
Boundary, International	
" Province or State	
" County or District	
" Reservations, Indian, Military, etc.	

ROADS - *ROUTES*
hard surface - *pavée*
loose surface - *de gravier*
cart track - *de terre*
trail - *sentier*
Deletions - *Suppressions* x x x x x

SPATSIZI
BRITISH COLUMBIA

Scale 1 : 250,000
1 Inch to 4 Miles Approximately

Miles 5 0 5 10 15 20 Miles
Kilometres 5 0 5 10 15 20 25 30 Kilometres

Copies may be obtained from
The Map Distribution Office,
Dept. of Mines and Technical Surveys,
Ottawa.

Contour interval 500 Feet.
All Elevations in Feet above Mean Sea Level.

North American Datum 1927

REFERENCE

Horizontal Control Point	Spot Elevation, in feet 124
Contours, Elevation	Forest, unclassified
" Depression	Swamp or Marsh
" Approximate	
Glacier or Snowfield	W. L. 125
Stream, Intermittent	Ferry
Dam	Mud
Falls	Sand
Airfield, on Land	Lighthouse
Power Transmission Line	Water, Landing Ground, Anchorage

Traverses
1984
1985
HELICOPTER TRAVERSE
1984 1985
To Accompany A Report By
MAP KEY

Scale 1:250,000
NTS 104H

796

Appendix I

Province of British Columbia

Ministry of Lands, Parks and Housing

Land and Housing
Regional Operations Division
Bag 5000
Smithers
British Columbia
V0J 2N0
Telephone: (604) 847-7334

Att'n: B. Macey
Our file: 6402296

85.06.20

Esso Resources Canada Limited
237 Fourth Avenue Southwest
Calgary, Alberta
T2P OH6

Attention: L.E. Klatzel Mudry

Dear Sirs:

Enclosed herewith is License Number 632354 covering all that parcel or tract of land situated in Cassiar District issued in the name of ESSO RESOURCES CANADA LIMITED dated June 12, 1985 containing 1.000 hectares and issued for a period of one month, for temporary campsite purposes, at the rental of $100.00, duly executed on behalf of the Regional Director.

Yours truly,

B. Macey (Mrs)

for J. McGregor
for Regional Director

/pmc
Enclosure

cc: Senior Land Officer, Skeena
B.C. Assessment Authority, (Northwest)
Exec. Director, Surveys & Lands Branch, Victoria
Surveyor of Taxes, Victoria
Regional District of Kitimat-Stikine
(Ref. Map 104A/12-f)

FOR INFORMATION PURPOSES ONLY
ORIGINAL DOCUMENT PICKED UP AT OFFICE HERE!
M.34

Province of British Columbia

Ministry of Lands, Parks and Housing

Lands and Housing
Regional Operations Division
Bag 5000
Smithers
British Columbia
V0J 2N0
Telephone: (604) 847-7334

Attn: D. Rose
Our file: 6402297

85.09.16

Esso Resources Canada Limited
#237 - 4th Avenue South West
Calgary, Alberta
T2P OH6

Attention: Louise E. Klatzel Mudry

Dear Madam:

Reference is made to your application of May 24, 1985 covering all that parcel or tract of land situated in the vicinity of Jigsaw Lake, Cassiar District, more particularly shown outlined in red on plan attached for campsite purposes.

Information received from our Field Services Section advises that the area has been left in a clean and sanitary condition to the satisfaction of the Ministry.

Consequently, your application has been recorded as abandoned and our records noted accordingly.

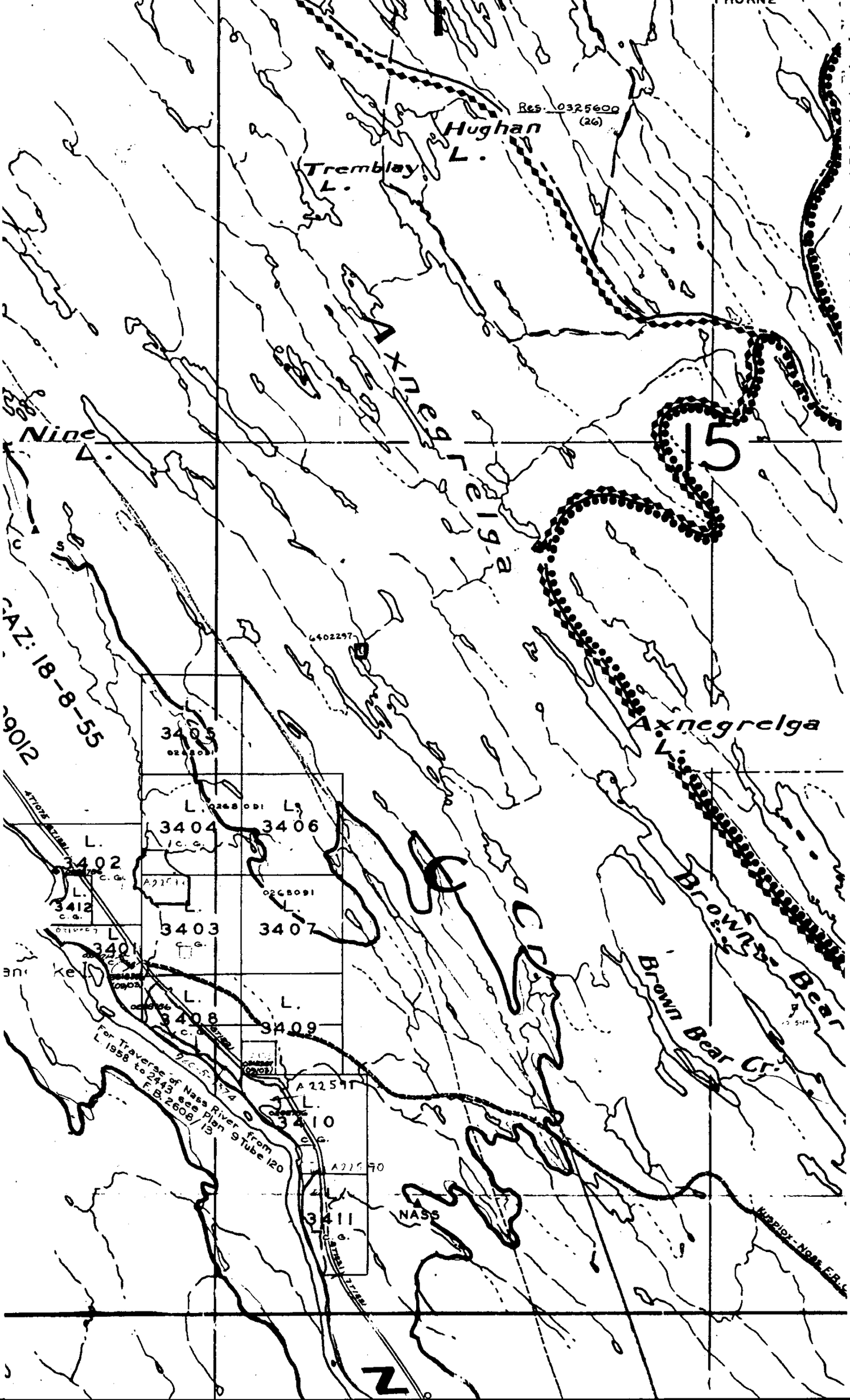
If you have any further enquiries regarding this matter, please do not hesitate to contact this office.

Yours truly,

W.M. Irwin
Manager, Land Administration

DR/pmc

cc: Senior Land Officer, Skeena
Surveys and Lands Branch, Victoria


Res. 0325600 (26)
Hughan L.
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L. 3407
L. 3401
L. 3408
L. 3409
L. 3410
L. 3411
A22541
A22590
NASS
For Traverse of Nass River from L 1958 to 2443 see Plan 9 Tube 120 F.B. 2608/13
AZ: 18-8-55
9012

MEMORANDUM

85 05 02
File: 2647

TO: L. Klatzel-Mudry

FROM: J. Allan

RE: Coal Sample DDH 84-13

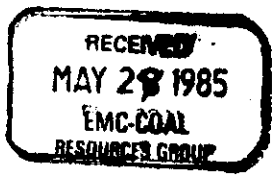
This coal is high volatile bituminous in rank. Vitrinite reflectance is 0.79% (mean random reflectance). The coal is vitrinite-rich and associated minerals are mostly clays, with minor quartz, pyrite and vein calcite. Proximate analysis gives the following:

	As Received	DAF
Moisture%	1.59	-
Ash %	13.75	-
Volatile Matter %	31.19	36.84

I do not have a CO_2 analysis yet, but I would estimate from microscopy that the CO_2 contribution by calcite to volatile matter will be < 1%. Thus, dmmf volatiles should be about 34-35%. The proximate analysis data are the means of values from three laboratories (Loring, Birtley and Esso). The data from the three labs meet A.S.T.M. reproducibility limits.

JA/mpa
cc: J. R. Rawling

MEMORANDUM



85 05 28
File. #2647

TO: Louise Klatzel-Mudry

FROM: J. Allan

RE: Coal Sample DDH 84 - 13

Further to my memorandum to you of 85 05 02, I have obtained a CO_2 analysis of sample DDH-13, and can now estimate a d.m.m.f. volatile matter content.

Results are:

	As Received	DAF	DMMF
% Moisture	1.59	-	-
% Ash	13.75	-	-
% Volatile Matter	31.19	36.84	35.15
% CO_2	0.80	-	-

The d.m.m.f. volatile matter shows that this coal is lower than medium-volatile bituminous in rank, but a calorific value determination is required to specify A.S.T.M. rank. The reflectance value (0.79%) indicates a borderline hvAb/hvBb coal

JA/fh

cc: J. R. Rawling

Appendix II

Traverse Summary

Date June 15/85

Traverse Name Road Work - Nine Lake Main Rd.

NTS Sheet 103 P/15 West Half

Line # BC 82019

Photo #'s 236 & 237

Scale 1:60,000 Photos

Traverse Description - checked outcrops from km 10 on Jigsaw Lake road to junction of Nine Lake Main Road & then all exposures on that road & its forks

Comments about traverse

Completed by: B. M. Wright & Tim Vant
outcrop #'s: BMW001 - BMW007

- marine sediments throughout length of traverse
- mainly dark greyish black mudstones and silty mudstones with occassional beds of bluish/green sandstone
- no internal sedimentary structures with the exception of rare sandy laminations and numerous rip-up mud clasts
- rare 1cm carbonaceous clay interbeds.
- orientations are extremely difficult due to lack of good bedding planes (ie well developed joints @ right angles to bedding & lack of internal features to determine bedding)
- beds strike at about 140-320° & dip 60-85°

Traverse Summary

Date June 16/85

Traverse Name Upper West Taylor River

NTS Sheet 104 A/7 Taylor River

Line # A12335

Photo #'s 181

Scale 1:60,000

Traverse Description - dropped off about 4km upstream of Taylor R. confluence & mapped downstream & downsection

Comments about traverse

Completed by : Brenda Wright & Tim Vant
outcrop #'s : BMW 008 - 012

- all day was spent mapping marine sediments: mudstone and sandstone interbeds
- mudstone was dark grey, non-calcareous with occassional light (sandy) laminations (slatey)
- sandstone is very fine grained, well indurated, quartzarenite)
- jointing is very well developed in all units, making it difficult to distinguish bedding
- went through some folding
- strike is ~ 140° — dips varied from 52° — 86°

Traverse Summary

Date JUNE 16 1985

Traverse Name LITTLE PAW CREEK

NTS Sheet 103 P/14 EAST HALF, 103 P/15 WEST HALF

Line # BC 82019

Photo #'s 260 - 262

Scale 1:60,000

Traverse Description following deeply incised creek east from Niska Lake to Nass River.

Comments about traverse /

Completed by: BOB TAHAKI & FRED KURZ
outcrop #'s: 1-8

Traverse 1 constituted walking down Little Paw Creek west of the Nass River. Observed mudstone section which continued downstream, striking (120°-140°) and dipping south west at (20°-46°). This section continued with no sedimentary features. The mudstone was characterized by sharp pointed thread like talus fragments. No internal sedimentary structure originally observed but further down the creek, minor cross beds and ripup clasts was seen. A minor anticline trending 164° with a plunge of 19° was observed. The strike has swung further eastward as you walk down the creek. Lithology has become coarser further downstream (mudstone → siltstone).
Conclusion: Very few sedimentary structure observed. Little Paw Creek appear to be part of a marine environment, continuation further down the creek in our next traverse.

Traverse Summary

Date June 16, 1985

Traverse Name Taylor River

NTS Sheet 104A-7

Line # A12335

Photo #'s 182

Scale 1:60,000

Traverse Description

Confluence of West Taylor River and Taylor River and mapped upstream (West Taylor River)

Comments about traverse

Completed by: Louise Klatzel Mudry & Susan Derby
outcrop #'s: 001, 002, 003 inclusive

Started traverse at confluence of West Taylor River & Taylor River & mapped upstream on West Taylor River. It is a deep canyon with very steep cliffs making access to the river next to impossible. We began mapping in marine phyllitic mudstone with interbedded sandstone laggers. The beds were mainly dipping NE varying from [illegible] we came upon a structurally disturbed area where beds were dipping almost vertically. Also sub-lithorenite was noted in two areas along the traverse.

Traverse Summary

(1)

Date June 17, 1985

Traverse Name Mount Weber

NTS Sheet Kispiox R. 103P/9 W.1/2, Cranberry R. 103P/10 E1/2.

Line # 82020

Photo #'s 79 & 80

Scale 1:60,000

Traverse Description

Across strike on geology along ridge of Mt. Weber.
traversing from small lake on ridge and proceeding west.

Comments about traverse

Completed by: J Stones & Joanna Sharpe
outcrop #'s: 018 - 027 inclusive.

Note: Parts of this area are mapped as far north as Sideslip lake on NTS 103P/10. The mapping was mainly done from the highway by R. Borg & N Foster in 1984

The traverse was good in that we had alot of continuous rock outcrop for the entire day. We saw black marine shales and fine grained medium grey to dark grey sandstones. In some outcrops the shale was thinly interbedded in sandstone but in most cases the outcrops were shales with interbedded sandstone units. The sandstone units had alot of quartz veining. The shales are generally strongly foliated

Good Bedding was hard to find in most outcrops.

Saw two wolverines from a distance,

Traverse Summary

Date : JUNE 17 1985

Traverse Name : Little Paw Creek

NTS Sheet : 103P/15 WEST

Line # BC 82019

Photo #'s 261-262

Scale 1:60,000

Traverse Description :- continuing to to walk down little Paw Creek.

Comment about traverse

Completed by BOB TAMAKI & FRED KURZ
outcrop # 005- 115

Walk down Little Paw Creek, saw a succession of mudstone, very fine grained sandstone, fine grain sandstone. The beds were striking ~355° dipping east at 45°. This continued to the middle of the traverse when the strike swung around to 140° dipping southwest at 12-15°. The mudstone were similar in description to those seen yesterday, very fine grained sandstone and fine grained sandstone. They were all medium dark grey. No noticeable internal sedimentary features. It appears to be part of continuing marine environment

Traverse Summary

Date June 16, 1985

Traverse Name Willoughby Creek

NTS Sheet 1:50,000 not available for traverse White River West Half missing

Line # 82019

Photo #'s 213 & 214

Scale 1:60,000

Traverse Description

Begin at foot of Cambria Glacier, or source of Willoughby Creek and traverse along North ridge away

Comments about traverse

Completed by: Joanna Thorne & John Stones
outcrop #'s: 001 & 002 inclusive

Snow on top of mountain prevented us from traversing from foot of glacier to top of ridge.
Started traverse at small creek on south side of river. Mapping (ironstone??? Imarine shale with fine grained sandstone stringers throughout & calcite & quartz veining and some limonite staining. Travelled about 1 mile in total. The slopes were too steep to get to the river. We encountered alot of very rough terrain including devils club. Spent most of day zig-zagging up and down slopes trying to get to river. The river was very high making access along banks difficult. Alot of snow on upper slopes.
The general outcrop trend is [illegible]

Traverse Summary

Date June 17/85

Traverse Name Highway 37 - between Jigsaw junction & Meziadin

NTS Sheet 103 P/15W & 103 P/14E

Line # 82019

Photo #'s 209, 259, 236

Scale 1:60,000

Traverse Description - finished jigsaw lake road & mapped in all outcrops north on Highway 37 to Meziadin jct.

Comments about traverse

Completed by : B. Wright & T. Vant
outcrop #'s : TRV 001 - TRV010

- silty mudstone & hard, sub-litharenite (hi quartz set)
- marine sediments
- tight folds with steep limbs.
- took one sample of what appears to be carbonaceous clay.

Traverse Summary

Date JUNE 18 1986

Traverse Name DEEP CANOE RIDGE

NTS Sheet KULDO CREEK 103 P/16, KISPIOX RIVER 103P/9 E½

Line # 82020

Photo #'s 026 & 027

Scale 1:60,000

Traverse Description RIDGE RUNNING SOUTHWEST, SOUTH OF DEEP CANOE CREEK

Comments about traverse

Completed by: BOB TAMAKI, FRED KURZ
outcrop #'s: 16-26

Walked southwest of Deep Canoe Ridge. It was striking NE-SW with a dip ranging from 15°-70°. The main lithologies consisted mainly of medium grain grey sandstone with occasional layers of thinly laminated slaty grey mudstone. We walked along the strike. No noticeable sedimentary features. Observed the same lithologies throughout the traverse. A possible recumbent fold seen on the side of the highest peak. It appears to be the continuation of the marine environment. Traversing north of Deep Canoe Ridge is recommended

Traverse Summary

Date June 18, 1985

Traverse Name SKEENA RIVER

NTS Sheet 93M/12

Line # 81051

Photo #'s 131 & 132

Scale 1:40000

Traverse Description Along North bank of river

Comments about traverse

Completed by: J. Stones & Joanna Sharpe
outcrop #'s: 028 – 040 inclusive

This is good outcrop exposure along the river section visited. We saw interbedded dark grey shales and medium grey to dark grey medium to fine grained sandstones.
The traverse direction was generally across the strike of the beds.
The shales are foliated and exhibit a strong cleavage whereas the sandstones are more massive and show jointing. Worm burrows are more common in the shales as we traversed further east.
At station JFS 040 we found fossil beds with pelecypod shells and algal mats.

Traverse Summary

Date June 18, 1985

Traverse Name Cornis Peak - ridges southwest of Saladamis Creek.

NTS Sheet Taylor River 104A/7 and Kluinageese River 104A/2

Line #

Photo #'s A12296-262

Scale

Traverse Description

along ridges trending northwest-southeast
excellent exposures except where snow covered.

Comments about traverse

completed by: Louise K.M. and Susan D.
outcrop #'s: LKM 004 - LKM 009

marine sequence along ridge tops
section at LKM 007 shows 3 distinct packages - a ~20m sandstone dominated sequence w/ beds ~~up~~ from 1->5m thick - rare calcareous mudstone presents - a steep cliff forming unit
an ± 20 m sandstone/siltstone sequence with equal ~~per~~portion recessive and resistant units - ~~rare~~ occasional calcareous mudstone
± 20 metre mudstone unit w/ abundant calcareous mudstones. mostly recessive
above this a 10 metre unit of typical marine sst - fine to v.f.g w/ silty lams caps the ridge top
this section was involved in a beautiful anticline/syncline pair - 2 cleavage planes - one very pervasive!

Traverse Summary

Date June 18/85

Traverse Name Wigley Ridge and Mountain Goat Ridge

NTS Sheet 104 H/7 & 104 A/6 East

Line # .

Photo #'s [redacted]

Scale 1:60,000

Traverse Description Spent morning on section near headwaters of Saladamis creek. Moved 2 ridges to the northeast to map sediments up-section from traverse.

Comments about traverse

Completed by: B. Wright & T. Vant.
outcrop #'s: BMW 013 – BMW 017

- 3 major units:
  1) dominant sandstone beds, varies between sub-litharenite & some feldspathic grains, f. fine grained to u. f. gr, moderately well indurated, minor siltstone interbeds
  2) dominant silty mudstone with thin sst & limy mudstone interbeds (~20 cm).
  3) interlaminated (.5 - 1 or 2 cm) sst and siltstone (dark / light)

- marine sediments
- walked up-section all day – encountered one thrust fault
- should work farther east (up-section) in order to try to find some continental seds.

Traverse Summary

Date June 19/85

Traverse Name: Shelf Ridge

NTS : 93M/13

Photo : BC81-051 No. 104

Traverse Description: Traverse to check section done in 1984 by R.B. - also flew to ridge further north. Then quick stop on Skeena - for one outcrop.

completed by L.A.M and Susan Derby.

Walked along ridge looking for evidence of continental sediments - found grey sst. and siltstones interbedded - some discontinuous Buchia horizons in sandstones - few (very few) carb plant frags in silts - very little mudst.

no evidence to state continental but is possibly near shore ie Buchia, silt & sandstone interbeds at base, bioturbations

very dark siltstones at top - not able to get to R.B outcrop of carb mudstone but viewed from helicopter - not a coal seam - hardly worth a mention nicely bedded to form a syncline at top of Shelf mountain - anticline to east of syncline and mapped on north ridge.

Phyllite on Skeena River - still marine w/ burrows & bio.

Traverse Summary

(2)

Date June 19 1985

Traverse Name Snake Lake Creek, east of Skeena River

NTS Sheet : 93M/13

Line # :

Photo #'s

Scale

Traverse Description : walking further west toward the Skeena River

Comments about traverse

Completed by : Bob Tamaki & Fred Kurz
outcrop #'s : 027-030

Walked a unknown creek east of the Skeena River trying to find any evidence of a continental environment. Down the slope from our landing spot, we found few small coal floats. Walking further west, more coal float was found. A coal seam ranging in thickness from (0.1 - 0.15m) was found halfway up the skee slope. A comprehensive stratigraphic section is found in book 1 B MW 1, station B TT 028 and coal sample was taken. The top and bottom of the coal seam consisted mainly of carbonaceous mudstone. A fine grained medium bedded, gray sandstone was located above and below the coal seam. The strike range from 118°-140° dipping southwest at 13°-40°.
Conclusion:- Coal was found, appears to be transitional environment.

Traverse Summary

Date Wednesday, June 19/85

Traverse Name Wet Creek

NTS Sheet Sheslin Creek 93M/13

Line # BC 81051

Photo #'s 057

Scale 1:60,000

Traverse Description - traversed downstream from low in Wet Creek towards Rosenthal Creek

Comments about traverse

Completed by: B. Wright & T. Vant
outcrop #'s: BMW 018-024

- transitional marine - continental beds
- dominantly sst with some sltst
- ssts are up to 12m thick, fine dark ripple laminations
- 1 m bed of "recrystallized lime mud"? - totally calcite (indicative of shallow marine with periods of subaerial exposure?)
- thrust fault half way down creek
- generally beds are near to flat lying
- good cliff sections in deeply incised canyons

Traverse Summary

Date June 20th Thursday

Traverse Name Ice Lake Ridge

NTS Sheet 104 A/7

Line # A12335

Photo #'s 20b

Scale 1: 60,000 ?

Traverse Description Worked upsection along ridge from southwest to northeast

Comments about traverse

Completed by: B. Wright & T. Vant
outcrop #'s: TRV 011 - TRV 013

- Marine sediments
- dominantly dark grey siltstone with minor v.f. → f. gr. sandstone interbeds
- some lime mud bands - extremely hard
- outcrops commonly have a banded appearance (black with thin yellow brown interbeds)
- this traverse should be the last one undertaken in this area
- recommend more to the northeast to find shallow marine & continental seds

Louise - Summary

Date: June [redacted]

Traverse: Name - Saccote Creek
Map Sheet - 104 A/2 Kwinageese
Air photo - not used.

Traversed by Louise KM and Susan Derby
Outcrop #'s LKM 16 - 19

Began traverse in creek - walked down stream [redacted] hr. very few outcrops - and those that were present were slumped lots of boulders in creek - decided to do section up ridge instead. Began climbing at 10:50 - described section in detail. Appears to be transitional marine lots of siltstone rip up clasts and fine interlams. large sst. and siltstone units in middle of ridge. upper half of ridge is all scree - very difficult walking (top 1600' all scree).
consistent dips of 20-40° strike 300 - 320 avg.
upsection to N.E. would recommend looking in this direction for continental sedo.
This section is quite similar to the one on Shelf Ridge with the intertidal? zone ie not monotinous marine shales nor is it distinctively continental, although there are ≈ 300 m of dominently siltst at top of ridge.

Traverse Summary

Date JUNE 20

Traverse Name : Canyon Lake Creek

NTS Sheet : 104A/8

Line # : A12262

Photo #'s 154 - 155

Scale

Traverse Description :- walking down the creek toward Vite Creek.

Comments about traverse

Completed by : Fred Kurz & Bob Tamaki
outcrop #'s : 051 - 036

Walked down creek northwest of Canyon Lake. The lithologies consisted mainly of fine grained sandstone, medium grain sandstone and few thin beds of mudstone. Some conglomerate floats were also found near the creek. We were generally walking down section all day. The sandstone were generally massive with few interbeds of mudstone. The strike range from 300° - 315° dipping northeast 10° - 36°. It appears we are moving away from marine environment

:- found one outcrop of volcanics with good hornblende crystals.

Traverse Summary

Date June 20, 1985

Traverse Name Traverse #6 Creek flowing east into Sallysout Ck.

NTS Sheet 104 A/1 Sallysout Creek.

Line # A 12275

Photo #'s 310

Scale 1:60,000

Traverse Description

Traversing east towards Sallysout Ck.

Comments about traverse

Completed by: J. Stones & Joanna Sharpe.
outcrop #'s: 041 - 043 inclusive.

Not many outcrops along creek. Very difficult terrain, lots of alders and ~~skree~~ covered slopes. The best outcrop seen was #041 where we found a section of metamorphosed shale, quart pebble congl. sandstone and a very siliceous pale green volcanic with either feldspar laths or glass shards. The sediments are foliated and show a phyllitic sheen. The foliation is in the same plane as bedding. Bedding 340/055 SW.

Traverse Summary

Date June 21 1985

Traverse Name Blackwater Peak

NTS Sheet 104 A/8

Line #

Photo #'s

Scale

Traverse Description : walk one of the main subridges ~~southward~~ towards the main ridge

Comments about traverse

Completed by : Fred Kurz and Bob Tanaka
outcrop #'s : 037 - 046

The traverse started by walking one of the subridge southward towards the main ridge south of Damocles Lake. We were initially getting repeating section of mudstone and fine grained sandstone. Two small beds of pebble conglomerate were found in a section containing repeating sequence of mudstone and fine grained sandstone. Upon reaching a peak east of Blackwater peak, we started walking northwest following the main ridge. We went through a anticline, syncline sequence. The lithologies were quite similar to those found earlier in the day. Traces of fossil (plants) were found in the morning walking toward the main ridge. It appears we are getting very close to a nearshore environment or in a continental environment. Tomorrow we should try a ridge east of Blackwater

Traverse Summary

Date June 21, 1985

Traverse Name Blackwater Peak

NTS Sheet 104 A/8

Line #

Photo #'s

Scale 1:60,000

Traverse Description Traversing east

Comments about traverse

Completed by: J. Storms & Joanna Sharpe
outcrop #'s: 044 – 051

Good traverse across strike of sediments. Fairly good outcrop exposure entire day. Noted coarsening upward sequence of mudstone, siltstone and sandstone. Bedding approximately 122/036° NE some slight variations.

Carb. plant casts were seen in the siltstone

A NE tops was obtained in outcrop JFS-043 where shale and sandstone are interbedded.

We are close to shoreline.

Traverse Summary

Date June 21, 1985

Traverse Name: Kotsinta Creek

NTS Sheet: 104 A/7 Taylor River

Photos: 12280 435 & 436 scale 1:60,000

Traverse Description:

Traversing east along Kotsinta Creek through braided river area, canyon with water falls and further down stream ~ 3 km.

Comments:

Louise K.M. and Susan Derby

Marine sediments - fine grained sandstone - blocky beds then interbedded sandstone/siltstone and then siltstone - no plant fragments seen - the interbedded sand/silt section was the most common unit seen. often shearing & slicks seen in siltstone unit. Small anticline seen at helicopter drop off location and seen obliquely along strike beds gently dip 20-40° northwest. most of the way down creek small minor structures; shear plane seen.

steep canyon walls difficult to navigate around.

small out crop along creek outside of canyon.

Traverse Summary

Date Friday, June 21/85

Traverse Name Skuyhil Ridge

NTS Sheet 104 A/7

Line # A12262

Photo #'s 45

Scale 1:60,000

Traverse Description Traverse along southwest portion of Skuyhil Ridge

Comments about traverse

Completed by: B. Wright & T. Vant
outcrop #'s: BMW 025 - BMW 028

- first half of day was spent doing a detailed section of marine ⇒ transitional sediments
- within the section was a series of sills consisting of possible basalts & mafics.
- moving up-section through some structure (probably an antiform - dips ~ 80°)
- afternoon spent in shaley mudstones with hard, lensing lime mud bands
- last outcrop was an u. f. gr. ⇒ l. med. gr. sst with cross-bedding & carb. plt frags
- near-shore seds - recommend more up-section again!

Traverse Summary

Date June 22, 1985

Traverse Name Cranberry River

NTS Sheet 103P 10E

Line # BCB2020

Photo #'s 039

Scale 1:60,000

Traverse Description

Traverse along Cranberry River off Highway 37.

Comments about traverse

Completed by: Joanna Sharpe & Susan Derby
outcrop #'s: LKM024 - 027

- Marine sediments consisting of fine and medium grained sandstones and mudstones. Mudstone fragments were noted in the sandstone units as well as abundant calcite veining. Generally, the sandstone & mudstone units would alternate as we cont'd along the river. Many of the units were too sheared to obtain bedding plane but the strikes & dips ranged from 201/86 to 152/86.

Traverse Summary

(1)

Date June 22/85

Traverse Name Microwave Tower Traverse

NTS Sheet 103P 10/EAST Cranberry River.

Line # BC 82020

Photo #'s 020

Scale 1:50000

Traverse Description Traversed along highway 37 south towards the Microwave Tower road and continued traverse along it.

Comments about traverse

Completed by: F. KURZ & T. VART

outcrop #'s: TRV 018 – 024

Rock exposed was collected along roadcuts and consisted of sandstone & dirty mudstone. Dip along Microwave Road was relatively consistent, but changed 180° dip direction along highway 37. The most notable rocks consists of dark gray fissile mudstone which appeared to have carbonaceous fragments shiny black in color.

Traverse Summary

Date June 23, 1985

Traverse Name Snowy Creek

NTS Sheet 104A/2

Line # A12275

Photo #'s 320, 321

Scale 1:60 000

Traverse Description Walking east towards Kiwanagese River, along unnamed creek south of Mt Stephens

Comments about traverse

Completed by : Fred Kurz and Susan Derby
outcrop #'s : SJD 001 to SJD 004

The traverse was along an unnamed creek (called here Snowy creek). The South side of the creek was extensively covered by snow, which covered many outcrops. We traversed on the north side of the creek, starting near its beginning, but outcrops on this side were rare. They were all of marine origin, however, consisting of beds of fine grained sandstone and mudstone. A change in dip (with the strike remaining the same) in direction from NE to SW along one part of the traverse indicates the presence of a small syncline.

Traverse Summary

Date JUNE 23 / 85

Traverse Name MOUNT STEPHENS

NTS Sheet 104 A/2 Kwinageese River

Line # ———

Photo #'s ———

Scale 1:50000

Traverse Description Traverse along east slope and peak of Mount Stephens

Comments about traverse

Completed by : J. SHAPPE & T. UART
outcrop #'s : TRVC25 - 029

A lot of rock was exposed although a lot was covered in places by grass, moss and dirt. All stations observed were sandstone and mudstone, with some mudstone being silty. Strikes and dips varied, and at one point we walked through the core of an anticline that appeared to be overturned.

Plerine sediments.

Traverse Summary

(2)

Date JUNE 24 1985

Traverse Name SOUTH KITEEN CREEK

NTS Sheet 103P/7 KITEEN RIVER

Line # -

Photo #'s NO AIRPHOTOS

Scale

Traverse Description : CREEK MOVING IN A NORTHWESTERLY DIRECTION TO KITEEN RIVER

Comments about traverse

Completed by : SUSAN DERBY & BOB TAMAKI
outcrop #'s : BIT 047 - 050

UNABLE TO REACH KITEEN PEAK, TOOK AN ALTERNATIVE TRAVERSE DOWN A CREEK RUNNING IN A NORTHWESTERLY DIRECTION TOWARDS KITEEN RIVER. VERY DIFFICULT TERRAIN, LOTS OF TILL COVERED SLOPES. MOST OF THE OUTCROP SEEN REPRESENTATIVE OF A MARINE ENVIRONMENT. IT CONSISTED MAINLY OF DARK COLOURED SILTSTONE, MUDSTONE AND VERY FINE GRAINED SANDSTONE. WE WENT THROUGH A SYNCLINE, ANTICLINE COMBINATION. NO VISIBLE SEDIMENTARY FEATURES

Traverse Summary

(1)

Date June 24, 1985

Traverse Name Kwinatahl River Tributary

NTS Sheet 103P/11

Line #

Photo #'s } no photos

Scale

Traverse Description along creek (unnamed) trending NNW from Kwinatahl River. Exellent exposures as steep embankments.

Comments about traverse

Completed by : Louise K.M. and Fred Kurz
outcrop #'s : LKM028 – 030

Marine sequence of sandstone and interbedded mudstone. The sandstone was very quartz-rich and both the sandstone and mudstone contained abundant pyrite. LKM029 (Stratigraphically at base of 028) ~~contain~~ consisted of ~~bedd~~ poorly bedded grit sandstone with small shale fragments & chert fragments 1mt in thickness which graded to 20cm thick fine-grained sandstone bed to 30cm siltstone with fissile partings. Traverse interrupted by Louise's accident.

Traverse Summary

(2)

Date Monday, June 24th /85

Traverse Name Kwinatahl Creek Road

NTS Sheet 103 P/6 - Aiyansh

Line #

Photo #'s no photos available. (use topo sheet.)

Scale 1:60,000

Traverse Description Traverse from around the confluence of Hoan Creek & Kwinatahl Creek on road to Alice Arm.

Comments about traverse

Completed by: B. Wright & J. Sharpe
outcrop #'s: BMW 067 - BMW 035

- excellent exposure in road cuts on north side of road.
- moving up section to the west through a series of small anticlines and synclines and a few minor associated faults
- rocks were of marine origin and consisted of extremely well indurated sandstones and siltstones with minor intervals of silty shale
- almost all rocks were heavily iron stained, slickensided and cut by quartz veins
- sandstones were notably dark in color, med → coarse grained in places and channelled on occasions
- sediments lie very close to volcanics to the west (on same 1:50,000 map sheet near Alice Arm)

Traverse Summary

Date June 24, 1905.

Traverse Name Seaskinnish Ck.

NTS Sheet 103 P/7 Kiteen River & 103 P/2 Lava Lake.

Line #

Photo #'s no photos available use topo.

Scale

Traverse Description We planned to do the southwest fork of Kiteen River but we could not fly over the mountains because of a low cloud ceiling.

Comments about traverse

Completed by: J. Stones & Tim Vant
outcrop #'s: 053-054

There is very little outcrop along the river section. However there are huge rocks that have slumped from the steep ridges above. Overall these rocks are well indurated black siltstones interbedded with medium to dark grey fine to medium grained very well indurated sandstone. Sandstone is the dominant lithology. These units are massive and jointed. No bedding features were seen on weathered or fresh surfaces. The traverse area is logged off in spots. There is alot of deadfall within the creek making traversing extremely difficult. We saw alot of bear signs in this valley.

Traverse Summary

(2)

Date JUNE 25 1985

Traverse Name LAVENDER PEAK

NTS Sheet 103 P/11

Line # BC-82020

Photo #'s 45 & 46

Scale 1:60,000

Traverse Description

Comments about traverse

Completed by : Tim Vont & Bob Tanaki
outcrop #'s : 051-056

Walked a ridge running in a southerly direction located east of Kinskuch River. It consisted mainly of highly weathered siltstone with a noticeable 1 meter thick outcrop of qtz rich volcanic rock (siliceous tuff) The strike was consistent throughout ranging from 330°- 357° dipping northeast at 28-67°. No visible sedimentary features. It appears to be continuation of a marine environment. The most noteworthy feature is the continual rubble of siltstone and mudstone found throughout the traverse.

Traverse Summary

(1)

Date June 25

Traverse Name Honey Lake Creek

NTS Sheet 103 P11

Line # Not Available

Photo #'s " "

Scale —

Traverse Description Followed deeply incised creek downstream from top of bluff to base. Access difficult.

Comments about traverse

completed by : Joanna Sharpe, Fred Kurz
outcrop #'s : JLS-001 → 004

Up section the outcrops were dominantly massive sandstone with minor mst laminations. Two types of sandstone were noted: 1.) fine-grained medium grey 2.) medium-grained, greenish grey.

Mudstone rip-up clasts and coarser sandstone concretions present in both types.

Further downsection a very thick mudstone unit was encountered.

Traverse Summary

(2)

Date Tuesday, June 25/85

Traverse Name Cranberry River Road (Traverse 2)

NTS Sheet 103P 10/E

Line # BC82020

Photo #'s 76-79

Scale 1:60,000

Traverse Description Tried to access west part of Cranberry River from logging road. Informed by logging supervisor that trucks were hauling. Did road north of Cranberry Junction instead.

Comments about traverse

Completed by: B. Wright & S. Derby
outcrop #'s: BMW036 - BMW039

- interbeds of f. → l.med.gr. sst and siltstone
- sst varies from very dark grey to med. grey
- also get some buff weathering massive channel sands and argillaceous sst pods that demonstrate a shaley parting
- occassional carbonaceous mudstones with .5cm clay and calcite veinlets at the base of channel sst (top of previous cyclothem
- one outcrop (039) is thrust faulted
- strikes are in the order of 120° with dips generally between 40° & 60° to the southwest
- Marine? possibly prodelta (nearshore) facies

Traverse Summary

Date June 26 '85

Traverse Name Kitwancool Ck.

NTS Sheet 103 P/8 Kitwanga Lake.

Line #

Photo #'s no photos available use topo sheet.

Scale

Traverse Description Very deeply incised, may be difficult

Comments about traverse

Completed by: Joanna Sharpe & Fred Kurz
outcrop #'s: JLS-005 → 008

- marine sediments
- one rock type encountered: dark mdst.
- qtz and calcite veining and carbonaceous plant fragments were encountered in one outcrop
- structure remained the same with a consistent dip to the NE.

Traverse Summary

(2)

Date June 26 1985

Traverse Name : Sweetin Creek.

NTS Sheet 103 P/16 Kuldo Creek

Line # BC 82019

Photo #'s # 255

Scale 1:60,000

Traverse Description Down the east fork of the Sweetin Creek.

Comments about traverse

Completed by : Tim Vant & Bob Tomoki
outcrop #'s : 057- 061

Walked through a continuous sequence of poorly consolidated siltstone and mudstone. The strike was consistently around 40° dipping northeast at 40°. No sedimentary features were found. We were moving up section all day seeing the same lithologies throughout. It appears to be part of the continual marine sequence.

Traverse Summary

(1)

Date June 26, 1985

Traverse Name Cranberry River (South)

NTS Sheet 103P/8

Line #

Photo #'s No photos available

Scale

Traverse Description

Comments about traverse

Completed by : B. Wright & S. Derby
outcrop #'s : BMW040 - BMW041

- traverse incomplete due to white-knuckled terror over very fresh griz & cub tracks going to same outcrops
- 12m sst/sltst section, minor laminations, 25° dip to the west, probable marine environment.

Traverse Summary

Date: June 28

Traverse Name: Lower Smokee Lake Creek

NTS sheet #: 93 M/13

LINE # BC 81043

Photo # 243 - 244

Scale #: 1:60,000

Traverse Description: Walking up the Smokee Lake Creek away from the coal seam
Outcrop #'s: JLS009 - JLS013
Completed by Joanna Sharpe & Fred Kurz

Dominantly sandstones and siltstones. The sandstones varied from very fine-grained to very coarse-grained. Fresh colour varied from med gray to greenish gray. The greenish grey variety had carbonaceous plant fragments.

There were minor black mudstone beds. Beds dipped SE on the first part of the traverse and swung around to SW. No folds or faults were observed in outcrop.

Minor calcite and quartz veins

Traverse Summary

(1)

Date June 28 1985

Traverse Name Damsumlo Lake Creek

NTS Sheet 93 M/13

Line # BC 81043

Photo #'s # 242

Scale

Traverse Description - Creek south of Smokee Lake, running in a westerly direction towards Skeena River

Comments about traverse

Completed by: Bob Tanaki & Tim Vant
outcrop #'s: 062 - 066

We started our traverse trying to find the extension of our small coal seam further south. The lithologies we encountered consisted mainly of fine grain and medium grain sandstone with a small band of siltstone. The strike were generally in a SE direction (150°) and NW direction (295°) with dips interchanging between NE at 30° and southwest at 35°. The sandstone were generally massive with few noticeable beddings. We walked through a syncline and an anticline combination. There were no visible sedimentary features or any sign of the extension of the coal southward. It does appear we are moving

Traverse Summary

(2)

Date Friday, June 28/85

Traverse Name Exposure Creek

NTS Sheet Shedin Creek 93M/13

Line # BC 8043

Photo #'s #142

Scale 1:60,000

Traverse Description Traverse down creek from swamp to just below 2nd tributary confluence

Comments about traverse

Completed by: B. Wright S. Derby
outcrop #'s: BNW 042 - BNW 047

- [illegible] section of v.f → f. gr sst, mid lt grey, few silty laminations
- nearly continuous exposure
- dips generally 25-30° to the southwest
- 2 thrust faults (1 or 2) observed
- marine? transitional?

Traverse Summary

Date Sat. JUNE 29/85

Traverse Name Wiminasik Lake

NTS Sheet 104 A 8

Line # A 12265

Photo #'s 164, 165

Scale

Traverse Description Traversed along the Northern most ridge of Blackwater Mtn.

Comments about traverse

Completed by: TROY BRAZZONI & Bob Tamaki
outcrop #'s: TKB 001 - 011

There was good exposure along most of the ridge however some was lost due to snow cover. Most of day was spent in transitional marine / cont. rocks. Five major units were noted.
Unit 1 consisted of very fine grained, dark grey sandstones (Marine)

Unit 2 consisted of upper fine grained, light grey S.S. which graded into a black silstone. The Silst. contained thin beds of S.S. which had some symetrical ripples.

Unit 3 consisted of a massive coarse grained sandstone. The sandstone was poorly sorted but the grains were well rounded. It was composed of mainly Qtz, chert & feldspars

Unit 4 consisted of fine grained, light grey sandstone. The sandstone contained abundant pelecypod fossils. (May turn out to be a marker bed as it divided the transitional lith. from the marine lith.

Unit 5 consisted of a sequence of rks ranging from mdst to med. grained S.S. The sandstone beds contained abundant cross beds.

An anticline was also traversed across.

Traverse Summary

Date Saturday, June 29th

Traverse Name Mt. Tommyjack - north end

NTS Sheet 94D

Line # BC2372

Photo #'s 18

Scale

Traverse Description - walked east along Mt. Tommyjack at north part of mtn.

Comments about traverse

Completed by : B. Wright & S. Derby
outcrop #'s : BMW048 - BMW050

- traversed through a series of small anticline/syncline pairs
- continental sediments all day
- sst ranges in grain size from fine → coarse (grit)
- siltstone & argillaceous s/tst interbeds & interlaminations
- beds are cyclic and are ~ 1m thick
- ssts are generally soft weathering (muddy matrix) and light colored with numerous carbonaceous plant fragments & wood casts
- one sst contains a lens of chert pebbles
- found a 25cm carb. mdst that was sampled for vitrinite reflectance (looked like a coal bloom smear on the ridge top)
- plant hash on mdst bedding planes that weathers white was found (exactly like what Bob found)

Traverse Summary

Date June 29/85

Traverse Name Blackwater Peak - Shilahou

NTS Sheet 104 A8

Line # A1226S

Photo #'s 166

Scale

Traverse Description South up the ridge.

Comments about traverse Ridges are great!

completed by: Joanna Sharpe & Fred Kurz

outcrop #'s: JLS014-018

Marine Sediments - probably very shallow - maybe transitional
Good exposure. Outcrop was almost continuous.

At the start of the traverse we encountered interbedded sandstone and siltstone. Sandstone varied from fine to very coarse-grained, was dirty looking and had a fresh greenish colour, and contained carbonaceous plant fragments. Siltstone was very dark. Further up the ridge a medium to coarse-grained clean hard sandstone and also a crumbly weathering sandstone were observed. A bed of conglomerate (~2m) was seen near the top.

At the start of the traverse beds were striking 131 and dipping 32 SW. The rest were striking about 300 with a dip varying from 27 to 65 NE.

Traverse Summary

Date Mon. July 1/85

Traverse Name Sicintine River Ridge

NTS Sheet 94 O

Line # BC 2372

Photo #'s 33, 34

Scale

Traverse Description walked on the ridge west of Mt. Tommy Jack, traversing the middle east west trending ridge and the Northern east west trending ridge.

Comments about traverse

Completed by: T. BRAZZONI & F Kurtz
outcrop #'s TKB011 - 017

Many of the outcrops were covered by snow and many parts of the traverse was along strike. However some good sects were obtain and some intresting structures were observed. Traverse contained at least one anticline and a major fault particularly evident on other ridges observed. The traverse was mainly through alternating sequences of fine greenish grey ss. There was also minor silstone and some fine grained dark grey ss. The eastern most end of the stream contained some upper fine to med. grained ss. light grey in color with dark grey interbedded silsto. in lenticular bedding. The sequence of seds. appear to be marine.

Traverse Summary

Date Monday, July 1/85

Traverse Name North Mt. Tommyjack & Horseshoe Ridge

NTS Sheet 94D (1:250,000)

Line # BC 2372 BC 2371

Photo #'s # 18 ↓ # 48 ↓

Scale 1:60,000

Traverse Description Finished NE part of North Tommyjack Mtn. Flew to Horseshoe Ridge in the NE to traverse in the afternoon.

Comments about traverse

Completed by : B. Wright & J. Sharpe
outcrop #'s : BMW 051 - BMW 053

- description is the same as for June 29th traverse
- encountered another carb. mdst that produced a black coal-like bloom (sampled for vit.)
- lots of carb. plt. frags and woody imprints
- good conglomeratic lense on Tommyjack
- small syncline at farthest NE end of ridge (Tommyjack)
- Horshoe ridge had an asymmetrical syncline (steeper limb on E-side)

- flew some traverses east of Sicintine R. - excellent ridge exposures

Traverse Summary

Date June 29 and July 1, 1985.

Traverse Name Mount Tommy Jack

NTS Sheet McConnell Creek 94D

Line # BC 2372

Photo #'s 20

Scale

Traverse Description

Travelling from west to east across Mt. Tommy Jack.

Comments about traverse

Completed by : J. Stones & T. Vant
outcrop #'s : JTS-055 - 063

Began traverse at base of section on west side of Mount Tommy Jack. Here we found very massive sandstone & siltstone. Upsection repeated units of sandstone, siltstone & mudstone were found. In this area large woody plant fragments were very abundant. Large scale cross bedding was noticed. At the end of our traverse a large unit of black shale was observed overlain by a large sandstone unit. Some very dark dirt was found but believed to be of mudstone origin.

All in all a good traverse.

As we travelled east (Line 29) coarse grained sandstone is still the dominant lithology, although the sandstone seemed to have a large amount of feldspar in it, and have a sizable amount of black chert fragments. Some mudstone beds interbedded with sandstone. Mudstone beds get thicker as continue east. Crossbedding is evident and tops are to east. Plant fragments are visible in both mudstone & sandstone. As we continued east conglomerate bed of undetermined thickness were found. Also crossbedding was found on a larger scale, as more plant fragments.

(2)

Appears to be transitional.

Traverse Summary

Date JULY 1 1985

Traverse Name EAST MT. TOMMY JACK RIDGE

NTS Sheet 94D 1:250,000

Line # BC 2234

Photo #'s 4

Scale

Traverse Description Walked towards Sicintine River.

Comments about traverse

Completed by: Bob Tarski & Susan Derby
outcrop #'s: 067 - 074

We walked northward towards Sicintine River to check the facies environment. The lithologies were mainly greenish fine grain sandstone and siltstone. The strike were generally at 185° or 300° dipping west 26° to 35° or northeast at 20° to 30°. We saw abundant plant fragments with one small section of carbonaceous mudstone (sample taken). We passed through one small anticline syncline combination. There was very few noticeable sedimentary structure other than ripup clasts. All the signs (plant fragments, rock colour, carbonaceous mudstone) indicate this area to be part of a terrestrial environment.

TRAVERSE # 9 SUMMARY

DATE July 2/65

TRAVERSE NAME: NORTH SICINTINE RANGE

NTS SHEET: 94D

LINE BC 2233

PHOTO 3, 21, 22

SCALE 1:60,000

TRAVERSE DISCRIPTION: Ridge traverse in a westerly direction on one of the northern most ridges of the Sicintine Range.

TRAVERSE COMPLETED BY: J. Sharpe & B. Wright

OUTCROP I.D.: JLS 019 – JLS 20

JLS 20 - coal 20cm

Comments:

Dar[illegible] sands[illegible]. The sandstone var[illegible] are fine-grained. The sequence [illegible] d. The sandstones [illegible]. Carbonaceous [illegible] were encountered [illegible] taken for [illegible] analysis. [illegible] trinite and [illegible] A major [illegible] fault [illegible] drag folds is located [illegible] 1:60,000. The [illegible] carry because of dangerous [illegible]

was not analized due to high ash content in sample.

Traverse Summary

Date July 2, 1985

Traverse Name

NTS Sheet McConnell Creek 94D

Line # BC-2227

Photo #'s 98

Scale 1:60,000

Traverse Description

Comments about traverse

Completed by: B. Tamaki & S. Derby
outcrop #'s: BIT075 - BIT081

We were walking up a ridge in a terrestrial environment. Our first outcrop consisted mainly of pebble-cobble beds (~1 meter thick) in a medium grain sandstone. Walking up section, we found continuous indication of volcanic rocks mixed with highly weathered dirty sandstone (greywacke). The volcanics were purple or green in colour (intermediate meta-volcanics). These volcanic rocks continued for the rest of the traverse. Very well preserved plant fragments were found in a highly weathered greywacke. This area appears to contain pile of volcanic alternating with greywacke. Any area to

Traverse Summary

Date July 2, 1985

Traverse Name 7200 Sicintine Ridge

NTS Sheet 94D McConnell Creek.

Line # BC-2232

Photo #'s 21 & 22

Scale

Traverse Description

travelling west along ridge
the ridge was too steep to traverse further to the east.

Comments about traverse

Completed by: J. Stones & T. Vant.
outcrop #'s:

We encountered either marine or transitional sediments. These were fine ~~and~~ grained sandstones and siltstones. In some outcrops siltstone was the dominant rock type whereas in others it was the other way around with sandstone and interbedded siltstone.
All rock types were well indurated and possibly silicified by nearby volcanic activity.
Minor cross bedding on weathered surfaces, no top determination made.
Bedding orientation @ 172/44°SW.

Traverse Summary

Date July 3/85

Traverse Name North Sicintine Range Day 2

NTS Sheet McConnell River, 94D 1:250,000

Line # 2233

Photo #'s 3, 22

Scale 1:60,000

Traverse Description Continued east along North Sicintine Range from the day before

Comments about traverse

completed by: Joanna Sharpe & Susan Derby
outcrop #'s: JLS021-023

Terrestrial environment

Very similar to the first part of the traverse. Dominant lithology was sandstone. Sandstones ranged from very fine-grained to medium-grained. Rare siltstone interbeds. Few carbonaceous fragments and plant casts were seen. No coaly interbeds were encountered. Along the ridge we noted a large anticline trending N-S.

Traverse Summary

Date July 3, 1985

Traverse Name Sicintine Ridge

NTS Sheet McConnell Creek (1:250000) 94D

Line # BC 2233 + BC 2232

Photo #'s 23 & 107

Scale 1:60000

Traverse Description Walking east along ~~Sicintine~~ Sicintine ridge

Comments about traverse

Completed by: F. Kurz & T. Vant
outcrop #'s: FWK 001 to 004

In terrestrial [redacted] sediments. Main rock types were sandstone and siltstone with occasional mudstone beds. The sandstones varied from ~~f~~ medium to ~~m~~ fine grained to very fine grained, and from massive to rubbly weathered. Plant fragments were abundant in fine and very fine grained sandstone as well as in the siltstone. The rocks were generally highly fractured with exposures on ridge edge and therefore good bedding planes for measurements were usually absent and bedding itself difficult to discern. The medium - fine grained sandstone beds were more resistant than the other rocks present, forming spines of ~~competent~~ more competent rock (though still fractured) among the recessive rocks. Attitude of beds remained constant for most of the traverse (Average 169°/68°) and only change at the end To 211°/06°, indicating the possible presence of a fold.

Traverse Summary

Date July 4 1985

Traverse Name W. SUSTUT RIDGE

NTS Sheet 94 D

Line # BC 2232 BC 2232

Photo #'s 103 33

Scale

Traverse Description WALK THE RIDGE WESTWARD

Comments about traverse

Completed by : S. DERBY & B. TAMAKI
outcrop #'s : 032- 035

We walked a ridge located west of the junction of the Sustut and Sikanni Rivers. The main lithologies throughout our traverse were dark gray siltstone alternating with massive beds of medium gray fine grain sandstone. Most of the rocks were highly weathered and badly fractured. No sedimentary features or any indicators of coal were found. The strike range from 314°- 350° dipping northeast at ~45° and striking ~168° dipping southwest at ~60°. It appears we are in a terrestrial environment but was

TRAVERSE SUMMARY

DATE July 4/85

Completed by: TROY GRAZZO & FRED KURZ

Outcrop #s: TRS 022 - 026

TRAVERSE NAME West Skeena Ridge

NTS SHEET 94D

LINE # BC 2232

PHOTO #S 101

SCALE 1:50,000?

TRAVERSE DESCRIPTION - one of 2 possible ridges on east side of southern Slamgeesh Range

COMMENTS ABOUT TRAVERSE

The traverse began on the west end of West Skeena Ridge and progressed in an easterly direction. The exposure was very good in the area however due the fact the orientation of the beds was very flat the vertical section was not very large. The section consisted mainly of med. grey fine grained ss. in the lower part of the section progressing up to fine grained ss. with interbeds of siltstone. The lower part of the section would appear to represent a marine sequence and the upper section a transition seque

TRAVERSE SUMMARY

Date July 4th 1985

Completed by: J. Stones, T. VANT.

Traverse Name South Mt. Tommyjack

Outcrop #s: 066 - 069

NTS sheet - 99D

Line # BC 2372

Photo #s 22 & 21

Scale 1:60,000

Traverse Description Ridge @ SW end of Mt. Tommyjack - good exposure on face - trying to wrap up Tommyjack area.

Comments About Traverse

In a marine environment. The rock types encountered were medium to dark gray siltstone and interbedded sandstone. The siltstone is well indurated.

Bedding averages 110/52° SW

We walked along strike a good part of the day, however we did cross several good sections.

Date: July 7, 1985 Completed by: J. Stones + F. Kurz

Traverse Name: 3 ridge helicopter hop

NTS Sheet: 94D

Line # —

Photo #'s no photos available

Scale —

Traverse Description: Traversed 3 ridges using helicopter to ridge-hop. Done to determine environment.

Outcrop #'s - FWK005 to FWK007

Comments about traverse

Ridge #1 - Composed mainly of finely laminated siltstone (alternating bands of light and dark siltstone). Rock is well indurated and thickly bedded. Cut by intermediate mafic dike. Rock most likely represents a marine environment.

Ridge #2 - Main rock type is poorly bedded medium dark gray sandstone (medium to fine grained) with shale rip-up clasts. Finely laminated siltstone was interbedded with the sandstone - more evident as we walked northalong ridge. Siltstone became almost phyllitic (∴ metamorphosed) and finely laminated fissile black mudstone was encountered moving North along ridge. Probably marine or near shore environment.

Ridge #3 - Fine grained medium dark gray sandstone with beds of very fissile black mudstone. At very north end of ridge rock steeply folded into faulted syncline/anticline pair.
Marine environment

In addition: Flew down into valley between Ridge #1 and Ridge #2 and hovered over several outcrops. We determined they were a marine sequence of dark mudstones and siltstones.

Traverse Summary

Date July 7/85

Traverse Name Notch Top Creek

NTS Sheet 94D

Line # BC2233

Photo #'s 33, 95

Scale —

Traverse Description Walk down Notch Top Creek to the Skeena River.

Comments about traverse

Completed by: T. Brazzoni & T. Vant.
outcrop #'s: TKB027 - 031

The traverse consisted of a section of mainly siltstone and sandstones. The siltstones were thinly bedded and med grey in color. The ss. were fine to U.F. grained mod. to well sorted and grey in color. The section was marine.

TRAVERSE SUMMARY

Date July 7/85

Completed by: Bob Tamaki

Traverse Name Notch top Peak

Outcrop #s: BIT086 -089

NTS sheet 94D

Line # BC 2233 ↓ 94 BC 2233 ↓ 34

Photo #s

Scale 1:60,000?

Traverse Description - 2 possible ridges east of high-point on Notch top Peak - may be hard to find a traversable ridge (keep east!)

Comments About Traverse

Continental Sediments

The dominant lithology was upper fine to lower medium-grained sandstone. Fresh colour was dark grey and the weathered surface was speckled and very lichen-covered. There were very thin interbeds of interlaminated siltstone and very fine-grained greenish sandstone.

The sandstone was fairly massive and contained lenses of siltstone rip-up clasts. The lenses were up to 20 cm. thick and had a very coarse-grained matrix. The clasts were elongate parallel to bedding and were up to 24 cm long. Siltstone layers were iron stained.

Sandstones and siltstones alternated throughout the traverse with no apparent fining-upwards sequences.

The strike and dip were fairly consistent, ranging from 117-160 and dipping from 11 to 49° SW.

Traverse Summary

Date July 7/85

Traverse Name Mosque Mtn.

NTS Sheet 94 D McConnell Creek 1:250,000

Line # ———

Photo #'s no photos available

Scale

Traverse Description 2 ridges on Mosque Mtn.

Comments about traverse

Completed by : B. Wright & J. Sharpe & S. Derby
outcrop #'s : JLS 025 - JLS 027

- representative of an upper alluvial plain environment
- section consists of conglomerate, sandstone, siltstone and banded siltstone
- the conglomerate varies from clast to matrix supported with clasts ranging in size from 1cm pieces to 20cm cobbles; matrix is dominantly a coarse sand; clast composition is quartzites, chert pebbles, volcanic, laminated sandstones; clasts vary from angular to well rounded
- the siltstones are rubbly weathered and iron-stained
- sandstones vary from green to light grey, v.f. → f.gr., contain carbonaceous plant fragments and often display large scale trough cross-bedding
- believed to be above the Bowser Lake Group and equiv. to the Tango Creek Fm.
- structure is an overturned anticline (overturned to the SW??)

Traverse Summary

Date July 8

Completed by TKB & TRJ

Traverse Name Central Slowmaldo Mtn.

Outcrop #s:

NTS Sheet 104A/9 East Half

Line # A12285

Photo #s 391

Scale 1:60,000

Traverse Description Central ridge of Slowmaldo Mtn. due east of Deadfall Creek.

Comments about traverse

The exposure along the ridge was good with only minor snow cover in some areas. The top of the section was composed of s.s. with interbeds of silst. The ss. was med grey and ranged from fine to coarse grained. The bedding tended to be planar but there were some asymetrical ripples. There was also a series of fining upwards cycles from a coarse erosional ss. to silst. The section is characteristic of a continental environment.

Traverse Summary

Date July 8/1985

Traverse Name Stephen Peak

NTS Sheet McConnell Creek, 94D, 1:250,000

Line # BC 2372

Photo #'s 48

Scale 1: 60,000

Traverse Description West along the southern ridge of Stephen Peak.

Comments about traverse Great!

completed by: Brenda Wright, Susan Derby, Joanna Sharpe
outcrop #'s: SJD007

Transitional Environment

Main lithology was fine-grained dark grey sandstone (fissile). It contained mudstone rip-up clasts, tiny 2mm shells and abundant plant fragments, and larger shells.

Interbedded with the sandstone was dark grey siltstone with contorted bedding. It contain large shells (ave 3 cm.).

Minor limey mud unit. Medium dark grey, weathers buff.

Average strike & dip 146/49SW.

Traverse Summary

Date July 8, 1985

Traverse Name North Sansixmor Ridge

NTS Sheet 104 A/9 East half

Line # BC 2372, A 12273

Photo #'s #96, #229

Scale 1:60000

Traverse Description Walking east along North Sansixmor Ridge

Comments about traverse

Completed by: B. Tamaki & F. Kurz
outcrop #'s: BIT 90 to BIT 95

Basically the same rocks were encountered throughout the traverse - alternating beds of sandstone (fine grained, thickly to very thickly bedded) and siltstone (thinly bedded). The rock was usually very fractured and reduced to rubble, so bedding was often hard to see. The beds were all shallow dipping (~10°) while strike remained relatively constant. Concretions were present at the western end of the ridge and rip-up clasts were present throughout, hence it is interpreted that the rocks were from a continental environment.

Date July 9, 1985

Traverse No. 2 Bridge heli-hopping

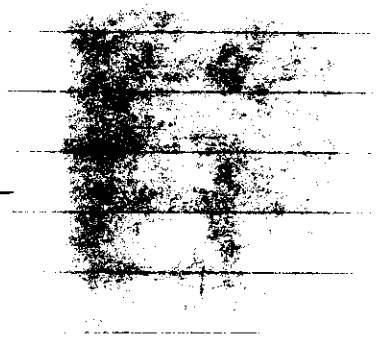
NTS Sheet Bowser Lake 1:250 000

Line # —

Photo #'s —

Scale —

Traverse Description We reconnoitered one end of a ridge while J. Sharpe + S. Derby did the other, to determine environment



Comments about Traverse

Completed by: F. Kurz & T. Vant

Outcrop #'s: Ridge 1 – Ridge 6.

Ridge #1 West

medium dark gray, fine grained sandstone, thickly bedded and cut by numerous quartz veins. Marine environment

Ridge #2 West

Very fine grained, dark gray sandstone poorly bedded, with interbeds of siltstone. walking up section, fine grained light medium gray, fissile, thickly bedded sandstone encountered. Zeolitised plant fragments in mudstone. Transitional environment

Ridge #3 Fine grained medium gray sandstone, well bedded, cut by numerous quartz veins. Sandstone beds alternate with beds of dark gray fissile siltstone. Probably marine

Ridge #4 West Thickly bedded, fine grained light to medium gray sandstone beds alternating with thickly to thinly bedded dark grey siltstone. Slickensides present. Marine, possibly transitional environment

[redacted] Traverse Summary

Date: July 9, 1985

Traverse Name: South East Bowser Lake Sheet (Ridge Hopping

NTS Sheet: Bowser Lake 1:250,000

Line # —

Photo #'s —

Scale —

[redacted]

Traverse Description: Moved from ridge to ridge determining lithology, orientation and possible environment of deposition

Comments about traverse

Completed by: J. Sharpe & S. Derby
Outcrop #'s: JLS 028 - JLS 032

Ridge #1 - East half

- Composed of dark greenish gray fine-grained sandstone
- Minor siltstone noted
- bedding 146/65
- Marine Environment

Ridge #2 - East half

- composed of fine-grained greenish gray sandstone
- interbeds of siltstone

[redacted] Traverse Summary

Date [redacted] 1985

Traverse Name :- Vile Creek Ridge

NTS Sheet :- 104 A/8

Line # :- A 12265

Photo #'s :- 169-171°

Scale :- 1:31,000

Traverse Description :- walking in a northerly direction towards Shilahou Creek

Comments about traverse : done by R. Tamaki & S. [redacted]

This traverse was part of the continuation of the South Bowser Program. Some of the areas not covered due to the snow cover will be covered in the second half. The main lithologies throughout our traverse consisted of cyclic repetition of fine grain medium dark gray sandstone interbedded with siltstone. The rocks were generally siliceous, medium bedded and poorly sorted. There were symmetrical ripple marks, plant fossils and rip up clasts indicating nearshore conditions. Another noticeable feature was the abundant lime mud beds found throughout our traverse. The orientation were striking ~350° dipping northeasterly at 17-45° or striking ~140° dipping southwesterly at 8°-35°. All the sedimentary features indicate this ridge to be part of a transitional zone.

Traverse Summary #6

Date : July 22/85

Traverse Name : Canyon Lake Ridge

NTS Sheet - 104 A/8 . 1:50,000

Line :- A12262

Photo : 53-54

Scale : 1:60,000?

Traverse Direction : ridge located in a northwesterly direction north of Canyon Lake. Started at south end of ridge and traversed north.

Compiled by: Joanna Sharpe and Susan Arbuckle

Transitional Environment

- Major lithology is sandstone. There were [illegible] conglomerates, and [illegible] mudstone. The sandstones varied from very fine grained medium dark grey to coarse light sandstones. Some sandstones had a calcareous cement. Minor rip-up clasts, plant fragments and plant imprints were [illegible].

Structure was very simple, striking 305° and dipping 11° to the northeast. Minor slickensides were noted.

TRAVERSE SUMMARY

TRAVERSE #8
MGB-001

DATE July 22nd 1985
TRAVERSE NAME: South Canyon Lake Ridge
NTS: 104 A/8
PHOTO: A12262-49 BY: Maria Besso + Fred Kurz
TRAVERSE DESCRIPTION: Outcrop #'s 001-009

Walked North East along Ridge starting at highest peak just south of icefield. Started in what appeared to be marine sandstones and shales, steeply dipping the dips shallowed as we walked down the ridge - across the valley (on next ridge) in a direction of 320° we observed a slightly overturned anticline bounded by a small fault zone (zone was oblique to bedding had a rust orange weathering). We continued to walk through shales + sandstones - which appeared to become more silty and finely laminated → perhaps becoming more continental. Dips steepened and we hit a highly weathered zone (orange) with what definitely appeared to be fault breccia - on strike with the fault observed on next ridge over (most probably same) The rest of the day was in interbedded S.S. silst + sh the S.S. appeared to become coarser and more salt and peppery. a few geolitized plant fragments were encountered. This latter part of the traverse appeared to be in transitional to continental environment - (more evidence of oxidation further attests to this). NO coal was encountered - no indication of bloom or carbonaceous material. The average strike along traverse was approx 140°

Traverse Summary
Date - July 24 /85
Traverse Name - Canyon Lake Ridge Day 2.
NTS Sheet - 104 A/8 1:50,000
Line - A12262
Photos - 53,54
Scale - 1:60,000
Traverse Direction - northeast
Completed by Joanna Sharpe and Susan Arbuckle
Comments

Completed by J. Sharpe, S. Arbuckle

Traverse cut short because of freezing rain and fog. Major lithology was sandstone, ranging from fine to medium-grained and from greenish to dark grey. One sandstone had dark wispy laminations. Very similar to Day 1 of Canyon Lake Ridge Traverse except no conglomerates were encountered. This is probably a transitional environment A syncline was noted.

TRAVERSE SUMMARY

DATE: July 24th 1985.
TRAVERSE NAME: Shaslomal Creek Ridge.
NTS Sheet: 104 A/8
Line #: A 12262
Photo #'s: 173 & 174
Scale: 1:36,000

TRAVERSE Description: Traversing east on ridge between Shaslomal creek and Shilahon Creek in the Blackwater past area.

TRAVERSE Notes: Completed By/ M. Besso
F. Kury.
outcrop #5 100 - 16

Started out in pebble conglomerate and salt and pepper sandstones - Walked all day through interbedded SS. sltst and mudstone with abundant carbonaceous plant fragments - leaf prints - and some wood casts - the sandstones were feldspathic and salt and pepper in color in many cases - A small coaly mudstone was trenched at station MGB-011 The interval was only 23cm, 9cm of which appeared to be a powdery coal. This was sampled for palynology + vit reflectance. From all this evidence it would appear that we were in a Continental environment. The average strike and dip was 325°/50-90

Traverse Summary

cont.?

Date:- July 24 1985
Traverse Name:- Shilahou Creek South
NTS Sheet :- 104A/8
Line :- A12262
Photo:- 171-172
Scale :- 1:32,000
Traverse Description :- ridge running northwest south of Shilahou Creek

Comment about traverse
completed by S. Derby & R. Tamaki.
outcrop : 103-107

The geology was difficult throughout the day. The orientations taken on top of the ridge may not be representative of the structure below due to many small sharp folds and small scale faults on the side of the ridge. The main lithologies consisted of cyclic repetition of sandstone and siltstone with a few large exposure of conglomerate. The conglomerate could be described a heterogeneous, matrix supported, pebble sized containing mainly chert clasts. A few beds of lime mud were found during the traverse. Plant fragments were also abundant in certain areas. It appears to be part of a transitional environment. quite similar to last ridge done in the area. It appear to be very close to a continental environment.

Traverse # FP4

Date - July 25, 1985
Traverse Name - Foster Peak South
NTS Sheet - McConnell Creek 94D, 1:250,000
Line # - BC 2371 BC 2233
Photo #'s - 64,65 91
Scale - 1:60,000
Traverse Description: Traversed east along the ridge between Slamgeesh River & Skeena River

Comments about traverse
completed by Tim Vant & Susan Darby.
Outcrop #'s JJD008 - JJD011

Continental Environment

We began in a medium-grained, poorly sorted sandstone with a high percentage of rock fragments. Siltstone rip-up clasts were found as well as occasional pebbles. From here, there was a cyclic repetition of sandstone & siltstone units as we moved east. Both iron-staining & slickensides were noted. There appeared to be a fault further east with an accompanying steepened dip. A conglomerate was noted & clasts ranging in size from 1mm to 20cm. The clasts consisted of sandstone fragments clasts & lithic clasts. More sst & siltstone units were encountered further along the ridge. The sst became finer grained & darker in colour as we moved east. No plant fragments were noted.

TRAVERSE SUMMARY

DATE : July 26TH 1985
TRAVERSE NAME : North Kitlangus Creek Ridge
NTS SHeet : 94D.
Line # : BC 2371
Photo # : 56
Scale : 1:36,000? Maria & Fred.

TRAVERSE DESCRIPTION : Walking North East on ridge just north of Kitlangus Creek, starting at 6080 ft. elevation control point.

TRAVESE NOTES: This ridge was very jagged and rubbly. The strata was striking (ave) 158°/45° SW. Lithologies consisted of mostly SS, Sltst + mdst that had undergone some degree of metamorphism some of the strata appeared slightly cleaved looking closely at the strata it was hard to determine bedding this was much easier to see from afar on a gross scale. Some minor shearing and tight Chevron folding was also observed. The environment was probably transitional but it is very hard to say for sure because all sed. structures were masked by the slight metamorphism.
NO COAL.

Stations MB-007 to MB-020.