



Ge. Mt. Klappan 83(6)

MOUNT KLAPPAN  
COAL PROJECT  
GEOLOGICAL REPORT  
1983

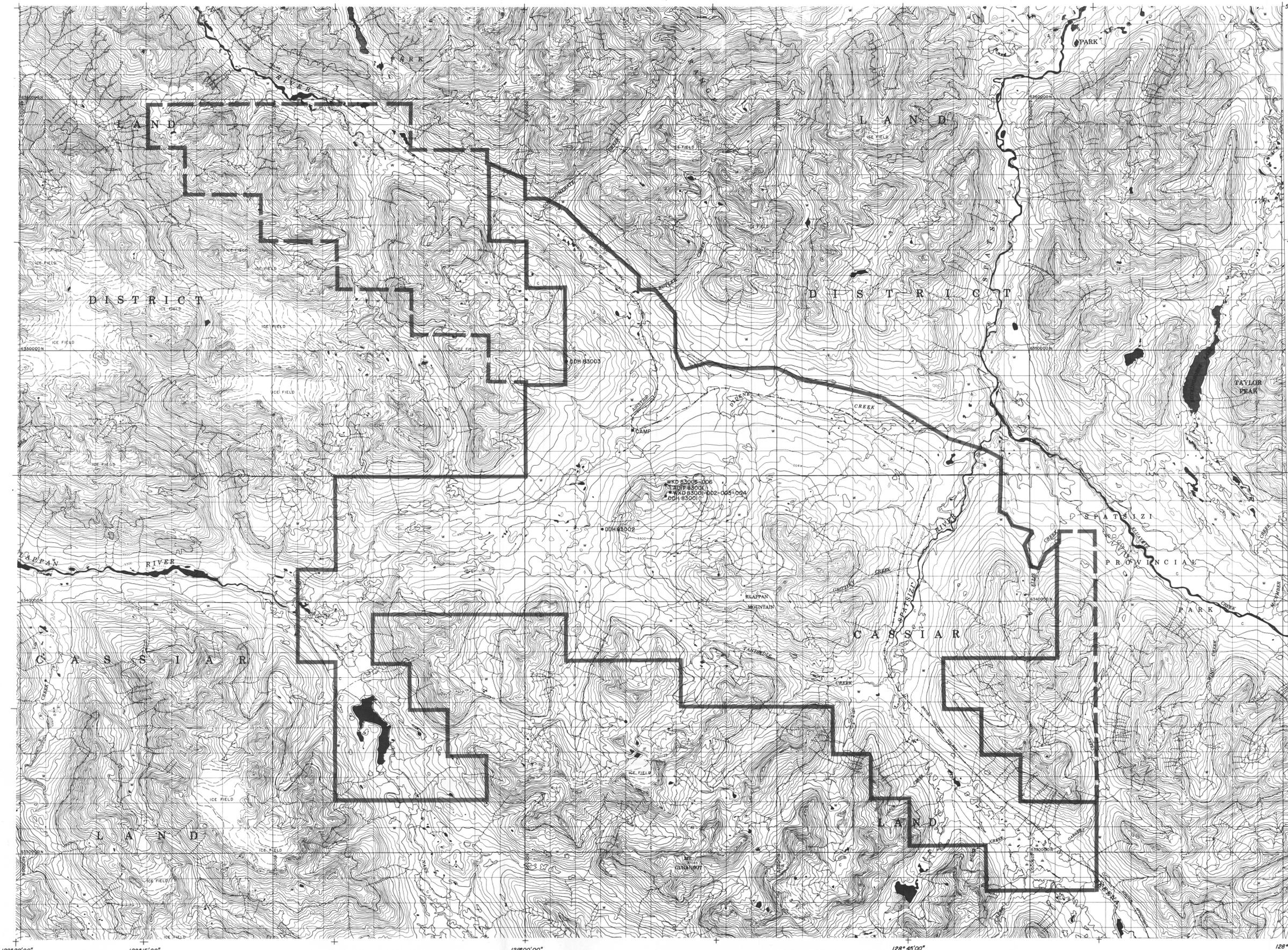
GEOLOGICAL REPORT

APPENDIX I

1:50 000 MAPS, CROSS - SECTIONS AND  
CORRELATION CHARTS

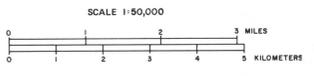
GEOLOGICAL BRANCH  
ASSESSMENT REPORT

00 111



57°25'  
57°20'  
57°15'  
57°10'  
57°05'  
129°20'00"  
129°15'00"  
129°00'00"  
128°45'00"  
128°30'00"

- LEGEND**
- ROADS AND RELATED FEATURES**
- HARD SURFACE, ALL WEATHER
  - LOOSE SURFACE, WINTER ROAD
  - GART TRACK, WINTER ROAD UNDER CONSTRUCTION
  - TRAIL, CULTURE PORTAGE
  - SOIL FLIP AREA
  - RAILWAY, SING. STATION STOP
  - BRIDGE
  - SEAPLANE BASE ANCHORAGE
- LANDMARK FEATURES**
- HOUSE, BARN
  - CHURCH, SCHOOL
  - POST OFFICE
  - HISTORICAL SITE
  - TOWERS, FIRE RADIO
  - WELL, OIL, GAS
  - TANK, OIL, GASOLINE, WATER
  - TELEPHONE LINE
  - POWER TRANSMISSION LINE
  - RAIL
  - CUTTING, EMBANKMENT
  - GRAVEL PIT
- BOUNDARIES AND CONTROL**
- INTERNATIONAL, PROVINCIAL, COUNTY, DISTRICT
  - TOWNSHIP, PARISH - SURVEYED
  - TOWNSHIP, DLS - SURVEYED
  - MUNICIPALITY
  - INDIAN RESERVE, PARK, ETC.
  - HORIZONTAL CONTROL POINT
  - BENCH MARK
  - SPOT ELEVATION, ELEVATION APPROXIMATE
- DRAINAGE AND RELATED FEATURES**
- STREAM, SHORELINE, INDEFINITE
  - DIRECTION OF FLOW
  - LAKE, INTERMITTENT
  - INDICATED, FLOODED LAND
  - MARSH, SWAMP, WOODED
  - DRY RIVER BED WITH CHANNELS
  - SAND, ABOVE IN WATER
  - STRING BOG
  - TUNDRA, MOSS POLYGOONS
  - RAPIDS
  - FORESHORE FLATS
  - ROCK
  - DAM
  - WHARF
  - DITCH
- RELIEF FEATURES**
- CONTOUR
  - APPROXIMATE CONTOUR
  - DEPRESSION
  - ESKER
  - PINGO
  - SAND, SAND DUNES
  - PALSA BOG
  - WOODED AREA
  - LICENCE BOUNDARY
  - LICENCE UNDER APPLICATION



104/H/1	104/H/2	104/H/3	104/H/4	104/H/5	104/H/6	104/H/7	104/H/8	104/H/9	104/H/10
104/H/11	104/H/12	104/H/13	104/H/14	104/H/15	104/H/16	104/H/17	104/H/18	104/H/19	104/H/20

**GULF CANADA RESOURCES INC.**  
Coal Division

CALGARY ALBERTA

**Gulf**

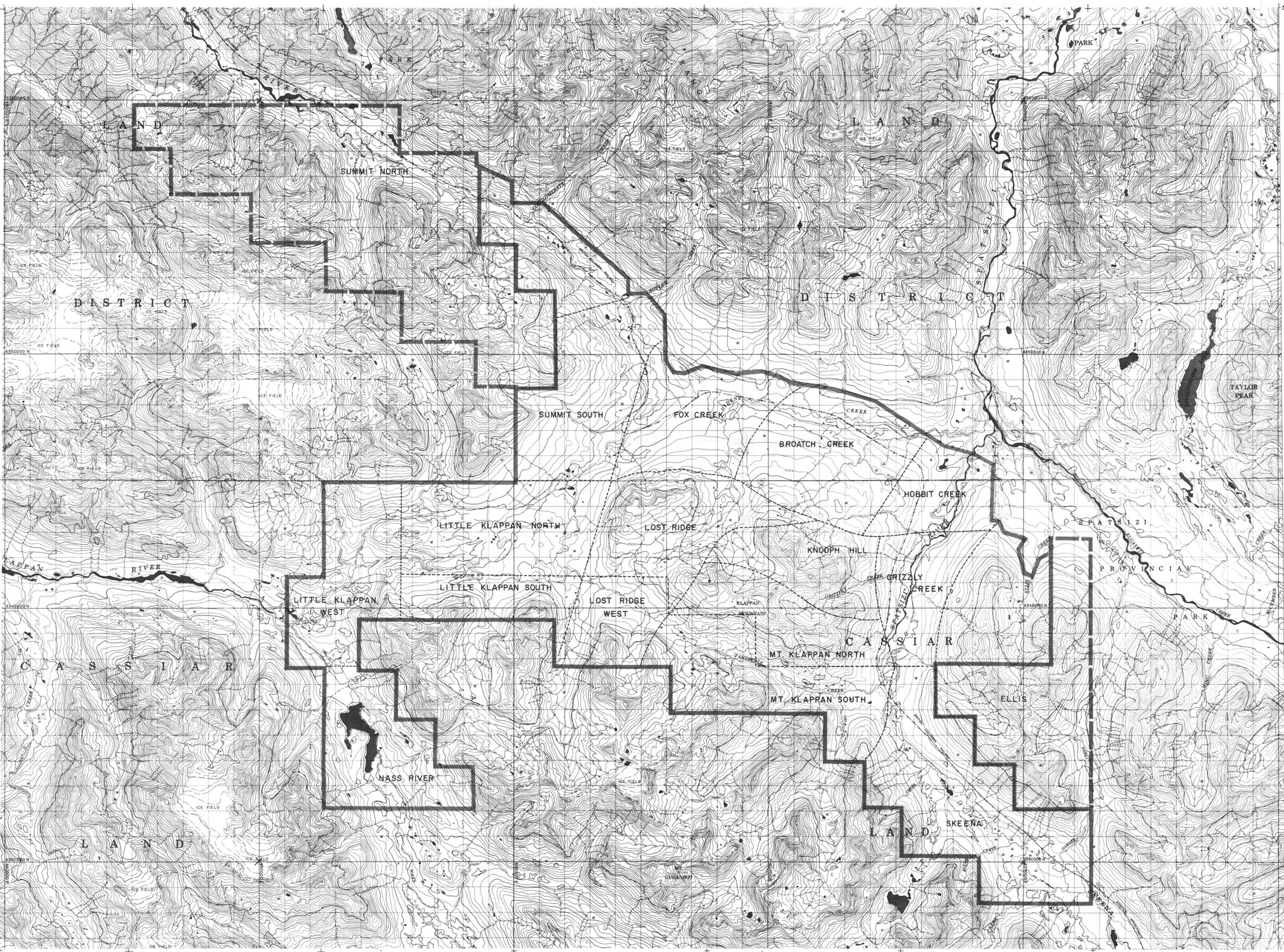
**MT. KLAPPAN COAL PROPERTY**

**1983 DRILL HOLES, ADIT, CAMP AND AIRSTRIP LOCATIONS**

PREPARED BY: C. LOUIE  
APPROVED BY: C. WILLIAMS

DRAWING No. KPN83A01  
DATE: JAN., 1984

APPENDIX I



57°25'  
57°20'  
57°15'  
57°10'  
57°05'

128°30'00"  
128°00'00"

**LEGEND**

**ROADS AND RELATED FEATURES**

- HARD SURFACE ALL WEATHER
- LOOSE SURFACE
- CART TRACK, WINTER ROAD
- TRAIL CUTLINE, PORTAGE
- BUILT UP AREA
- RAILWAY SIDING, STATION STOP
- BRIDGE
- SEAWALL, BASE, ANCHORAGE

**LANDMARK FEATURES**

- HOUSE, BARN
- CHURCH, SCHOOL
- POST OFFICE
- HISTORICAL SITE
- TOWERS, FIRE RADIO
- WELL, OIL, GAS
- TANK, OIL, GASOLINE, WATER
- TELEPHONE LINE
- POWER TRANSMISSION LINE
- MINE
- CUTTING EMBANKMENT
- GRAVEL PIT

**BOUNDARIES AND CONTROL**

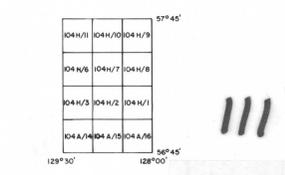
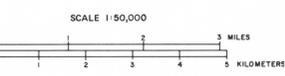
- INTERNATIONAL, PROVINCIAL
- COUNTY, DISTRICT
- TOWNSHIP PARISH - SURVEYED
- TOWNSHIP DLS - SURVEYED
- MUNICIPALITY
- INDIAN RESERVE, PARK, ETC.
- HORIZONTAL CONTROL POINT
- BENCH MARK
- SPOT ELEVATION, ELEVATION APPROXIMATE

**DRAINAGE AND RELATED FEATURES**

- STREAM, SHOULDER, RESERVE
- DIRECTION OF FLOW
- LAKE, INTERMITTENT
- INUNDATED, FLOODED LAND
- MARSH OR SWAMP, WOODED
- DRY RIVER BED WITH CHANNELS
- SAND, ABOVE, IN WATER
- STRONG BODS
- TUNDRA, FENS, POLYDONS
- RAPIDS
- FORESHORE FLATS
- ROCK
- DAM
- WHAFF
- CRICH

**RELIEF FEATURES**

- CONTOURS
- APPROXIMATE CONTOUR
- DEPRESSION
- ESKER
- RIDGE
- SAND, SAND DUNES
- PALSA BODS
- WOODED AREA
- MAPPING AREA BOUNDARY
- LICENCE BOUNDARY
- LICENCE UNDER APPLICATION



Ge. Mt. Klappan 83(a)

**GULF CANADA RESOURCES INC.**  
Coal Division

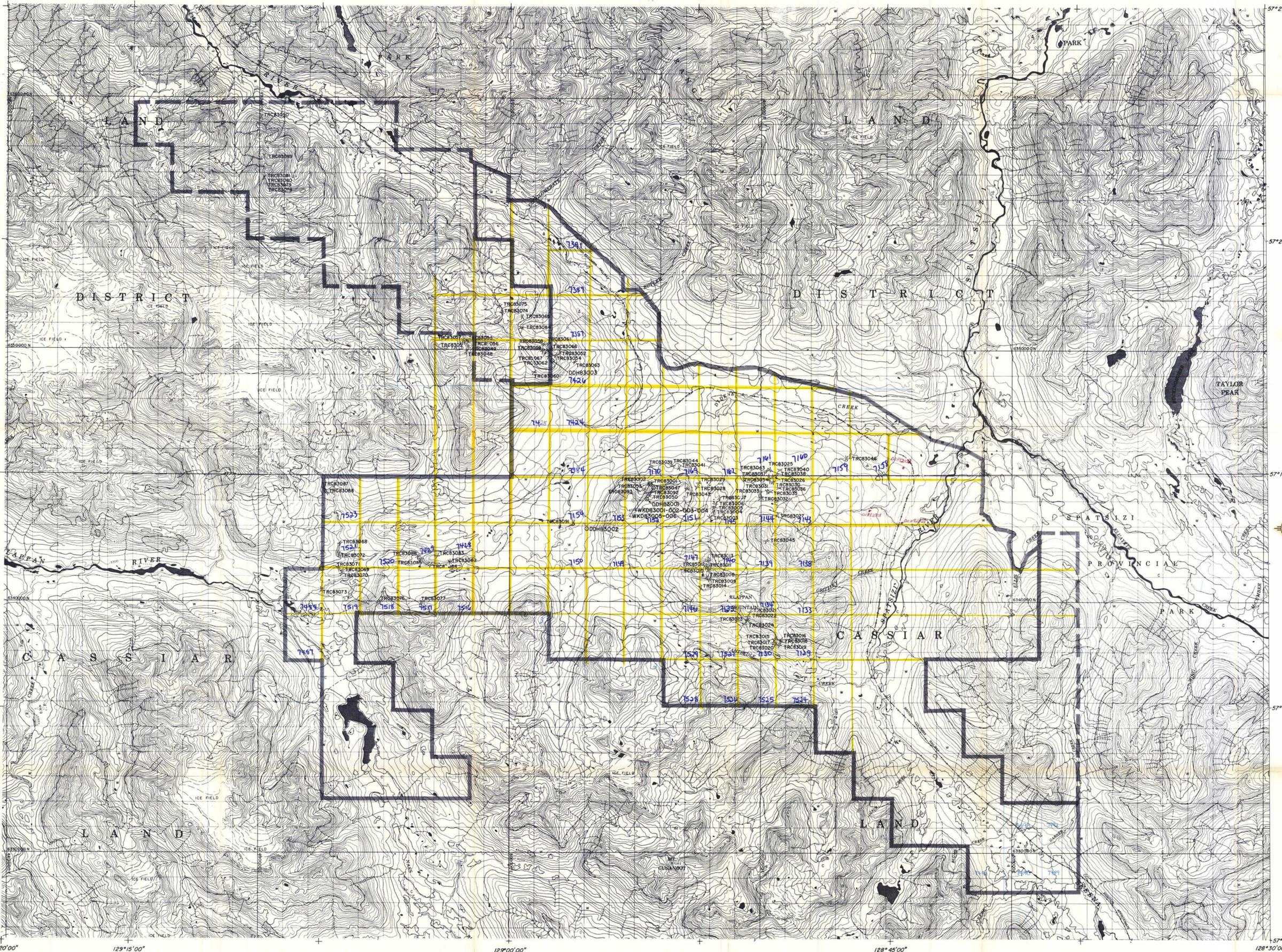
CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY**

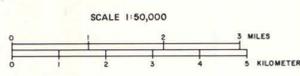
**1983 EXPLORATION MAPPING AREAS**

PREPARED BY: G. LOUIE  
APPROVED BY: G. WILLIAMS

DRAWING No. KPN83A02  
DATE: JAN., 1984



- LEGEND**
- ROADS AND RELATED FEATURES**
    - HARD SURFACE, ALL WEATHER
    - LOOSE SURFACE
    - CART TRACK, WINTER ROAD, UNDER CONSTRUCTION
    - TRAIL, CUTLINE, PORTAGE
    - RAIL OF AREA
    - RAILWAY, BONGS, STATION, STOP
    - BRIDGE
    - SEAPLANE BASE, ANCHORAGE
  - LANDMARK FEATURES**
    - HOUSE, BARN
    - CHURCH, SCHOOL
    - POST OFFICE
    - HISTORICAL SITE
    - TOWERS, FIRE RADIO
    - WELL, OIL, GAS
    - TANK, OIL, GASOLINE, WATER
    - TELEPHONE LINE
    - POWER TRANSMISSION LINE
    - RAIL
    - CUTTING, EMBANKMENT
    - GRAVEL PIT
  - BOUNDARIES AND CONTROL**
    - INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
    - COUNTY, DISTRICT
    - TOWNSHIP, PARISH - SURVEYED
    - TOWNSHIP, QLS - SURVEYED
    - MUNICIPALITY
    - INDIAN RESERVE, PARK, ETC.
    - HORIZONTAL CONTROL POINT
    - BENCH MARK
    - SPOT ELEVATION, ELEVATION APPROXIMATE
  - DRAINAGE AND RELATED FEATURES**
    - STREAM, SHORELINE, INDEFINITE
    - DIRECTION OF FLOW
    - LAKE, INTERMITTENT
    - INDICATED, FLOODED LAND
    - MARSH, OR SWAMP, WOODS
    - DRY RIVER BED WITH CHANNELS
    - SAND, ABOVE IN WATER
    - STRING BOG
    - TUNDRA PONDS, POLYGONS
    - RAPIDS
    - FRESHWATER FLATS
    - ROCK
    - DAM
    - WHARF
    - DITCH
  - RELIEF FEATURES**
    - CONTOURS
    - APPROXIMATE CONTOUR
    - DEPRESSION
    - ESKER
    - PINGO
    - SAND, SAND DUNES
    - PALSA BOG
    - WOODED AREA
    - LICENCE BOUNDARY
    - LICENCE UNDER APPLICATION



104H/1	104H/10	104H/9
104H/6	104H/7	104H/8
104H/3	104H/2	104H/1
104A/104A	104A/4	104A/6

APPENDIX I

GR-MT. KLAPPAN 83(2)A

**GULF CANADA RESOURCES INC.**

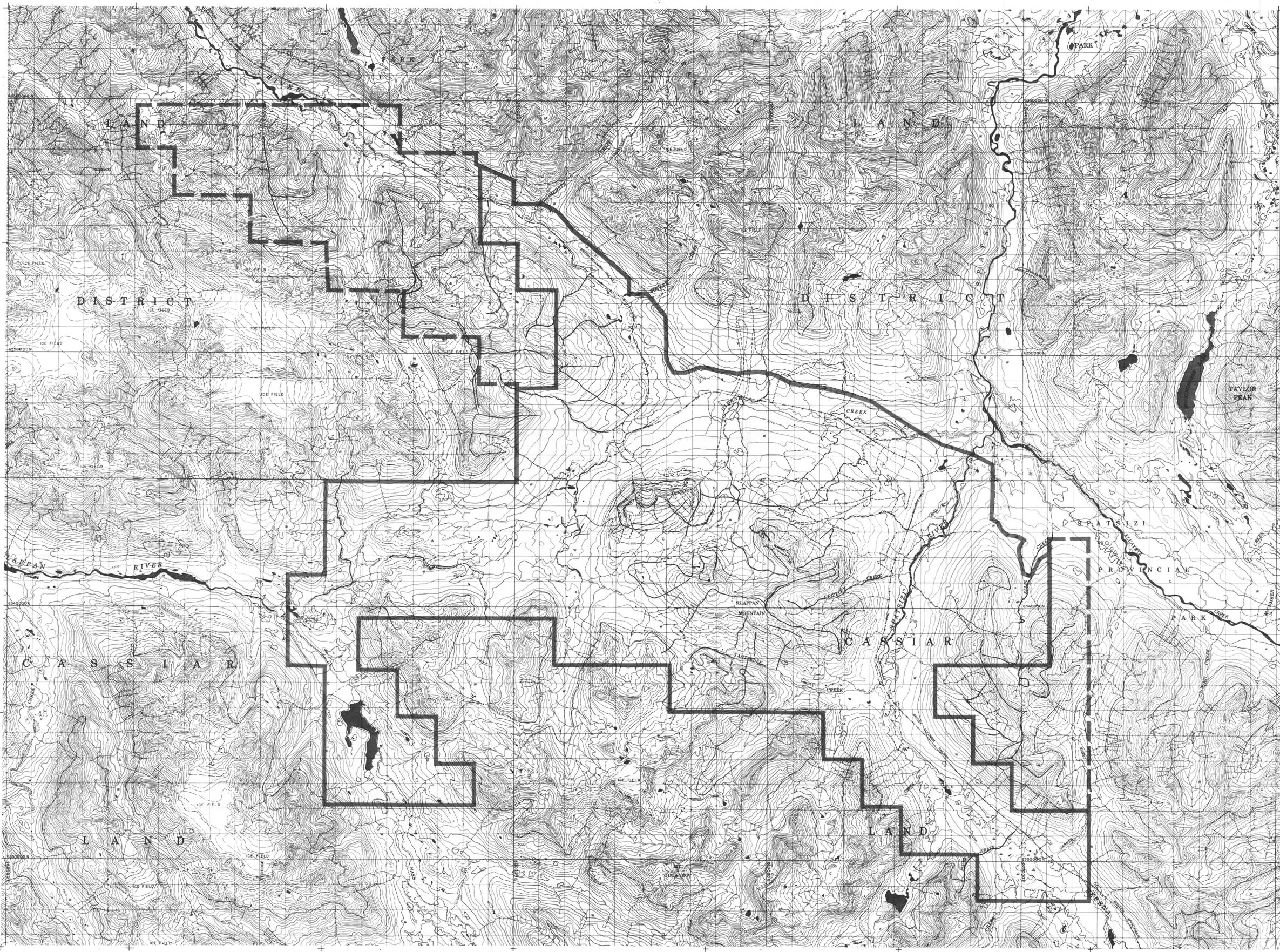
Calgary Coal Division Alberta

**MT. KLAPPAN COAL PROPERTY**

**1983 TRENCH AND DRILL HOLE LOCATION MAP WITH LICENCES**

PREPARED BY: C. LOUIE DRAWING No. KPN85A03

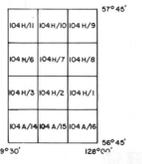
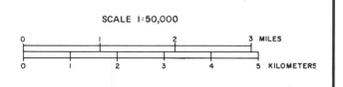
APPROVED BY: C. WILLIAMS DATE: JAN, 1984



57°25'  
57°20'  
57°15'  
57°10'  
57°05'

129°20'00"  
129°15'00"  
129°00'00"  
128°45'00"  
128°30'00"

- LEGEND**
- ROADS AND RELATED FEATURES**
- HARD SURFACE ALL WEATHER
  - LOOSE SURFACE
  - CART TRACK WINTER ROAD
  - TRAIL CUTLINE PORTAGE
  - BUILT UP AREA
  - RAILWAY, SIGNAL, STATION, STOP
  - BRIDGE
  - SEWERAGE BASE, ANCHORAGE
- LANDMARK FEATURES**
- HOUSE BARN
  - CHURCH SCHOOL
  - POST OFFICE
  - HISTORICAL SITE
  - TOWERS FIRE RADIO
  - WELL OIL GAS
  - TANK OIL GAS/STONE WATER
  - TELEPHONE LINE
  - POWER TRANSMISSION LINE
  - MINE
  - CUTTING EMBANKMENT
  - GRAVEL PIT
- BOUNDARIES AND CONTROL**
- INTERNATIONAL PROVINCIAL BOUNDARY MONUMENT
  - COUNTY DISTRICT
  - TOWNSHIP PARISH - SURVEYED
  - TOWNSHIP DLS - SURVEYED
  - MUNICIPALITY
  - INDIAN RESERVE PARK ETC
  - HORIZONTAL CONTROL POINT
  - BENCH MARK
  - SPOT ELEVATION ELEVATION APPROXIMATE
- DRAINAGE AND RELATED FEATURES**
- STREAM SHORELINE INDEFINITE
  - DIRECTION OF FLOW
  - LAKE INTERMITTENT
  - INUNDATED FLOODED LAND
  - MARSH OR SWAMP (WOODED)
  - DRY RIVER BED WITH CHANNELS
  - SAND ABOVE IN WATER
  - STRONG BOD
  - TUNDRA PONDS POLYTONS
  - RAPIDS
  - FORESHORE FLATS
  - ROCK
  - DAM
  - WHARF
  - DITCH
  - RELIEF FEATURES
  - CONTOUR
  - APPROXIMATE CONTOUR
  - DEPRESSION
  - ESKER
  - PINGO
  - SAND SAND DUNES
  - PULVER BOD
  - WOODED AREA
  - 1982 TRAVERSE LOCATION
  - 1983 TRAVERSE LOCATION
  - LICENCE BOUNDARY
  - LICENCE UNDER APPLICATION



APPENDIX I

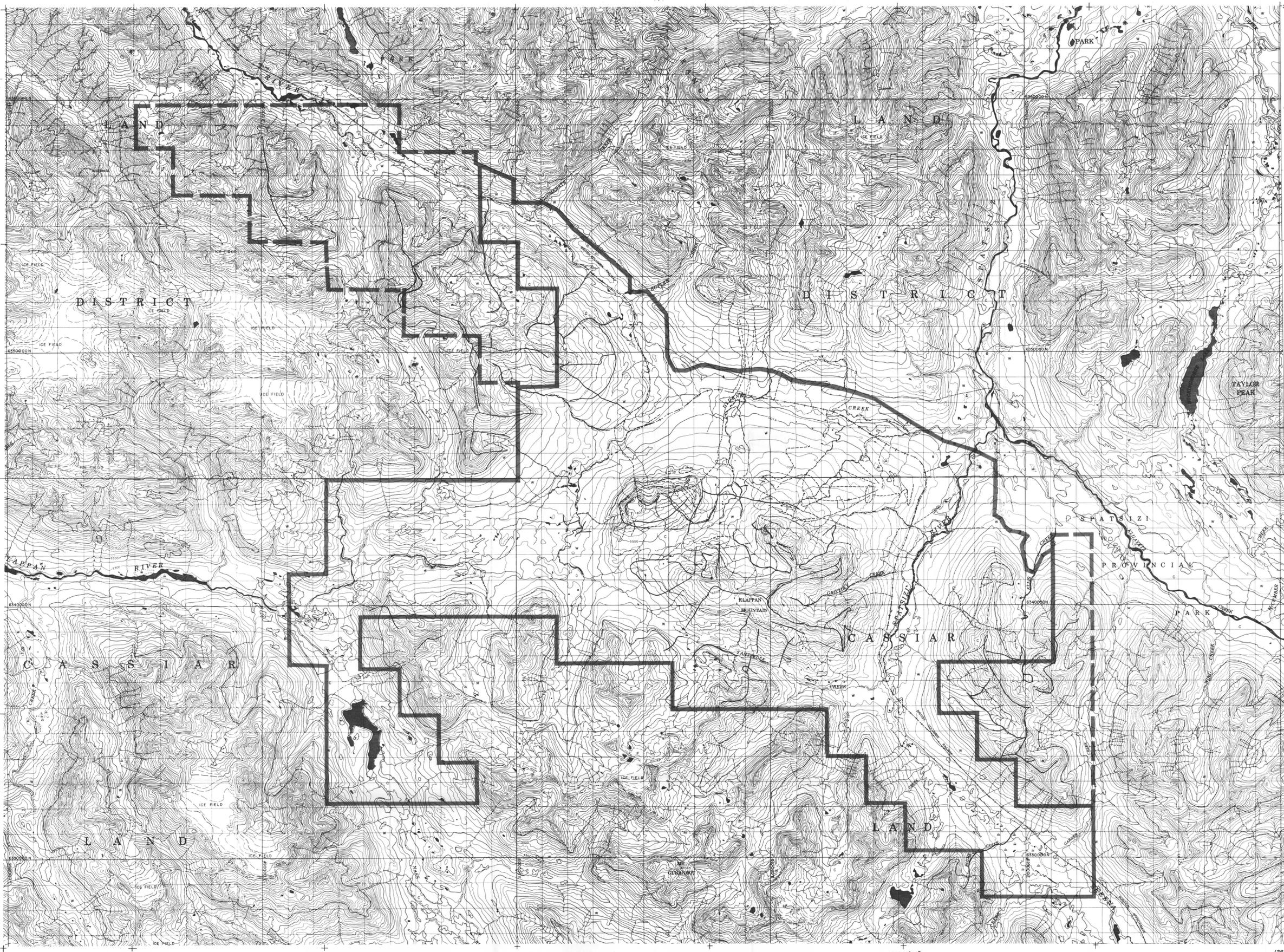
G. M. Klappan 83(2)

**GULF CANADA RESOURCES INC.**  
Coal Division ALBERTA

✓ MT. KLAPPAN COAL PROPERTY

**1982, 1983 TRAVERSE LOCATION MAP**

PREPARED BY: C. LOUIE      DRAWING No.      KPN83A04  
APPROVED BY: C. WILLIAMS      DATE: JAN., 1984



**LEGEND**

**ROADS AND RELATED FEATURES**

- HARD SURFACE ALL WEATHER
- LOOSE SURFACE
- CART TRACK WINTER ROAD UNDER CONSTRUCTION
- TRAIL CUTLINE PORTAGE
- BUILT UP AREA
- RAILWAY SIGNAL STATION STOP
- BRIDGE
- SEAPLANE BASE ANCHORAGE

**LANDMARK FEATURES**

- HOUSE BARN
- CHURCH SCHOOL
- POST OFFICE
- HISTORICAL SITE
- TOWER FIRE RADIO
- WELL OIL GAS
- TANK OIL GASOLINE WATER
- TELEPHONE LINE
- POWER TRANSMISSION LINE
- MINE
- CUTTING EMBANKMENT
- GRAVEL PIT

**BOUNDARIES AND CONTROL**

- INTERNATIONAL PROVINCIAL BOUNDARY MONUMENT
- COUNTY DISTRICT
- TOWNSHIP PARISH - SURVEYED
- TOWNSHIP QLS - SURVEYED
- TOWNSHIP QLS - UNSURVEYED
- SECTION CORNERS
- MUNICIPALITY
- INDIAN RESERVE PARK ETC
- HORIZONTAL CONTROL POINT
- BENCH MARK
- SPOT ELEVATION ELEVATION APPROXIMATE

**DRAINAGE AND RELATED FEATURES**

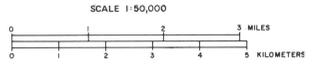
- STREAM SHORELINE INDEFINITE
- DIRECTION OF FLOW
- LAKE INTERMITTENT
- INUNDATED FLOODED LAND
- MARSH OR SWAMP WOODS
- DRY RIVER BED WITH CHANNELS
- SAND ABOVE IN WATER
- STRING BOG
- TUNDRA PONDS POLYGENS
- RAPIDS
- FORESHORE FLATS
- ROCK
- DAM
- WHARF
- DITCH
- RELIEF FEATURES
- CONTOURS
- APPROXIMATE CONTOUR
- DEPRESSION
- ESKER
- PINGO
- SAND SAND DUNES
- FALSA BOG
- WOODED AREA

**1982 TRAVERSE LOCATION**

**1983 TRAVERSE LOCATION**

**LICENCE BOUNDARY**

**LICENCE UNDER APPLICATION**



104 N/1	104 N/10	104 N/9
104 N/6	104 N/7	104 N/8
104 N/3	104 N/2	104 N/1
104 A/1004 A/10	104 A/6	

129°20'00" 129°15'00" 129°00'00" 128°45'00" 128°30'00" 57°25' 57°20' 57°15' 57°10'

57°05' 57°45' 129°30' 128°00'

APPENDIX I

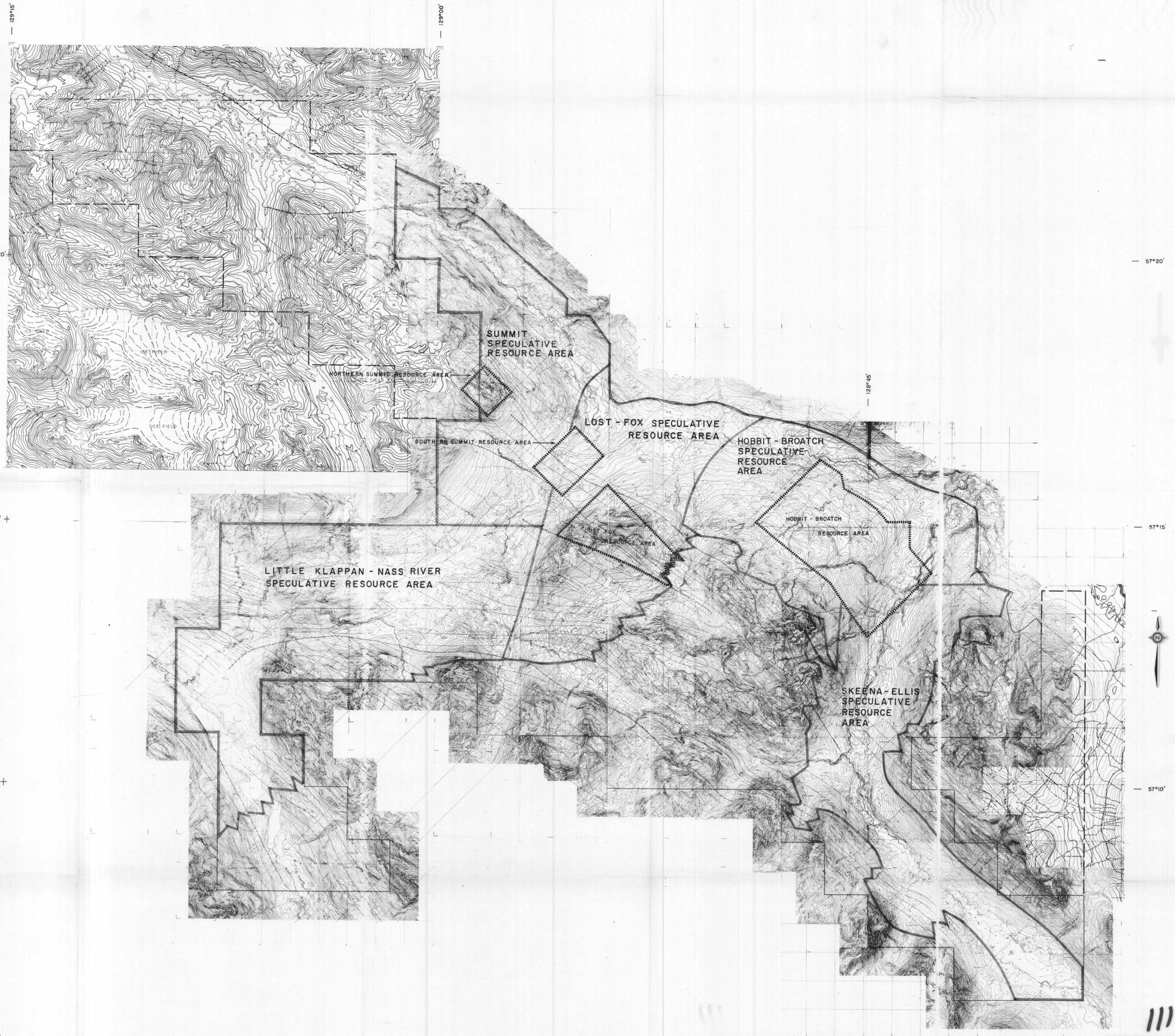
**GULF CANADA RESOURCES INC.**  
 Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY**

**1982, 1983 TRAVERSE LOCATION MAP**

PREPARED BY: C. LOUIE DRAWING No. KPN83A04  
 APPROVED BY: C. WILLIAMS DATE: JAN., 1984



**RHONDDA SEQUENCE**  
**JKr** Massive to thick conglomerates and grits interbedded with minor siltstones and shales.

**MALLOCH SEQUENCE**  
**JKm** Interbedded cyclic sequences of predominantly dark grey to dark brown weathering siltstones, orange weathering siliceous nodular siltstones and conglomerates. Unit shows marked increase in abundance of sandstones, massive conglomerates and thin coal seams towards the base. Coal seams average 1.0 to 2.0 metres in thickness and contain abundant rock splits. Sequence may contain petrified wood.

**KLAPPAN SEQUENCE**  
**JKk** Sequence of predominantly dark grey weathering mudstones and siltstones interbedded with fine to coarse grained sandstones, occasional thin bedded calcareous orange weathering siltstone nodules, conglomerates, and abundant coal seams up to 5.7 m thick. Unit grades downwards into repetitive sequence of predominantly tabular bedded, medium to coarse grained conglomeratic sandstones which may display trough cross stratification. Interbedded siltstones and mudstones often displaying low angle cross lamination. Thick coal seams may be associated with the more massive of the sandstone beds. Fossils associated with the fine grained sediments include several species of bivalves as well as rare belemnites and ammonites.

- LEGEND**
- LICENCE BOUNDARY
  - GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
  - COAL SEAM (OUTCROP, INFERRED)
  - ANTICLINE (DEFINED, APPROXIMATE) (ARROW INDICATES PLUNGE DIRECTION)
  - SYNCLINE (DEFINED, APPROXIMATE) (ARROW INDICATES PLUNGE DIRECTION)
  - OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
  - OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
  - MONOCLINE - ARROW INDICATES DIP DIRECTION
  - BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
  - THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) (TEETH INDICATE UP/THRUST SIDE)
  - FAULT (DEFINED, APPROXIMATE, INFERRED) (SOLID CIRCLE INDICATES DOWNTHROWN SIDE)
  - ADIT
  - TRENCH LOCATION
  - MEASURED SECTION LOCATION
  - CROSS-SECTION LOCATION
  - DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)
  - SPECULATIVE RESOURCE AREA
  - INFERRED RESOURCE AREA

SCALE 1:50 000

0 1000 2000 3000 4000 5000 METERS

0 1 2 3 MILES

**GULF CANADA RESOURCES INC.**  
 Coal Division

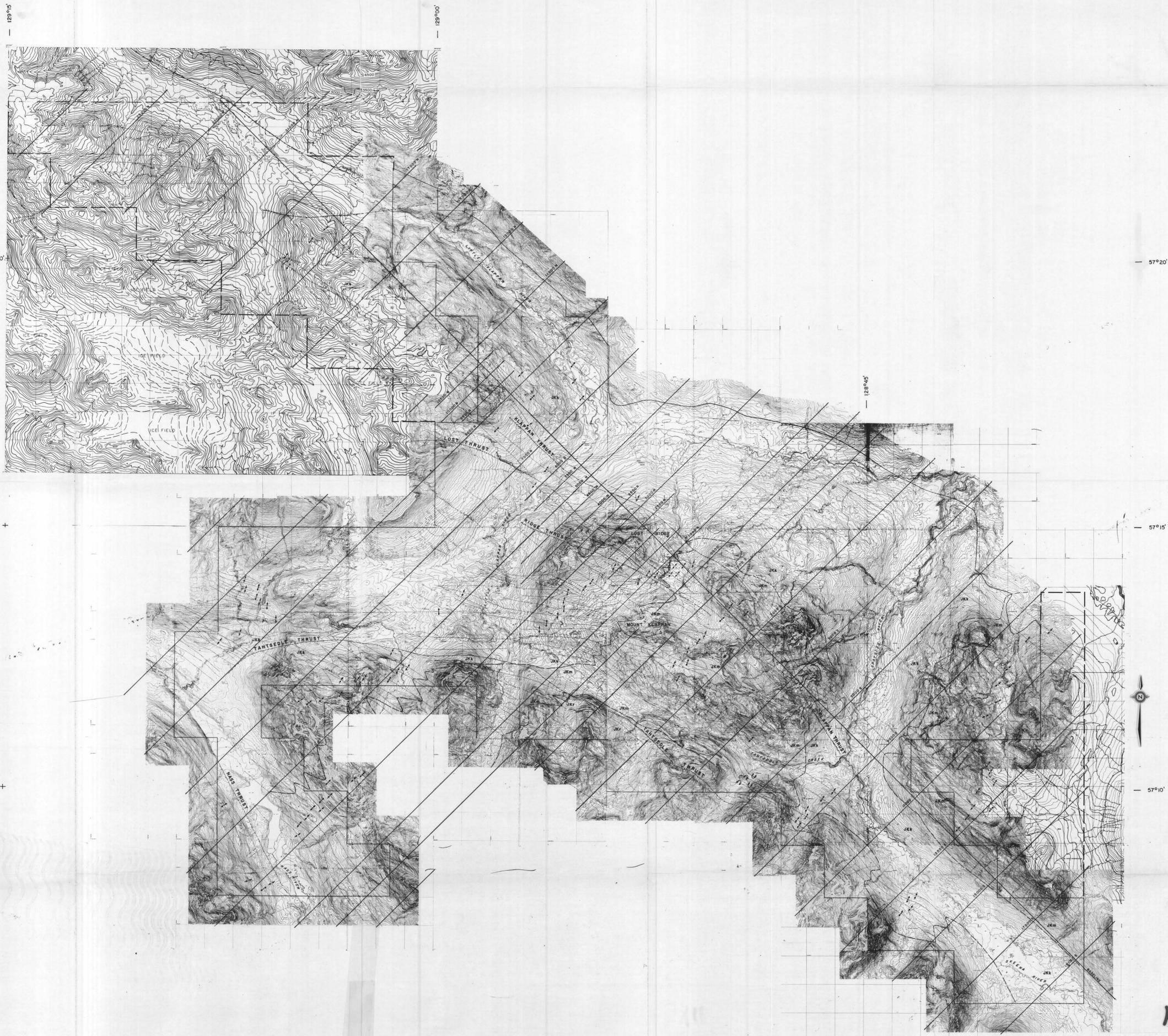
CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY**

**RESOURCE AREA MAP**

PREPARED BY: K.J., G.S., S.M.      DRAWING No. KPN 83A05  
 APPROVED BY: C. WILLIAMS      DATE: MARCH, 84

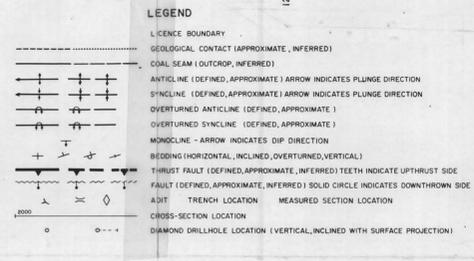
APPENDIX I



**RHONDDA SEQUENCE**  
**JKr** Massive to thick conglomerates and grits interbedded with minor siltstones and shales.

**MALLOCH SEQUENCE**  
**JKm** Interbedded cyclic sequences of predominantly dark grey to dark brown weathering siltstones, orange weathering siliceous nodular siltstones and conglomerates. Unit shows marked increase in abundance of sandstones, massive conglomerates and thin coal seams towards the base. Coal seams average 1.0 to 2.0 metres in thickness and contain abundant rock splits. Sequence may contain petrified wood.

**KLAPPAN SEQUENCE**  
**JKk** Sequence of predominantly dark grey weathering mudstones and siltstones interbedded with fine to coarse grained sandstones, occasional thin bedded calcareous orange weathering siltstone nodules, conglomerates, and abundant coal seams up to 5.7 m thick. Unit grades downwards into repetitive sequence of predominantly tabular bedded, medium to coarse grained conglomeratic sandstones which may display trough cross stratification. Interbedded siltstones and mudstones often displaying low angle cross lamination. Thick coal seams may be associated with the more massive of the sandstone beds. Fossils associated with the fine grained sediments include several species of bivalves as well as rare belemnites and ammonites.



SCALE 1:50,000  
 0 1000 2000 3000 4000 5000 METERS  
 0 1 2 3 MILES

*Ge. Mt. Klappan 83/84*

**GULF CANADA RESOURCES INC.**  
 Coal Division

CALGARY ALBERTA

**MT. KLAPPAN  
 1983 GEOLOGY MAP**

PREPARED BY: C.W., K.J., G.S., S.M. DRAWING No.  
 APPROVED BY: C.W. DATE: MAR. 84 KP83A06

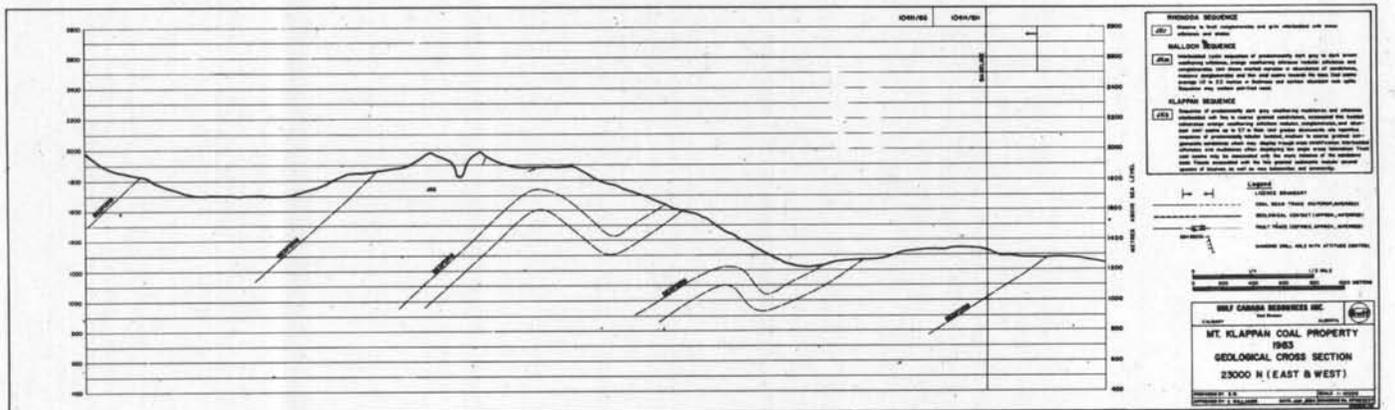
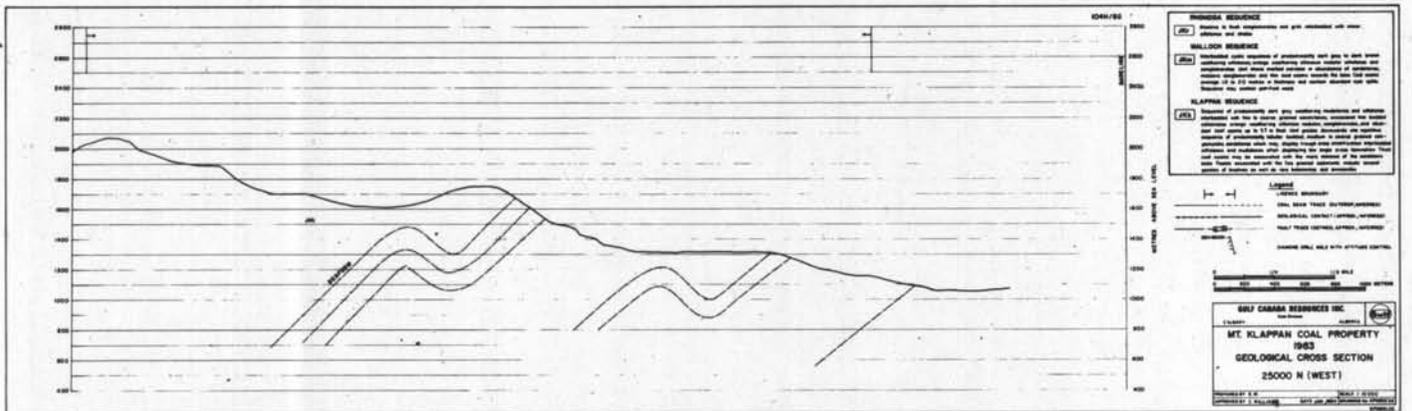
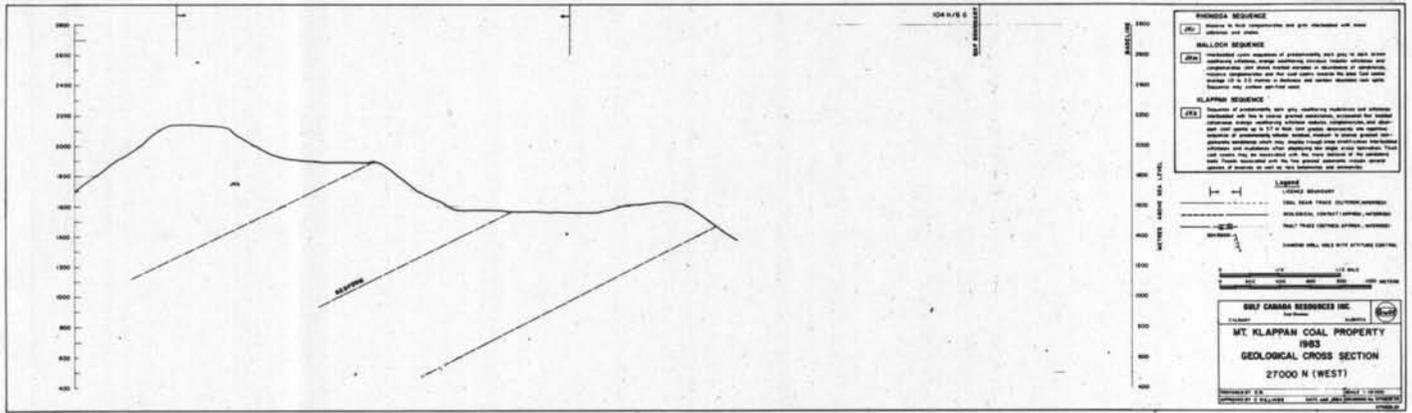
APPENDIX I

111



# MOUNT KLAPPAN COAL PROPERTY 1983 GEOLOGY CROSS-SECTIONS 1:50,000

## APPENDIX I



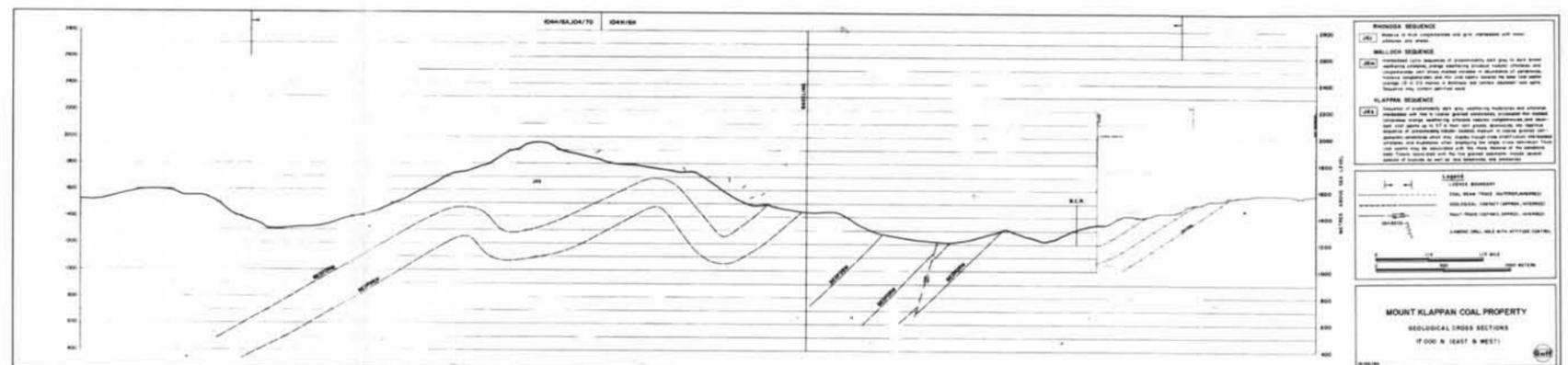
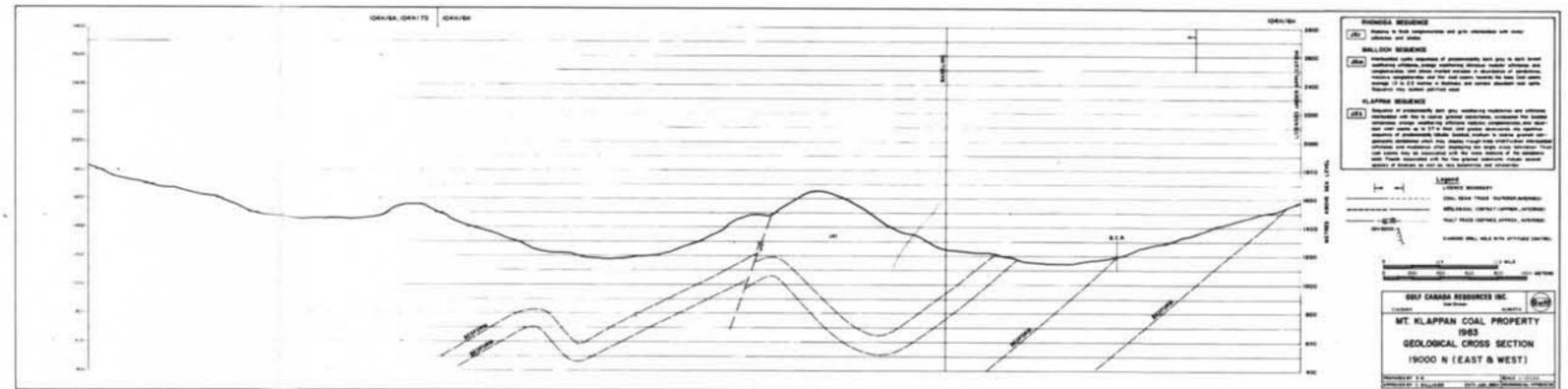
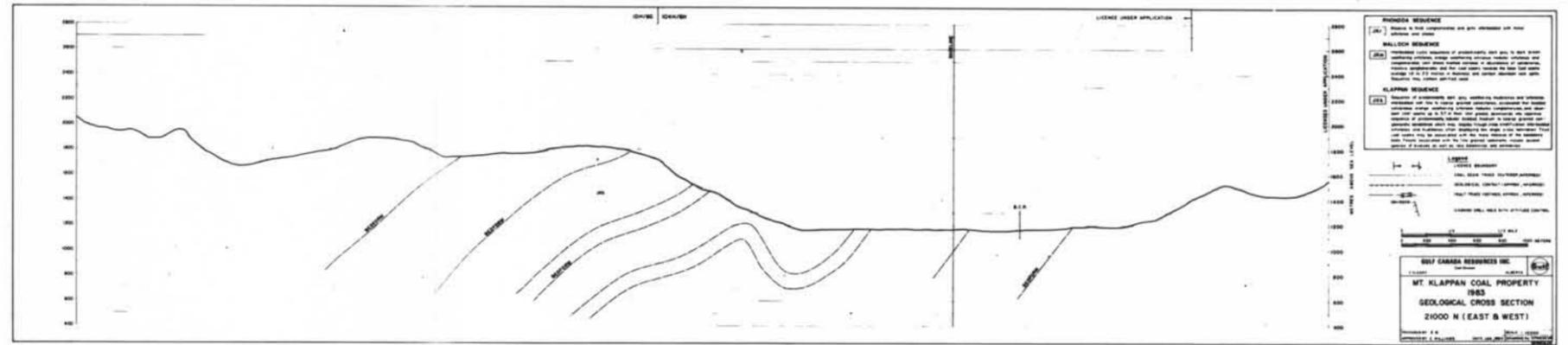
# MOUNT KLAPPAN COAL PROPERTY

## 1983 GEOLOGY CROSS-SECTIONS

1:50,000

GR-MT. KLAPPAN 83(2)A

APPENDIX I



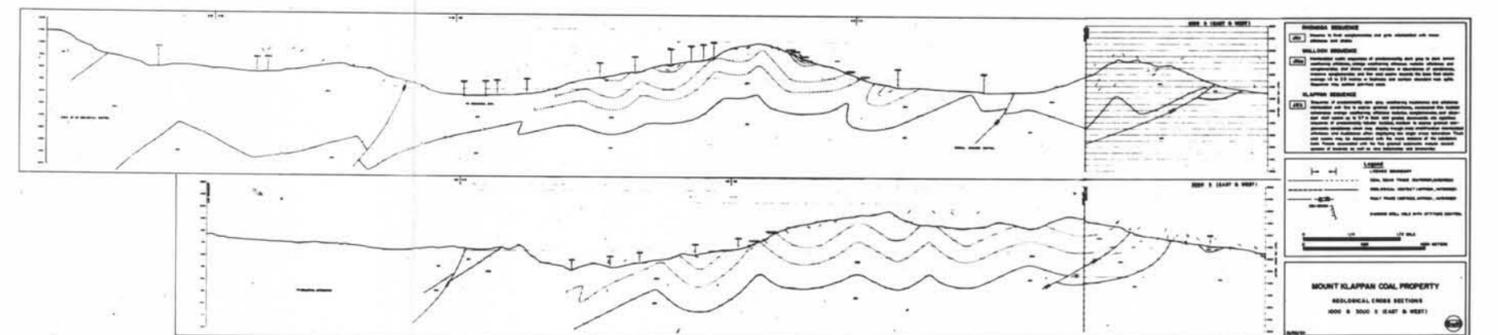
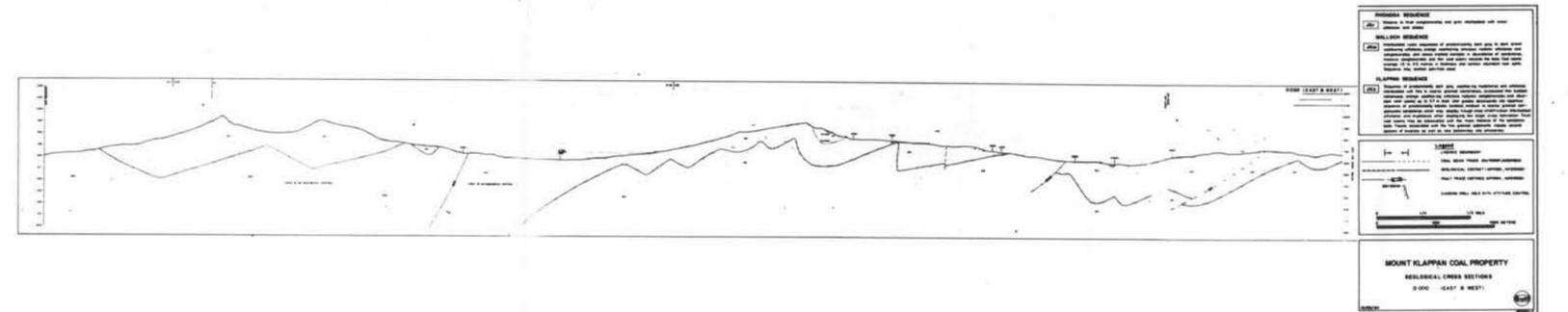
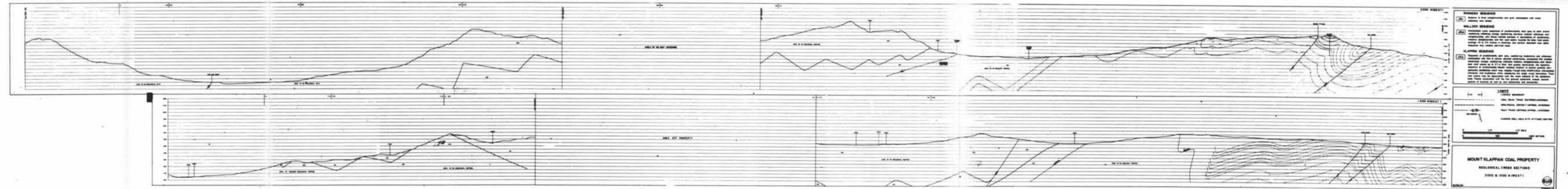


# MOUNT KLAPPAN COAL PROPERTY

## 1983 GEOLOGY CROSS-SECTIONS

1:50,000

APPENDIX I

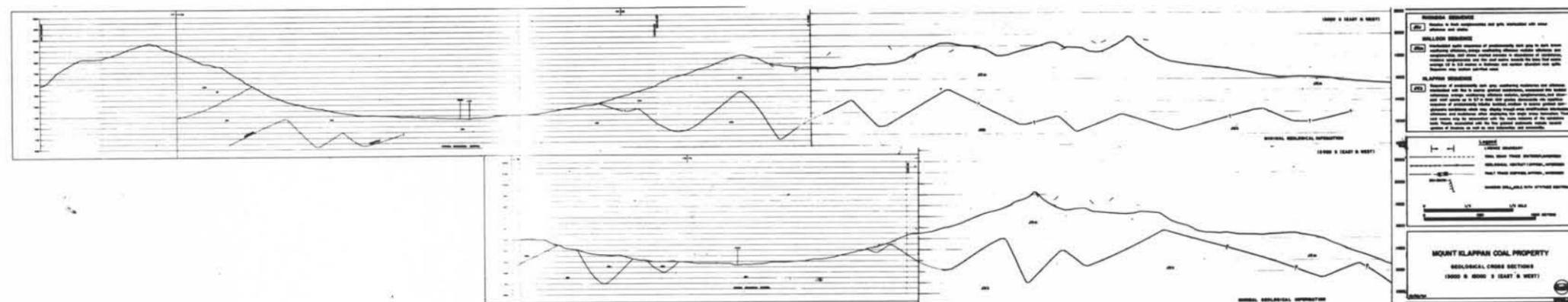
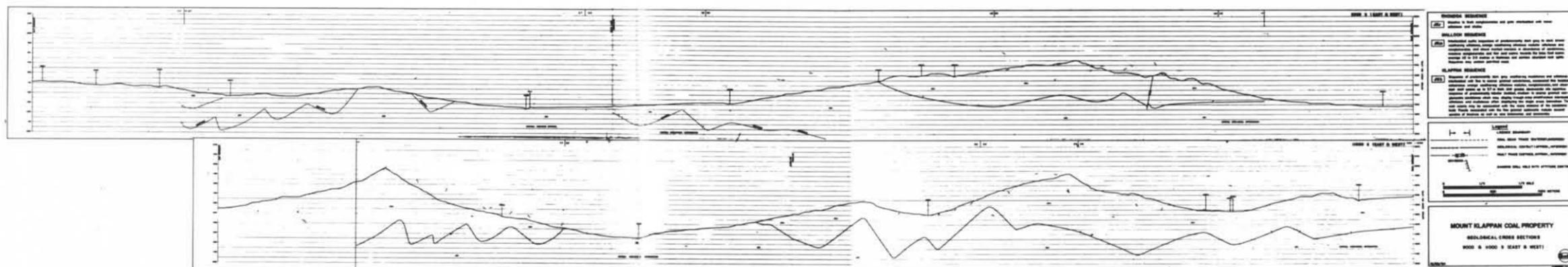
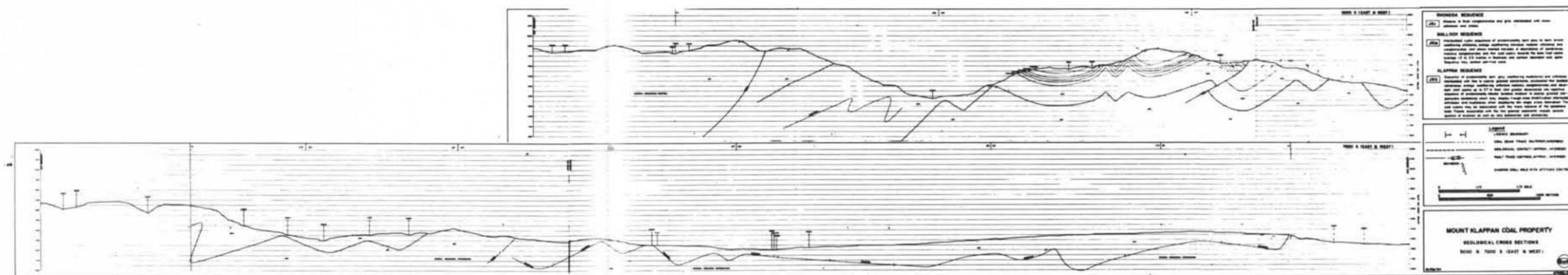


# MOUNT KLAPPAN COAL PROPERTY

## 1983 GEOLOGY CROSS-SECTIONS

1:50,000

APPENDIX I

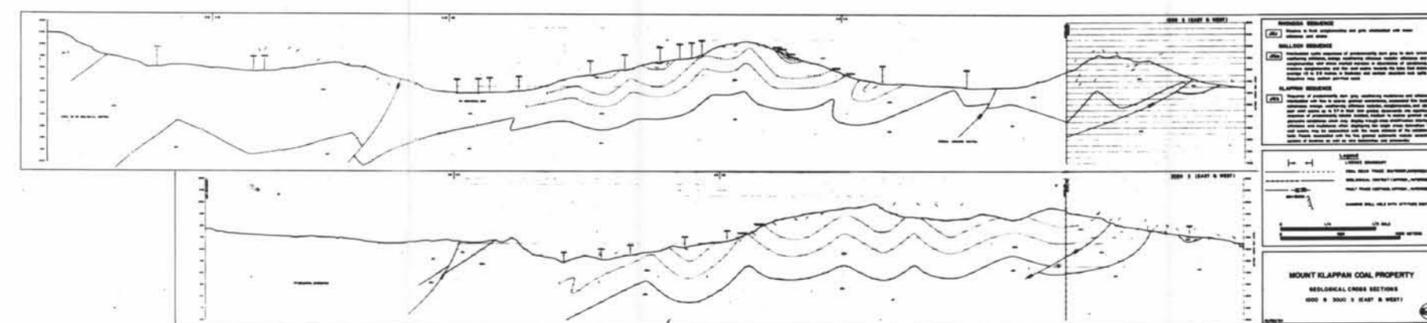
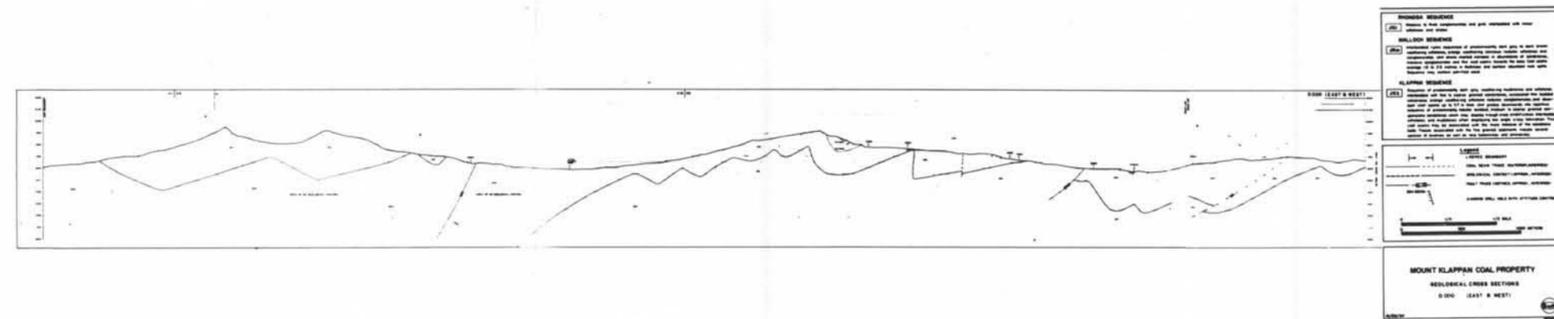
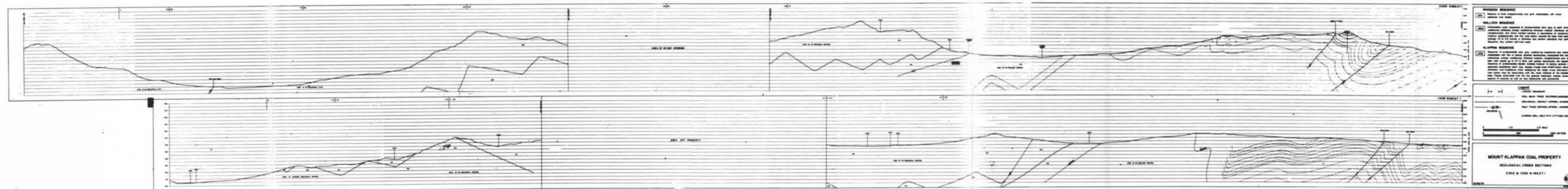


# MOUNT KLAPPAN COAL PROPERTY

## 1983 GEOLOGY CROSS-SECTIONS

1:50,000

APPENDIX I

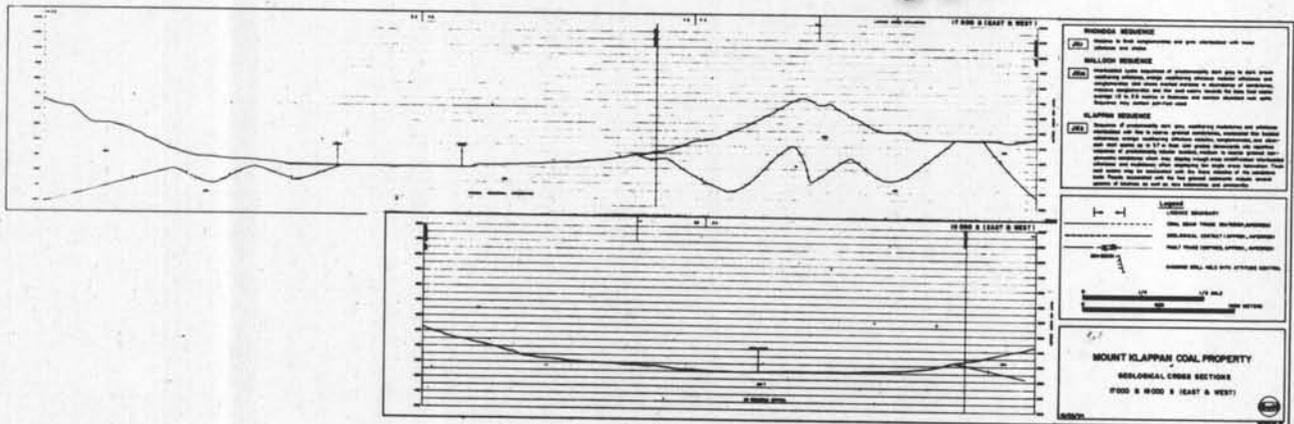


# MOUNT KLAPPAN COAL PROPERTY 1983 GEOLOGY CROSS-SECTIONS

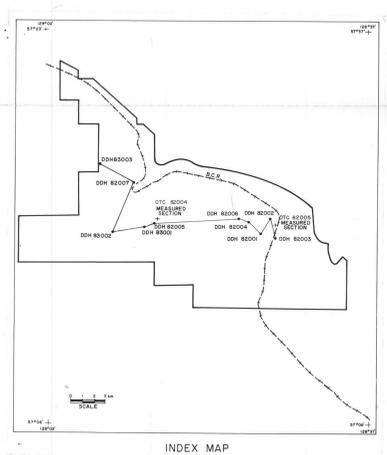
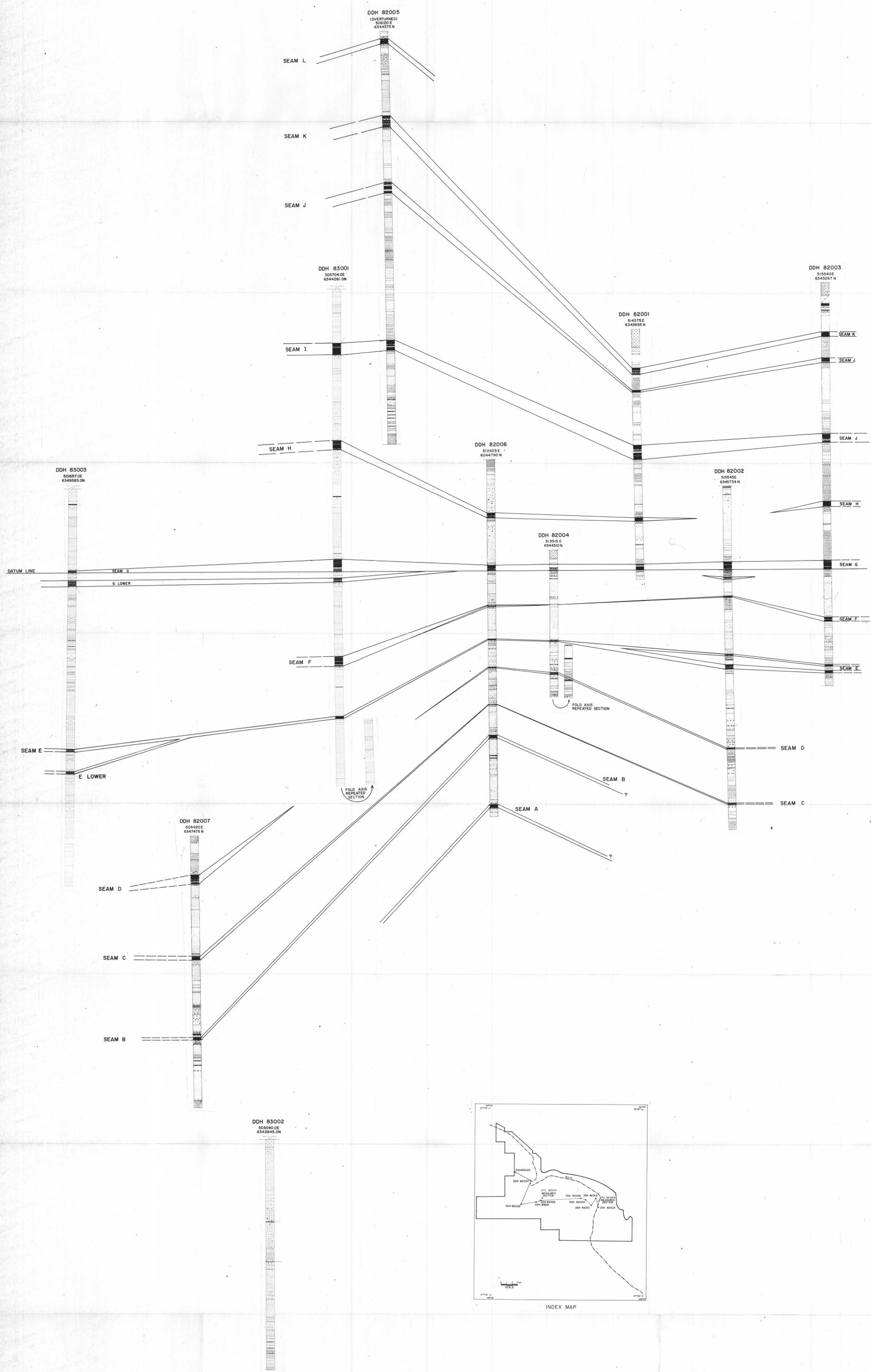
1:50,000 GR. MT. KLAPPAN

83(2)A

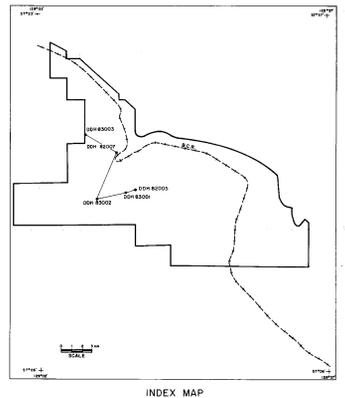
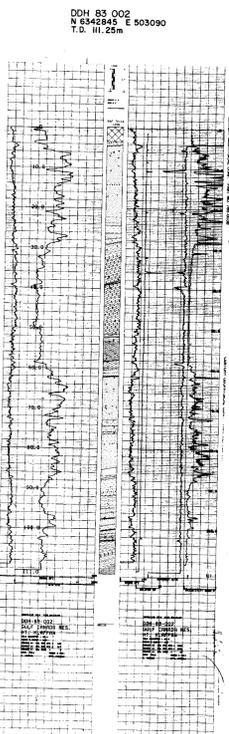
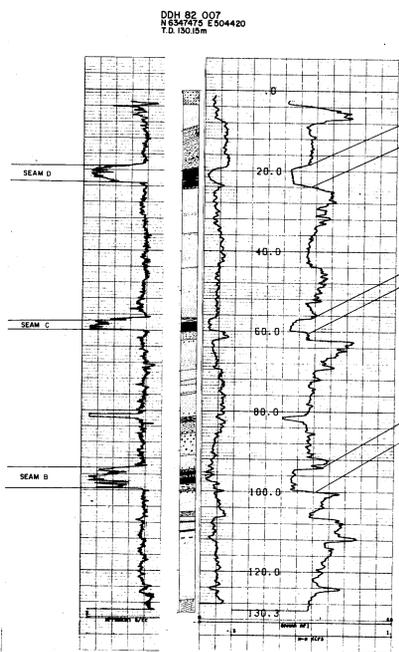
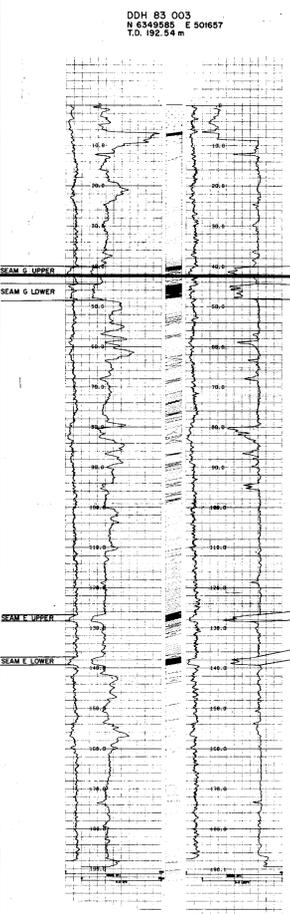
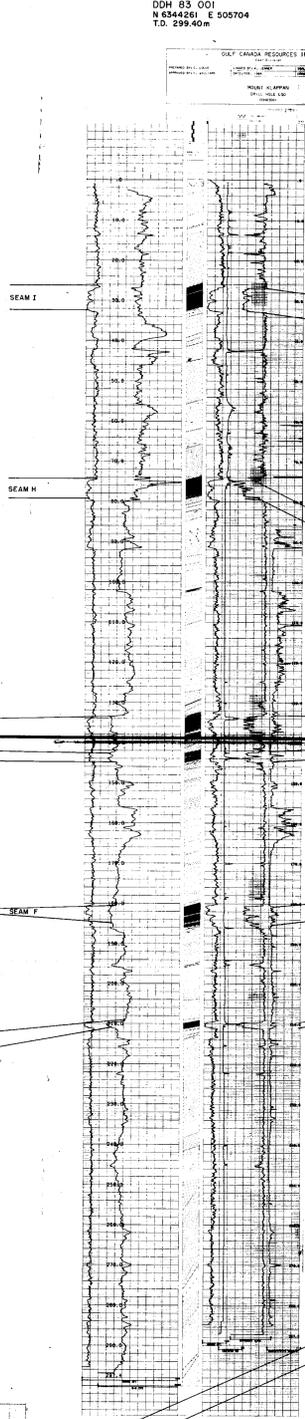
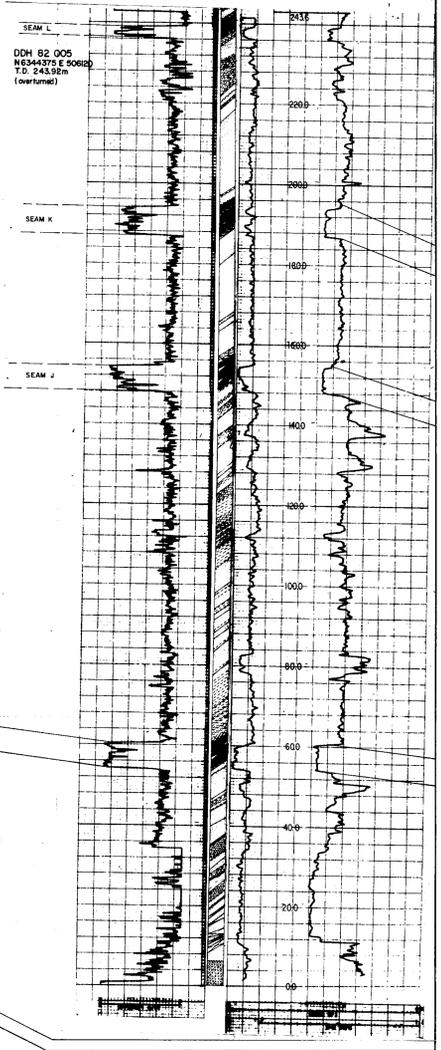
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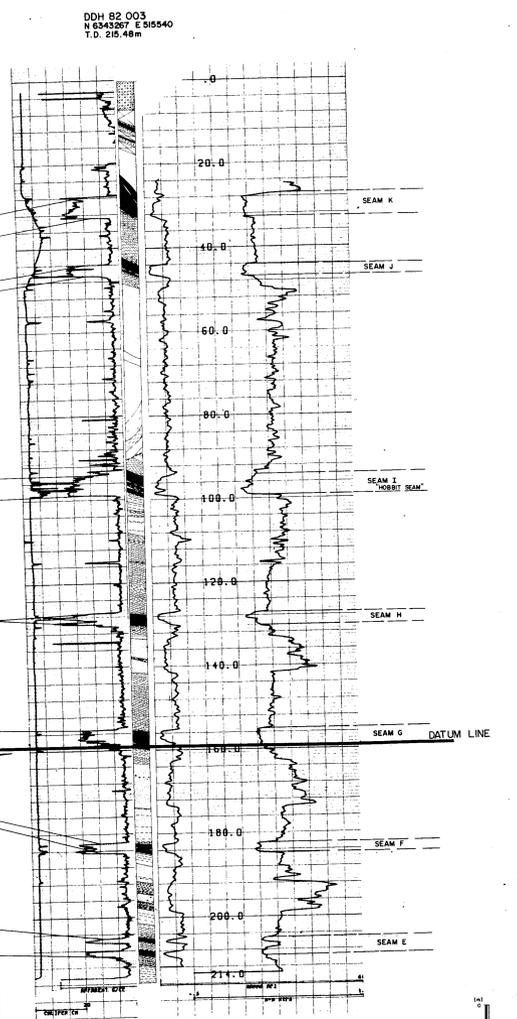
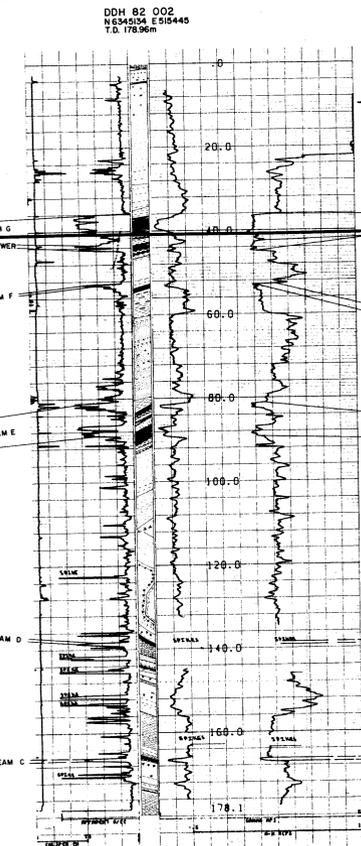
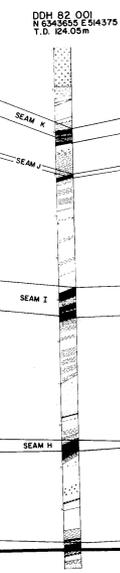
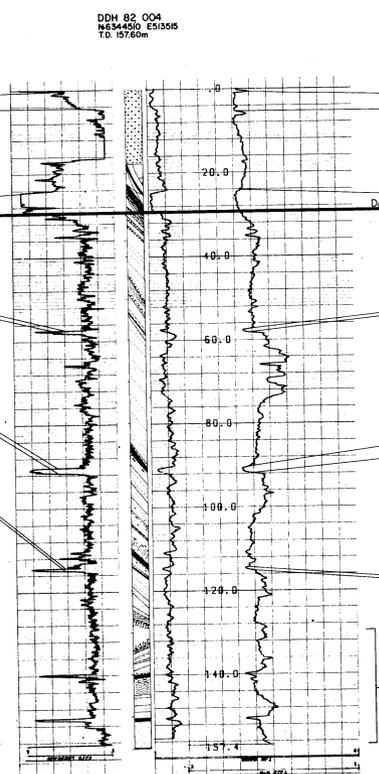
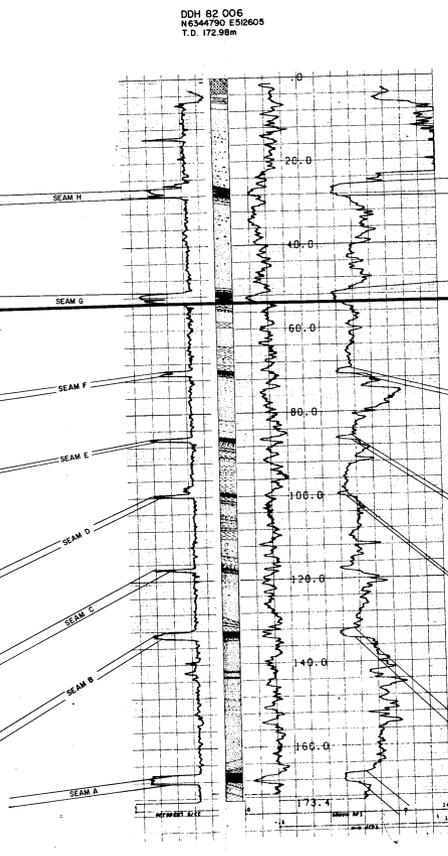
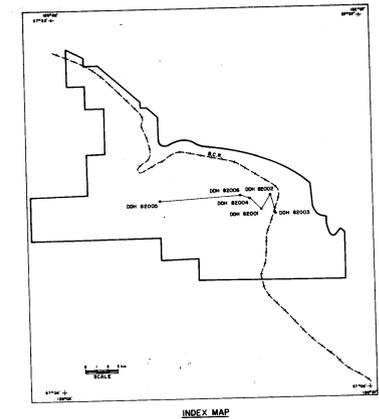
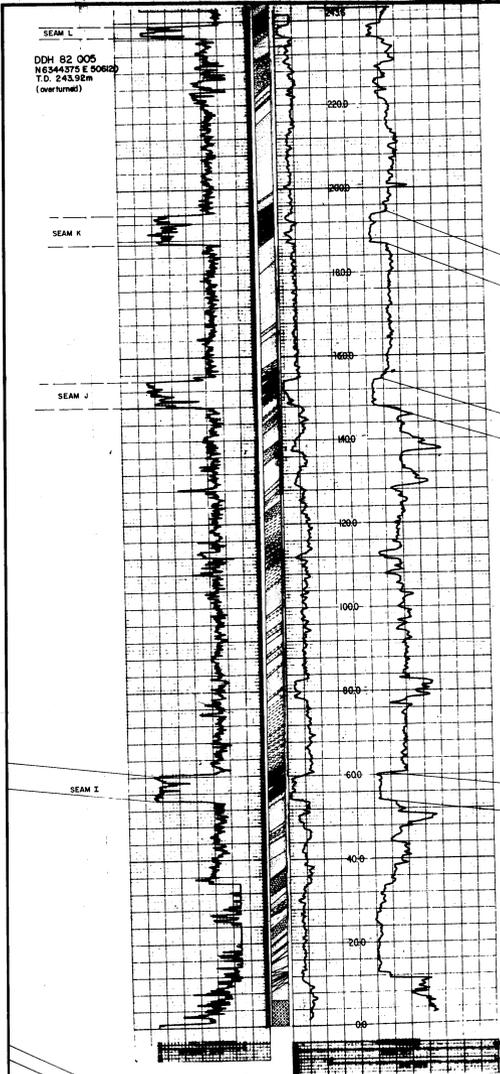


APPENDIX I









DATUM LINE



DDH 83 001

DDH 82 005

DDH 82 006

DDH 82 001

DDH 82 003

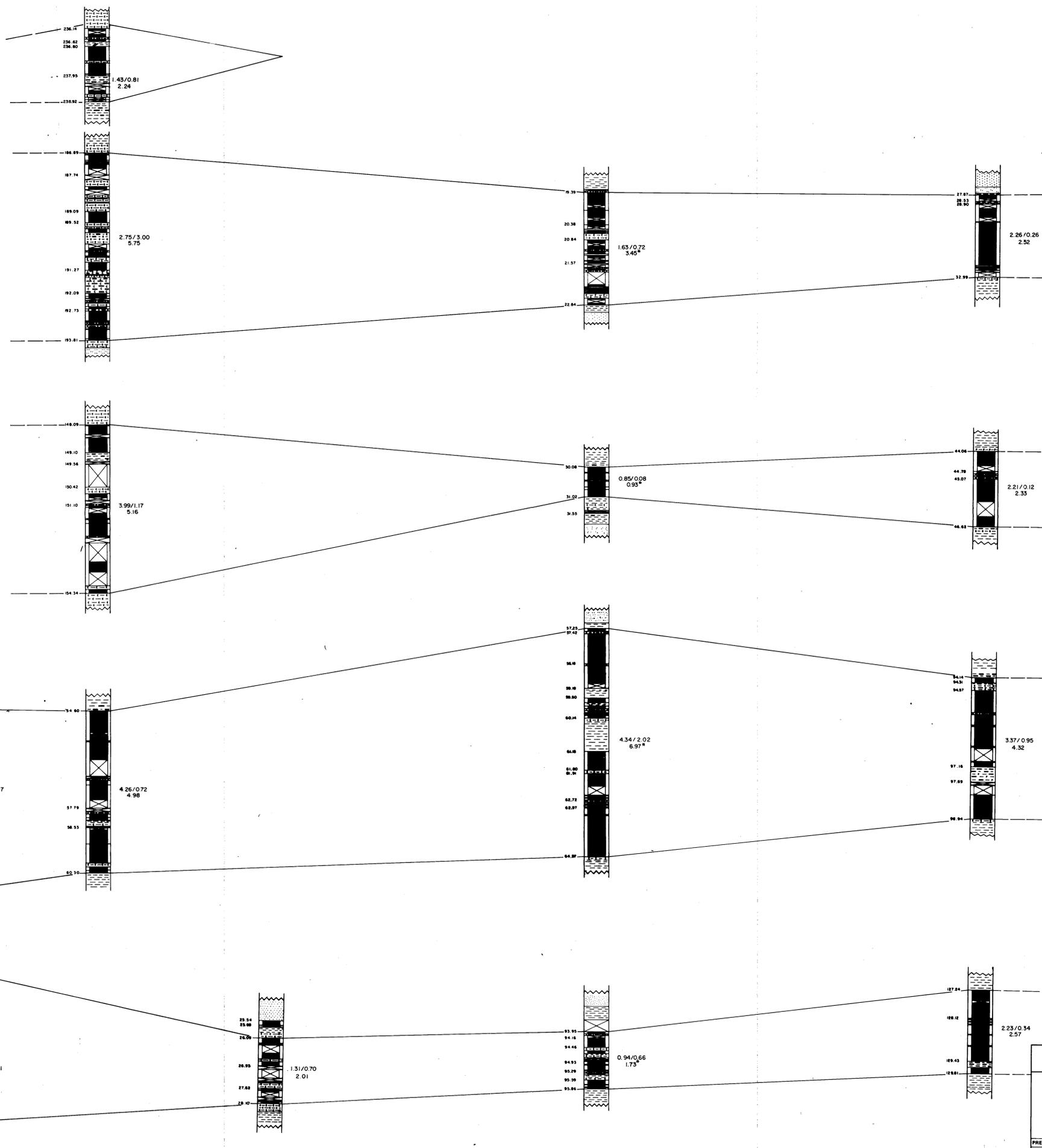
SEAM L

SEAM K

SEAM J

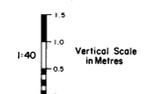
SEAM I

SEAM H



**LITHOLOGIC SYMBOLS**

	CONGLOMERATE		FELSIC SANDSTONE
	SANDSTONE		MUDSTONE, CLAYSTONE
	CARBONACEOUS		BENTONITE
	SILTSTONE		PYRITE
	COAL		CORE LOSS
	COAL - THIN BEDS		PLANT FOSSIL
	OVERBURDEN		SHELL FOSSIL
	QUARTZ		



3.37/0.95 Coal to Rock Ratio  
4.32 Total Seam True Thickness

\* Drill hole 82 001 was not geophysically logged - core loss is included in the total seam thickness but it is unknown if it is coal or rock.

DDH 82003 Diamond Drill Hole

GULF CANADA RESOURCES INC.  
Coal Division

MT. KLAPPAN COAL PROPERTY  
DETAILED SEAM TO SEAM CORRELATION  
SEAMS H - L

PREPARED BY: G. SEVE  
APPROVED BY: B. WILLIAMS

DRAWING No. KPN83 805  
DATE: MARCH, 1990