



MOUNT KLAPPAN
COAL PROJECT
GEOLOGICAL REPORT
1983

APPENDIX II

GEOLOGY MAPS AND
CROSS - SECTIONS

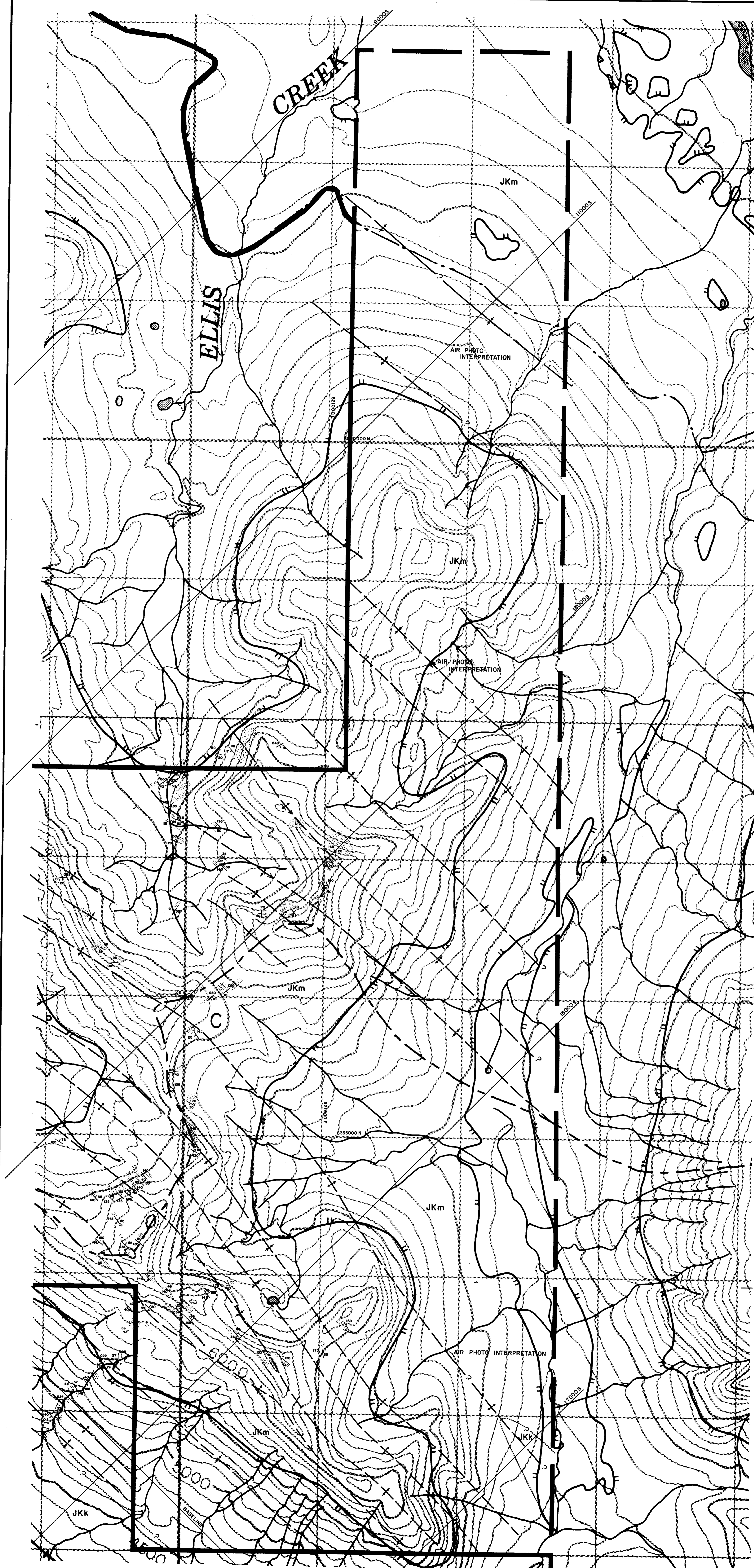
VOLUME I

GEOLOGICAL MAPS
1:5 000 & 1:10 000

GEOLOGICAL BRANCH
ASSESSMENT REPORT

00 111

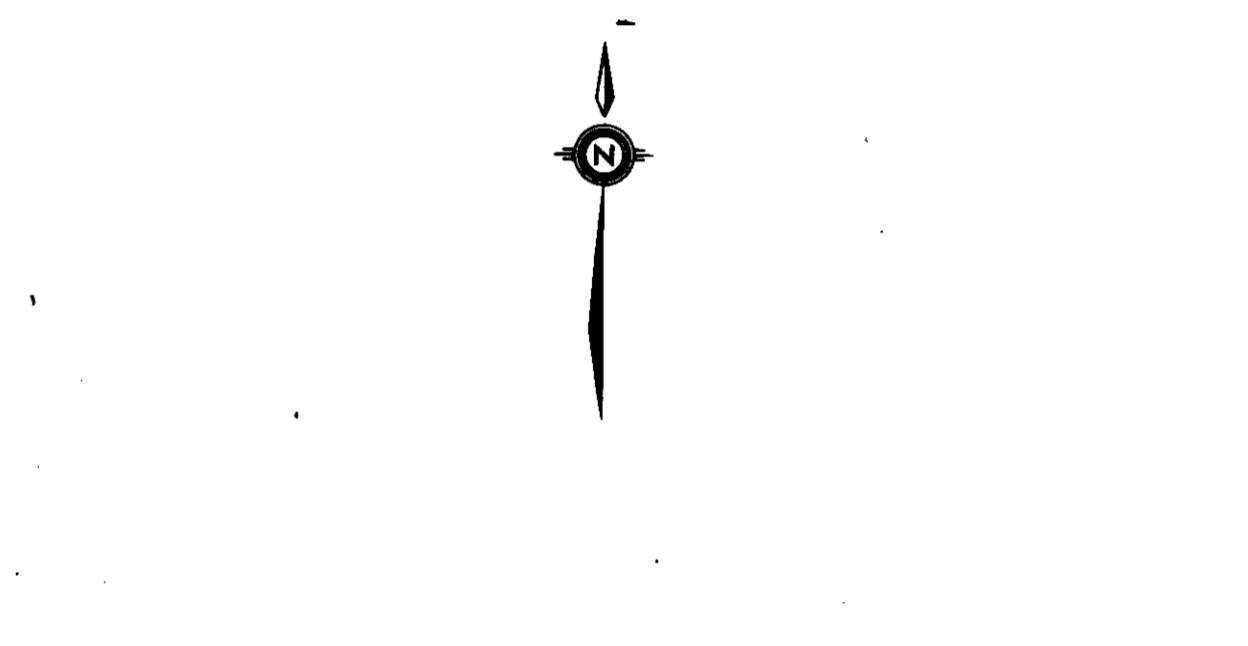
GA - M.F. KLAPPAN 83(2)A



LEGEND

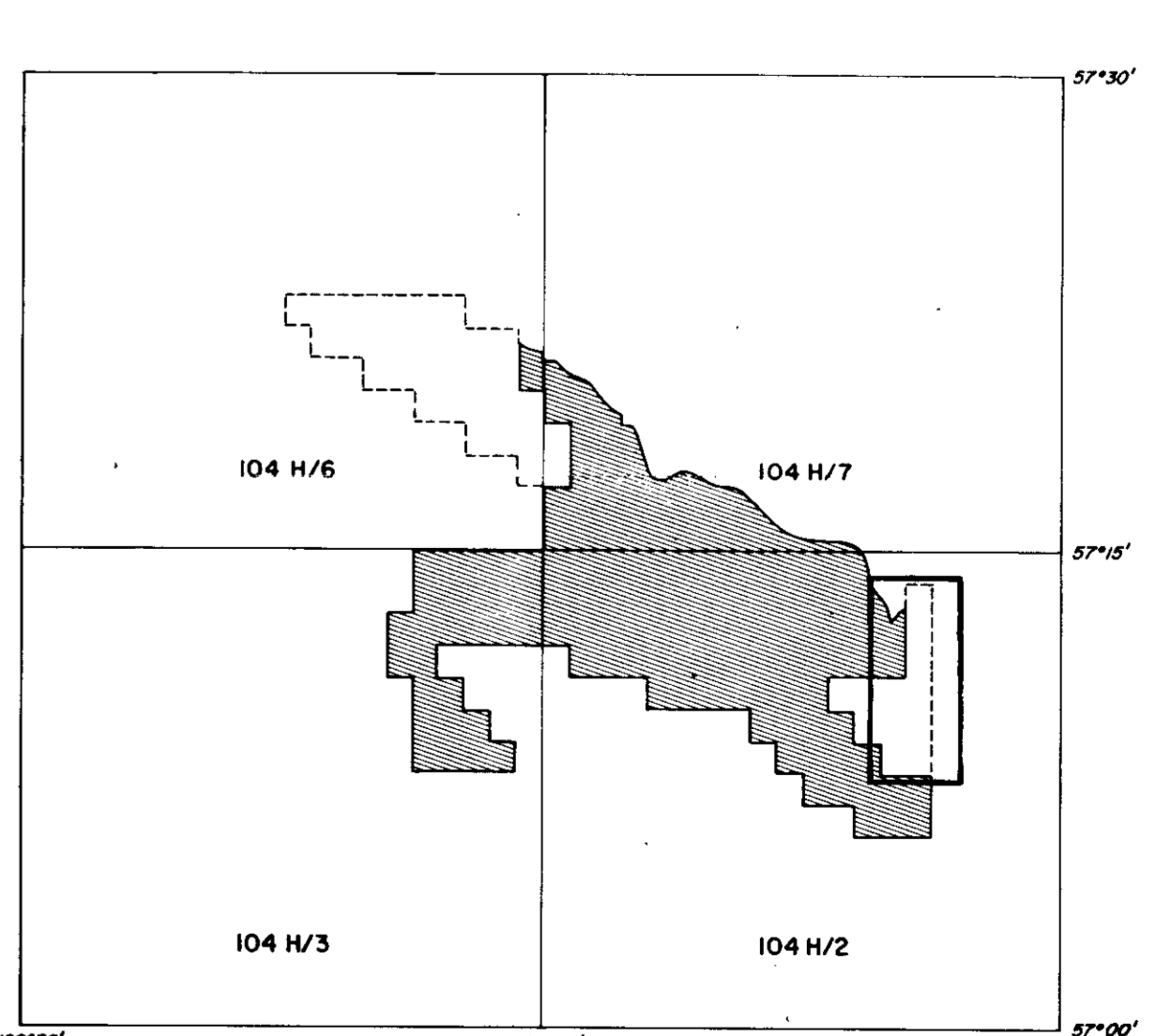
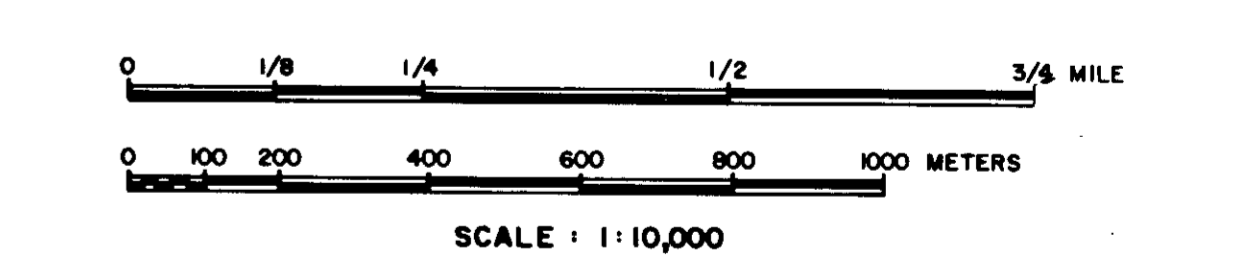
---	LICENCE BOUNDARY
---	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
---	COAL SEAM (OUTCROP, INFERRED)
+	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
+	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
+	OVERTHROWN ANTICLINE (DEFINED, APPROXIMATE)
+	OVERTHROWN SYNCLINE (DEFINED, APPROXIMATE)
+	MONOCLINE - ARROW INDICATES DIP DIRECTION
+	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
+	THrust FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UPRIGHT SIDE
+	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWNTHROW SIDE
+	ADIT
+	TRENCH LOCATION
+	CROSS-SECTION LOCATION
+	MEASURED SECTION LOCATION
+	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

- 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

---	ROADS AND RELATED FEATURES
---	HARD SURFACE, ALL WEATHER
---	LOOSE SURFACE
---	CART TRACK, WINTER ROAD
---	UNDER CONSTRUCTION
---	TRAIL, OUTLINE, PORTAGE
---	BUILT UP AREA
---	RAILWAY Siding 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
---	UNSURVEYED
---	TOWNSHIP, DLS - SURVEYED
---	UNSURVEYED
---	SECTION CORNERS
---	MUNICIPALITY
---	INDIAN RESERVE, PARK, ETC.
---	HORIZONTAL CONTROL POINT
---	BENCH MARK
---	SPOT ELEVATION, ELEVATION APPROXIMATE
---	280 721
---	BOUNDARIES 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 BOG
---	TUNDRA POND, POLYGENOUS
---	RAPIDS
---	FORESHORE FLATS
---	ROCK
---	DAM
---	WHARF
---	DITCH
---	RELIEF FEATURES
---	CONTOURS
---	APPROXIMATE CONTOUR
---	DEPRESSION
---	ESKER
---	FRODO
---	SAND, SAND DUNES
---	PALSA BOG
---	WOODED AREA
---	LICENCE BOUNDARY
---	LICENCE UNDER APPLICATION



Ge. Mt. Klappan (3/2/2)

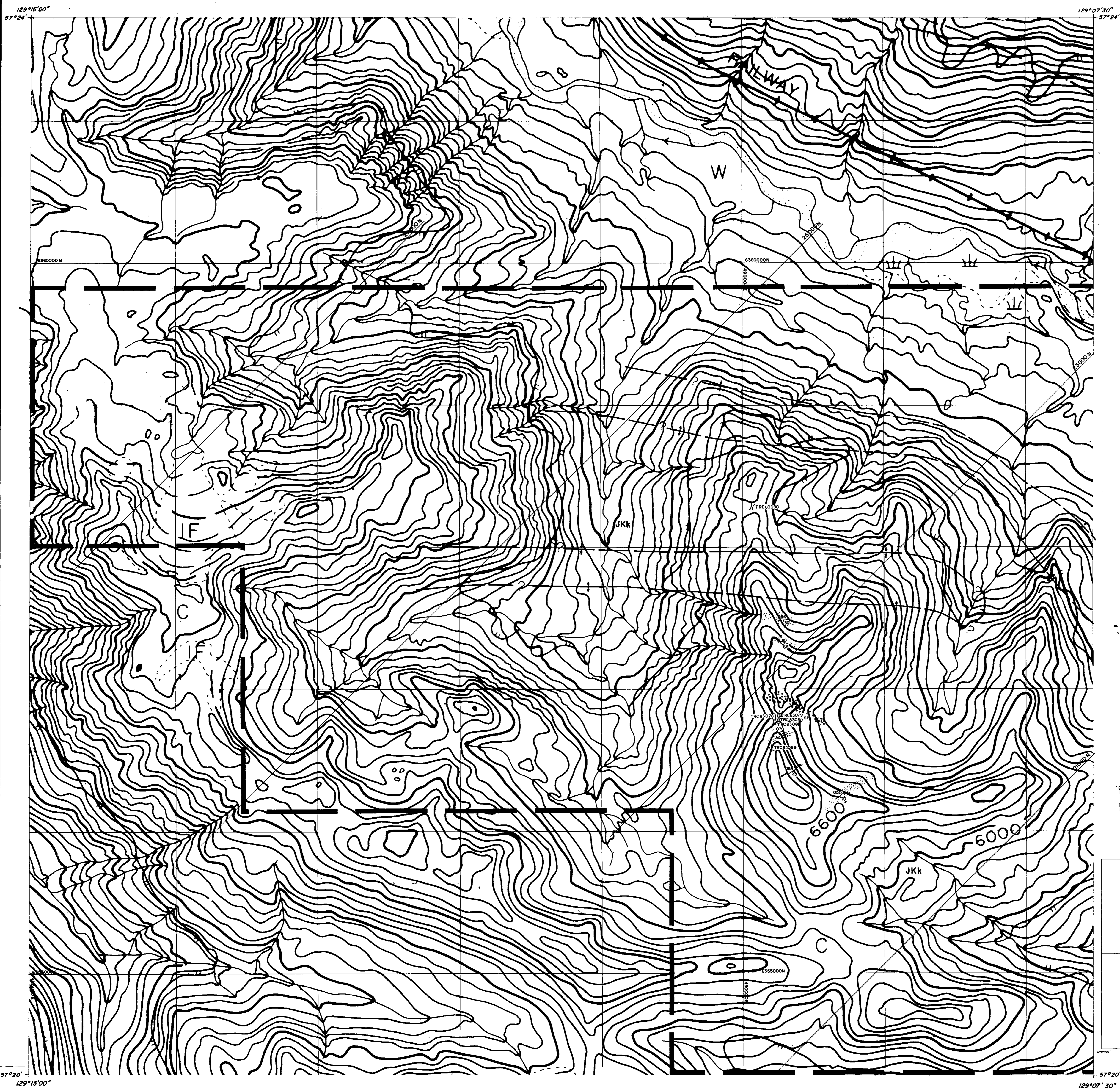
GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
MAP SHEET 104 H/2 G, J
ELLIS RIDGE
GEOLOGY

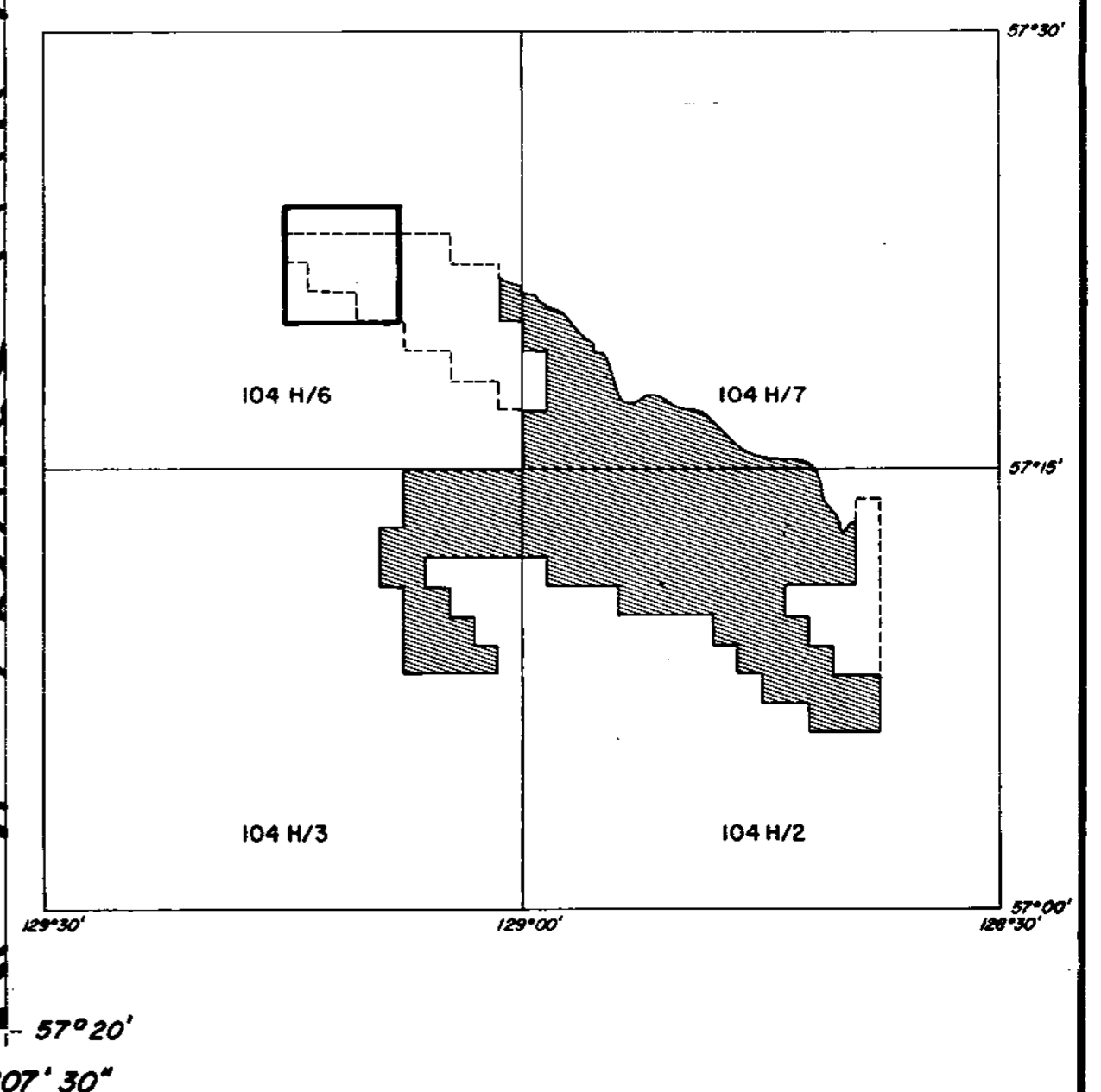
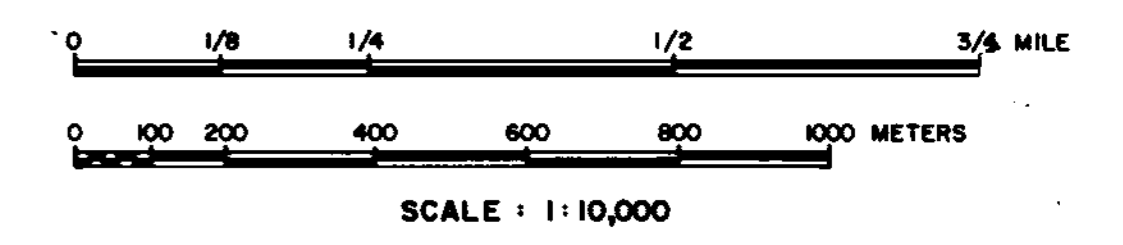
PREPARED BY: G.S.
APPROVED BY: C. WILLIAMS

DRAWING No. KPN-501
DATE: FEB. 1984



LEGEND

- ROADS AND RELATED FEATURES**
- HARD SURFACE - ALL WEATHER
- LOOSE SURFACE
- CART TRACK, WATER ROAD
- TRAIL, CUTLINE, PORTAGE
- BUILT UP AREA
- RAILWAY, SIGNAL, 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
- MINE
- CUTTING, EMBANKMENT
- GRAVEL PIT
- BOUNDARIES AND CONTROL**
- INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
- COUNTY, DISTRICT
- TOWNSHIP, PARISH - SURVEYED
- TOWNSHIP, DLS - SURVEYED
- MUNICIPALITY
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- SPOT ELEVATION, ELEVATION APPROXIMATE
- DRAINAGE AND RELATED FEATURES**
- STREAM, SHORELINE, INDEFINITE
- DIRECTION OF FLOW
- LAKE, INTERMITTENT
- HUNGATED, FLOODED LAND
- MARSH, SWAMP, WOODED
- DRY RIVER BED WITH CHANNELS
- SAND, ABOVE IN WATER
- STRAND BOG
- TUNDRA PONDS, POLYGONS
- RAPIDS
- FORESHORE 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



RHODDA SEQUENCE

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

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Cp. Mt. Klappan 83(2)

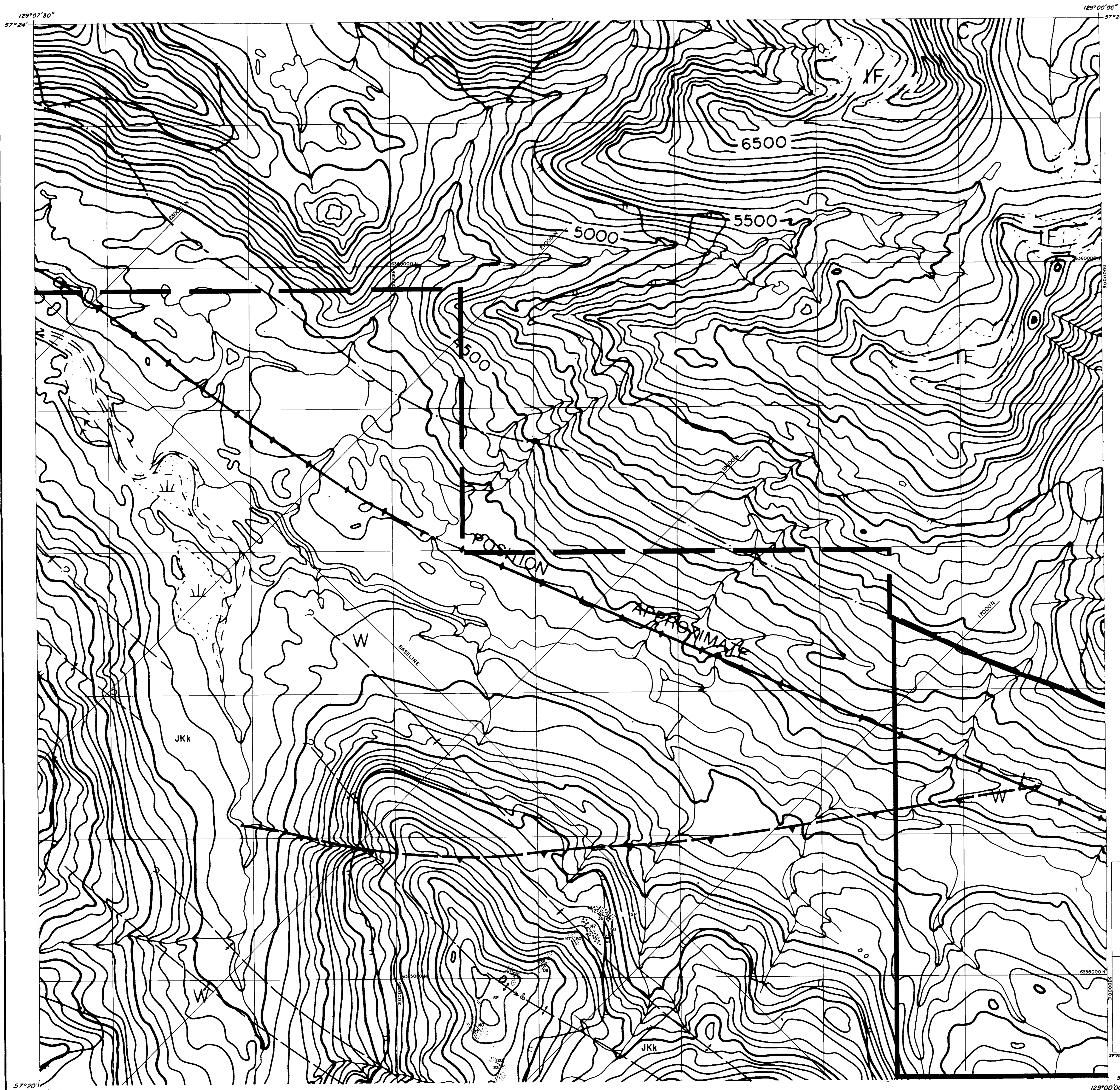
GULF CANADA RESOURCES INC.
Coal Division

MOUNT KLAPPAN COAL PROPERTY
MAP SHEET 104 H/6 G
SUMMIT NORTH
GEOLOGY

CALGARY ALBERTA

PREPARED BY: S.M.
APPROVED BY: C. WILLIAMS DATE: FEB. 1984

DRAWING No.
KPN8002



LEGEND

ROADS AND RELATED FEATURES

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

LANDMARK FEATURES

- HOUSE BARN
- CHURCH SCHOOL
- POST OFFICE
- HISTORICAL SITE
- TOWERS FIRE RADIO
- WELL OIL GAS
- TANK OIL GASLINE WATER
- TELEPHONE LINE
- POWER TRANSMISSION LINE
- RAIL
- 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

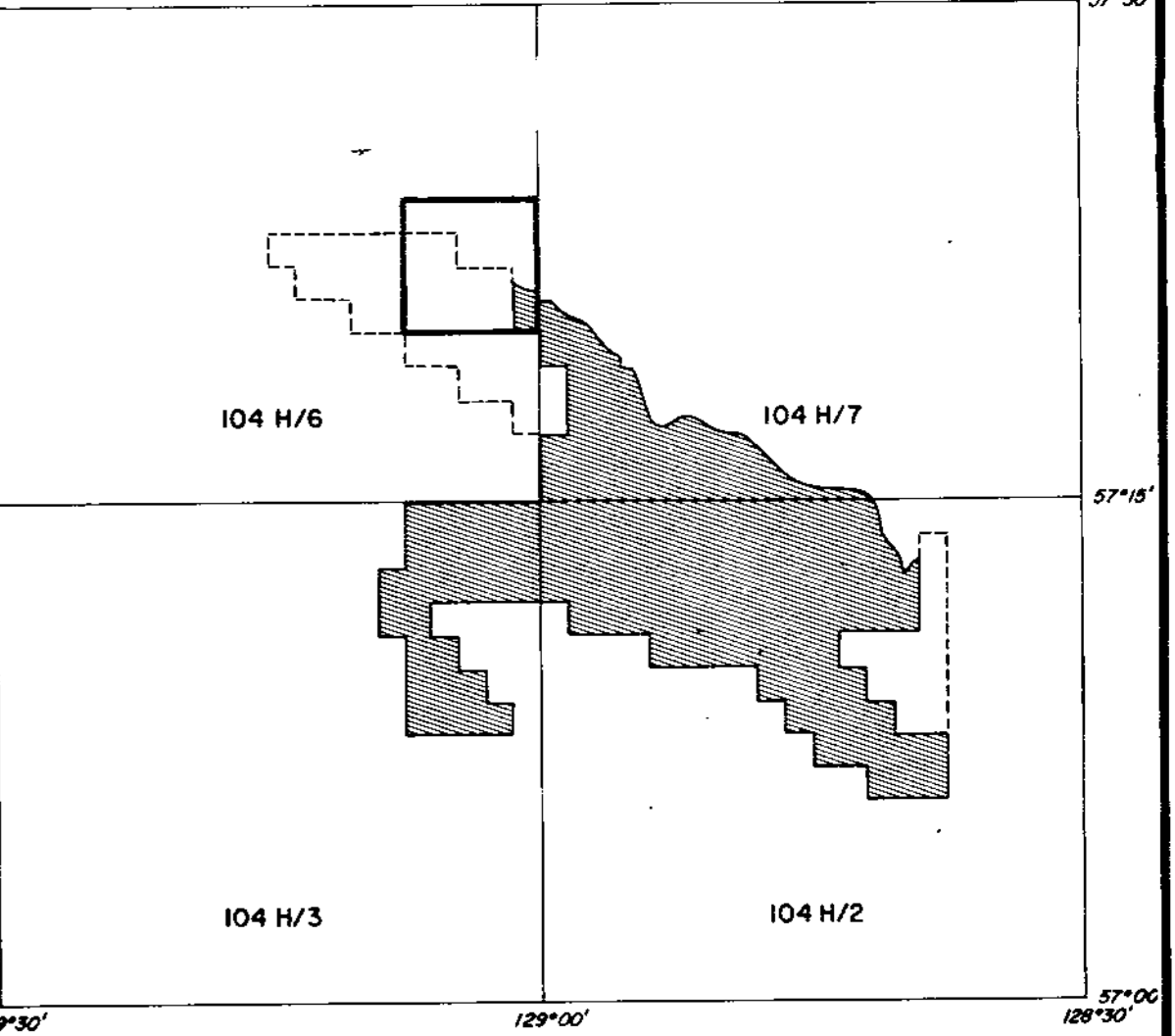
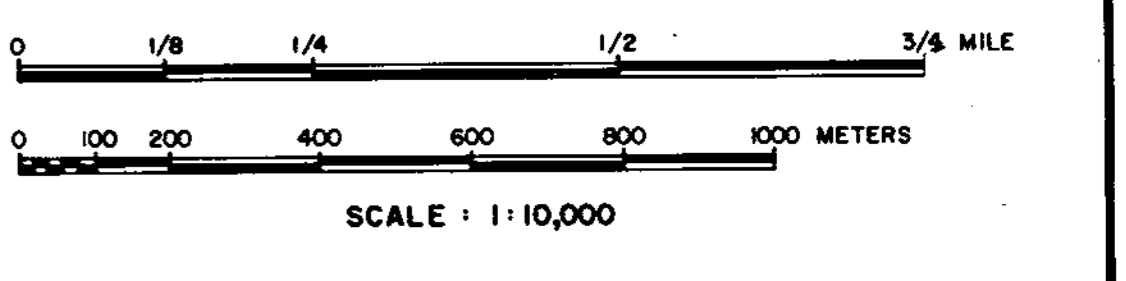
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- DIRECTION OF FLOW
- LAKE INTERMITTENT
- INDICATED FLOODED LAND
- MARSH (SWAMP) WOODS
- DRY RIVER BED WITH CHANNELS
- SAND ABOVE WATER
- STRING BOG
- TUNDRA PONDS POLYGENS
- RAPIDS
- FORESHORE FLATS
- ROCK
- DAM
- WHARF
- DITCH

RELIEF FEATURES

- CONTOURS
- APPROXIMATE CONTOUR
- DEPRESSION
- ESKER
- PIGGO
- SAND SAND DUNES
- PALSA BOG
- WOODED AREA

LICENCE BOUNDARY

- LICENCE UNDER APPLICATION



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Dr. M. Klappan 8/3/24

GULF CANADA RESOURCES INC.

Coal Division

CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY

MAP SHEET 104 H/6 H

SUMMIT NORTH

GEOLOGY

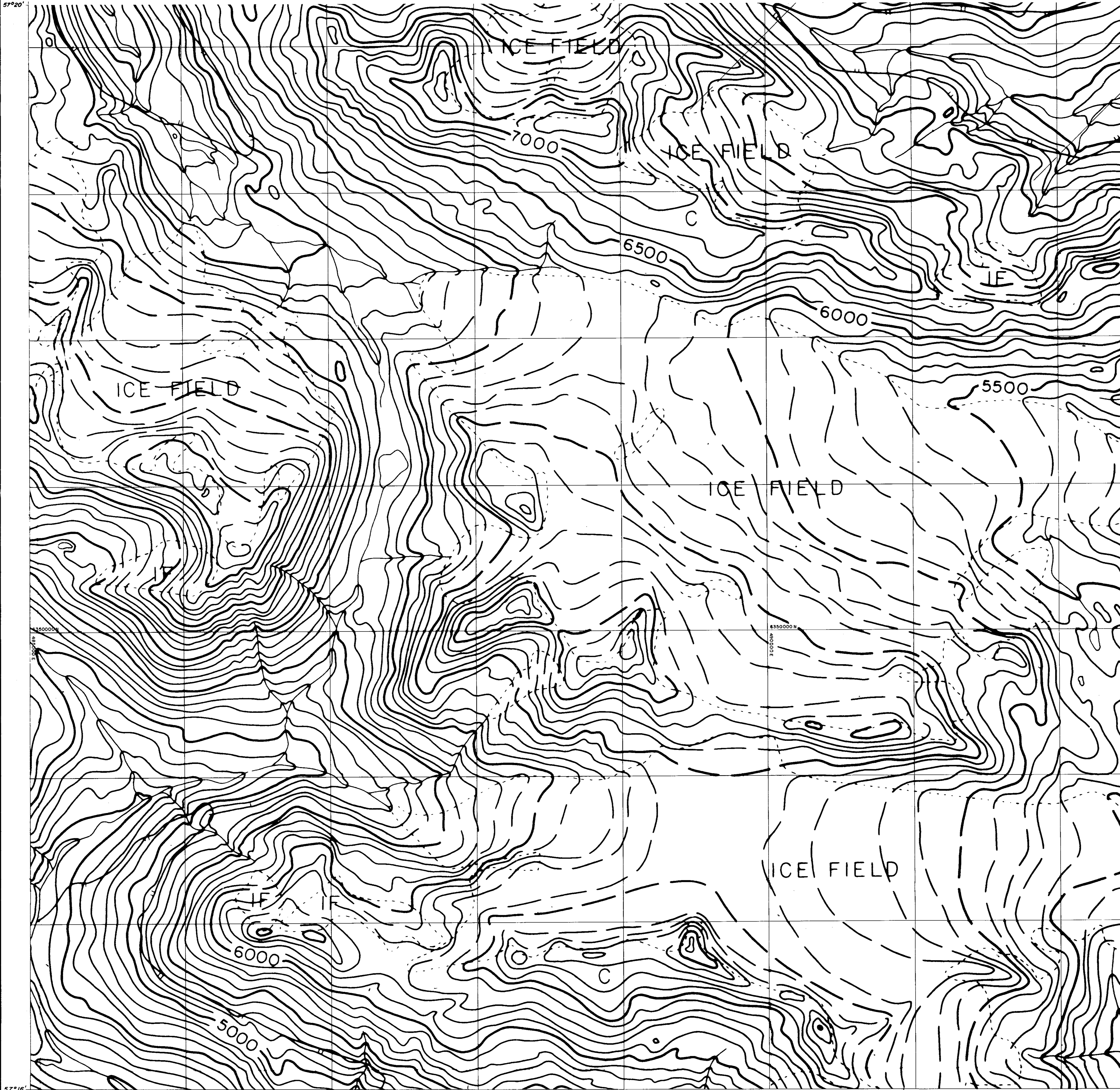
PREPARED BY: S.M. DATE: FEB. 1984

APPROVED BY: C. WILLIAMS

DRAWING No. KPN8303

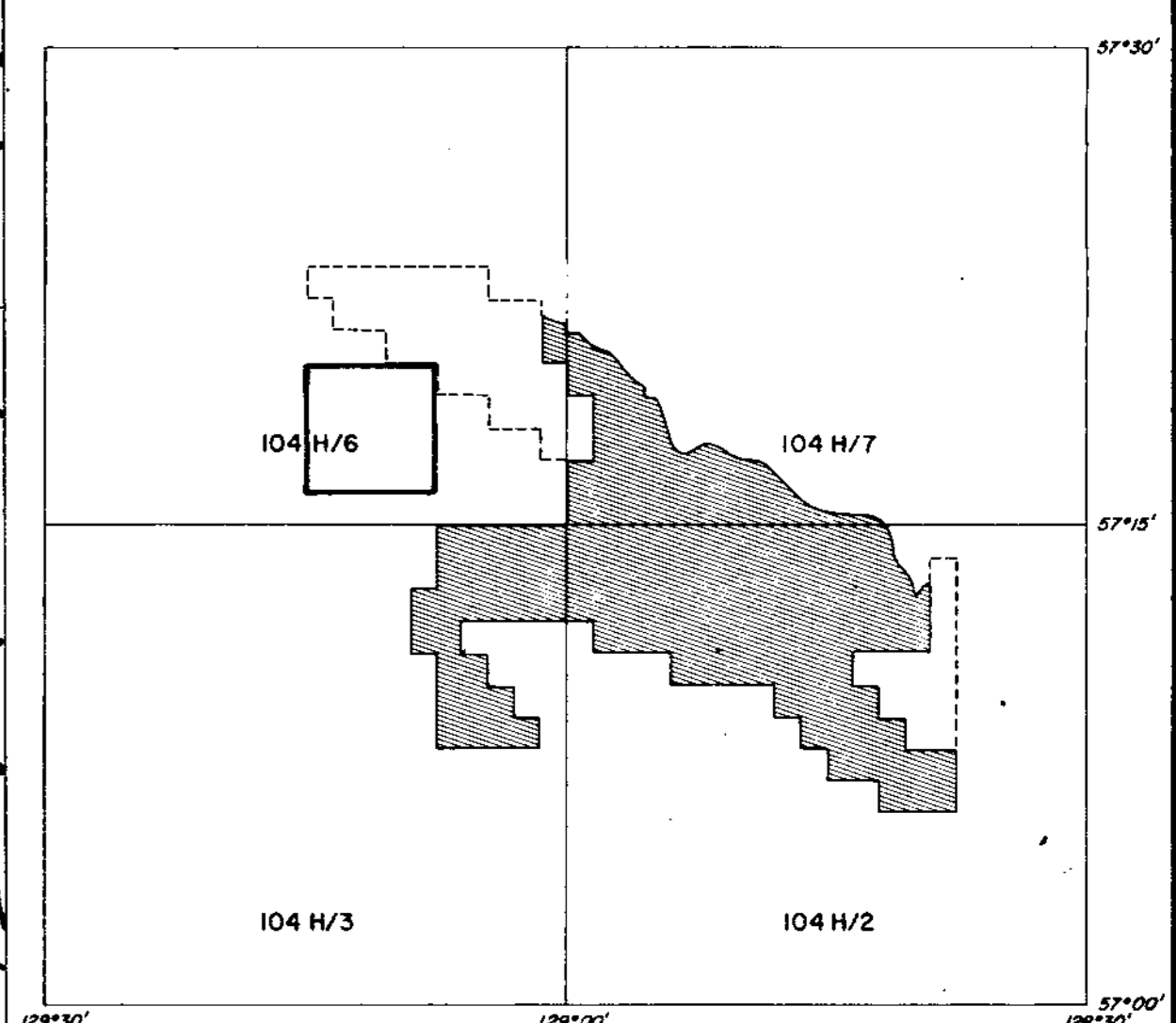
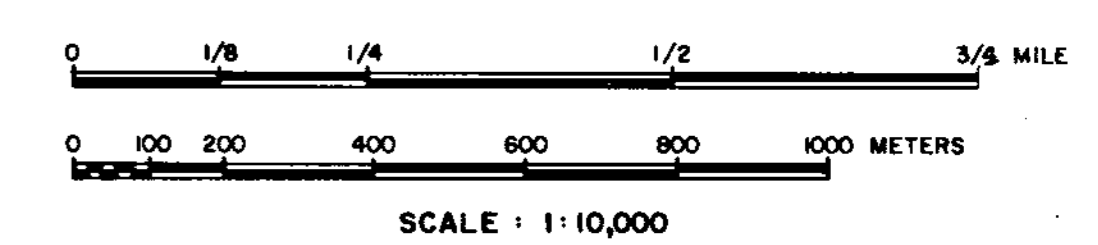
129°15'00"
57°20'

129°07'30"
57°20'



LEGEND

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- HARD SURFACE ALL WEATHER
 - LOOSE SURFACE
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 - SEAPLANE BASE ANCHORAGE
- LANDMARK FEATURES**
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 - FLINDERS POLYGONS
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 - SAND SAND DUNES
 - PALSA BOG
 - WOODED AREA
 - LICENCE BOUNDARY
 - LICENCE UNDER APPLICATION



57°16'
129°15'00"

57°16'
129°07'30"

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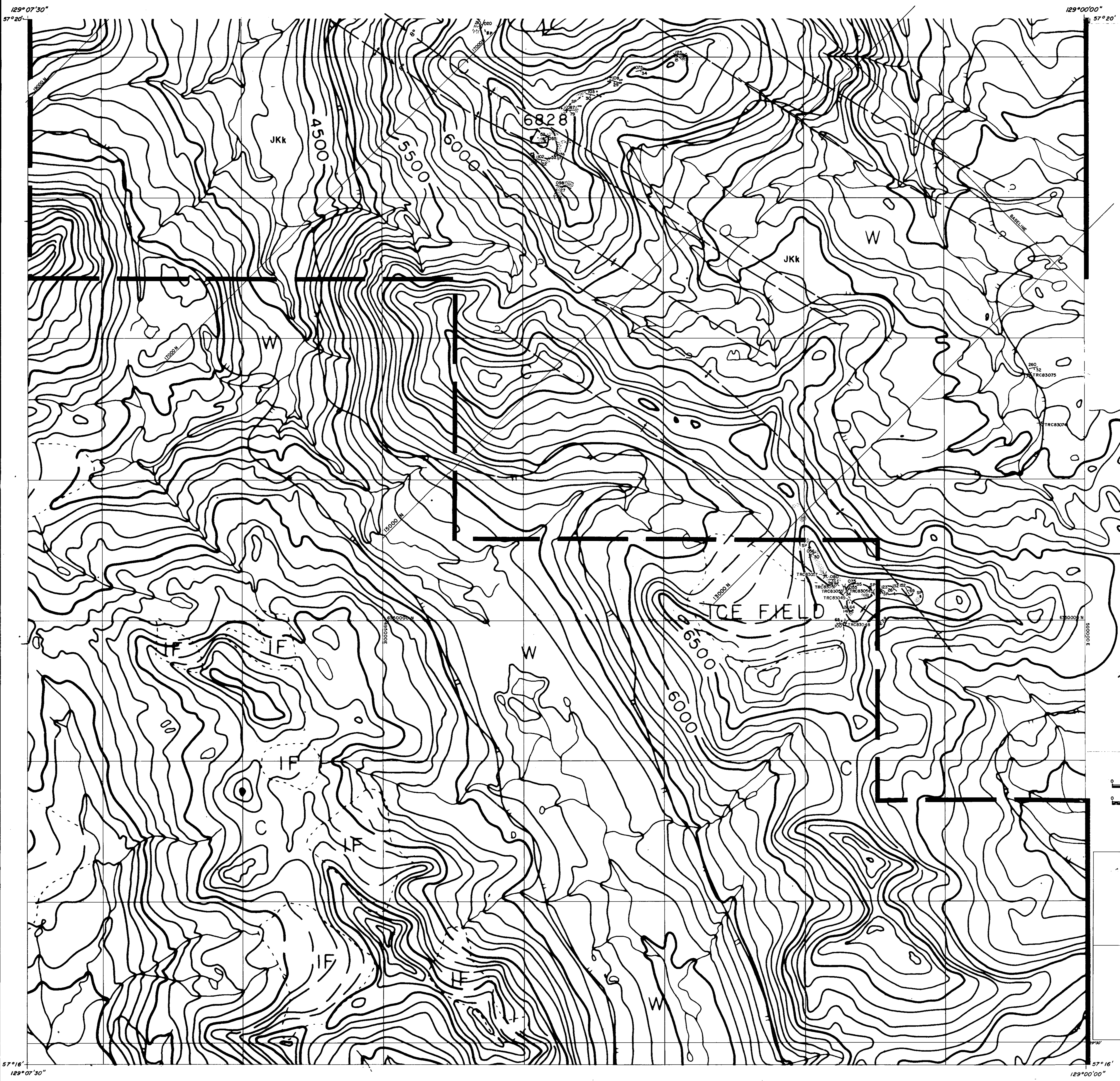
111

Ge. Mr. Klappan 83/24

GULF CANADA RESOURCES INC.
Coal Division

MOUNT KLAPPAN COAL PROPERTY
MAP SHEET 104 H/6 B
SUMMIT NORTH
GEOLOGY

PREPARED BY: S.M. APPROVED BY: C. WILLIAMS DATE: FEB. 1984 DRAWING No. KPNS 8204



LEGEND

ROADS AND RELATED FEATURES

HARD SURFACE ALL WEATHER

LOOSE SURFACE

CART TRACK WINTER ROAD UNDER CONSTRUCTION

TRAIL CUTLINE PORTAGE

BUILT UP AREA

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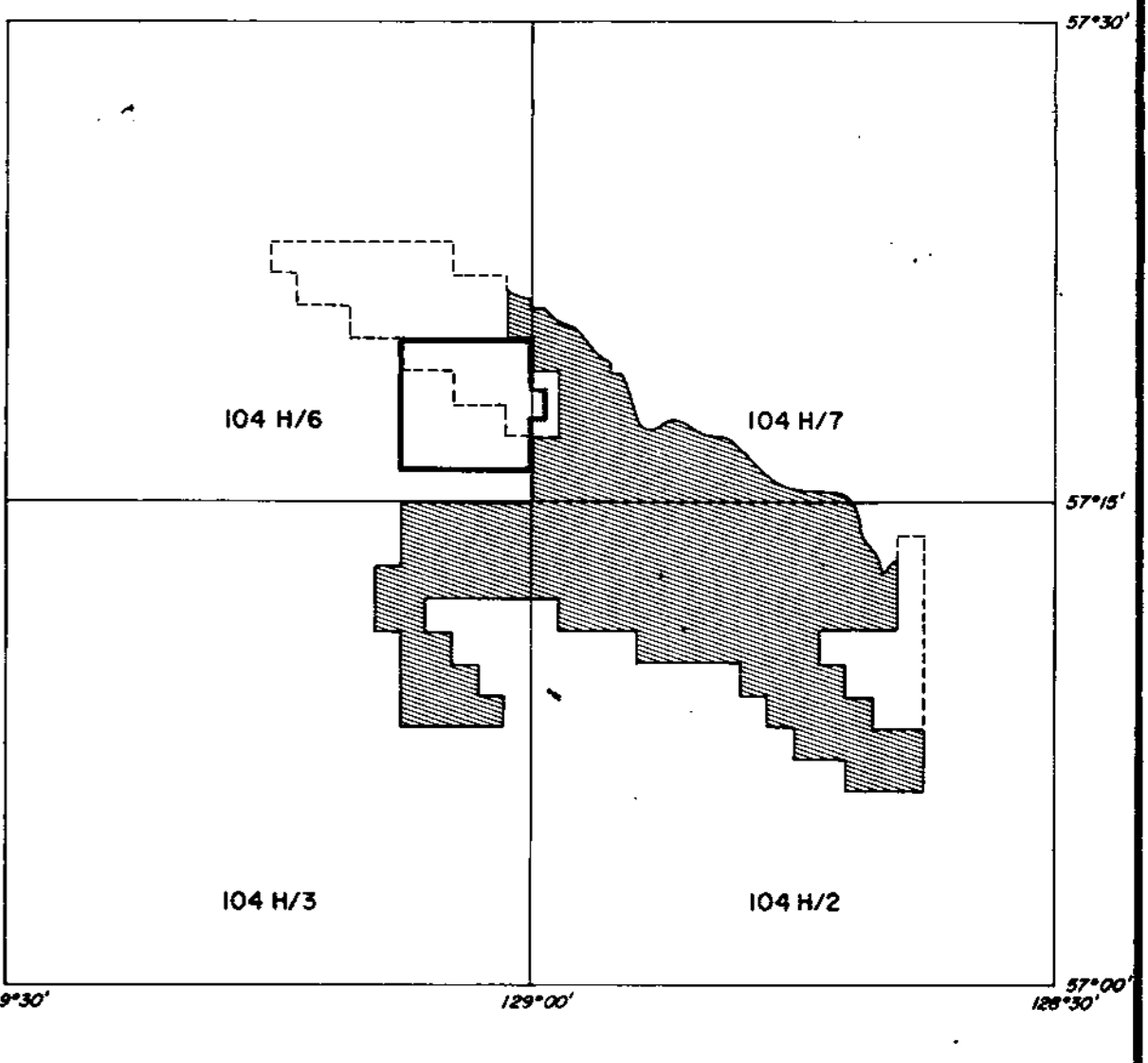
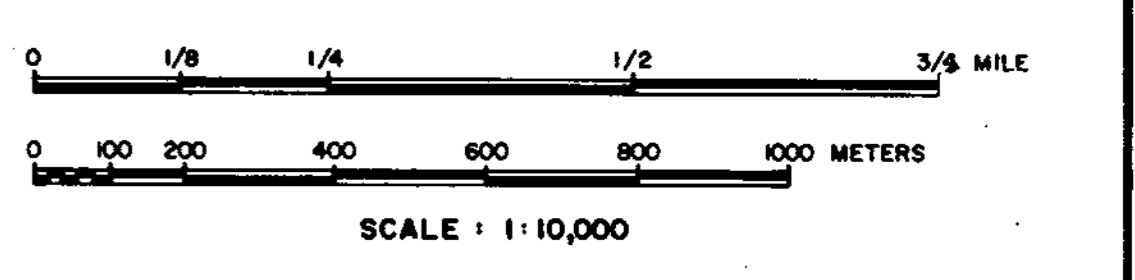
SAND SAND DUNES

PALSA BOG

WOODED AREA

LICENCE BOUNDARY

LICENCE UNDER APPLICATION



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DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

III

Ge. Mr. Klappan 83(2)

GULF CANADA RESOURCES INC.

Cal Division

CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY

MAP SHEET 104 H/6 A 104 H/7 D

SUMMIT NORTH

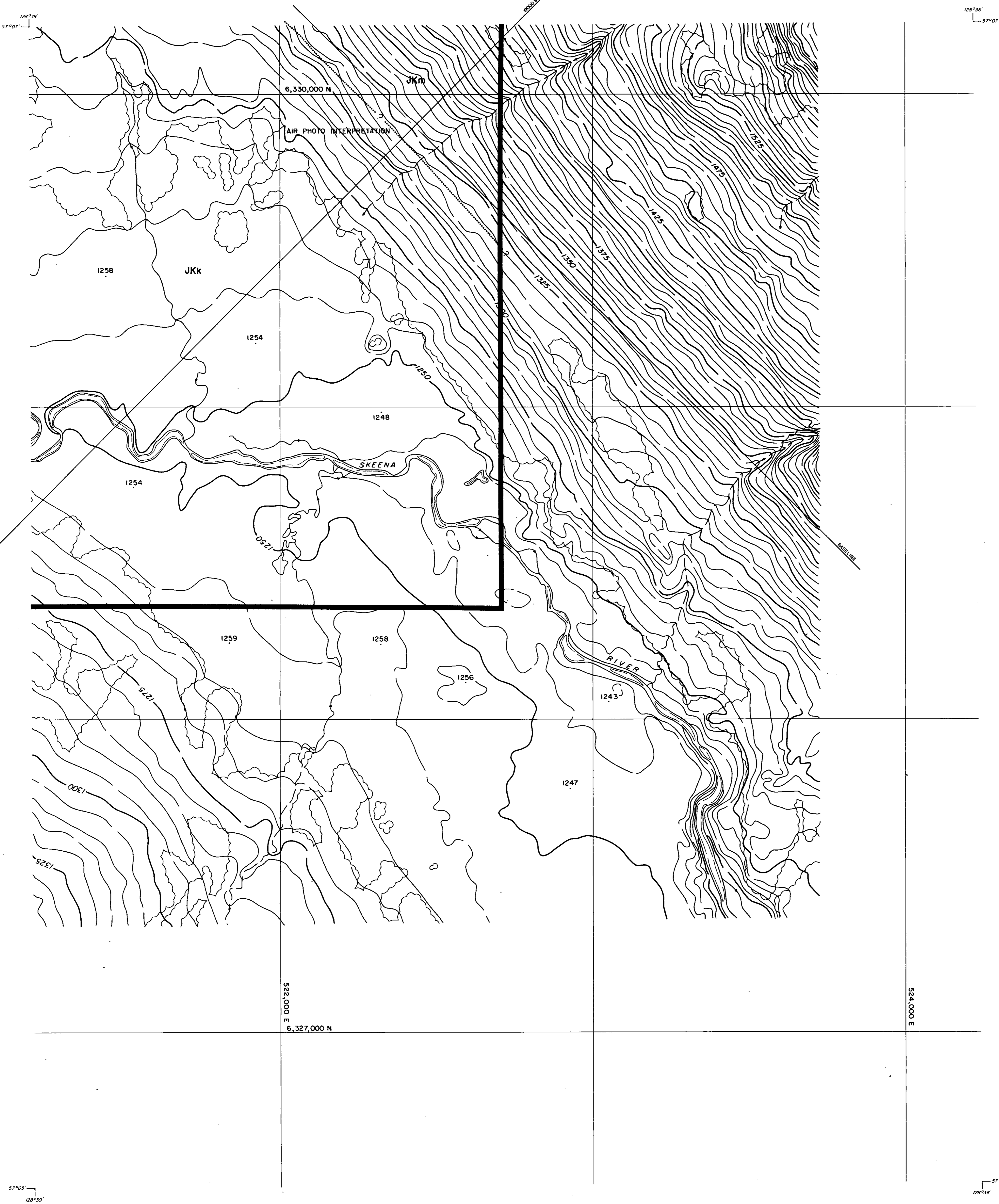
GEOLOGY

PREPARED BY: S.M.

APPROVED BY: C. WILLIAMS

DATE: FEB 1984

DRAWING NO. KPN8-023



LEGEND

BUILDING	---	ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---	CART TRACK	---
TRAIL	---	RAILROAD BED	---
RIVER	---	STREAM, DEFINITE	---
STREAM, APPROXIMATE	---	SPLIT	---
LAKE	---	WATER LEVEL	---
SWAMP	---	BEAVER DAM	---
TREE LINE	---	CUT LINE	---
CONTOURS, INDEX	---	CONTOURS, INTERMEDIATE	---
DEPRESSION	---	APPROXIMATE	---
SPOT ELEVATION	---	FORM LINES	---
CUT/FILL	---	FIELD CONTROL POINT	---
COAL LICENCE	---		---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

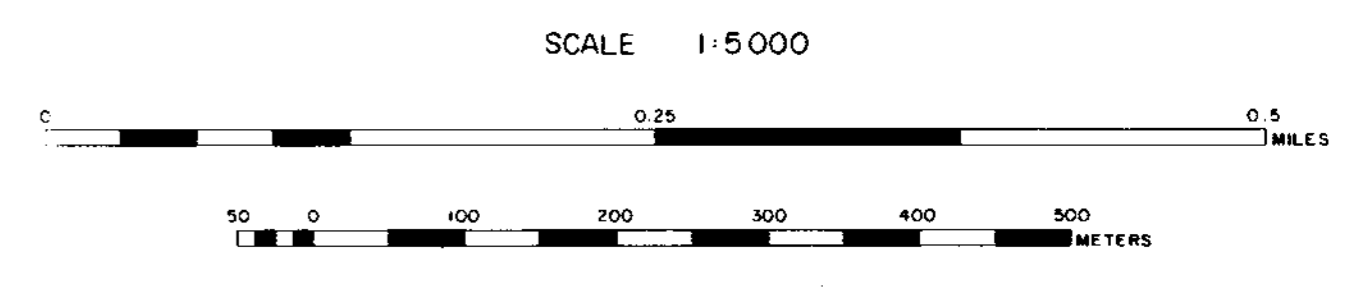
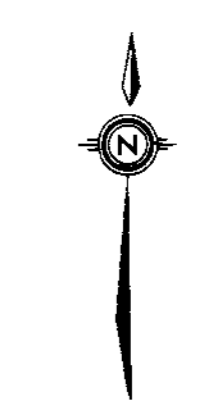
CONTOUR INTERVAL = 10 M., WITH FORM LINES INTERVAL = 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

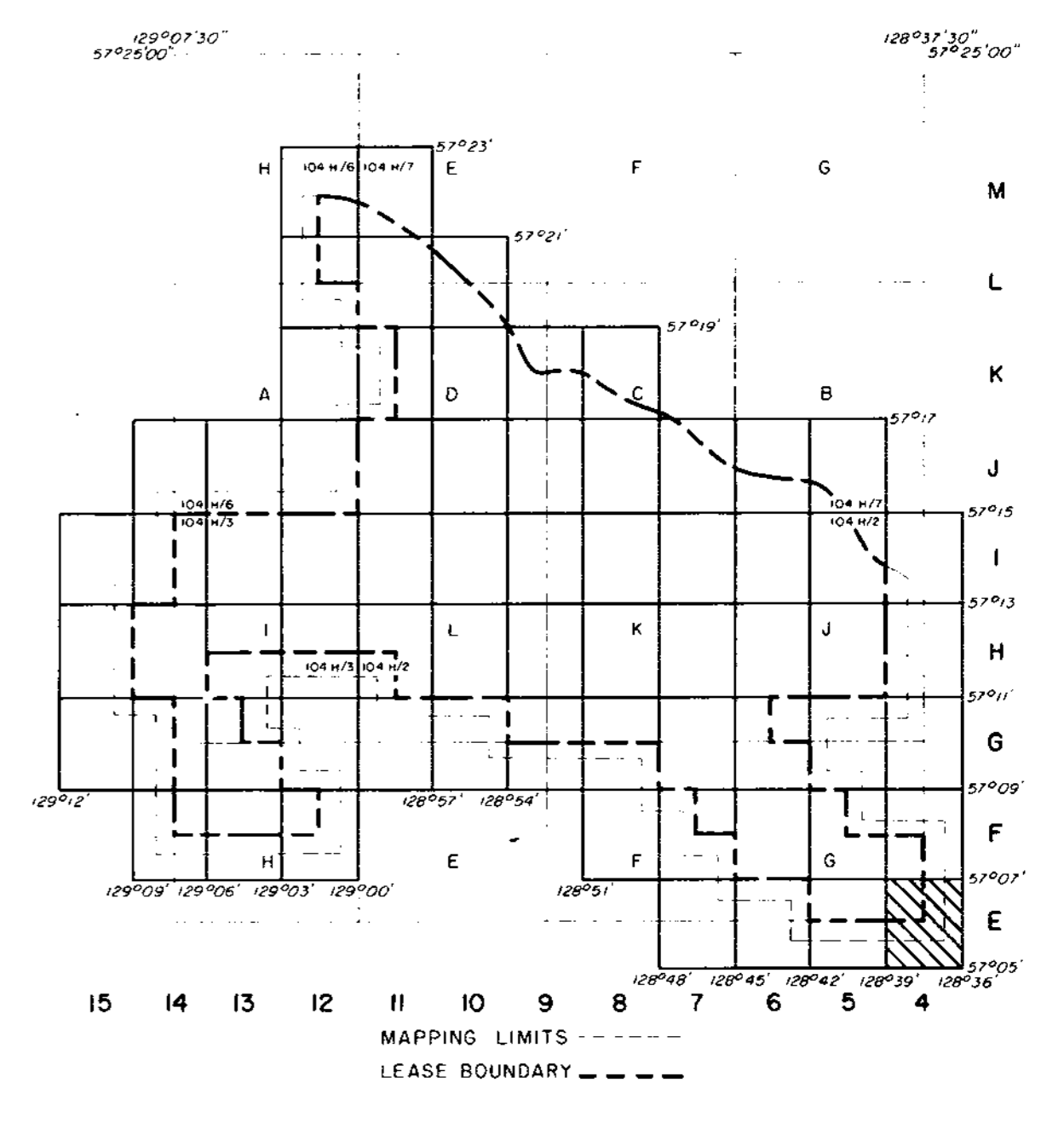
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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 DOWN THRUST SIDE
—	ADIT
—	TRENCH LOCATION
—	MEASURED SECTION LOCATION
—	CROSS-SECTION LOCATION
○	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

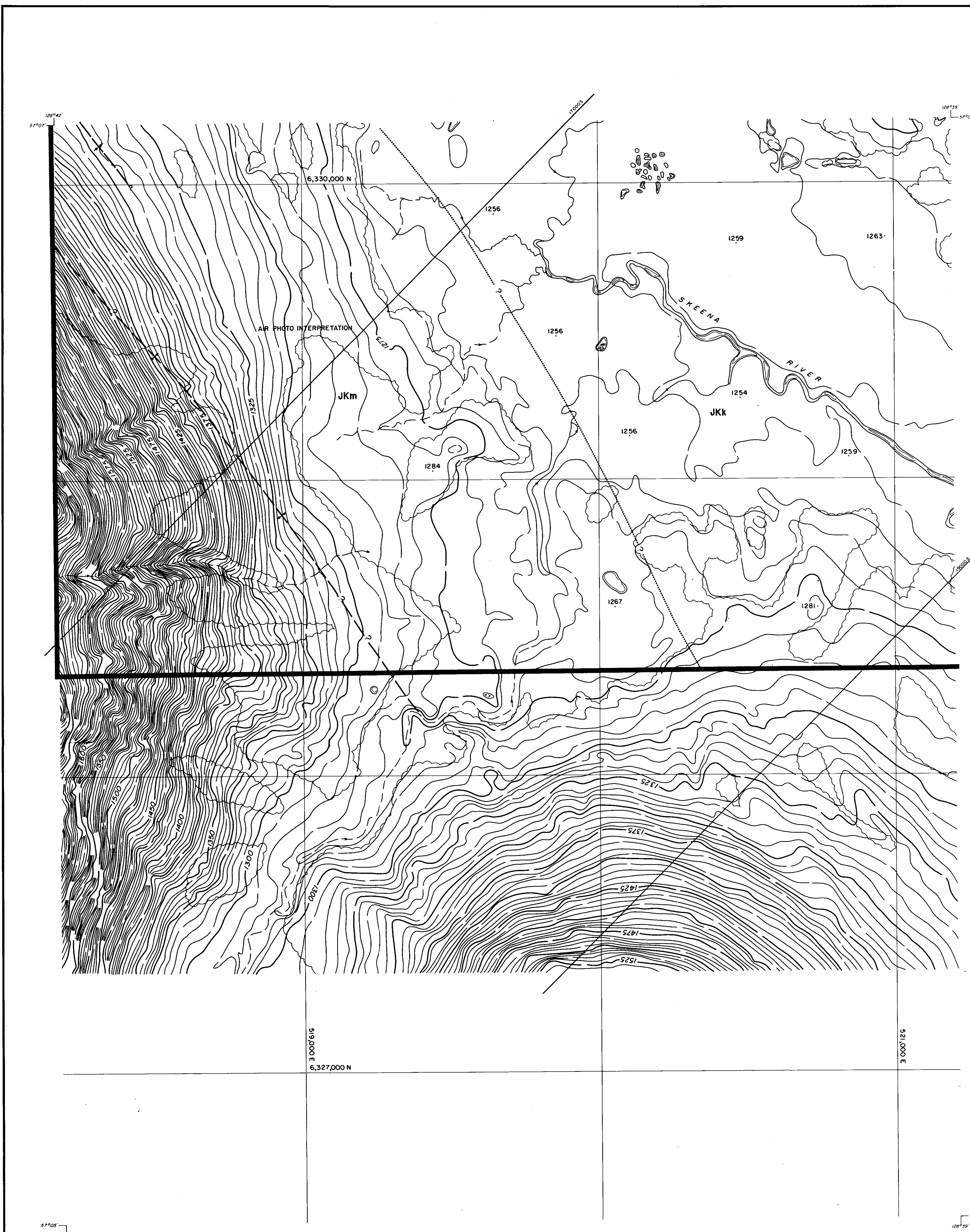
Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET E4
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5,000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KP83CGI



LEGEND

BUILDING	---	---
ROAD, HARD SURFACE	---	---
LOOSE SURFACE	---	---
CART TRACK	---	---
TRAIL	---	---
RAILROAD BED	---	---
RIVER	---	---
STREAM, DEFINITE	---	---
APPROXIMATE	---	---
SPLIT	---	---
LAKE	---	---
WATER LEVEL	---	---
SWAMP	---	---
BEAVER DAM	---	---
TREE LINE	---	---
CUT LINE	---	---
CONTOURS, INDEX	---	---
INTERMEDIATE	---	---
DEPRESSION	---	---
APPROXIMATE	---	---
SPOT ELEVATION	---	---
FORM LINES	---	---
CUT/FILL	---	---
FIELD CONTROL POINT	---	---
COAL LICENCE	---	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

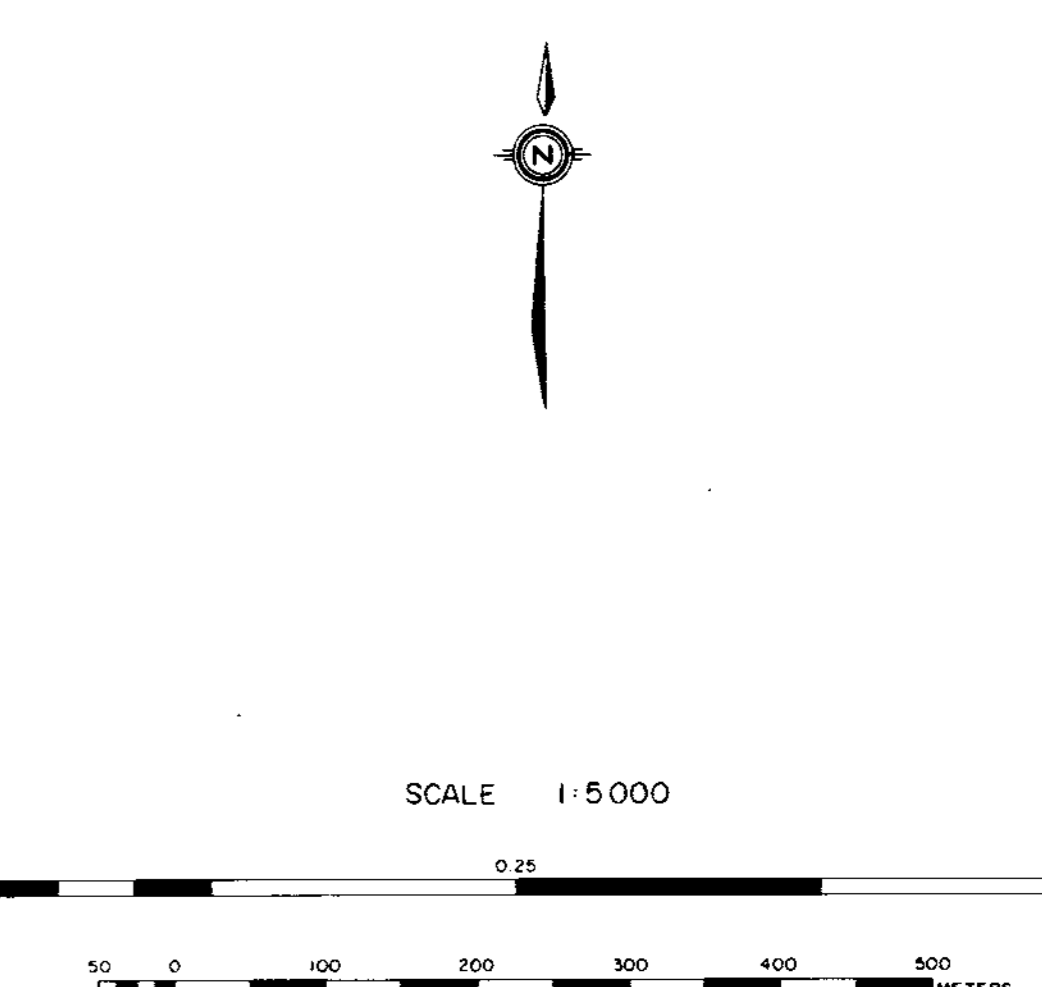
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

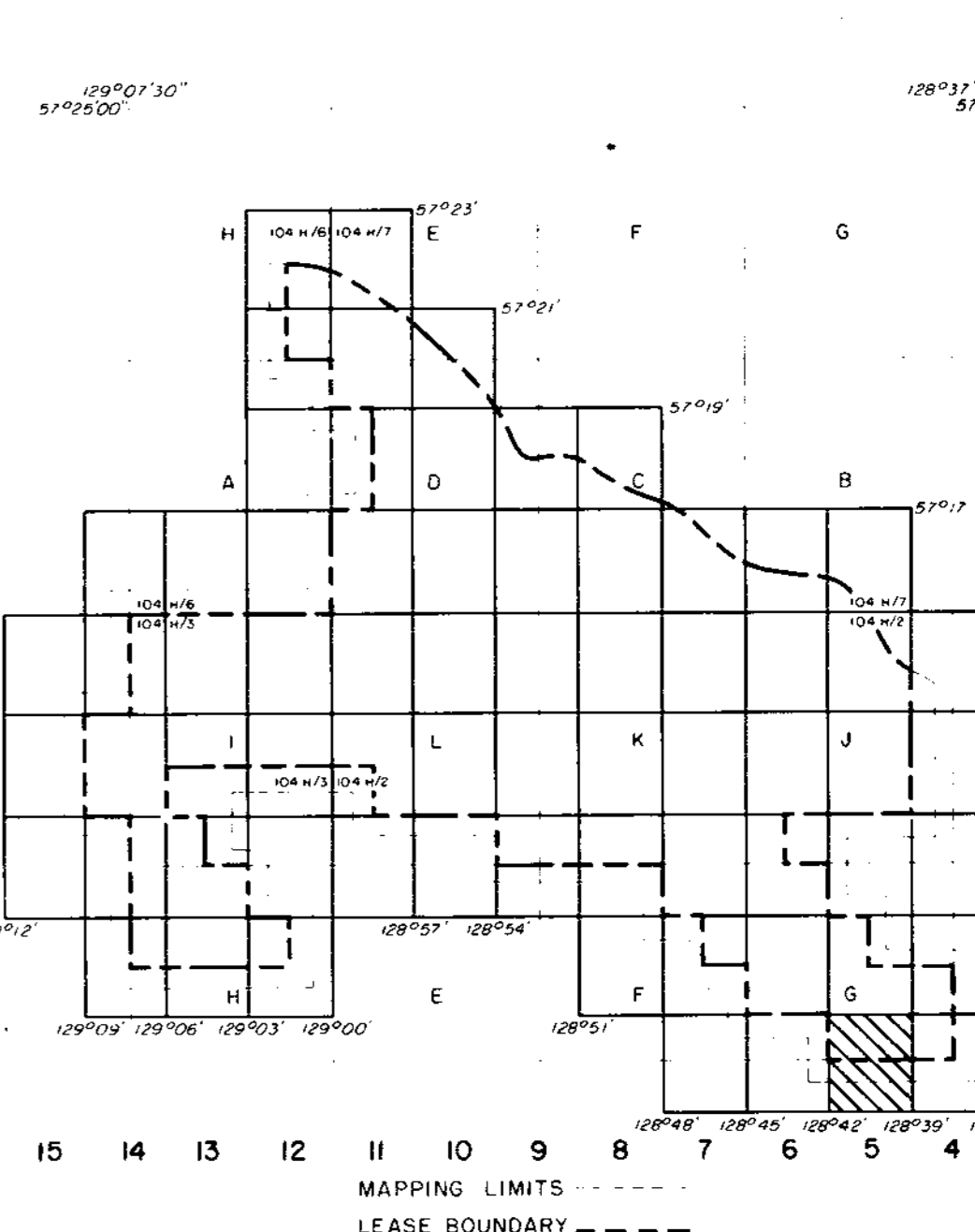
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD. FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



- 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 UPTHURST 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)

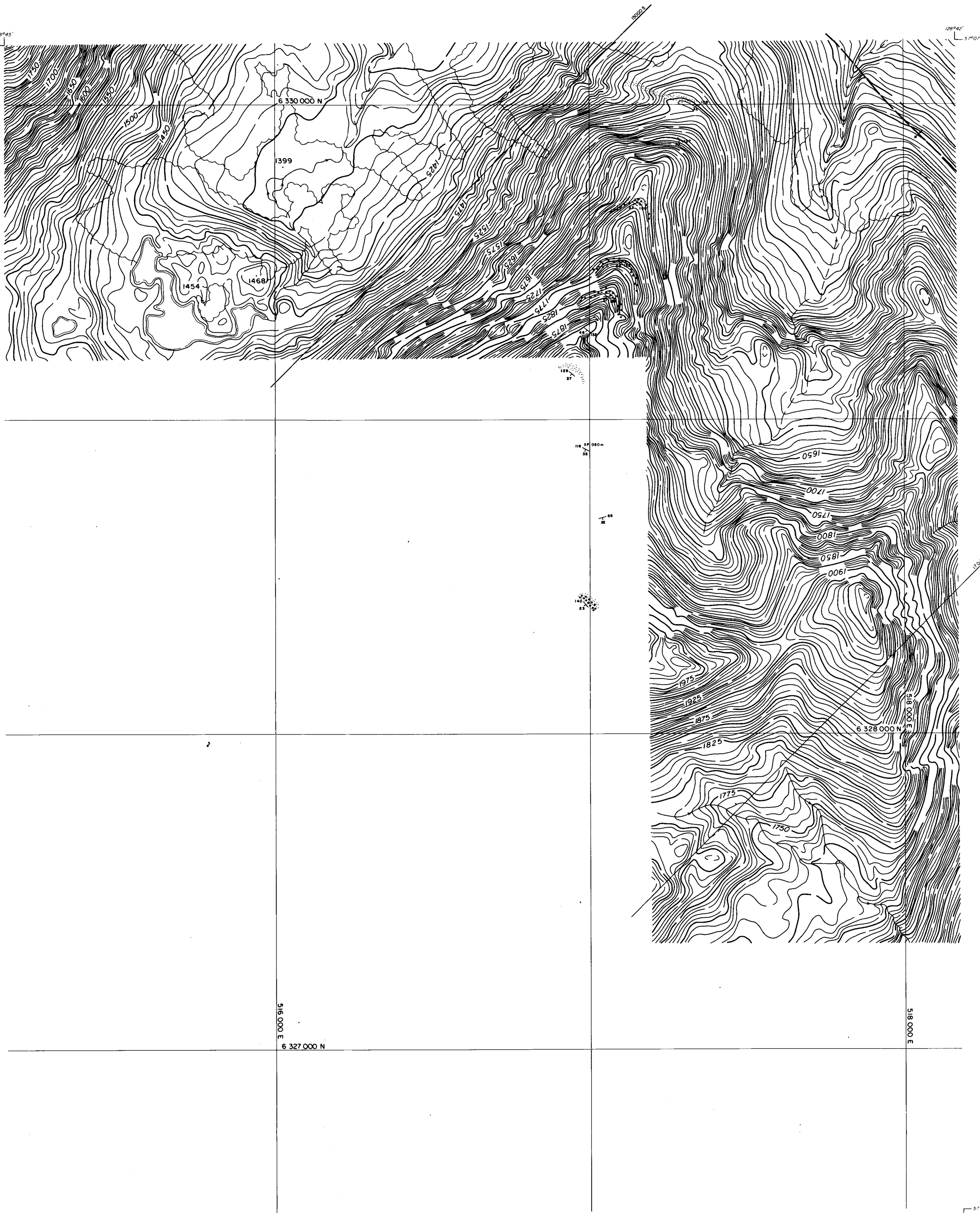
Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET E5
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPN8302E



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

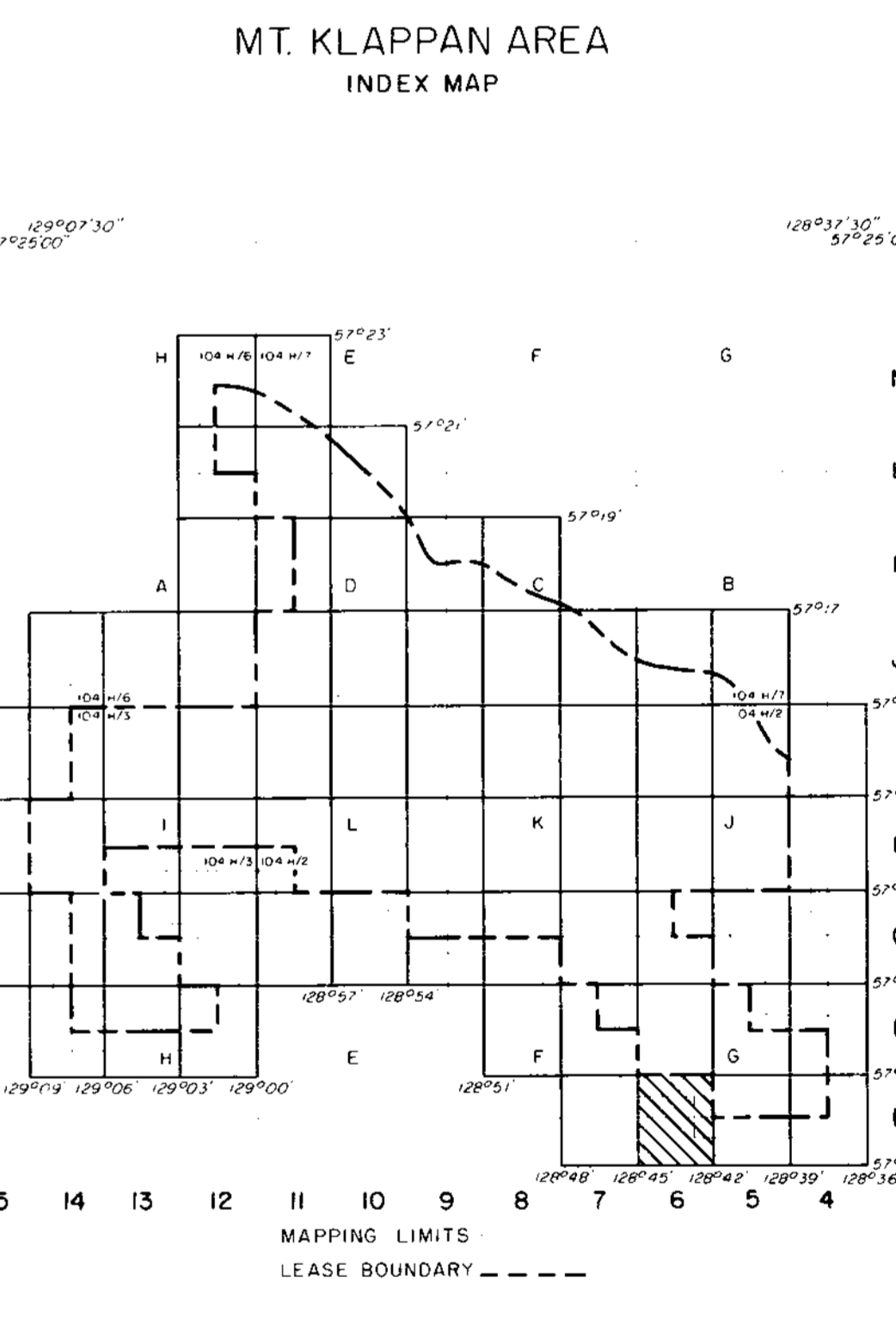
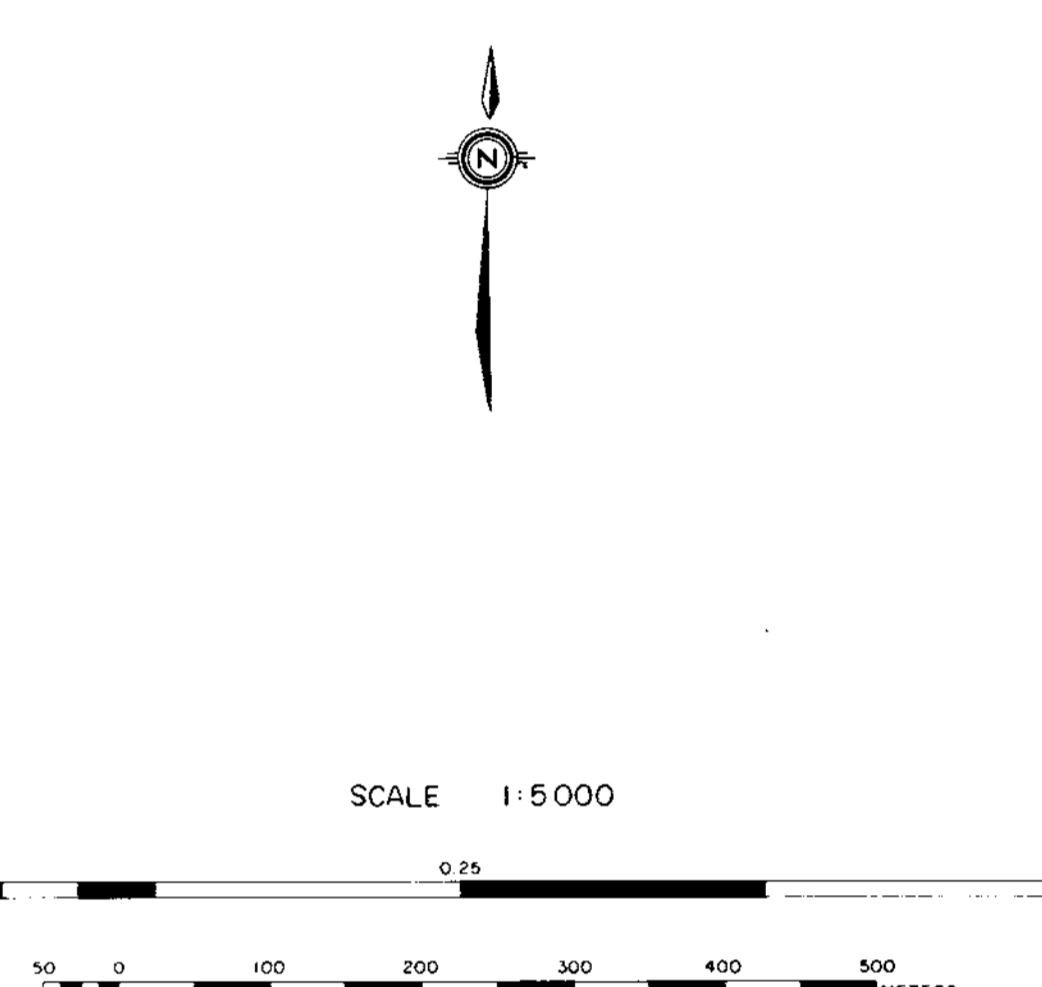
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS +15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



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.

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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 DOWNTHRUST SIDE	---
ADIT TRENCH LOCATION	---
MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

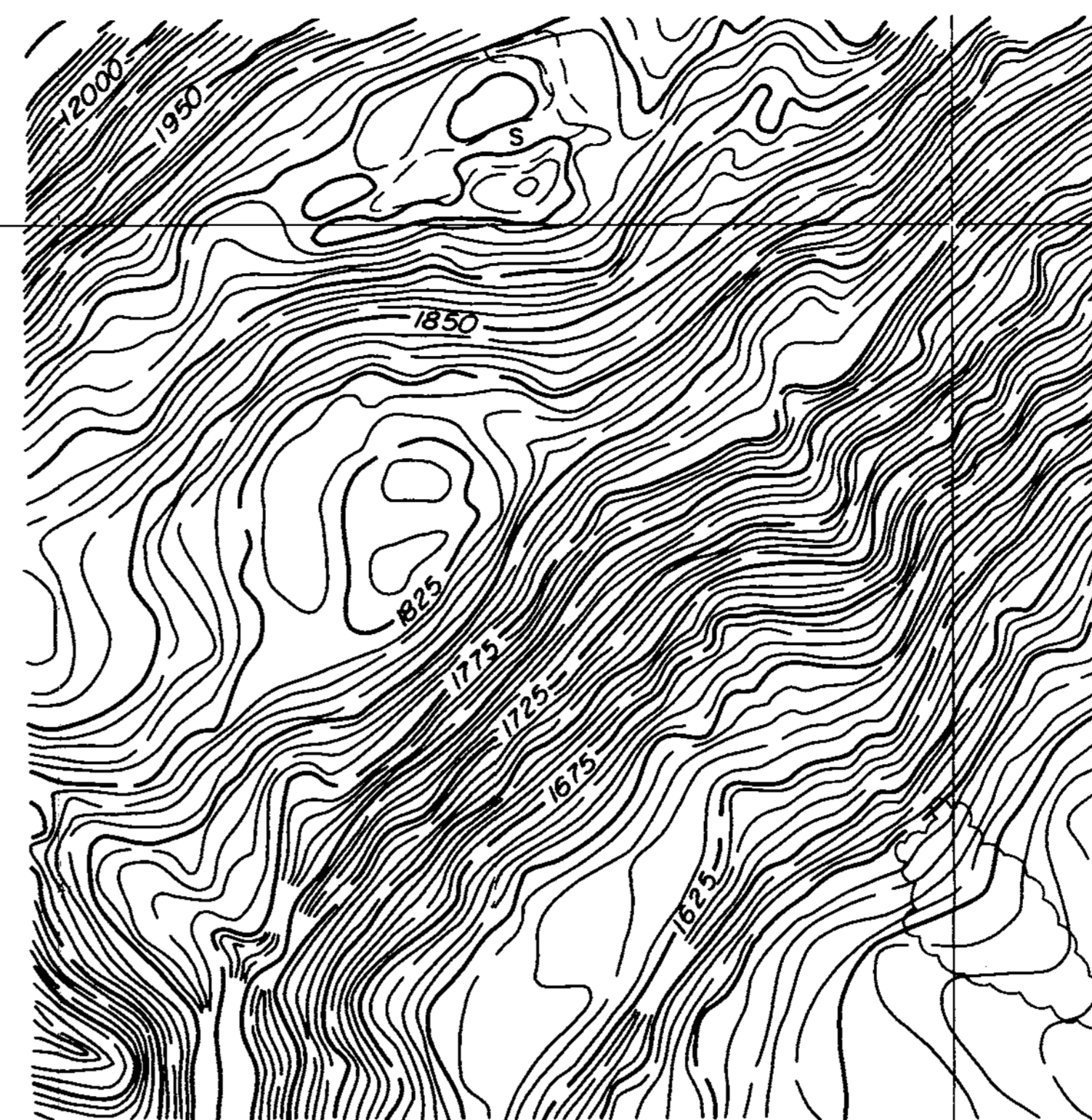
MT. KLAPPAN COAL PROPERTY
MAP SHEET E6
1983
GEOLOGY MAP

PREPARED BY: GS. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KP83003

128°48' 57°07'

128°45' 57°07'

6,330,000 N



LEGEND

BUILDINGS	---
ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	EL. 500'
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
CONTOURS, INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

CONTOUR INTERVAL 10 M., WITH FORM LINES INTERVAL 5 M.

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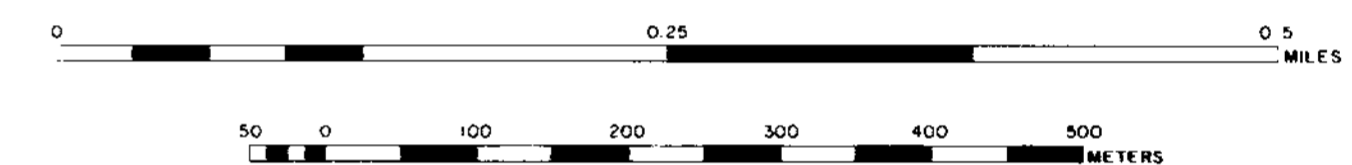
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

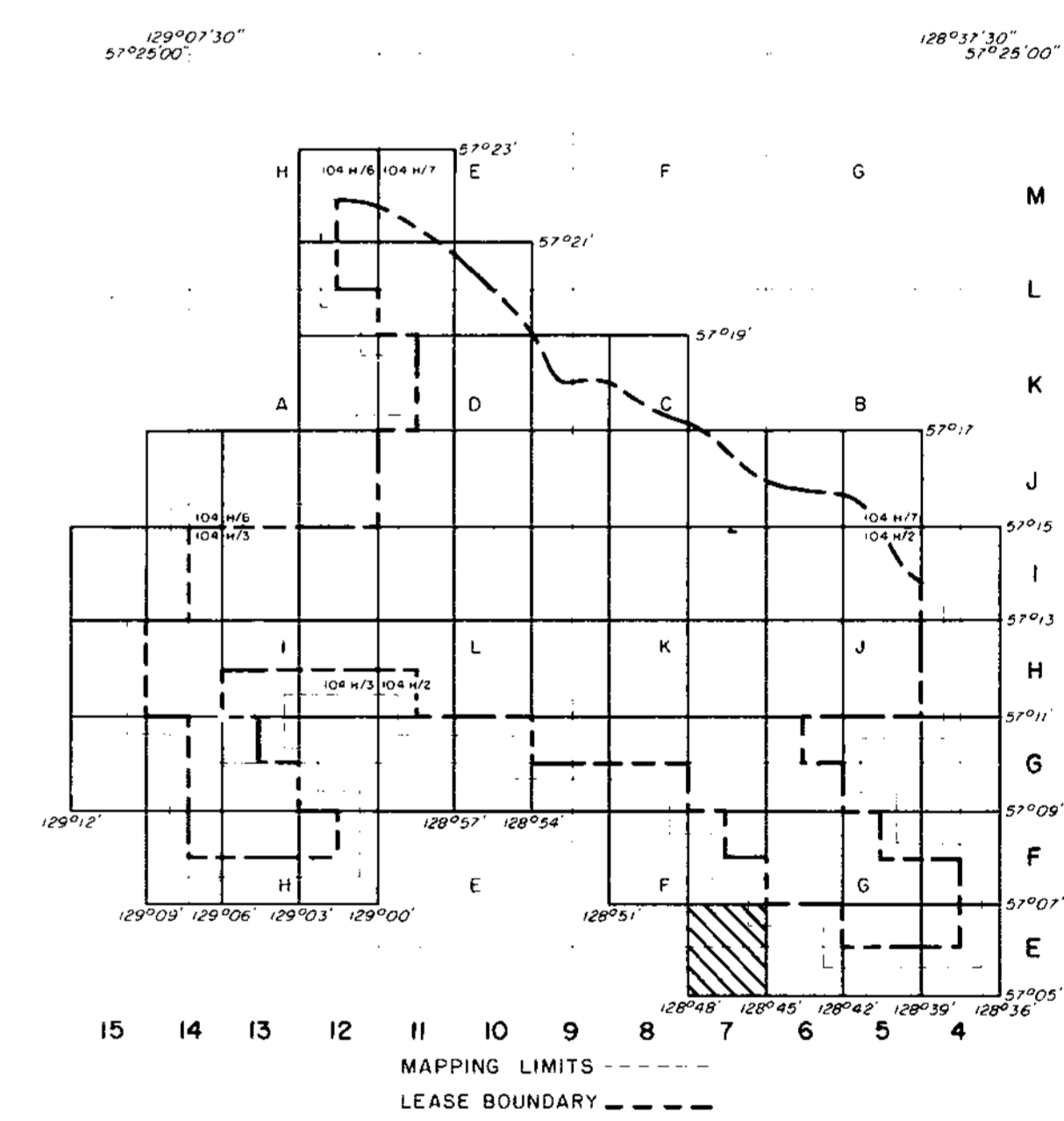
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA INDEX MAP



128°48' 57°05'

128°45' 57°05'

6,330,000 E

6,350,000 E

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.

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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 DOWN THRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83(2)

GULF CANADA RESOURCES INC.
Coal Division ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET E7
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KP83C04

128°36'
57°09'

128°36'
57°09'

LEGEND

- BUILDING
- ROAD, HARD SURFACE
- ROAD, LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- STREAM, APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- CONTOURS, INTERMEDIATE
- CONTOURS, APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

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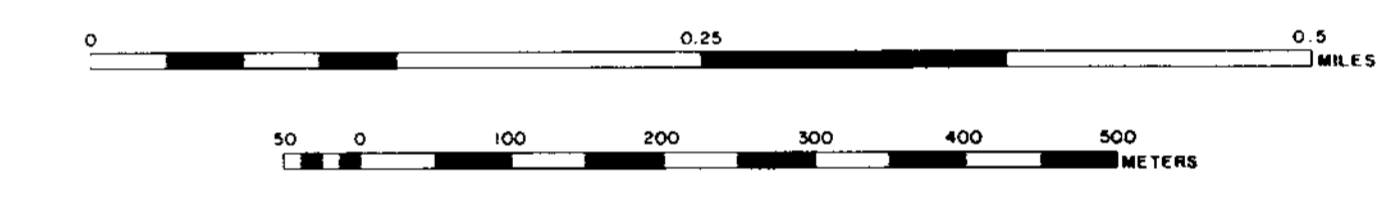
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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

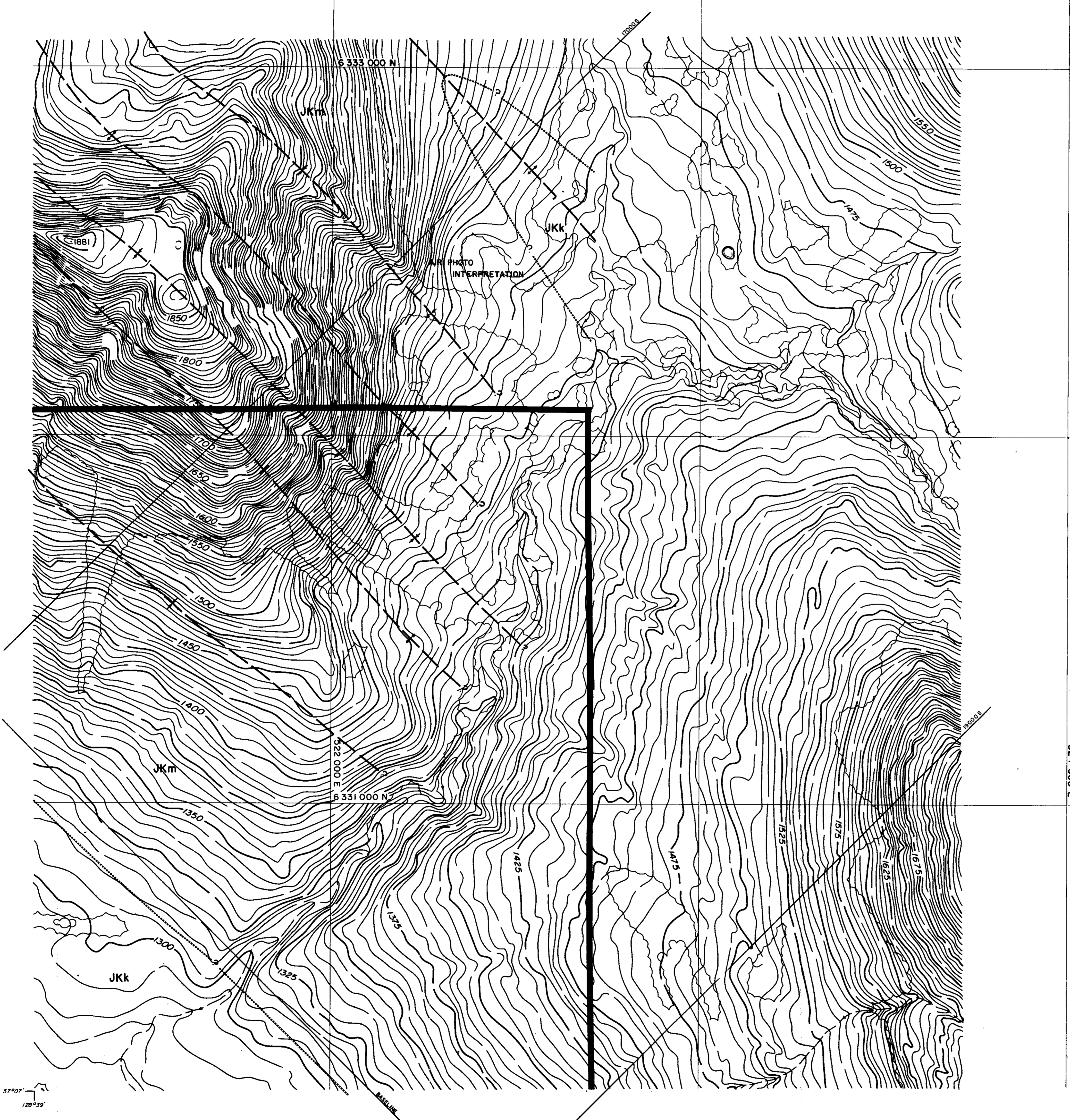
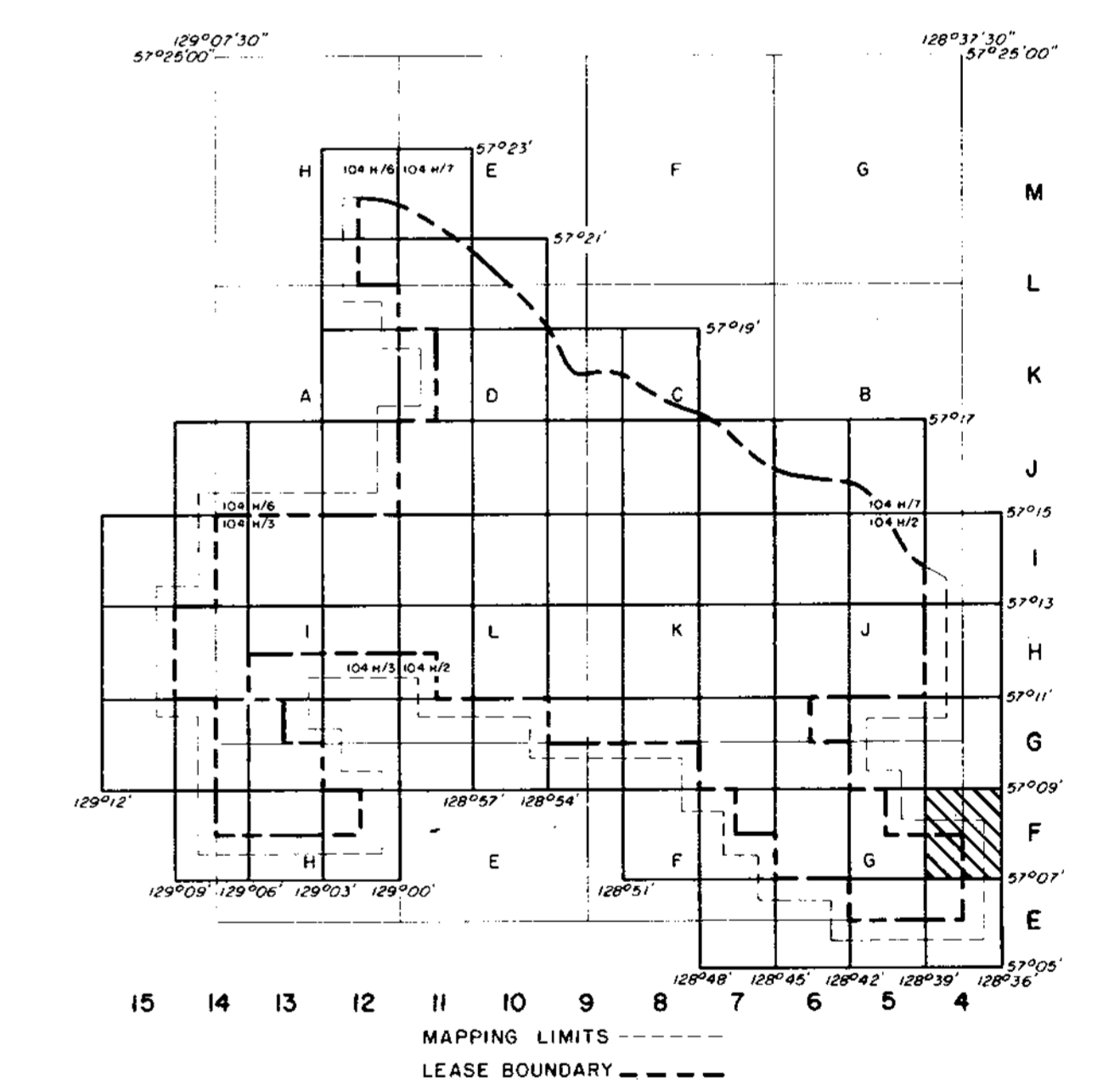
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA
INDEX MAP



RHONDDA SEQUENCE

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MALLOCH SEQUENCE

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LEGEND

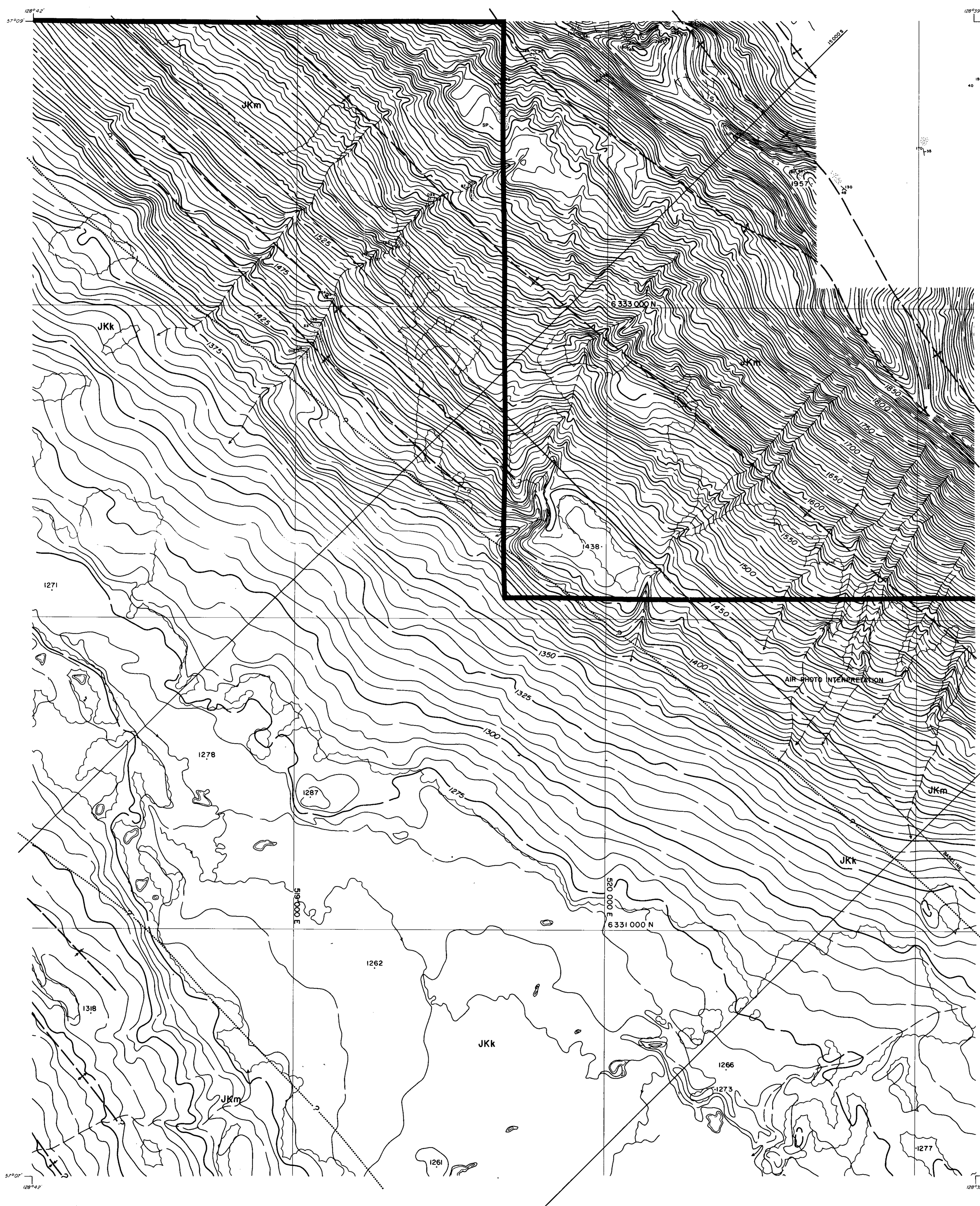
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (OUTCROP, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, 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 DOWNTHRUST SIDE
- ADIT TRENCH LOCATION
- MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 1983

GULF CANADA RESOURCES INC.
Coal Division

**MT. KLAPPAN COAL PROPERTY
MAP SHEET F4
1983
GEOLOGY MAP**

PREPARED BY: G.S. DATE: JAN, 1984 SCALE 1:5000
APPROVED BY: C. WILLIAMS DRAWING No. KPN83C05



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
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CONTOURS, INTERMEDIATE	---
CONTOURS, DEPRESSION	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

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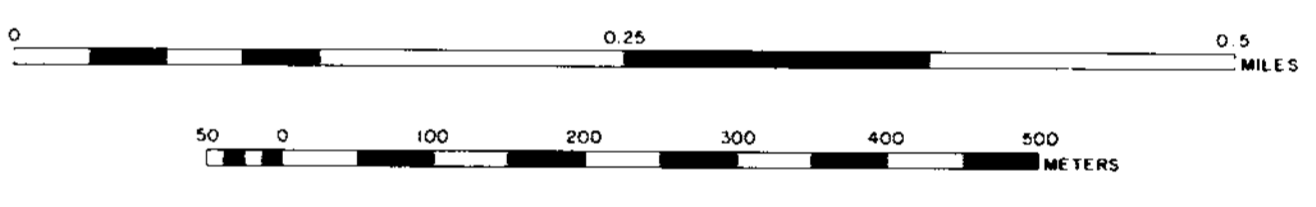
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

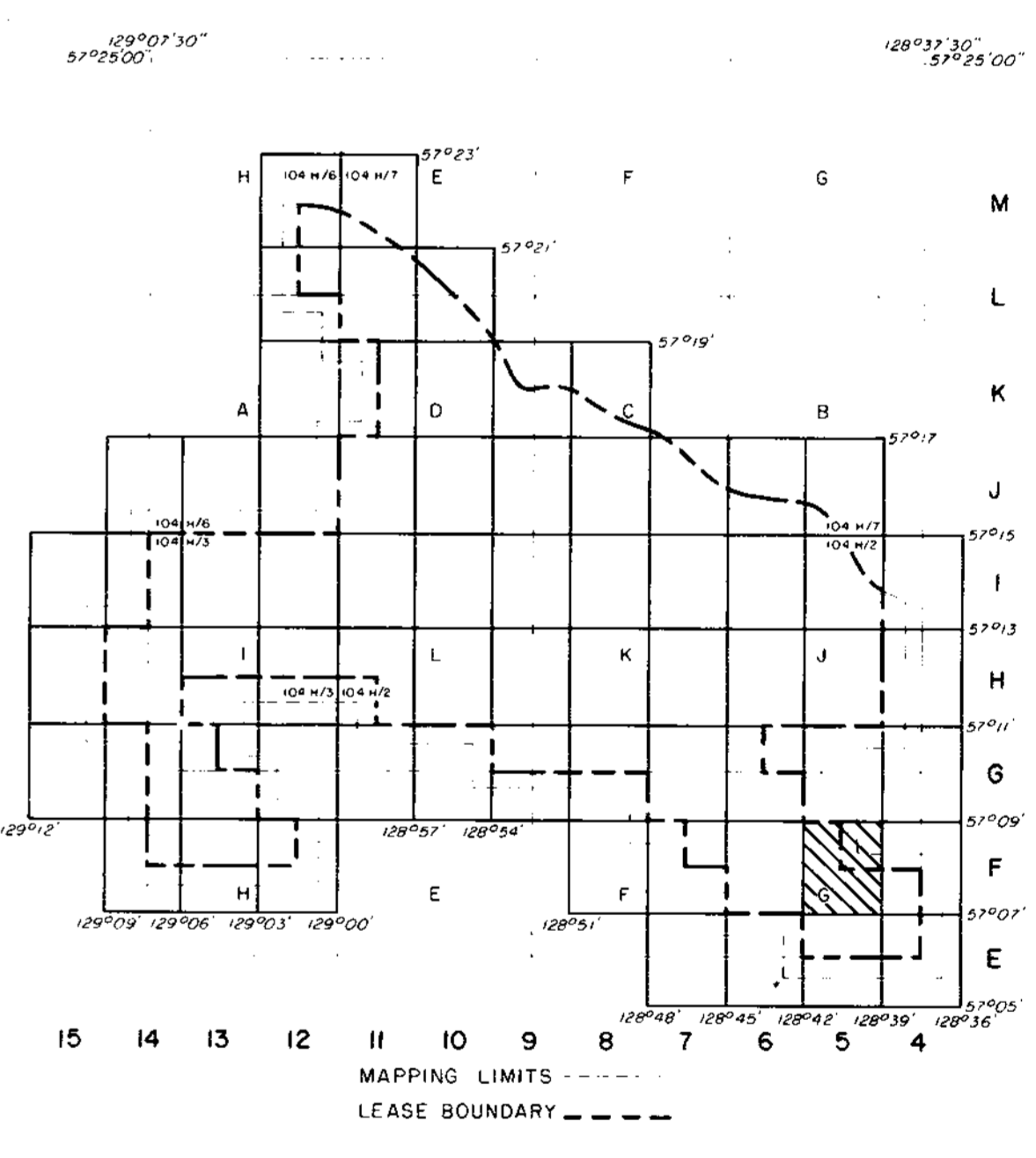
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MULLER LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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

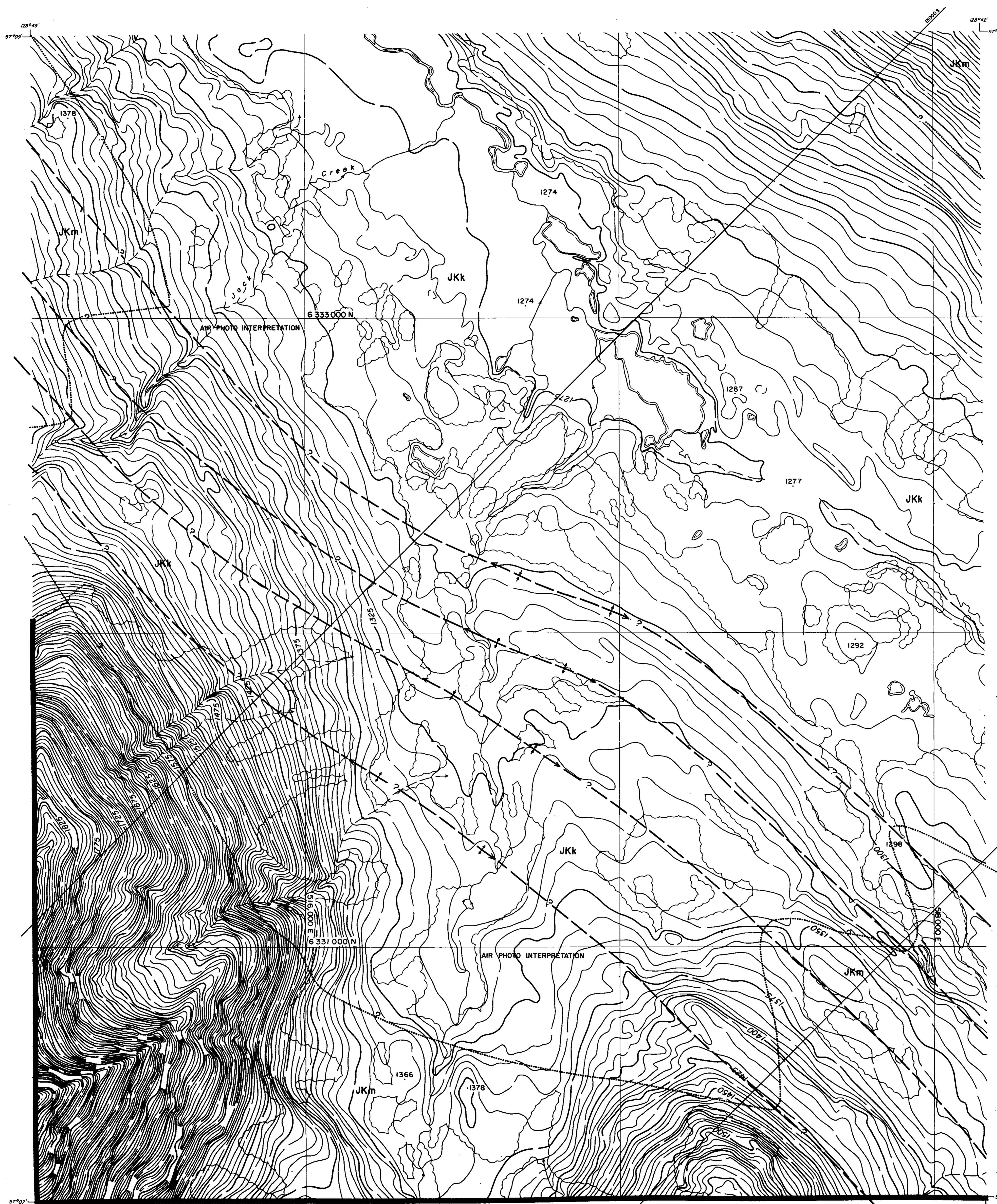
---	LICENCE BOUNDARY
---	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
---	COAL SEAM (OUTCROP, INFERRED)
---	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
---	OVERTURNED 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 DOWNTHRUST SIDE
---	ADIT
---	TRENCH LOCATION
---	MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83(a)

GULF CANADA RESOURCES INC.
Coal Division ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET F5
1983
GEOLOGY MAP**

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: G. WILLIAMS DATE: JAN. 1984 DRAWING NO. KP8306



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

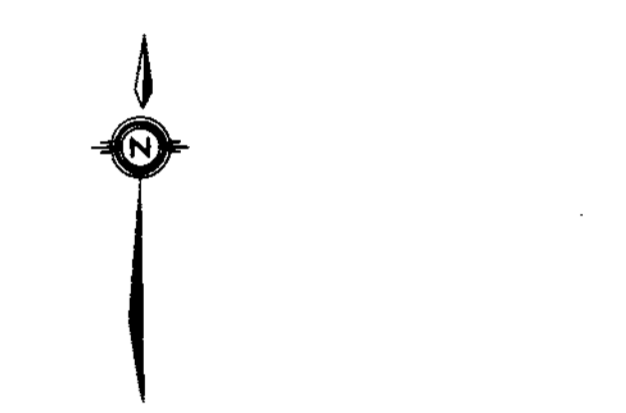
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

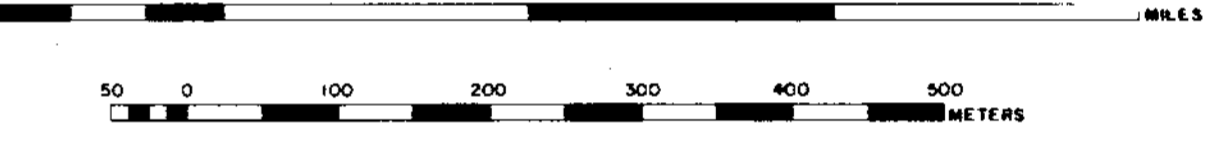
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

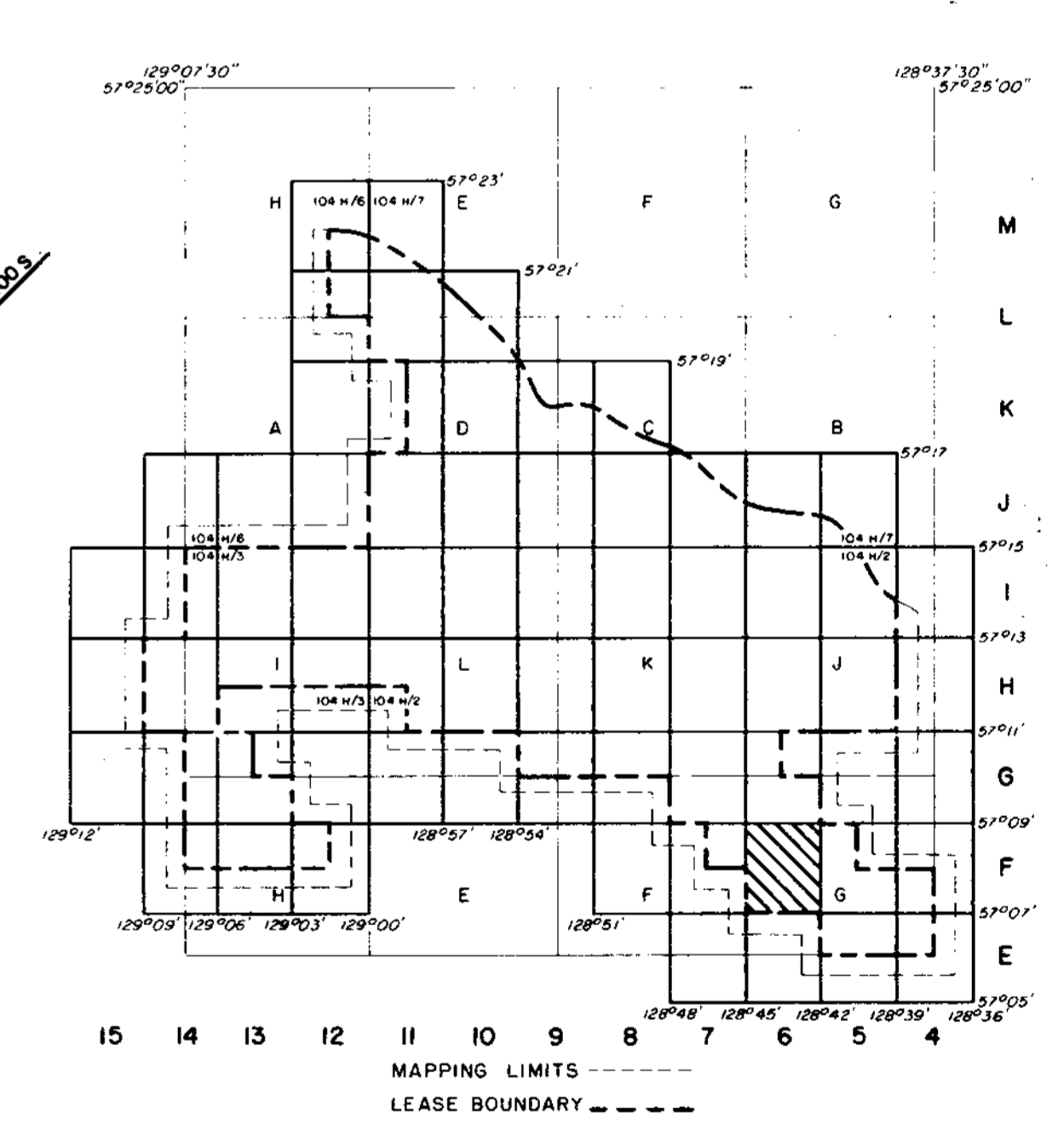
COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/87 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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

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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 DOWN THROWN SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

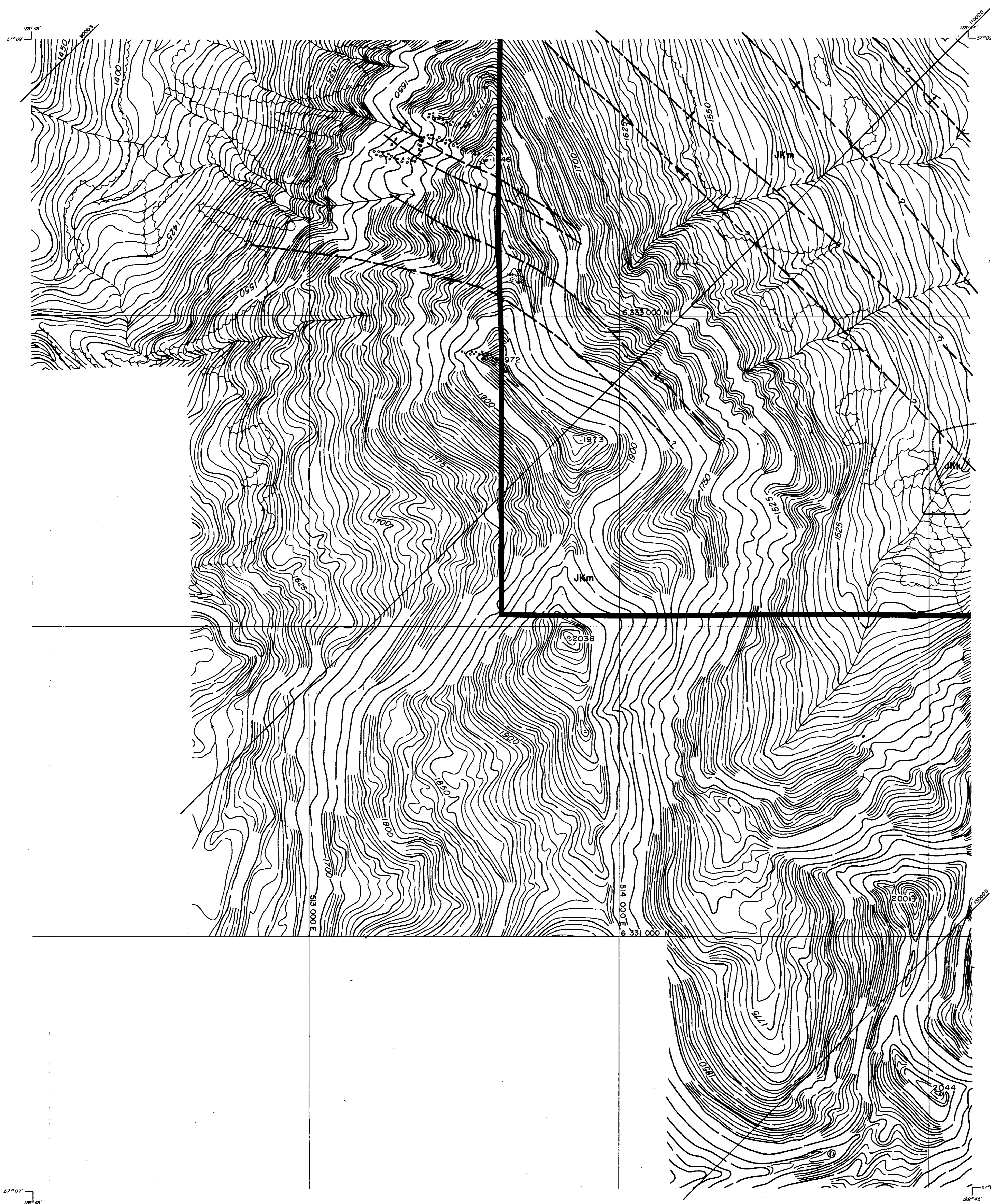
Ge. Mt. Klappan 83/2A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET F6
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C07



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

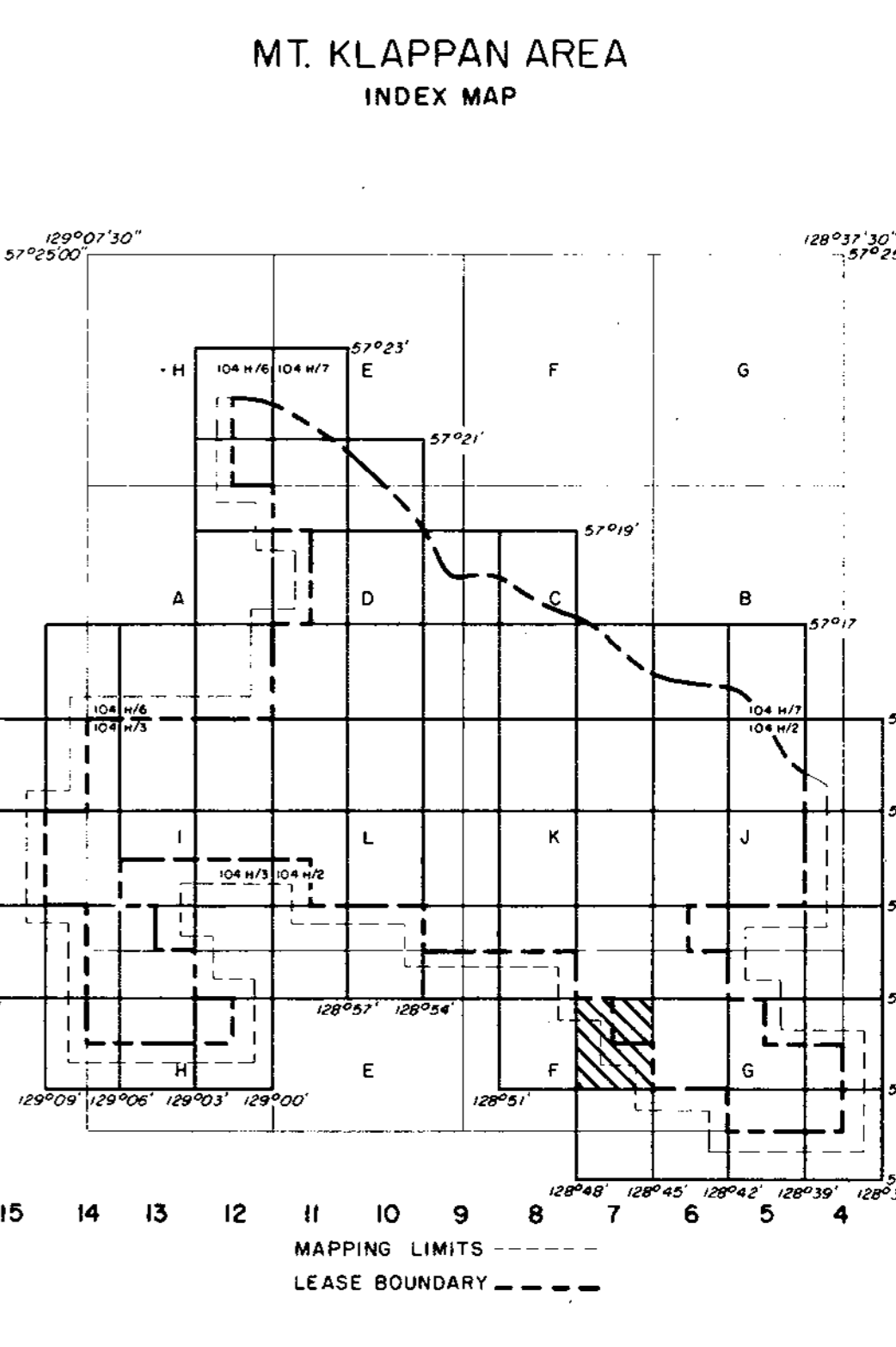
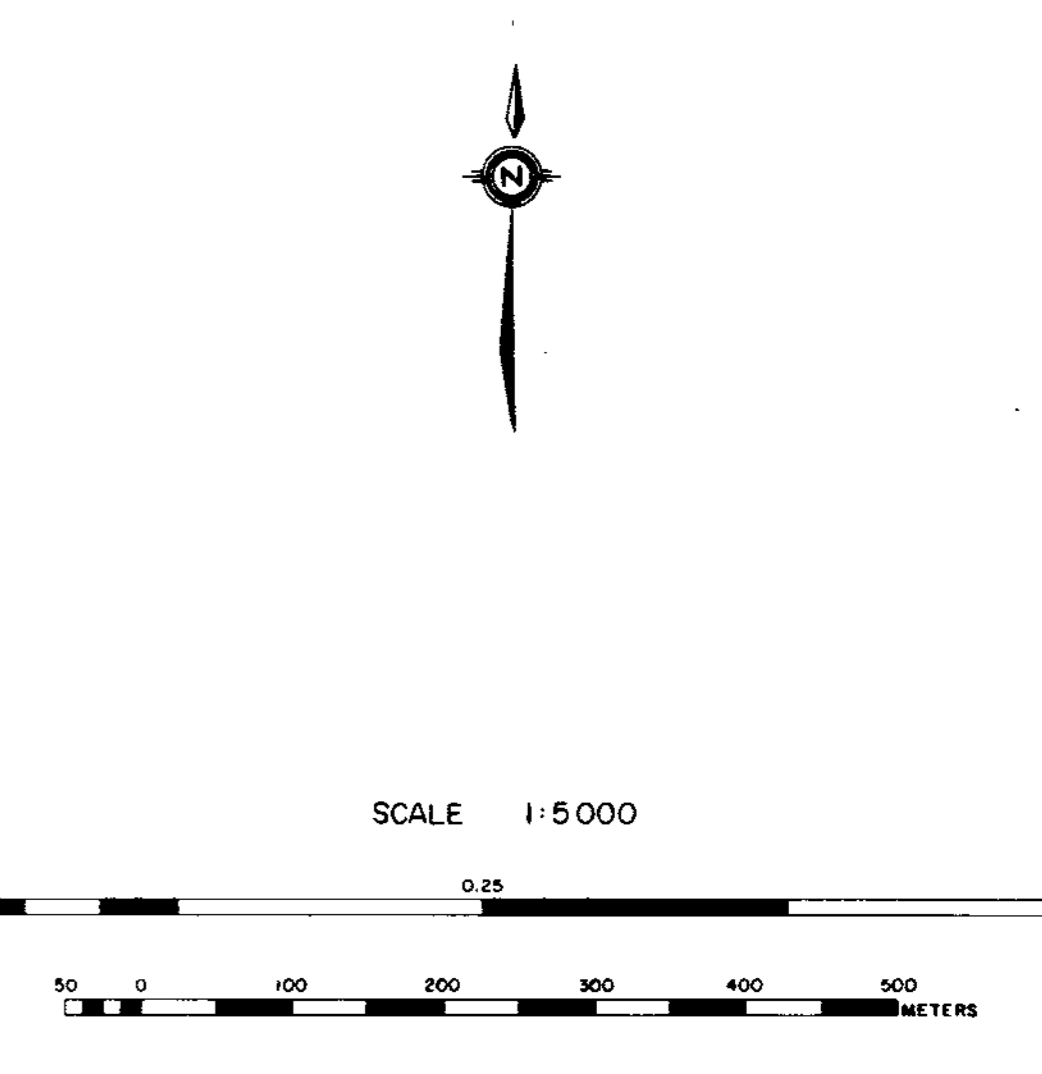
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



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)

Gr. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

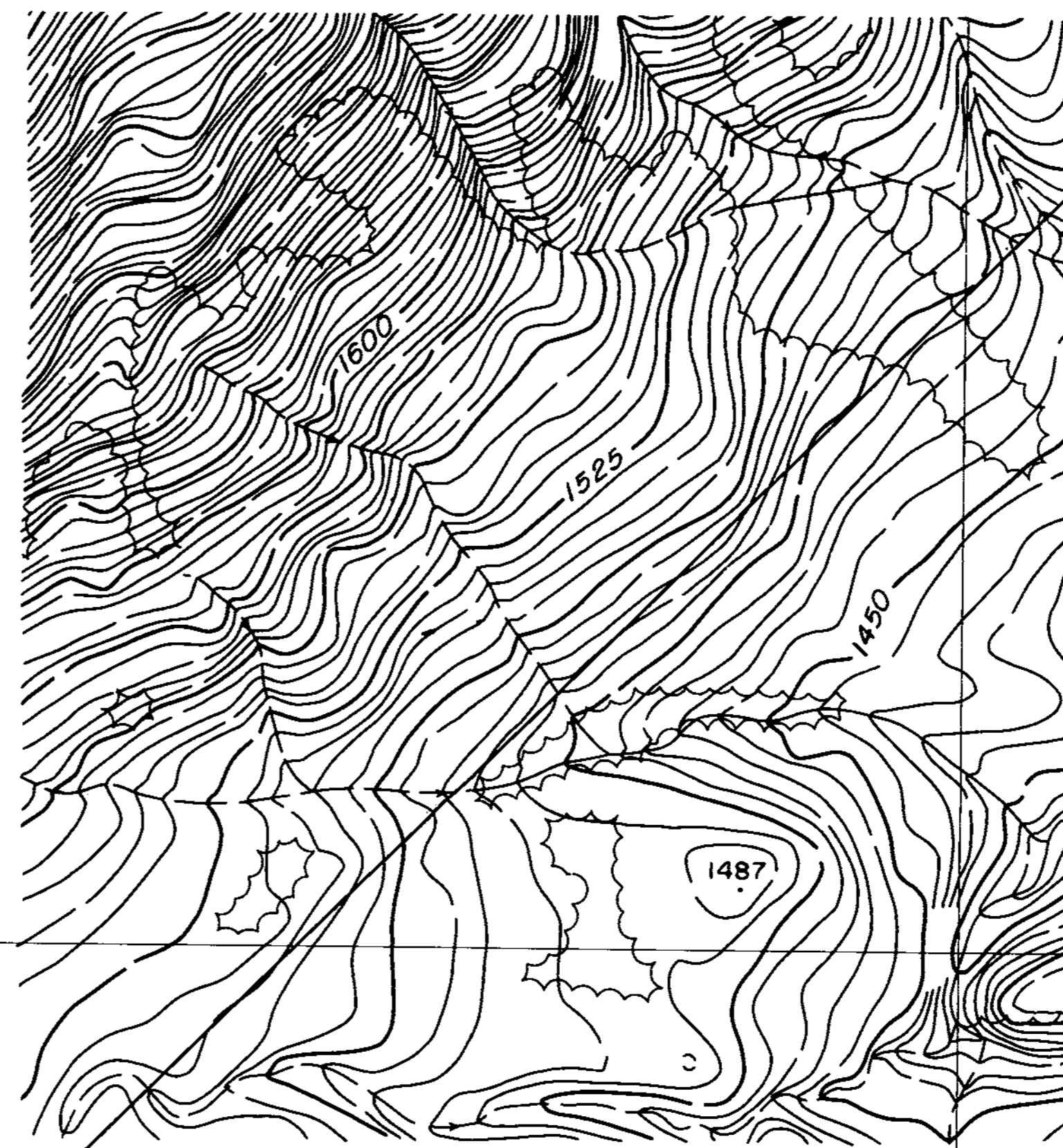
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET F7
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPMB3008

128°51'
57°09'

128°48'
57°09'



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	FL. 500'
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
CONTOURS, INTERMEDIATE	---
DEPRESSION	---
DEPRESSION, APPROXIMATE	---
SPOT ELEVATION	1854
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

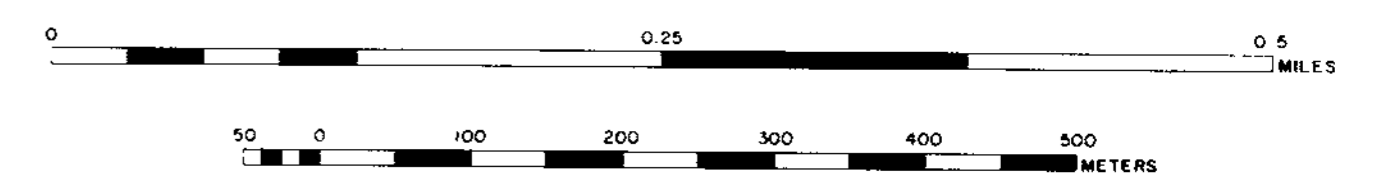
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

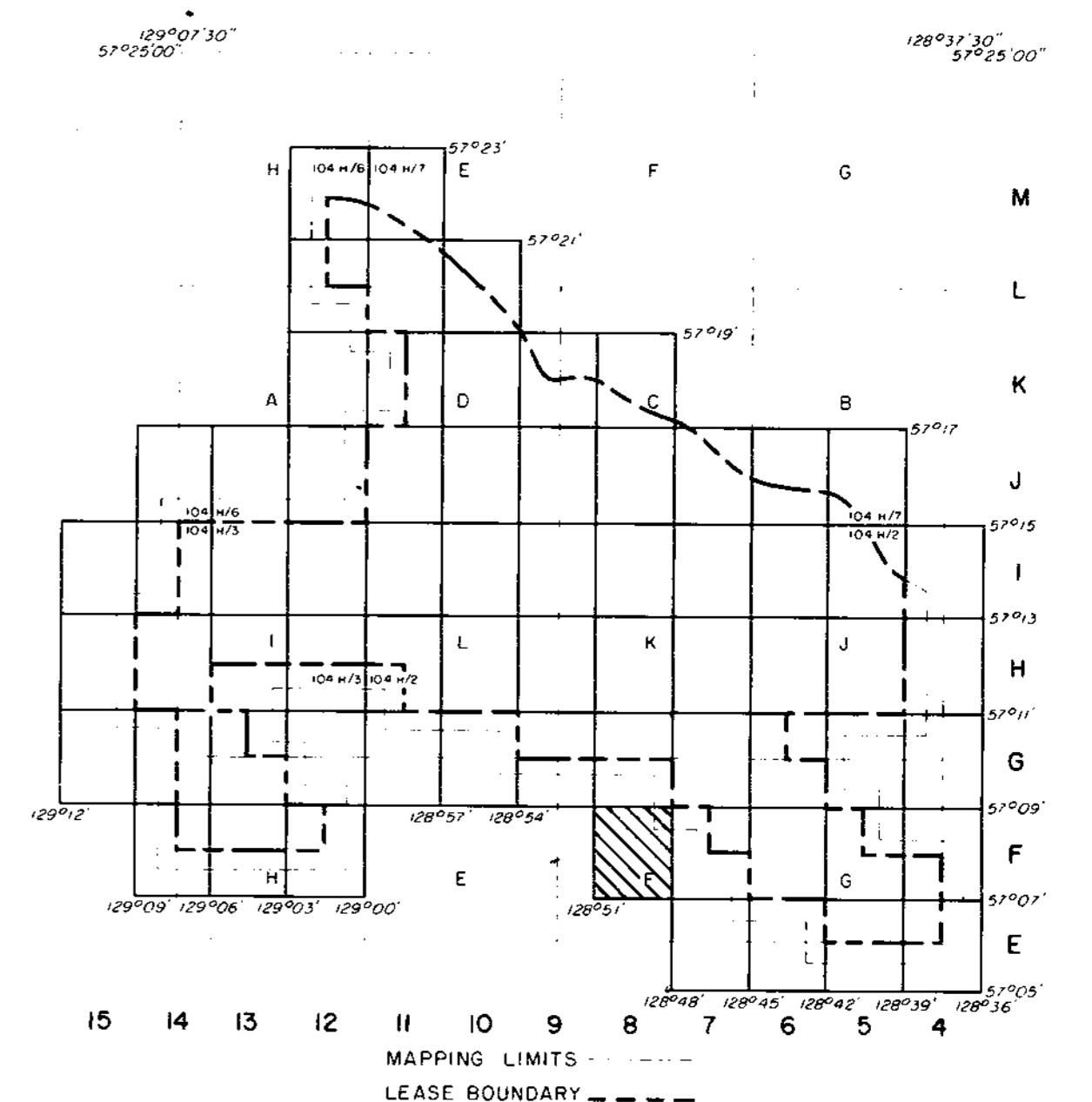
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA
INDEX MAP



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

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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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

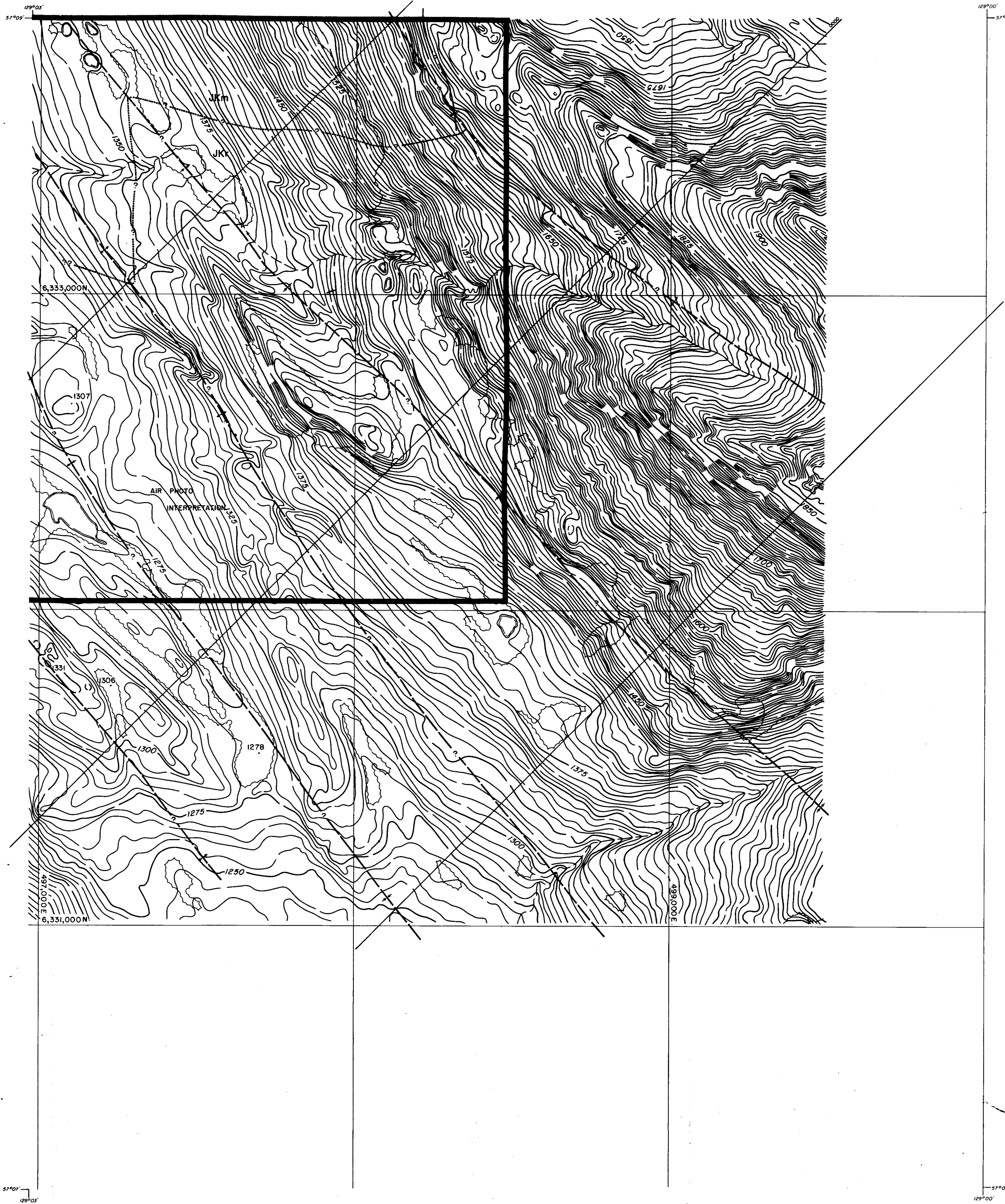
Coal - Mt. Klappan 83(2)

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET F8
1983
GEOLOGY MAP**

PREPARED BY: C. WILLIAMS SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPW83C09



LEGEND

BUILDING	---	1:10000
ROAD, HARD SURFACE	---	1:10000
LOOSE SURFACE	---	1:10000
CART TRACK	---	1:10000
TRAIL	---	1:10000
RAILROAD BED	---	1:10000
RIVER	---	1:10000
STREAM, DEFINITE	---	1:10000
APPROXIMATE	---	1:10000
SPLIT	---	1:10000
LAKE	---	1:10000
WATER LEVEL	---	1:10000
SWAMP	---	1:10000
BEAVER DAM	---	1:10000
TREE LINE	---	1:10000
CUT LINE	---	1:10000
CONTOURS, INDEX	---	1:10000
INTERMEDIATE	---	1:10000
DEPRESSION	---	1:10000
APPROXIMATE	---	1:10000
SPOT ELEVATION	---	1:10000
FORM LINES	---	1:10000
CUT/FILL	---	1:10000
FIELD CONTROL POINT	---	1:10000
COAL LICENCE	---	1:10000

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

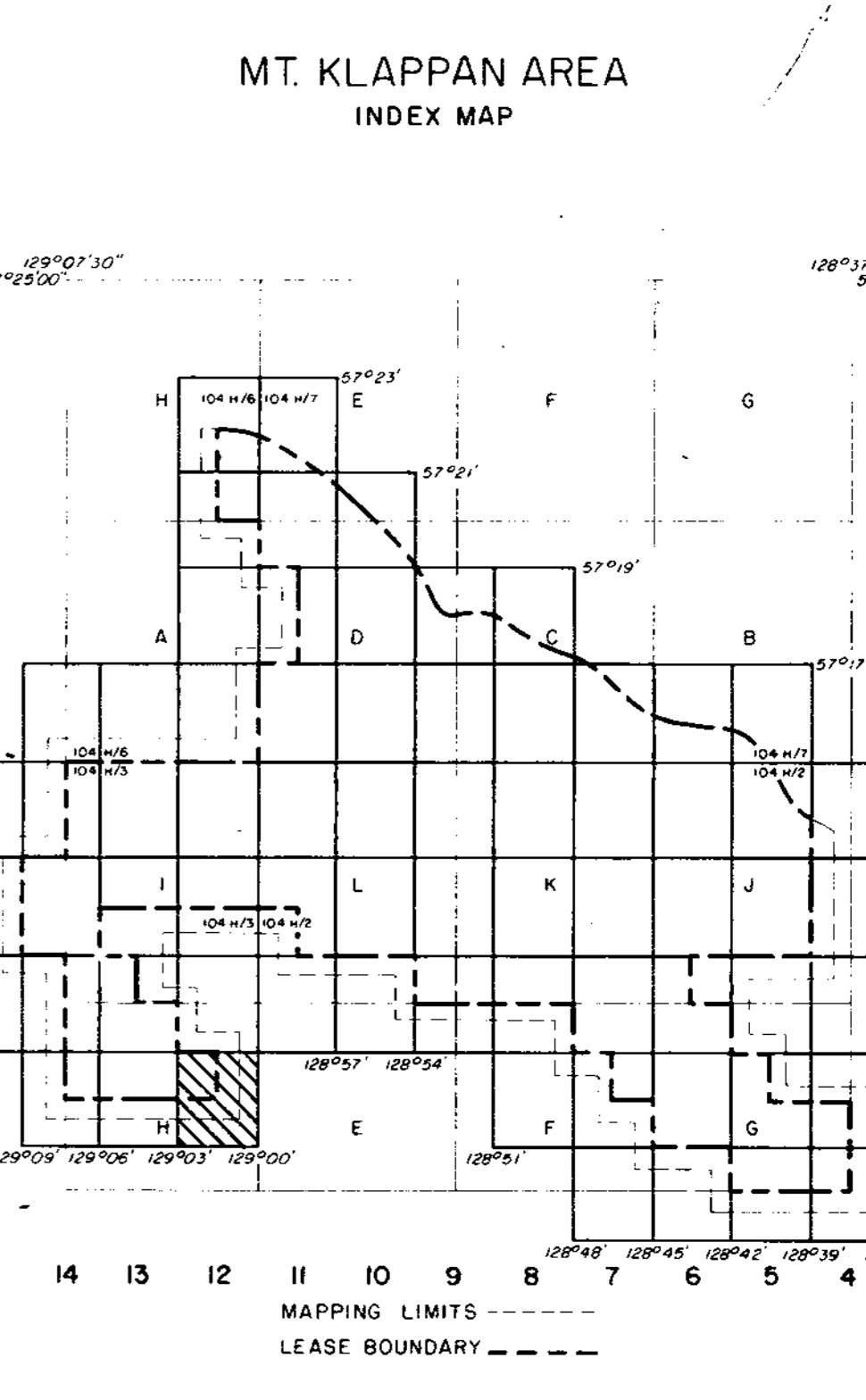
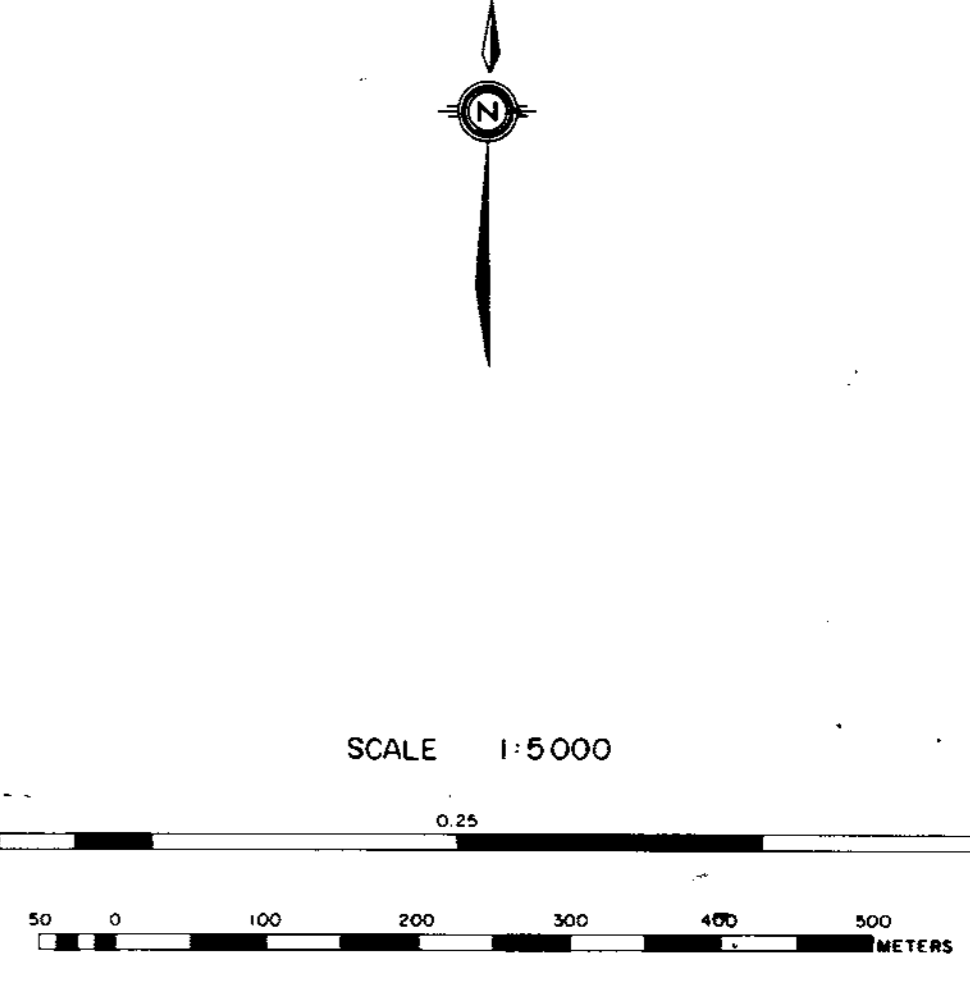
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ± 5.0 METERS FOR GROUND NOT OBSERVED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/87
AT A SCALE OF 1:60,000 (APPROXIMATE).



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 UPTHURST 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)

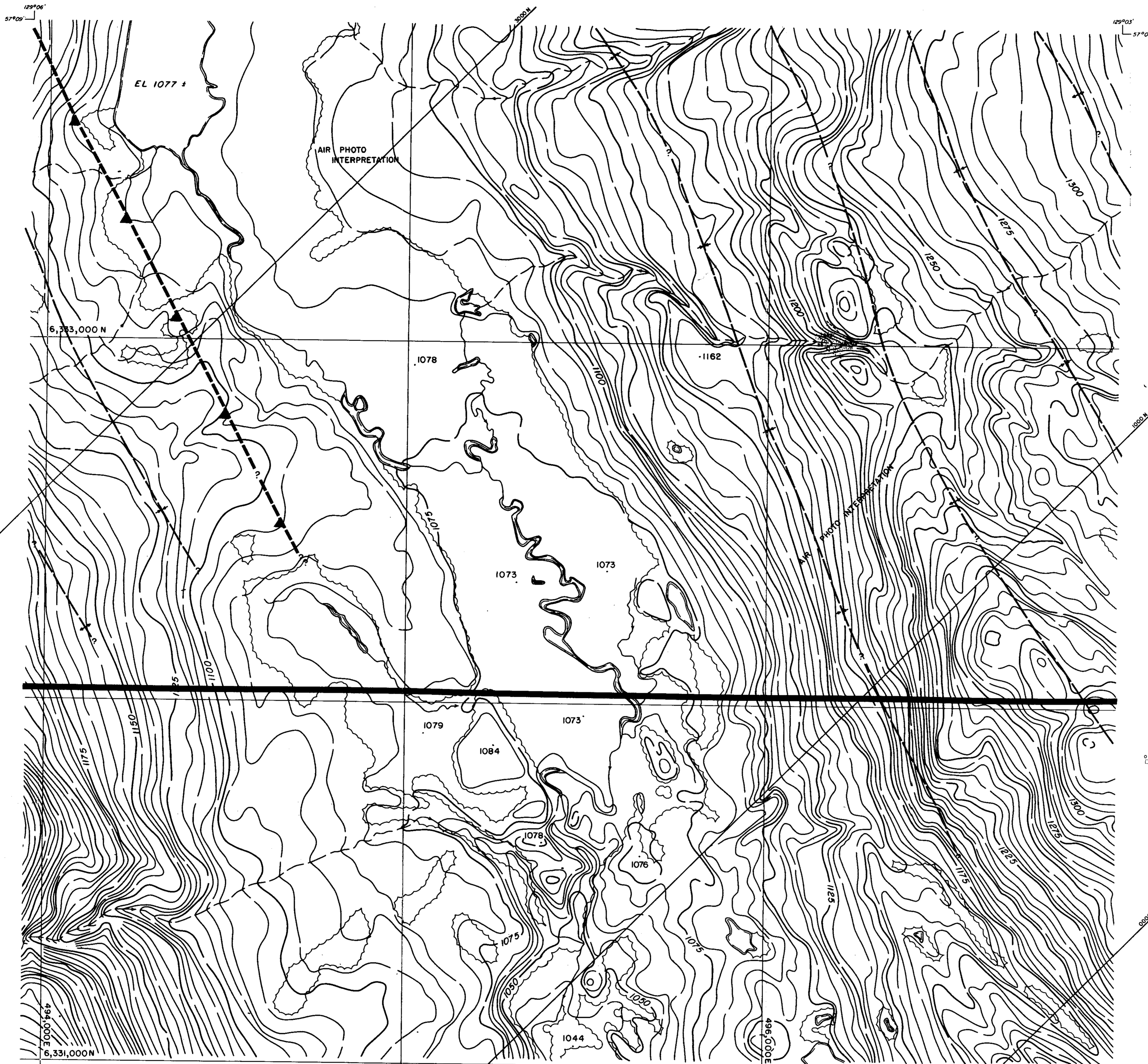
III

Ge. Mt. Klappan 83(2)10

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET F12
1983
GEOLOGY MAP

PREPARED BY: C.W. SCALE 1:5,000
APPROVED BY: C.WILLIAMS DATE: JAN, 1984 DRAWING NO. KP83C10



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

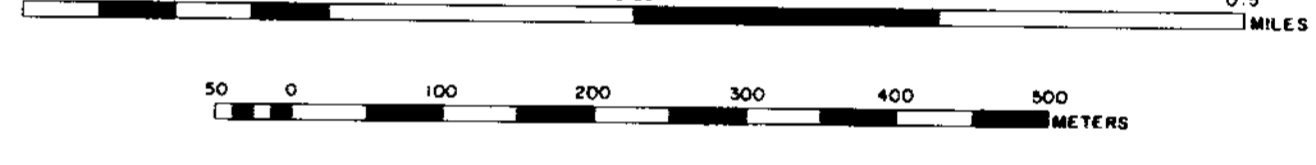
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

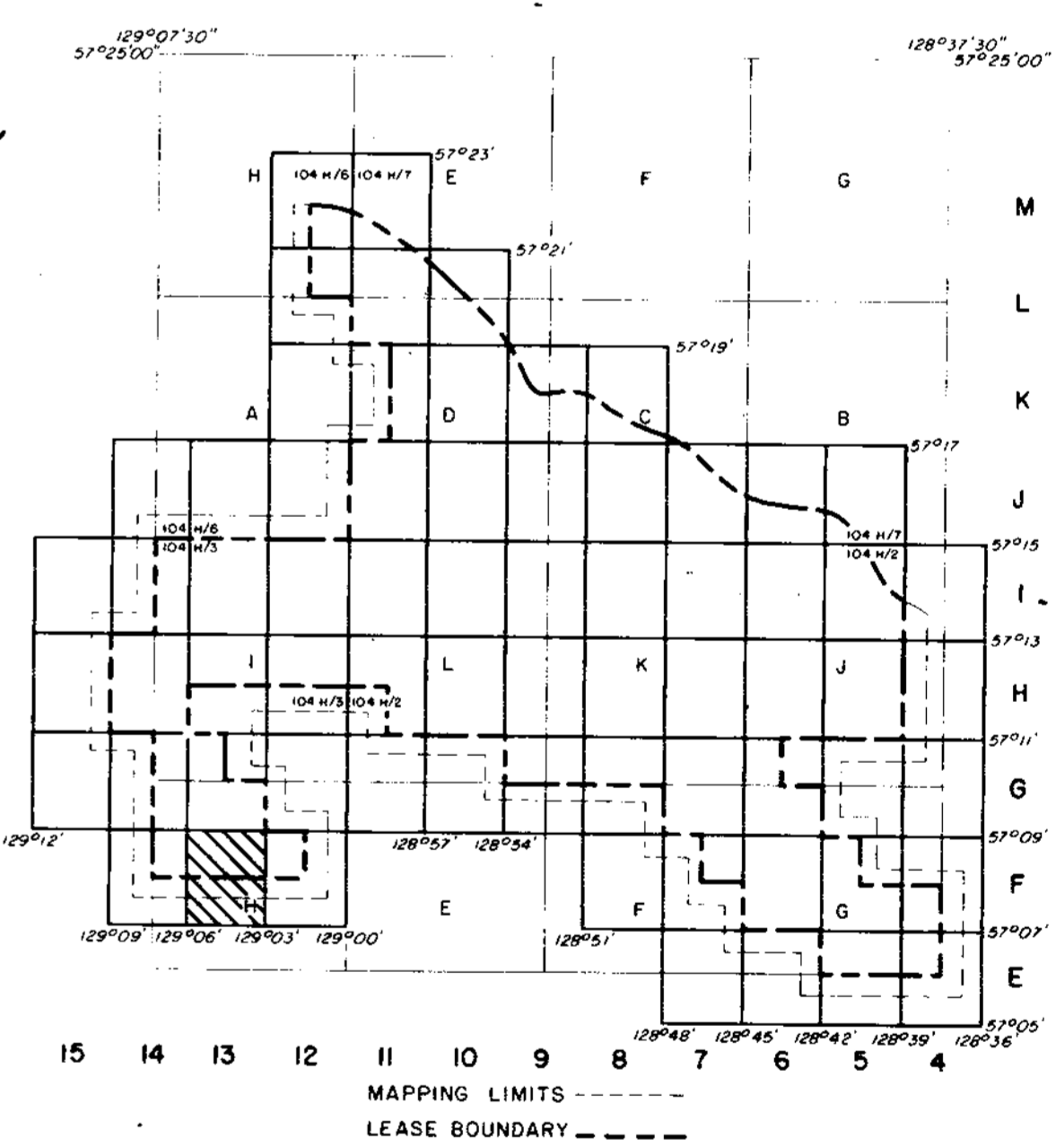
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MULLER LTD.
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



**MT. KLAPPAN AREA
INDEX MAP**



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

[Symbol]	LICENCE BOUNDARY
[Symbol]	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
[Symbol]	COAL SEAM (OUTCROP, INFERRED)
[Symbol]	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
[Symbol]	OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
[Symbol]	MONOCLINE - ARROW INDICATES DIP DIRECTION
[Symbol]	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
[Symbol]	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UP THRUST SIDE
[Symbol]	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWN THROWN SIDE
[Symbol]	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
[Symbol]	CROSS-SECTION LOCATION
[Symbol]	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

52- Mt. Klappan 83 (2)A

GULF CANADA RESOURCES INC.
Coal Division

ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET F13
1983
GEOLOGY MAP**

PREPARED BY: C.W. SCALE 1:5,000
APPROVED BY: C.WILLIAMS DATE: JAN. 1984 DRAWING NO. KP83C11

129°09' 57°08'

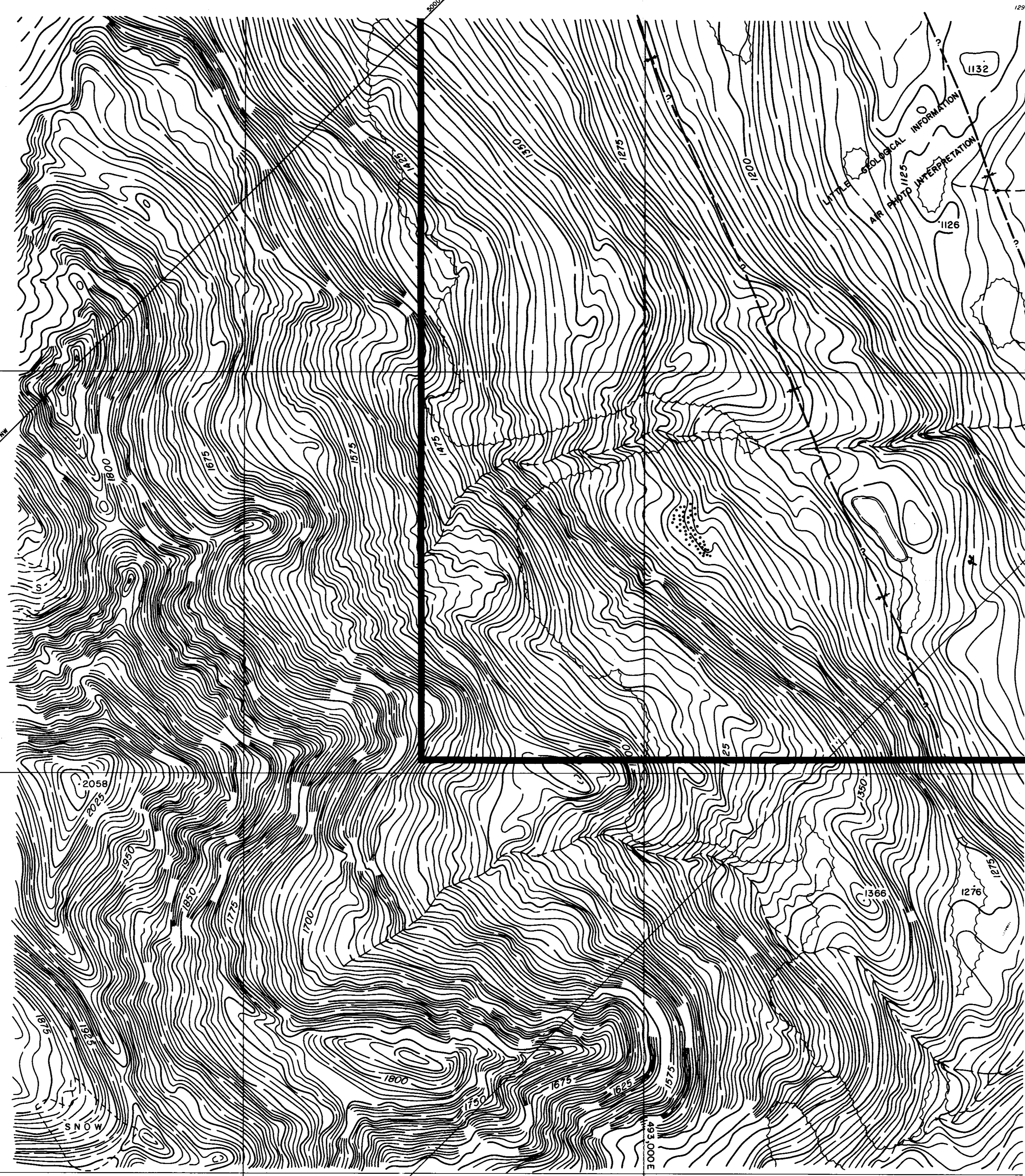
129°06' 57°09'

6,333,000 N

493,000 E 6,331,000 N

57°07' 129°09'

57°08' 129°06'



LEGEND

- BUILDING
- ROAD, HARD SURFACE
- ROAD, LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- STREAM, APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- CONTOURS, INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

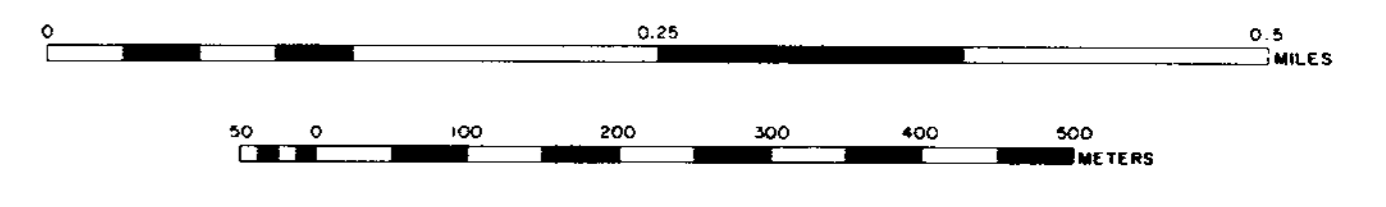
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

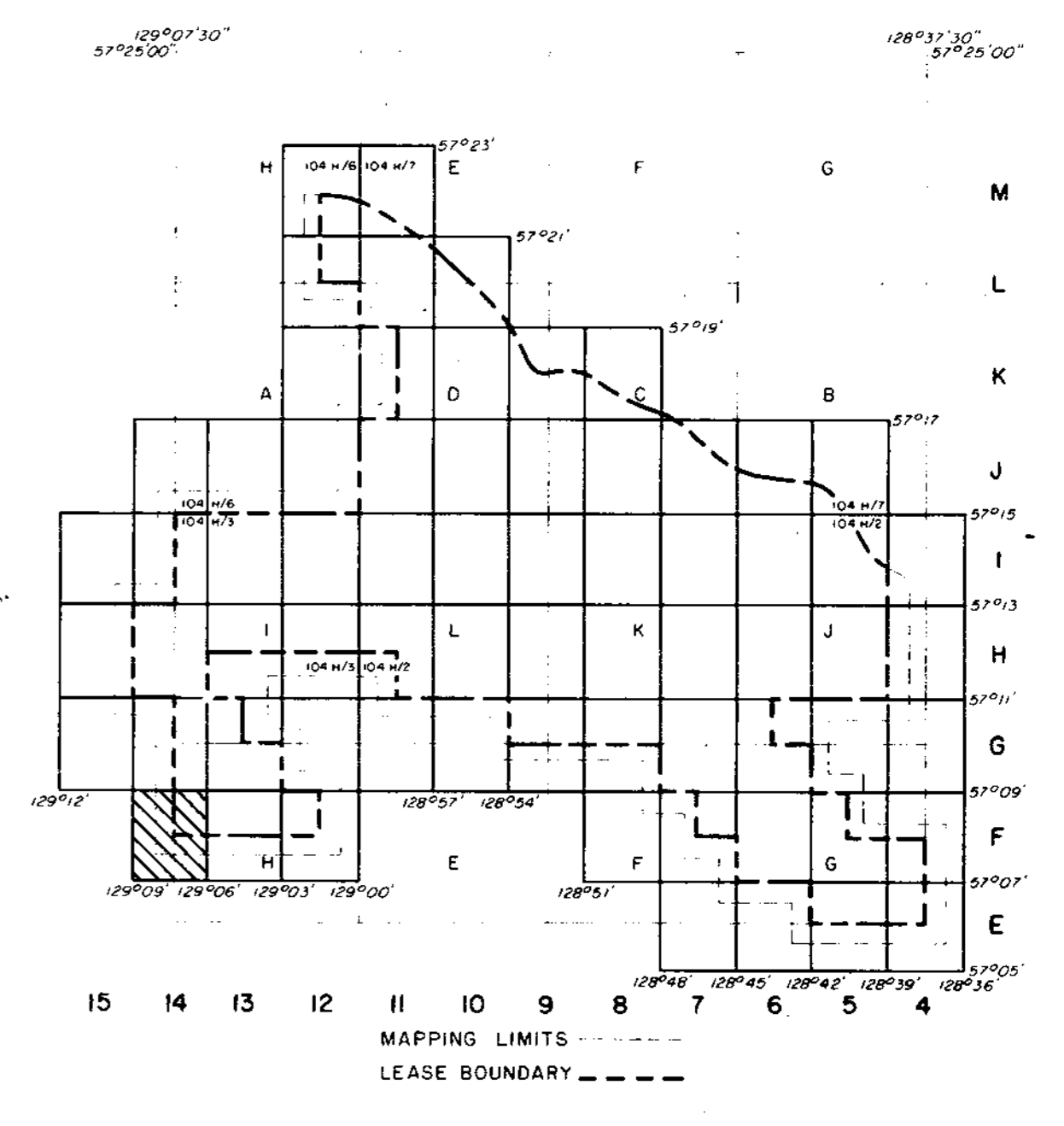
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MULLER LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA INDEX MAP



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 UPTHROW 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)

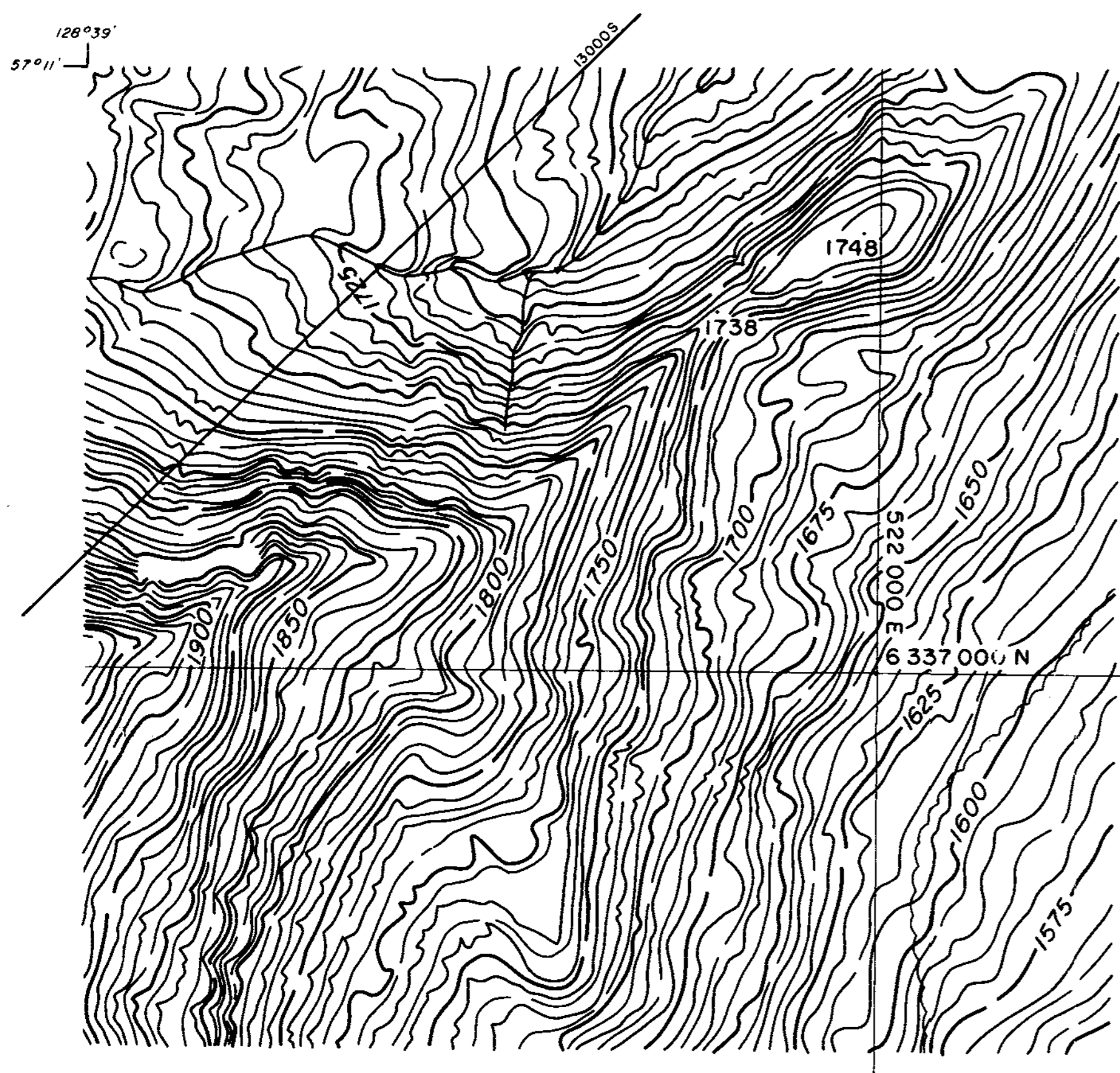
GR - MT. KLAPPAN 93(a)

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET F14
1983
GEOLOGY MAP

PREPARED BY: C.W. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No: KPN83C12



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOUR, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

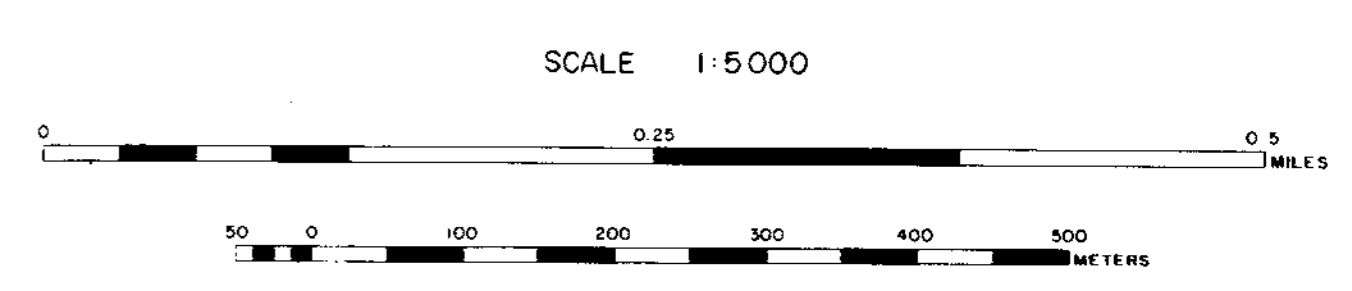
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL 1.5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

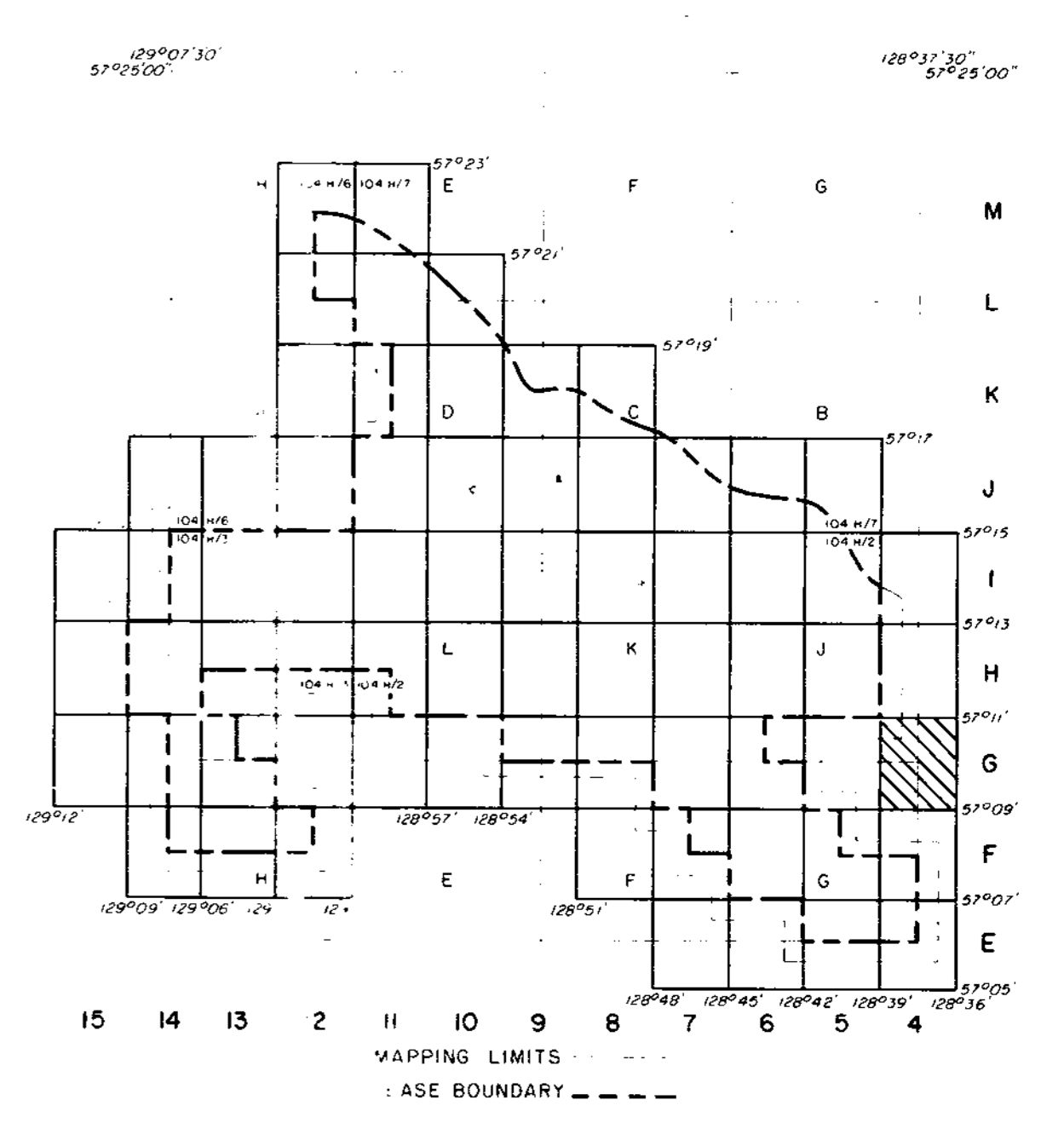
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/87 AT A SCALE OF 1:60,000 (APPROXIMATE)



MT. KLAPPAN AREA
INDEX MAP



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 through 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

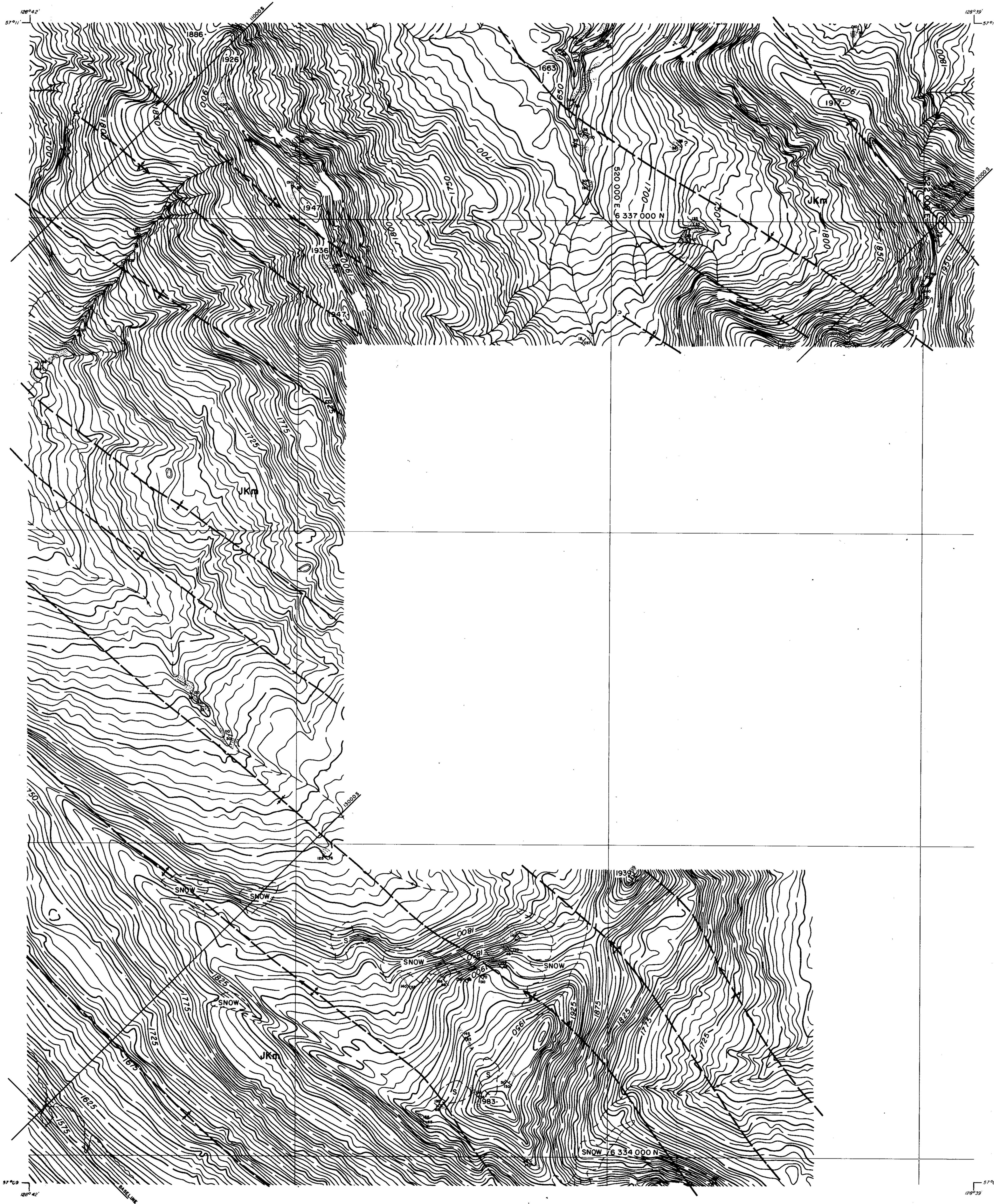
---	LICENCE BOUNDARY
---	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
---	COAL SEAM (OUTCROP, INFERRED)
---	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
---	OVERTURNED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

Ge. Mt Klappan 83(a)h

GULF CANADA RESOURCES INC.
Calgary Alberta

**MT. KLAPPAN COAL PROPERTY
MAP SHEET G4
1983
GEOLOGY MAP**

PREPARED BY: C. WILLIAMS
APPROVED BY: C. WILLIAMS
DATE: JAN. 1984
SCALE: 1:5000
DRAWING NO.: KPN83C12



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

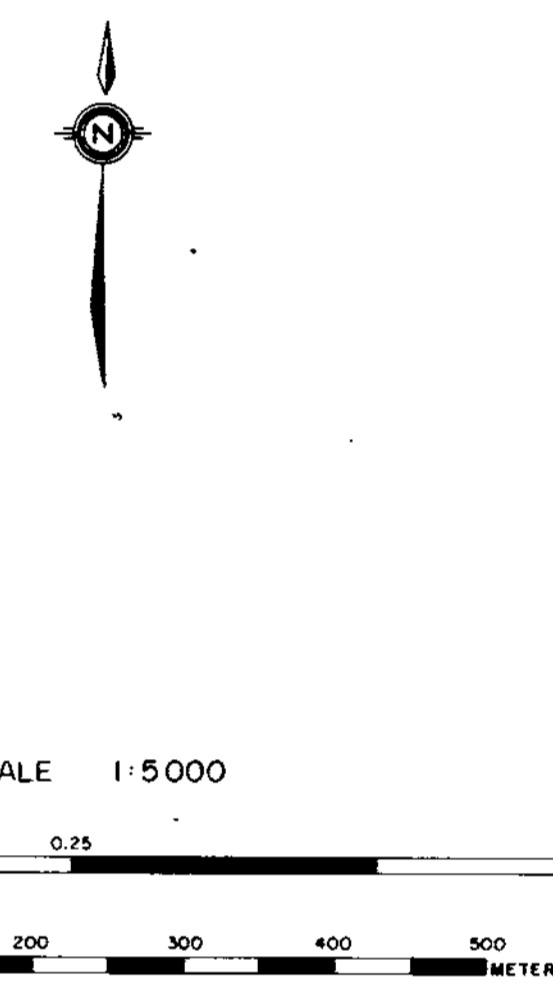
CONTOUR INTERVAL - 10 M., WITH FORM LINES INTERVAL 1 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

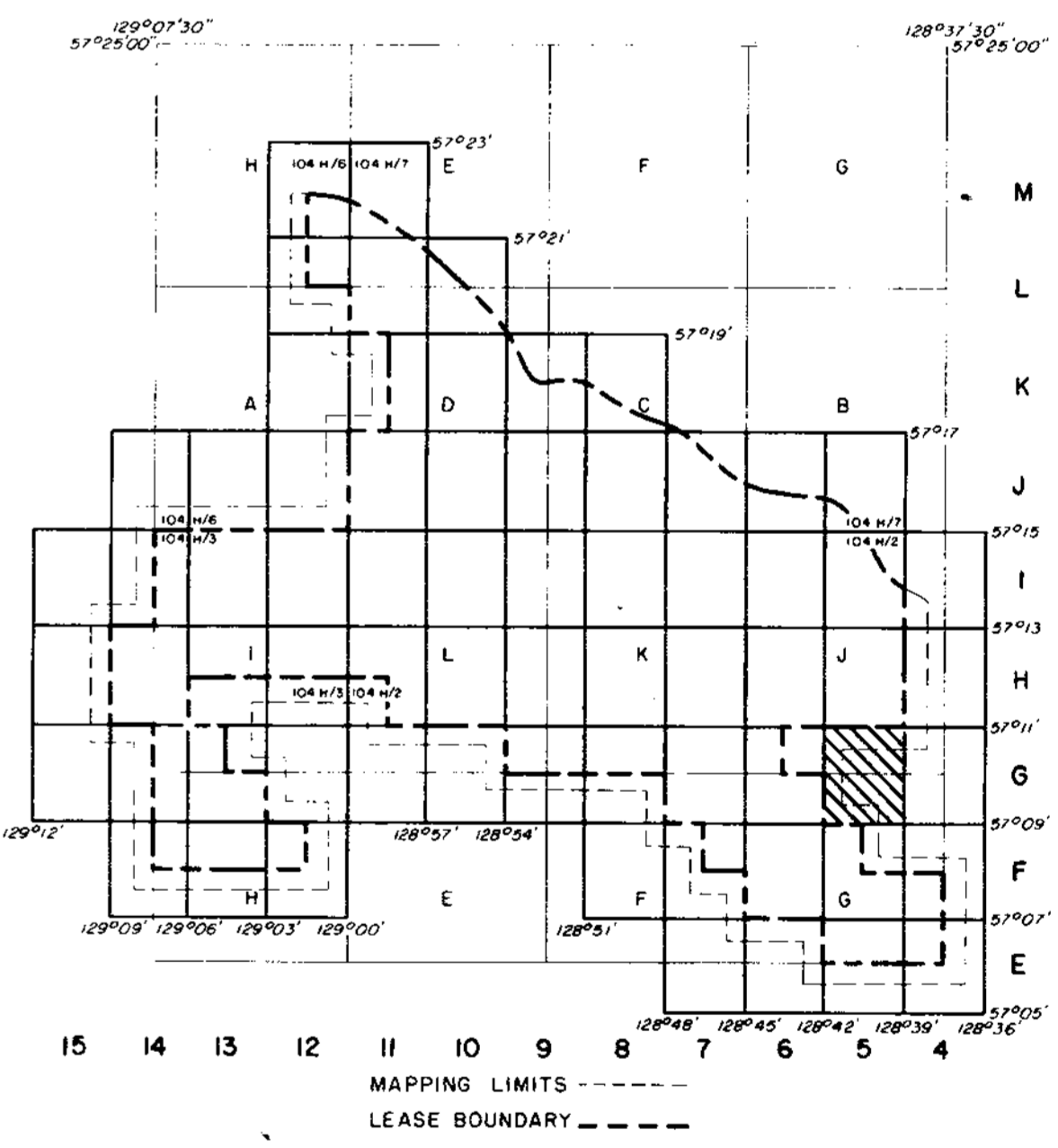
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND M.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY.

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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 DOWN THRUST SIDE	---
ADIT TRENCH LOCATION MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

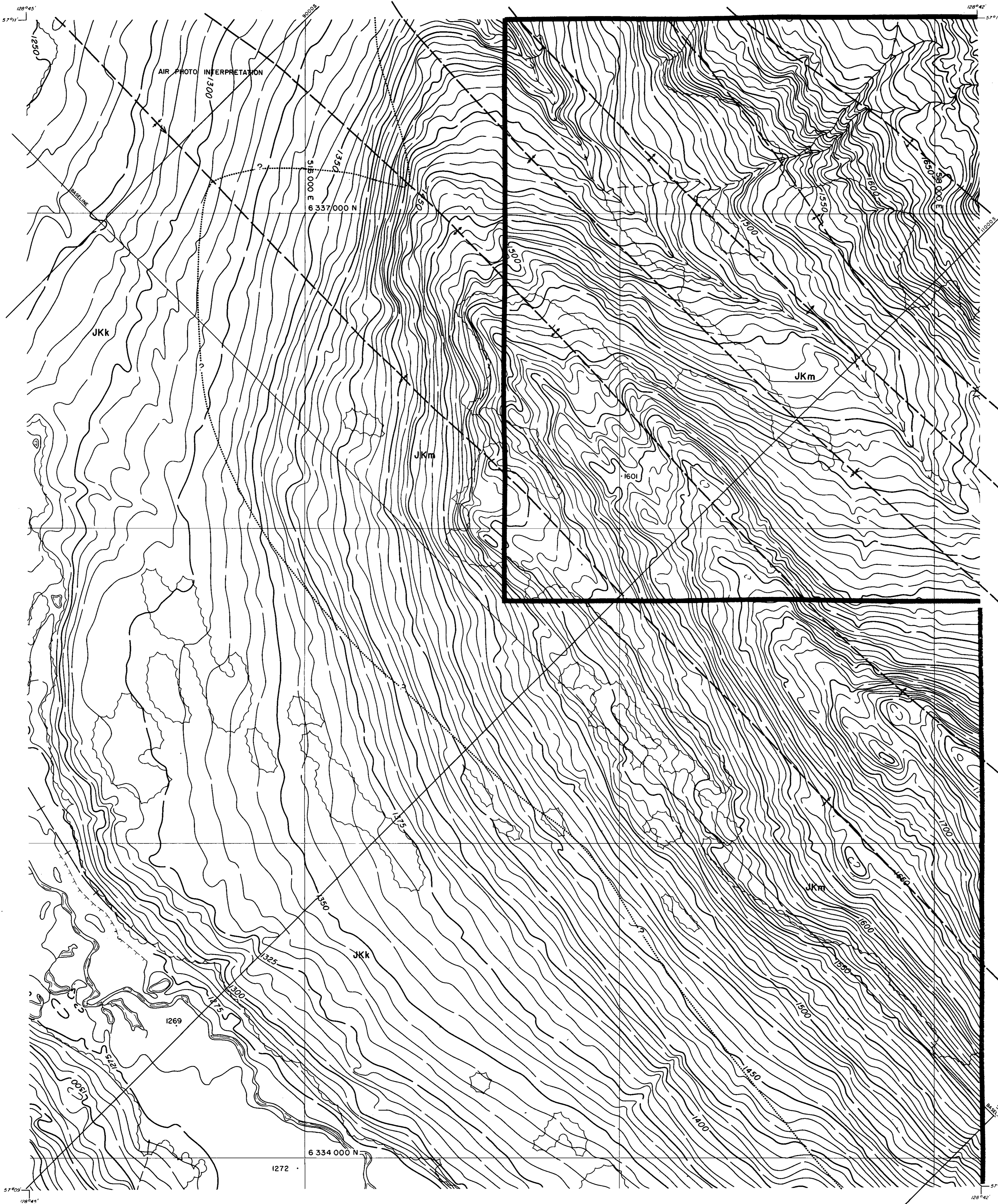
111

Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET G5
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPH83C14



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

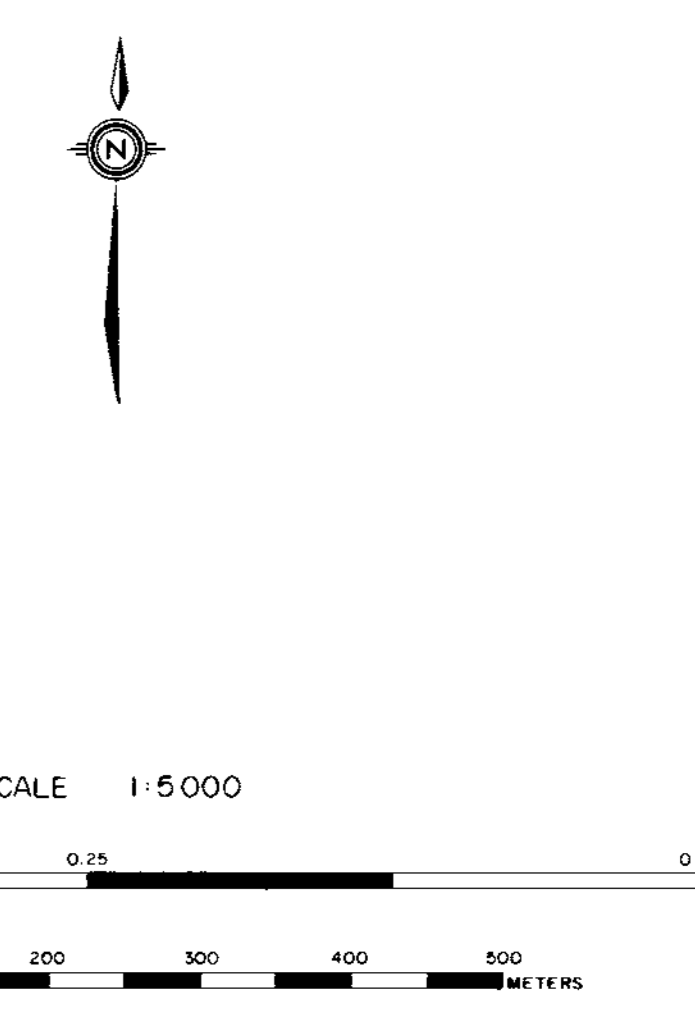
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS + 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

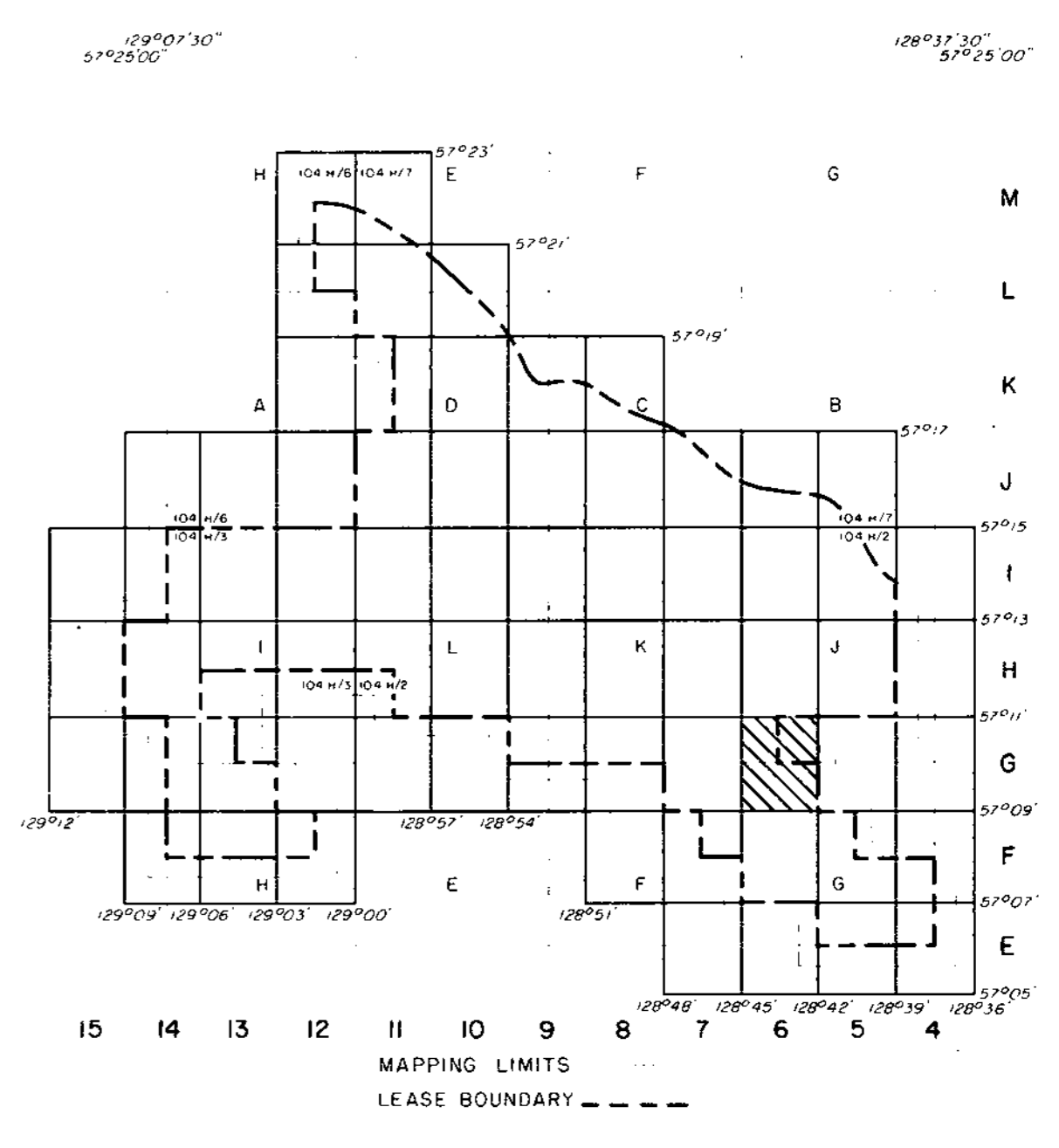
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE)



MT. KLAPPAN AREA INDEX MAP



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.

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LEGEND

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

111

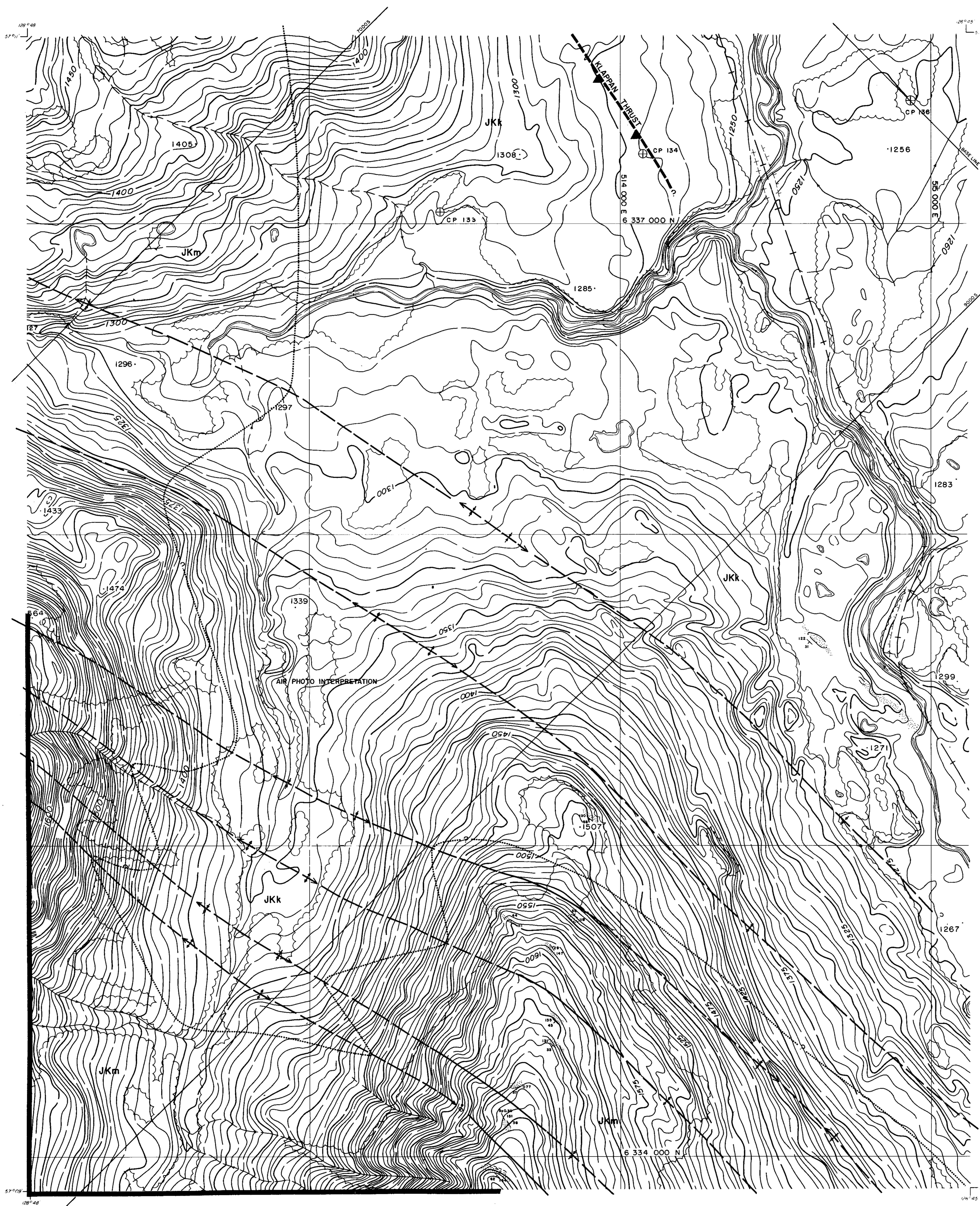
Ge - Mt. Klappan 33(24)

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET G6
1983
GEOLOGY MAP**

PREPARED BY: G.S. SCALE: 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO: KPN83C15



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

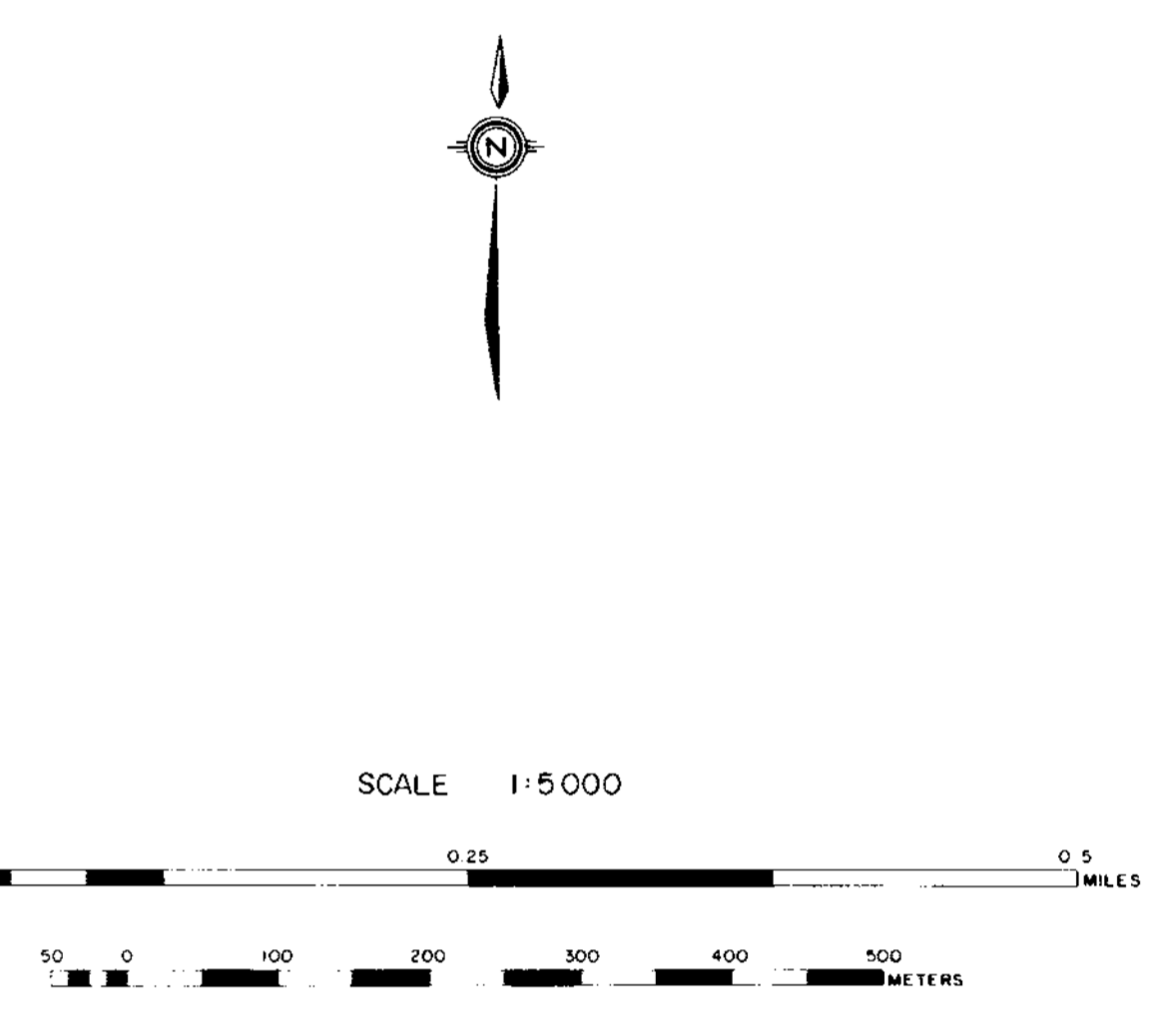
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE)



RHONDDA SEQUENCE

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

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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.

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LEGEND

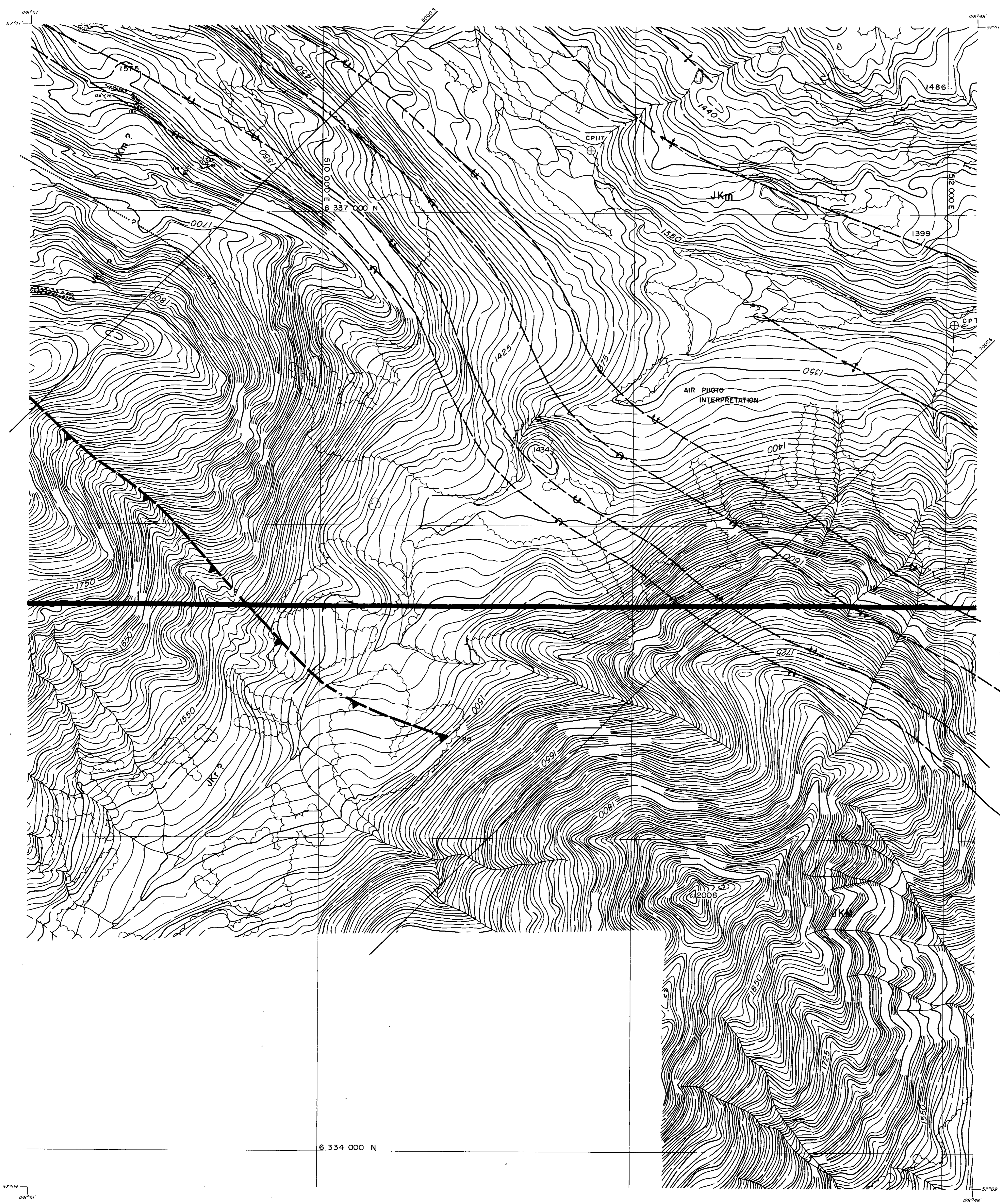
LICENCE BOUNDARY	---
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)	---
COAL SEAM (OUTCROP, INFERRED)	---
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION	---
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION	---
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)	---
OVERTURNED SYNCLINE (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 DOWNTHRUST SIDE	---
ADIT	---
TRENCH LOCATION	---
MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 85(24)

GULF CANADA RESOURCES INC.
Coal Division ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET G7
1983
GEOLOGY MAP**

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO: KPN83216



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SUMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
CONTOURS, INTERMEDIATE	---
CONTOURS, APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

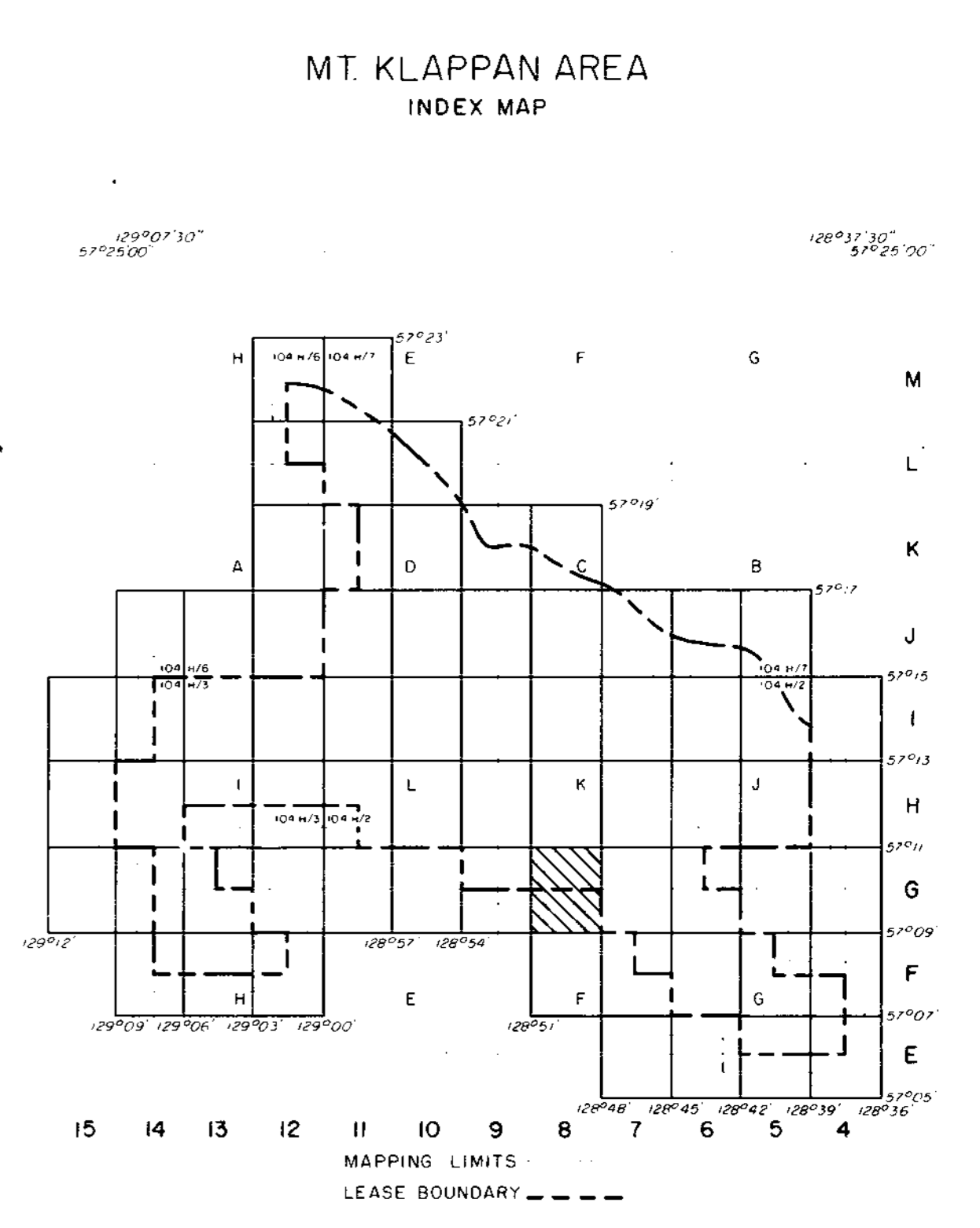
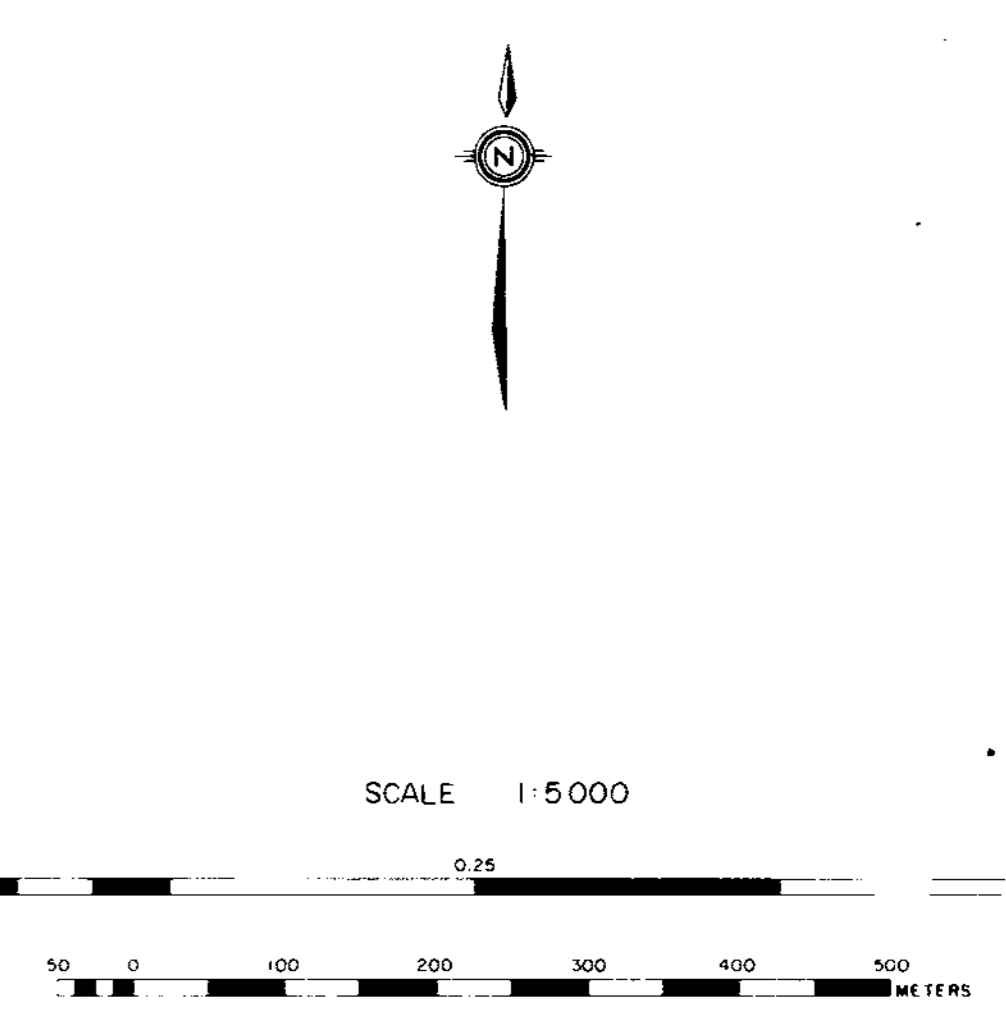
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 15.0 METERS FOR GROUND NOT OCCUPIED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./62 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/F67 AT A SCALE OF 1:60,000 (APPROXIMATE)



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 DOWN THROWN SIDE	---
ADIT TRENCH LOCATION	---
MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 83/84

GULF CANADA RESOURCES INC.

Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

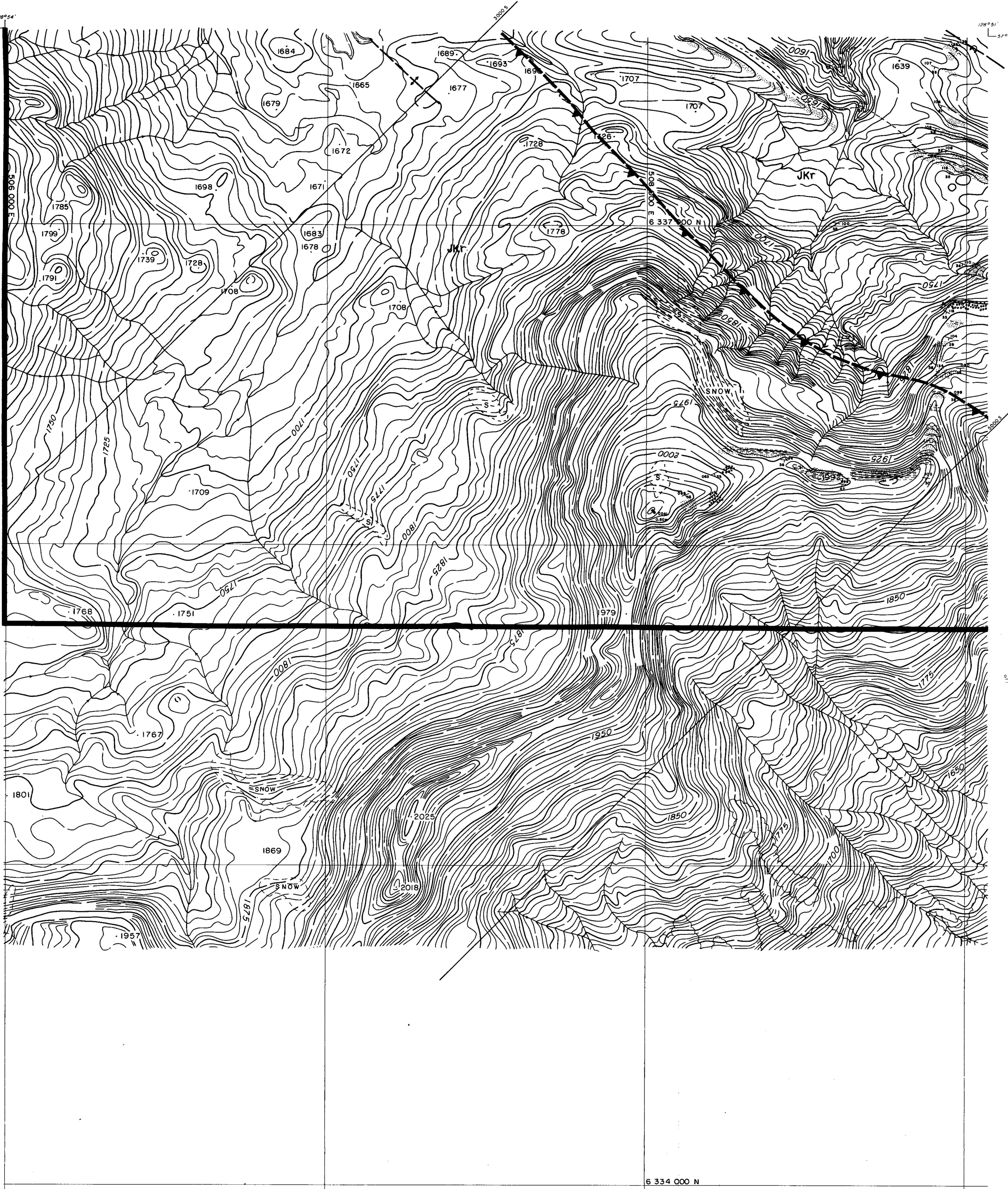
MAP SHEET G8

1983

GEOLOGY MAP

PREPARED BY: G.S., C.W. SCALE: 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO: KPN83C17



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

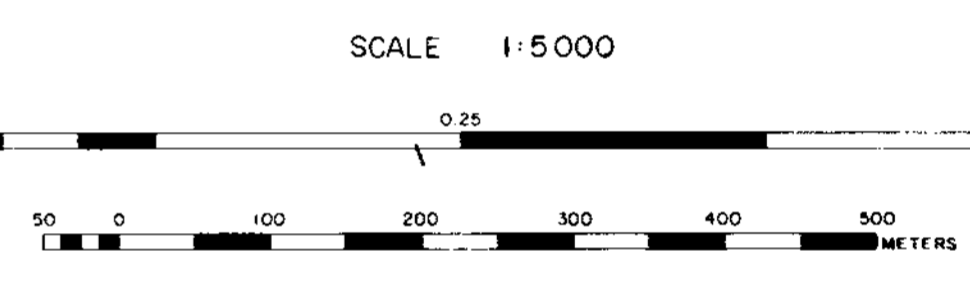
CONTOUR INTERVAL = 10 M., WITH FORM LINES INTERVAL = 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

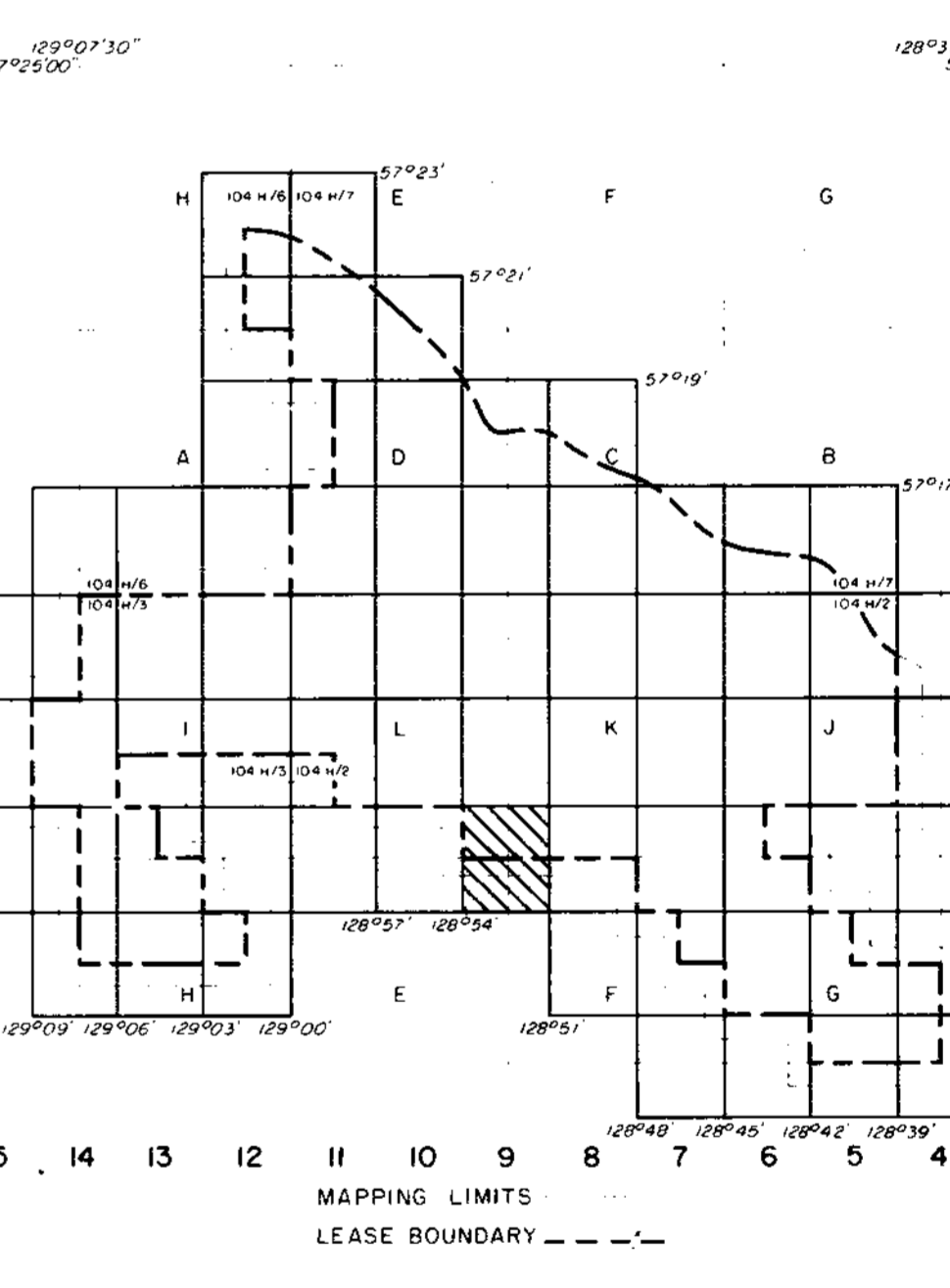
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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

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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 DOWNTHRUST SIDE	---
ADIT TRENCH LOCATION MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

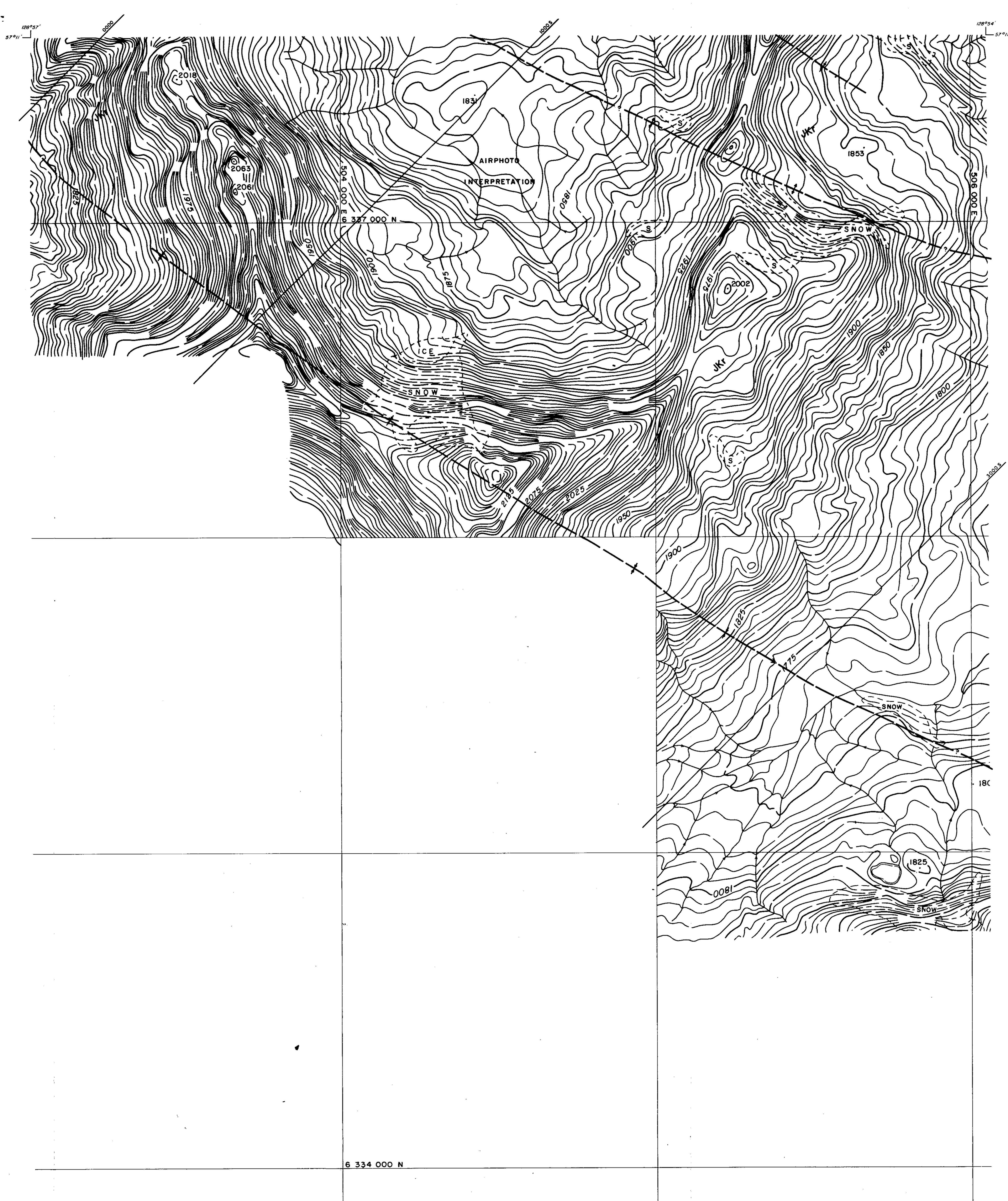
Ge. Mt. Klappan 93/69

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET G9
1983
GEOLOGY MAP

PREPARED BY: G.S., C.W. SCALE 1:6000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KP83CB



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
ROAD, LOOSE SURFACE	[Symbol]
RAILROAD TRACK	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
STREAM, APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
CONTOURS, INTERMEDIATE	[Symbol]
CONTOURS, APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

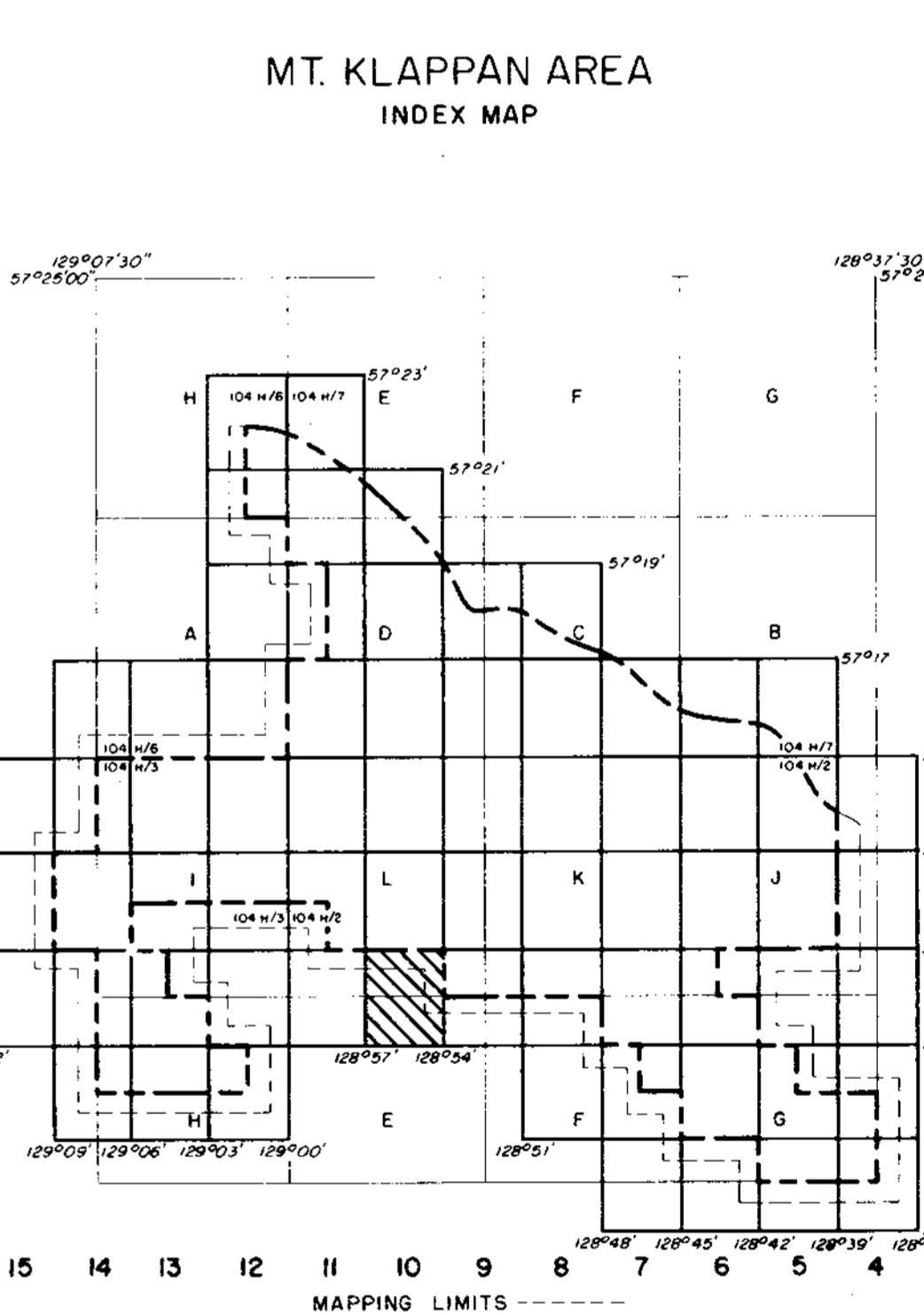
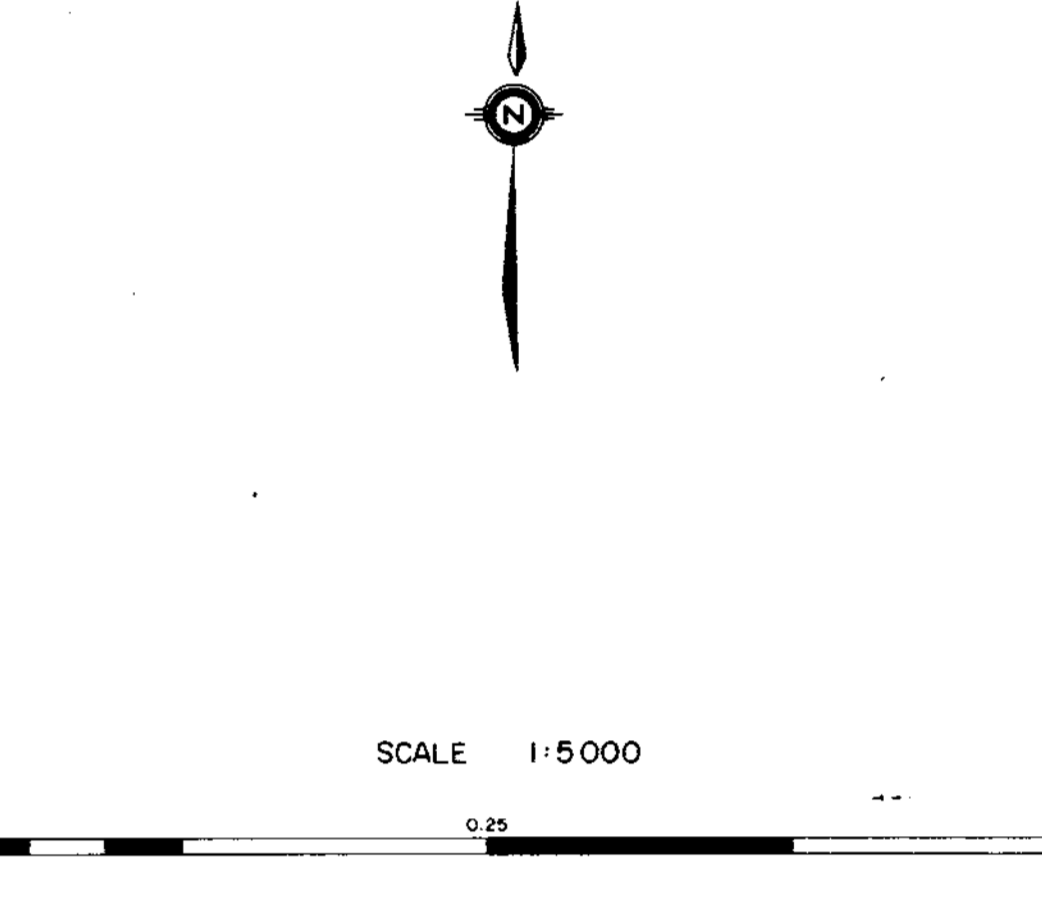
CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - ±5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/87
AT A SCALE OF 1:60,000 (APPROXIMATE).



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.

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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

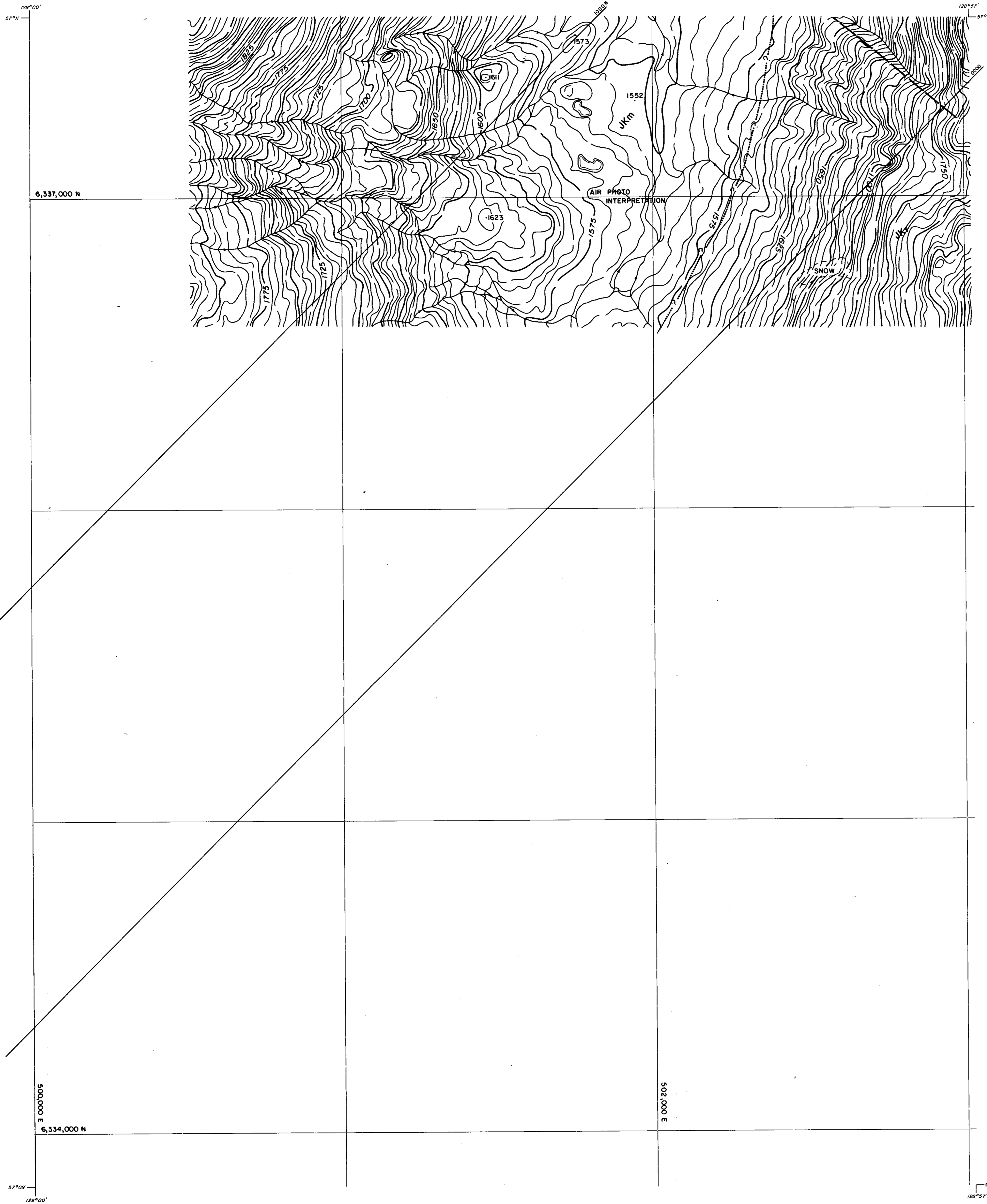
[Symbol]	LICENCE BOUNDARY
[Symbol]	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
[Symbol]	COAL SEAM (OUTCROP, INFERRED)
[Symbol]	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
[Symbol]	OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
[Symbol]	MONOCLINE - ARROW INDICATES DIP DIRECTION
[Symbol]	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
[Symbol]	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UPTHURST SIDE
[Symbol]	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWNTHRUST SIDE
[Symbol]	ADIT
[Symbol]	TRENCH LOCATION
[Symbol]	MEASURED SECTION LOCATION
[Symbol]	CROSS-SECTION LOCATION
[Symbol]	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83/84

GULF CANADA RESOURCES INC.
Calgary Coal Division ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET G10
1983
GEOLOGY MAP**

PREPARED BY: C.W. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KP83C19



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
ROAD, LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
STREAM, APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
CONTOURS, INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
DEPRESSION, APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

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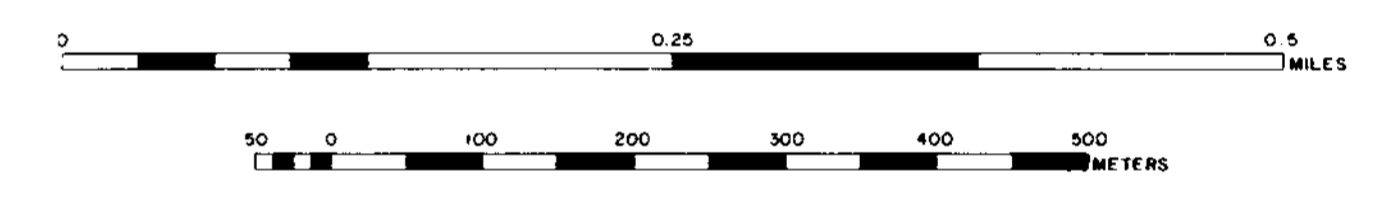
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

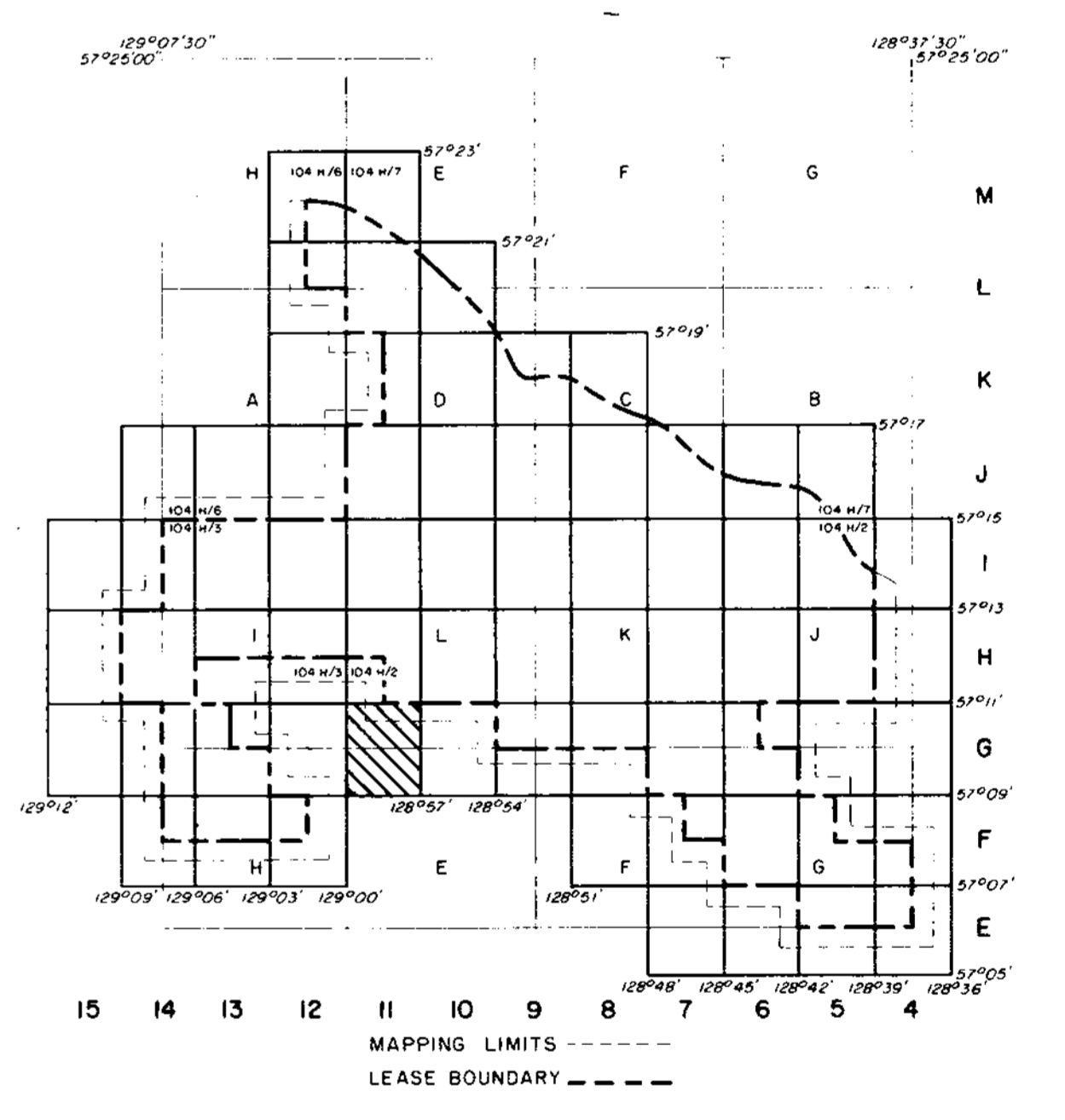
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



**MT. KLAPPAN AREA
INDEX MAP**



RHONDDA SEQUENCE

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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.

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LEGEND

[Symbol]	LICENCE BOUNDARY
[Symbol]	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
[Symbol]	COAL SEAM (OUTCROP, INFERRED)
[Symbol]	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
[Symbol]	OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
[Symbol]	MONOCLINE - ARROW INDICATES DIP DIRECTION
[Symbol]	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
[Symbol]	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UP THRUST SIDE
[Symbol]	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWN THROWN SIDE
[Symbol]	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
[Symbol]	CROSS-SECTION LOCATION
[Symbol]	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

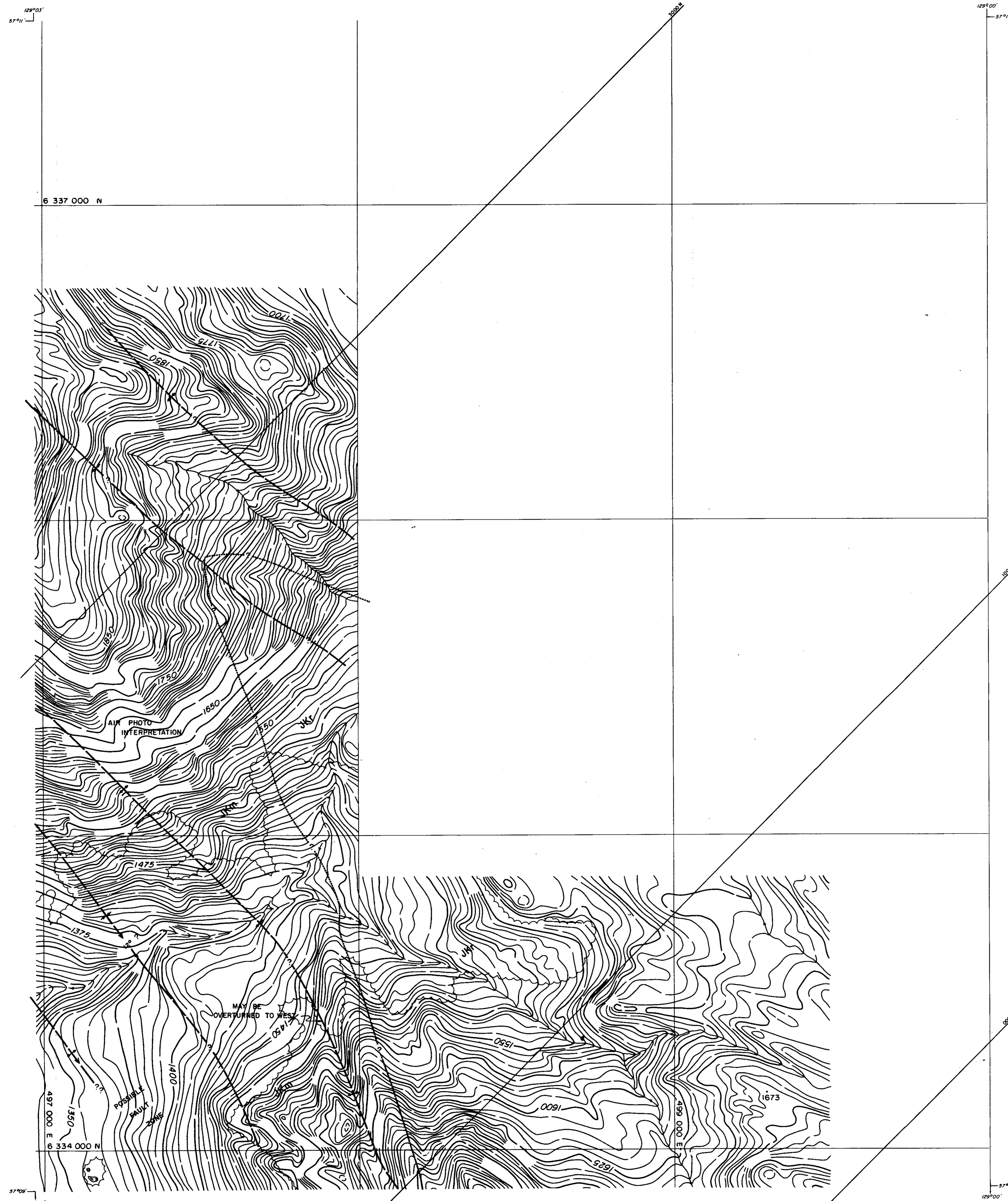
Ge. Mt. Klappan 83/2A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET G11
1983
GEOLOGY MAP**

PREPARED BY: C.W. SCALE 1:5,000
APPROVED BY: C. WILLIAMS DATE: JUN. 1984 DRAWING NO. KPM83C20



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
ROAD, LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
STREAM, APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
CONTOURS, INTERMEDIATE	[Symbol]
CONTOURS, APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

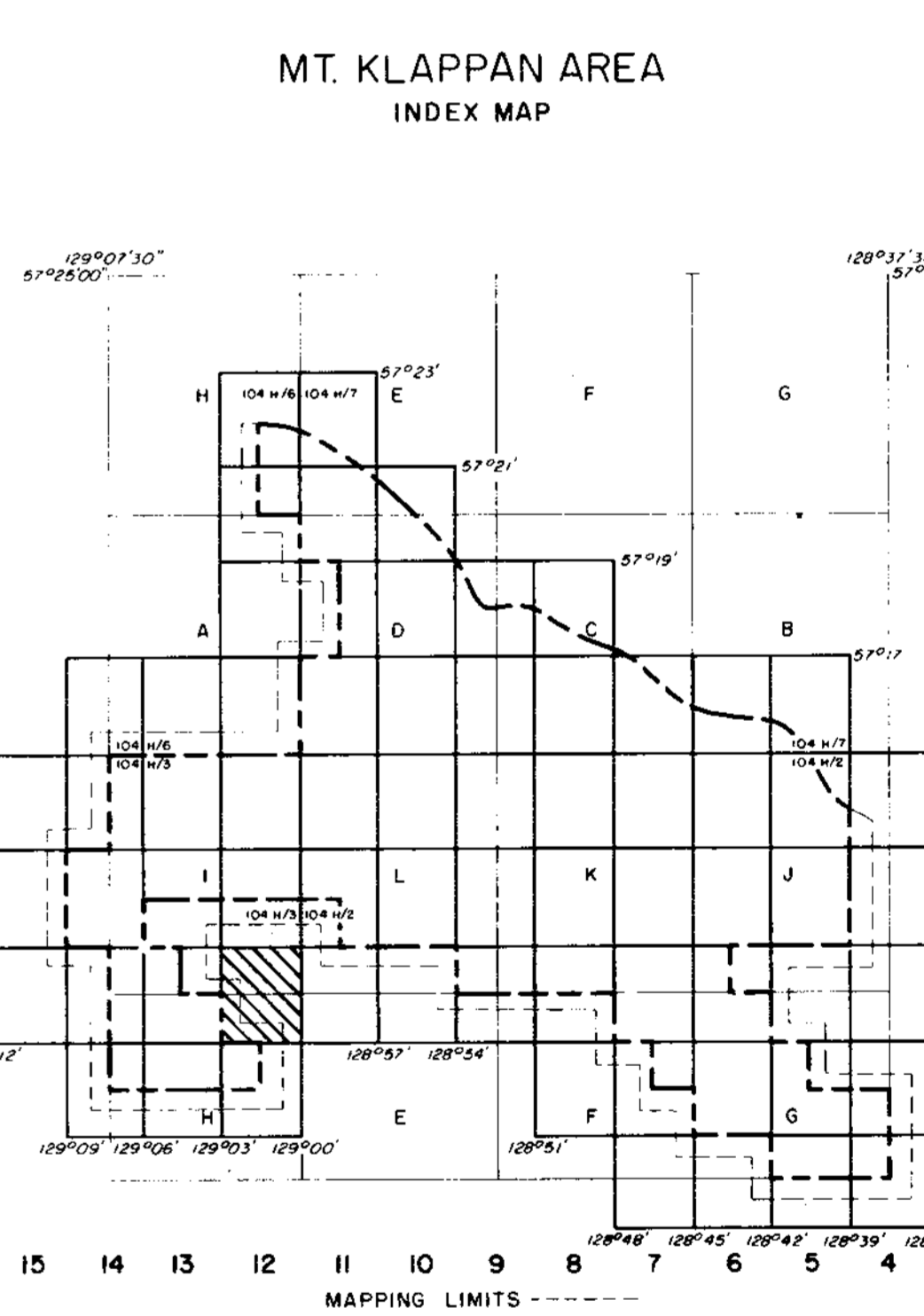
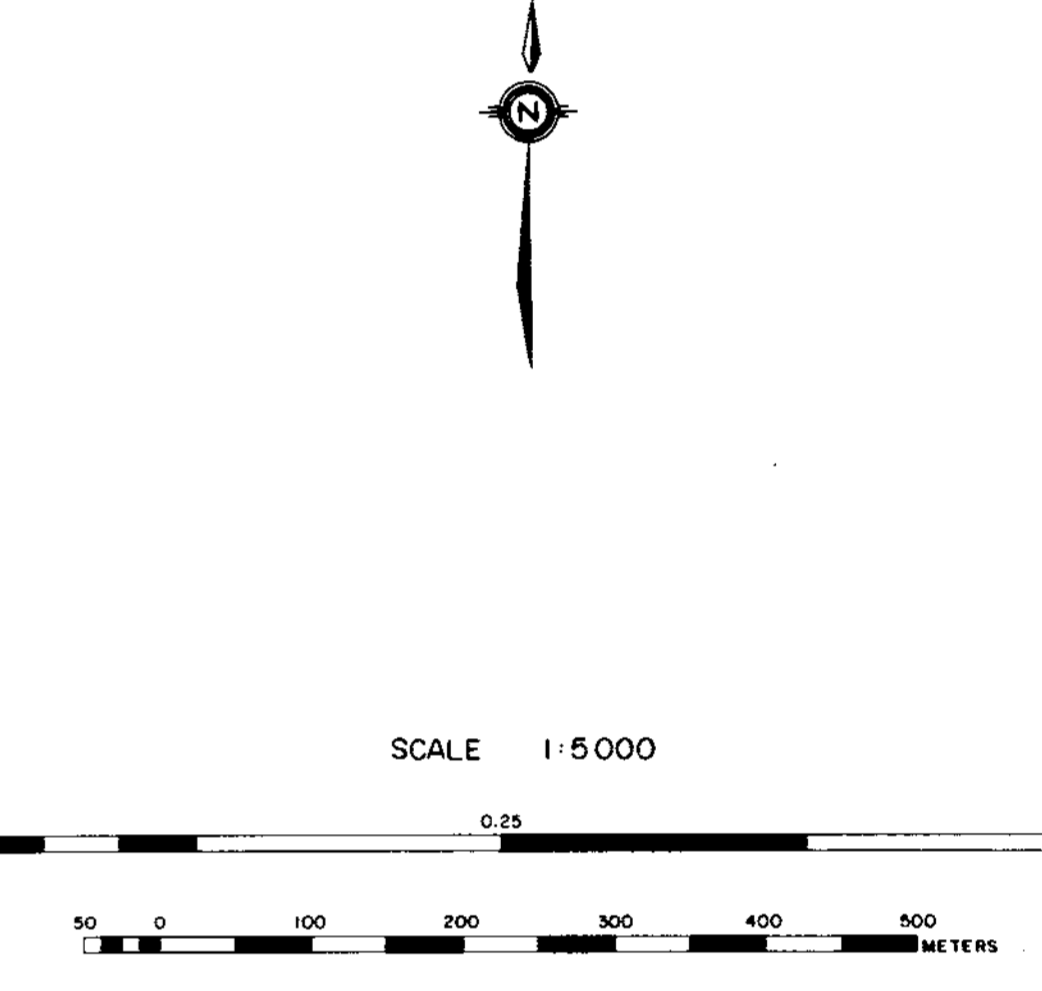
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/81
AT A SCALE OF 1:60,000 (APPROXIMATE).



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.

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LEGEND

[Symbol]	LICENCE BOUNDARY
[Symbol]	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
[Symbol]	COAL SEAM (OUTCROP, INFERRED)
[Symbol]	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
[Symbol]	OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
[Symbol]	MONOCLINE - ARROW INDICATES DIP DIRECTION
[Symbol]	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
[Symbol]	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UP THRUST SIDE
[Symbol]	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWNTHRUST SIDE
[Symbol]	ADIT TRENCH LOCATION
[Symbol]	CROSS-SECTION LOCATION
[Symbol]	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

111

Ge. Mt. Klappan 83/21A

GULF CANADA RESOURCES INC.
Calgary Coal Division ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET G12
1983
GEOLOGY MAP

PREPARED BY: C.W., K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C21

LEGEND

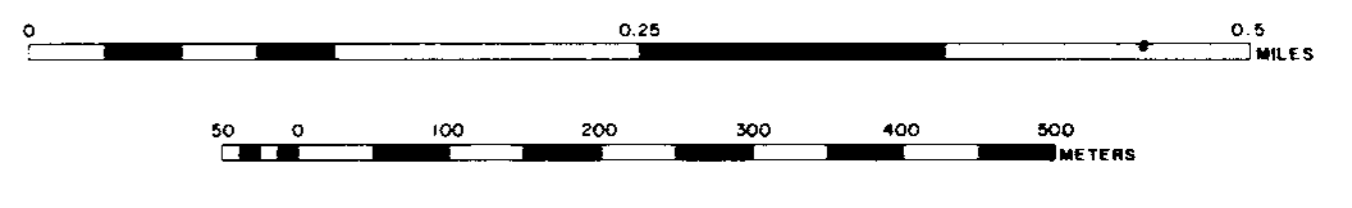
BUILDING	---	---
ROAD, HARD SURFACE	---	---
LOOSE SURFACE	---	---
CART TRACK	---	---
TRAIL	---	---
RAILROAD BED	---	---
RIVER	---	---
STREAM, DEFINITE	---	---
APPROXIMATE	---	---
SPLIT	---	---
LAKE	---	---
WATER LEVEL	---	---
SWAMP	---	---
BEAVER DAM	---	---
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CUT LINE	---	---
CONTOURS, INDEX	---	---
INTERMEDIATE	---	---
DEPRESSION	---	---
APPROXIMATE	---	---
SPOT ELEVATION	---	---
FORM LINES	---	---
CUT/FILL	---	---
FIELD CONTROL POINT	---	---
COAL LICENCE	---	---

NOTES

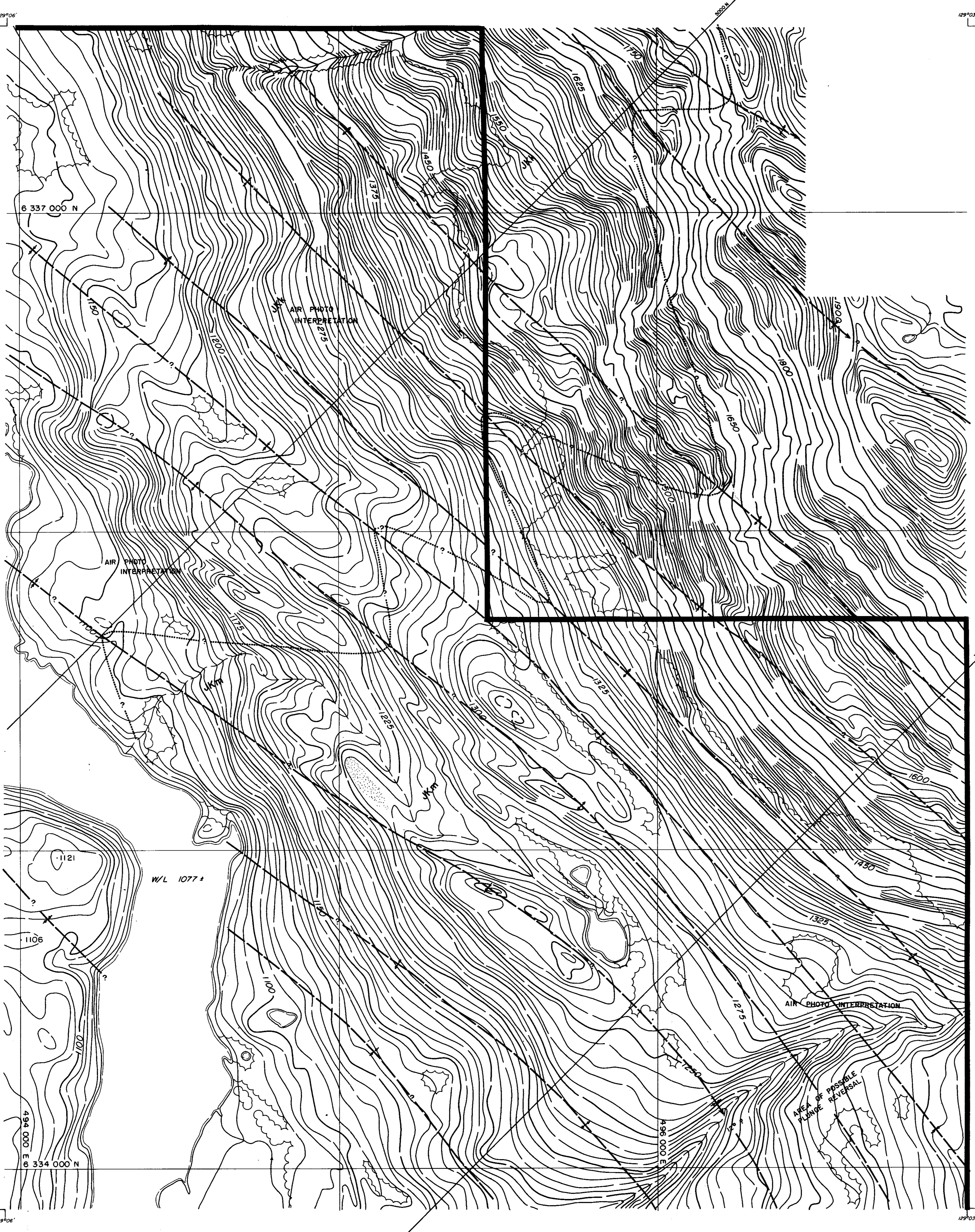
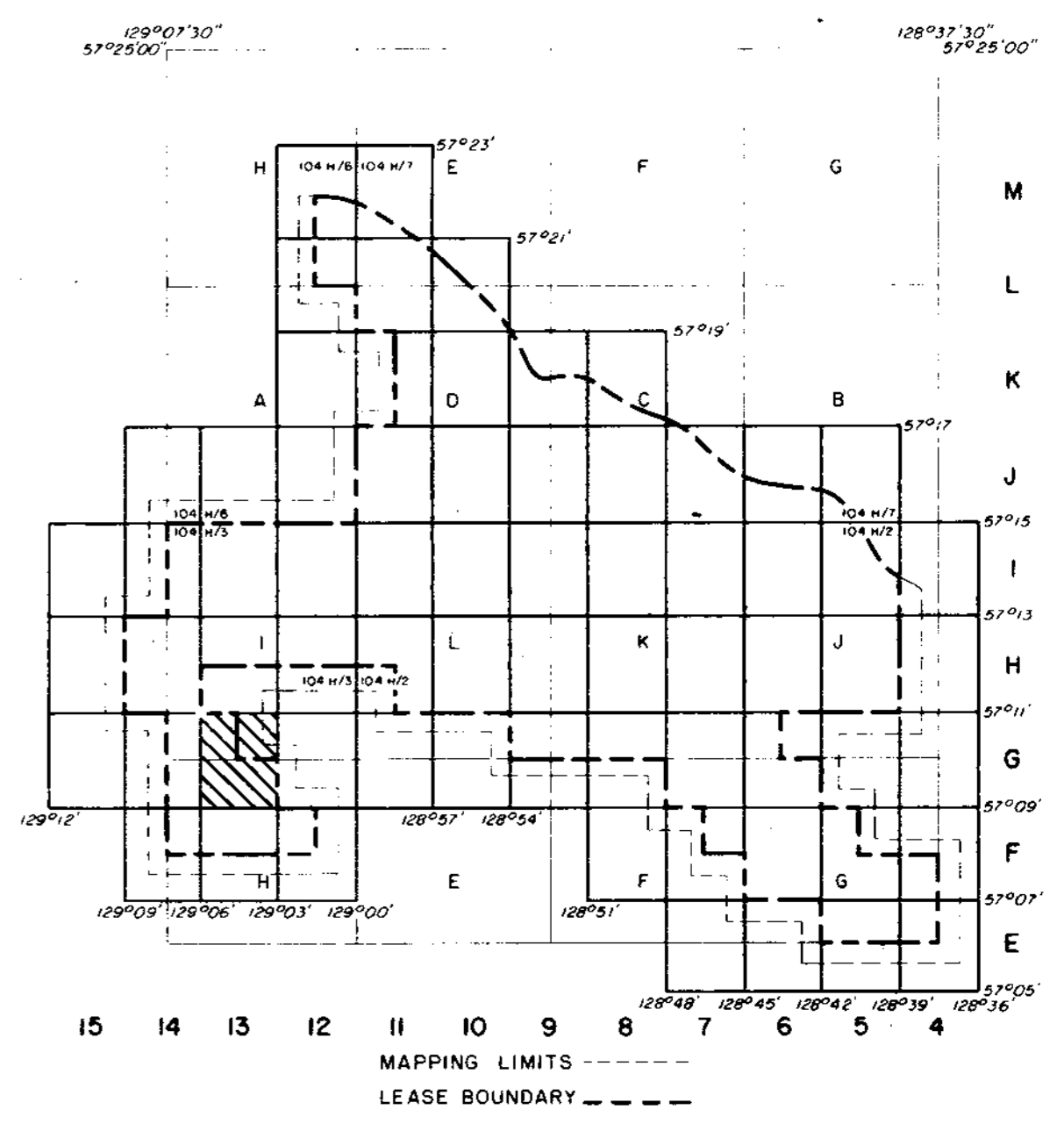
MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES
 CONTOUR INTERVAL = 10 M, WITH FORM LINES INTERVAL = 5 M.
 ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ± 0.5 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.
 SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.
 RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY
 COMPILED BY:
 WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
 FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

111

Ge. Mt. Klappan 83(2)

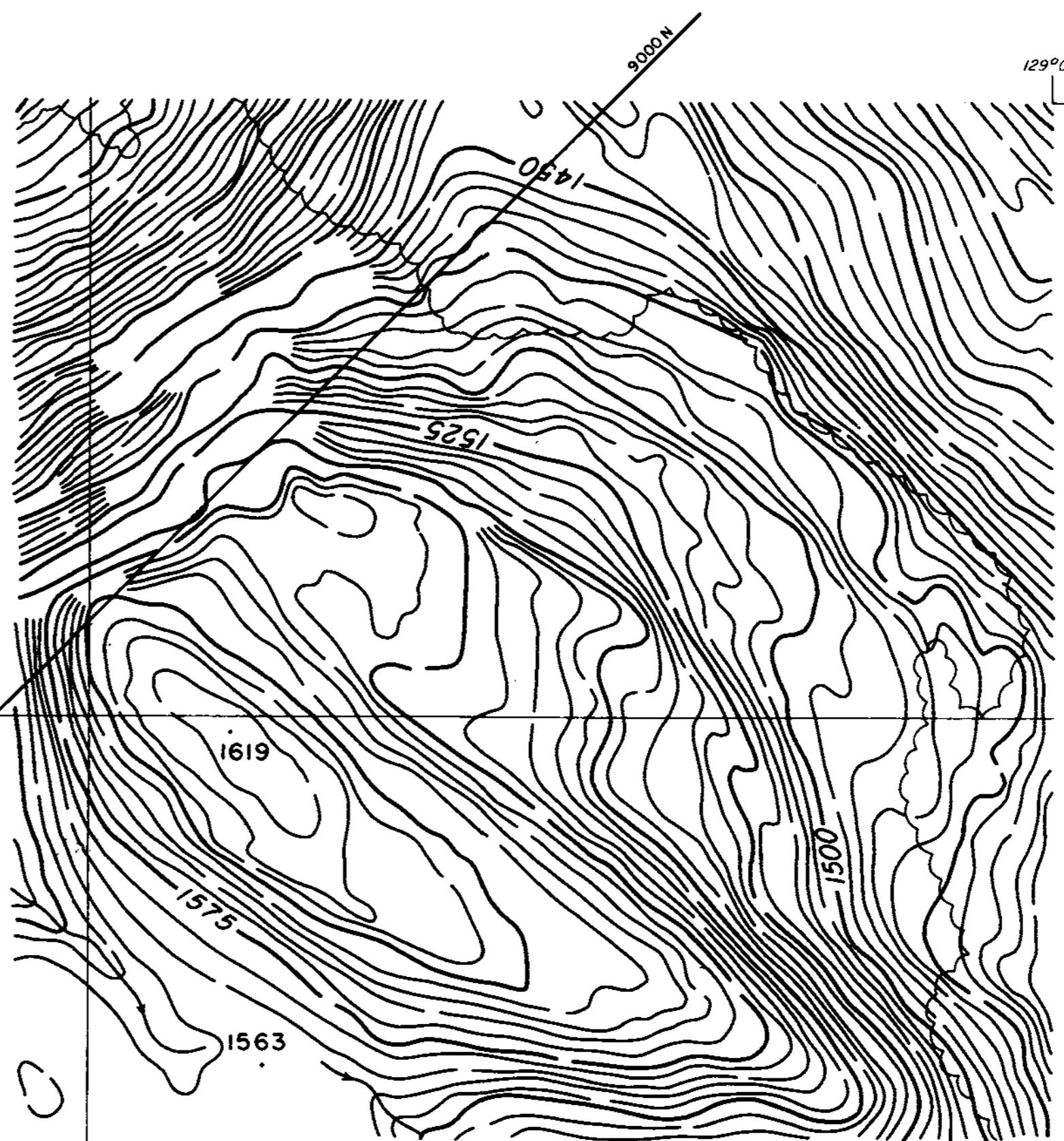
GULF CANADA RESOURCES INC.
 Coal Division ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET G13
1983
GEOLOGY MAP

PREPARED BY: C.W. K.J. SCALE 1:5000
 APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C22

129°12'

6 337 000 N



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

CONTOUR INTERVAL = 10 M, WITH FORM LINES INTERVAL 1.5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

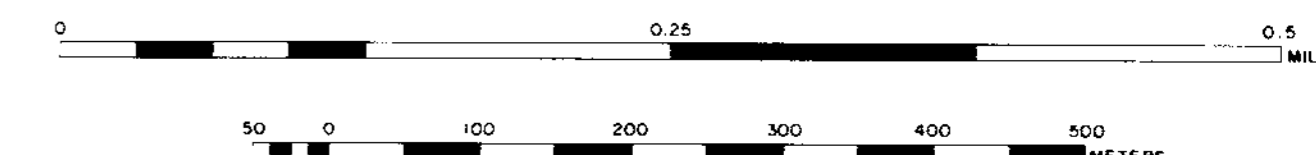
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

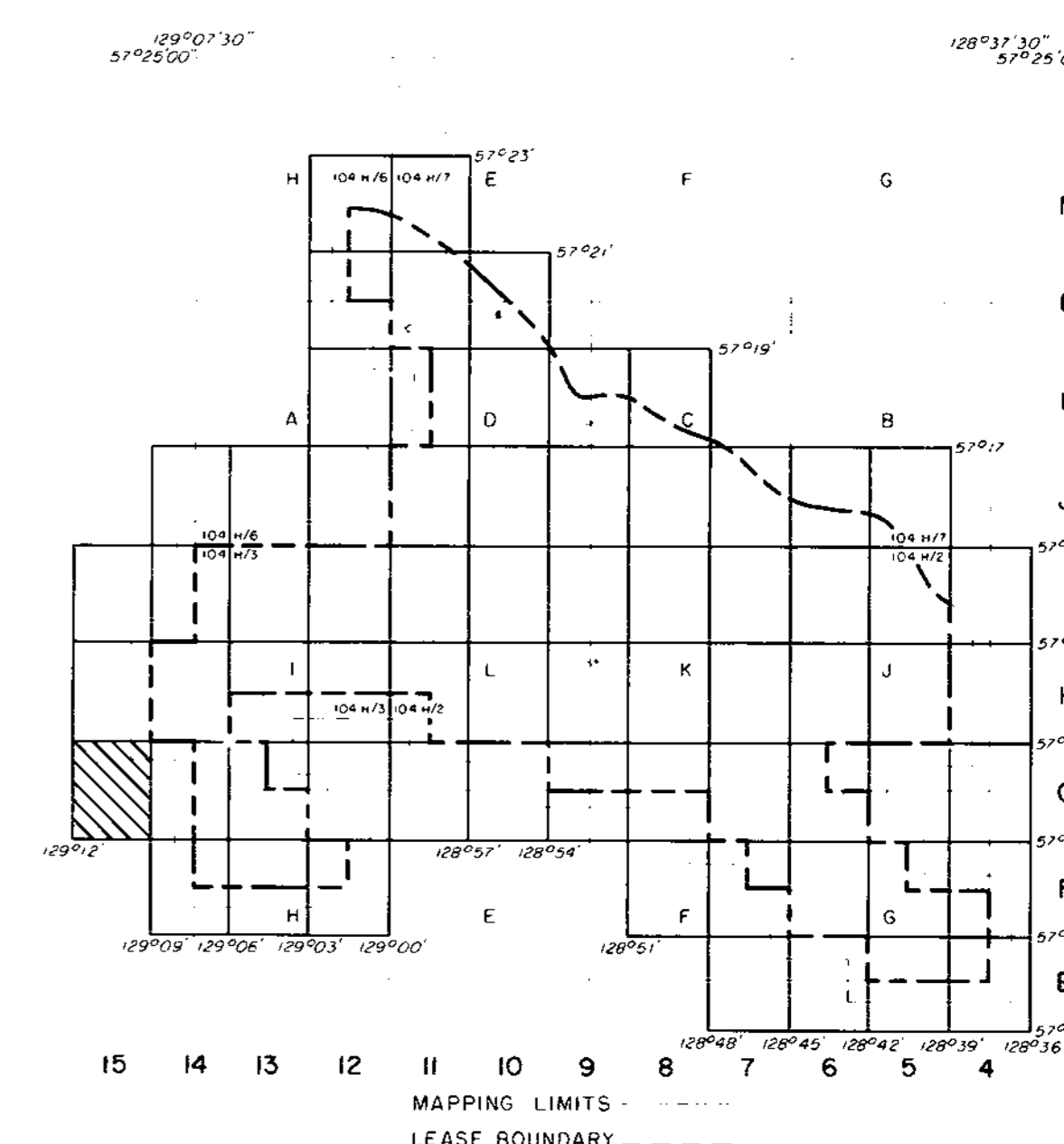
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MULLER LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA INDEX MAP



488 000 E

6 334 000 N

480 000 E

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 DOWNTOWN SIDE
○	ADIT TRENCH LOCATION
○	MEASURED SECTION LOCATION
○	CROSS-SECTION LOCATION
○	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

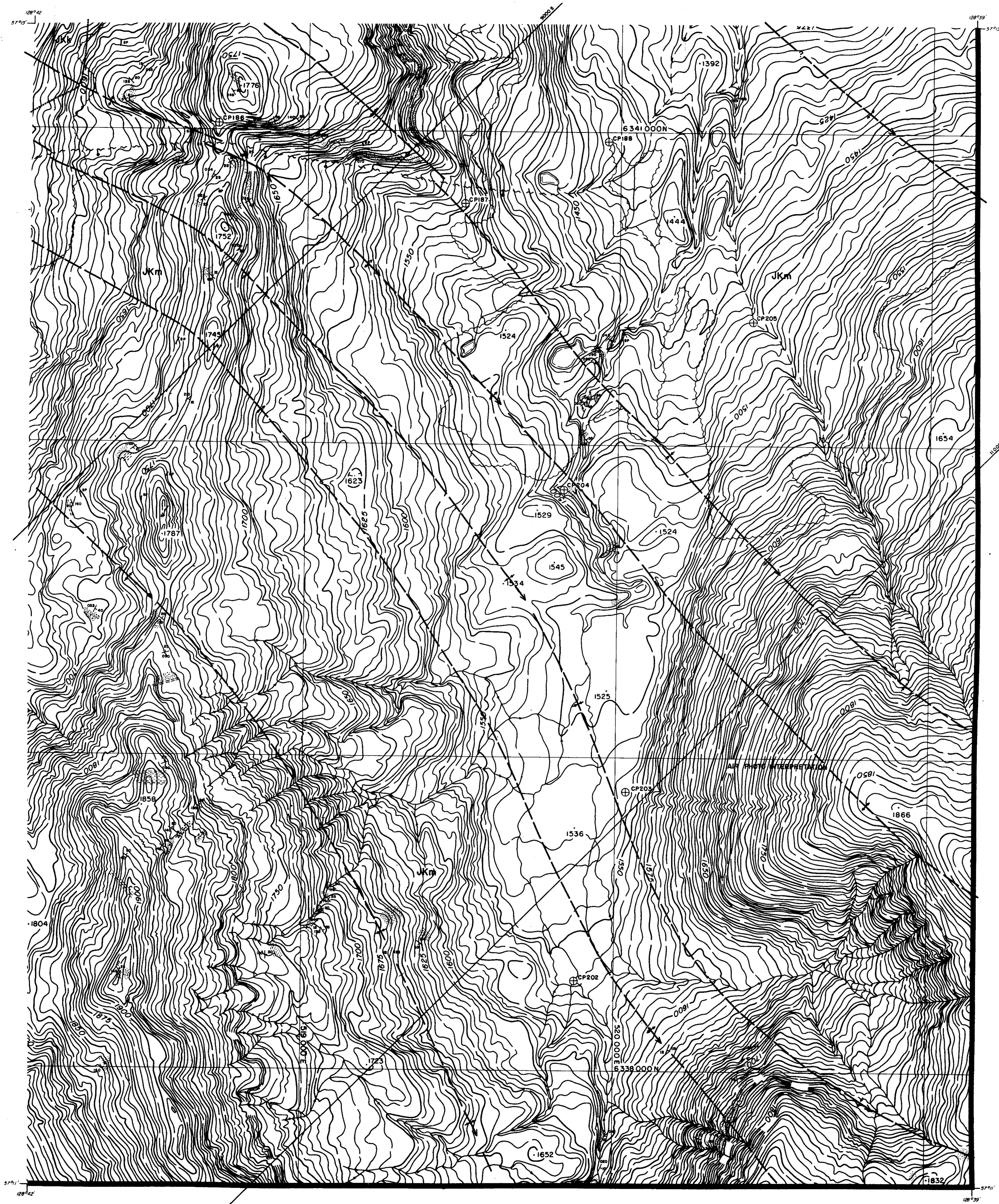
CR - MT. Klappan 93(2)

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET G15
1983
GEOLOGY MAP

PREPARED BY: SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KP983C24



LEGEND

BUILDING	---	---
ROAD, HARD SURFACE	---	---
LOOSE SURFACE	---	---
CART TRACK	---	---
TRAIL	---	---
RAILROAD BED	---	---
RIVER	---	---
STREAM, DEFINITE	---	---
APPROXIMATE	---	---
SPLIT	---	---
LAKE	---	---
WATER LEVEL	---	---
SWAMP	---	---
BEAVER DAM	---	---
TREE LINE	---	---
CUT LINE	---	---
CONTOURS, INDEX	---	---
INTERMEDIATE	---	---
DEPRESSION	---	---
APPROXIMATE	---	---
SPOT ELEVATION	---	---
FORM LINES	---	---
CUT/FILL	---	---
FIELD CONTROL POINT	---	---
COAL LICENCE	---	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

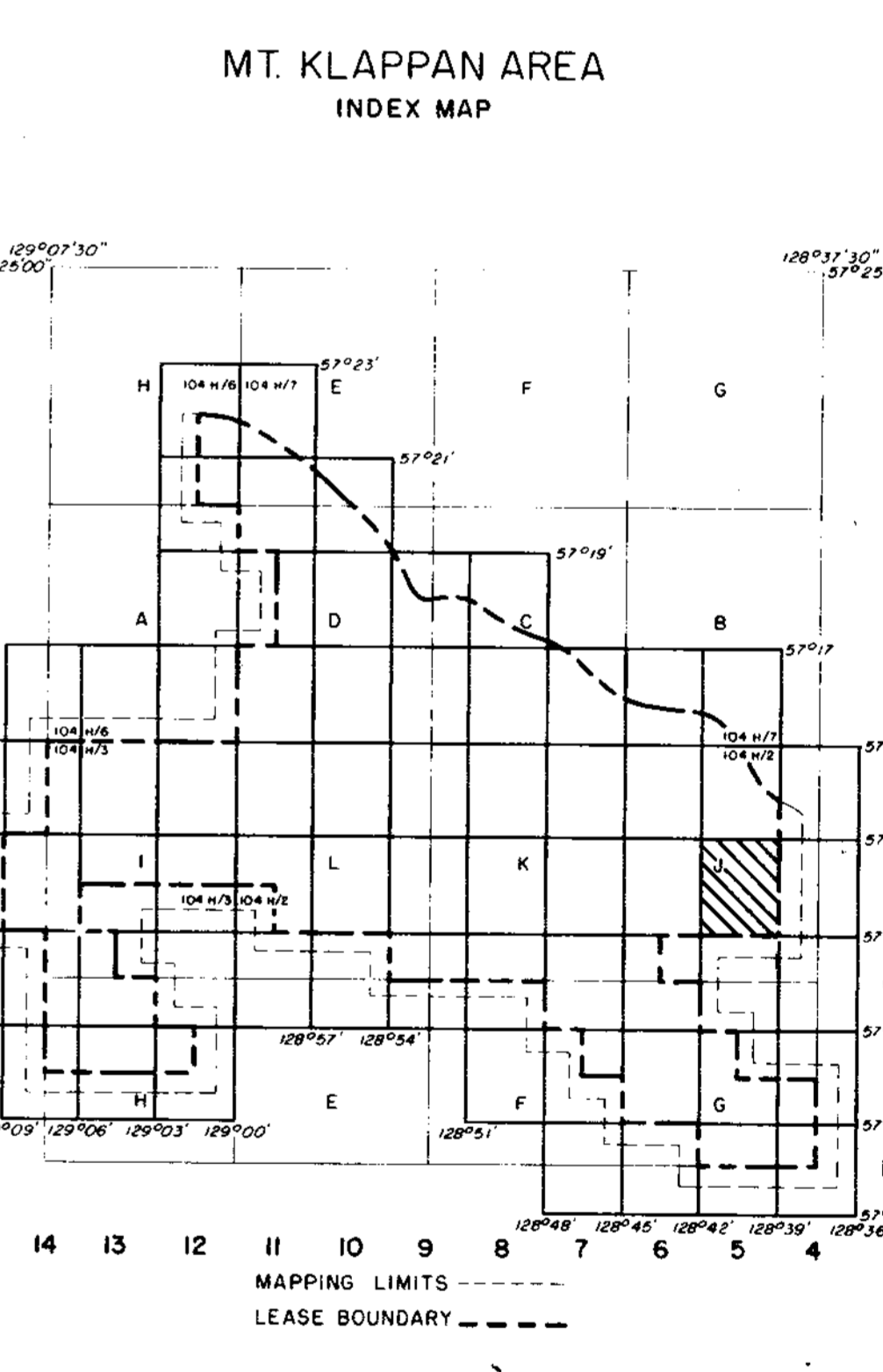
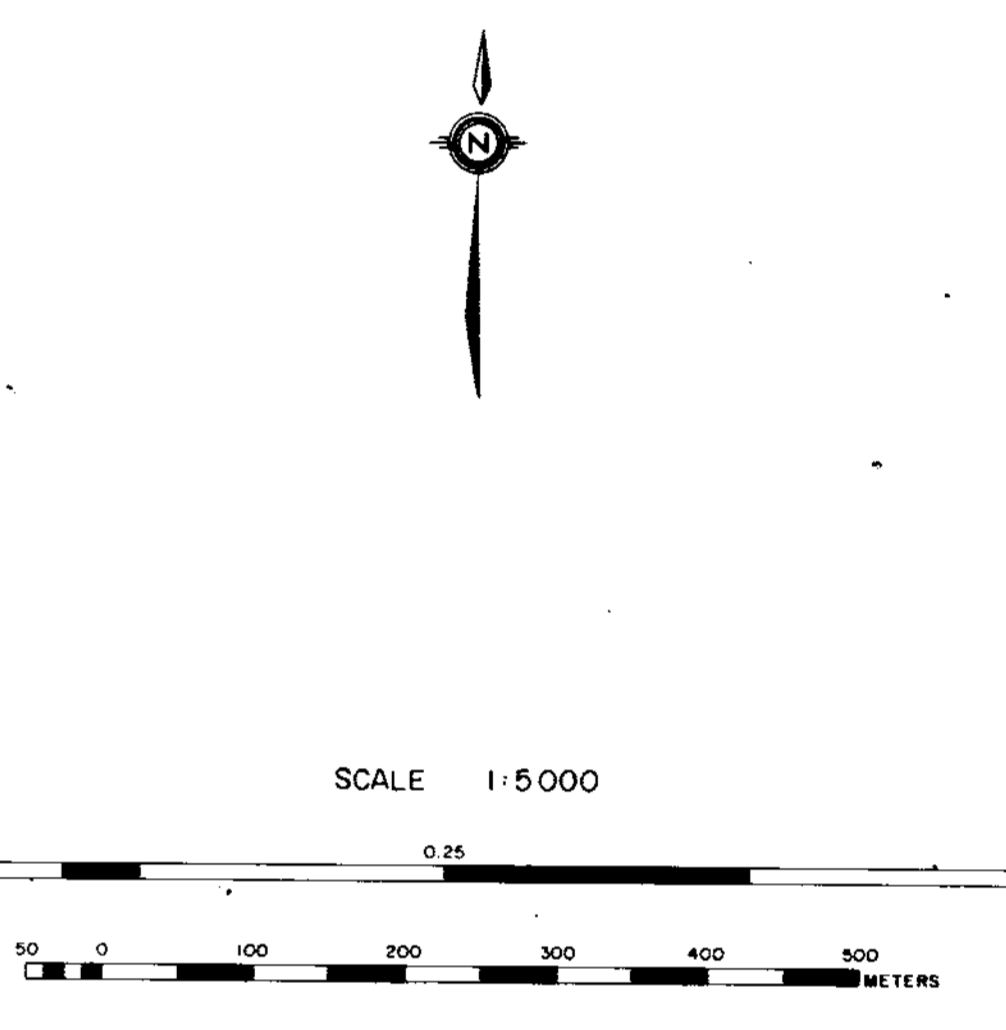
CONTOUR INTERVAL - 10 M; WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MULLER LTD. FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



- RHONDA 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.

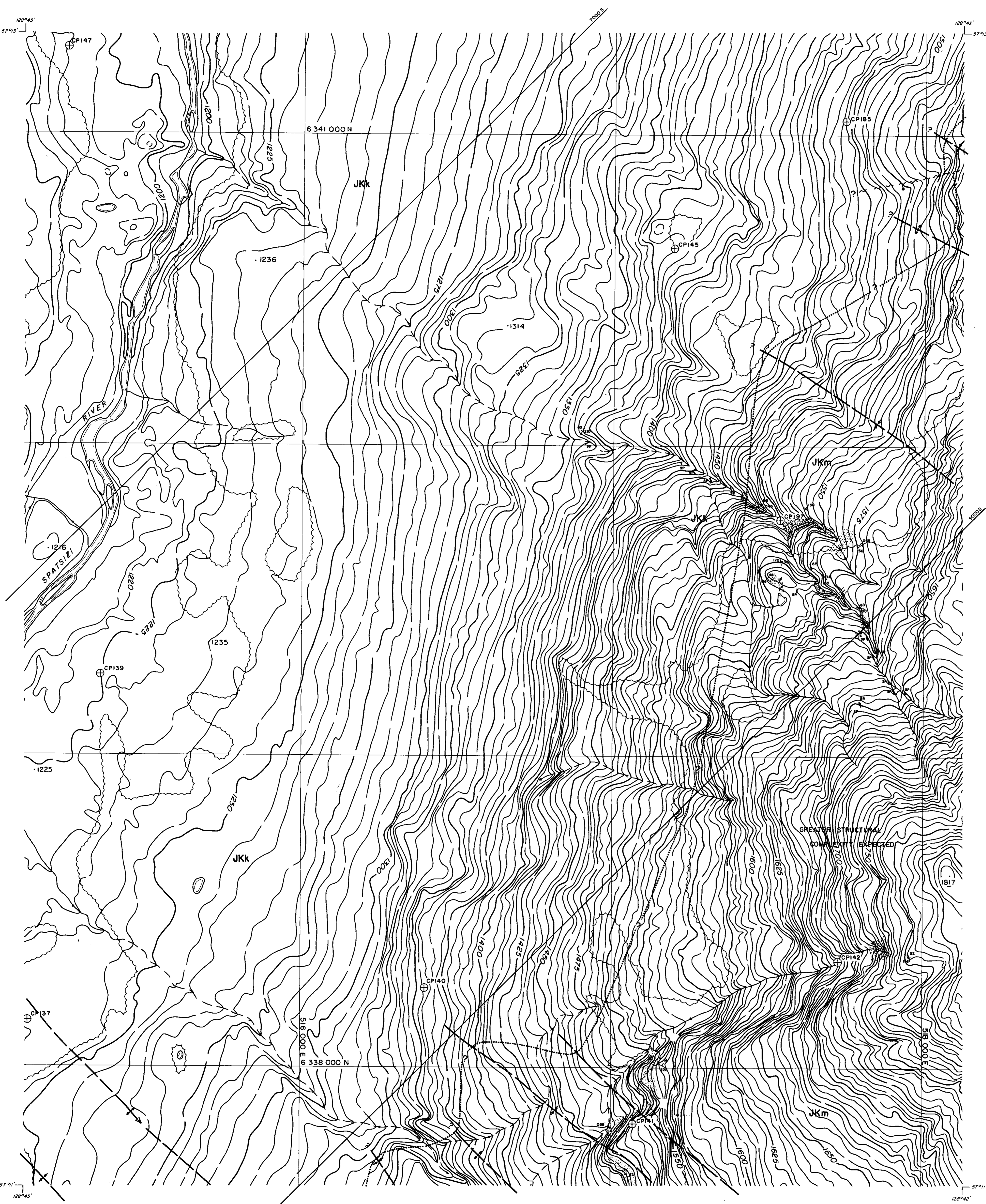
- LEGEND**
- LICENCE BOUNDARY
 - GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
 - COAL SEAM (OUTCROP, INFERRED)
 - ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
 - SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
 - OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
 - OVERTURNED 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 DOWNTHRUST SIDE
 - ADIT TRENCH LOCATION MEASURED SECTION LOCATION
 - CROSS-SECTION LOCATION
 - DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83/84

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET H5
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPN83C25



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 5.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

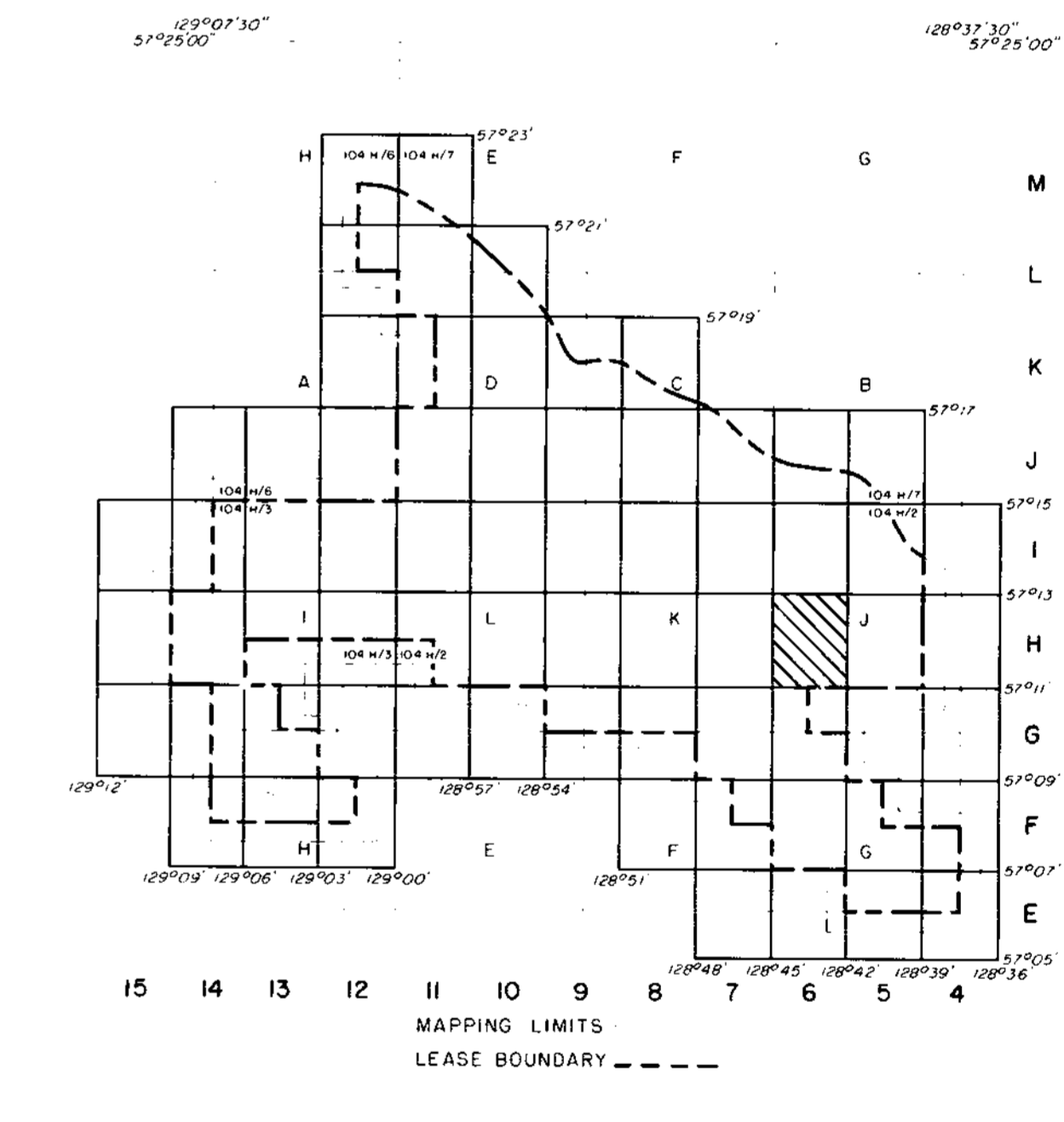
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/87 AERIAL PHOTOGRAPHY.

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/87
AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA
INDEX MAP



- 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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION (MEASURED SECTION LOCATION)
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

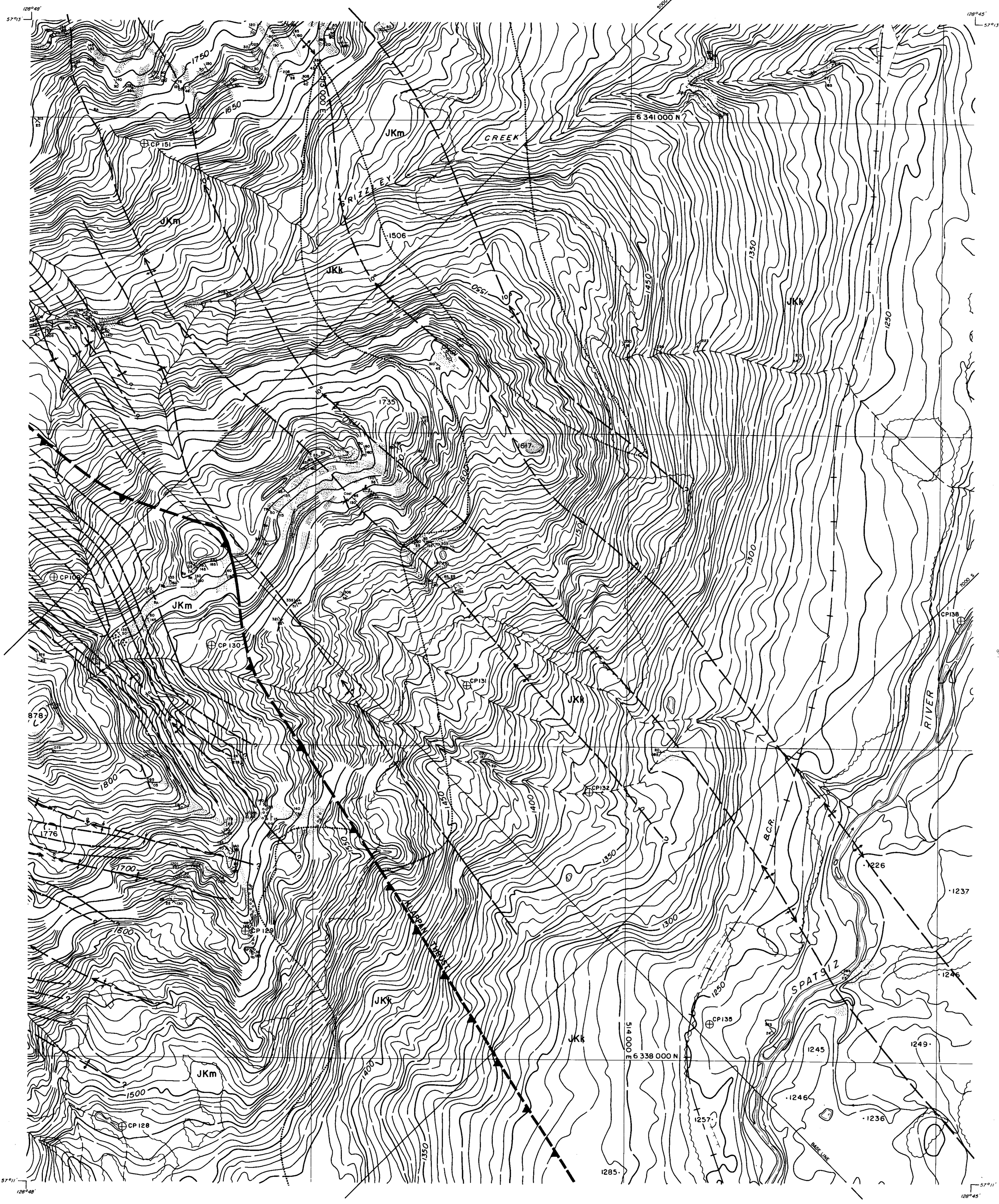
Ge. Mt. Klappan 83/2A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET H6
1983
GEOLOGY MAP**

PREPARED BY: G.S. SCALE 1:5,000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C27



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

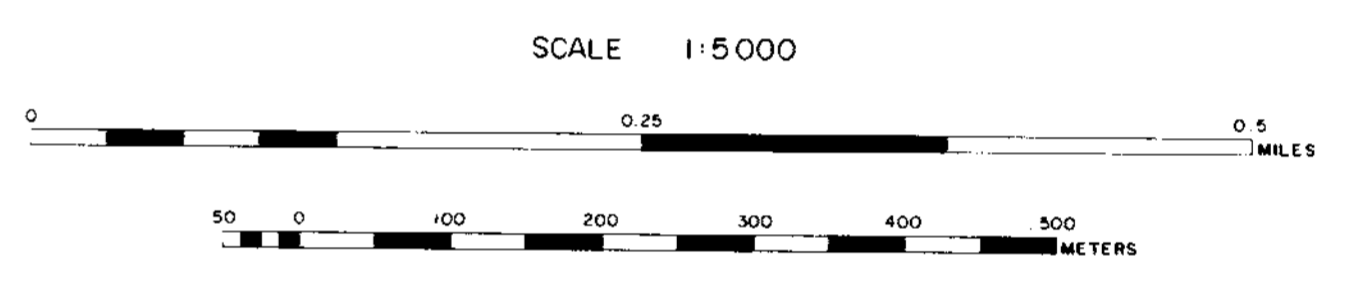
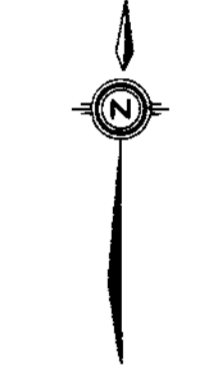
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

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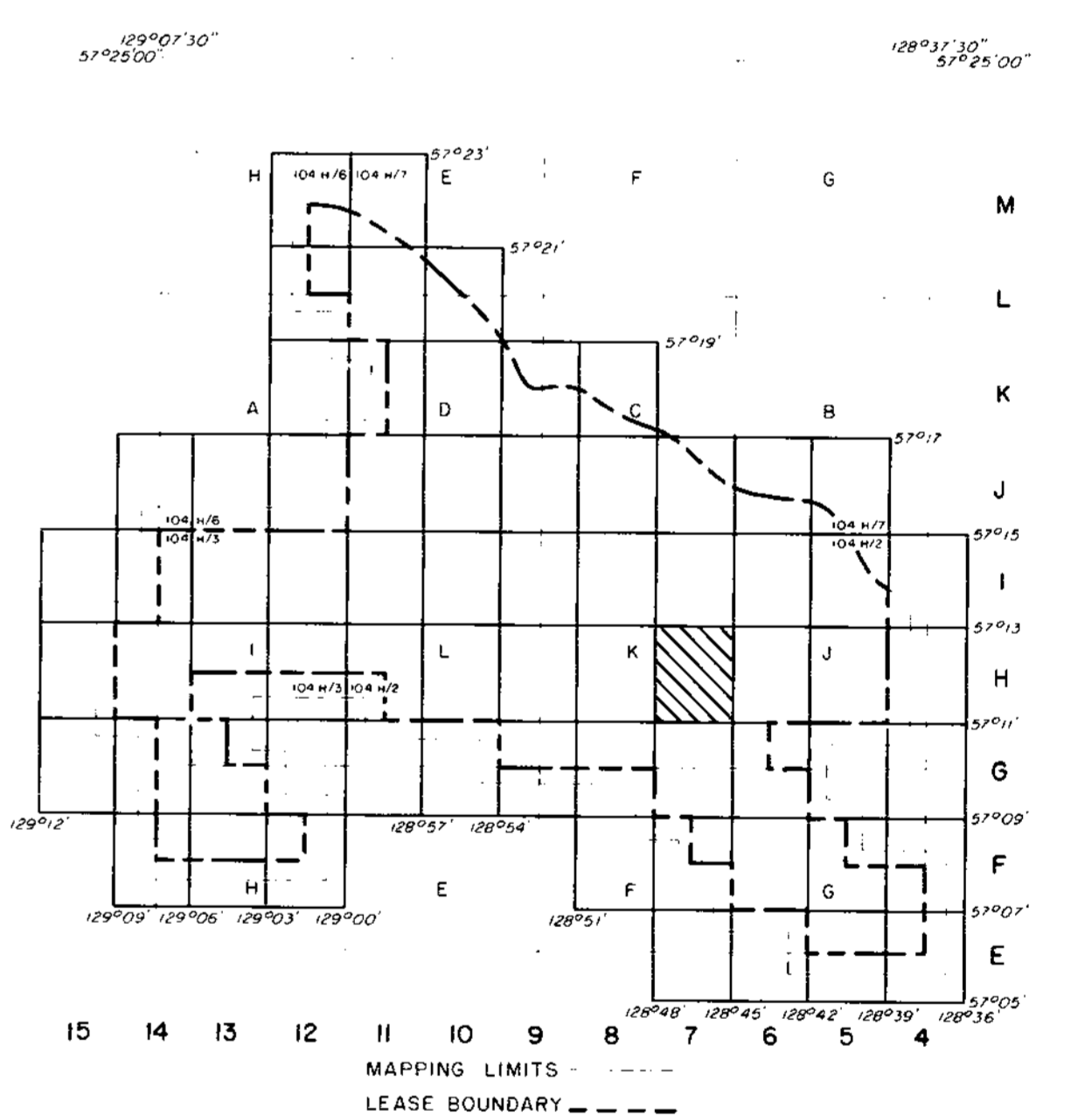
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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCFILLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/76 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



- RHONDA 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.
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LEGEND

---	LICENCE BOUNDARY
---	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
---	COAL SEAM (OUTCROP, INFERRED)
---	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
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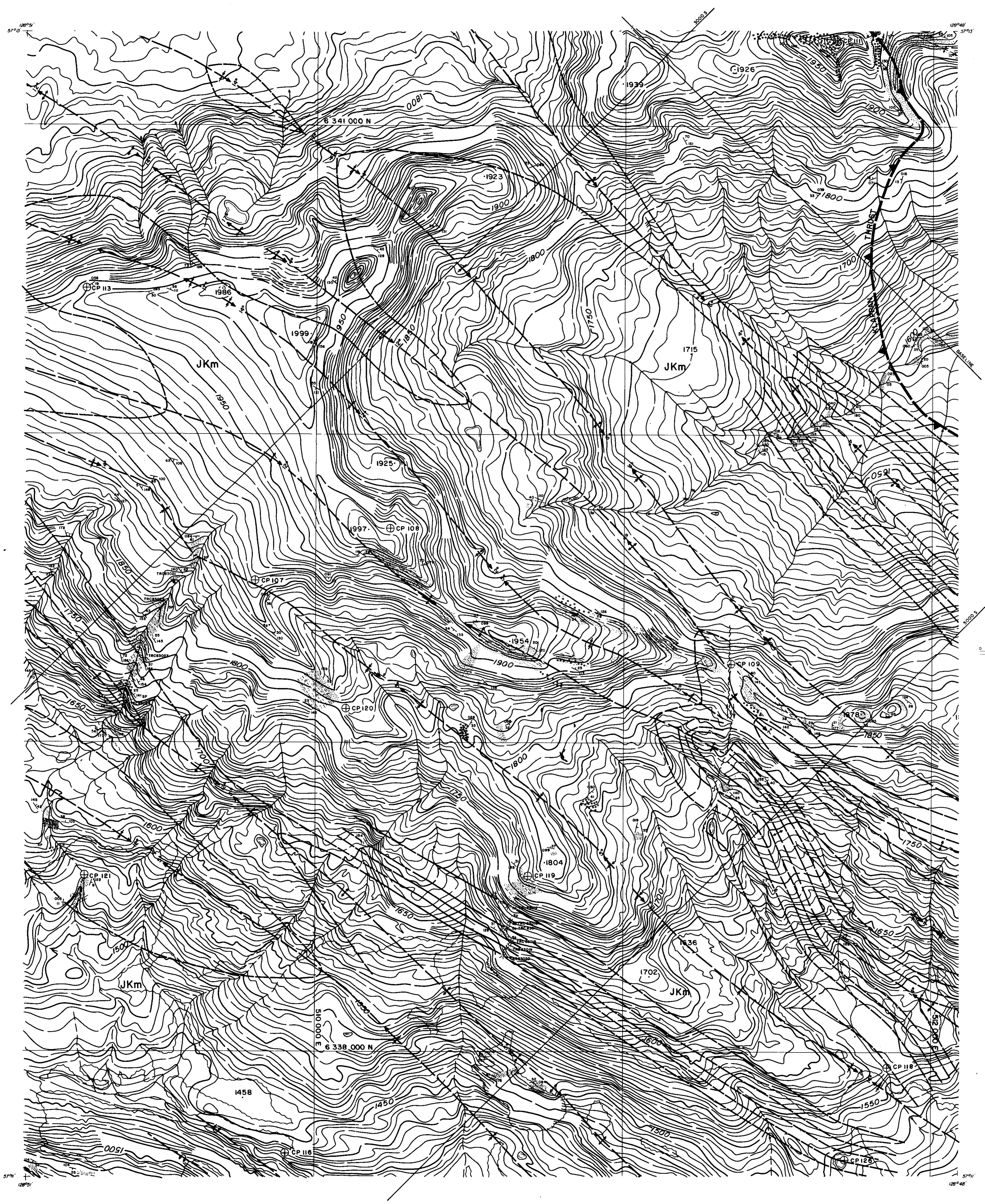
111

Ge. Mt. Klappan 93(2)

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET H7
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO: 10N83C28



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
GART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

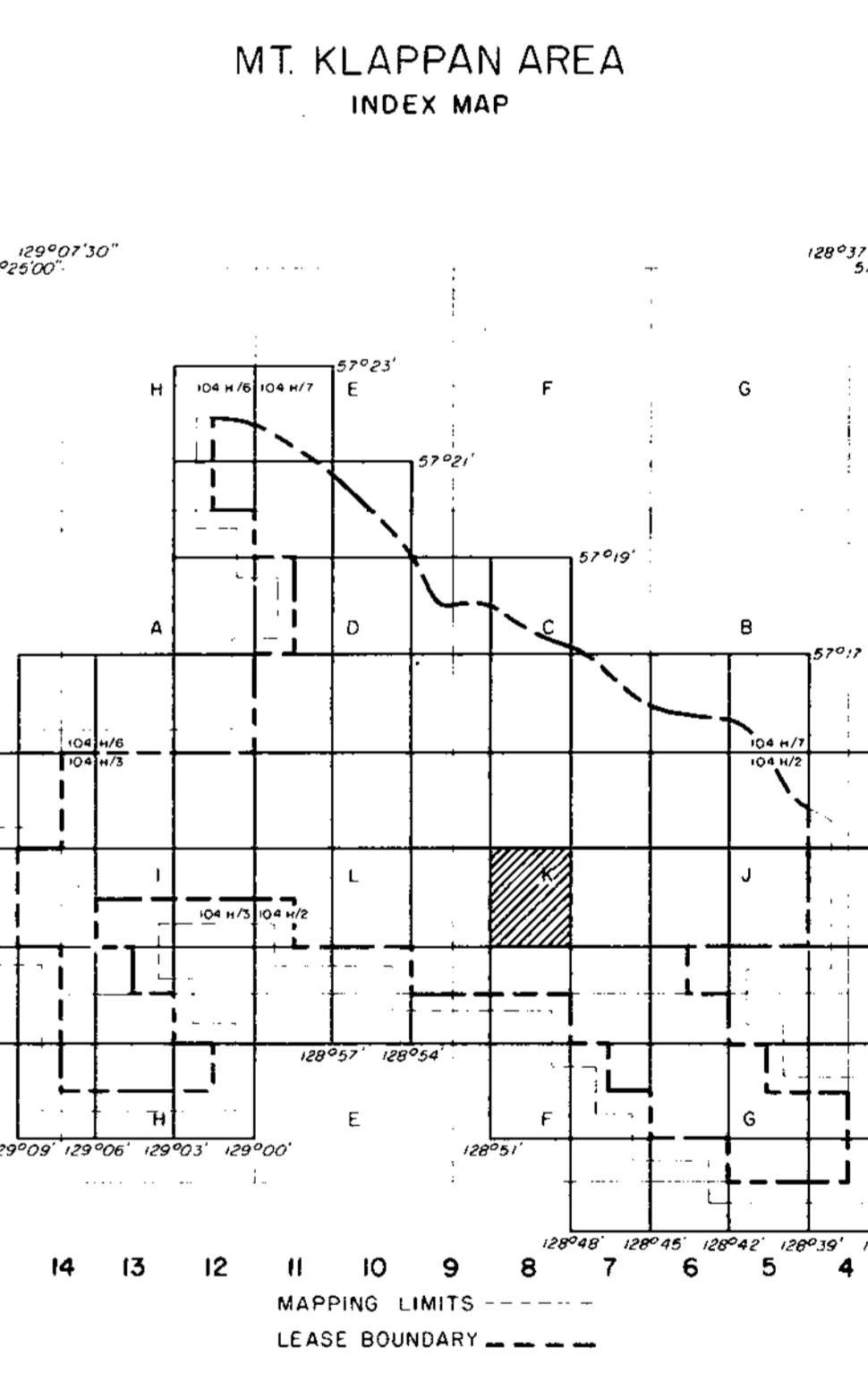
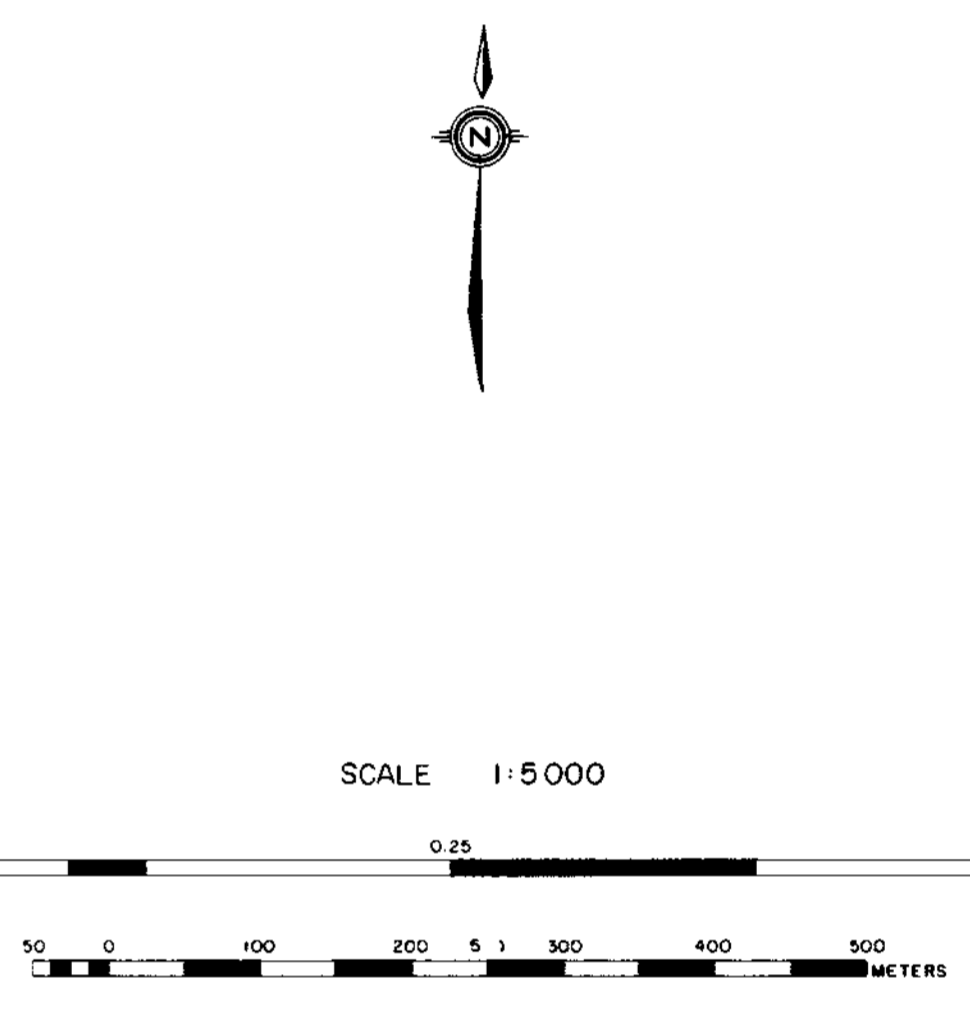
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COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



RHONDDA SEQUENCE

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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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83(2A)

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET H8
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPN83C29



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	EL 505'
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	7654
FORM LINES	---
CUT-FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

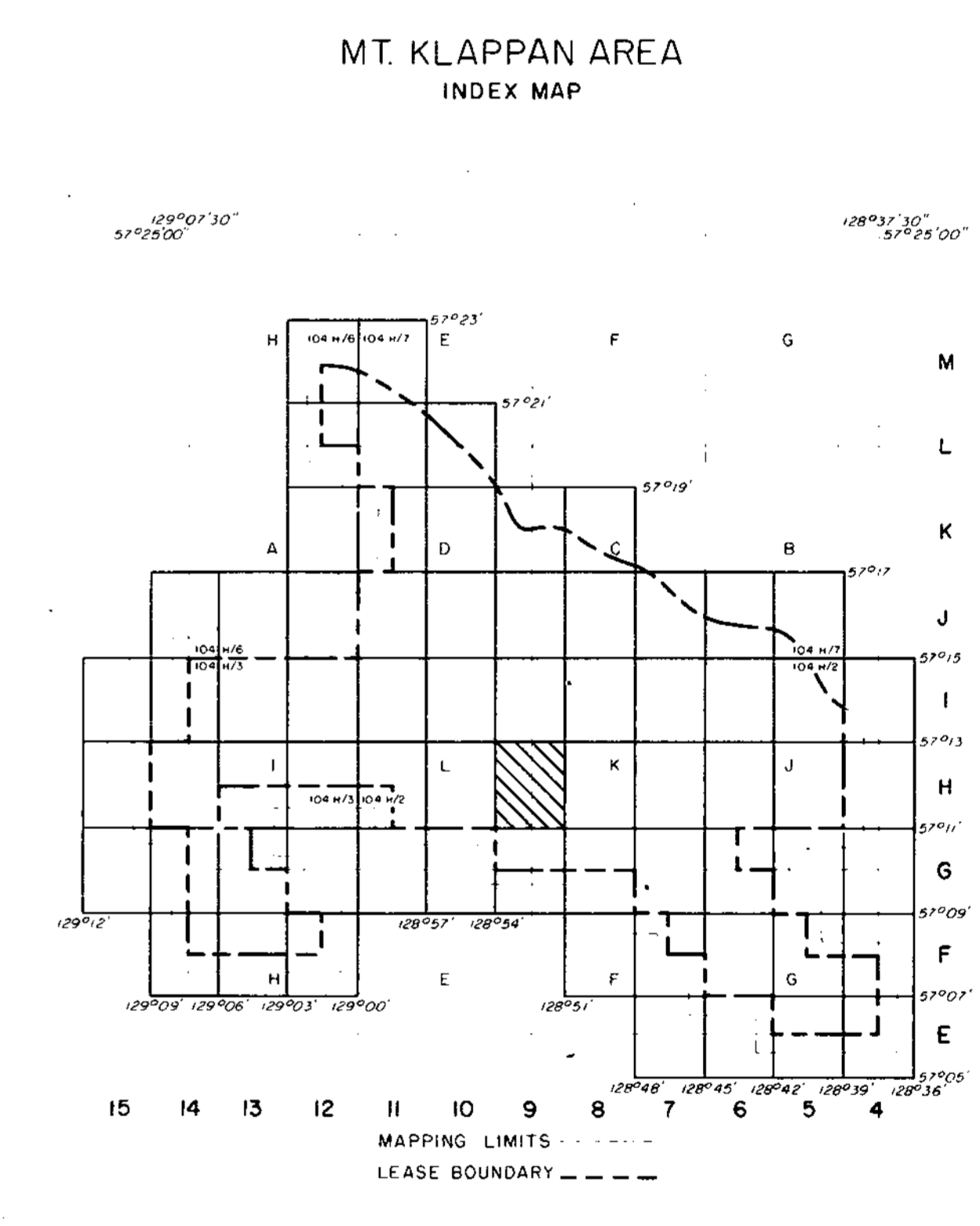
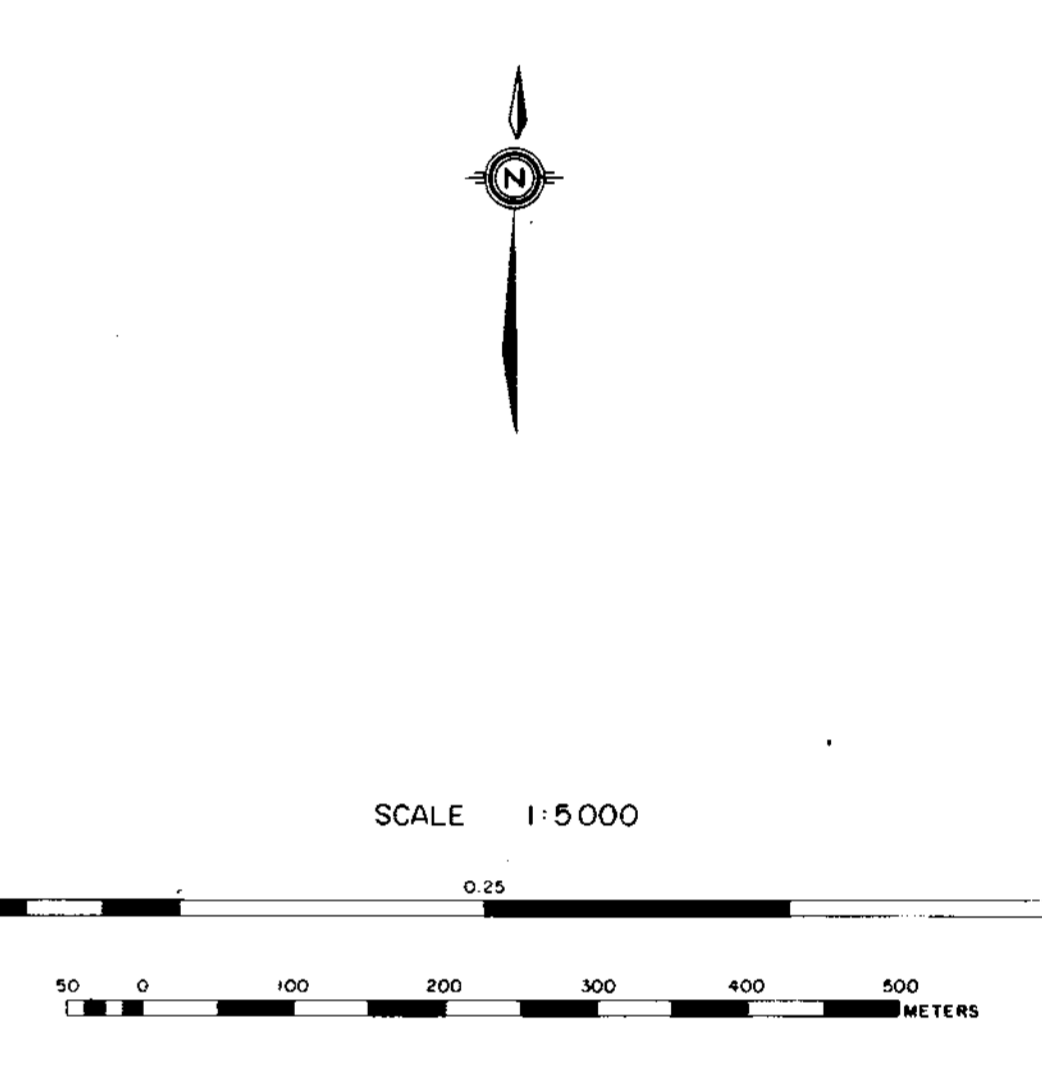
CONTOUR INTERVAL - 10 M., WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS; MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:50,000 (APPROXIMATE).



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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Gr. Mt. Klappan 83(a)

GULF CANADA RESOURCES INC.

Calgary Alberta

MT. KLAPPAN COAL PROPERTY

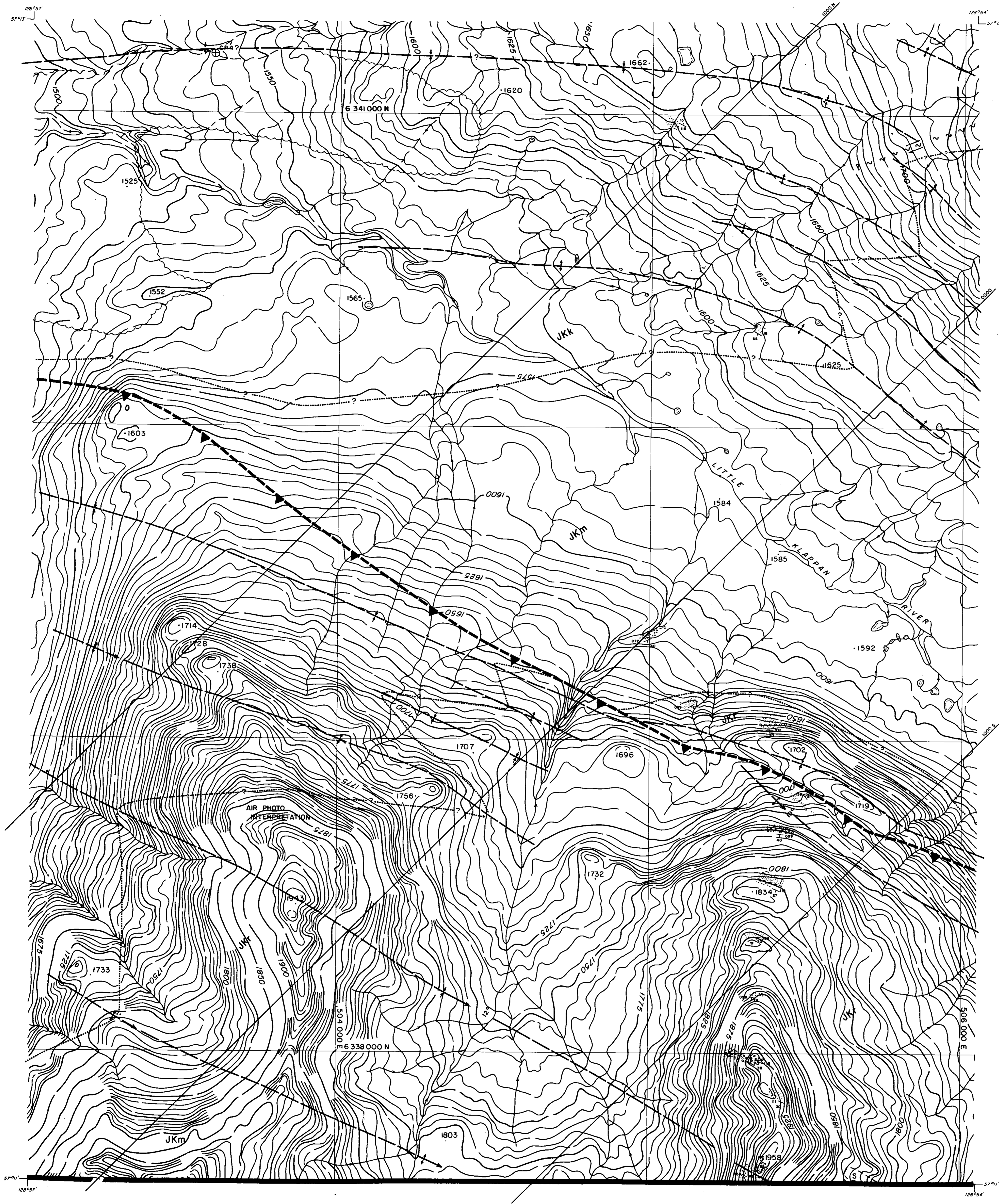
MAP SHEET H9

1983

GEOLOGY MAP

PREPARED BY: G.S., C.W., K.J. SCALE 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KP83C50



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

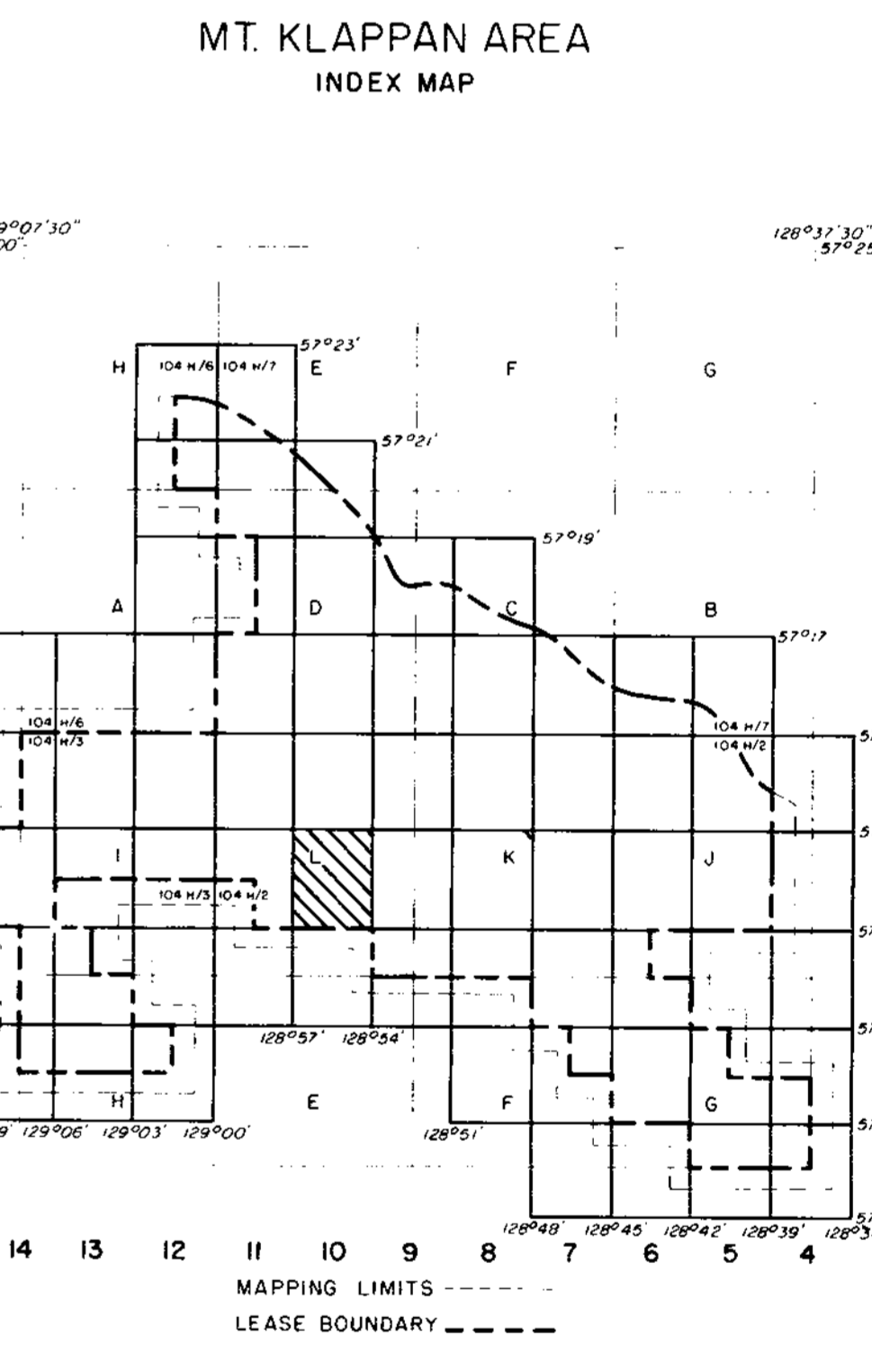
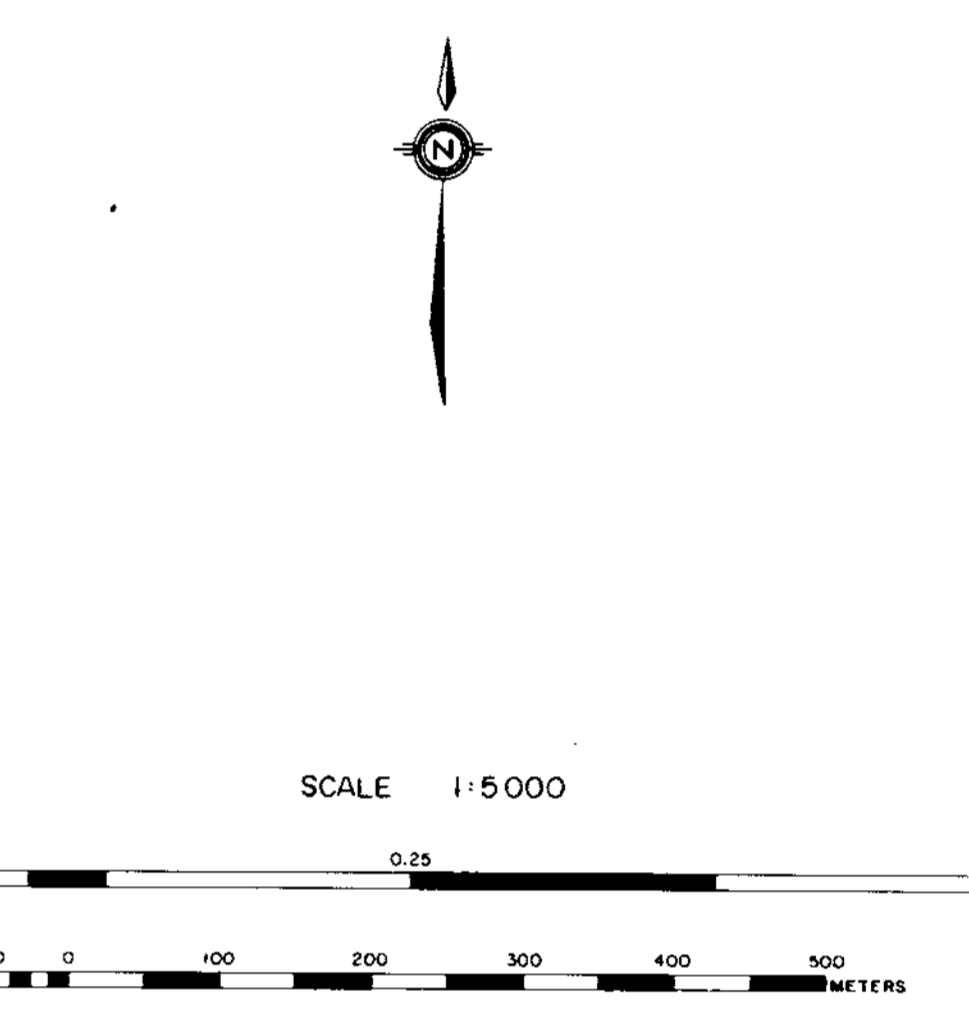
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



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.

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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 DOWN THRUST SIDE	---
ADIT TRENCH LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 83/2/9

GULF CANADA RESOURCES INC.

Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

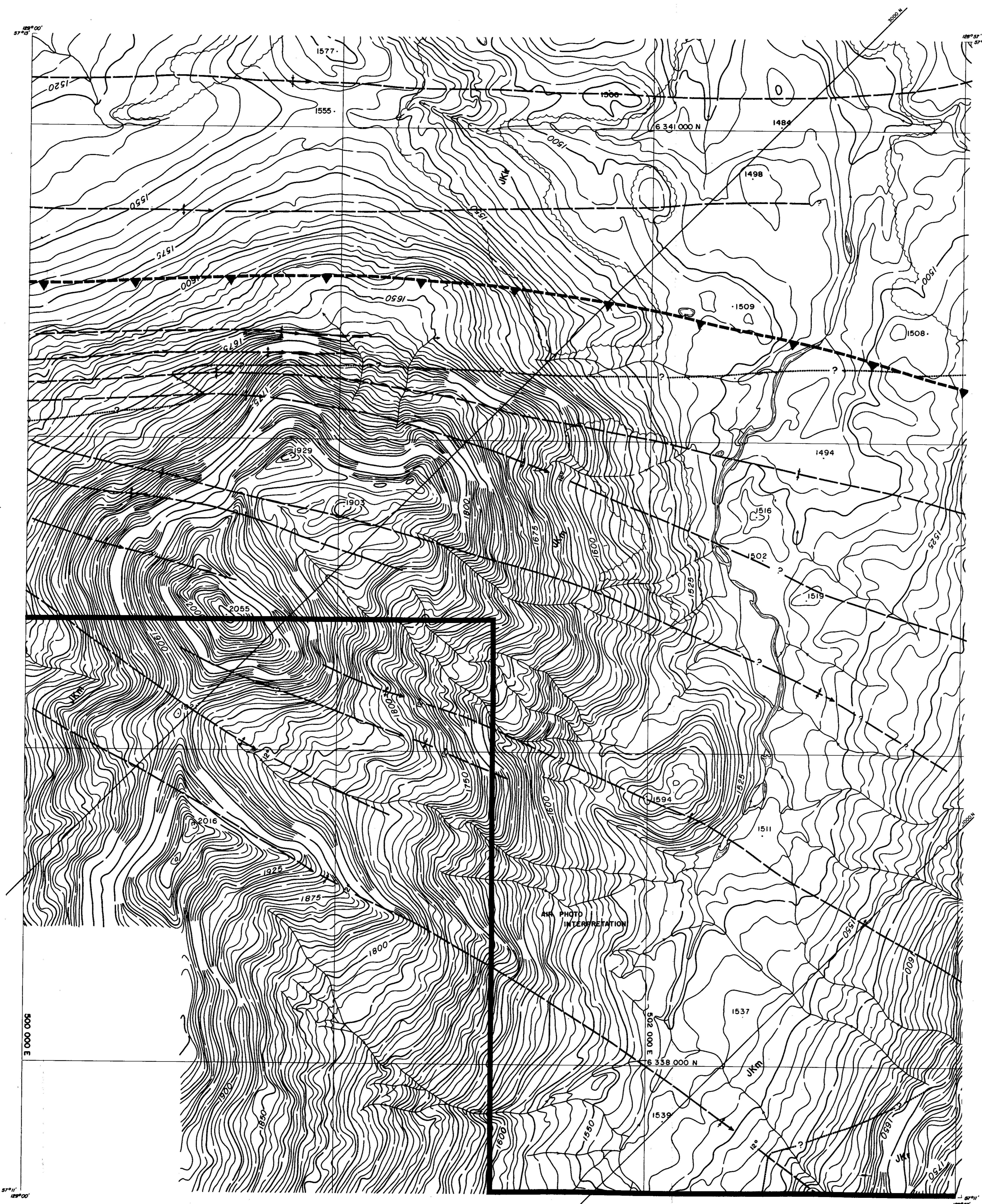
MAP SHEET H10

1983

GEOLOGY MAP

PREPARED BY: S.S., C.W., K.J. SCALE 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KP83C31



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

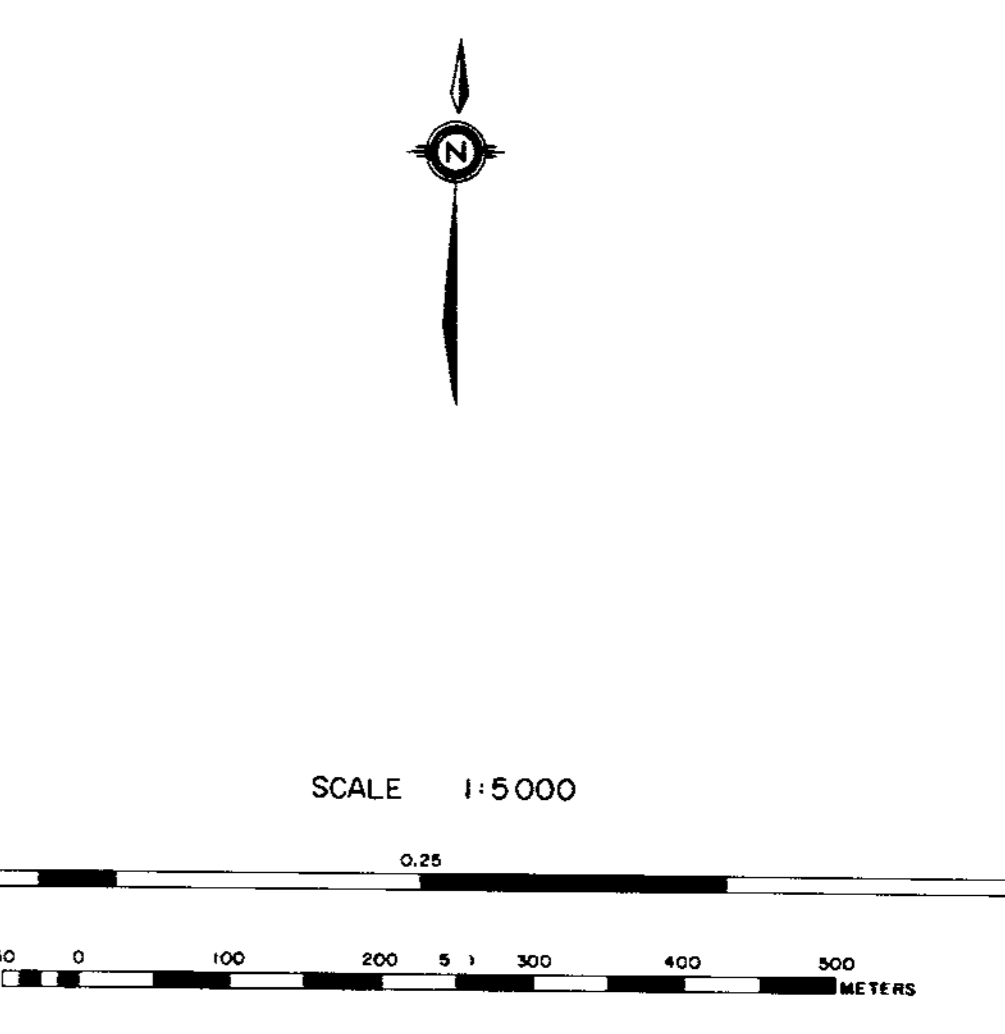
CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



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.

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LEGEND

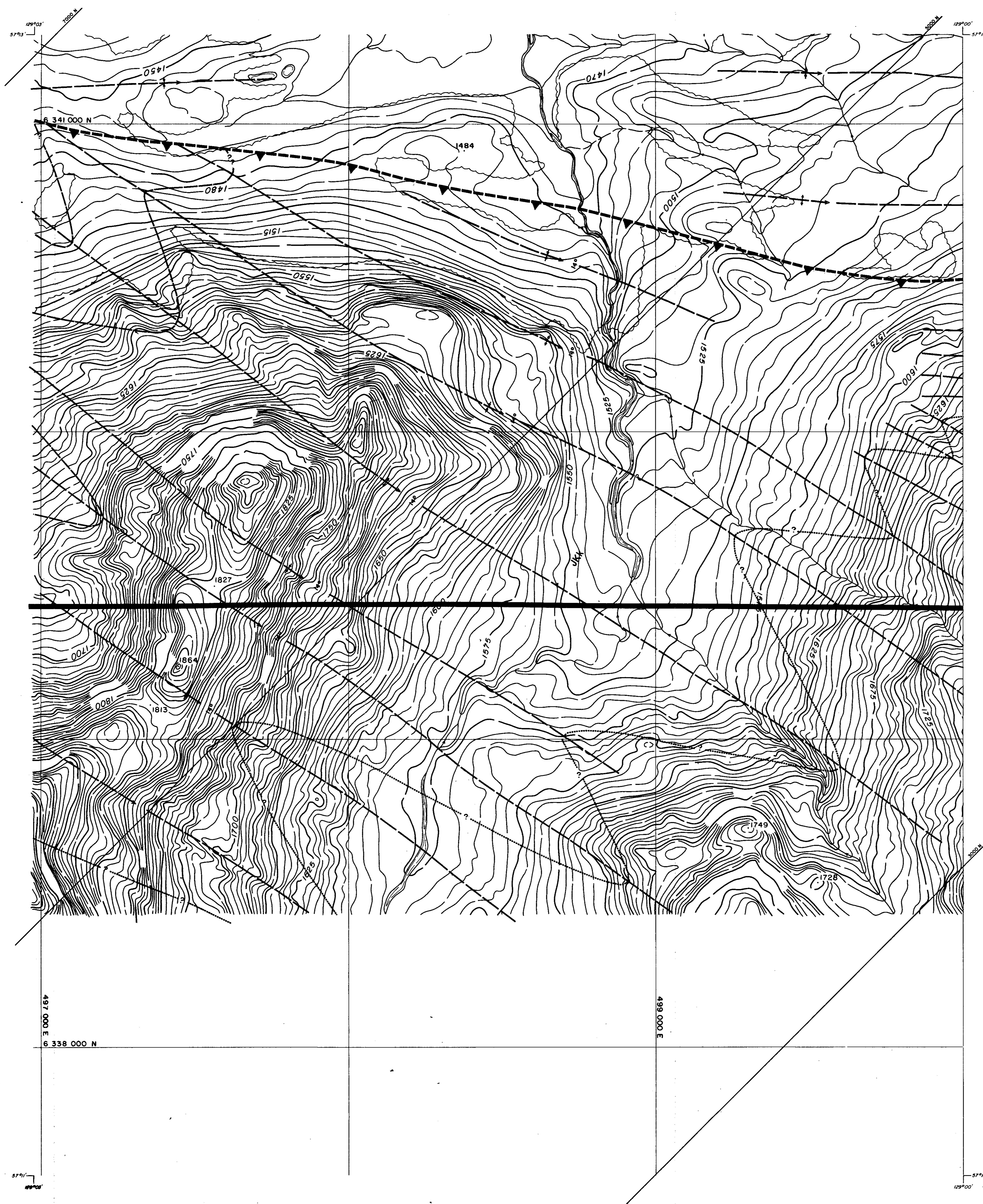
LICENCE BOUNDARY	---
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)	---
COAL SEAM (OUTCROP, INFERRED)	---
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION	---
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION	---
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)	---
OVERTURNED SYNCLINE (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 DOWNTHRUST SIDE	---
ADIT TRENCH LOCATION MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 83/24

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET III
1983
GEOLOGY MAP

PREPARED BY: C.W. K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPN83C32



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

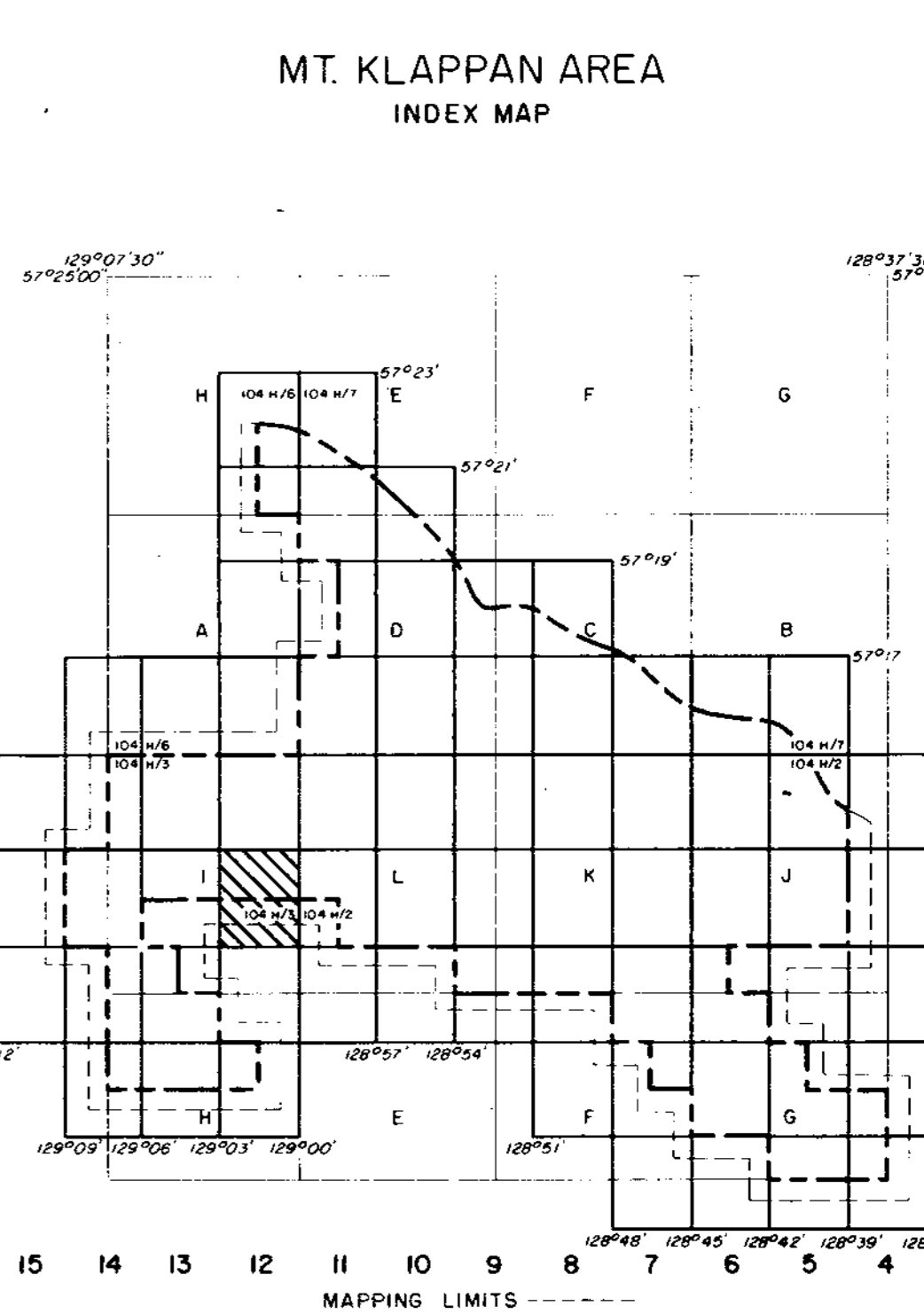
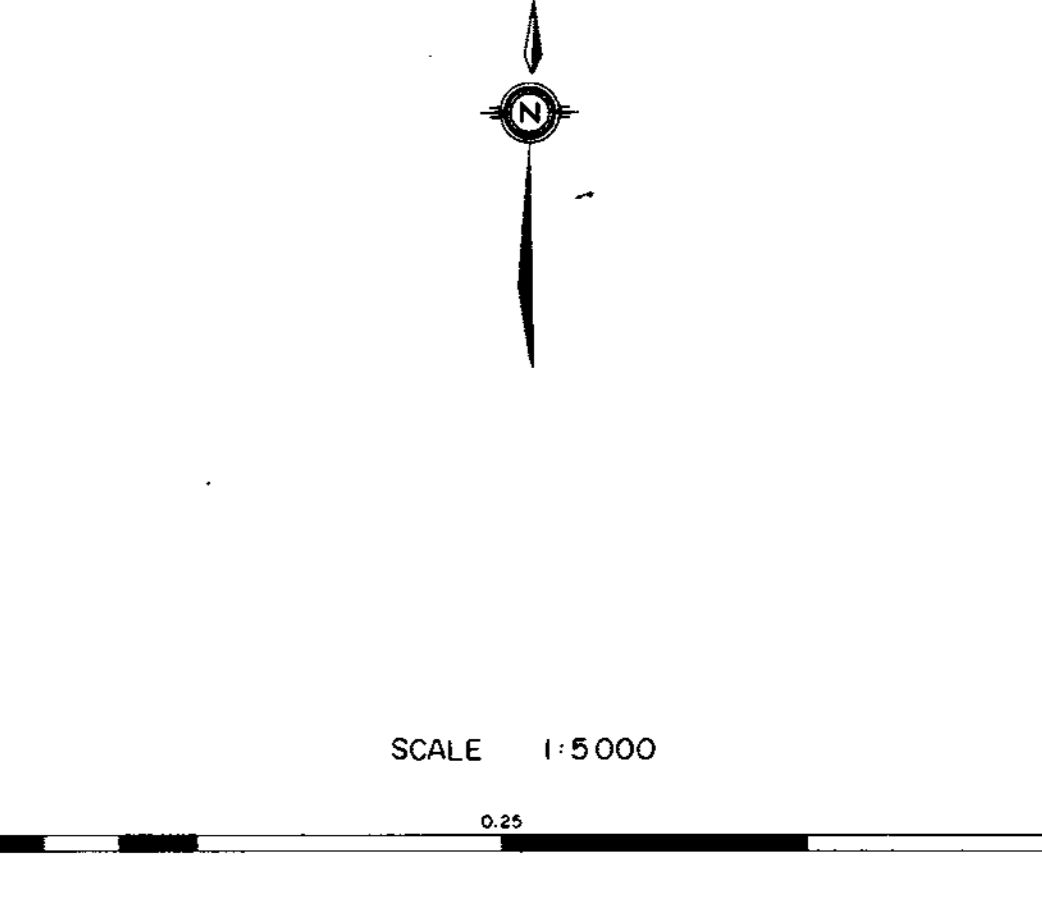
CONTOUR INTERVAL = 10 M, WITH FORM LINES INTERVAL = 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS + 15.0 METERS FOR GROUND NOT OBTAINED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY.

COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/82 AT A SCALE OF 1:60,000 (APPROXIMATE).



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

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LEGEND

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

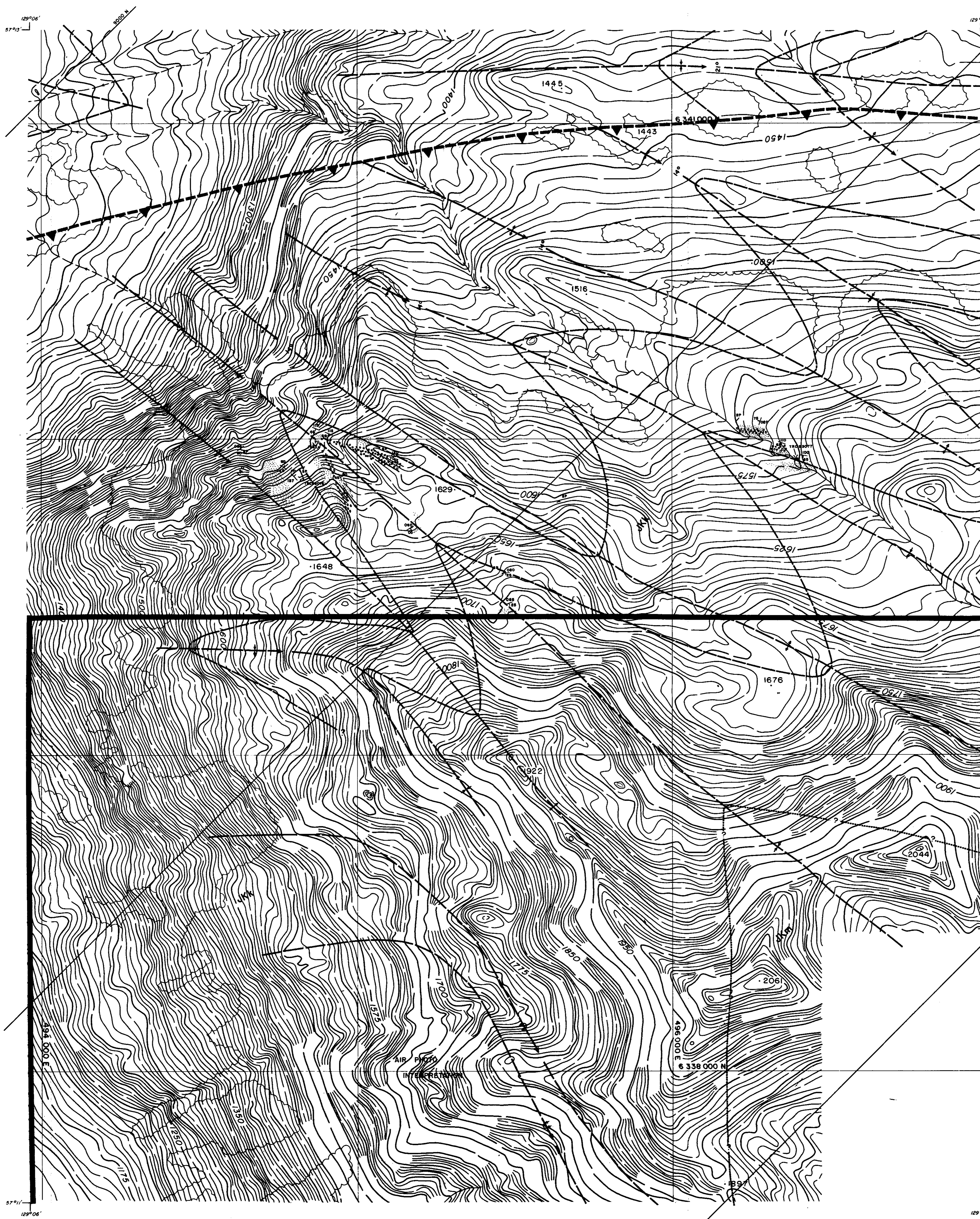
Ge. Mr. K. Williams 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET H12
1983
GEOLOGY MAP**

PREPARED BY: K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C53



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
ROAD, LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
STREAM, APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
CONTOURS, INTERMEDIATE	[Symbol]
CONTOURS, DEPRESSION	[Symbol]
CONTOURS, APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

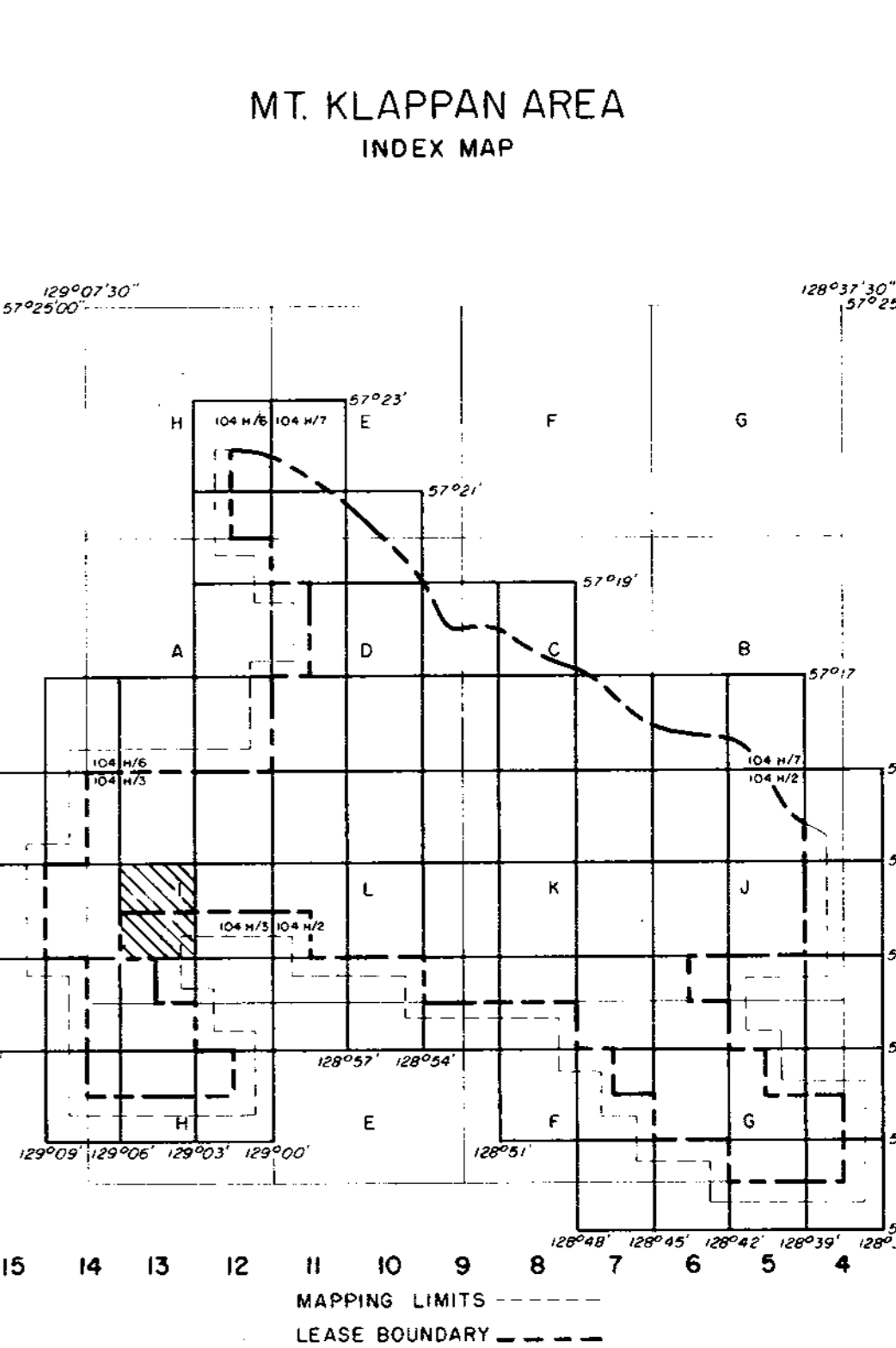
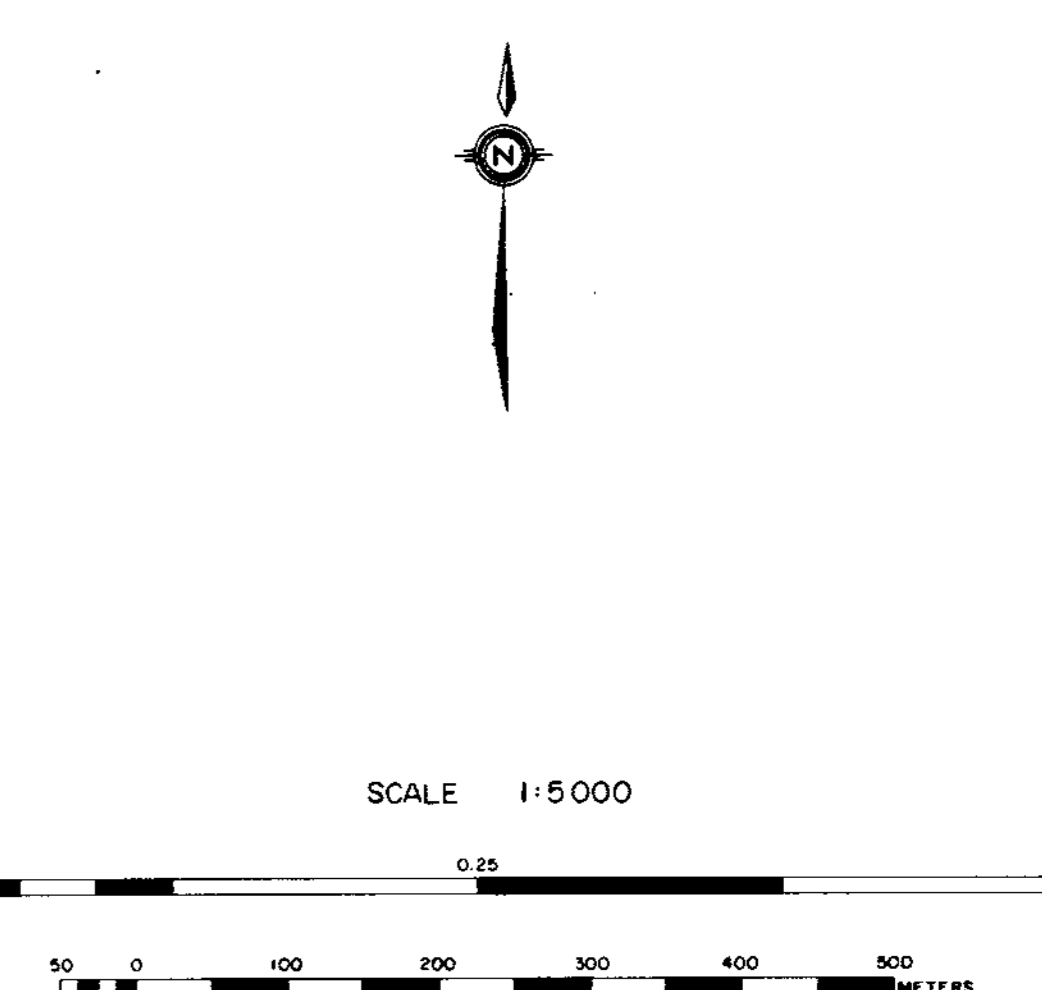
CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLENN LTD. FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



RHONDDA SEQUENCE

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

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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 spits. Sequence may contain petrified wood.

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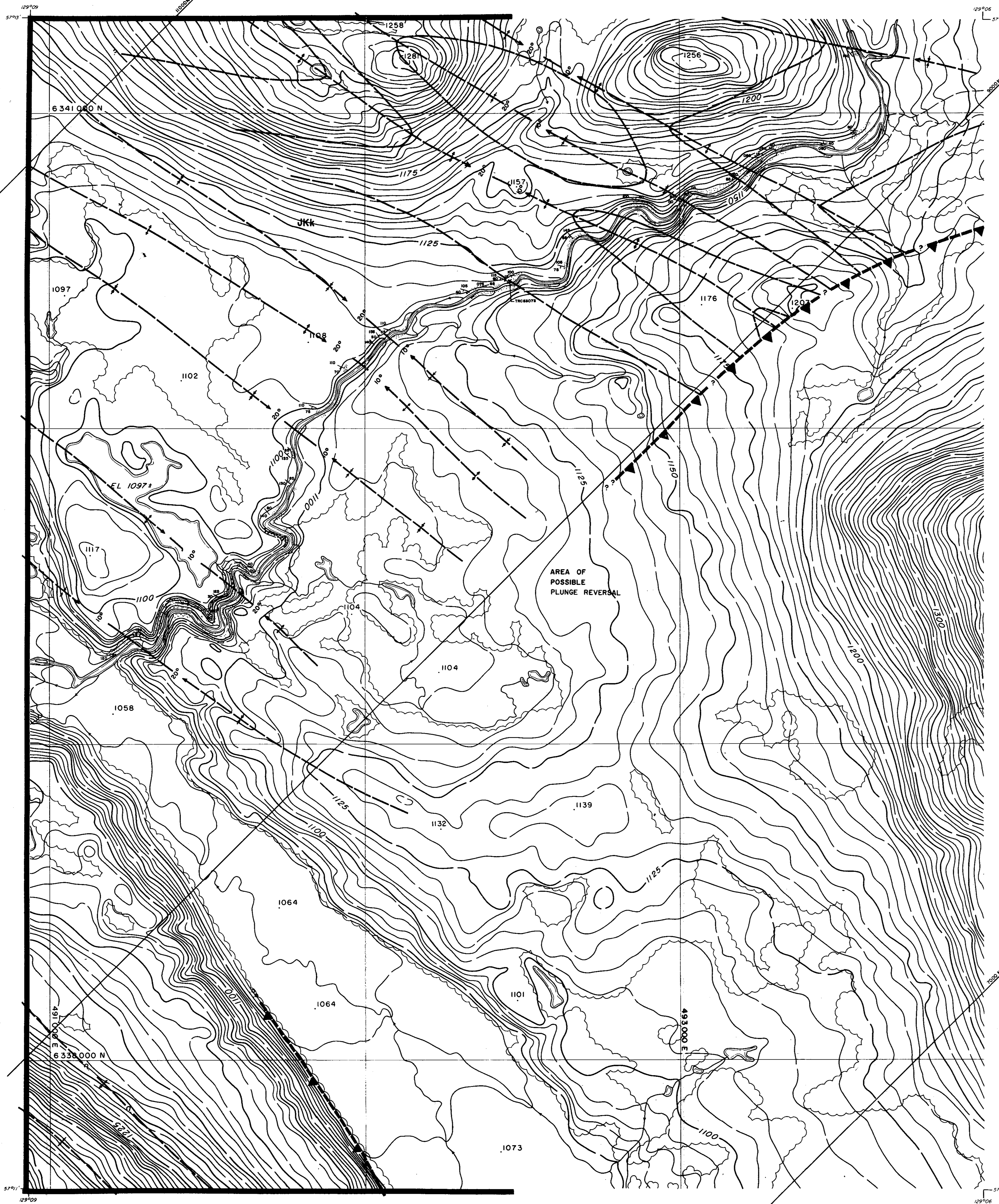
LEGEND

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

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET H13
1983
GEOLOGY MAP

PREPARED BY: K.J. SCALE: 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPN83C24



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TRACE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

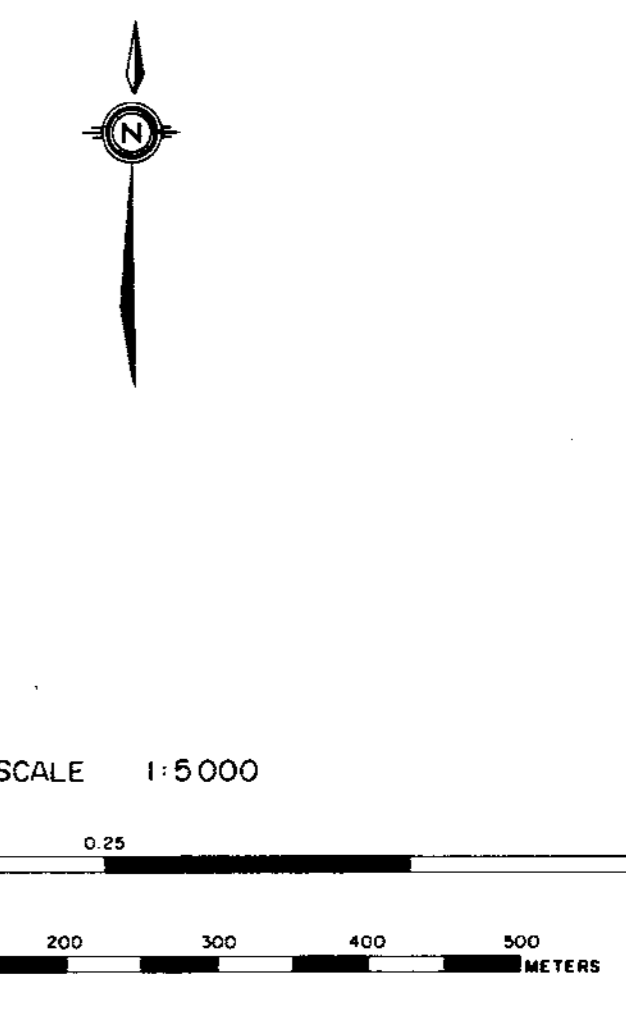
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

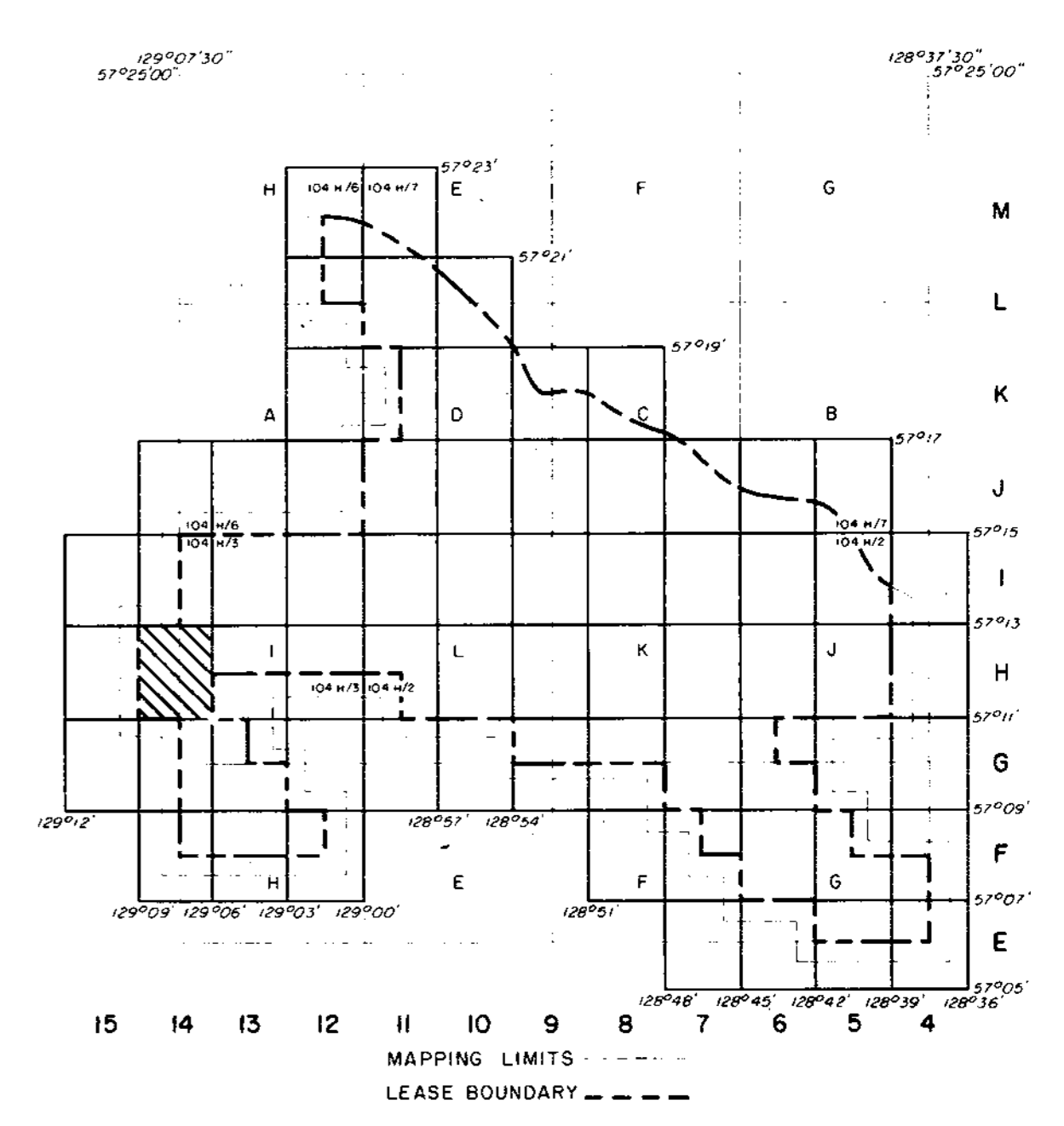
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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 DOWN-THRUST SIDE	---
ADIT TRENCH LOCATION	---
MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 8312/8

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET H 14
1983
GEOLOGY MAP

PREPARED BY: K. J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPM83C35

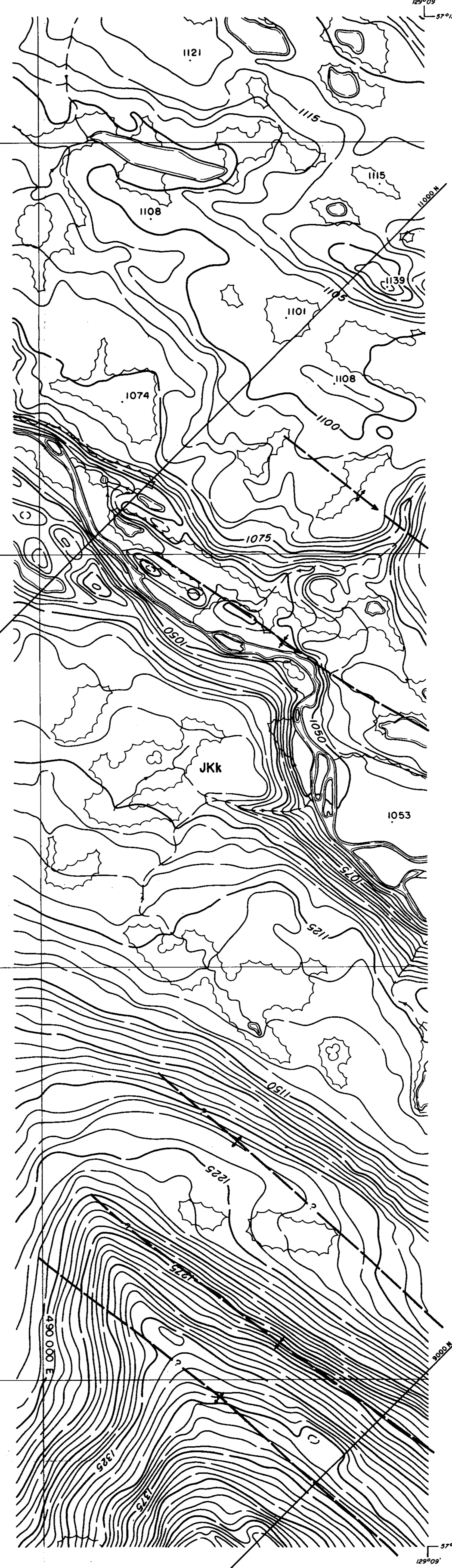
129°15' 57°15'

6 341 000 N

488 000 E

6 338 000 N

129°15' 57°15'



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

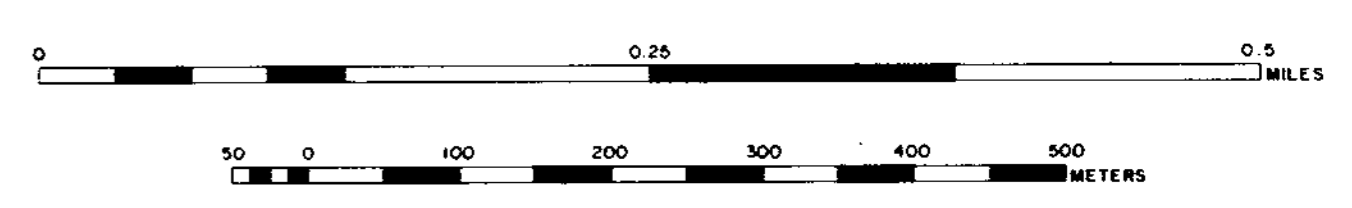
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

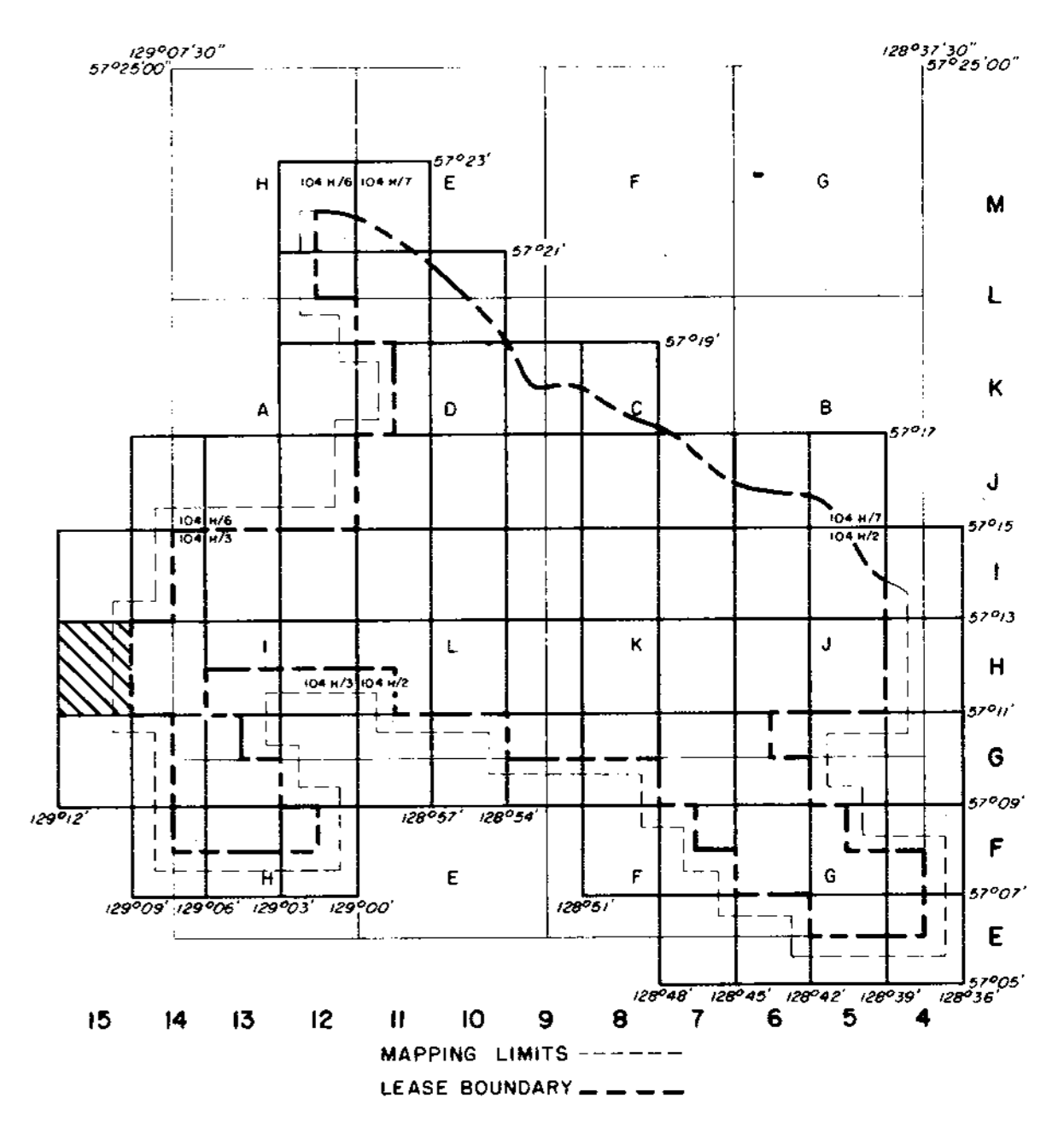
COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:50,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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 DOWN THRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge - Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET H15
1983
GEOLOGY MAP**

PREPARED BY: K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KP83C25

128°39' 57°15'

128°36' 57°15'

522 000 E

6 344 000 N

524 000 E

LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
ROAD, LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
STREAM, APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
CONTOURS, INTERMEDIATE	[Symbol]
CONTOURS, APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

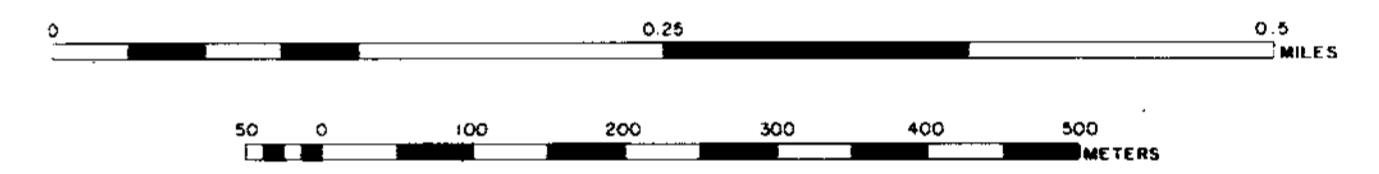
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY.

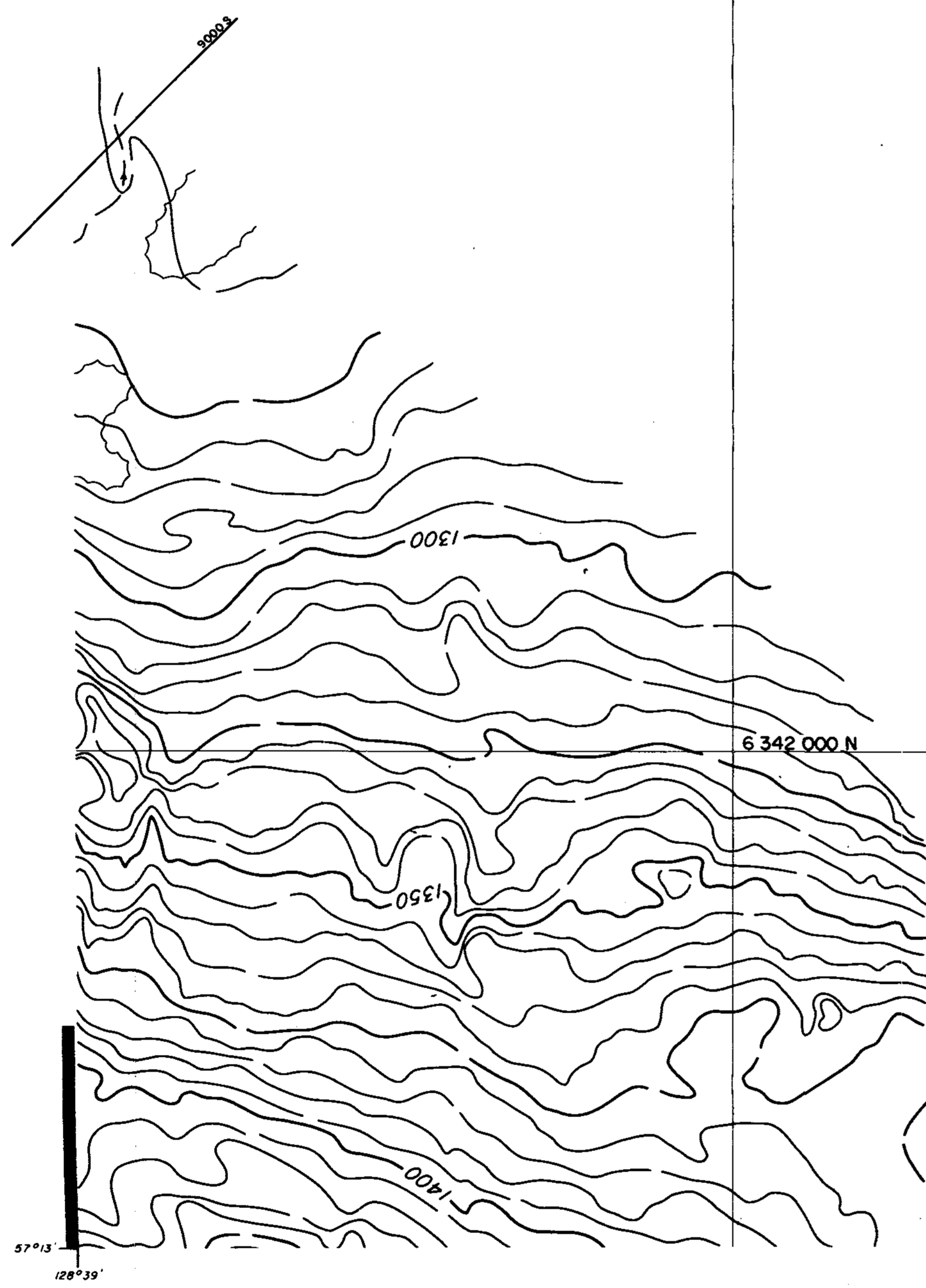
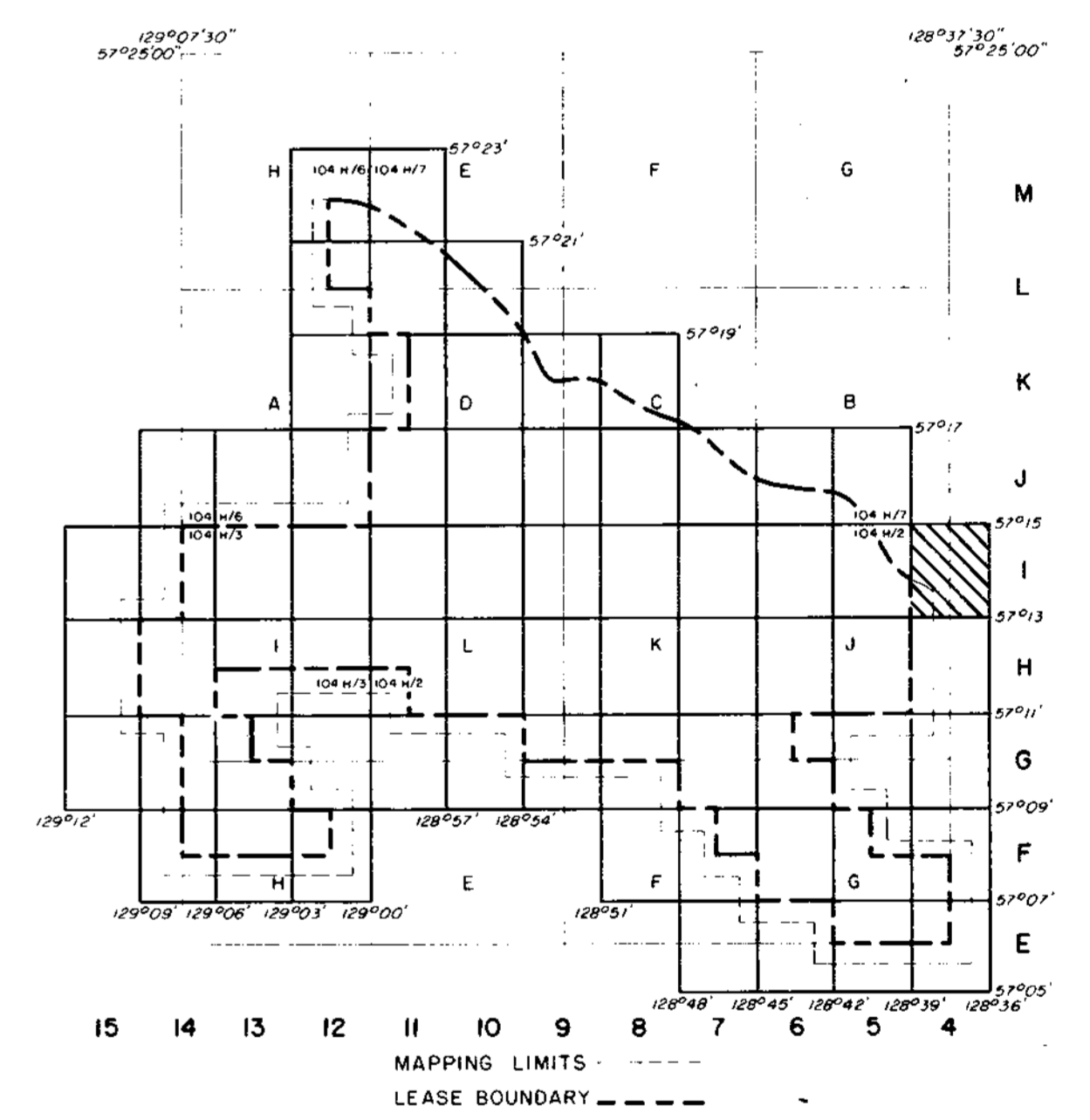
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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

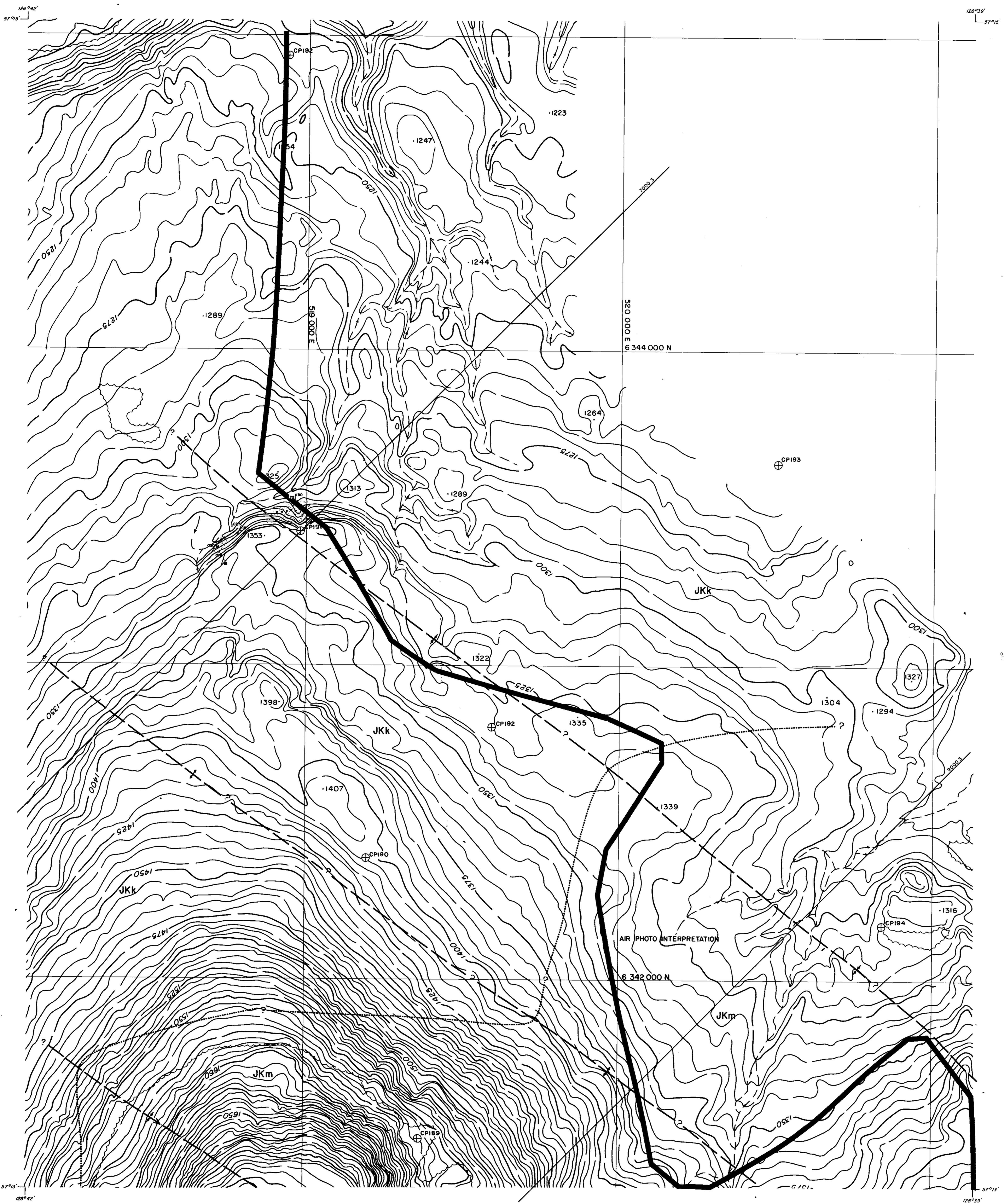
[Symbol]	LICENCE BOUNDARY
[Symbol]	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
[Symbol]	COAL SEAM (OUTCROP, INFERRED)
[Symbol]	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
[Symbol]	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
[Symbol]	OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
[Symbol]	MONOCLINE - ARROW INDICATES DIP DIRECTION
[Symbol]	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
[Symbol]	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UP THRUST SIDE
[Symbol]	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWN THROWN SIDE
[Symbol]	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
[Symbol]	CROSS-SECTION LOCATION
[Symbol]	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83/21a

GULF CANADA RESOURCES INC.
 Coal Division
 CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
 MAP SHEET I4
 1983
 GEOLOGY MAP**

PREPARED BY: G.S. SCALE 1:5000
 APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPH83C37



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

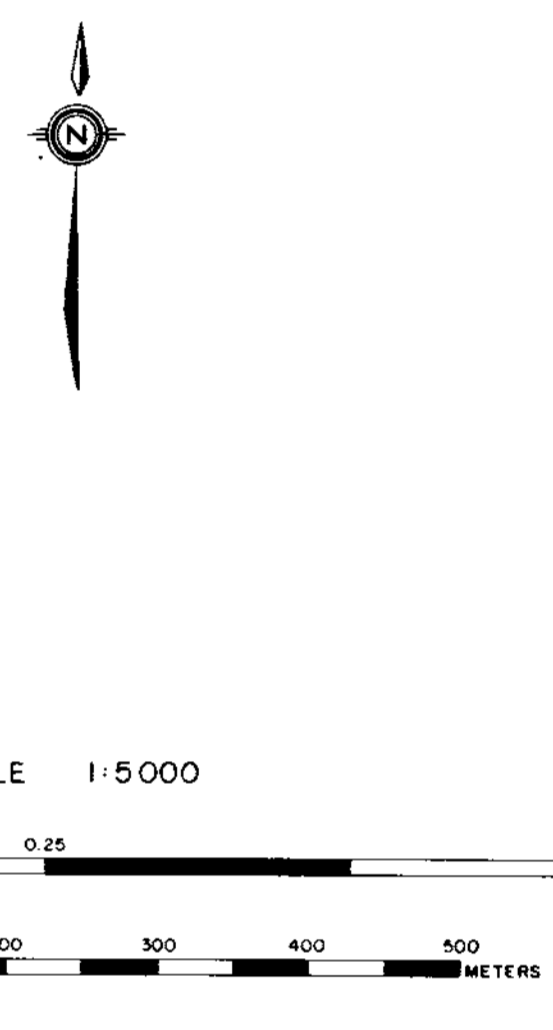
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

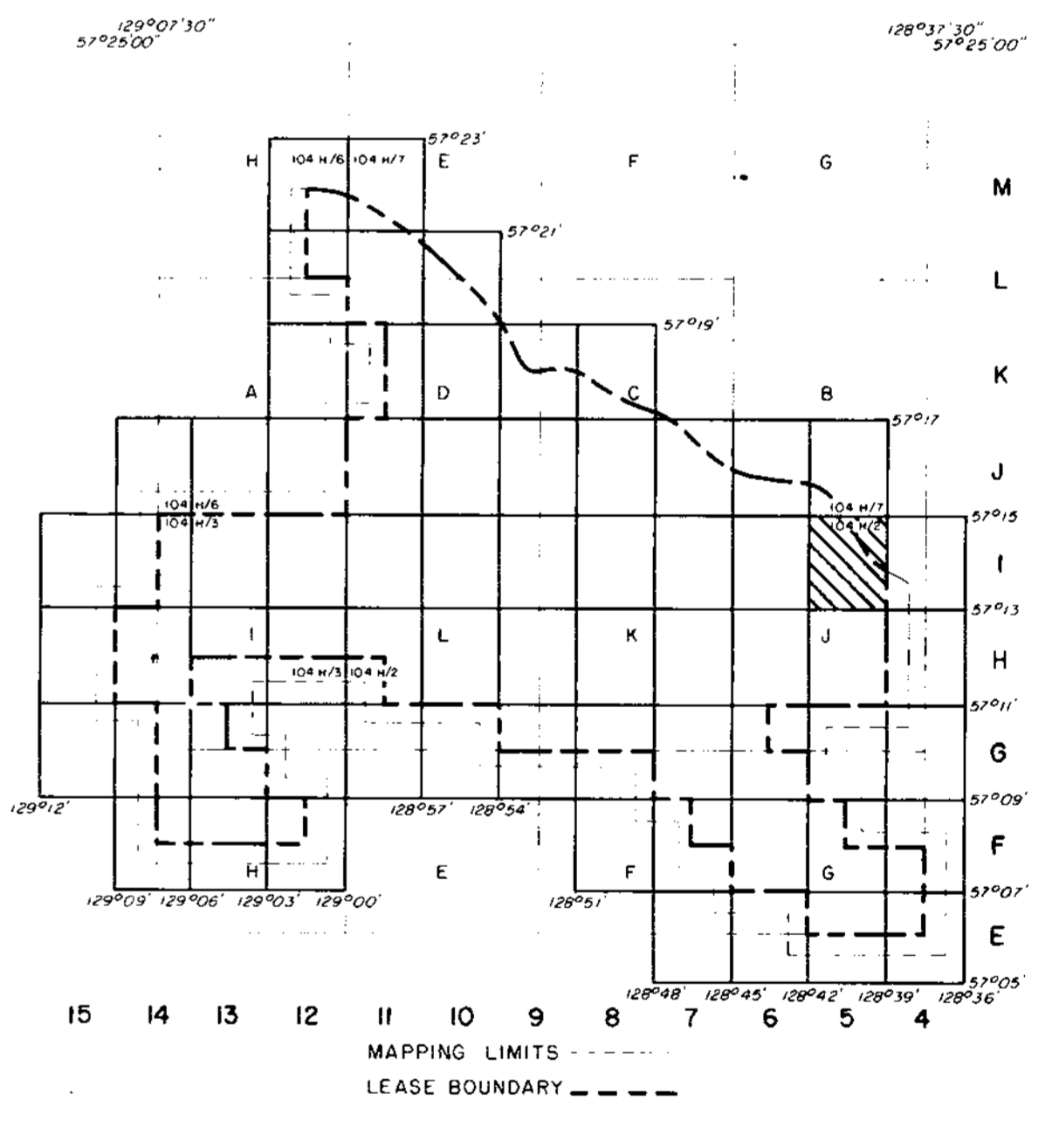
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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 UPTHROW 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)

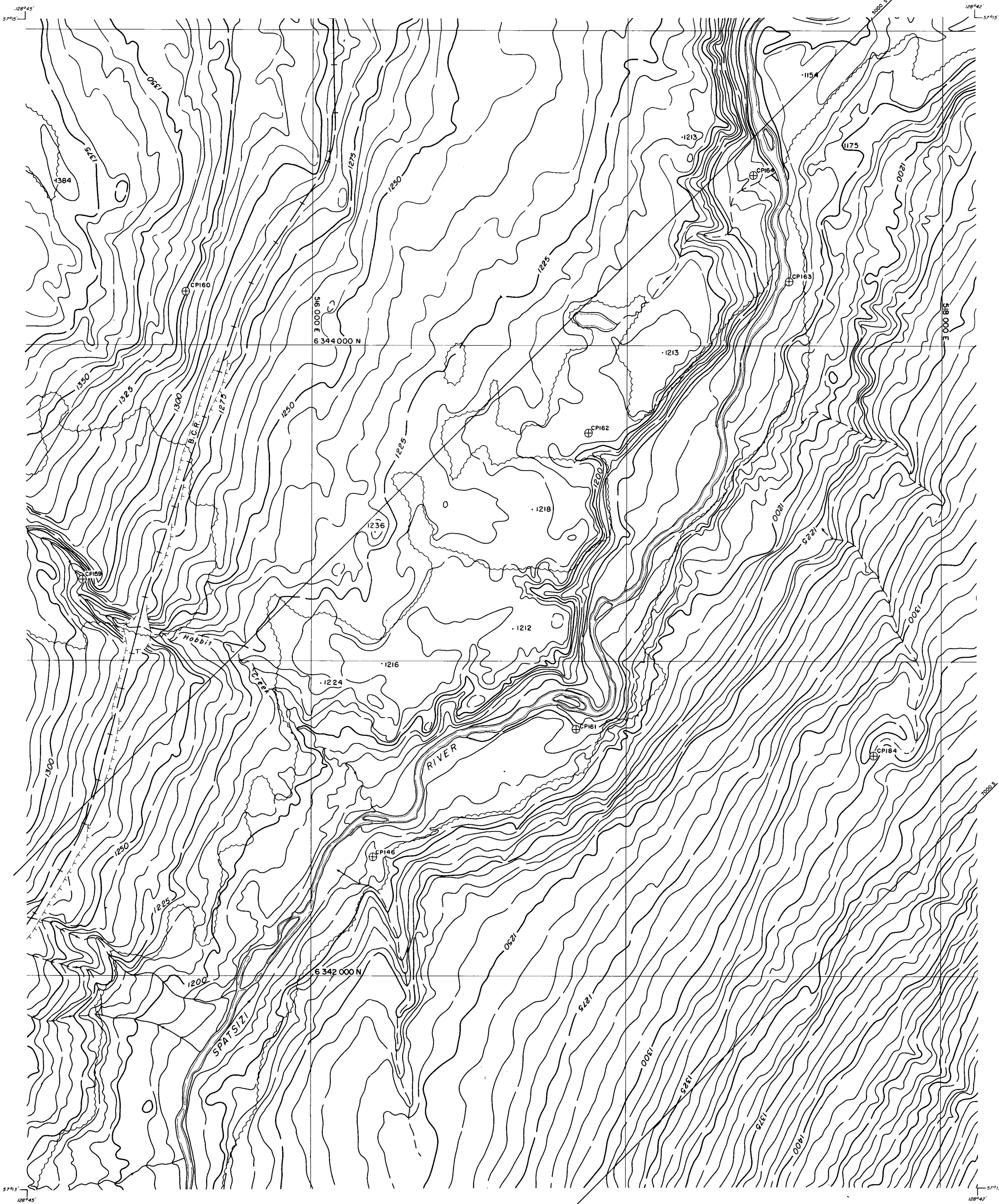
III

Gr- Mt. Klappan 83(2)

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET I5
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO: KP83C38



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	FL 500'
SWAMP	---
BEVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

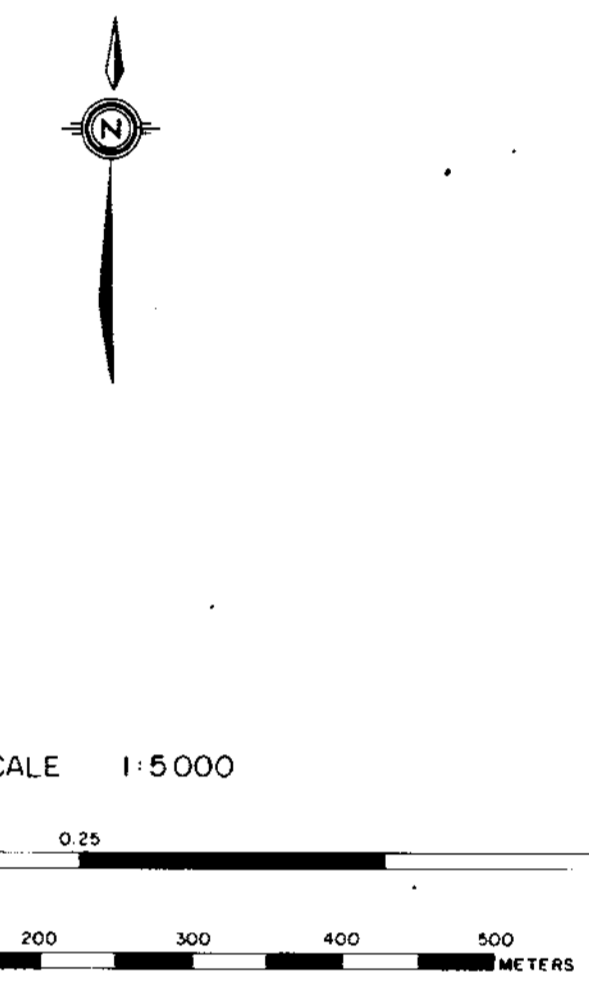
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS +5.0 METERS FOR GROUND NOT OBSERVED BY TREES OR VEGETATION

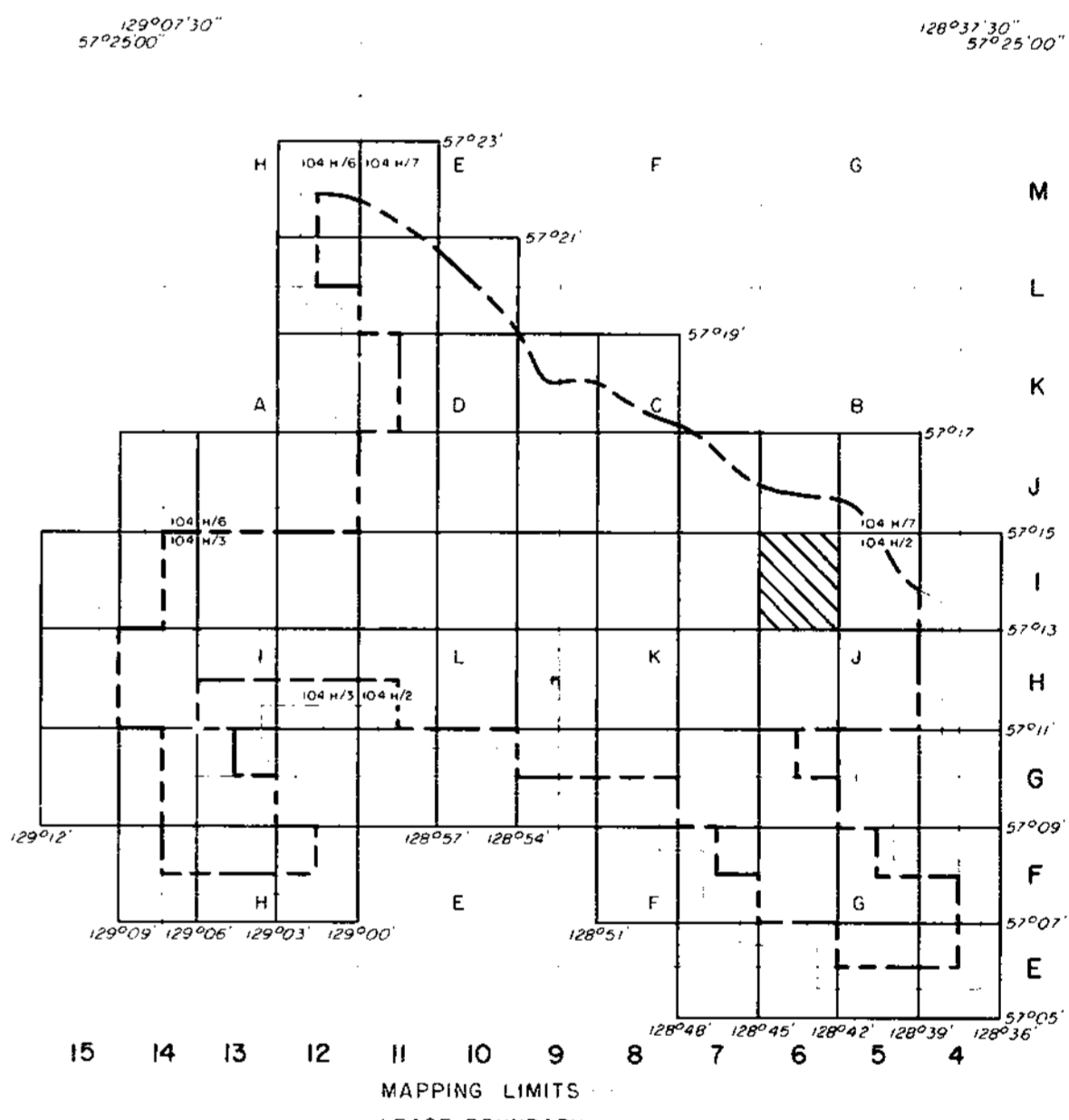
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/87 AT A SCALE OF 1:50,000 (APPROXIMATE)



MT. KLAPPAN AREA INDEX MAP



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 10 to 20 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 UPTHROW 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)	---

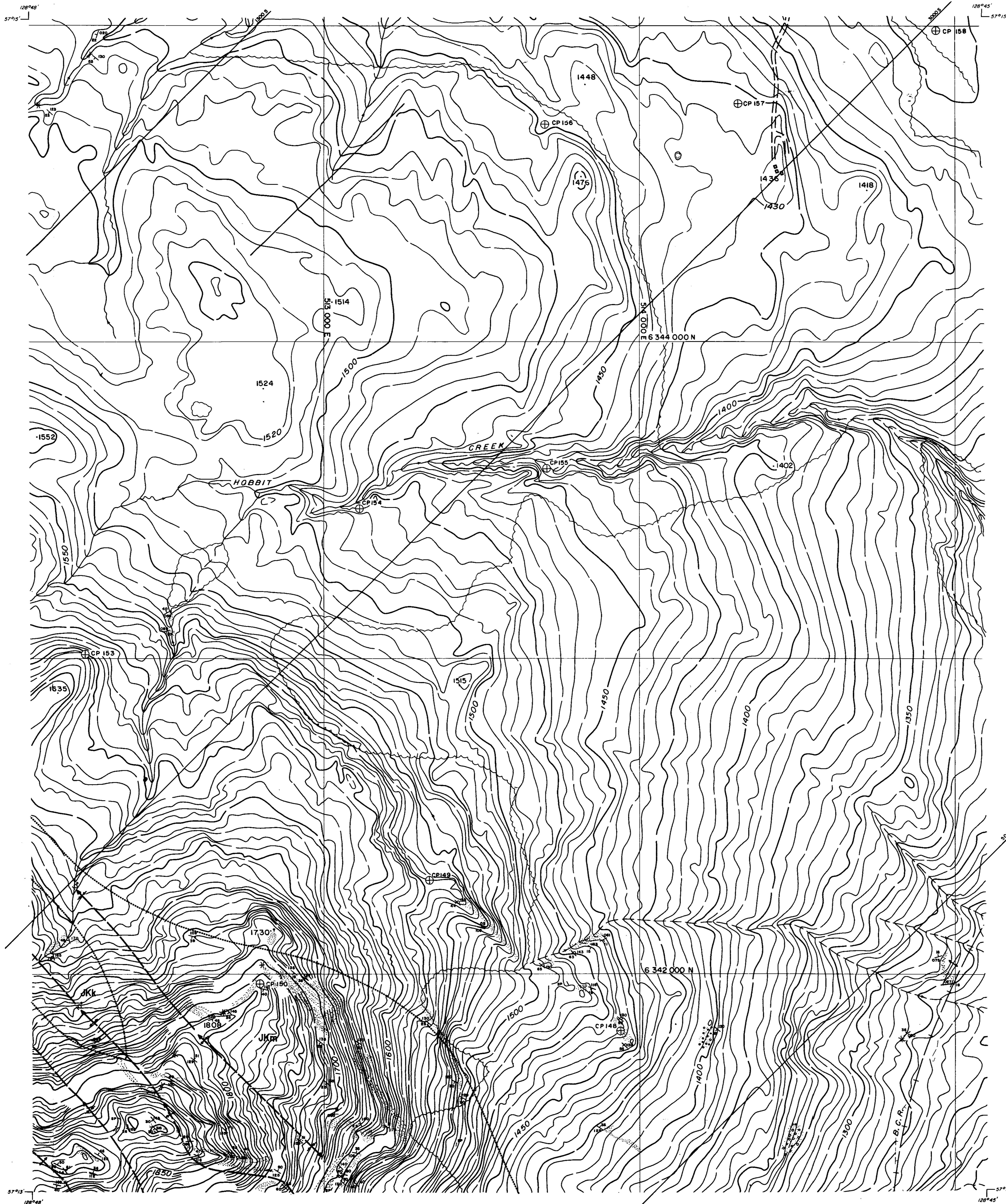
Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET I6
1983
GEOLOGY MAP

PREPARED BY: C. WILLIAMS SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C39



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

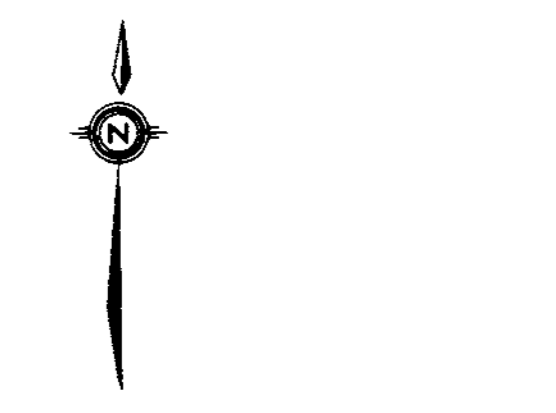
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

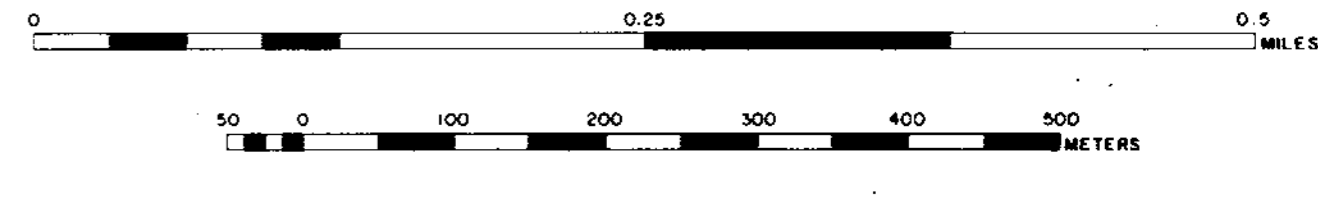
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

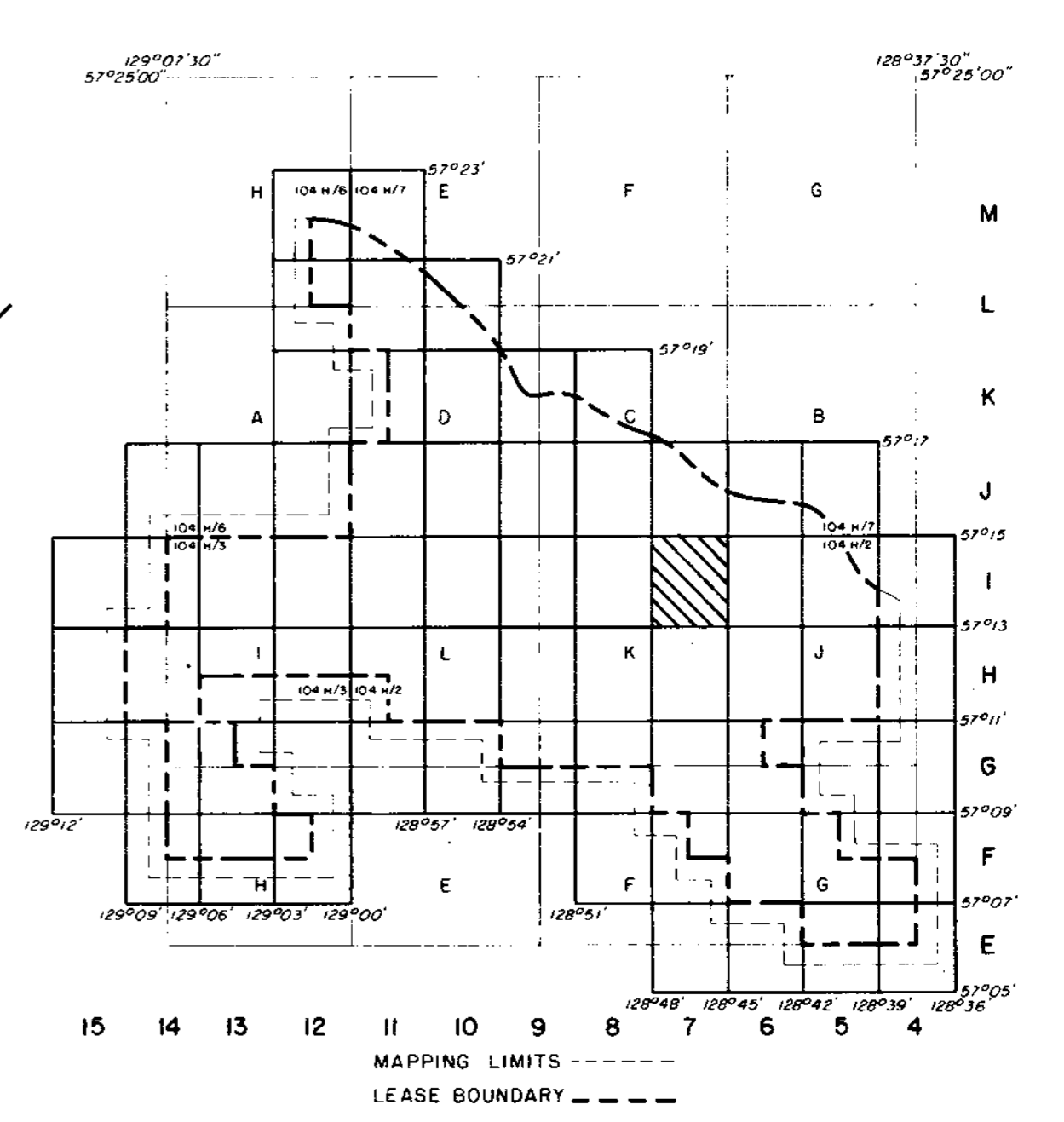
COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA INDEX MAP



RHONQDA 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 UPTHURST SIDE
---	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

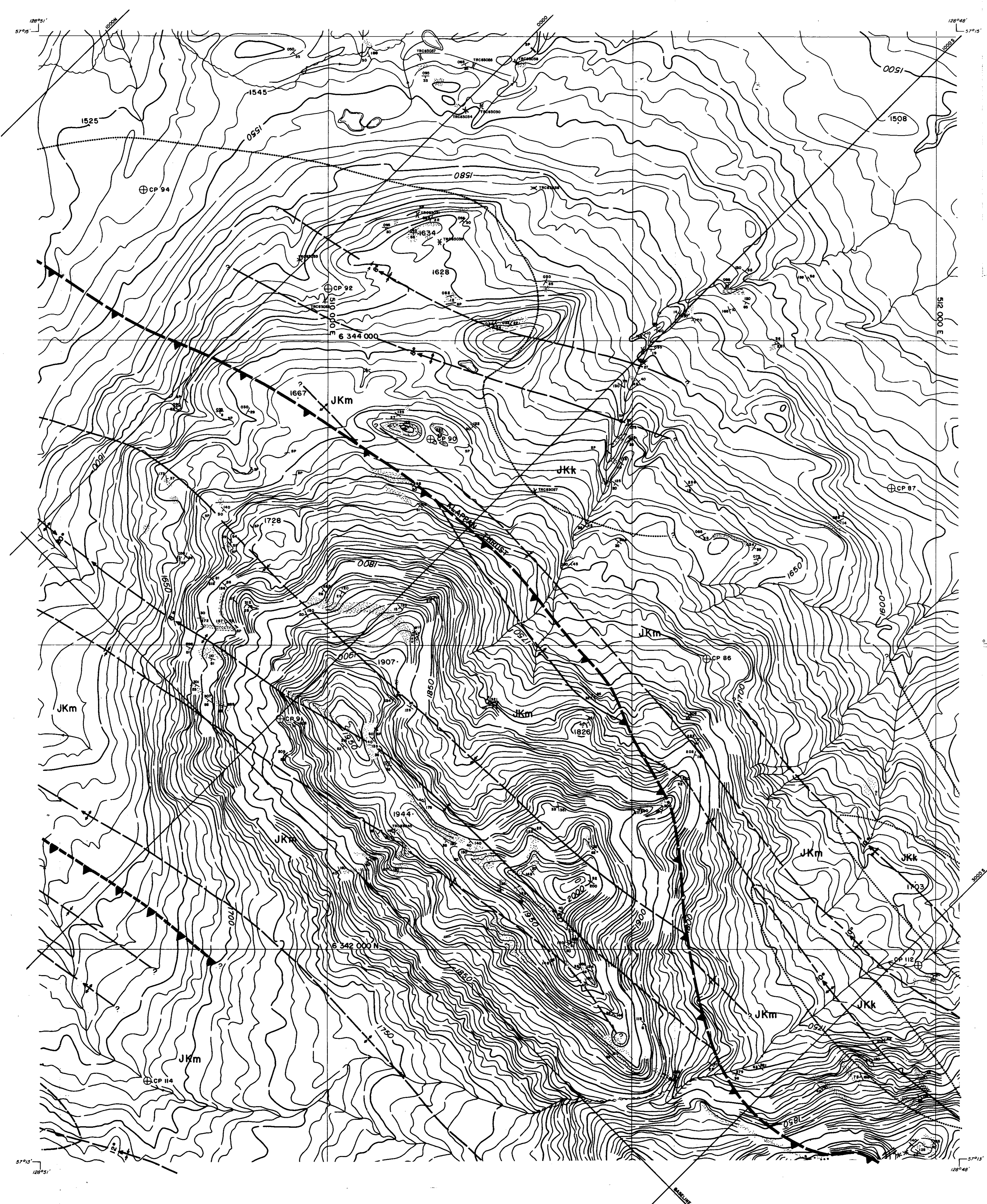
111

Ge. Mt. Klappan 83/24

GULF CANADA RESOURCES INC.
Coal Division

**MT. KLAPPAN COAL PROPERTY
MAP SHEET I7
1983
GEOLOGY MAP**

PREPARED BY: K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KP83C40



LEGEND

ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	- - - -
RAILROAD BED	—+—+—+—+—
TRAIL	— · — · — · — · —
RIVER	— — — — —
STREAM, DEFINITE	— — — — —
STREAM, APPROXIMATE	— · — · — · — · —
LAKE	— — — — —
WATER LEVEL	— — — — —
SWAMP	— — — — —
BEAVER DAM	— — — — —
TREE LINE	— — — — —
CUT LINE	— — — — —
CONTOURS, INDEX	— — — — —
CONTOURS, INTERMEDIATE	— — — — —
CONTOURS, DEPRESSION	— — — — —
SPOT ELEVATION	— — — — —
FORM LINES	— — — — —
CUT/FILL	— — — — —
FIELD CONTROL POINT	— — — — —
COAL LICENCE	— — — — —

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL - 10 M., WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

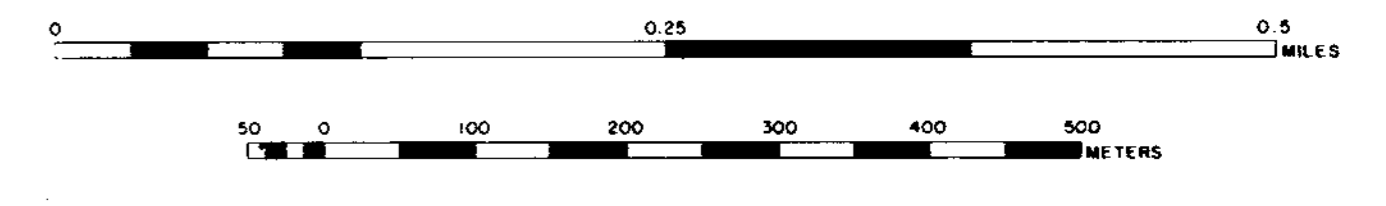
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

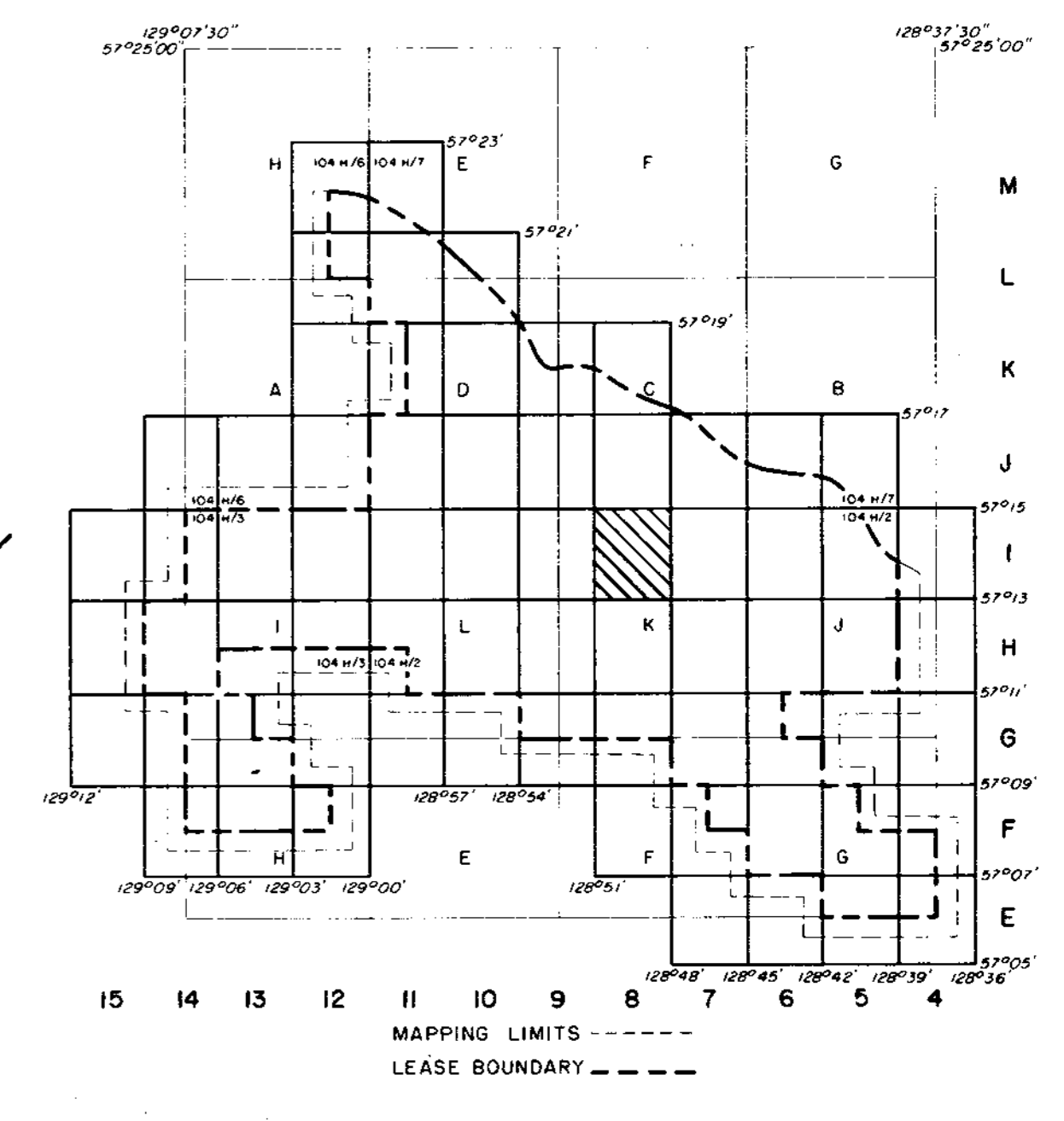
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEN LTD. FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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.

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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 DOWNTHROW SIDE
— — — — —	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
— — — — —	CROSS-SECTION LOCATION
— — — — —	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

111

GULF CANADA RESOURCES INC.

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

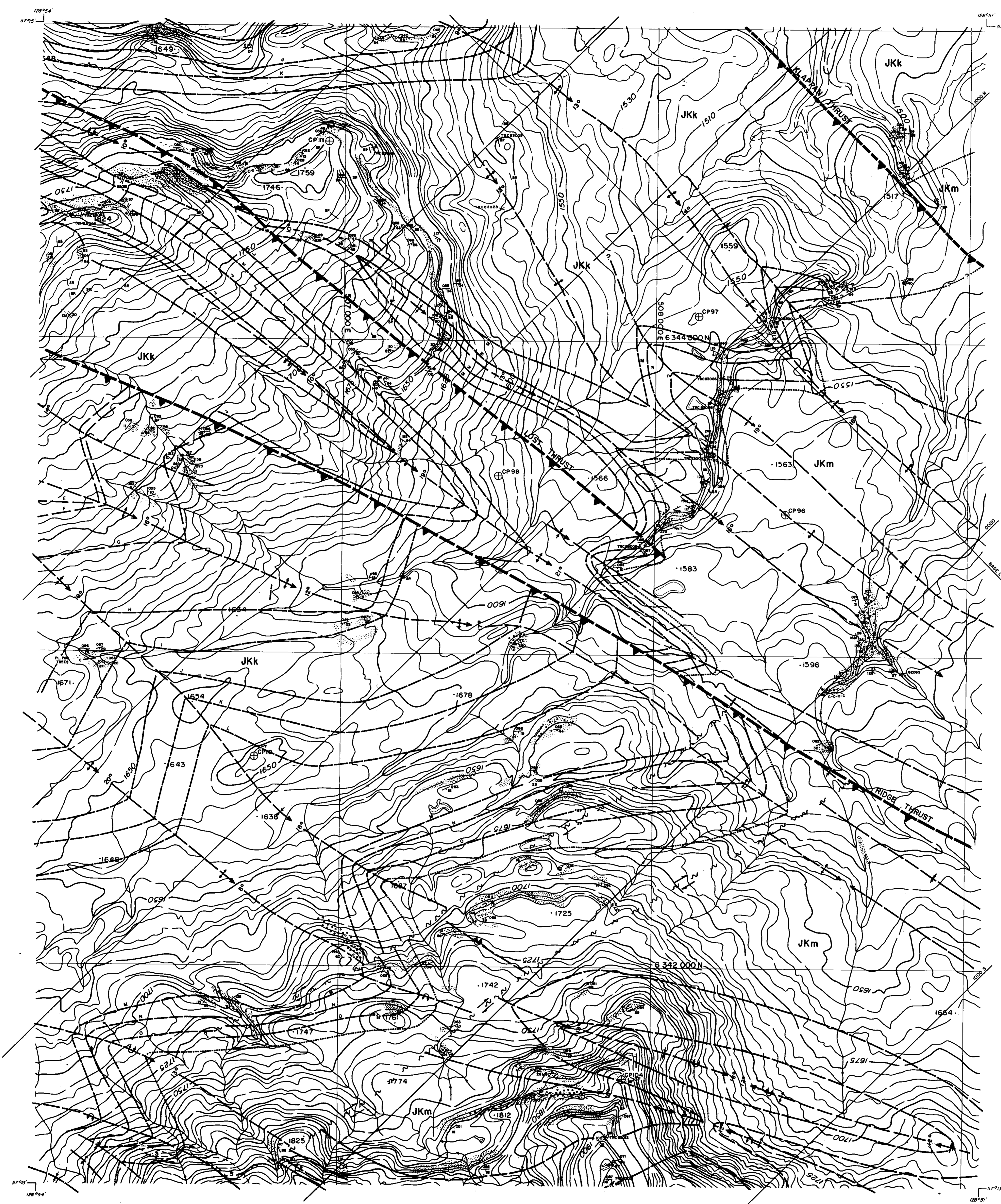
MAP SHEET I8

1983

GEOLOGY MAP

PREPARED BY: K.J. SCALE 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KPN83C4



LEGEND

- BUILDING
- ROAD, HARD SURFACE
- ROAD, LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- STREAM, APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- CONTOURS, INTERMEDIATE
- CONTOURS, APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- DIE FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:40,000 NEGATIVES.

CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

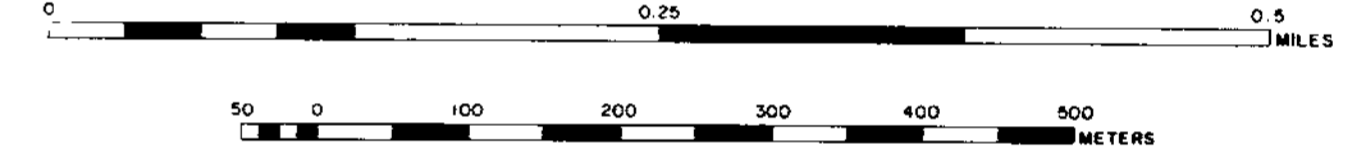
SURVEY CONTROL: TARS N FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

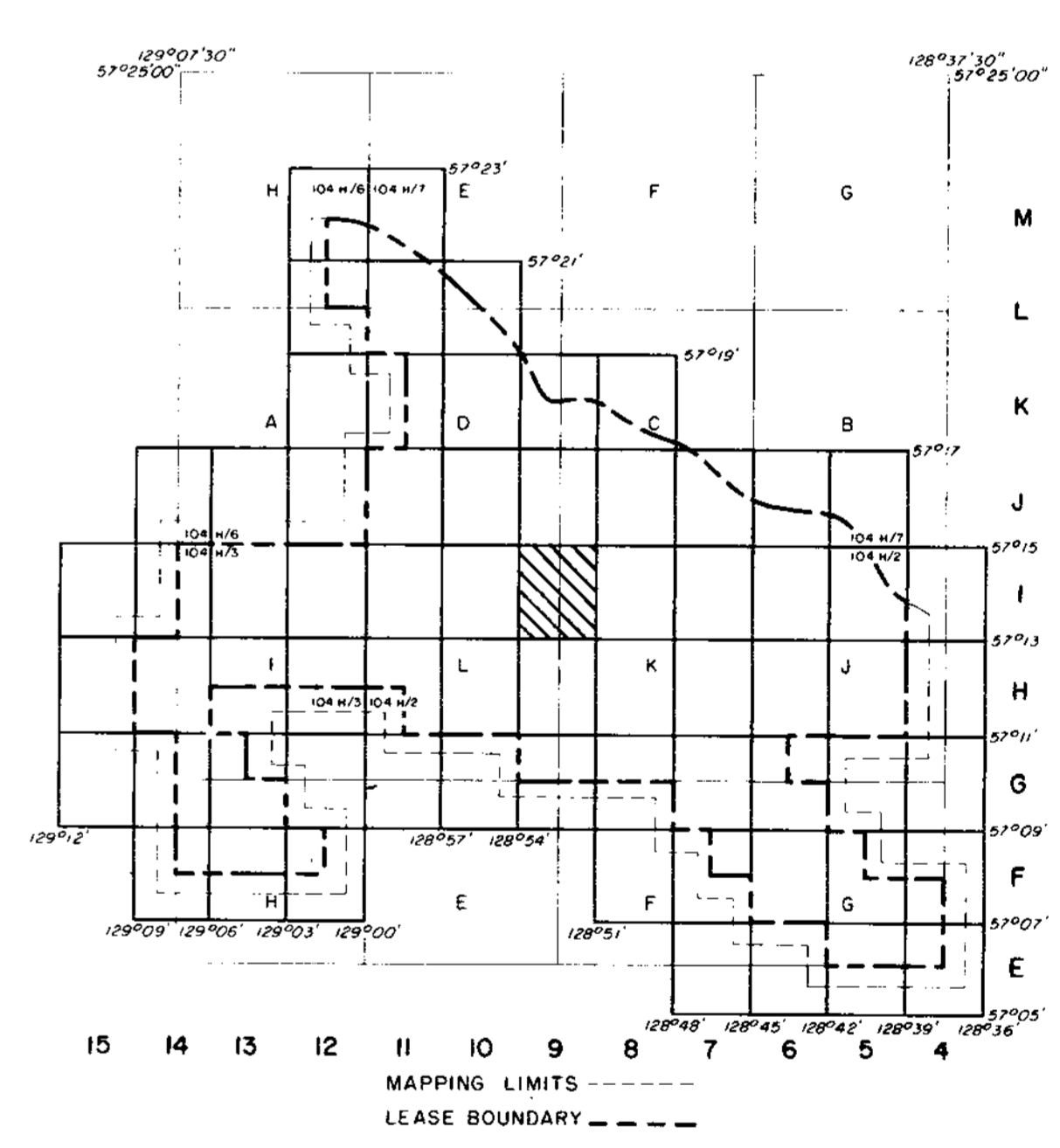
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



- 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.
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- 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

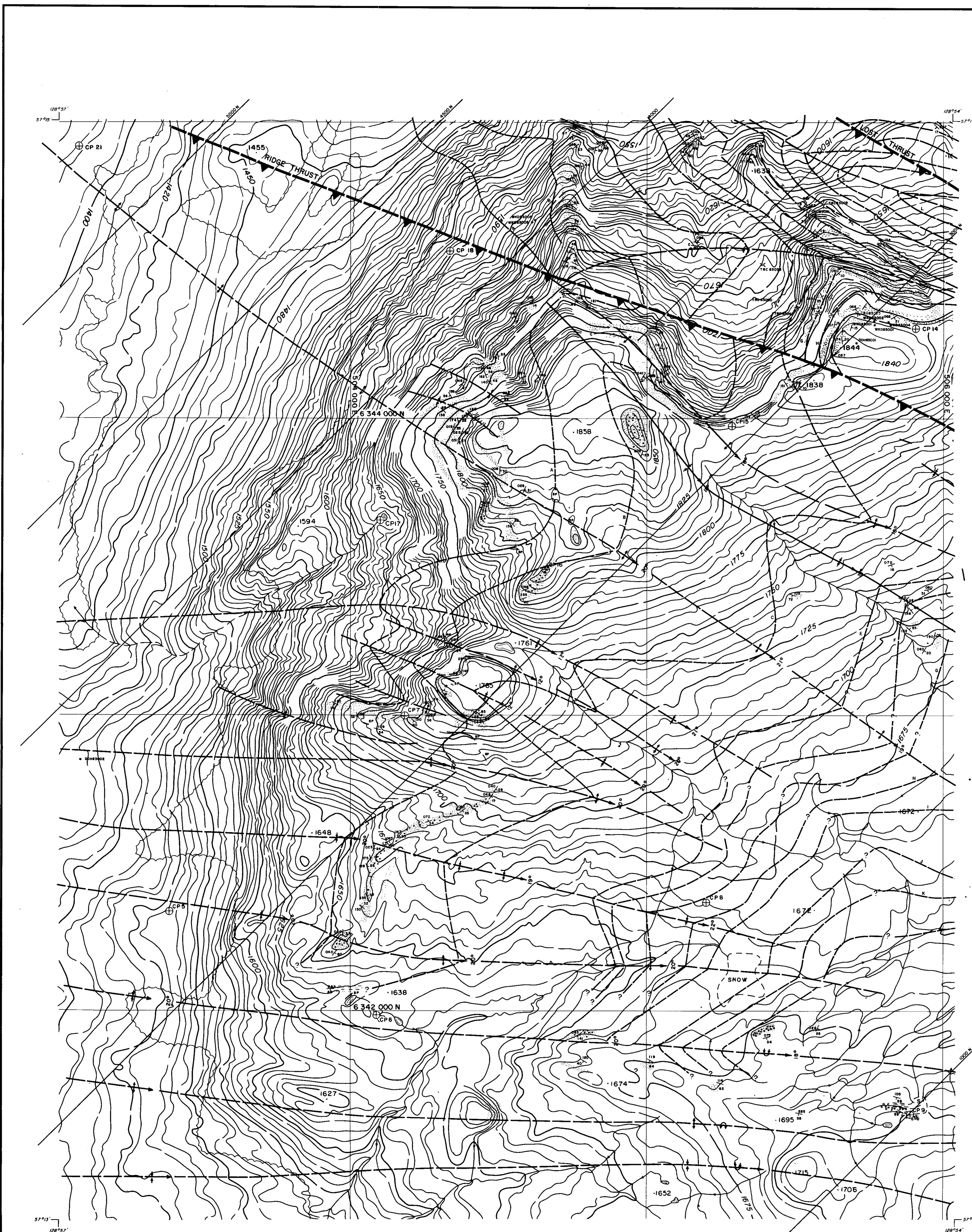
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (OUTCROP, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, 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 DOWN THRUST SIDE
- ADIT TRENCH LOCATION MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83(2)

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET 19
1983
GEOLOGY MAP

PREPARED BY: C.W. K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KP83C42



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

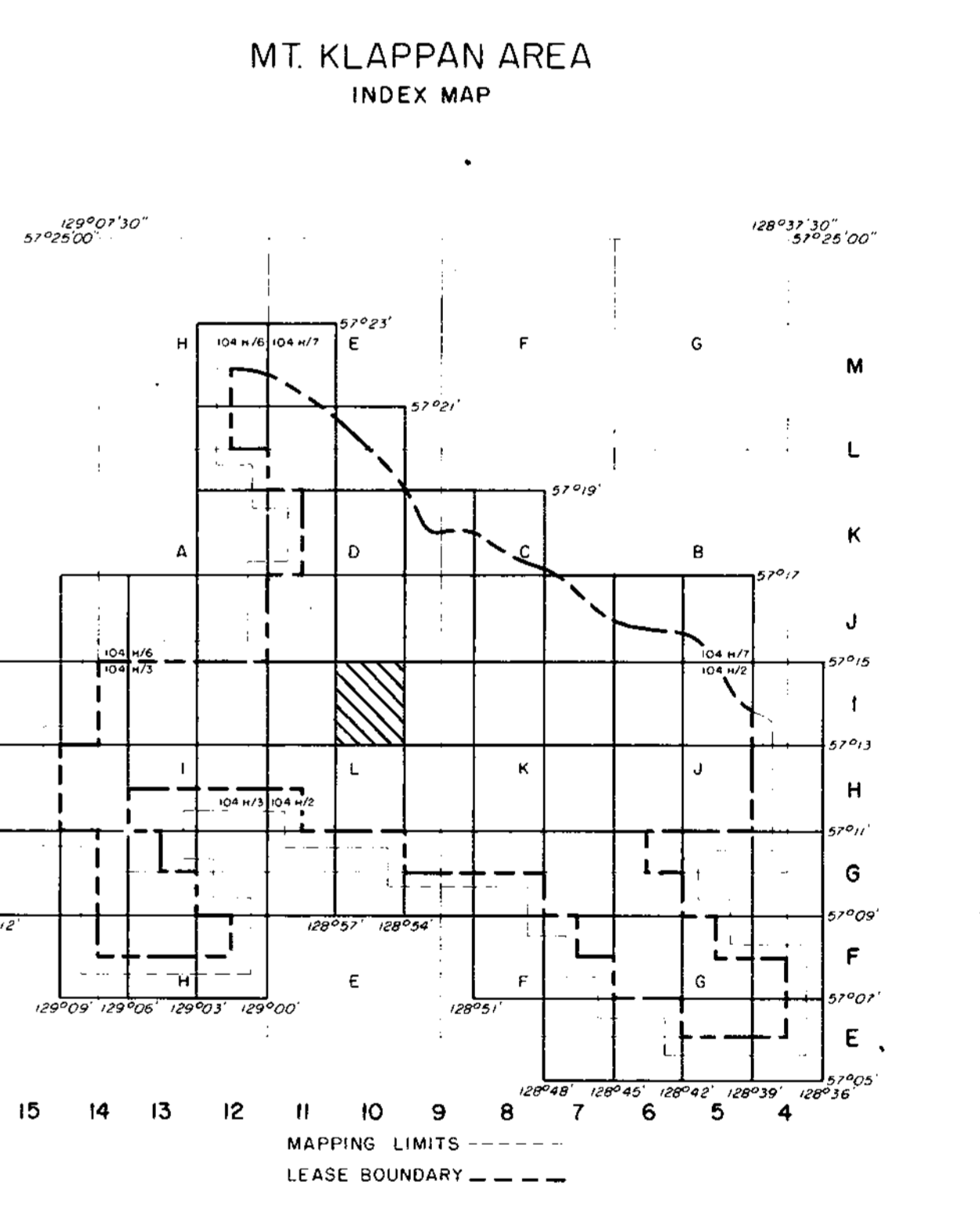
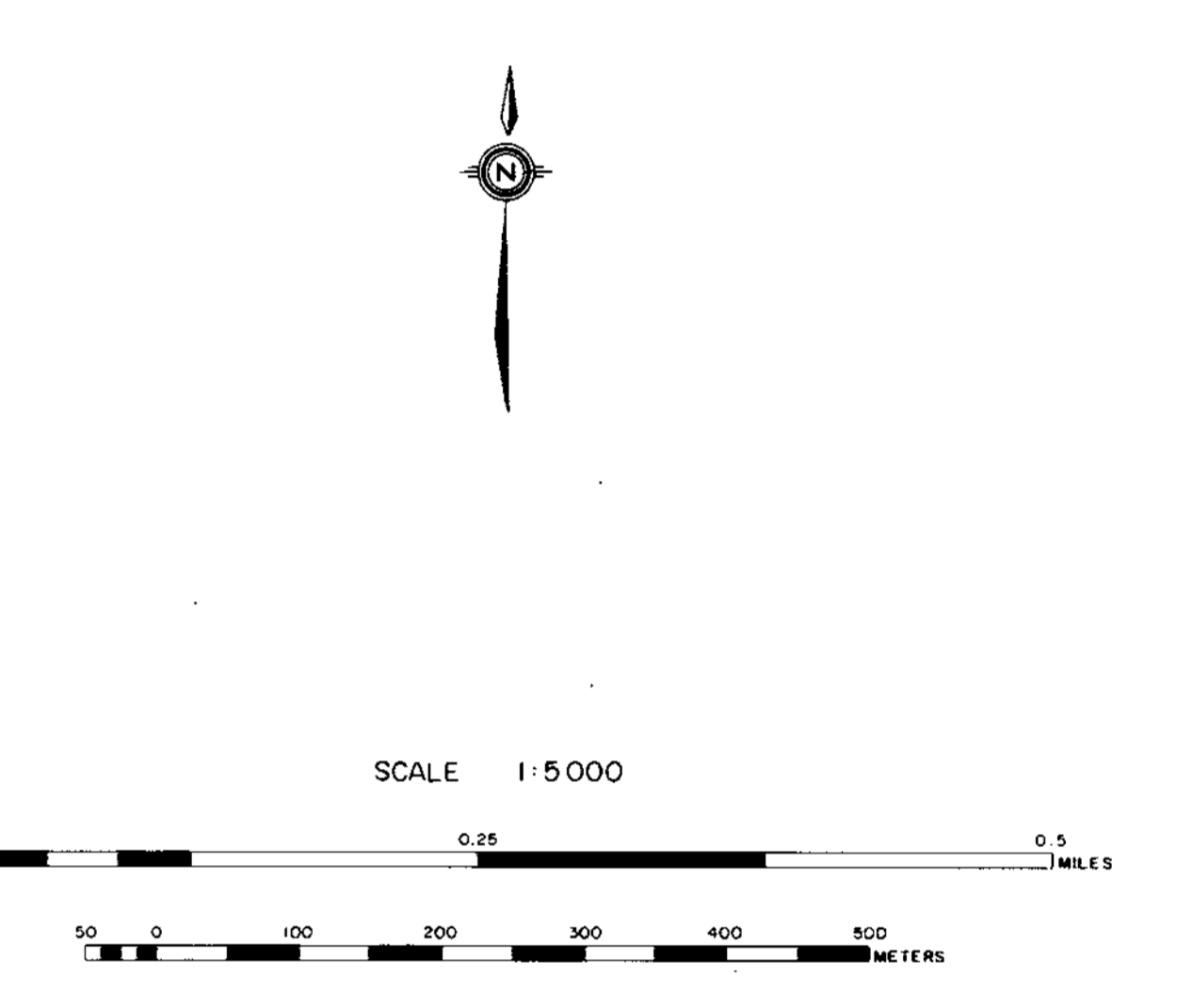
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



RHONDDA SEQUENCE

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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 DOWNTHRUST SIDE	---
ADIT TRENCH LOCATION	---
MEASURED SECTION LOCATION	---
CROSS-SECTION LOCATION	---
DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)	---

Ge. Mt. Klappan 83129

GULF CANADA RESOURCES INC.

Calgary Alberta

MT. KLAPPAN COAL PROPERTY

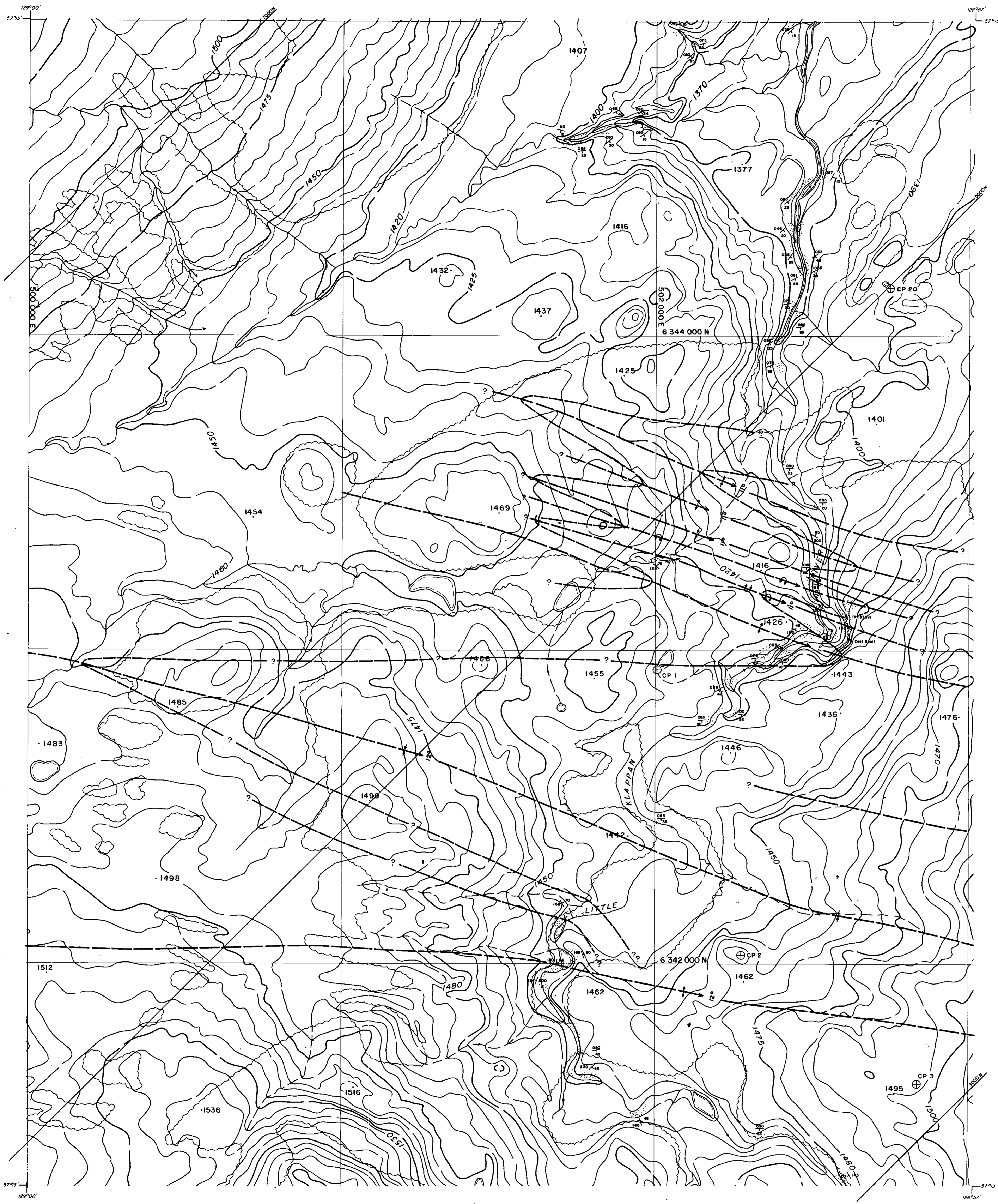
MAP SHEET I 10

1983

GEOLOGY MAP

PREPARED BY: C.W. K.J., S.M. SCALE 1:5000

APPROVED BY: G. WILLIAMS DATE: JAN. 1984 DRAWING NO. KP83C43



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
CONTOURS, INTERMEDIATE	---
CONTOURS, APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:40,000 NEGATIVES

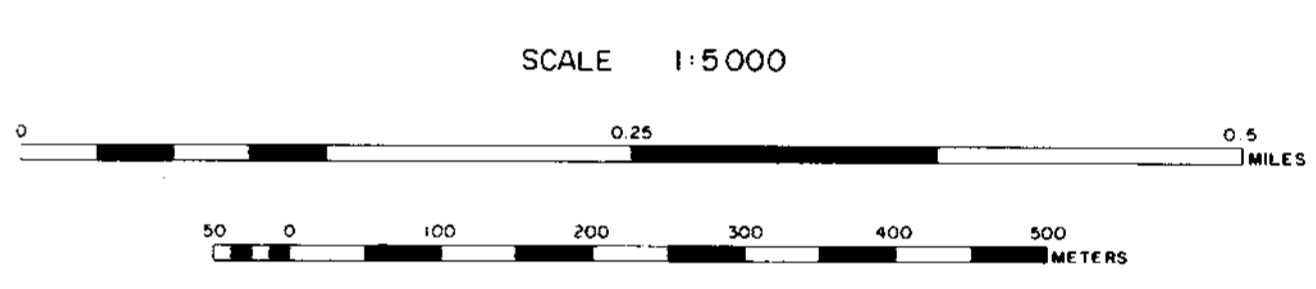
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

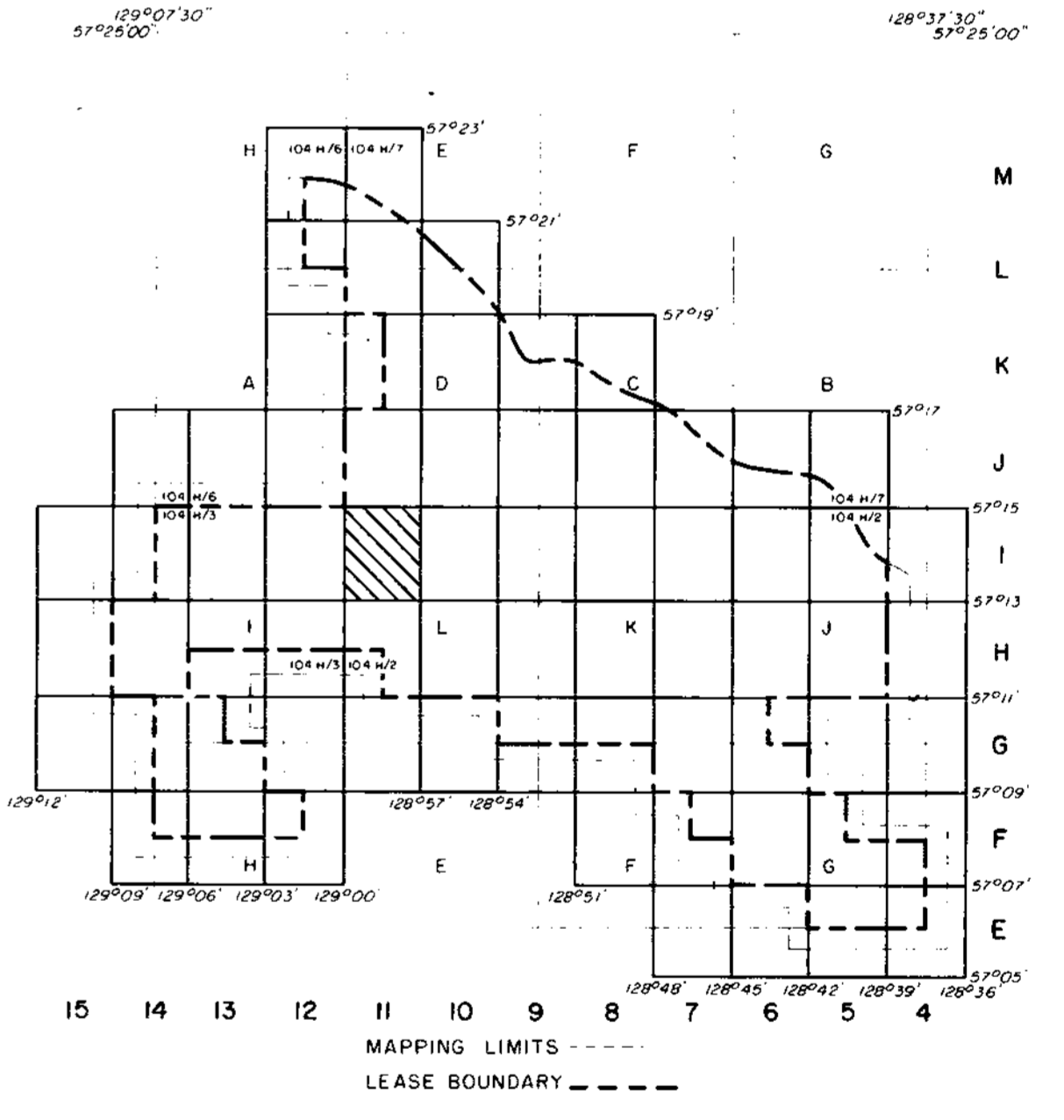
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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/82 AT A SCALE OF 1:40,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



RHONDDA SEQUENCE

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

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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)
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---	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
---	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UP THRUST SIDE
---	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWN THROWN SIDE
---	ADIT
---	TRENCH LOCATION
---	MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

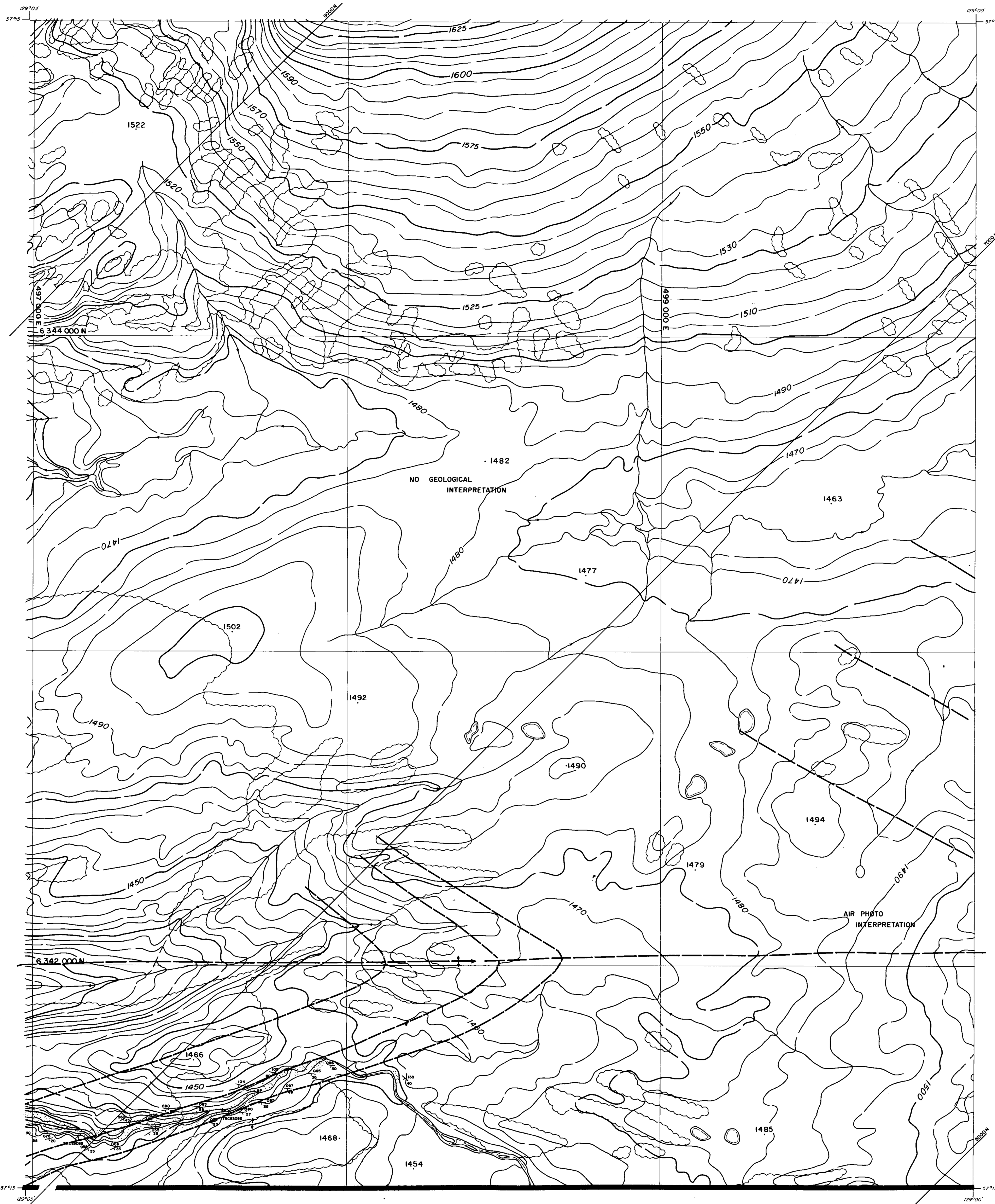
III

Gr. Mt. Klappan 83/19

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET III
1983
GEOLOGY MAP

PREPARED BY: C.W., K.J., S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KP83C44



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

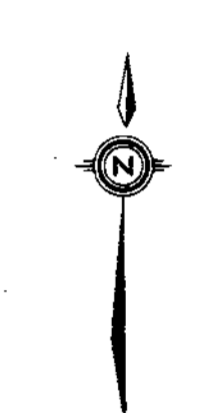
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 150 METERS FOR GROUND NOT OCCUPIED BY TREES OR VEGETATION.

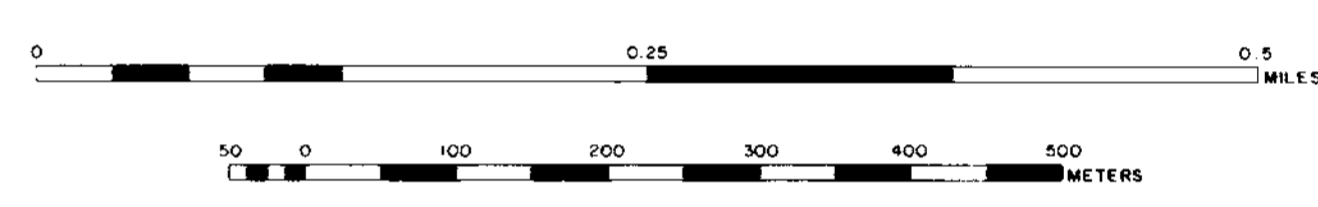
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MARKING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

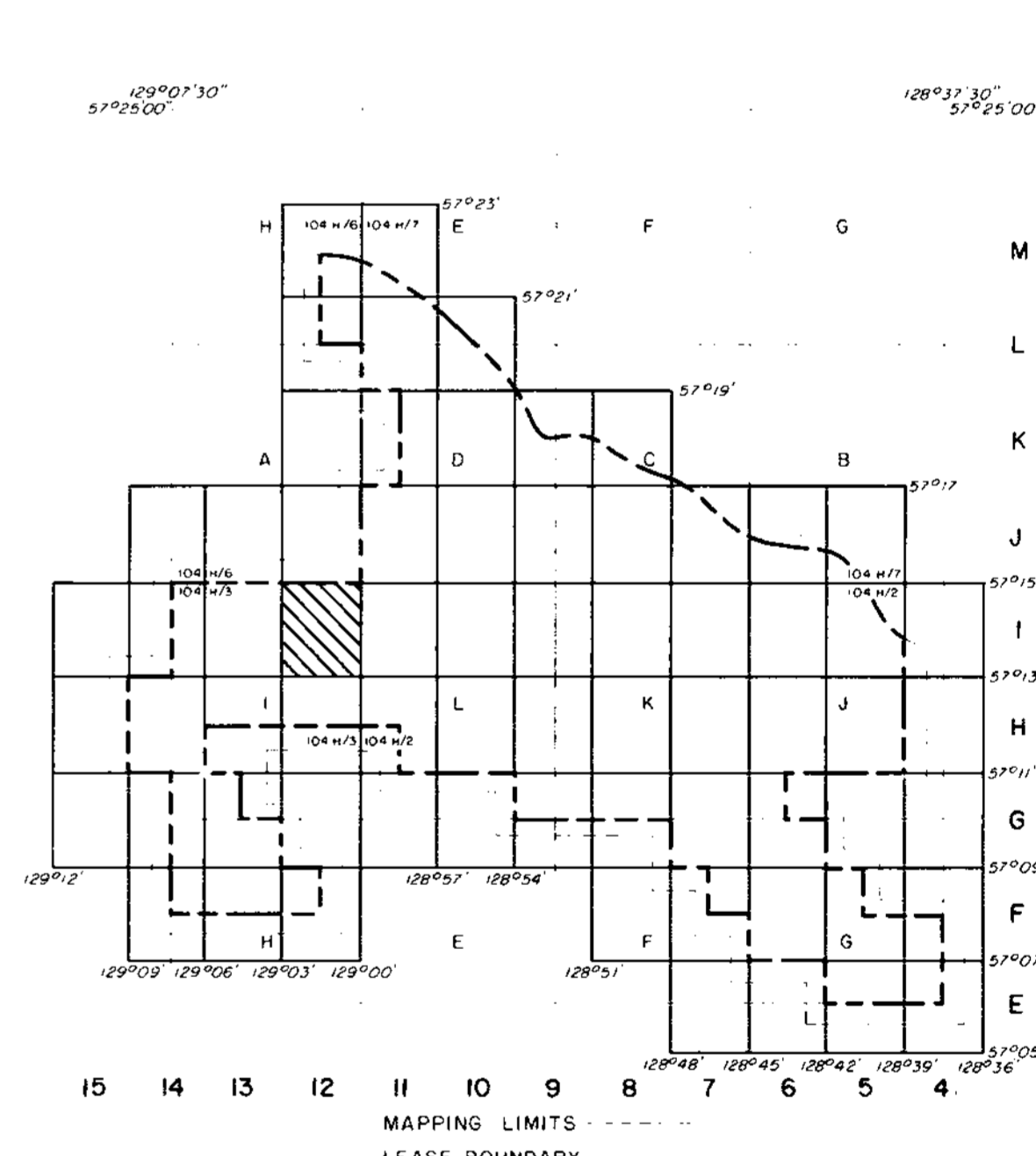
COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA
INDEX MAP



- 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

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

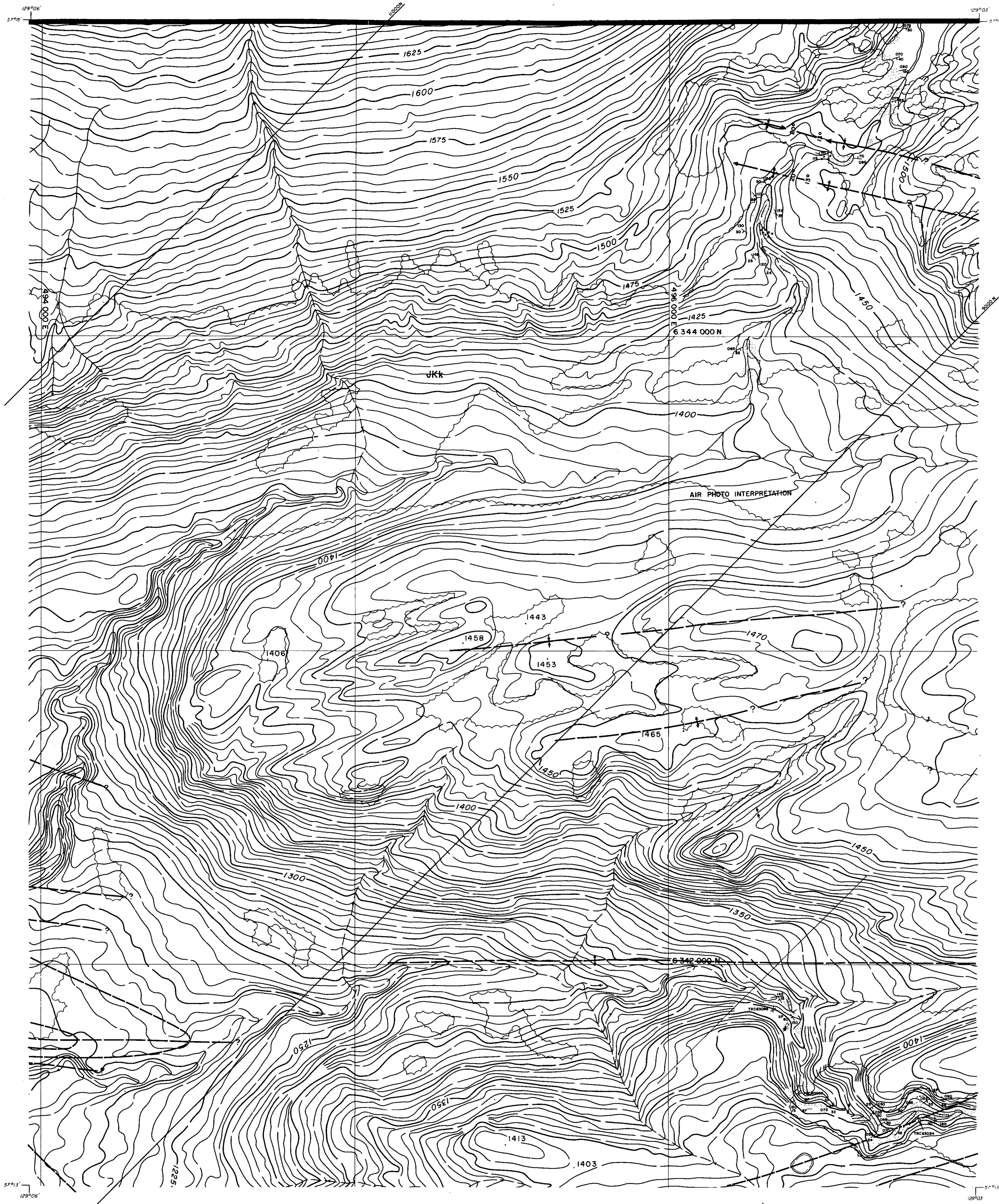
Ge. Mt. Klappan 83(2)11

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET I2
1983
GEOLOGY MAP**

PREPARED BY: K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPN83C45



LEGEND

BUILDING	---	---
ROAD, HARD SURFACE	---	---
LOOSE SURFACE	---	---
CART TRACK	---	---
TRAIL	---	---
RAILROAD BED	---	---
RIVER	---	---
STREAM, DEFINITE	---	---
APPROXIMATE	---	---
SPLIT	---	---
LAKE	---	---
WATER LEVEL	---	---
SWAMP	---	---
BEAVER DAM	---	---
TREE LINE	---	---
CUT LINE	---	---
CONTOURS, INDEX	---	---
INTERMEDIATE	---	---
DEPRESSION	---	---
APPROXIMATE	---	---
SPOT ELEVATION	---	---
FORM LINES	---	---
CUT/FILL	---	---
FIELD CONTROL POINT	---	---
COAL LICENCE	---	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

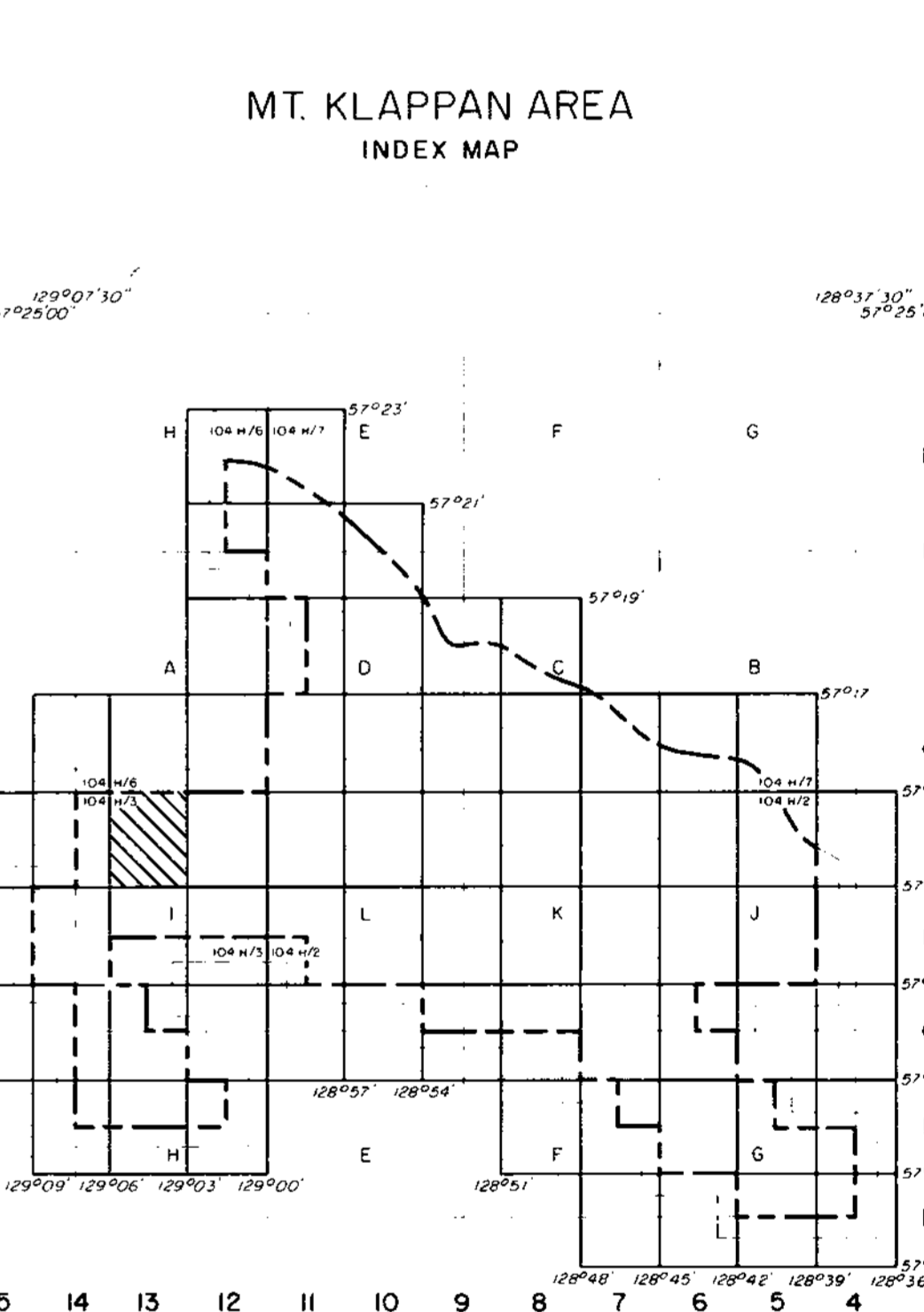
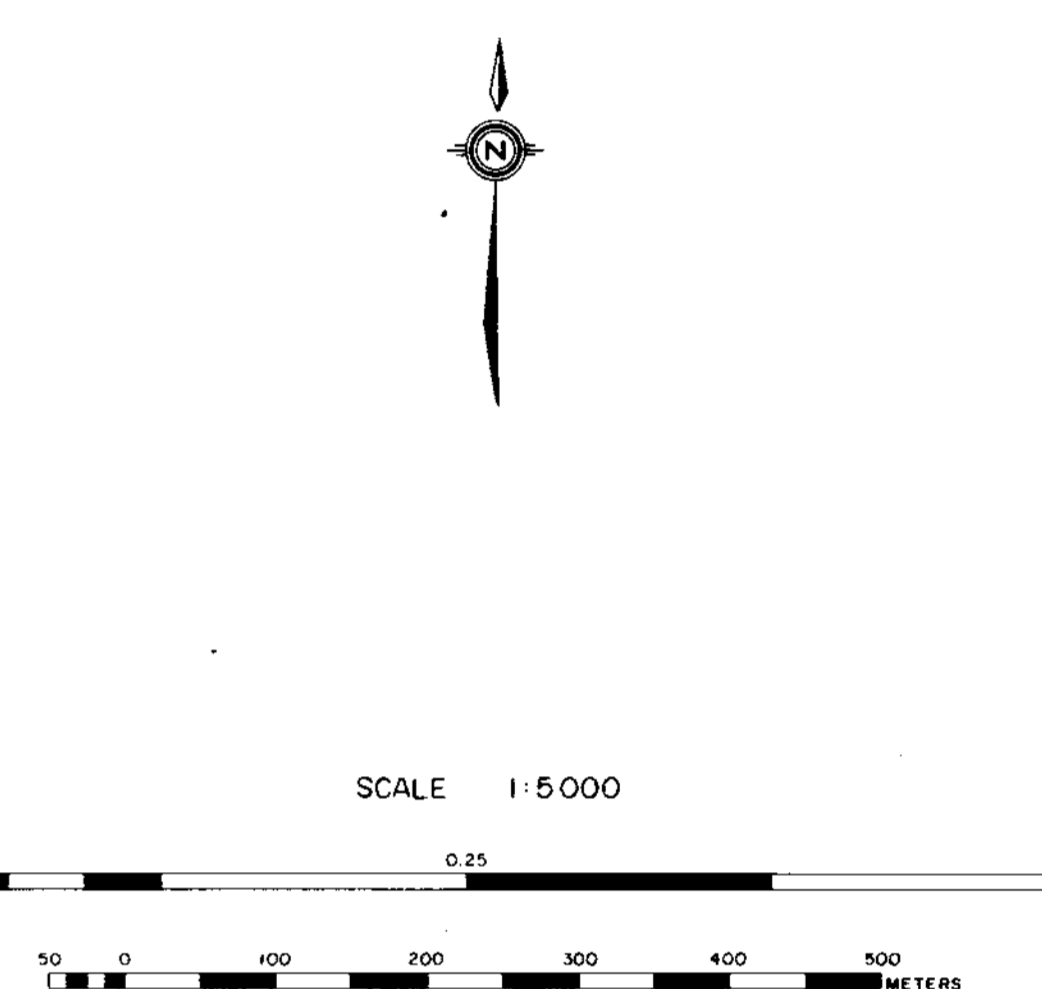
CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M. CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MULLER LTD. FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/82 AT A SCALE OF 1:60,000 (APPROXIMATE).



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 10 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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION
---	MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

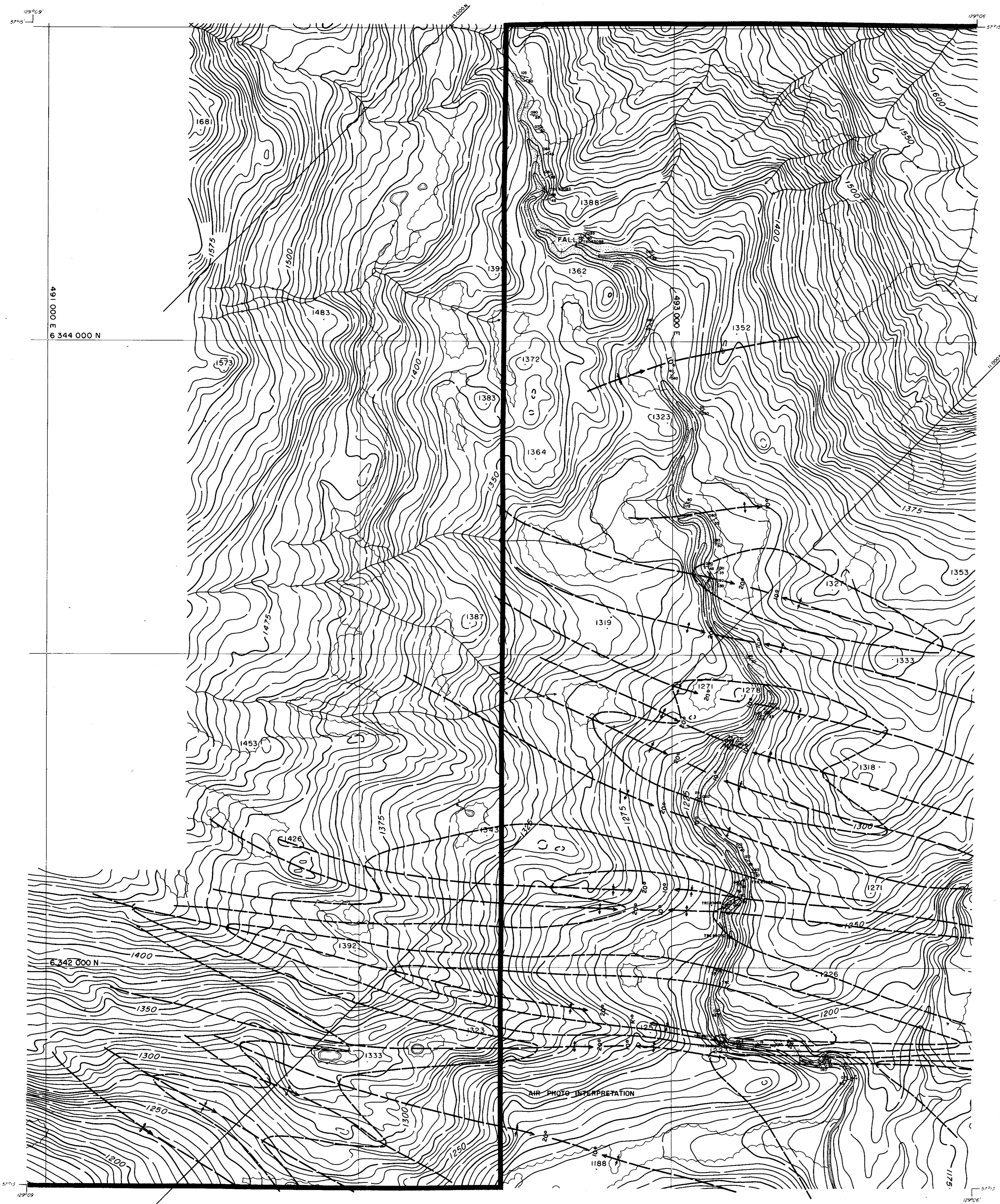
III

Gr. Mt. Klappan 8362A

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET 113
1983
GEOLOGY MAP

PREPARED BY: R.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C46



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

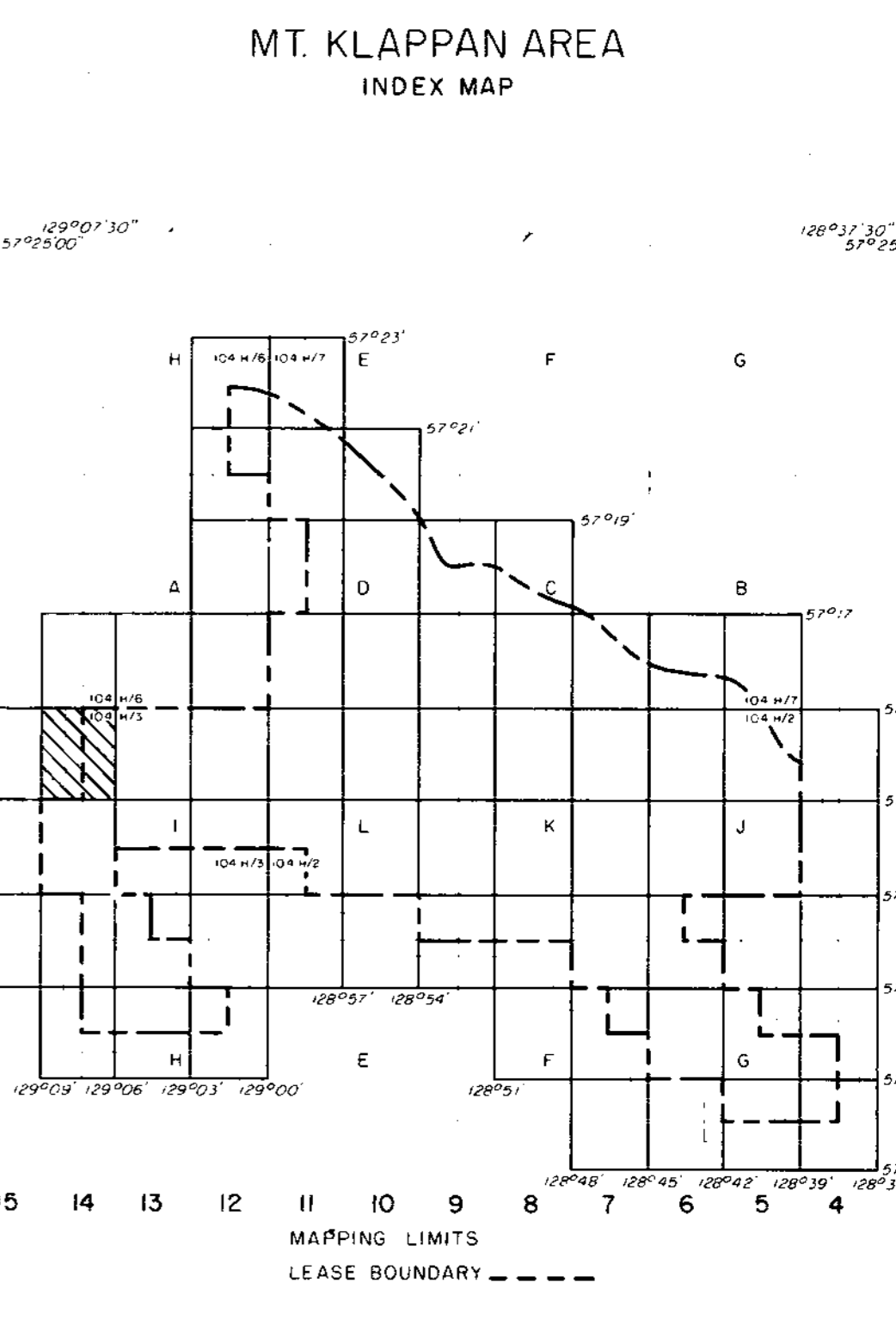
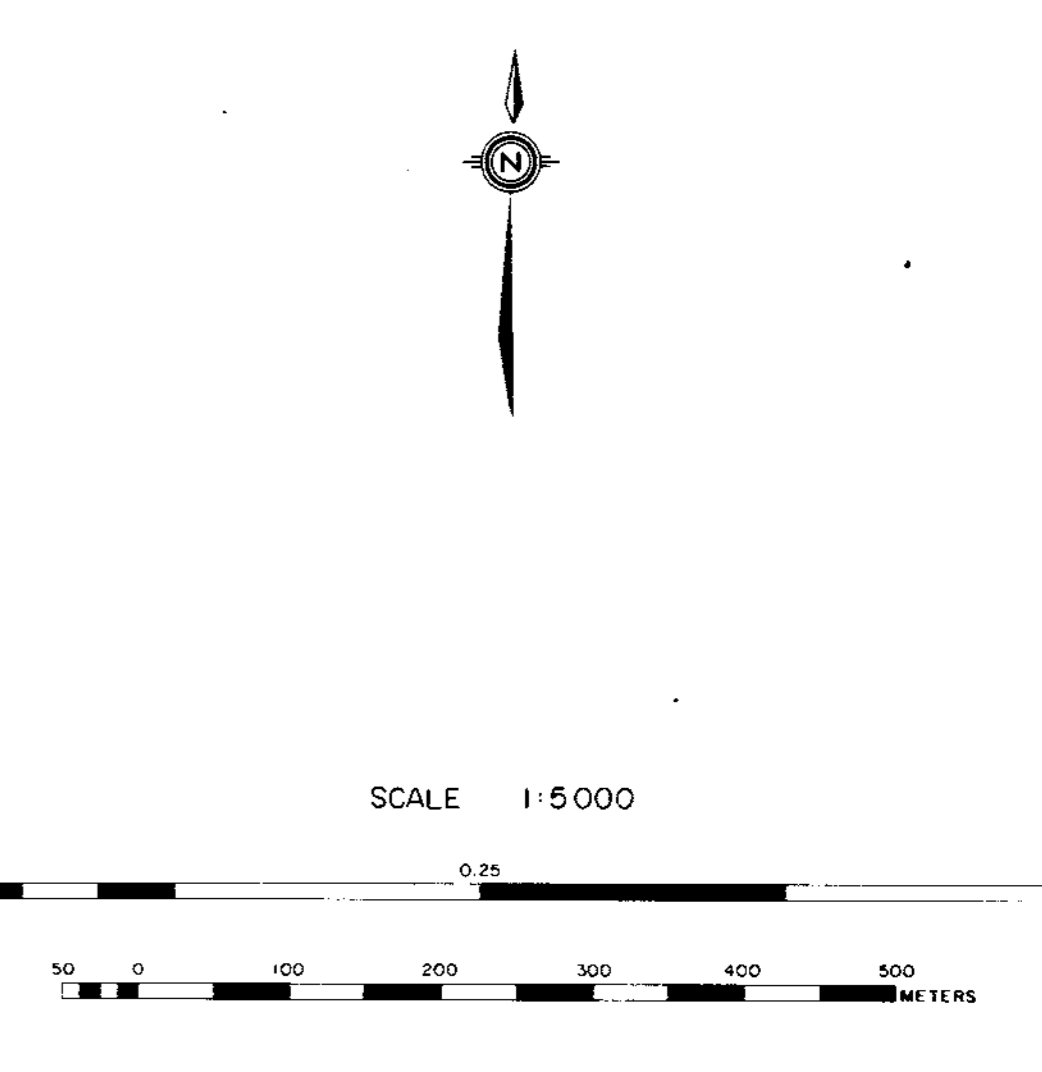
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE)



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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET I14
1983
GEOLOGY MAP

PREPARED BY: K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. 87N83C47

129°12' 57°15'

129°09' 57°15'

6 344 000 N

488 000 E
6 342 000 N

57°13' 129°12'

57°13' 129°09'

LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- STREAM, APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- WEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

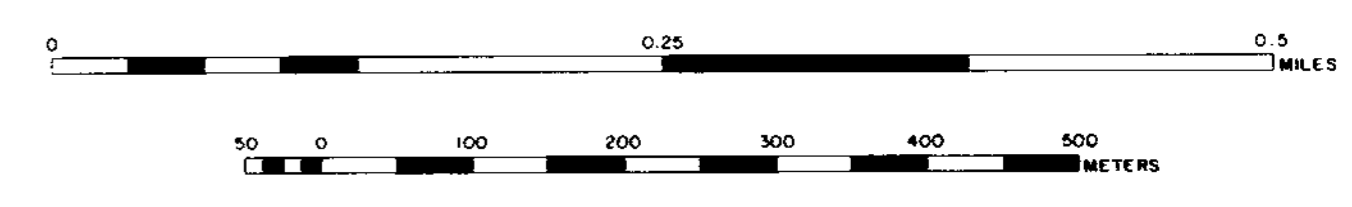
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

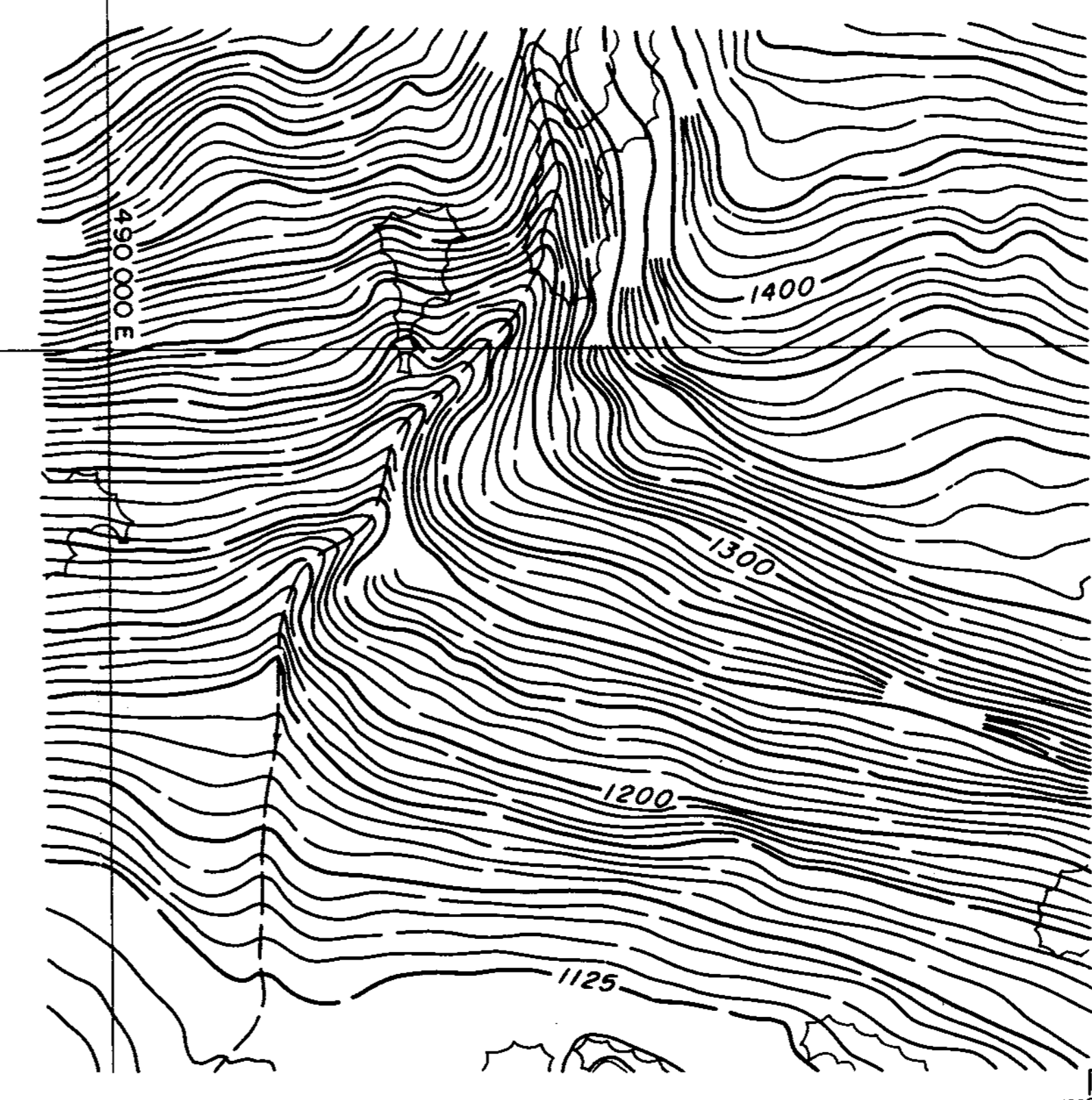
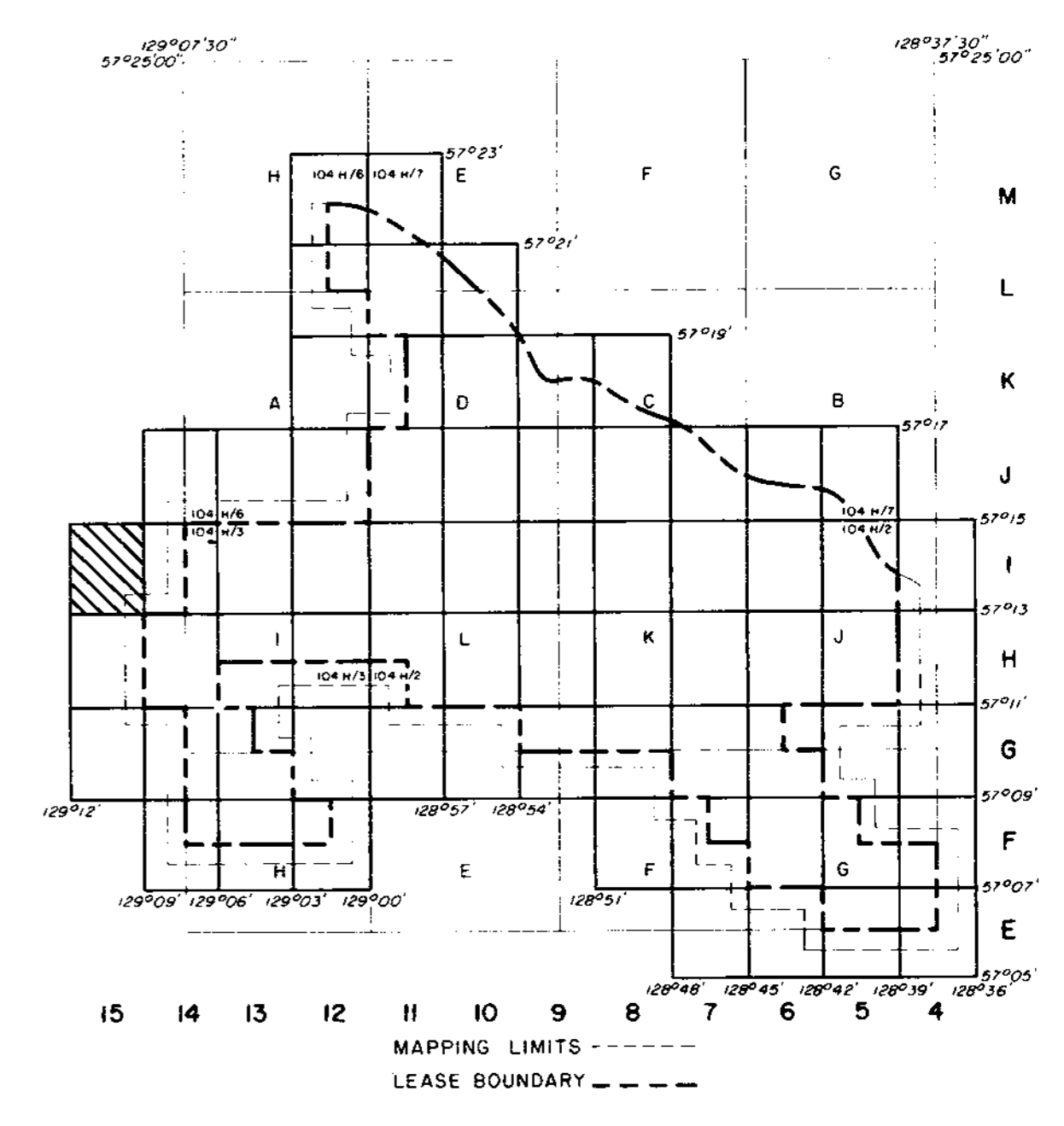
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/82 AT A SCALE OF 1:60,000 (APPROXIMATE)



SCALE 1:5 000



MT. KLAPPAN AREA INDEX MAP



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 DOWN THRUST SIDE
- ADIT
- TRENCH LOCATION
- MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83/2a

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET J15
1983
GEOLOGY MAP

PREPARED BY: K.J. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPW83C48

128°42' 57°17'

128°39' 57°17'

LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

6 348 000 N

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

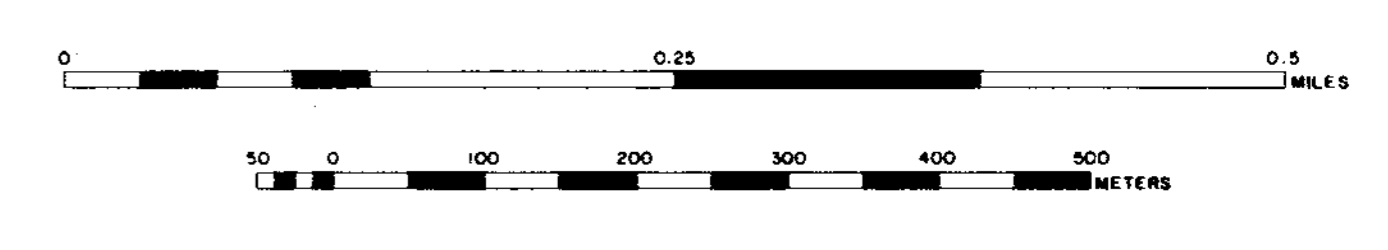
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

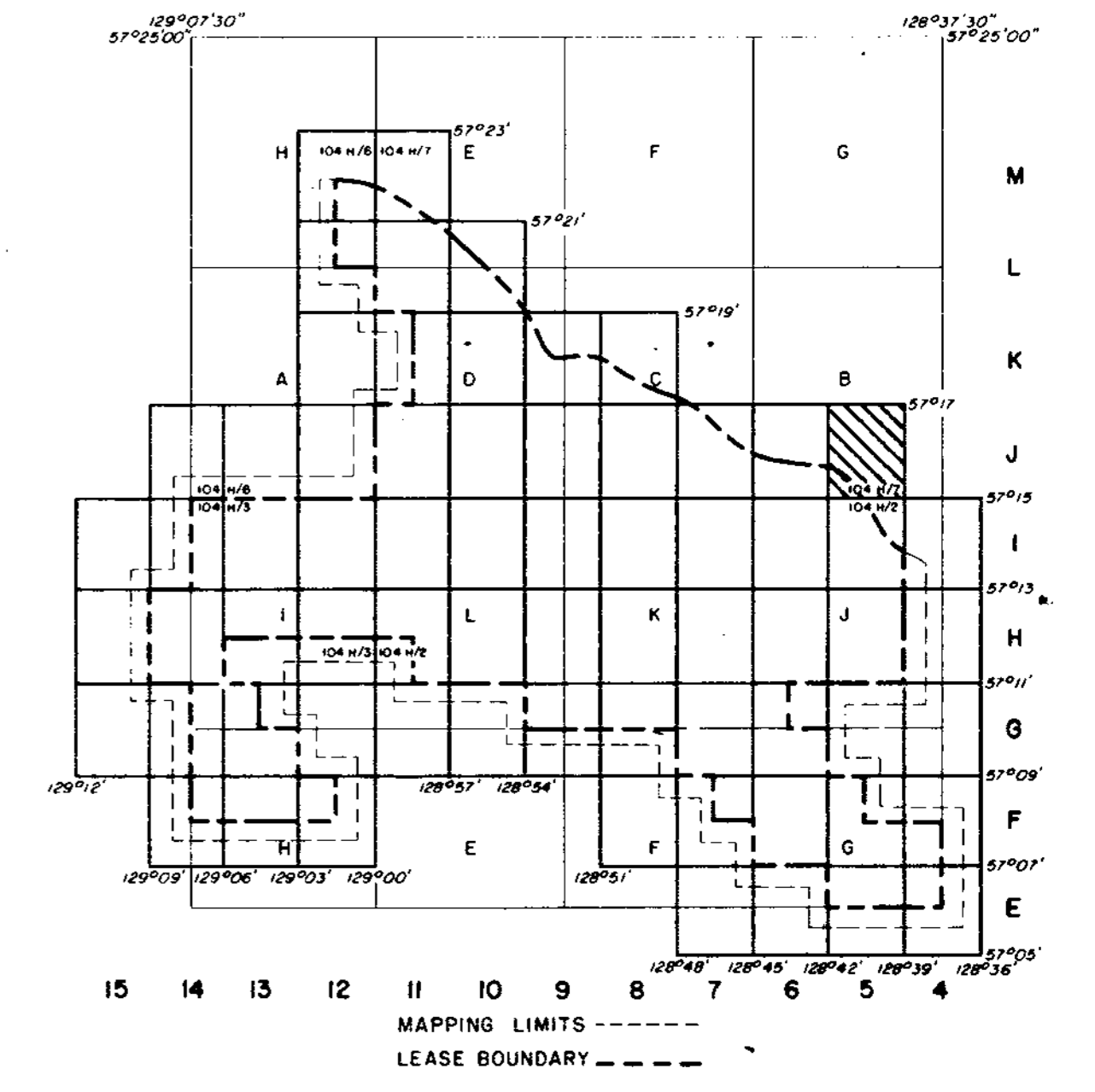
COMPILED BY: WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000

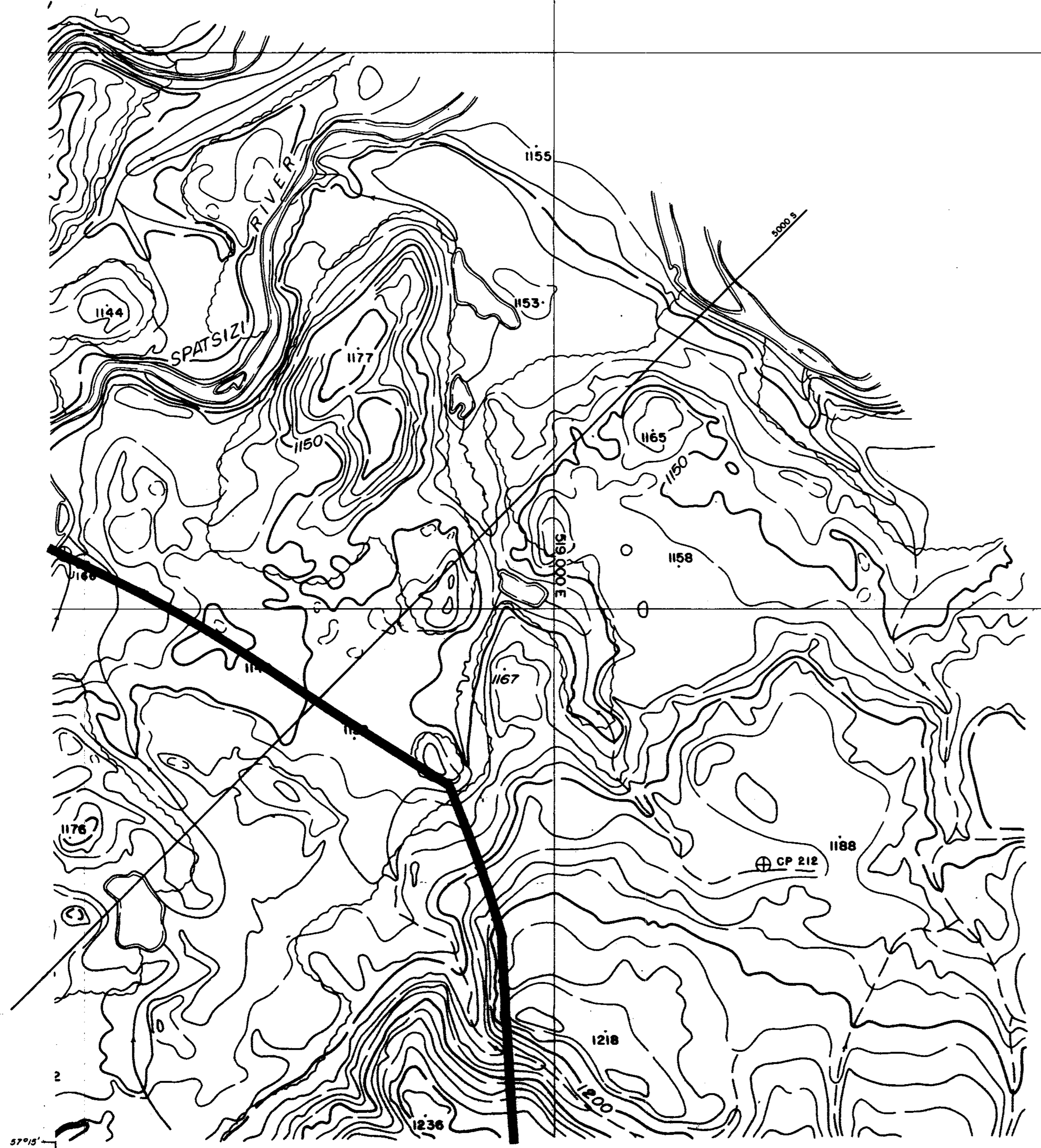


MT. KLAPPAN AREA INDEX MAP



521 000 E

6 346 000 N



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 DOWNTHRUST SIDE
- ADIT TRENCH LOCATION
- MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

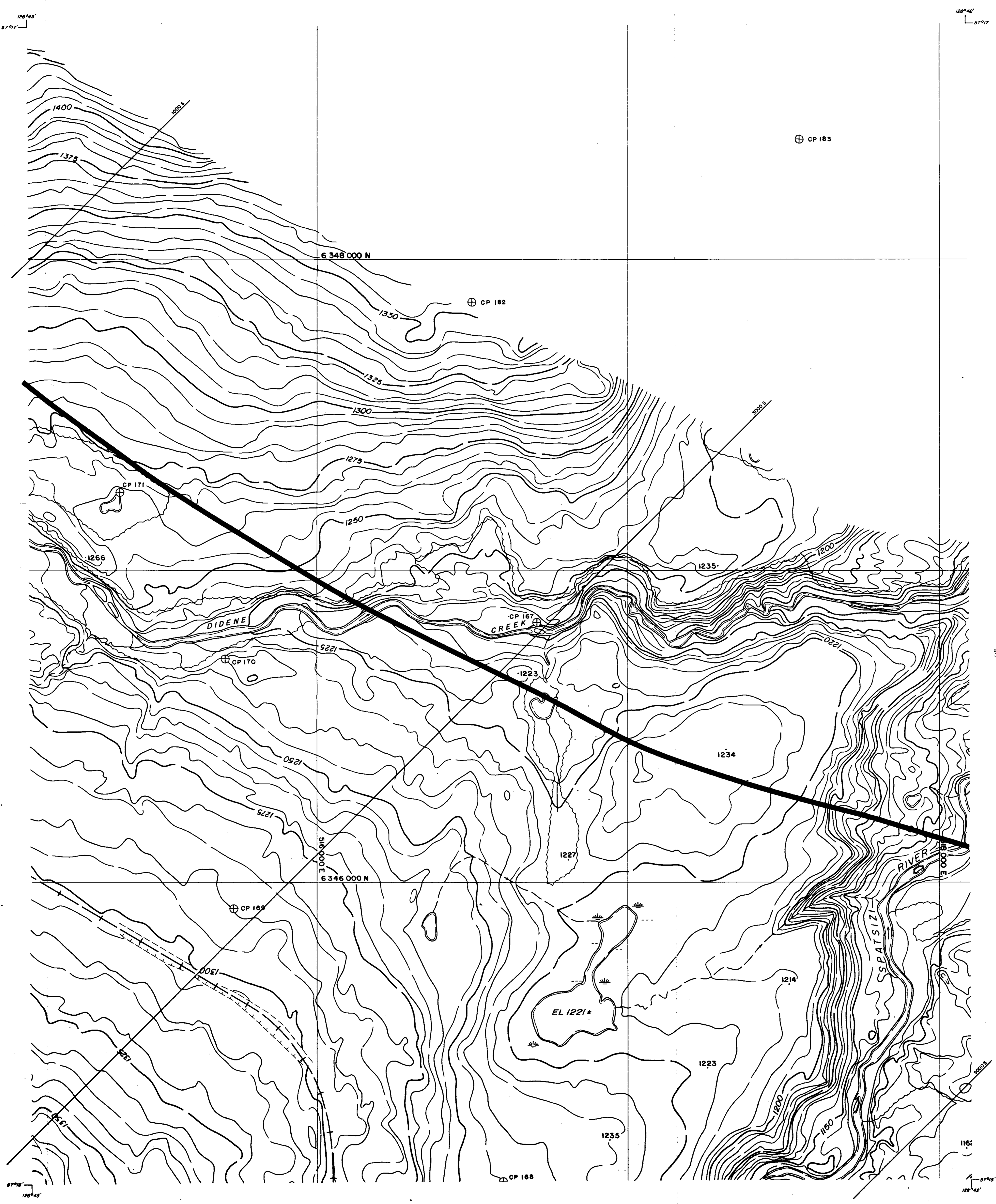
111

Gr. Mt. Klappan 83(2)

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET J5
1983
GEOLOGY MAP

PREPARED BY: C. WILLIAMS DATE: JAN, 1984 SCALE: 1:5000
DRAWING NO. KPN83C49



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CARE TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

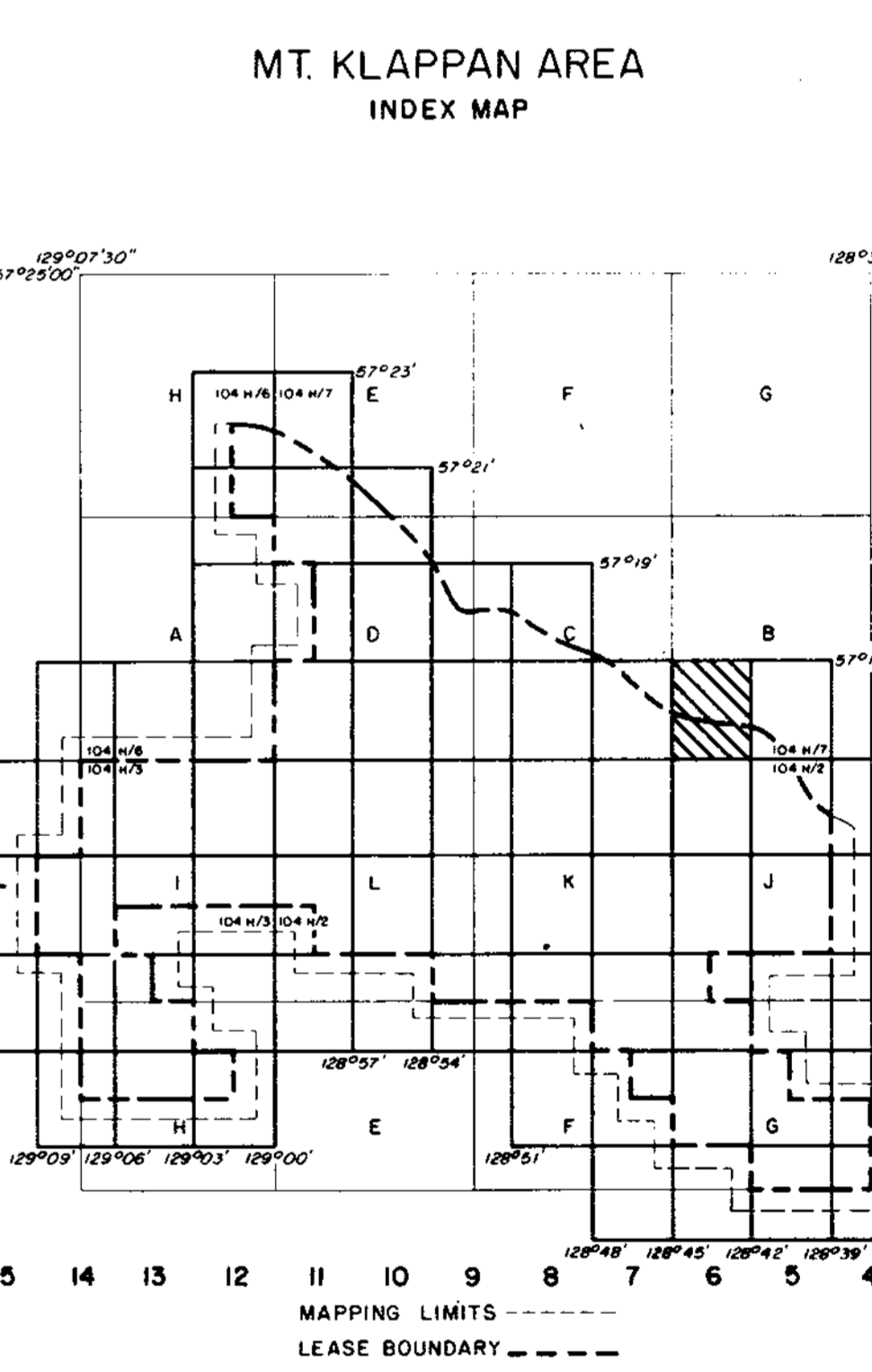
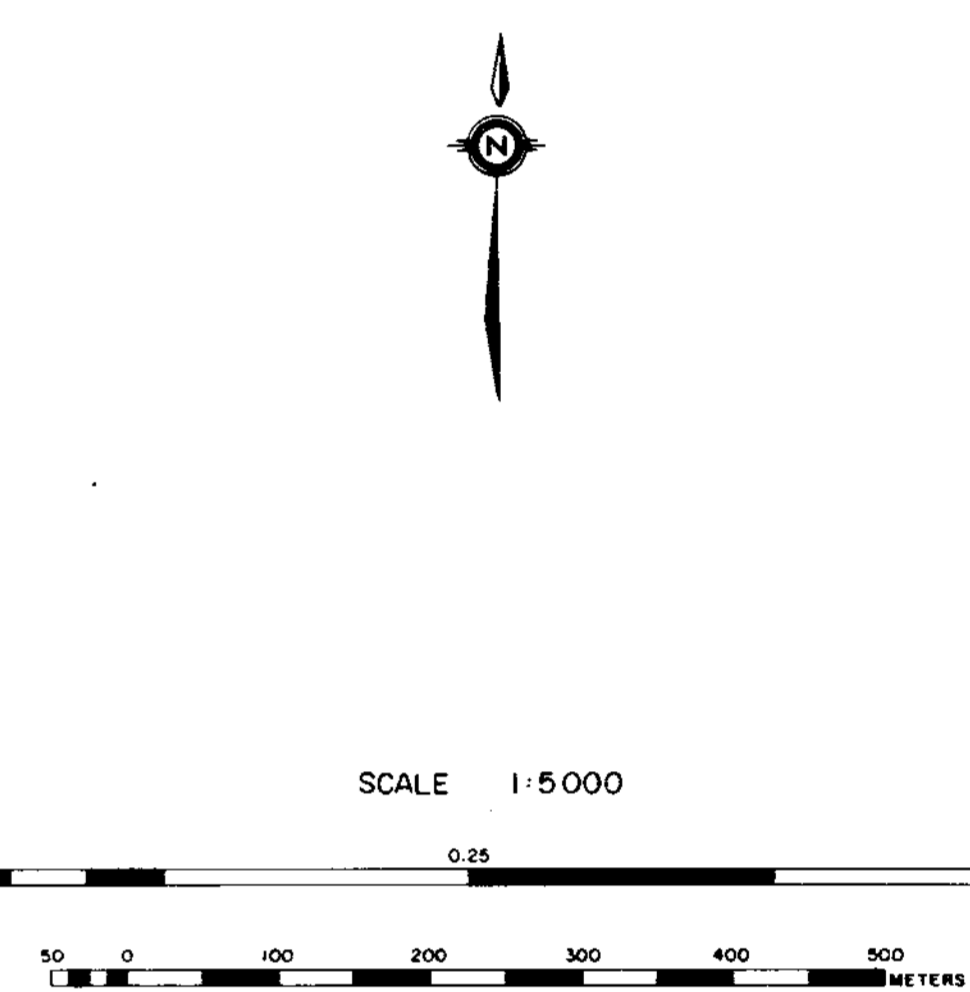
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



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.

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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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

GR - MT. KLAPPAN 88/2/A

GULF CANADA RESOURCES INC.

Calgary Coal Division ALBERTA

MT. KLAPPAN COAL PROPERTY

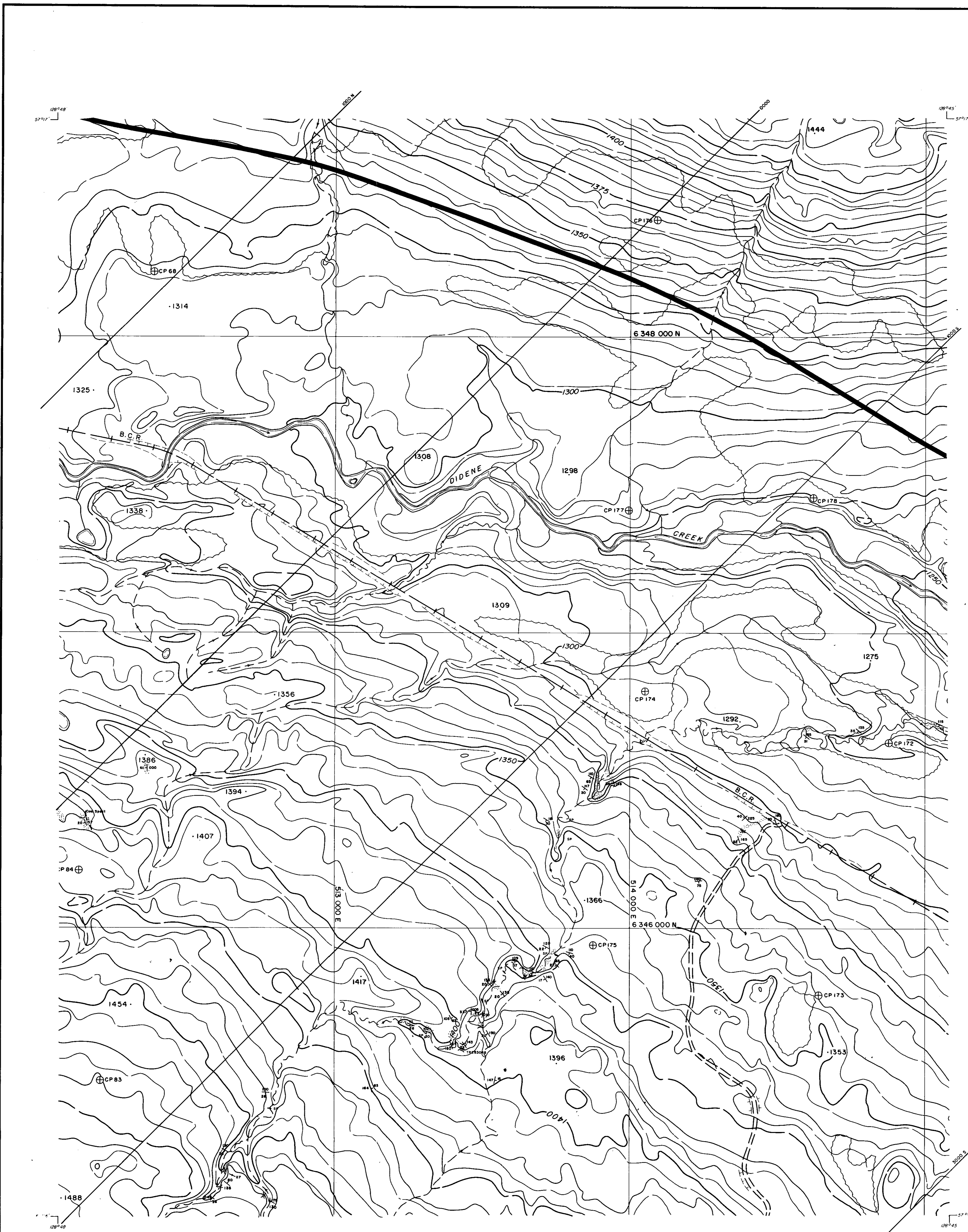
MAP SHEET J6

1983

GEOLOGY MAP

PREPARED BY: C. WILLIAMS SCALE 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPNB350



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
LOOSE SURFACE	[Symbol]
CAIRN TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
BEAVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:40,000 NEGATIVES.

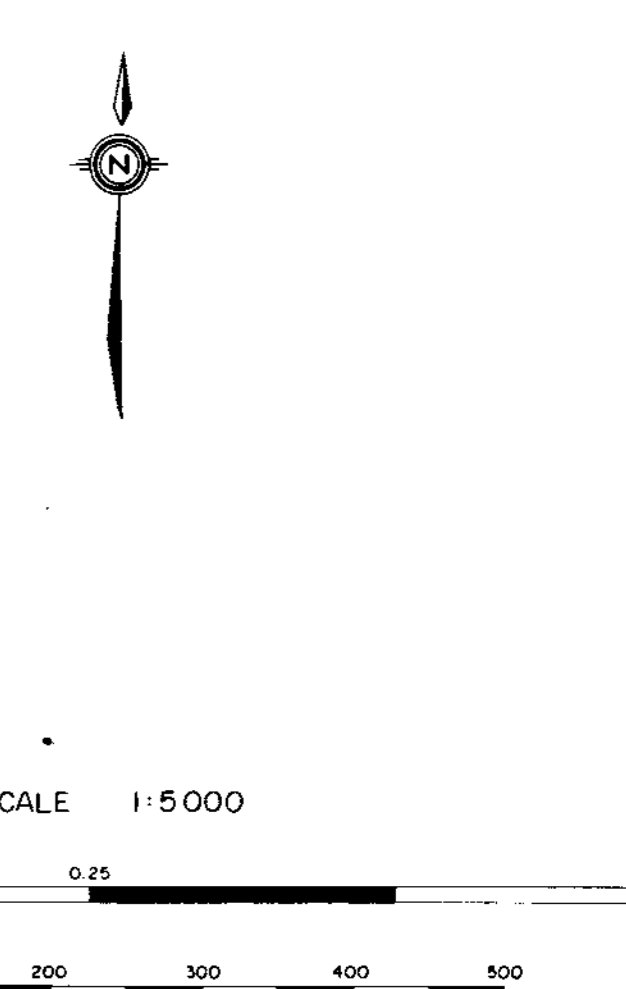
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS +5.0 METERS FOR GROUND NOT OCCUPIED BY TREES OR VEGETATION.

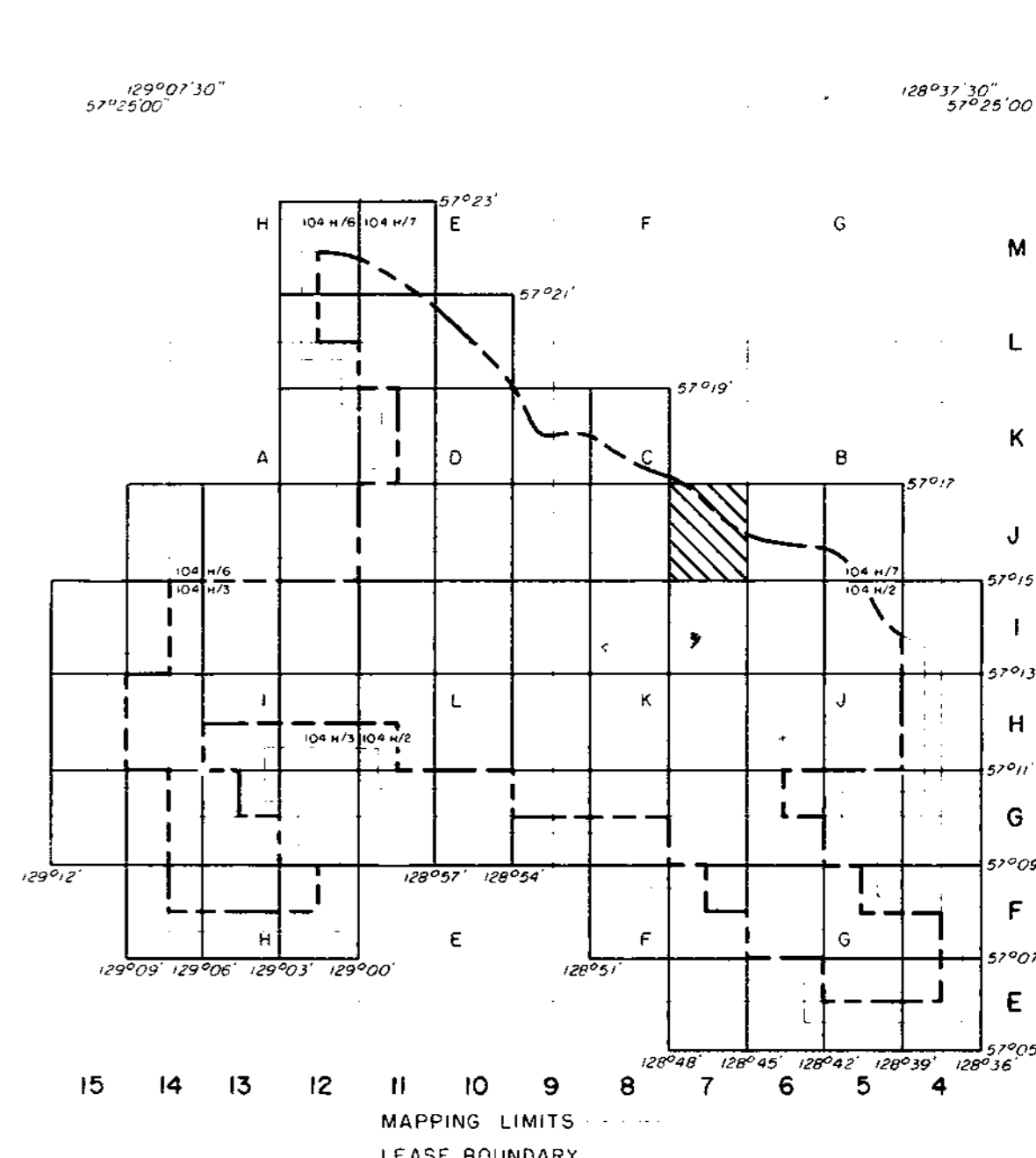
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MARKS. MARKING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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

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

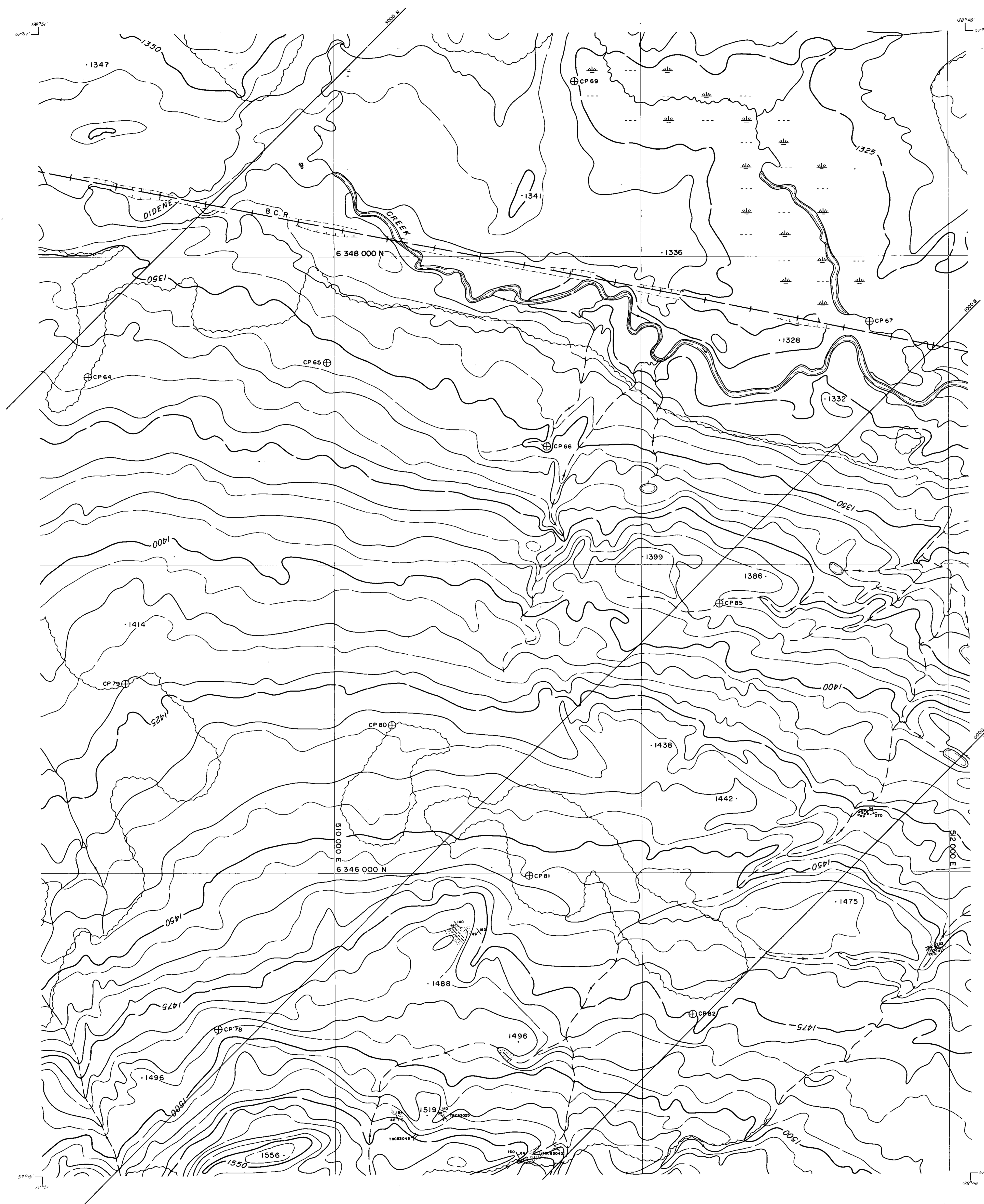
111

GR - MT. KLAPPAN 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET J7
1983
GEOLOGY MAP

PREPARED BY: G.S. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1983 DRAWING NO. KPB3C5H



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE DEPRESSION	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

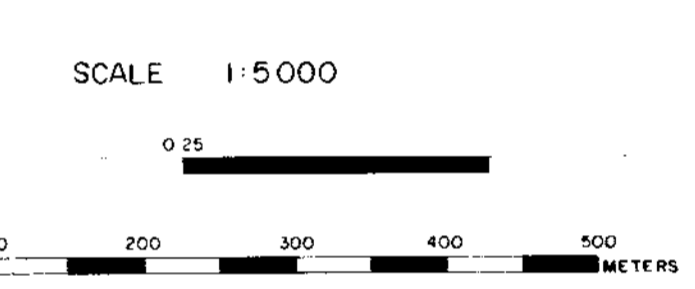
CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 15.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

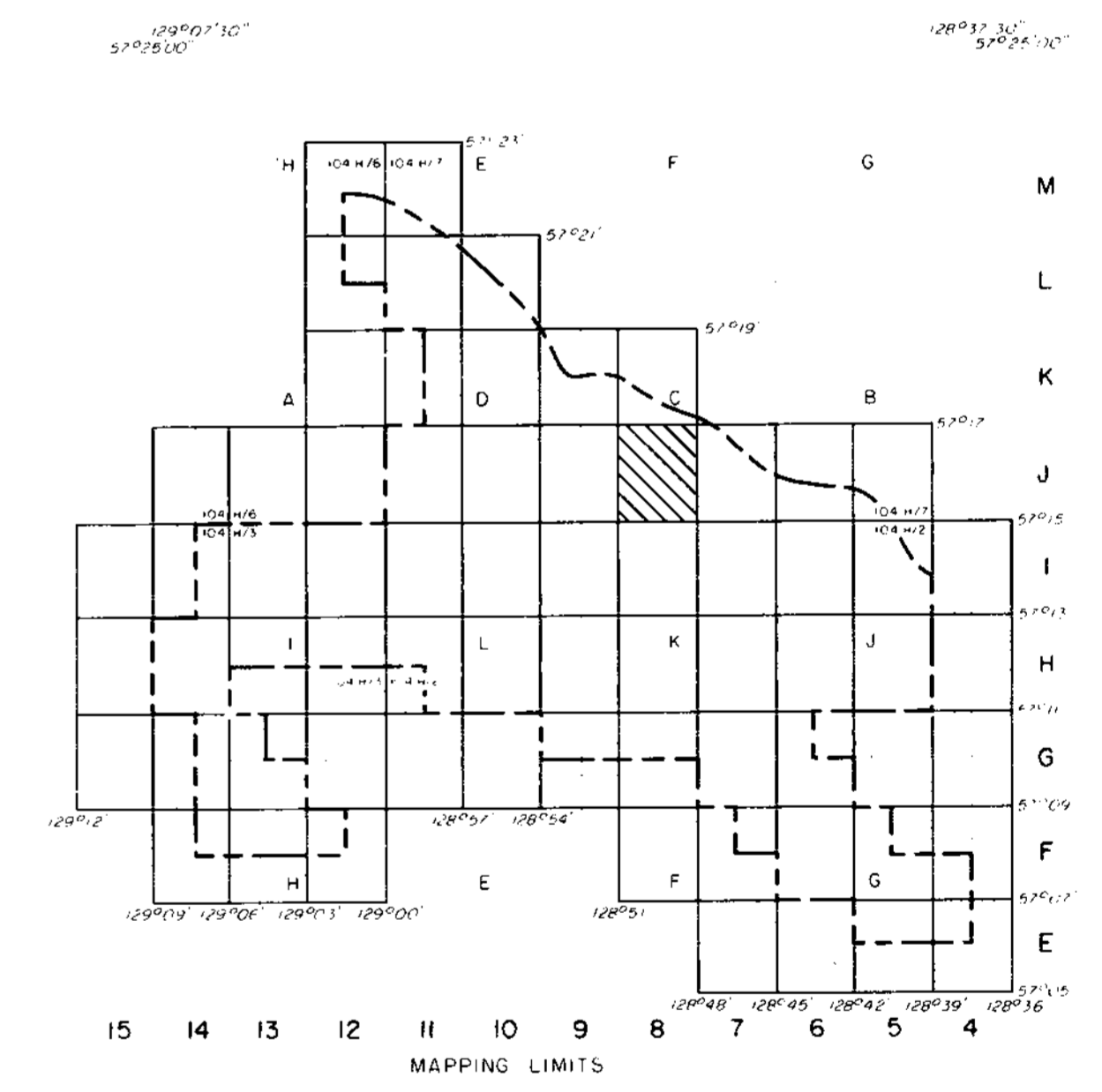
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/76 AT A SCALE OF 1:60,000 (APPROXIMATE)



MT. KLAPPAN AREA INDEX MAP



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 through 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)

Ge - Mt. Klappan 93(2A)

GULF CANADA RESOURCES INC.

Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

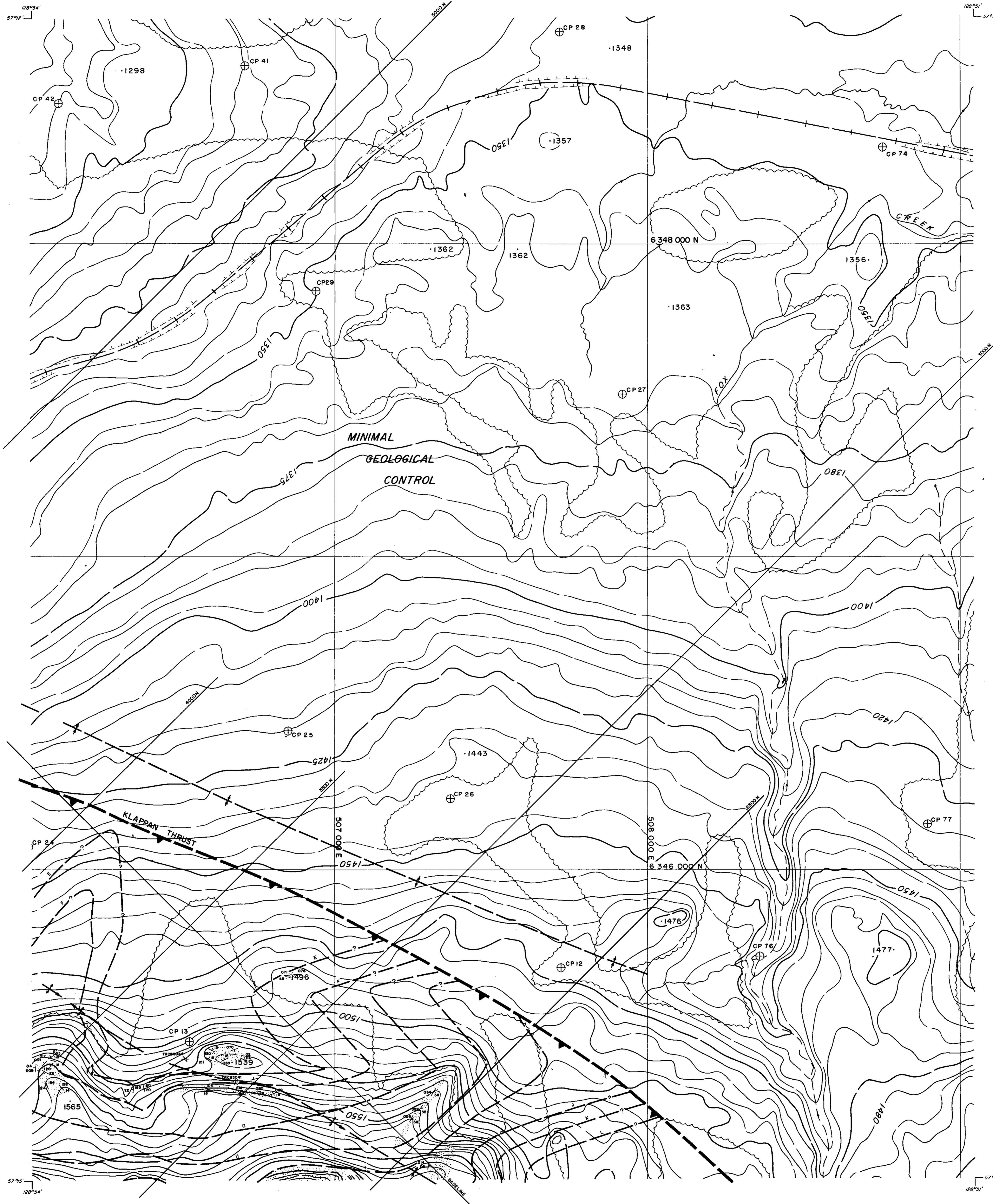
MAP SHEET J8

1983

GEOLOGY MAP

PREPARED BY: S.M. SCALE 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPM35C2



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

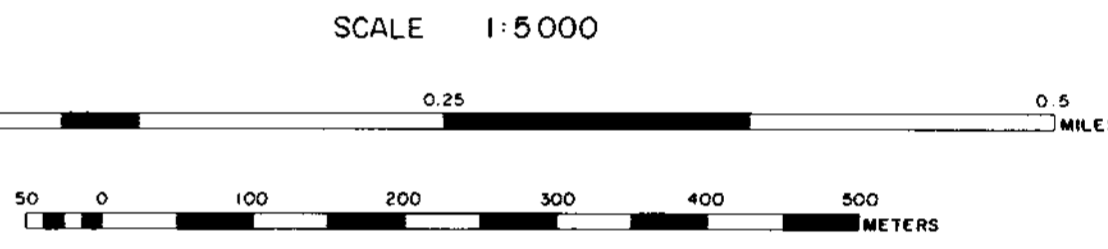
CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OBSERVED BY TREES OR VEGETATION.

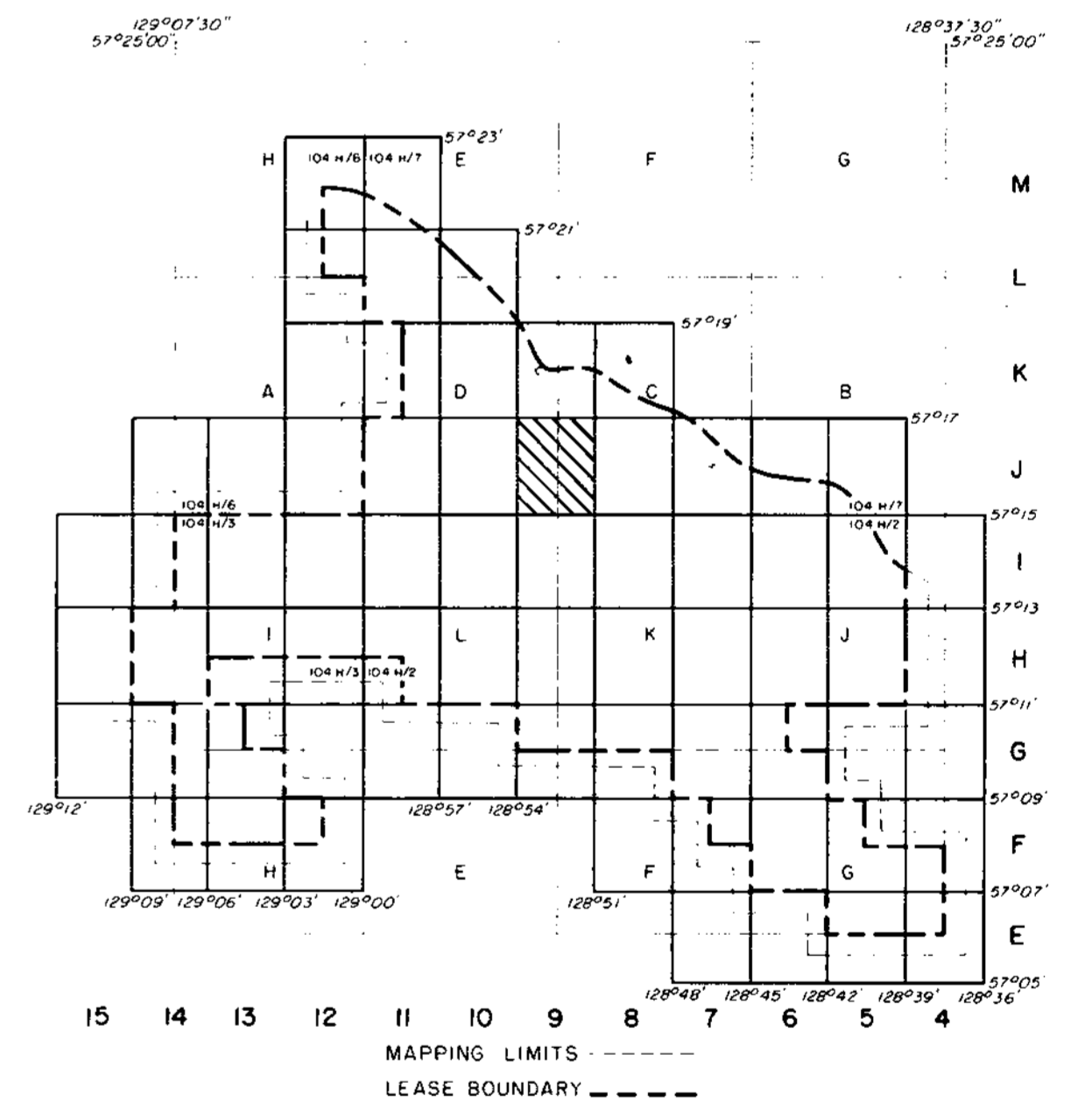
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



- 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

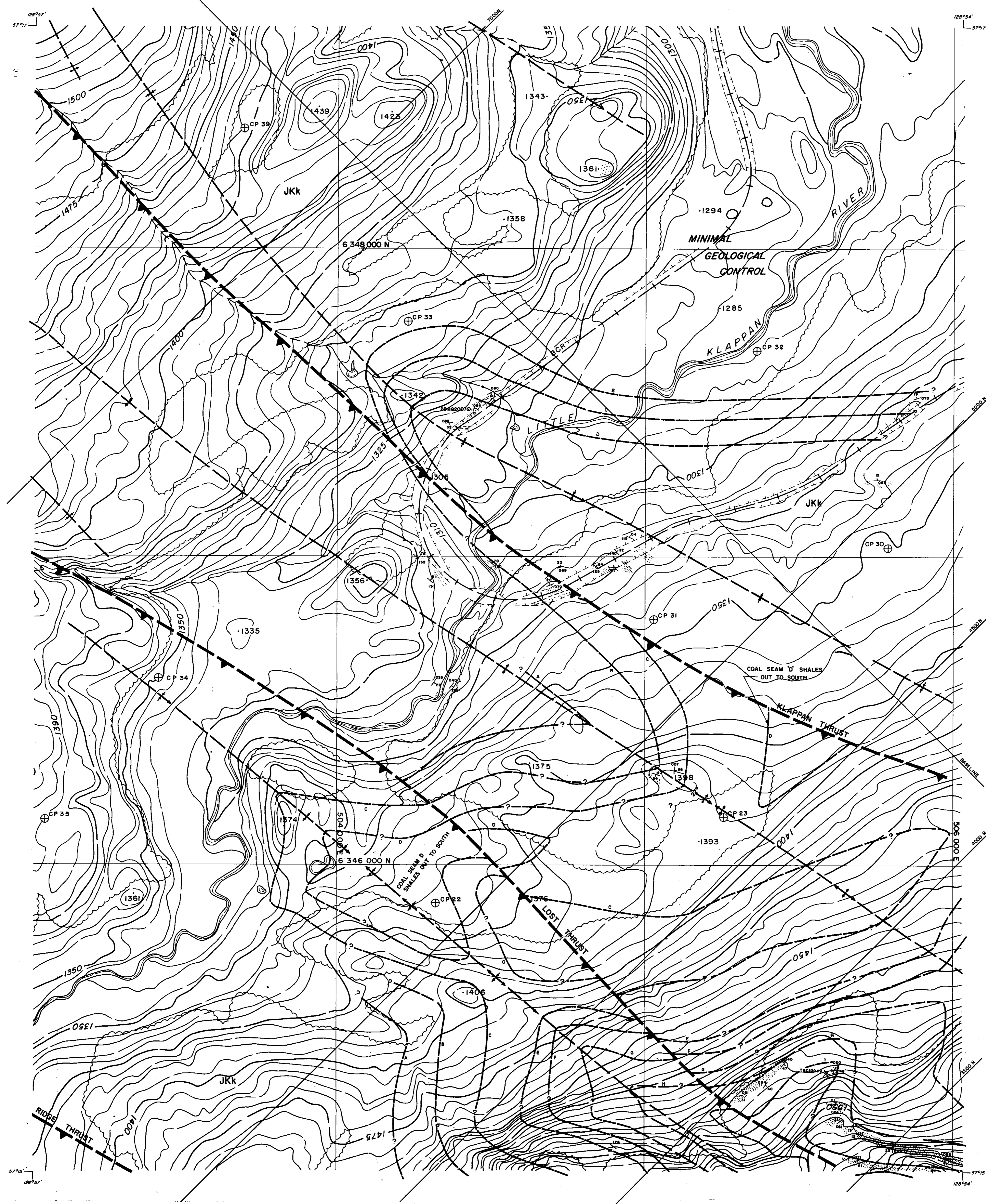
---	LICENCE BOUNDARY
---	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
---	COAL SEAM (OUTCROP, INFERRED)
---	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
---	OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
---	MONOCLINE - ARROW INDICATES DIP DIRECTION
---	BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL)
---	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UPTHROW 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)

PREPARED BY: C.W.S.M. SCALE 1:5,000

APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KP83CS3

MT. KLAPPAN COAL PROPERTY
MAP SHEET J9
1983
GEOLOGY MAP

GULF CANADA RESOURCES INC.
CALGARY ALBERTA



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL - 10 M., WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

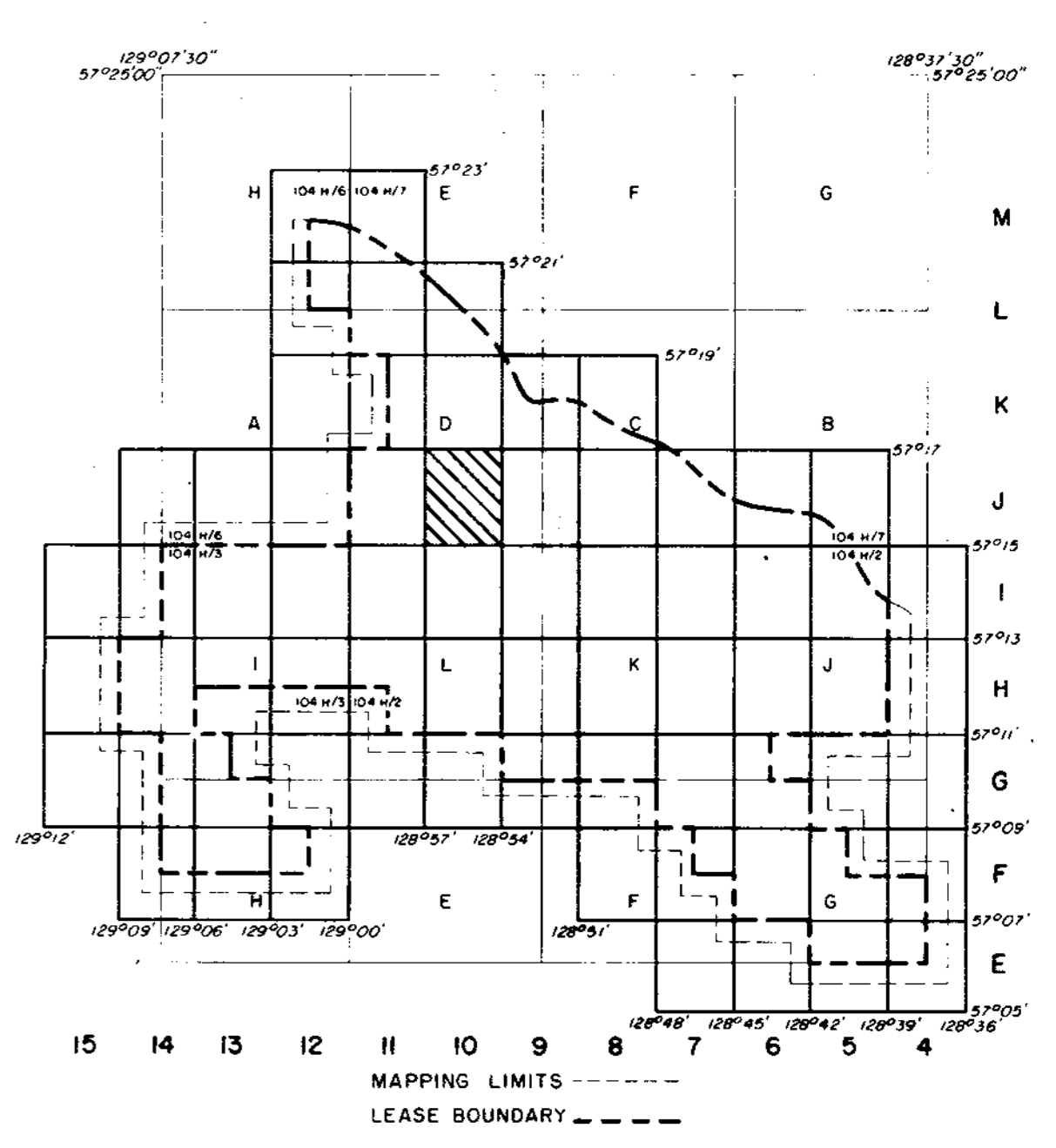
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



MT. KLAPPAN AREA INDEX MAP



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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 83/20

GULF CANADA RESOURCES INC.

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

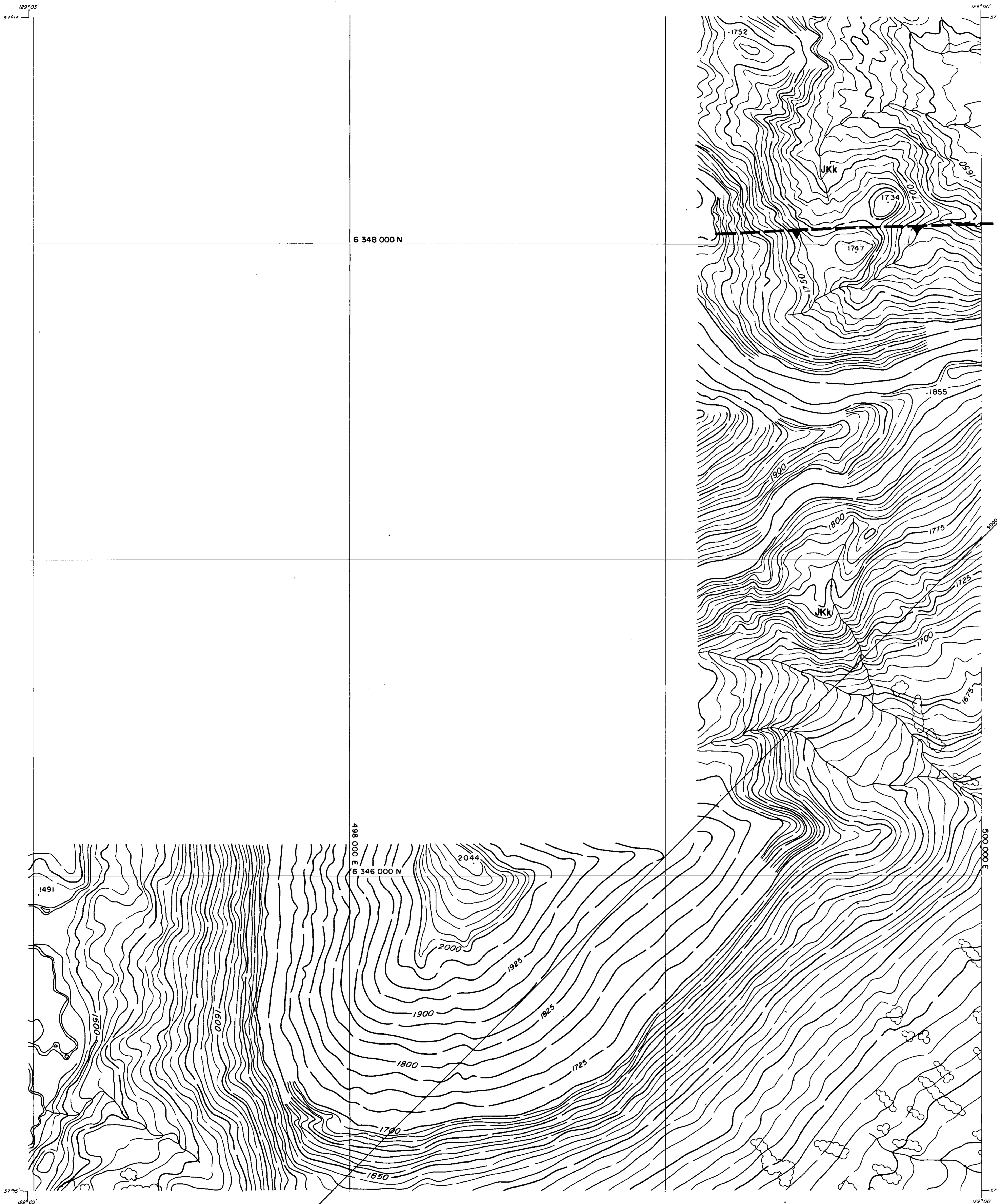
MAP SHEET J10

1983

GEOLOGY MAP

PREPARED BY: C.W. S.M. SCALE 1:5000

APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPN83254



LEGEND

BUILDING	[Symbol]
ROAD, HARD SURFACE	[Symbol]
LOOSE SURFACE	[Symbol]
CART TRACK	[Symbol]
TRAIL	[Symbol]
RAILROAD BED	[Symbol]
RIVER	[Symbol]
STREAM, DEFINITE	[Symbol]
APPROXIMATE	[Symbol]
SPLIT	[Symbol]
LAKE	[Symbol]
WATER LEVEL	[Symbol]
SWAMP	[Symbol]
REVER DAM	[Symbol]
TREE LINE	[Symbol]
CUT LINE	[Symbol]
CONTOURS, INDEX	[Symbol]
INTERMEDIATE	[Symbol]
DEPRESSION	[Symbol]
APPROXIMATE	[Symbol]
SPOT ELEVATION	[Symbol]
FORM LINES	[Symbol]
CUT/FILL	[Symbol]
FIELD CONTROL POINT	[Symbol]
COAL LICENCE	[Symbol]

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

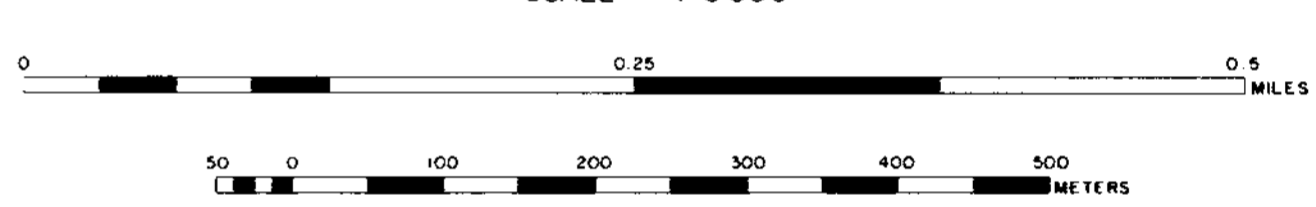
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

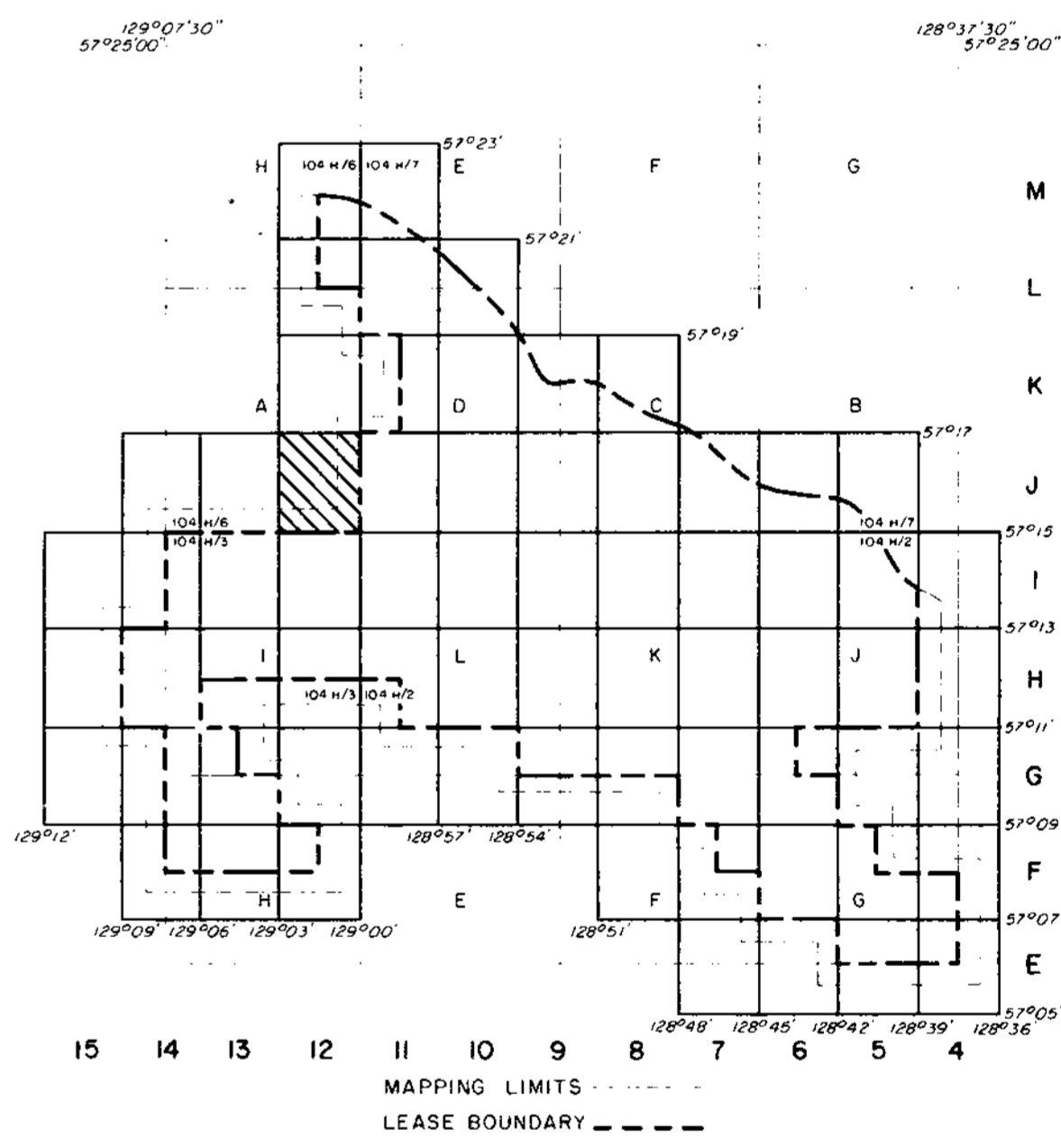
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



- 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

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

111

GR. MT. KLAPPAN 83(2)

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET J12
1983
GEOLOGY MAP

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C56

LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL = 10 M, WITH FORM LINES INTERVAL = 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 15.0 METERS FOR GROUND NOT OBSERVED BY TREES OR VEGETATION.

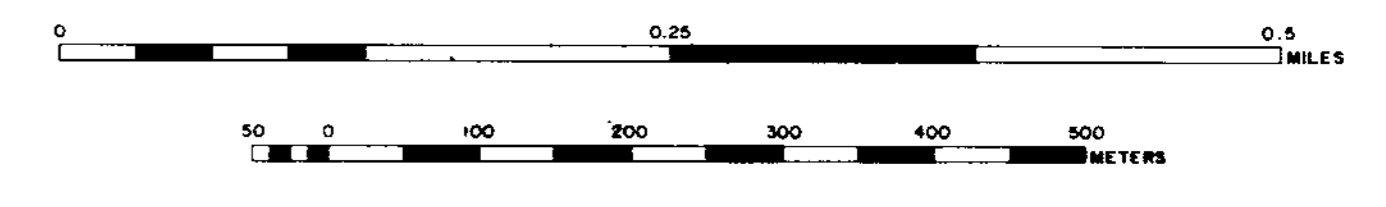
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY.

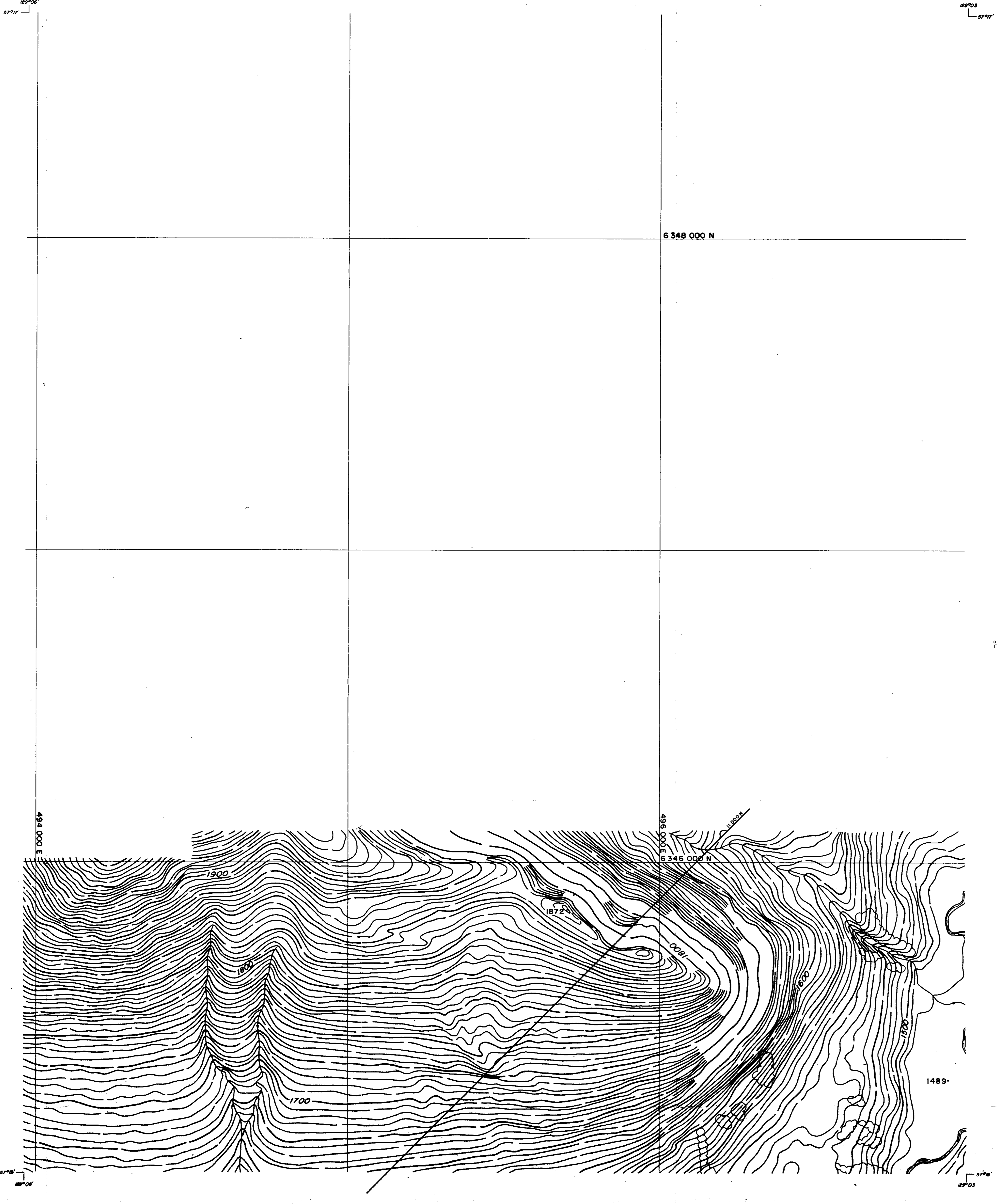
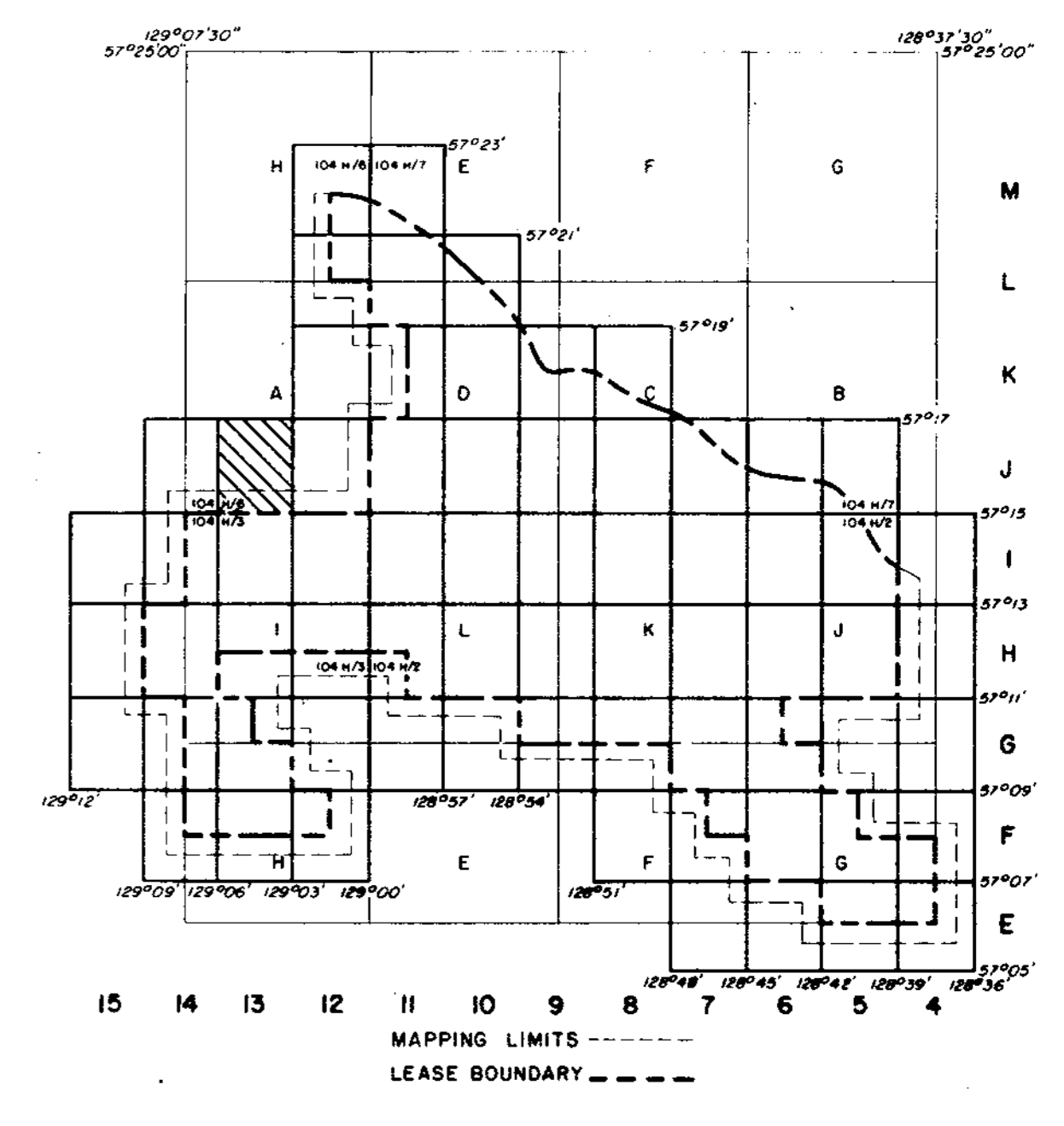
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA
INDEX MAP



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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

GR. MT. KLAPPAN 8(a)

GULF CANADA RESOURCES INC.
Calgary Coal Division ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET JKk
1983
GEOLOGY MAP**

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KPN83C57

LEGEND

BUILDING	---	□
ROAD, HARD SURFACE	---	▬
LOOSE SURFACE	---	▬
CART TRACK	---	▬
TRAIL	---	▬
RAILROAD BED	---	▬
RIVER	---	▬
STREAM, DEFINITE	---	▬
APPROXIMATE	---	▬
SPLIT	---	▬
LAKE	---	▬
WATER LEVEL	---	▬
SWAMP	---	▬
BEAVER DAM	---	▬
TREE LINE	---	▬
CUT LINE	---	▬
CONTOURS, INDEX	---	▬
INTERMEDIATE	---	▬
DEPRESSION	---	▬
APPROXIMATE	---	▬
SPOT ELEVATION	---	▬
FORM LINES	---	▬
CUT/FILL	---	▬
FIELD CONTROL POINT	---	▬
COAL LICENCE	---	▬

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL - 10 M., WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

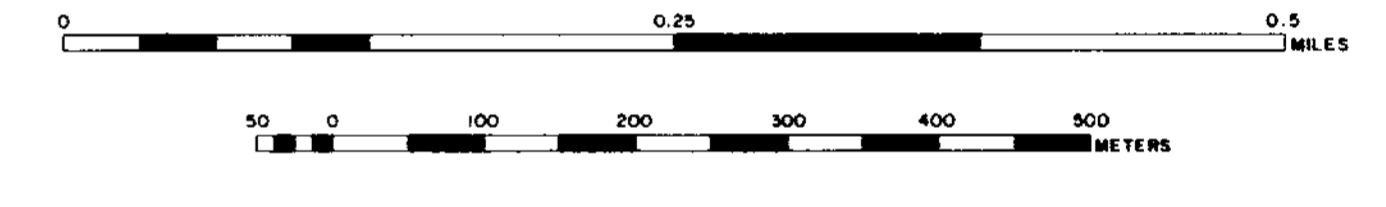
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

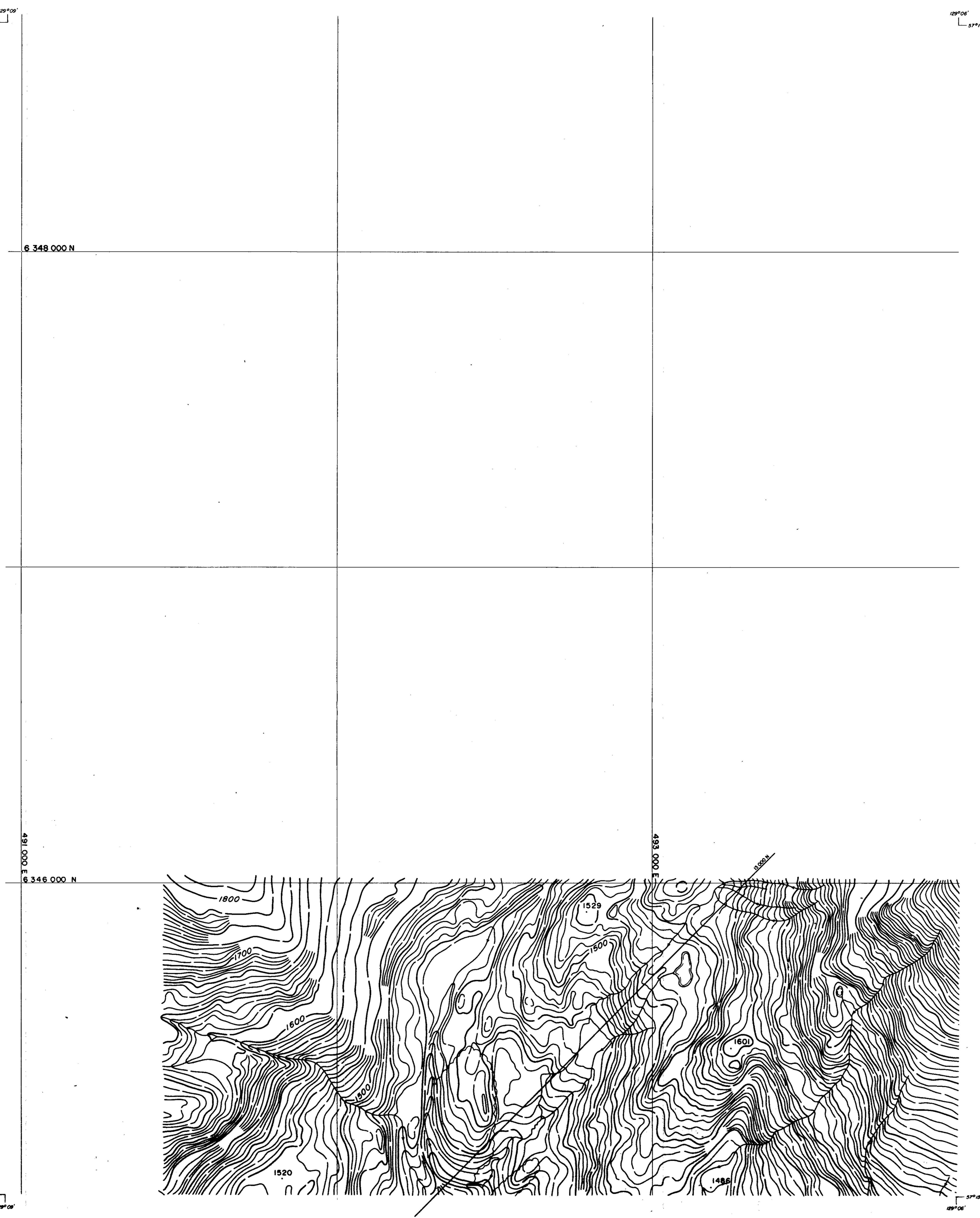
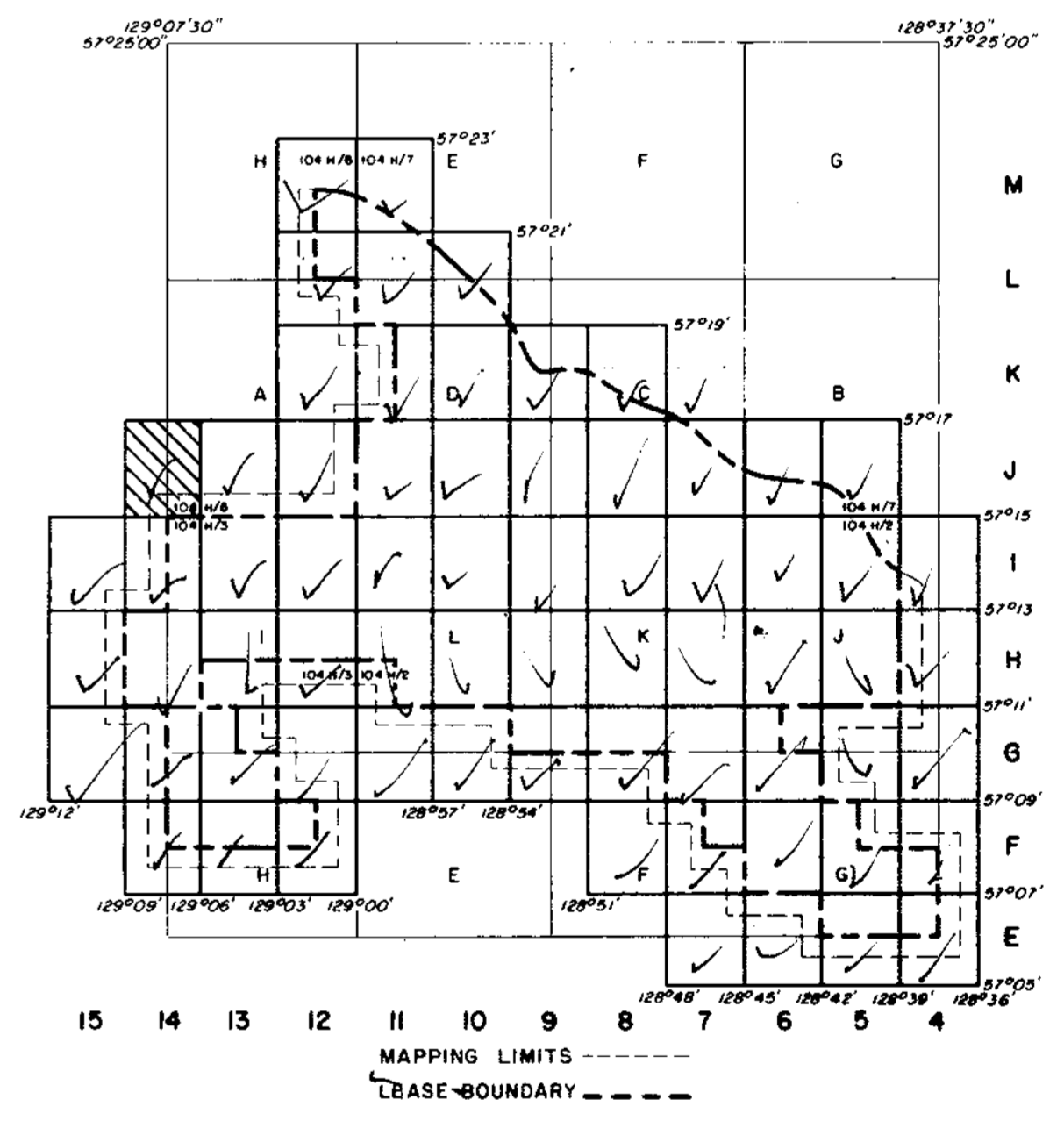
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5,000



MT. KLAPPAN AREA
INDEX MAP



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

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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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

III

Gr. - Mt. Klappan 83(2)A

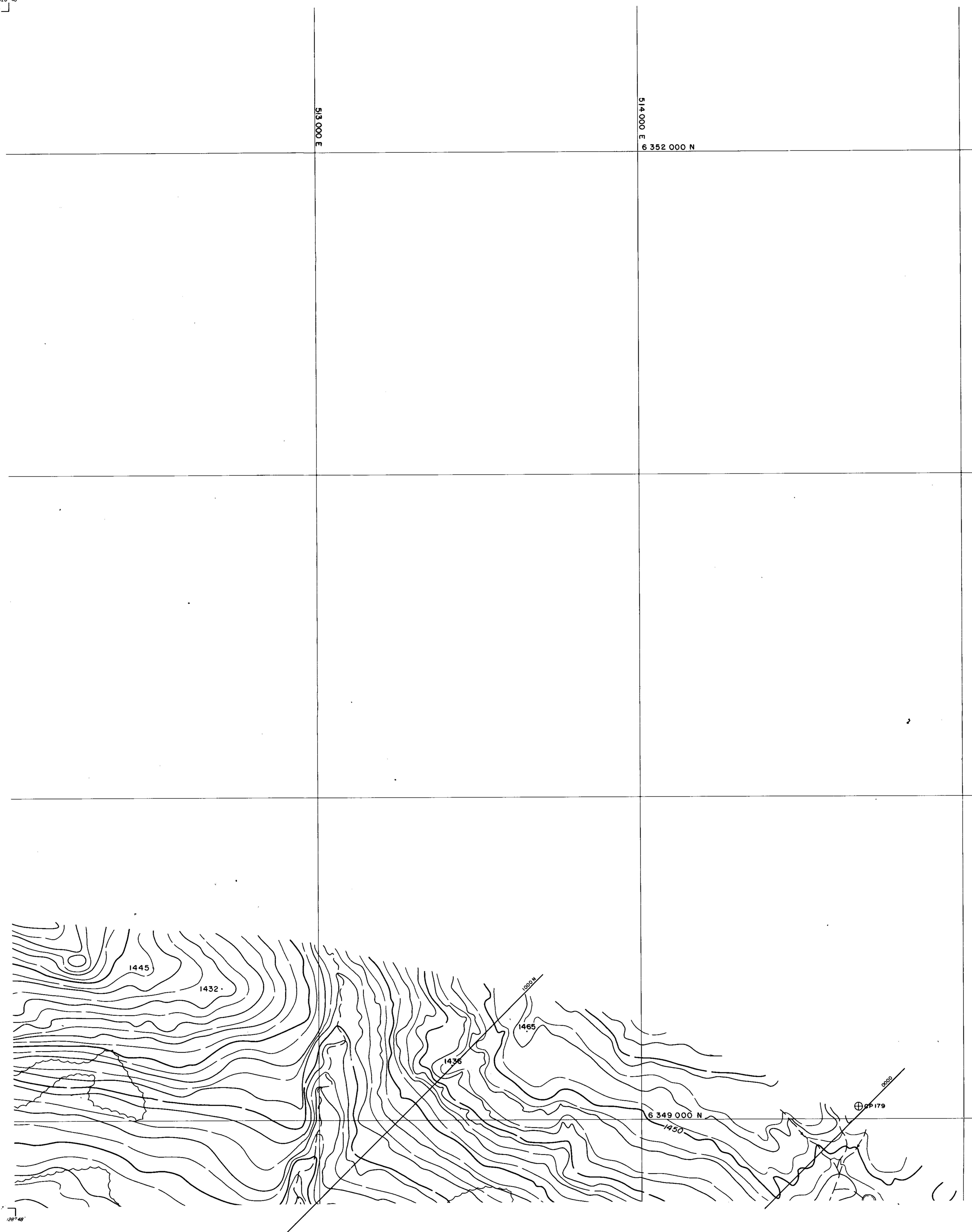
GULF CANADA RESOURCES INC.
Coal Division

**MT. KLAPPAN COAL PROPERTY
MAP SHEET J14
1983
GEOLOGY MAP**

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KPM83C58

129° 40'
57° 10'

129° 45'
57° 10'



LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- STREAM, APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- FREE LINE
- CUT LINE
- CONTOURS, INDEX
- CONTOURS, INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OBSCURED BY TREES OR VEGETATION.

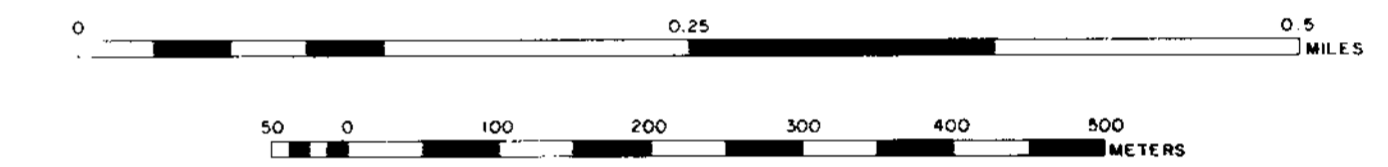
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

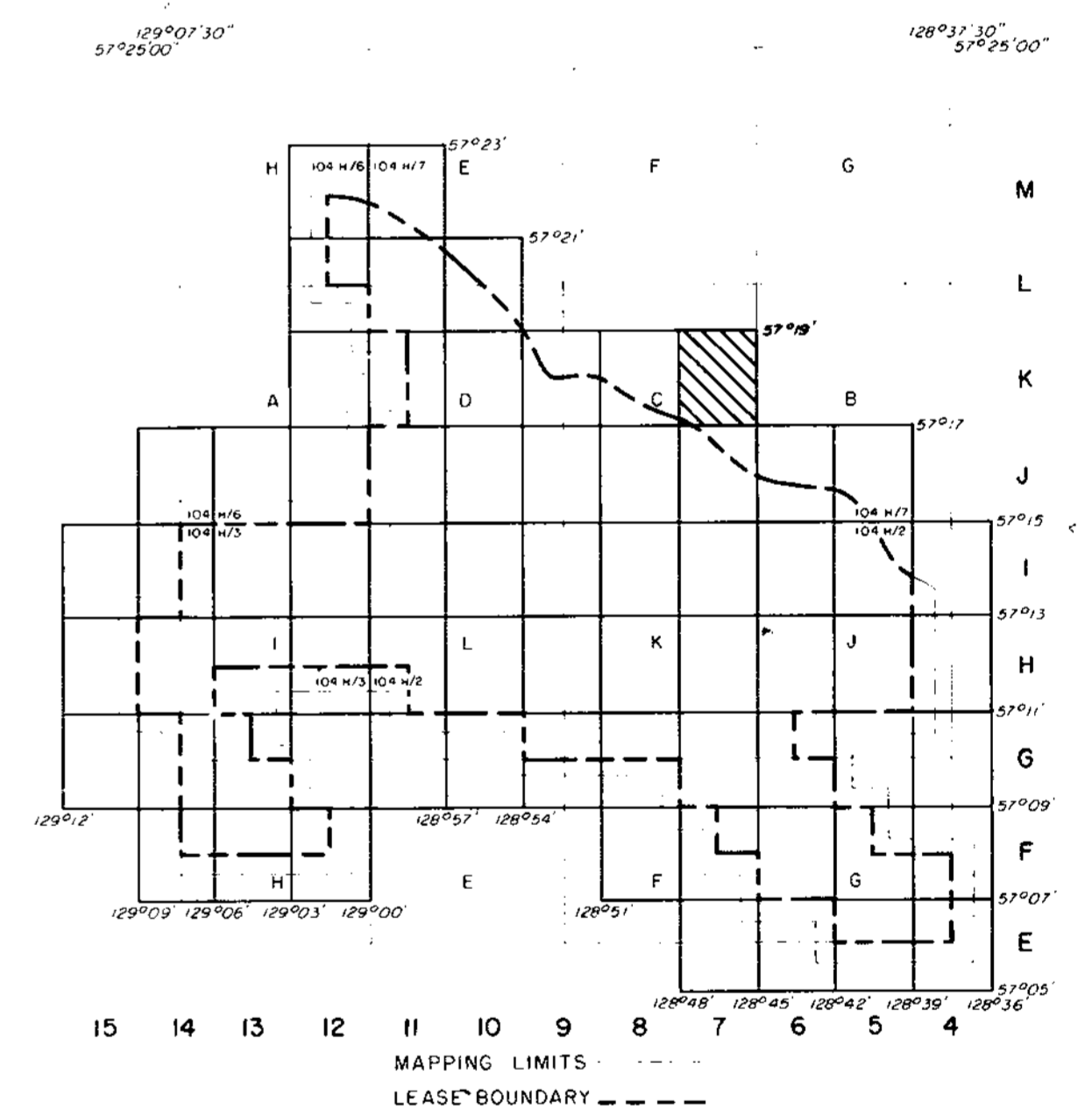
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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.

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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 DOWN THRUST SIDE
- ADIT TRENCH LOCATION MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Mr. Klappan 896/8

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET K7
1983
GEOLOGY MAP

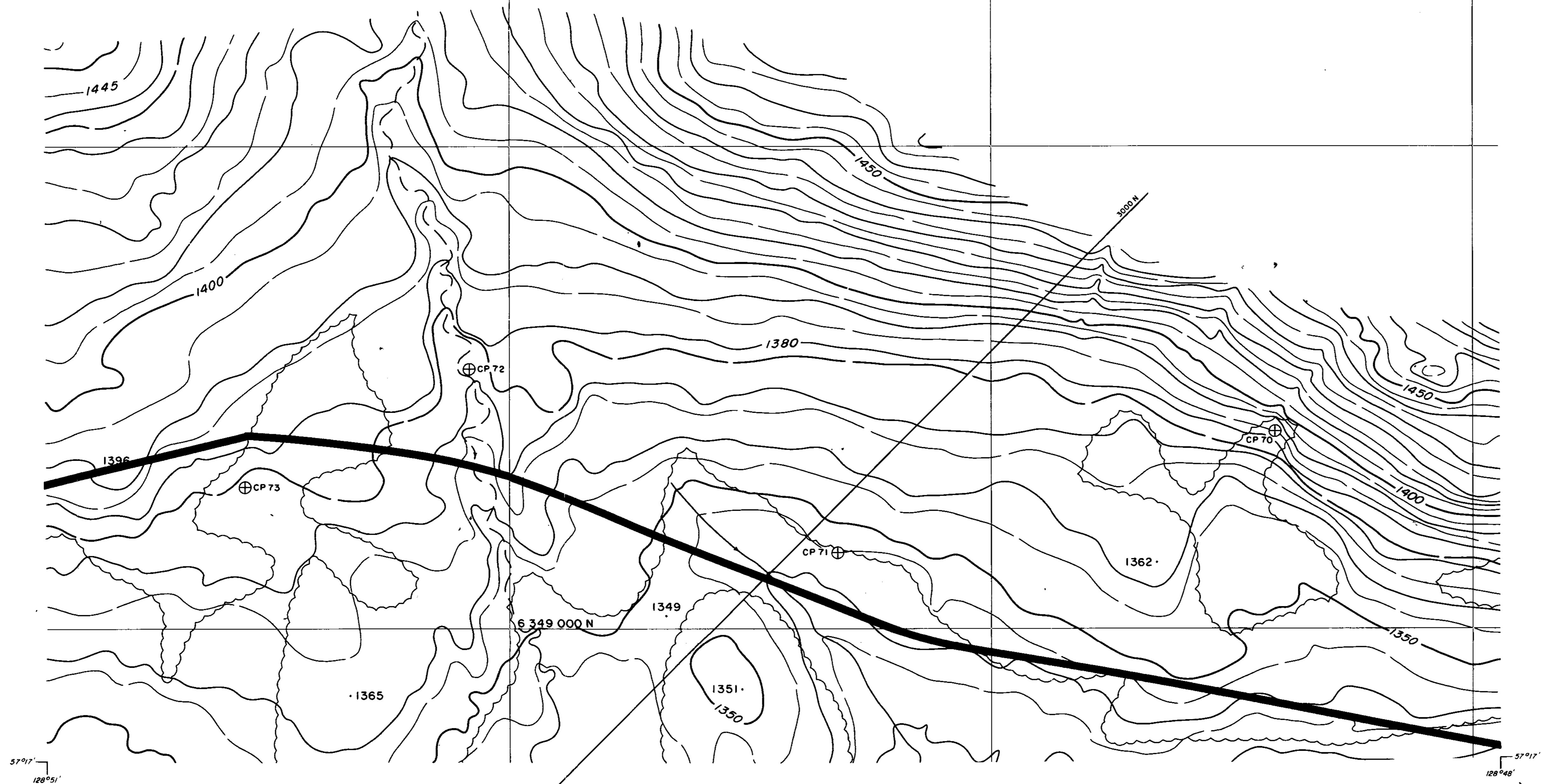
PREPARED BY: C. WILLIAMS SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING No. KPN83C59

128°51'
57°52'

128°48'
57°51'

510 000 E
6 352 000 N

512 000 E



57°57'
128°51'

57°51'
128°48'

LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 1.50 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

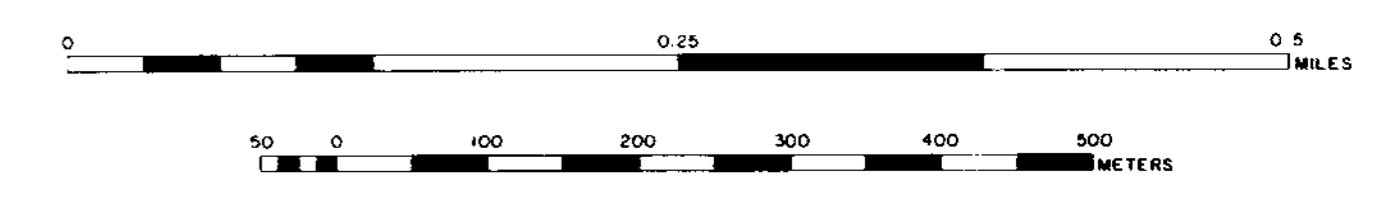
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./92 AERIAL PHOTOGRAPHY

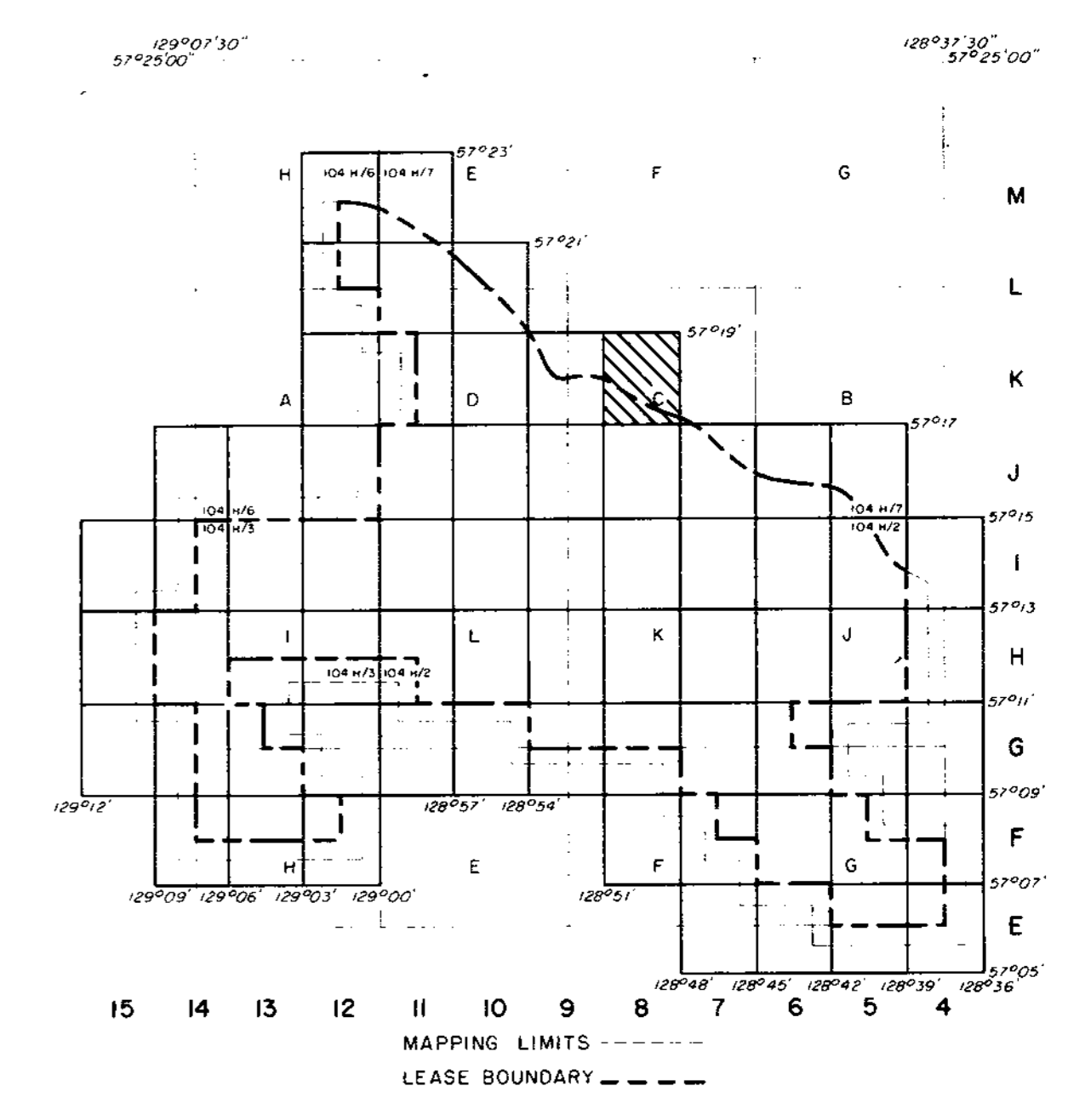
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5 000



MT. KLAPPAN AREA INDEX MAP



RHONDDA SEQUENCE

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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.

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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
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- ADIT TRENCH LOCATION MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

111

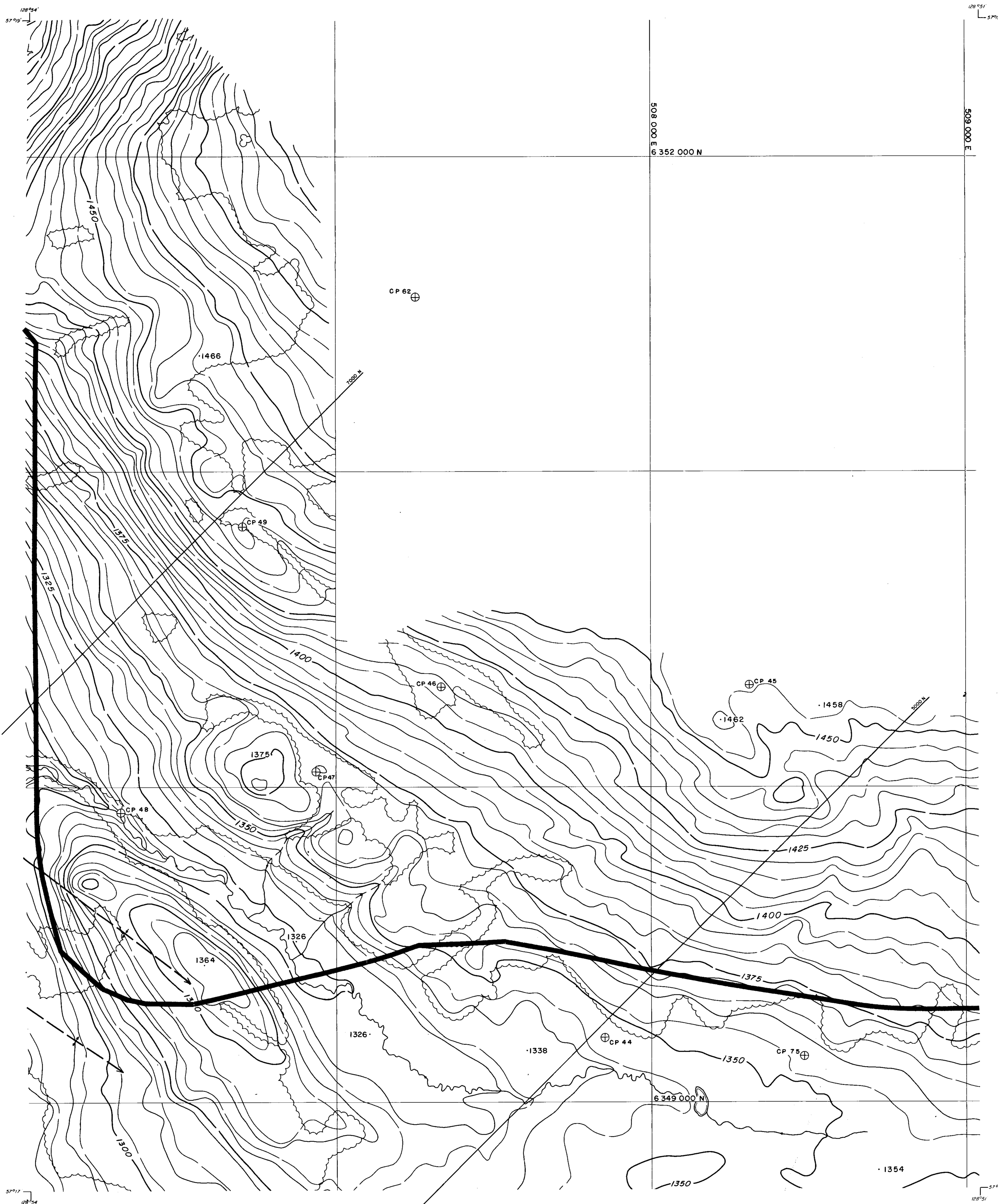
Ge. Mt. Klappan 88(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET K 8
1983
GEOLOGY MAP

PREPARED BY: _____ SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KPN83C60



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

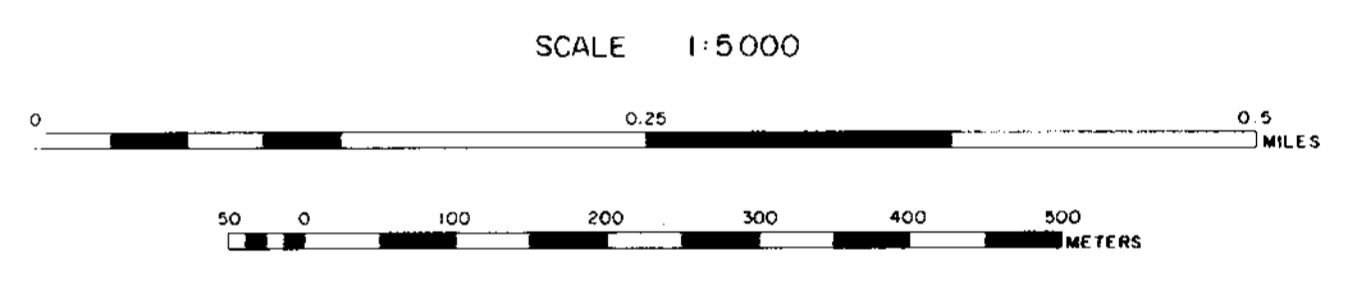
CONTOUR INTERVAL = 10 M, WITH FORM LINES INTERVAL = 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

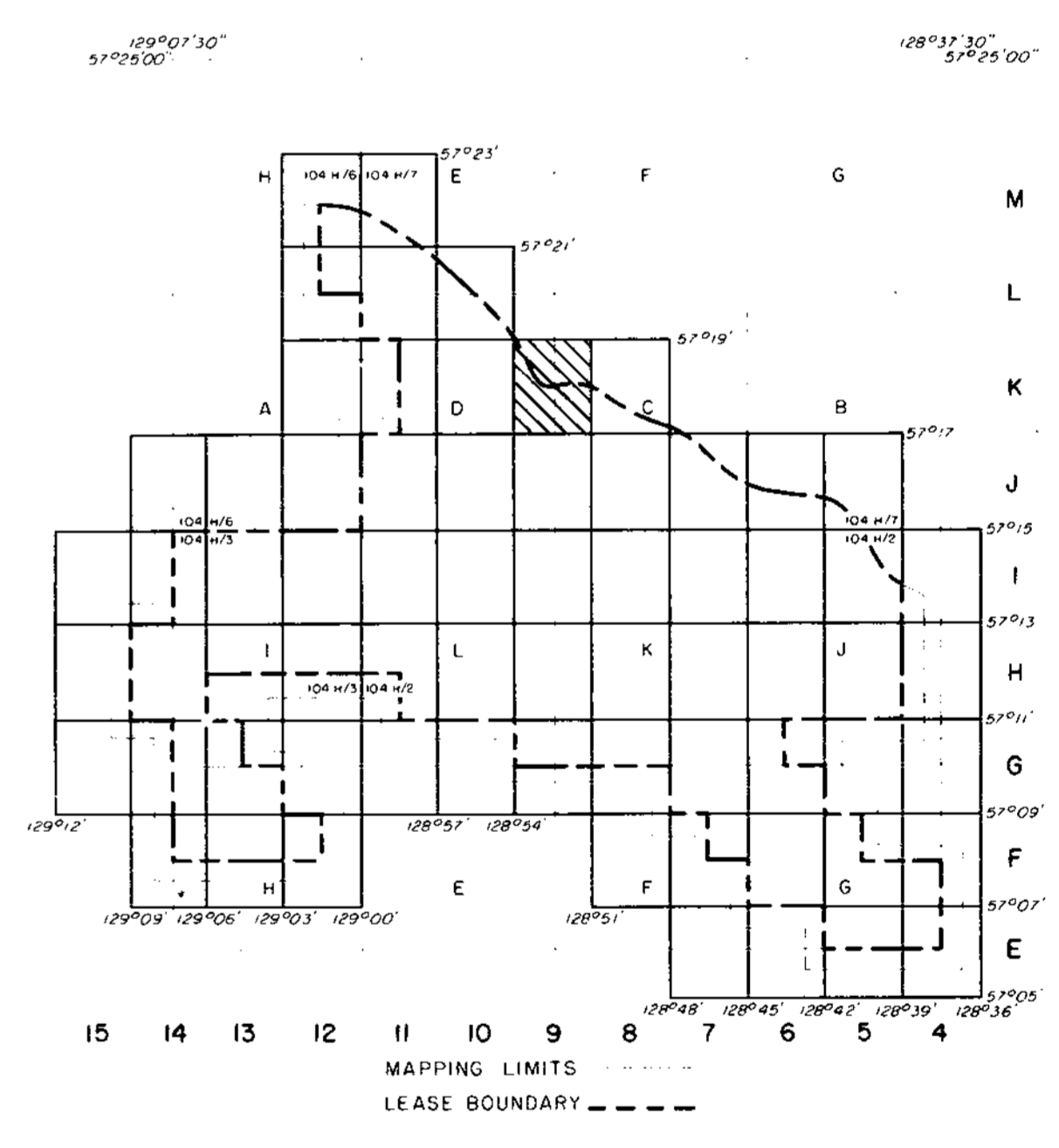
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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
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**MT. KLAPPAN AREA
INDEX MAP**



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LEGEND

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---	COAL SEAM (OUTCROP, INFERRED)
---	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
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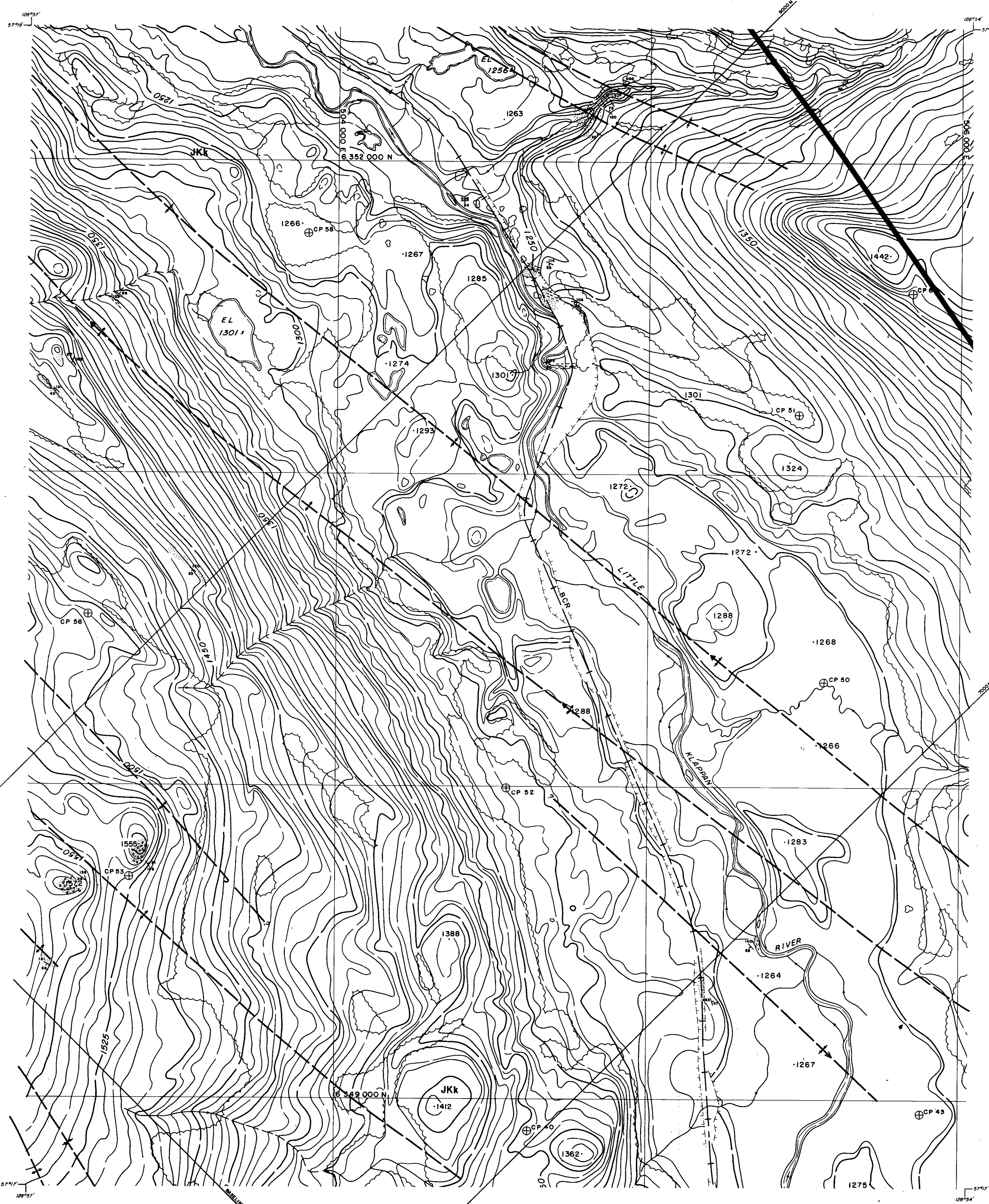
Ge. Mt. Klappan 1313a

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET K9
1983
GEOLOGY MAP**

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPNRSC61



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

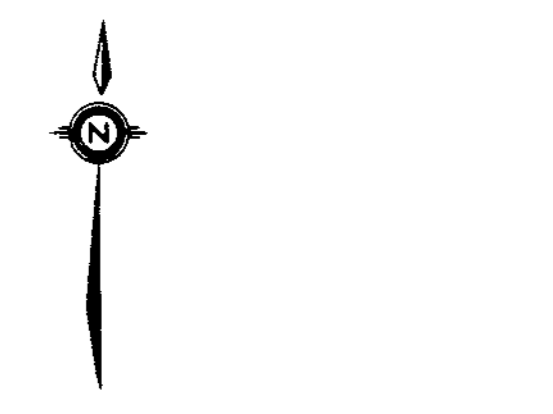
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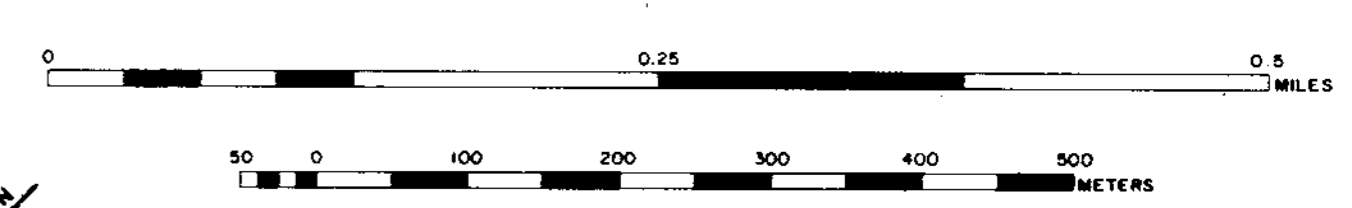
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RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY

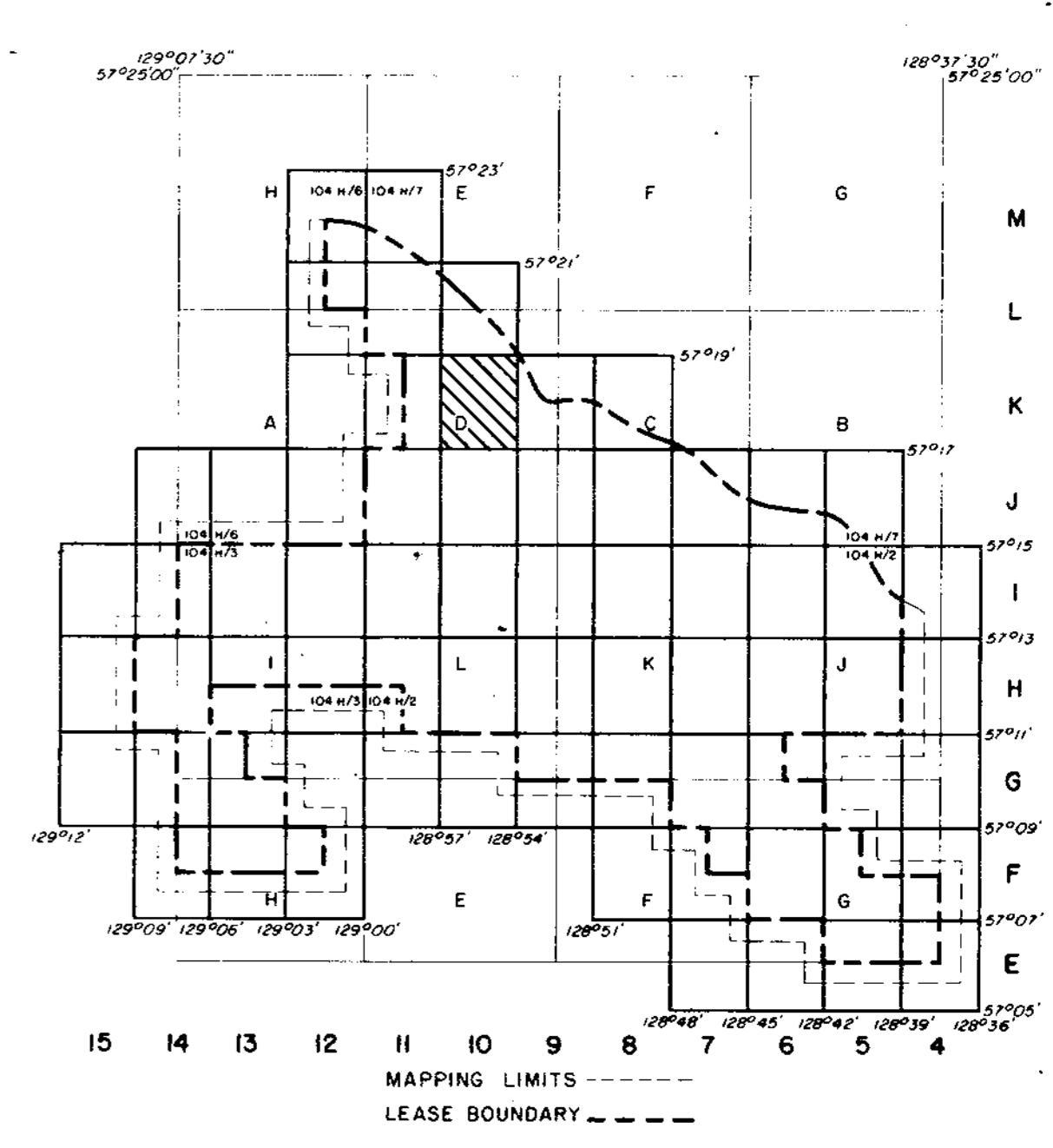
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SCALE 1:5000



**MT. KLAPPAN AREA
INDEX MAP**



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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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

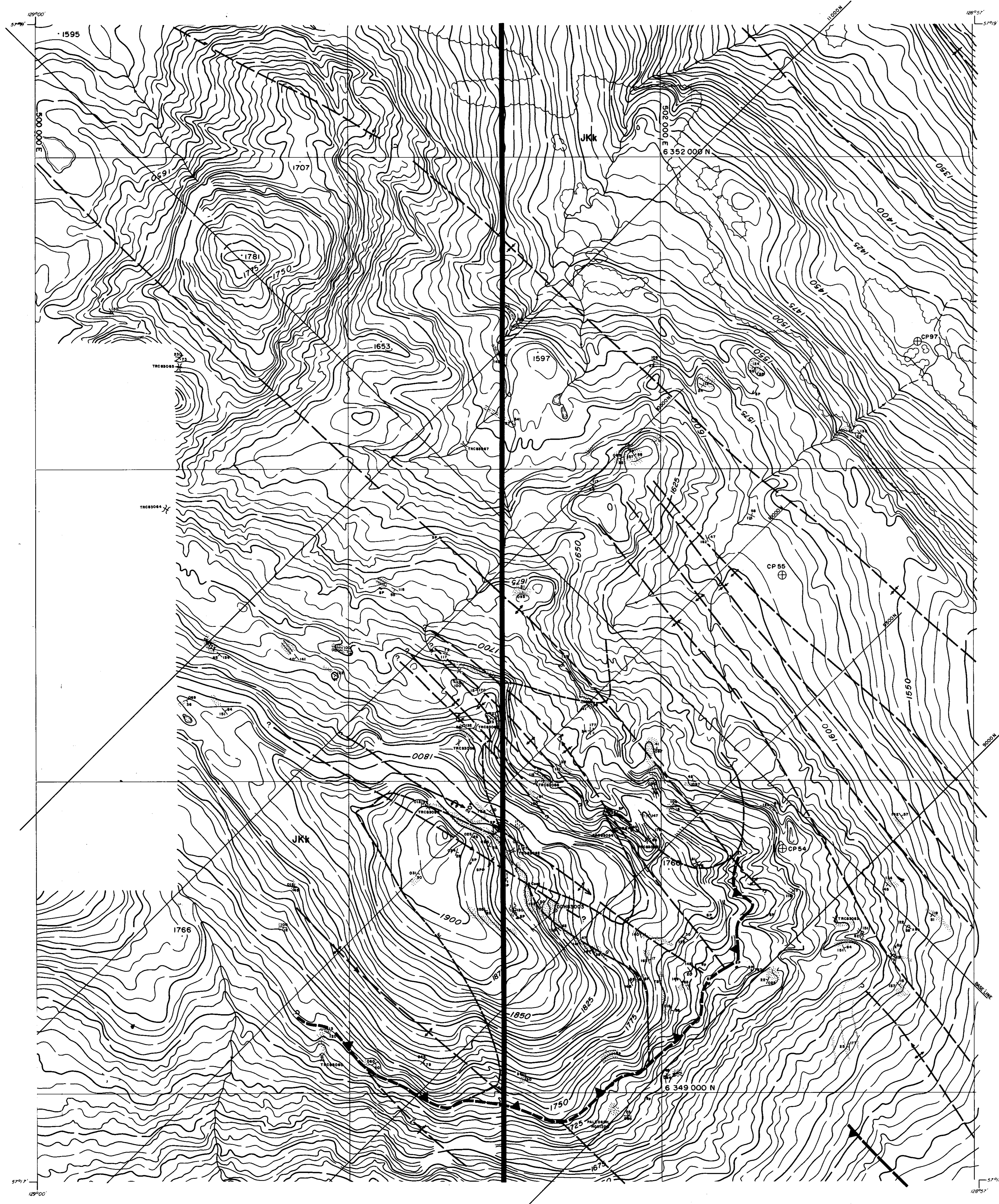
Ge. Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

CALGARY ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET K10
1983
GEOLOGY MAP**

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO. KP83C28



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:40,000 NEGATIVES.

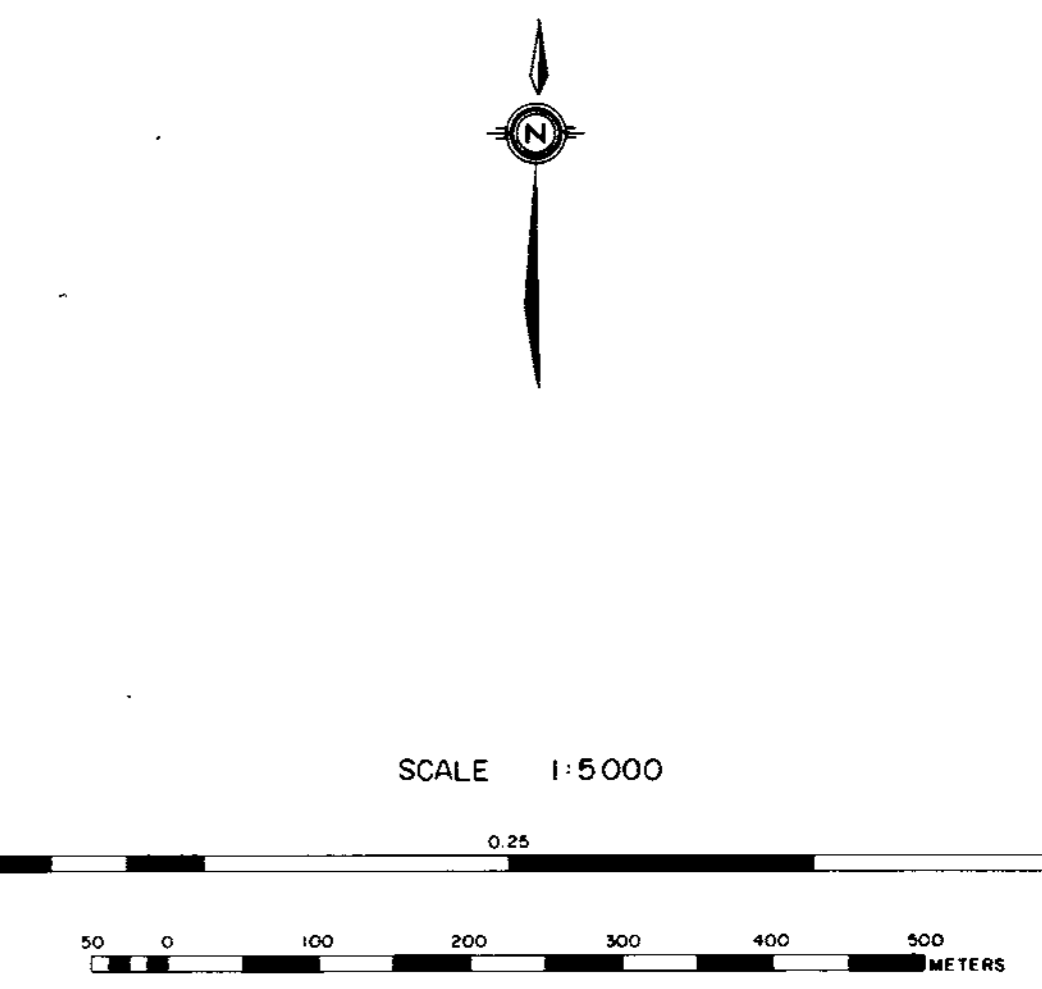
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - +5.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY.

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



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)

GR - Mt. Klappan 83(2)A

GULF CANADA RESOURCES INC.
Coal Division

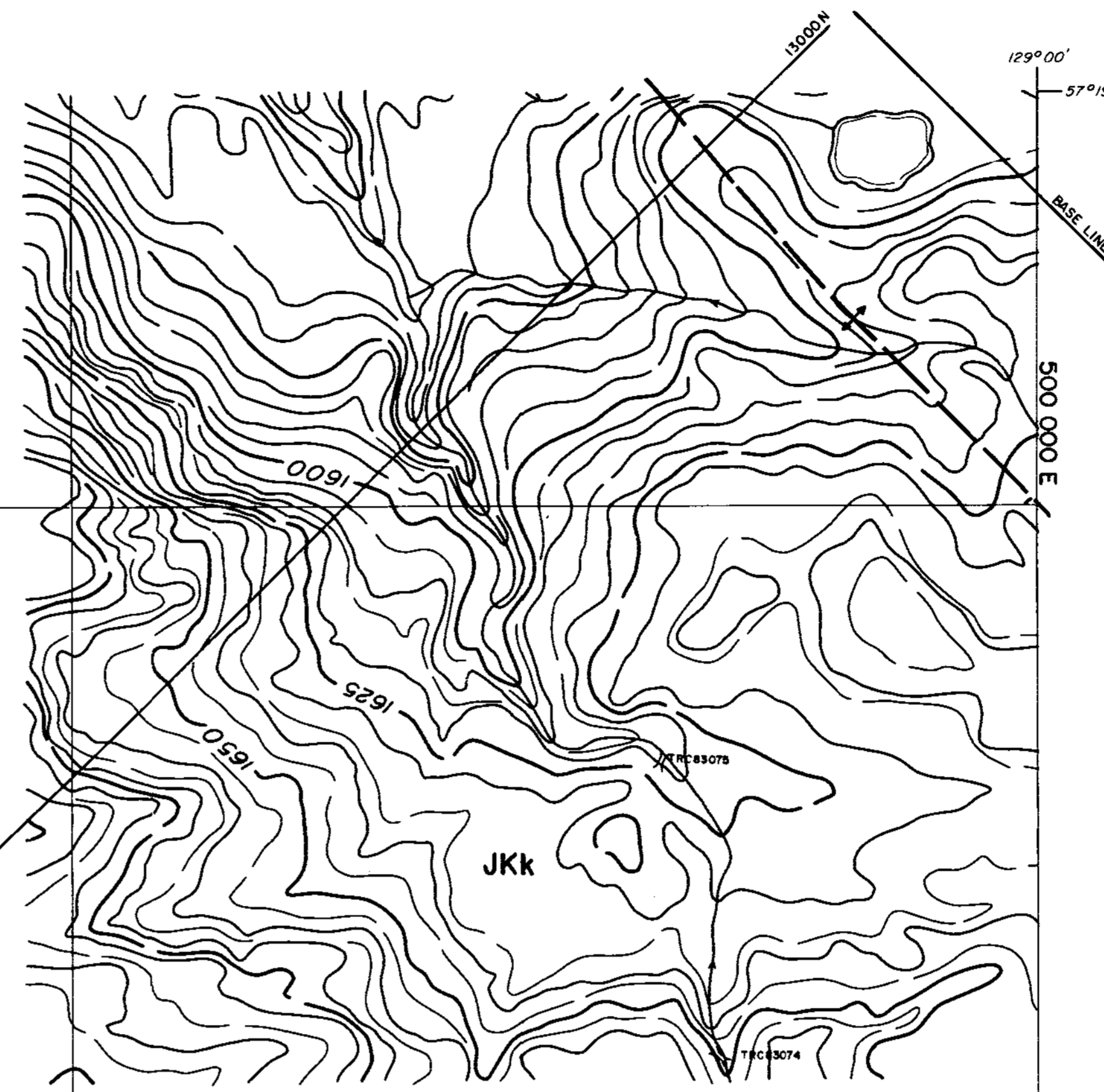
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET KII
1983
GEOLOGY MAP

PREPARED BY: S.M. SCALE 1:5,000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPN83C63

129°03'
57°09'

3 000 869
6 352 000 N



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	---
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL: 10 M, WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

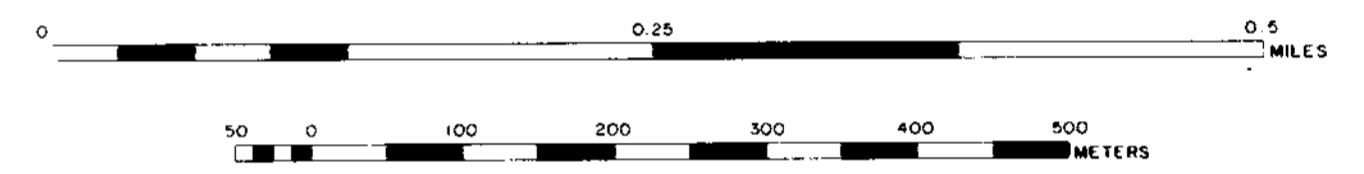
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

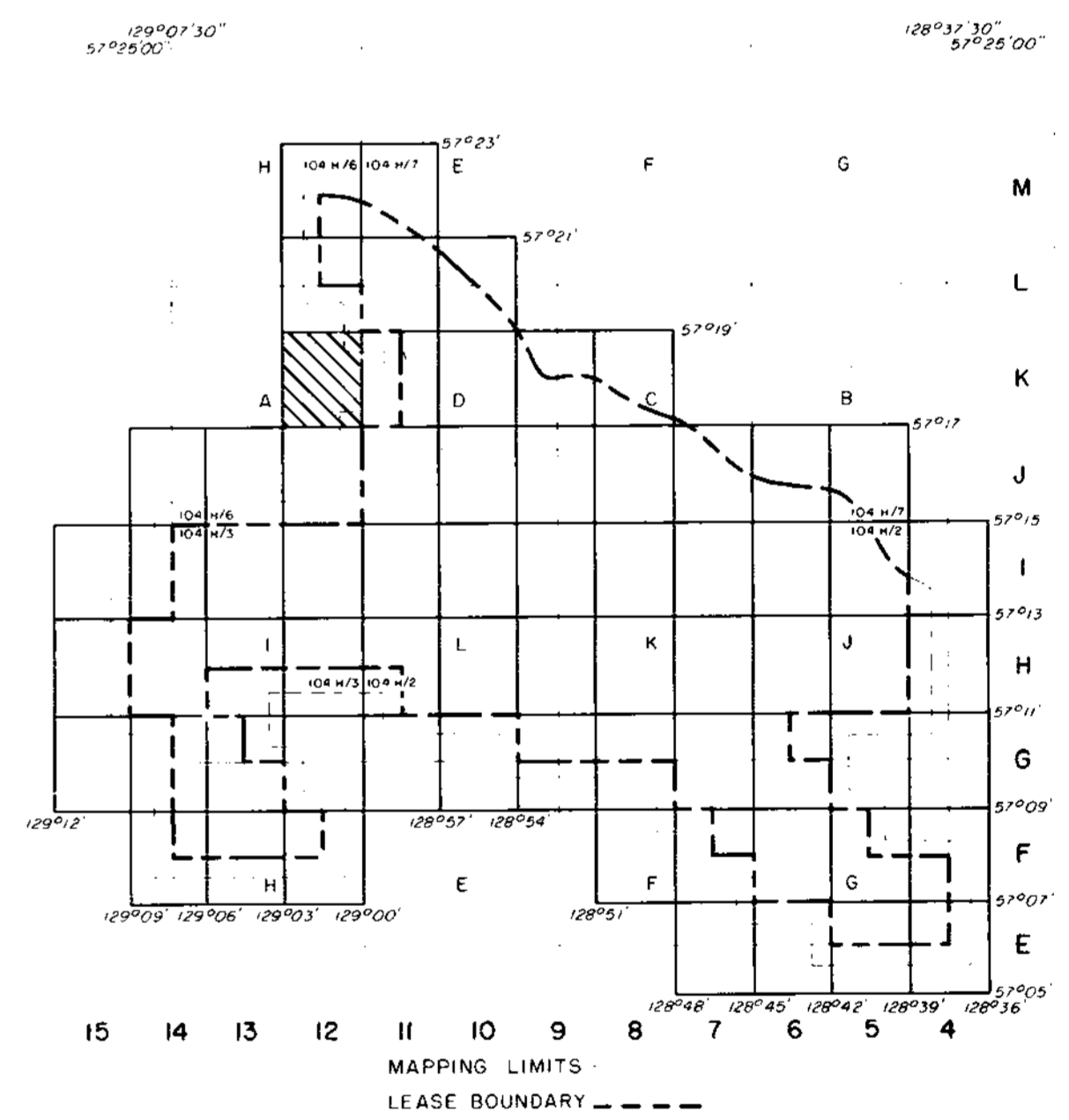
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5 000

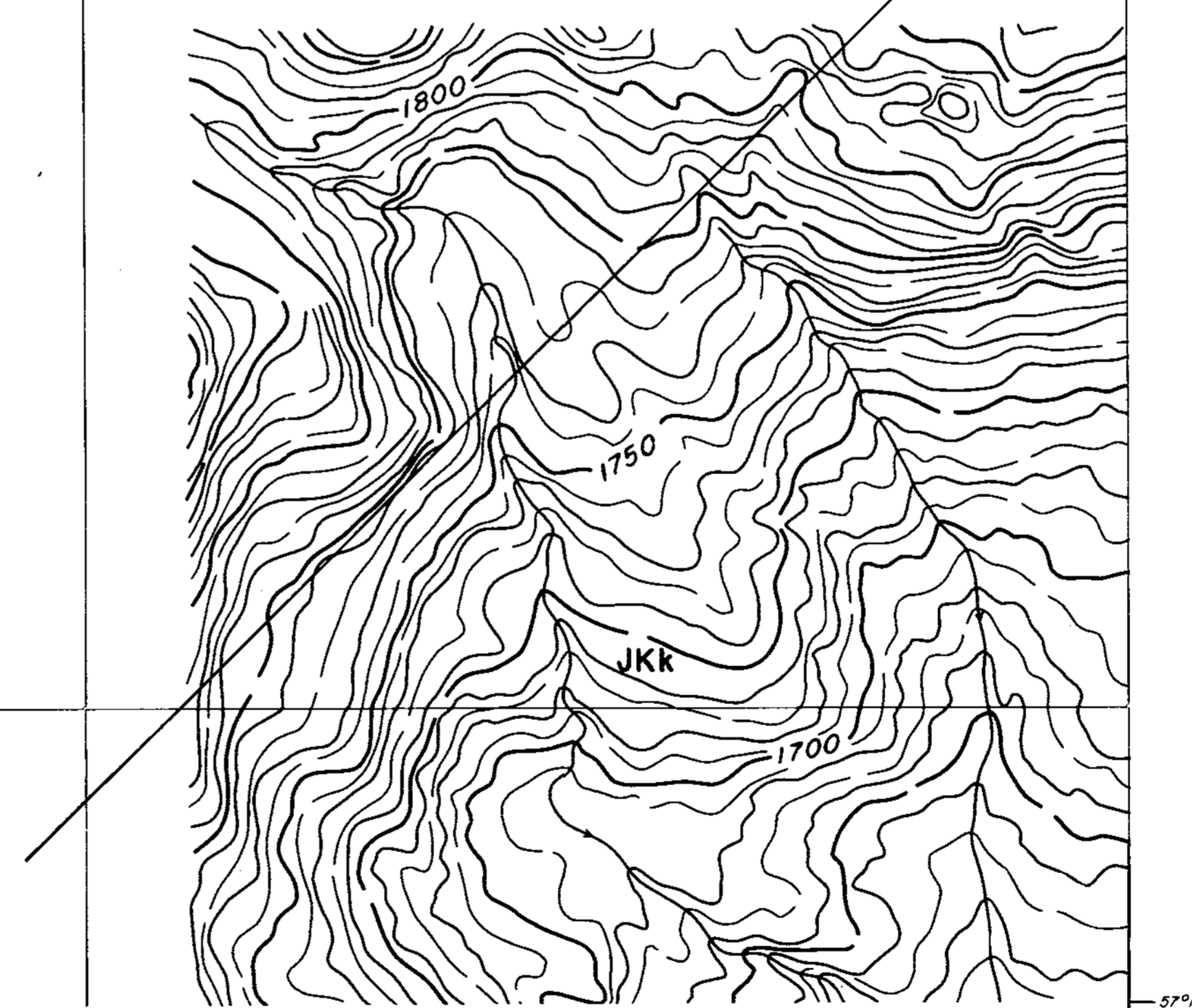


MT. KLAPPAN AREA
INDEX MAP



57°07'
129°01'

6 349 000 N



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

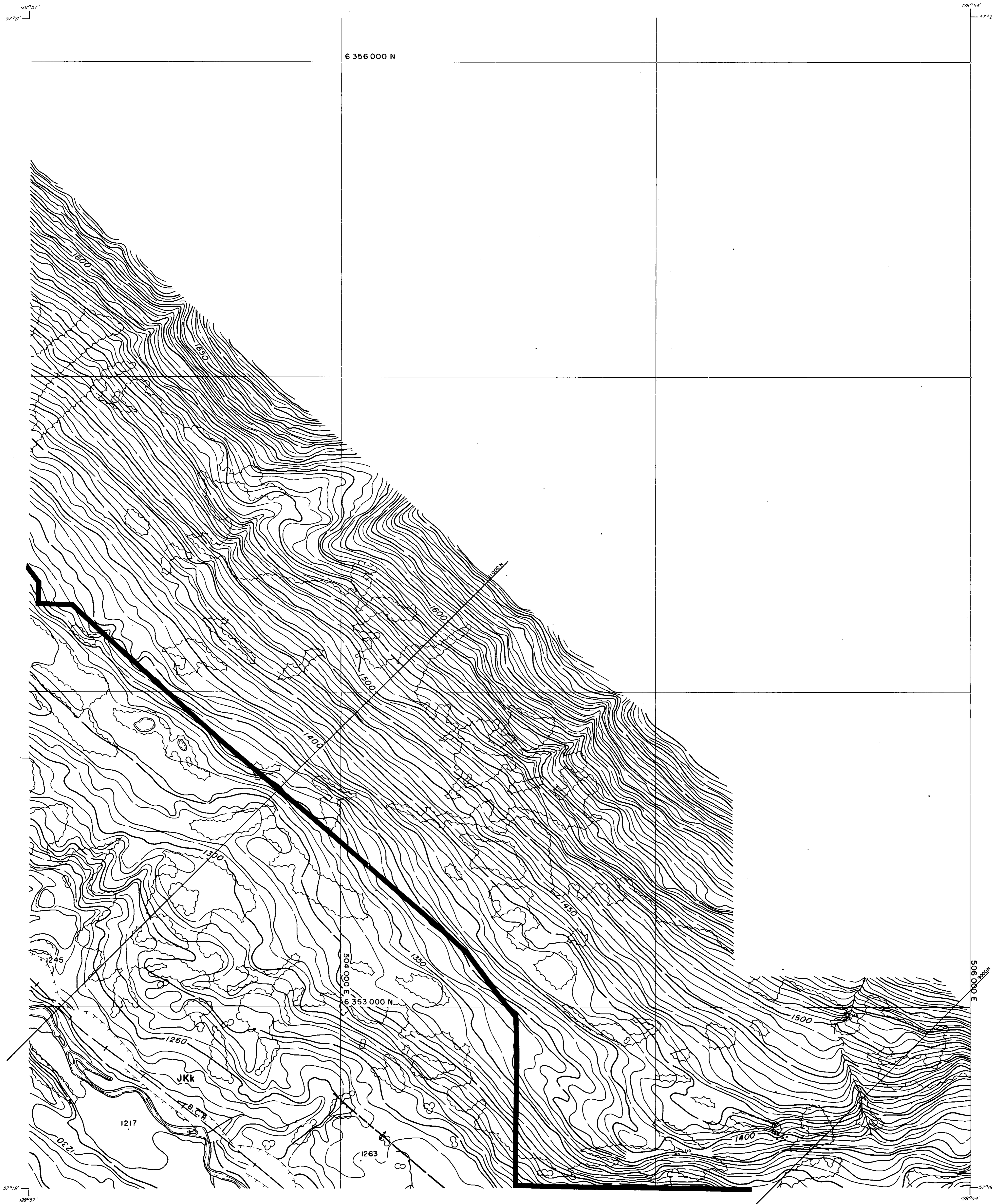
---	LICENCE BOUNDARY
---	GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
---	COAL SEAM (OUTCROP, INFERRED)
---	ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
---	OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
---	OVERTURNED 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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge - Mt. Klappan 83/64

GULF CANADA RESOURCES INC.
Coal Division ALBERTA

**MT. KLAPPAN COAL PROPERTY
MAP SHEET K12
1983
GEOLOGY MAP**

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING NO: KP83C64



LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- STREAM, APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

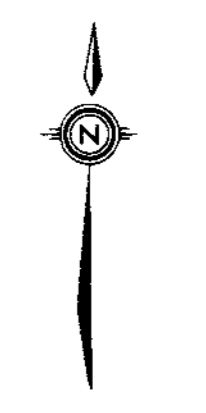
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

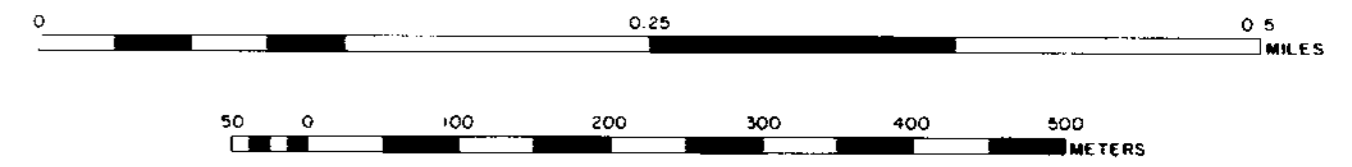
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

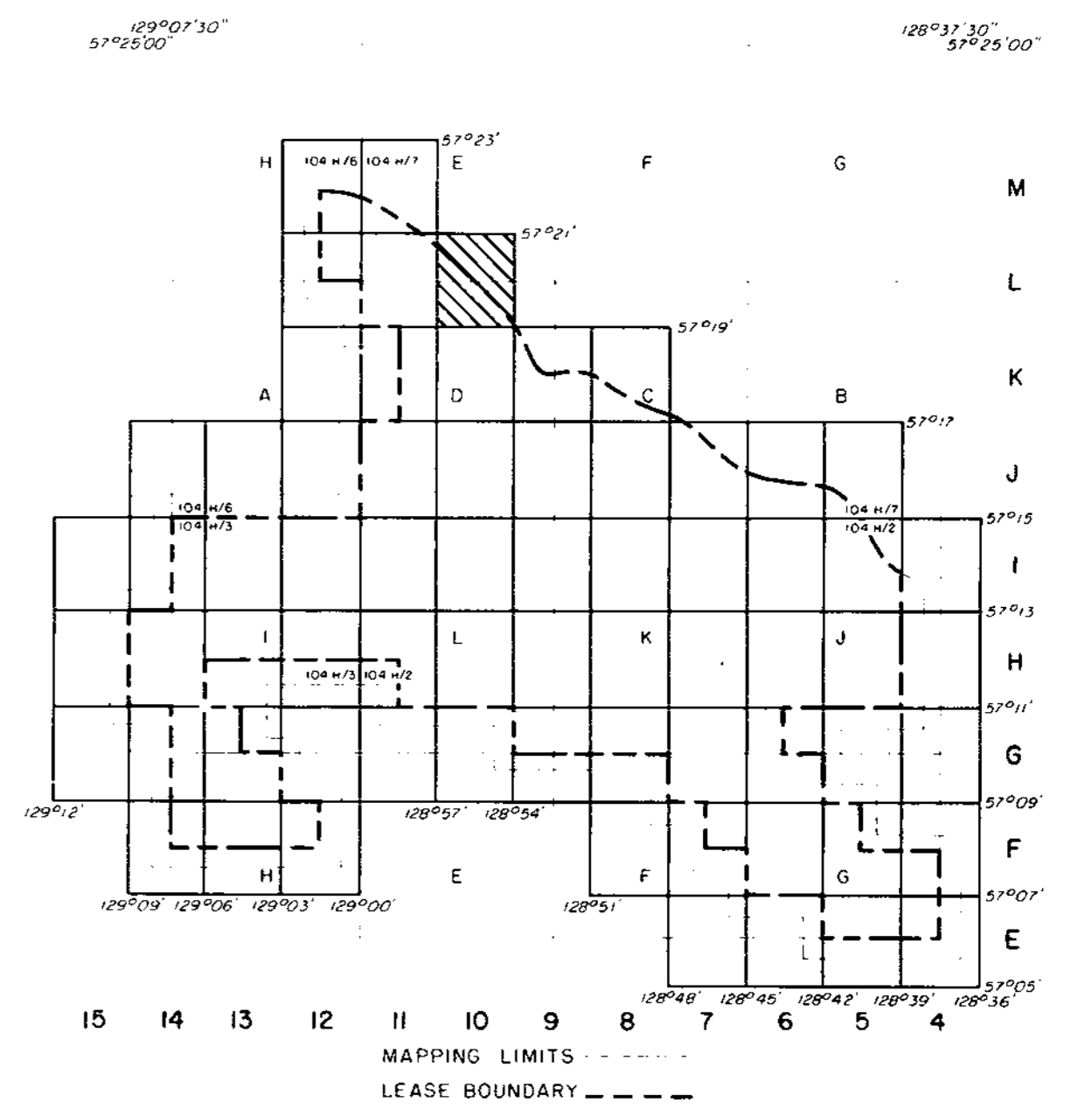
COMPILED BY:
WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEAN LTD.,
FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



MT KLAPPAN AREA
INDEX MAP



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.

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LEGEND

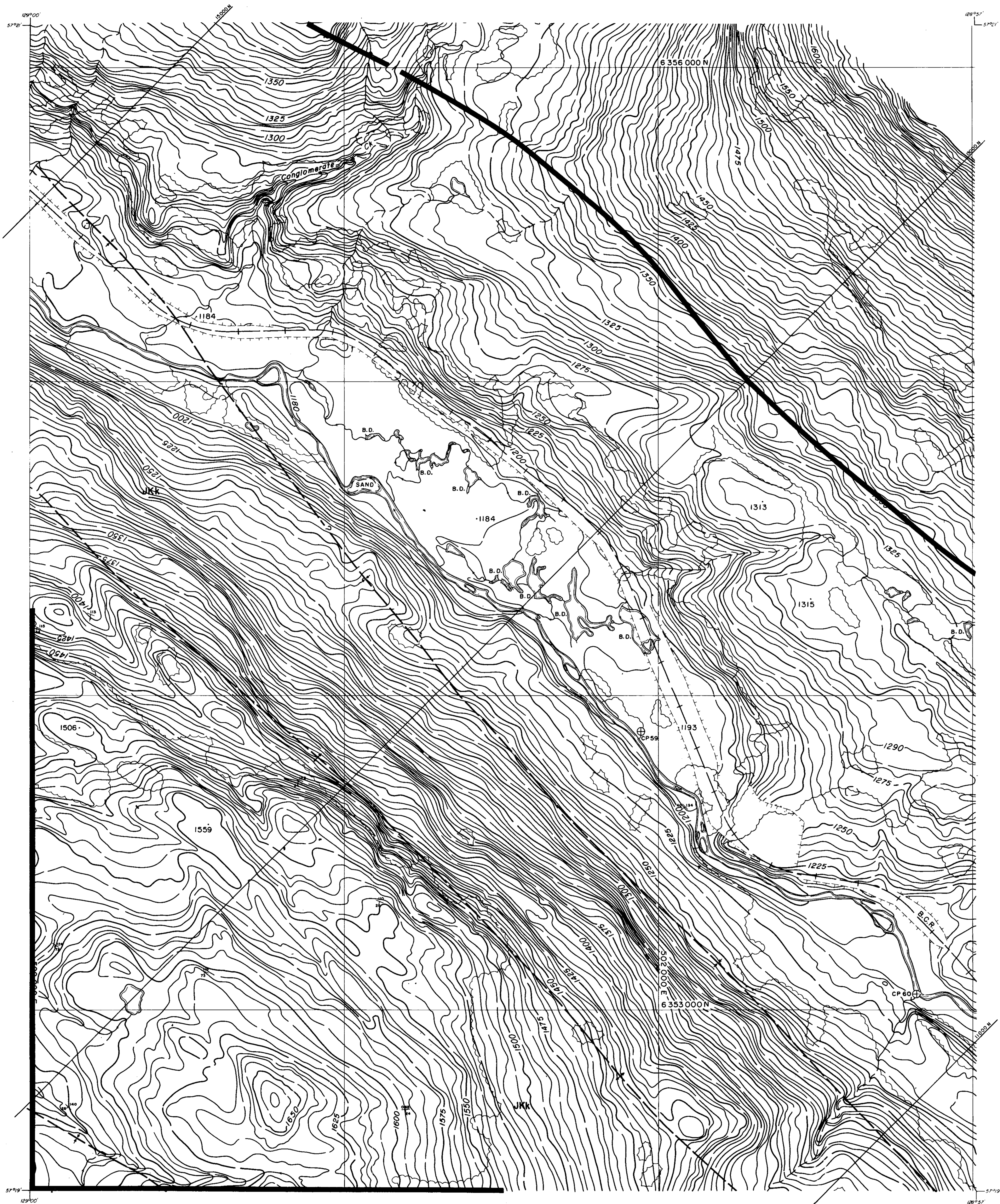
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (OUTCROP, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, 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 DOWNTHRUST SIDE
- ADIT TRENCH LOCATION MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Ge. Mt. Klappan 836A

GULF CANADA RESOURCES INC.
Coal Division

**MT KLAPPAN COAL PROPERTY
MAP SHEET L10
1983
GEOLOGY MAP**

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN. 1984 DRAWING NO. KPN83C65



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	EL. 500'
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
INTERMEDIATE	---
DEPRESSION	---
APPROXIMATE	---
SPOT ELEVATION	754
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	CP 40
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

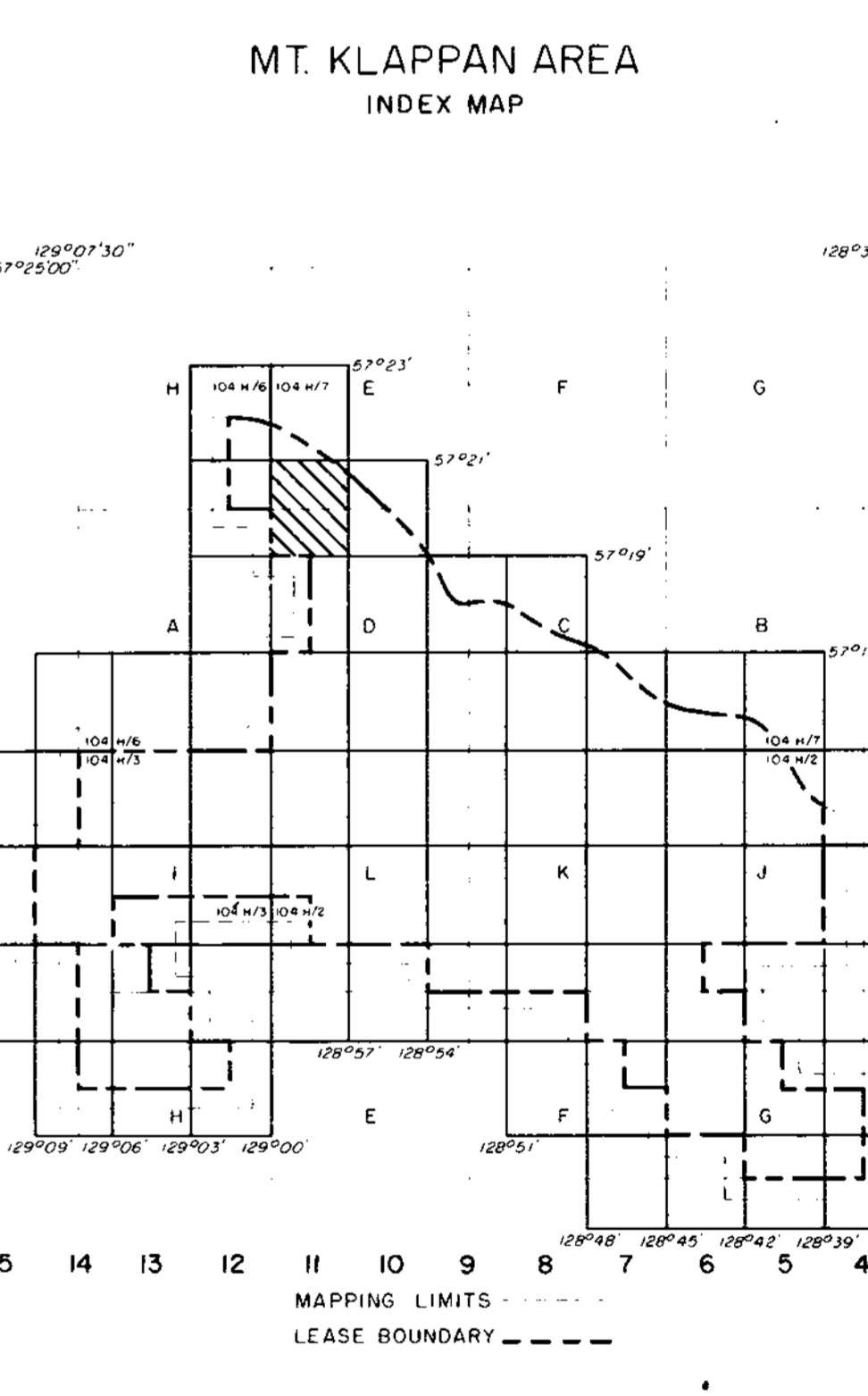
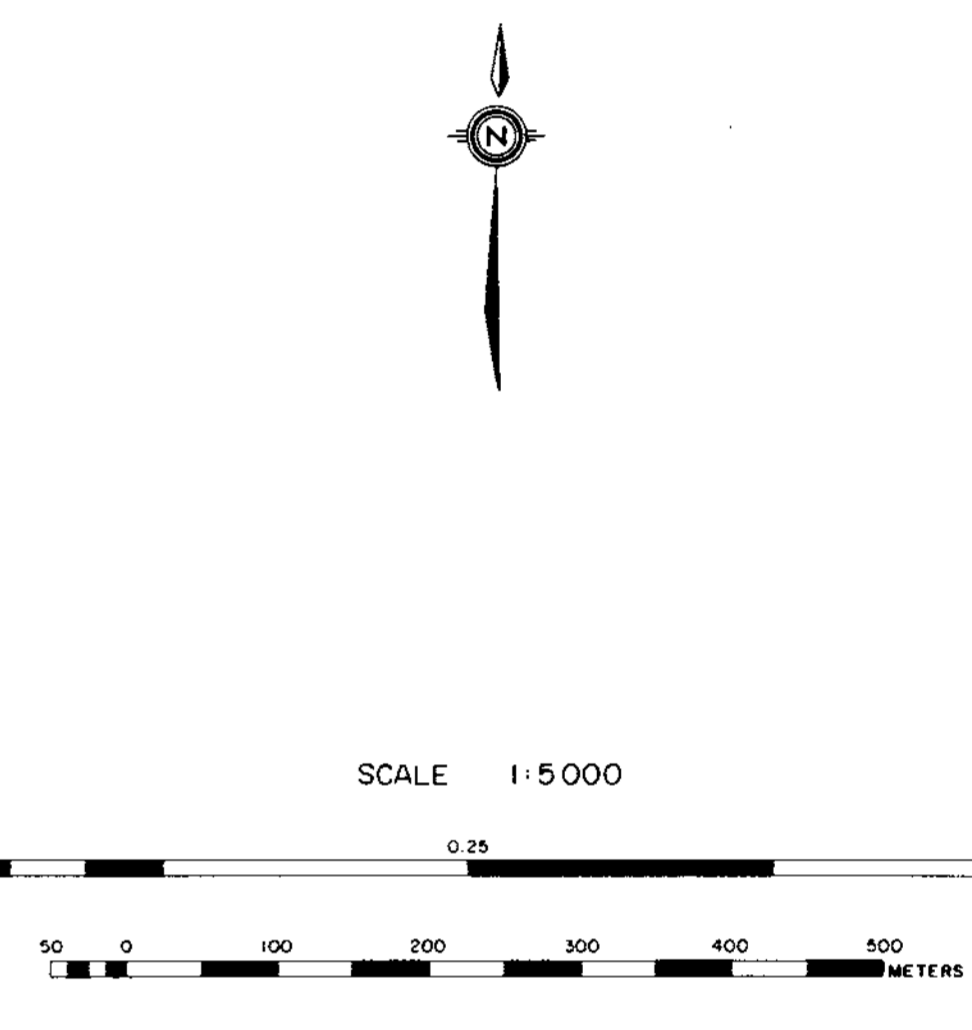
CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5 M.

ACCURACY OF 5 M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10 M CONTOURS - 15.0 METERS FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



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
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---	THRUST FAULT (DEFINED, APPROXIMATE, INFERRED) TEETH INDICATE UP THRUST SIDE
---	FAULT (DEFINED, APPROXIMATE, INFERRED) SOLID CIRCLE INDICATES DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION
---	MEASURED SECTION LOCATION
---	CROSS-SECTION LOCATION
---	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Gr. Mt. Klappan 83/2A

GULF CANADA RESOURCES INC.
Coal Division

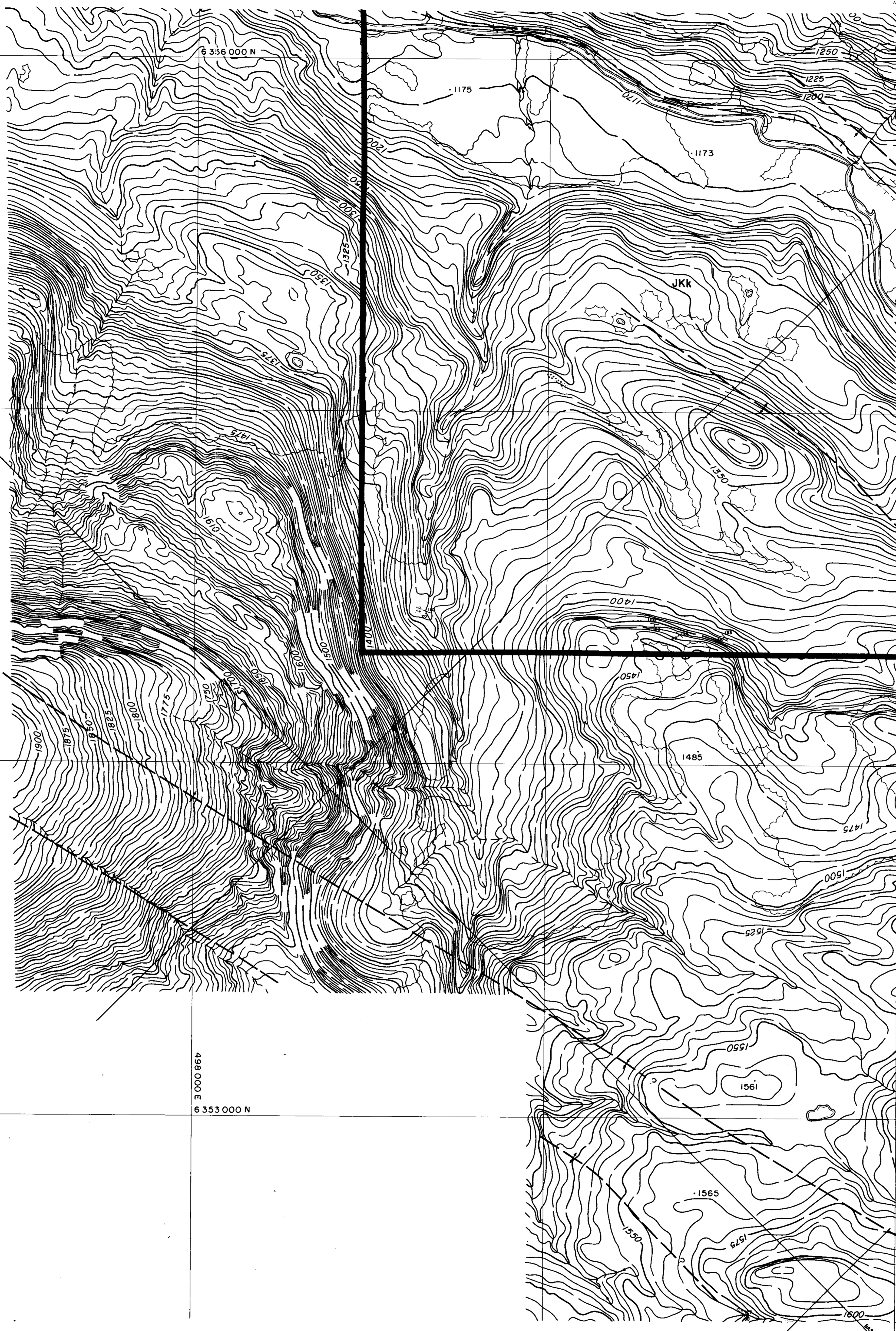
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
MAP SHEET L11
1983
GEOLOGY MAP

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPB8366

129°02'

57°22'



57°22'

RHONDDA SEQUENCE

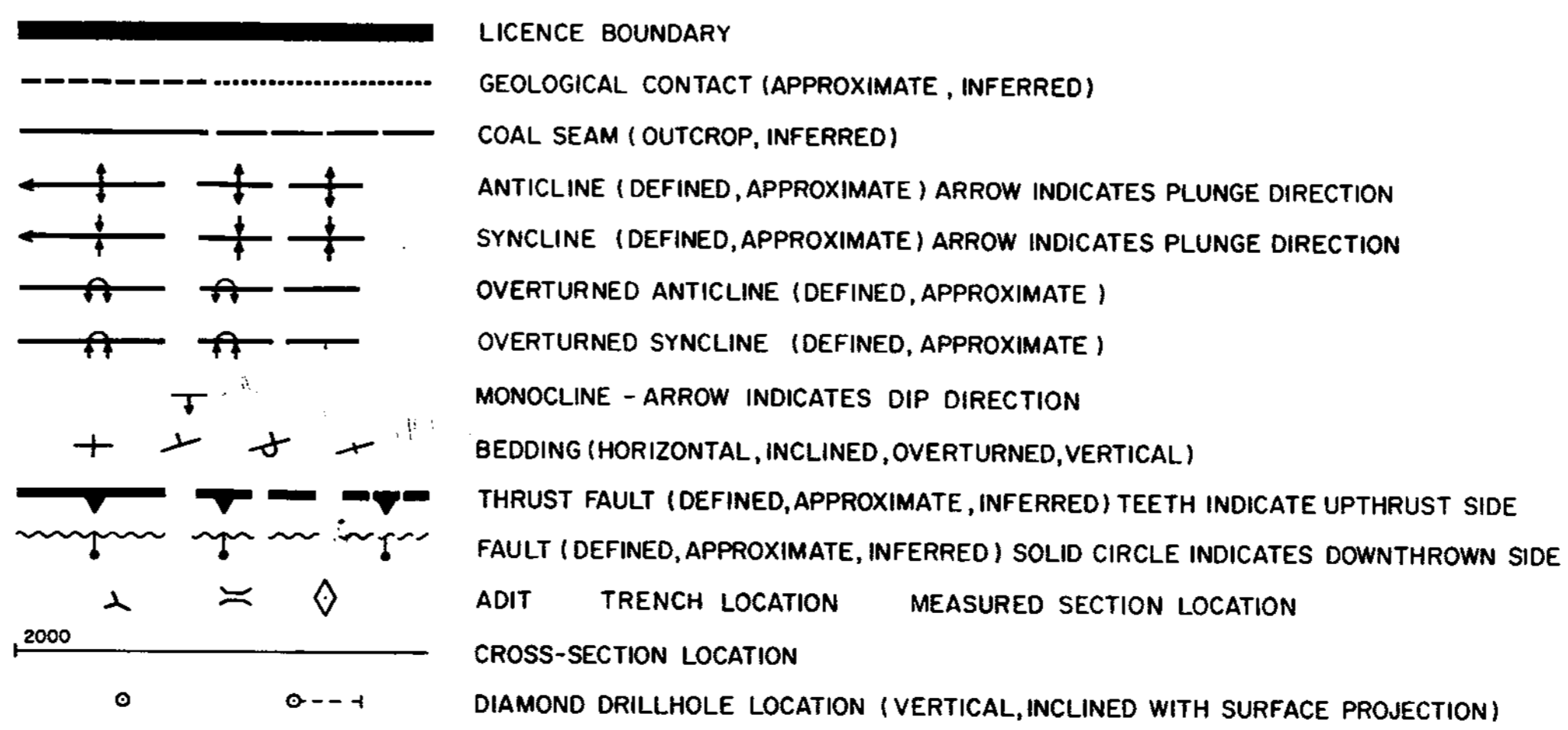
JKr Massive to thick conglomerates and grits interbedded with minor siltstones and shales.

MALLOCH SEQUENCE

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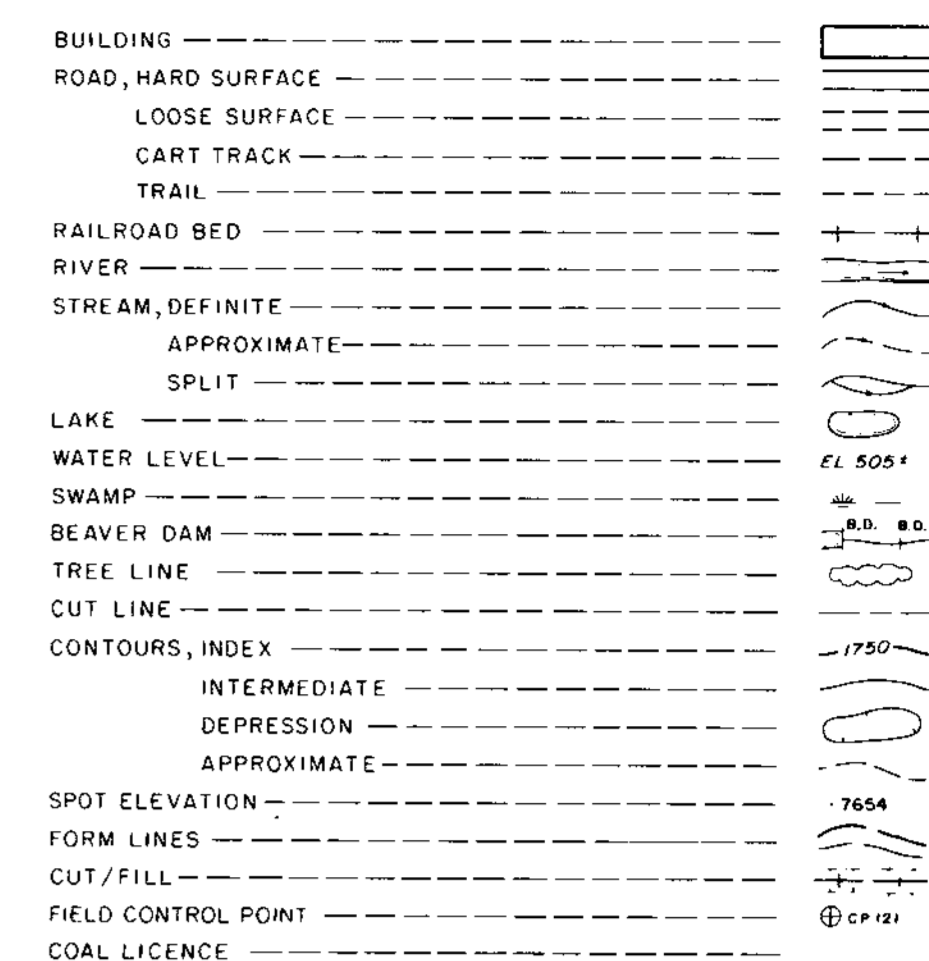
KLAPPAN SEQUENCE

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LEGEND

LEGEND



NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES.

CONTOUR INTERVAL - 10 M, WITH FORM LINES INTERVAL - 5M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS - ±5.0 METRES FOR GROUND NOT OCCURRED BY TREES OR VEGETATION.

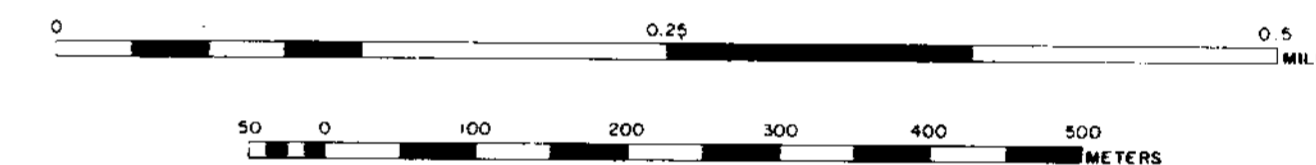
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT/82 AERIAL PHOTOGRAPHY.

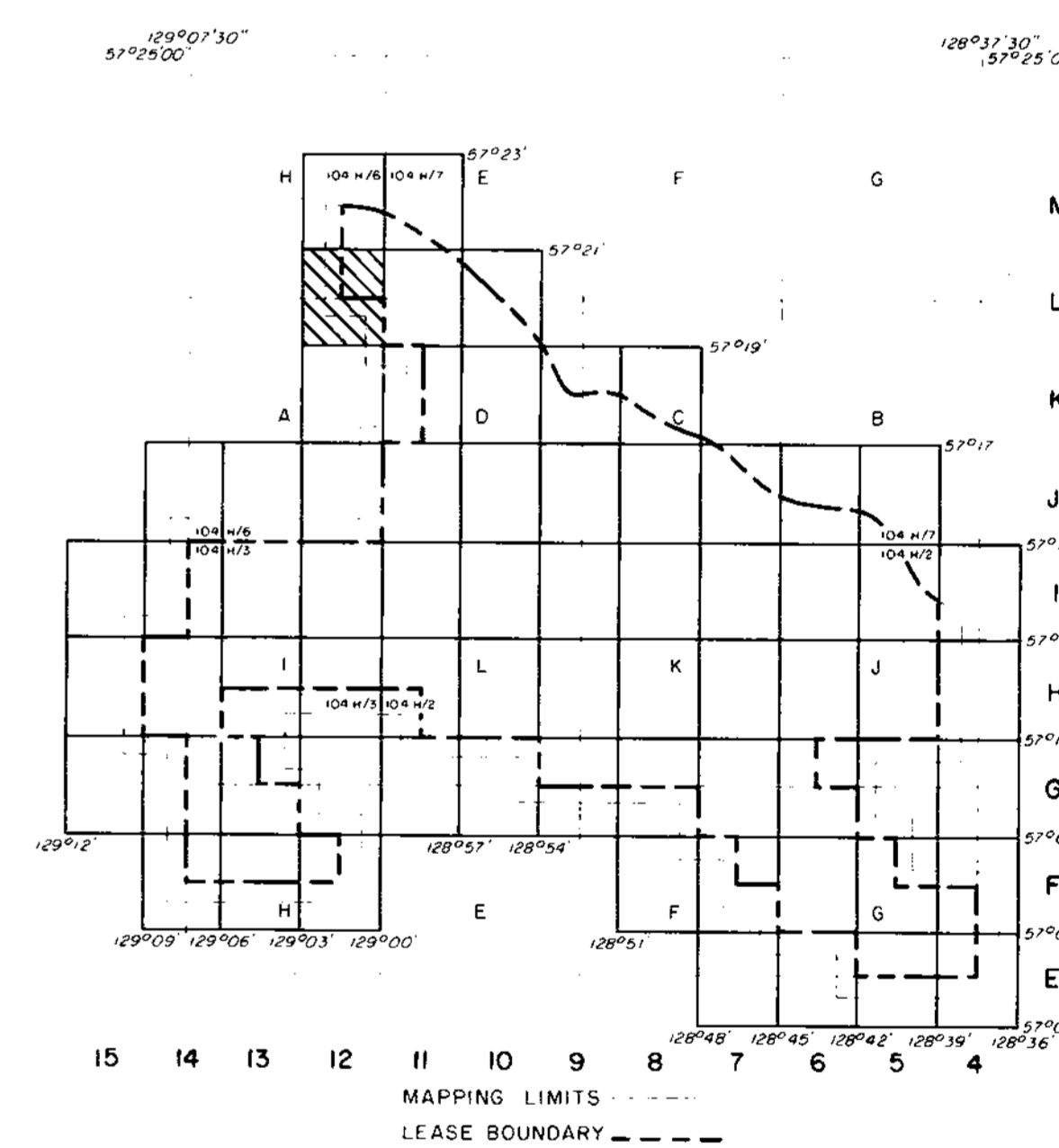
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60,000 (APPROXIMATE).



SCALE 1:5000



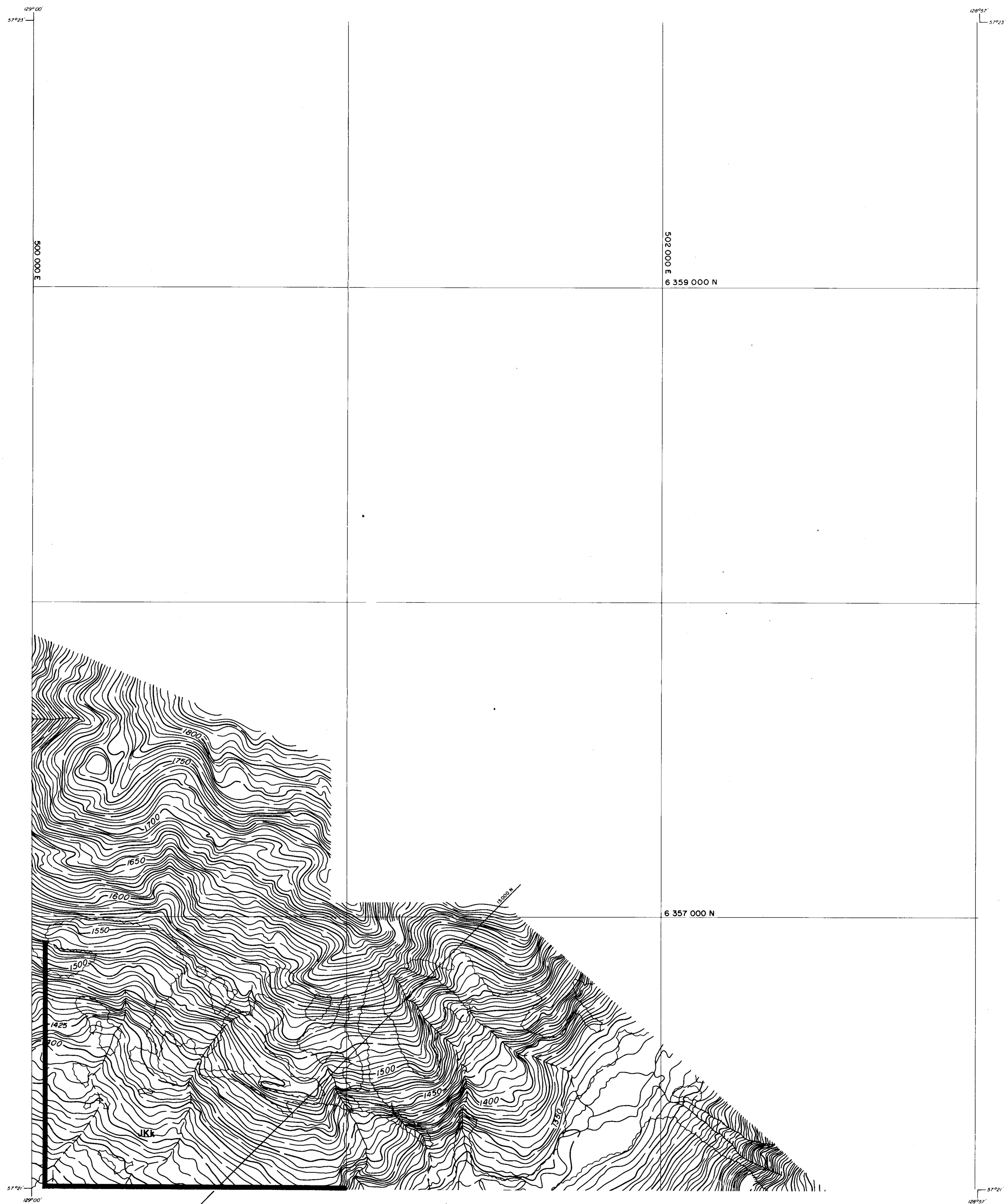
MT. KLAPPAN AREA INDEX MAP



GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET L12
1983
GEOLOGY MAP

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C87



LEGEND

BUILDING	---
ROAD, HARD SURFACE	---
ROAD, LOOSE SURFACE	---
CART TRACK	---
TRAIL	---
RAILROAD BED	---
RIVER	---
STREAM, DEFINITE	---
STREAM, APPROXIMATE	---
SPLIT	---
LAKE	---
WATER LEVEL	EL. 505'
SWAMP	---
BEAVER DAM	---
TREE LINE	---
CUT LINE	---
CONTOURS, INDEX	---
CONTOURS, INTERMEDIATE	---
CONTOURS, APPROXIMATE	---
SPOT ELEVATION	---
FORM LINES	---
CUT/FILL	---
FIELD CONTROL POINT	---
COAL LICENCE	---

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

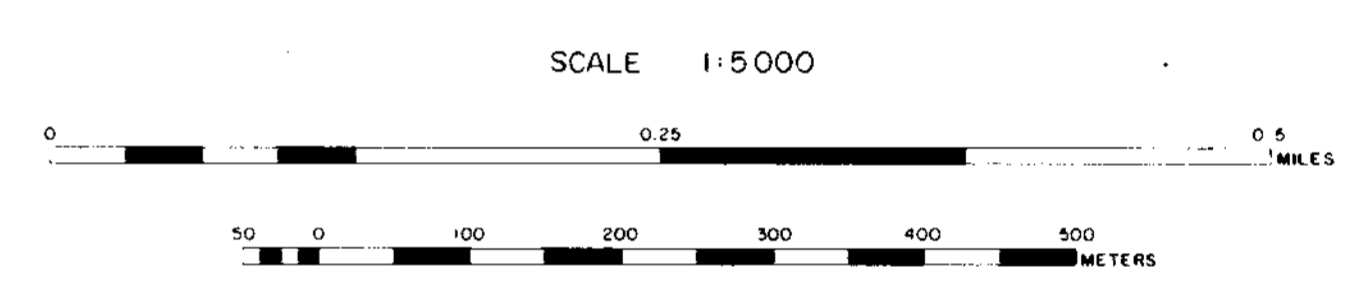
CONTOUR INTERVAL: 10 M., WITH FORM LINES INTERVAL: 5 M.

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS + 15.0 METERS FOR GROUND NOT OBTAINED BY TREES OR VEGETATION.

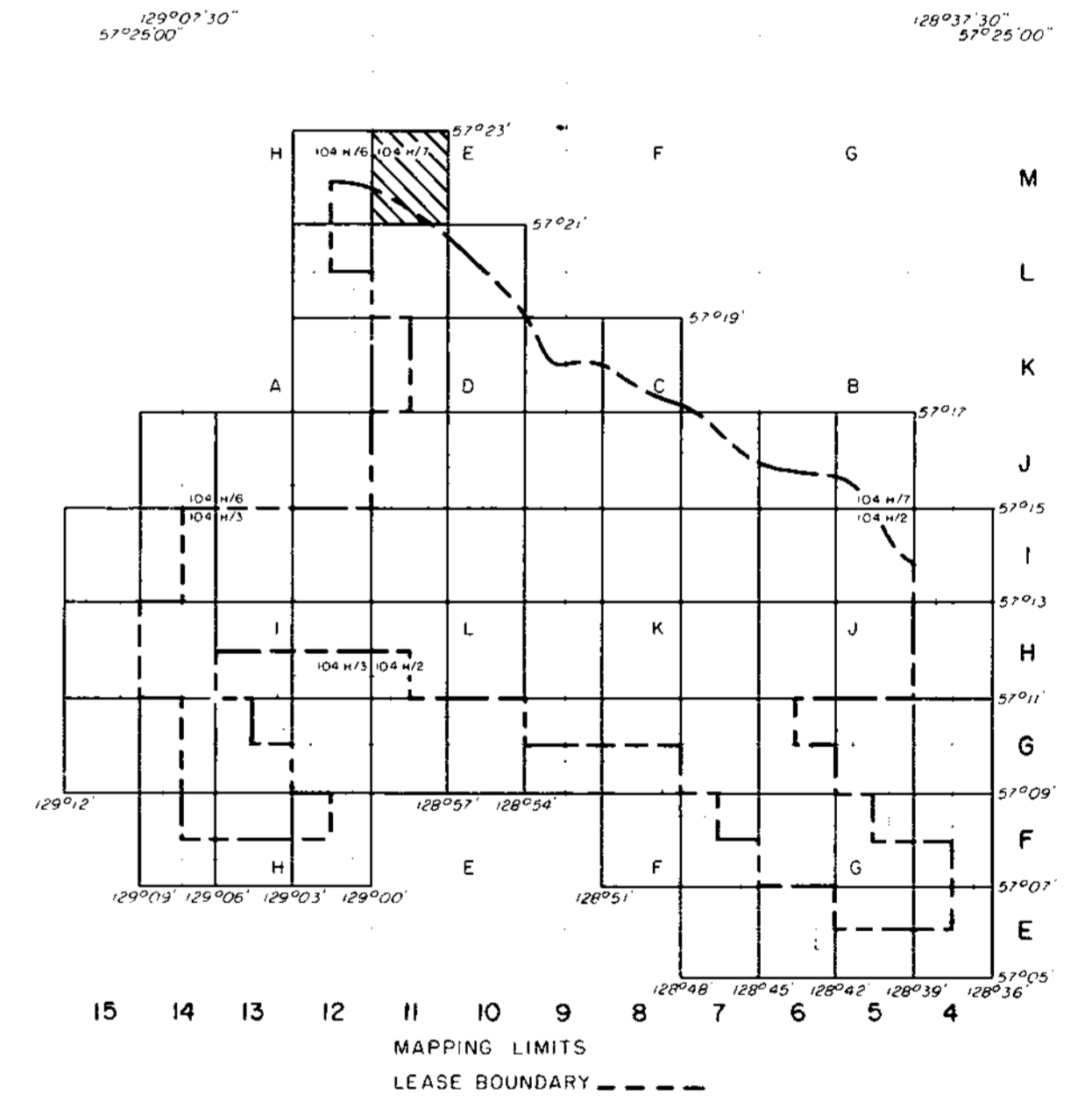
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLEN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/82 AT A SCALE OF 1:6000 (APPROXIMATE)



MT. KLAPPAN AREA INDEX MAP



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 DOWNTHRUST SIDE
---	ADIT TRENCH LOCATION MEASURED SECTION LOCATION
○	CROSS-SECTION LOCATION
○	DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Prepared by: S.M. C. Williams
 Approved by: C. Williams
 Date: Jun, 1984
 Scale: 1:5000
 Drawing No: KP83C68

GULF CANADA RESOURCES INC.
 Coal Division
MT. KLAPPAN COAL PROPERTY
MAP SHEET M II
1983
GEOLOGY MAP

49°05'
121°23'

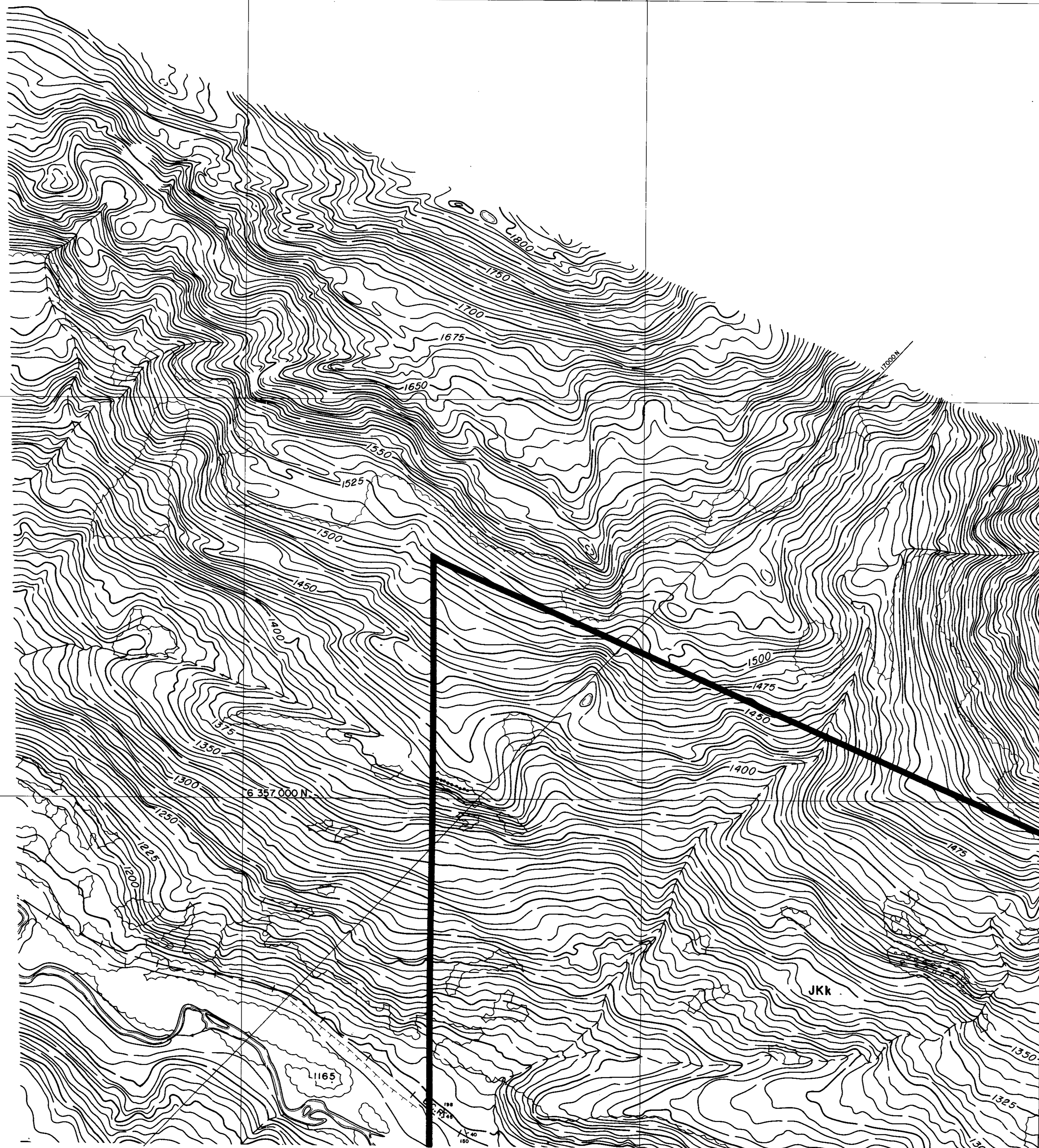
49°00'
121°12'

488 000 E
3 359 000 N

500 000 E

57°21'
121°03'

57°00'



LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL
- SWAMP
- BEAVER DAM
- TREE LINE
- CUT LINE
- CONTOURS, INDEX
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT
- COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

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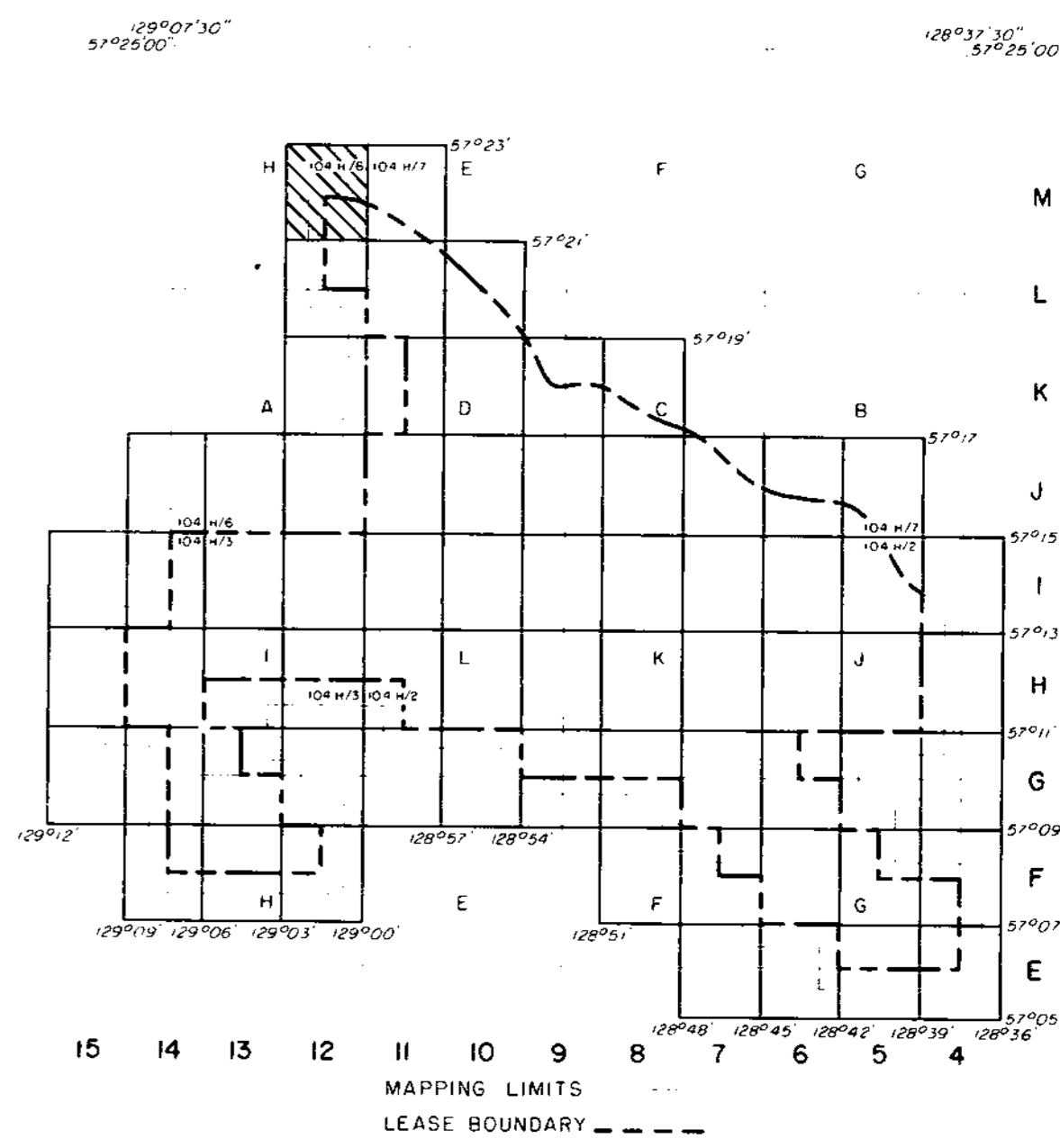
COMPILED BY WESTERN PHOTOGRAMMETRY, A DIVISION OF UNDERWOOD MCELLENN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/77 AT A SCALE OF 1:60,000 (APPROXIMATE)



SCALE 1:5000



MT. KLAPPAN AREA INDEX MAP



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- ADIT TRENCH LOCATION MEASURED SECTION LOCATION
- CROSS-SECTION LOCATION
- DIAMOND DRILLHOLE LOCATION (VERTICAL, INCLINED WITH SURFACE PROJECTION)

Gr. Mt. Klappan 83/210

GULF CANADA RESOURCES INC.
Coal Division

MT. KLAPPAN COAL PROPERTY
MAP SHEET M12
1983
GEOLOGY MAP

PREPARED BY: S.M. SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: JAN, 1984 DRAWING No. KPN83C69