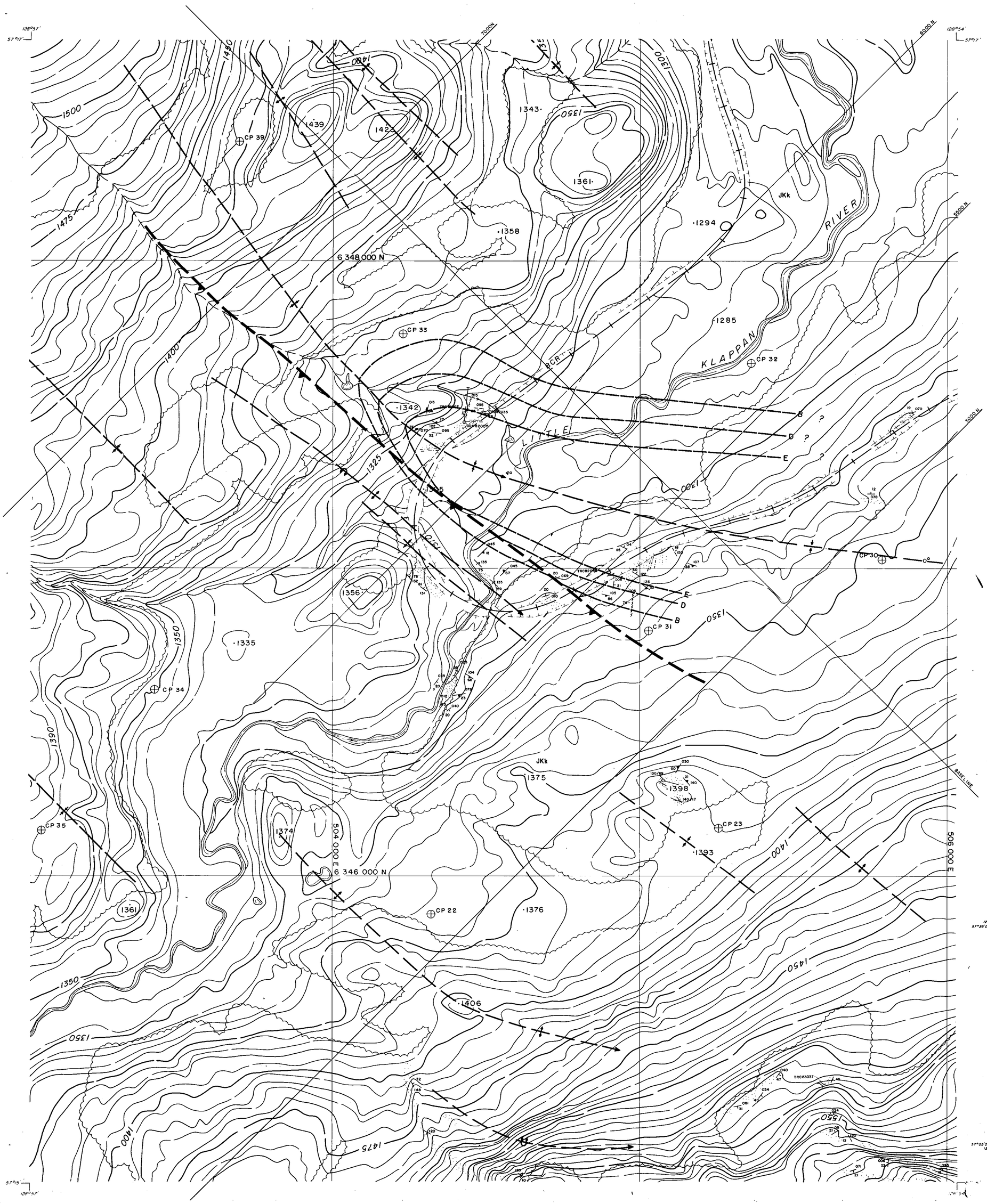
00706

APPENDIX II



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 — B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP121
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 OBSCURRED 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)

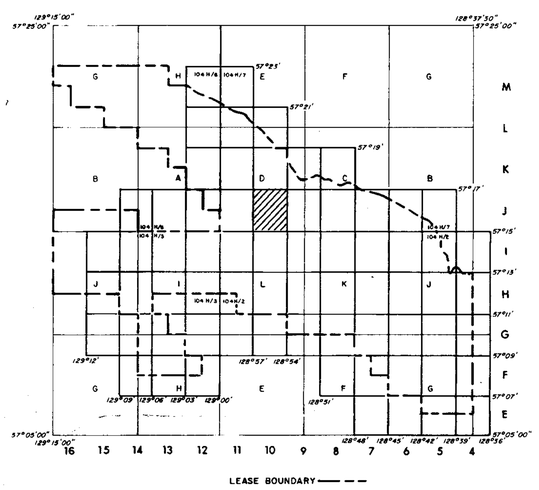
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

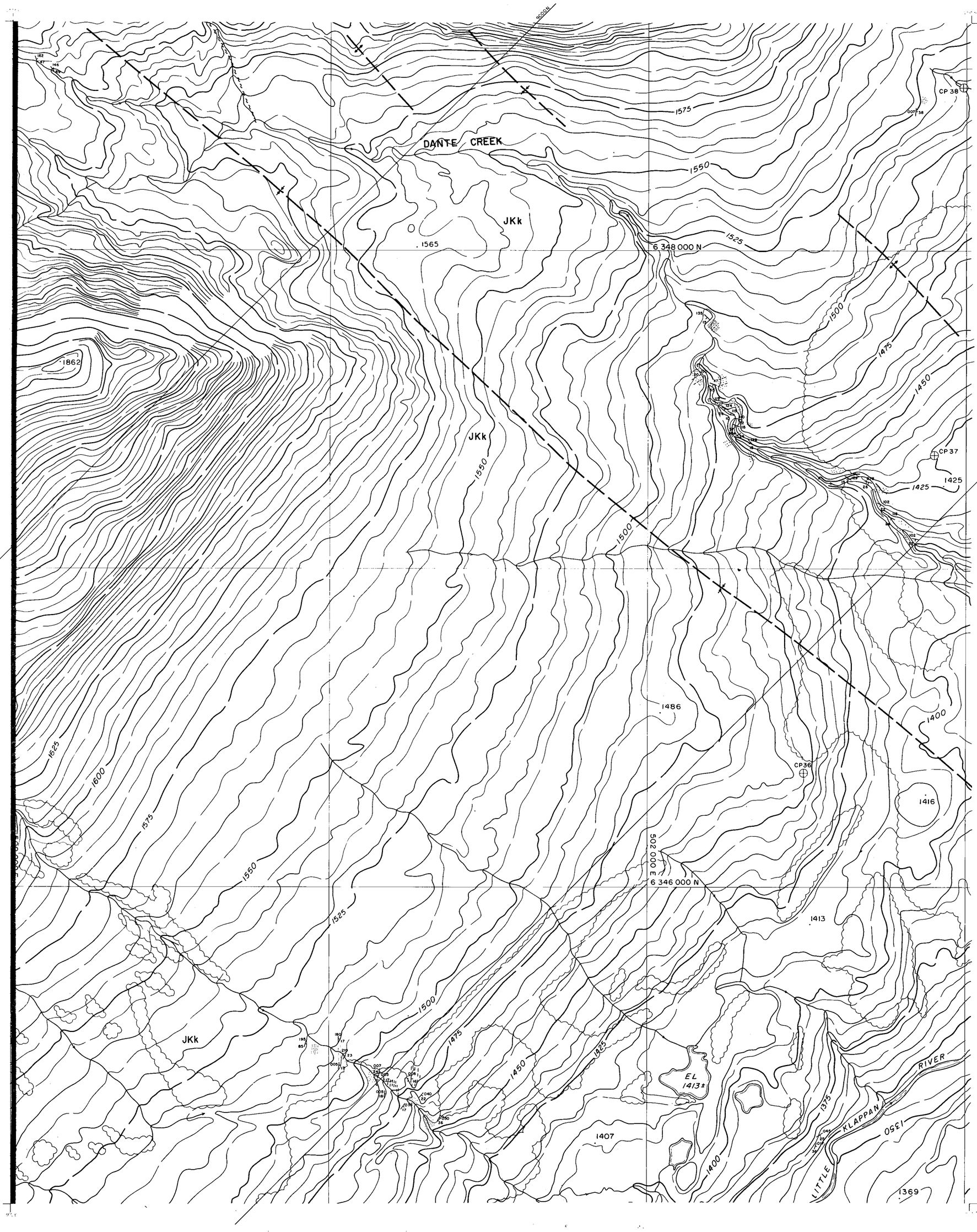
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP J-10

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. [redacted] 1-01



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 [illegible] 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 OBSCURRED BY TREES OR VEGETATION.

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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY
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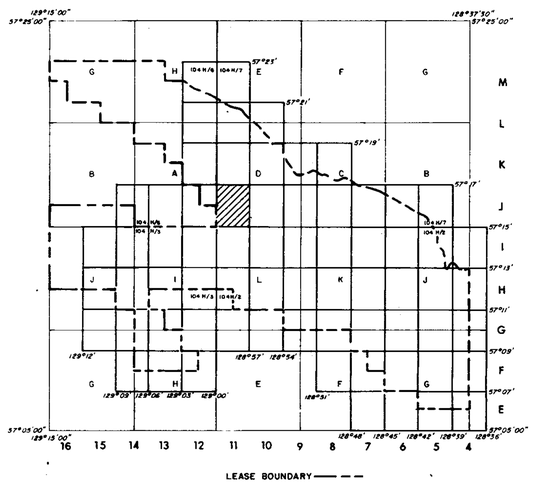
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

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LEGEND

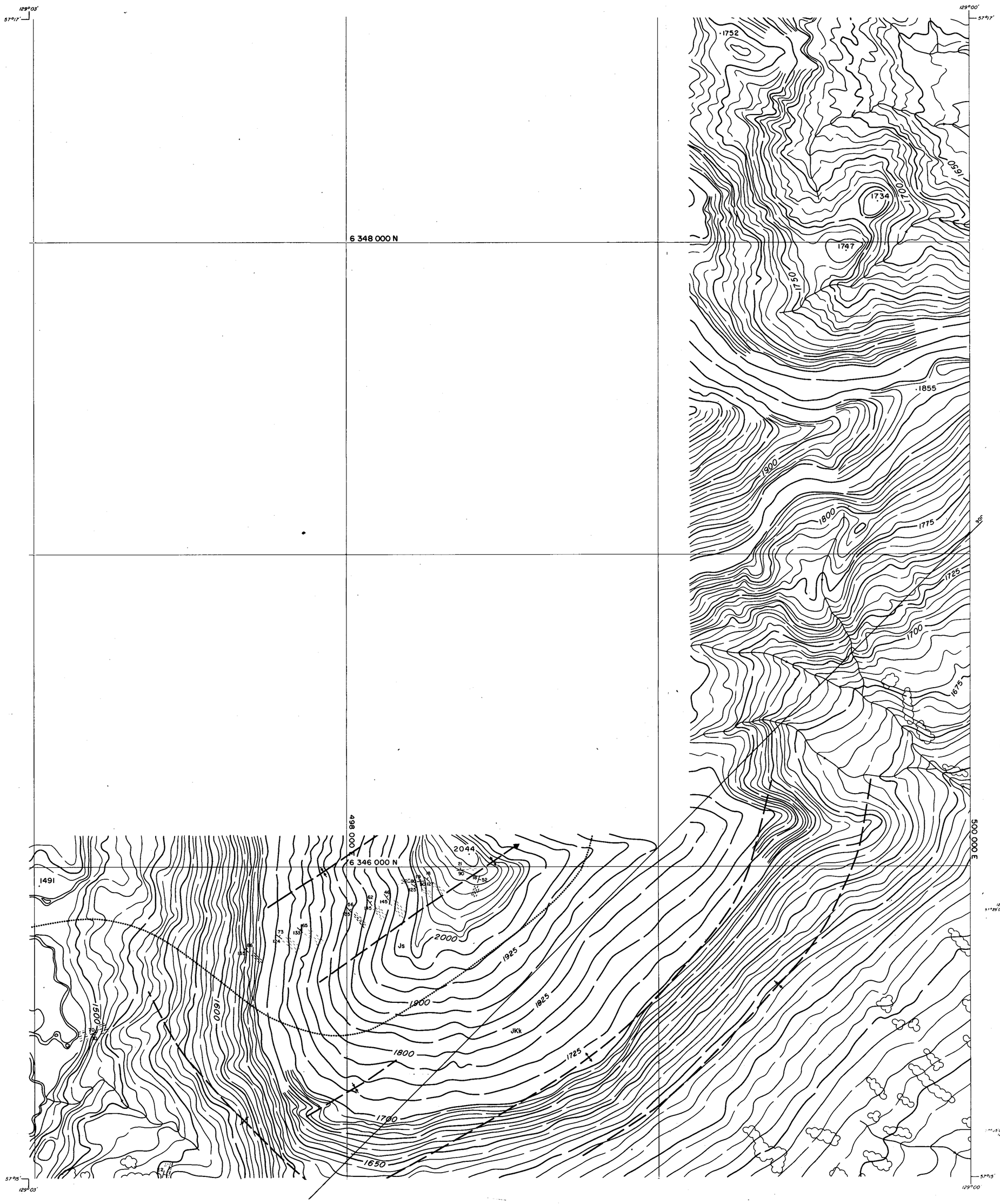
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP J-11

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DRAWING KPN85SUA-02



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
  - INTERMEDIATE
  - DEPRESSION
  - APPROXIMATE
- SPOT ELEVATION — ·7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- COAL LICENCE

NOTES

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

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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 AT A SCALE OF 1:60 000 (APPROXIMATE).

N

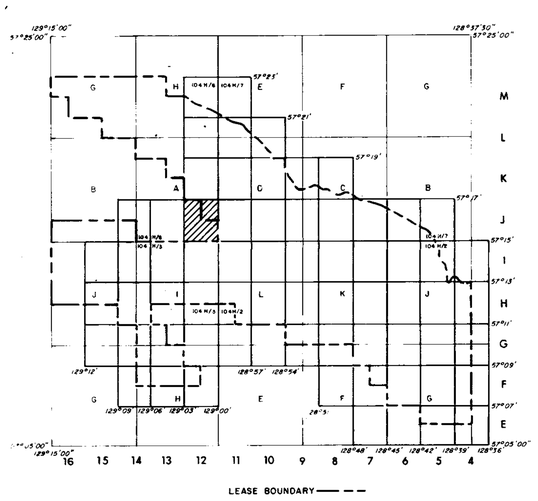
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

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LEGEND

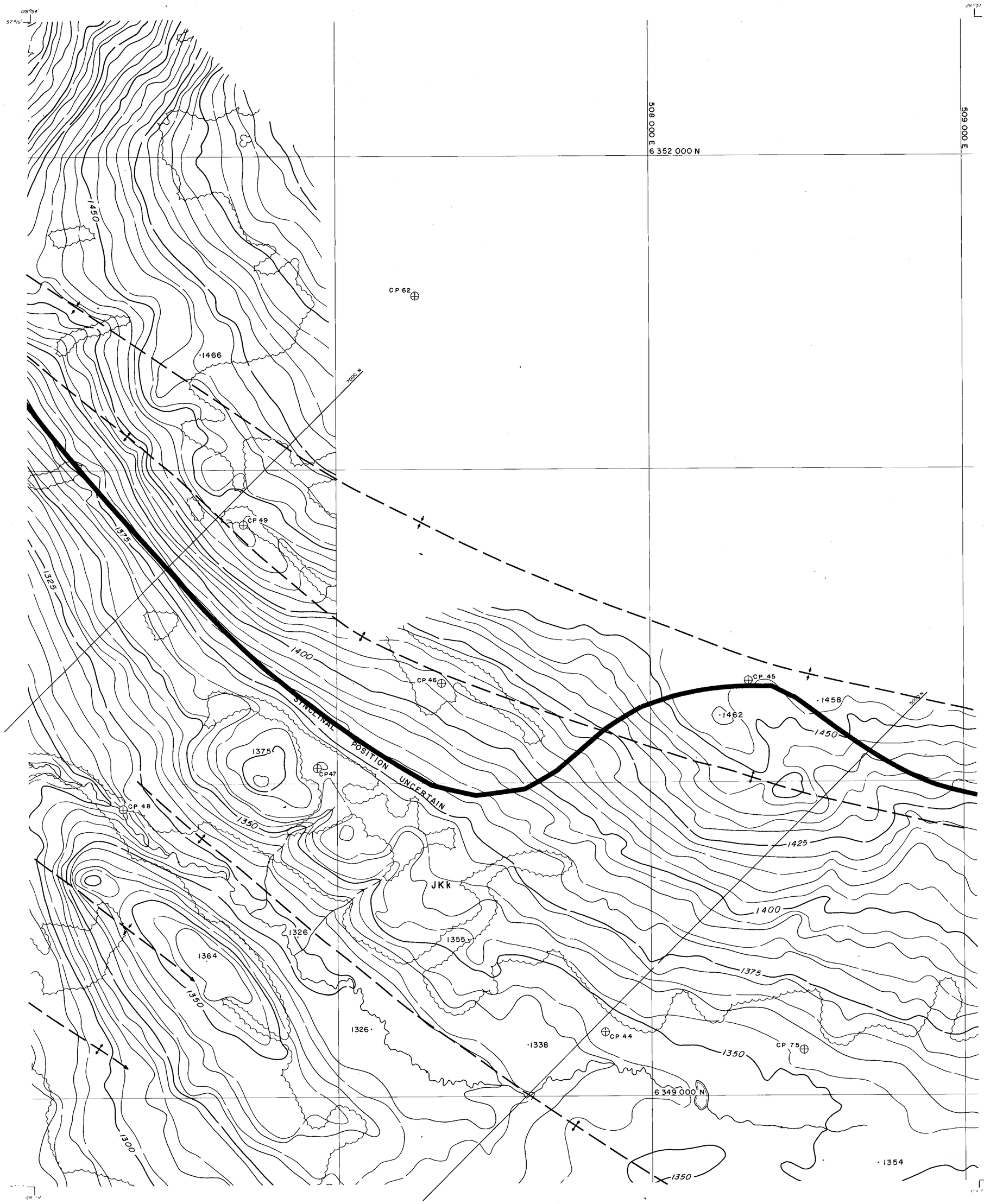
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT — TRENCH — COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP J-12

PREPARED BY: S. MACLEOD		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DRAWING KPN85SUA-03



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
  - INTERMEDIATE
  - DEPRESSION
  - APPROXIMATE
- SPOT ELEVATION — 7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- COAL LICENCE

NOTES

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

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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY
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N

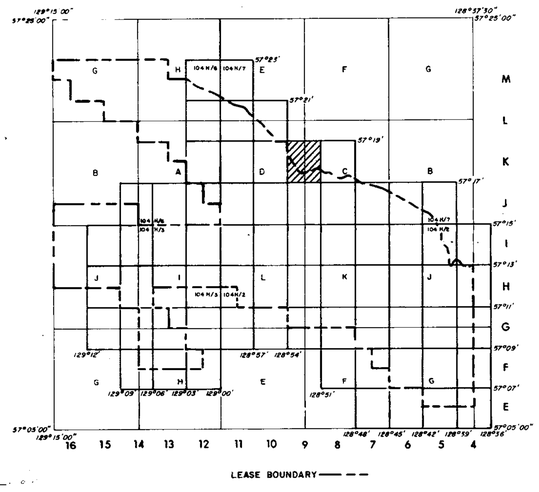
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

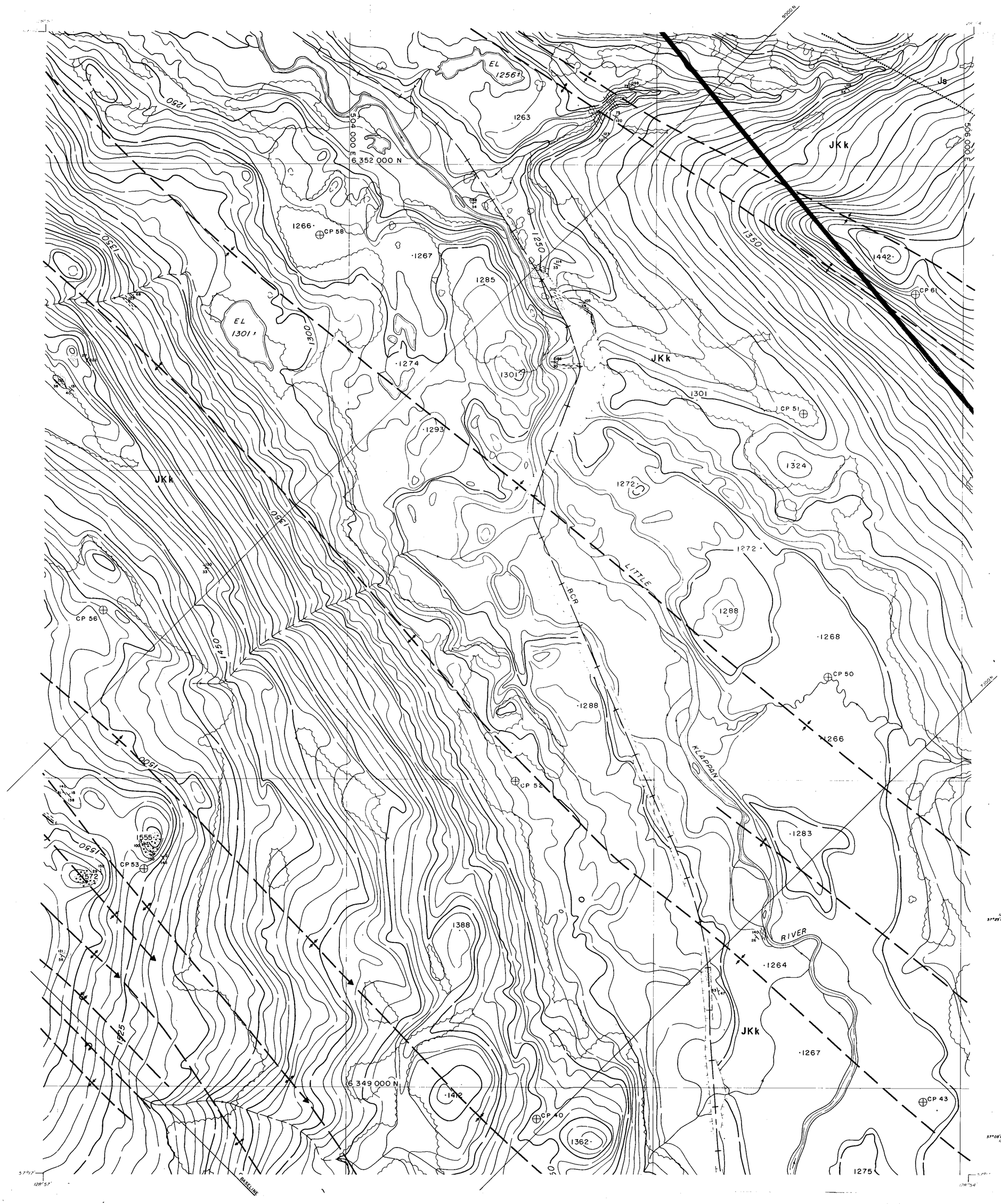
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL — TRC84001 — SP
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION) — DDH RDH WKD
- MEASURED SECTION — OTC 84001
- SURVEY CAIRN — SC-17
- CROSS SECTION LINE — 3000 N

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP K-9

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85SUA-04



LEGEND

BUILDING
ROAD, HARD SURFACE
LOOSE SURFACE
CART TRACK
TRAIL
RAILROAD BED
RIVER
STREAM, DEFINITE
APPROXIMATE
SPLIT
LAKE
WATER LEVEL
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TREE LINE
CUT LINE
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FIELD CONTROL POINT
LOAM LEGENDS

NOTES

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COMPILED BY
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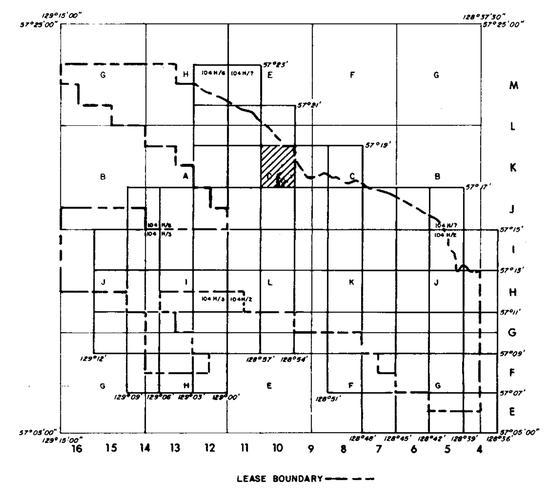
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

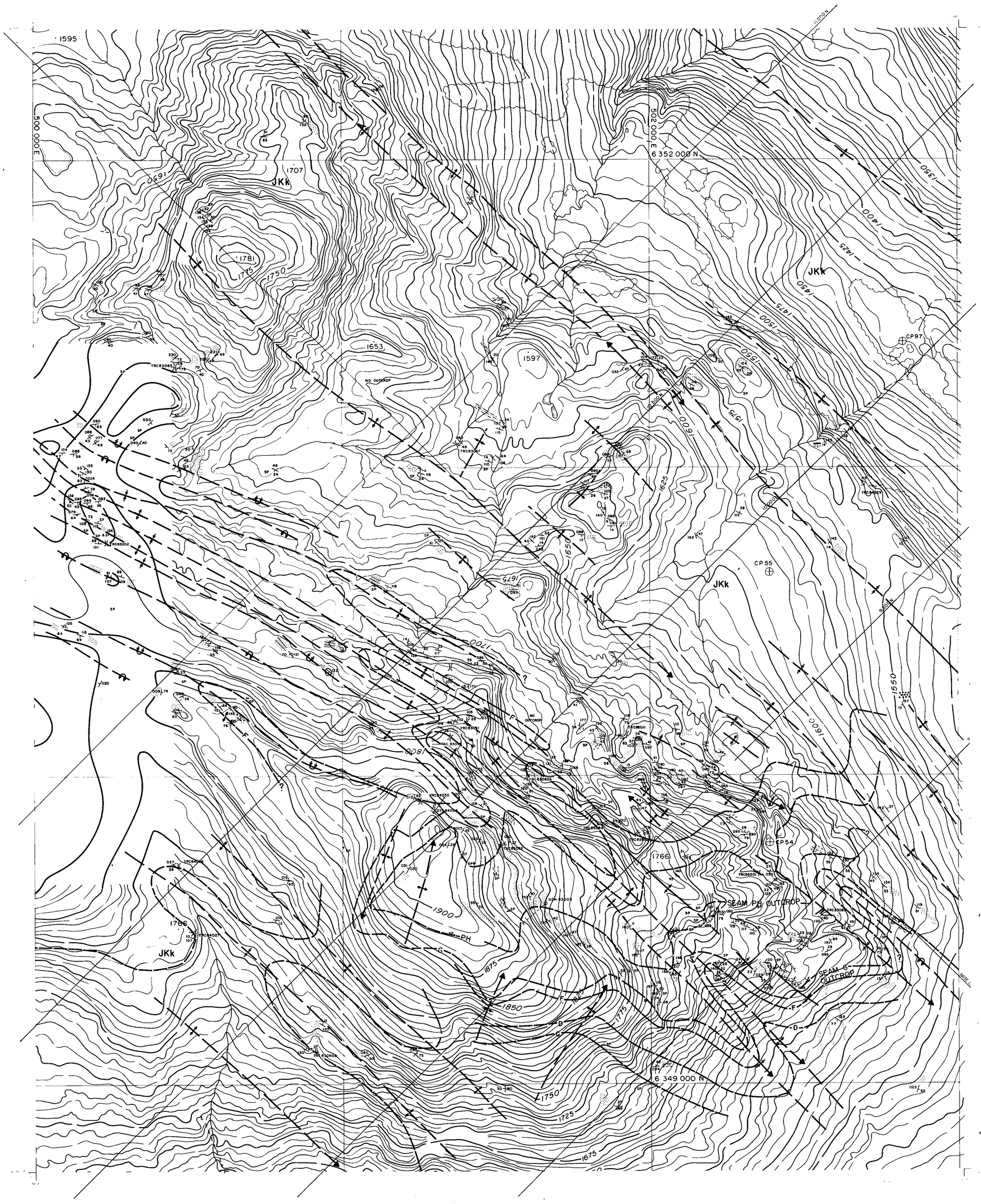
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP K-10

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85SUA-05



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 LINE
FIELD CONTROL POINT
COAL LICENCE

NOTES

MAP COMPILED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:10,000 NEGATIVES

CONTOUR INTERVAL 10M, WITH FORM LINES INTERVAL 1.5M

ACCURACY OF 5M FORM LINES IS EQUAL TO THE ACCURACY OF THE 10M CONTOURS ±5.0 METERS FOR GROUND NOT OBSCURRED 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)

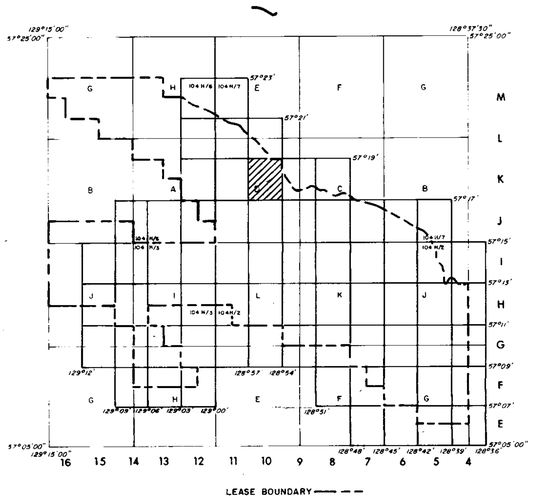
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

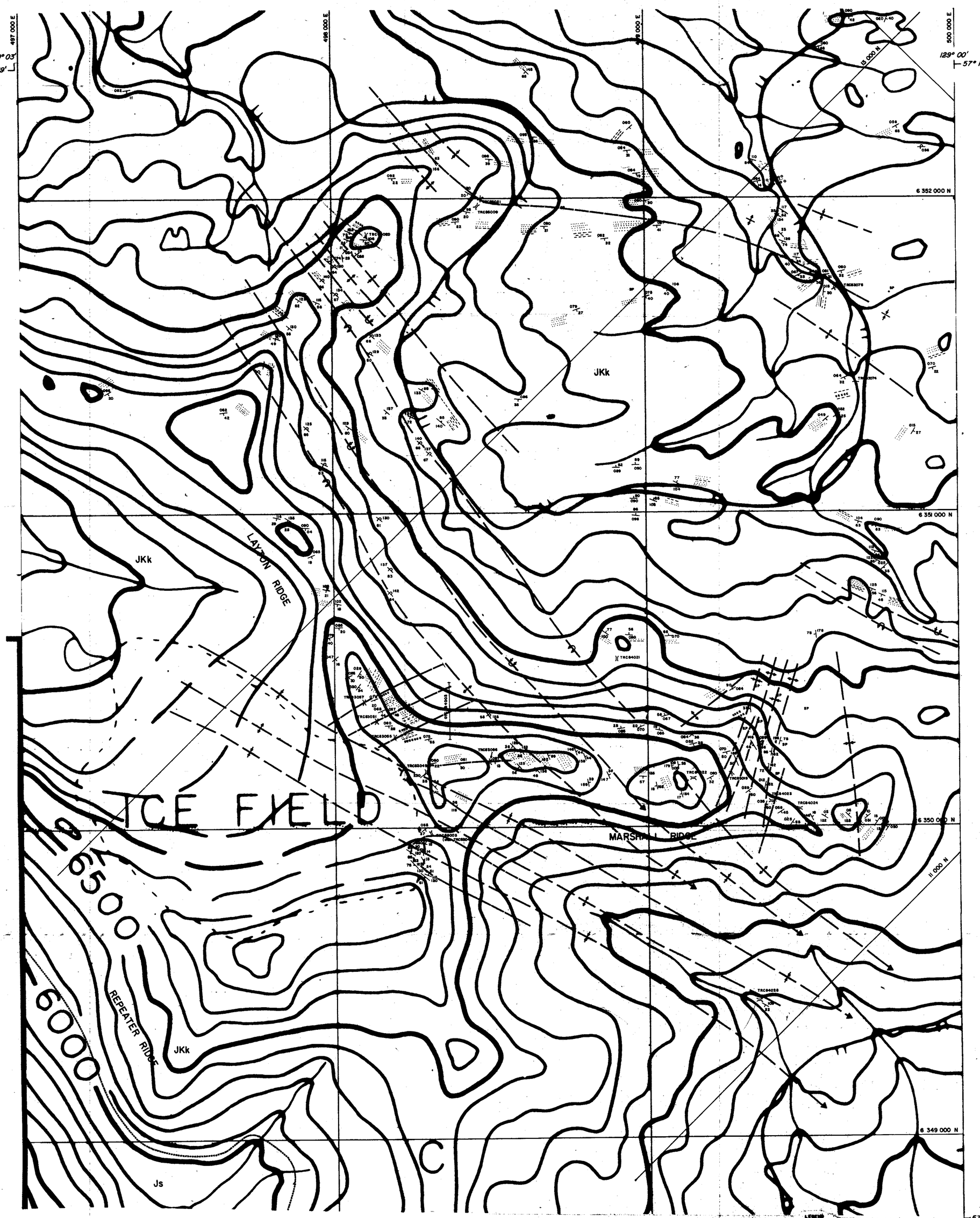
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

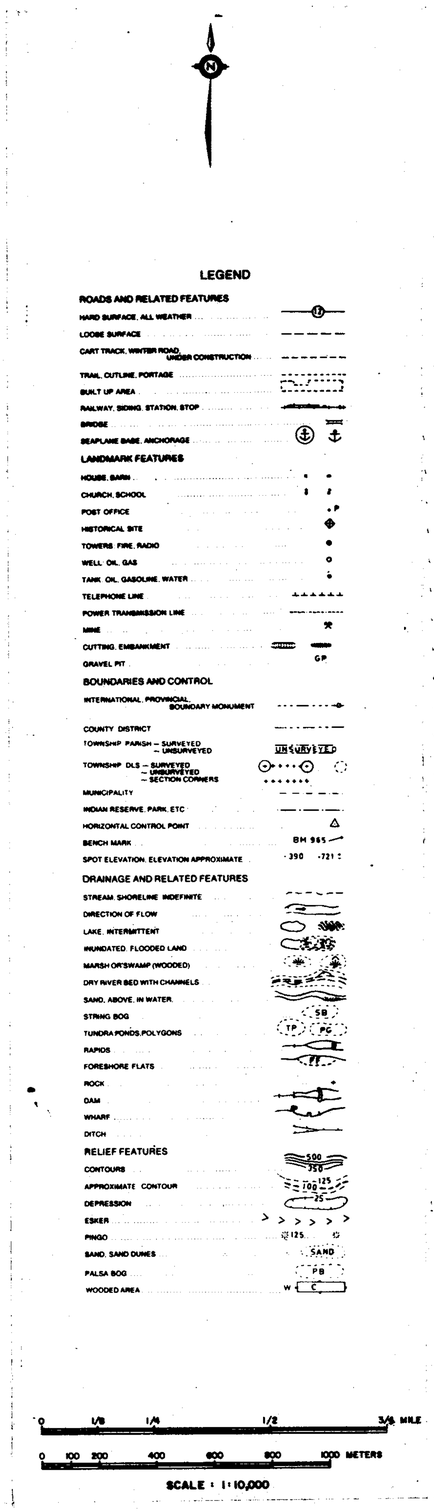
706

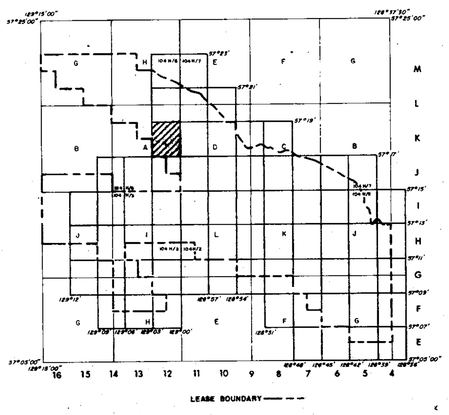
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP K-II

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1985	DWG. No. KPN85SUA-06







706

RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large pods trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the top of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, siltstones siltstones, fine grained sandstones and thin interbeds of orange weathering siltstones. Many sandstones beds display large scale cross bedding and tend to be laterally discontinuous. Thick coarse sandstone beds and thin coal seams increase in abundance towards the basal conglomerate contact. Twenty species of plant fossils exist within the sequence. Blackwood are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with siltstones, siltstones, occasional thin bands of orange weathering siltstones. Coal seams conglomerate and abundant coal seams. Conglomerate beds grade laterally into sandstones. Sandstones often display tabular to trough cross bedding. Bioturbation occurs in the middle of the sequence. Twenty-three species of pteridophyte and twenty-two species of plants are throughout. Petrified wood and rare conifer may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded sandstones, siltstones, mudstones and conglomerate. Carbonaceous mudstones, coal and coaly and other pebbly conglomerates are more abundant in the upper part of the sequence. Bioturbation and bioclasts are present. Palynology may vary. Plant debris may occur near the upper geological contact.

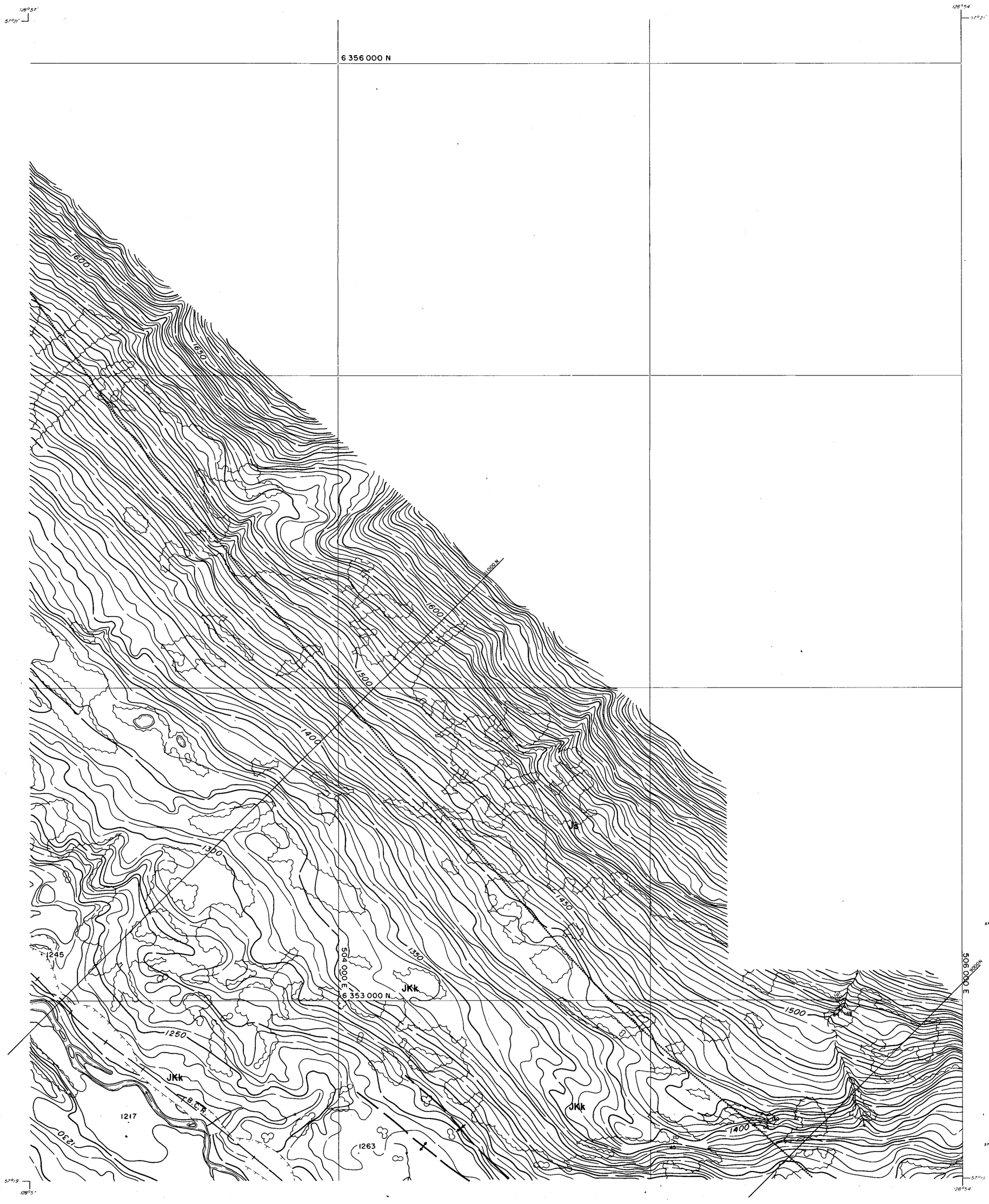
LEGEND

LEASE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, DECLINED, OVERTURNED, VERTICAL, APPROXIMATE, ESTIMATED)
FOLIATION (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) DIPPING RELATIVE MOVEMENT
ADIT TRENCH COAL SPRL
DIAMOND, ROTARY, WHERE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
GEOLOGICAL SECTION
SURVEY CAMP
SEISMIC SECTION LINE

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP K-12

PREPARED BY: S. MACLEOD	
APPROVED BY: K. JENNER	DATE: JAN. 1986 / DWG. No. KPN85SA-07



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — ·7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- 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 OBSCURRED 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).

N

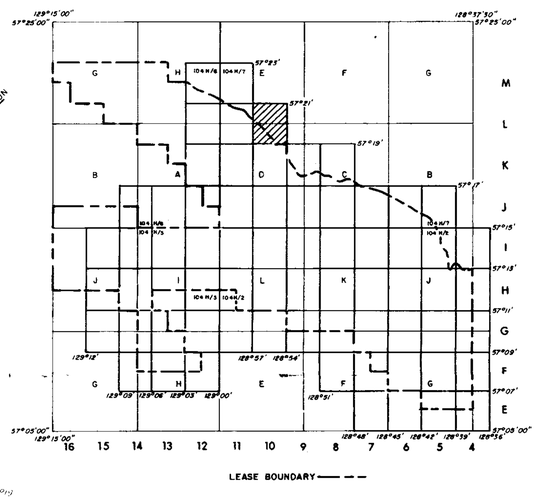
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

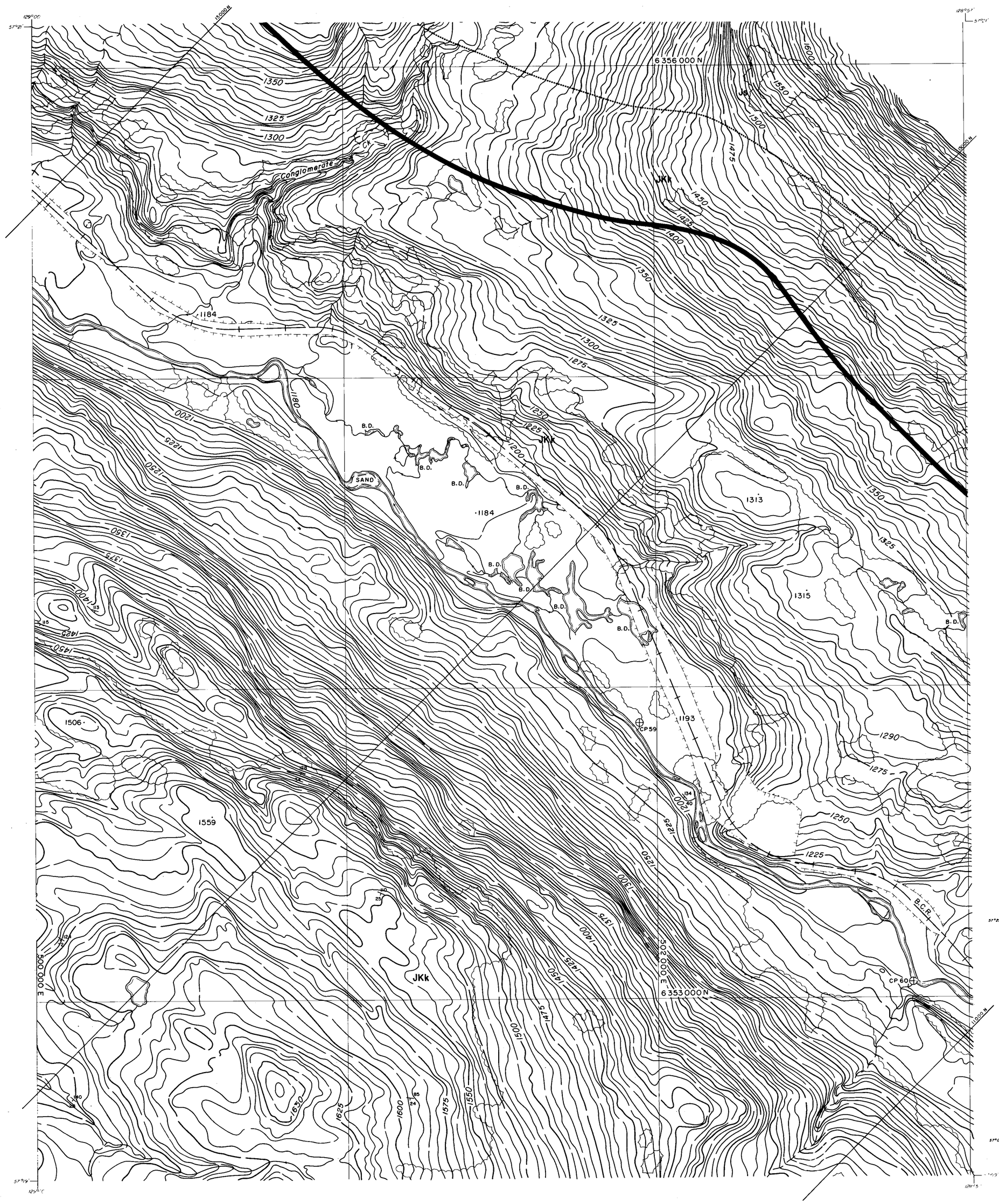
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP L-10

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85SUA-08



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 — B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — 7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
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 OBSCURRED 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).

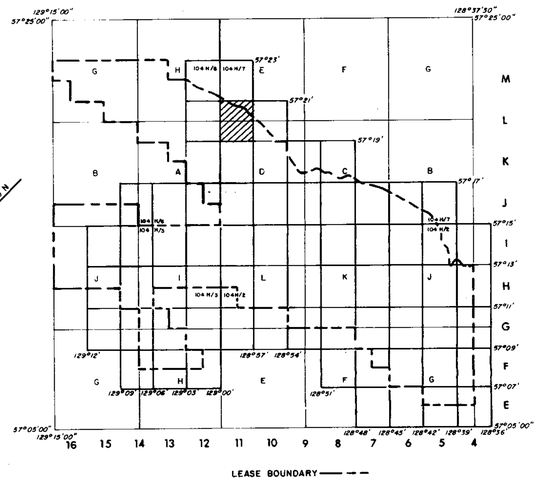
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

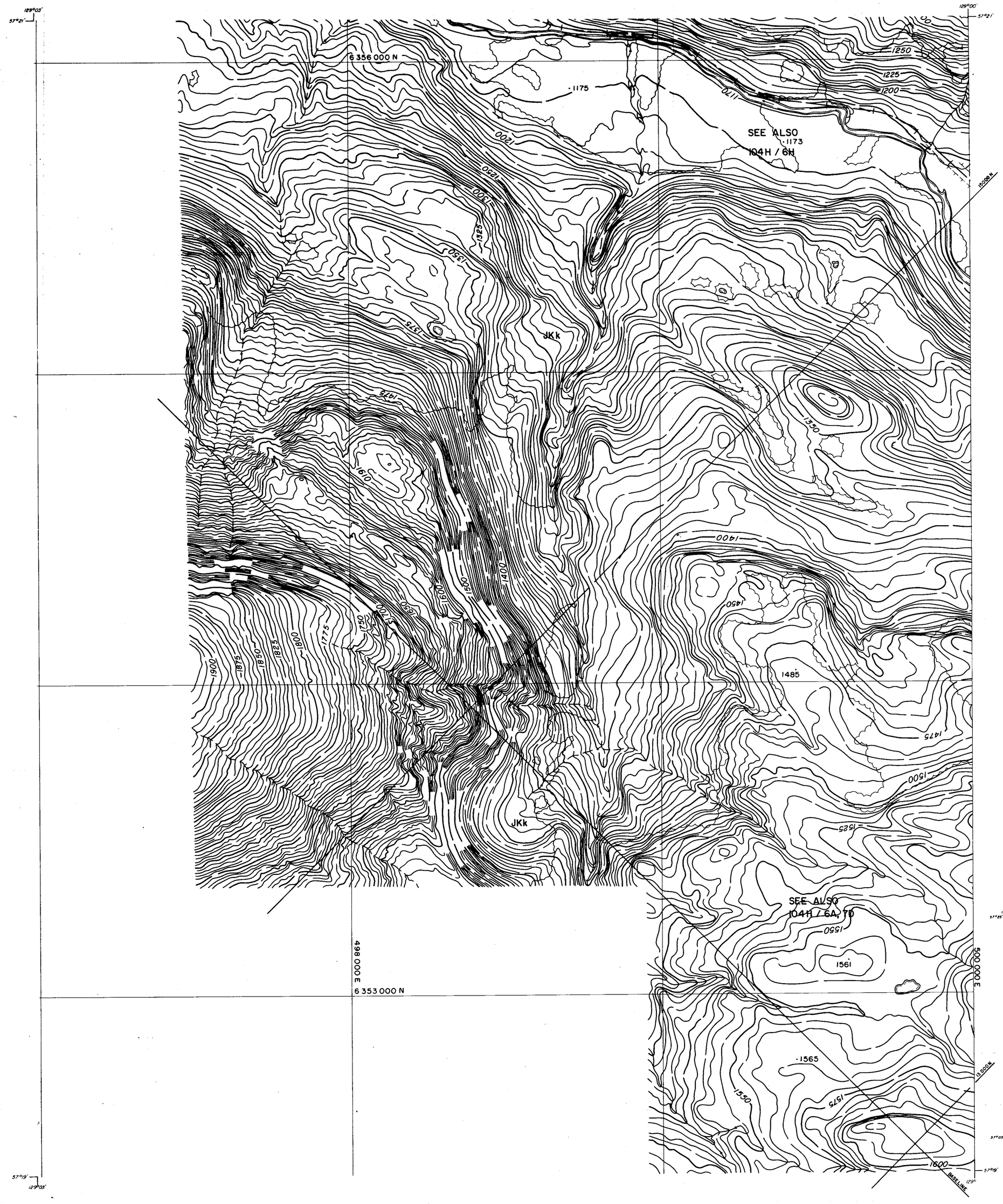
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT — TRC84001 — TRENCH — COAL SPOIL — SP
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION) — DDH RDH WKD
MEASURED SECTION — DTC 84001
SURVEY CAIRN — SC-17
CROSS SECTION LINE — 3000 N

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP L-11

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER — DATE: JAN. 1986	DWG. No. KPN85SA-09



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
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 OBSCURRED 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).

N

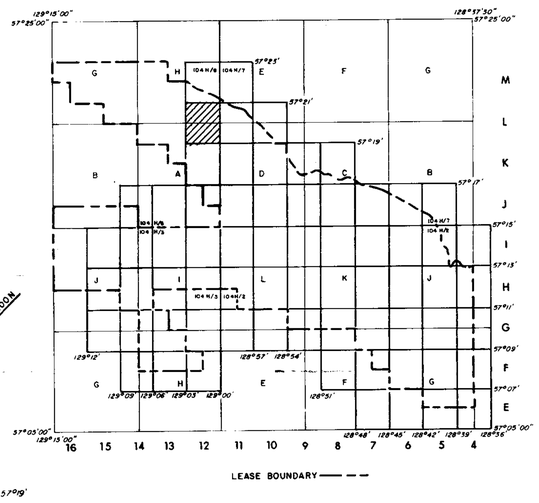
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

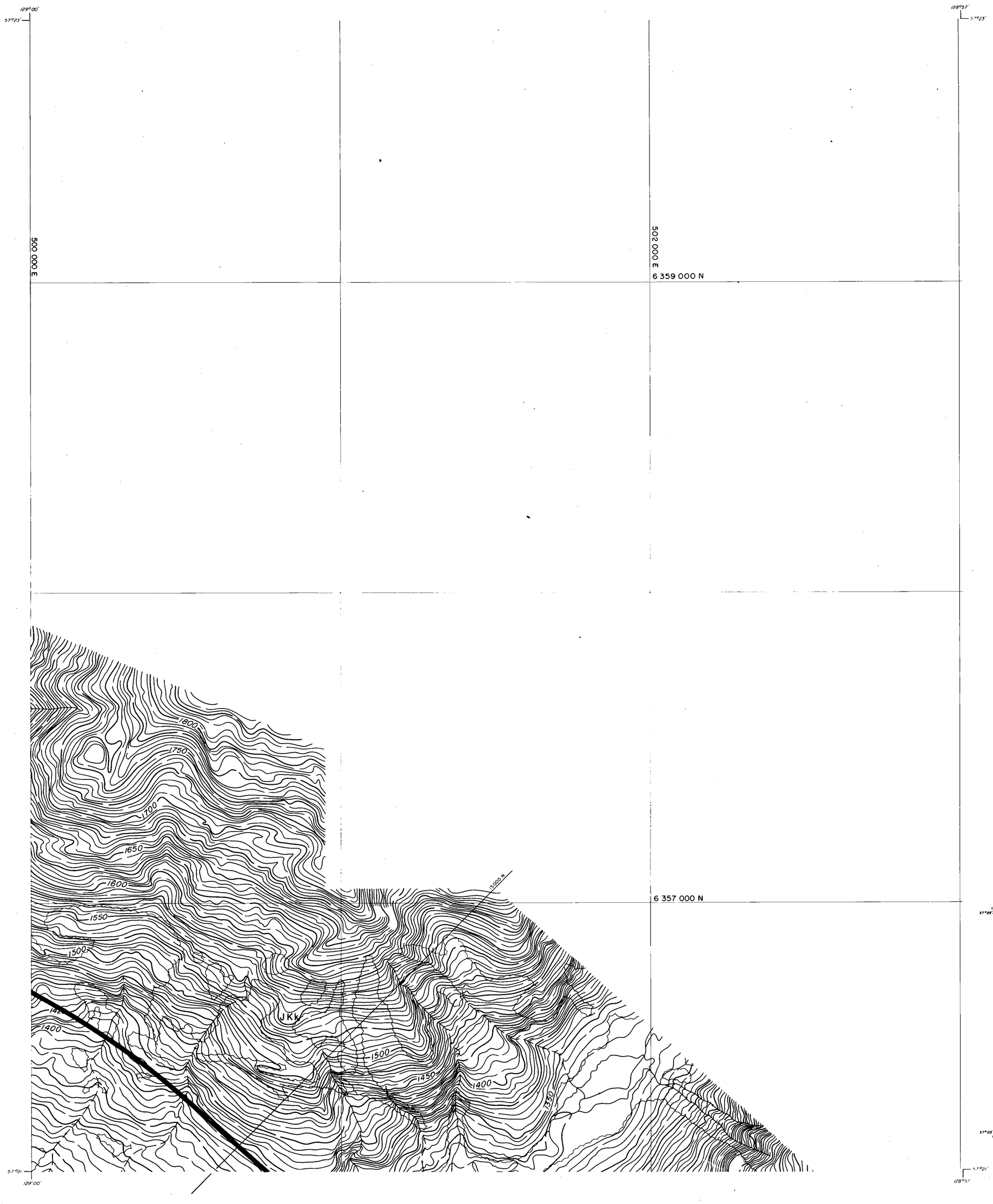
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL — TRC84001 — SP
DDH RDH WKD — DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
OTC 84001 — MEASURED SECTION
SC-17 — SURVEY CAIRN
3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP L-12

PREPARED BY: S. MACLEOD	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85SA-10



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 — B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
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 OBSCURRED 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)

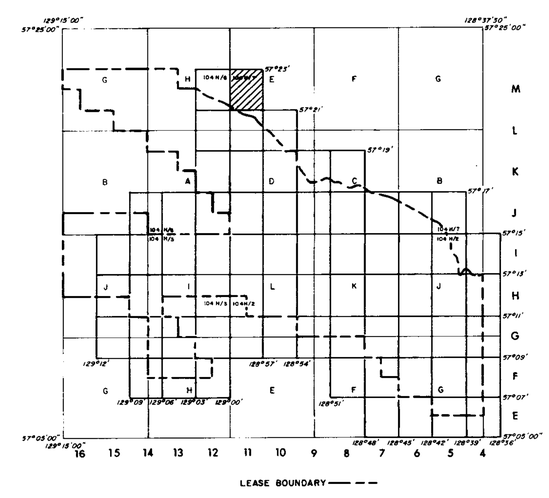
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

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SPATSIZI SEQUENCE

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LEGEND

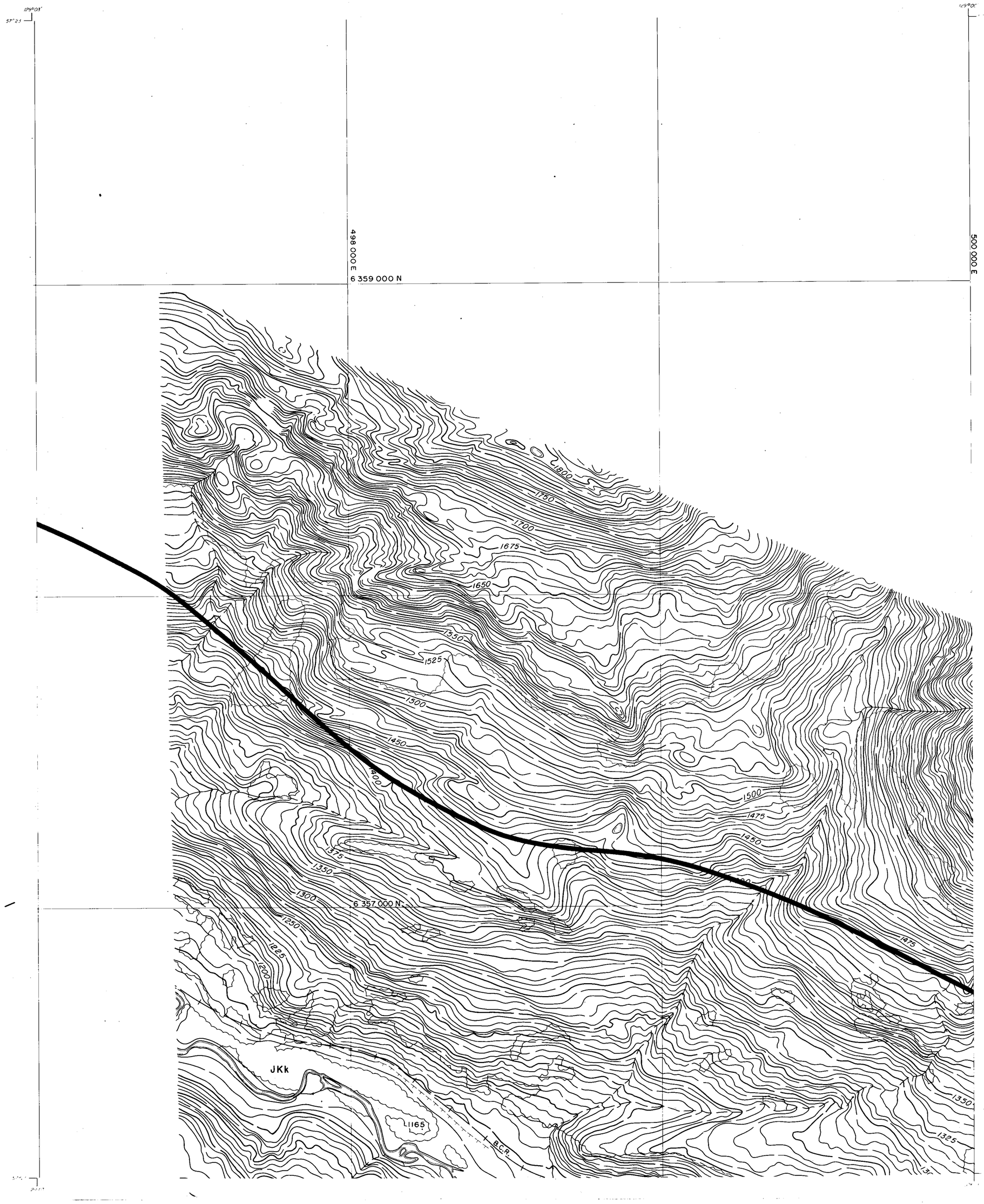
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP M-11

PREPARED BY: SHARON MACLEOD	SCALE 1:5000
APPROVED BY: KIM JENNER DATE: JAN. 1986	DWG. No. KPN85SUA - 11



LEGEND

BUILDING
ROAD, HARD SURFACE
LOOSE SURFACE
CART TRACK
TRAIL
RAILROAD BED
RIVER
STREAM, DEFINITE
APPROXIMATE
SPLIT
LAKE
WATER LEVEL — EL 5057
SWAMP
BEAVER DAM — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
COAL LICENCE

NOTES

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

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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 AT A SCALE OF 1:60000 (APPROXIMATE)

N

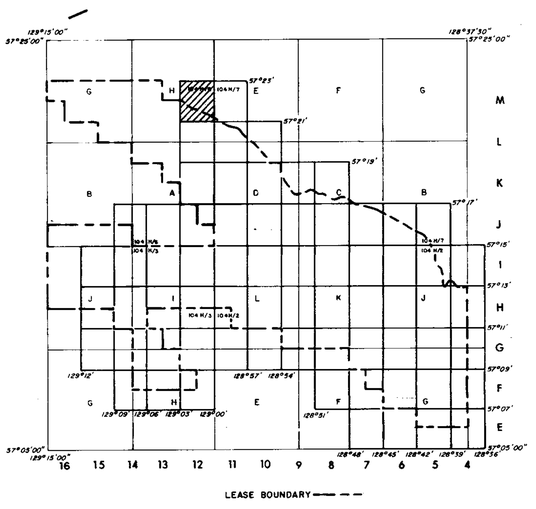
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

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LEGEND

LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
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OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
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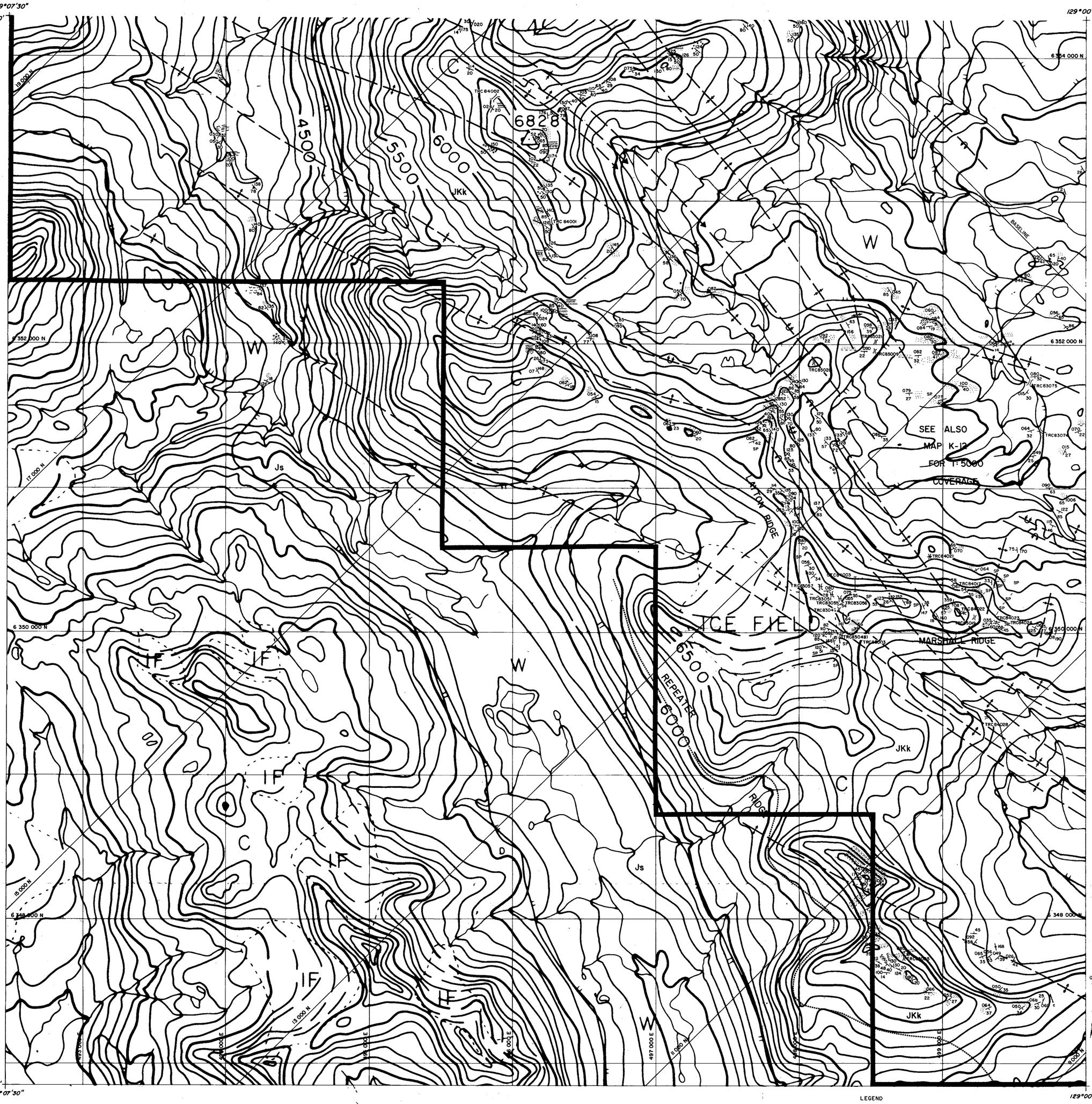
TRC84001 — SP — ADIT TRENCH COAL SPOIL
DDH RDH WKD — DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
OTC 84001 — MEASURED SECTION
SC-17 — SURVEY CAIRN
3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP M-12

PREPARED BY: S. MACLEOD		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DWG. No. KPN85SUA-12



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, GASOLINE, WATER
- TELEPHONE LINE
- POWER TRANSMISSION LINE
- MINE
- CUTTING, EMBANKMENT
- GRAVEL PIT — GP

BOUNDARIES AND CONTROL

- INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
- COUNTY, DISTRICT
- TOWNSHIP, PARISH — SURVEYED — UNSURVEYED — UNSURVEYED
- TOWNSHIP, DLS — SURVEYED — UNSURVEYED — SECTION CORNERS
- MUNICIPALITY
- INDIAN RESERVE, PARK, ETC
- HORIZONTAL CONTROL POINT
- BENCH MARK — BM 965
- SPOT ELEVATION, ELEVATION APPROXIMATE — ·390 ·721±

DRAINAGE AND RELATED FEATURES

- STREAM, SHORELINE INDEFINITE
- DIRECTION OF FLOW
- LAKE, INTERMITTENT
- INUNDATED, FLOODED LAND
- MARSH OR SWAMP (WOODED)
- DRY RIVER BED WITH CHANNELS
- SAND, ABOVE, IN WATER
- STRING BOG — SB
- TUNDRA PONDS, POLYGONS — TP, PG
- RAPIDS
- FORESHORE FLATS — FF
- ROCK
- DAM
- WHARF
- DITCH

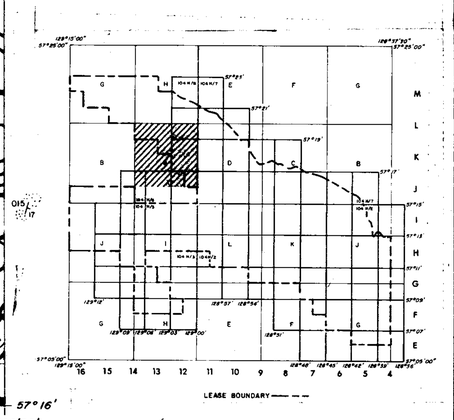
RELIEF FEATURES

- CONTOURS — 500, 250
- APPROXIMATE CONTOUR — 125, 100, 75
- DEPRESSION
- ESKER
- PINGO — 125
- SAND, SAND DUNES — SAND
- PALSA BOG — PB
- WOODED AREA — W, C

0 1/8 1/4 1/2 3/4 MILE

0 100 200 400 600 800 1000 METERS

SCALE : 1:10,000



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LEGEND

- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
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- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
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- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
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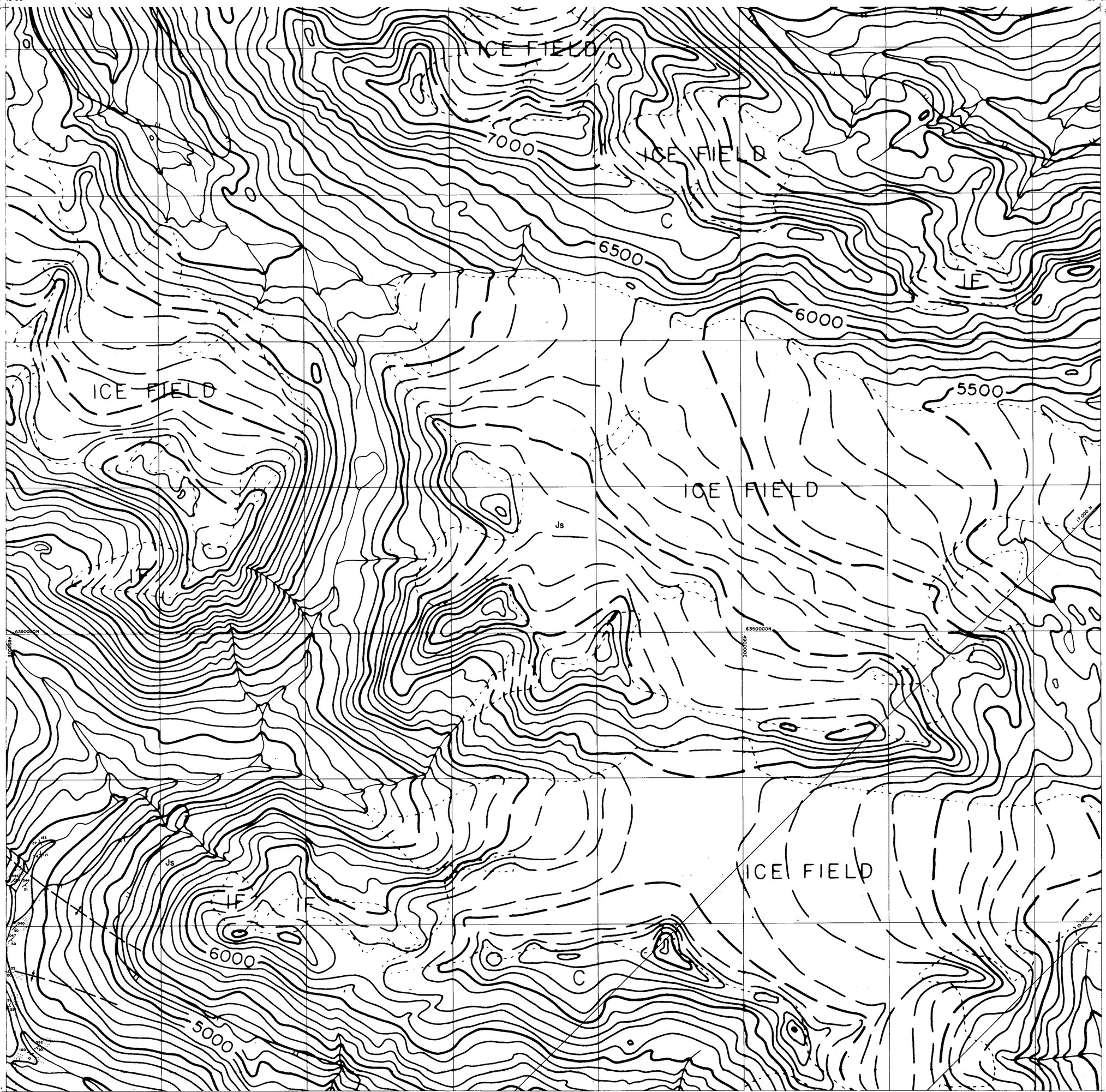
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT, TRENCH, COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP 104 H/6 A 104 H/7 D

PREPARED BY: S. MACLEOD	SCALE 1:10,000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85SA-13



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 GASOLINE WATER
TELEPHONE LINE
POWER TRANSMISSION LINE
MINE
CUTTING EMBANKMENT
GRAVEL PIT

BOUNDARIES AND CONTROL

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

DRAINAGE AND RELATED FEATURES

STREAM SHORELINE INDEFINITE
DIRECTION OF FLOW
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INUNDATED FLOODED LAND
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DRY RIVER BED WITH CHANNELS
SAND ABOVE IN WATER
STRING BOG
TUNDRA PONDS POLYGONS
RAPIDS
FORESHORE FLATS
ROCK
DAM
WHARF
DITCH

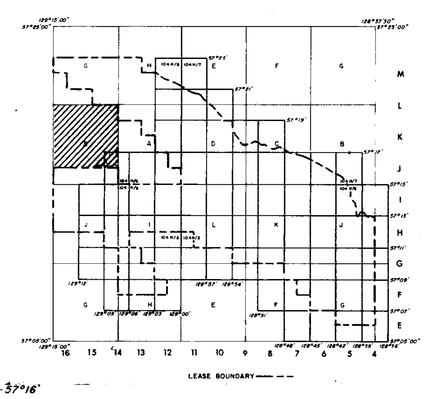
RELIEF FEATURES

CONTOURS
APPROXIMATE CONTOUR
DEPRESSION
ESKER
PINGO
SAND SAND DUNES
PALSA BOG
WOODED AREA

0 1/8 1/4 1/2 3/4 MILE

0 100 200 400 600 800 1000 METERS

SCALE 1:10,000



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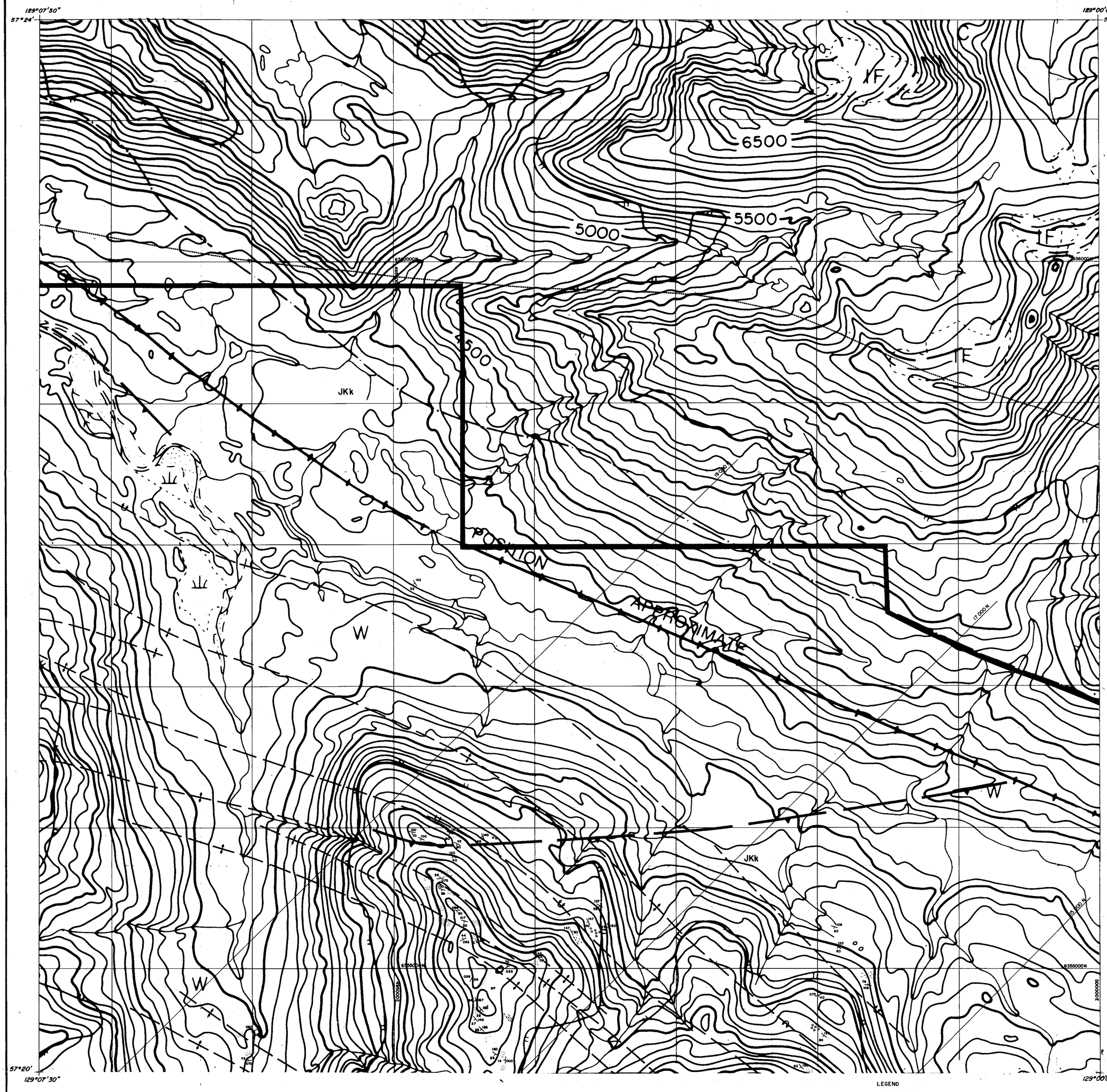
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP 104 H/6 B

PREPARED BY:	S. MACLEOD		SCALE 1:10,000
APPROVED BY:	K. JENNER	DATE: JAN/86	DWG. No. KPN85NA-14



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, GASOLINE, WATER
TELEPHONE LINE
POWER TRANSMISSION LINE
MINE
CUTTING, EMBANKMENT
GRAVEL PIT — GP

BOUNDARIES AND CONTROL

INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
COUNTY, DISTRICT
TOWNSHIP, PARISH — SURVEYED — UNSURVEYED — UNSURVEYED
TOWNSHIP, DLS — SURVEYED — UNSURVEYED — SECTION CORNERS
MUNICIPALITY
INDIAN RESERVE, PARK, ETC
HORIZONTAL CONTROL POINT
BENCH MARK — BM 965
SPOT ELEVATION, ELEVATION APPROXIMATE — ·390 ·721±

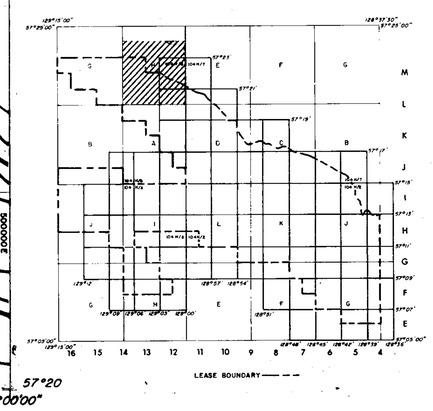
DRAINAGE AND RELATED FEATURES

STREAM, SHORELINE, INDEFINITE
DIRECTION OF FLOW
LAKE, INTERMITTENT
INUNDATED, FLOODED LAND
MARSH OR SWAMP (WOODED)
DRY RIVER BED WITH CHANNELS
SAND, ABOVE, IN WATER
STRING BOG — SB
TUNDRA PONDS, POLYGONS — TP, PG
RAPIDS
FORESHORE FLATS — FF
ROCK
DAM
WHARF
DITCH

RELIEF FEATURES

CONTOURS — 500, 375
APPROXIMATE CONTOUR — 125, 100
DEPRESSION — 25
ESKER
PINGO — 125
SAND, SAND DUNES — SAND
PALSA BOG — PB
WOODED AREA — W, C

0 1/8 1/4 1/2 3/4 MILE
0 100 200 400 600 800 1000 METERS
SCALE 1:10,000



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Ninetean species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

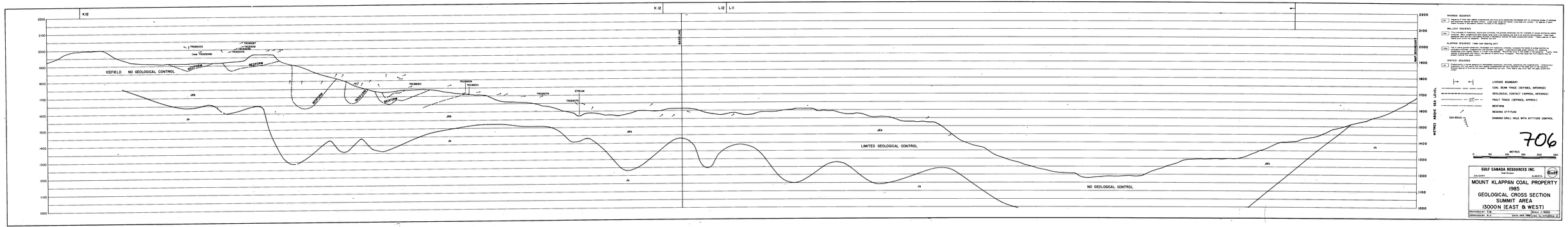
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
SUMMIT AREA
MAP 104 H/6 H

PREPARED BY: S. MACLEOD	SCALE 1:10,000
APPROVED BY: K. JENNER — DATE: JAN. 1986	DWG. No. KPN85NA-16



THRUSTS SEQUENCE

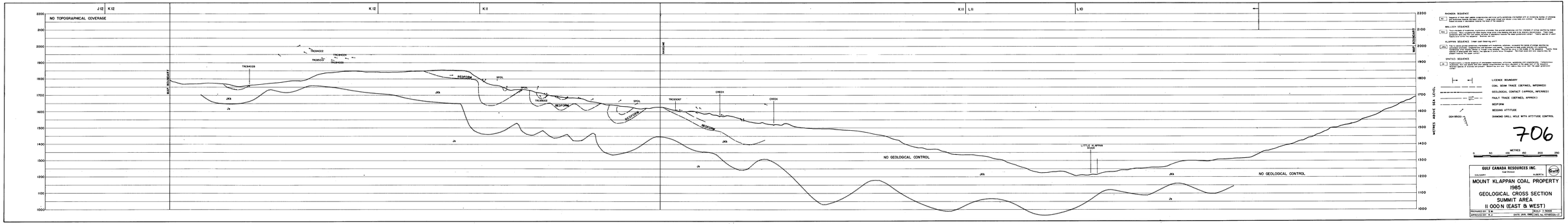
(6) Thrusting of Upper Triassic Jackpine Formation over Early Jurassic Kootenay Formation with an increasing number of subsidiary thrusts towards the Jackpine Formation contact. Thrusts are dated as post Jurassic. (Thrusts of phase 2)

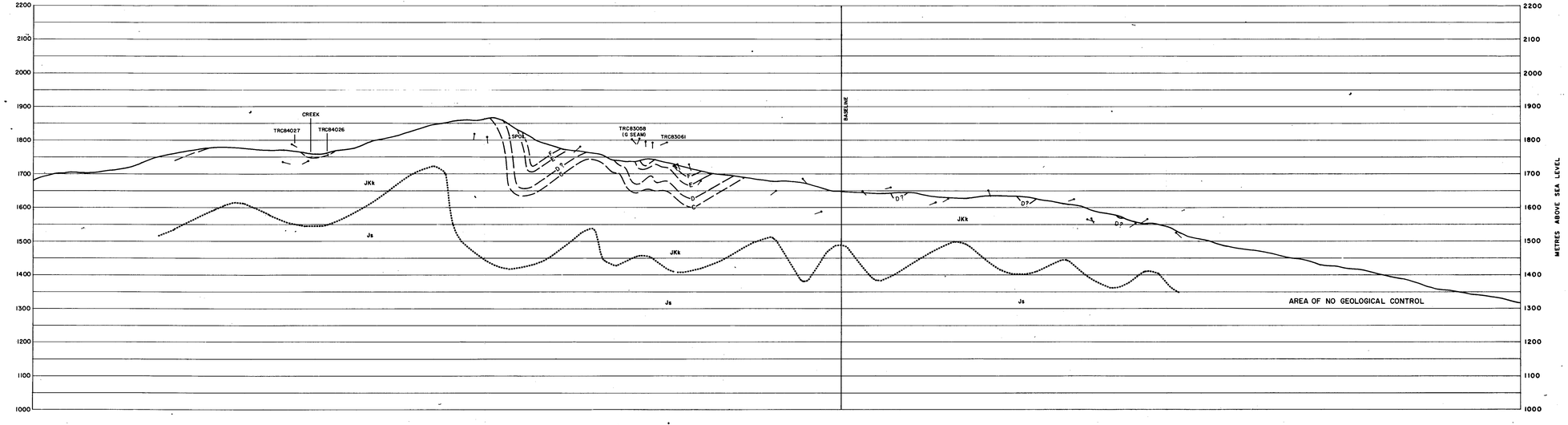
WALLCOCK SEQUENCE

(5) Tilting of Jackpine Formation, Kootenay Formation, Fernie Formation and the Jurassic of Group and thrusting beneath the Jackpine Formation. Early thrusting that cuts the Jackpine Formation and the Jurassic of Group and thrusts the Jurassic and Fernie Formation over the Jurassic and Kootenay Formation. (Thrusts phase of phase 2 and 3)

KLAPPAN SEQUENCE (1000-1200 Ma/Hadrynian)

(4) Tilt to vertical gravity sedimentary rocks (Hadrynian of Purcell Supergroup, Kitchener, Corbeau and Kitchener of Kitchener Formation) and Jurassic Kootenay Formation. Tilting of Kootenay Formation and Jurassic Kootenay Formation and Jurassic Kootenay Formation. Tilting of Kootenay Formation and Jurassic Kootenay Formation. Tilting of Kootenay Formation and Jurassic Kootenay Formation. Tilting of


J12
K12
K11
L11
L10
NO TOPOGRAPHICAL COVERAGE
MAP BOUNDARY
BASELINE
TRC84009
TRC84022
TRC84004
TRC85017
TRC84005
JKR
Jk
REDFORM
SPOIL
TRC85007
CREEK
NO GEOLOGICAL CONTROL
LITTLE KLAPPAN RIVER
METRES ABOVE SEA LEVEL
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
RUNDLE SEQUENCE
Rc 1 Sequence of thin coal seams (underlying and lying above a thick sandstone unit) separated with an increasing number of carbonate beds (siderite) in the upper section. Thin coal seams are common. The sequence of seam thicknesses is very variable.
MALLICK SEQUENCE
Ma 1 Thick coal seams of variable, significant extents, the general sequence, and the thickness of partings and the rock types of partings. Many of sedimentary beds display thick cross-bedding and have to be bedding and have to be mentally reconstructed. These coal seams are commonly underlain by thick, massive, cross-bedded sandstones. Rocks of this sequence are found in the Mallick, Rundle and Spring Coulee formations.
KLAPPAN SEQUENCE (Upper Coal Seam Sequence)
Jk 1 Sequence of thin coal seams (underlying and lying above) thick sandstones. Distinguished from the Rundle of Mallick sequences by the presence of thin carbonate beds (siderite) and shale. Distinguished from the Spring Coulee sequence by the presence of thick sandstones underlying the coal seams. Rocks of this sequence are found in the Mallick, Rundle and Spring Coulee formations. Particular shale and thin siderite may be present in the Spring Coulee formation.
SPRING COULEE SEQUENCE
Jc 1 Sequence of thin coal seams of variable thickness, significant extents and characteristics. Characteristic carbonaceous shale and siderite beds are present in the sequence. Rocks of this sequence are found in the Spring Coulee formation. Rocks of Rundle and Mallick sequences may also be present in the Spring Coulee formation.
LICENCE BOUNDARY
COAL SEAM TRACE (DEFINED, INFERRED)
GEOLOGICAL CONTACT (APPROX, INFERRED)
FAULT TRACE (DEFINED, APPROX.)
REDFORM
BEDDING ATTITUDE
DDH 85020
DIAMOND DRILL HOLE WITH ATTITUDE CONTROL
706
METRES
0 50 100 200 300 400
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA
MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
11 000 N (EAST & WEST)
PREPARED BY: D.R.
SCALE 1:5000
APPROVED BY: R.Z.
DATE JAN. 1986 (REF. No. KP4085A-1-F



RHONDDA SEQUENCE

Kr — Sequence of thick, short pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering medium siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Rootlets are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering medium siltstones and thin coal seams. Conglomerates are rare. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Sandstones often display tabular to trough cross bedding. Rootlets are rare in the middle of the sequence. Twenty three species of pelecypods and twenty two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a coarse sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

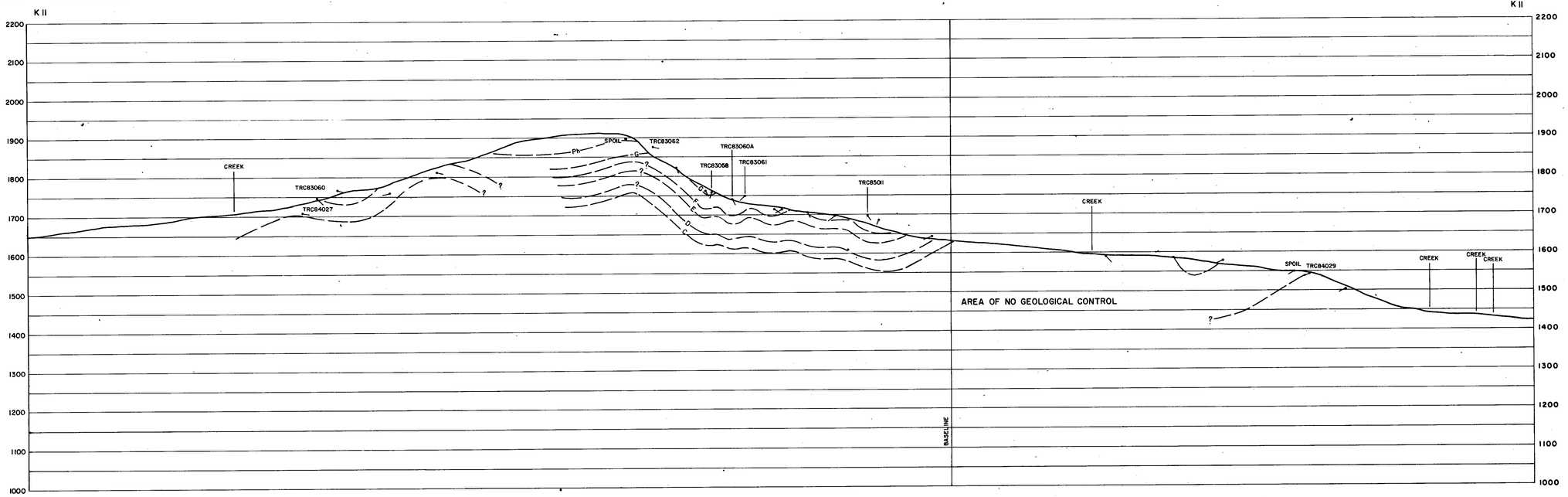
706

METRES 0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
10 500 N (EAST & WEST)

PREPARED BY: S. M.	SCALE 1:5000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KPNB55A-18



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering concretionary siltstones, conglomerates and abundant coal seams. Conglomerates occur in the middle of the sequence. Sandstones often display tabular or trough cross bedding. Mudstones occur in the middle of the sequence. Twenty-three species of plants (two species of bivalves) occur throughout. Petrified wood and rare coquina may be present towards the upper contact

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

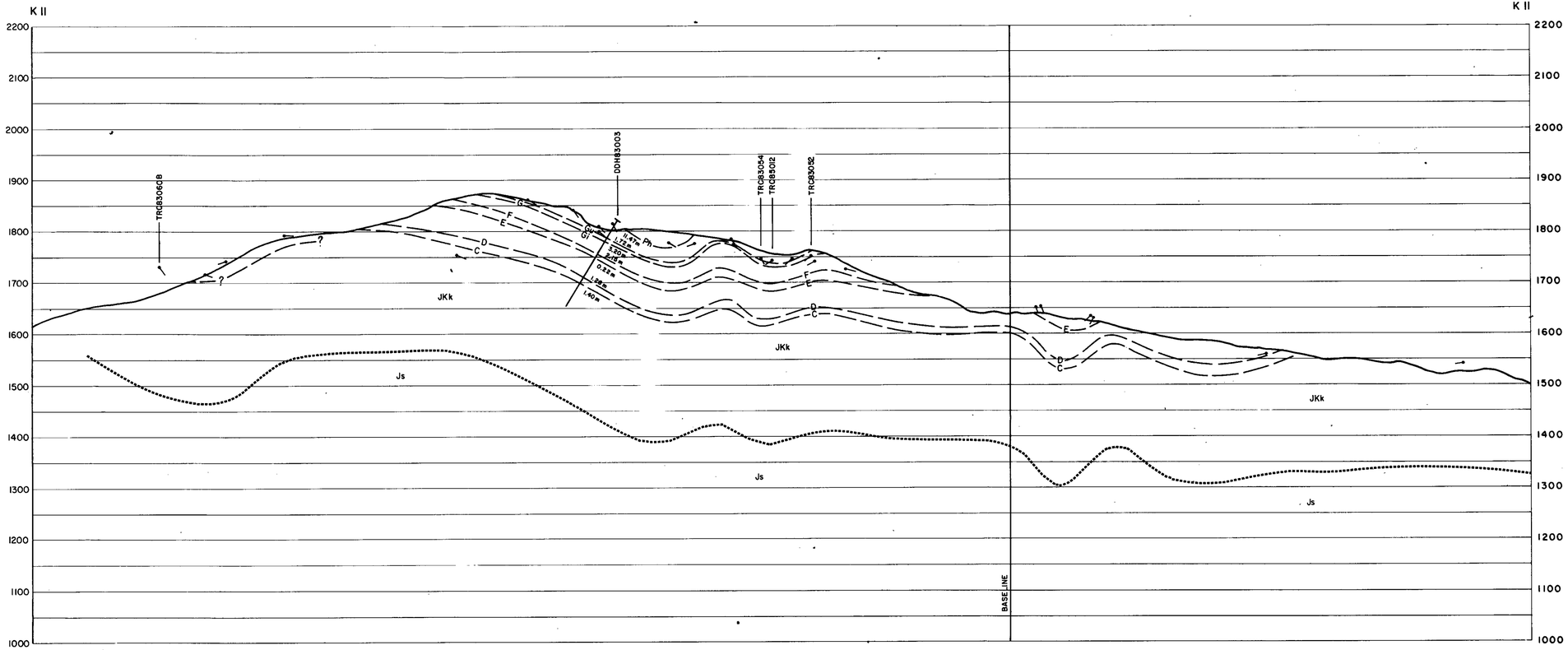
706

0 50 100 METRES 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
10 000 N (EAST & WEST)

PREPARED BY: S. M.		SCALE 1:5000
APPROVED BY: K.J.	DATE: JAN. 1986	DWG. No. KPN85SA-19



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

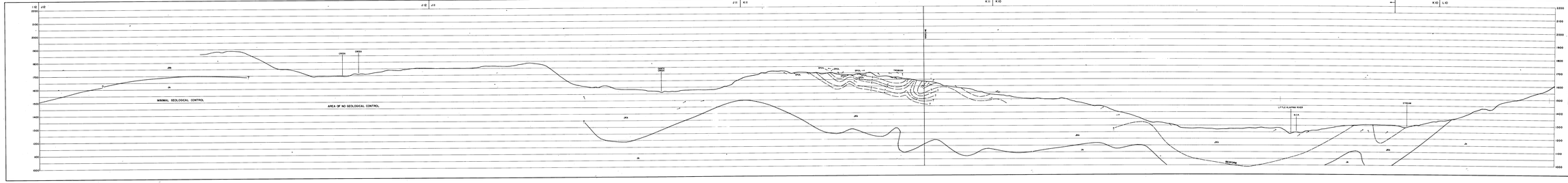
706

METRES 0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
9500 N (EAST & WEST)

PREPARED BY: S. M.		SCALE 1:5000
APPROVED BY: K.J.	DATE: JAN. 1986	DWG. No. KPN85SA-20



PROPERTY BOUNDARY

JK TERRACE FORMATION (LOWER JURASSIC) - DARK GREY TO BLACK, FOSSILIFEROUS SHALE WITH SILTSTONE, SANDSTONE, CONGLOMERATE AND COAL SEAMS. THE BASE OF THE FORMATION IS NOT EXPOSED. THE TOP IS EROSIONAL.

MILLER SEQUENCE

JKA TERRACE FORMATION (LOWER JURASSIC) - DARK GREY TO BLACK, FOSSILIFEROUS SHALE WITH SILTSTONE, SANDSTONE, CONGLOMERATE AND COAL SEAMS. THE BASE OF THE FORMATION IS NOT EXPOSED. THE TOP IS EROSIONAL. THIS UNIT IS DIVIDED INTO THREE MEMBERS, A, B, AND C, BY THE ADDITION OF A SUFFIX TO THE SYMBOL.

SLATER SEQUENCE (SEE ALSO DETAIL A)

JKR THE SLATER FORMATION (TRIASSIC AND JURASSIC) - DARK GREY, FOSSILIFEROUS SHALE WITH SILTSTONE, SANDSTONE, CONGLOMERATE AND COAL SEAMS. THE BASE OF THE FORMATION IS NOT EXPOSED. THE TOP IS EROSIONAL. THIS UNIT IS DIVIDED INTO THREE MEMBERS, A, B, AND C, BY THE ADDITION OF A SUFFIX TO THE SYMBOL. THE SLATER FORMATION IS DIVIDED INTO THREE MEMBERS, A, B, AND C, BY THE ADDITION OF A SUFFIX TO THE SYMBOL.

UNITIZED SEQUENCE

A CONSOLIDATED, STRATIGRAPHICALLY ORDERED SEQUENCE, INCLUDING SEQUENCES, FORMATIONS, MEMBERS, SUBMEMBERS, AND COAL SEAMS. THE SEQUENCE IS DIVIDED INTO UNITS, EACH UNIT BEING DESIGNATED BY A SUFFIX NUMBER OF ZERO OR GREATER. SEQUENCES LIE THE ABOVE, BELOW, OR ON THE SAME LEVEL AS ANOTHER SEQUENCE.

LEGEND SUMMARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

MEASURED ATTITUDE

DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

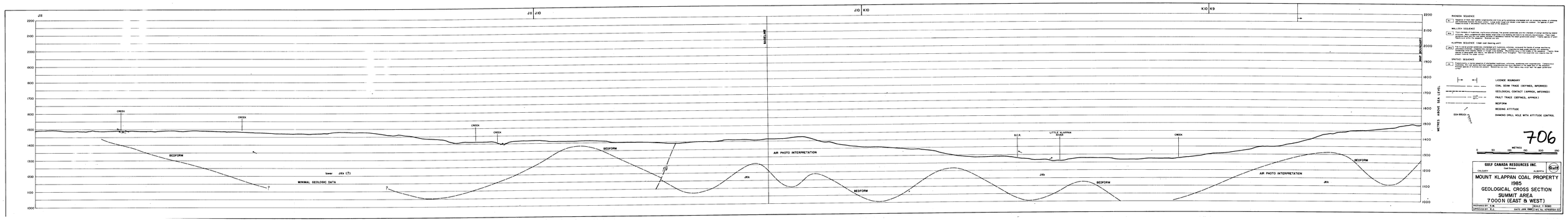
0 10 METRES 100 200 300

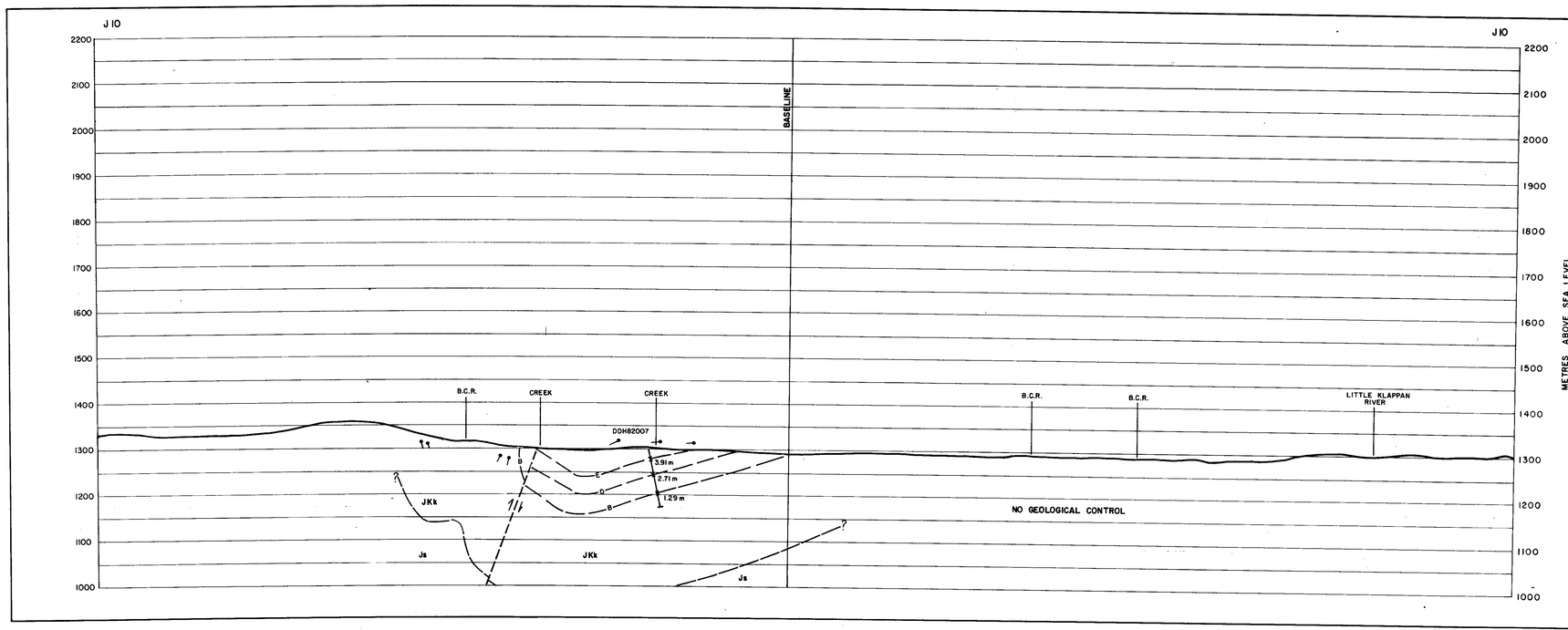
GULF CANADA RESOURCES INC.
PRINCE RUPERT, B.C.

CALGARY | SURVEY | Gulf

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
9000N (EAST & WEST)

PREPARED BY: R.K. | SCALE: 1:5000
APPROVED BY: | DATE: JAN. 1985 | FILE NO. 2100-01-17


J11
J11 J10
J10 K10
K10 K9
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
METRES ABOVE SEA LEVEL
MAP BOUNDARY
CREEK
CREEK
CREEK
CREEK
BEDFORM
BEDFORM
lower JKA (?)
MINIMAL GEOLOGIC DATA
?
?
JKA
AIR PHOTO INTERPRETATION
BEDFORM
B.C.R.
LITTLE KLAPPAN RIVER
JKA
BEDFORM
CREEK
AIR PHOTO INTERPRETATION
JKA
BEDFORM
PHONOLA SEQUENCE
(Ph) Sequence of black clay shale underlain by coal and a very gritty sandstone overlapped with an increasing number of siltstone beds and finally by a thick sandstone. Sandstone is cross-bedded, fine to medium grained, light brown to white in colour. Top sandstone is well jointed.
MALLOCK SEQUENCE
(Ma) Thick interbeds of siltstone, light brown siltstone, fine grained sandstone and thin interbeds of orange weathering marine siltstone. Sandstone is cross-bedded, fine to medium grained, light brown to white in colour. Top sandstone has well developed joints. Lower part of sequence has thin coal seams. Marine siltstone beds are thin and have widely spaced or absence bedding. Top bed is a very distinctive marine siltstone. Upper part of sequence has thick coal seams. Top coal seam is 1.5 m thick.
KLAPPAN SEQUENCE (JKA) (see facing page)
(JKA) This is a very diverse sequence consisting of coal seams, siltstone, carbonaceous siltstone, carbonaceous shale, orange weathering siltstone, fine grained sandstone, medium grained sandstone, coarse grained sandstone, conglomerate and carbonaceous shale. Sandstone is cross-bedded, fine to medium grained, light brown to white in colour. Top sandstone has well developed joints. Top bed is a very distinctive orange weathering, fine grained sandstone. Coal seams, top seam is 1.5 m thick, top seam is 20 m of plants only throughout. Partings and roof and floor rocks may be present in any coal seam. Top coal seam is 1.5 m thick.
SPATED SEQUENCE
(J) Predominately a thick sequence of interbedded mudstone, siltstone, sandstone and conglomerate. Carbonaceous mudstone and coal are present in the lower part of the sequence. Sandstone is cross-bedded, fine to medium grained, light brown to white in colour and jointed. Sandstone and c.s. floor rocks may be present in the upper sequence.
LICENCE BOUNDARY
COAL SEAM TRACE (DEFINED, INFERRED)
GEOLOGICAL CONTACT (APPROX, INFERRED)
FAULT TRACE (DEFINED, APPROX.)
BEDFORM
BEDDING ATTITUDE
DDH-86G01
DIAMOND DRILL HOLE WITH ATTITUDE CONTROL
706
0 50 100 METRES 150 200 250
GULF CANADA RESOURCES INC.
Gulf
Oil Division
CALGARY ALBERTA
MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
7000N (EAST & WEST)
PREPARED BY: S.M.
SCALE 1:1000
APPROVED BY: P.J.
DATE JUN 1986
FILE No. KP6GS04.J12



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick coarse sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering carbonaceous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone beds which often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of plant fossils and twenty-two species of plants occur throughout. Petrified wood and rare coliums may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

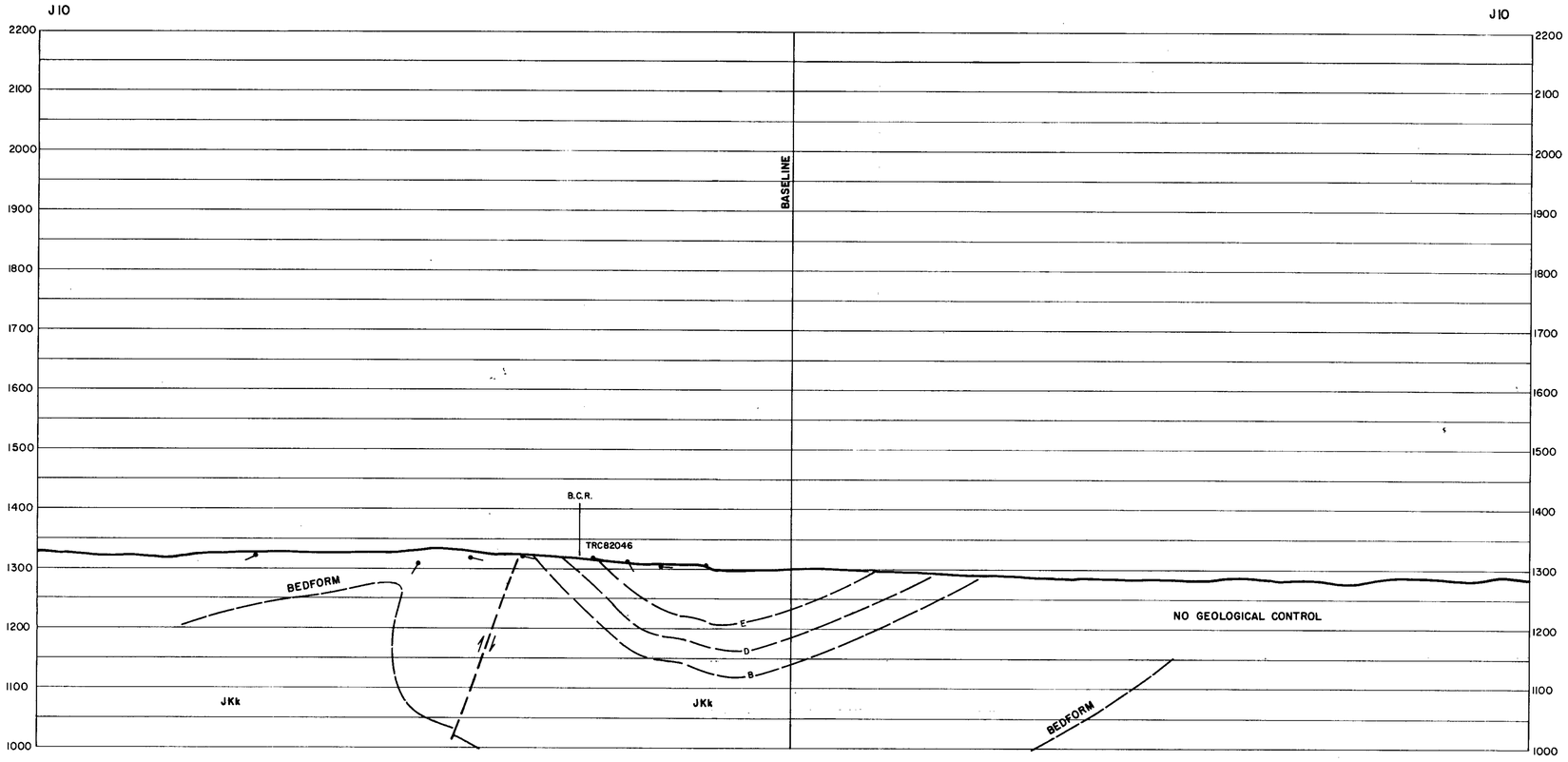
706

METRES 0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
6000 N (EAST & WEST)

PREPARED BY: S.M.	SCALE 1: 5000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KPN85SA-23



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

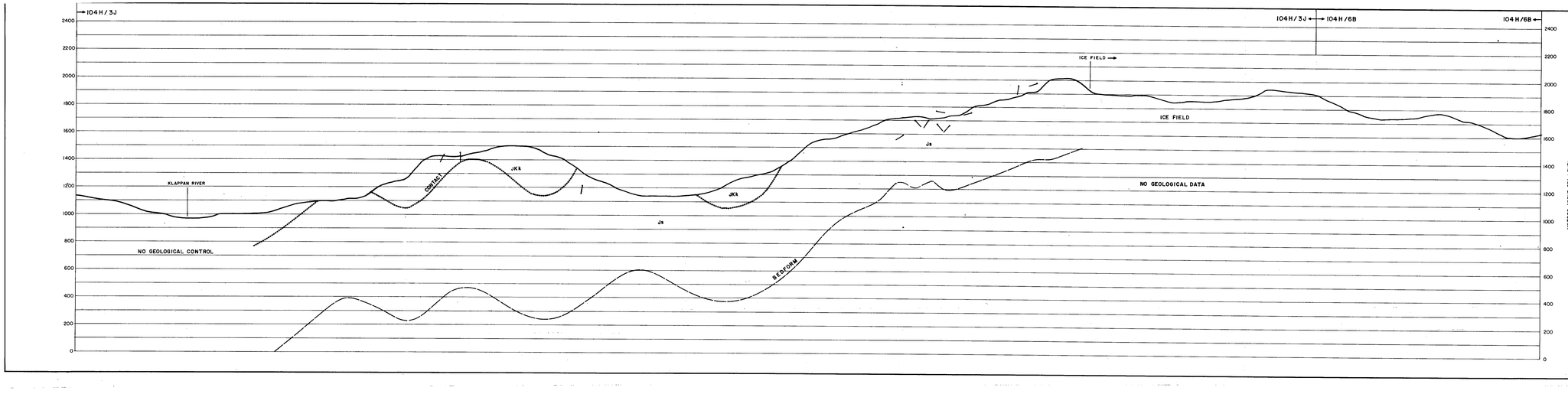
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
5500 N (EAST & WEST)

PREPARED BY: S.M.	SCALE 1:5000
APPROVED BY: K.J. DATE: JAN. 1986	DWG. No. KPN85SA-24



RHONDDA SEQUENCE

KJ — Sequence of thick-bedded pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. No species of plant fossils recorded in abundance towards the base of the sequence.

MALLOCH SEQUENCE

JKk — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross-bedding and tend to be laterally discontinuous. Thick clean sandstones are more abundant towards the top of the sequence. Plant fossils are more abundant towards the lower gradational contact. Twenty species of plant fossils exist within the sequence. Bulkiness are rare.

KLAPPAN SEQUENCE (major coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering nodular siltstones and coal seams and chert pebble conglomerates are more abundant in the lower part of the sequence. Sandstones often display tabular or trough cross bedding. Mudstones occur in the middle of the sequence. Twenty three species of pelecypod and twenty two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Twenty species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

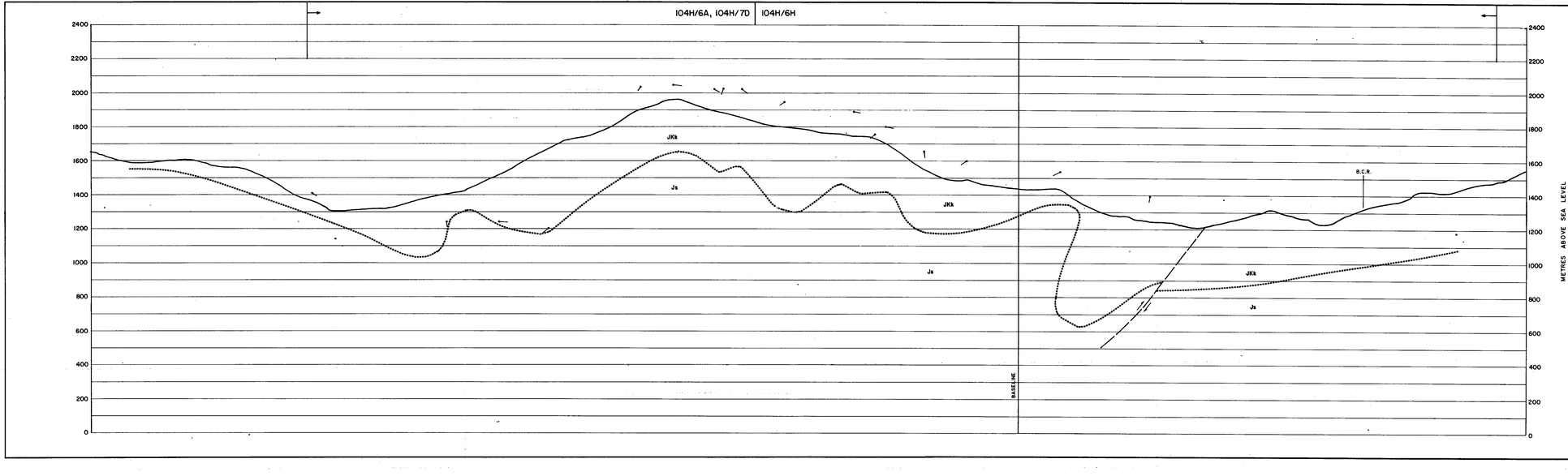
706

METRES 0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
15 000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J.	DATE: JAN. 1985 DWG. NO. KM85GS2-33



RHONDDA SEQUENCE

Kr — Sequence of thick (massive) pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones. Many conglomerate beds display large scale cross bedding and lenses. Large tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MAILLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within this sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering nodular siltstones and thin coal seams. Sandstones are commonly cross bedded and contain mica and coal fragments. Sandstones often display tabular or through cross bedding. Rhythmic units are in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare conifers may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

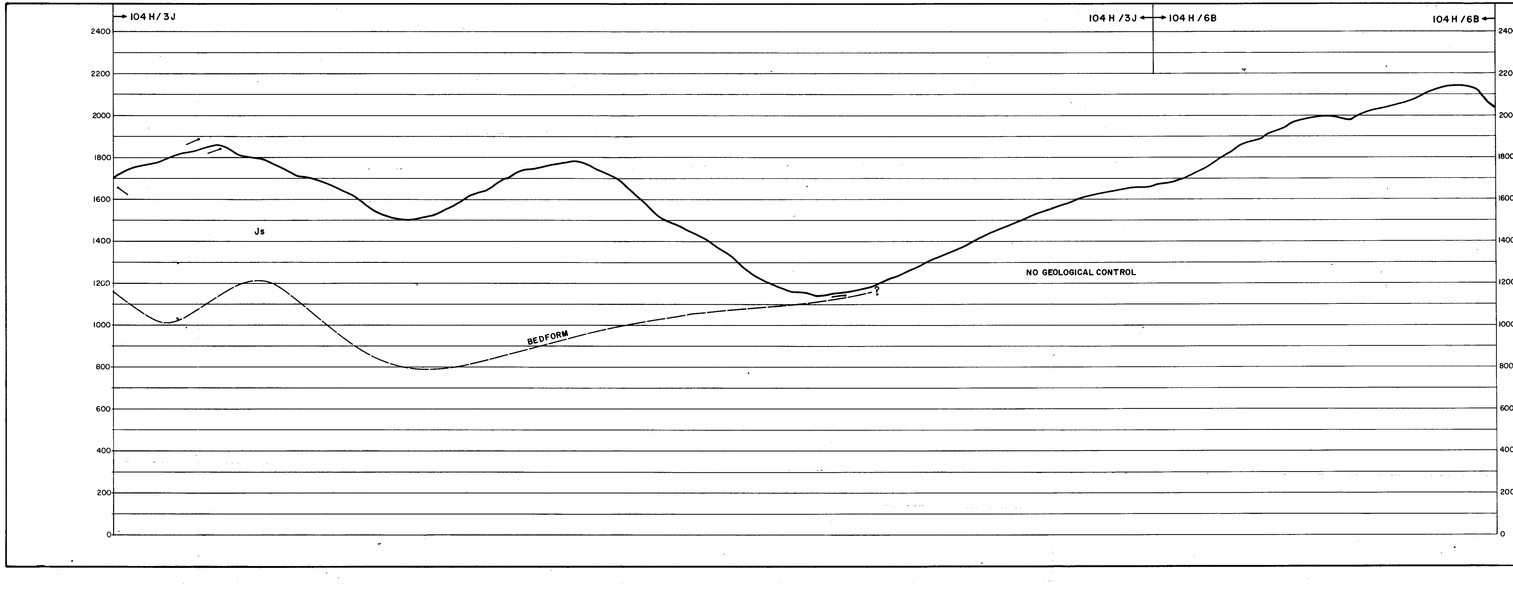
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
17000 N (EAST & WEST)

PREPARED BY: S.M.	SCALE 1:10 000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KPN85SA-25



RHONDDA SEQUENCE

Kr — Sequence of thick (4m) pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Sandstones often display tabular or trough cross bedding and tend to be laterally discontinuous. Thick coal seams, siltstone beds and the coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Washtenaw occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Part-fired wood and rare conjunds may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous material is abundant and coal seams are common in the lower and upper contacts of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

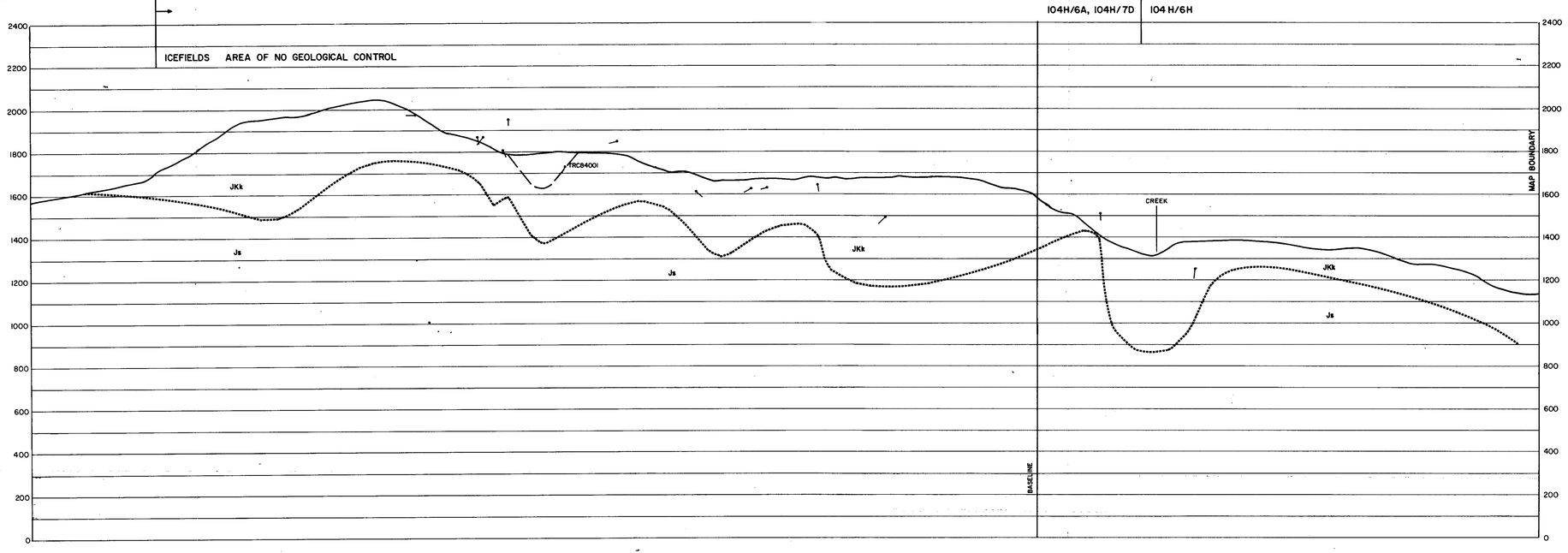
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
17000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KPN85 NA-32



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythemites occur in the middle of the sequence. Twenty three species of pelecypods and twenty two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

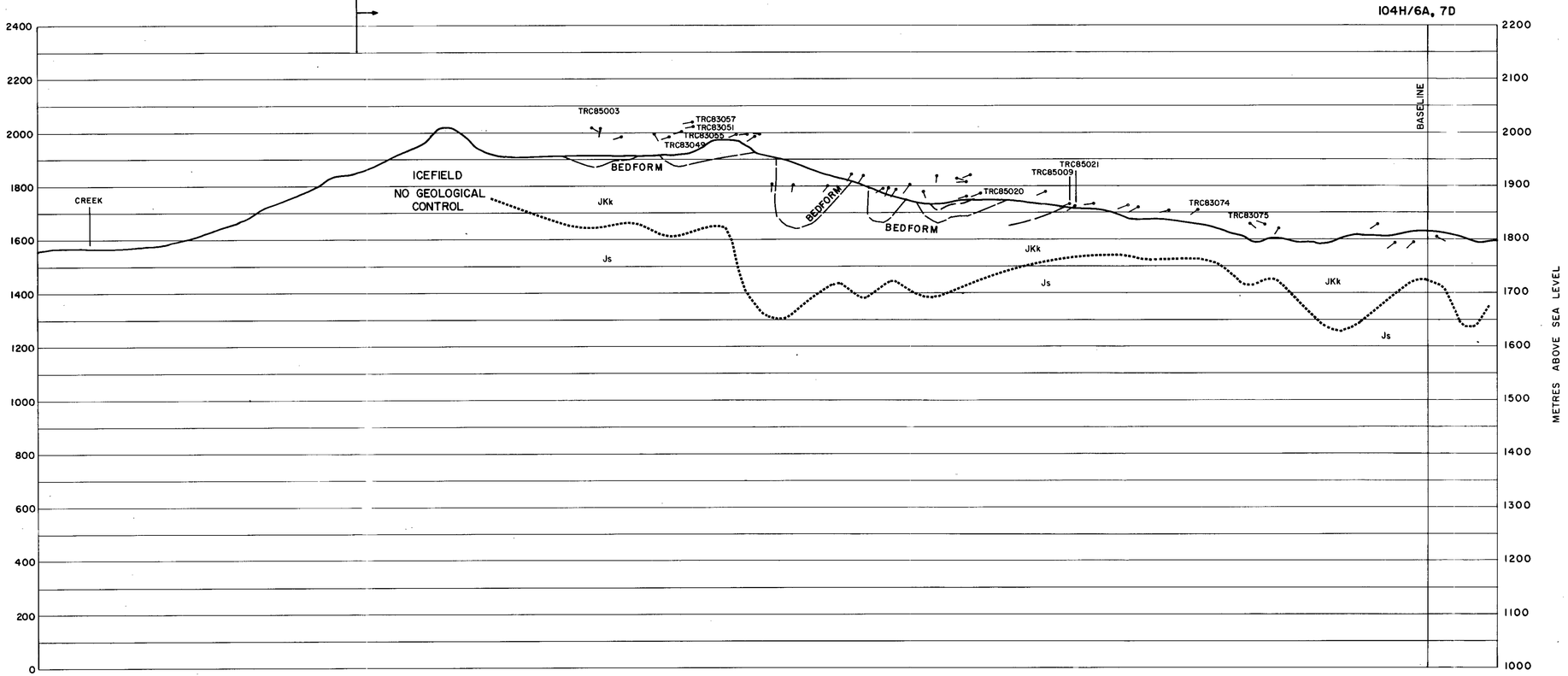
706

METRES 0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
15 000 N (EAST & WEST)

PREPARED BY: S.M.	SCALE 1:10 000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KPN85SA-26



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty three species of pelecypods and twenty two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

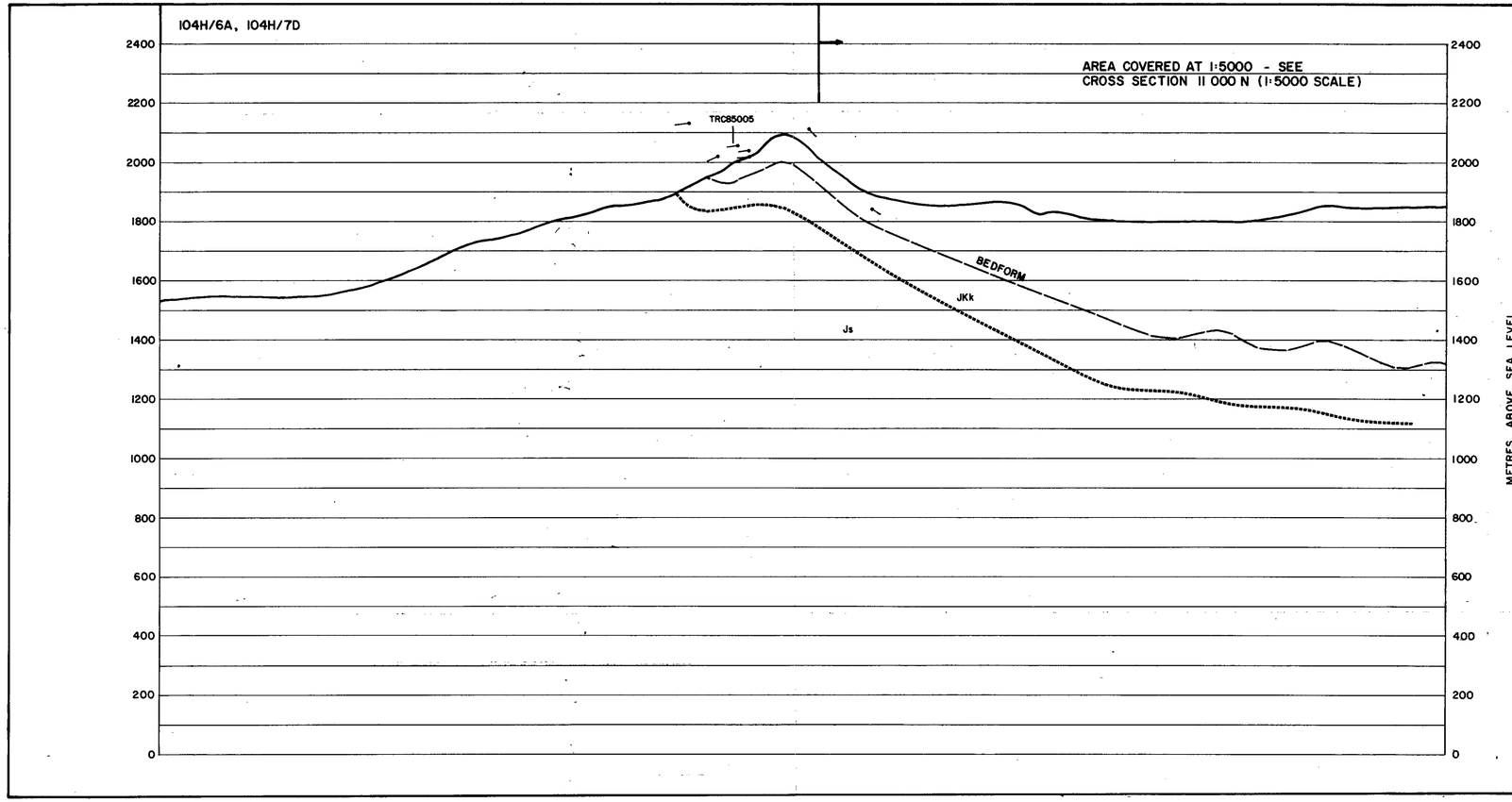
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
13 000 N (EAST & WEST)

PREPARED BY: S.M.	SCALE 1:10 000
APPROVED BY: K.J. DATE: JAN. 1986	DWG. No. KPN85SA-27



RHONODA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

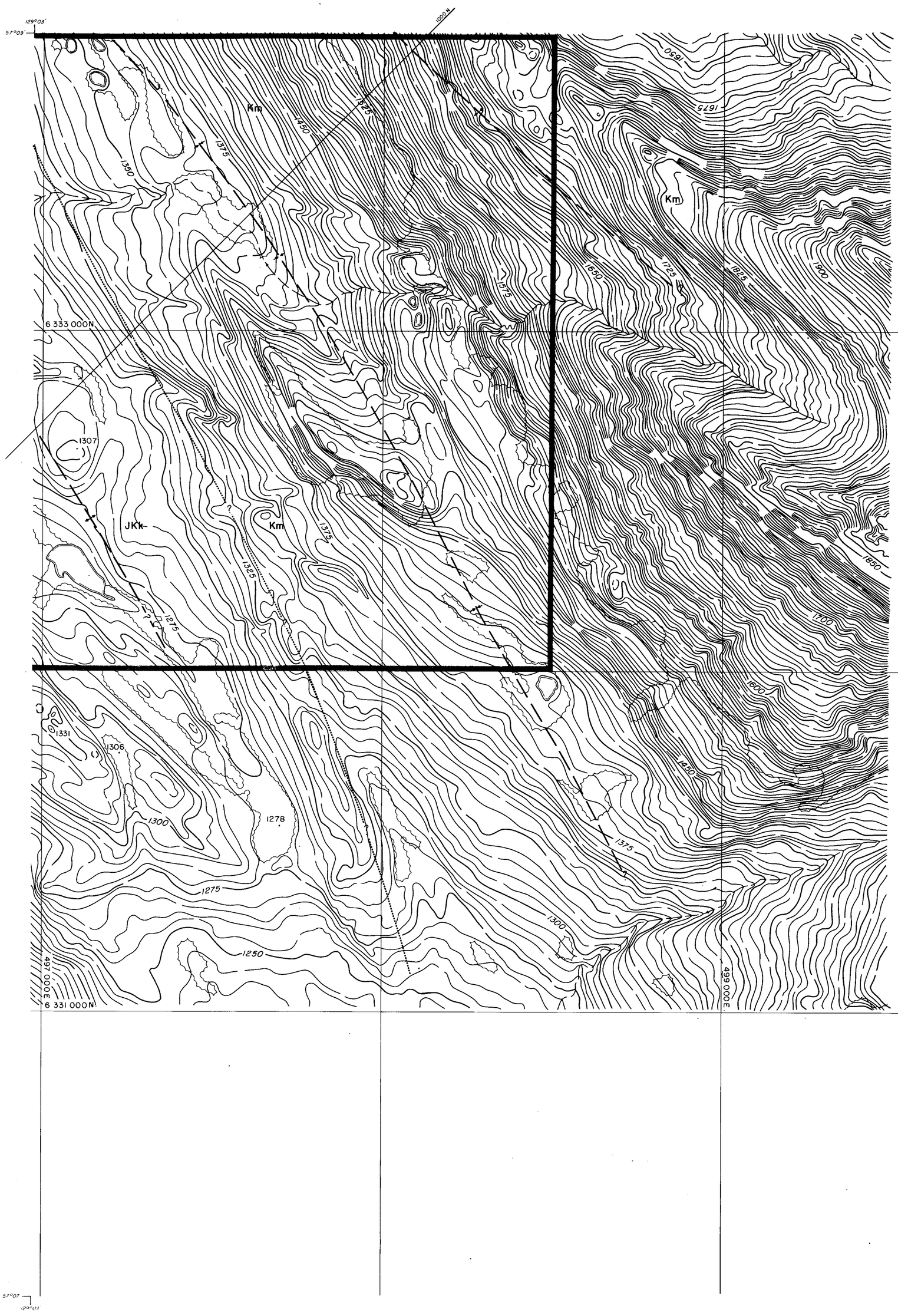
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
SUMMIT AREA
11000 N (WEST)

PREPARED BY: S. M.	SCALE 1:10 000
APPROVED BY: K.J. DATE: JAN. 1986	DWG. No. KPN85SA-28



LEGEND

- BUILDING
- ROAD, HARD SURFACE
- LOOSE SURFACE
- CART TRACK
- TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
- APPROXIMATE
- SPLIT
- LAKE
- WATER LEVEL — EL 905±
- SWAMP
- BEAVER DAM — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — 7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- 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 OBSCURRED 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)

N

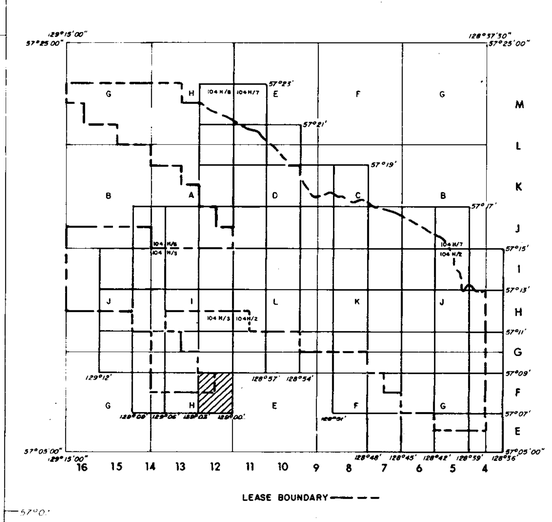
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

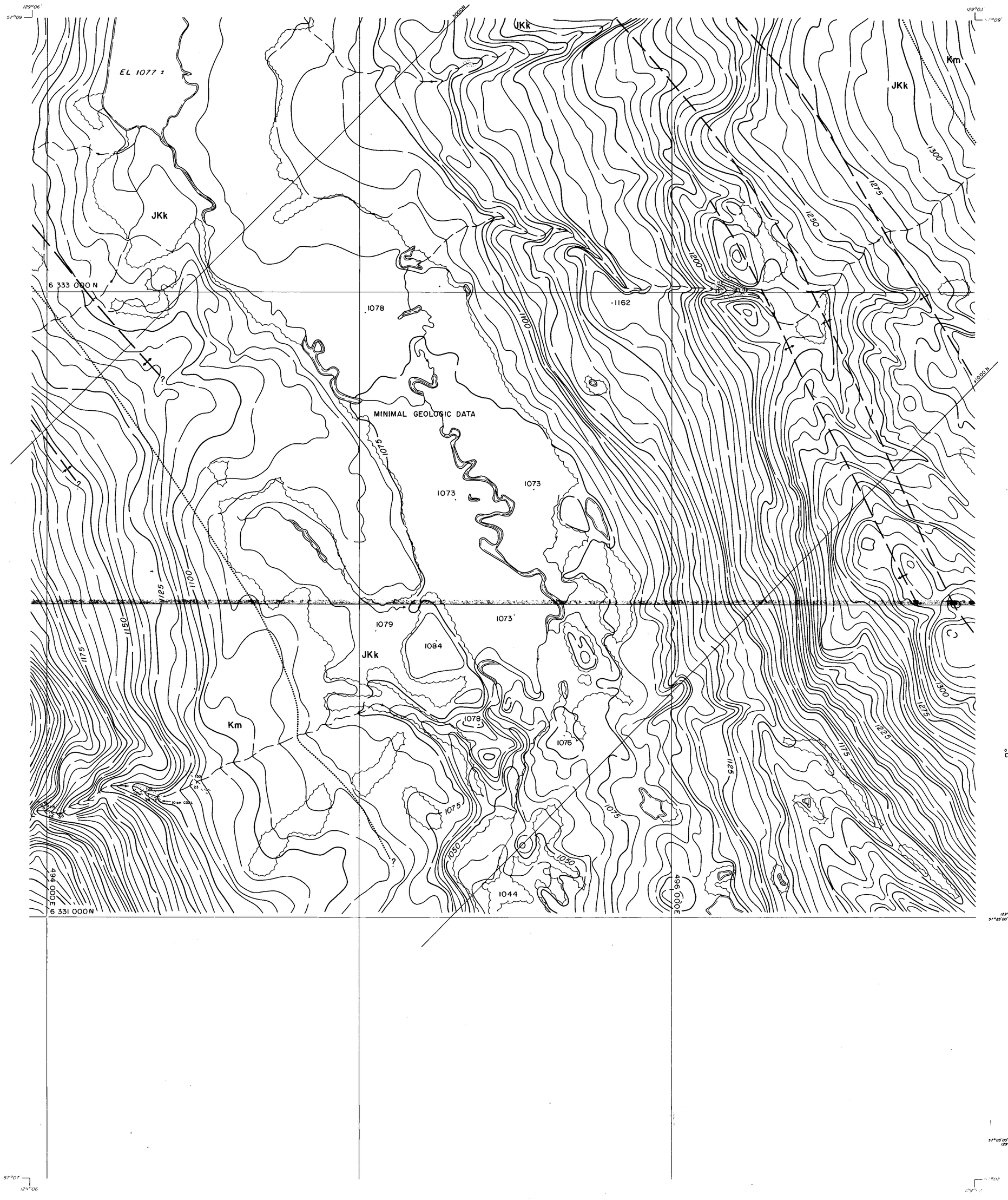
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT — TRENCH — COAL SPOIL — SP
- DDH RDH WKD — DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- OTC 84001 — MEASURED SECTION
- SC-17 — SURVEY CAIRN
- 3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY — ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP F-12

PREPARED BY: K. JENNER		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DWG. No. KPN85NA-01



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — · 7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- 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 OBSCURRED 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)

N

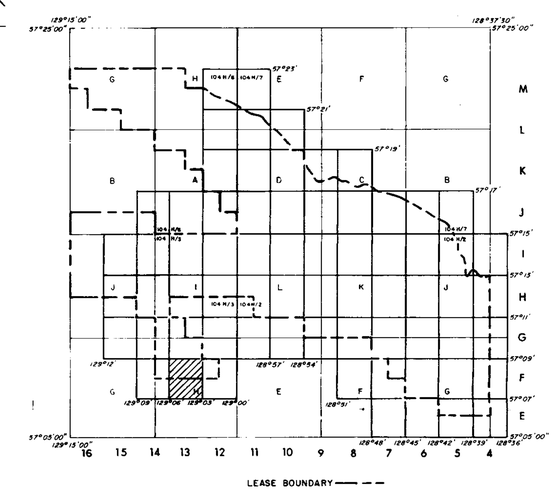
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

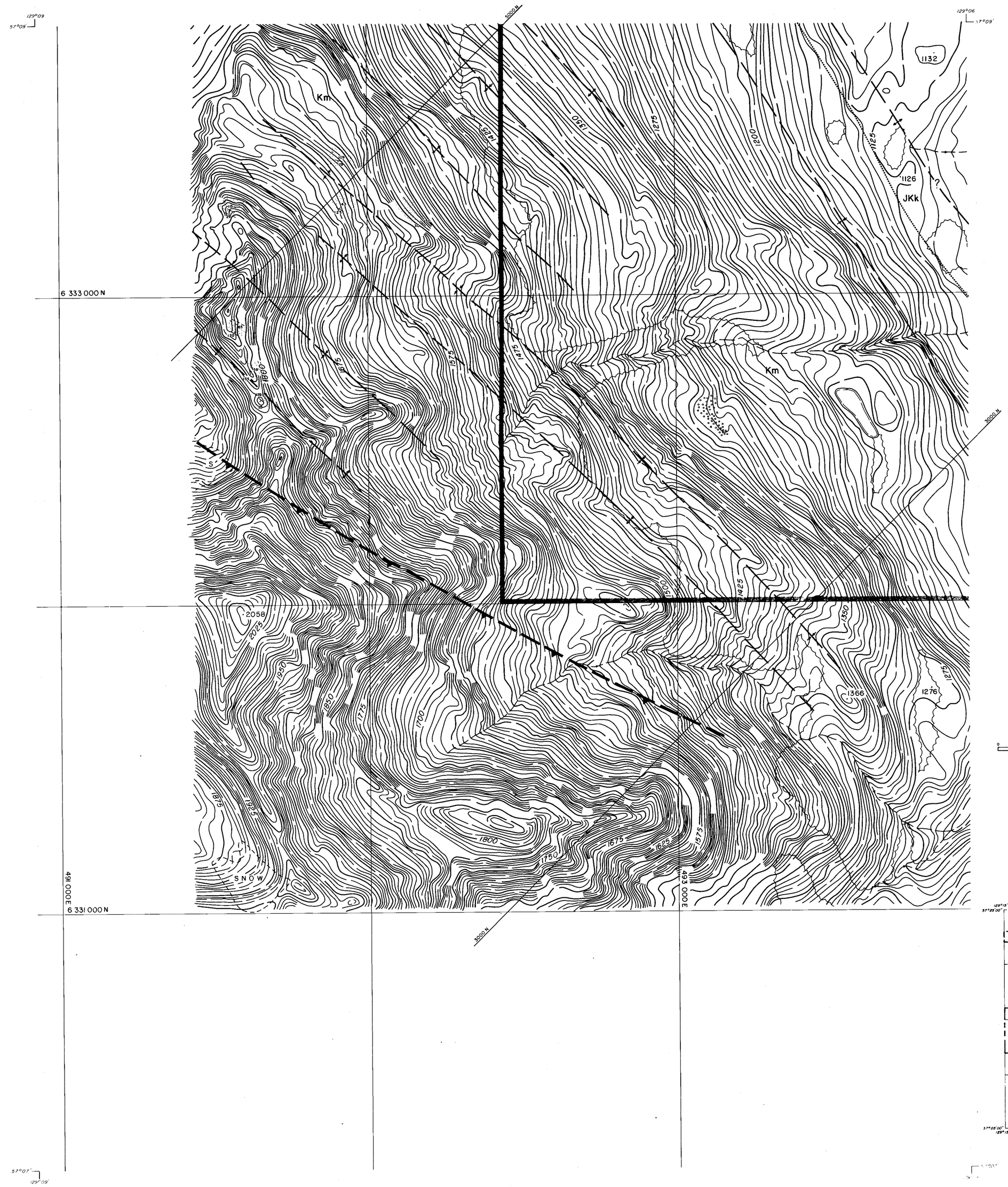
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP F-13

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-02



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — ·7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- 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 OBSCURRED 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).

N

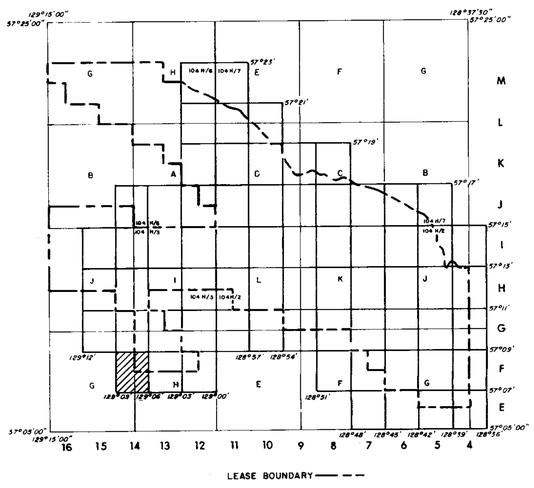
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

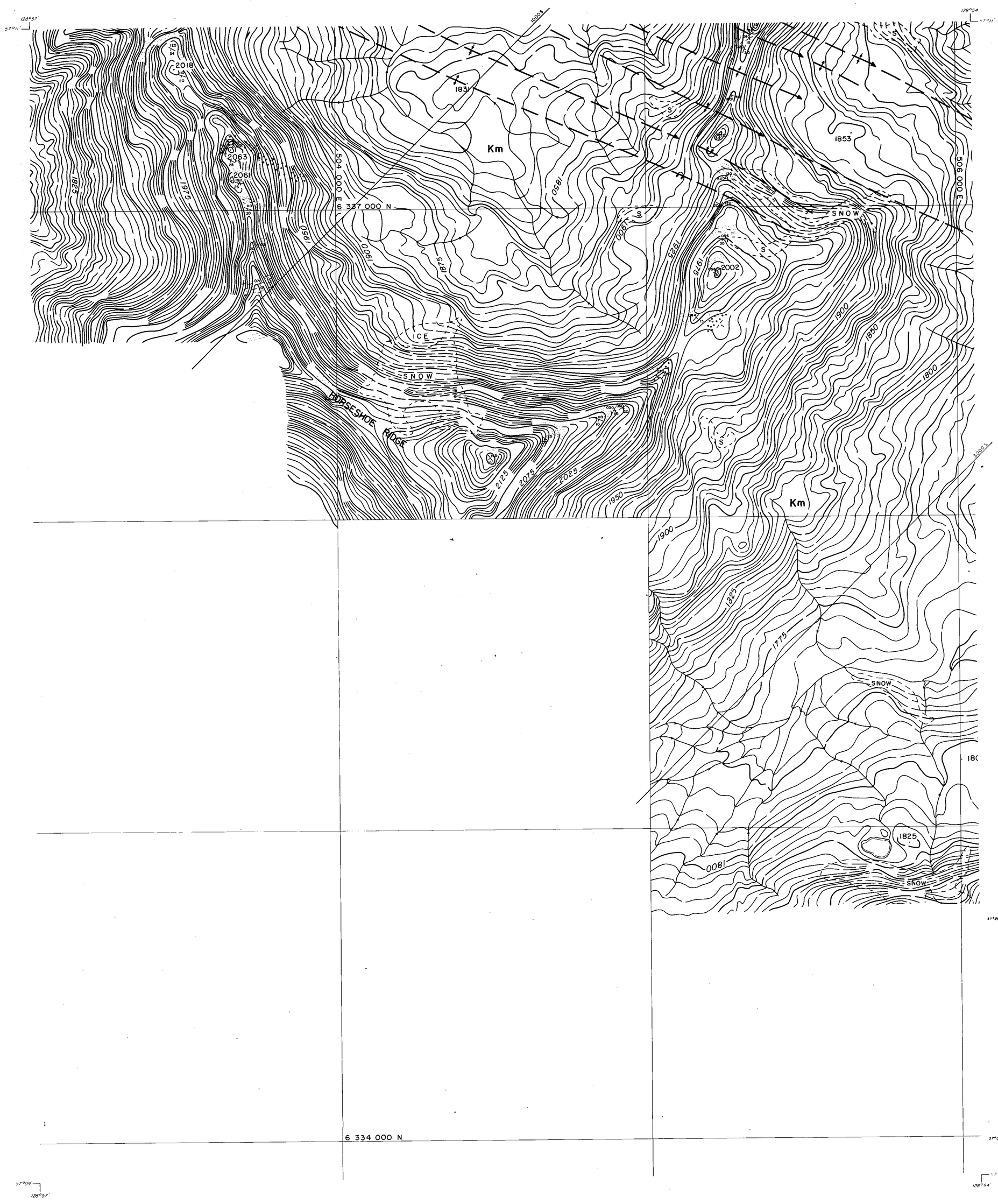
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP F-14

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-03



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — 7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP121
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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N

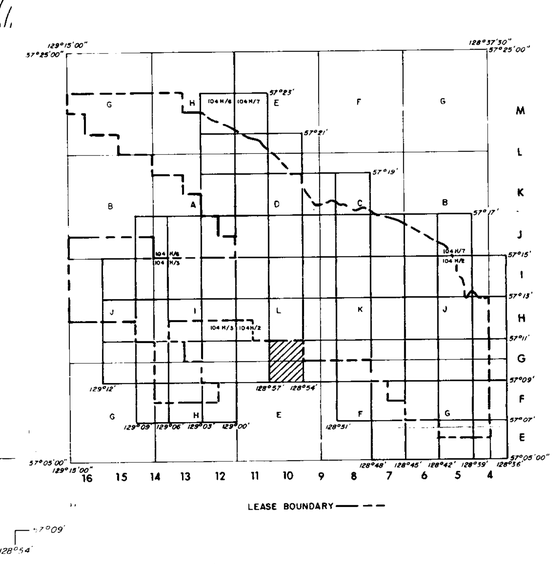
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

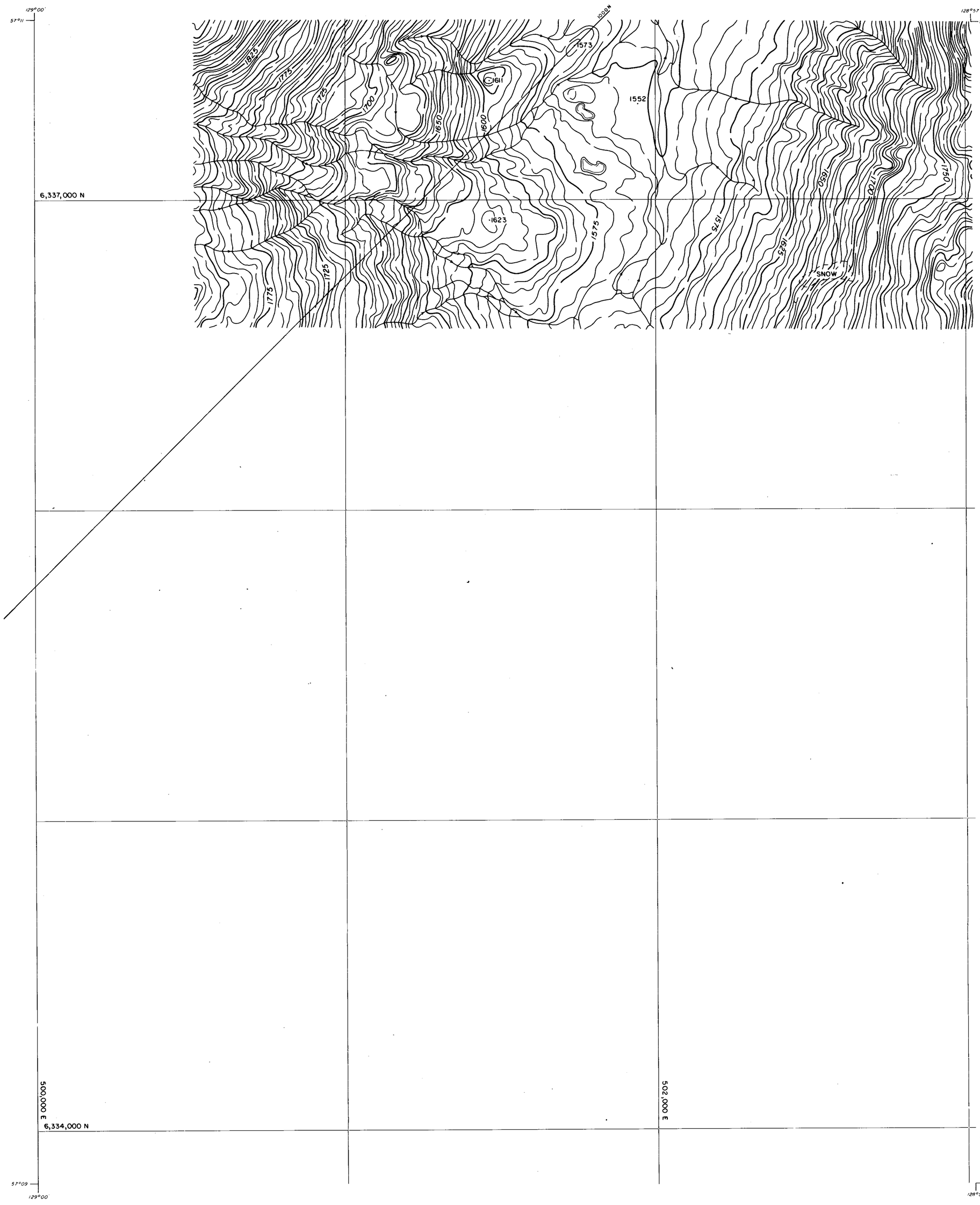
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL — TRC84001 — SP
DDH RDH WKD — DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
OTC 84001 — MEASURED SECTION
SC-17 — SURVEY CAIRN
3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP G-10

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-04



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 — BD. BD
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
  - INTERMEDIATE
  - DEPRESSION
  - APPROXIMATE
- SPOT ELEVATION — ·765A
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- COAL LICENCE

NOTES

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N

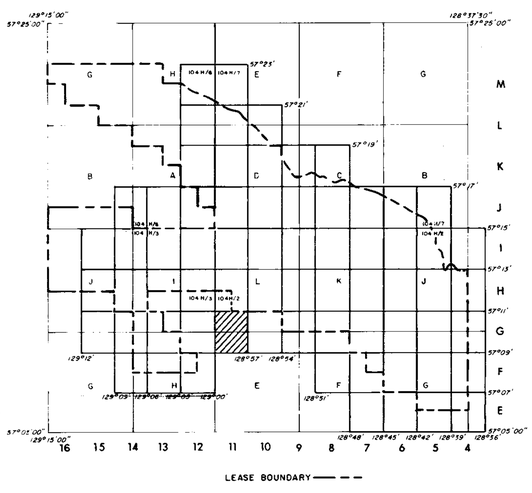
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

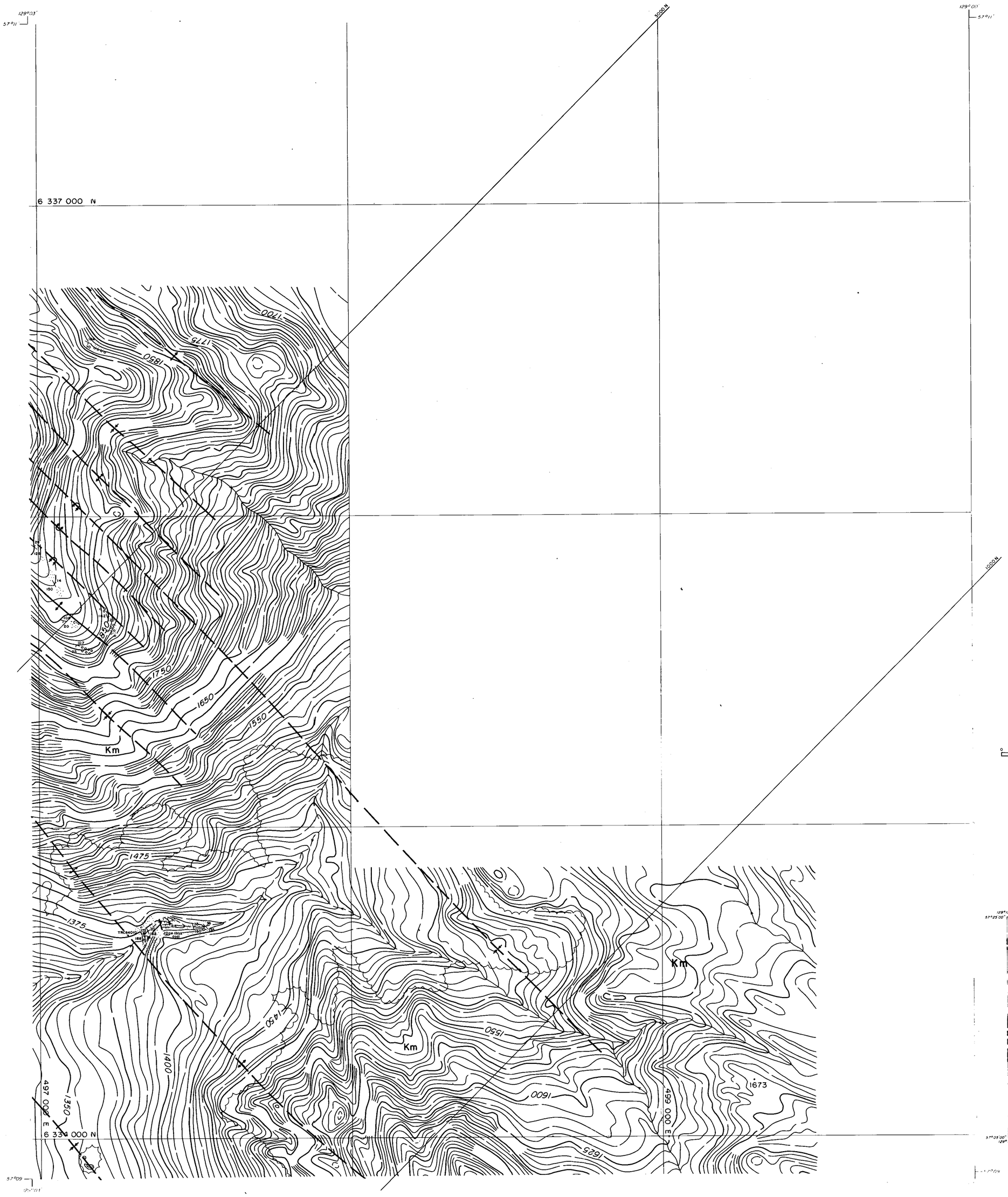
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL (TRC84001; SP)
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION) (DDH, RDH, WKD)
- MEASURED SECTION (GTC 84001)
- SURVEY CAIRN (SC-17)
- CROSS SECTION LINE (3000 N)

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP G-11

PREPARED BY: E.S.	SCALE 1:5000
APPROVED BY: E.S. DATE: JAN. 1986	DWG. No. KPN85NA-05



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 — B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — ·7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- COAL LICENCE

NOTES

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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY
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FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67
AT A SCALE OF 1:60 000 (APPROXIMATE)

N

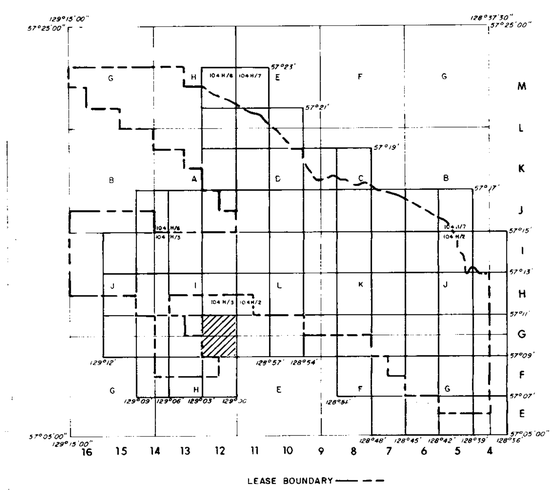
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, 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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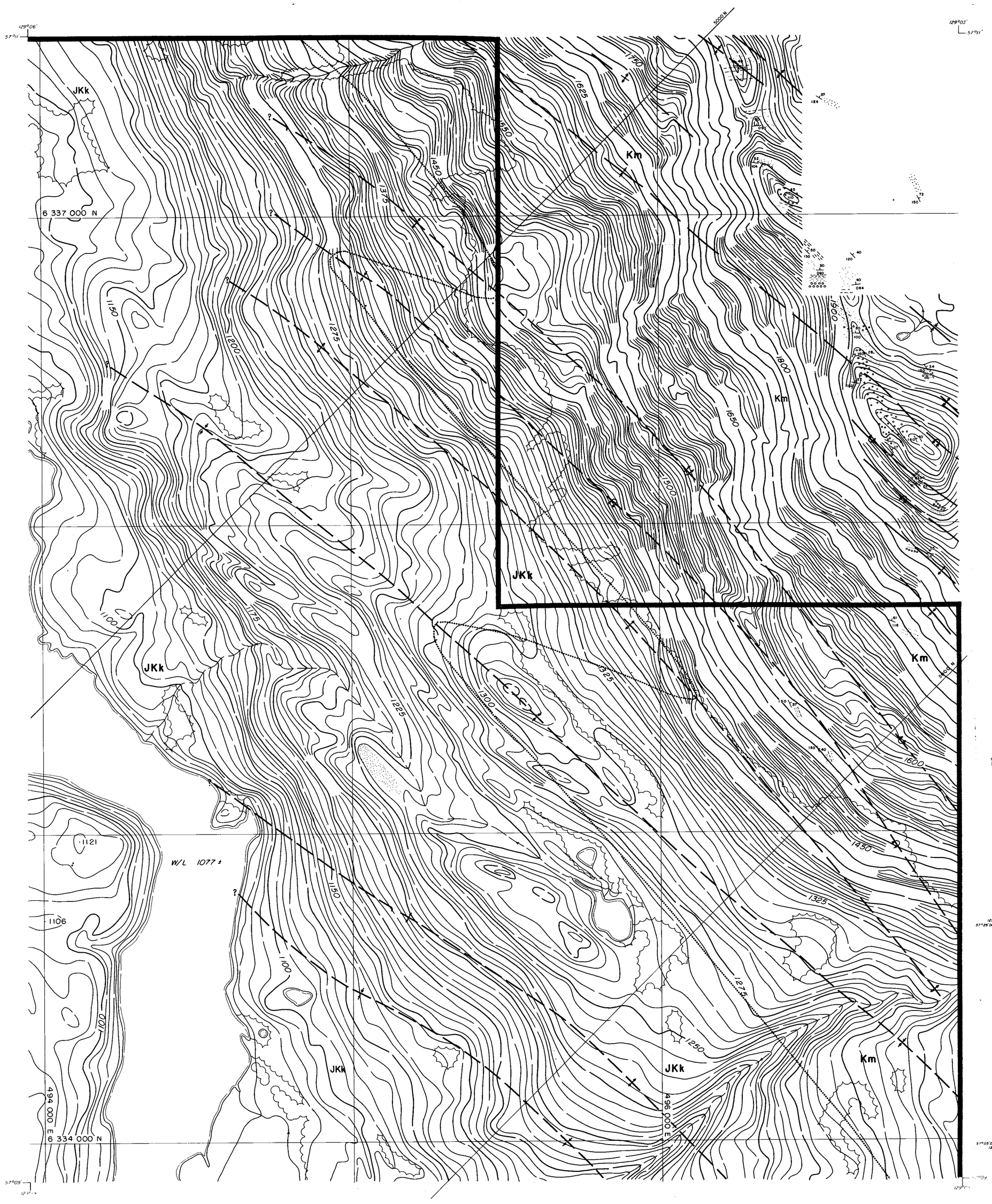
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT — TRC84001 — TRENCH — SP — COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION) — DDH, RDH, WKO
- MEASURED SECTION — OTC 84001
- SURVEY CAIRN — SC-17
- CROSS SECTION LINE — 3000 N

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY — ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP G-12

PREPARED BY: K. JENNER		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DWG. No. KPN85NA-06



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
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SPOT ELEVATION — ·7654
FORM LINES
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FIELD CONTROL POINT — CP 121
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N

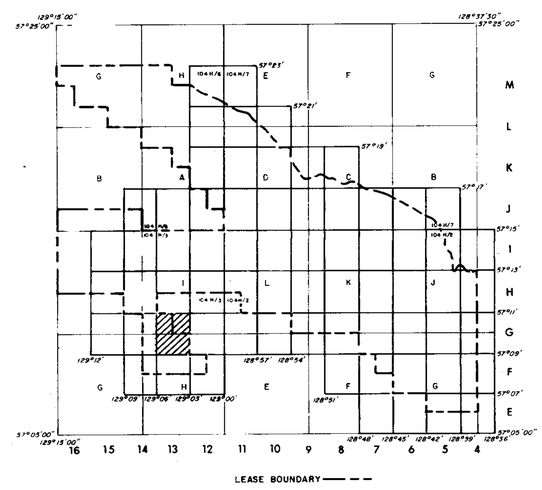
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

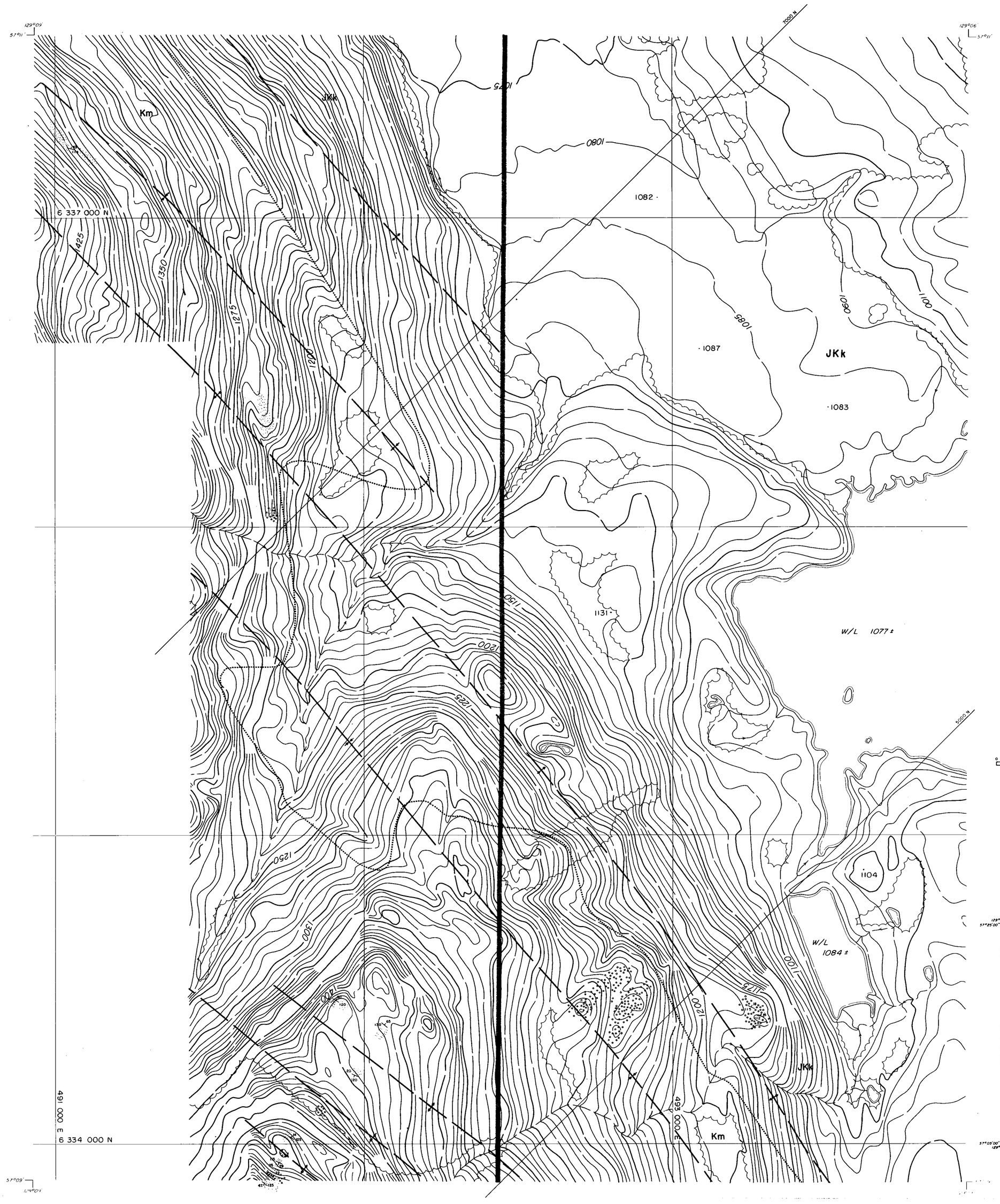
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP G-13

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-07



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — 7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 124
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 OBSCURRED 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)

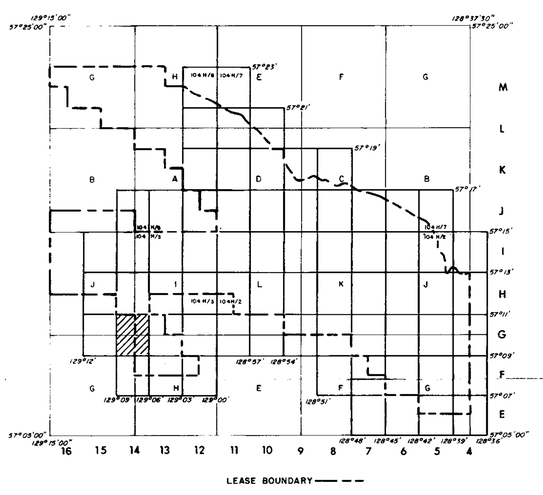
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

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LEGEND

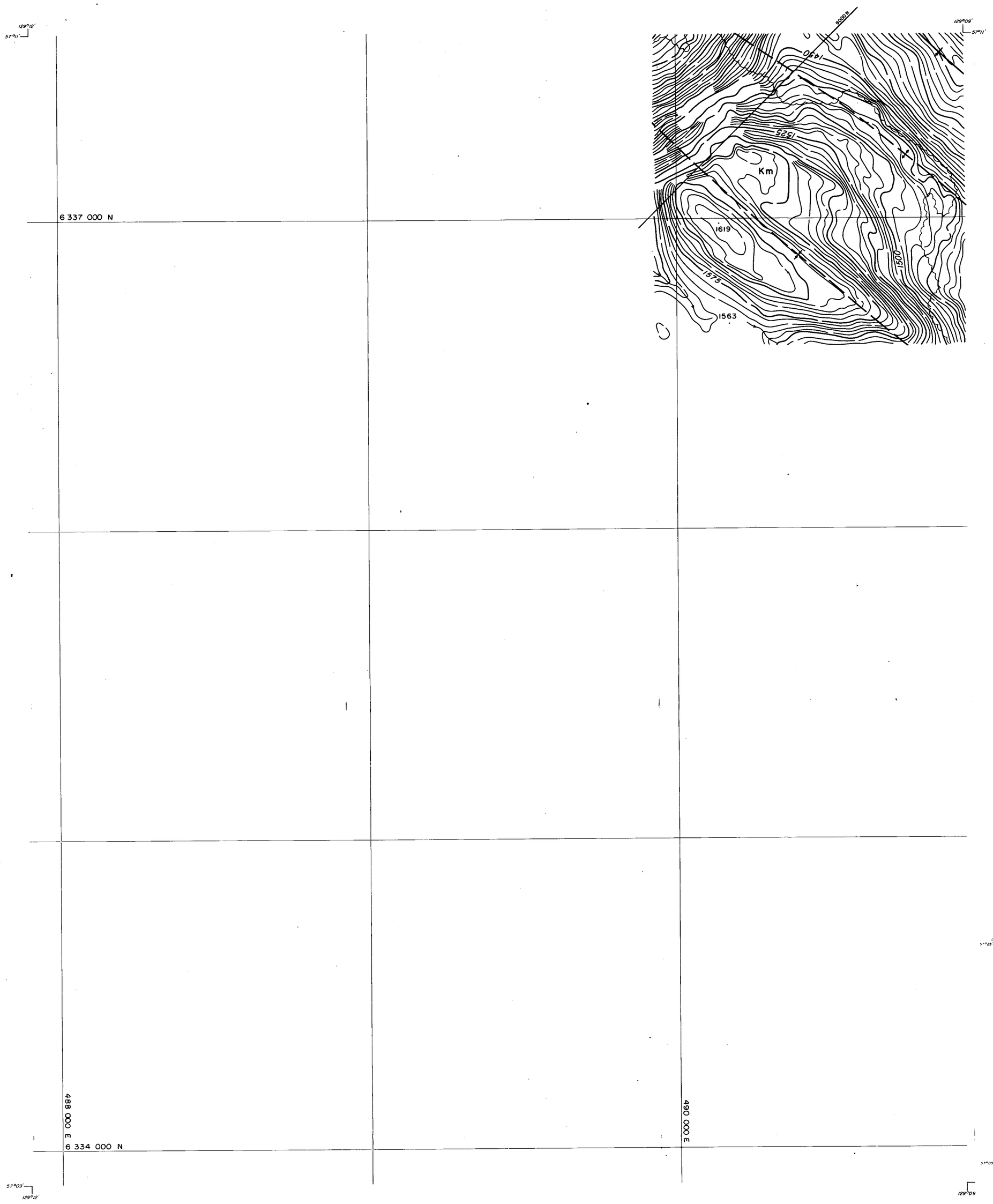
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP G-14

PREPARED BY: K. JENNER		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DWG. No. KPN85NA-08



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
COAL LICENCE

NOTES

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

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RAILROAD BED LOCATION BASED ON SEPT./82 AERIAL PHOTOGRAPHY

COMPILED BY:
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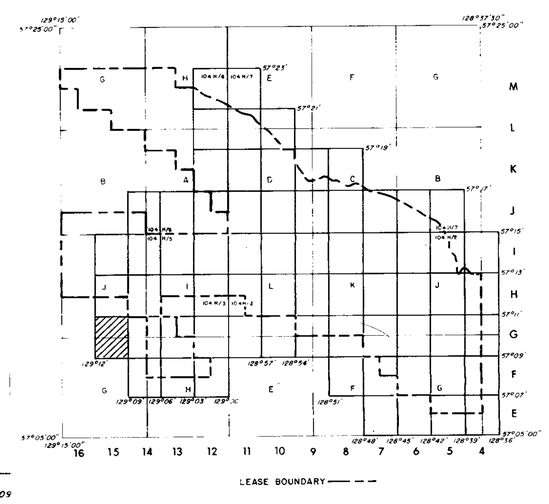
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

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LEGEND

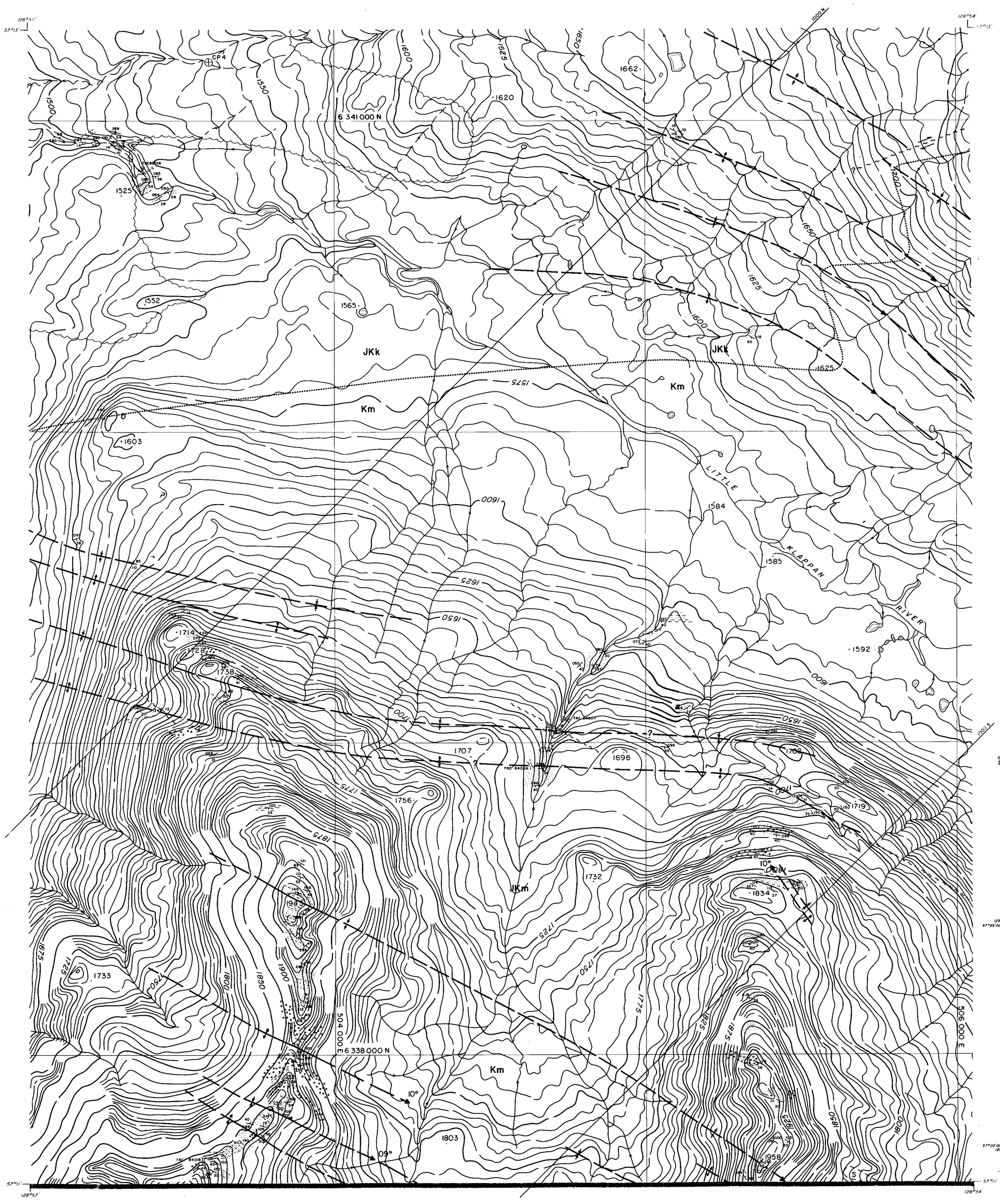
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
U D — FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
TRC84001 — SP — ADIT TRENCH COAL SPOIL
DDH RDH WKD — DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
OTC 84001 — MEASURED SECTION
SC-17 — SURVEY CAIRN
3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP G-15

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-09



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP121
COAL LICENCE

NOTES

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

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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 AT A SCALE OF 1:60 000 (APPROXIMATE)

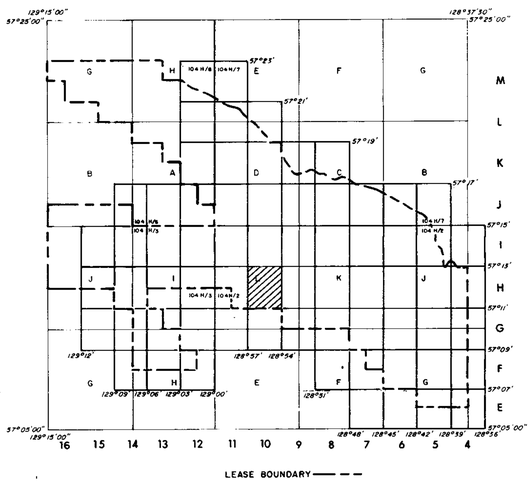
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
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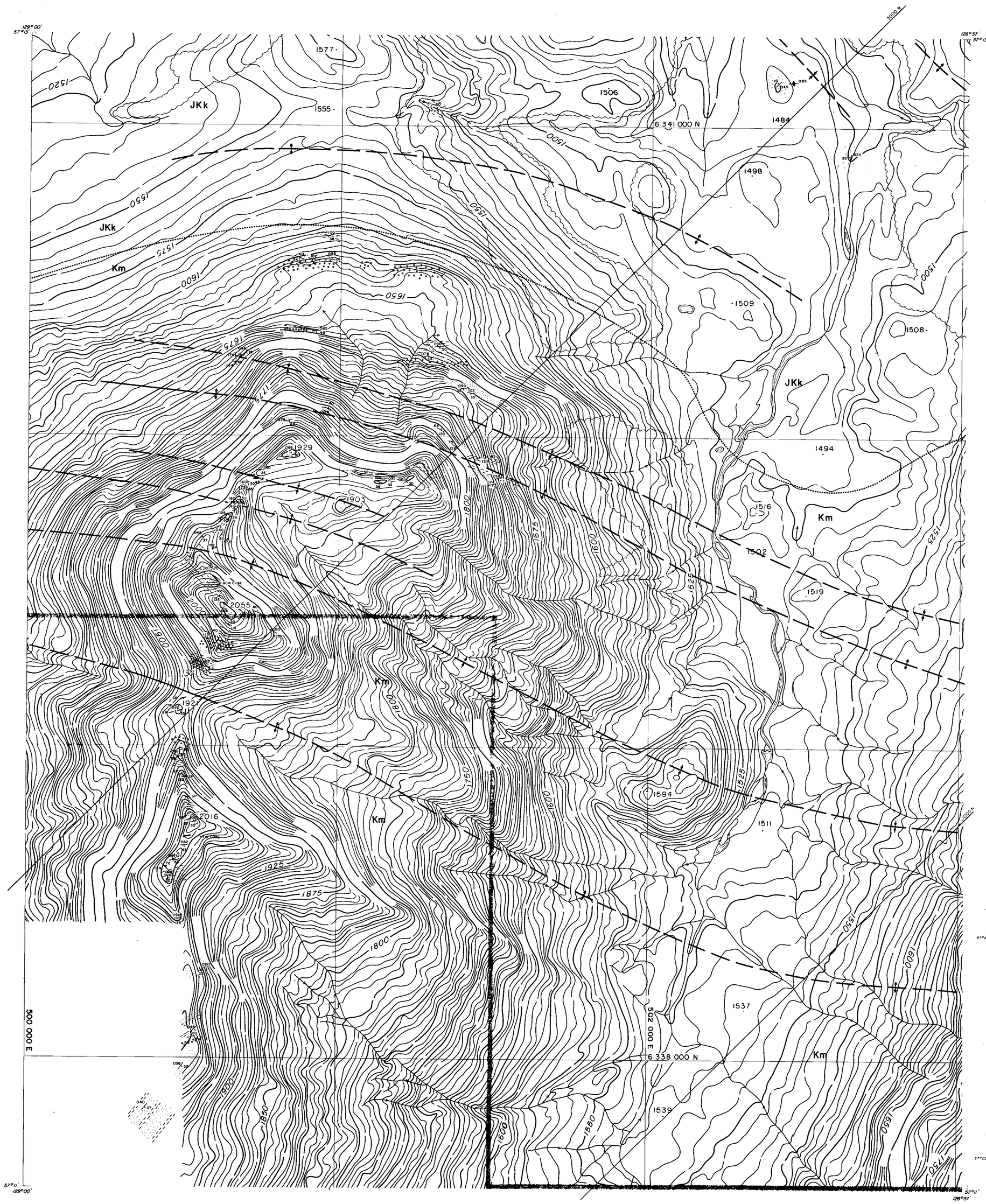
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT — TRENCH — COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP H-10

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-10



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — ·7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 124
- COAL LICENCE

NOTES

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AT A SCALE OF 1:60 000 (APPROXIMATE).

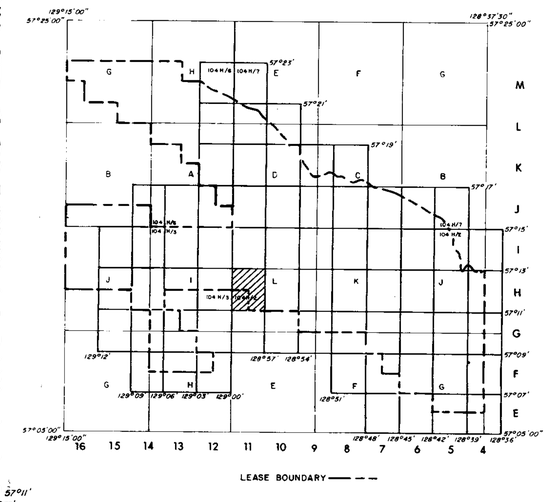
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
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- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
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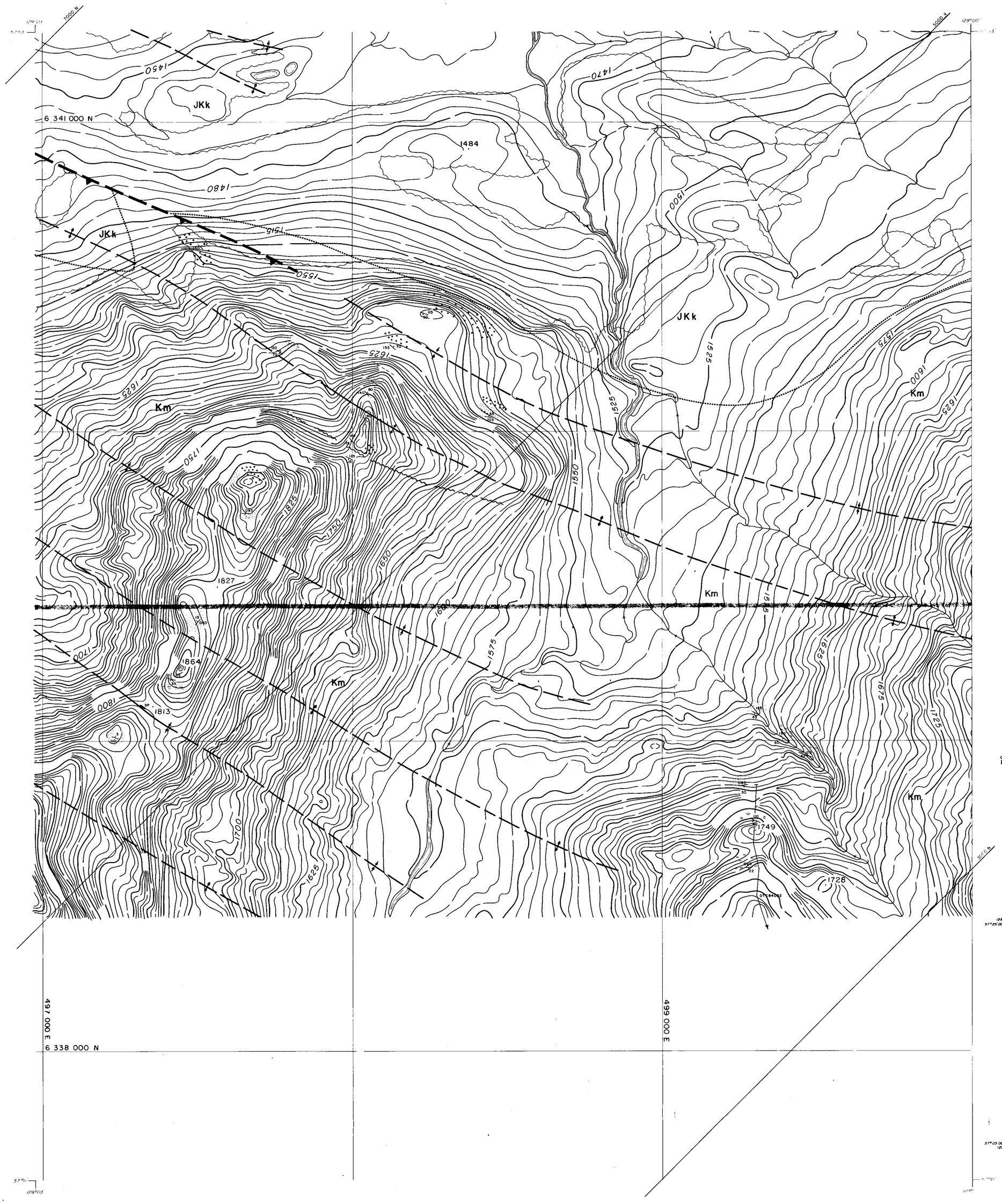
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP H-11

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-11



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 — B.D. 80
TREE LINE
CUT LINE
CONTOURS, INDEX
INTERMEDIATE
DEPRESSION
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FORM LINES
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FIELD CONTROL POINT — CP121
COAL LICENCE

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N

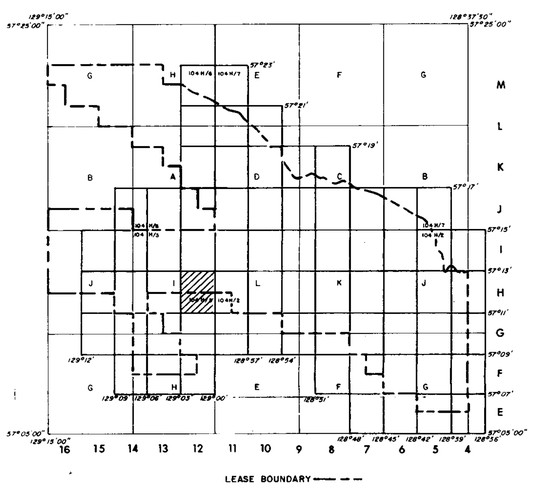
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

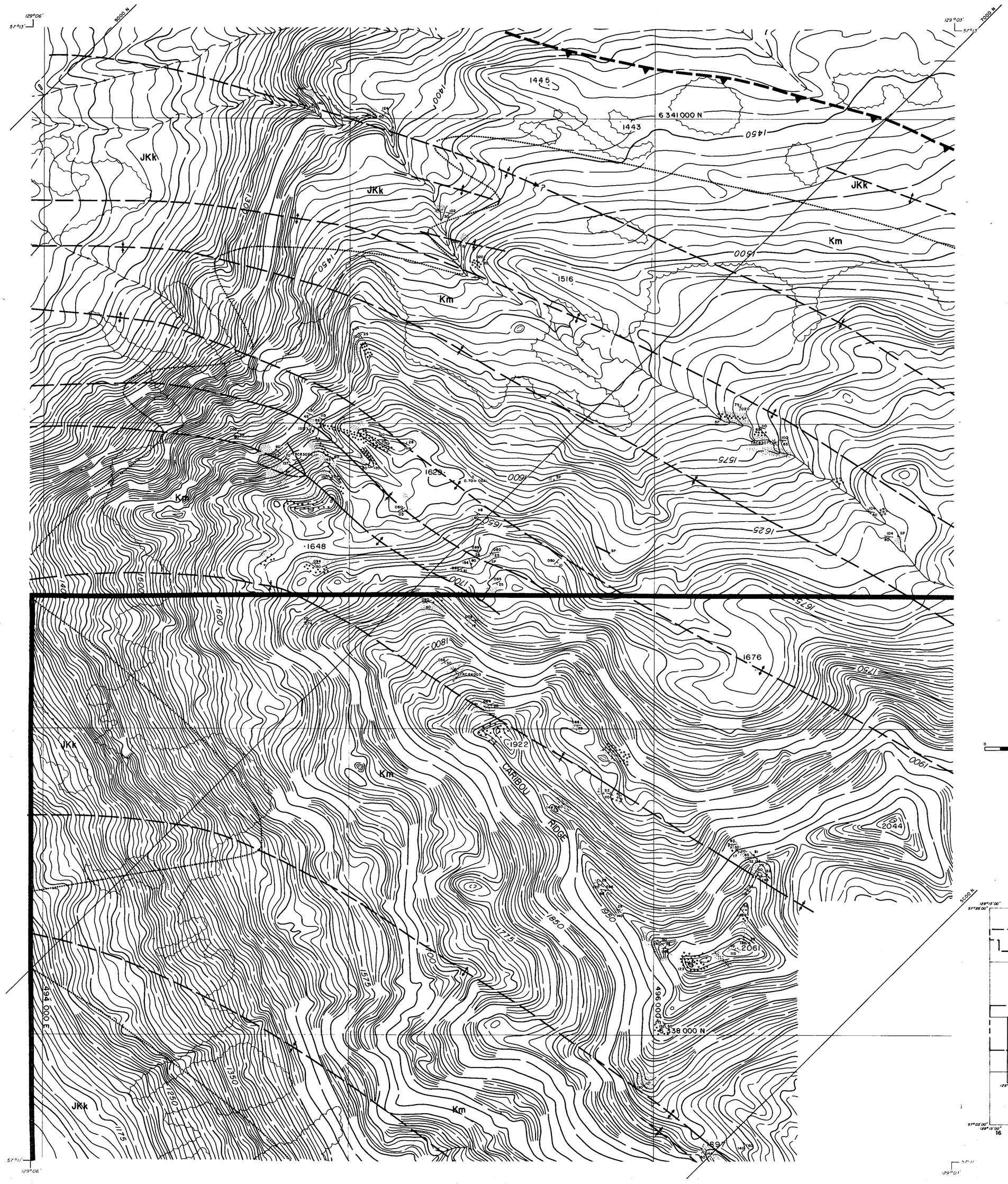
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL — SP
TRC84001
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
ODH RDH WKD
MEASURED SECTION
OTC 84001
SURVEY CAIRN
SC-17
CROSS SECTION LINE
3000 N

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP H-12

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-12



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 — B.D. B.D.
- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
- INTERMEDIATE
- DEPRESSION
- APPROXIMATE
- SPOT ELEVATION — ·7654
- FORM LINES
- CUT/FILL
- FIELD CONTROL POINT — CP 121
- 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 OBSCURRED 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).

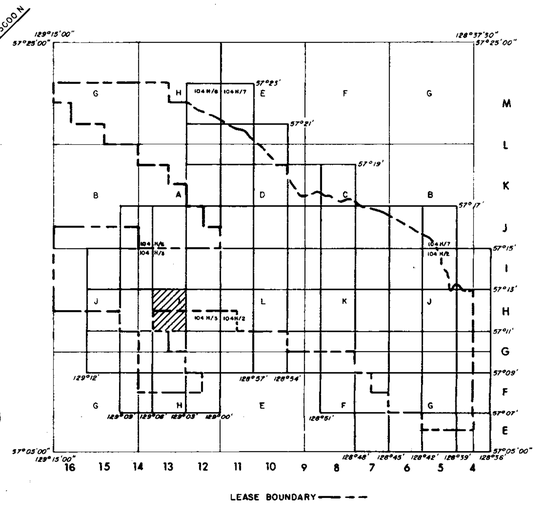
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 — 0 — 100 — 200 — 300 — 400 — 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

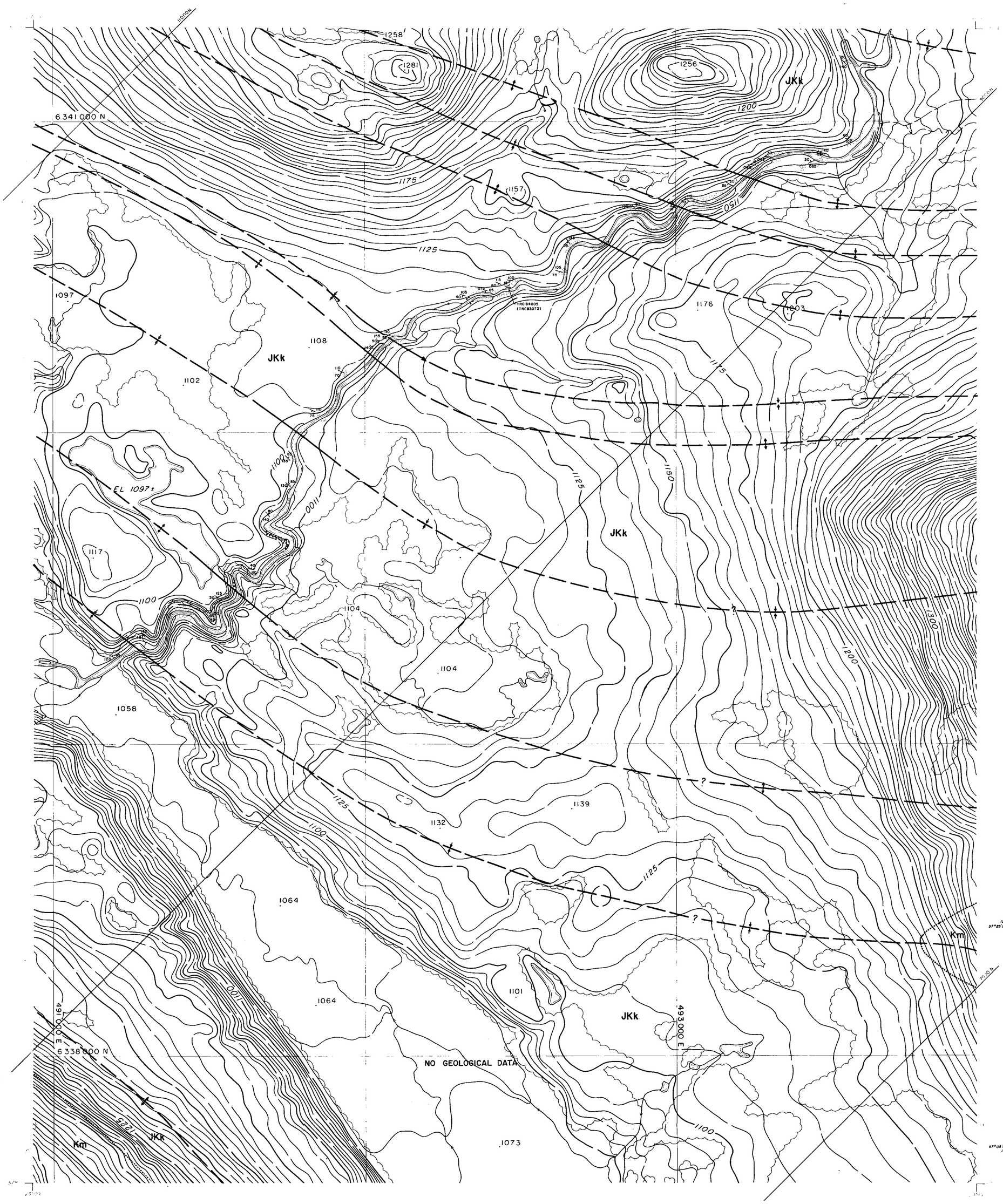
- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
- JOINTS (INCLINED, VERTICAL, HORIZONTAL)
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP H-13

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-13



LEGEND

BUILDING
ROAD, HARD SURFACE
LOOSE SURFACE
CART TRACK
TRAIL
RAILROAD BED
RIVER
STREAM, DEFINITE
APPROXIMATE
LAKE
WATER LEVEL — EL 1057
SWAMP
BEAVER DAM — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — 1654
FORM LINES
CUTLINE
FIELD CONTROL POINT — (1-2-121)
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 McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST/67 AT A SCALE OF 1:60 000 (APPROXIMATE)

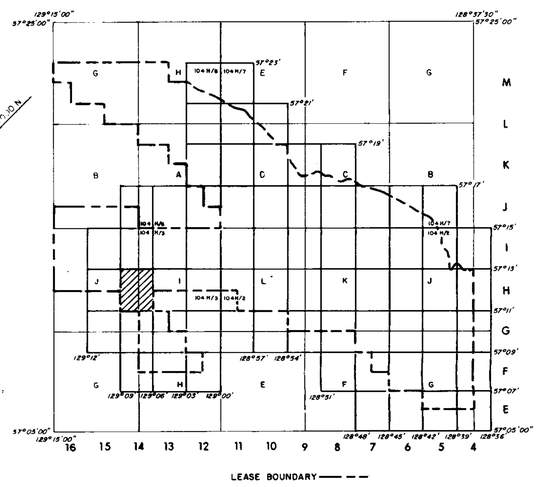
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

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LEGEND

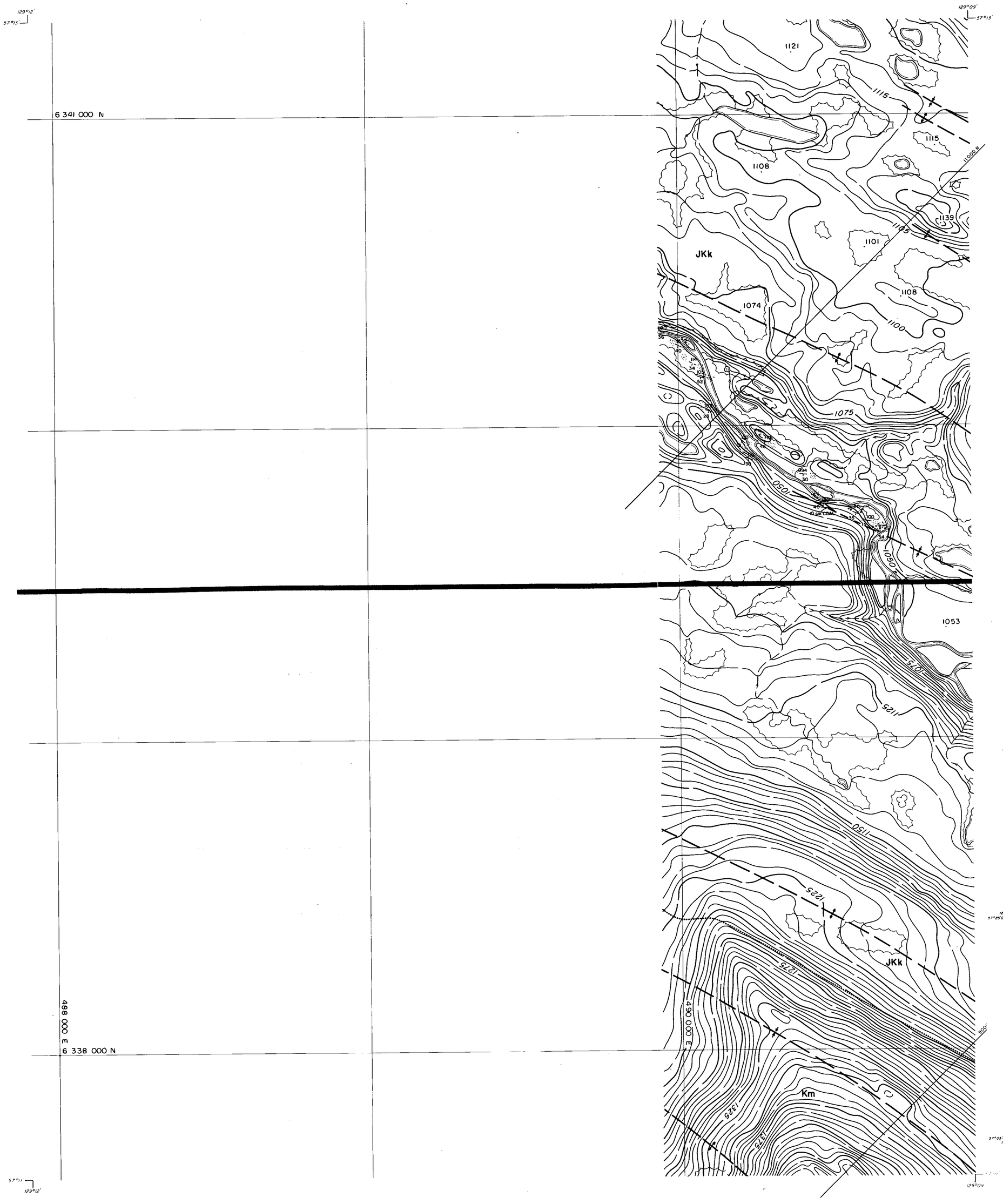
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP H-14

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-14



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 — B.D. BD
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
COAL LICENCE

NOTES

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

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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 AT A SCALE OF 1 60 000 (APPROXIMATE).

N

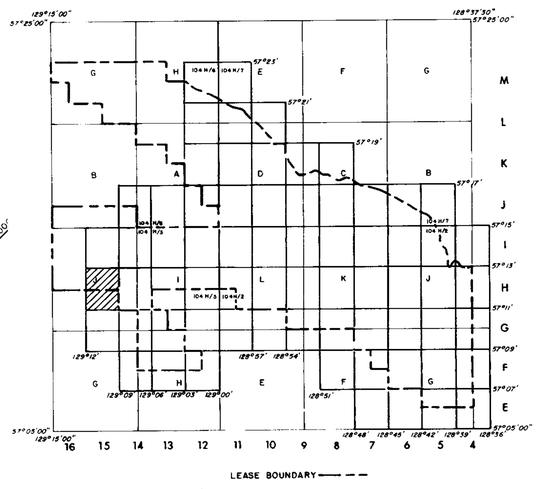
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
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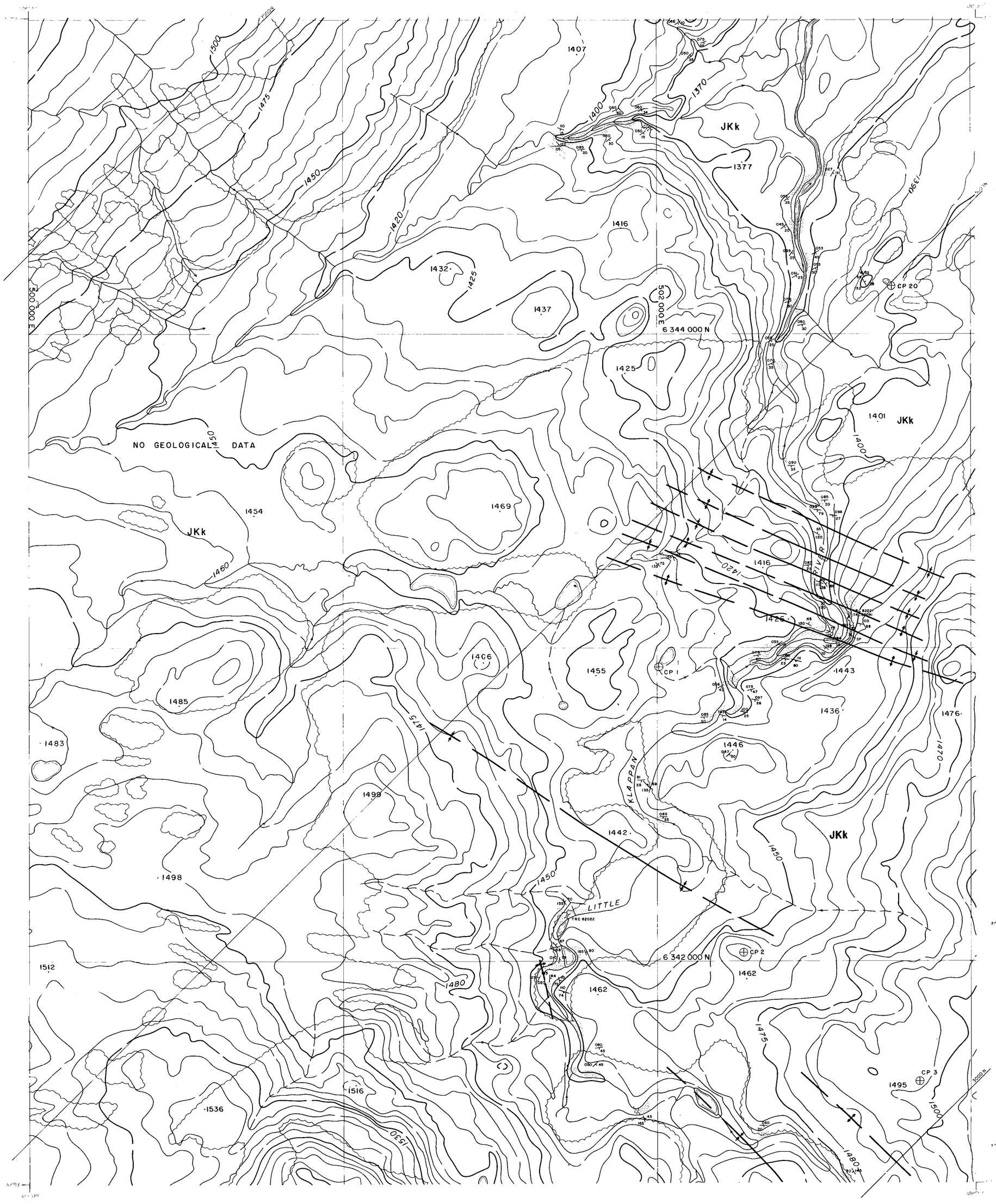
U D — FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
TRC84001 — SP — ADIT TRENCH COAL SPOIL
DDH RDH WKD — DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
OTC 84001 — MEASURED SECTION
SC-17 — SURVEY CAIRN
3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP H-15

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-15



LEGEND

BUILDINGS
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
FIXED
FIELD CONTROL POINT
COAL LICENCE

NOTES

MAPPING REDUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF ORIGINAL NEGATIVES

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

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SCALE 1:5000

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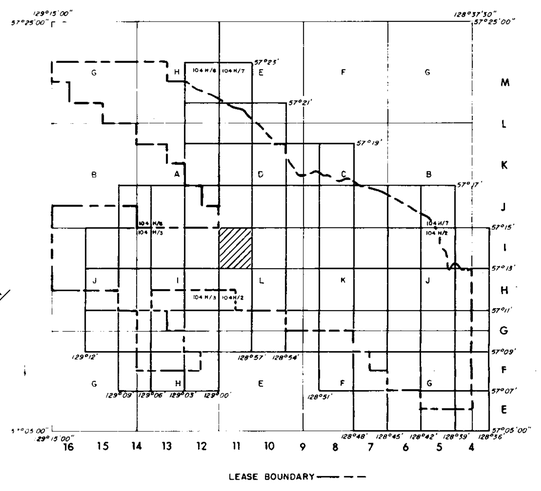
MT. KLAPPAN AREA

INDEX MAP



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LEGEND

- LICENCE BOUNDARY
- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
- OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
- MONOCLINE (DEFINED, APPROXIMATE)
- BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
- FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
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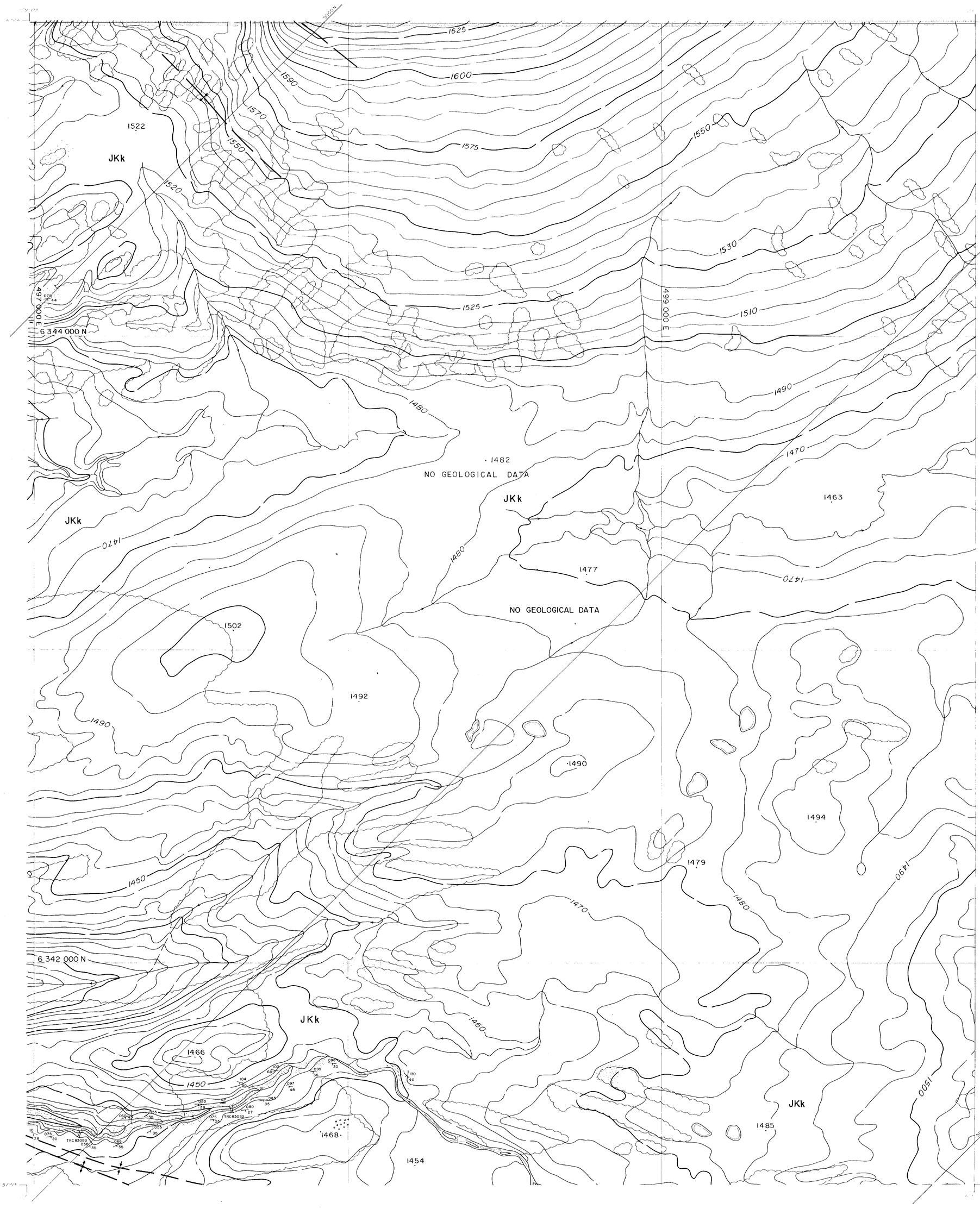
- THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT, TRENCH, COAL SPOIL
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
- MEASURED SECTION
- SURVEY CAIRN
- CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP I-11

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-16



LEGEND

BUILDING
ROAD, HARD SURFACE
LOOSE SURFACE
CART TRACK
TRAIL
RAILROAD BED
RIVER
STREAM, DEFINITE
APPROXIMATE
SPLIT
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SWAMP
BEAVER DAM
TREE LINE
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CONTOURS, INDEX
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION
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COALESCENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF ENSPOO NEGATIVES

CONTOUR INTERVAL 10M, WITH FORM LINES INTERVAL 5M

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 A[illegible] AT A SCALE OF 1:60,000 (APPROXIMATE)

N

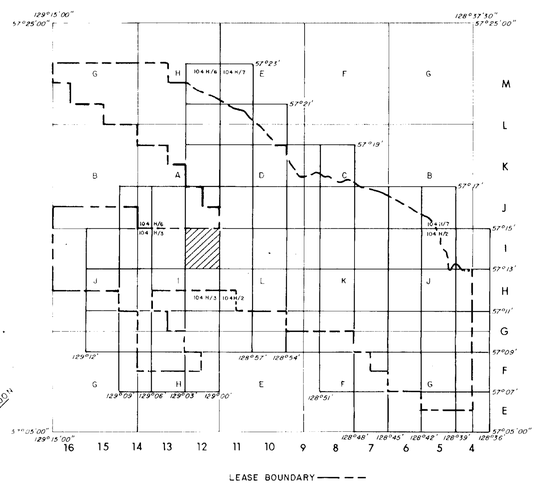
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

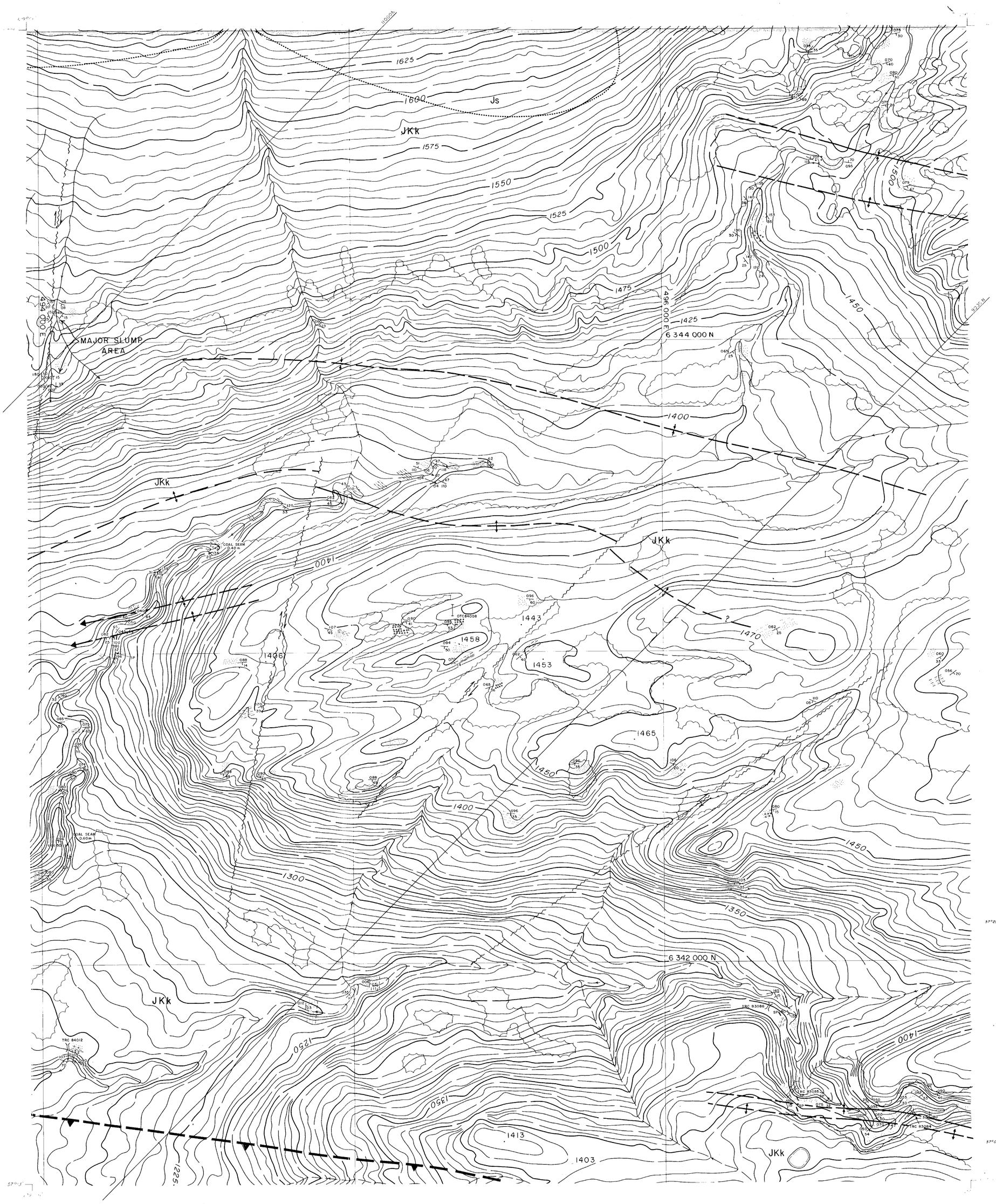
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP I-12

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-17



LEGEND

BUILDING
ROAD, HARD SURFACE
LOOSE SURFACE
CART TRACK
TRAIL
RAILROAD BED
RIVER
STREAM, DEFINITE
APPROXIMATE
SPLIT
LAKE
WATER LEVEL — EL 505.4
SWAMP
BEAVER DAM — BD
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — 7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
COAL LICENCE

NOTES

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

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COMPILED BY
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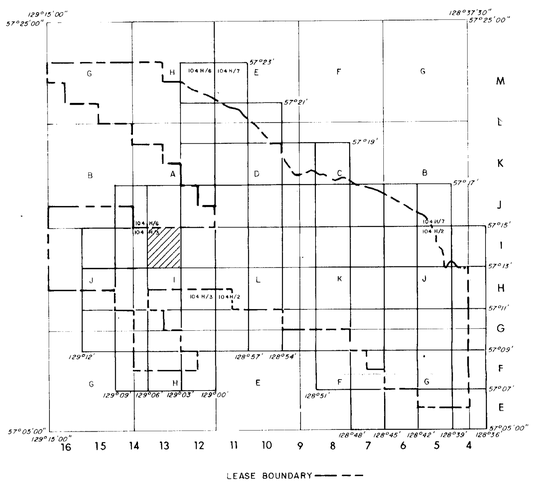
SCALE 1:5000

0 — 0.25 — 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

LICENCE BOUNDARY
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COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
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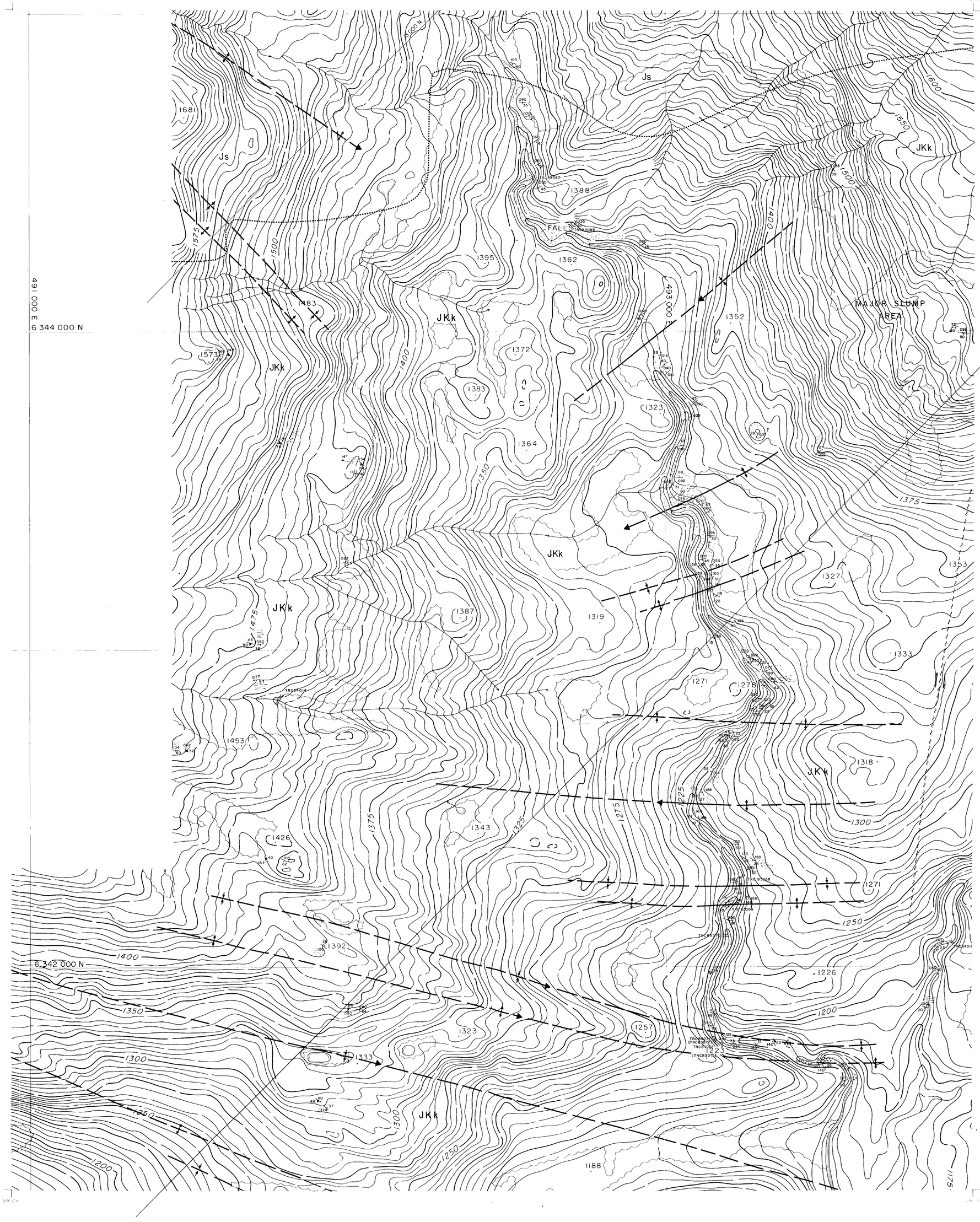
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL — SP
TRC84001
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
DDH RDH WKD
MEASURED SECTION
OTC 84001
SURVEY CAIRN
SC-17
CROSS SECTION LINE
3000 N

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP I-13

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-18



LEGEND

BEDDING
ROAD NAME SURFACE
LOOSE SURFACE
CART TRACK
TRAIL
RAILROAD BED
RIVER
STREAM, DEFINITE
APPROXIMATE
SPLIT
LAKE
WATER
SWAMP
BEAVER DAM
TREE LINE
CUT LINE
CONTOURS, INDEX
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION
FORM LINES
CUTZELL
HEIGHT OF INSTRUMENT
COAL LICENCE

NOTES

MAPPING PRODUCED FROM PHOTOGRAPHIC ENLARGEMENTS OF 1:15 000 NEGATIVES

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RAILROAD BED LOCATION BASED ON SEE 162 AERIAL PHOTOGRAPHY

COMPILED BY
WESTERN PHOTOGRAMMETRY, A DIVISION OF GALLWOOD, McLELLAN LTD., FROM FEDERAL GOVERNMENT AERIAL PHOTOGRAPHY FLOWN IN AUGUST 1967 AT A SCALE OF 1:15 000 (APPROXIMATE).

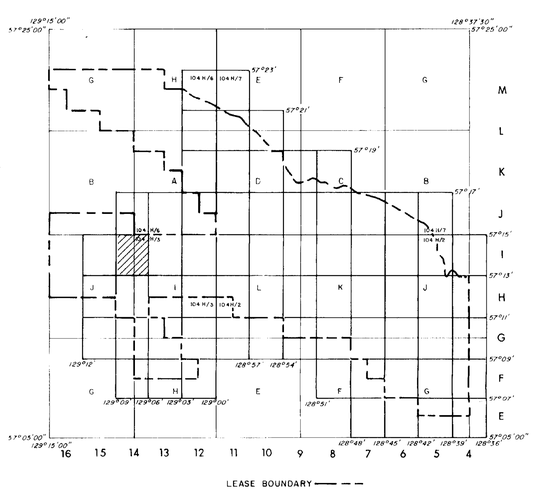
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

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- GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
- COAL SEAM (DEFINED, INFERRED)
- ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
- SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
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- MONOCLINE (DEFINED, APPROXIMATE)
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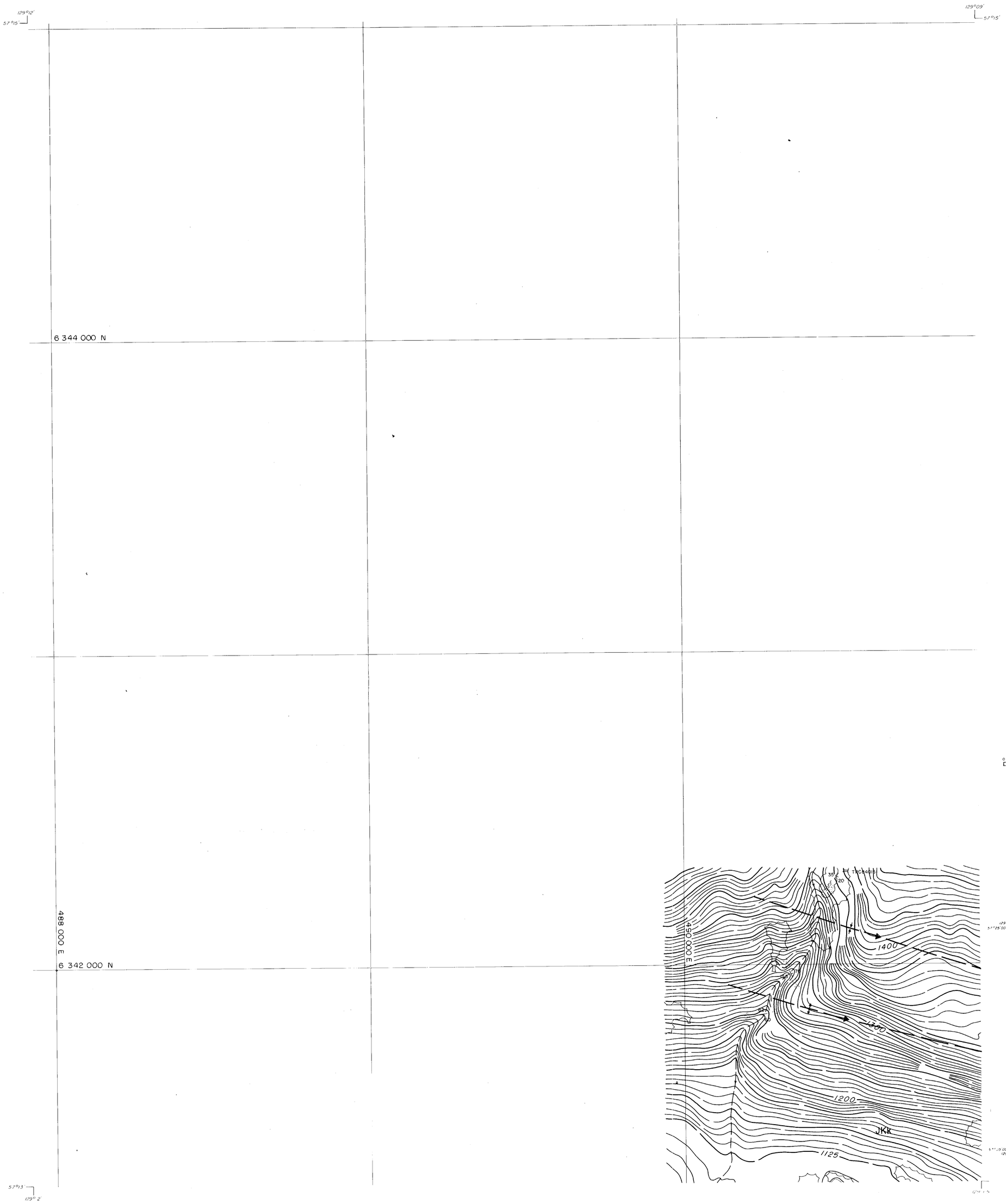
- FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
- FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
- ADIT TRENCH COAL SPOIL (TRC84001; SP)
- DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION) (DDH, RDH, WKD)
- MEASURED SECTION (OTC 84001)
- SURVEY CAIRN (SC-17)
- CROSS SECTION LINE (3000 N)

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP I-14

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-19



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 — B.D. B.D.
TREE LINE
CUT LINE
CONTOURS, INDEX — 1750
INTERMEDIATE
DEPRESSION
APPROXIMATE
SPOT ELEVATION — ·7654
FORM LINES
CUT/FILL
FIELD CONTROL POINT — CP 121
COAL LICENCE

NOTES

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

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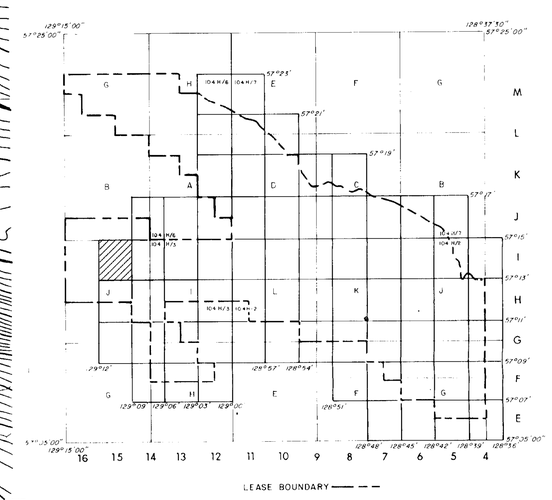
SCALE 1:5000

0 0.25 0.5 MILES

50 0 100 200 300 400 500 METERS

MT. KLAPPAN AREA

INDEX MAP



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LEGEND

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TRC84001 — SP — ADIT TRENCH COAL SPOIL
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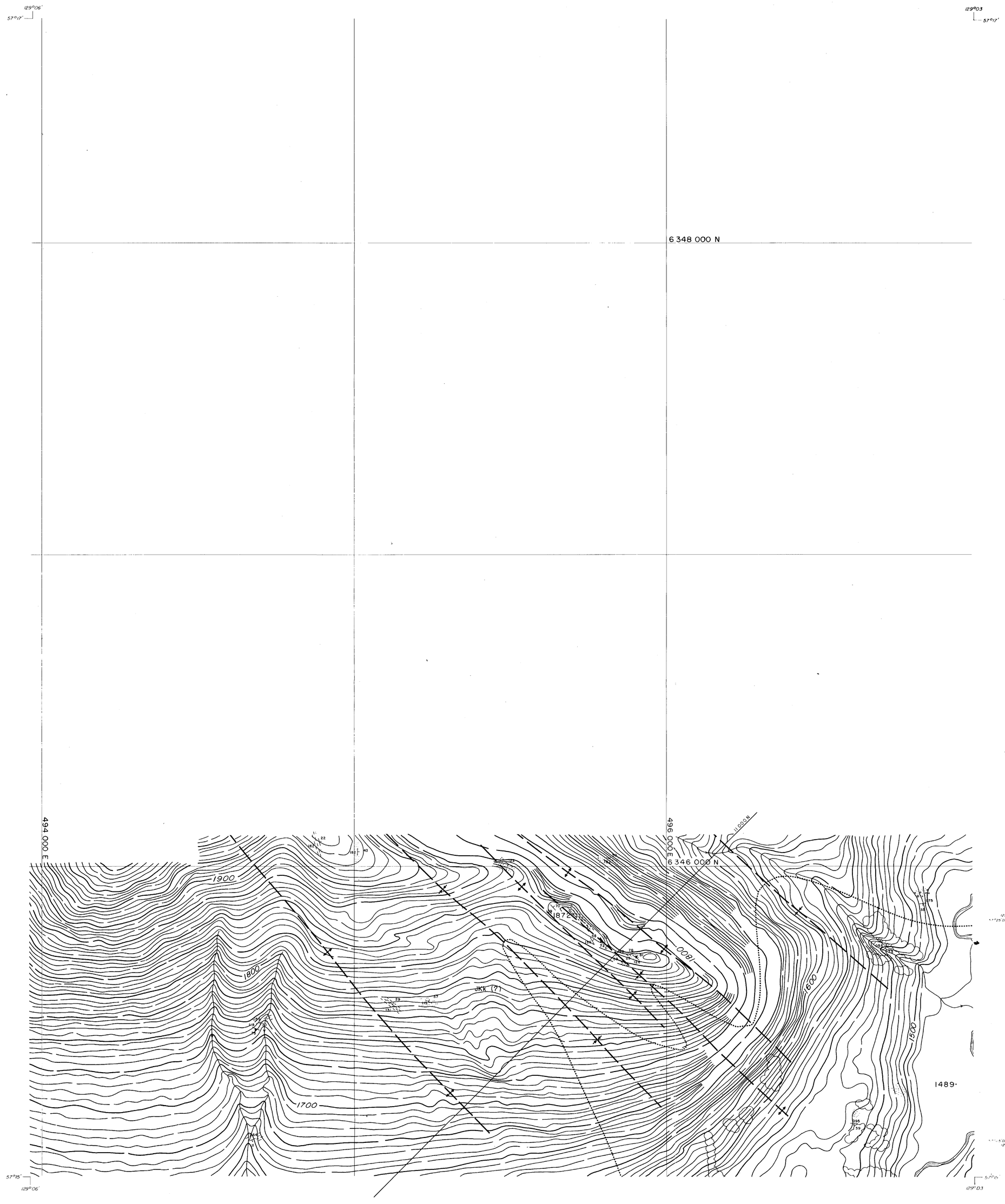
OTC 84001 — MEASURED SECTION
SC-17 — SURVEY CAIRN
3000 N — CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP I-15

PREPARED BY: K. JENNER		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DWG. No. KPN85NA-20



LEGEND

- BUILDING
- ROAD, HARD SURFACE
  - LOOSE SURFACE
  - CART TRACK
  - TRAIL
- RAILROAD BED
- RIVER
- STREAM, DEFINITE
  - APPROXIMATE
  - SPLIT
- LAKE
- WATER LEVEL — EL 505 ±
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- TREE LINE
- CUT LINE
- CONTOURS, INDEX — 1750
  - INTERMEDIATE
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MT. KLAPPAN AREA

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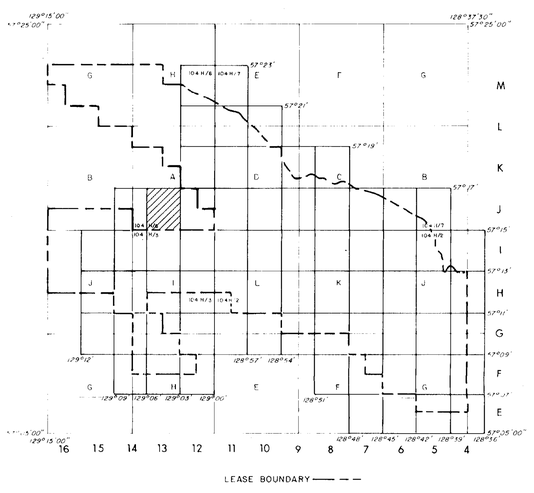

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- ADIT TRENCH COAL SPOIL
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706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
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GEOLOGY MAP
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MAP J-13

PREPARED BY: K. JENNER		SCALE 1:5000
APPROVED BY: K. JENNER	DATE: JAN. 1986	DWG. No. KPN85NA-21

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.

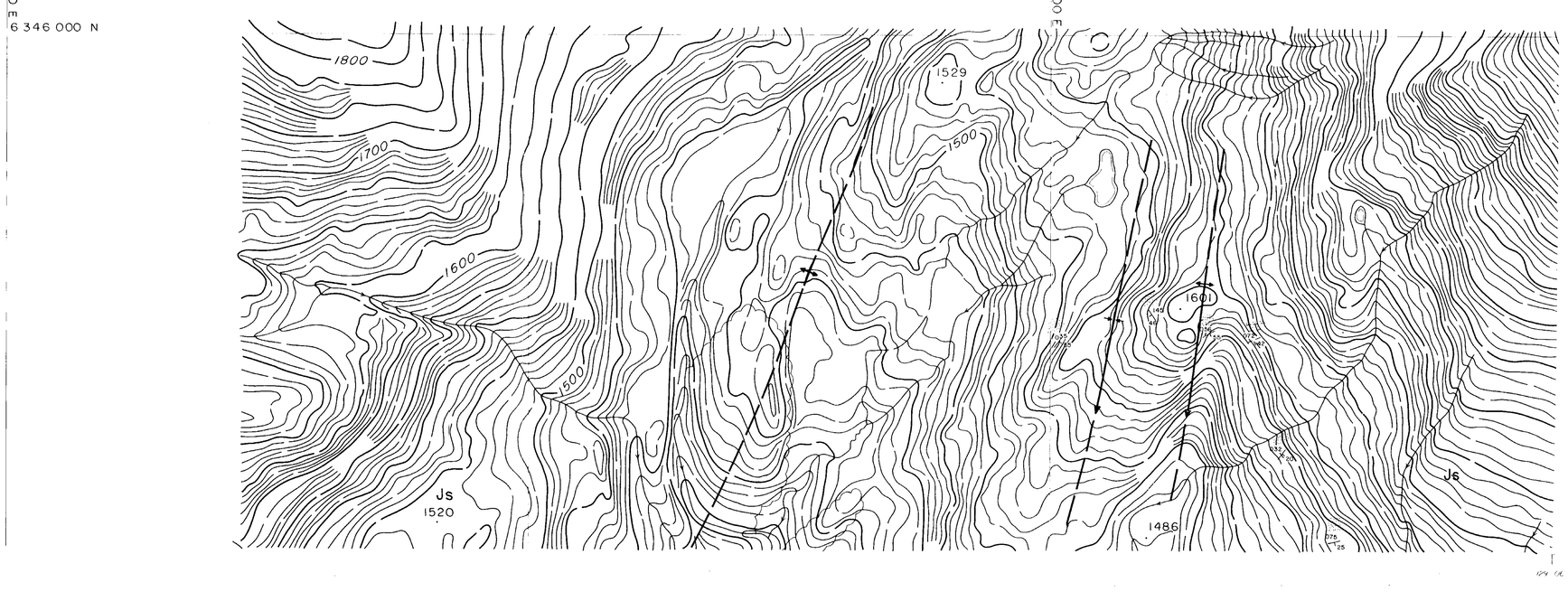
CONTOUR INTERVAL = 10 M, WITH FORM LINES INTERVAL = 5 M.

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

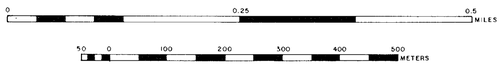
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

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).

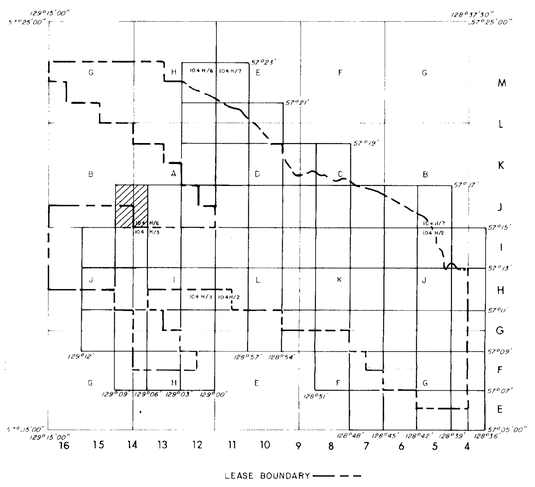


SCALE 1:5000



MT. KLAPPAN AREA

INDEX MAP



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LEGEND

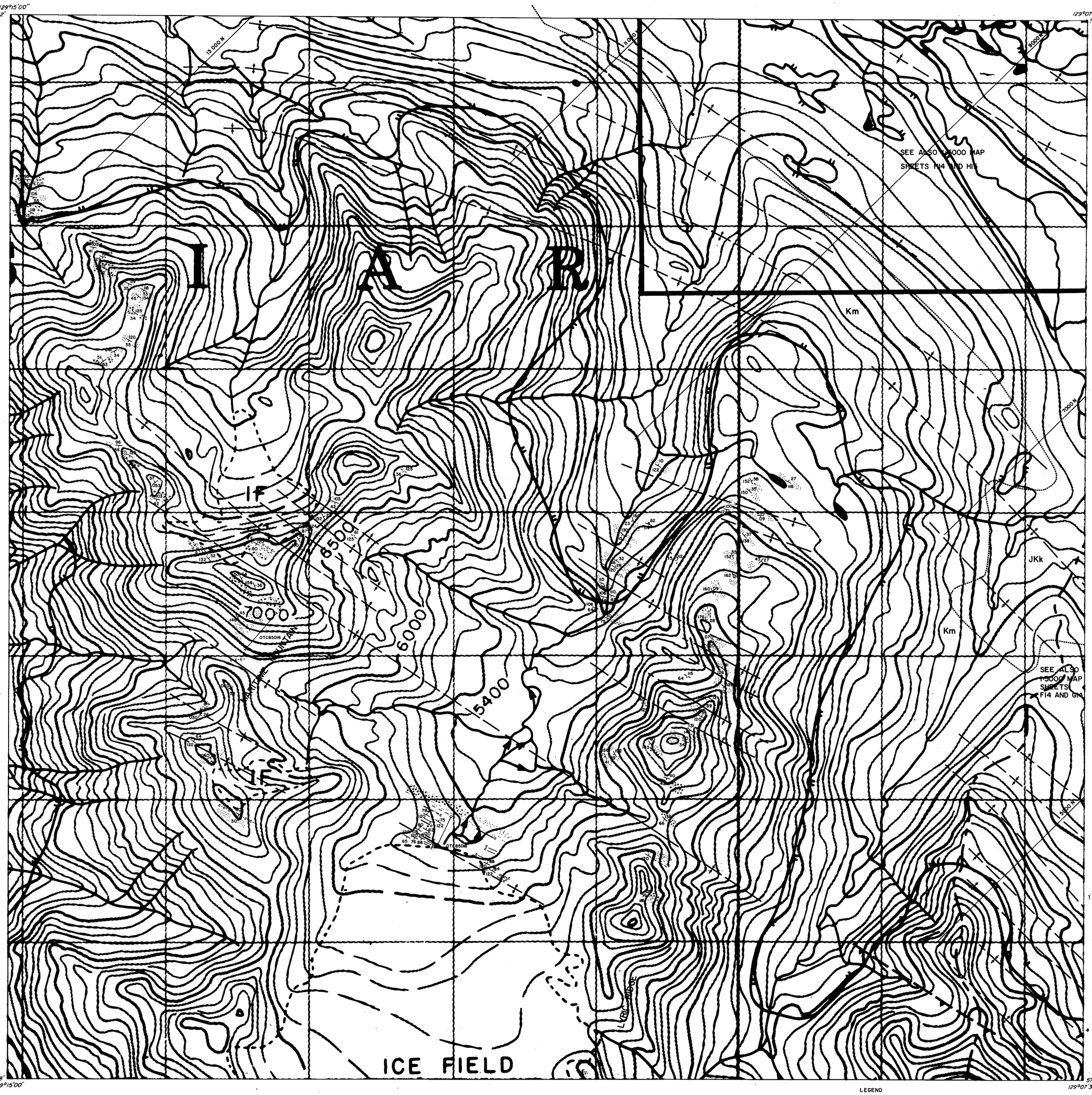
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP J-14

PREPARED BY: K. JENNER	SCALE 1:5000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-22



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, GASOLINE, WATER
TELEPHONE LINE
POWER TRANSMISSION LINE
MINE
CUTTING, EMBANKMENT
GRAVEL PIT — GP

BOUNDARIES AND CONTROL

INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
COUNTY DISTRICT
TOWNSHIP PARISH — SURVEYED, UNSURVEYED — UNSURVEYED
TOWNSHIP DLS — SURVEYED, UNSURVEYED, SECTION CORNERS
MUNICIPALITY
INDIAN RESERVE, PARK, ETC
HORIZONTAL CONTROL POINT
BENCH MARK — BM 965
SPOT ELEVATION, ELEVATION APPROXIMATE — ·390 ·721±

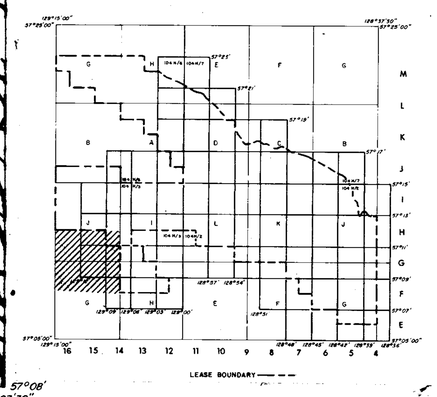
DRAINAGE AND RELATED FEATURES

STREAM, SHORELINE INDEFINITE
DIRECTION OF FLOW
LAKE, INTERMITTENT
INUNDATED, FLOODED LAND
MARSH OR SWAMP (WOODED)
DRY RIVER BED WITH CHANNELS
SAND, ABOVE, IN WATER
STRING BOG — SB
TUNDRA PONDS, POLYGONS — TP, PG
RAPIDS
FORESHORE FLATS — FF
ROCK
DAM
WHARF
DITCH

RELIEF FEATURES

CONTOURS — 500, 250
APPROXIMATE CONTOUR — 125, 100, 75
DEPRESSION
ESKER
PINGO — 125
SAND, SAND DUNES — SAND
PALSA BOG — PB
WOODED AREA — W, C

0 1/8 1/4 1/2 3/4 MILE
0 100 200 400 600 800 1000 METERS
SCALE : 1:10,000



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

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LEGEND

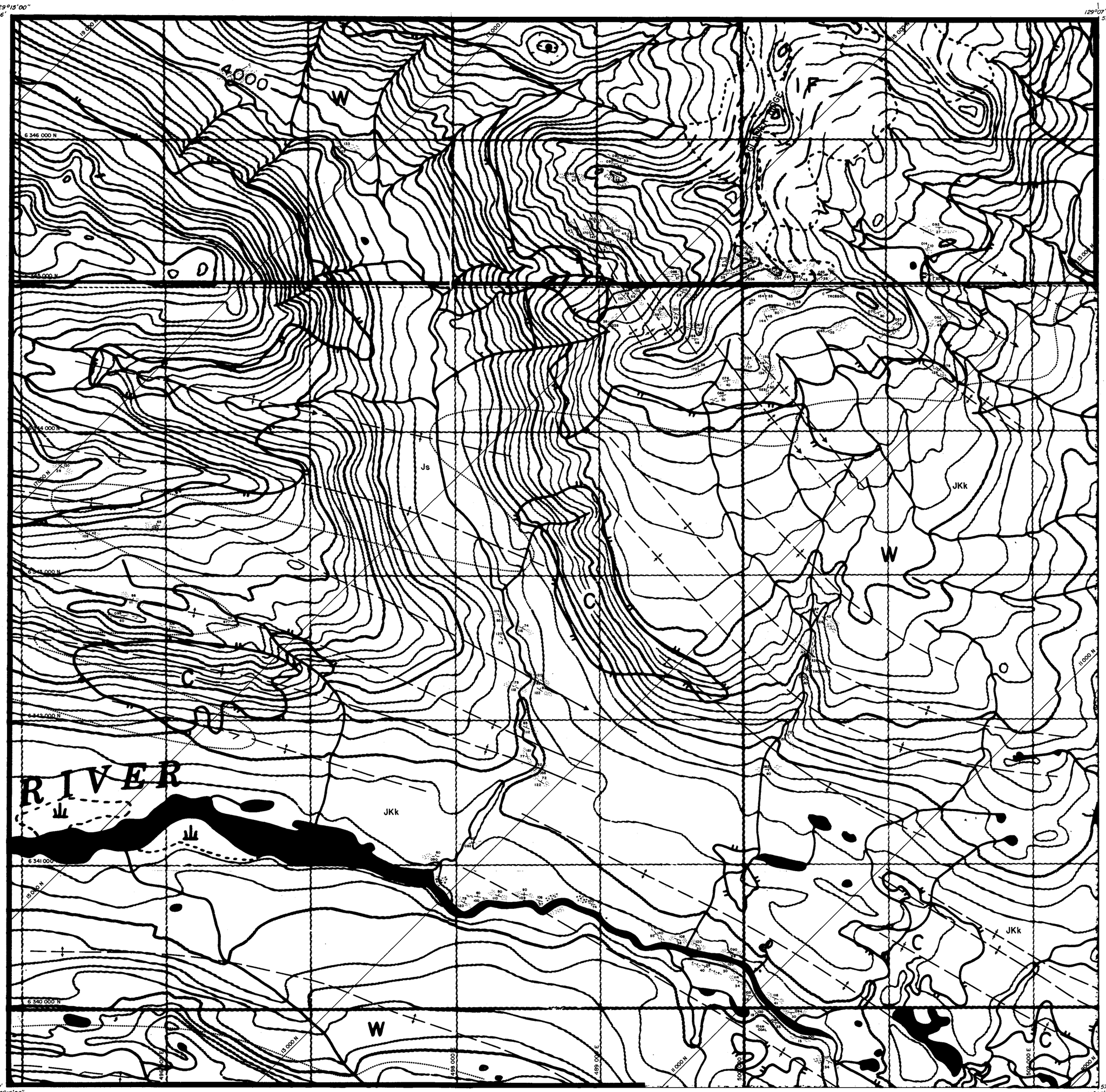
LICENCE BOUNDARY
GEOLOGICAL CONTACT (APPROXIMATE, INFERRED)
COAL SEAM (DEFINED, INFERRED)
ANTICLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
MONOCLINE (DEFINED, APPROXIMATE)
BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
JOINTS (INCLINED, VERTICAL, HORIZONTAL)
THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPTHRUST SIDE
FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWNTHROWN SIDE
FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP 104 H/3 G

PREPARED BY: K. JENNER	SCALE 1:10,000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-23



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, GASOLINE, WATER
TELEPHONE LINE
POWER TRANSMISSION LINE
MINE
CUTTING, EMBANKMENT
GRAVEL PIT — GP

BOUNDARIES AND CONTROL

INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
COUNTY, DISTRICT
TOWNSHIP, PARISH — SURVEYED — UNSURVEYED — UNSURVEYED
TOWNSHIP, DLS — SURVEYED — UNSURVEYED — SECTION CORNERS
MUNICIPALITY
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BENCH MARK — BM 965
SPOT ELEVATION, ELEVATION APPROXIMATE — ·390 ·721±

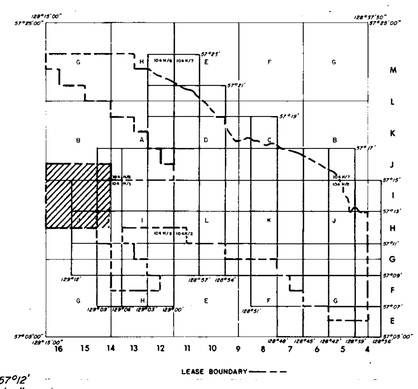
DRAINAGE AND RELATED FEATURES

STREAM, SHORELINE, INDEFINITE
DIRECTION OF FLOW
LAKE, INTERMITTENT
INUNDATED, FLOODED LAND
MARSH OR SWAMP (WOODED)
DRY RIVER BED WITH CHANNELS
SAND, ABOVE, IN WATER
STRING BOG — SB
TUNDRA PONDS, POLYGONS — TP, PG
RAPIDS
FORESHORE FLATS — FF
ROCK
DAM
WHARF
DITCH

RELIEF FEATURES

CONTOURS — 500, 350
APPROXIMATE CONTOUR — 700, 125
DEPRESSION — 25
ESKER
PINGO — 125
SAND, SAND DUNES — SAND
PALSA BOG — PB
WOODED AREA — W, C

0 1/8 1/4 1/2 3/4 MILE
0 100 200 400 600 800 1000 METERS
SCALE : 1:10,000



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SYNCLINE (DEFINED, APPROXIMATE) ARROW INDICATES PLUNGE DIRECTION
OVERTURNED ANTICLINE (DEFINED, APPROXIMATE)
OVERTURNED SYNCLINE (DEFINED, APPROXIMATE)
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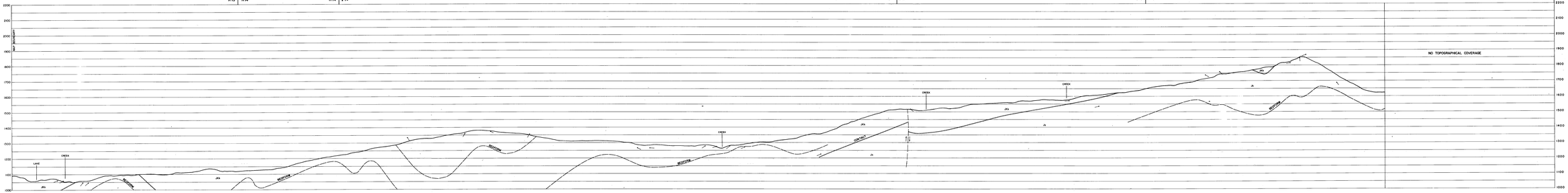
ADIT TRENCH COAL SPOIL
DIAMOND, ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
MEASURED SECTION
SURVEY CAIRN
CROSS SECTION LINE

706

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
NASS AREA
MAP 104 H/3 J

PREPARED BY: K. JENNER	SCALE 1:10,000
APPROVED BY: K. JENNER DATE: JAN. 1986	DWG. No. KPN85NA-24

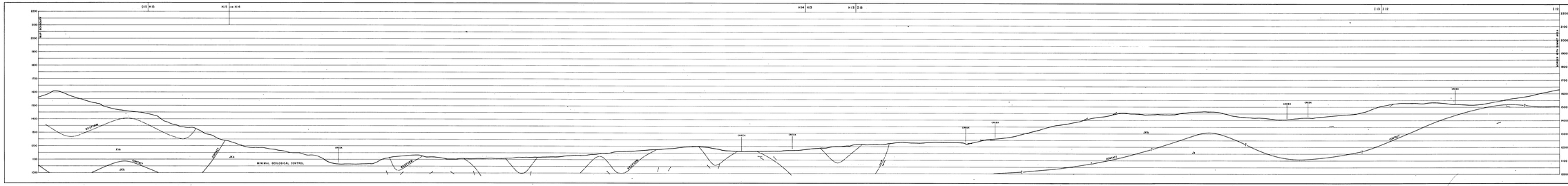


RIVERS SEQUENCE

Rr 1 Feldspathic and mica rich arkose (greywacke) and minor grey siltstone interbedded with a minor amount of conglomerate. Conglomerate contains quartzite, chert, and minor granitic clasts (max. 10 cm diameter). Tuff is dominant in upper sequence.

WILLOCK SEQUENCE

Wk 1 Dominantly fine grained, massive to poorly bedded siltstone. Tuff is dominant in upper sequence. Rare coarser sandstone. Rare conglomerate. Rare coaly material. Rare pyrite and pyrrhotite. Rare fossils. Rare coal. Rare tuffaceous siltstone. Rare tuff. Rare coal. Rare tuffaceous siltstone. Rare tuff. Rare coal. Rare tuffaceous siltstone. Rare tuff



PRIMARY SOURCES

[1] TRENCHES & PITS WERE MAPPED BY PETER BYE & PETER THOMAS OF A CANADA MINE & TUNNELING CORPORATION LTD. GEOLOGICAL MAPPING WAS CARRIED OUT BY PETER BYE & PETER THOMAS. THE MAPPING WAS DONE IN MARCH & APRIL 1985.

BELLER'S SOURCES

[2] BELLER, TERRY: "GEOLOGICAL MAPPING OF THE MOUNT KLAPPAN COAL PROPERTY, 1985". GULF CANADA RESOURCES INC. 1985. THIS REPORT CONTAINS MAPS AND DATA COMPILED BY PETER BYE AND PETER THOMAS. THE MAPS ARE DATED MARCH 1985 AND THE DATA IS DATED 1985 UNLESS OTHERWISE STATED.

SUPPER SOURCES (NOT ON MAPS)

[3] THE SUPPER SOURCES ARE BASED ON DRILLING, TRENCHING, PROSPECTING & PITS DATA. THE SUPPER SOURCES ARE DATED 1983 UNLESS OTHERWISE STATED. THE SUPPER SOURCES ARE DATED 1983 UNLESS OTHERWISE STATED. THE SUPPER SOURCES ARE DATED 1983 UNLESS OTHERWISE STATED. THE SUPPER SOURCES ARE DATED 1983 UNLESS OTHERWISE STATED.

OPTICS SOURCE

[4] CONSISTS OF A SERIES OF 4 CANADA RESOURCES OPTICS SOURCES & 4 SUPPER SOURCES. CONSISTS OF A SERIES OF 4 CANADA RESOURCES OPTICS SOURCES & 4 SUPPER SOURCES. CONSISTS OF A SERIES OF 4 CANADA RESOURCES OPTICS SOURCES & 4 SUPPER SOURCES.

LEGEND

- COAL SEAM TRACE (DEFINED, INFERRED)
- GEOLOGICAL CONTACT (APPROX, INFERRED)
- FAULT TRACE (DEFINED, APPROX.)
- BEDPLANE
- BEDDING ATTITUDE
- DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

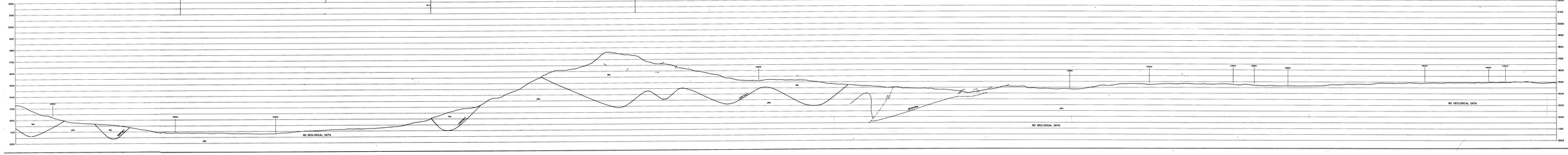
0 10 METRES 100 200 300

GULF CANADA RESOURCES INC.
PRIME RESOURCES

Gulf

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
9000N (WEST)

DRAWN BY: K.T. SCALE: 1:2000
APPROVED BY: D.G. DATE: APR. 1985 (G.L.N. REVISED)



FEATURES DESCRIBED

(N.T.) NORTH TRACE OF THE ORIGINAL CONTACTS OF A SLIVER OF CRETACEOUS ROCKS IN CONTACT WITH JURASSIC ROCKS. THE CONTACTS WERE DISTURBED BY SUBSEQUENT FAULTING.

(N.F.) THE NORTH FAULT, CONTACTS WITH A SLIVER OF CRETACEOUS ROCKS ON THE TRACE OF THE NORTH FAULT. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED.

(LATER) DESCRIBED (TRACE NOT SHOWING ON SECTION)

(S.F.) THE SOUTH FAULT, BRINGING CRETACEOUS ROCKS, CONTACTS WITH A SLIVER OF JURASSIC ROCKS. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJacent TO THE FAULT ARE DISTURBED.

(LATER) DESCRIBED

(N.F.) THE NORTH FAULT, BRINGING CRETACEOUS ROCKS, CONTACTS WITH A SLIVER OF JURASSIC ROCKS. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED. THE FAULT DIPS 60° TO THE SOUTH. THE ROCKS ADJACENT TO THE FAULT ARE DISTURBED.

LEGEND SUMMARY

COAL SEAM TRACE (METHOD, REFERENCE)

GEOLOGICAL CONTACT (APPROX, REFERENCE)

FAULT TRACE (METHOD, REFERENCE)

BEDDING

BEDDING ATTITUDE

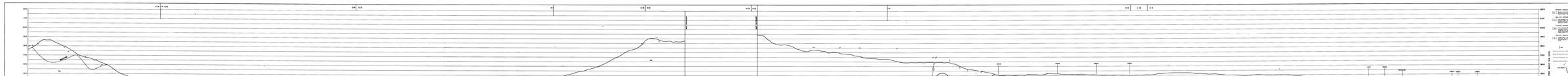
DRILLHOLE

DRAWN DRILL HOLE WITH ATTITUDE CONTROL

706

0 50 100 METRES 200 300 400

GULF CANADA RESOURCES INC.	
LOCATION: MOUNT KLAPPAN COAL PROPERTY	GULF
1985	
GEOLOGICAL CROSS SECTION	
NASS AREA	
7000 N (WEST)	
DRAWN BY: R.J.	SCALE: 1 INCH = 100 FEET
APPROVED BY: R.J.	DATE: MARCH 26, 1985


F.N. 5+ 0.N
0+0 0.S
4+
0+0 0.N
4+
0+0 0.S
0+
0+0 0.N
4+
0+0 0.S
0+
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2000
1950
1900
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300
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100
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ELEVATION ABOVE SEA LEVEL (M.)
CONTACT
BOUNDARY
1986
1985
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ELEVATION ABOVE SEA LEVEL (M.)
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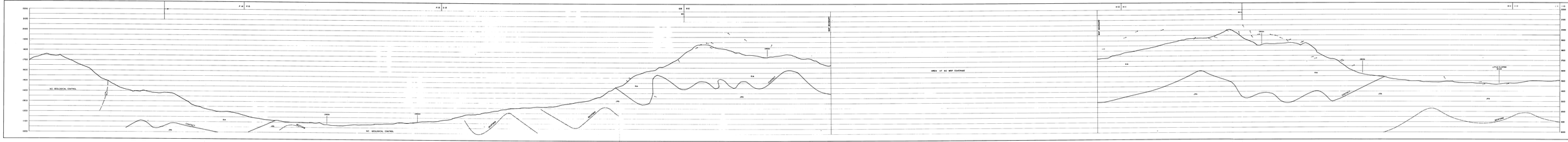
GULF COAST RESOURCES INC.
MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NORTH WEST
SOUTH WEST
DATE: OCT. 1985
DRAWN BY: J.T.
SCALE: HORIZ. 1:1000 VERT. 1:1000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DRAWING REFERENCE
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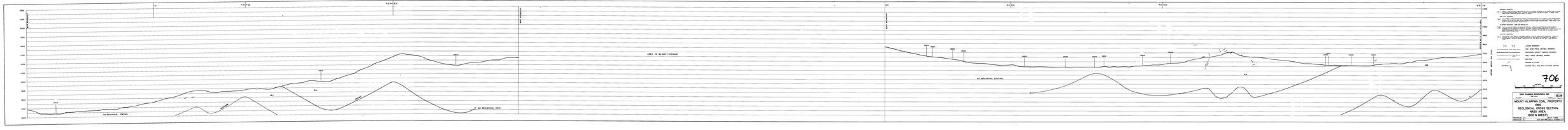
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AREA OF NO MAP COVERAGE
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NO GEOLOGICAL CONTROL
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TRACE OF CROSS SECTION
TRACE OF CROSS SECTION
ELEVATION ABOVE SEA LEVEL (FEET)
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DRILLHOLE
LEGEND
CROSS SECTION
DRILLHOLE
GEOLOGICAL CONTACT (DETAIL, INFERRED)
GEOLOGICAL CONTACT (GENERAL, INFERRED)
FAULT TRACE (DETAILED, EXPOSED)
FAULT TRACE (DETAILED, INFERRED)
SYMBOLS
DRILLHOLE
CROSS SECTION
CHAINAGE (HILL, HILL WITH LITTLEHILL CAPPED)
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METRES
1:2500
GOLD FIELDS RESOURCES INC.
MOUNT KLAPPAN COAL PROPERTY
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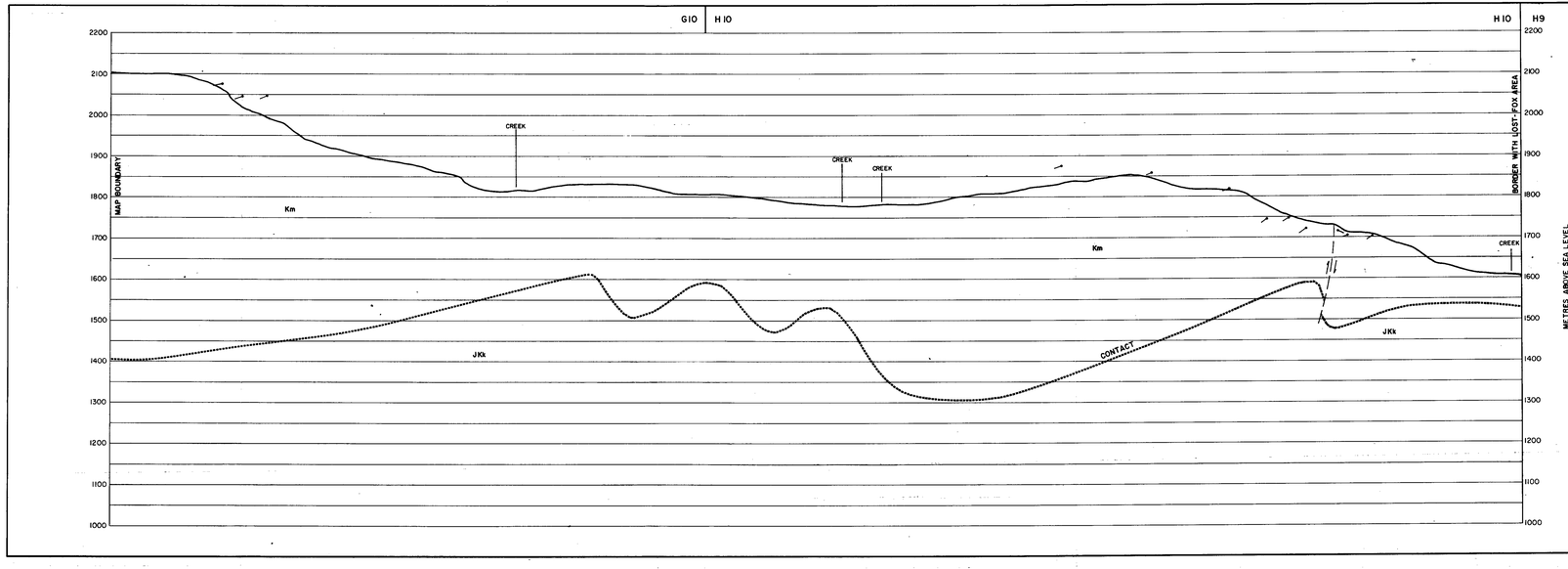
GEOLOGICAL CROSS SECTION
INDICATED
OGC'S (WEST)
DRAWN BY: T.T. DATE: 1 MAY 1
REFERENCE: 1:2500 SCALE



RHONDDA SEQUENCE

Kr — Sequence of thick chert-pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Tire species of plant fossils increase in abundance towards the base of the sequence

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstones are rare. Coal seams are more abundant towards the basal gradational contact. Twenty species of plant fossils occur within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmicity occur in the middle of the sequence. Twenty-three species of plant fossils and two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 8500I — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

METRES

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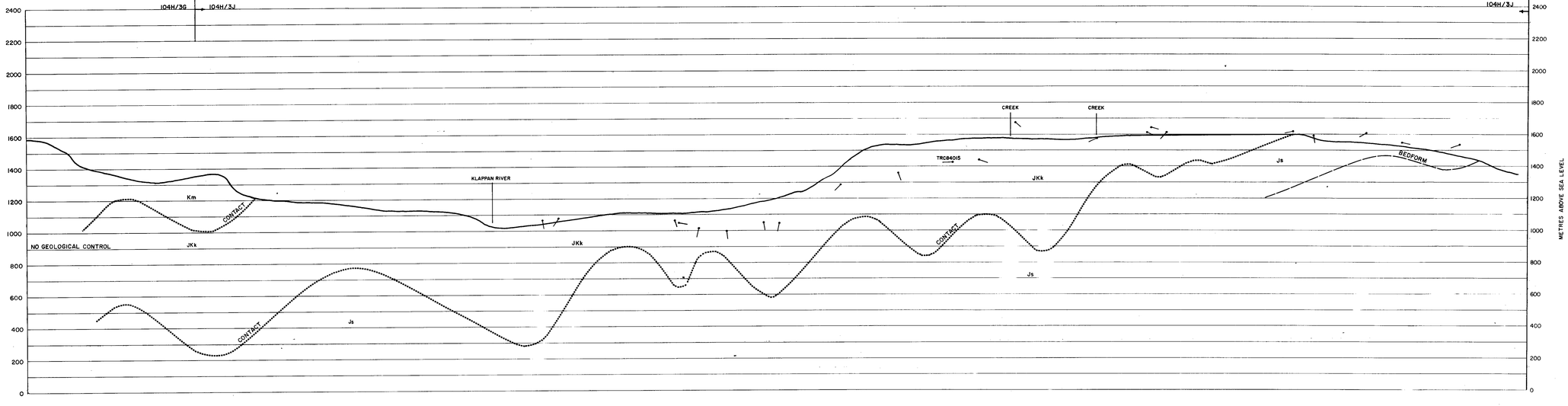
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
1000 S (WEST)

PREPARED BY: K.F.	SCALE 1:5000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KPN85NA-51



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstones. Sandstones are commonly cross bedded, lenticular and contain abundant coal fragments. Bivalves are common. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a monotonous sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant at the upper part of the sequence. Nonlacustrine species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.

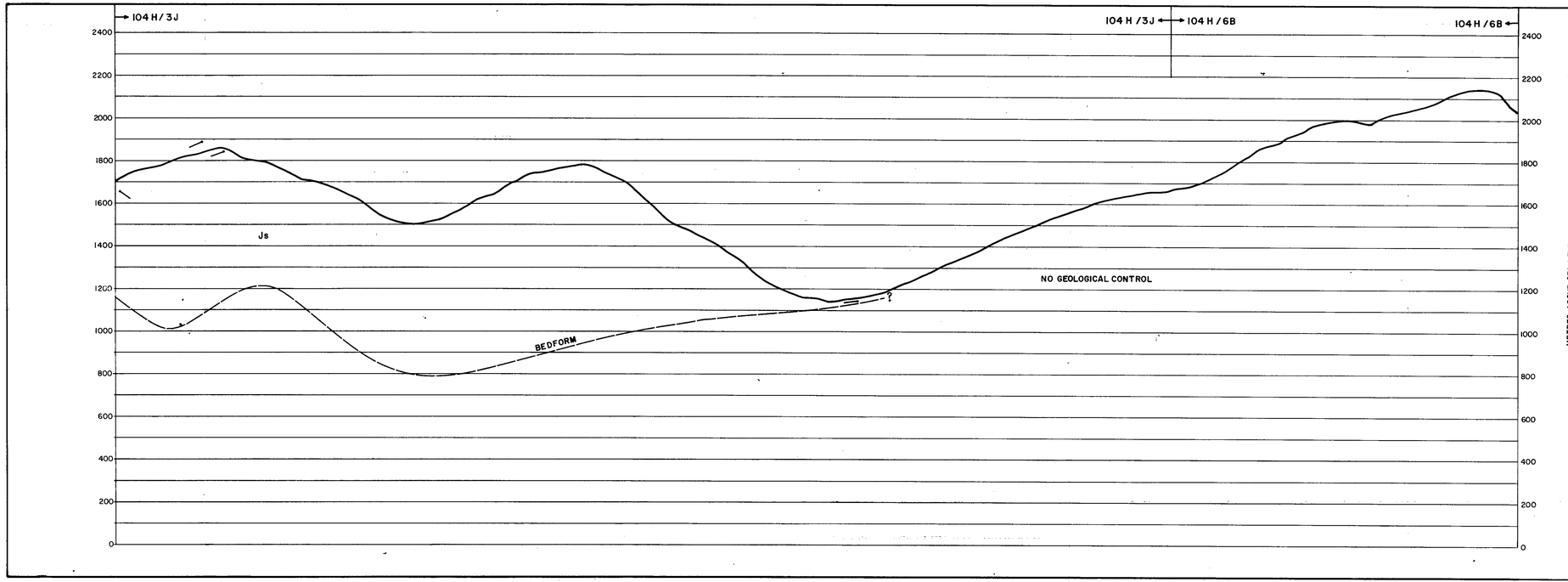
Coal Division

CALGARY ALBERTA

Gulf

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
13 000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KP185N4-34



RHONDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstones and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKs Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

METRES

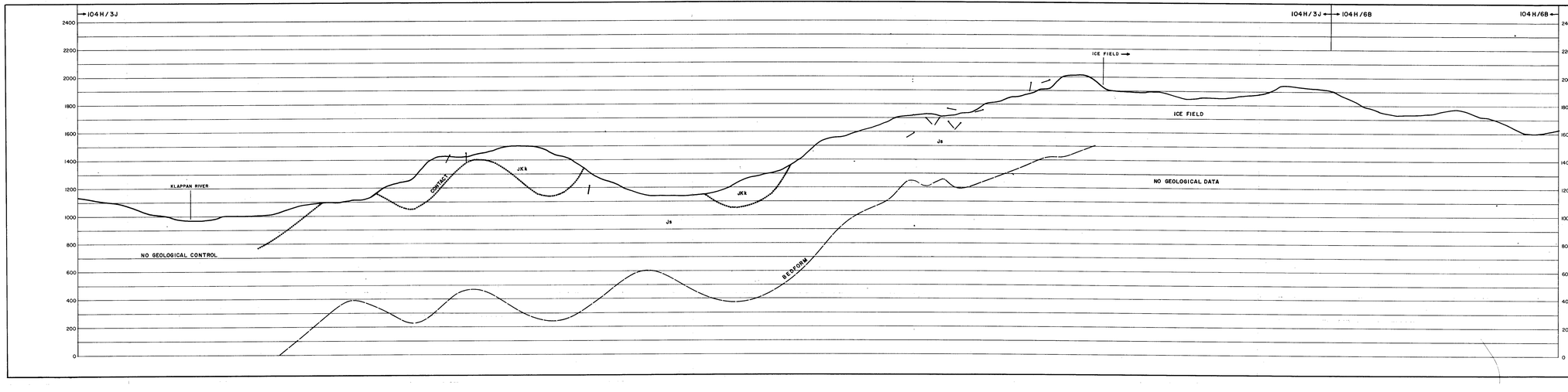
0 50 100 150 200 250

GULF CANADA RESOURCES INC.

CALGARY Coal Division ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
17000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J. DATE: JAN. 1986	DWG. No. KPN85NA-32



RHONDDA SEQUENCE

Kr — Sequence of black chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils occurred at abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstones occur in the upper part of the sequence. Carbonaceous materials the lower gradational contact. Twenty species of plant fossils occur within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (major coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering nodular siltstones. Conglomerate beds are laterally discontinuous and tend to be thinner than those of the Rhondda and Malloch. Conglomerates often display tabular or trough cross bedding. Mudstones occur in the middle of the sequence. Twenty three species of pelecypods and twenty two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Twenty species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

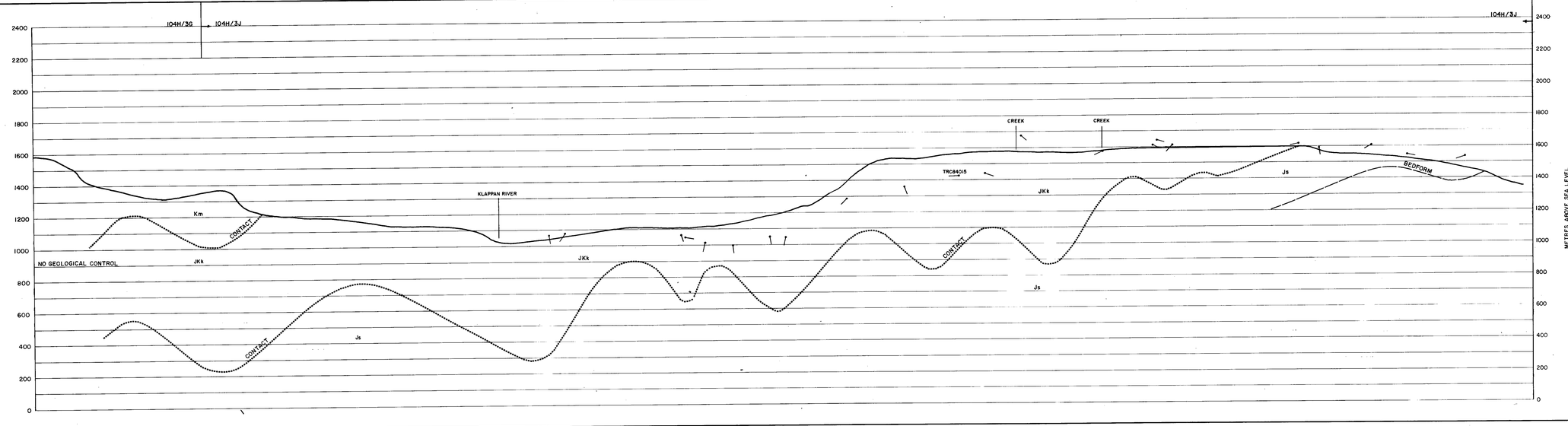
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
15 000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J.	DATE: JAN. 1986 DWG. No. KP1985GA-33



RHONDDA SEQUENCE

Kr — Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones. Coal seams are rare. Planar and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km — Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick coarse sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk — Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds are laterally discontinuous and tend to be more abundant in the middle of the sequence. Twenty three Sandstones often display tabular or trough cross bedding. Throughout, the sequence is coarsening upward. Twenty two species of plant fossils occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js — Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 — DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

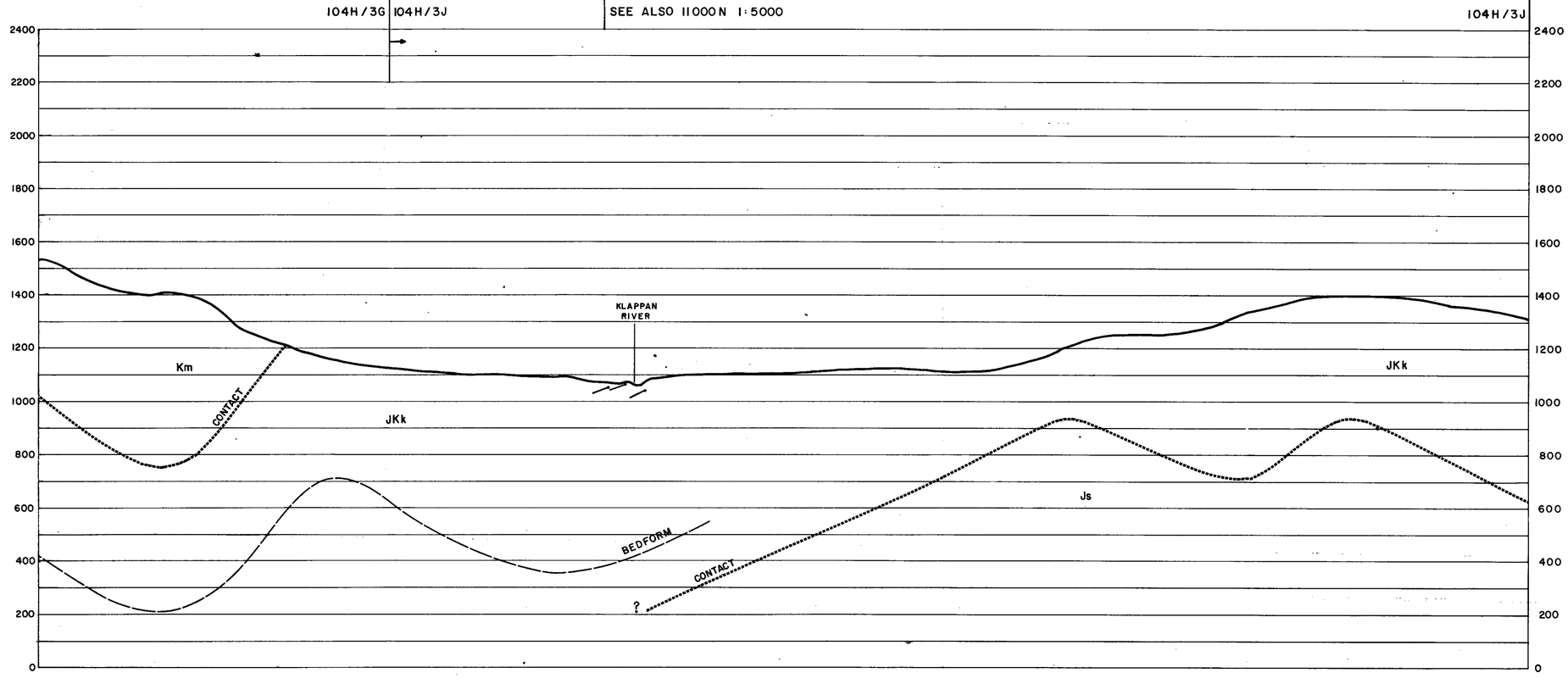
706

METRES 0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
13 000 N (WEST)

PREPARED BY: K.J. — SCALE 1:10 000
APPROVED BY: K.J. — DATE: JAN. 1986 — DWG. No. KPN85NA-34



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

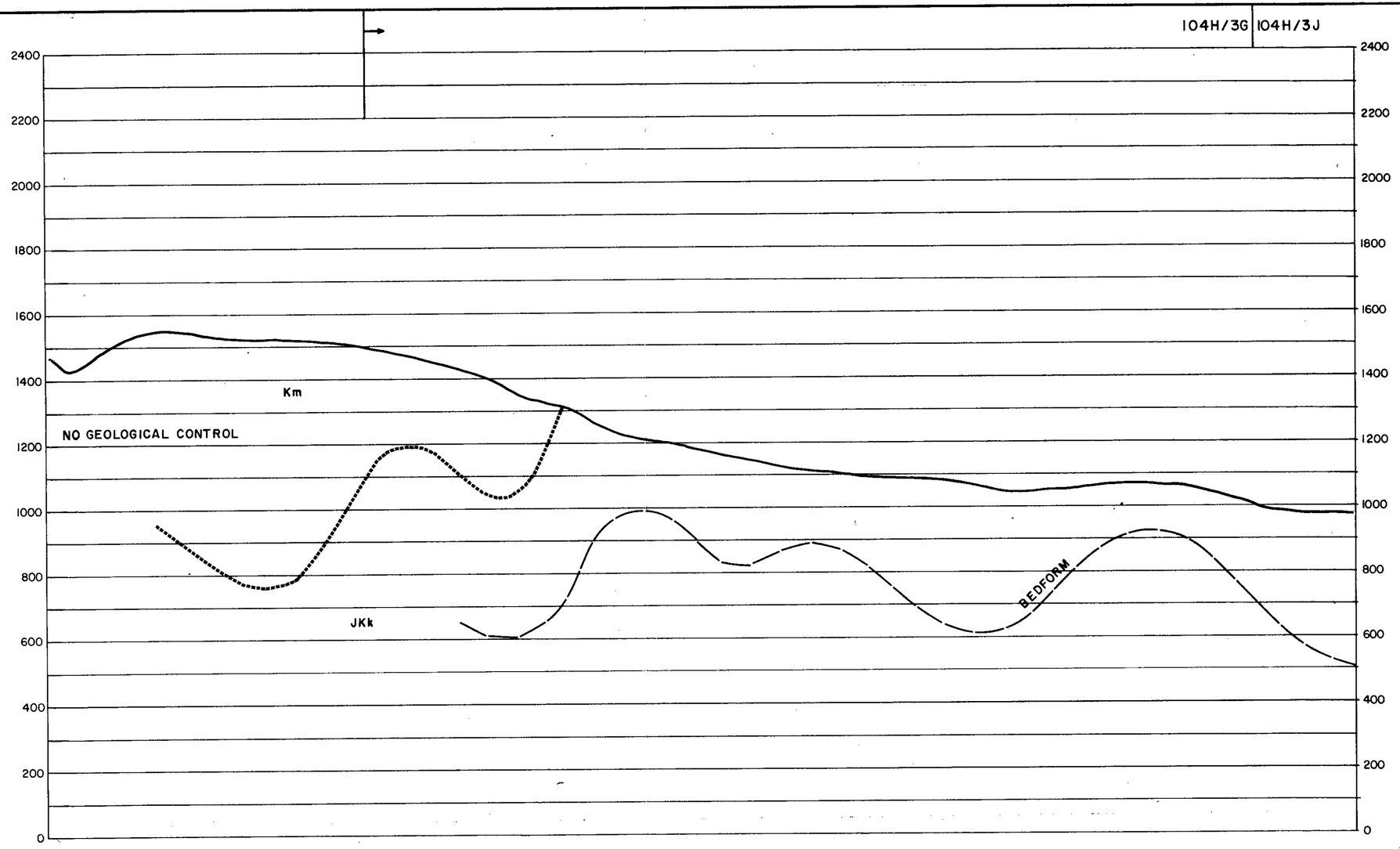
METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
11 000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J. DATE: JAN. 1986	DWG. No. KPN85NA-35



RHONDDA SEQUENCE

Kr Sequence of thick chert pebble conglomerates and minor gritty sandstones interbedded with an increasing number of siltstones and mudstones towards the basal contact. Large scale trough and tabular cross beds are common. Six species of plant fossils increase in abundance towards the base of the sequence.

MALLOCH SEQUENCE

Km Thick interbeds of mudstones, argillaceous siltstones, fine grained sandstones and thin interbeds of orange weathering nodular siltstones. Many conglomerate beds display large scale cross bedding and tend to be laterally discontinuous. Thick clean sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils exist within the sequence. Bivalves are rare.

KLAPPAN SEQUENCE (main coal-bearing unit)

JKk Fine to coarse grained sandstones interbedded with mudstones, siltstones, occasional thin bands of orange weathering calcareous siltstones, conglomerates and abundant coal seams. Conglomerate beds grade laterally into sandstone. Sandstones often display tabular or trough cross bedding. Rhythmites occur in the middle of the sequence. Twenty-three species of pelecypods and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.

SPATSIZI SEQUENCE

Js Predominantly a marine sequence of interbedded mudstones, siltstones, sandstones and conglomerates. Carbonaceous mudstones, thin coal seams and chert pebble conglomerates are more abundant in the upper part of the sequence. Nineteen species of bivalves are present. Belemnites are rare. Plant debris may occur near the upper gradational contact.

LICENCE BOUNDARY

COAL SEAM TRACE (DEFINED, INFERRED)

GEOLOGICAL CONTACT (APPROX, INFERRED)

FAULT TRACE (DEFINED, APPROX.)

BEDFORM

BEDDING ATTITUDE

DDH 85001 DIAMOND DRILL HOLE WITH ATTITUDE CONTROL

706

METRES

0 50 100 150 200 250

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGICAL CROSS SECTION
NASS AREA
9000 N (WEST)

PREPARED BY: K.J.	SCALE 1:10 000
APPROVED BY: K.J. DATE: JAN. 1986	DWG. No. KPN85NA-36