

707



MOUNT KLAPPAN
COAL PROJECT
LOST - FOX AREA
GEOLOGICAL REPORT

1985

APPENDIX II

VOLUME I

1:2500

GEOLOGICAL MAPS

AND

CROSS - SECTIONS

VOLUME II

1:5000

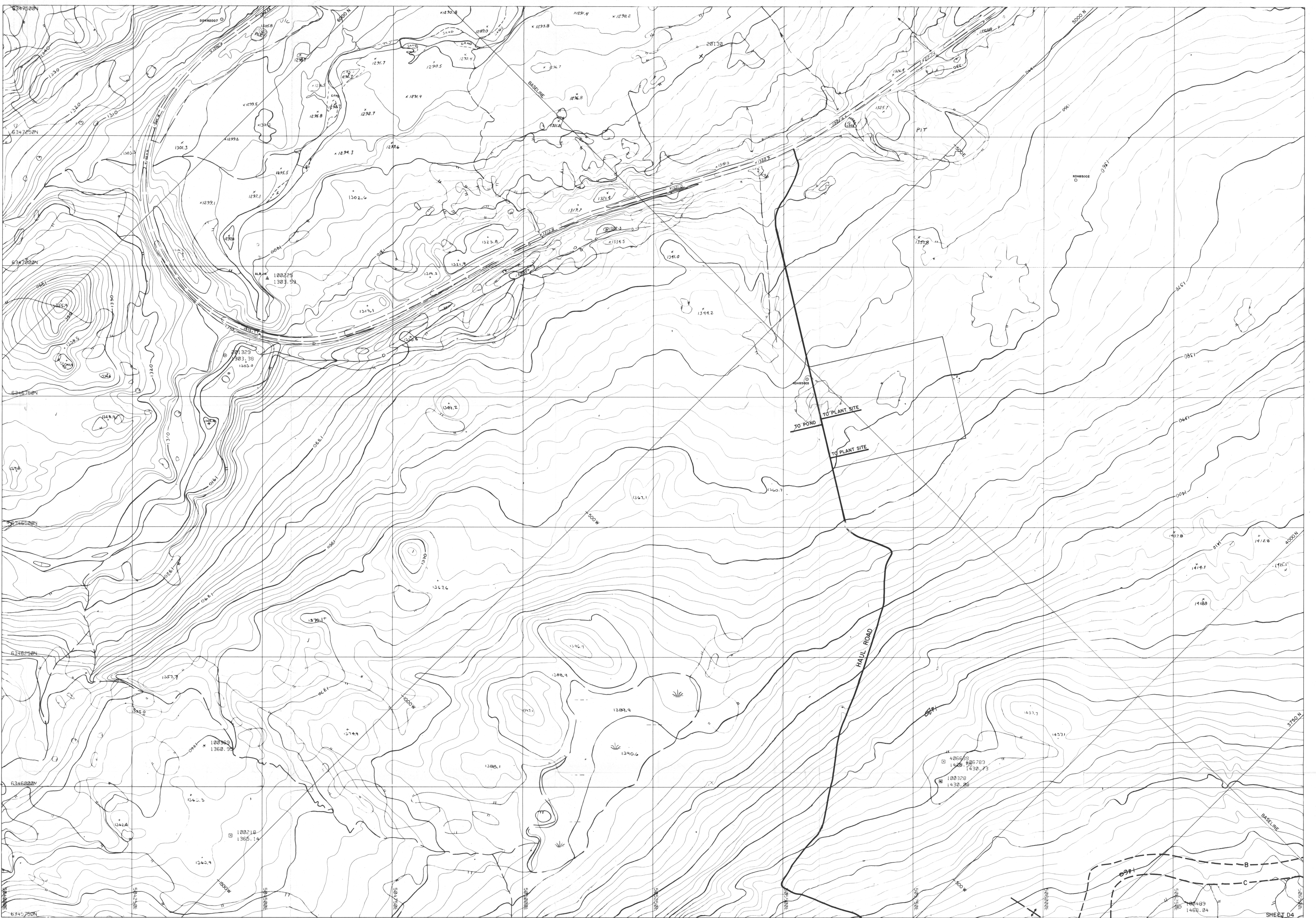
GEOLOGICAL MAPS

AND

CROSS - SECTIONS

GULF CANADA LIMITED

COAL DIVISION



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- RHONDA SEQUENCE**
 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**
 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 steep 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)**
 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. Bivalves occur in the middle of the sequence. Twenty-three species of bryozoans and twenty-two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.
- SPATSIZI SEQUENCE**
 Predominantly a massive 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. No plant species of bivalves are present. Beryllium is rare. Plant debris may occur near the upper gradational contact.

- LEGEND**
- LEASING 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 UPRHURST SIDE
 - FAULT (DEFINED, APPROXIMATE) UPRHURST, DOWN-THROWN SIDE
 - ADIT TRENCH COAL SPOIL
 - MEASURED SECTION
 - SURVEY CAIRN
 - CROSS SECTION LINE

CONTROL: UMA ENGINEERING LTD
 HORIZONTAL: Geometric
 VERTICAL: Elevation in metres above Mean Sea Level

SCALE: 1:2500
 PHOTO SCALE: 1:20,000

C.I.: 2 metres	PHOTO No.: 19-12-23, 25-35
COMPILED: May, 1985	ROLL No.: WP 8431
JOB No.: 1227-015-01	PHOTO DATE: Sep 21, 1984

Western Photogrammetry

707

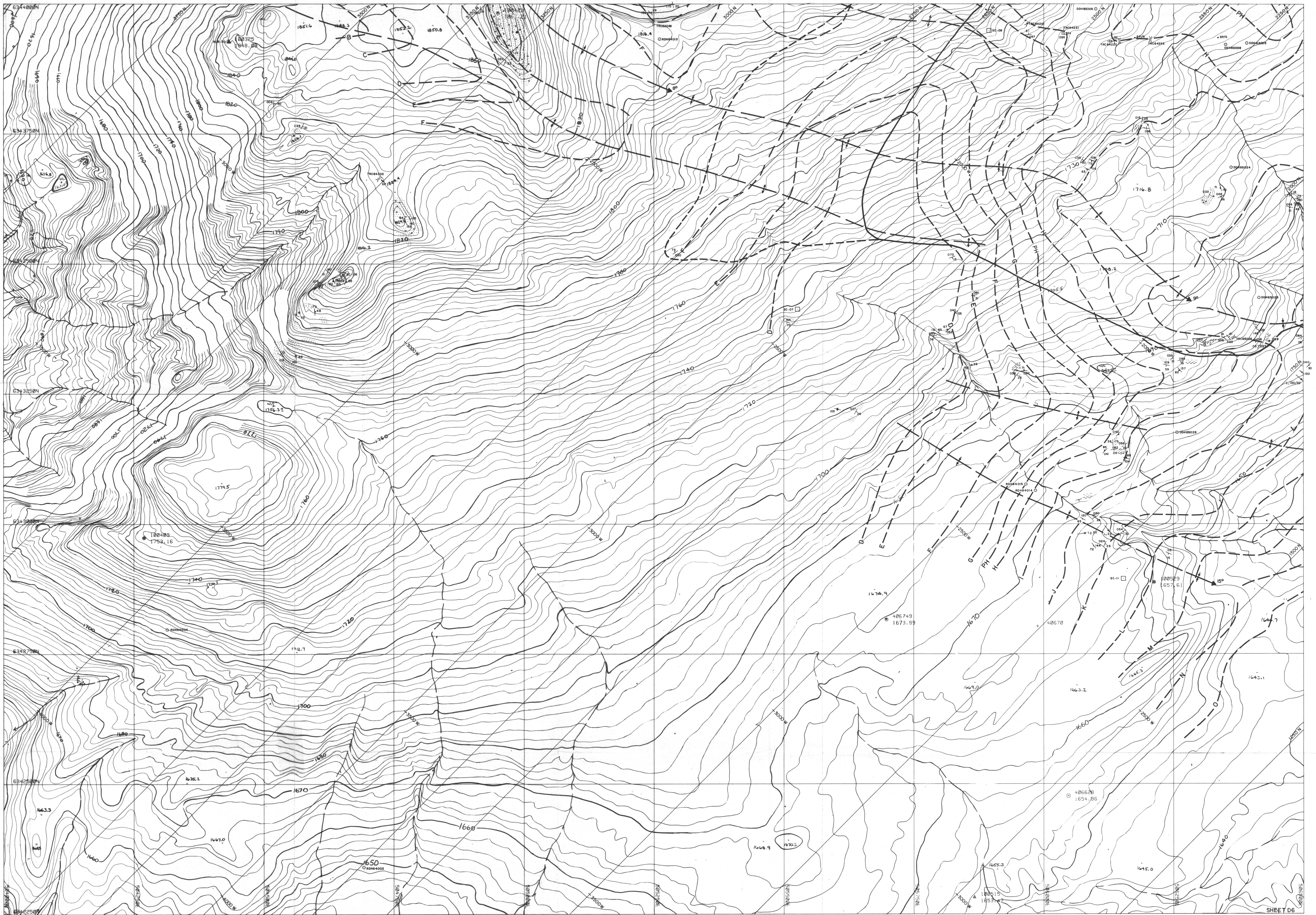
GULF CANADA RESOURCES INC.
 Coal Division

CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY

1985
GEOLOGY MAP
 LOST-FOX AREA
 MAP D-4

PREPARED BY: J.T., L.S.	SCALE: 1:2500
APPROVED BY: E.S.	DATE: JAN. 1988 DWG. No. KPN85LF-21



SHEET D6

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- 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 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.
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- 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 palaeoplants and twenty two species of plants occur throughout. Petrified wood and rare coquina may be present towards the upper contact.
- SPATSZI 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. Betermines 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 UP THRUST SIDE
 - - - - - FAULT (DEFINED, APPROXIMATE) UPTHROWN, DOWN THROWN 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

CONTROL: UMA ENGINEERING LTD	
HORIZONTAL: Geodetic	
VERTICAL: Elevation in metres above Mean Sea Level	
SCALE: 1:2500	PHOTO SCALE: 1:20,000
C.I.: 2 metres	PHOTO No.: 1-9, 12-23, 25-35
COMPILED: May 1985	ROLL No.: WF 8431
JOB No.: 1227-010-01	PHOTO DATE: Sep 21, 1984
Western Photogrammetry	

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 Coal Division

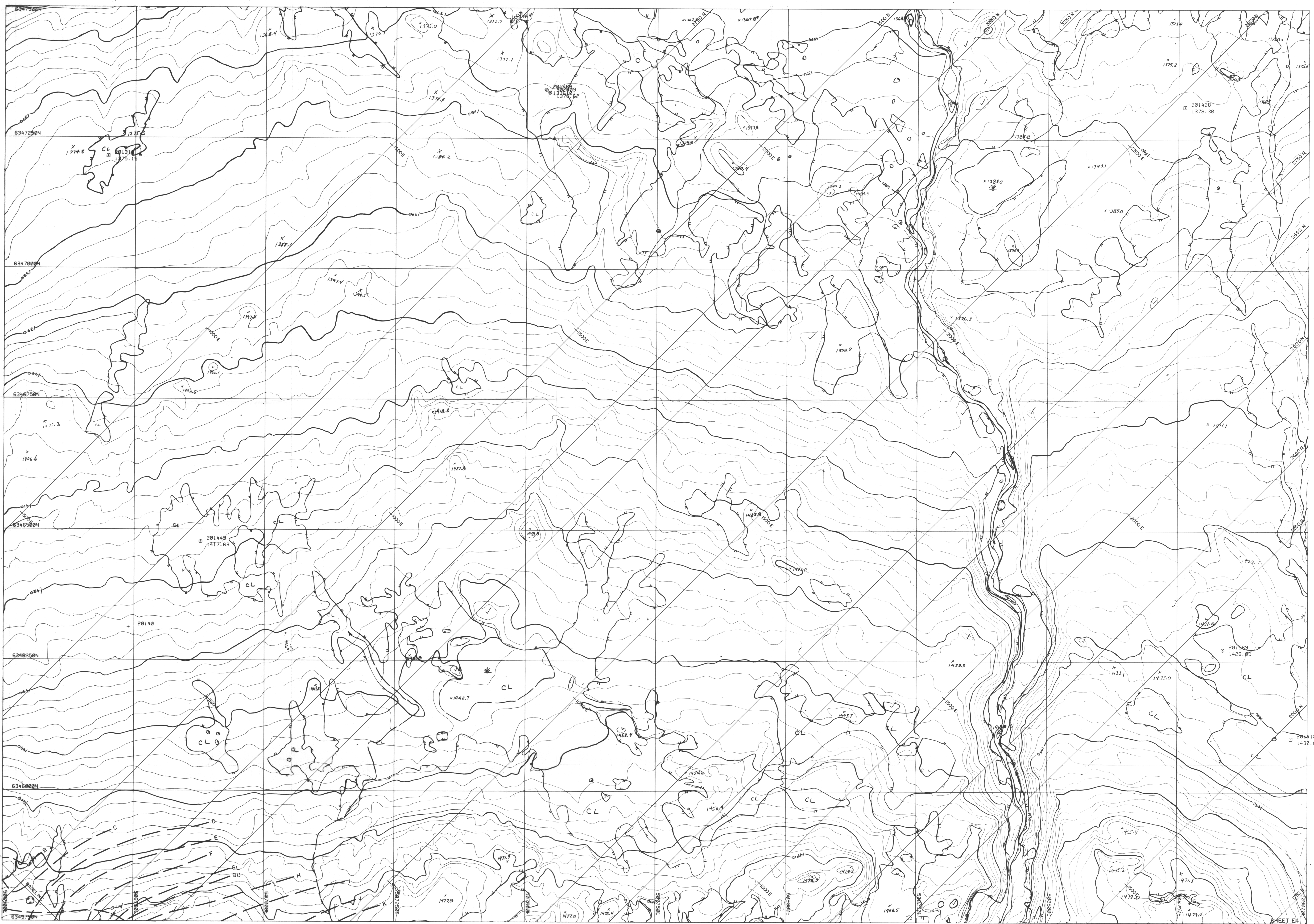
CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY

1985

GEOLOGY MAP
LOST-FOX AREA
MAP D-6

PREPARED BY: J.T., L.S. SCALE: 1:2500
 APPROVED BY: E.S. DATE: JAN, 1986 DWG. No. KPN85LF-23



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- RHONDA SEQUENCE**
- X* 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**
- Xm 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 clay sandstone beds and thin coal seams increase in abundance towards the basal gradational contact. Twenty species of plant fossils occur within the sequence. Bivalves are rare.
- KLAPPAN SEQUENCE (main coal-bearing unit)**
- XJK 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 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 corals may be present towards the upper contact.
- SPATSIZI SEQUENCE**
- XJS 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. Bivalves 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)
 - WOODLINE (DEFINED, APPROXIMATE)
 - BEDDING (HORIZONTAL, INCLINED, OVERTURNED, VERTICAL, UPRIGHT, ESTIMATED)
 - FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
 - JOINTS (INCLINED, VERTICAL, HORIZONTAL)
 - THRUST FAULT (DEFINED, APPROXIMATE) TEETH INDICATE UPRIGHT SIDE
 - FAULT (DEFINED, APPROXIMATE) UPRIGHT, DOWNTOWN SIDE
 - FAULT (DEFINED, APPROXIMATE) SHOWING RELATIVE MOVEMENT
 - ADIT TRENCH
 - COAL SPILL
 - DIAMOND ROTARY WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
 - MEASURED SECTION
 - SURVEY CAIRN
 - CROSS SECTION LINE

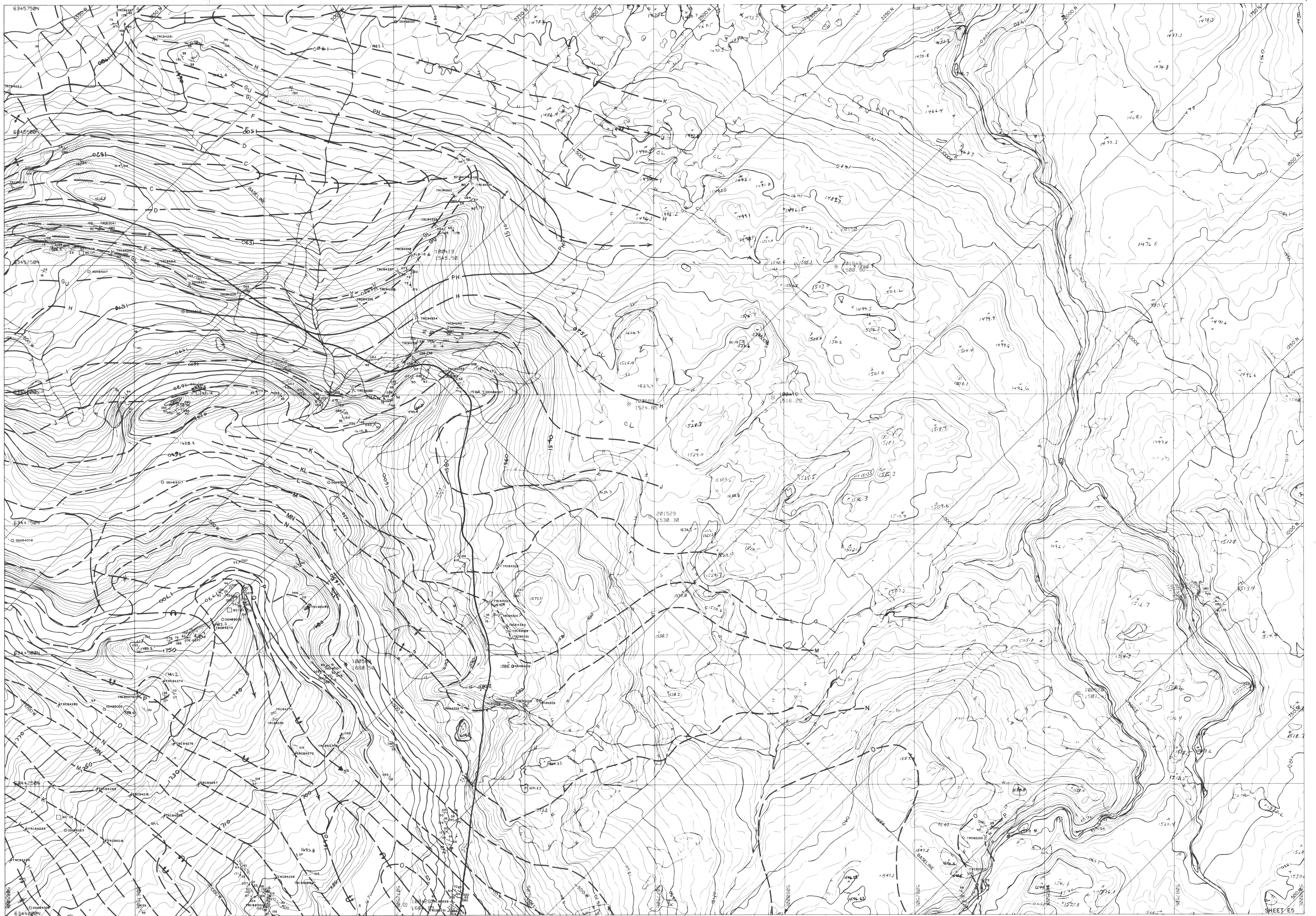
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HORIZONTAL: Geodetic	
VERTICAL: Elevation in metres above Mean Sea Level	
SCALE: 1:2500	PHOTO SCALE: 1:20000
C.I.: 2 metres	PHOTO No.: 1-9, 12-23, 25-35
COMPILED: May, 1985	ROLL No.: WP 8431
JOB No.: 1227-015-01	PHOTO DATE: Sept 21, 1984
Western Photogrammetry	

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GULF CANADA RESOURCES INC.
Calgary Coal Division Alberta

MOUNT KLAPPAN COAL PROPERTY
1985
GEOLOGY MAP
LOST-FOX AREA
MAP E-4

PREPARED BY: J.T., L.S.	SCALE: 1:2500
APPROVED BY: E.S.	DATE: JAN. 1986
	DWG. No. KPN65LF-24



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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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 - INVERTED ANTICLINE (DEFINED, APPROXIMATE)
 - INVERTED SYNCLINE (DEFINED, APPROXIMATE)
 - MONOCLINE (DEFINED, APPROXIMATE)
 - REGIONAL HORIZONTAL, INCLINED, OVERTURNED, VERTICAL (UPRIGHT, ESTIMATED)
 - FOLIATIONS (INCLINED, VERTICAL, HORIZONTAL)
 - JOINTS (INCLINED, VERTICAL, HORIZONTAL)
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 - FAULT (DEFINED, APPROXIMATE) UP-THROWN, DOWN-THROWN SIDE
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 - DIAMOND ROTARY, WINKIE DRILL HOLE (VERTICAL, INCLINED WITH SURFACE PROJECTION)
 - MEASURED SECTION
 - SURVEY CAIRN
 - CROSS SECTION LINE

CONTROL: UMA ENGINEERING LTD
 HORIZONTAL, Geoidic
 VERTICAL, Elevation in metres above Mean Sea Level

SCALE: 1:2500	PHOTO SCALE: 1:20 000
C.I.: 2 metres	PHOTO No.: 1-12-23, 25-29
COMPILED: May, 1985	ROLL No.: WF 8437
JOB No.: 1227-015-01	PHOTO DATE: Sept 21, 1984

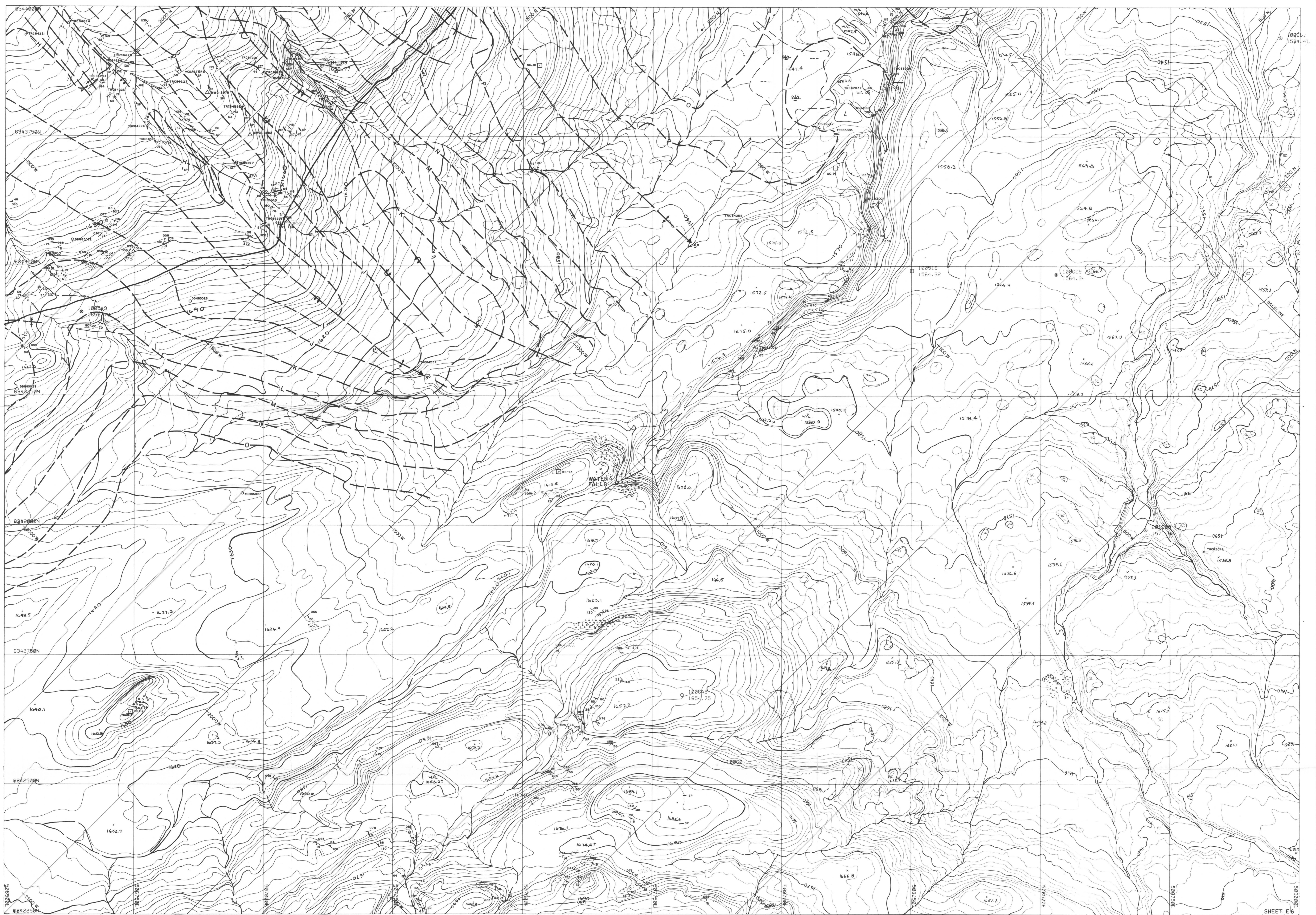
Western Photogrammetry

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GULF CANADA RESOURCES INC.
 Calgary Alberta

MOUNT KLAPPAN COAL PROPERTY
 1985
GEOLOGY MAP
LOST-FOX AREA
MAP E-5

PREPARED BY: J.T., L.S.	SCALE: 1:2500
APPROVED BY: E.S.	DATE: JAN. 1986 DWG. No. KPN85LF-25



SHEET E6

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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 CLAIM
 - CROSS SECTION LINE

CONTROL: LMA ENGINEERING LTD
 HORIZONTAL: Geometric
 VERTICAL: Elevation in metres above Mean Sea Level

SCALE: 1:2500	PHOTO SCALE: 1:20,000
CT: 2 metres	PHOTO No: 1-9-12-23-25-35
COMPILED: May, 1985	ROLL No: WP 8431
JOB No: 1227-015-01	PHOTO DATE: Sept 21, 1984

Western Photogrammetry

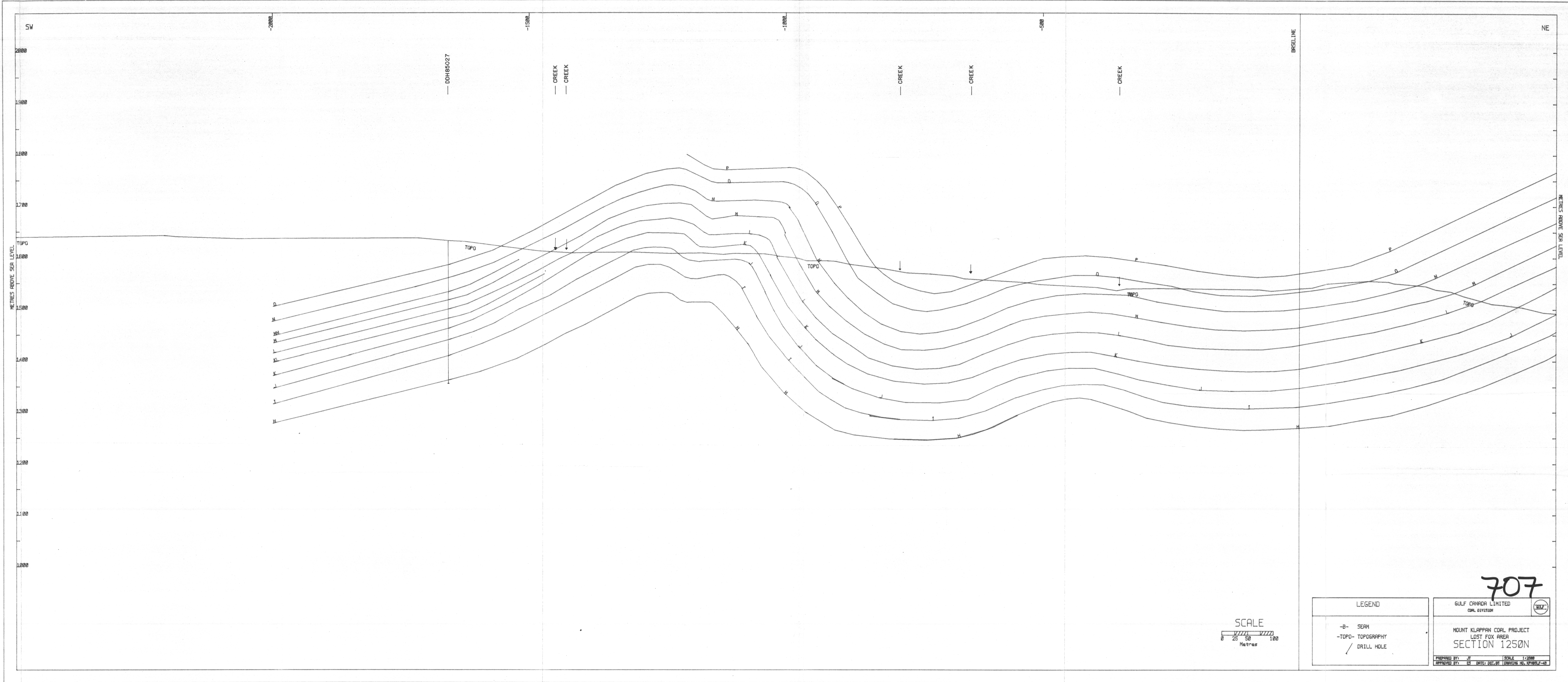
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GULF CANADA RESOURCES INC.
 Coal Division

CALGARY ALBERTA

MOUNT KLAPPAN COAL PROPERTY
 1985
GEOLOGY MAP
LOST-FOX AREA
MAP E-6

PREPARED BY: J.T., L.S. SCALE: 1:2500
 APPROVED BY: E.S. DATE: JAN, 1986 DWG. No. KPN85LF-26



SCALE
 0 25 50 100
 Metres

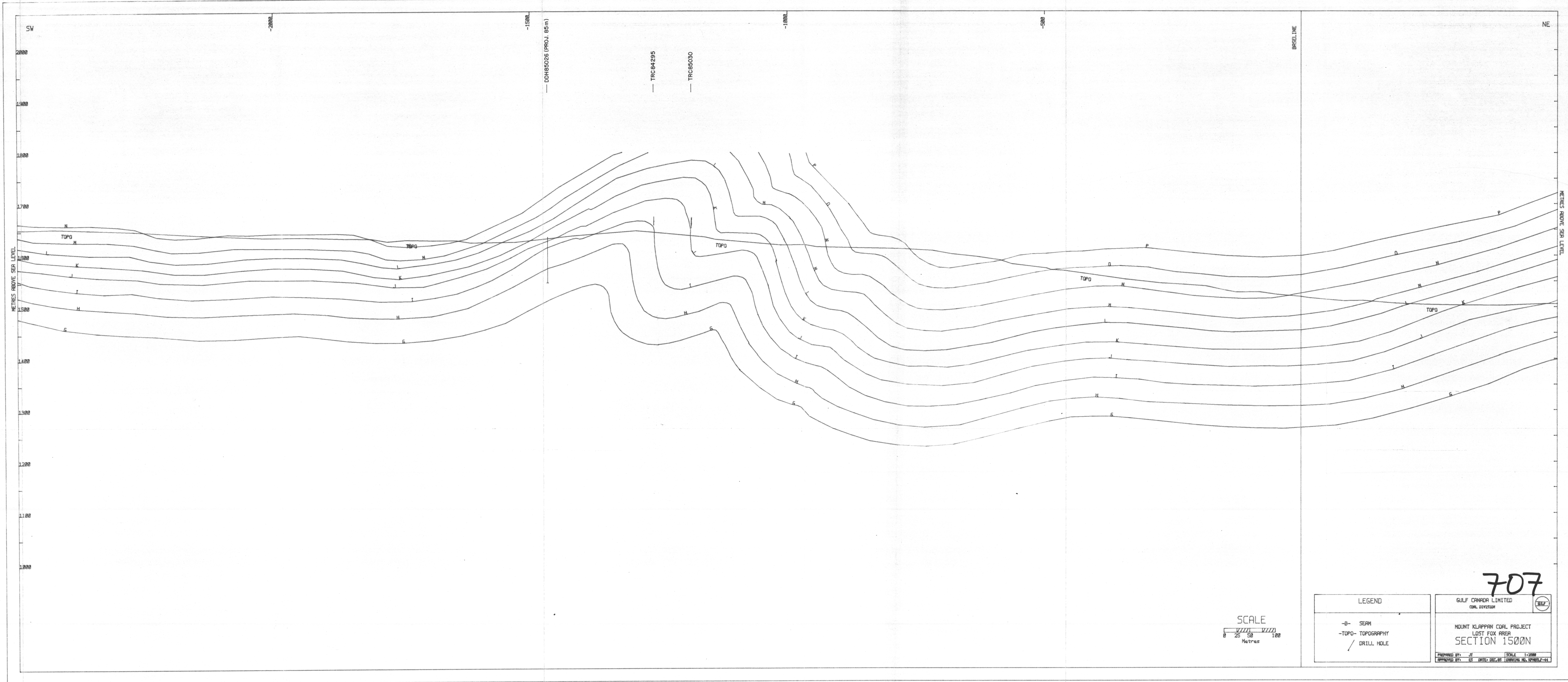
LEGEND	
-B-	SEAM
-TOPO-	TOPOGRAPHY
/	DRILL HOLE

707

GULF CANADA LIMITED
 COAL DIVISION

MOUNT KLAPPAN COAL PROJECT
 LOST FOX AREA
 SECTION 1250N

PREPARED BY: JF SCALE 1:2000
 APPROVED BY: EC DATE: DEC 11 1998 DRAWING NO. 87004-03

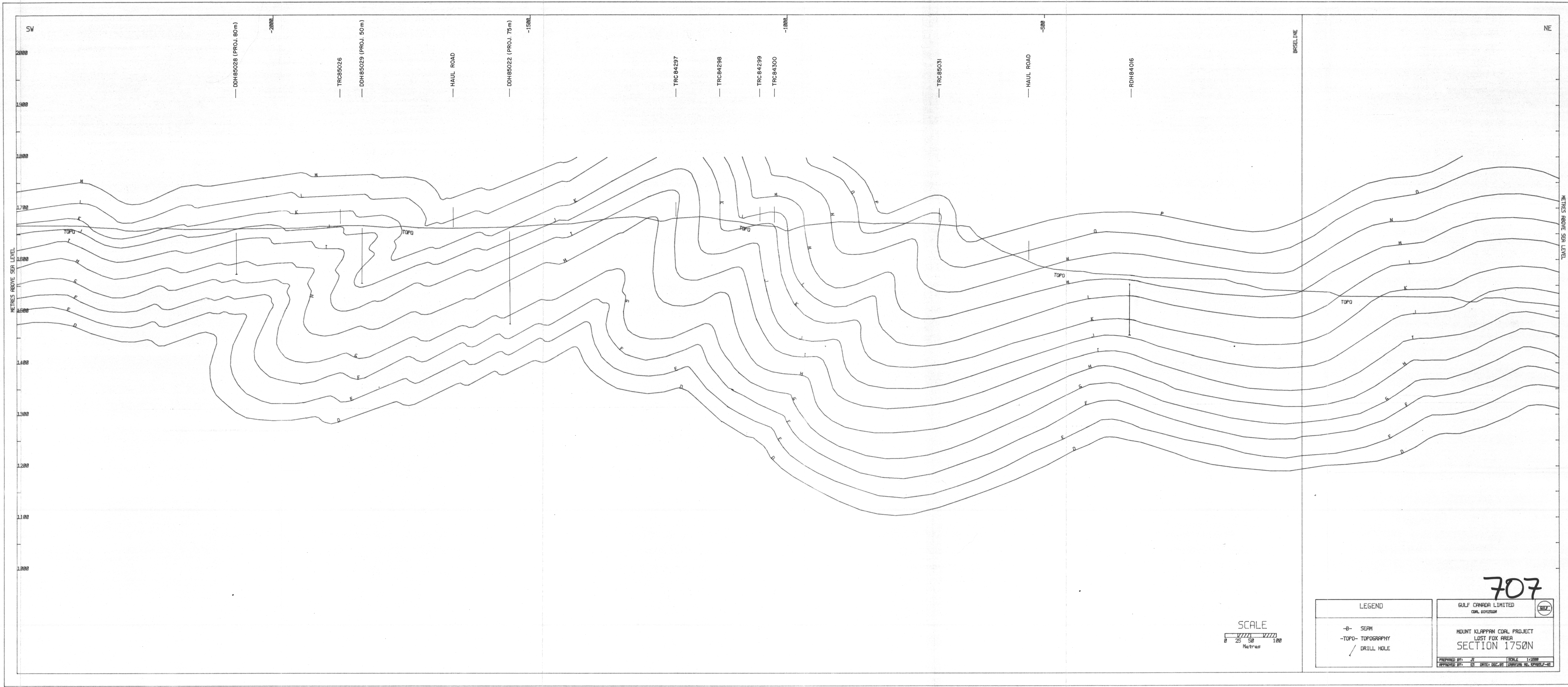


SCALE
 0 25 50 100
 Metres

LEGEND	
-B-	SEAM
-TOPO-	TOPOGRAPHY
/	DRILL HOLE

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GULF CANADA LIMITED COAL DIVISION	
MOUNT KLAPPAN COAL PROJECT LOST FOX AREA SECTION 1500N	
PREPARED BY: JT	SCALE: 1:1000
APPROVED BY: GE	DRAWN BY: GE



SW

NE

METRES ABOVE SEA LEVEL

METRES ABOVE SEA LEVEL

2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000

DDH85028 (PROJ. 80m)

TRC85026

DDH85029 (PROJ. 50m)

HAUL ROAD

DDH85022 (PROJ. 75m)

TRC84297

TRC84298

TRC84299

TRC84300

TRC85031

HAUL ROAD

RDH84016

BASELINE

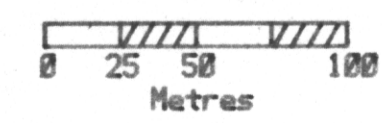
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-1500

-1000

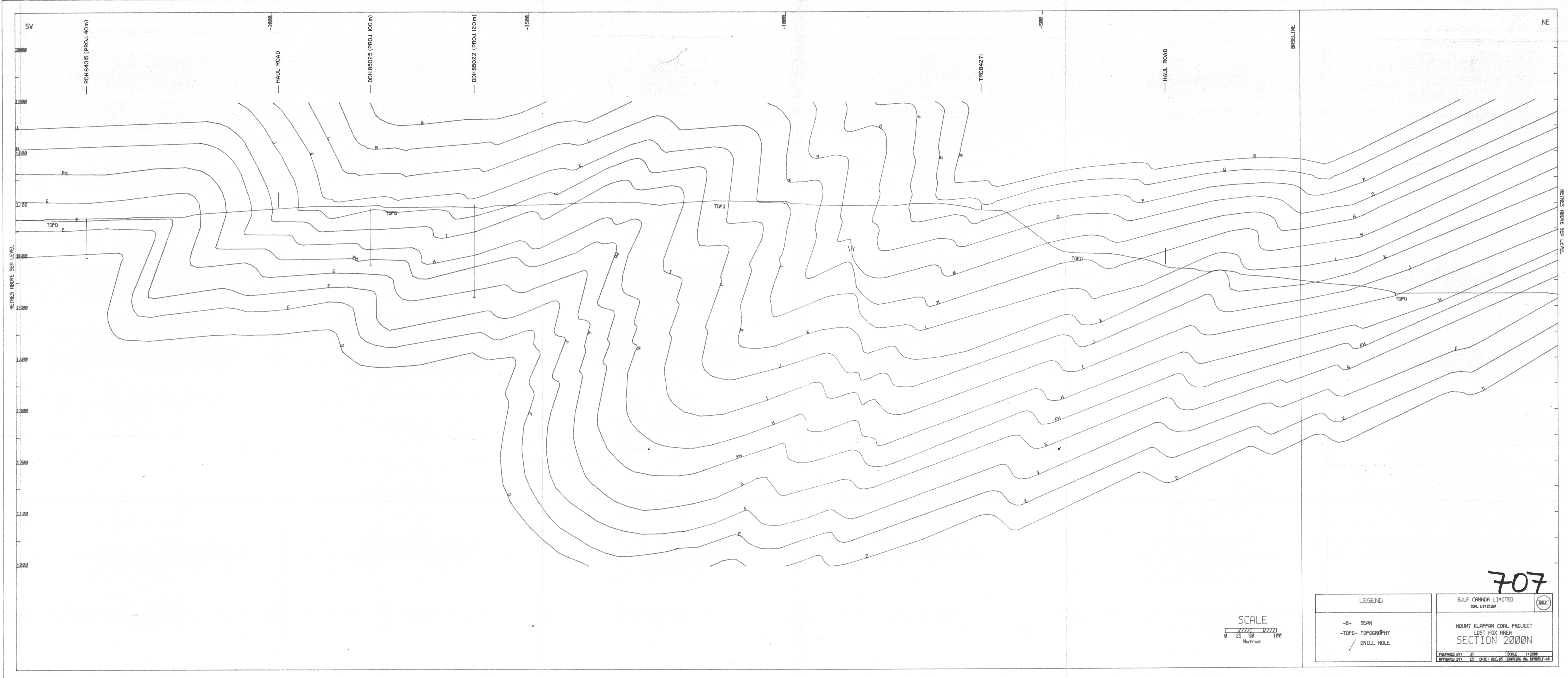
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SCALE



LEGEND	
-B-	SEAM
-TOPO-	TOPOGRAPHY
/	DRILL HOLE

707	
GULF CANADA LIMITED COAL DIVISION	
MOUNT KLAPPAN COAL PROJECT LOST FOX AREA SECTION 1750N	
PREPARED BY: JI	SCALE: 1:2000
APPROVED BY: DS	DATE: DEC. 92



SCALE
 0 25 50 100
 Metres

LEGEND	
-B-	SEAM
-TOPO-	TOPOGRAPHY
/	DRILL HOLE

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GULF CANADA LIMITED <small>COAL DIVISION</small>	
MOUNT KLAPPAN COAL PROJECT LOST FOX AREA SECTION 2000N	
<small>PREPARED BY: JT</small>	<small>SCALE: 1:5000</small>
<small>APPROVED BY: EE</small>	<small>DATE: 04/01/01</small>