7-9-6-52

IMPERIAL OIL ENTERPRISES LTD.

GEOLOGICAL DEPARTMENT.

**Report on:** Reflection Seismic Program - Peel Plateau - N.W.T. Territorial Oil & Gas Work Bonus Blocks 32-63, 35-63, 36-63, 37-63, 38-63 & 39-63. For period November 18, 1963 to April 25, 1964.

**Enclosures:**
- Six Seismic Station Location and Elevation Maps
- Five Bear Rock Formation Structure Maps
- Five Bear Rock to Cambrian Shale Isochron Maps
- One Bear Rock to Upper Cretaceous-Tertiary Structure Map.

missing

**By:** J. C. Underhill

**Date:** July 30, 1965.

**Map References:**

106 K Martin House

106 L Trail River

106 M Fort McPherson

106 N Arctic Red River

106 O Travaillant Lake

107 B Aklavik.

IMPERIAL OIL ENTERPRISES LTD.

PRODUCING DEPARTMENT - WESTERN REGION.

# REFLECTION SEISMIC OPERATIONS - PEEL PLATEAU AREA.

N.W.T. Work Bonus Blocks 32-63, 35-63, 36-63, 37-63, 38-63 and 39-63.

N.W.T. Permits 3594-3601, 3618-3624, 3625-3631, 3632-3638, 3639-3646 and 3647-3654.

November 1963 - April 1964.

By

J. C. Underhill

July 30, 1965.

PEACE RIVER EXPLORATION DIVISION

DAWSON CREEK, BRITISH COLUMBIA.



6

## CONTENTS.

## SUMMARY.

Report on reflection seismograph operations conducted by Geophysical Service Incorporated Party No. 26 on behalf of Imperial Oil Enterprises Ltd. in the Peel Plateau Area from November 18, 1963 to April 25, 1964. Submitted in support of application for credit. See Affidavit of Work by. H. W. Johnson dated April 15, 1965.

## INTRODUCTION.

Due to winter inaccessibility of the area a program of stockpiling fuel and supplies was carried out during the summer of 1963 via the Mackenzie River. Cat crews moved into the area in November 1963 while the seismic crews were assembled and moved into the area in December. The crews were serviced by company-owned DC-3 and Otter aircraft. Equipment, in addition to a standard reflection seismic operation, consisted of three cats with bulldozers.

## REFLECTION SEISMIC OPERATIONS.

Three company survey personnel left Calgary on the I.O.L. DC-3 and arrived at the initial work site on November 18, 1963. The three men loaded 100 propane bottles onto the trailers, cleaned out the frozen stove lines and performed necessary repairs. Supplies were unloaded from the vehicles and placed in storage trailers. The caterpillar contractor, a cook and four cat operators arrived also on November 18, 1963. They commenced snow plowing roads around the camp and cutting a suitable crossing over a deep coulee some eight miles from camp. Some five men, an instrument engineer, a junior observor, a driller, a shooter and a mechanic left Edmonton on a commercial P.W.A. flight and arrived on November 24th. The cats meanwhile commenced stockpiling fuel at the working area.

During the period November 23rd to November 30th, the Party Chief, three staff camp personnel and two cat operators arrived on the I.O.L. DC-3 flight from Fort Nelson and continued to the campsite on November 25th, 1963.

.....2/

Various members of the crew worked on the following: mounting the instruments and recorder in the dog house, preparing and winterizing the vehicles and equipment for operation as well as moving about three hundred barrels of fuel to higher ground. The dynamite was stockpiled at the edge of the airport and supplies were loaded in and on the end of the trailers. Two cats continued to cut line to the edge of the prospect, a distance of some fifty miles, and completed the job by November 29, 1963. The road surface was very rough and had to be dragged many times before equipment could cross. Several areas of soft muskeg gave the cat crew considerable trouble. Weather during the period was very cold with temperatures ranging from thirty to forty-five below zero with fairly high winds.

From December 1st to December 7th, the first three days were spent moving camp. The camp had been assembled in strings and after picking up supplies and personnel from the incoming DC-3 flight, the camp commenced the move to the initial work area on December 1, 1963. The steep coulee previously mentioned caused some trouble as the cats had to double up to get equipment across. On December 2, 1963, the camp moved some twenty-eight miles by travelling from 0730 to 2300 hours. Cats also had to double up on hills because of the heavily loaded trailers. The camp arrived at its destination about 1800 hours on December 3, 1963. The approximate location was Latitude 67°05' North and Longitude 133°00'West. On December 4th, experimental shooting was commenced to determine methods to obtain the best possible results including various spreads, filters and geophones.

During the period December 8th to 14th, the experimental shooting

.....2/

was completed and a three hundred foot uphole survey was taken. The first line commenced with a three hundred foot spread using sixteen geophones per trace on the Arctic Red River map. The record quality was fair to poor, with some good quality records being obtained. The main factors hindering production were the very short daylight period, as the sun did not break above the horizon and the pigtails on the geophone strings snapped often in the intense cold. Hard shale and sandstone drilling was encountered on the west half of the line. Other formations were clay and sandstone, clay, gravel and sandstone, muskeg and perma-frost. Two ravines were encountered on the line leading to Arctic Red River. The cats were called back about two miles south of the ravine and given a deflection angle to miss the ravines,and then the line was directed to Arctic Red River. Estimated cutting time of the line was five days. The road was extremely rough with a maximum five mile per hour driving speed. Vertical surveys were based on old work while horizontal control was corrected to the lakes from air photos.

Work continued in the Arctic Red River area from December 15th to the 21st with the east-west line from 67°05' North, 132°45' West to 67°05' North and 133°15' West being completed. Recording began on December 18th on a line northwest to the town of Arctic Red River approximately forty miles northwest. Record quality was fair to good with the river noise giving continuous interference. Shooting was restricted to near daylight hours.

.....2/

The cats reached the town of Arctic Red River on December 19, 1963. The fuel dump there was on the east bank of the river and had to be moved across the river when the crew passed through. The camp also was moved to about twenty miles south of the town. Several day's shooting within the period comprised eight geophones per trace with a 150 foot spread. Evaluation and interpretation of these records indicated that sixteen geophones over a three hundred foot spread was equally satisfactory, and the crew returned to this method. It was found that an extra surveyor could be used effectively as the one and one-half hours of daylight available to the surveyors was not sufficient to keep up with the shooting crew. An extra man during the deep winter months allowed both a chaining and elevation team to operate simultaneously.

During the period December 22nd to 28th, good production was obtained with record quality being fair to good. Strong continuous surface noise was prevalent but the crew managed to dampen this with filters. The weather was good with temperatures ranging from minus thirty to minus five degrees. There were no winds or snow to hamper operations. The lines were extremely rough over gently rolling terrain interspersed with lakes. Drilling was good except when encountering hard sandstones.

The camp was moved to six miles southeast of Arctic Red River on December 30th. Cats continued to keep ahead of the seismic crew by useof double shifts. Weather continued relatively mild during the December 29th to January 4th period. Several equipment breakdowns caused some interruptions, especially the light plant and one of the drills.

.....2/

On January 5th the camp was moved to approximately fifteen miles west-south-west of the Point Separation wellsite as located on the Fort McPherson map. Record quality continued to be mostly fair with strong surface reflections giving trouble. Good weather with no snow or high winds was enjoyed by the crew. Roads continued to be very rough and the terrain changed from gently rolling to small valleys. Drilling was good with mostly hard shales and some gravel being the only problems. Program consisted of a line west-south-west from the Point Separation well.

During the period January 12th to 18th, the crew worked south of Fort McPherson on the west bank of the Peel River in the general region of 67° 32' North and 134° 00' West. Record quality was good with satisfactory shallow data. Little difference was found between single and three hole patterns at the same depth. Shallow shots exhibited ground roll which became more severe with decreasing depth. The weather was clear and cold with temperature down to fifty below zero. A fuel shortage caused the crew to lose one cat which had to make a long trip to Arctic Red River for fuel supplies and precipitated the camp move of January 16th. The line was scouted west of Fort McPherson by air on January 16th. The cats were advised to swing well north of their proposed strike to avoid a deep canyon in the area. Some crew delay was due to the Peel River crossing as not one truck, including the four wheel drive shooting unit, could make the hill from the river to the west side of the Peel. All vehicles had to be towed by the cats. It was decided to leave part of the camp at Fort McPherson, including supplies and interpreters. The balance would continue west with the shooting crew. Upon completion of the west line, the shooting

.....2/

crew camp was to return to Fort McPherson and continue the program southward.

From January 19th to the 25th the crew worked in the area of 67° 25' North and 134° 55' West. The record quality was good to poor with the best records being obtained west of the Peel River. The roads were extremely rough with elevation changes of 350 feet between shotpoints. On January 25th, the terrain forced the crew to return to Fort McPherson after completing some twenty-one miles of line west of the Peel River. Drilling was good, but the drills became often stuck between shotpoints. Camp moves on January 19th, 21st, 24th and 25th cut production somewhat. The light plant continued to give trouble.

Work continued in the Fort McPherson area from January 26th to February 1st and by the end of the period were approximately twelve miles south by fifteen degrees east of Fort McPherson and heading due south. The weather was very cold with temperatures varying from more than minus fifty degrees to high of minus thirty-five degrees below zero. Record quality was fair to good. The terrain was hilly and extremely rough with all equipment becoming stuck in dirt fills. The crew experimented in spraying water on selected fills to see if they could be made more solid. The area south and west of Fort McPherson is above the tree line and each small creek has steeply cut banks. Without trees the vehicles had nothing to winch to. Cats were required to move the drills between locations. The cats, therefore, were only just ahead of the crew shooting line.

On February 8th the camp was at Longitude 134° 30' West and Latitude 67° 06' North, approximately twenty-six miles southeast of Fort McPherson and was proceeding south by twenty-six degrees east. The record quality for this area improved with strong deep reflections becoming evident. Weather was quite mild with highs of zero degrees recorded. The area was hilly but the roads were not quite as rough. During the period of February 4th to 6th, an experimental program was conducted in the vicinity of 67° 20' North and 134° 45' West. An uphole survey was taken from a depth of 150 feet, a noise analysis was run over varying distances and intervals with an expanded spread over a 1.85 mile distance being shot using three hole inline patterns and seven hole perpendicular patterns. Program results indicated that the most effective shot hole depth was between twenty and sixty-feet - such depth to be determined by drilling problems encountered. Also indicated was a single, strong noise wave of relatively high velocity moving horizontally down the spread and a very high near surface reflection velocity.

On February 10th the camp was moved to 66° 47' North and 134° 15' West or approximately forty-six miles south by southeast of Fort McPherson. The weather was very cold with high winds bringing the wind chill factor to about seventy below zero. The country was mostly flat with many lakes and gulleys. The roads improved but still remained rough. The program was conducted on the Trail River map along the south by southeast line from Fort McPherson. The crew then turned east by Northeast on the line which passed Martin House and across the Arctic Red River.

.....2/

On February 22nd the crew was located at 66° 50' North and 133° 25' West - approximately forty-eight miles south by fifteen degrees east from the town of Arctic Red River and five miles due west of Arctic Red River proper. The weather continued very cold. Crew changes were effected during the interval. The terrain was flat with many lakes. A fuel shortage had initiated reduction of hole patterns. Some experimental shooting was done approximately seven miles due east of Martin House. It was discovered from support aircraft that the proposed tie line to the Ontaratue wellsite could go over some twenty miles of old seismic lines and a prepared river crossing. The fuel shortage was remedied by having P.W.A. transport 10,000 pounds of diesel fuel to the Ontaratue airstrip.

By February 29th the crew had reached 132° 50' West and 66° 54' North or about forty-six miles south by thirty degrees east of Arctic Red River and fourteen miles south of the tie with the first program line. Weather was mild but cloudy causing poor flying weather every day except February 27th. Terrain was flat except crossing the Arctic Red River. All equipment had either to be pulled or winched part of the quarter mile climb up the east bank of the river. The program continued to use inline patterns and cut line as fast as possible to reach the first program line before fuel became critical. As soon as a tie was made fuel sloops were dispatched to the Arctic Red River fuel dump. It was noted that as the program moved southward and the weather became mild the radio communication link with Dawson Creek improved. However, difficulties with air support caused critical situations with fuel and powder.

.....2/

During the period March 1st to 7th, the camp was located at 66° 43' North and 132° 45' West or approximately fifty-seven miles southeast of Arctic Red River town. Record quality varied considerably due to clay deposits. Nights were very cold with temperatures of minus forty-five degrees and highwinds. Days were mostly sunny and after 1000 hours mild. The country was flat with generally poor roads. Average driving speed was about five miles per hour. With new supplies of fuel the crew commenced seven hole patterns. An experimental program was conducted using anuphole survey and various spread patterns. It was found that strong surface noise continued to exist with three hole perpendicular patterns being the best choice.

From March 8th to 14th the crew worked toward the Ontaratue wellsite on the Martin House map in the general area of 66° 25' North and 132° 15' West. The weather turned very cold. Terrain improved as old seismic lines were followed as much as possible. As one of the drills broke down, double and treble shifts were used on the remaining drill.

Camp moves were required on March 17th, 19th and 20th as short lines completed certain of the projected coverage. Record quality was generally poor with excessive noise on all records. It was discovered that record quality improved west of Martin House. The country near the wellsite was flat but west of Martin House it became hilly and very rough. Three hole perpendicular patterns were shot over 3,600 foot coverage. All shot holes were fifty feet or more as shallow hole records were mostly poor.

....2/

On March 22nd the camp was moved to 66° 50' North and 133° 20' West and then to 66° 57' North and 133° 33' West on March 25th. Record quality degenerated especially when crossing many small, shallow lakes which created considerable low frequency noise. A gradual rise in elevation was noted along with drainage ravines from lakes to the Arctic Red River.

By March 31st the crew was located at 67° 05' North and 133° 35' West or twenty-three miles southeast of Arctic Red River while working north to the Arctic Red River settlement. Record quality was fair to poor as the Bear Rock formation remained the only continuous reflector over the area. A distinct warming trend during daylight hours was noted except for one blizzard during the period. The country was flat with generally good roads and many intermittent lakes. The crew began shooting three hole perpendicular patterns using fifteen pound charges and split 1,800 foot spreads. The estimated date of program completion was thought to be about April 28th if continued production was maintained.

During the period April 5th to 11th, the crew reached within eleven miles south of Arctic Red River and continued north. Temperatures dropped during the period with lows of minus thirty-five degrees. The road from the campsite to Arctic Red River was extremely rough - being the worst encountered during the program. As one drill broke down and gravel was predominant, the remaining drill went on double shifts.

.....2/

At the end of the April 12th to 18th interval the camp was thirty miles south by forty-six degrees west of Arctic Red River. The crew shot two miles west of camp and headed southwest over cut lines to shoot a projected thirty mile line commencing at 67° 15' North and 133° 50' West. Thawing commenced between April 13th to 16th causing the crew to speed up operations as much as possible. Surface terrain in this area of Fort McPherson is hilly with small lakes and muskeg swamps. Roads ranged from poor to fair. Good drilling was encountered from April 15th onward as gravel was found to be well sorted and rounded along with cemented stringers.

The program was completed on April 24th after the crew had run a fill-in line. With the fair weather winds caused excessive wind noise on records. The terrain for the last period was hilly with lakes. Drilling encountered mostly clay and shale. On April 25th the crew shut down and serviced equipment. The crew was moved out by company-owned DC-3 aircraft while the camp and equipment was moved to the Arctic Red River townsite and stored for the summer.

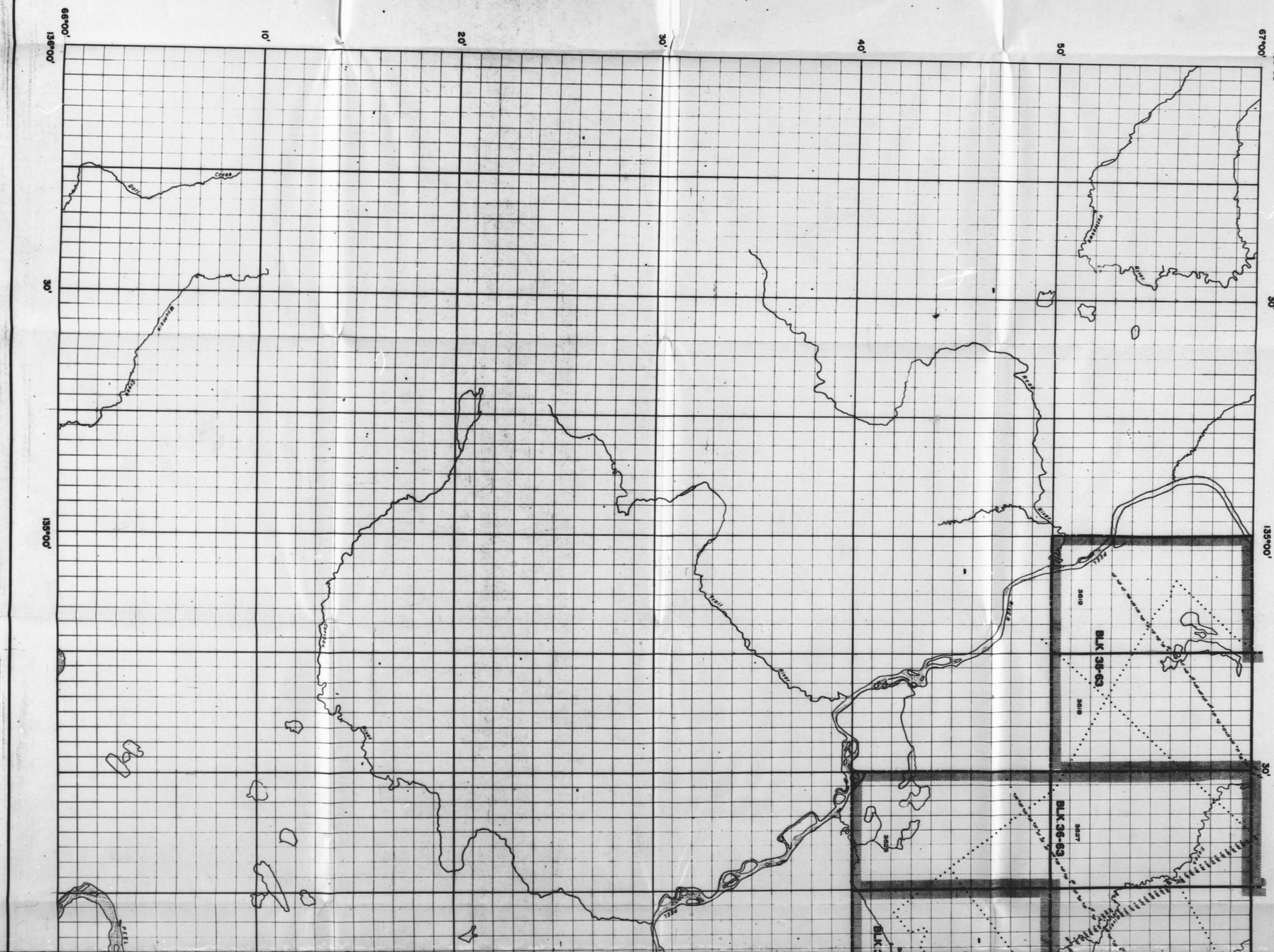
During the above program, a total of 1,249 shots were taken at 1,123 shotpoint locations to obtain some 2,914 profiles. A total of 373 miles of seismic was shot during the 143 days of actual shooting operations.

Incorporated with the maps of this report are three seismic trades made with Texaco Exploration, Richfield Oil Corporation and Shell Oil Company. The Shell Oil trade involved some 274 shotpoint locations

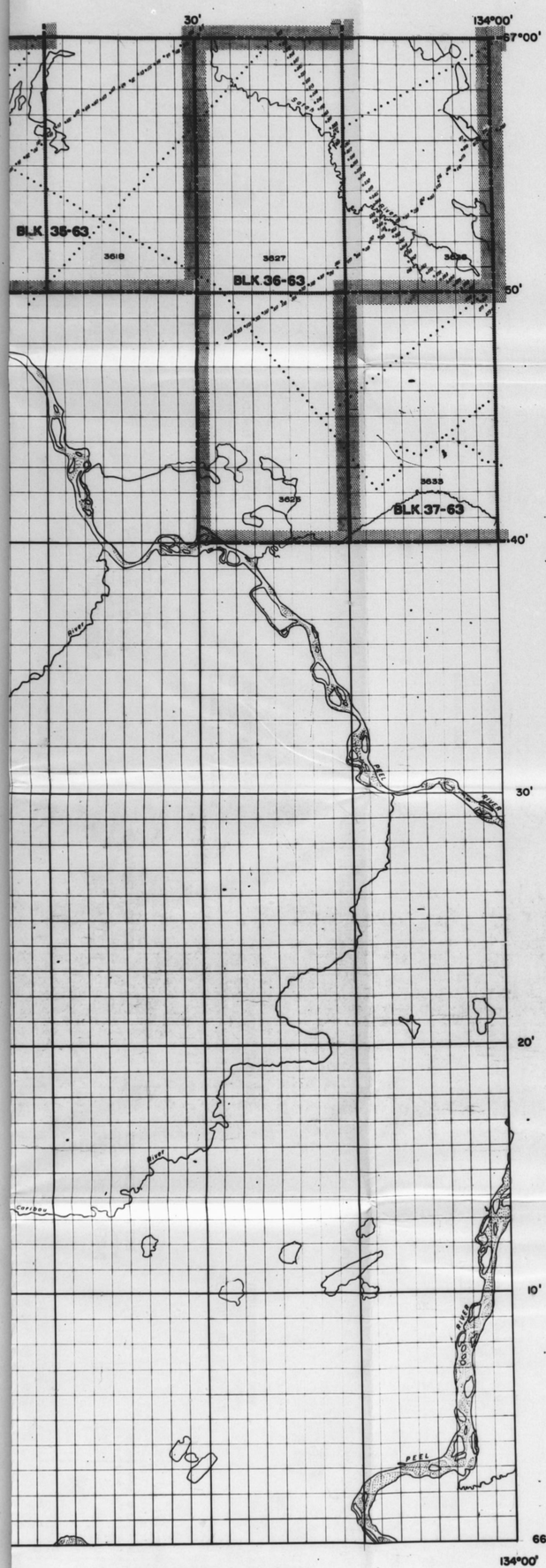
or 128.4 miles of line on the Martin House, Trail River, Fort McPherson and Arctic Red River map sheets. The Richfield seismic trade involved some 212 shotpoint locations or some 65.2 miles of line on the Arctic Red River and Travaillant Lake map sheets. The Texaco seismic trade, entirely off-permit, involved some 534 shotpoint locations or some 130 miles of line on the Arctic Red River, Travaillant Lake and Aklavik map sheets. These are differentiated on the maps by being shown as solid dots whereas the Party No. 26 shooting is shown as open dots.

J.C. UNDERHILL,
DIVISION EXPLORATION MANAGER,
PEACE RIVER DIVISION,
IMPERIAL OIL ENTERPRISES LTD.

July 30, 1965.

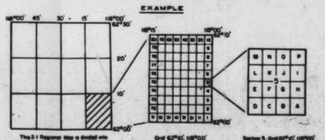

BLK 36-63
BLK 35-63
BLK
3627
3626
3618
3619
Satah River
PEEL RIVER
PEEL
River
Road River
Vittrekwa River
Trail River
Caribou River
Mountain Creek
Doll Creek
30'
135°00'
136°00'
67°00'
50'
40'
30'
20'
10'
66°00'

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

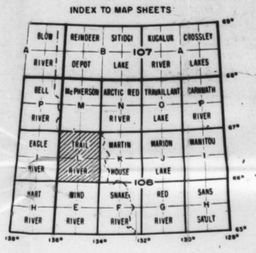



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS




SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS

Contour Interval _____
Datums: Plane _____ Velocity _____

REVISED JULY 6, 1965

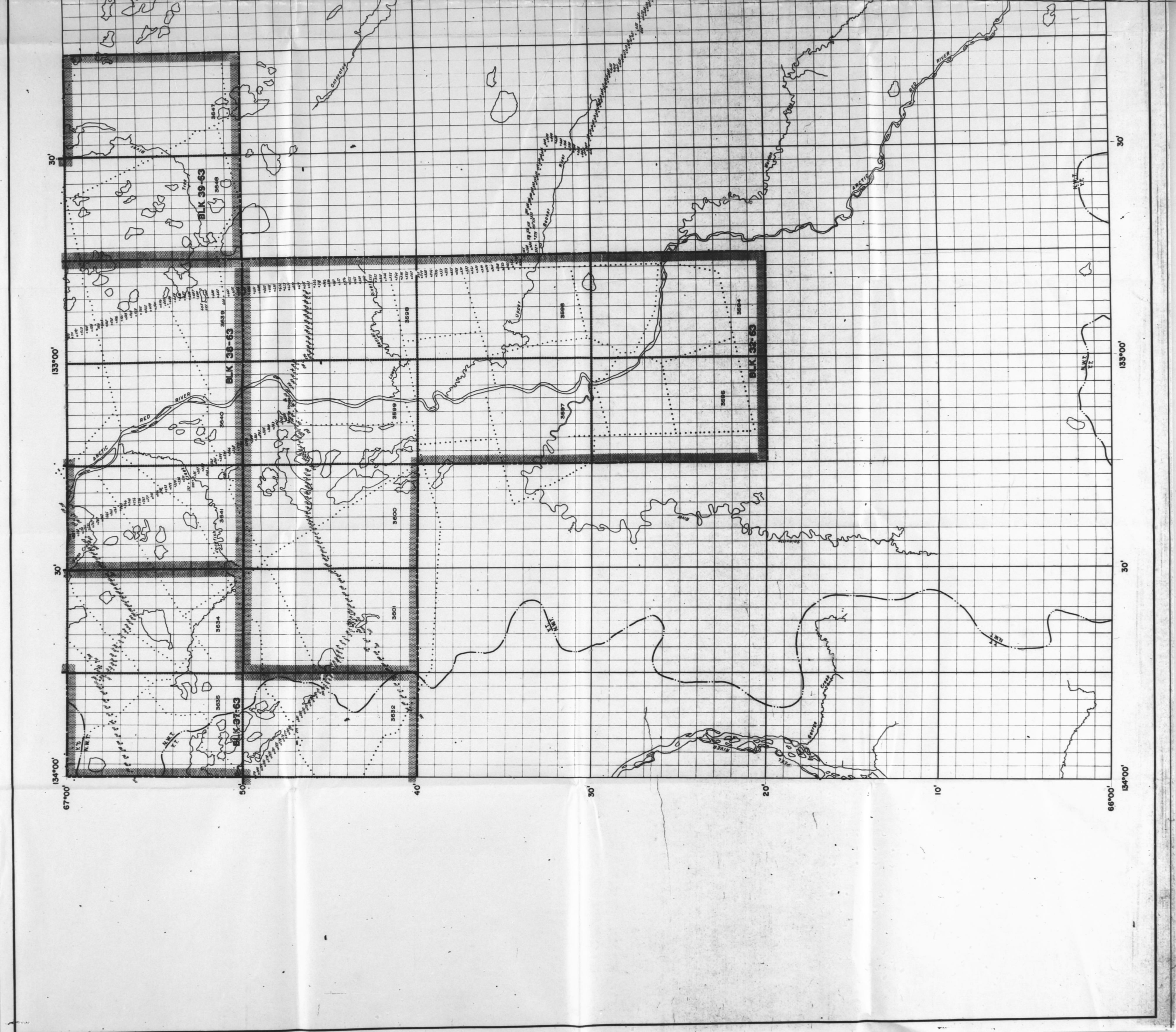
106L TRAIL RIVER

2 MILES TO 1 INCH



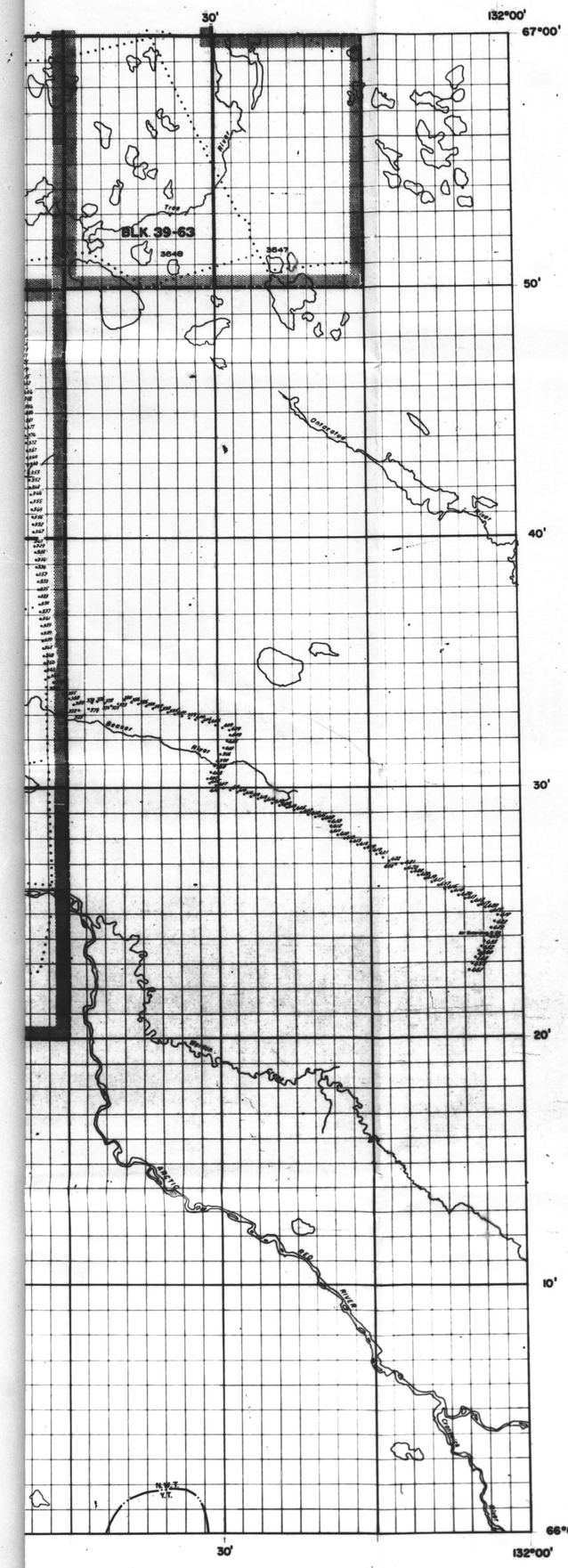
7-9-6-52

| 5237 | | | 5236 |
|---|---|---|---|



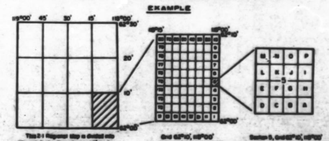
30x
West Canadian Graphic Industries Ltd.

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

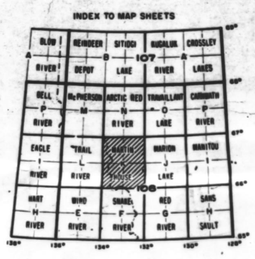



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS




SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS

Contour Interval .....
Datums: Plane ..... Velocity .....

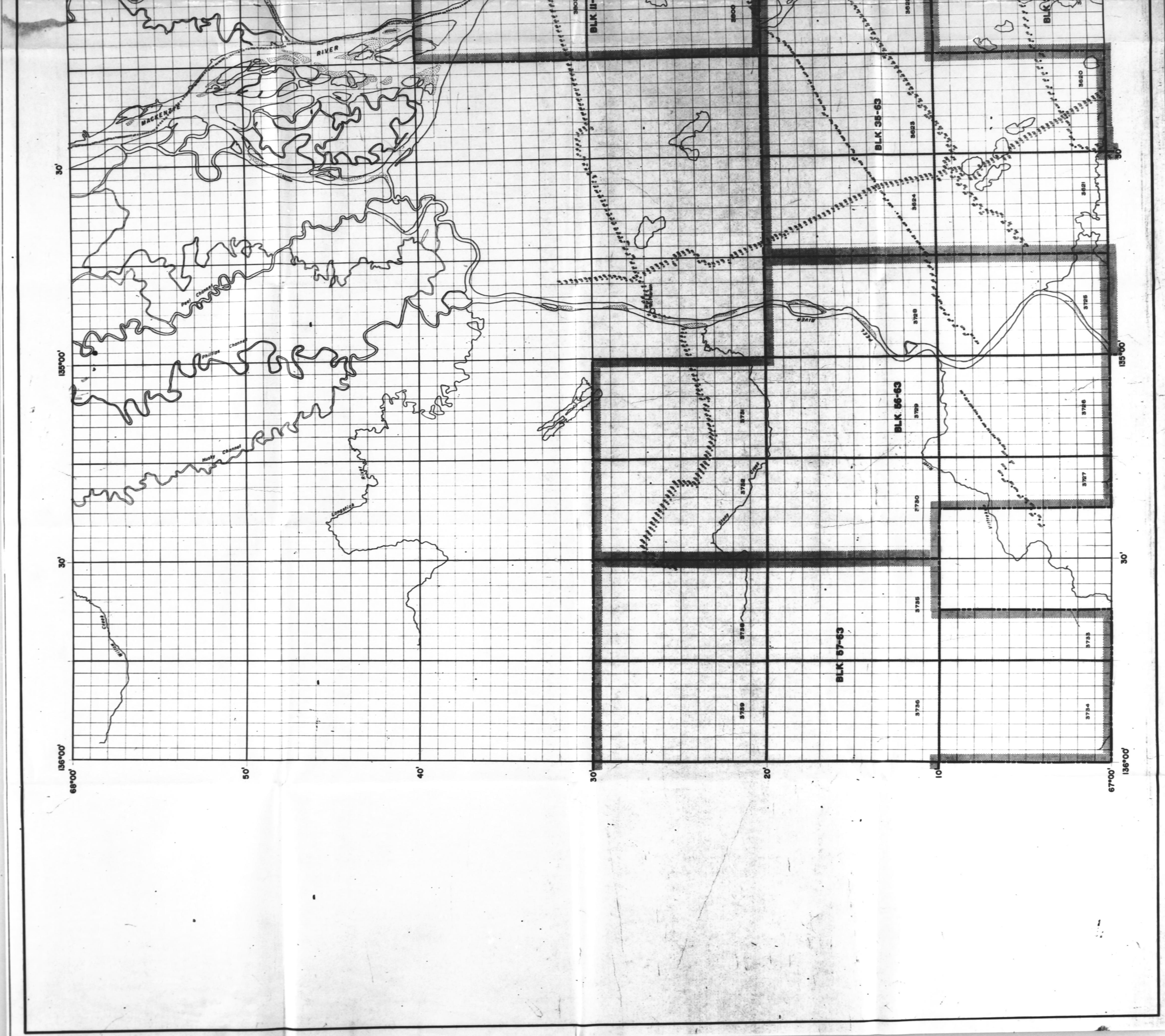
REVISED ..JULY 6, 1959.....

106 K MARTIN HOUSE

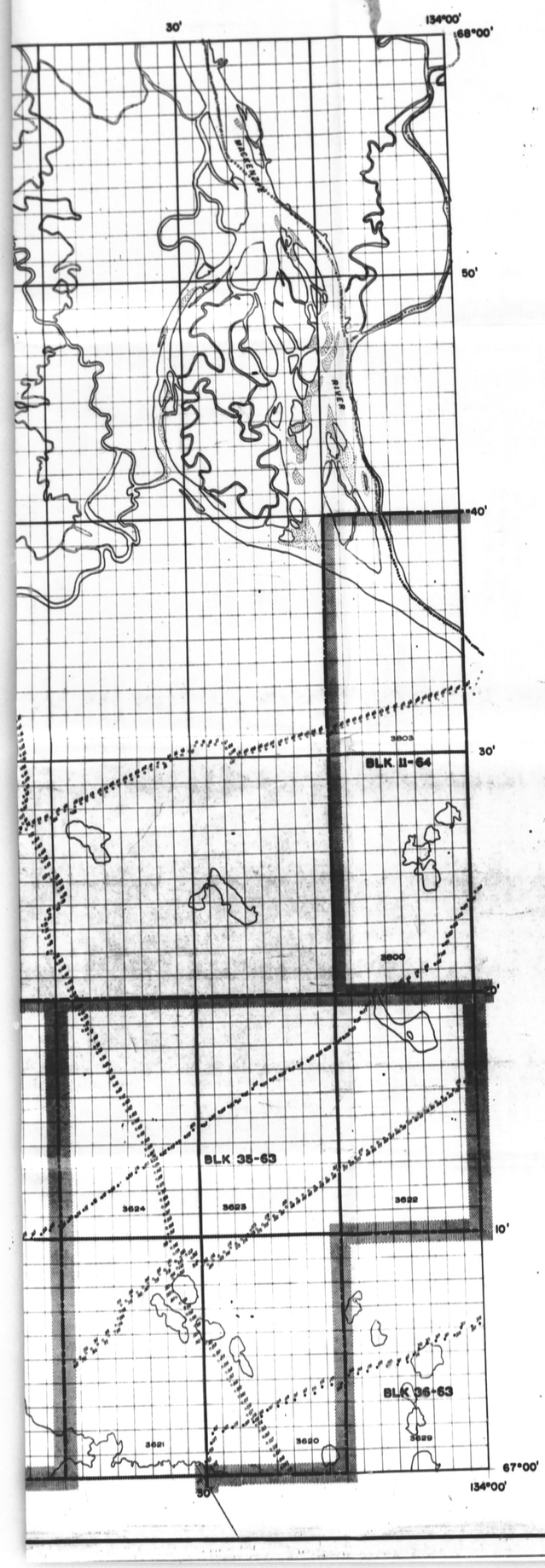
2 MILES TO 1 INCH

DEC 13 1966

5234

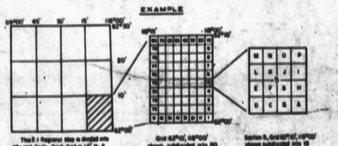
 MACKENZIE
RIVER
Peel Channel
Phillips Channel
Husky Channel
Longstick River
Willow Creek
Stony Creek
Vittrekwa
PEEL RIVER
Fort McPherson
BLK. 11-
BLK. 35-63
BLK.
BLK. 56-63
BLK. 57-63
3800
3622
3620
3623
3624
3621
3728
3725
3729
3731
3726
3732
3727
3730
3735
3733
3738
3736
3739
3734
30'
135°00'
30'
136°00'
68°00'
50'
40'
30'
20'
10
67°00'
136°00'
30'
135°00'
30'

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

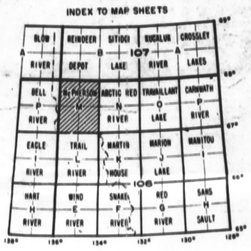



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS

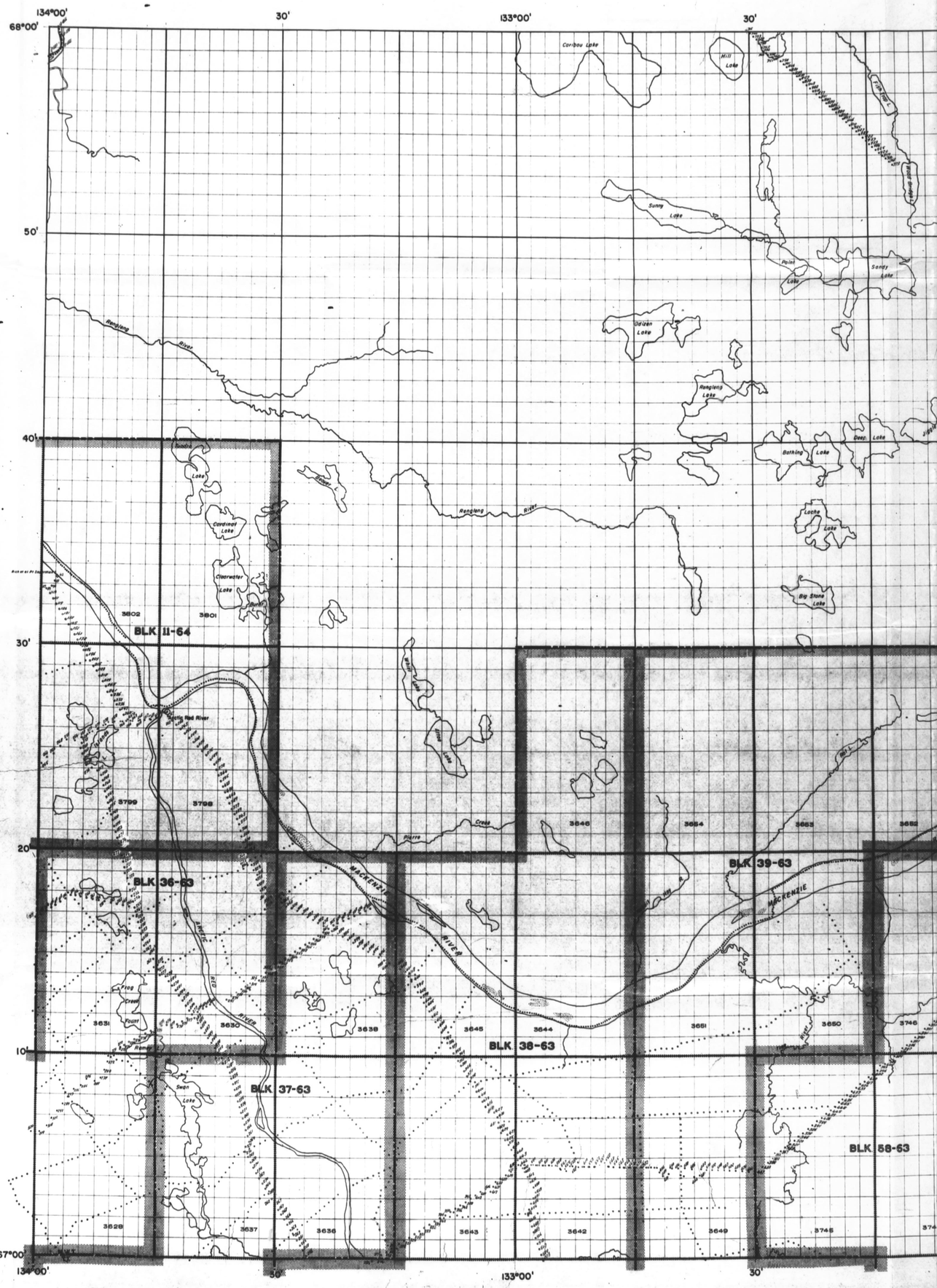



SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS
Contour Interval .....
Datum: Plane ..... Velocity .....
REVISED ..... 1963 .....

106 M FORT McPHERSON

2 MILES TO 1 INCH

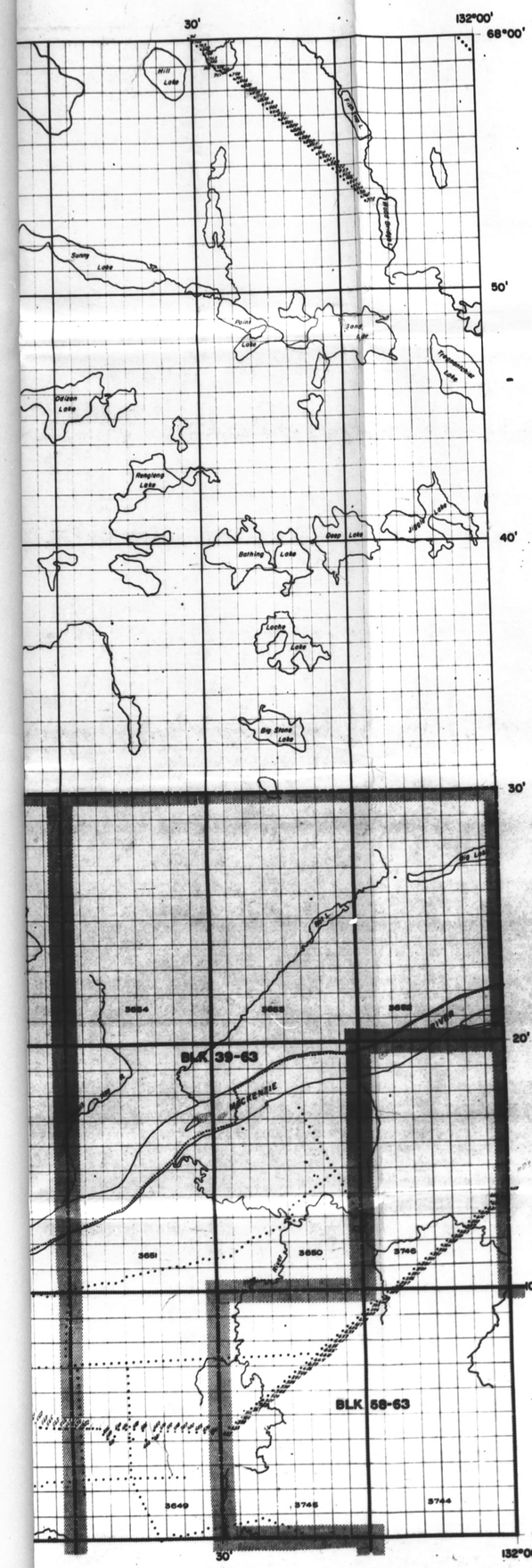
14963




30 x

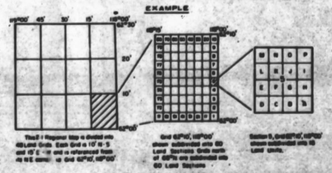
West Canadian Graphic Industries Ltd.

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DISTRICT

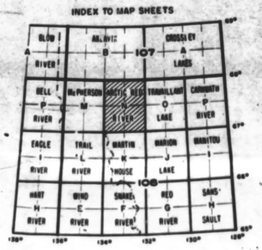



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS




SEISMOGRAPH MAP
**SEISMIC STATION LOCATIONS & ELEVATIONS**

*Contour Interval* _____
*Datum: Plane* _____ *Velocity* _____

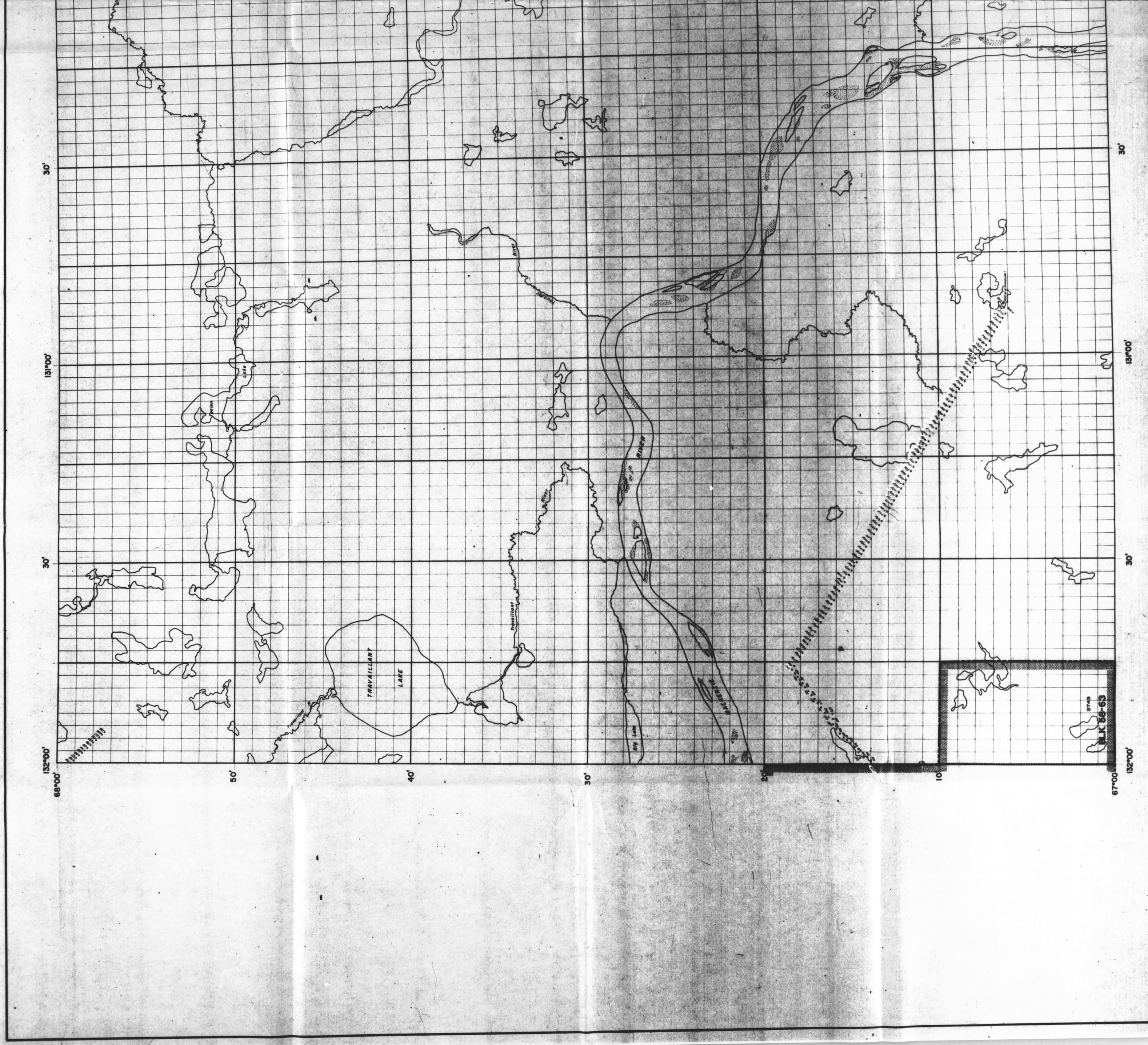
REVISED OCT 6 1965

**106 N ARCTIC RED RIVER**
2 MILES TO 1 INCH

DEC 13 1965

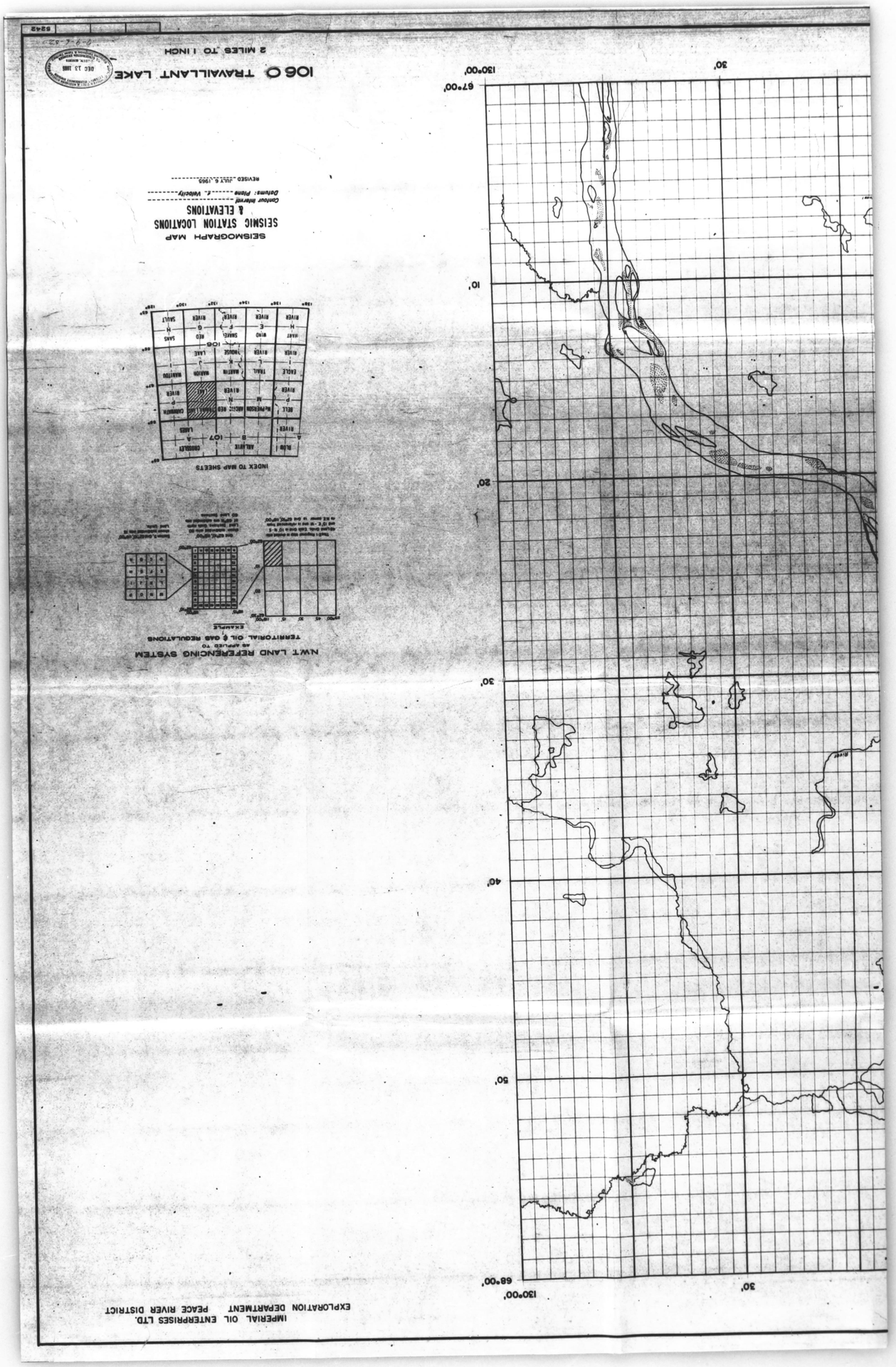
7-9-6-52

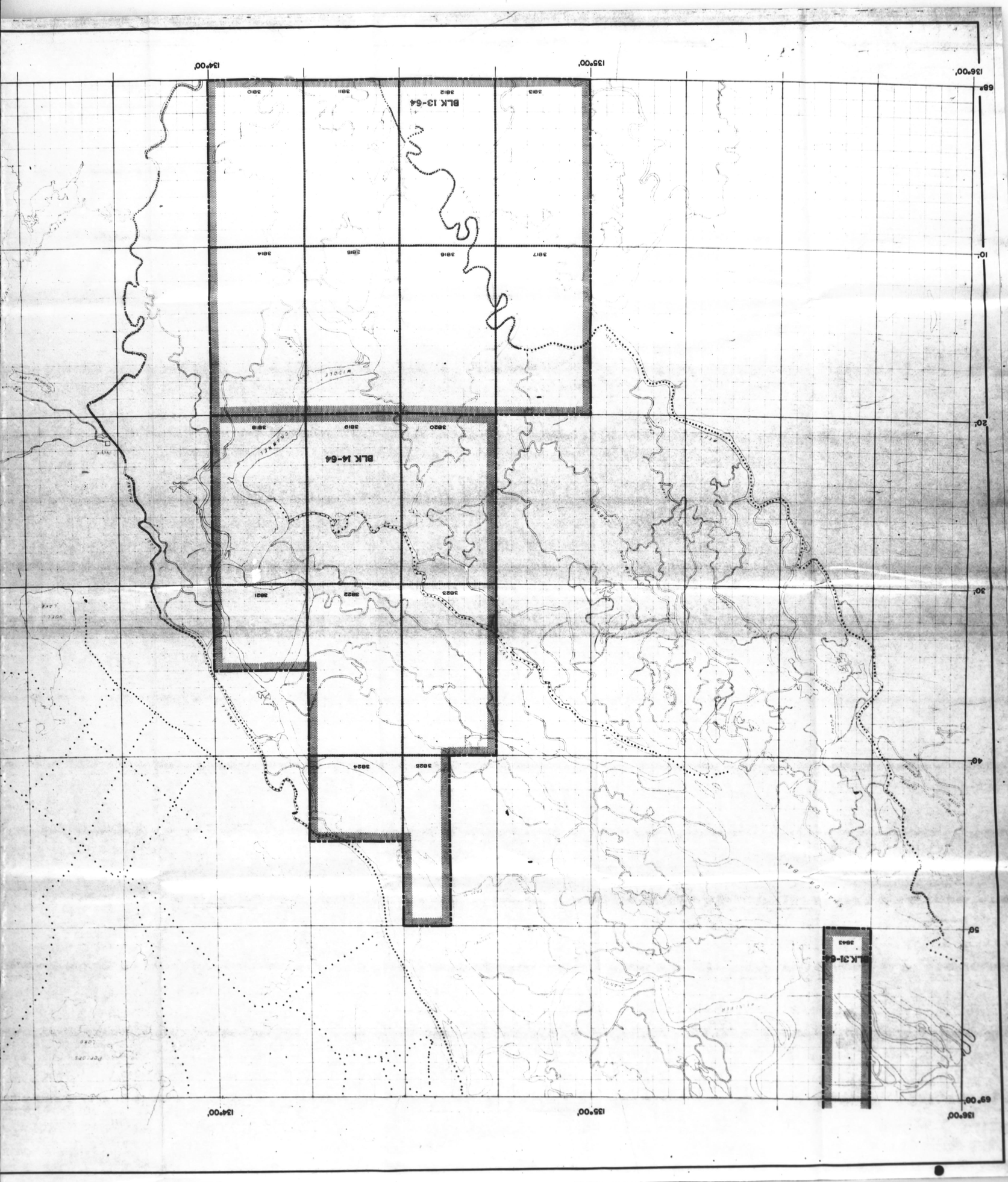
5240

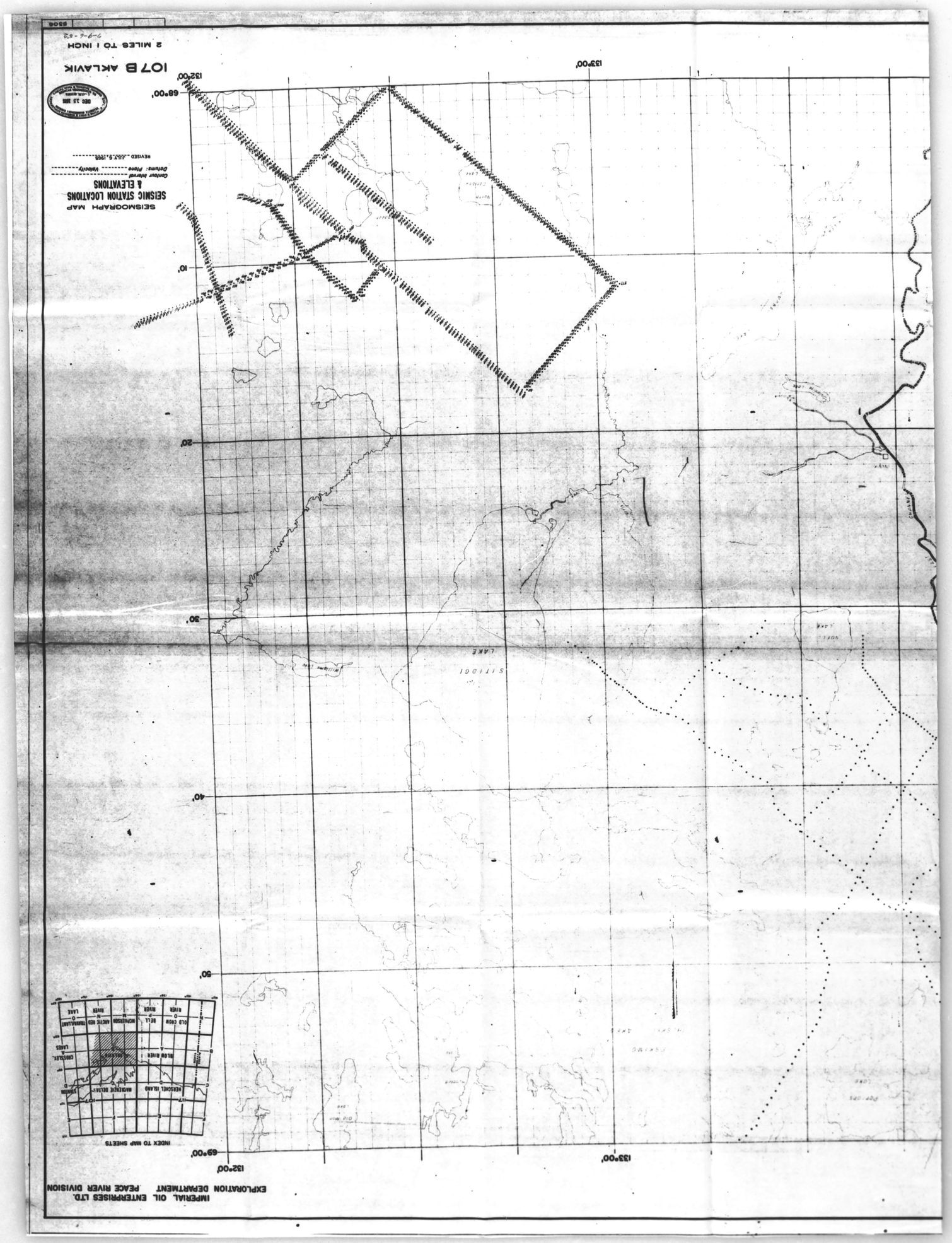


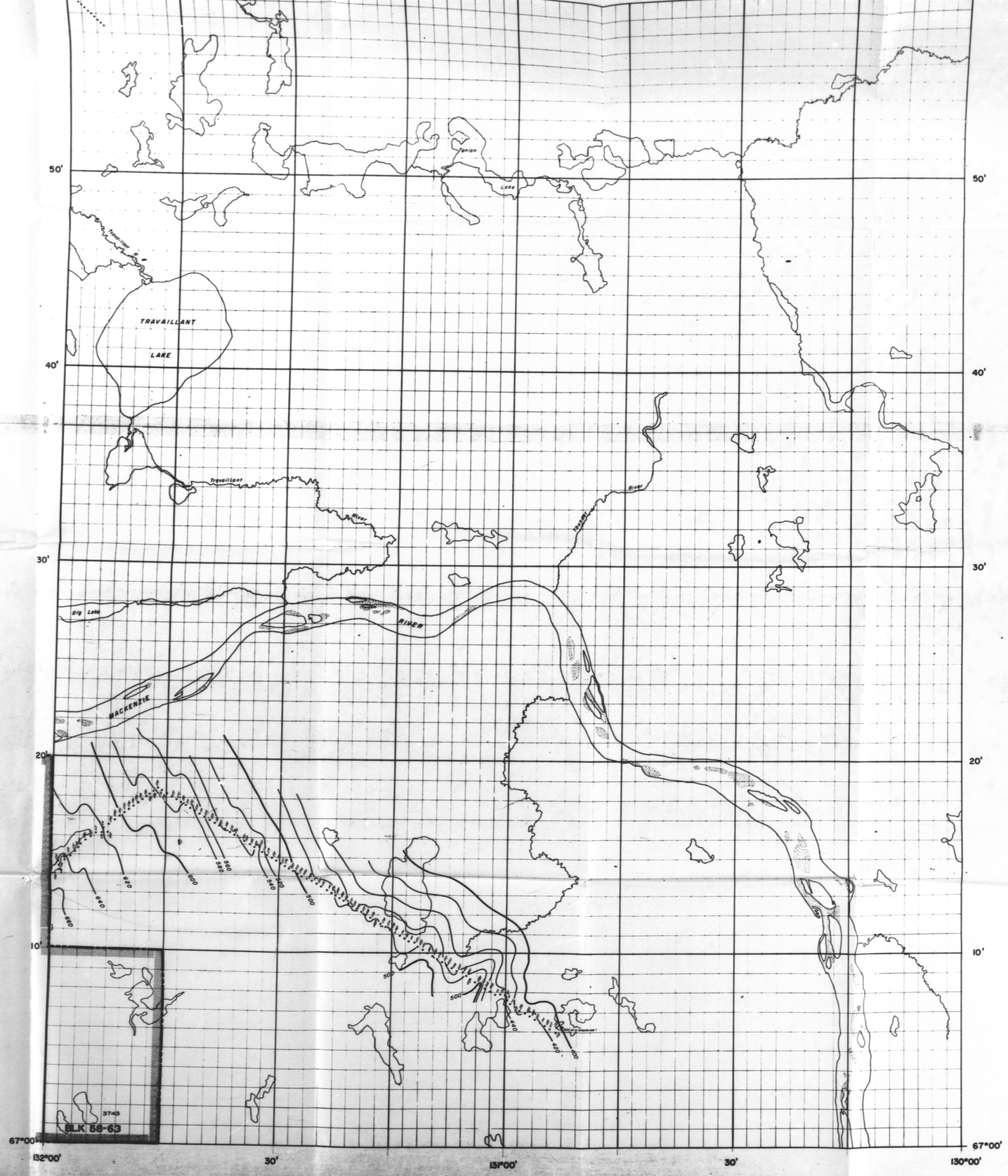
30x

West Canadian Graphic Industries Ltd.


IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DISTRICT
68°00'
50'
40'
30'
20'
10'
30'
130°00'
67°00'
NW.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS
EXAMPLE
INDEX TO MAP SHEETS
SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS
Contour Interval
Datums: Plane
Z. Velocity
REVISED JULY 6, 1965
106 O TRAVAILLANT LAKE
2 MILES TO 1 INCH
DEC 13 1965
6242

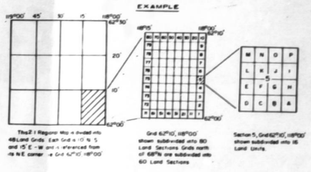




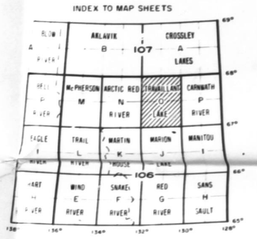



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS




2 of 2

SEISMOGRAPH MAP
STRUCTURE
BEAR ROCK

Contour Interval .020 SEC.
Datums: Plane 3000 Velocity 10000'/s

REVISED JULY 6, 1965

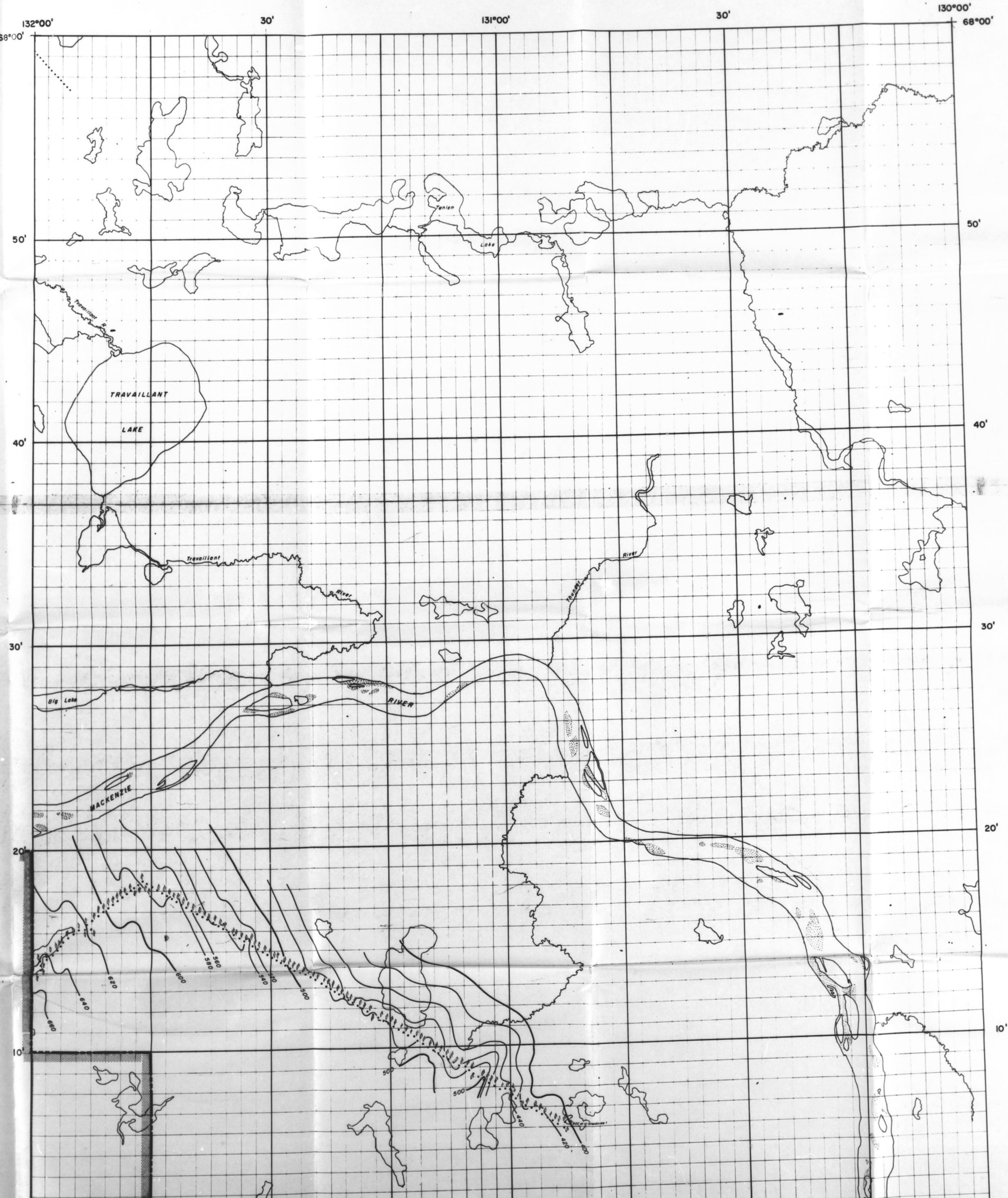
CONFIDENTIAL

106 O TRAVAILLANT LAKE

2 MILES TO 1 INCH

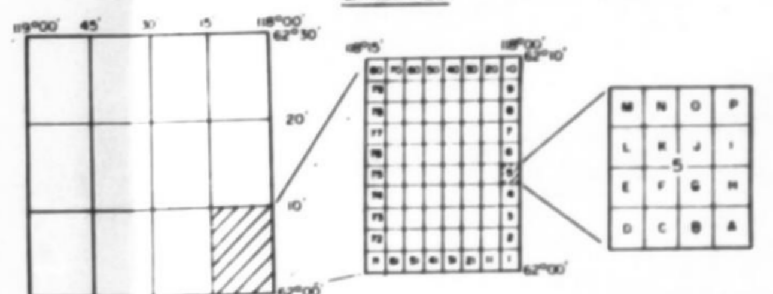
5503 | 5242

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DISTRICT



## N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
## TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

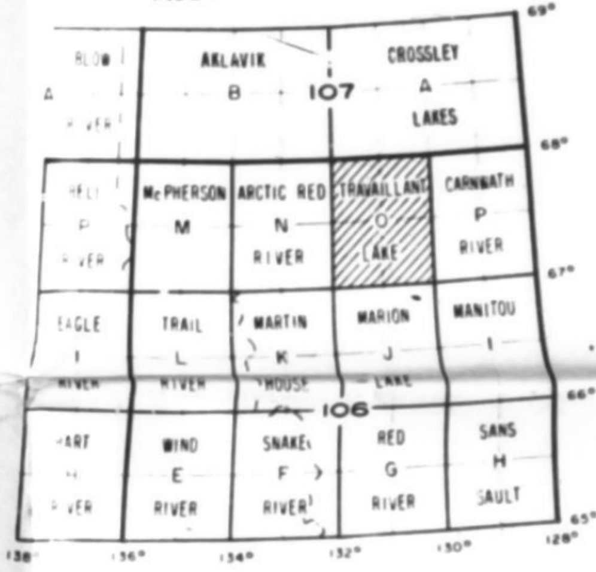


This 2:1 Regional Map is divided into 48 Land Grids. Each Grid is 10' N-S and 15' E-W and is referenced from its N.E. corner i.e. Grid 62°10', 118°00'

Grid 62°10', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units

INDEX TO MAP SHEETS



107

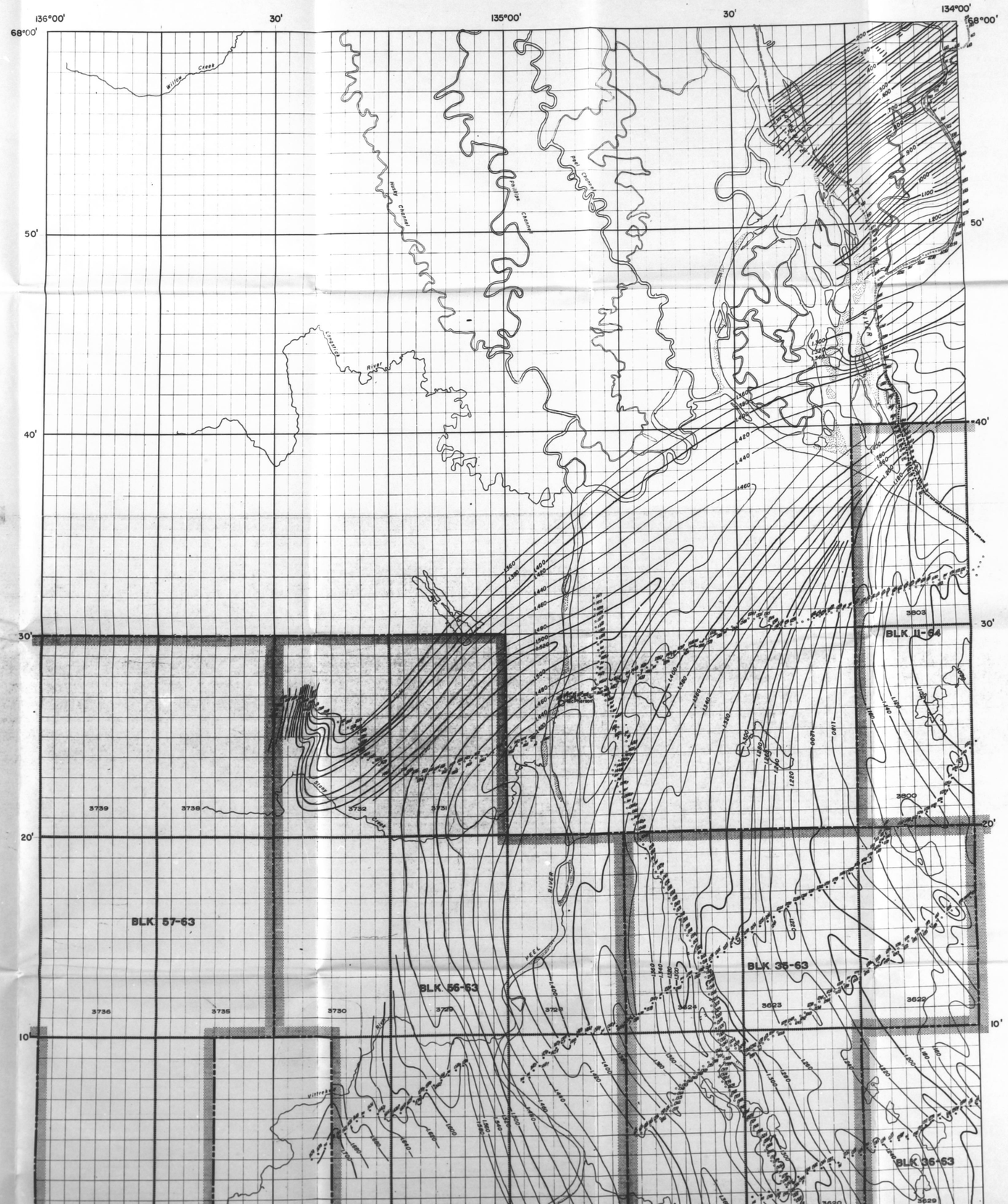
## SEISMOGRAPH MAP
## STRUCTURE
## BEAR ROCK

Contour Interval .020 SEC.
Datums: Plane 1000' Velocity 10000'/s

REVISED JULY 6, 1965

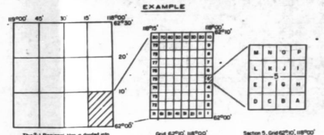
CONFIDENTIAL

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION




N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

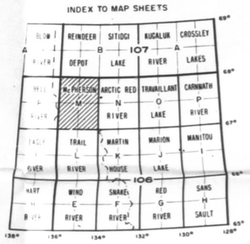


The B.C. Regional Map is divided into 48 Land Grids. Each Grid is 10' N. & 15' E.-W. and is referenced from its N.E. corner, ie. Grid 62°10', 118°00'

Grid 62°10', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS



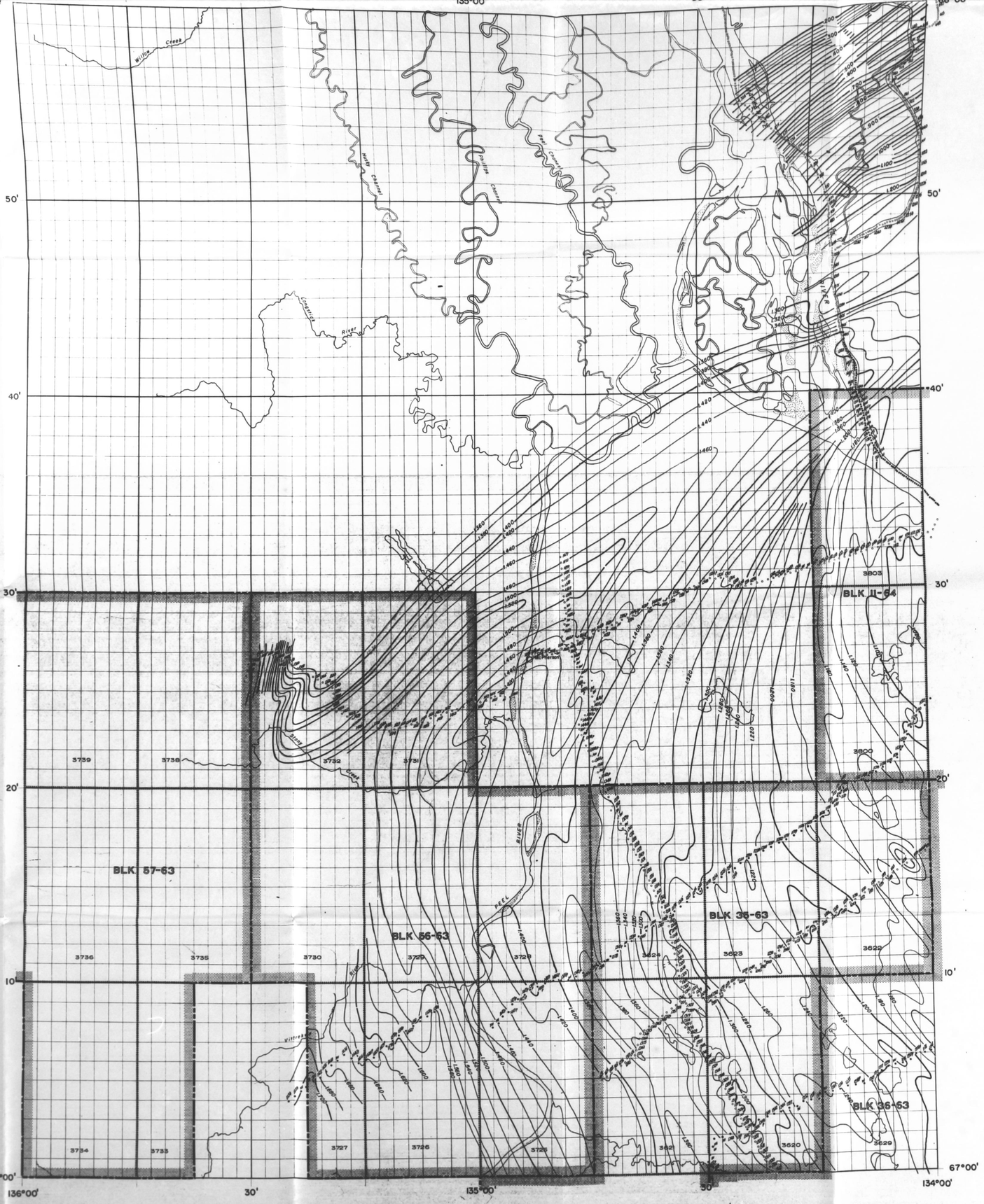

107

SEISMOGRAPH MAP
STRUCTURE
BEAR ROCK

Contour Interval 0.20 SEC.
Datums: Plane 1000' Velocity 10,000

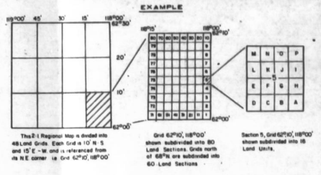
REVISED JULY 8, 1965

CONFIDENTIAL




N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

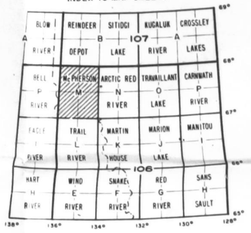



The 2:1 Regional Map is divided into 48 Land Grids. Each Grid is 10' N-S and 15' E-W and is referenced from its N.E. corner i.e. Grid 62°10', 118°00'

Grid 62°10', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS




2 of 2

SEISMOGRAPH MAP
STRUCTURE
BEAR ROCK

Contour Interval 200 FEET
Datums: Plane 1000' Velocity 10,000

REVISED JULY 6, 1965

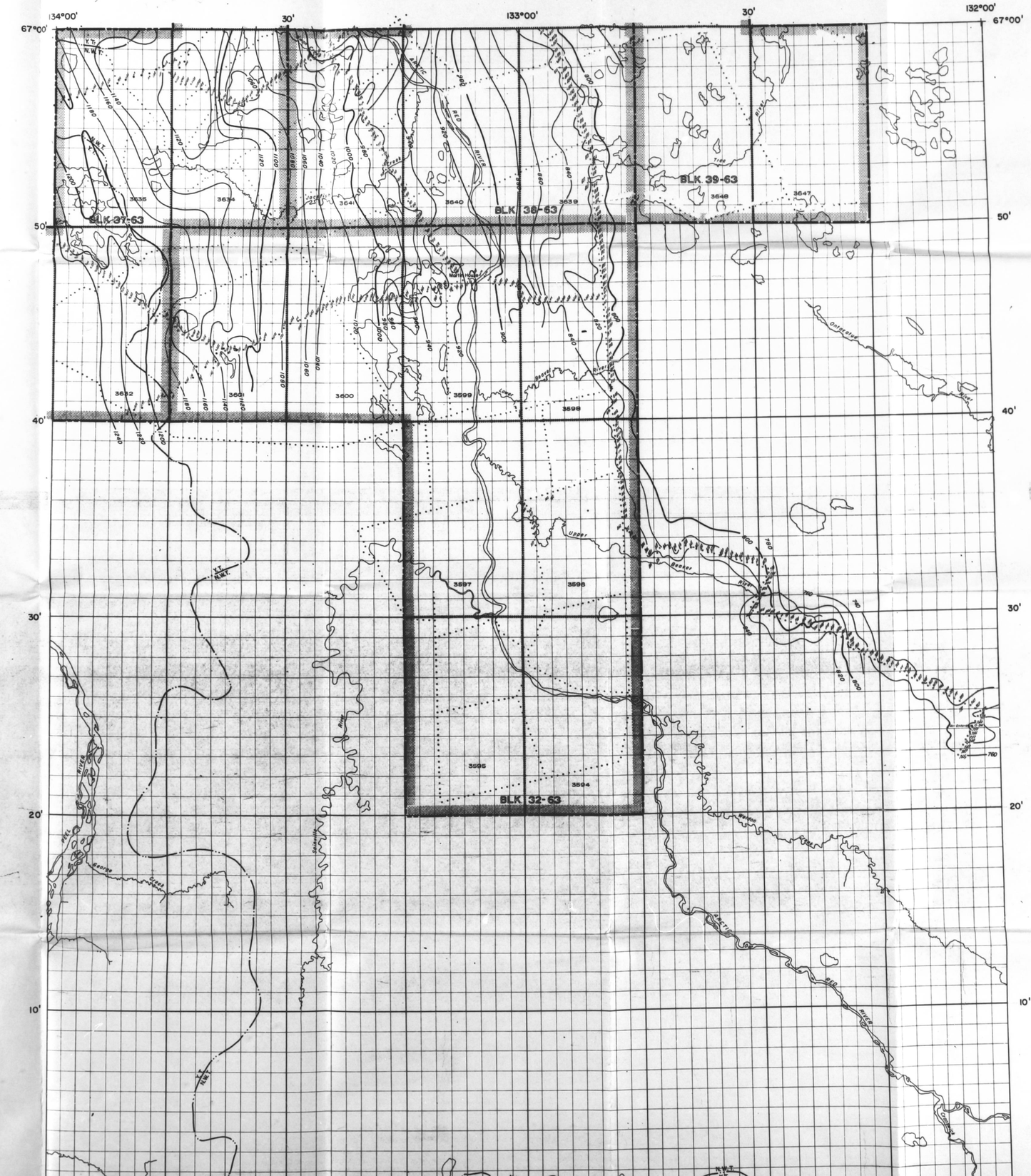
CONFIDENTIAL

106 M FORT McPHERSON

2 MILES TO 1 INCH

14963

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

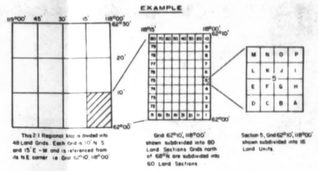



## N.W.T. LAND REFERENCING SYSTEM

AS APPLIED TO

TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

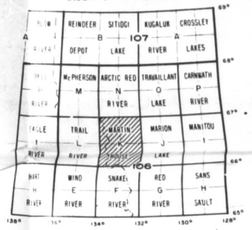



This 2 I Regional Block is divided into 48 Land Grids. Each Grid is 17' N. S. and 15' E.-W. and is referenced from its N.E. corner i.e. Grid 62°40' 118°00'

Grid 62°40', 118°00' shown subdivided into 60 Land Sections. Grids north of 62°15' are subdivided into 60 Land Sections

Section 5, Grid 62°40', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS



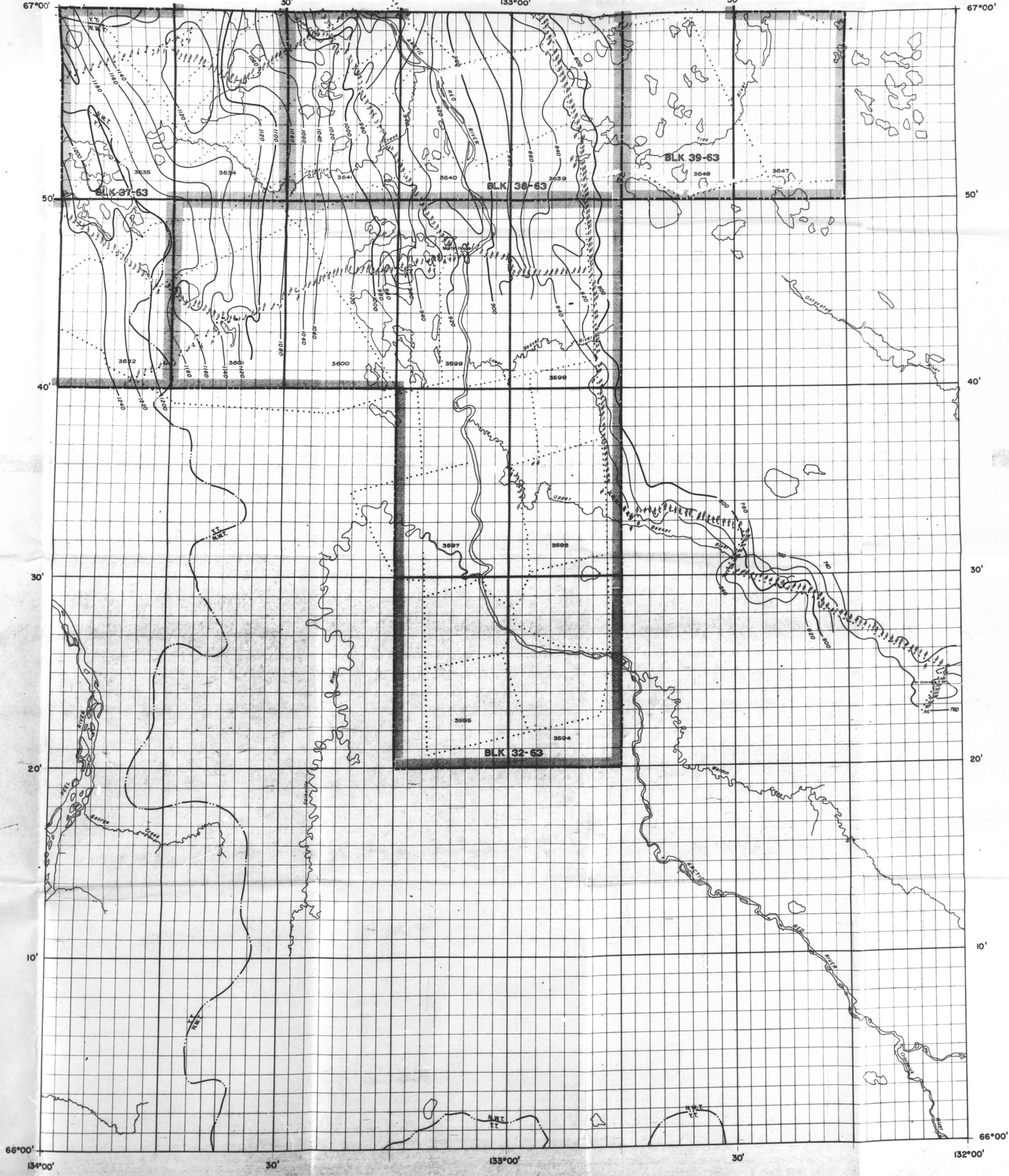

107

## SEISMOGRAPH MAP
## STRUCTURE
## BEAR ROCK

Contour Interval 020 SEC.

Datums: Plane 1000' Velocity 10000'

REVISED JULY 6, 1965

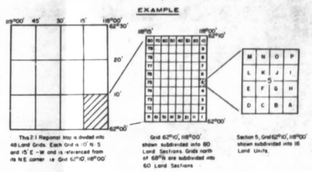



## N.W.T. LAND REFERENCING SYSTEM

AS APPLIED TO

TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

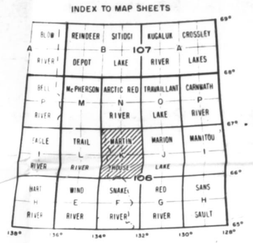



The 3 x 3 Regional Inch is divided into 48 Land Grids. Each Grid is 10' N. & S. and 15' E. - W. and is referenced from its N.E. corner - ie. Grid 62°10' 118°00'

Grid 62°10', 118°00' shown subdivided into 60 Land Sections. Grids north of 62°15' are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS




SEISMOGRAPH MAP

STRUCTURE

BEAR ROCK

Contour Interval 020 SEC

Datums: Plane 1000' Velocity 10000'

REVISED JULY 6, 1965

2 of 2

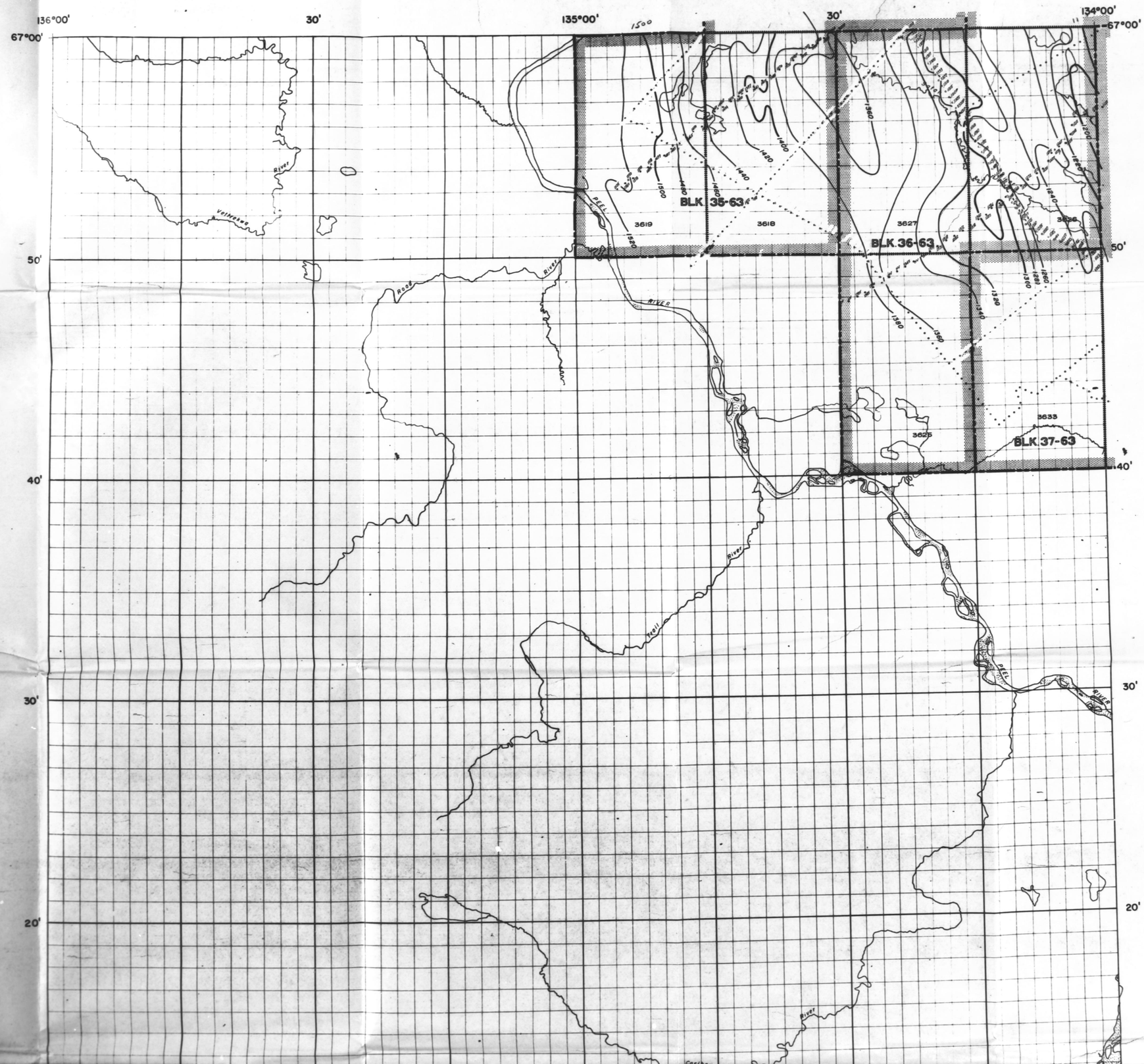
CONFIDENTIAL

# 106 K MARTIN HOUSE

2 MILES TO 1 INCH

5501 5234

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

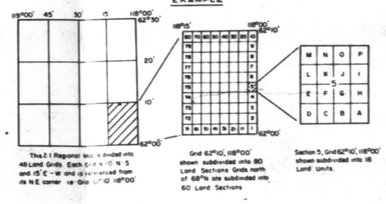



## N.W.T. LAND REFERENCING SYSTEM

AS APPLIED TO

TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

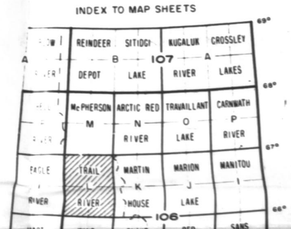



The 2.1 Regional Block is divided into 48 Land Grids. Each Grid is 10' N S and 15' E - W and is referenced from its N.E. corner i.e. Grid L-7-G 118°00'

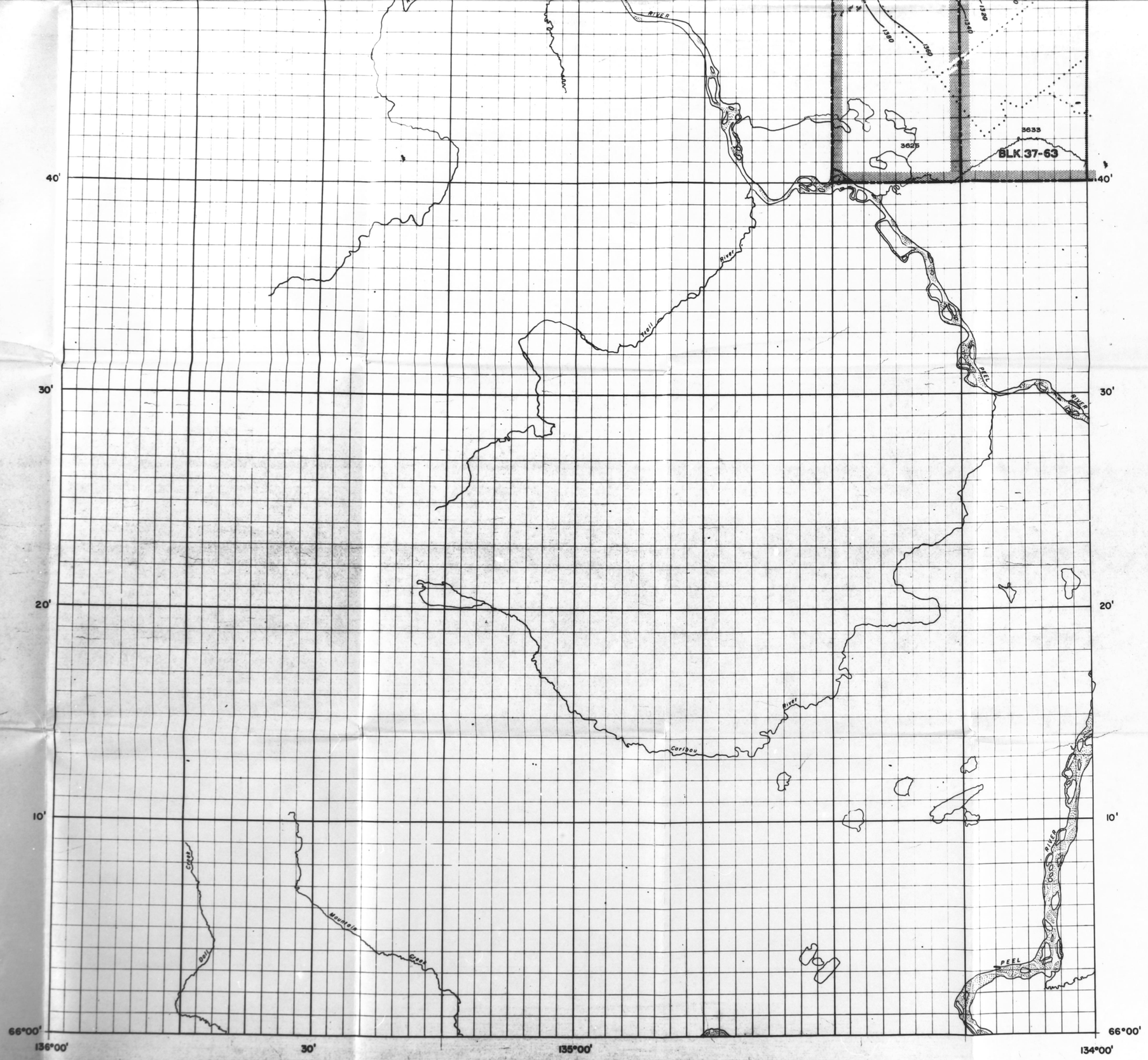
Grid 62°10', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS

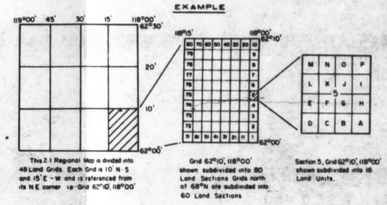



107




## N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
## TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

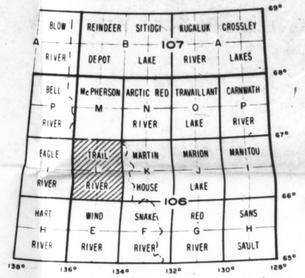



This 2:1 Regional Map is divided into 48 Land Grids. Each Grid is 10' N-S and 15' E-W and is referenced from its N.E. corner i.e. Grid 62°10', 118°00'

Grid 62°10', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS




SEISMOGRAPH MAP
STRUCTURE
BEAR ROCK

Contour Interval 020 SEC.
Datums: Plane 3000 Velocity 10,000'/s

REVISED JULY 8, 1965

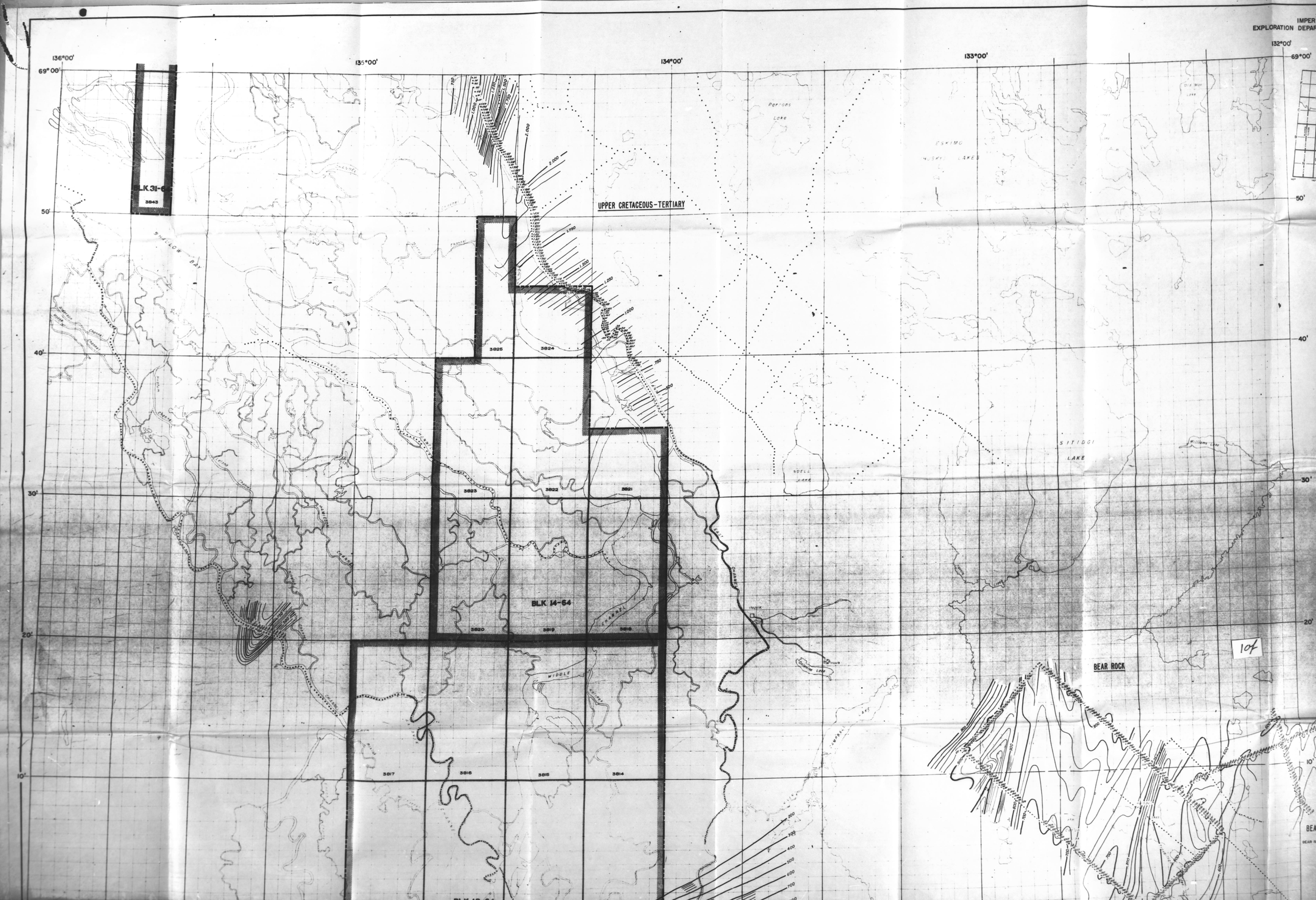
CONFIDENTIAL

2 of 2

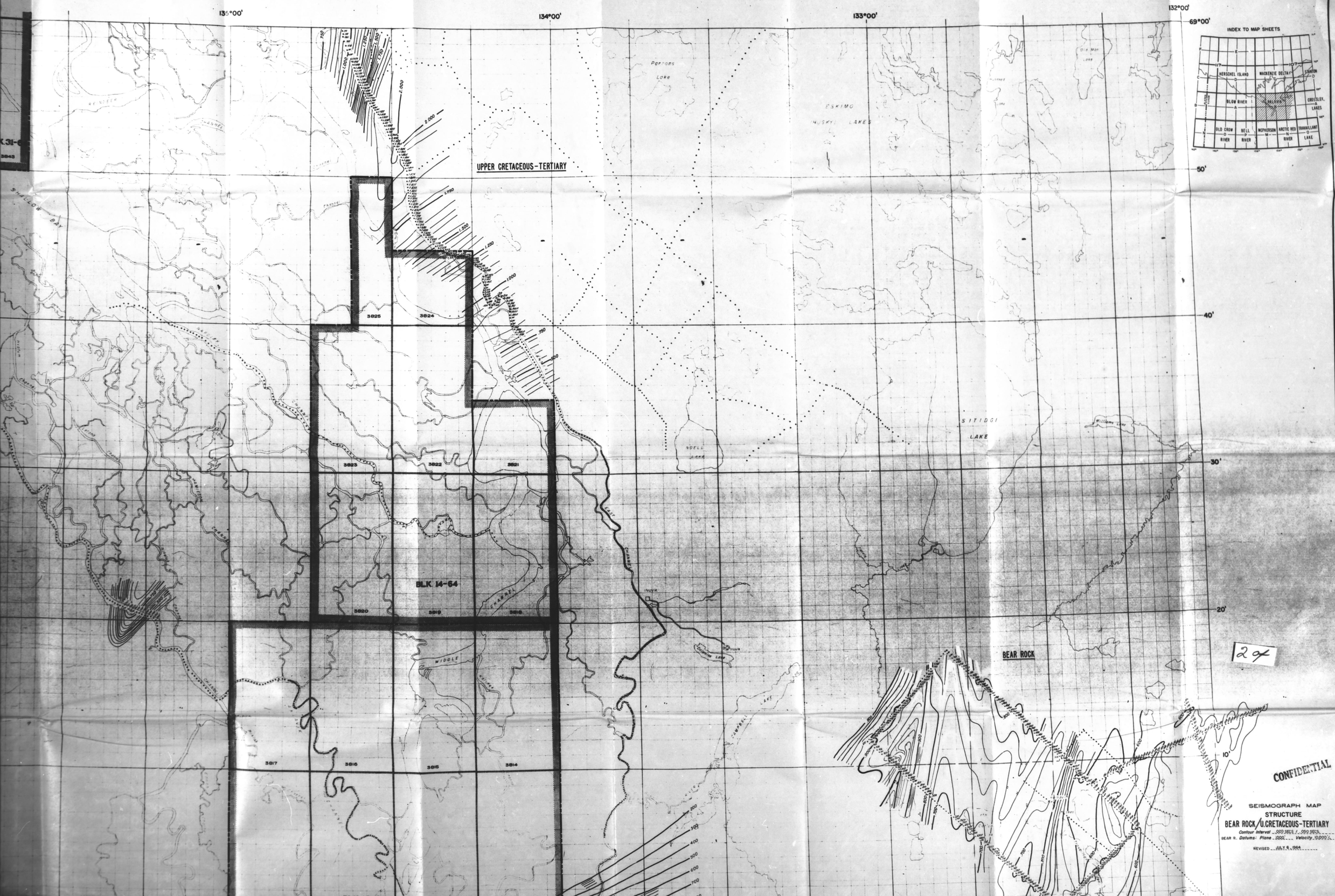
# 106L TRAIL RIVER

2 MILES TO 1 INCH

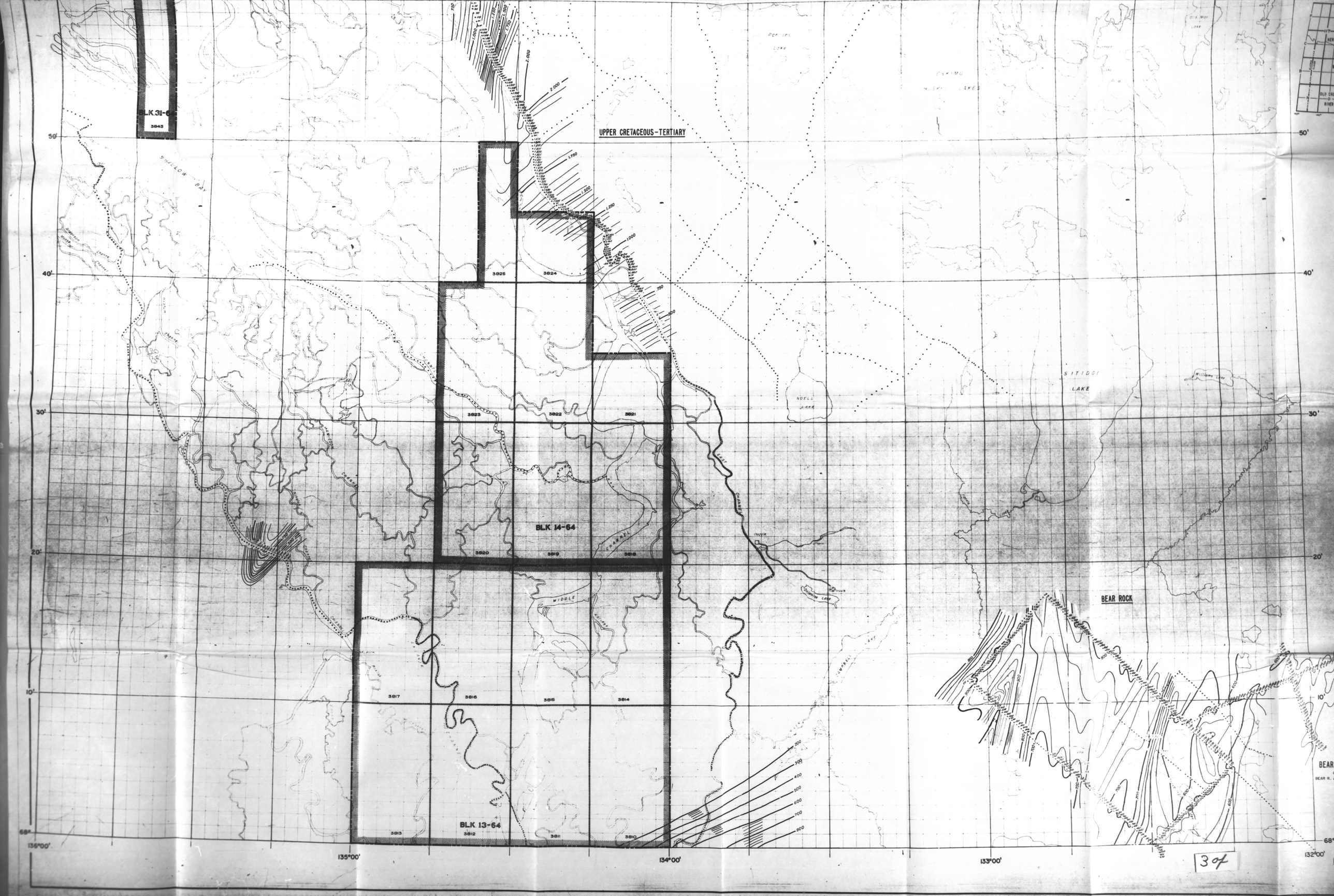
5237 | 5502 | 5236

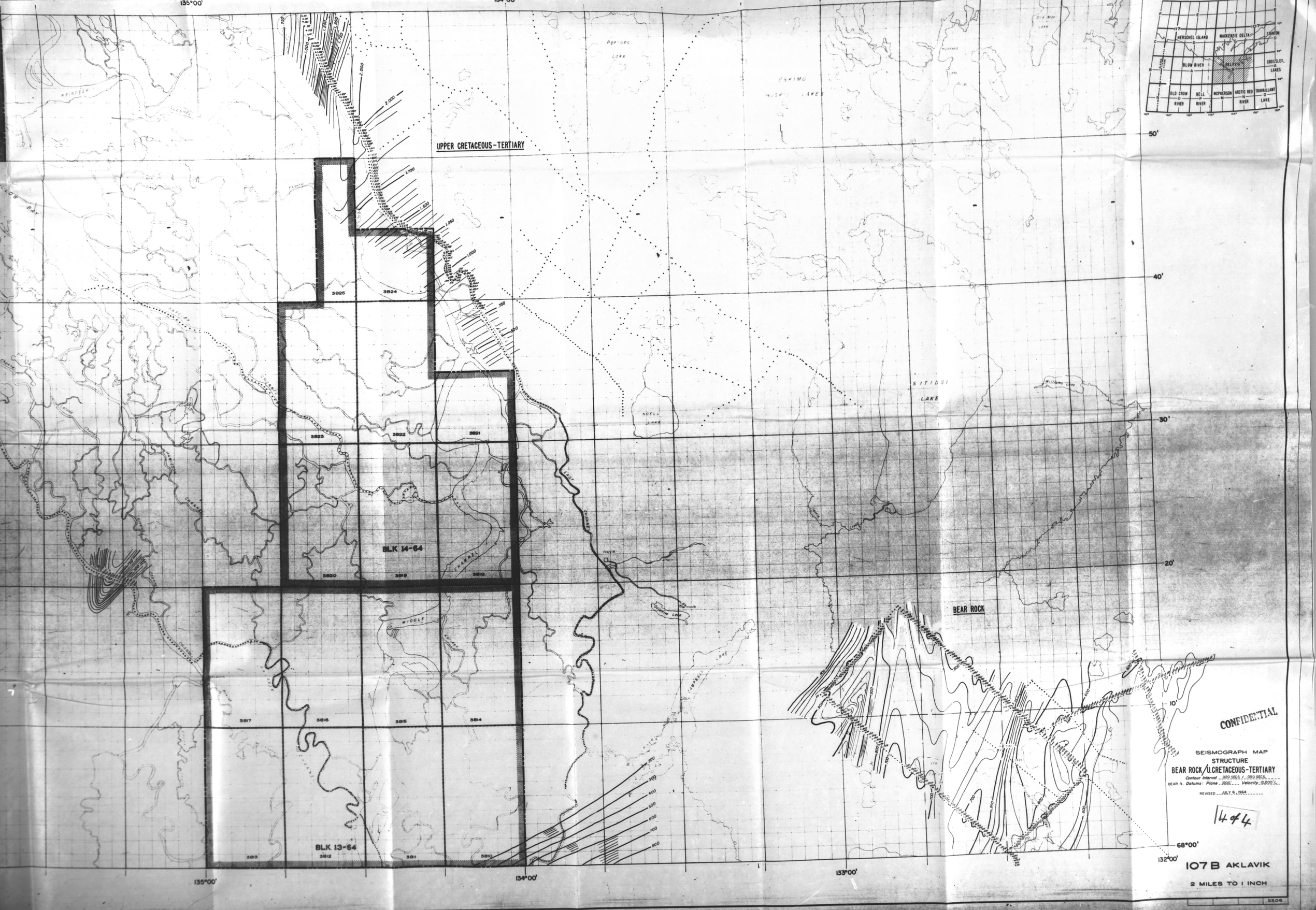

IMPER
EXPLORATION DEPAR
136°00'
135°00'
134°00'
133°00'
132°00'
69°00'
50'
40'
30'
20'
10'
BLK.31-6
3843
SHALLOW BAY
UPPER CRETACEOUS-TERTIARY
Porcupine Lake
ESKIMO
HUSKY LAKES
SITIDGI
LAKE
NOELL LAKE
3825
3824
3823
3822
3821
BLK. 14-64
3820
3819
3818
INUYIK
MIDDLE
CHANNEL
3817
3816
3815
3814
BEAR ROCK
107

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

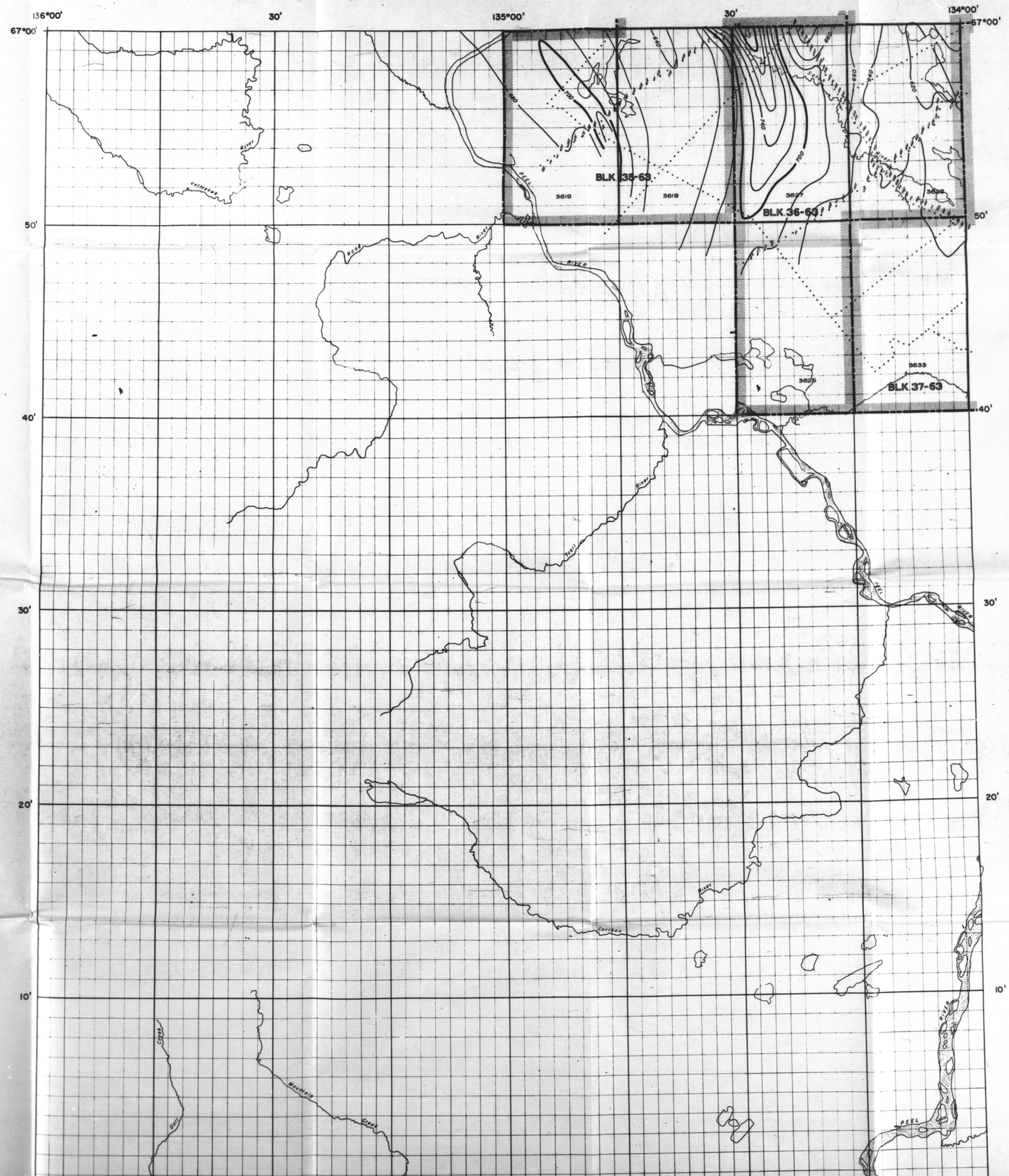



29


UPPER CRETACEOUS-TERTIARY
BLK. 31-6
3843
BLK. 14-64
BLK. 13-64
3825
3824
3823
3822
3821
3820
3819
3818
3817
3816
3815
3814
3813
3812
3811
3810
SWALLOW BAY
ESKIMO LAKES
SITIDGI LAKE
NOELL LAKE
INUVIK
MIDDLE CHANNEL
EAST CHANNEL
BEAR ROCK
50'
40'
30'
20'
10'
68°
136°00'
135°00'
134°00'
133°00'
132°00'
3 of

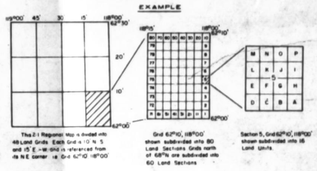

135°00'
134°00'
133°00'
132°00'
68°00'
50'
40'
30'
20'
10'
UPPER CRETACEOUS-TERTIARY
BEAR ROCK
BLK. 14-64
BLK. 13-64
3825
3824
3823
3822
3821
3820
3819
3818
3817
3816
3815
3814
3813
3812
3811
3810
REINDEER
ESKIMO
HUSKY LAKES
SITIDGI
LAKE
NDELL
LAKE
INUVIK
MIDDLE
CHANNEL
CAMPBELL
LAKE
BLOW BAY
HERSCHEL ISLAND
MACKENZIE DELTA
STANTON
BLOW RIVER
AKLAVIK
CROSSLEY LAKES
OLD CROW RIVER
BELL RIVER
MCPHERSON
ARCTIC RED RIVER
TRAVAILLANT LAKE
CONFIDENTIAL
SEISMOGRAPH MAP
STRUCTURE
BEAR ROCK/U.CRETACEOUS-TERTIARY
Contour Interval .020 SECS. / .050 SECS.
BEAR R. Datums: Plane 2000 Velocity 10,000'/s
REVISED JULY 6, 1964
1 of 4
107 B AKLAVIK
2 MILES TO 1 INCH

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION



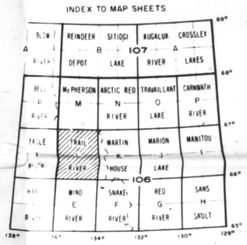

N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




107

INDEX TO MAP SHEETS

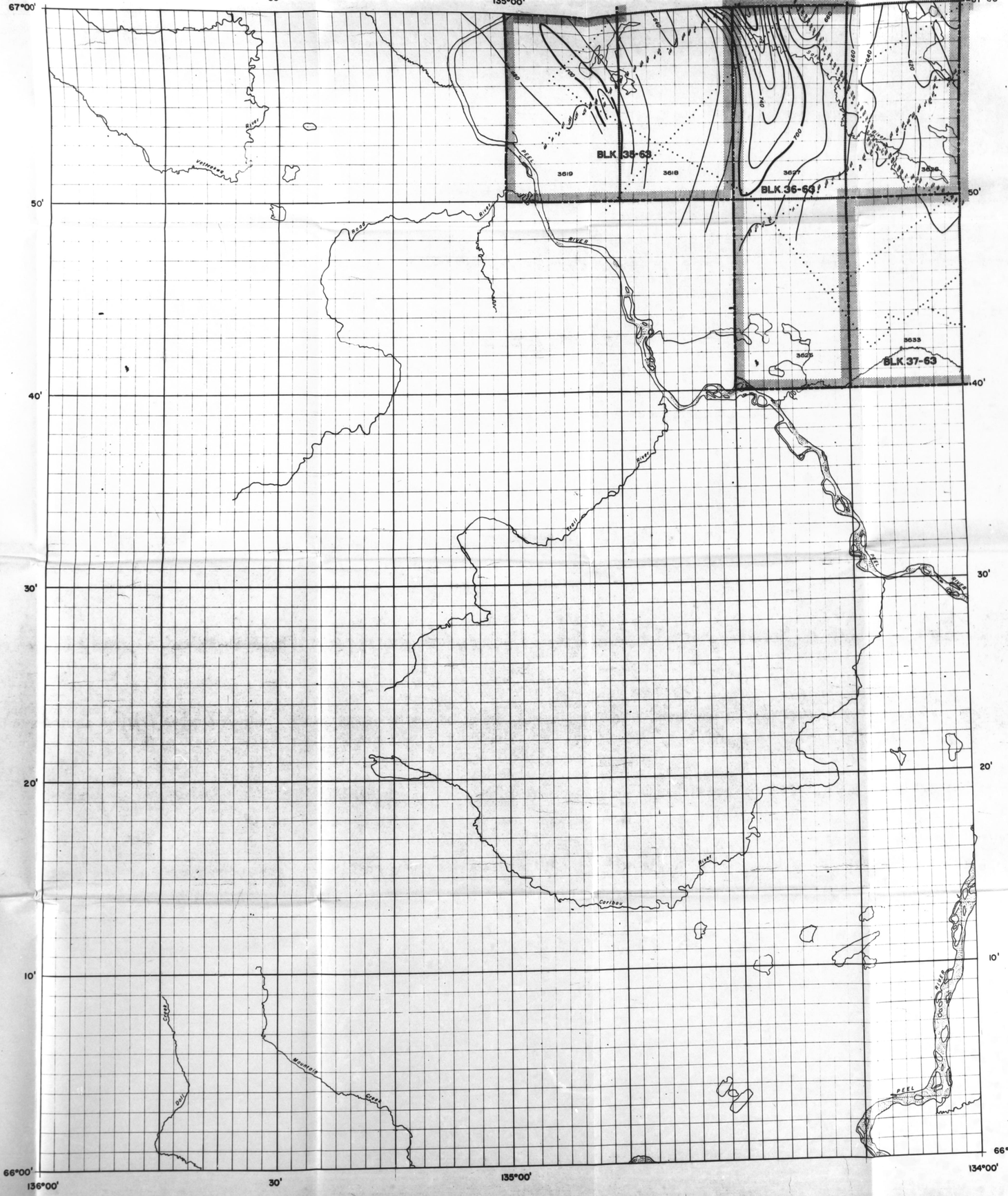



SEISMOGRAPH MAP
ISOCHRON
**BEAR ROCK TO CAMBRIAN SHALE**

Contour Interval ____.020 SEC.
Datums: Plane _____ Velocity _____

REVISED ___JULY. 5, 1969____

**CONFIDENTIAL**

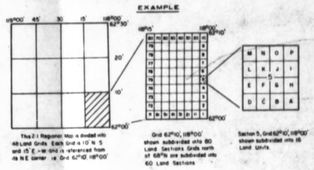



N.W.T. LAND REFERENCING SYSTEM

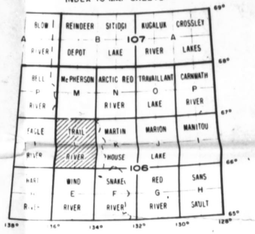
AS APPLIED TO

TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS




SEISMOGRAPH MAP

ISOCHRON

**BEAR ROCK TO CAMBRIAN SHALE**

Contour Interval ____DED. DEC.____

Datums: Plane ____ Velocity ____

REVISED ___JULY. 8, 1969___

CONFIDENTIAL

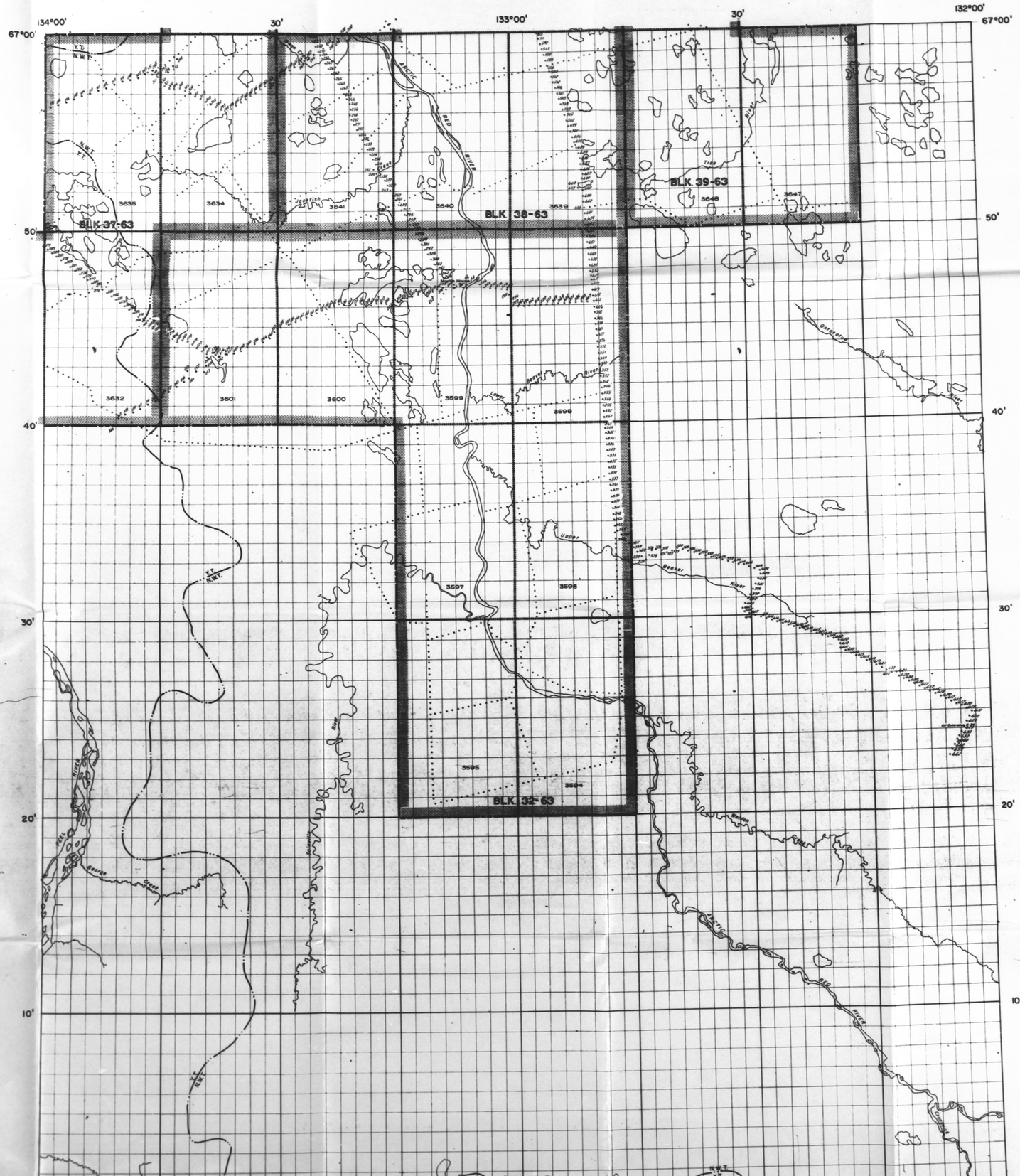
2 of 2

106L TRAIL RIVER

2 MILES TO 1 INCH

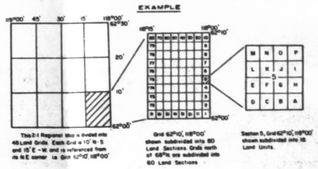
| | | |
|---|---|---|
| 5237 | 5446 | 5236 |

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION




## N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

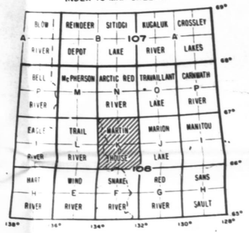



This 2-1 Regional Map is divided into 48 Land Grids. Each Grid is 10' N-S and 15' E-W and is referenced from its N.E corner. In this 127°-0' 68°00'

Grid 62°00', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°00', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS




107

GSI
PARTY 36

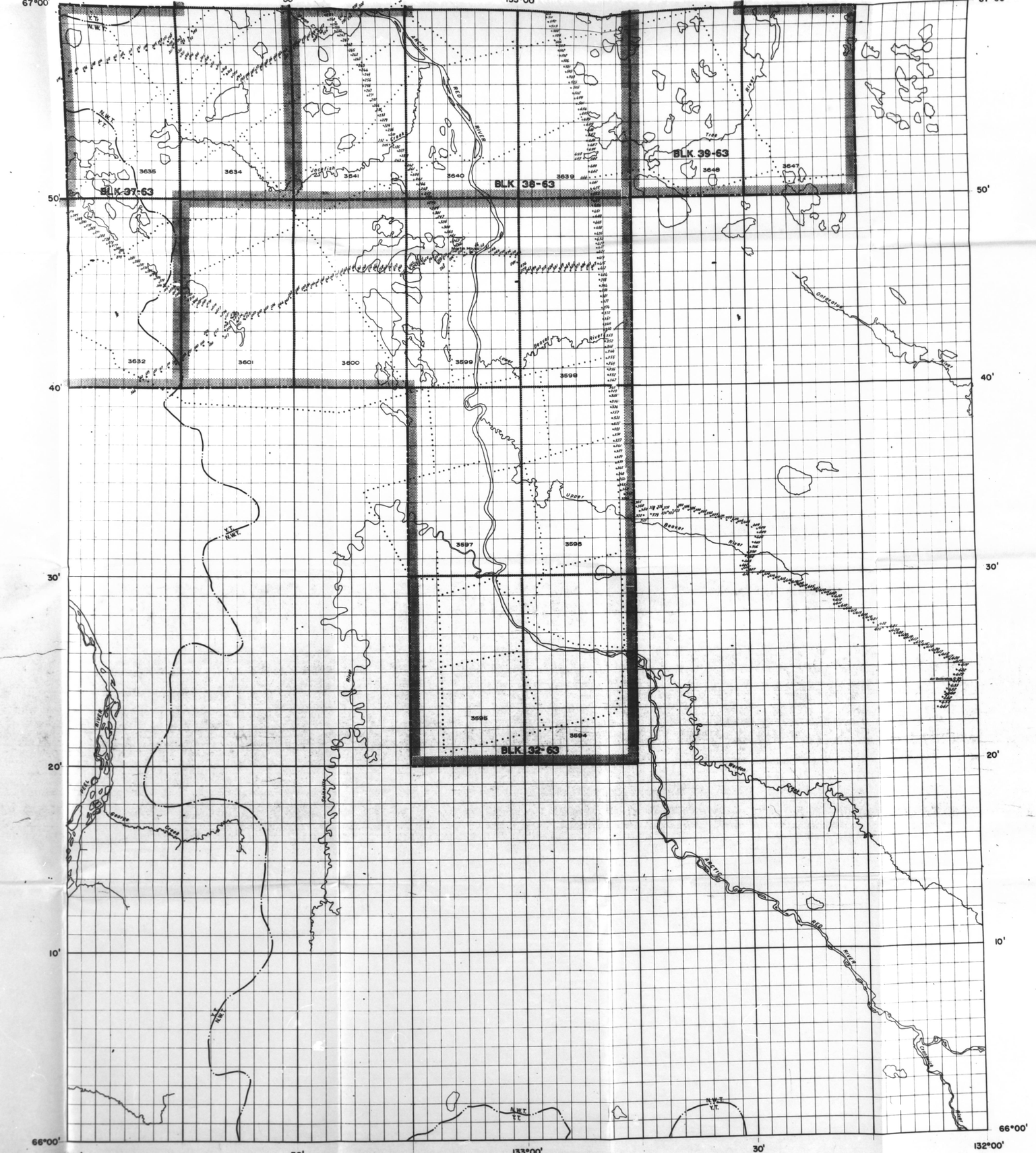
SEISMOGRAPH MAP

## SEISMIC STATION LOCATIONS & ELEVATIONS

Contour Interval _____

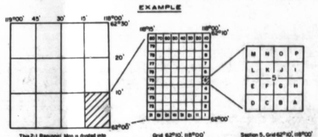
Datums: Plane _____ Velocity _____

REVISED JULY 6, 1965




N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

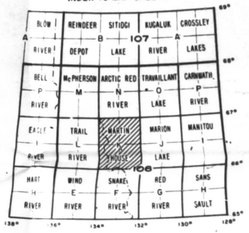



The 2-1 Regional Map is divided into 48 Land Grids. Each Grid is 1° in 5 and 15' E - W and is referenced from its N.E. corner i.e. Grid 62°10', 118°00'

Grid 62°10', 118°00' shown subdivided into 80 Land Sections. Grids north of 68°N are subdivided into 60 Land Sections

Section 5, Grid 62°10', 118°00' shown subdivided into 16 Land Units.

INDEX TO MAP SHEETS




SEISMOGRAPH MAP

SEISMIC STATION LOCATIONS
& ELEVATIONS

Contour Interval _____
Datums: Plane _____ Velocity _____

REVISED JULY 6, 1965

GSI
Party 36

1 of 2

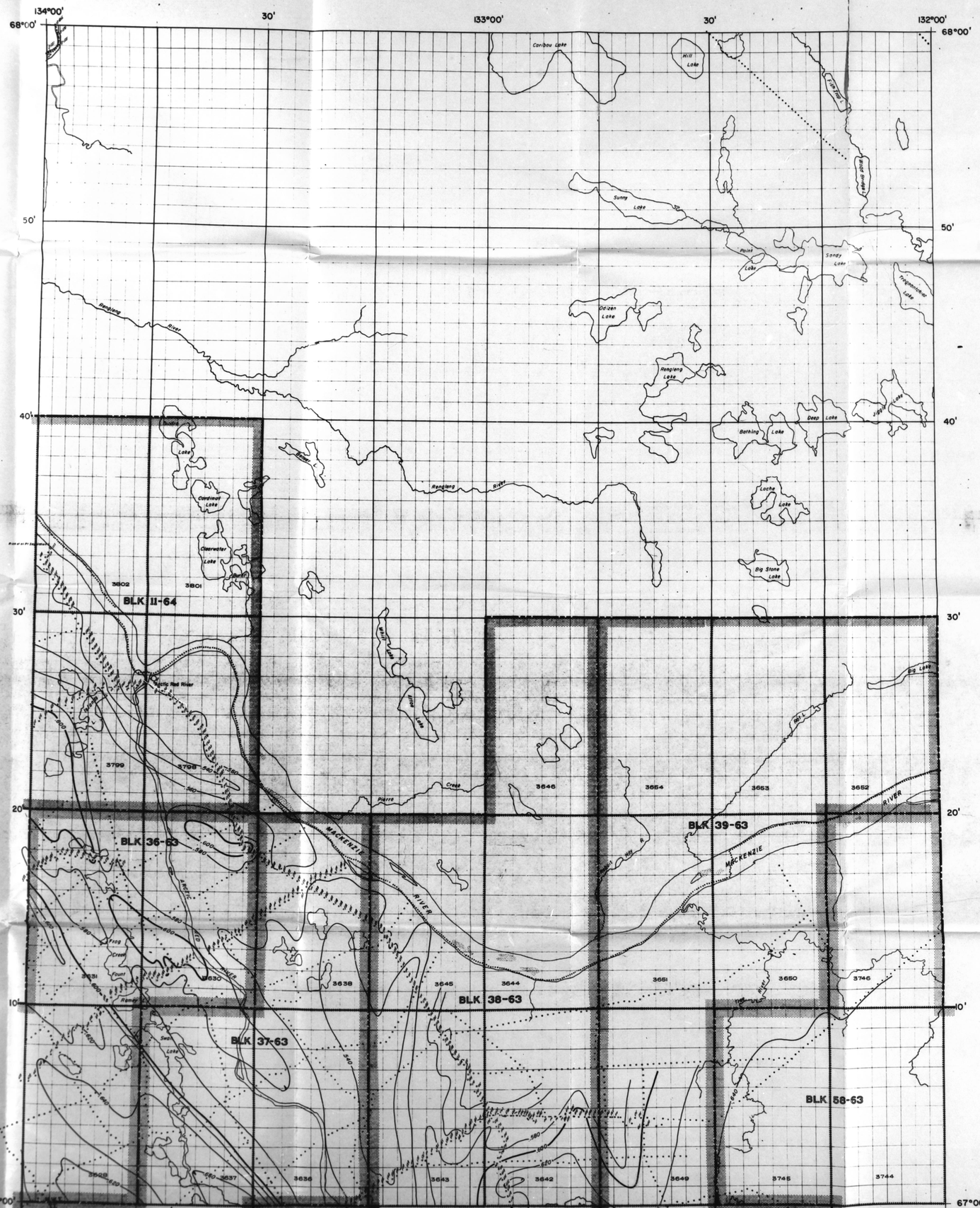
# 106 K MARTIN HOUSE

2 MILES TO 1 INCH

5234

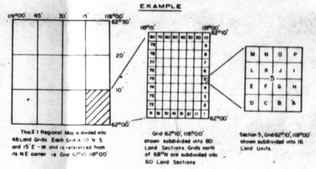
106 N ARCTIC RED RIVER 21 ISOCHRON BEAR ROCK—CAMBRIAN SHALE

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DISTRICT

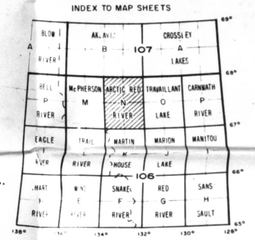



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS



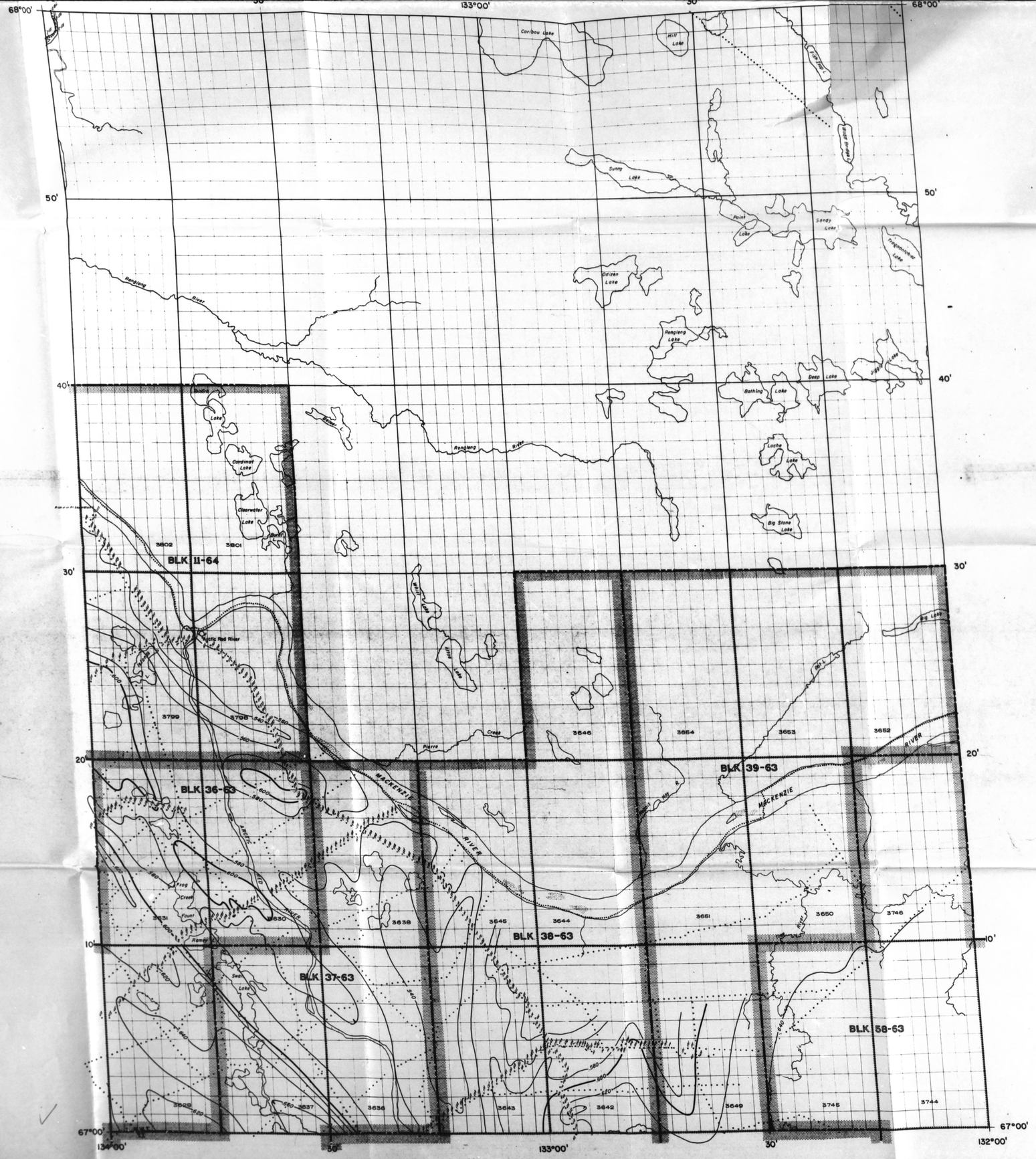

107

SEISMOGRAPH MAP
ISOCHRON
BEAR ROCK - CAMBRIAN SHALE

Contour Interval 0.00 SECS.
Datum: Plane _____ Velocity _____

REVISED JULY 8, 1968

CONFIDENTIAL

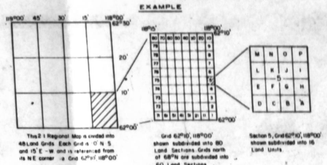



## N.W.T. LAND REFERENCING SYSTEM

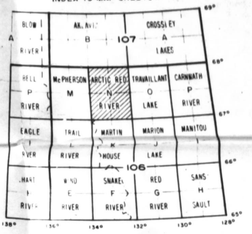
AS APPLIED TO

TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS




SEISMOGRAPH MAP

ISOCHRON

BEAR ROCK - CAMBRIAN SHALE

Contour Interval 020 Secs

Datums: Plane _____ Velocity _____

REVISED July 9, 1968

2 of 2

CONFIDENTIAL

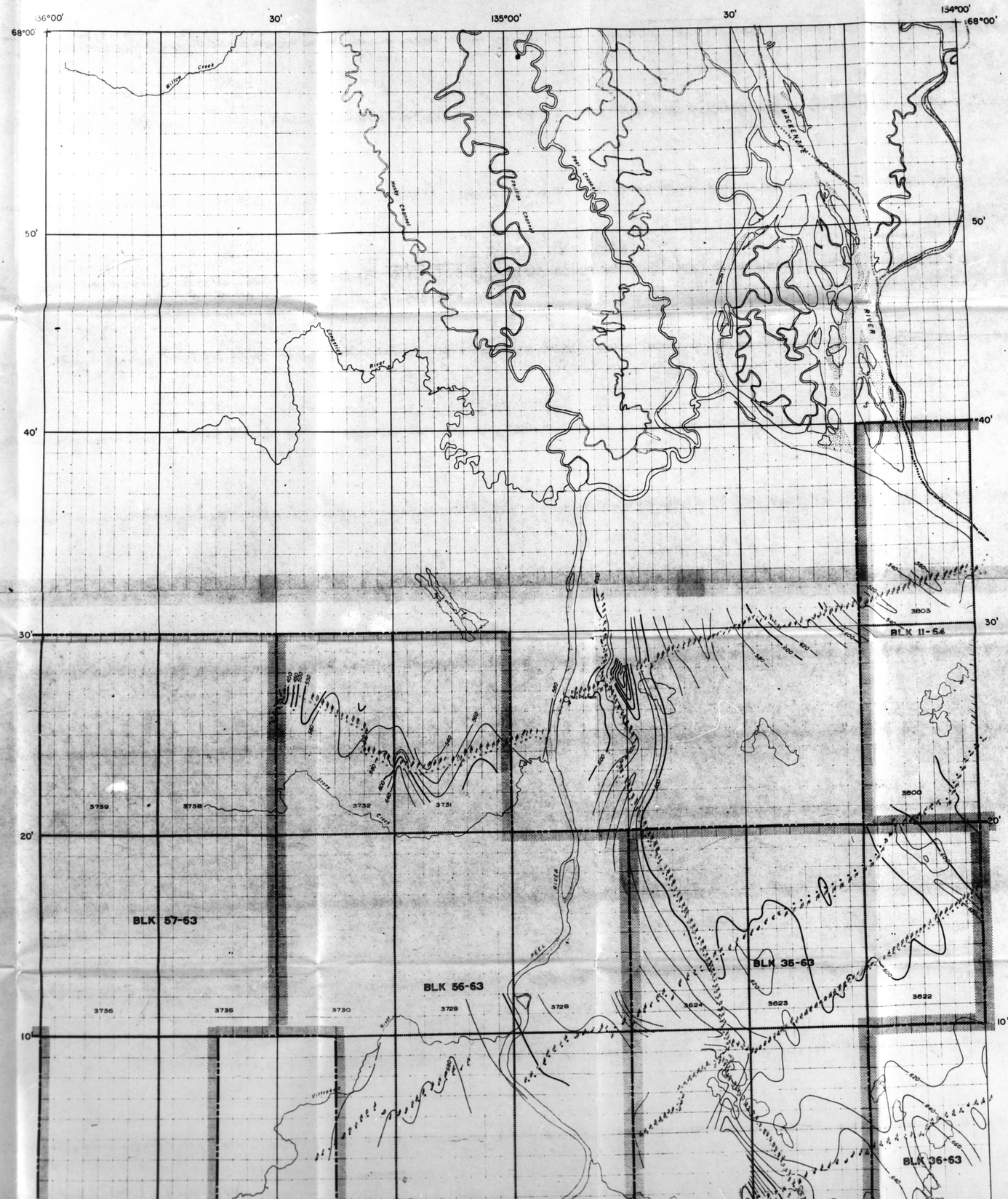
# 106 N ARCTIC RED RIVER

2 MILES TO 1 INCH

5898 | 5240

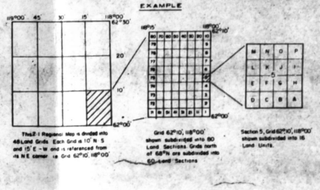
2" FT McPHERSON SES BEAR ROCK TO ∈ SHALE

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

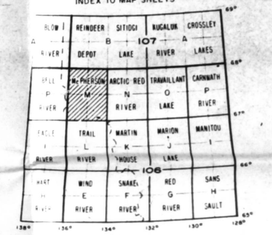



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS



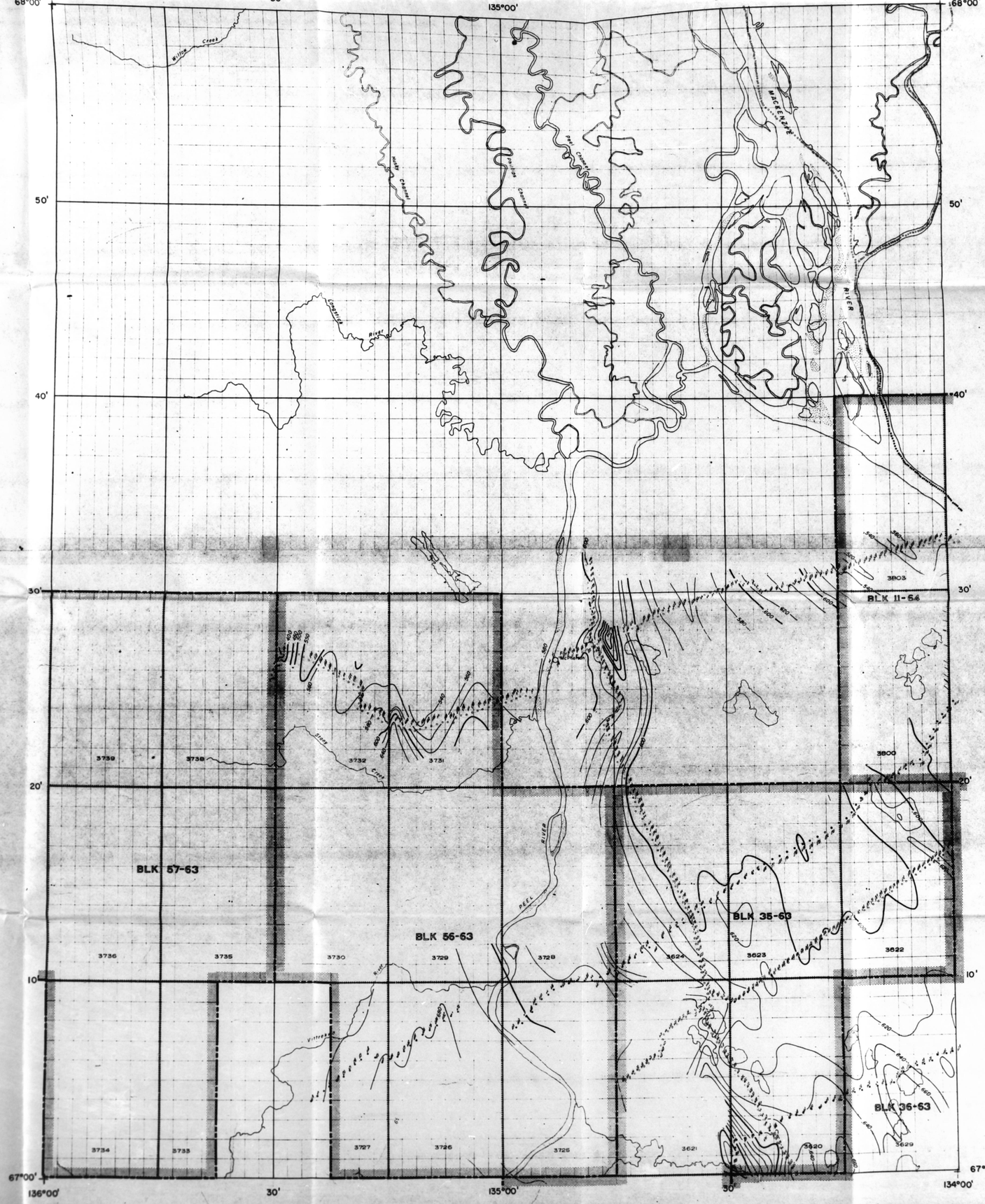

107

SEISMOGRAPH MAP
ISOCHRON
BEAR ROCK TO CAMBRIAN SHALE

Contour Interval ....02th SECS.....
Datums: Plane ..... Velocity .....

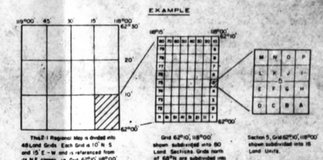
REVISED ....JULY 6, 1965....

CONFIDENTIAL

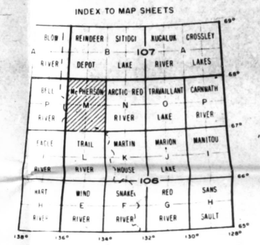



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS




SEISMOGRAPH MAP
ISOCHRON
BEAR ROCK TO CAMBRIAN SHALE

Contour Interval .....0.20 SECS.....
Datums: Plane ..... Velocity .....

REVISED .....JULY 2, 1965.....

CONFIDENTIAL

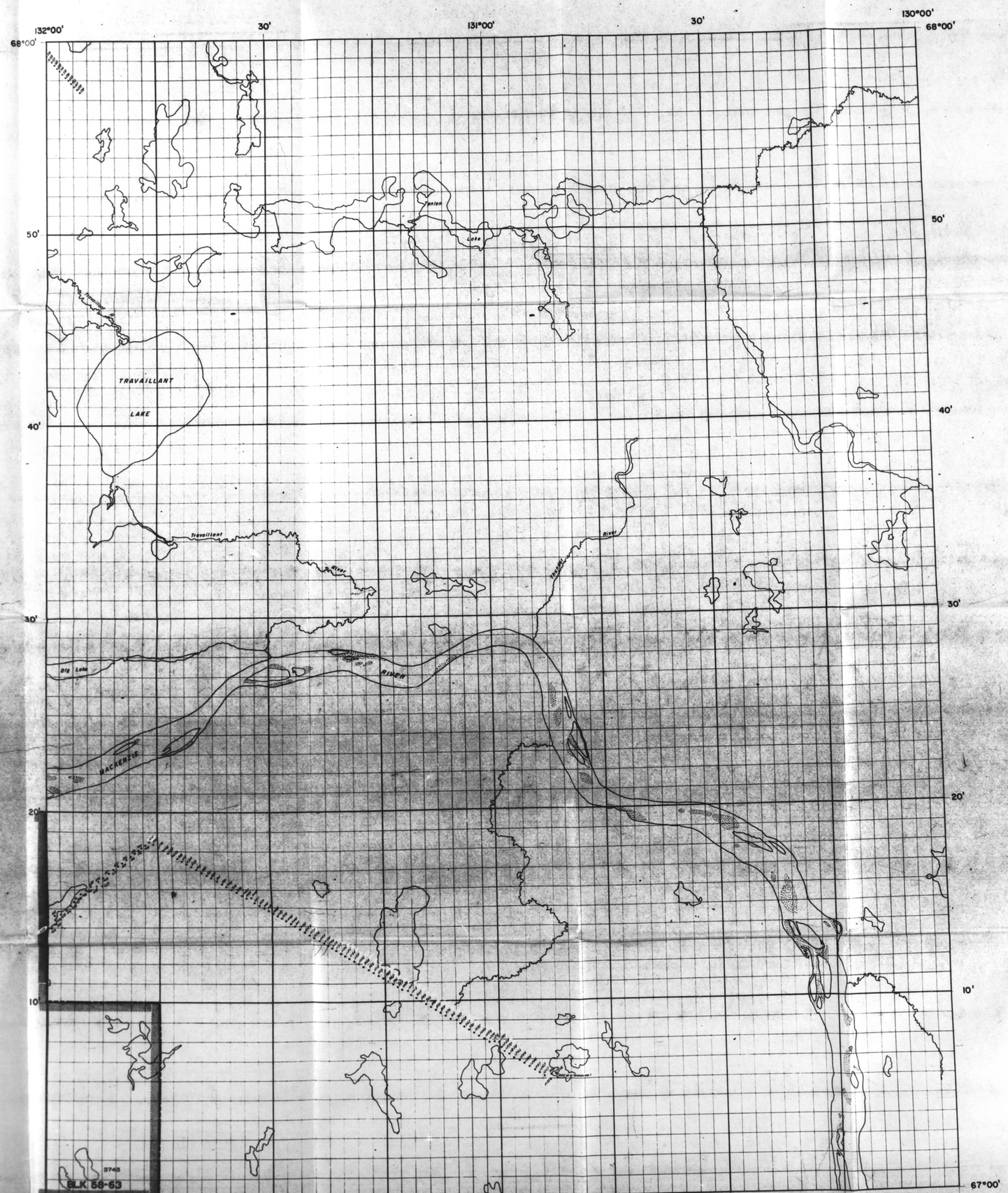
1 of 2

106 M FORT McPHERSON

2 MILES TO 1 INCH

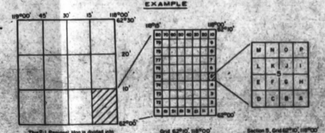
| | | |
|---|---|---|
| 5465 | 5455 | 14963 |

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DISTRICT




N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE

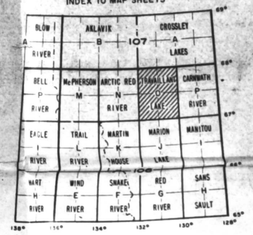



The 2.5 Degree Map is divided into 48 Land Units. Each Unit is 10' N-S and 15' E-W and is referenced from its N.E. corner, ie Grid 62°00', 118°00'

Grid 62°00', 118°00' shown subdivided into 60 Land Sections. Each Unit of 48°N are subdivided into 60 Land Sections.

Section B, Grid 62°00', 118°00' shown subdivided into 36 Land Units.

INDEX TO MAP SHEETS

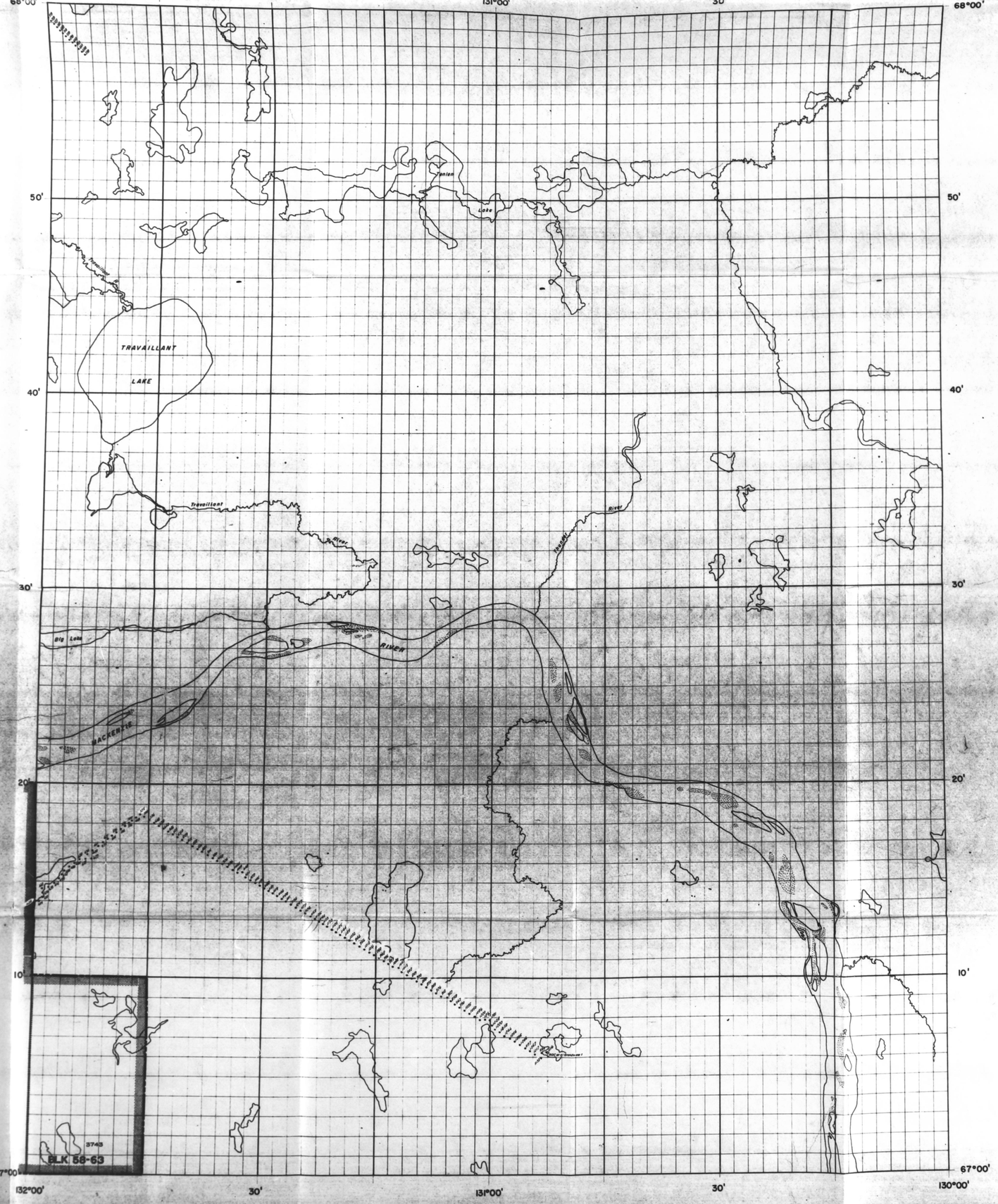



SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS

Contour Interval _____
Datums: Plane _____ Velocity _____

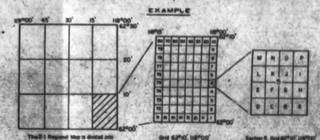
REVISED JULY 6, 1965

107

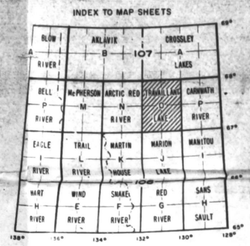



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS




SEISMOGRAPH MAP

SEISMIC STATION LOCATIONS
& ELEVATIONS

Contour Interval _____

Datums: Plane _____ Velocity _____

REVISED JULY 6, 1965

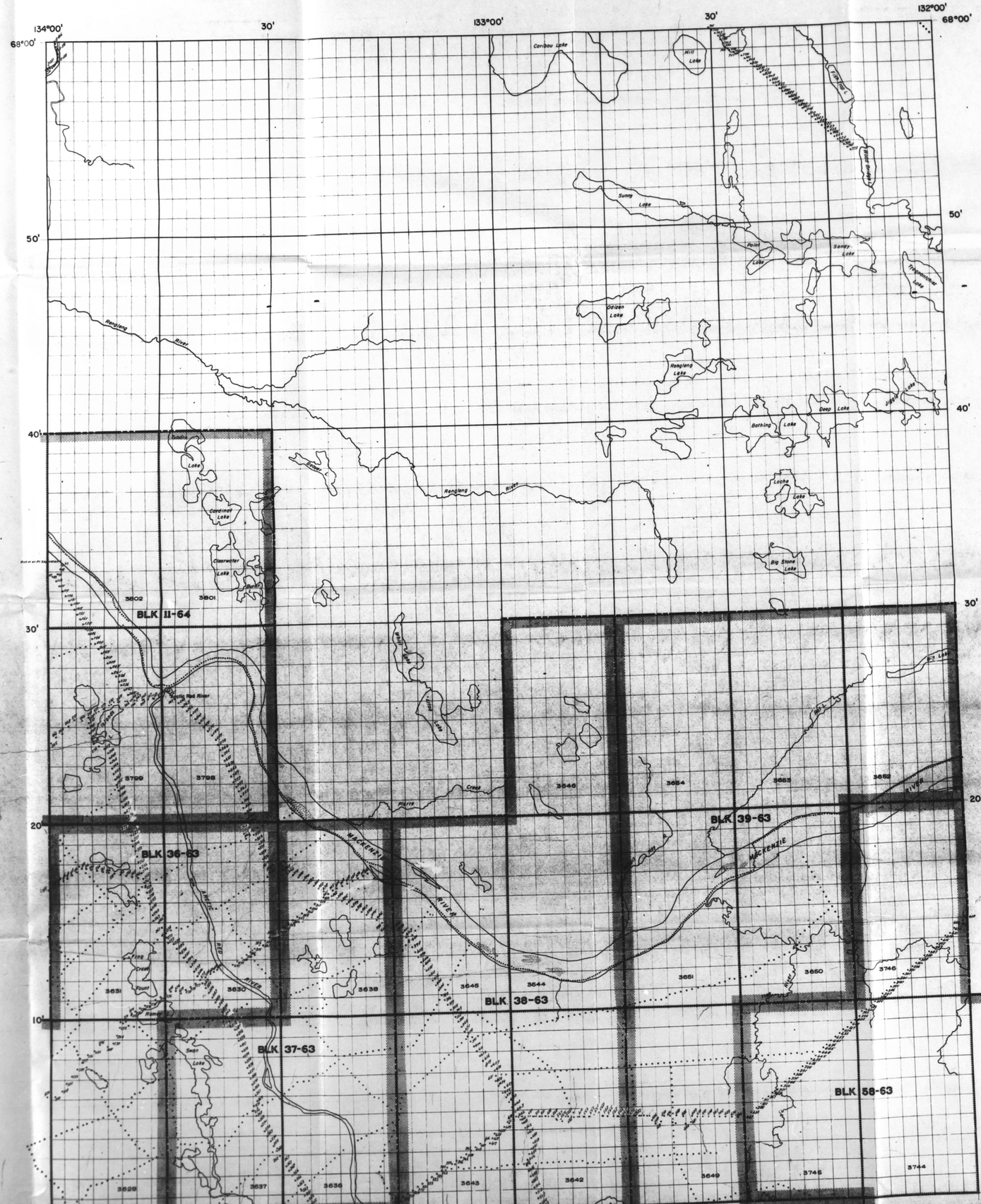
1060 TRAVAILLANT LAKE

2 MILES TO 1 INCH

2 of 2

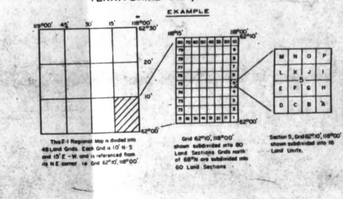
5242

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DISTRICT

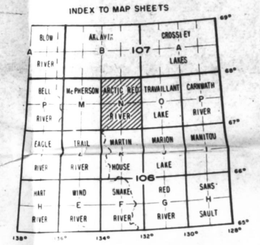



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS

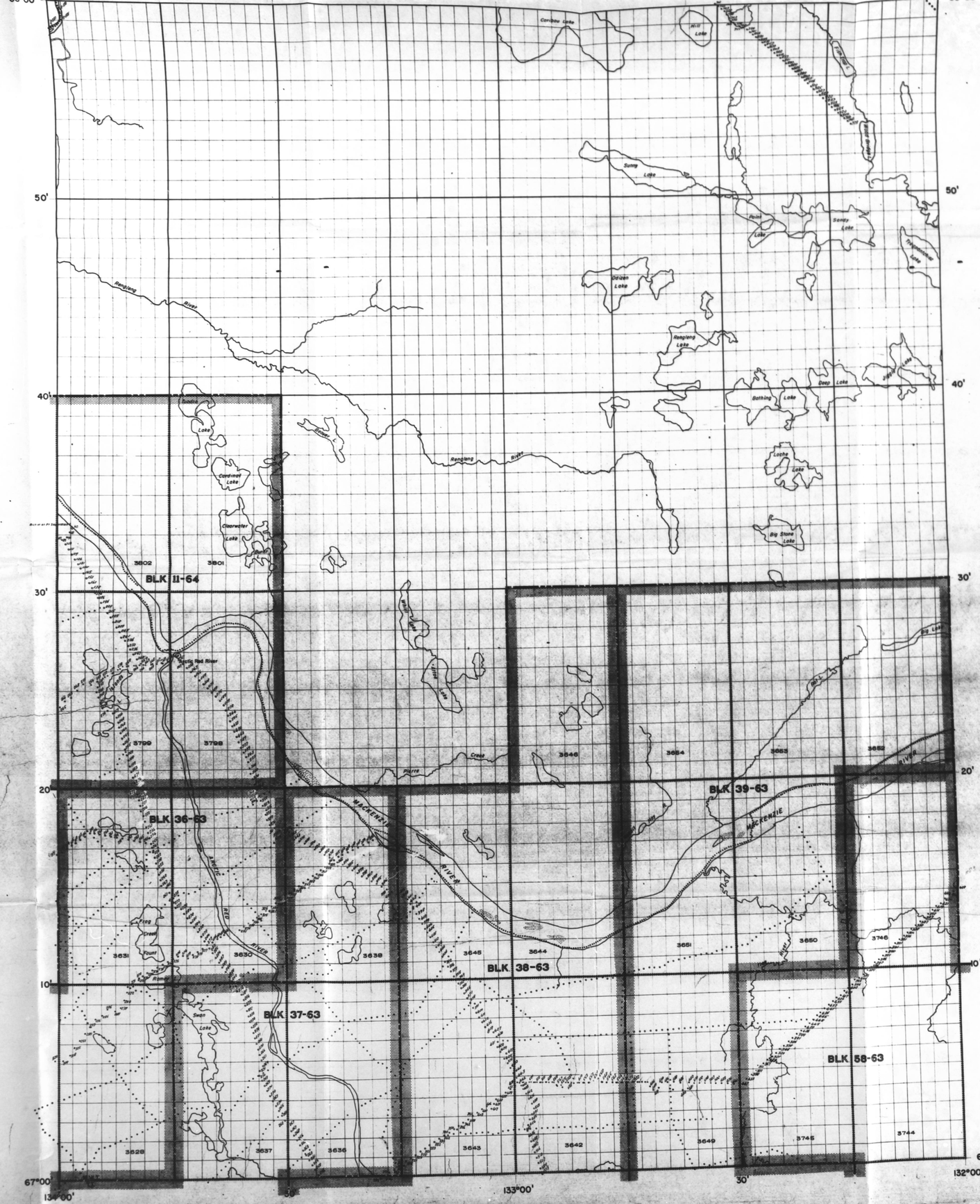



107

SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS

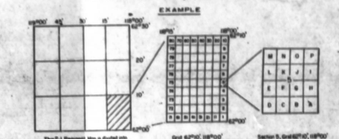
Contour Interval _____ Velocity _____
Datum: Plane _____

REVISED JULY 6, 1965

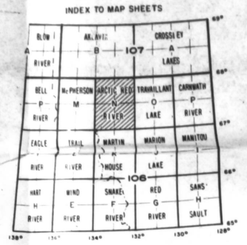



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE



INDEX TO MAP SHEETS



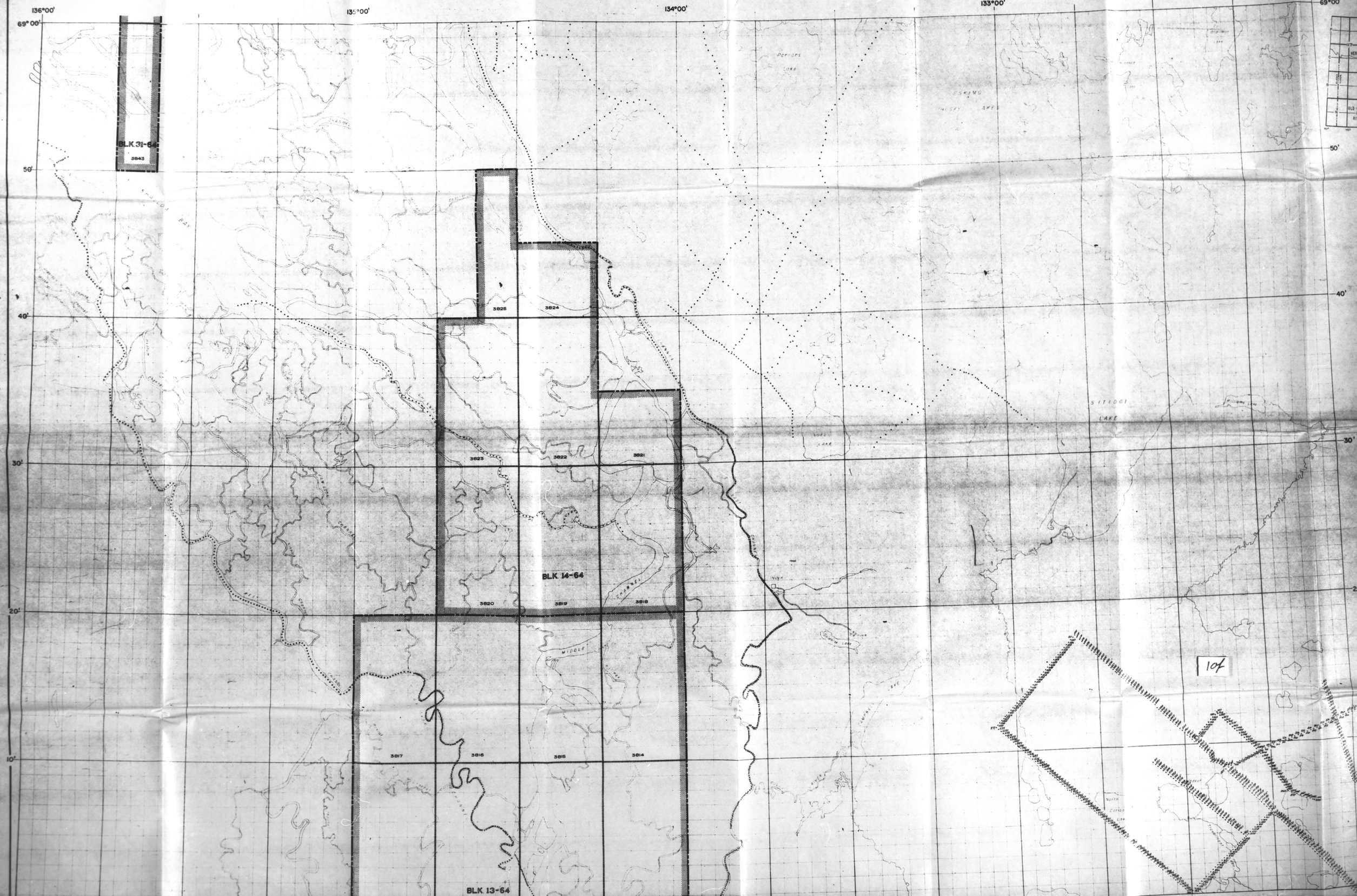

SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS

Contour Interval _____
Datum: Plane _____ Velocity _____
REVISED JULY 6, 1965

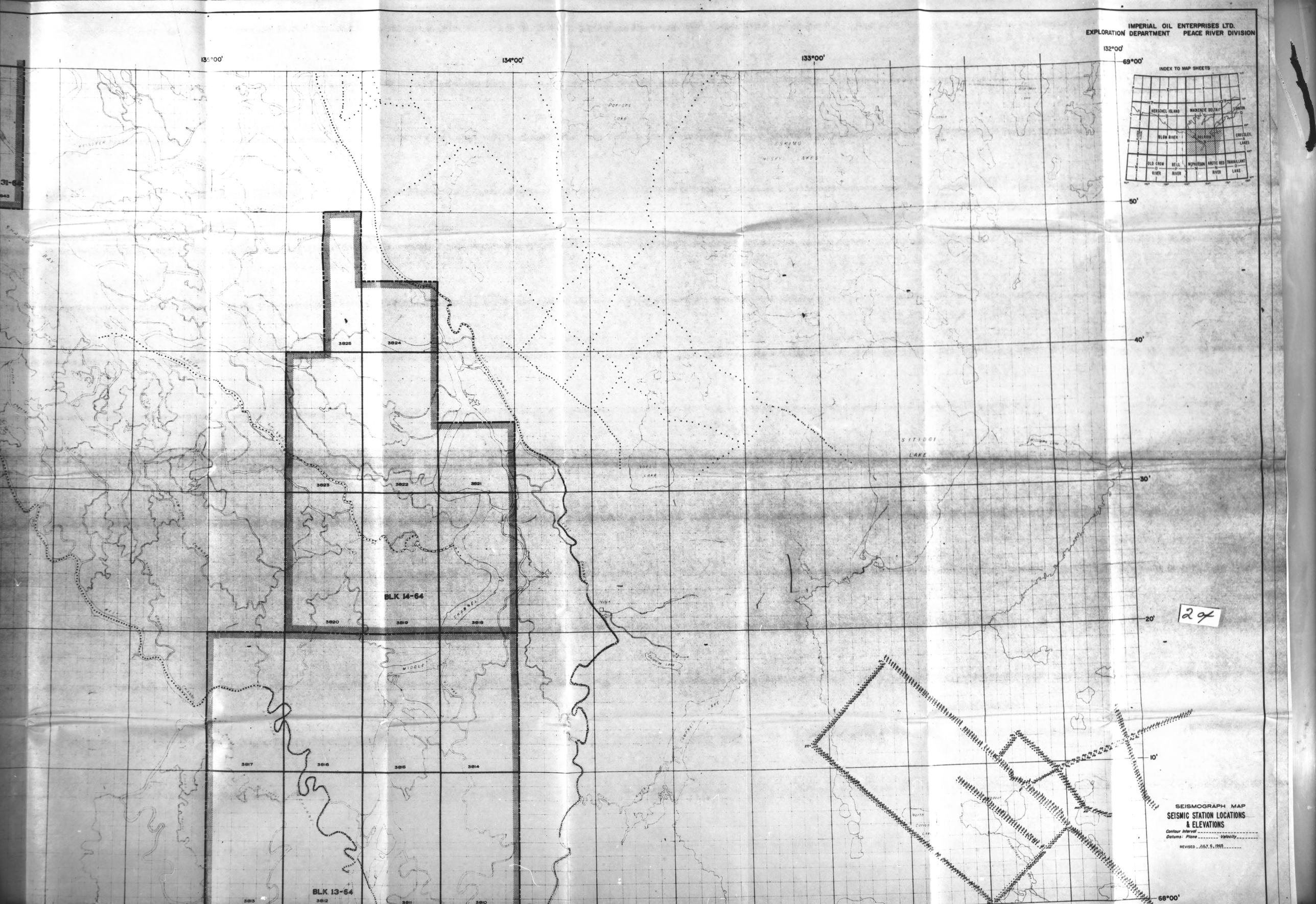
2 of 2

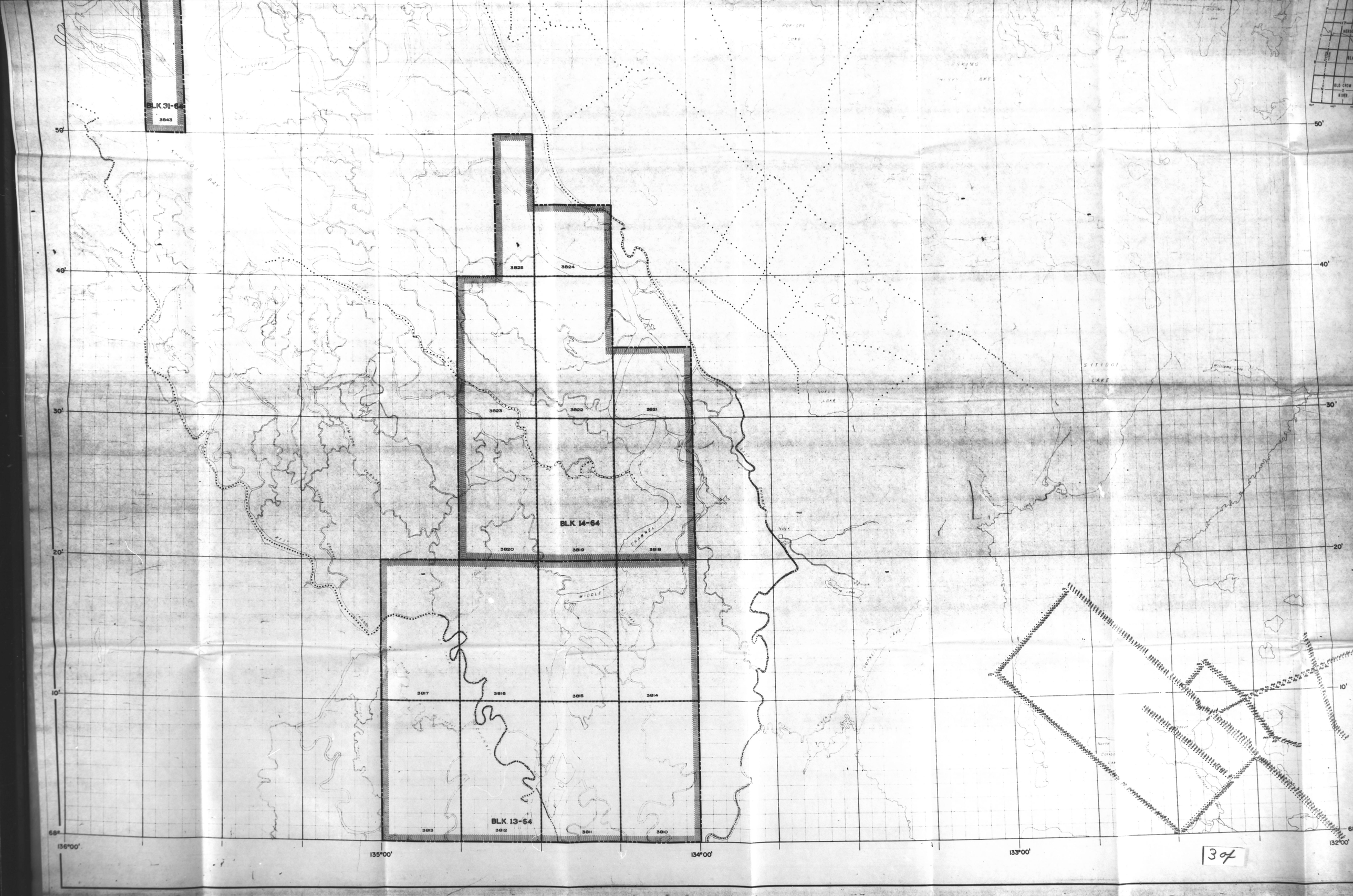
106 N ARCTIC RED RIVER
2 MILES TO 1 INCH

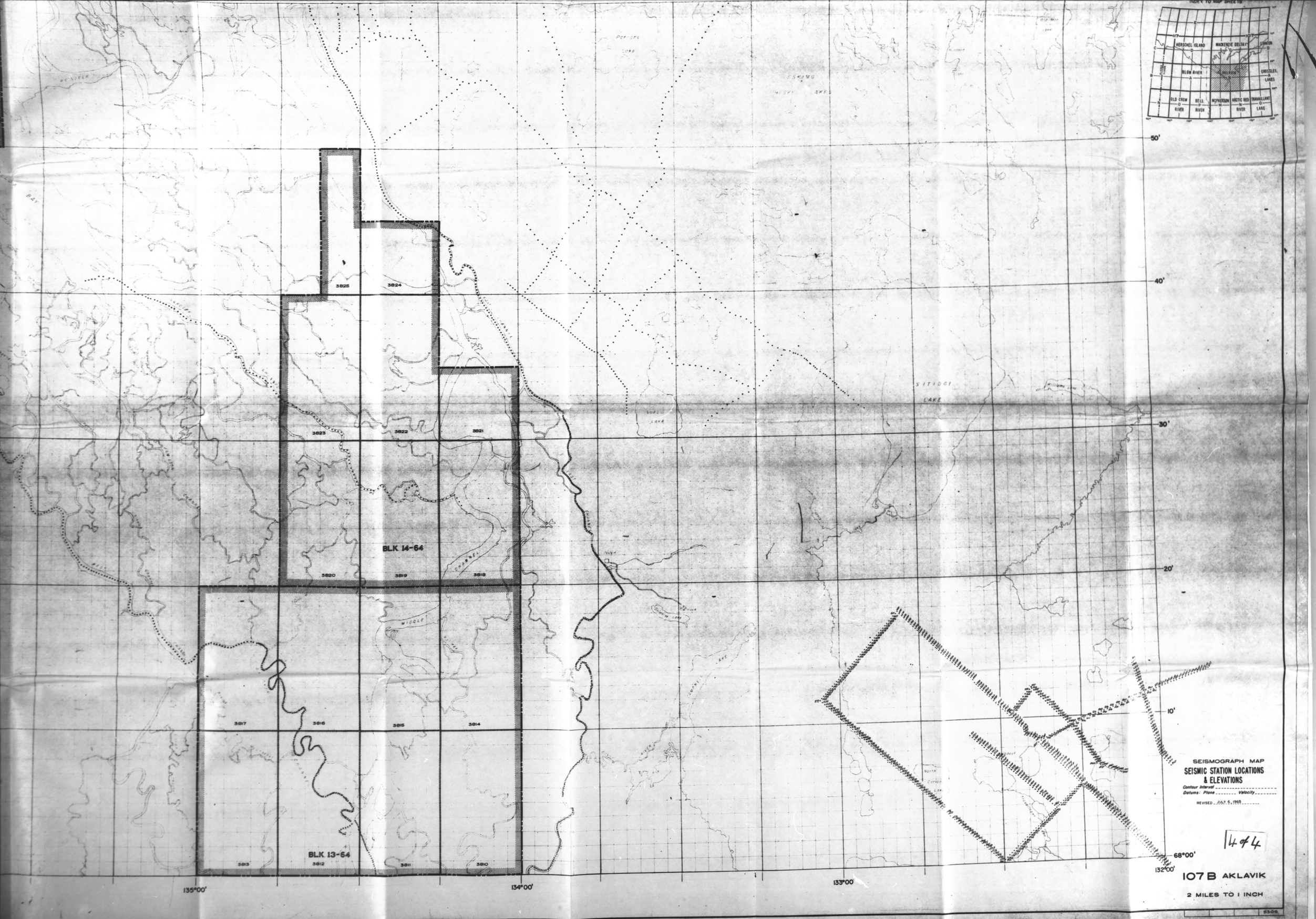
5240


IMPERIAL
EXPLORATION DEPARTM
136°00'
135°00'
134°00'
133°00'
132°00'
69°00'
50'
40'
30'
20'
10'
BLK. 31-64
3843
3825
3824
3823
3822
3821
BLK. 14-64
3820
3819
3818
3817
3816
3815
3814
BLK. 13-64
Perrons
Lake
ESKIMO
LAKE
SITIDGI
LAKE
MIDDLE
CHANNEL
NUYK
107

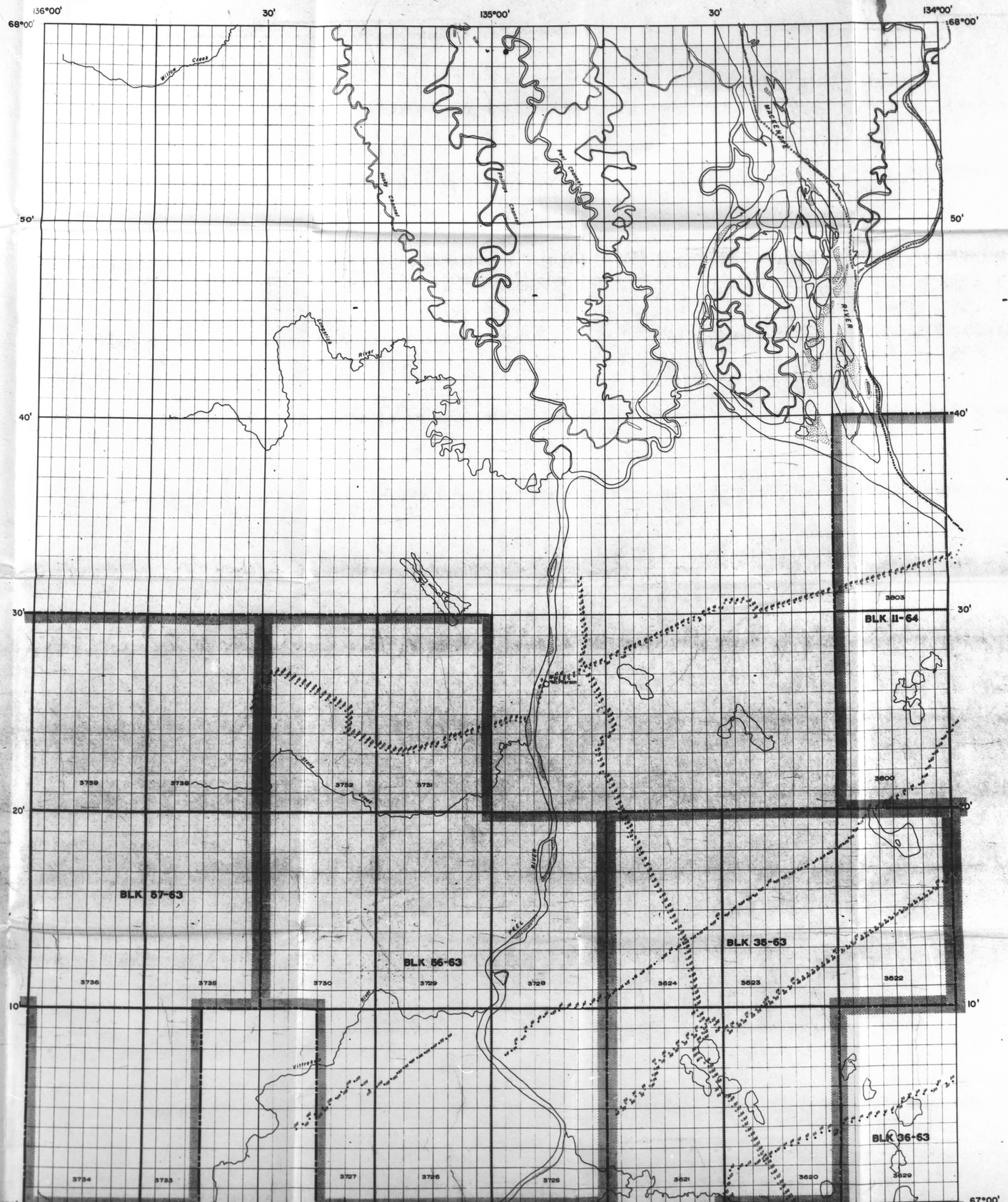
IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION




BLK. 31-64
3843
BLK. 14-64
3825
3824
3823
3822
3821
3820
3819
3818
BLK. 13-64
3817
3816
3815
3814
3813
3812
3811
3810
CHANNEL
MIDDLE
SITEDGI
LAKE
50'
40'
30'
20'
10'
68°
136°00'
135°00'
134°00'
133°00'
132°00'
3 of

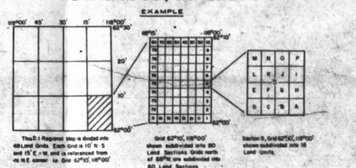

INDEX TO MAP SHEETS
HERSCHEL ISLAND
MACKENZIE DELTA
BLOW RIVER
CROSSLEY LAKES
OLD CROW RIVER
BELL RIVER
McPHERSON
ARCTIC RED RIVER
TRAVAILLANT LAKE
PORTER
ESKIMO
LAKES
SITIDGI
LAKE
BLK. 14-64
BLK. 13-64
3825
3824
3823
3822
3821
3820
3819
3818
3817
3816
3815
3814
3813
3812
3811
3810
50'
40'
30'
20'
10'
68°00'
135°00'
134°00'
133°00'
132°00'
SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS
Contour Interval
Datums: Plane Velocity
REVISED JULY 6, 1965
4 of 4
107 B AKLAVIK
2 MILES TO 1 INCH

IMPERIAL OIL ENTERPRISES LTD.
EXPLORATION DEPARTMENT PEACE RIVER DIVISION

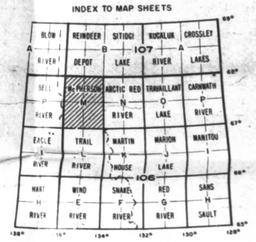



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS

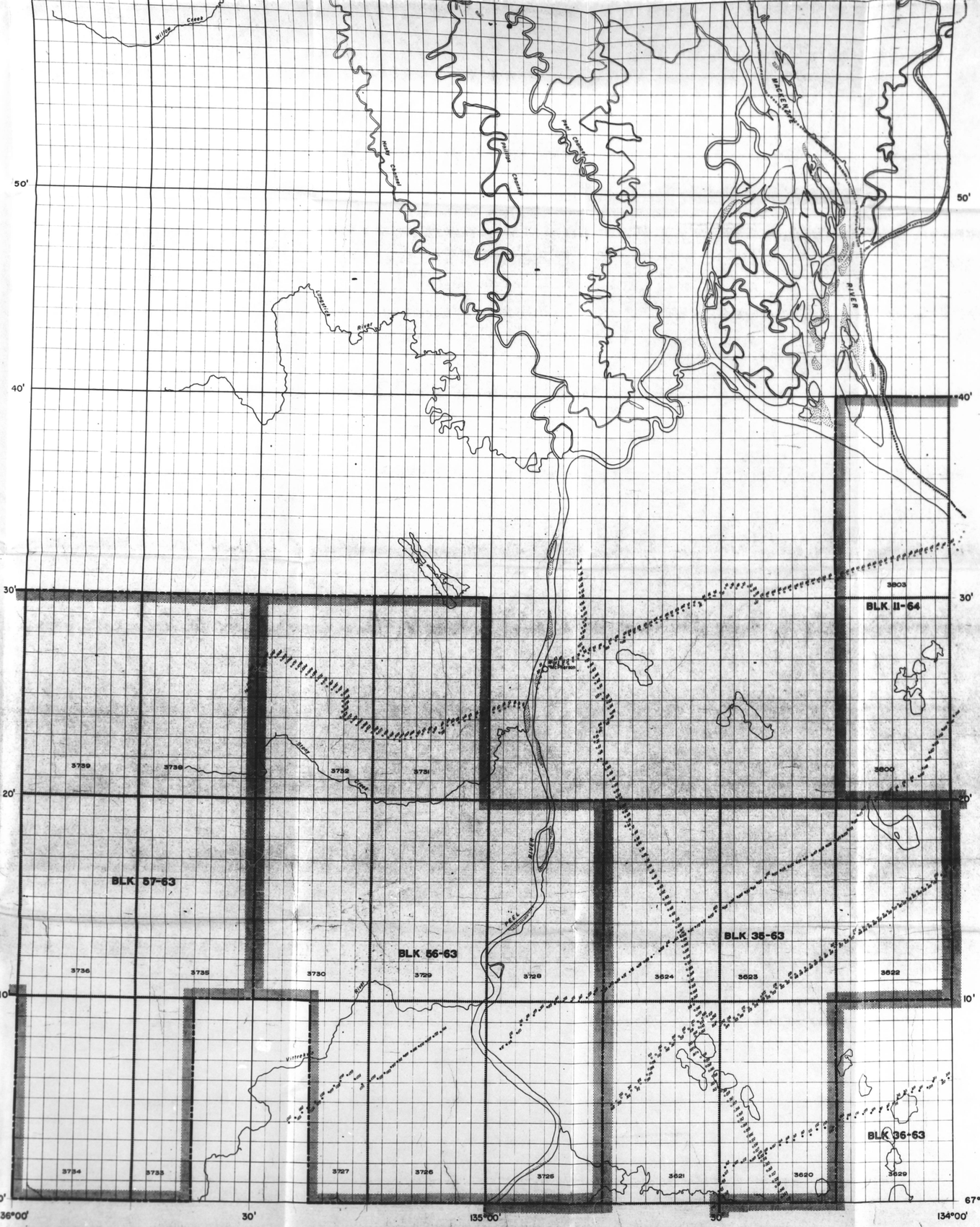



107

SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS

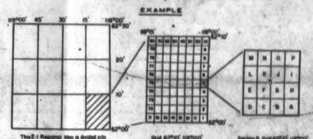
Contour Interval _____
Datums: Plane _____ Velocity _____

REVISED JULY 6, 1965

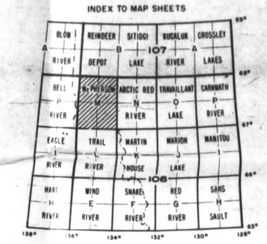



N.W.T. LAND REFERENCING SYSTEM
AS APPLIED TO
TERRITORIAL OIL & GAS REGULATIONS

EXAMPLE




INDEX TO MAP SHEETS




SEISMOGRAPH MAP
SEISMIC STATION LOCATIONS
& ELEVATIONS
Contour Interval _____
Datums: Plane _____ Velocity _____
REVISED JULY 6, 1965

1292

106 M FORT McPHERSON

2 MILES TO 1 INCH

14963

1-9-6-52

IMPERIAL OIL ENTERPRISES LTD.

GEOLOGICAL DEPARTMENT.

Report on: Reflection Seismic Program - Peel Plateau - N.W.T. Territorial Oil & Gas Work Bonus Blocks 32-63, 35-63, 36-63, 37-63, 38-63 & 39-63. For period November 18, 1963 to April 25, 1964.

Enclosures: Six Seismic Station Location and Elevation Maps
Five Bear Rock Formation Structure Maps
Five Bear Rock to Cambrian Shale Isochron Maps
One Bear Rock to Upper Cretaceous-Tertiary Structure Map.

By: J. C. Underhill.

Date: July 30, 1965.

Map References:

106 K Martin House
106 L Trail River
106 M Fort McPherson
106 N Arctic Red River
106 O Travaillant Lake
107 B Aklavik

IMPERIAL OIL ENTERPRISES LTD.

PRODUCING DEPARTMENT - WESTERN REGION.

# REFLECTION SEISMIC OPERATIONS - PEEL PLATEAU AREA.

N.W.T. Work Bonus Blocks 32-63, 35-63, 36-63, 37-63, 38-63 and 39-63.

N.W.T. Permits 3594-3601, 3618-3624, 3625-3631, 3632-3638, 3639-3646 and 3647-3654.

November 1963 - April 1964.

By

J. C. Underhill

July 30, 1965.

PEACE RIVER EXPLORATION DIVISION

DAWSON CREEK, BRITISH COLUMBIA.

## CONTENTS.

## SUMMARY.

Report on reflection seismograph operations conducted by Geophysical Service Incorporated Party No. 26 on behalf of Imperial Oil Enterprises Ltd. in the Peel Plateau Area from November 18, 1963 to April 25, 1964. Submitted in support of application for credit. See Affidavit of Work by. H. W. Johnson dated April 15, 1965.

## INTRODUCTION.

Due to winter inaccessibility of the area a program of stockpiling fuel and supplies was carried out during the summer of 1963 via the Mackenzie River. Cat crews moved into the area in November 1963 while the seismic crews were assembled and moved into the area in December. The crews were serviced by company-owned DC-3 and Otter aircraft. Equipment, in addition to a standard reflection seismic operation, consisted of three cats with bulldozers.

## REFLECTION SEISMIC OPERATIONS.

Three company survey personnel left Calgary on the I.O.L. DC-3 and arrived at the initial work site on November 18, 1963. The three men loaded 100 propane bottles onto the trailers, cleaned out the frozen stove lines and performed necessary repairs. Supplies were unloaded from the vehicles and placed in storage trailers. The caterpillar contractor, a cook and four cat operators arrived also on November 18, 1963. They commenced snow plowing roads around the camp and cutting a suitable crossing over a deep coulee some eight miles from camp. Some five men, an instrument engineer, a junior observor, a driller, a shooter and a mechanic left Edmonton on a commercial P.W.A. flight and arrived on November 24th. The cats meanwhile commenced stockpiling fuel at the working area.

During the period November 23rd to November 30th, the Party Chief, three staff camp personnel and two cat operators arrived on the I.O.L. DC-3 flight from Fort Nelson and continued to the campsite on November 25th, 1963.

.....2/

Various members of the crew worked on the following: mounting the instruments and recorder in the dog house, preparing and winterizing the vehicles and equipment for operation as well as moving about three hundred barrels of fuel to higher ground. The dynamite was stockpiled at the edge of the airport and supplies were loaded in and on the end of the trailers. Two cats continued to cut line to the edge of the prospect, a distance of some fifty miles, and completed the job by November 29, 1963. The road surface was very rough and had to be dragged many times before equipment could cross. Several areas of soft muskeg gave the cat crew considerable trouble. Weather during the period was very cold with temperatures ranging from thirty to forty-five below zero with fairly high winds.

From December 1st to December 7th, the first three days were spent moving camp. The camp had been assembled in strings and after picking up supplies and personnel from the incoming DC-3 flight, the camp commenced the move to the initial work area on December 1, 1963. The steep coulee previously mentioned caused some trouble as the cats had to double up to get equipment across. On December 2, 1963, the camp moved some twenty-eight miles by travelling from 0730 to 2300 hours. Cats also had to double up on hills because of the heavily loaded trailers. The camp arrived at its destination about 1800 hours on December 3, 1963. The approximate location was Latitude 67°05' North and Longitude 133°00'West. On December 4th, experimental shooting was commenced to determine methods to obtain the best possible results including various spreads, filters and geophones.

During the period December 8th to 14th, the experimental shooting

.....2/

was completed and a three hundred foot uphole survey was taken. The first line commenced with a three hundred foot spread using sixteen geophones per trace on the Arctic Red River map. The record quality was fair to poor, with some good quality records being obtained. The main factors hindering production were the very short daylight period, as the sun did not break above the horizon and the pigtails on the geophone strings snapped often in the intense cold. Hard shale and sandstone drilling was encountered on the west half of the line. Other formations were clay and sandstone, clay, gravel and sandstone, muskeg and perma-frost. Two ravines were encountered on the line leading to Arctic Red River. The cats were called back about two miles south of the ravine and given a deflection angle to miss the ravines,and then the line was directed to Arctic Red River. Estimated cutting time of the line was five days. The road was extremely rough with a maximum five mile per hour driving speed. Vertical surveys were based on old work while horizontal control was corrected to the lakes from air photos.

Work continued in the Arctic Red River area from December 15th to the 21st with the east-west line from 67°05' North, 132°45' West to 67°05' North and 133°15' West being completed. Recording began on December 18th on a line northwest to the town of Arctic Red River approximately forty miles northwest. Record quality was fair to good with the river noise giving continuous interference. Shooting was restricted to near daylight hours.

.....2/

The cats reached the town of Arctic Red River on December 19, 1963. The fuel dump there was on the east bank of the river and had to be moved across the river when the crew passed through. The camp also was moved to about twenty miles south of the town. Several day's shooting within the period comprised eight geophones per trace with a 150 foot spread. Evaluation and interpretation of these records indicated that sixteen geophones over a three hundred foot spread was equally satisfactory, and the crew returned to this method. It was found that an extra surveyor could be used effectively as the one and one-half hours of daylight available to the surveyors was not sufficient to keep up with the shooting crew. An extra man during the deep winter months allowed both a chaining and elevation team to operate simultaneously.

During the period December 22nd to 28th, good production was obtained with record quality being fair to good. Strong continuous surface noise was prevalent but the crew managed to dampen this with filters. The weather was good with temperatures ranging from minus thirty to minus five degrees. There were no winds or snow to hamper operations. The lines were extremely rough over gently rolling terrain interspersed with lakes. Drilling was good except when encountering hard sandstones.

The camp was moved to six miles southeast of Arctic Red River on December 30th. Cats continued to keep ahead of the seismic crew by use of double shifts. Weather continued relatively mild during the December 29th to January 4th period. Several equipment breakdowns caused some interruptions, especially the light plant and one of the drills.

.....2/

On January 5th the camp was moved to approximately fifteen miles west-south-west of the Point Separation wellsite as located on the Fort McPherson map. Record quality continued to be mostly fair with strong surface reflections giving trouble. Good weather with no snow or high winds was enjoyed by the crew. Roads continued to be very rough and the terrain changed from gently rolling to small valleys. Drilling was good with mostly hard shales and some gravel being the only problems. Program consisted of a line west-south-west from the Point Separation well.

During the period January 12th to 18th, the crew worked south of Fort McPherson on the west bank of the Peel River in the general region of 67° 32' North and 134° 00' West. Record quality was good with satisfactory shallow data. Little difference was found between single and three hole patterns at the same depth. Shallow shots exhibited ground roll which became more severe with decreasing depth. The weather was clear and cold with temperature down to fifty below zero. A fuel shortage caused the crew to lose one cat which had to make a long trip to Arctic Red River for fuel supplies and precipitated the camp move of January 16th. The line was scouted west of Fort McPherson by air on January 16th. The cats were advised to swing well north of their proposed strike to avoid a deep canyon in the area. Some crew delay was due to the Peel River crossing as not one truck, including the four wheel drive shooting unit, could make the hill from the river to the west side of the Peel. All vehicles had to be towed by the cats. It was decided to leave part of the camp at Fort McPherson, including supplies and interpreters. The balance would continue west with the shooting crew. Upon completion of the west line, the shooting

.... 2/

crew camp was to return to Fort McPherson and continue the program southward.

From January 19th to the 25th the crew worked in the area of 67° 25' North and 134° 55' West. The record quality was good to poor with the best records being obtained west of the Peel River. The roads were extremely rough with elevation changes of 350 feet between shotpoints. On January 25th, the terrain forced the crew to return to Fort McPherson after completing some twenty-one miles of line west of the Peel River. Drilling was good, but the drills became often stuck between shotpoints. Camp moves on January 19th, 21st, 24th and 25th cut production somewhat. The light plant continued to give trouble.

Work continued in the Fort McPherson area from January 26th to February 1st and by the end of the period were approximately twelve miles south by fifteen degrees east of Fort McPherson and heading due south. The weather was very cold with temperatures varying from more than minus fifty degrees to high of minus thirty-five degrees below zero. Record quality was fair to good. The terrain was hilly and extremely rough with all equipment becoming stuck in dirt fills. The crew experimented in spraying water on selected fills to see if they could be made more solid. The area south and west of Fort McPherson is above the tree line and each small creek has steeply cut banks. Without trees the vehicles had nothing to winch to. Cats were required to move the drills between locations. The cats, therefore, were only just ahead of the crew shooting line.

On February 8th the camp was at Longitude 134° 30' West and Latitude 67° 06' North, approximately twenty-six miles southeast of Fort McPherson and was proceeding south by twenty-six degrees east. The record quality for this area improved with strong deep reflections becoming evident. Weather was quite mild with highs of zero degrees recorded. The area was hilly but the roads were not quite as rough. During the period of February 4th to 6th, an experimental program was conducted in the vicinity of 67° 20' North and 134° 45' West. An uphole survey was taken from a depth of 150 feet, a noise analysis was run over varying distances and intervals with an expanded spread over a 1.85 mile distance being shot using three hole inline patterns and seven hole perpendicular patterns. Program results indicated that the most effective shot hole depth was between twenty and sixty-feet - such depth to be determined by drilling problems encountered. Also indicated was a single, strong noise wave of relatively high velocity moving horizontally down the spread and a very high near surface reflection velocity.

On February 10th the camp was moved to 66° 47' North and 134° 15' West or approximately forty-six miles south by southeast of Fort McPherson. The weather was very cold with high winds bringing the wind chill factor to about seventy below zero. The country was mostly flat with many lakes and gulleys. The roads improved but still remained rough. The program was conducted on the Trail River map along the south by southeast line from Fort McPherson. The crew then turned east by Northeast on the line which passed Martin House and across the Arctic Red River.

.....2/

On February 8th the camp was at Longitude 134° 30' West and Latitude 67° 06' North, approximately twenty-six miles southeast of Fort McPherson and was proceeding south by twenty-six degrees east. The record quality for this area improved with strong deep reflections becoming evident. Weather was quite mild with highs of zero degrees recorded. The area was hilly but the roads were not quite as rough. During the period of February 4th to 6th, an experimental program was conducted in the vicinity of 67° 20' North and 134° 45' West. An uphole survey was taken from a depth of 150 feet, a noise analysis was run over varying distances and intervals with an expanded spread over a 1.85 mile distance being shot using three hole inline patterns and seven hole perpendicular patterns. Program results indicated that the most effective shot hole depth was between twenty and sixty-feet - such depth to be determined by drilling problems encountered. Also indicated was a single, strong noise wave of relatively high velocity moving horizontally down the spread and a very high near surface reflection velocity.

On February 10th the camp was moved to 66° 47' North and 134° 15' West or approximately forty-six miles south by southeast of Fort McPherson. The weather was very cold with high winds bringing the wind chill factor to about seventy below zero. The country was mostly flat with many lakes and gulleys. The roads improved but still remained rough. The program was conducted on the Trail River map along the south by southeast line from Fort McPherson. The crew then turned east by Northeast on the line which passed Martin House and across the Arctic Red River.

.....2/

On February 22nd the crew was located at 66° 50' North and 133° 25' West - approximately forty-eight miles south by fifteen degrees east from the town of Arctic Red River and five miles due west of Arctic Red River proper. The weather continued very cold. Crew changes were effected during the interval. The terrain was flat with many lakes. A fuel shortage had initiated reduction of hole patterns. Some experimental shooting was done approximately seven miles due east of Martin House. It was discovered from support aircraft that the proposed tie line to the Ontaratue wellsite could go over some twenty miles of old seismic lines and a prepared river crossing. The fuel shortage was remedied by having P.W.A. transport 10,000 pounds of diesel fuel to the Ontaratue airstrip.

By February 29th the crew had reached 132° 50' West and 66° 54' North or about forty-six miles south by thirty degrees east of Arctic Red River and fourteen miles south of the tie with the first program line. Weather was mild but cloudy causing poor flying weather every day except February 27th. Terrain was flat except crossing the Arctic Red River. All equipment had either to be pulled or winched part of the quarter mile climb up the east bank of the river. The program continued to use inline patterns and cut line as fast as possible to reach the first program line before fuel became critical. As soon as a tie was made fuel sloops were dispatched to the Arctic Red River fuel dump. It was noted that as the program moved southward and the weather became mild the radio communication link with Dawson Creek improved. However, difficulties with air support caused critical situations with fuel and powder.

...../

During the period March 1st to 7th, the camp was located at 66° 43' North and 132° 45' West or approximately fifty-seven miles southeast of Arctic Red River town. Record quality varied considerably due to clay deposits. Nights were very cold with temperatures of minus forty-five degrees and highwinds. Days were mostly sunny and after 1000 hours mild. The country was flat with generally poor roads. Average driving speed was about five miles per hour. With new supplies of fuel the crew commenced seven hole patterns. An experimental program was conducted using an uphole survey and various spread patterns. It was found that strong surface noise continued to exist with three hole perpendicular patterns being the best choice.

From March 8th to 14th the crew worked toward the Ontaratue wellsite on the Martin House map in the general area of 66° 25' North and 132° 15' West. The weather turned very cold. Terrain improved as old seismic lines were followed as much as possible. As one of the drills broke down, double and treble shifts were used on the remaining drill.

Camp moves were required on March 17th, 19th and 20th as short lines completed certain of the projected coverage. Record quality was generally poor with excessive noise on all records. It was discovered that record quality improved west of Martin House. The country near the wellsite was flat but west of Martin House it became hilly and very rough. Three hole perpendicular patterns were shot over 3,600 foot coverage. All shot holes were fifty feet or more as shallow hole records were mostly poor.

....2/

On March 22nd the camp was moved to 66° 50' North and 133° 20' West and then to 66° 57' North and 133° 33' West on March 25th. Record quality degenerated especially when crossing many small, shallow lakes which created considerable low frequency noise. A gradual rise in elevation was noted along with drainage ravines fromlakes to the Arctic Red River.

By March 31st the crew was located at 67° 05' North and 133° 35' West or twenty-three miles southeast of Arctic Red River while working north to the Arctic Red River settlement. Record quality was fair to poor as the Bear Rock formation remained the only continuous reflector over the area. A distinct warming trend during daylight hours was noted except for one blizzard during the period. The country was flat with generally good roads and many intermittent lakes. The crew began shooting three hole perpendicular patterns using fifteen pound charges and split 1,800 foot spreads. The estimated date of program completion was thought to be about April 28th if continued production was maintained.

During the period April 5th to 11th, the crew reached within eleven miles south of Arctic Red River and continued north. Temperatures dropped during the period with lows of minus thirty-five degrees. The road from the campsite to Arctic Red River was extremely rough - being the worst encountered during the program. As one drill broke down and gravel was predominant, the remaining drill went on double shifts.

.....2/

At the end of the April 12th to 18th interval the camp was thirty miles south by forty-six degrees west of Arctic Red River. The crew shot two miles west of camp and headed southwest over cut lines to shoot a projected thirty mile line commencing at 67° 15' North and 133° 50' West. Thawing commenced between April 13th to 16th causing the crew to speed up operations as much as possible. Surface terrain in this area of Fort McPherson is hilly with small lakes and muskeg swamps. Roads ranged from poor to fair. Good drilling was encountered from April 15th onward as gravel was found to be well sorted and rounded along with cemented stringers.

The program was completed on April 24th after the crew had run a fill-in line. With the fair weather winds caused excessive wind noise on records. The terrain for the last period was hilly with lakes. Drilling encountered mostly clay and shale. On April 25th the crew shut down and serviced equipment. The crew was moved out by company-owned DC-3 aircraft while the camp and equipment was moved to the Arctic Red River townsite and stored for the summer.

During the above program, a total of 1,249 shots were taken at 1,123 shotpoint locations to obtain some 2,914 profiles. A total of 373 miles of seismic was shot during the 143 days of actual shooting operations.

Incorporated with the maps of this report are three seismic trades made with Texaco Exploration, Richfield Oil Corporation and Shell Oil Company. The Shell Oil trade involved some 274 shotpoint locations

....2/

or 128.4 miles of line on the Martin House, Trail River, Fort McPherson and Arctic Red River map sheets. The Richfield seismic trade involved some 212 shotpoint locations or some 65.2 miles of line on the Arctic Red River and Travaillant Lake map sheets. The Texaco seismic trade. entirely off-permit, involved some 534 shotpoint locations or some 130 miles of line on the Arctic Red River, Travaillant Lake and Aklavik map sheets. These are differentiated on the maps by being shown as solid dots whereas the Party No. 26 shooting is shown as open dots.

J.C. UNDERHILL,
DIVISION EXPLORATION MANAGER,
PEACE RIVER DIVISION,
IMPERIAL OIL ENTERPRISES LTD.

July 30, 1965.