

COMINCO LTD.

EXPLORATION

NTS: 82K-7W

WESTERN DISTRICT

GEOPHYSICAL REPORT

ON A

HYDROSONDE SURVEY

DUNCAN LAKE PROPERTY

Duncan Lake Area, Stocan Mining Division, B.C.

LATITUDE: 50°20'N

LONGITUDE: 116°50'W

Geophysical Field Work Performed: April 28 - May 3, 1981

On Claims: DUNC 1,2,5,6,7;
KATE 6;
ROSCO 3-16

22 JULY 1981

ALAN R. SCOTT

MM
9380

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Duncan Lake Area, Slocan Mining Division, B.C.

INTRODUCTION

The survey on Duncan Lake, British Columbia (Figure 1), was carried out from April 28, 1981 to May 3, 1981 by McElhanney Surveying & Engineering Ltd. for Cominco Ltd. The survey area is located north of Howser and south of Gallop Point on Duncan Lake. (Figure 2)

Bathymetric and high resolution seismic data were collected on 10 cross lines and 2 tie lines. Approximately 25 km of data was collected to determine water depths and the depth to bedrock. All data was recorded graphically in analogue form. Positioning of the survey vessel was achieved using 2 theodolites at shore stations which were located by Cominco personnel. The survey crew consisted of 4 persons: 1 geophysicist/operator, 2 surveyors, and a boat operator.

DATA ACQUISITION

Field Systems

The survey utilized a 21 foot aluminum work boat which proved to be an ideal work platform.

Bathymetric data was collected using a Raytheon Model 719B fathometer. The transducer was mounted on the starboard side of the vessel with a draft of approximately 1 ft. Sub-bottom information was obtained using an EG & G Surface Towed Boomer (Model 230) and an EG & G 265 single channel streamer. The source (boomer) and receiver (streamer) were towed about 10 metres astern of the vessel with a horizontal separation of approximately 3 to 4 metres.

The position of the survey vessel was determined using 2 theodolite. One theodolite was set up at the end of the line to keep the boat on track while the other was used to determine intersection angles from a known location further along the shoreline. This method worked quite well and gave an overall position accuracy of under 15 metres.

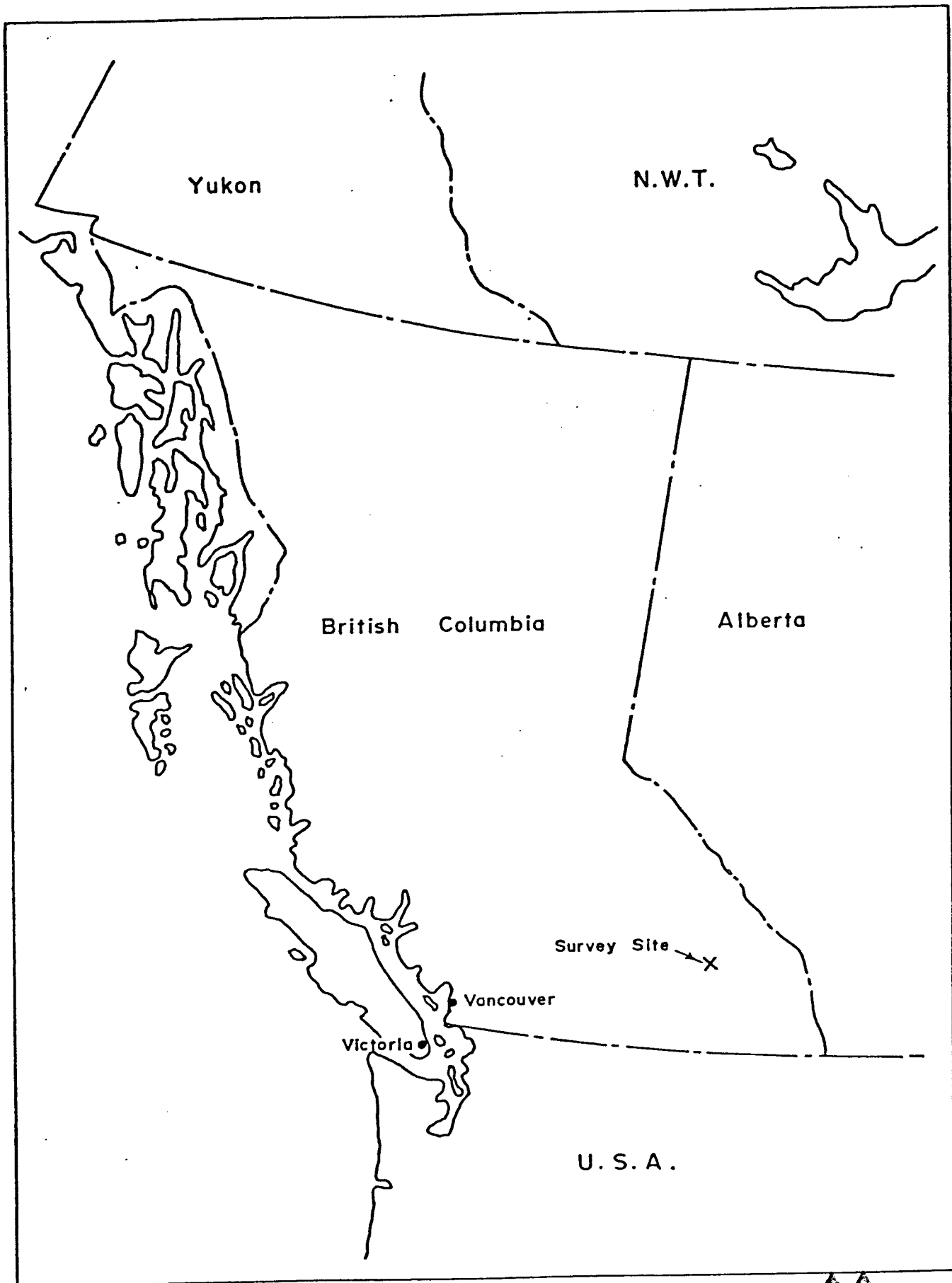


FIGURE 1
LOCATION MAP

210-81-1



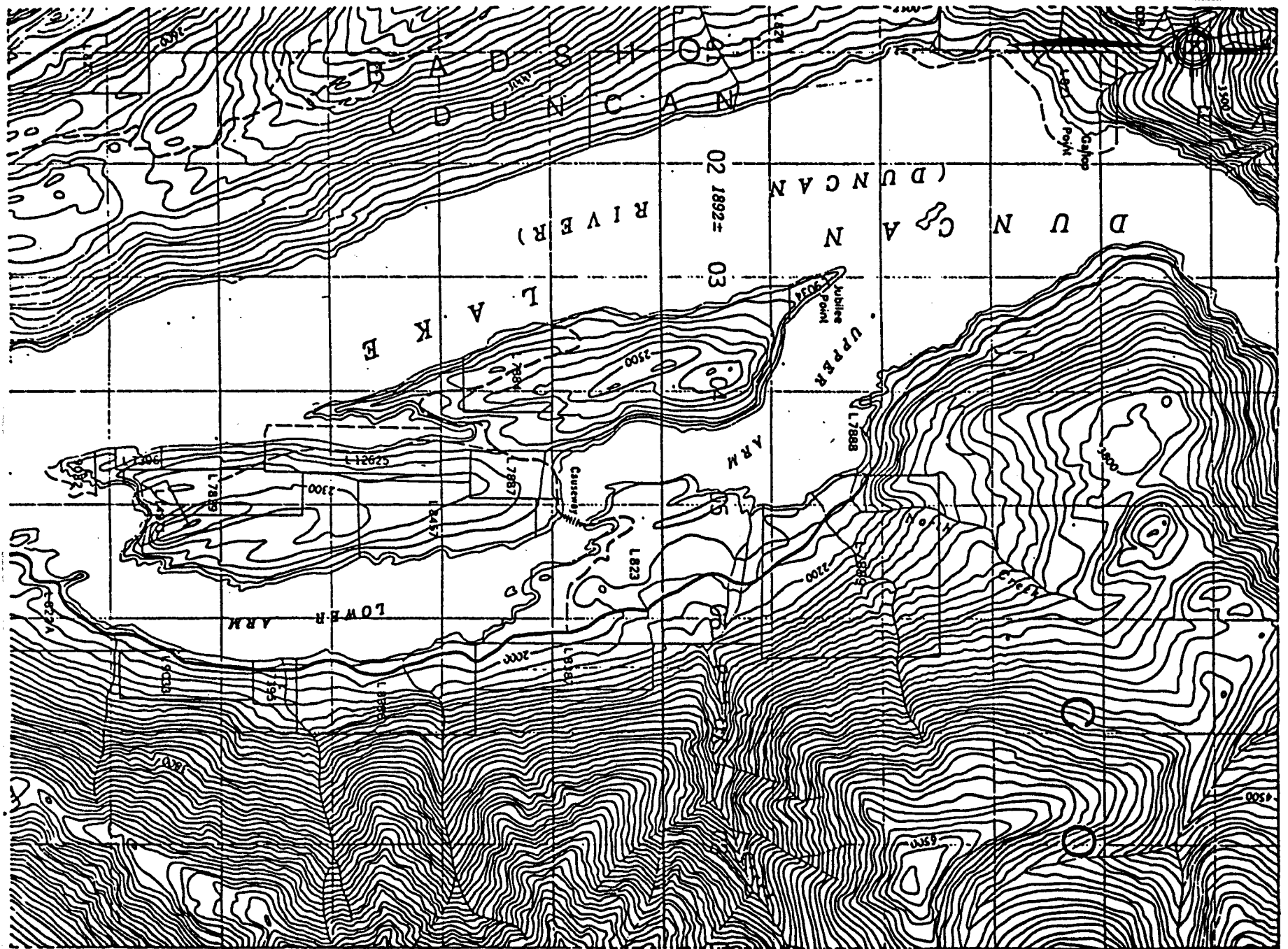


FIGURE 2

210-81-2

Field Operations

The sub-bottom survey was completed in a three day period from April 30 to May 2, 1981.

All the cross lines were surveyed from West to East with the exception of line 5 which was run from East to West. Two tie lines, 11 and 12, were surveyed in order to correlate the cross lines. Line 11 was run South to North and line 12 North to South approximately 500 metres from either shore (see Line Location Map). Re-shoots were required on lines 1 and 5.

Both the sounding and seismic systems operated without downtime due to malfunction. However, due to the large slopes that were encountered (approaching 40 degrees) some of the data was not recoverable, in particular the sounding data. This was mainly due to the signal being scattered and diffracted on the large slopes.

INTERPRETATION

Bathymetry

A bar check was carried out daily and the fathometer calibrated to ensure that correct water depths were being recorded. Depths were then obtained directly from the sounding rolls and corrected for water level changes. During the survey the water level was monitored every day and an increase of 1.6 feet was observed over the three day survey period. Where no bathymetry data was recorded, particularly on slopes exceeding 30 degrees, water depths were obtained from the seismic records using a speed of sound in water of 1470 m/sec.

The bathymetric data has been corrected to a datum elevation of 1827 feet (556.84 m), which was obtained from water level gauges at Duncan Dam. The data is presented in profile form with the lake bottom information at a scale of 1:2,500 (horizontal and vertical).

The data indicates a very smooth and flat bottom over the entire survey area with water depths exceeding 100 metres in the middle of the lake. Depths of 80 to 90 metres are encountered close to the shoreline.

Plotted water depths may be in error as much as 3 percent in some areas. This is mainly due to the positioning accuracy (± 15 metres).

High Resolution Seismic

The seismic data indicates a very deep U-shaped valley with a large amount of sediment infilling.

Depth to bedrock was estimated using a velocity of sound of 1,500 m/sec. The plotted depths are minimum thicknesses as this type of sediment may have velocities as high as 1,800 m/sec. Note: Velocity information cannot be calculated directly from this data.

The survey area shows at least two different types of recent sediment. The most recent extends as much as 40 metres below the lake bottom. The material is probably fine to coarse grained silt/sand, exhibiting horizontal layering. The layering is uniform, thereby indicating that the rate of deposition has been constant. Underlying this horizon is a large amount of reworked alluvium, possibly as much as 100 m thick. Some boulder layers were identified within this unit but are not continuous. The relic river channel was observed on some cross lines at more than 50 metres below the present lake bottom.

At depths greater than 150 metres, it is difficult to estimate the type of material that is present due to the low signal to noise ratio.

In the middle of the lake, the bedrock extends to more than 250 metres below the present lake bottom and rises sharply at an angle at more than 30 degrees. Bedrock outcrops are present all along the east shore and only at lines 1, 2, 3, 4, and 5 on the west shore. The profiles show several side reflections which indicate that the bedrock surface is irregular. Therefore even a slight deviation off the line could produce a difference in depth to bedrock of up to 15 metres. Since the accuracy of the horizontal position is 15 m, the reader should be aware that the depth to bedrock is an averaged value.

An anomalous feature was identified on the west side of lines 9 and 10 (see Stacked Profile Plot). The Boomer system could not penetrate more than 30 metres in this area. It is, therefore, postulated that this is bedrock material that may have slumped down prior to the recent sedimentation, as evidenced by the abrupt truncation of the horizontal layering.

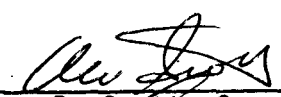
The two tie lines were surveyed only as a cross-correlation and are not presented in profile form.

CONCLUSIONS

The survey was very successful in that all the objectives were met. It should be noted, however, that the depth to bedrock values are not exact since the velocity of sound for the sediments is an assumed average.

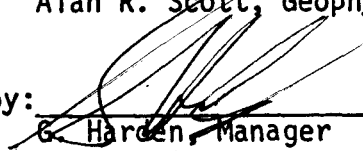
Report prepared by: D.M. Danyluk, P.Eng., McElhanney Ltd.
Z. Jarowicz, P.Eng., McElhanney Ltd.

Respectfully submitted by:


Alan R. Scott, Geophysicist

ARS/skg
Distribution
Mining Recorder
Western District
Geophysics File

(2) Endorsed for release by:
(1)
(1)


G. Harden, Manager
Exploration,
Western District

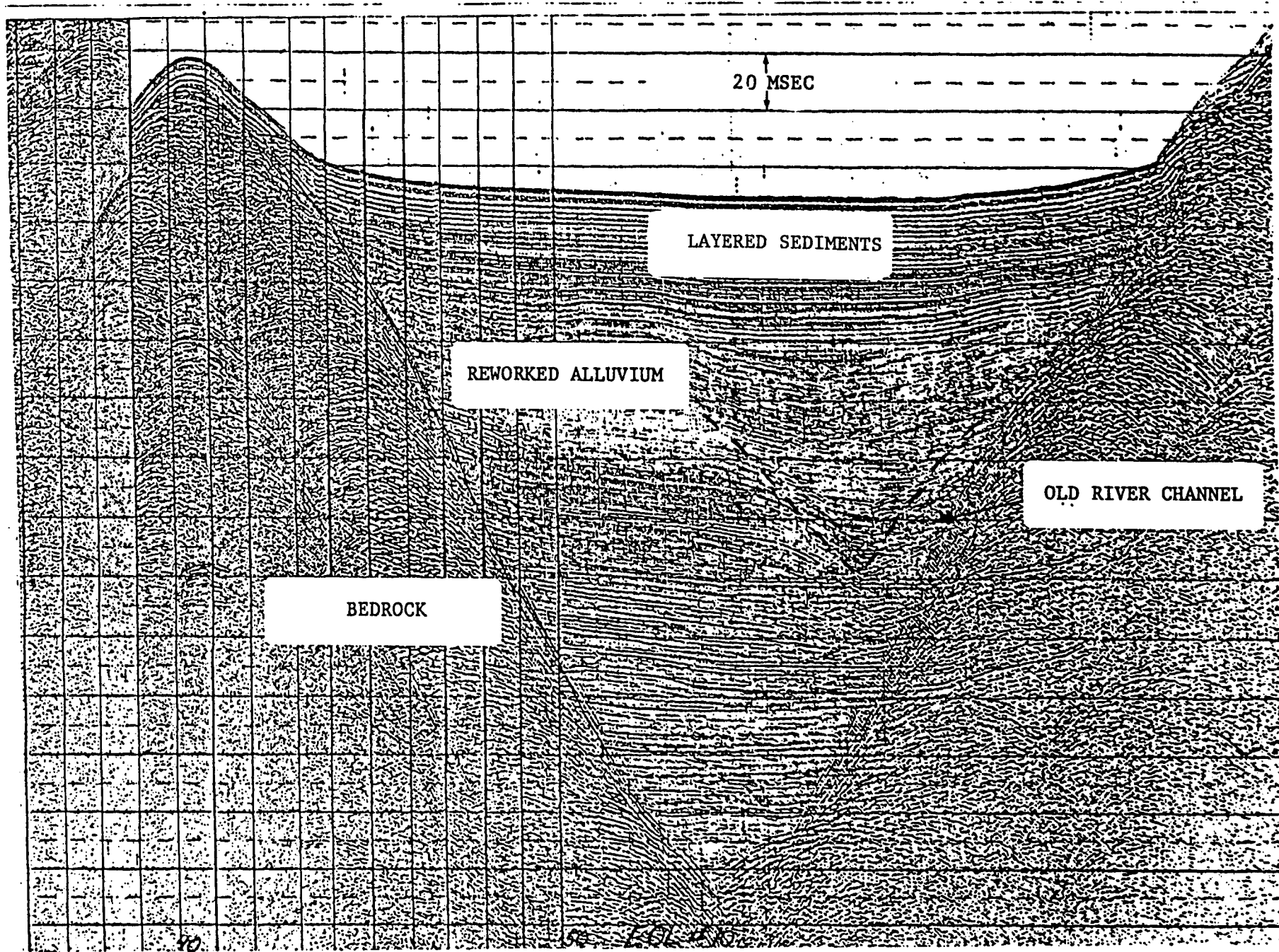


FIGURE 3 210-81-3

EXAMPLE RECORD (LINE #10)

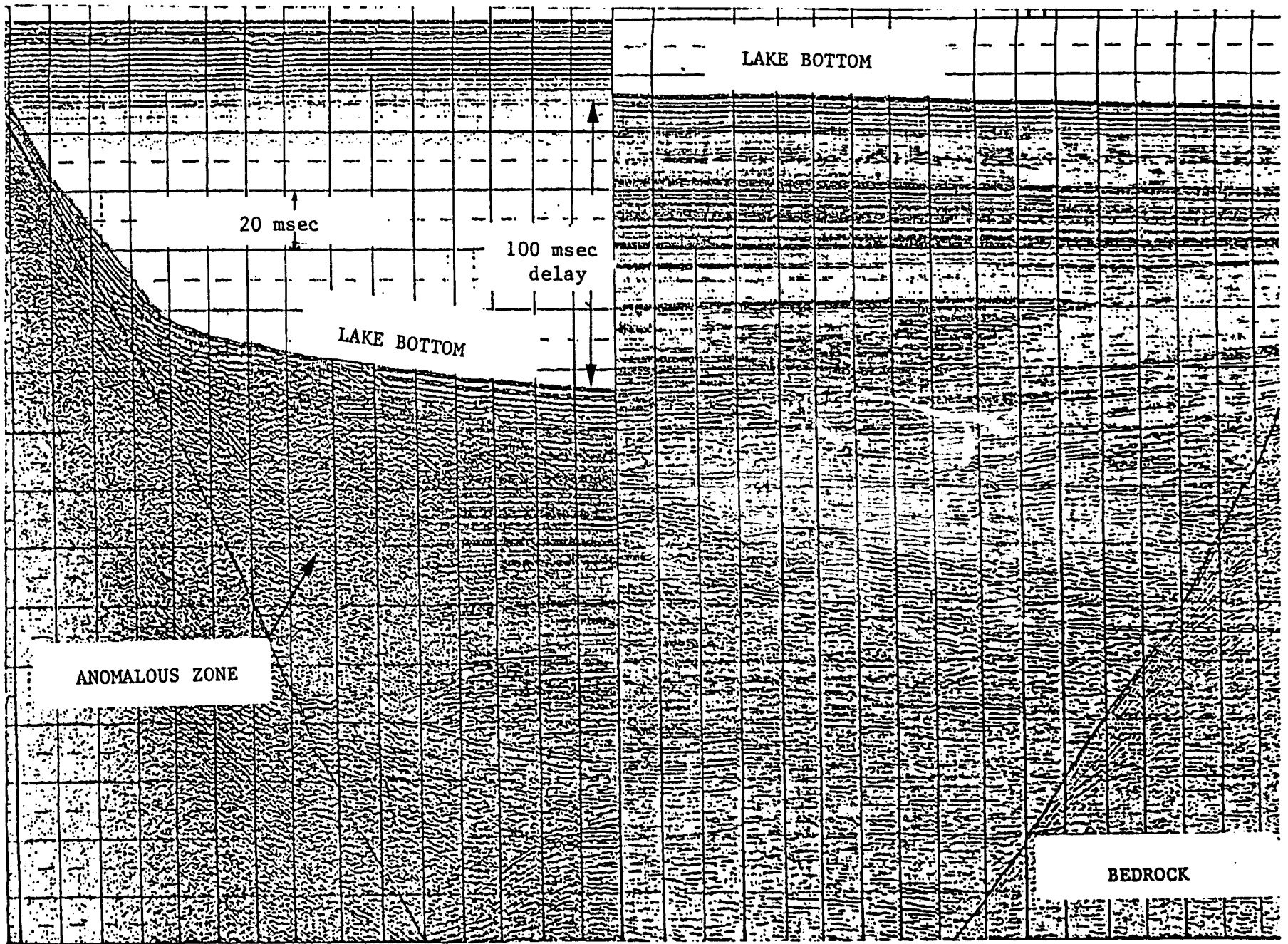


FIGURE 4 210-81-4

ANOMALOUS FEATURE (LINE # 10)

APPENDIX I

IN THE MATTER OF THE B.C. MINERAL ACT
AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME
CARRIED OUT ON PORTIONS OF THE DUNC, ROSCO, and JUBILEE MINERAL CLAIMS
ON THE DUNCAN LAKE PROPERTY
LOCATED AT DUNCAN LAKE IN THE SLOCAN MINING DIVISION
OF THE PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY
N.T.S.: 82K-7W

S T A T E M E N T

I, Alan R. Scott, of the City of Vancouver, in the Province of British Columbia, make oath and say:-

1. THAT I am employed as a geophysicist by Cominco Ltd. and, as such have a personal knowledge of the facts to which I hereinafter depose;
2. THAT the annexed hereto and marked as "Appendix II" to this statement is a true copy of expenditures incurred on geophysical survey on the DUNCAN LAKE Property;
3. THAT the said expenditures were incurred for the purpose of mineral exploration of the above noted claims between the 28th day of April and the 3rd day of May, 1981.

Signed: 
Alan R. Scott, Geophysicist

22 July 1981

APPENDIX II

STATEMENT OF EXPENDITURES

D U N C A N L A K E P R O P E R T Y

(Hydrosonde survey and navigation target preparation)

1. Contract Hydrosonde Geophysical Survey McElhanney Surveying and Engineering Ltd.		<hr/>
		\$19,366.19
2. Establishing Navigation Targets (Cominco)		
Salaries (F. Ferguson and A. MacGregor)	\$ 631.00	
Meals, accommodations, supplies, fuel	1,407.71	
Truck rentals	454.00	
Radio telephone rentals	143.30	
		<hr/>
		\$ 2,636.01
		<hr/>
Total Expenditures:		<u>\$22,002.20</u>

Alfred

22 July 1981

APPENDIX III

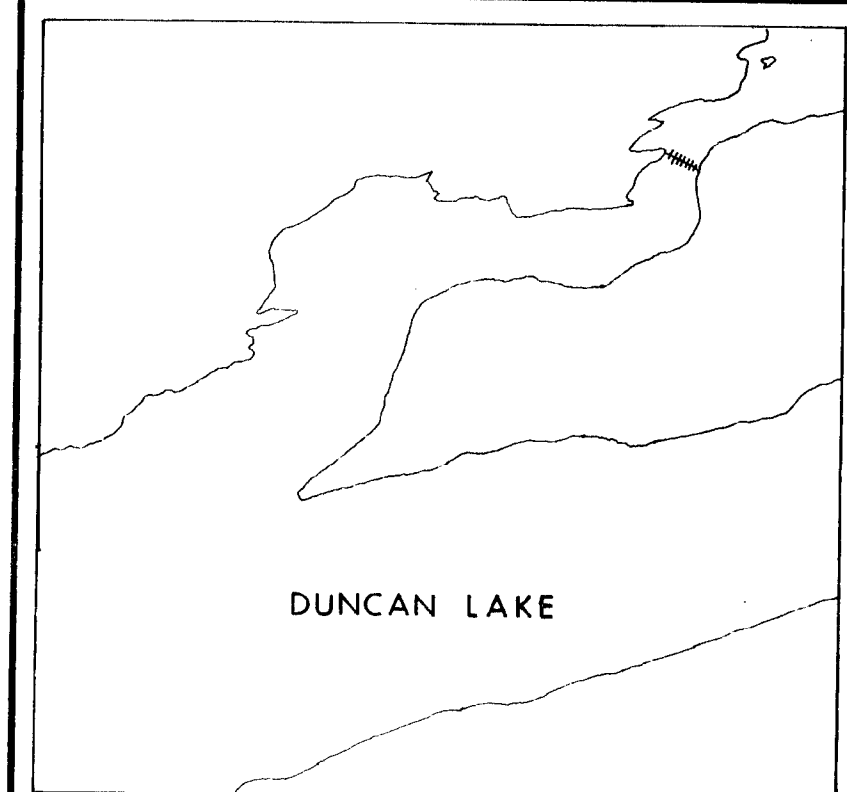
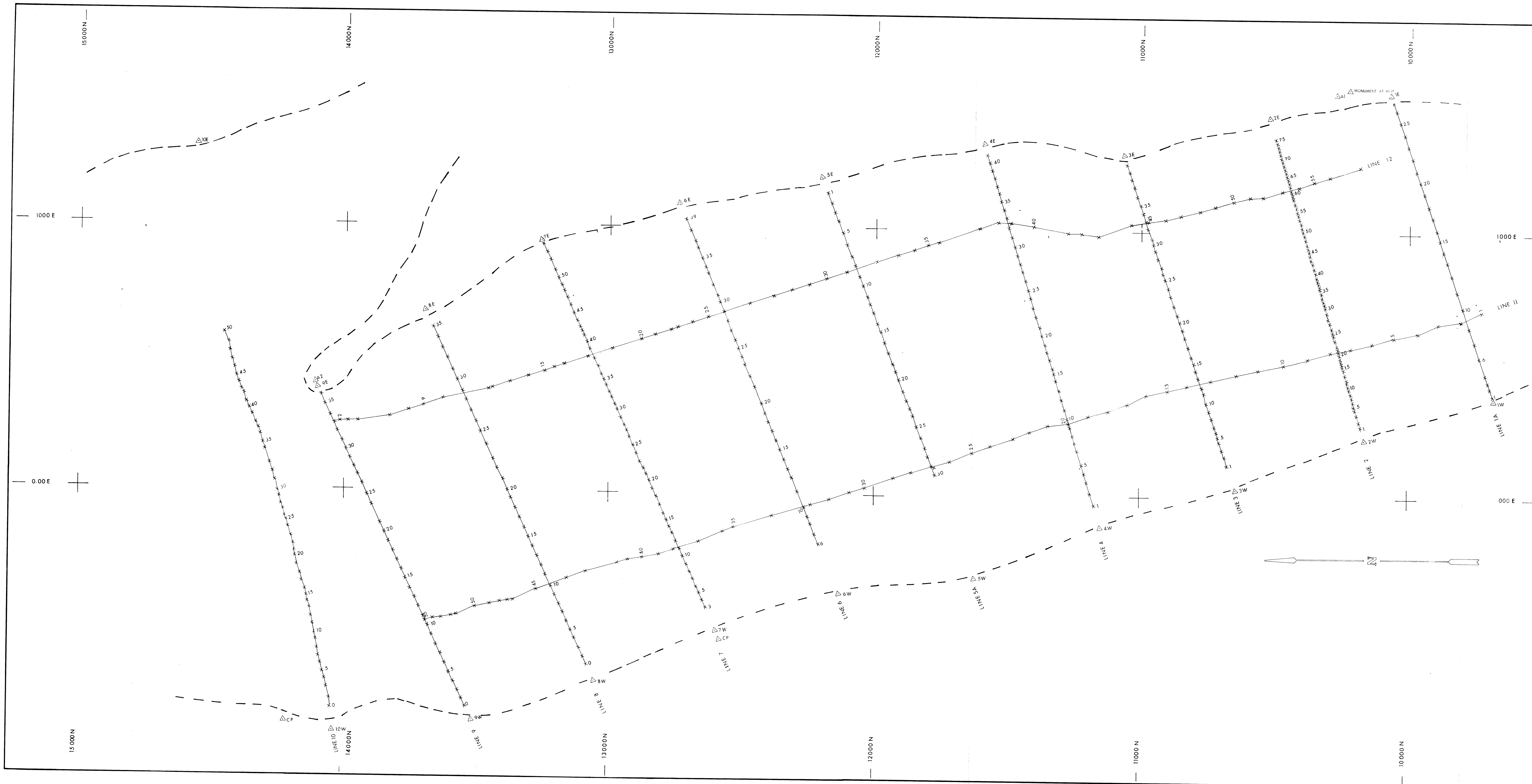
C E R T I F I C A T I O N

I, Alan R. Scott, of 4013 West 14th Avenue, in the City of Vancouver,
in the Province of British Columbia, do hereby certify:-

1. THAT I graduated from the University of British Columbia in]970
with a B.Sc. in Geophysics;
2. THAT I am a member of the Association of Professional Engineers
of the Province of Saskatchewan, the Society of Exploration Geo-
physicists of America, and the British Columbia Geophysical Society;
3. THAT I have been practising my profession for the past eleven years.

Signed: 
Alan R. Scott, Geophysicist

22 July 1981



KEY PLAN

LEGEND:

- Approximate Location of Shoreline at Time of Survey
- X Fix Location
- △ Arbitrary Coring Locations Obtained from COMINCO LTD

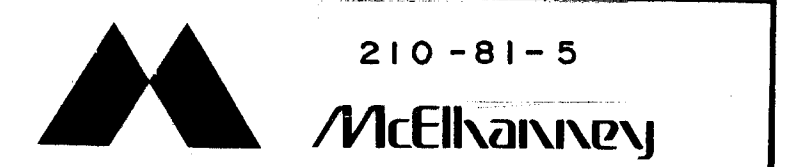
9380

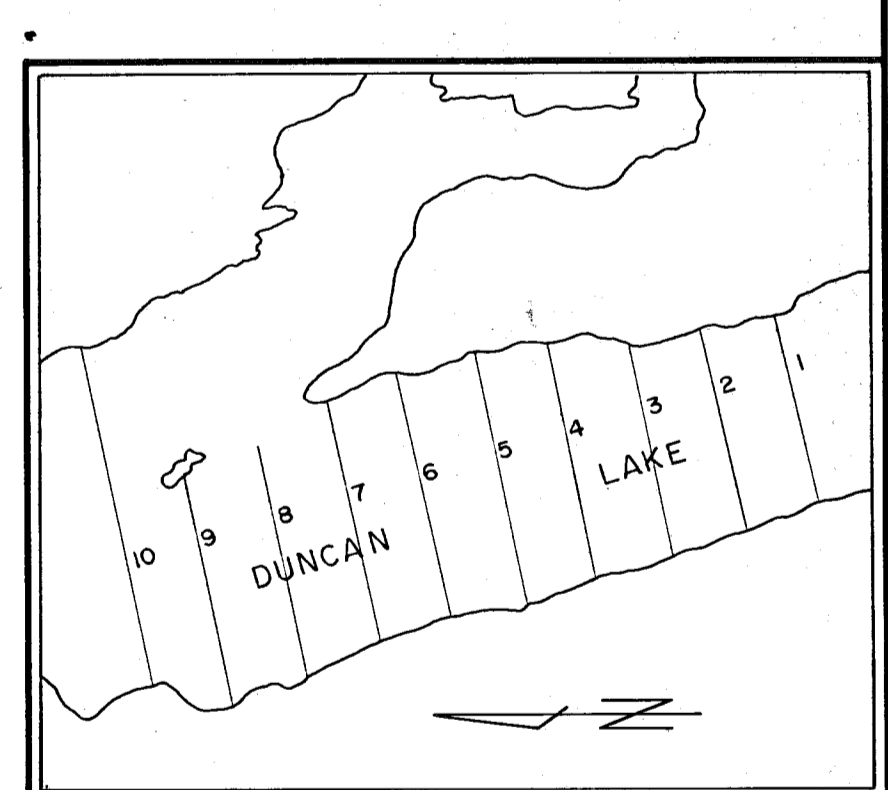
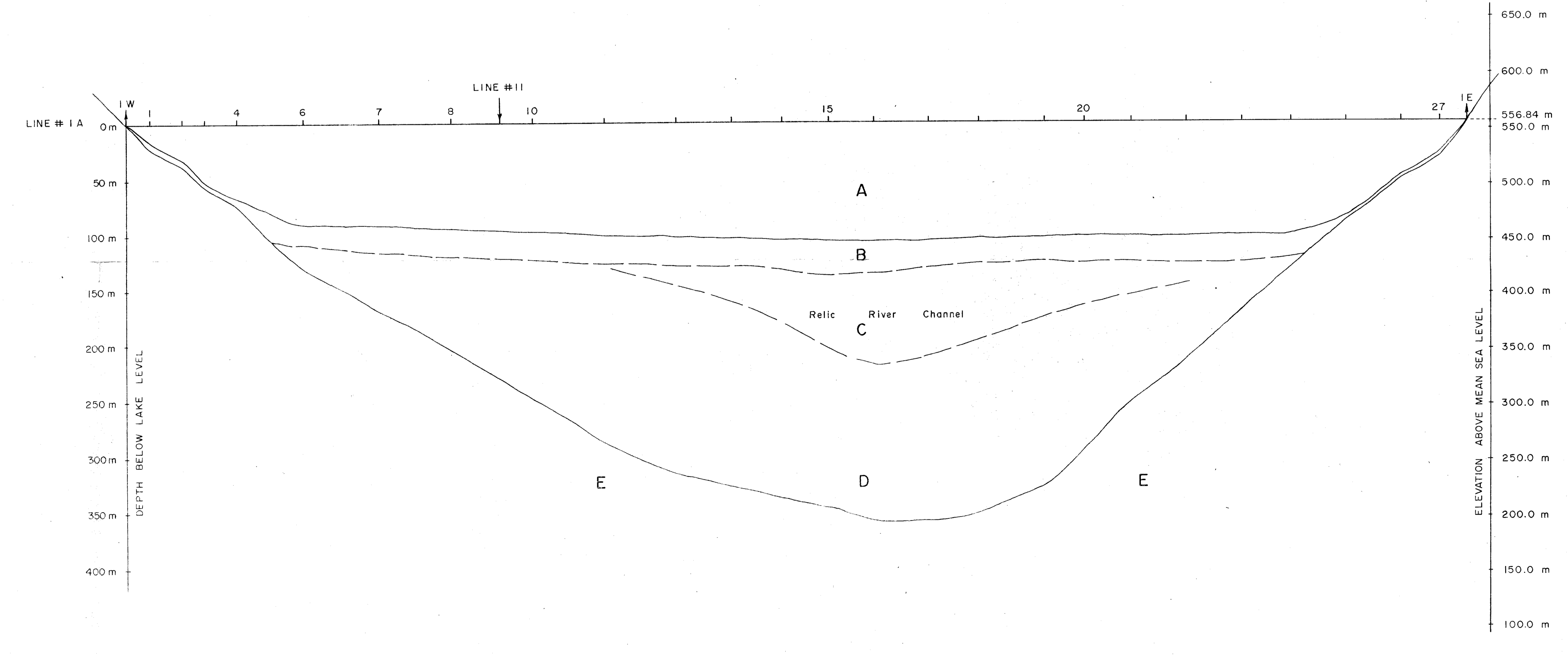
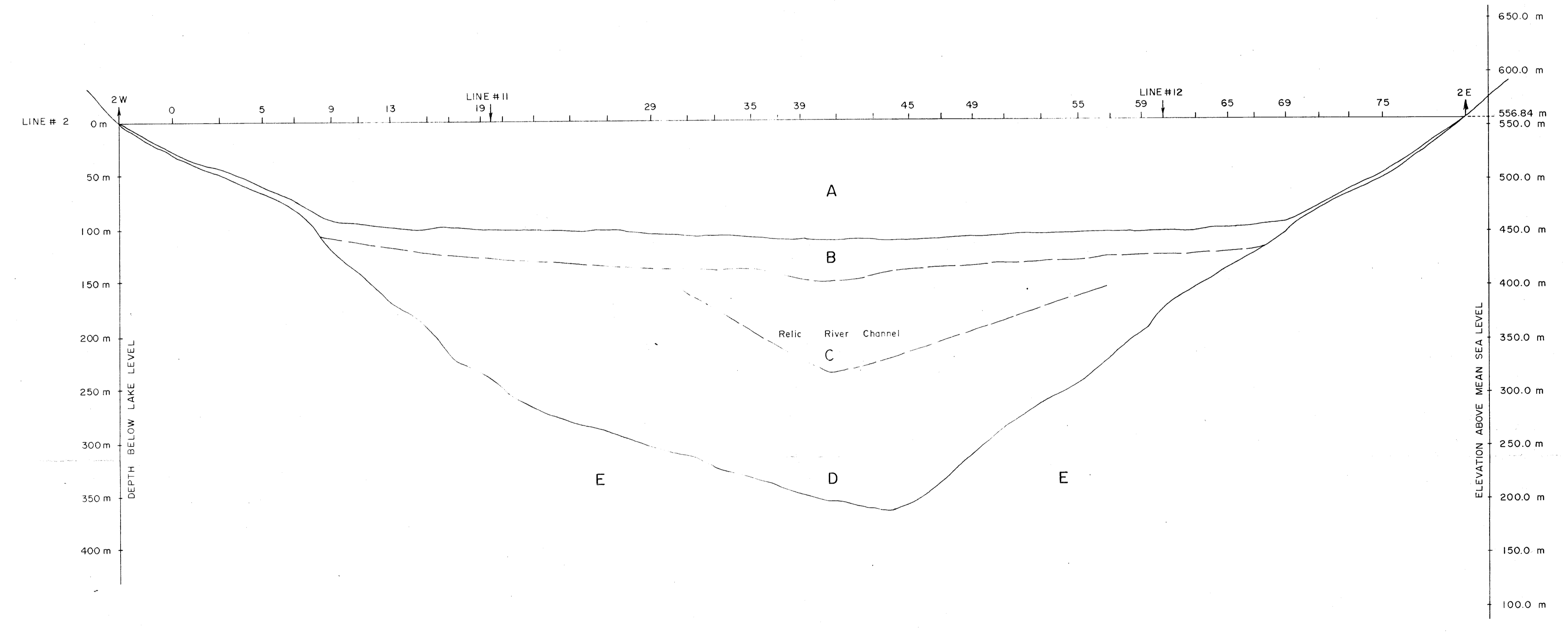
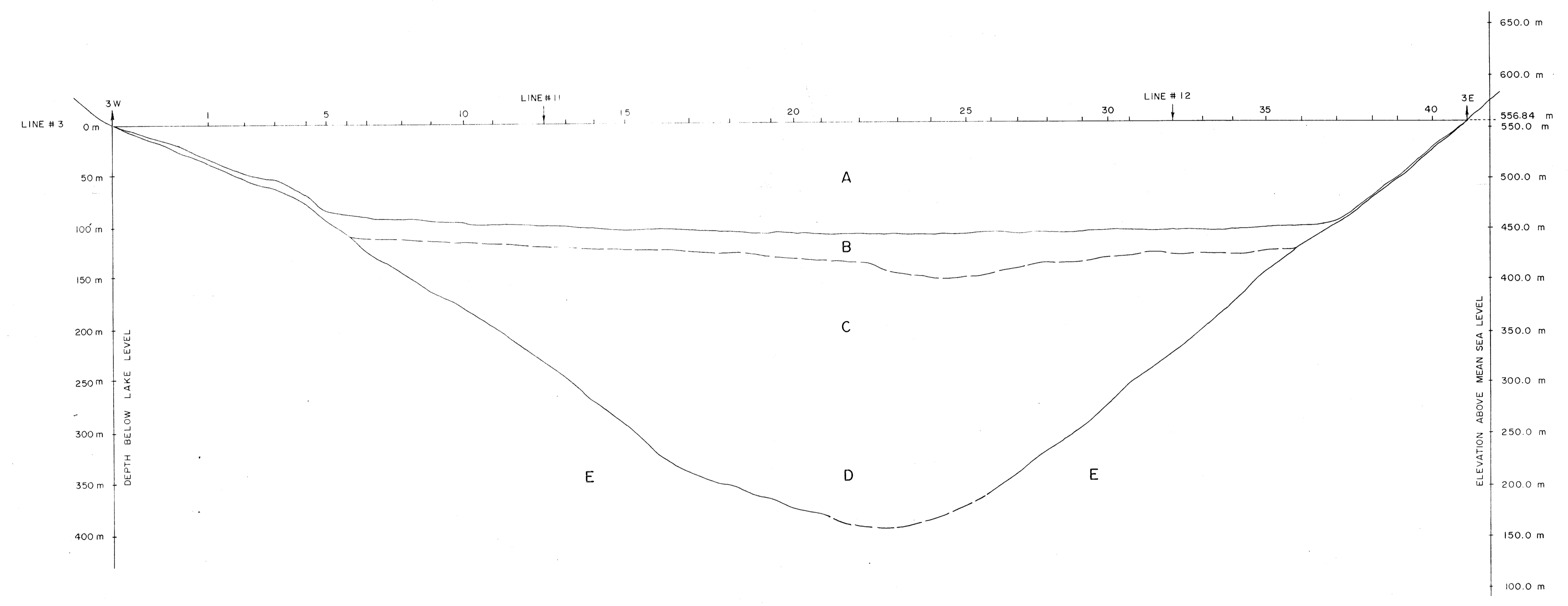
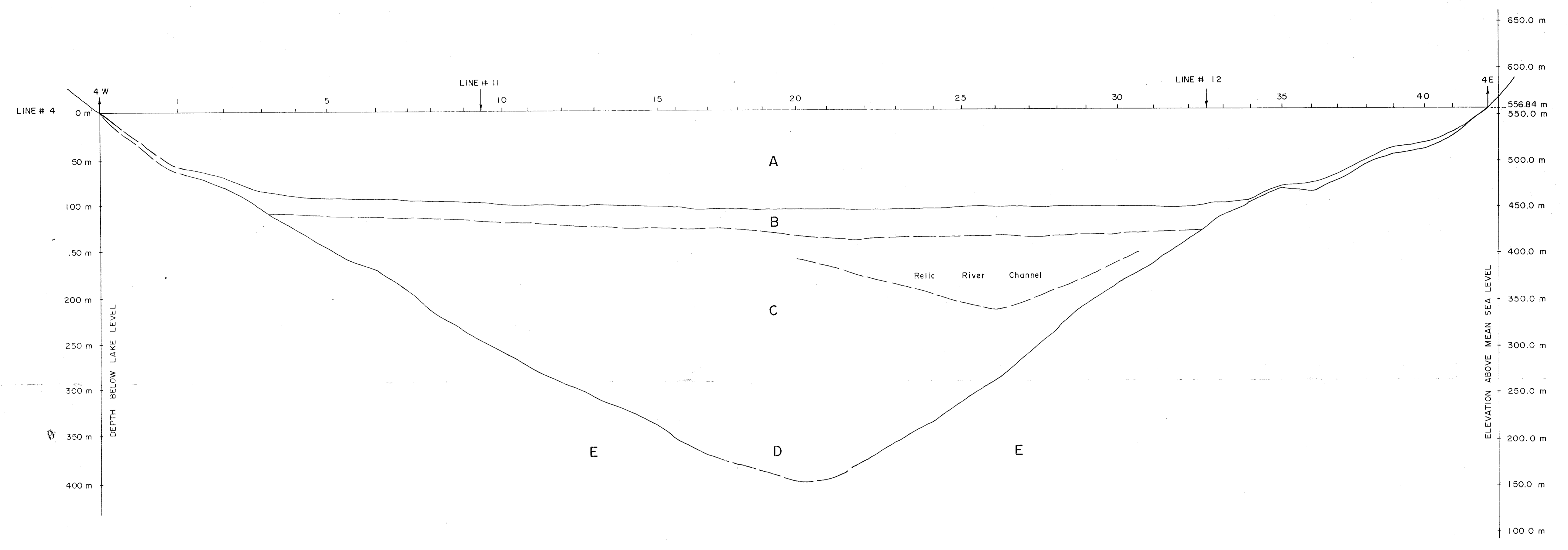
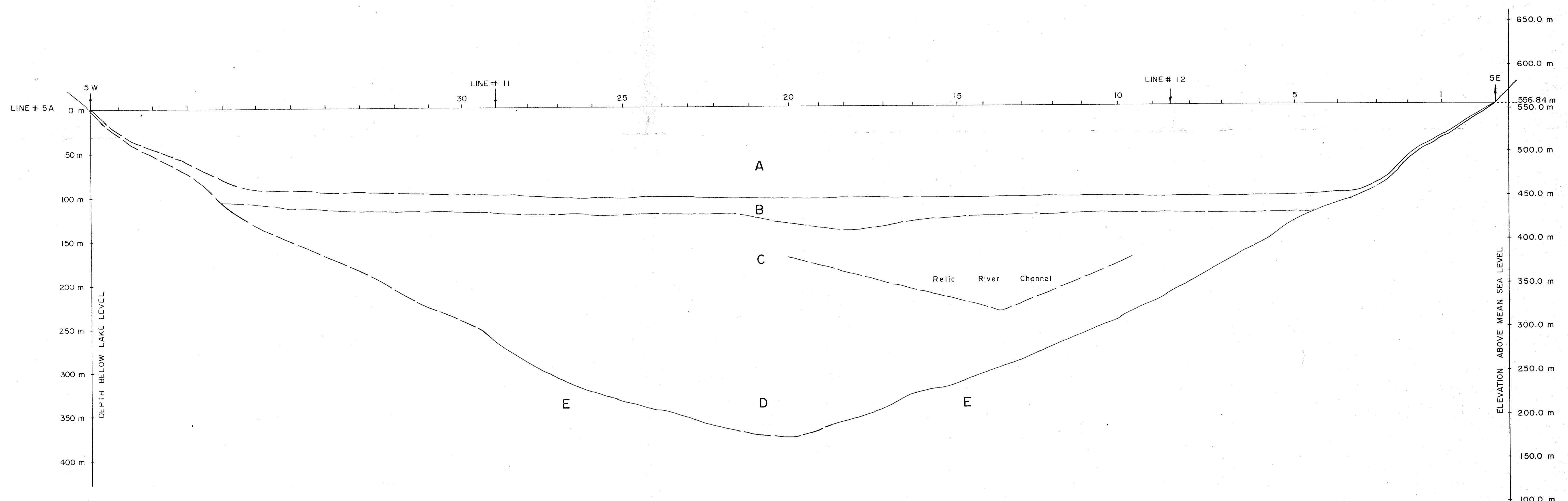
COMINCO LTD.

DUNCAN LAKE
HIGH RESOLUTION SEISMIC SURVEY

LINE LOCATION MAP

DATE	MAY 10, 1981
SCALE	1:5000
JOB NO.	086001
DWG NO.	DWN B.R.





KEY PLAN

LEGEND

- A - Water Column
- B - Layered Sediments
- C - Reworked Alluvium
- D - ? (Sediments)
- E - Bedrock

* Water level is set at 1827 ft. (556.84m).
 Taken from Duncan Dam visual water level gauge.
 --- Estimated boundary
 --- 1500 m/sec used to determine thickness of sediments.

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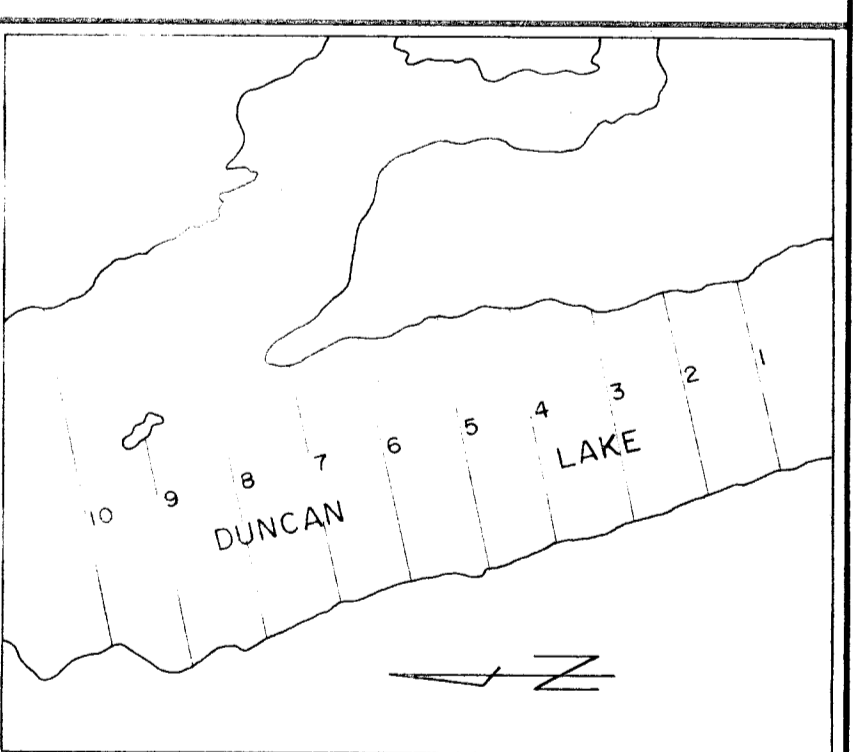
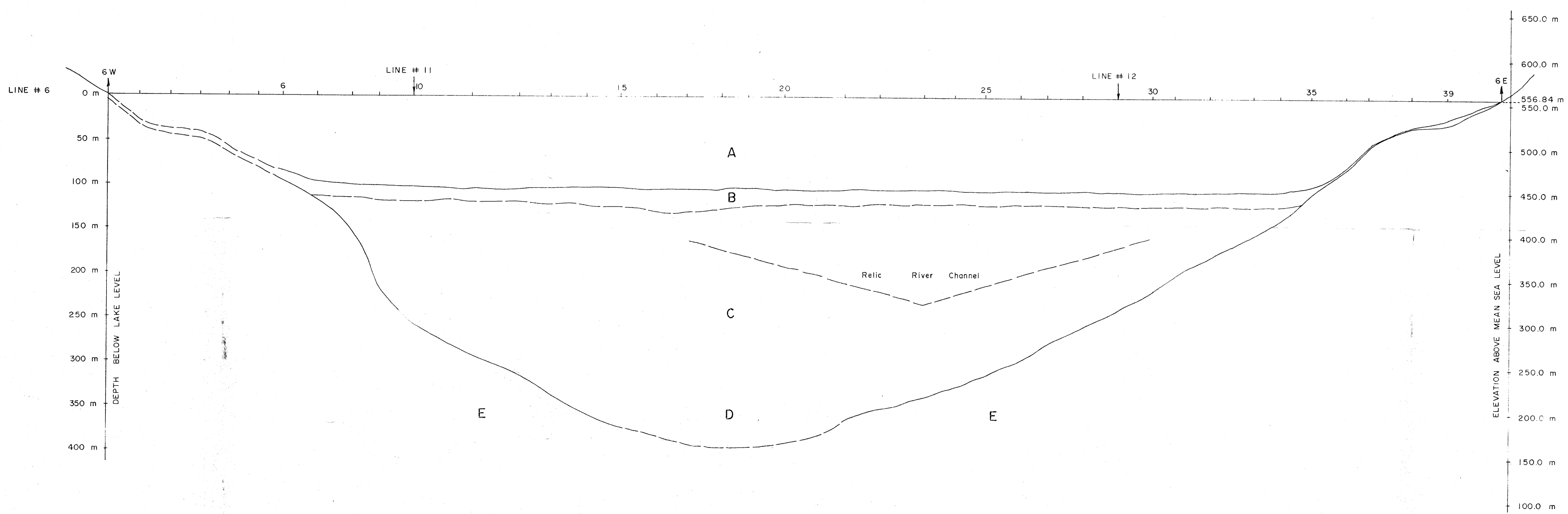
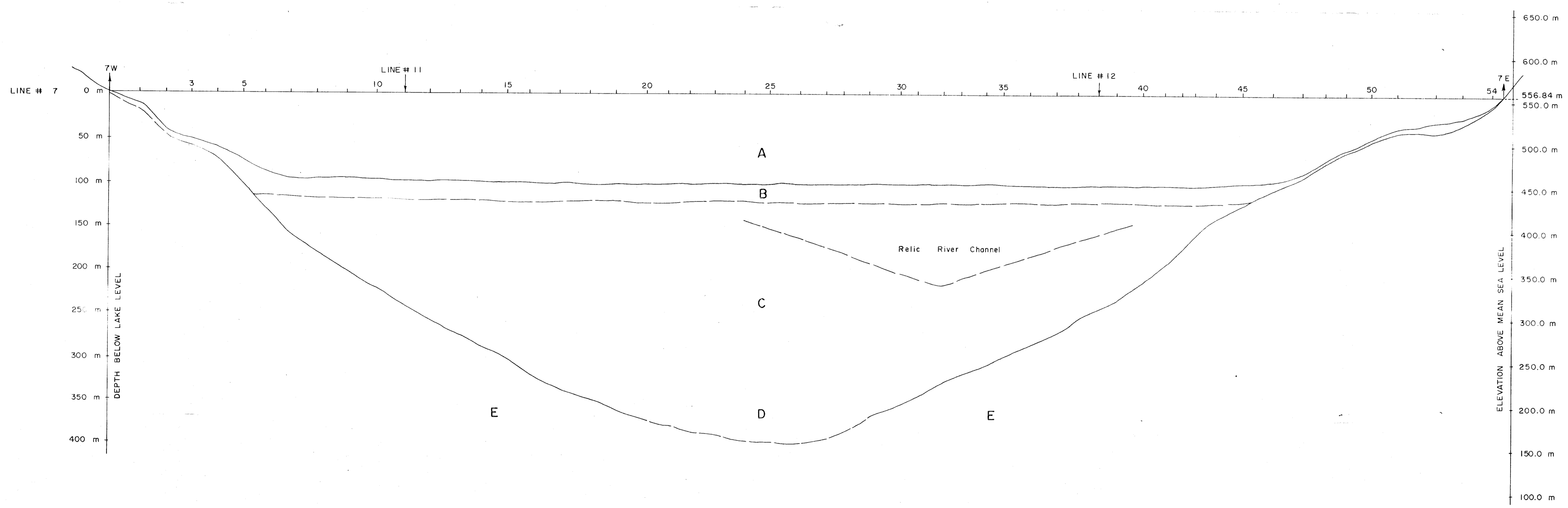
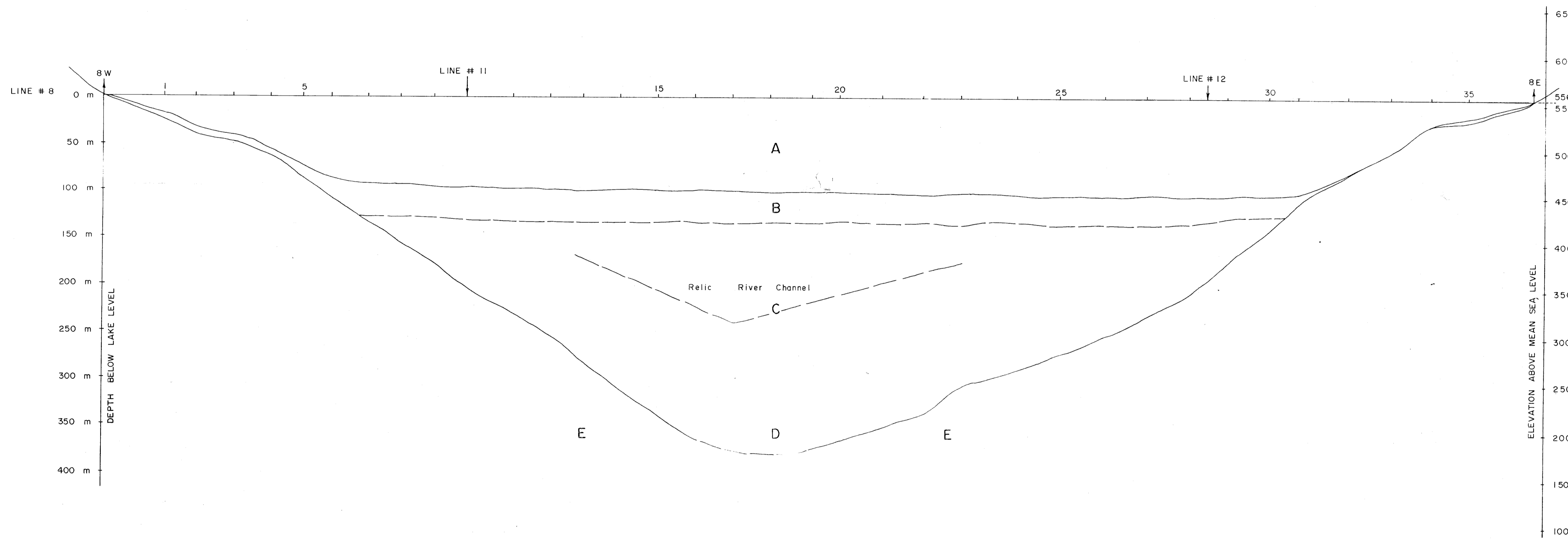
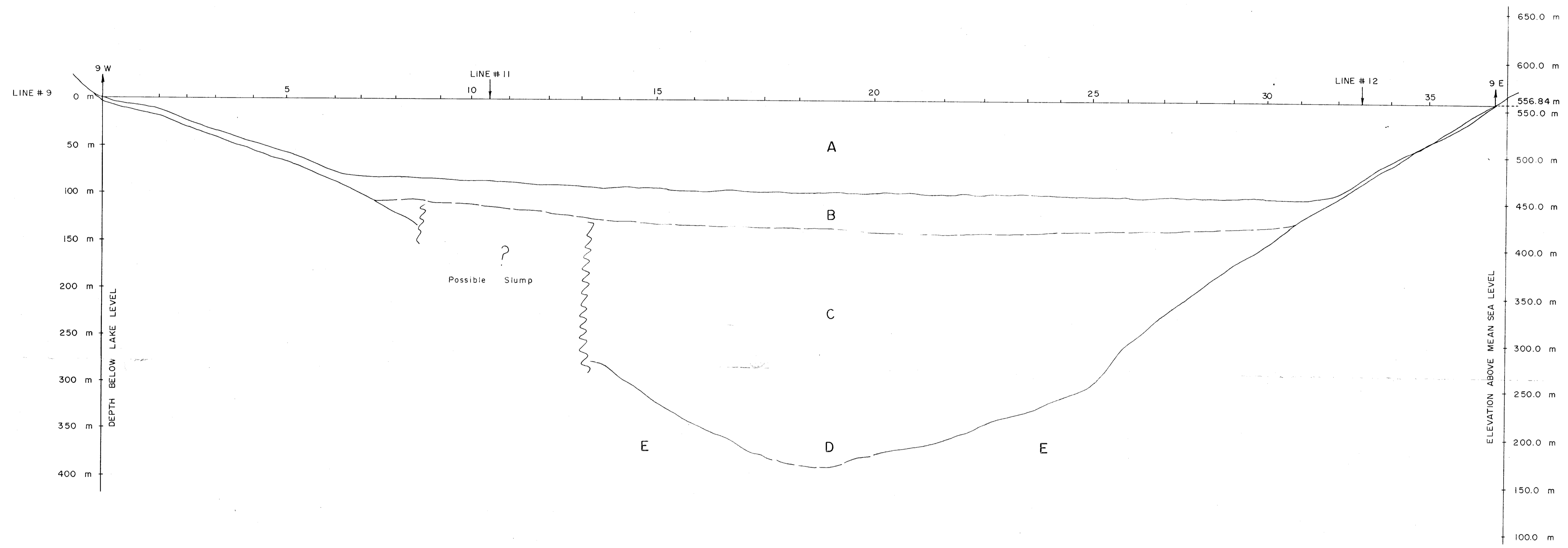
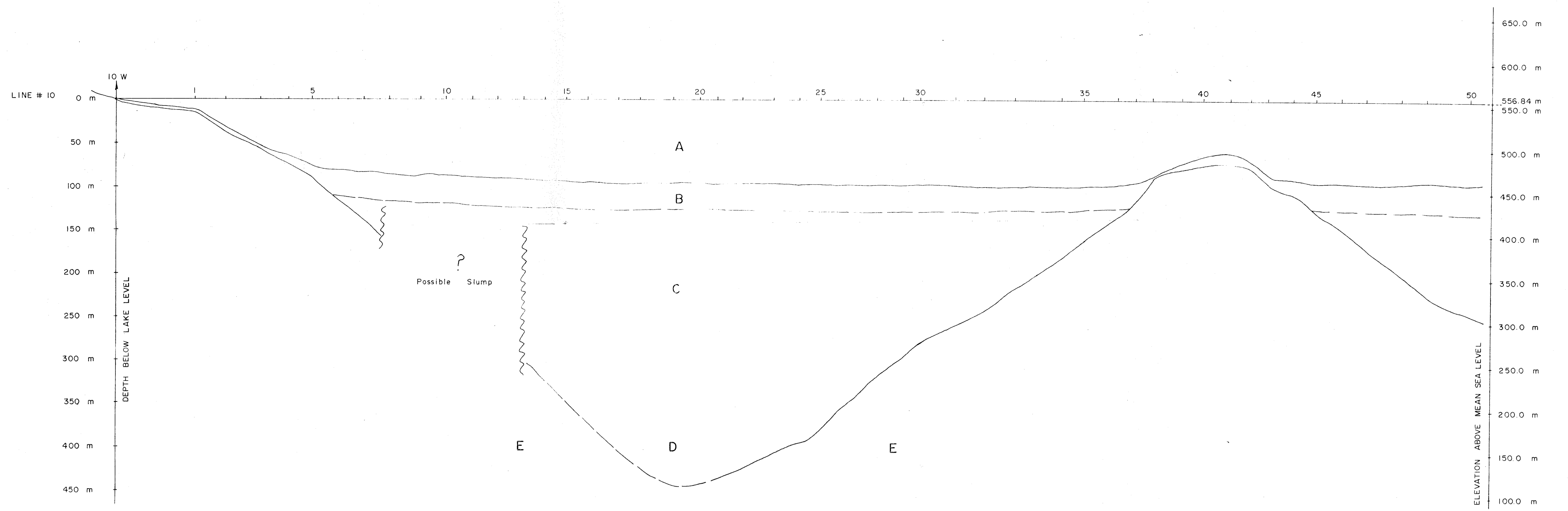
COMINCO LTD.

DUNCAN LAKE
 HIGH RESOLUTION SEISMIC SURVEY

STACKED PROFILE

DATE - MAY 12, 1981	DWN. - S.N.
SCALE - 1:2500	DWG. NO. 2A
JOB NO. 086001	

210-81-6
McElvaney



KEY PLAN

LEGEND

- A - Water Column
- B - Layered Sediments
- C - Dispersed Siltstone
- D - Siltstone
- E - Bedrock

* Water level is set at 1827 m. (556.84 m).
 Taken from Station 00m visual water level
 0051.

--- Estimated boundary
 - - - 1500 msec used to determine thickness
 of sediments.

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COMINCO LTD.

DUNCAN LAKE
 HIGH RESOLUTION SEISMIC SURVEY

STACKED PROFILE

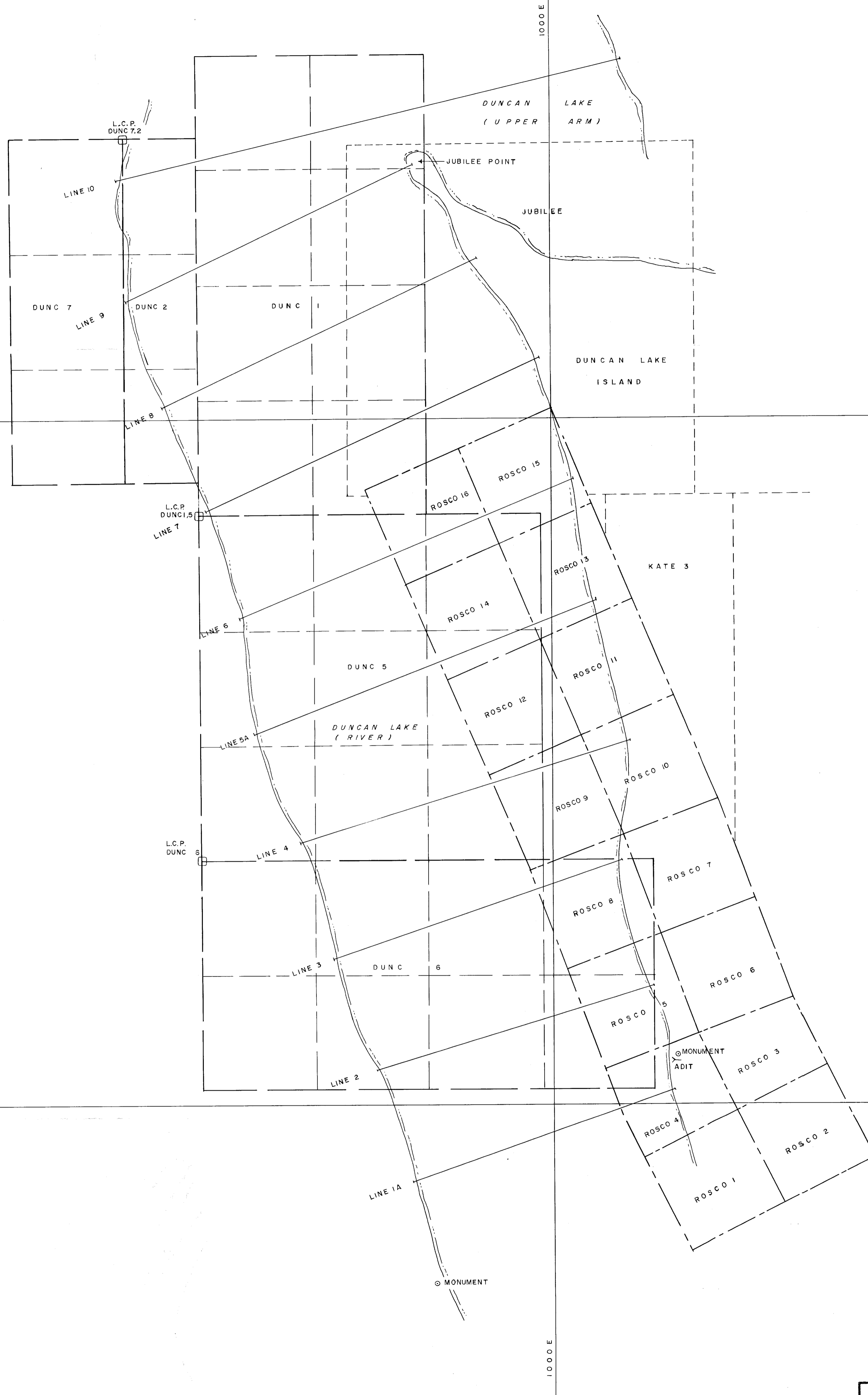
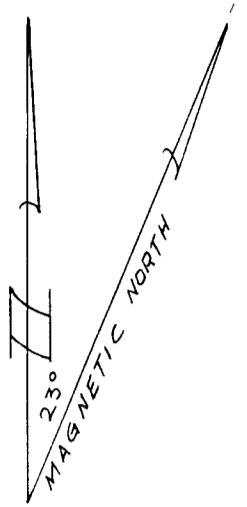
DATE - MAY 12, 1981

SCALE - 1:2500 DWN. - S.N.

JOB NO. 086001 DWG. NO. 2 B

210-81-7





- LAKE
- 1981 HYDROSONDE SURVEY LINE (BY McELHANNEY SURVEYING & ENGINEERING LTD. CALGARY, ALBERTA)
- ADIT
- MONUMENT
- L.C.P.
- LEGAL CORNER POST
- DUNC CLAIM BOUNDARY (APPROXIMATE LOCATION)
- DUNC UNIT BOUNDARY (APPROXIMATE LOCATION)
- ROSCO CLAIM BOUNDARY (APPROXIMATE LOCATION)
- JUBILEE CLAIM BOUNDARY (APPROXIMATE LOCATION)

ADIT CO-ORDINATES 10,222.270 N 1,546.101 E
 ADIT BEARING S 47° 03' 59" W

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DUNCAN LAKE PROPERTY				NTS 82M-7-W
Drawn by:		Traced by:		 CLAIM MAP SLOCAN M. D., B. C.
Revised by:	Date:	Revised by:	Date:	
Scale: 1:10,000		Date: JULY 1981		Plate: 210-81-8