



KLOHN LEONOFF
CONSULTING ENGINEERS

Our File: VA 2685

December 18, 1980

Placer Development Limited
700 Burrard Building
1030 West Georgia Street
Vancouver, B.C.
V6E 3A8

Mr. T.M. Allen

Geotechnical Work at
Surprise Lake

Dear Sirs:

Please find enclosed three copies of the above report related to placer leases held in the area by Placer Development Limited. We hope this meets with your approval.

Yours very truly,
KLOHN LEONOFF LTD.

6v

VINOD K. GARGA, P. Eng.
Project Manager

Encl.

PEM/VKG/mjl

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

8674

DRILLING AND SEISMIC REPORT
ON PLACER LEASES #2537 - #2552
ATLIN MINING DIVISION

104N / 12E
59° 35' N 133° 35' W

Our File: VA 2685

December 18, 1980

owner/operator: Placer Development Ltd.

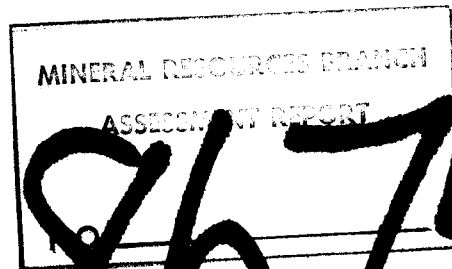


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1. INTRODUCTION

This report presents data obtained from field investigations near Surprise Lake for the proposed Mini-Hydro Scheme which forms part of the overall program to bring Placer Development's Adanac Molybdenum Mine into operation. The field work associated with Klohn Leonoff's involvement consisted of a drilling program supervised by our company and a hammer refraction seismic survey conducted by Silvicast Enterprises Ltd.

The property consists of 37 placer leases which run from Surprise Lake to Atlin Lake, not all of the claims are continuous due to previously staked placer leases on the area. A listing is as follows:

<u>Claim Name</u>	<u>Tag #</u>
PL 2530 - 2551	P 6760 - 6781
PL 2552	P 7709
PL 2553	P 7713
PL 2554 - 2767	P 7715 - 7728

The claims are shown on Drawing No. B-2685-205

The leases extend from Surprise Lake west along Pine Creek to its mouth on Atlin Lake about three kilometres south of Atlin, B.C. The eastern end of the leases have an access along Surprise Lake Road east from Atlin. The western end of the leases have an access from Warm Bay Road running south from Atlin.

Vegetation along Pine Creek Valley varies from low shrubs to scrub timber along the flood deposits to coniferous growth along the valley walls.

2. FIELD INVESTIGATIONS

2.1 Drilling Program

Five holes were drilled to determine the nature of the overburden and in two holes, the bedrock quality. The drill hole locations are shown on Drawing B-2685-204. Qualifications of Klohn Leonoff personnel are documented in Appendix 1.

The Contractor, Midnight Sun Drilling, elected to use a CME 750 rig for the drilling program, which began on August 7, 1980. Eight-inch diameter hollow stem augers were used above bedrock, except where the density or coarseness of the soil required the use of tricone bits and drilling mud. NQ size diamond bits were used to core the bedrock in Drill Holes #3 and #5. The core has been stored at the Adanac Ruby Creek Site.

2.2 Hammer Refraction Seismic Survey

The hammer refraction seismic survey was conducted by Mr. W.W. Moore, P. Eng. of Silvicast Enterprises Ltd. The survey description and the results are included in Appendix II. The location of the surveys are shown on Drawing B-2685-204.

3. RESULTS

The overburden samples recovered showed that the soils can be generally classified as silts and sand and gravels. Most of the overburden is in a dense condition as indicated by high values of the Standard Penetration test blow counts. Bedrock was encountered in Drill Hole #3 at a depth of 13 feet. The 21 feet of core that was recovered was siltstone in a highly fractured condition (i.e.,

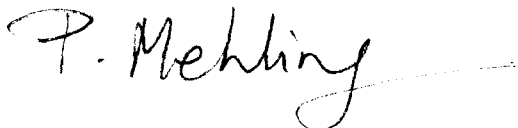
RQD = 0). In Drill Hole #5, bedrock was encountered at a depth of 49 feet and cored for 21 feet. Weathered serpentine was recovered with a high density of healed fractures. The total core recovery and RQD percentages are shown on the drill hole logs, which are listed in Appendix III. Water levels were estimated in mud filled holes after standing over night. These are shown on the drill hole logs. Photographs of representative samples and drill hole locations are documented in Appendix IV.

4.

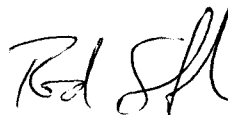
EXPENSES

An itemized list of expenses incurred on the drilling program is shown in Appendix V.

KLOHN LEONOFF LTD.



PERI E. MEHLING



H. RODNEY SMITH, P. Eng.

PEM/HRS/mjl

APPENDIX I

Personnel Qualifications

APPENDIX I
PERSONNEL QUALIFICATIONS

PERI E. MEHLING, E.I.T

- B.A.Sc., Civil Engineering, University of British Columbia, 1979.

Ms. Mehling has been involved in various aspects of geotechnical investigations, including drilling supervision, laboratory work and report preparation.

H. RODNEY SMITH, P.Eng.

- B.A.Sc., Engineering Geology, University of British Columbia, 1971.
- M.A.Sc., Mineral Engineering, University of British Columbia, 1975.
- M.Eng., Geological Engineering, University of California, Berkeley, 1980.

Mr. Smith has been involved in geotechnical investigation programs for slopes, foundations, tunnels and embankments. His responsibility has included field direction of investigations, slope design and report preparation.

APPENDIX II

Refraction Hammer Seismic Survey

Silvicast Enterprises Ltd.

1669

~~25~~ RIDGEWOOD DRIVE
CASTLEGAR, B.C., V1N 2L5

PHONE: BUS. 365-3136
RES. 365-6460

October 18, 1980

RECEIVED

OCT 20 1980

Klohn Leonoff Consultants Ltd.
10180 Shellbridge Way
Richmond, B.C. V6X 2W7

Klohn Leonoff Consultants Ltd.

Attention: Dr. V. Garga, P. Eng.

Dear Dr. Garga:

As requested by Mr. R. Smith of your organization, the following is a brief summary of the refraction hammer seismic survey conducted by us, for Placer Development Limited, at Atlin, B.C., during the month of August of this year.

Period of Survey: August 11 to 17, 1980.

Type of Survey: Two-man Hammer Refraction Seismic.

Equipment Used: Single channel, Model 1570-C Bison Signal Enhancement Seismograph, and 16-pound sledgehammer.

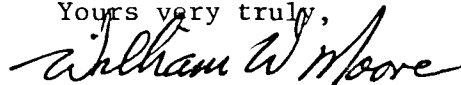
Location of Survey: On or adjacent to centre-line of proposed hydro canal, and power house sites between Surprise Lake and Atlin Lake, in the Spruce Creek drainage at Atlin, B.C.

Field Method: Under the direction of Mr. R. Smith and Mr. S. Porter of Klohn Leonoff, and at sites selected by them, 30 to 60 metre seismic lines were established on centre line, and transverse to centre line; using two geophones to provide reverse profile data.

Interpretation: The standard interpretation method, consisting of mathematical relationships between the critical distance and velocity ratios, was employed. Interpretation was performed to the best of my ability and experience. Nevertheless, inherent and well-known limitations of this system, e.g., side refraction, and overlapping velocities of various materials (see Caterpillar rippability charts) must be appreciated. It was obvious from the results that velocities in glacial fill are generally substantially greater in the survey area than in Southern B.C., probably as a result of denser compaction during periods of glacial activity.

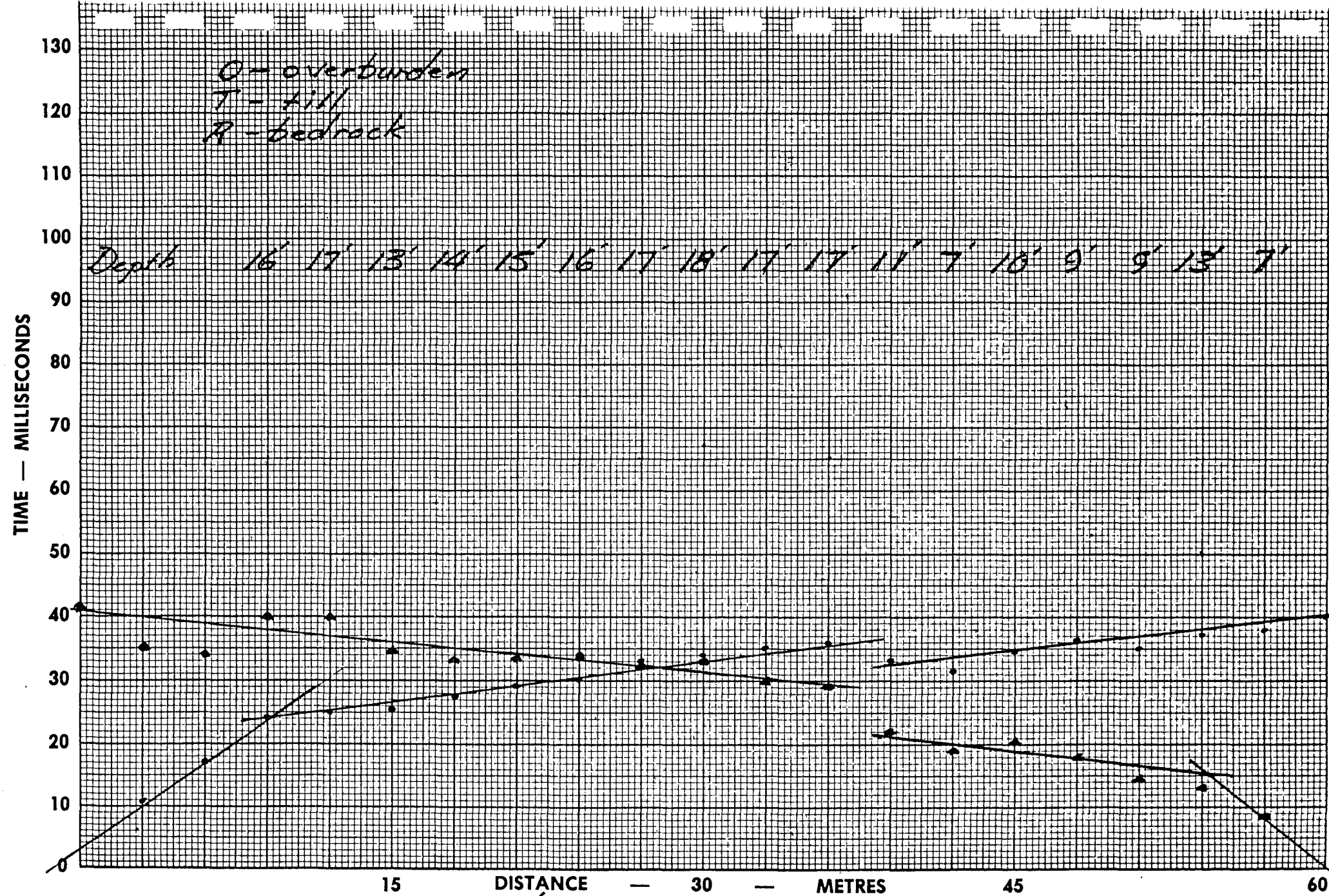
Trusting that the above information is satisfactory. We look forward to being of further service to your organization.

Yours very truly,



William W. Moore, M.F., P.Eng.
President

/bd



Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Kleha Leona Ft-Placer Traverse SZ-1

Location/Description Atlin - Lower Power house

Field Notes 0+00 @ lakeshore - clamp posts - Underhill pin #8
N66°E + 10% on ϕ

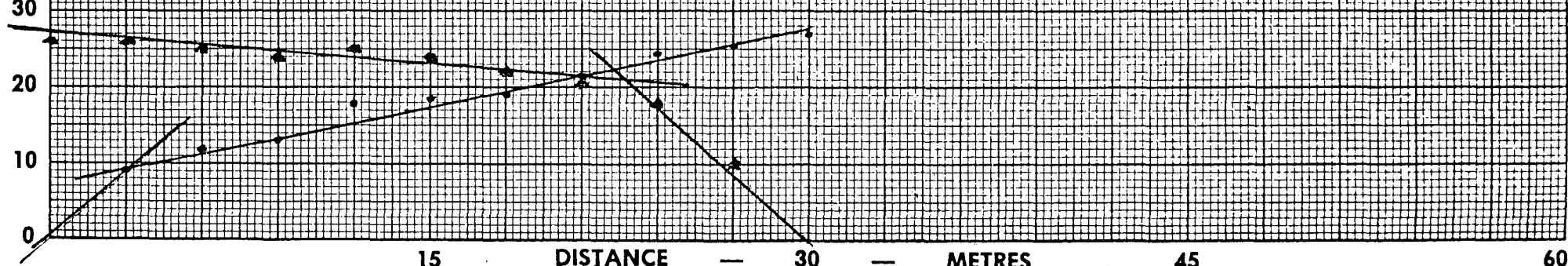
RESULTS

O	V1a = 1500's	V1b = 1200's
R	V2a = 8000's	V2b = 10,000's
	V3a = -	V3b = -
	D1a = 13'	D1b = 9'
	D2a = -	D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 METRES 45 60



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

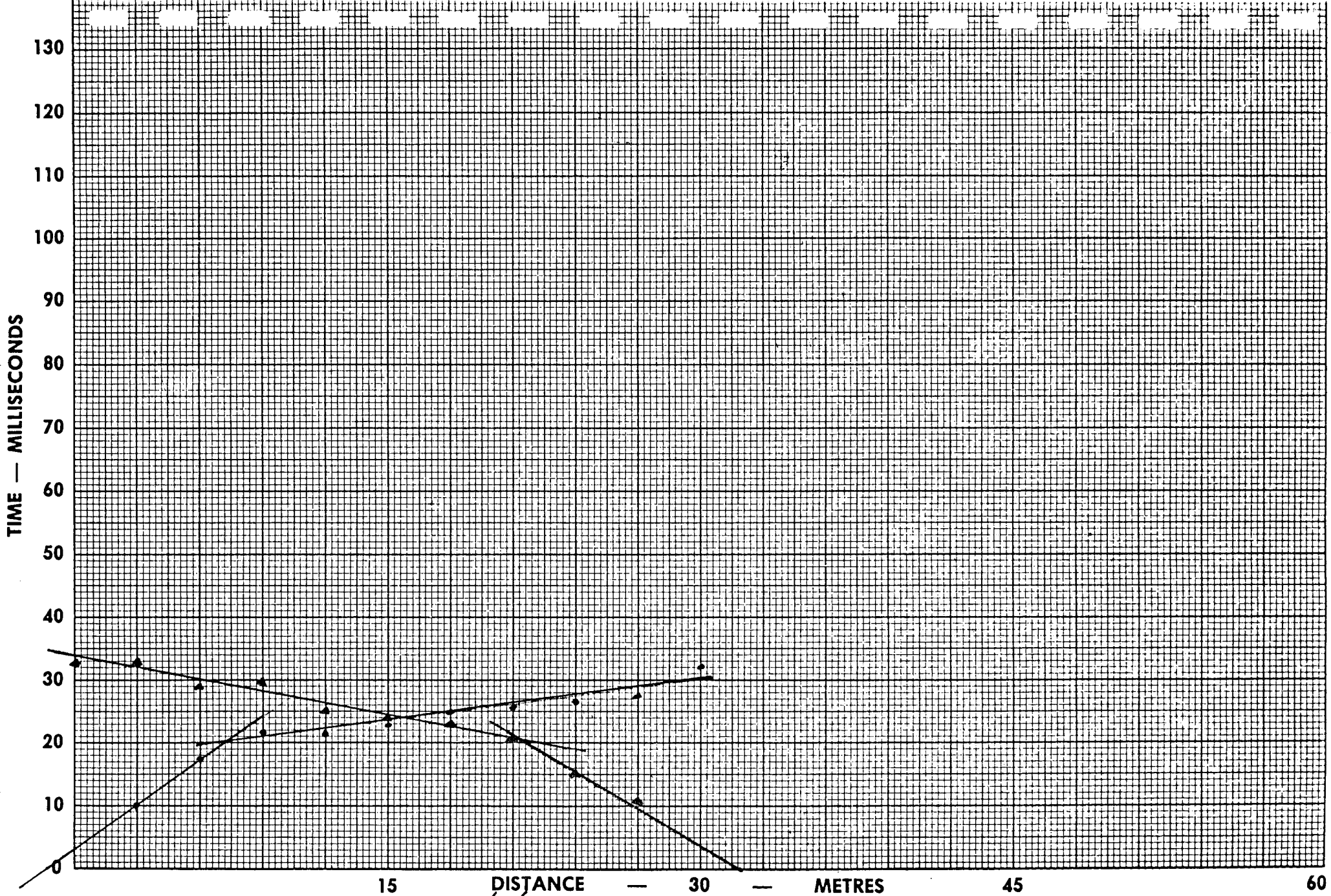
Job Klohn Leonoff-Placer Traverse 52-2

Location/Description Atlin-Lower Power house

Field Notes N 60° E + 8% 11 cft #1

RESULTS

O	V1a = 1100'/s	V1b = 1200'/s
R	V2a = 5000'/s	V2b = 12000'/s
	V3a = -	V3b = -
	D1a = 4'	D1b = 11'
	D2a = -	D2b = -



15 DISTANCE — 30 — METRES 45 60

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff Power Traverse 52-3

Location/Description Atlin-Lower Power house
0+00 @ 1400 of rd,

Field Notes N23W, 0° (perp. to #1)

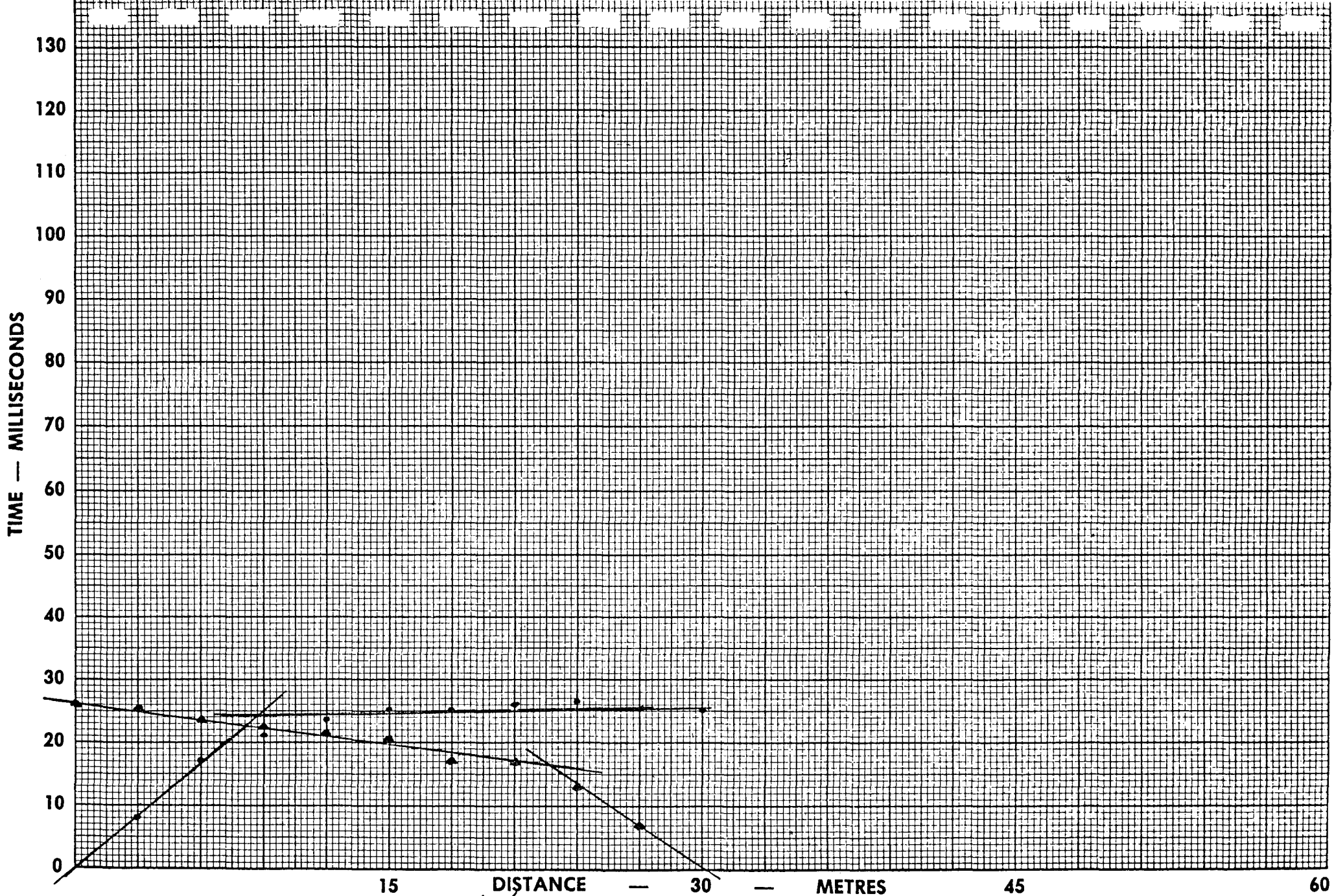
RESULTS

O	V1a = 1400' / s	V1b = 1750' / s
R	V2a = 7500' / s	V2b = 5000' / s
	V3a = -	V3b = -
	D1a = 10'	D1b = 11'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5



15 DISTANCE — 30 — METRES 45 60

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff - Placer Traverse 52-4

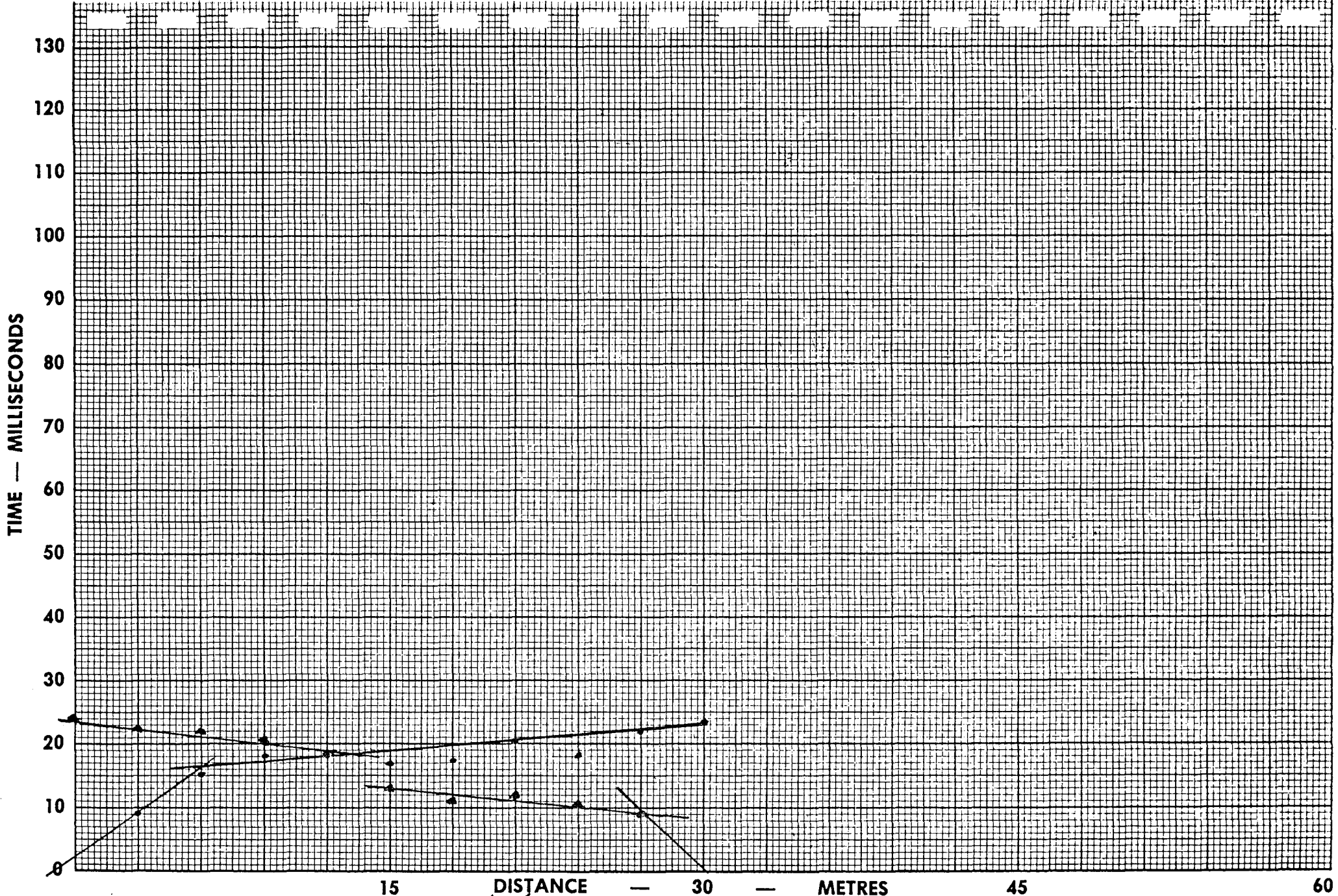
Location/Description Atlin - Lower Power house

Field Notes 55°W, -12%
0+00 @ bottom road bank, 100' N of E, 11'

RESULTS

O	V1a = 1200's	V1b = 1400's
R	V2a = 20000's	V2b = 8000's
	V3a = -	V3b = -
	D1a = 14'	D1b = 11'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5



15 DISTANCE — 30 — METRES 45 60

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job KlohnLeonoff-Placer Traverse 52-5

Location/Description Atlin-Lower Penstock

Field Notes 0+00 @ rock outcrop East on E, +10%

RESULTS

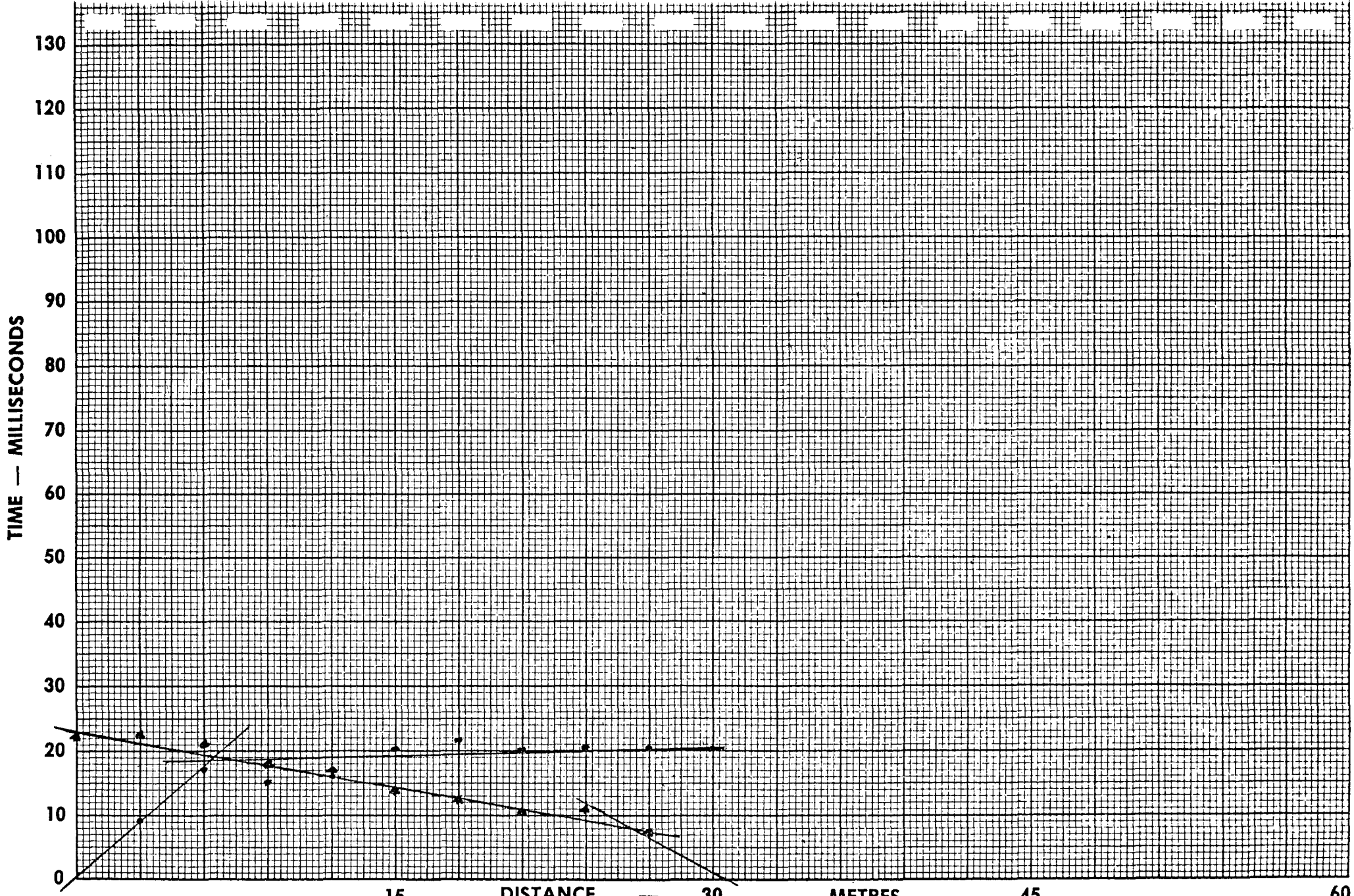
O	V1a = 1400'/s	V1b = 1000'/s
R	V2a = 9000'/s	V2b = 10,000'/s
	V3a = -	V3b = -
	D1a = 8'	D1b = 4'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

V1N 2L5



15 DISTANCE — 30 — METRES 45 60

Silvicast Enterprises Ltd.
 — HAMMER SEISMIC SURVEYS —
 1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
 VIN 2L5

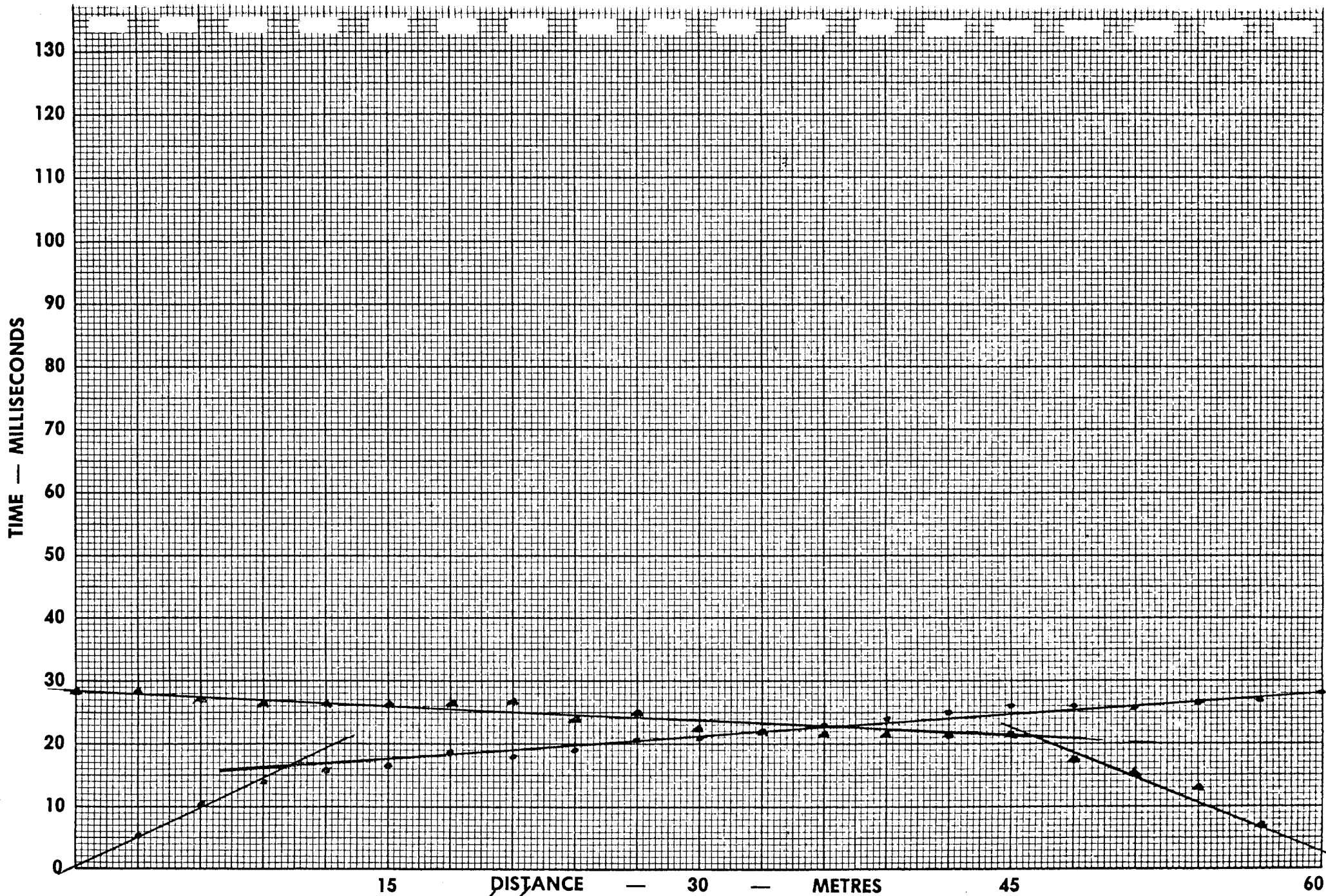
Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-6

Location/Description Atlin - Lower Peastock
on rock outcrops below claim post

Field Notes Perp to $N 20^{\circ} W, 0^{\circ}$

RESULTS
 O V1a = 1100/s V1b = 1600/s
 R V2a = 20000/s V2b = 5500/s
 V3a = - V3b = -
 D1a = 9' D1b = 4'
 D2a = - D2b = -



15 30 45 60
 DISTANCE — METRES

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohnkeonoff-Placer Traverse 52-7

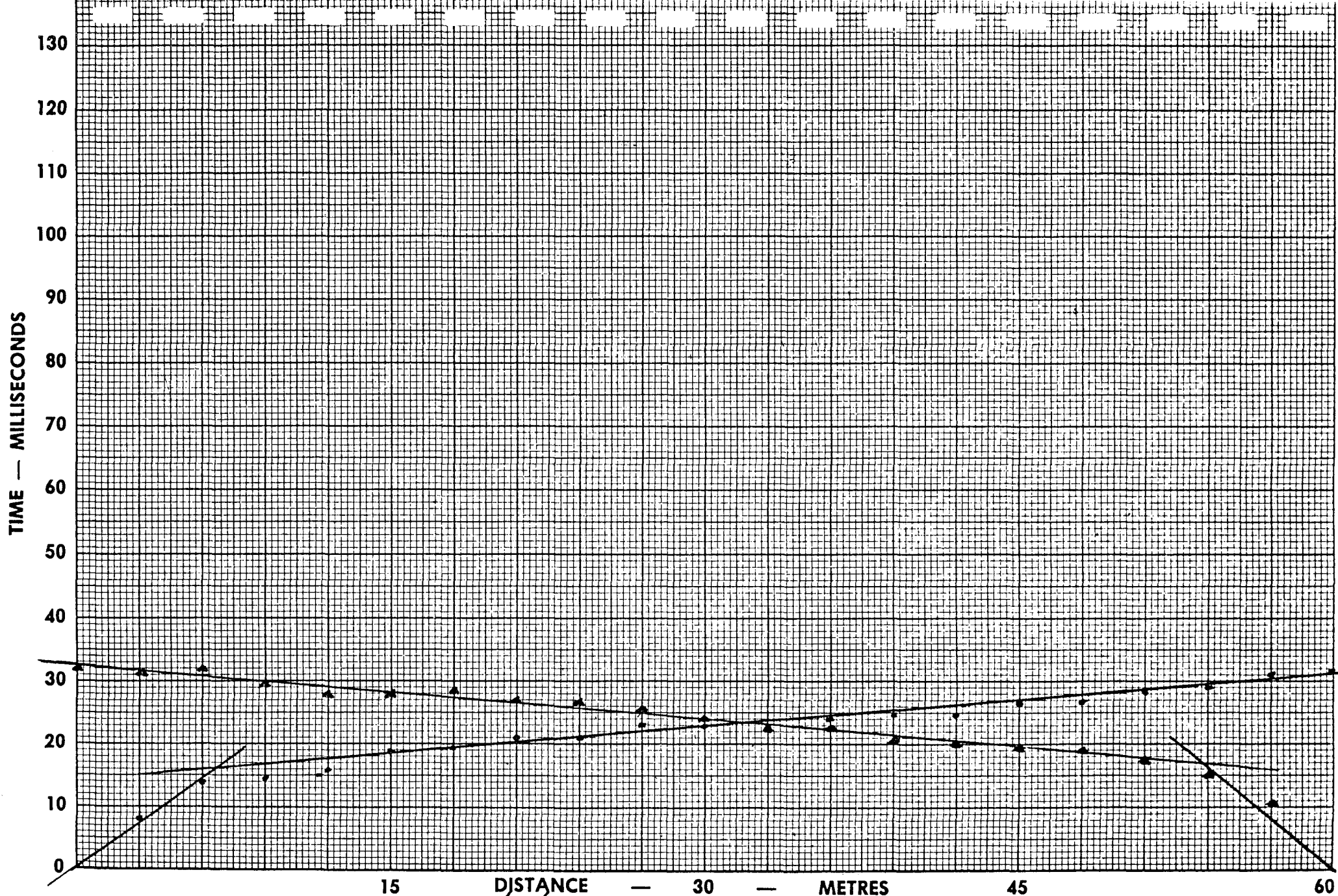
Location/Description Atlin - Upper Power house

Field Notes S85° E, 07°

RESULTS

T	V1a = 2100' / s	V1b = 2400' / s
R	V2a = 15000' / s	V2b = 15000' / s
	V3a = -	V3b = -
	D1a = 14'	D1b = 19'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.
 — HAMMER SEISMIC SURVEYS —
 1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
 V1N 2L5



15 DISTANCE — 30 — METRES 45 60

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job K/John Leonard-Placer Traverse 52-8

Location/Description Atlin-Upper Powerhouse

Field Notes S 80° E 0%
"Underhill" pin #12 @ 90'

RESULTS

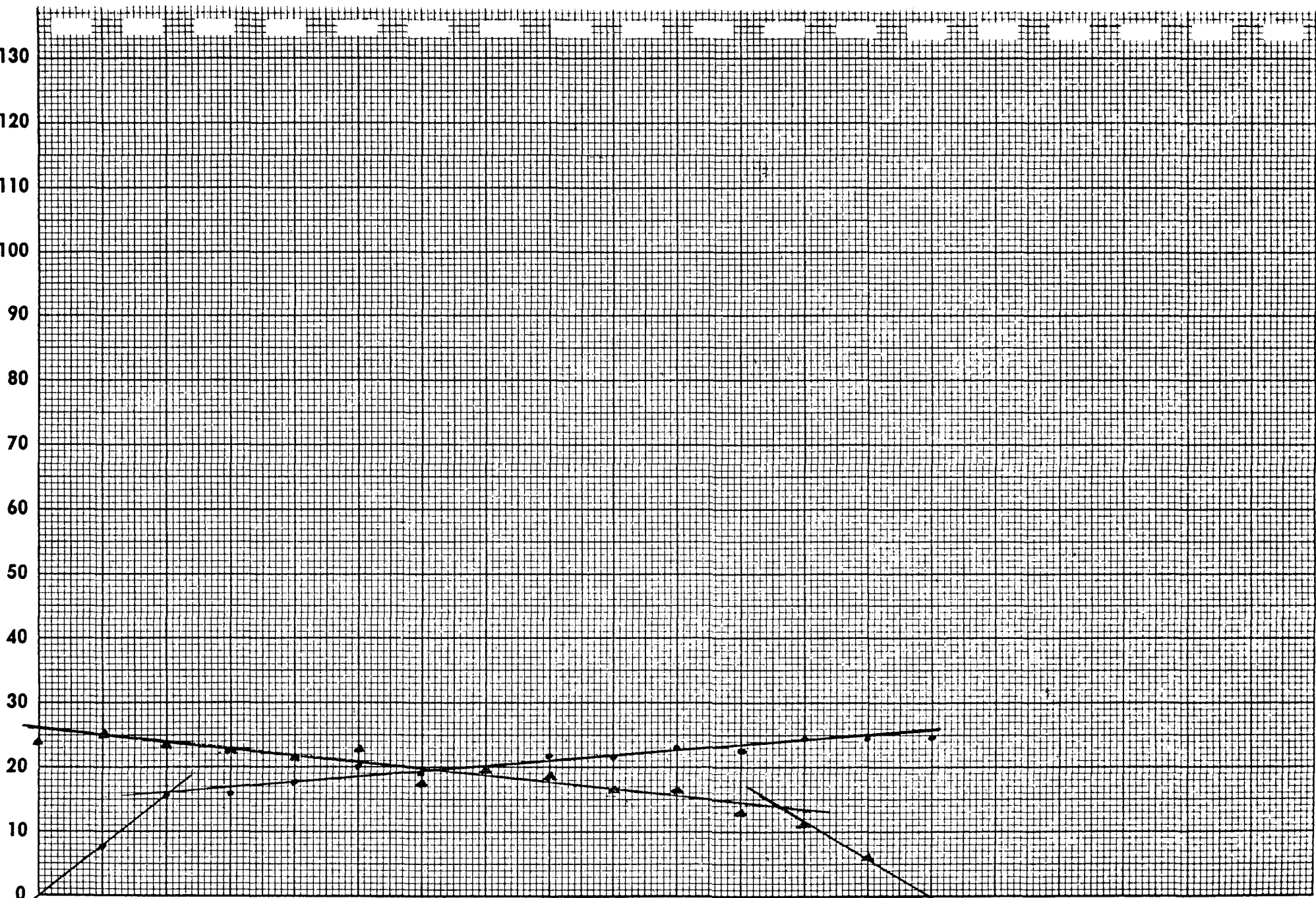
T	V1a = 1400'/s	V1b = 1200'/s
R	V2a = 12500'/s	V2b = 12000'/s
	V3a = -	V3b = -
	D1a = 9'	D1b = 9'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — METRES 30 45 60



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

V1N 2L5

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

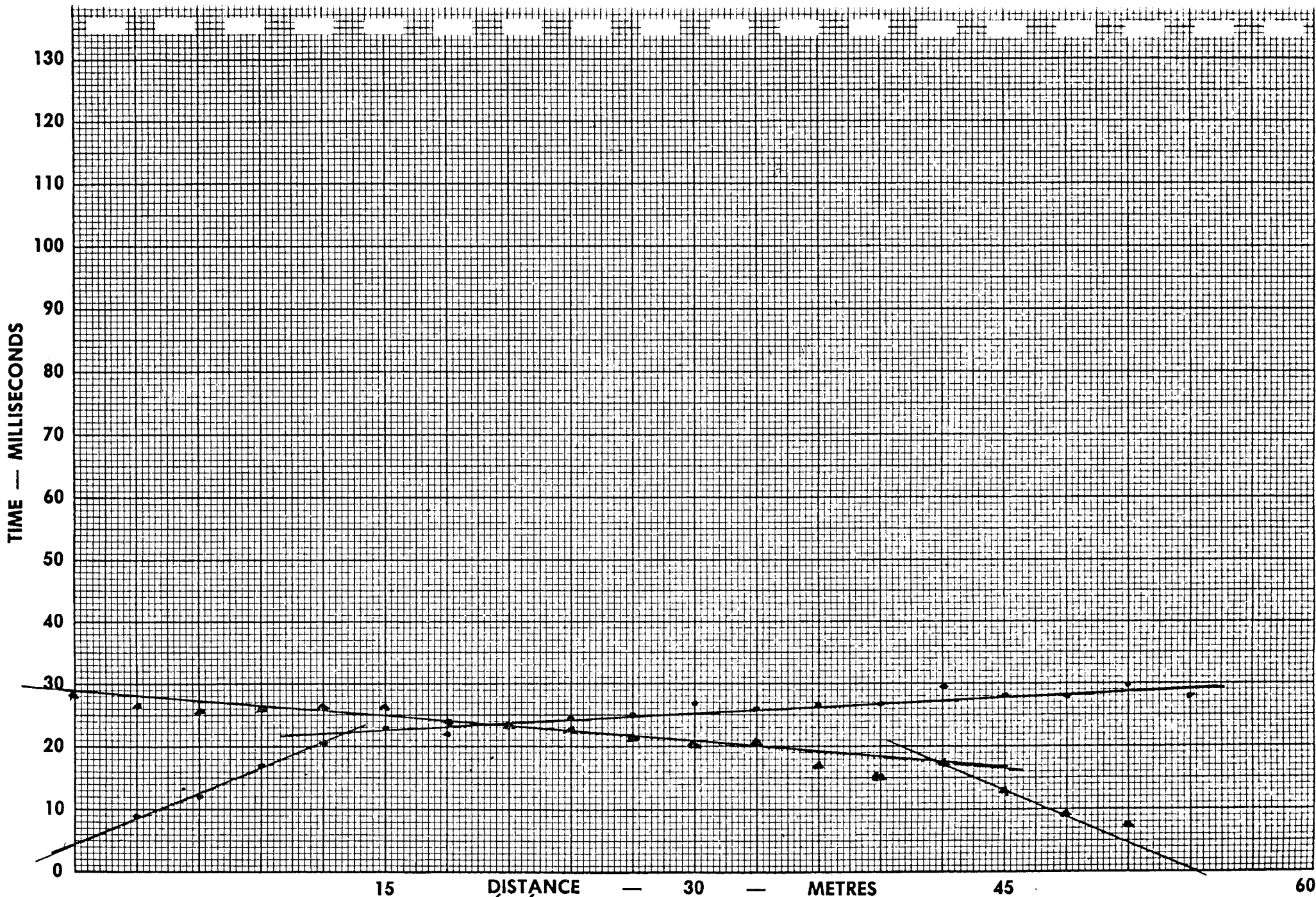
Job Kloha Lenott-Placer Traverse 5209

Location/Description Atlin - Upper Power house

Field Notes N, 0% overlaps # 7 @ 20' (50' on 7)
140' @ foot of bank

RESULTS

T	V1a = 1200' / s	V1b = 1850' / s
R	V2a = 13000' / s	V2b = 10000' / s
	V3a = -	V3b = -
	D1a = 9'	D1b = 11'
	D2a = -	D2b = -



15 DISTANCE — 30 — METRES 45 60

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Klehn Leon H-Placer traverse 52-10

Location/Description Atlin-Upper Passerhouse

Field Notes N50W, 0%
10' @ claim post - Underhill pin #323

RESULTS

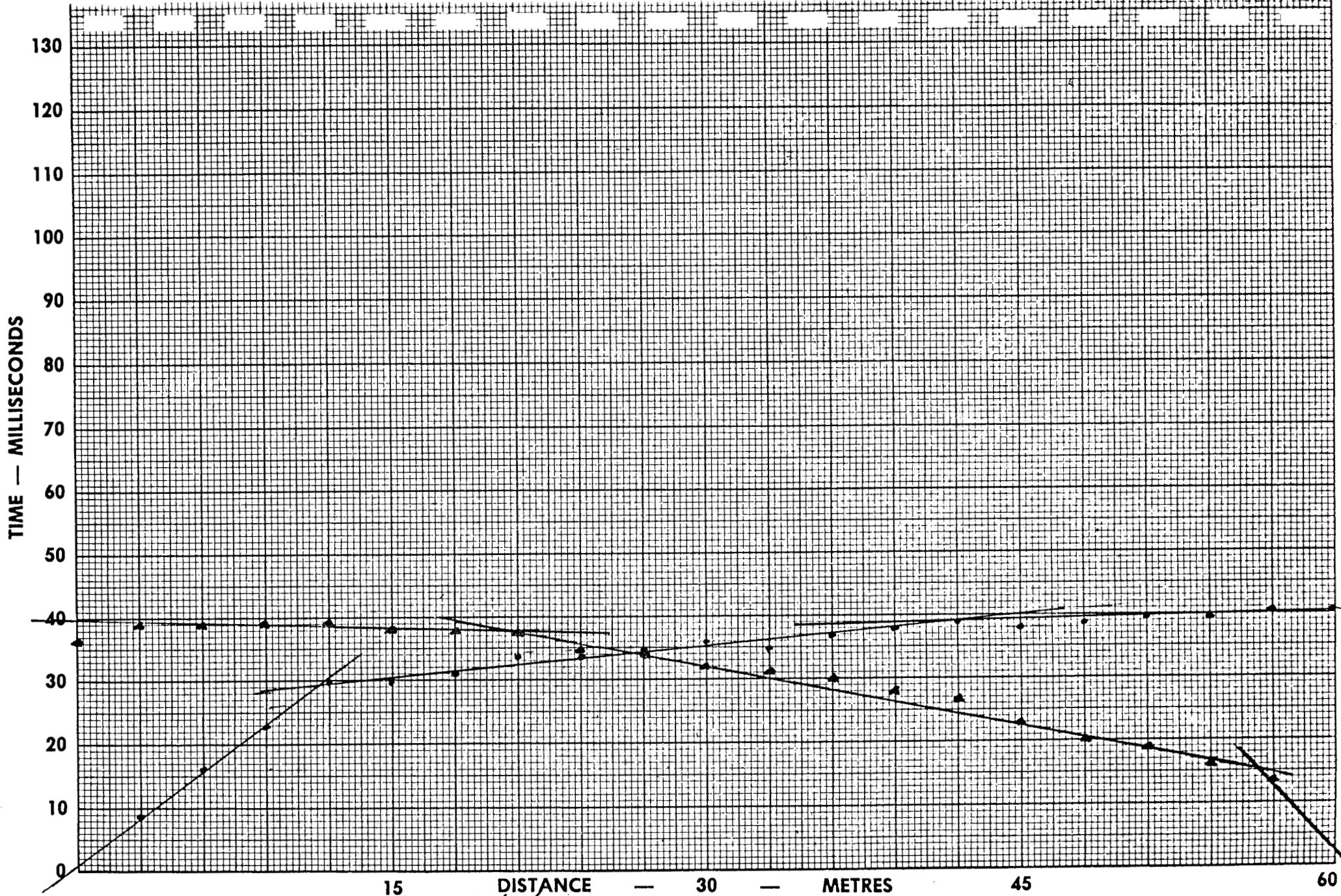
T	V1a = 2500' / s	V1b = 2900' / s
R	V2a = 15000' / s +	V2b = 12000' / s
	V3a = -	V3b = -
	D1a = 19'	D1b = 16'
	D2a = 3	D2b = -

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

VIN 2L5



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

VIN 2L5

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

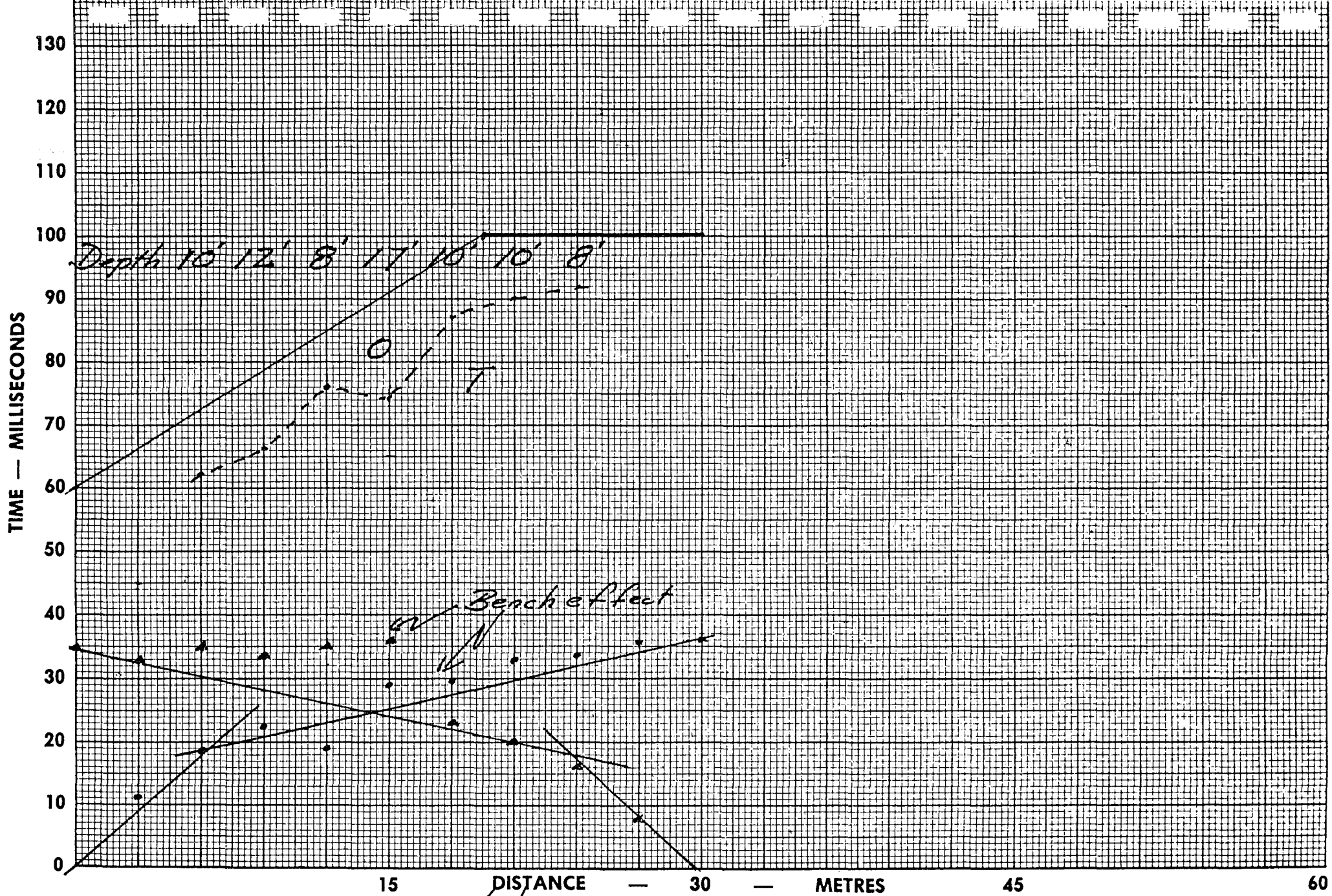
Job Klehn Leon off-Place traverse 52-11

Location/Description Atlin-Spruce Cr. Diversion
along edge of road below bank

Field Notes N 4014, 070, 100' opposite BN 4456

RESULTS

O	V1a = 1400'/s	V1b = 900'/s
T	V2a = 10000'/s	V2b = 5000'/s
R	V3a = 20000'/s	V3b = 20000'/s
	D1a = 17'	D1b = 6'
	D2a = 50'	D2b = 55'



15 DISTANCE — 30 — METRES 45 60

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —
 1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
 VIN 2L5

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

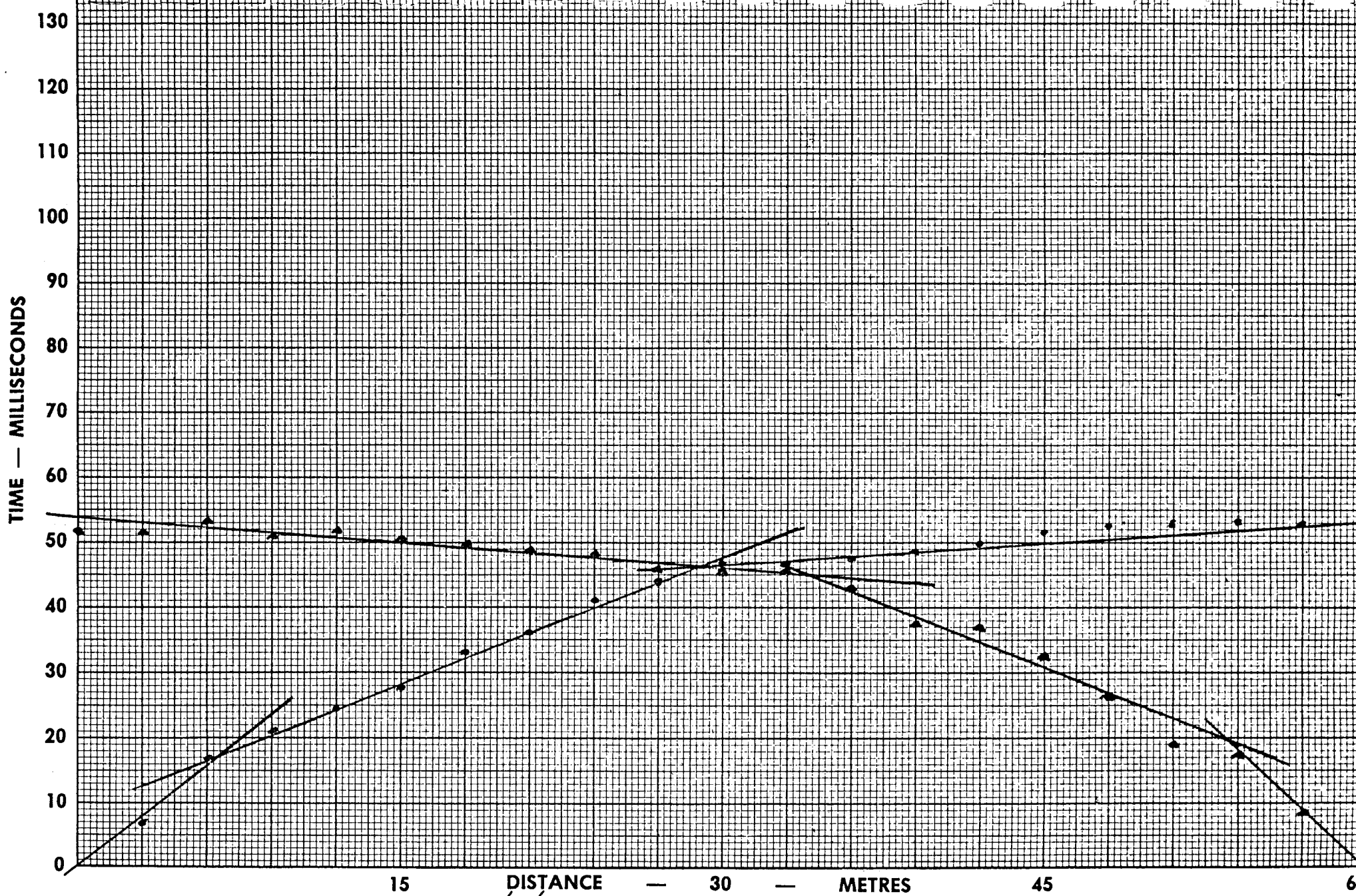
Job Klohn Leonoff-Placer Traverse 52-12

Location/Description Spruce Cr. Diversion

Field Notes 0' @ bottom of bank (Bm-79-4456)
6.5' @ top edge bank (60%±)

RESULTS

O	V1a = 1100' / s	V1b = 1100' / s
T	V2a = 4600' / s	V2b = 4600' / s
	V3a = -	V3b = -
	D1a = 8'	D1b = 8'
	D2a = -	D2b = -



15 30 45 60
 DISTANCE — METRES

Date 12/8/80 Operator: W.W. MOORE, P. ENG.

Job Klobukonoff-Placer Traverse 52-13

Location/Description Atlas-Spruce Cr. Diversion

Field Notes N 32° 14' 09" W
across top edge bench 100' @ 65' of d. 12

RESULTS

O	V1a = 1200'/s	V1b = 1050'/s
T	V2a = 2500'/s	V2b = 2500'/s
R	V3a = 15000'/s	V3b = 13000'/s
	D1a = 6'	D1b = 6'
	D2a = 45'	D2b = 40'

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —
 1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
 VIN 2L5

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Date 13/8/80 Operator: W.W. MOORE, P. ENG.

Job Klein Leonoff-Placer Traverse 52-14

Location/Description Atlin-Lower Canal

Field Notes N26°E, 0%
50' @ 50' of 15

RESULTS

O	V1a = 800'/s	V1b = 1200'/s
T	V2a = 2200'/s	V2b = 3200'/s
R	V3a = 20000'/s	V3b = 15000'/s
	D1a = 3'	D1b = 3'
	D2a = 22'	D2b = 28'

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

V1N 2L5

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 13/8/80 Operator: W.W. MOORE, P. ENG.

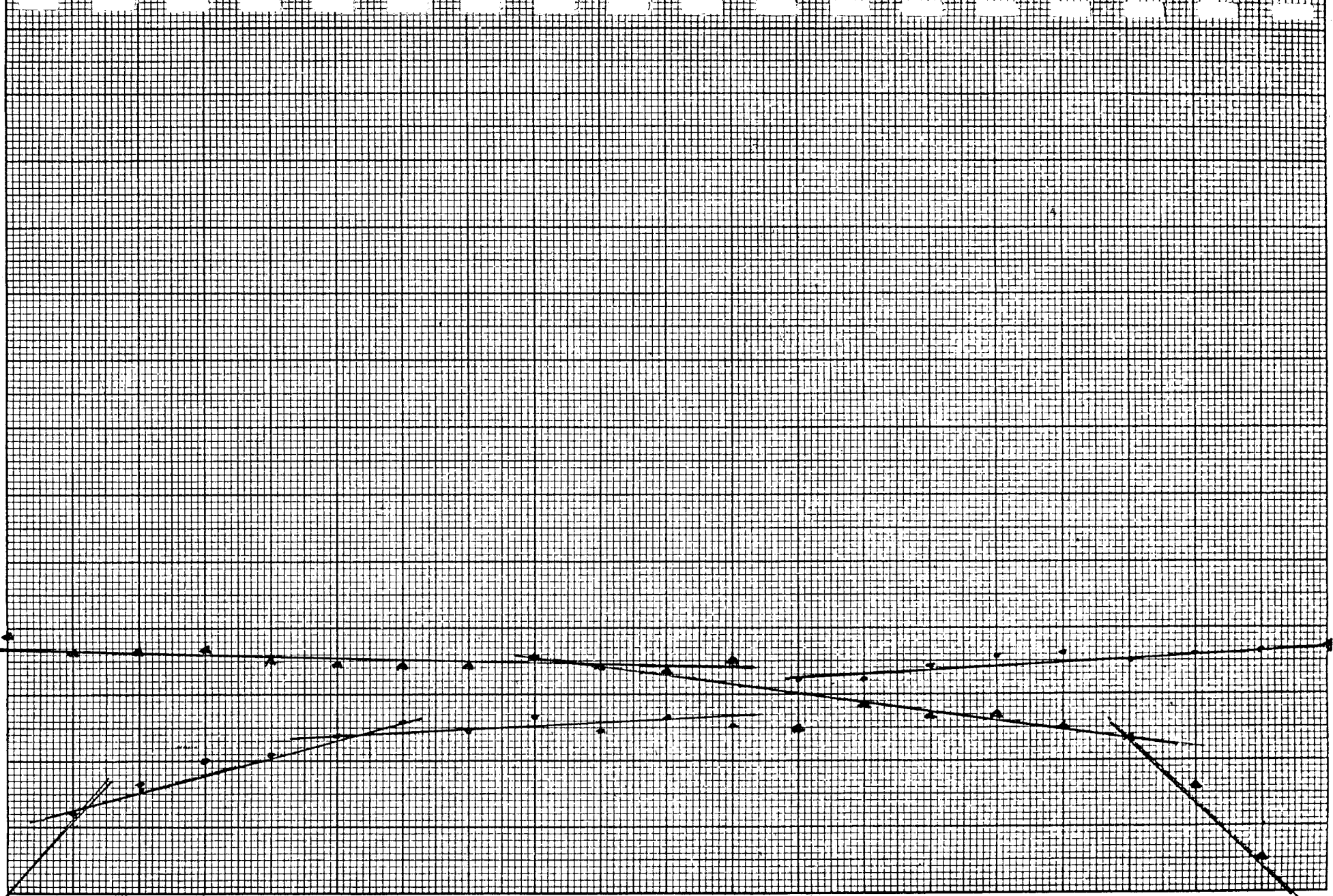
Job Klohn Leonoff - Placer Traverse 52-15

Location/Description Atlix-Lower Canal
N70°W, -38%

Field Notes 50' @ 50' of # 14

RESULTS

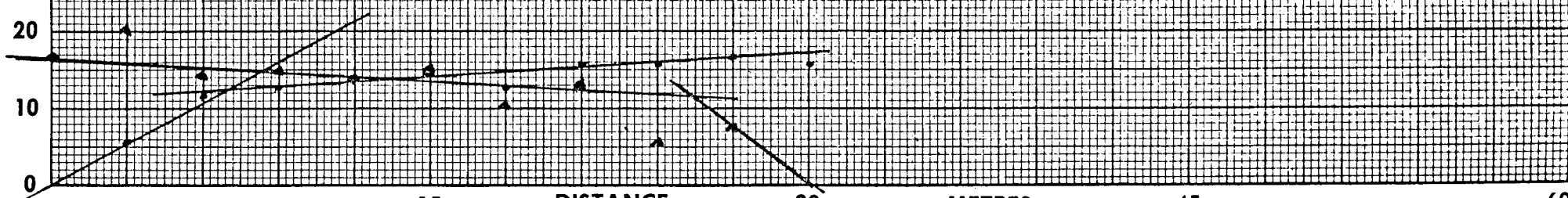
O T R	V1a = 950'ls	V1b = 1050'ls
	V2a = 3800'ls	V2b = 7200'ls
	V3a = 15000'ls	V3b = 20000'ls
	D1a = 6'	D1b = 13'
	D2a = 19'	D2b = 50'



TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

VIN 215

Date 13/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-16

Location/Description Atlin - Lower Canal

Field Notes N 15 E, 0%
50' @ 50' of #17

RESULTS

O	V1a = 1850's	V1b = 1300's
R	V2a = 15000's	V2b = 15000's
	V3a = -	V3b = -
	D1a = 11'	D1b = 7'
	D2a = -	D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15

DISTANCE —

30

METRES

45

60

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 13/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-17

Location/Description Atlin-Lower Canal

Field Notes N70°W, -18%
50' @ 50' OR 16

RESULTS

O	V1a = 1750's	V1b = 2750's
R	V2a = 12000's	V2b = 20000's
	V3a = -	V3b = -
	D1a = 6'	D1b = 17'
	D2a = -	D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

130
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Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

VIN 2L5

Date 14/8/80 Operator: W.W. MOORE, P. ENG.

Job John Leacock-Placer Traverse 52-18

Location/Description Atlin-Lower Canal

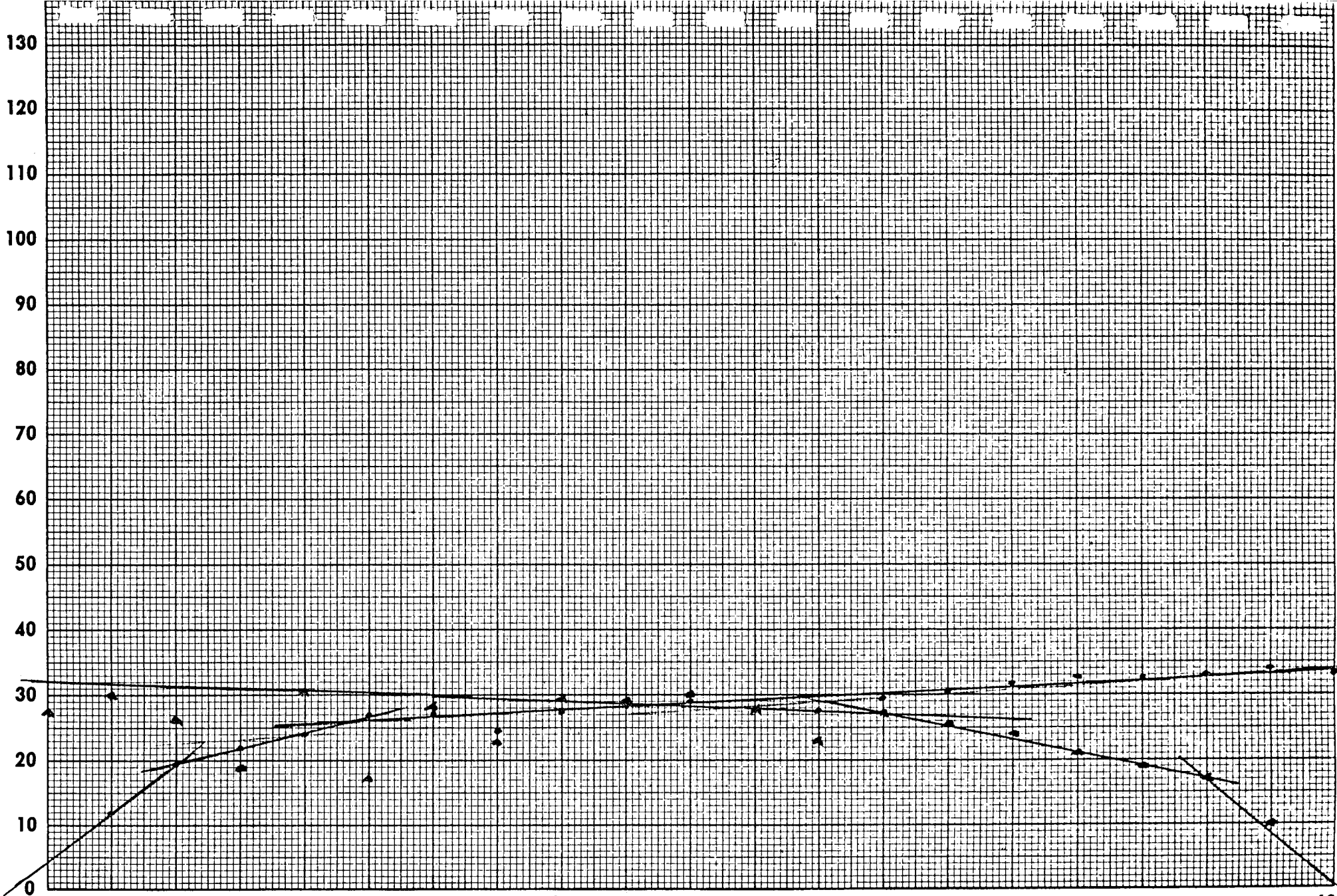
Field Notes N 75° E, 0.9%
50' @ 50' of #19

RESULTS

V1a = 1100's	V1b = 1200's
V2a = 10000's	V2b = 8000's
V3a = -	V3b = -
D1a = 11'	D1b = 8'
D2a = -	D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0



15 DISTANCE — 30 — METRES 45 60

Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 14/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn-Leonoff-Placer Traverse 52-19

Location/Description Atlin-Lower Canal

Field Notes N 18° W, -20%
50' @ 50' of #18

RESULTS

O	V1a = 1300'/s	V1b = 1100'/s
T	V2a = 3600'/s	V2b = 5000'/s
R	V3a = 20000'/s	V3b = 15000'/s +
	D1a = 7'	D1b = 8'
	D2a = 27'	D2b = 32'

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 14/8/80 Operator: W.W. MOORE, P. ENG.

Job K/John Leonoff-Placer Traverse SZ-20

Location/Description Atlin-Lower Canal
N 45°W, -10%

Field Notes Swampy, irregular ground

RESULTS

T	V1a = 2000'/s	V1b = 2500'/s
R	V2a = 15000'/s	V2b = 15000'/s
	V3a = -	V3b = -
	D1a = 8'	D1b = 8'
	D2a = -	D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

DISTANCE — METRES

15

30

45

60

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 13/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-21

Location/Description Atlin-Lower Canal

Field Notes N44E, 0% - on E
50' @ 50' of #22

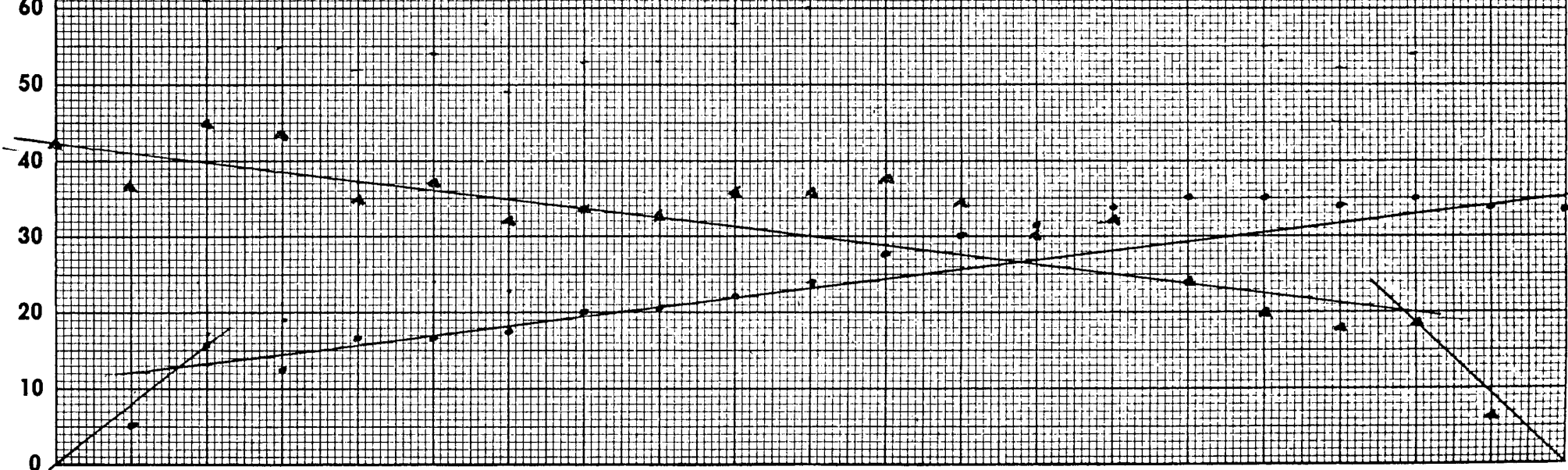
RESULTS

0	V1a = 1300's	V1b = 950's
R	V2a = 13000's	V2b = 10000's
	V3a = -	V3b = -
	D1a = 12'	D1b = 9'
	D2a = -	D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

Depth 12' 8' 7' 7' 5' 7' 7' 10' 11' 14' 13' 12' 14' 10' 8' 7' 7'



15 DISTANCE — 30 — METRES 45 60

Date 13/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-22

Location/Description Atlin-Lower Canal

Field Notes N38W, -20°
50' @ 50' of #21

RESULTS

0	V1a = 1100's	V1b = 1100's
R	V2a = 8000's	V2b = 8000's
	V3a = -	V3b = -
	D1a = 6'	D1b = 9'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

VIN 2L5

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

V1N 2L5

Date 16/8/80 Operator: W.W. MOORE, P. ENG.

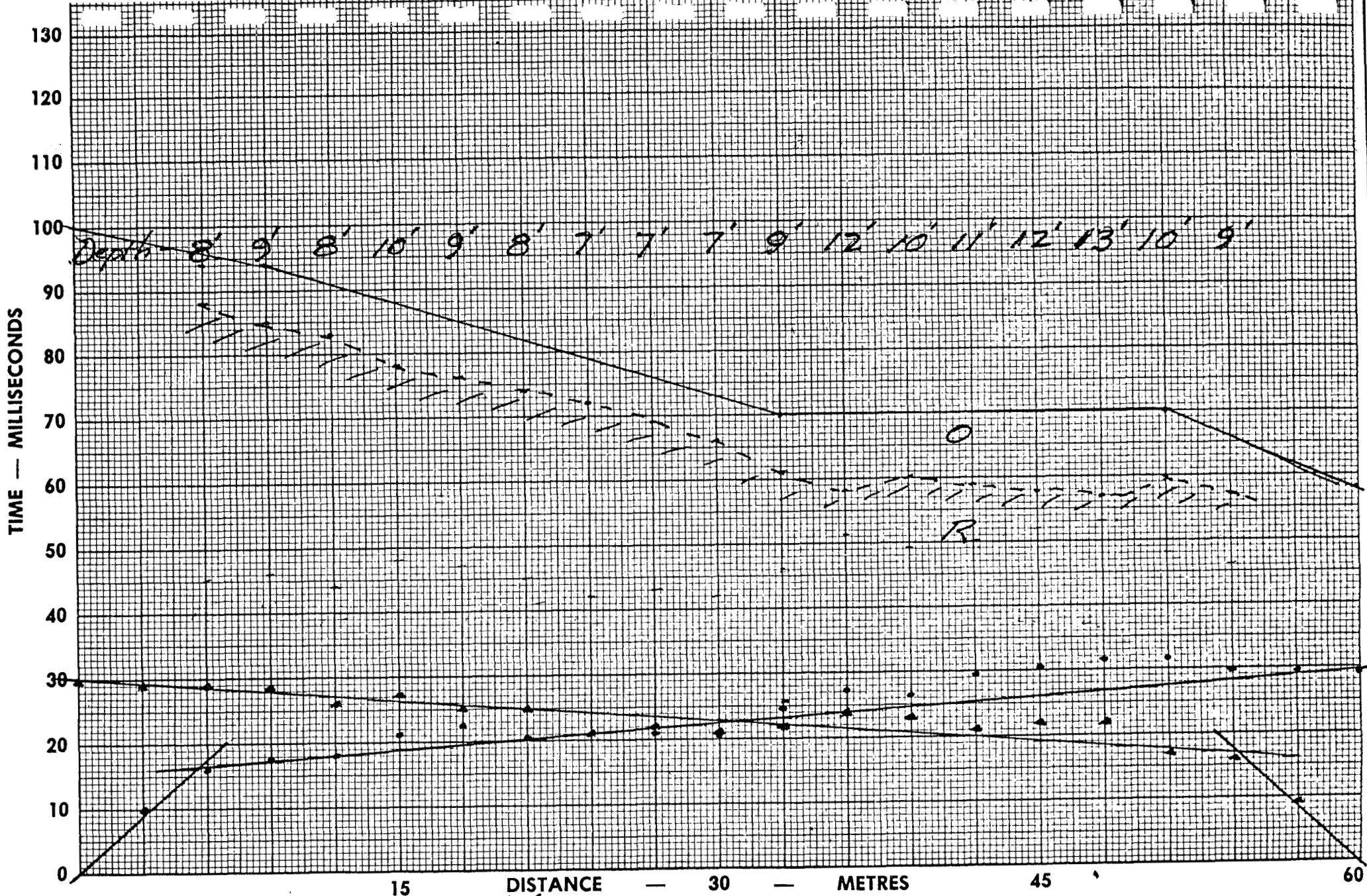
Job Kloha Leonoff-Placer Traverse 52-23

Location/Description Atlin - Lower Canal

N, 0% (hor.) 50' @ 50' of #24
Field Notes @ Edge of Swamp - pine

RESULTS

0	V1a = 1200's	V1b = 1200's
R	V2a = 10000's	V2b = 8500's
	V3a = -	V3b = -
	D1a = 9'	D1b = 9'
	D2a = -	D2b = -



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— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 16/8/80 Operator: W.W. MOORE, P. ENG.

Job Klebo Leonoff-Place Traverse 52-24

Location/Description Atlin-Lower Canal
585°W, 0-30' - 20%, 30-110' - 30%

Field Notes 110-170' - 0%, 170-200' - 40%

RESULTS

O	V1a = 1150's	V1b = 1100's
R	V2a = 13000	V2b = 13000's
	V3a = -	V3b = -
	D1a = 9'	D1b = 9'
	D2a =	D2b =

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 METRES

45 60

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 15/8/80 Operator: W.W. MOORE, P. ENG.

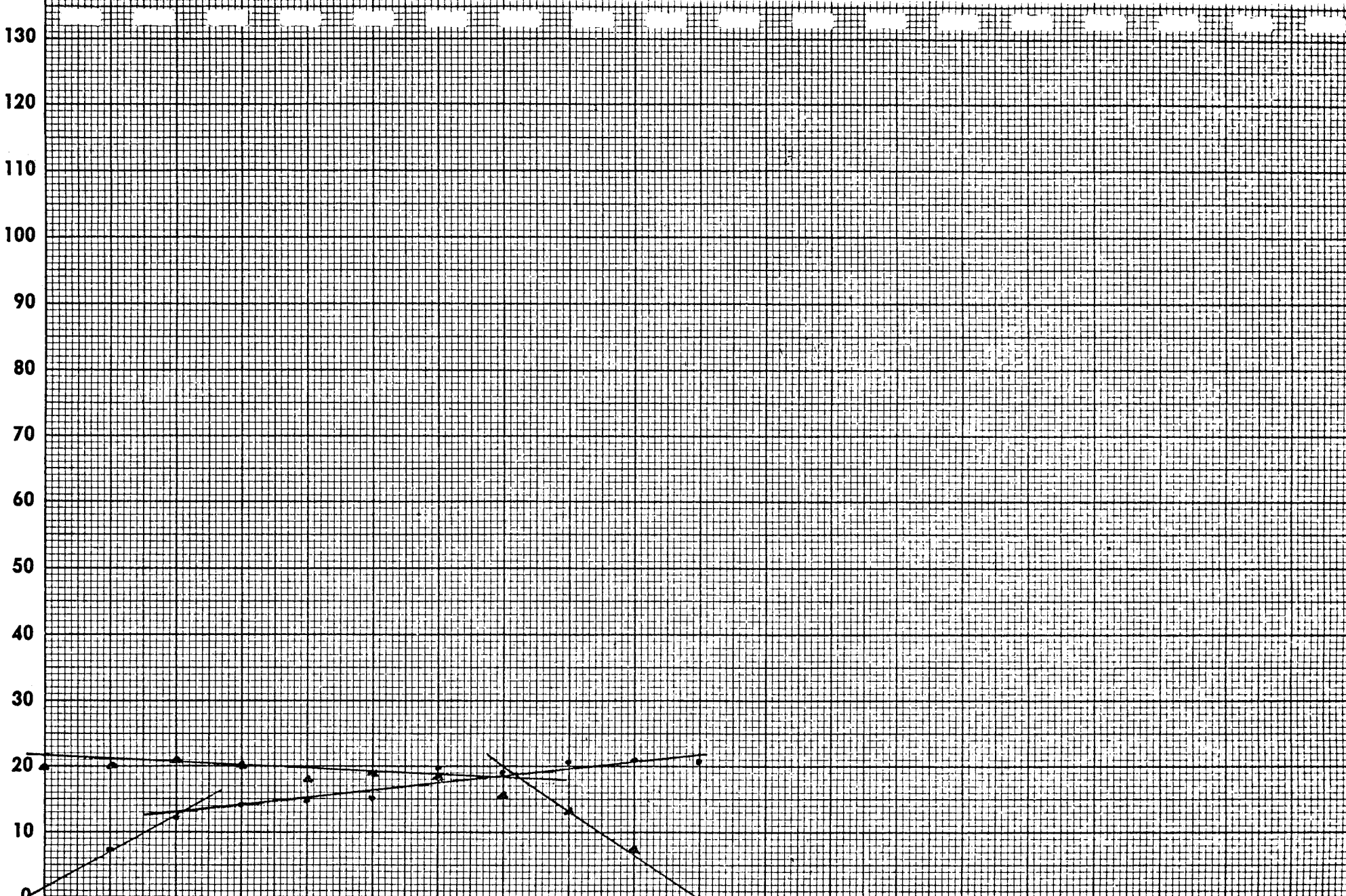
Job Klohn Leonoff - Placer Traverse 52-25

Location/Description Atlin - Lower Canal

Field Notes N. 0% (hor.)
50' @ 50' of #26

RESULTS

\overline{T}	V1a = 1750' / s	V1b = 1500' / s
\overline{R}	V2a = 9000' / s	V2b = 15000' / s +
	V3a = -	V3b = -
	D1a = 8'	D1b = 14'
	D2a = -	D2b = -



TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Date 15/8/80 Operator: W.W. MOORE, P. ENG.

Job Klobukoff-Placer Traverse 52-26

Location/Description Atlin-Lower Canal

Field Notes W₁ - 15% (slope)
S₀ @ 50' of 225

RESULTS

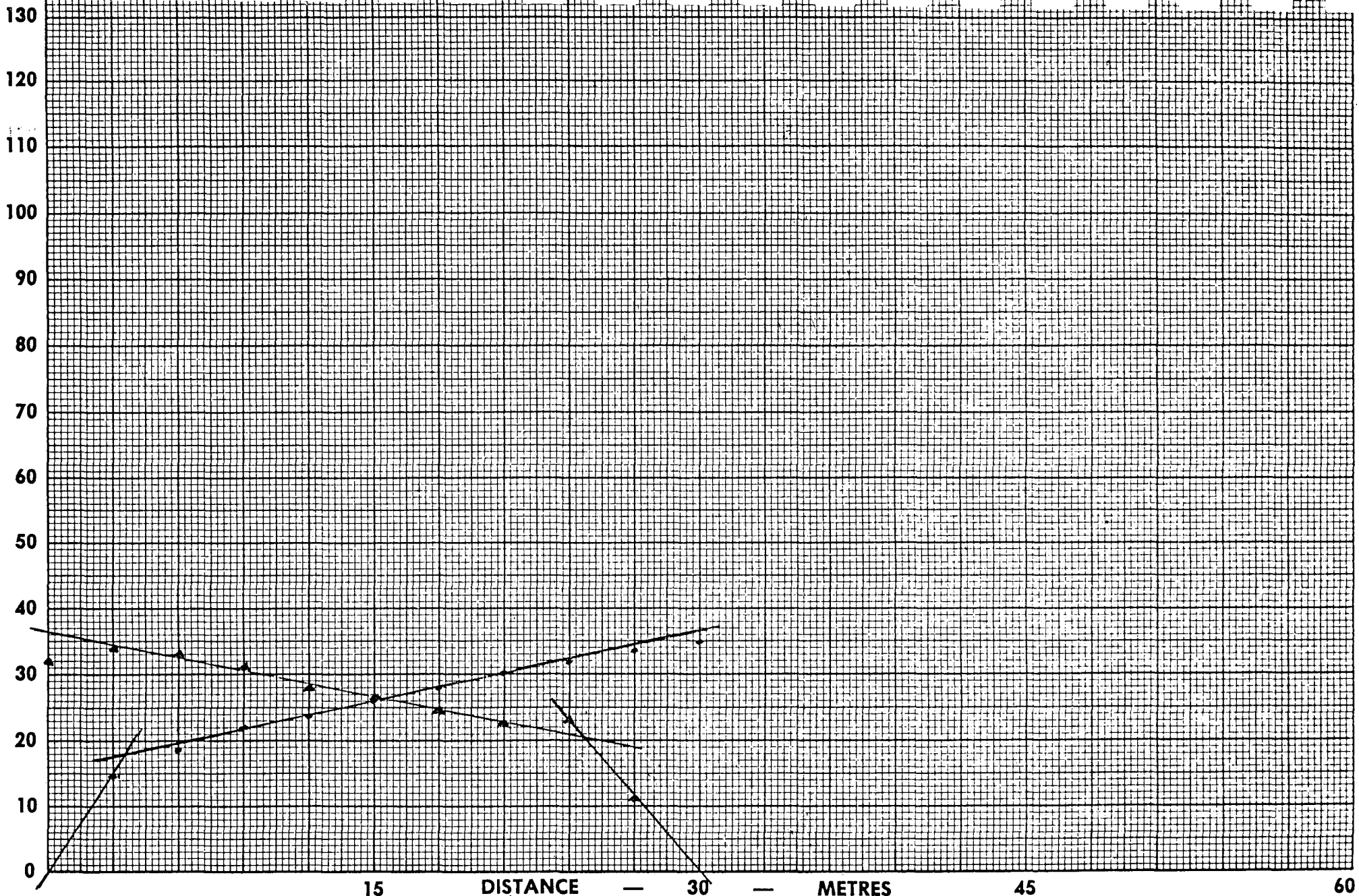
$\frac{T}{R}$ V1a = 2000'/s	V1b = 2400'/s
V2a = 10000'/s	V2b = 14000'/s
V3a = -	V3b = -
D1a = 12'	D1b = 17'
D2a = -	D2b = -

Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

TIME — MILLISECONDS



15 DISTANCE — METRES 30 45 60

Silvicast Enterprises Ltd.
 — HAMMER SEISMIC SURVEYS —
 1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
 VIN 2L5

Date 15/8/80 Operator: W.W. MOORE, P. ENG.
 Job Klohn Leonoff-Placer Traverse 52-29
 Location/Description Atlin-Lower Canal
S₁ + 10% (not.)
 Field Notes 50' @ 150' of #30

RESULTS
 0 V1a = 800's V1b = 800's
 R/V2a = 4800's V2b = 5200's
 V3a = - V3b = -
 D1a = 4' D1b = 8'
 D2a = - D2b = -

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Date 15/8/80 Operator: W.W. MOORE, P. ENG.

Job K/John Leaslett-Placer Traverse 52-28

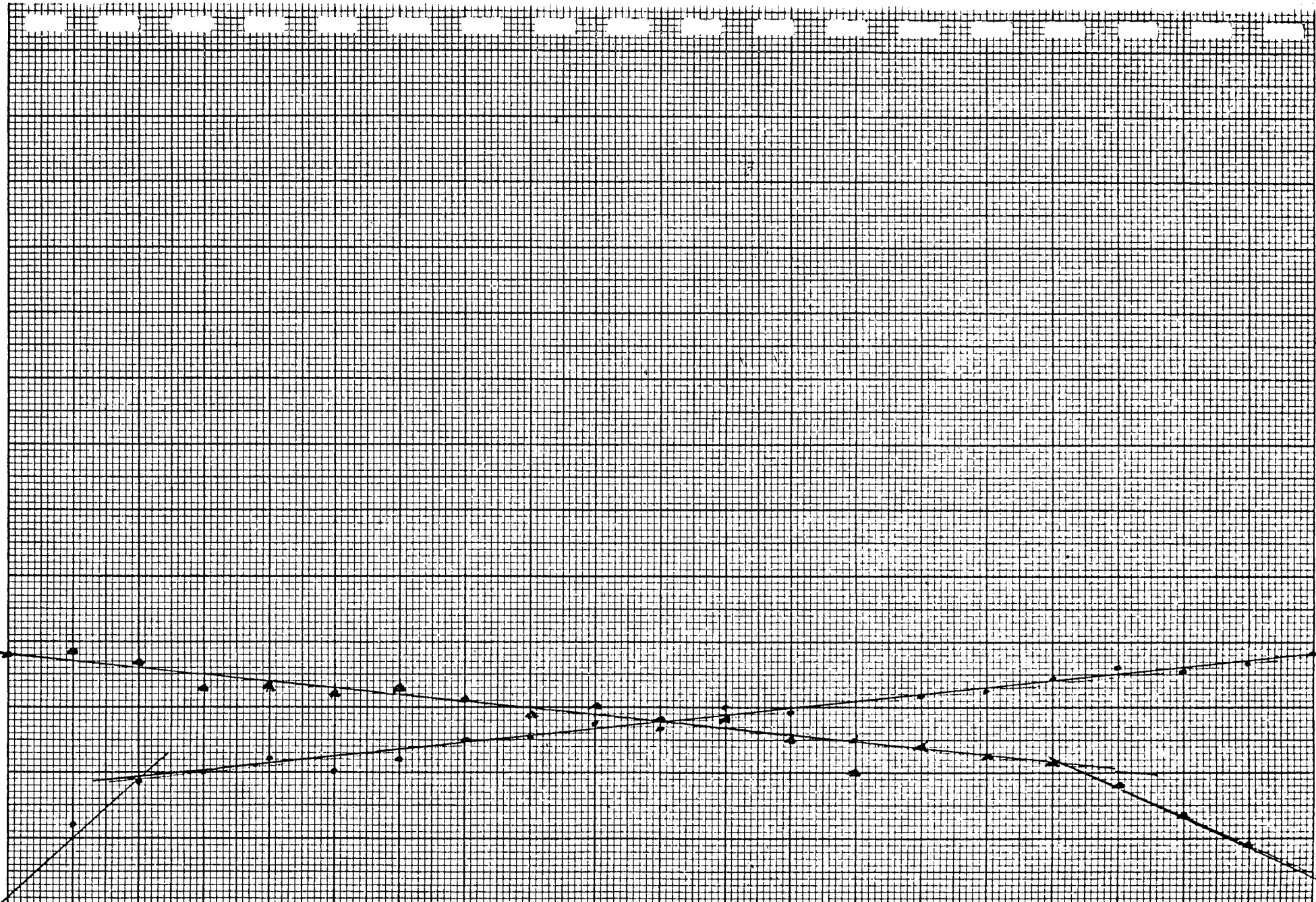
Location/Description Atlin-Lower Canal

Field Notes N 68° W, -25%
50' @ 50' of # 27

RESULTS

0	V1a = 1100'ls	V1b = 2200'ls
RA	V2a = 9000'ls	V2b = 9000'ls
PH	V3a = -	V3b = -
	D1a = 9'	D1b = 15'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5



TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — 30 — METRES 45 60

Date 15/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-27

Location/Description Atlin-Lower Canal

Field Notes N 26 E, 0% (hor.)
50' @ 50' of #2B

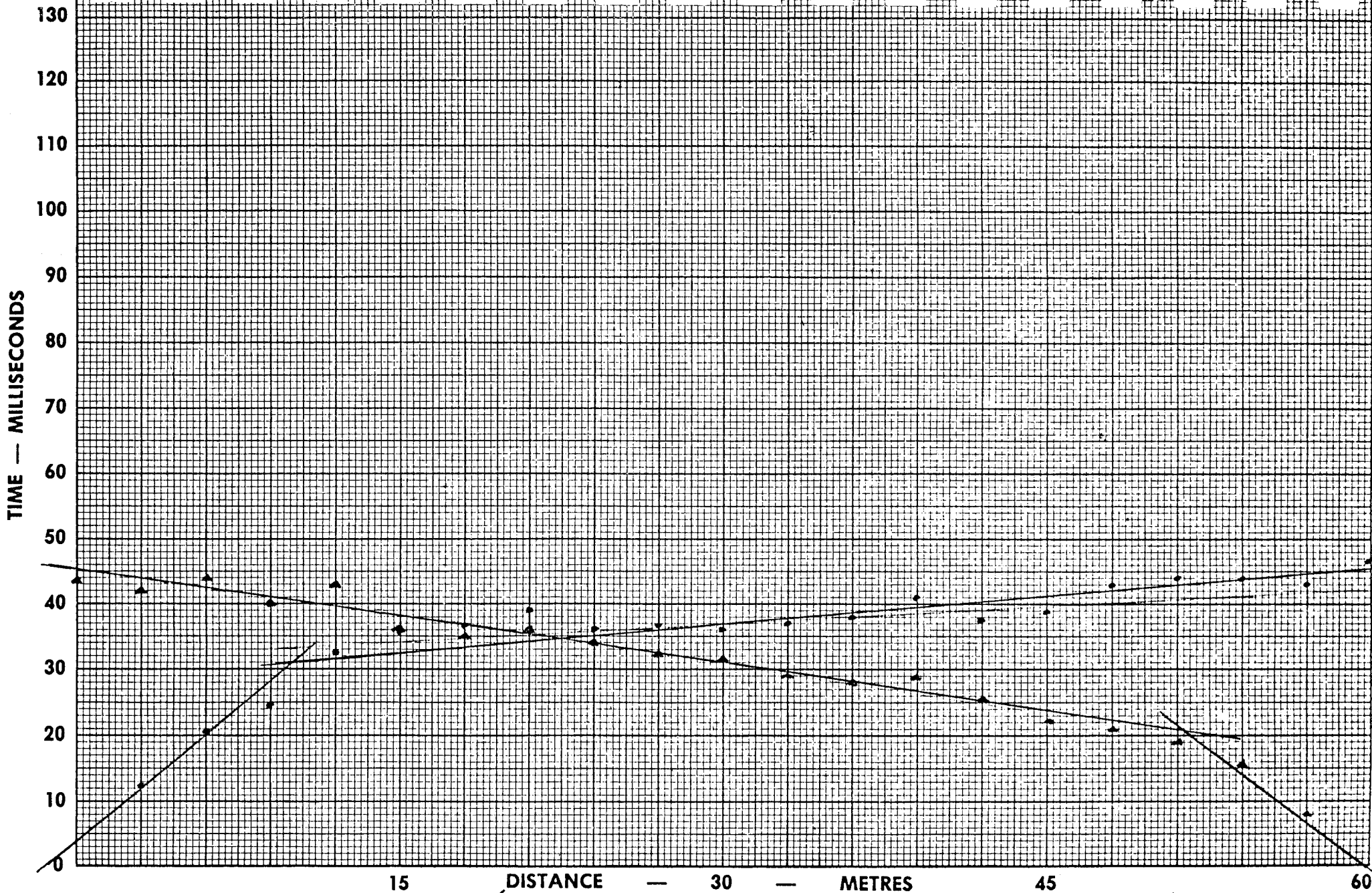
RESULTS

<u>0</u> V1a = 900'/s	V1b = 1100'/s
<u>R/H</u> V2a = 6500'/s	V2b = 8000'/s
V3a = -	V3b = -
D1a = 6'	D1b = 8'
D2a = -	D2b = -

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— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5



15 DISTANCE — 30 — METRES 45 60

Date 15/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Lemott-Placer Traverse S2-30

Location/Description At Hin Lower Canal

Field Notes S85°E, +12%
150' @ 50' of # 29

RESULTS

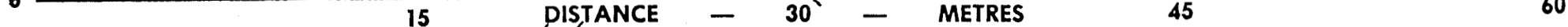
0	V1a = 1200's	V1b = 1400's
R/H	V2a = 12000's	V2b = 7000's
	V3a = -	V3b = -
	D1a = 16'	D1b = 13'
	D2a = -	D2b = -

Silvicast Enterprises Ltd.
— HAMMER SEISMIC SURVEYS —
1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 DISTANCE — METRES 30 45 60



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 14/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leon off-Placer Traverse 52-31

Location/Description Atlin-Lower Canal

Field Notes N 18° E, 0%
50' @ claim post (T.P.), * @ 50' of #32

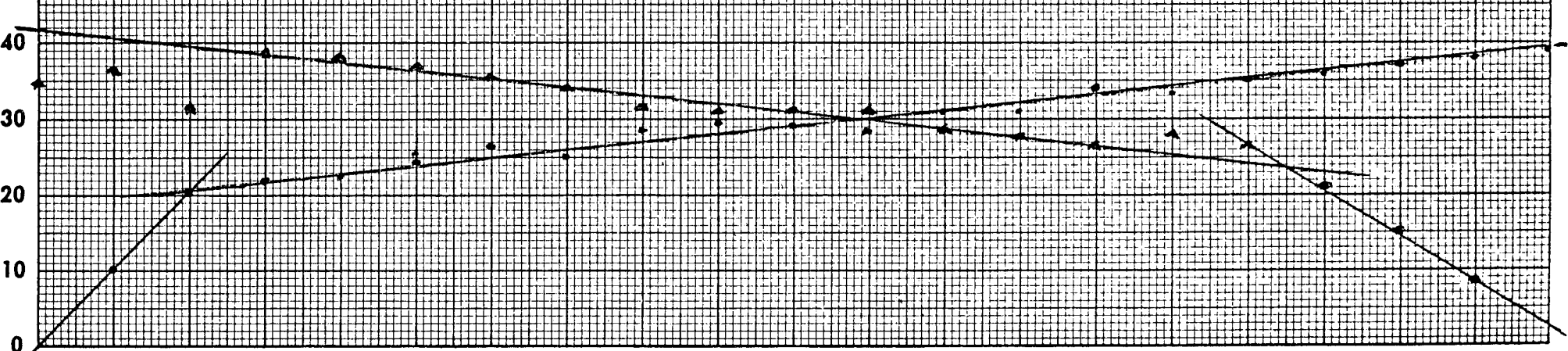
RESULTS

O R	V1a = 1300' / s	V1b = 1000' / s
	V2a = 10000' / s	V2b = 12000' / s
	V3a = -	V3b = -
D1a = 13'	D1b = 9'	
D2a = -	D2b = -	

TIME — MILLISECONDS

130
120
110
100
90
80
70
60
50
40
30
20
10
0

15 — DISTANCE — 30 — METRES 45 60



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.
VIN 2L5

Date 14/9/80 Operator: W.W. MOORE, P. ENG.

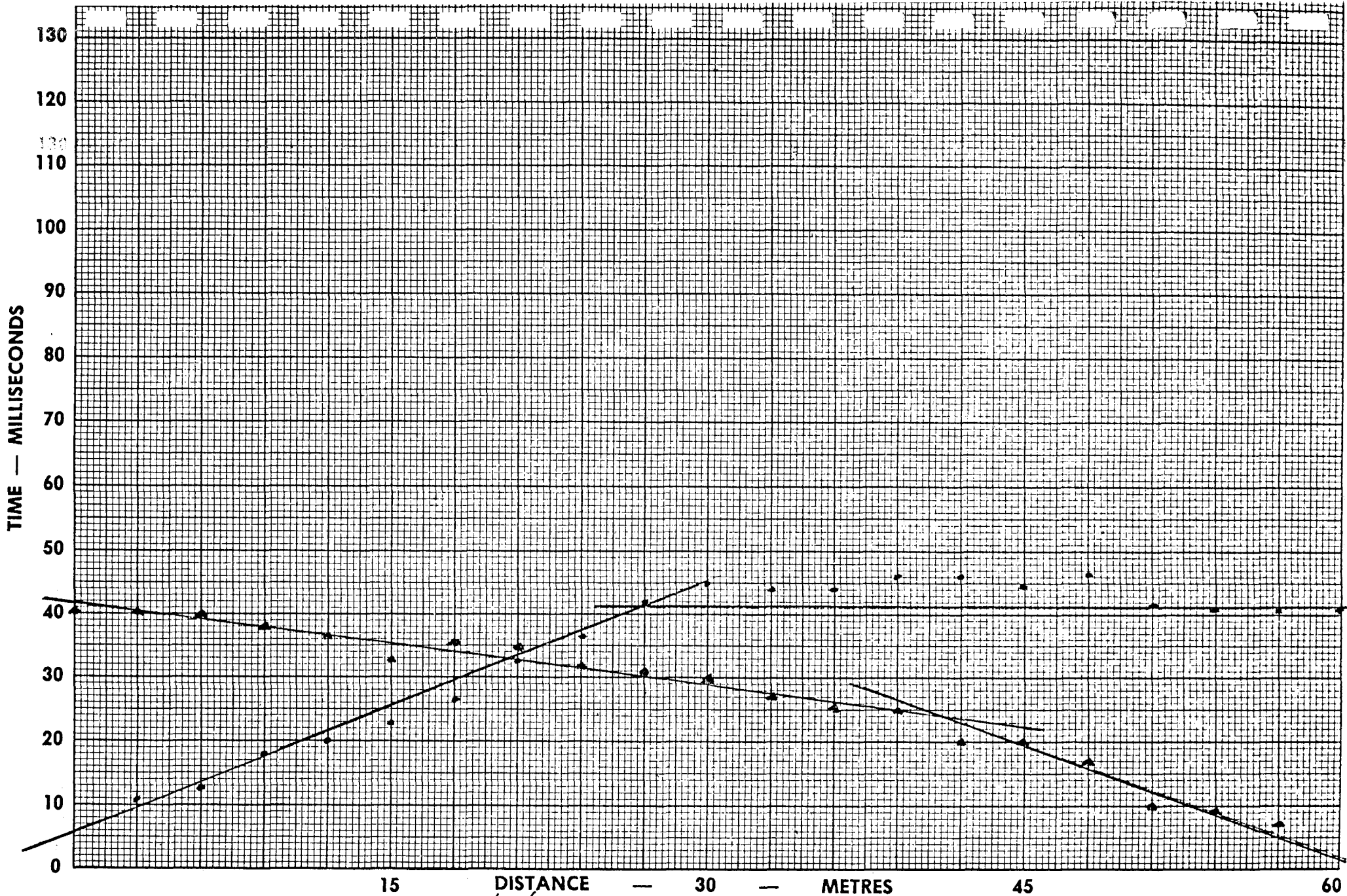
Job Klohn Leonoff-Placer Traverse 52-32

Location/Description Atlin-Lower Canal

Field Notes N44°E, +10%
50' @ claim post & @ 50' of #31

RESULTS

R	V1a = 1000's	V1b = 1600's
	V2a = 10000's	V2b = 9000's
	V3a = -	V3b = -
	D1a = 9'	D1b = 15'
	D2a = -	D2b = -



Silvicast Enterprises Ltd.

— HAMMER SEISMIC SURVEYS —

1669 RIDGEWOOD DRIVE, CASTLEGAR, B.C.

VIN 2L5

Date 16/8/80 Operator: W.W. MOORE, P. ENG.

Job Klohn Leonoff-Placer Traverse 52-33

Location/Description Atlin-Lower Canal

Field Notes N80°E -30% on ridgeline from top of bench to bottom slope

RESULTS			
T	V1a = 2500's	V1b = 2800's	
R	V2a = 20000's	V2b = 8000's	
	V3a = -	V3b = -	
	D1a = 37'	D1b = 23'	
	D2a = -	D2b = -	

APPENDIX III

Drill Hole Logs

TEST HOLE LOG

SAMPLE DATA				SYMBOL	ELEV. COLLAR									
WEIGHT HAMMER 140#					ELEV. GROUND 913.00 m									
HEIGHT DROP 30"					CO-ORD. LOCATION 6610970.70N, 589122.55E									
DEPTH ELEV	O.D T.D	BLOWS FT	NO.	DESCRIPTION OF MATERIAL					10	30	50	70	90%	
10'	2	22	1	1/2"	TOPSOIL - trace									
			2	3 1/2"	SILT - some fine sand, brown, moist									
20'	43	5	3	5'	SILT - some clay, moist to wet									
			4	19'	SAND, PEAT - fine to med. sand, trace silt grey - dark brown fibrous peat, wet									
30'	5	6	5		SAND, GRAVEL - subangular to subrounded, wet - med to coarse sand, some silt									
			6		SILT - some sand, fine to medium - dark grey to dark greybrown - moist to wet, firm									
40'	9	7	7											
			8											
50'	9	10	9	43'	SILT, SAND - some clay, moist to wet, soft - grey, fine sand									
			10	50 1/2'	SAND, GRAVEL - fine to med. grained sand, wet, grey									
60'	20	11	11	55'	- gravel, subangular, wet, greybrown									
			12		SILT, SAND, GRAVEL - grey brown silt, moist - sub-rounded gravel to 3/4" φ									
70'	>50	13	13		- angular to subangular - till-like.									
			14											
80'	>50	15	15											
			16											



Klohn Leonoff Consultants Ltd.
CIVIL & GEOTECHNICAL ENGINEERS

JOB No. VA 2685
PROJECT MINI HYDRO SCHEME
LOCATION ADANAC
HOLE No. DH #1
DATE AUG. 11, 1980 PLATE No. 1/2

TEST HOLE LOG

SAMPLE DATA				SYMBOL	ELEV. COLLAR	DESCRIPTION OF MATERIAL				
WEIGHT HAMMER 140#					ELEV. GROUND 913.00 m					
HEIGHT DROP 30"					CO-ORD. LOCATION 6610970.20N, 589122.55E					
DEPTH ELEV.	O.D. I.D.	BLOWS FT	NO.			10	30	50	70	90%
		50	17	0.0	END OF HOLE @ 89.5'					
90					Water level estimated at 2'-5" below ground surface.					
100										



Klohn Leonoff Consultants Ltd.
CIVIL & GEOTECHNICAL ENGINEERS

JOB No. VA 2685
 PROJECT MINI HYDRO SCHEME
 LOCATION ADANAC
 HOLE No. D11#1
 DATE AUG. 11, 1980 PLATE No. 2/2

TEST HOLE LOG

SAMPLE DATA				SYMBOL	ELEV. COLLAR							
WEIGHT HAMMER 140 ^{LB}					ELEV. GROUND 909.17 m							
HEIGHT DROP 30"					CO-ORD. LOCATION 6609866.70 N, 587536.41 E							
DEPTH ELEV.	O. D. I. D.	BLOWS FT	NO.	DESCRIPTION OF MATERIAL		10	30	50	70	90%		
10'		32	1	0	2"	TOPSOIL						
		45	2	0	3 1/2"	SILT - trace sand, some organics - brown, moist, firm						
20'		49	3	0	est	SAND, GRAVEL - well graded, grey, wet, dense - subrounded to subangular - some silt						
		>50	4	0								
		>50	5	0								
30'		>50	6	0	21'	SILT TILL - brown, moist, well graded - some sand, gravel to 1/4" φ - very hard.						
		>50	7	0	27'							
40'		>50	8	0		SILT TILL - grey, very dense, moist - well-graded						
		>50	9	0								
50'		>50	10	0								
		>50	11	0								
60'		>50	12	0								
						END OF HOLE @ 51 1/2'						
50'						Water level estimated at 7'-10" below ground surface from mud hole.						
70'												
80'												



Klohn Leonoff Consultants Ltd.
CIVIL & GEOTECHNICAL ENGINEERS

JOB No. VA 2685

PROJECT MINI HYDRO SCHEME

LOCATION ADANAC

HOLE No. DH.#2

DATE AUG. 12, 1980 PLATE No. 1/1

TEST HOLE LOG

SAMPLE DATA				SYMBOL	ELEV. COLLAR		% CORE RECOVERY				
WEIGHT HAMMER 140 ^{lb}					ELEV. GROUND 824.68 m		TOTAL				
HEIGHT DROP 30"					CO-ORD. LOCATION 6606171.09N, 580062.00E		RQD				
DEPTH ELEV	O.D. I.D.	BLOWS FT	NO.	DESCRIPTION OF MATERIAL		10	30	50	70	90%	
10'	2" ϕ SPLITSPRONG			SAND, GRAVEL - subangular to angular - some silt, cobbles to 24" ϕ - est. - dry, loose, brown to grey							
20'		X50	1	11.5' 13' SAND, GRAVEL, COBBLES, SILT - grey to blue grey, layers, 6"-12"							
30'	NO CORE			SILTSTONE - highly fractured, gravel sized pieces recovered - dark grey, fine grained, very hard - weathered - on joint surface.							
END OF HOLE @ 34'											
40'	Water level estimated at 8'-8" below ground surface in casing (mud still in hole)										
50'											
60'											
70'											
80'											



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JOB No. VA2585

PROJECT MINI HYDRO SCHEME

LOCATION ADANAC

HOLE No. DH #3

DATE AUG. 14, 1980 PLATE No. 1/1

TEST HOLE LOG

SAMPLE DATA				SYMBOL	ELEV. COLLAR										
WEIGHT HAMMER 140#					ELEV. GROUND 824.06 m										
HEIGHT DROP 30"					CO-ORD. LOCATION 6605565.81N, 579600.08E										
DEPTH ELEV	O.D. I.D.	BLOWS FT	NO.	DESCRIPTION OF MATERIAL					10	30	50	70	90%		
5'		26	1	0.0	6"	TOPSOIL - moist, dark brown									
			2	0.0	9'	SAND, GRAVEL - well-graded, some brown silt - dry to moist - some grey brown to rusty brown weathering - occasional cobble									
10'		31	2	0.0	9'	SAND, GRAVEL - some silt, moist, well graded - grey brown to light brown - dense									
			3	0.0											
15'		>50	4	0.0	14'	SILT, SAND, GRAVEL - till-like, well graded - grey, moist, dense - sand & gravel is black, sub-rounded									
			5	0.0											
20'		>50	6	0.0	14'	SILT, SAND, GRAVEL - till-like, well graded - grey, moist, dense - sand & gravel is black, sub-rounded									
			7	0.0											
25'		>50	8	0.0	14'	SILT, SAND, GRAVEL - till-like, well graded - grey, moist, dense - sand & gravel is black, sub-rounded									
			8	0.0											
35'						END OF HOLE @ 34 1/2'									
					Water level estimated at 2'-10" below ground surface in mud hole.										



Klohn Leonoff Consultants Ltd.
CIVIL & GEOTECHNICAL ENGINEERS

JOB No. VA2685
PROJECT MINI HYDRO SCHEME
LOCATION ADANAC
HOLE No. DH #4
DATE AUG. 16, 1980 PLATE No. 1/1

TEST HOLE LOG

SAMPLE DATA				SYMBOL	ELEV. COLLAR		% CORE RECOVERY				
WEIGHT HAMMER 140#					ELEV. GROUND 669.77 m		TOTAL				
HEIGHT DROP 20"					CO-ORD. LOCATION 6601683.41N, 575843.39E		RQD				
DEPTH ELEV	O.D. I.D.	BLOWS FT	NO.	DESCRIPTION OF MATERIAL		10	30	50	70	90%	
				0.0	6"						
		2	1	0.5	TOPSOIL - dark brown, dry						
10		14	2	1.0	SILT, SAND, GRAVEL - well graded, grey, wet - layers of silt, sand 1/8" - 1/4"						
		13	3	1.5							
20		9	4	2.0							
		>50	5	2.5	SILT TILL - some sand - some gravel, black, greenish - sub angular, fractured - very dense - grey, moist						
30		>50	6	3.0							
		>50	7	3.5							
40		>50	8	4.0							
		>50	9	4.5							
50		>50	10	5.0							
				5.5	47'						
60				6.0	SERPENTINE - weathered - alteration to clay along joint surfaces - high density of healed fractures						
70				7.0							
					END OF HOLE @ 70'						
					Water level estimated at 3' below ground surface (height of lake level)						
80											

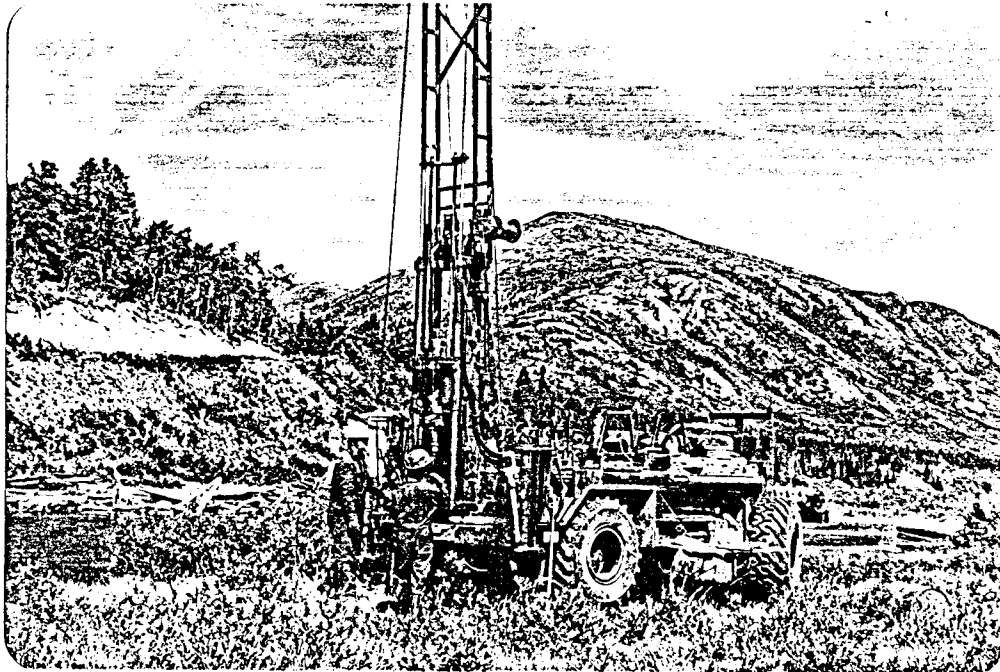


Klohn Leonoff Consultants Ltd.
CIVIL & GEOTECHNICAL ENGINEERS

JOB No. VA2685
PROJECT MINI HYDRO SCHEME
LOCATION ADANAC
HOLE No. D4#5
DATE AUG. 22, 1980 PLATE No. 1/1

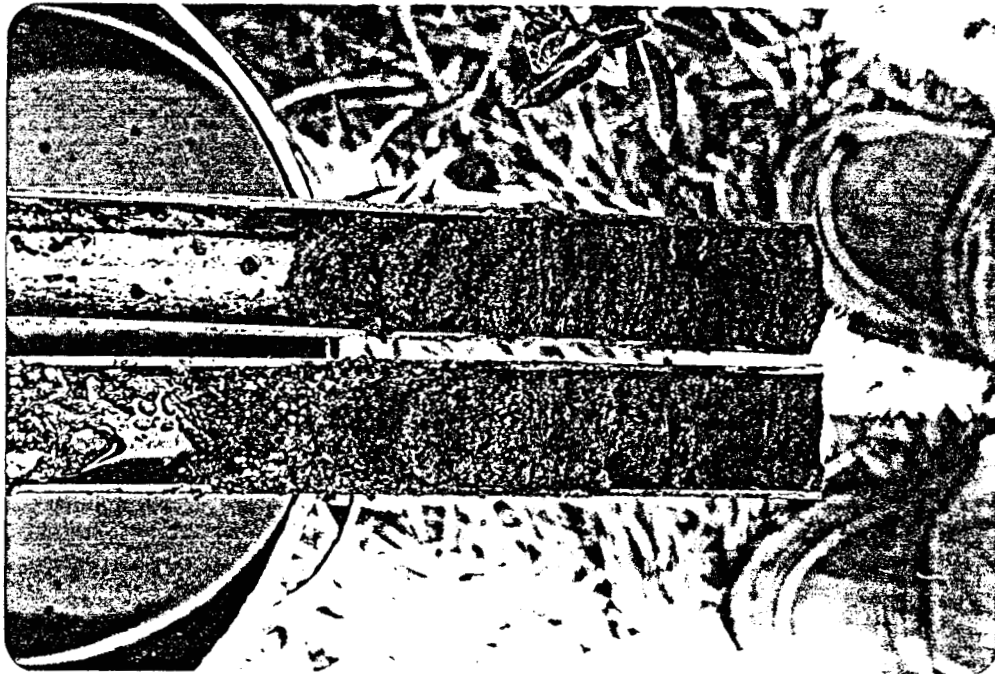
APPENDIX IV

Photographs



DRILL HOLE # 1

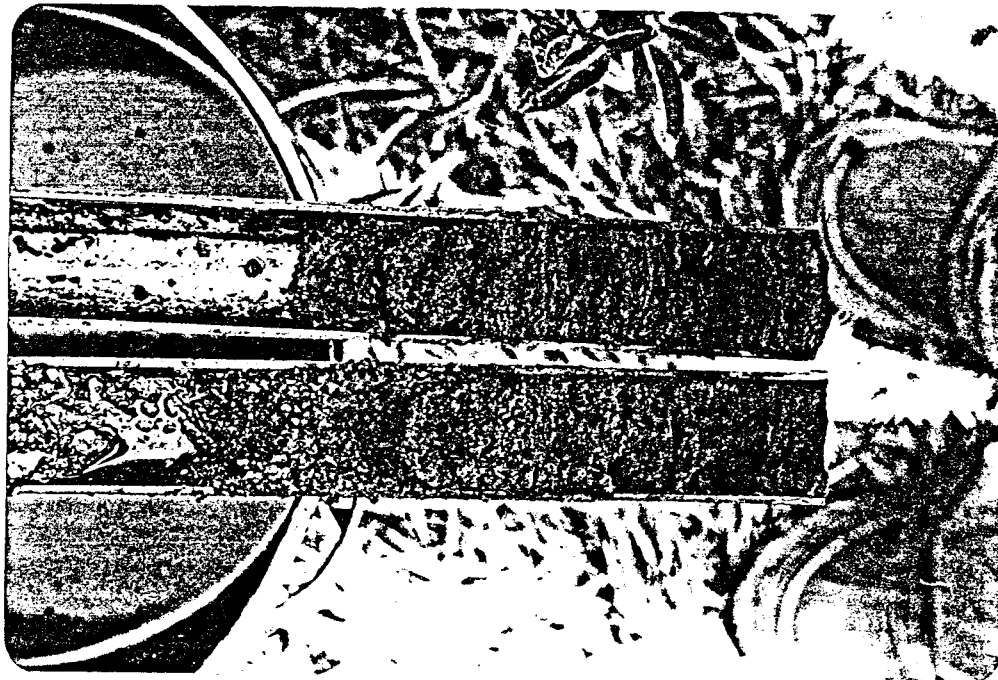
Location: View to outlet of Pine Creek
from Surprise Lake.



DRILL HOLE # 1

Sample 4: @ 18 - 19½'

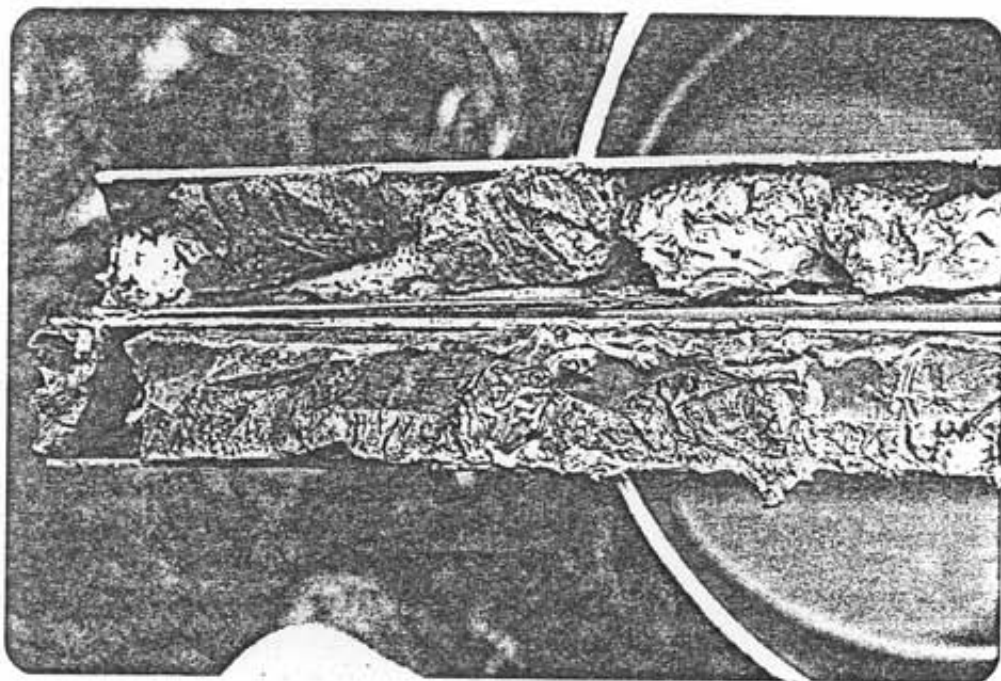
SAND, SILT - layered, moist, some
fibrous organics



DRILL HOLE # 1

Sample 4: @ 18 - 19½'

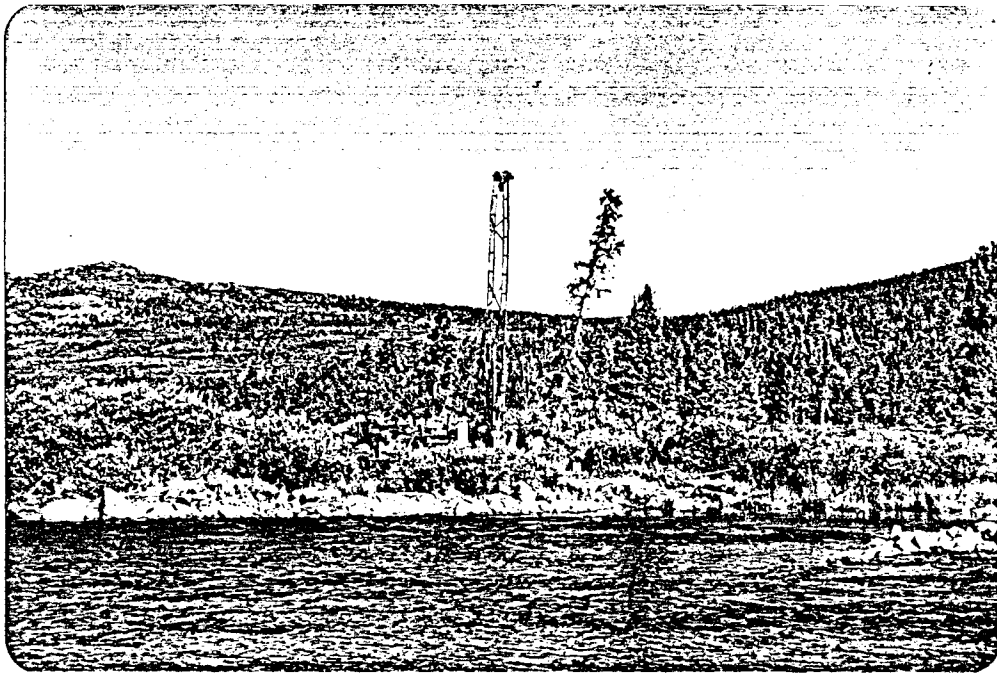
SAND, SILT - layered, moist, some
fibrous organics



DRILL HOLE # 1

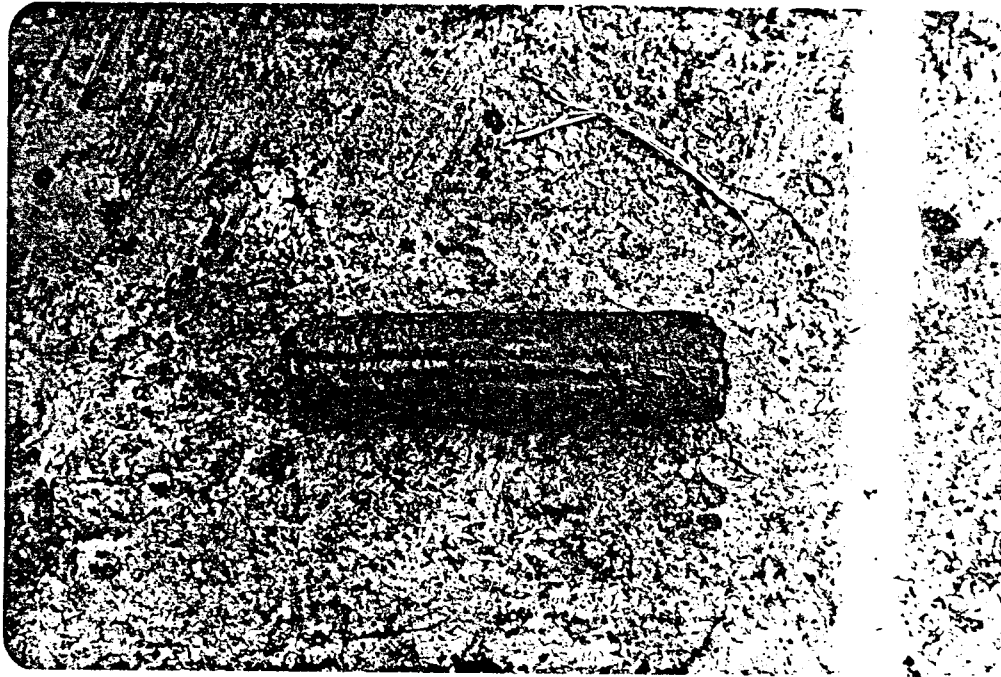
Sample 9: @ 43 - 44½'

SILT - trace of clay, moist to
wet, very soft.



DRILL HOLE # 2

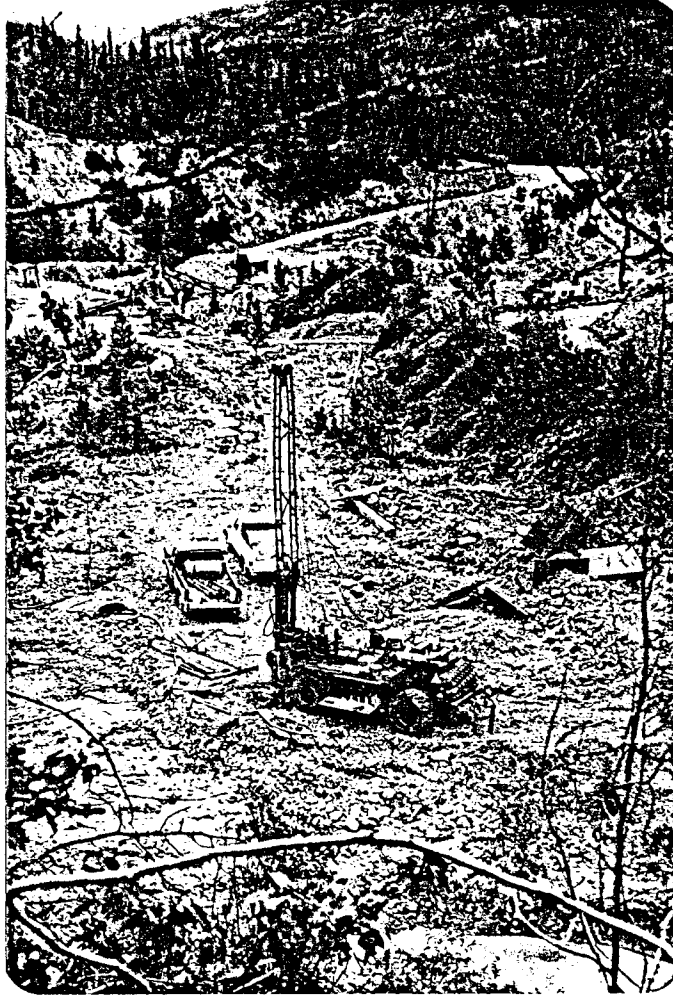
Location: View at edge of Pine Creek



DRILL HOLE # 2

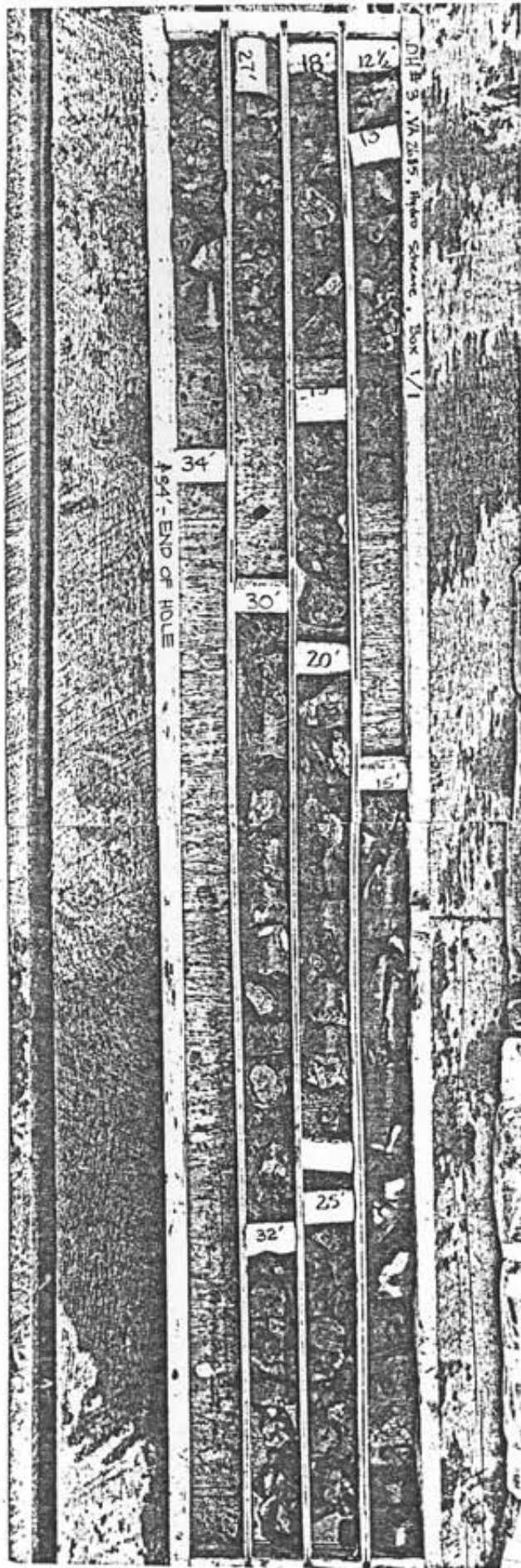
Sample 7: @ 28 - 28.5

SILT TILL - very dense, moist.



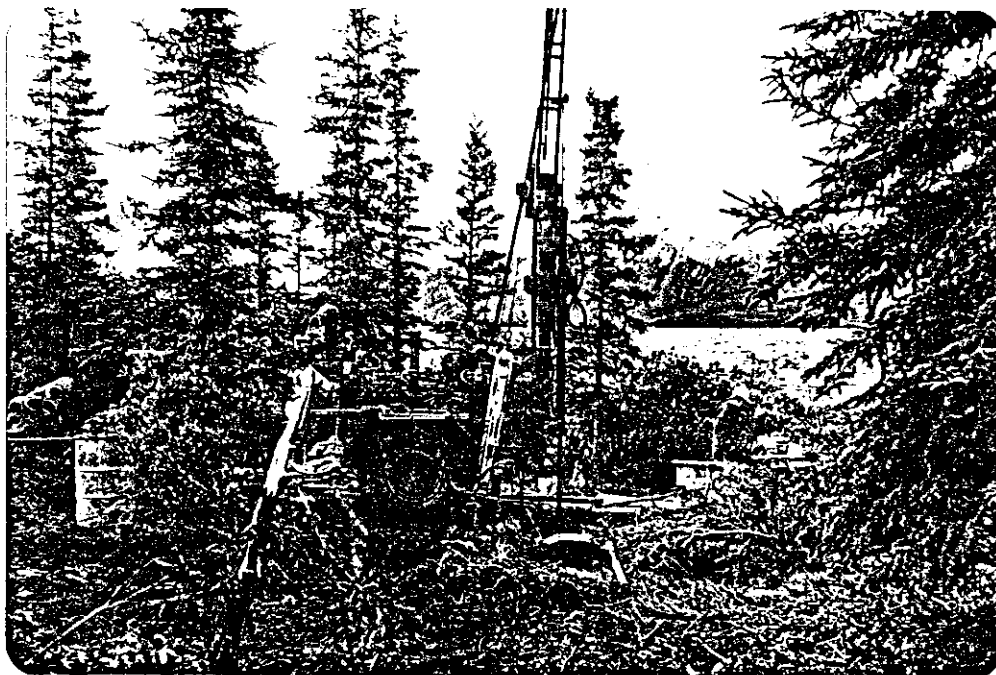
DRILL HOLE # 3

Location: Western edge of Placer workings -
Discovery claim



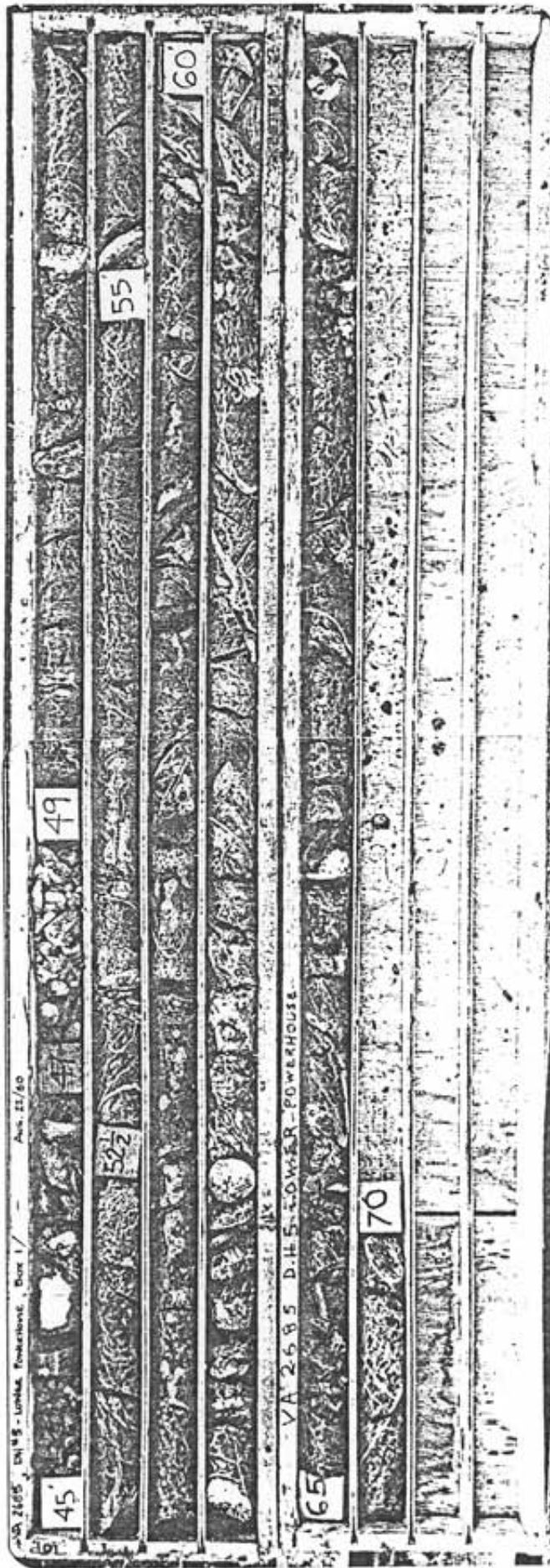
DRILL HOLE # 3

Core: 12 1/2' - 34'



DRILL HOLE # 5

Location: View to west at edge of Atlin Lake



DRILL HOLE # 5

Core: 45' - 70'

APPENDIX V

Costs for Drilling Program

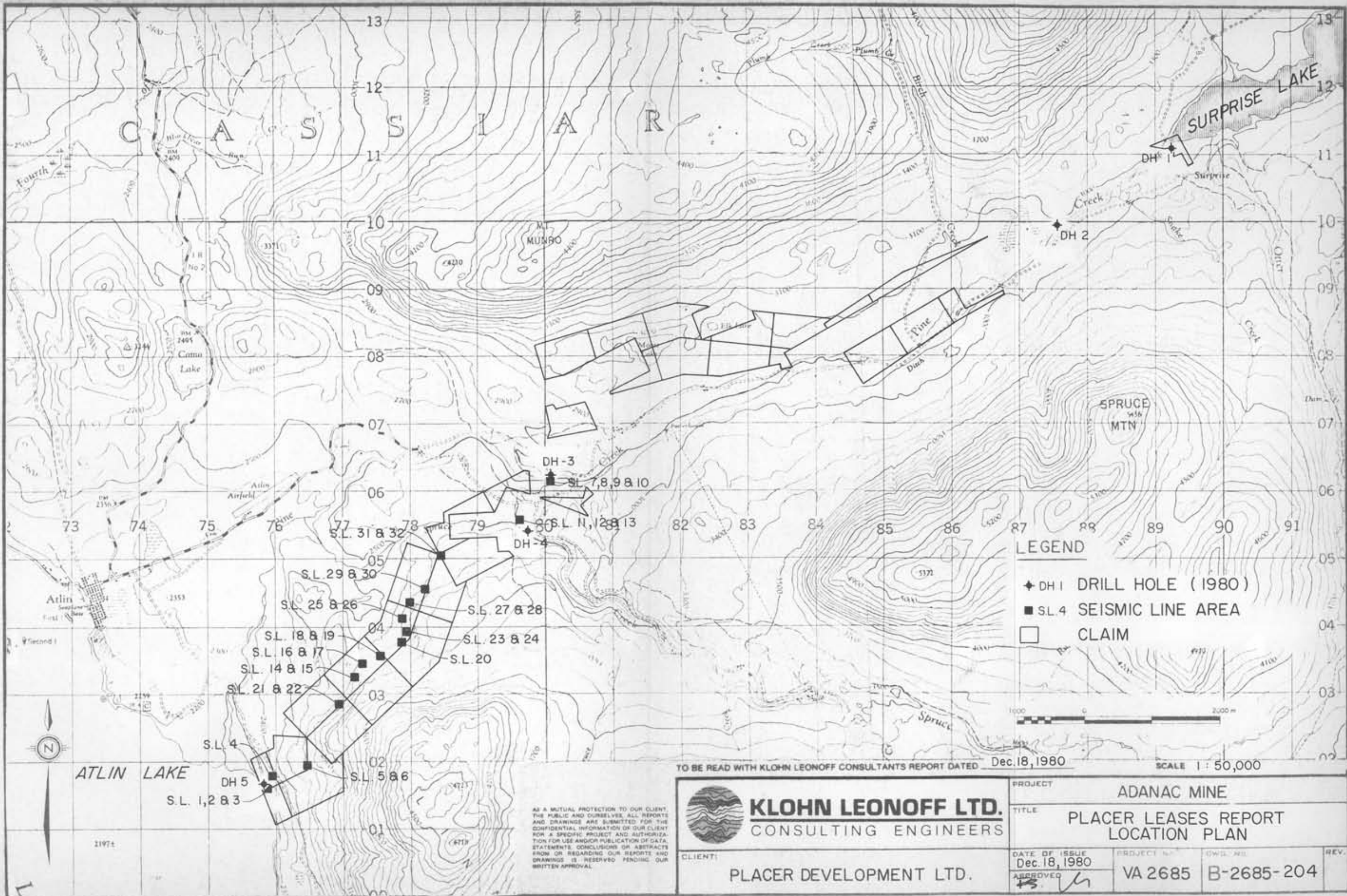
APPENDIX V
COSTS FOR DRILLING PROGRAM

Drilling Rig	-	107.5 h @ \$68.50/hr.	\$ 7,363.75
Crew	-	129.5 h @ \$60.00/hr.	7,770.00
Crew Truck	-	11 days @ \$40.00/day	440.00
Expendables			5,560.00
Mobilization	-	direct mileage Whitehorse to Atlin	437.50
Portion of Mobilization and Demobilization (lump sum)	-	<u>20</u> 240 x \$12,445.00	1,037.18
Drill Supervision	-	148 h @ \$25.17/hr (P. Mehling)	3,725.16
Report Preparation	-	40 h @ \$24.38/hr (P. Mehling)	975.20
Field Expenses	-	11 days @ \$60.00/day	660.00
Transport	-	Vancouver to Atlin	200.00
Site Reconnaissance, Assess & Authorization	-	12 h @ \$25.17/hr (P. Mehling)	302.04
Seismic Work (Silvicast Enterprises)			7,048.05
Reconnaissance of Seismic Lines	-	10 h @ \$36.77/hr (R. Smith)	367.70
Administration	-	8 h @ \$55.00/hr (V. Garga) 12 h @ \$36.77/hr (R. Smith)	440.00 441.24
			\$37,207.72

DRAWINGS

B-2685-204 - Placer leases report location plan


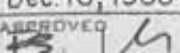
B-2685-205 - Placer leases report property location plan ;

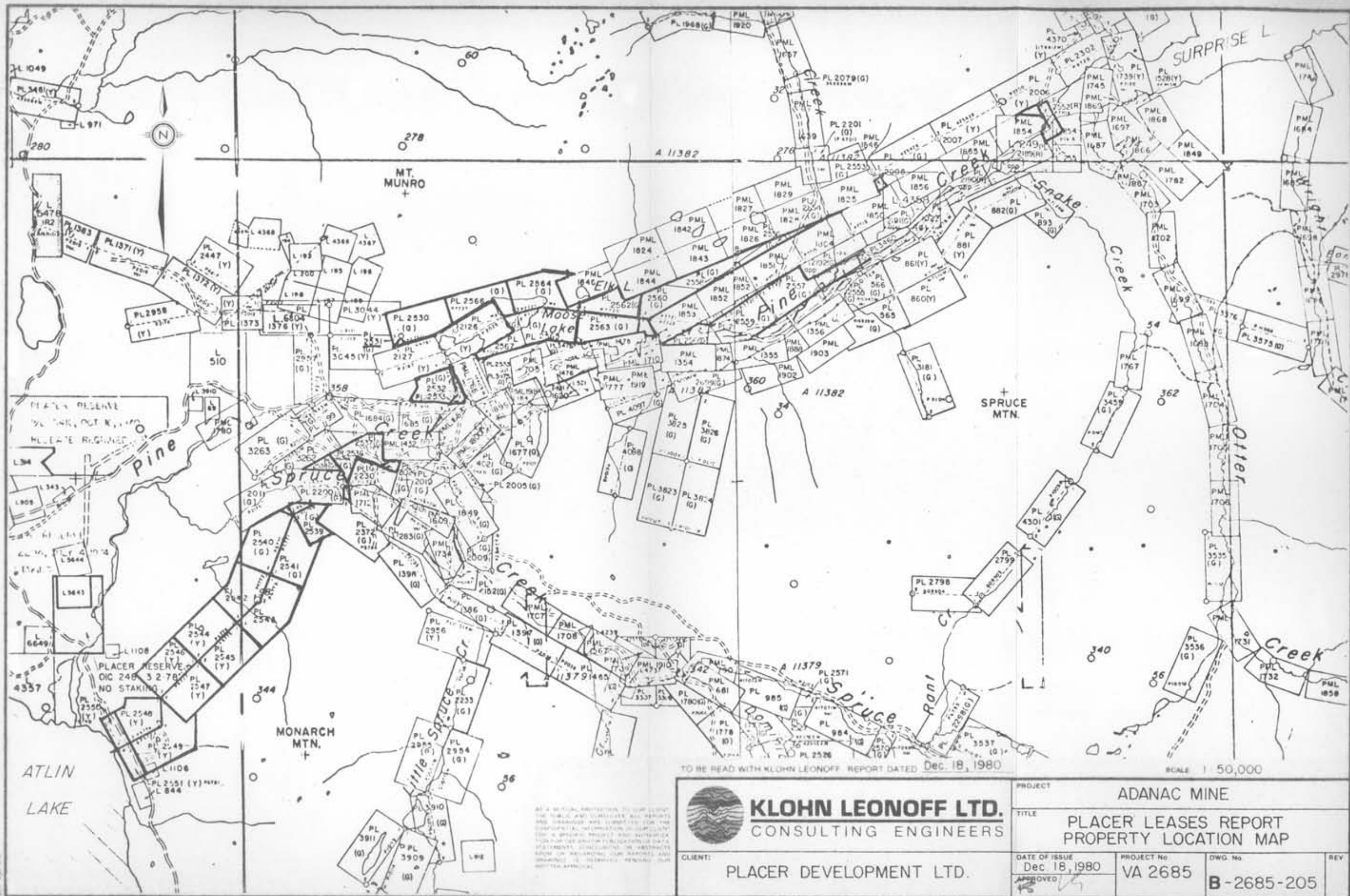


- LEGEND**
- ◆ DH 1 DRILL HOLE (1980)
 - S.L. 4 SEISMIC LINE AREA
 - CLAIM

TO BE READ WITH KLOHN LEONOFF CONSULTANTS REPORT DATED Dec. 18, 1980 SCALE 1 : 50,000

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 KLOHN LEONOFF LTD. CONSULTING ENGINEERS	PROJECT		ADANAC MINE		
	TITLE		PLACER LEASES REPORT LOCATION PLAN		
CLIENT:	PLACER DEVELOPMENT LTD.	DATE OF ISSUE	Dec. 18, 1980	PROJECT No.	VA 2685
		APPROVED		ISSUE No.	B-2685-204
				REV.	



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