

820-6-5-1

REPORT ON FIELD STATISTICS

And

DATA PREPARATION

of

LITTLE BEAR RIVER AREA, NORTHWEST TERRITORIES

N. T. S. 96C Zone 9

For

CANDEX DEVELOPMENT LIMITED

From

April 8, 1971 to April 13, 1971

Submitted By

J. D. Lundie, Party Chief

July, 1971



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ENCLOSURES

Dozing Map

INTRODUCTION

This is a report on Field Statistics and data preparation for a Reflection Seismic Survey employing Four Fold Common Depth Point technique in the Little Bear River Area, Northwest Territories.

The survey was conducted by Globe Universal Sciences Canada Ltd. during the period April 7, 1971 to April 13, 1971.

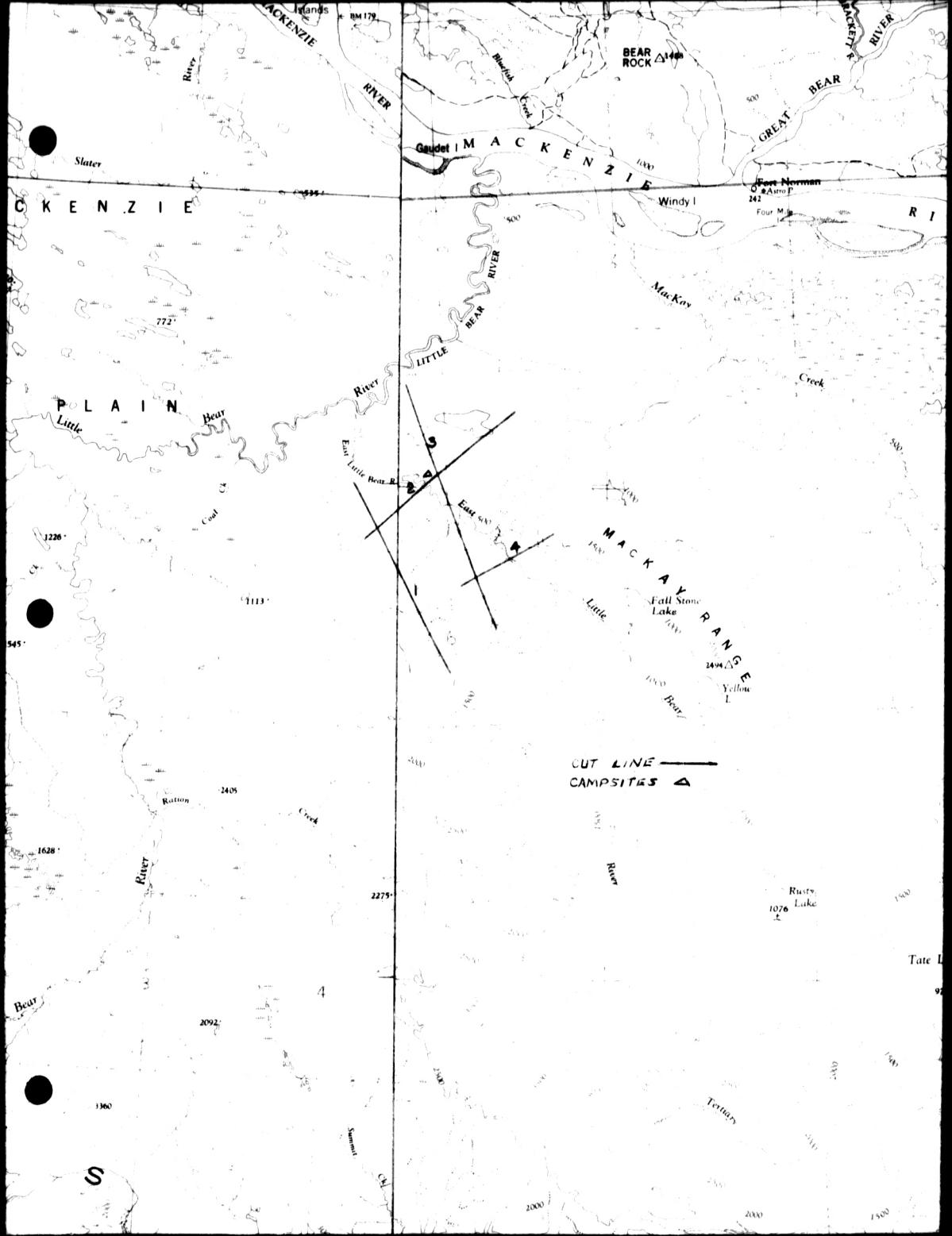
LOCATION OF PROJECT

The Project Area is located on the West side of the MacKenzie River, approximately forty-five miles Southwest of Fort Norman, Northwest Territories. It lies between Latitudes 64 Degrees, 25 Minutes North and 64 Degrees, 55 Minutes North and Longitudes 125 Degrees, 30 Minutes West and 126 Degrees, 20 Minutes West.

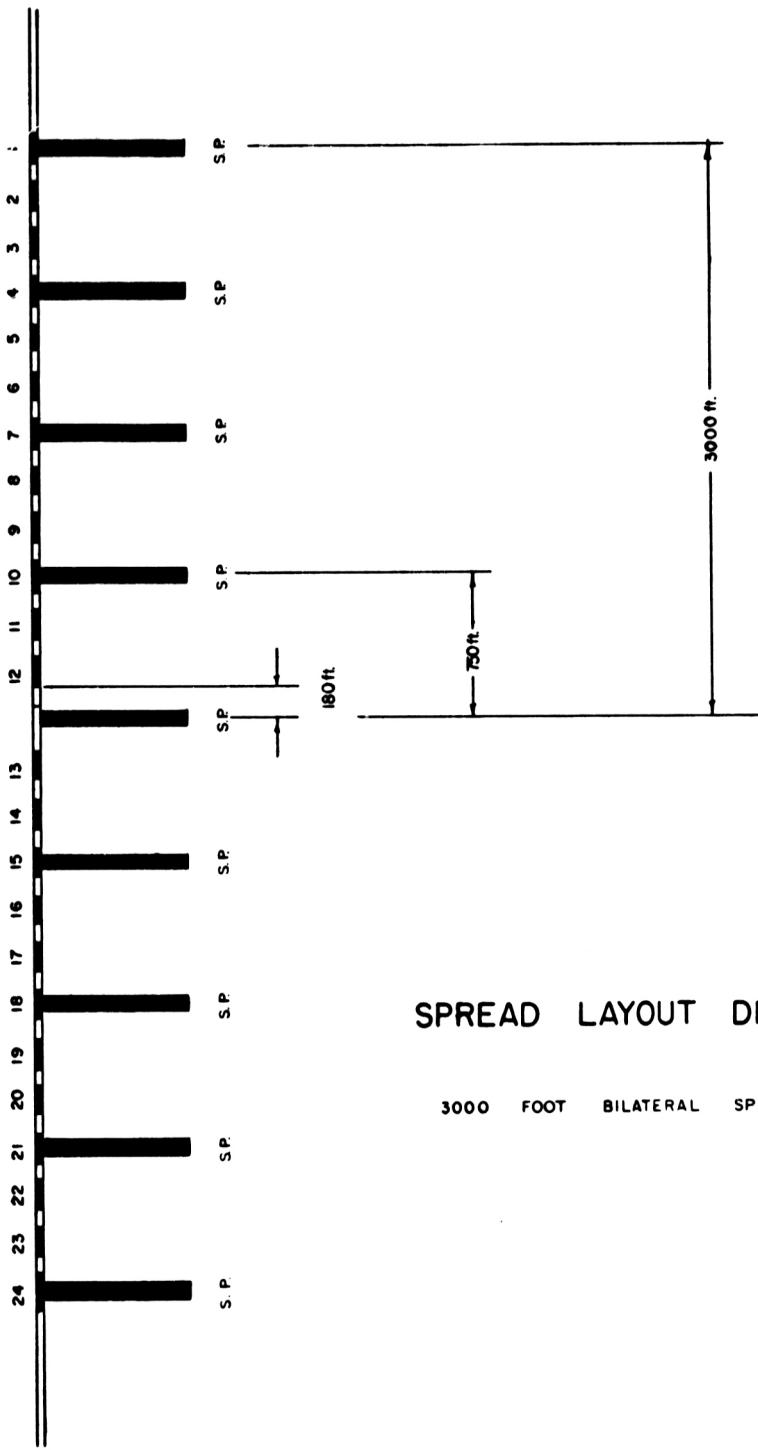
TOPOGRAPHY

The terrain in the general area is typical Foothills with steep creek and river banks.

Drainage is controlled by the Little Bear River and the East Little Bear Creek.



GROUP



SPREAD LAYOUT DIAGRAM

3000 FOOT BILATERAL SPREAD

RECORD QUALITY

Good quality records were obtained over most of the Program Area. On the Northwest end of Lines 1 and 3 record quality deteriorated considerably, possibly due to faulting in the area.

FIELD PROCEDURES

The recording equipment consisted of a 24 Channel TIAC 21 Track Format DFSIII Seismic Digital Field System with Binary Gain amplifiers in conjunction with an SIE ERC 6 Electrostatic camera.

Tape size - 1 inch; reel diameter - 8 inches with 1,200 feet of tape per reel.

The field record length was 5 seconds and the sample rate 2 milliseconds.

A Four Fold Common Depth Point technique was used, together with a Bilateral spread of 3,000'-250'-0-250'-3,000'.

The Geophones were Electro-Tech HSJ with a frequency of 14 CPS.

Eight Geophones per trace connected in series parallel were used. The Geophone interval was 20 feet.

The record filter was 8/18 - 124, and a read after write (essentially a playback direct) paper record was produced for each shot.

DRILLING CONDITIONS

Drilling equipment consisted of 3 Failing CFD-1 air-water rigs, 3 Mayhew 1000 air rigs and 1 Top Drive auger drilling rig. All rigs were mounted on Yukon or Nodwell track vehicles.

Near surface sand and gravel deposits encountered in numerous holes made drilling difficult.

Tabulation 2 gives a complete statistical summary of drilling production.

DOZERS

Four D7E Dozers; two equipped with rippers and two with winches, were used in the operation. All dozers were utilized for line cutting, detour cutting, snow ploughing and moving camp. A considerable amount of dozer time was spent making river crossings on the Little Bear River and the East Little Bear River.

Tabulation 3 denotes total dozer hours line cutting and total dozer hours worked on detours and access road.

SURVEYING

Field surveying was carried out with the use of a Wilde T1 Theodolite to obtain both horizontal and vertical control. Shot Point and Spread Distances were measured,

SURVEYING

chainages and horizontal distances checked with Stadia Readings. Two independent survey crews were used; one directed the dozers and established the horizontal control while the other crew ran the vertical control.

Vertical control was established from a tie line (Sigma Exploration's Lines 13, 12 and 11) run from the Slater A-37 Well location to the MacKay B-45 Well location. Vertical tie between well locations was 2.4 feet low. Shot Point 6636 + 205 feet on Sigma Exploration's Line 11 ties with Line 2 at Shot Point 24 + 200 feet and Line 3 at Shot Point 77 + 50 feet. Vertical control for the Project Area was carried from this point. All vertical ties were less than 3 feet.

Horizontal control was carried from co-ordinates of Shot Point CD527 along Sigma Exploration's Line 11 to Shot Point 6636 + 205 feet and the intersection of Lines 2 and 3. Horizontal control for the survey was carried from this point.

It is to be noted that the location of Shot Point CD-527 and the MacKay B-45 Well occupy the same ground position, although co-ordinates are not the same. Co-ordinates from Shot Point CD-527 were used to establish control.

SURVEYING

The Grid Zone for the area surveyed was 123 Degrees, 00 Minutes West Longitude (UTM Zone 9). Bearings were derived from Astronomic observations of Polaris and corrected to an origin of 123 Degrees, 00 Minutes West Longitude.

COMPUTING PROCEDURE

Refraction Profiles were shot on Line 1 between Shot Points 154 and 162 + 250 feet, Line 2 between Shot Points 13 + 500 feet and 22 and on Line 3 between Shot Points 97 and 105 + 250 feet. The first break plots from these Refraction Profiles indicated a velocity inversion, the near surface velocity being around 9500'/sec. breaking into an average velocity of 7500'/sec. and then back into a velocity of from 9000'/sec. to 9500'/sec. From the results of the refraction plots it was decided to plot the first breaks from each shot recorded to determine the time delay of the low velocity layer. Average velocities and intercepts indicated were used.

The following intercept method was used to calculate the drift correction :

$$H = \left[T_2 - T_1 \right] \frac{V_1}{2 \cos \theta}$$

and $\frac{2H}{V_1} - \frac{2H}{V_D} = \text{Delay Time}$

Where : T_2 = Averaged intercepts from tie Shot Points of the second V_2 velocity.

T_1 = Averaged intercepts from tie Shot Points of first V_2 velocity.

V_1 = Averaged drift velocity from tie Shot Points.

COMPUTING PROCEDURE

v_2 = Averaged high velocity from tie Shot Points.

v_d = Datum velocity of 10,000'/sec.

$$\sin \theta = \frac{v_1}{v_2}$$

Delay time is a two way drift correction in time.

Shot and detectors were reduced to a Datum Plane of 1,000 feet A.S.L., using a constant velocity of 10,000'/sec. The drift correction was added to Datum correction giving the total correction.

The Drift correction over most of the area was from -10 ms to -15 ms with a maximum correction of -61 ms occurring at Shot Point 56 on Line 3. Other areas of large corrections occurred at Shot Point 148, Line 1 (-36 ms), Shot Points 198 and 199, Line 1 (-33 ms) and Shot Point 11, Line 2 (-54 ms). No drift correction occurred on the North end of Line 4 from Shot Points 120 to 123 and on the South West end of Line 2, at Shot Point 52.

DATA PREPARATION AND PLAYBACK PROCEDURE

The following steps were used to process data through Digitech Limited's processing center.

Shot Point numbers 55, Line 1; 79 and 75, Line 2 and 42, Line 2 were selected as average record quality to determine playback parameters. Digitech ran a band pass frequency analysis and several trail deconvolution operators on these shot points. From these analyses it was decided to use a Digital Filter with a band width of 10/15 - 55/60.

Structure Statics (datum correction plus drift correction), Digital filter, trace equalization and Common Depth Points gathered on the data were then applied. From this tape Digitech ran velocity analysis (one every 2 miles) to determine average velocities for normal move-out functions. Normal move-out was then applied and trace gather structure displays made. Trim statics and trace editing were picked and tabulated and a mute pattern to suppress the first break energy on the far traces were made from the gather displays to apply to the stacked section.

A Digital filter of 10/15 - 55/60 and amplitude recovery were applied after stacking the data. From this tape a variable area-wiggly trace film display was made.

GENERAL INFORMATION

The recording crew consisted of four vehicles; recorder, shooting unit and two line trucks, all four wheel drive vehicles. Personnel for the recording identity accounting for twelve people.

The survey crew was made up of two crews, a total of five people, with two four wheel drive vehicles.

Two four wheel drive personnel carriers were used by the drill crews to travel to and from the field.

The camp also had two water trucks (truck mounted) and one water truck (track mounted) to haul water for the auger drill rig, the conventional air-water rigs and also water for camp. Two supply vehicles were also used, one with a flat deck stake box to haul propane, oil and bulk items and one with a heated van to haul perishable items.

Fuel for the operation was trucked from the Norman Wells refinery by Borek Construction's fuel tanker and stored in field blader tanks. Disposition of fuel from the field blader tanks was by Globe's fuel tanker.

Explosives were hauled from Mobil Oil magazines at Norman Wells as required.

Groceries were purchased primarily from the Hudson Bay store in Yellowknife and shipped to Norman Wells by Pacific Western Airlines.

GENERAL INFORMATION

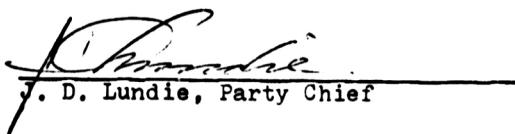
Communication was maintained to Calgary by Single Side Band radio through the Edmonton Answering Service and by ground telephone from Norman Wells.

Wild game was not abundant in any of the area surveyed. Wolves were noticed on occasions on the main access road from Norman Wells.

Line cutting and dozer operations were inspected by the MacKenzie Forest Service upon completing operations.

Respectfully submitted

GLOBE UNIVERSAL SCIENCES CANADA LTD.



J. D. Lundie, Party Chief

STATISTICAL SUMMARY

Days Worked	6
Number of Hours Worked	81.0
Field Hours	62.5
Driving Hours	18.5
Moving Hours	Nil
Number of Holes Shot	187
Number of Shots	194
Continuous Subsurface Coverage (In Miles)	26.56
Total Amount of Powder Used	3,820 Lbs.
Average Powder Per Shot	19.68 Lbs.
Total Number of Caps Used	566

DRILLING

Number of Hours Worked	455.5
Field Hours	359.5
Driving Hours	96.0
Moving Hours	Nil
Number of Holes Drilled	372
Total Footage Drilled	18,885
Average Depth Per Hole	40.01

STATISTICAL SUMMARY

DOZERS

Operating Hours 413

Extra Hours
(Cutting Detours and Access
Roads) 115

LITTLE BEAR RIVER, N.W.T.

INTERPRETATION

Two reflectors were mapped and are identified as the Cretaceous unconformity and the Devonian Hume formation. Identification of these events was made by correlation to data tying the Shell Cloverleaf well and by relating to known geological information closer to the area. An event of poorer quality, interpreted to be the Canol formation above the Hume, is observed over most of the area. Isochronal changes in the interval Canol to Hume, when they can be mapped, are minimal.

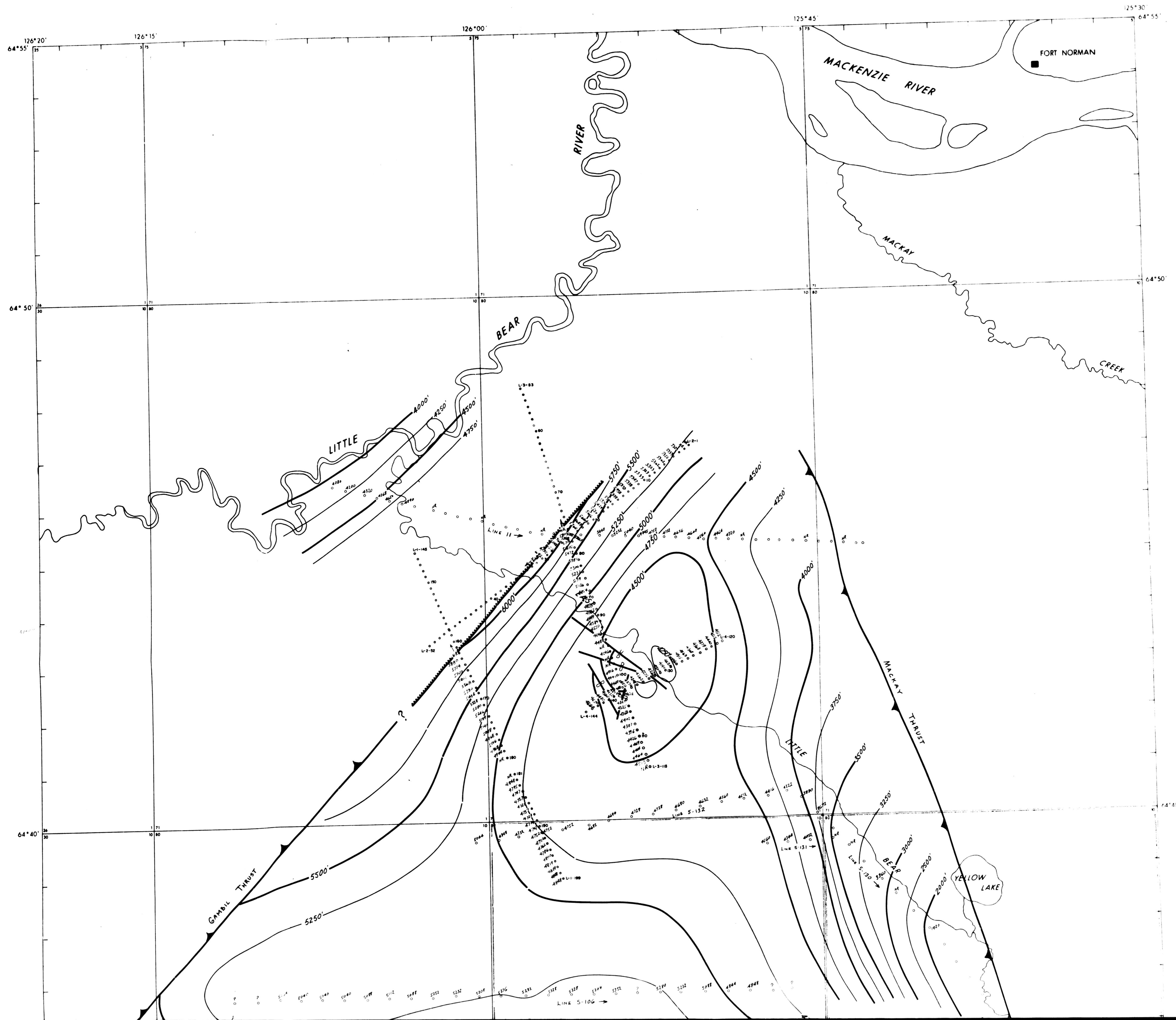
The structure map on the Cretaceous unconformity was constructed converting times from +1000' datum using 9600'/sec. interval velocity. This map shows a structure which is faulted at its apex and probably closes against a thrust fault on the northeast. To the northwest the structure plunges under another thrust fault. Data on the upper sheet of this thrust are not usable. The Hume structure map was constructed converting the Cretaceous unconformity to Hume interval times to depths using an interval velocity of 12,300 ft. per sec. and adding these to the Cretaceous unconformity depths. The structure on the Hume is similar to the structure on the Cretaceous unconformity. The structure appears to be of Laramide Age.

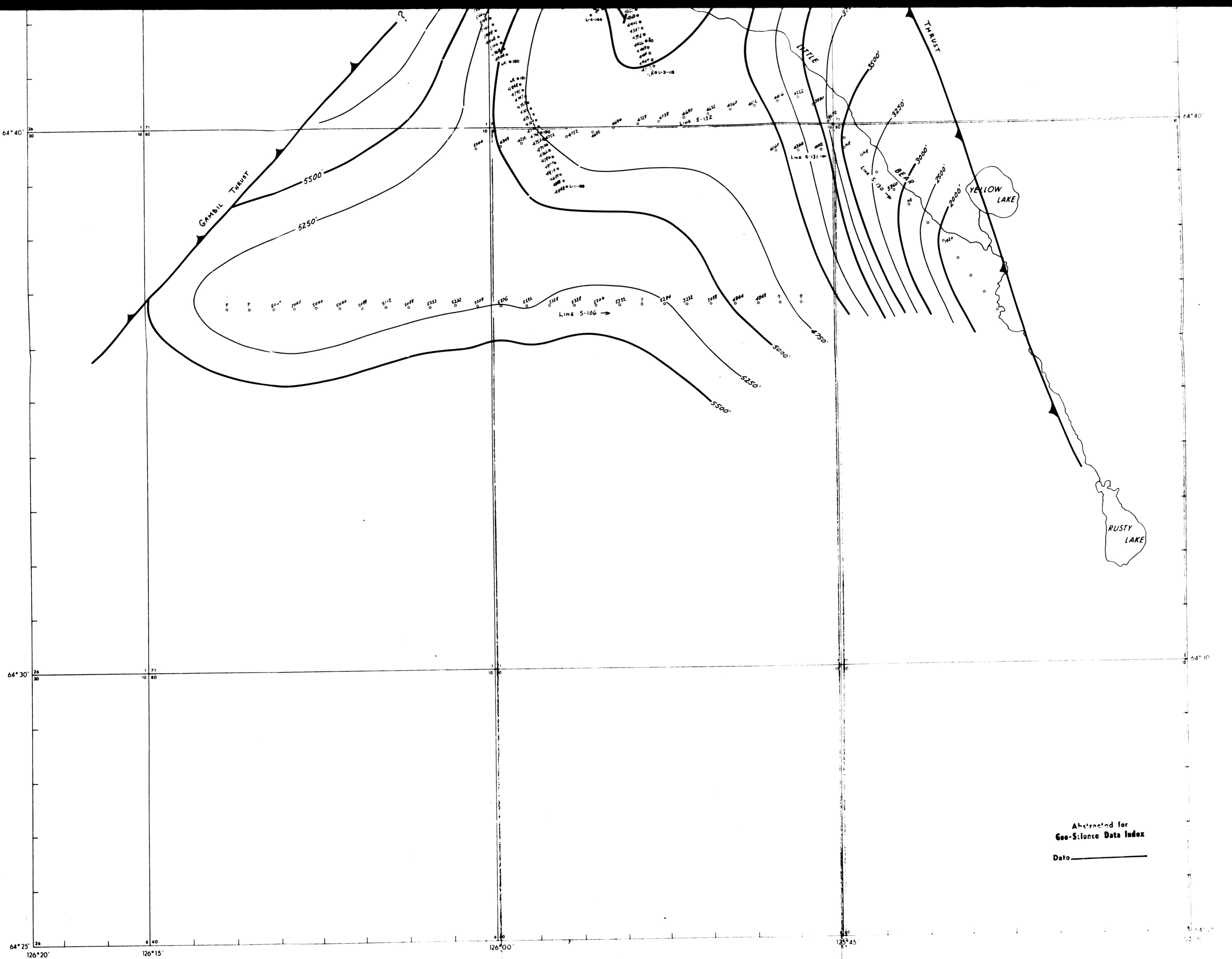
CONCLUSIONS:

Except for local domal structure of 240' closure on this Cretaceous unconformity, structural closure to the northeast is probably against the MacKay Thrust. Prospective horizons of Devonian Age and older outcrop in the MacKay Range.

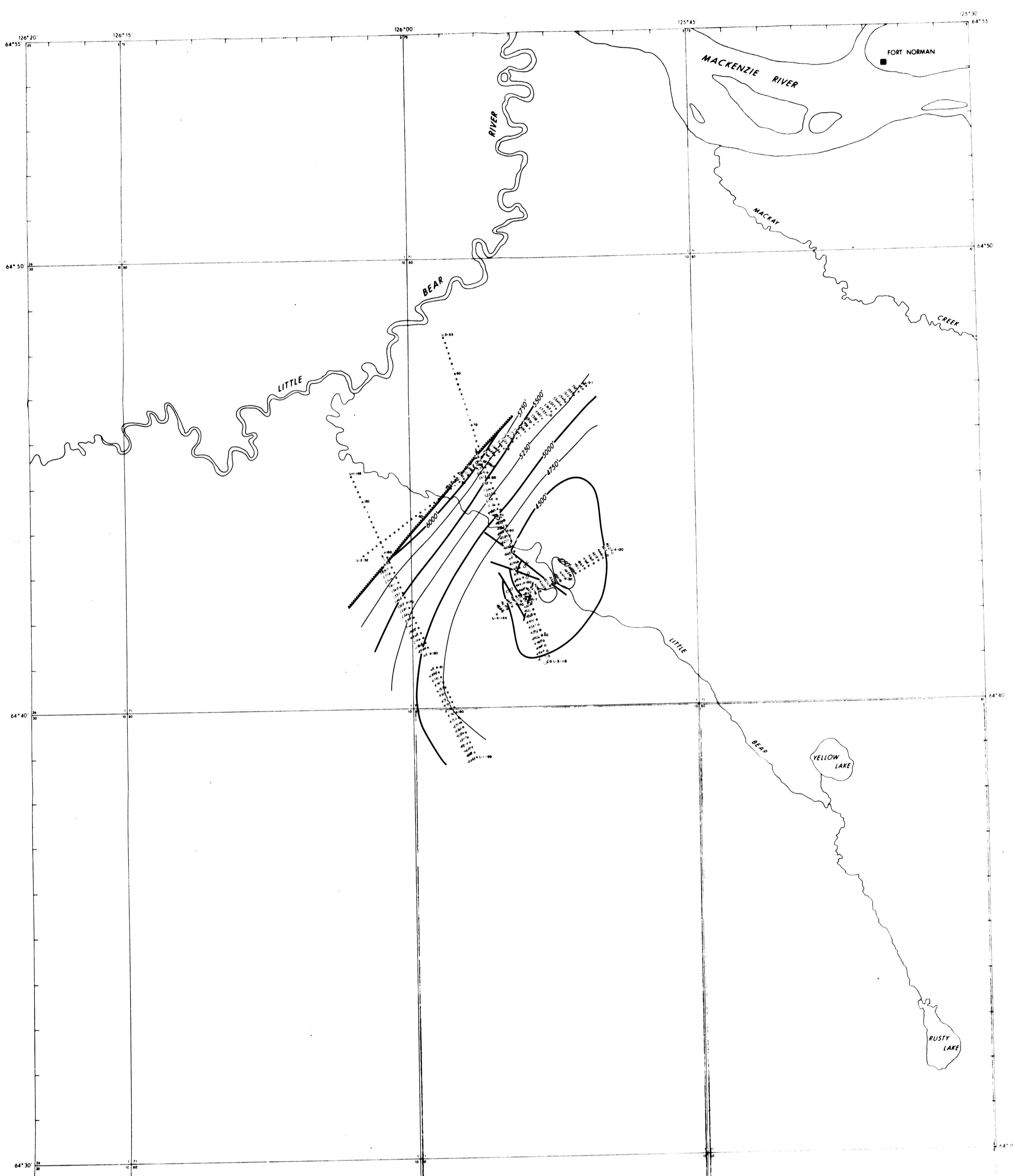


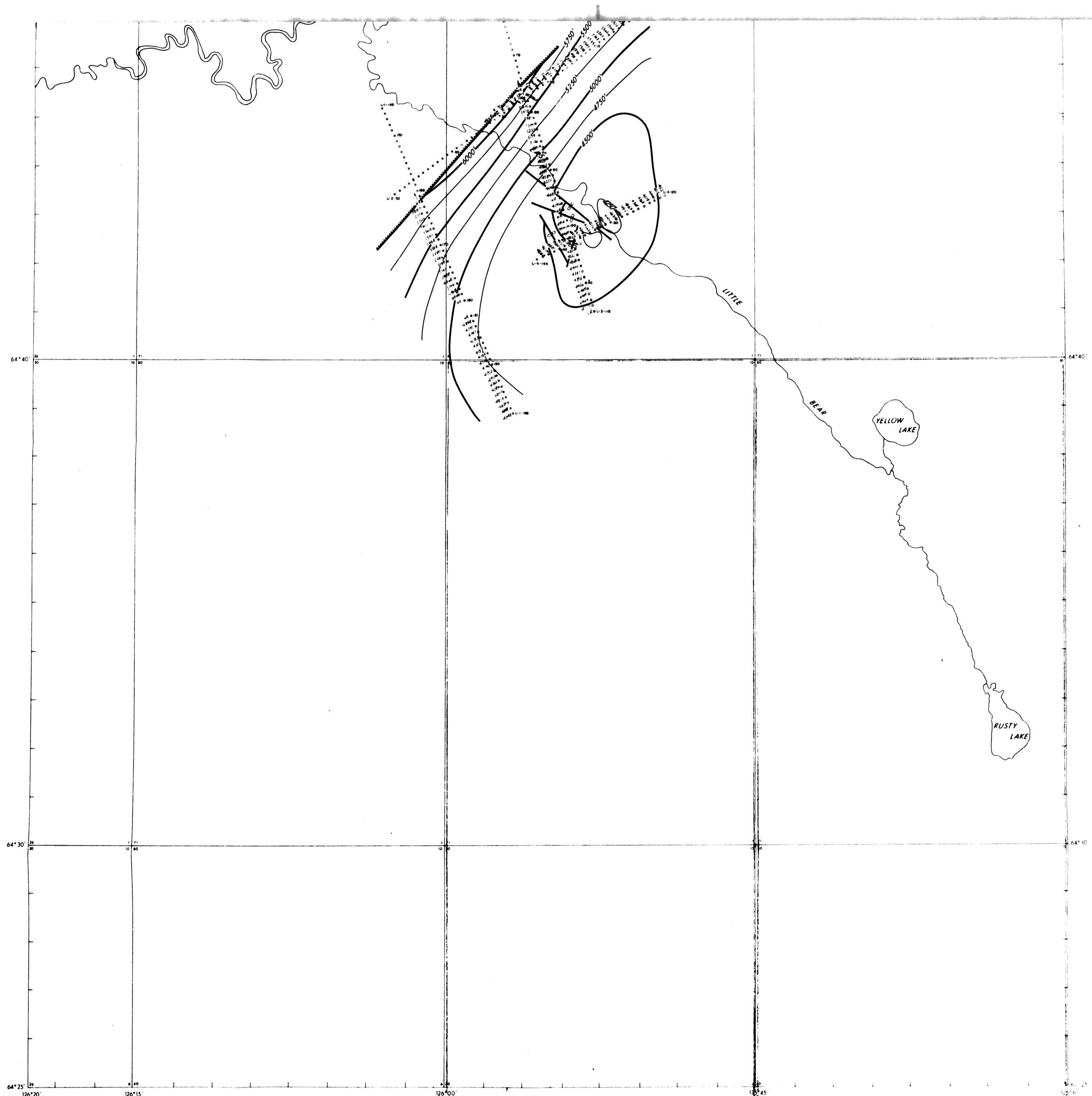
H. F. Gleason





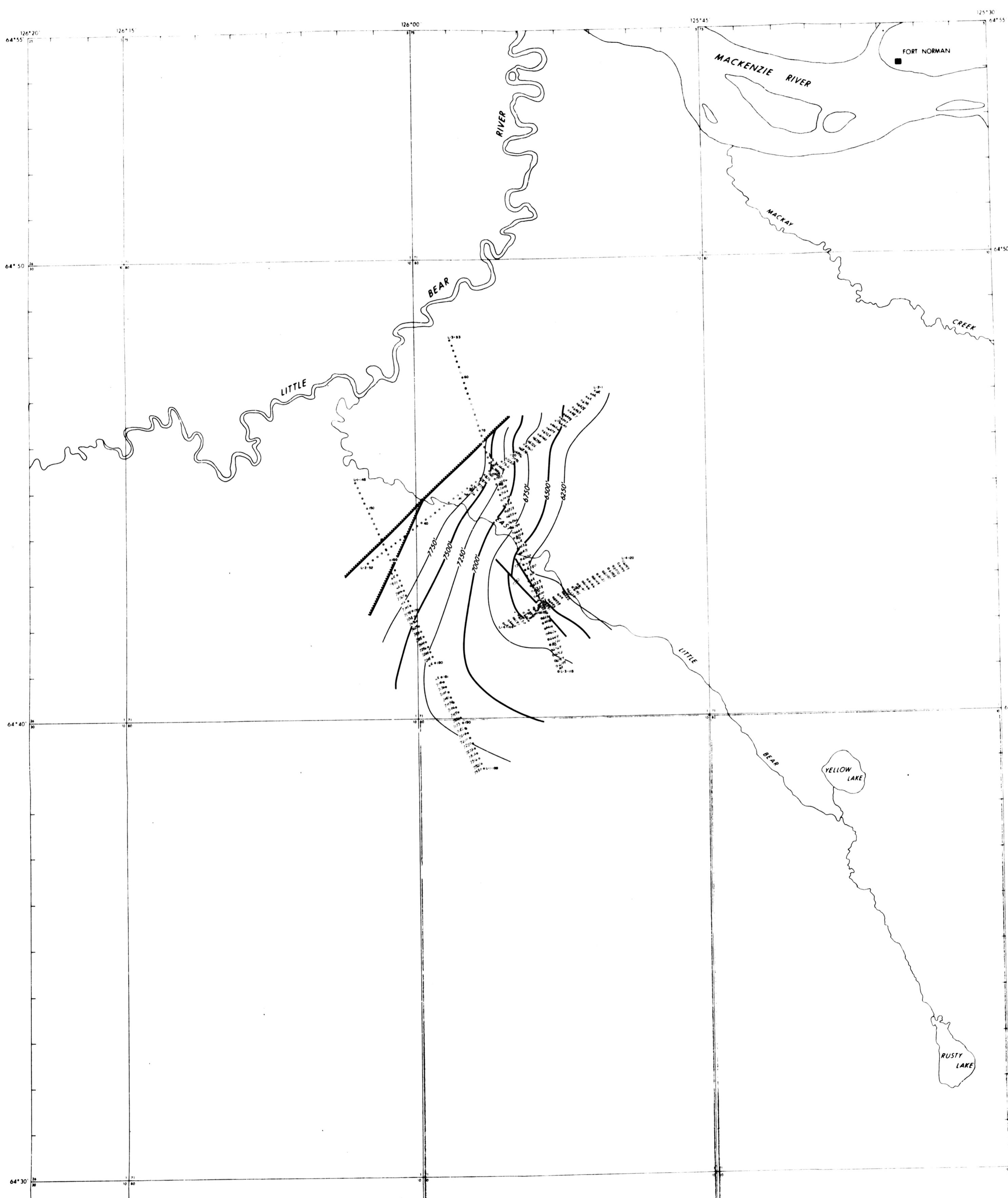
CANDEX DEVELOPMENT LTD.	
820-6-5-7	
LITTLE BEAR RIVER AREA	
NORTHWEST TERRITORIES	
CRETACEOUS UNCONFORMITY DEPTH STRUC.	
AVERAGE VELOCITY 9600' sec	CONTOURS FROM 1000' DATUM
REPLACEMENT VELOCITY 10,000' sec	
SHOT BY GLOBE UNIVERSAL SCIENCES CANADA LTD (PBY7)	
MAP N° DD 2 A CONTOUR INTERVAL 250 FEET SCALE 1 INCH = 1 MILE	DATE JULY 20 1977 REVISED AUTHOR R. H. B. EDITION 1

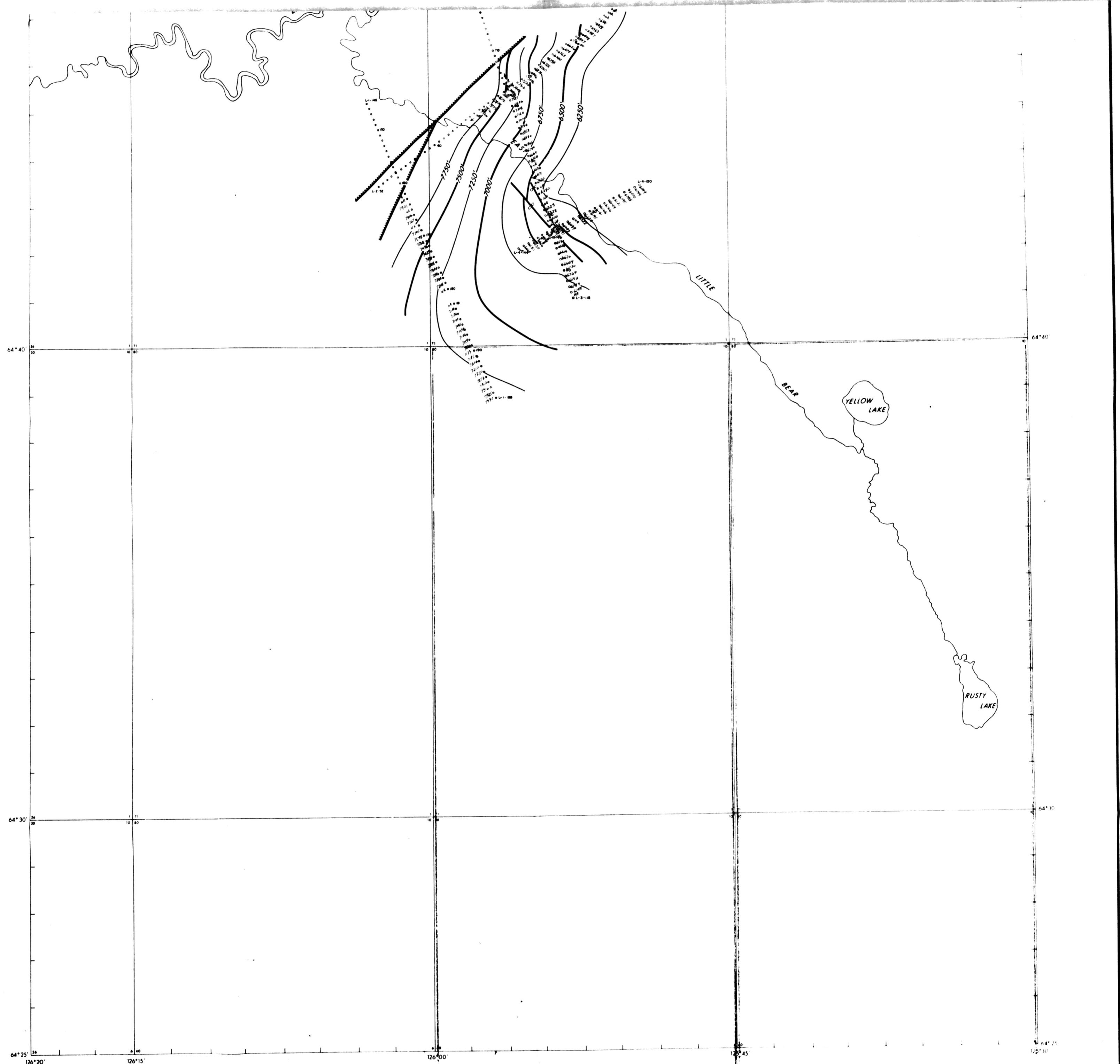




CANDEX DEVELOPMENT LTD.
CALGARY, ALBERTA
LITTLE BEAR RIVER AREA
NORTHWEST TERRITORIES
CRETACEOUS UNCONFORMITY DEPTH STRUC.

AVERAGE VELOCITY 9,600' / sec.	CONTOURS FROM 1000' DATUM	REPLACEMENT VELOCITY 10,000' / sec.
SHOT BY GLOBE UNIVERSAL SCIENCES CANADA LTD (PTY) LTD		
MAP NO. DD-2-A	DATE JULY 20, 1971	FILE NO. 1000
CONTOUR INTERVAL 250 FEET	AUTHOR HFG	FILE NO. 6-F-6
SCALE 1 INCH = 1 MILE		





CANDEX DEVELOPMENT LTD.
CALGARY, ALBERTA

LITTLE BEAR RIVER AREA
NORTHWEST TERRITORIES

HUME DEPTH STRUCTURE

CONTOURS FROM 1000' DATUM REPLACEMENT VELOCITY 10,000'

SHOT BY GLOBE UNIVERSAL SCIENCES, CANADA LTD (PTY) LTD

MAP NO. DD-7-A	DATE JULY 20, 1971
CONTOUR INTERVAL 250 FEET	REVISED
SCALE 1 INCH = 1 MILE	AUTHOR HFG
	FILE NO. 6-F-6-5

