

Vangorda

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VANGORDA CREEK - SWIM LAKE
LEAD-ZINC DEPOSITS
A REVIEW OF ECONOMIC POTENTIAL

July 20, 1970

A. D. KENNEDY

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KERR ADDISON MINES LIMITED

SUITE 1600 - 44 KING STREET WEST
TORONTO 1, ONTARIO
TELEPHONE 362-7111

MEMORANDUM

July 16, 1970

TO: Mr. J. H. Stovel

FROM: M. D. Rowswell

VANGORDA CREEK - SWIM LAKE, LEAD-ZINC DEPOSITS A REVIEW OF ECONOMIC POTENTIAL

The economics of the Vangorda Creek and Swim Lake lead-zinc deposits have been reviewed and revised on the basis of:

1. A revision of Vangorda Creek indicated ore reserves;
2. A combination of open-pit and underground mining of the indicated ore reserves;
3. Revision of Capital Cost estimate for a 3,000 tons per day mining and milling complex;
4. A review of "ore value" based upon metallurgical test results;
5. The calculation of a Rate of Return on Investment using the optimum metallurgical results as achieved by Brunswick Mining and Smelting in their 1969 test work, and the costs, capital and operating as developed herein;
6. The calculation of the approximate Capital Investment which could be applied to the development of the properties, with milling of the ore at the Anvil Mining site.

SUMMARY:

1. Vangorda Creek - Swim Lake Indicated Ore Reserve:

<u>Property</u>	<u>Undiluted Tonnage</u>	<u>Undiluted Grade</u>			
		<u>% Pb</u>	<u>% Zn</u>	<u>% Cu</u>	<u>Oz. Ag</u>
Vangorda Creek	6,600,000	3.58	5.95	0.21	2.00
Swim Lake	4,750,000	3.8	4.7	--	1.50

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2. Division of tonnage by location and method.

Property	Open-pit Ore	Tonnage Waste	Underground Tonnage	Underground Extraction	Operating Costs per ton ore		Concentration at Anvil per ton ore	
					Open-pit	Under- ground	Open-pit	Under groun
Vangorda	3,400,000	4,100,000	3,200,000	80%	\$4.00	\$7.00	\$5.14	\$7.99
Swim	--	--	4,750,000	80%	--	\$7.35	--	\$8.41

3. It is estimated that the preproduction and capital costs of a 3,000 ton per day mining and milling complex would be:

Method	Years of Expenditure	Preproduction \$	Fixed Assets \$	Total \$
Open-pit	-2, -1	2,750,000	19,000,000	21,750,000
Underground (V)	3, 4	500,000	1,000,000	1,500,000
Underground (S)	5, 6	1,500,000	2,500,000	<u>4,000,000</u>
				<u>\$27,250,000</u>

4. Value of ore in place (Brunswick Mining and Smelting, 1969 - differential concentrates):

Property	Open-pit \$/ton	Underground \$/ton
Vangorda	10.22	9.15
Swim	---	9.21

5. The "project rate of return" as calculated would be approximately 6%. This does not allow for interest on invested funds.

6. At a "project rate of return" of 15% approximately \$11,250,000 in capital could be used for the development and capital assets at the Vangorda Creek property as well as the additional milling facilities at the Anvil Mining site.

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It must be separately noted that the economics have been developed using the optimum metallurgical test results received to date.

		<u>Concentrate Grade</u>	<u>Recovery</u>
Brunswick Mining and Smelting - 1969	Pb	51.7%	89.7%
	Zn	55.4%	78.1%
	Ag	18.52 oz.	82.9%

MDR:lfr

M. D. Rowswell

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Data and Calculations

No allowance is made in any of the calculations for dillution as this is felt to be minimized by values in the hanging and footwall which approach the cut-off grade. In addition, the percentage dilution due to thickness is minimized.

Indicated Ore Reserves

Vangorda Creek

Diamond drill "value intersections" were studied and divided by the writers interpretation into those which could be classified open-pitable and those which could be mined by underground methods.

Mineral values, as combined lead-zinc of less than 4% were not considered as ore in the pit unless occurring between higher grade sections and values of less than 6% combined were not considered as ore for underground mining purposes.

The resulting "value intersections" were given to C. K. Wilton for indicated reserve calculations and interpretation as to structural continuity.

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A summation is as follows; however cross-sections and a summary of information hole by hole is attached.

	<u>Tons</u>	<u>% pb</u>	<u>% Zn</u>	<u>% Cu</u>	<u>oz. Ag.</u>
Open-pit	3,400,000	3.64	6.42	0.21	2.00
Underground	<u>3,200,000</u>	<u>3.39</u>	<u>5.45</u>	<u>0.21</u>	<u>2.00</u>
Total	6,600,000	3.58	5.95	0.21	2.00
Prospectors Airways (1955)	9,400,000	3.18	4.96	0.27	1.76
Geco (1965)	5,640,000	3.25	5.34	0.27	1.77

The difference in estimated tonnage between that calculated in 1955 by Prospectors Airways and that calculated by C. K. Wilton is as follows:

- 1.) Cut-off grade used in present calculations
(4% combined open-pit 6% combined underground)
- 2.) Method of calculation
 - A.) C. K. Wilton used area of influence rectangles on individual value intersections as taken from cross-section drawings.
 - B.) Prospectors Airways used triangulation method on the surface plan and summed all value intersections.

The difference in tonnage between Geco (1965) and C. K. Wilton may be explained as follows:

1. A smaller open-pit area
2. Cut-off grades
3. The inclusion of mineable ore by underground method.

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Comparison of Open-Pit Layouts

<u>Open-Pit Tonnage</u>	<u>Overburden</u>	<u>Waste Rock</u>	<u>Barren Sulphides</u>
3,400,000	2,200,000 cu. yds.	360,000 cu. yds.	-
5,640,000	4,100,000 cu. yds.	2,670,000 cu. yds.	1,780,000 cu. yds.

Stripping Ratio's

Small Pit -

$$\begin{array}{l} \text{Overburden} \quad 2,200,000 \times \frac{27}{18} = 3,300,000 \text{ tons} \\ \text{Waste Rock} \quad 360,000 \times \frac{27}{12} = \underline{810,000 \text{ tons}} \\ \phantom{\text{Waste Rock}} \phantom{360,000 \times \frac{27}{12} =} 4,110,000 \text{ tons} \end{array}$$

$$\frac{4,110,000}{3,400,000} = 1.21 \text{ waste to 1.0 ore.}$$

Large Pit -

$$\begin{array}{l} \text{Overburden} \quad 4,100,000 \times \frac{27}{18} = 6,150,000 \text{ tons} \\ \text{Waste rock} \quad 2,670,000 \times \frac{27}{12} = 6,000,000 \text{ tons} \\ \text{Barren Sulphides} \quad 1,780,000 \times \frac{27}{8} = \underline{6,000,000 \text{ tons}} \\ \phantom{\text{Barren Sulphides}} \phantom{1,780,000 \times \frac{27}{8} =} 18,150,000 \text{ tons} \end{array}$$

$$\frac{18,150,000}{5,640,000} = 3.22 \text{ waste to 1.0 ore}$$

or on difference of ore tonnage in pit

$$5,640,000 - 3,400,000 = 2,240,000 \text{ tons ore}$$

$$18,150,000 - 4,110,000 = 14,040,000 \text{ tons to strip}$$

$$\text{Ratio} = \frac{14,040,000}{2,240,000} = 6.35 \text{ waste to 1.0 ore}$$

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The economic ratio of open-pit mineable ore and underground ore could be established properly through the use of computer programing.

Indicated ore reserves for the Swim Lake deposit have been taken at 4,750,000 tons grading, 3.8% Pb, 4.7% ZN, 1.5 oz. AG as per report by P. M. Kavanagh December 1966. As the minimum cover on this deposit is 75 feet, it has been considered as totally being mined by underground methods.

Operating Costs - (1970 approach)

Operating costs are estimated following discussions with R. L. Coleman, J. Hall and E. Futterer of Noranda Mines Limited.

	Vangorda				Swim Lake	
	Open Pit		Underground		Underground	
	<u>Bulk*</u>	<u>Differential*</u>	<u>Bulk</u>	<u>Differential</u>	<u>Bulk</u>	<u>Differential</u>
	\$	\$	\$	\$	\$	\$
Mining (excluding alluvial overburden shipping)	0.50	0.50	3.00	3.00	3.00	3.00
Milling	2.45	2.75	2.45	2.75	2.45	2.75
Surface and Services	0.25	0.25	0.50	0.50	0.85	0.85
Administration and General	<u>0.50</u>	<u>0.50</u>	<u>0.75</u>	<u>0.75</u>	<u>0.75</u>	<u>0.75</u>
Totals per ton -	3.70	4.00	6.70	7.00	7.05	7.35

Assumed Costs - Anvil Mining Custom Milling

	<u>Open Pit</u>	<u>Underground</u>	<u>Underground</u>
Mining	0.50	3.00	3.00
Milling	2.75	2.75	2.75
Surface and Service	0.20	0.40	0.40
Administration and General	0.35	0.50	0.50
Haulage to mill @ .07¢/ton mile	0.84	0.84	1.26
Custom Charges	<u>0.50</u>	<u>0.50</u>	<u>0.50</u>
	5.14	7.99	8.41

Metallurgical Studies

Vangorda ore has been the subject of numerous laboratory trails producing bulk and differential concentrates. They may be summarized as follows:

<u>Tested by</u>	<u>Date</u>	<u>Method</u>							<u>N.S.R.</u>		<u>\$ Per Ton Ore</u>
			<u>Head</u>	<u>Lead Conc.</u>	<u>Recovery</u>	<u>Head</u>	<u>Zinc Conc.</u>	<u>Recovery</u>	<u>\$/Ton Lead</u>	<u>Con. Zinc</u>	
Noranda	1954	Differential	3.2	46.1	77.6	5.2	53.0	49.5	67.45	47.40	6.50
Brunswick	1969	"	4.1	51.7	89.7	5.2	55.4	78.1	84.45	53.40	9.40
Galigher	1968	"	3.9	56.5	72.5	5.1	50.8	51.5	* -		-
Galigher	1969	"	4.1	48.2	73.8	4.8	55.4	42.7	* -		-
	1969		4.6	56.6	83.8	4.7	54.4	79.7	* -		-
Dawa	1969	"	4.0	49.8	77.0	4.9	49.4	60.4			
Noranda	1970	"	3.7	37.6	83.4	4.5	48.1	55.5	47.35	35.90	6.04
Noranda	1970	"	3.7	54.1	63.3	4.5	56.2	71.4	87.95	54.90	7.50

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<u>Tested by</u>	<u>Date</u>	<u>Method</u>	<u>Lead</u>			<u>Zinc</u>			<u>N.S.R.</u>		<u>\$</u> <u>Per Ton Or</u>
			<u>Head</u>	<u>Conc.</u>	<u>Recovery</u>	<u>Head</u>	<u>Conc.</u>	<u>Recovery</u>	<u>\$/Ton</u>	<u>Conc.</u>	
Mitsui	1956	Bulk	3.8	20.4	78.2	5.2	35.6	92.3	61.45		8.50
Noranda	1965	"	3.7	24.2	81.5	5.3	36.4	85.0	* -		-
Brunswick	1969	"	3.6	23.5	84.2	4.8	34.7	94.5	65.70		9.10
Brunswick	1970	"	3.8	22.4	77.1	5.4	35.3	86.6	62.71		8.10

* Assay for silver in Lead concentrate not available.

CAPITAL COSTS

Capital Cost Estimate - Mining and Milling Complex for a production rate of 3000 tons per day.

Prior to Open-Pit Mining - Vangorda

	\$
Roads - as Anvil Mining have already constructed roads to within a very short distance from the Vangorda property, the amount for improvement and bridge construction is minimized.	300,000.
Construction buildings - from Geco estimate	200,000.
Administration and Service buildings - from Geco estimate	500,000.
Service equipment - from Geco estimate .	250,000.
Power, water and Sewage - as there is no excess power available for purchase, a self contained diesel plant would have to be constructed.	1,500,000.
Townsite (Faro)	2,000,000.
Equipment	1,250,000.
Concentrator, 3000 tpd - the proposed 3000 tpd plant for Matagami Lake Mines Limited at Sturgeon Lake is estimated at \$10,000,000., a 20% increase in this figure is included due to location.	12,000,000.
Preproduction - stripping and pit development by contractor 2,200,000 cu. yds. @ \$1.25 per cu. yd.	2,750,000.
Working Capital	1,000,000.
TOTAL Phase I	\$ 21,750,000.

Prior to Underground Mining - Vangorda	
Preproduction - ramps and stope development	750,000.
Equipment - pumps, drill jumbo's etc.	750,000.
	<hr/>
TOTAL Phase II	\$ 1,500,000.
 Prior to Underground Mining - Swim	
Preproduction - ramps and mine development	1,500,000.
Buildings and service facilities	2,500,000.
	<hr/>
TOTAL Phase III	\$ 4,000,000.
 TOTAL Phases I, II, III	\$ 27,250,000.

NET SMELTER CALCULATIONS

Concentrate Transportation and Smelter Costs:

Transportation:

	<u>Europe</u>	<u>Japan</u>
Truck transport - concentrator to Whitehorse	\$12.50	\$12.50
Rail transport - Whitehorse to Skagway	7.50	7.50
Dockside handling	1.75	1.75
Ocean transport, handling, inland freight	10.00	5.00
Product Insurance, representation, sales	1.00	1.00
	<u> </u>	<u> </u>
Estimated Total per S.D.T.	<u>\$32.75</u>	<u>\$27.75</u>

Smelter:

	<u>Europe</u>	<u>Japan</u>
Bulk Concentrates		
Base Treatment	\$39.90	\$43.50
Escalation	3.60	4.05
	<u> </u>	<u> </u>
Estimated Total per S.D.T.	<u>\$43.50</u>	<u>\$47.55</u>
Total charges per S.D.T.	<u>\$76.25</u>	<u>\$75.35</u>

Smelter Payments:

	<u>Europe</u>	<u>Japan</u>
Lead: $2000 \times 0.2241 \times 0.75 \times 0.13 =$		\$ 43.70
$2000 \times 0.2241 \times 0.80 \times 0.13 =$	\$ 46.70	
Zinc: $2000 \times 0.3531 \times 0.85 \times 0.14 =$		84.00
$2000 \times (0.3531 - 0.07) \times 0.14 =$	79.20	
Silver: $(8.16 - 4.08) \times 0.60 \times 2.00 =$		4.90
$(8.16 - 1.50) \times (2.00 - 0.0233) =$	13.06	
	<u> </u>	<u> </u>
Estimated Total per S.D.T.	\$138.96	\$132.60
LESS CHARGES	<u>76.25</u>	<u>75.35</u>
	\$ 62.71	\$ 57.25
1155 lbs. metal - per lb.	0.542	0.495

Estimated Value of Ore in Place (European Market):

	<u>\$/Ton</u>
Vangorda Open-pit - 168 lbs. per ton	8.90
Vangorda Underground - 137 lbs. per ton	7.95
Swim Lake Underground - 141 lbs. per ton	7.60

Estimated Value of Ore in Place by Differential Concentration (Noranda Mines Limited, Metallurgical Study, July 1970):

Test - V-24:

Payment:

Lead concentrate Pb 2000 x 0.80 x 0.13 x 0.376 = \$ 78.30
 Ag (14.6 - 1)0.95 x 2.00 = 25.90
 \$104.20
 Zinc concentrate Zn 2000 x 0.85 x 0.14 x 0.481 = \$114.50

Charges:

Transportation = \$ 27.75
 Treatment Pb = \$ 29.10
 Zn = \$ 50.85

Net Smelter Return:

Lead Concentrate - 104.20 - 27.75 - 29.10 = \$ 47.35 S.D.T.
 752 lbs. - per lb. = \$0.063
 Zinc Concentrate - 114.50 - 27.75 - 50.85 = \$ 35.90 S.D.T.
 960 lbs. - per lb. = \$0.0374

THEREFORE:

		<u>\$/ton ore</u>	<u>1973 Estimate</u>
Vangorda Open-pit	- Pb - 61	= \$ 6.48	6.98
	Zn - 71		
Vangorda Underground	- Pb - 56	= 5.74	7.9
	Zn - 60		
Swim Lake Underground	- Pb - 63	= 5.90	5.70
	Zn - 52		

Test - V-32:

Payment:

Lead concentrate Pb $2000 \times 0.80 \times 0.13 \times 0.541 = \112.50
 Ag $(18.0 - 1)0.95 \times 2.00 = \underline{32.30}$
 \$144.80

Zinc concentrate Zn $2000 \times 0.85 \times 0.14 \times 0.562 = \133.50

Charges:

As in Test V-24

Lead = \$56.85

Zinc = \$78.60

Net Smelter Return:

Lead Concentrate - $144.80 - 56.85 = \$ 87.95$ S.D.T.
 1082 lbs. - per lb. = \$0.081

Zinc Concentrate - $133.50 - 78.60 = \$ 54.90$ S.D.T.
 1124 lbs. - per lb. = \$0.0487

THEREFORE:

\$/ton ore

Vangorda Open-pit - Pb - 46 = \$ 8.22 9.30
 Zn - 92

Vangorda Underground - Pb - 43 = 7.28 8.15
 Zn - 78

Swim Lake Underground - Pb - 48 = 7.15 8.04
 Zn - 67

TABLE
ALLOWABLE CAPITAL INVESTMENT

			1	2	3	4	5	6	7	8	9	10
Rate of Production - 3000 tons per day		1,050,000										650,000
Combined Metal Grade %			10.1	10.1	10.1	8.9	8.8	8.8	8.5	8.5	8.5	8.5
Net Smelter Return \$per ton			10.22	10.22	10.22	9.42	9.15	9.15	9.19	9.21	9.21	9.21
Production Cost \$per ton			9.14	5.14	5.14	7.85	7.99	7.99	8.41	8.41	8.41	8.41
Operating Profit \$per ton			5.08	5.08	5.08	1.57	1.16	1.16	0.78	0.78	0.78	0.78
	000's\$		5,334	5,334	5,334	1,649	1,218	1,218		819	819	819
												507
Discount Factor 18%			.71818	.60863	.51579	.43711	.37043	.31393		.71818	.60863	.51579
												.42711
Present Value @ 18% 000's\$			3,831	3,246	2,751	721	451	382				
		11,382					1,729					
Capital Required												
Preproduction 000's	1,000	1,750			250	500						
Fixed Assets 000's	4,000	4,000			250	500						
Working Cap. 000's			500									
	000's \$	5,000	5,750	500	500	1,000		(500)				
Operating Profit \$000's			5,334	5,334	5,334	1,649	1,218	1,218				
Mining Duties \$000's			186	186	170	0	0	0				
Federal Tax \$000's			0	0	1,500	216	407	407				
Cash Flow 000's\$ (5,000)	(5,750)		4,648	5,148	3,164	433	811	1,311				
Discount Factor 15%	1.0	.86957	.75614	.65752	.57175	.49718	.43233	.37594				
Present Value	(5,000)	(5,000)	3,515	3,385	1,809	215	351	493	(9,768)			

No Sufficient for Development
of Property

TABLE
ALLOWABLE CAPITAL INVESTMENT

1	2	3	4	5	6	7	8	9	10
year									650,000
	10.1	10.1	8.9	8.8	8.8	8.5	8.5	8.5	8.5
	10.22	10.22	9.42	9.15	9.15	9.19	9.21	9.21	9.21
	5.14	5.14	7.85	7.99	7.99	8.41	8.41	8.41	8.41
	5.08	5.08	1.57	1.16	1.16	0.78	0.78	0.78	0.78
	,334	5,334	1,649	1,218	1,218				

5 575

5

575

5 575

85. 382
1,779

50885 51579 167711

575 1031 177 271 221

No Sufficient for Development
of Property

250
250

500
500

(500)

500
1,000

5,334	5,334	1,649	1,218	1,218
186	170	0	0	0
0	1,500	216	407	407
5,148	3,164	433	811	1,311
65752	57175	49718	43233	

VANGORDA MINES - ORE RESERVES

	<u>Tons</u>	<u>% pb</u>	<u>% Zn</u>	<u>ozs. Ag.</u>	<u>% Cu</u>
A'	360,000	3.84	8.33	1.64	0.39
A''	139,000	4.10	7.26	1.44	0.18
A	3,449,000	3.41	5.50	2.12	0.23
B	860,000	3.28	5.53	1.77	0.13
C	1,307,000	3.79	6.29	2.01	
D	527,000	3.59	6.74	2.07	0.07
TOTAL	6,652,000	3.52	5.95	2.01	0.21

OPEN PIT TONNAGE

<u>SECT</u>	<u>W.</u>	<u>HOR L.</u>	<u>VERT T.</u>	<u>CU.FT.</u>	<u>TONS CUFT/8</u>	<u>% pb</u>	<u>%Zn</u>	<u>ozs. Ag.</u>	<u>% Cu</u>	
2					360,000	3.84	8.33	1.64	0.39	A'
4	300	200	83		620,000	3.04	5.87	2.11		A
5	300	200	65		490,000	3.23	5.64	1.82		A
6	350	200	36		315,000	3.75	6.81	2.19		A
7	150	200	52		195,000	3.41	5.67	1.37		A
9	450	200	15	1,350,000	170,000	4.96	5.94	2.32		B
10	300	200	10	600,000	75,000	3.16	4.23	1.53		B
11	350	200	30		260,000	2.99	6.14	2.53		C
12	175	200	20		88,000	3.26	5.89	1.81		C
13	300	200	37	2,220,000	277,000	5.00	6.26	2.17		C
14	400	200	20	1,600,000	200,000	4.13	7.73	1.71		C
	500	200	21	2,100,000	260,000	3.72	7.58	2.37		D
15	90	200	25		55,000	4.14	4.58	1.50		
					3,365,000	3.64	6.42	2.00		

OREBODY A

<u>Hole</u>	<u>Sect</u>	<u>W</u>	<u>Hor Length</u>	<u>Vert. Thickness</u>	<u>CU.F.T ± 8</u>	<u>= Tons</u>	<u>%Pb.</u>	<u>%Zn.</u>	<u>Ozs. Ag.</u>	<u>%Cu.</u>
26	2	240	200	40	1,920,000	240,000	3.08	5.20	1.90	0.23
7	3	400	200	80	6,400,000	800,000	3.47	5.70		
119										
15										
115										
10	4	350	200	135	9,450,000	1,180,000	3.10	4.93	2.11	
33										
96	5	420	200	77	6,470,000	807,000	3.48	5.49	2.25	
20										
95										
47										
94	6	200	200	70	2,800,000	350,000	4.42	7.17	2.22	
53										
18										
114	7	100	75	77	578,000	72,000	3.44	5.62	1.37	
50										
						3,449,000	3.41	5.50	2.12	0.23

OREBODY A'

<u>Hole</u>	<u>Sect</u>	<u>W</u>	<u>Hor. Length</u>	<u>Vert. Thickness</u>	<u>CU.FT. ÷ 8</u>	= <u>Tons</u>	<u>%Pb.</u>	<u>%Zn.</u>	<u>Ozs. Ag.</u>	<u>%Cu.</u>
4 } 1 } 6 } 7 }	2	250	250	46	2,870,000	360,000	3.84	8.33	1.64	0.39
						<u>360,000</u>				

OREBODY A''

6 } 26 }	2	300	200	9.5	570,000	70,000	4.58	7.53	1.44	0.18
119 } 15 } 115 }	3	325	200	8'	520,000	65,000	3.46	6.83		
	4	100	100	3		<u>4,000</u>	6.16	10.06		
				TOTAL		139,000	4.10	7.26	1.44	0.18

DREBODY B

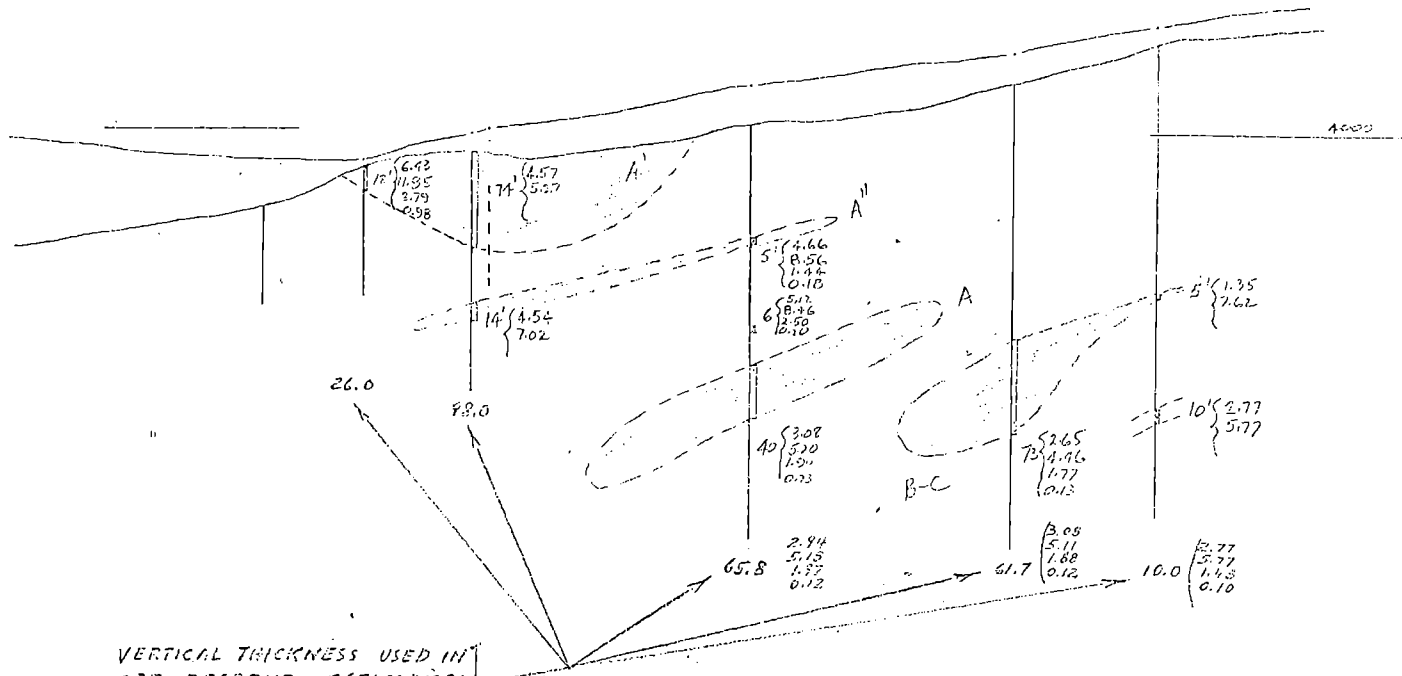
<u>Hole</u>	<u>Sect</u>	<u>W</u>	<u>Hor. Length</u>	<u>Vert. Thickness</u>	<u>Cu.Ft.</u>	<u>Tons</u>	<u>Pb.</u>	<u>Zn.</u>	<u>Ag.</u>	<u>Cu.</u>
27 } 143 }	2	175	200	39	1,365,000	170,000	2.56	4.66	1.77	0.13
115	3	200	200	15	600,000	75,000	3.54	5.26		
33	4	200	200	25	1,000,000	125,000	2.65	6.10	1.48	
97 } 94 }	5	200	200	20	800,000	100,000	1.89	7.23	1.82	
45	6	100	200	25	500,000	60,000	3.02	5.47		
50	7	100	200	24	480,000	60,000	3.28	4.52	1.14	
49 } 63 }	8	200	200	5	200,000	25,000	5.81	6.31	1.52	
40 } 98 }	9	450	200	15	1,350,000	170,000	4.96	5.94	2.32	
52										
97										
56										
44 } 68 }	10	300	200	10	600,000	<u>75,000</u>	3.16	4.23	1.53	
				TOTAL		860,000	3.28	5.53	1.77	0.13

OREBODY C

<u>Hole</u>	<u>Sect</u>	<u>W</u>	<u>Hor. Length</u>	<u>Vert. Thickness</u>	<u>Cu.Ft.</u>	<u>Tons</u>	<u>Pb.</u>	<u>Zn.</u>	<u>Ag.</u>	<u>Cu.</u>
43 } 44 }	10	300	200	10	600,000	75,000	2.69	4.83	1.24	
11 } 12 } 72 } 109 } 71 }	11	400	200	31	2,480,000	310,000	2.99	6.14	2.53	
58 } 19 }	13	300	200	37	2,220,000	277,000	5.00	6.26	2.17	
91 } 81 }	14	400	200	20	1,600,000	200,000	4.13	7.73	1.71	
84	15	100	200	20	400,000	50,000	5.35	6.74	2.05	
86	16	100	200	11	220,000	27,000	2.08	9.00	1.78	
121	17	100	200	5	100,000	13,000	2.60	4.12		
						1,132,000	3.80	6.37		
143	2	100	200	10	200,000	13,000	2.77	5.77		
133	3	100	200	30	600,000	75,000	3.02	6.00		
16	4	100	200	20	400,000	50,000	4.97	4.75		
126	5	100	200	15	300,000	37,000	3.95	6.52		
						1,307,000	2.79	6.29	2.01	

OREBODY D

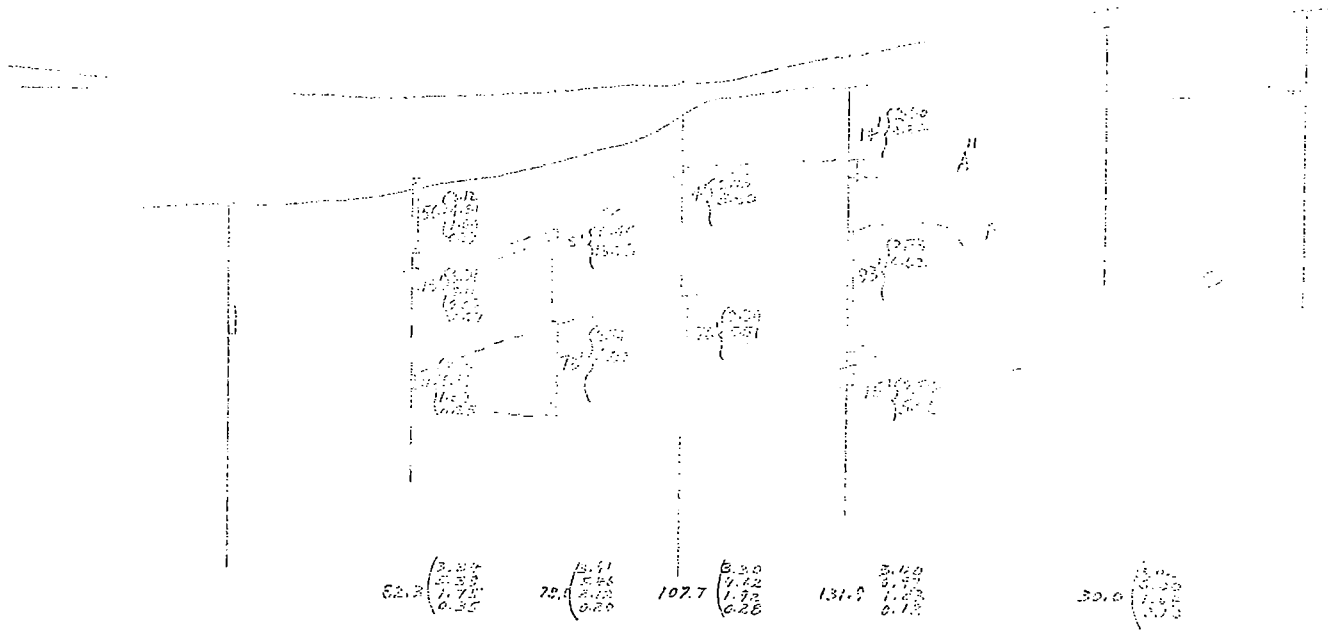
<u>Hole</u>	<u>Sect.</u>	<u>W</u>	<u>Hor. Length</u>	<u>Vert. Thickness</u>	<u>Cu. Ft.</u>	<u>Tons</u>	<u>Pb.</u>	<u>Zn.</u>	<u>Ag.</u>	<u>Cu.</u>
8 } 5 } 75 }	12	250	200	13	650,000	80,000	4.04	7.44	2.33	0.07
78 } 99 } 77 }	13	300	200	13	780,000	97,000	2.82	5.84	1.49	
91 } 81 } 80 }	14	500	200	21	2,100,000	260,000	3.72	7.58	2.37	
118 } 55 }	15	150	200	17	510,000	64,000	4.36	4.48	1.50	
86	16	100	200	12	240,000	30,000	2.28	5.90	1.87	
29 } 121 }	17	100	100	5	50,000	6,000	2.35	3.90		
TOTAL						537,000	3.59	6.74	2.07	0.07



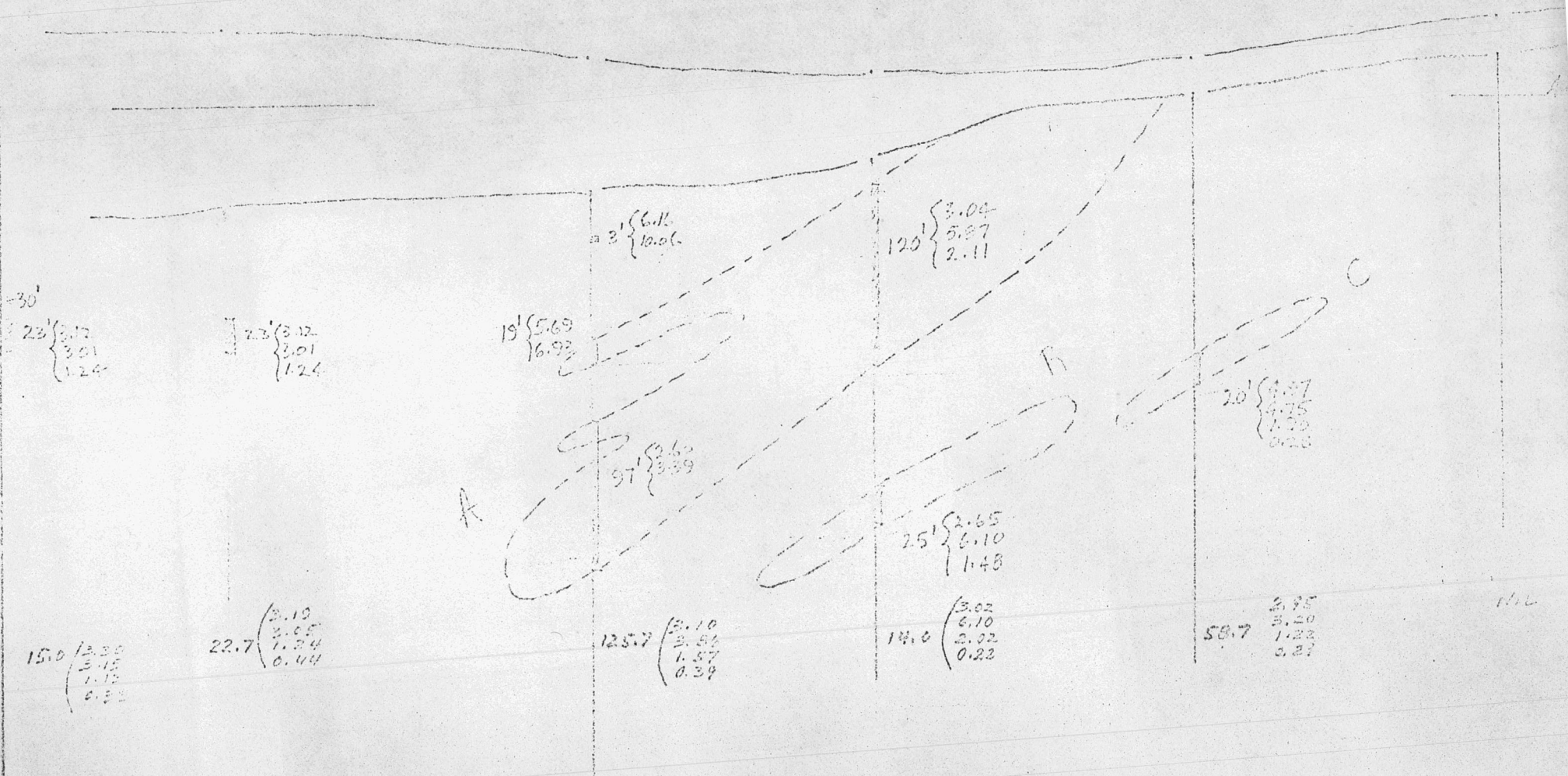
VERTICAL THICKNESS USED IN
 ORE RESERVE ESTIMATES
 BY PROSPECTORS AIRWAYS.

VHIGOR P.H.
 SECTION 2
 LOOKING NW

1 in. = 100 ft - 2



Vinkovci
 septem 3
 Lestak, 11/1



VAN/CURON
SECTION 11
LOOKING NW

129

96

20

95

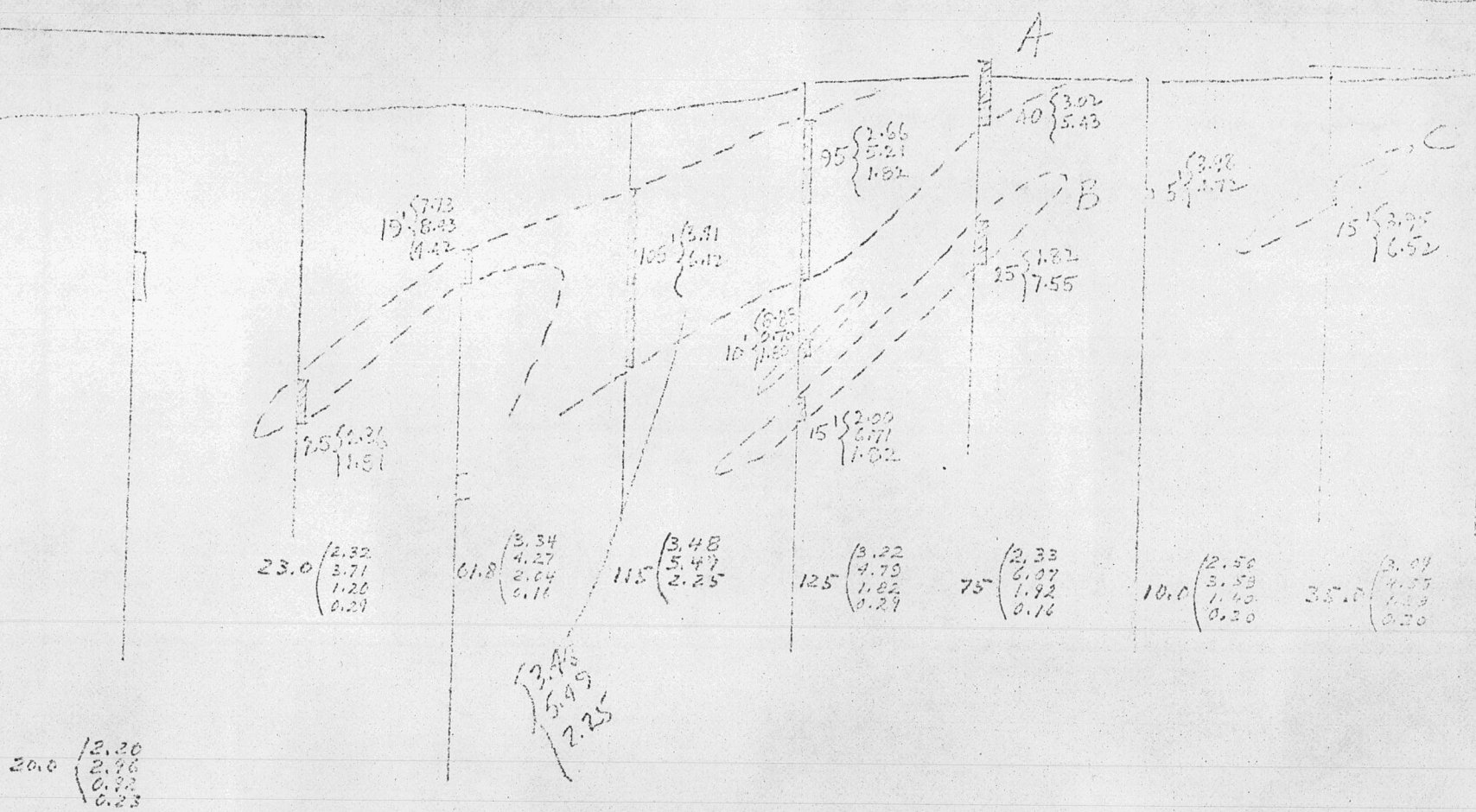
47

94

35

122

38



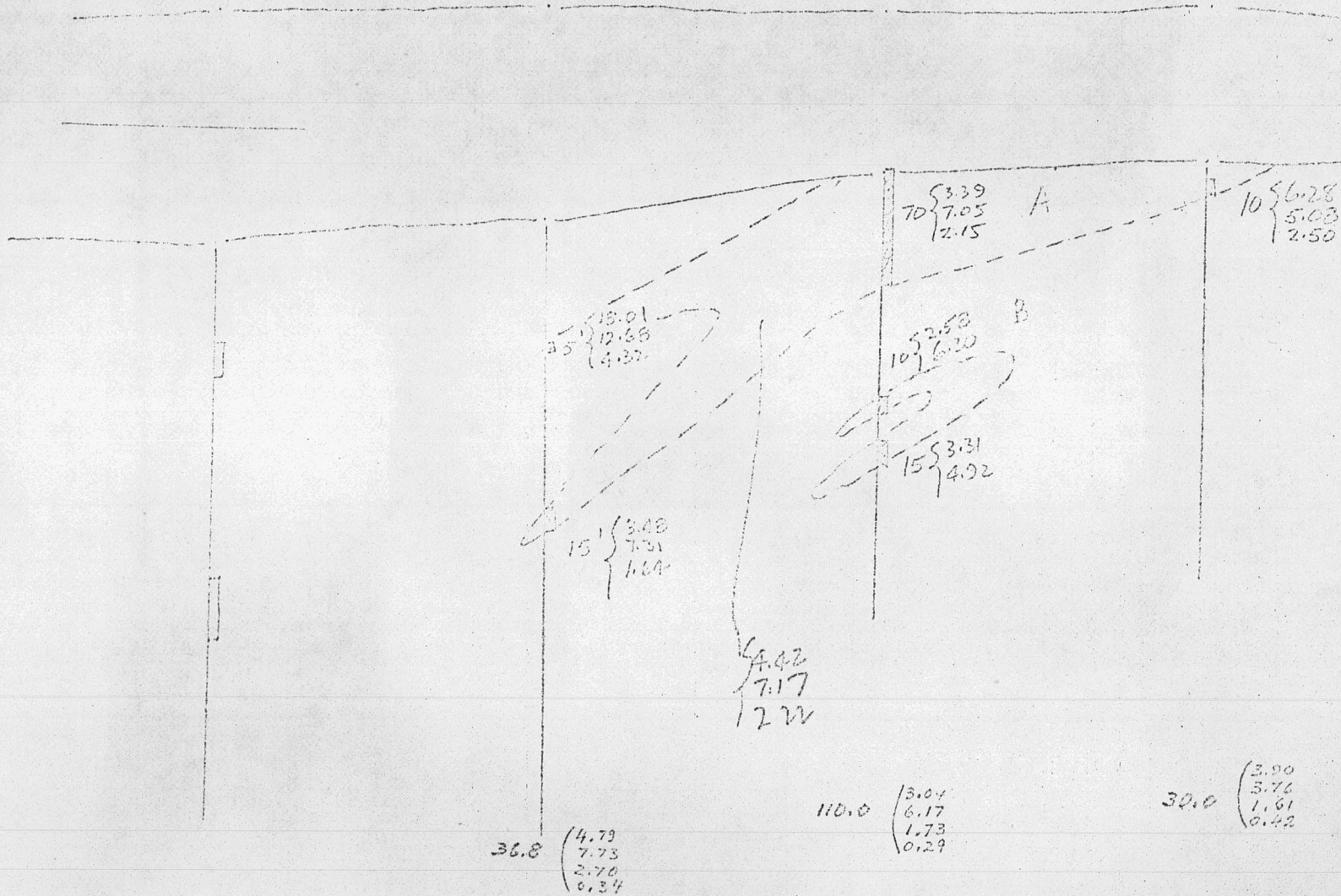
VANGUARD
 SECTION 5
 LOOKING NW

64

53

45

18



VANGUARD
SECTION 6
LOOKING N.W.

117

46

114

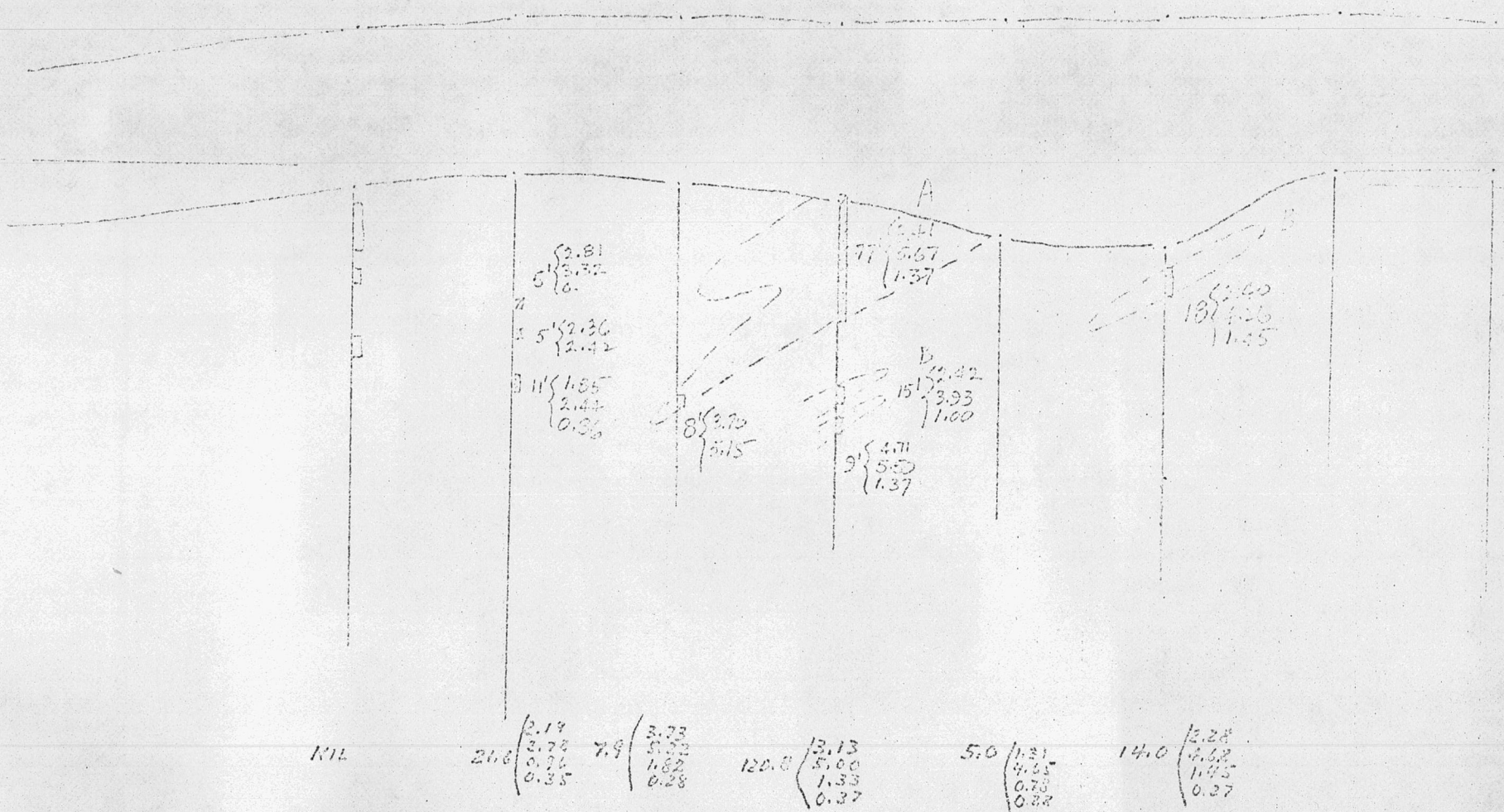
50

110

60

133

66



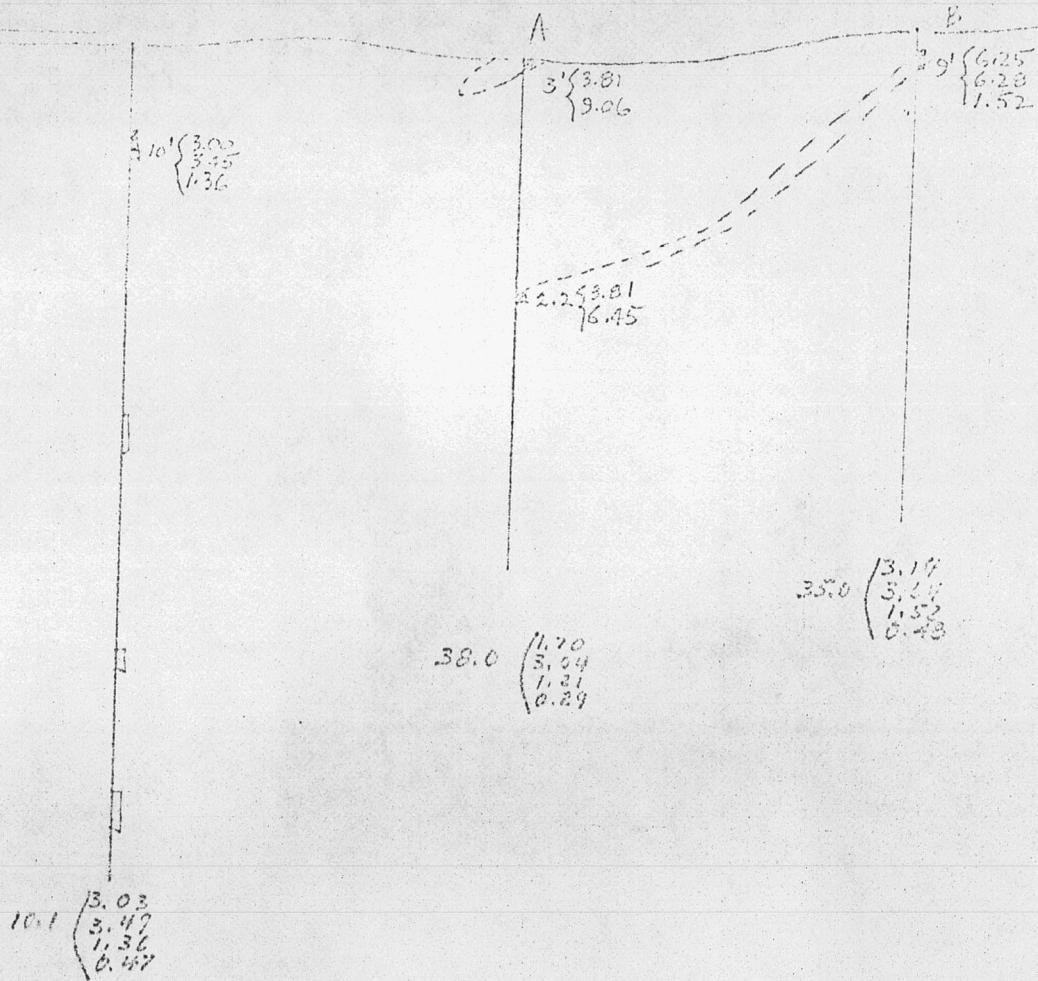
VANSONDA
SECTION 7
LOOKING NW

61

57

49

63



VANGORD II.
SECTION 8
LOOKING NW

42

40

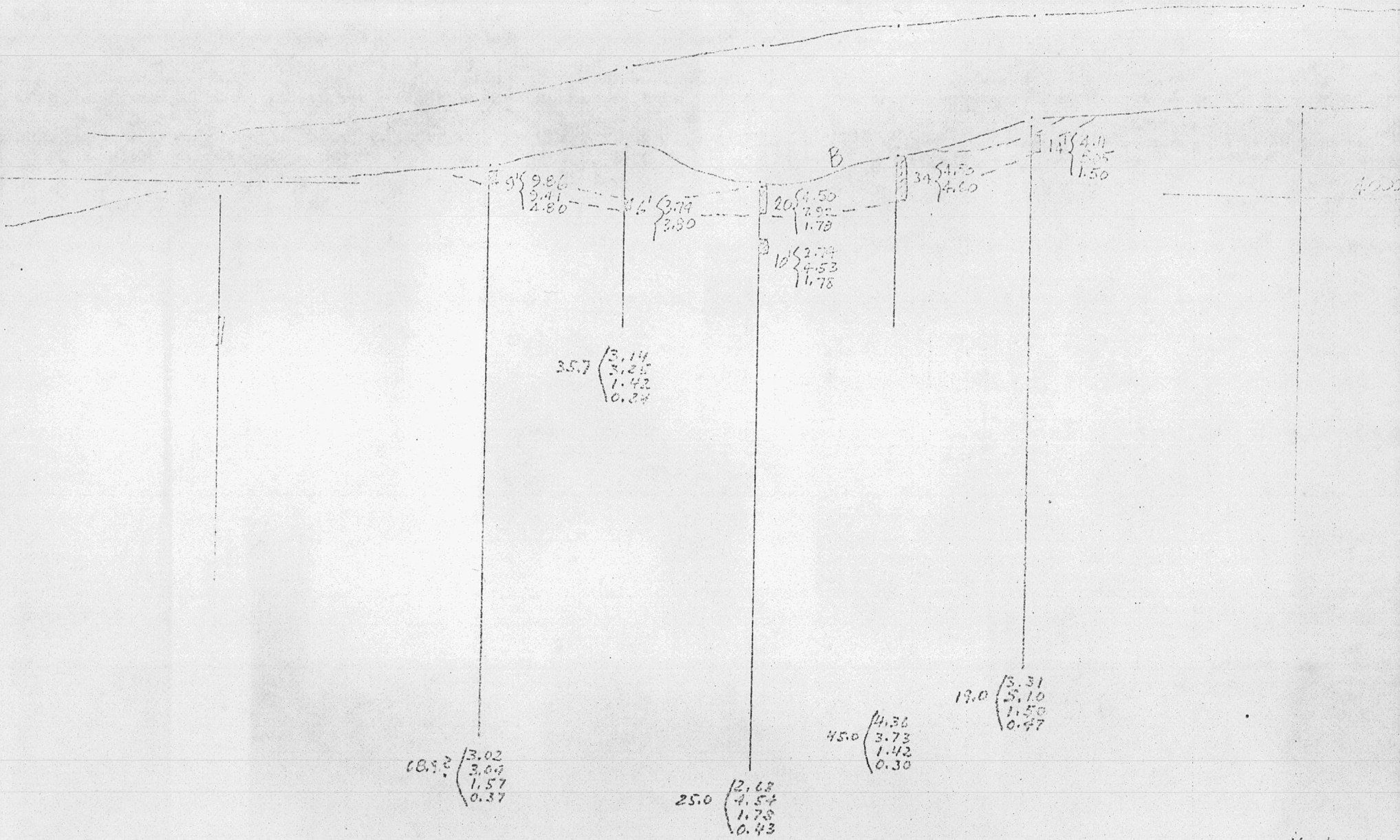
98

52

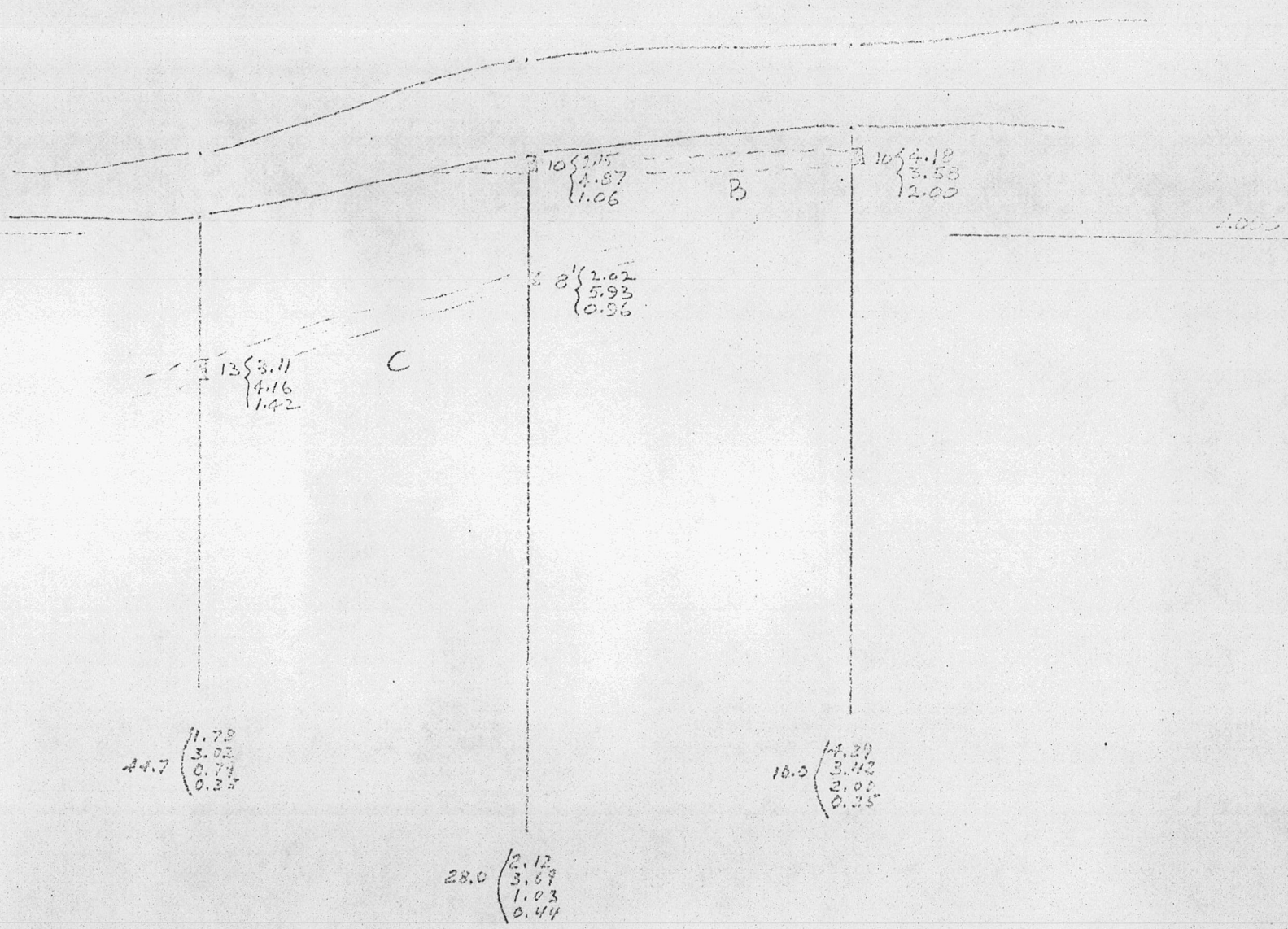
97

56

89



VANKORDA
SECTION 9
LOOKING NW



VINEGOLA
SECTION 10
FOOTING #11

14

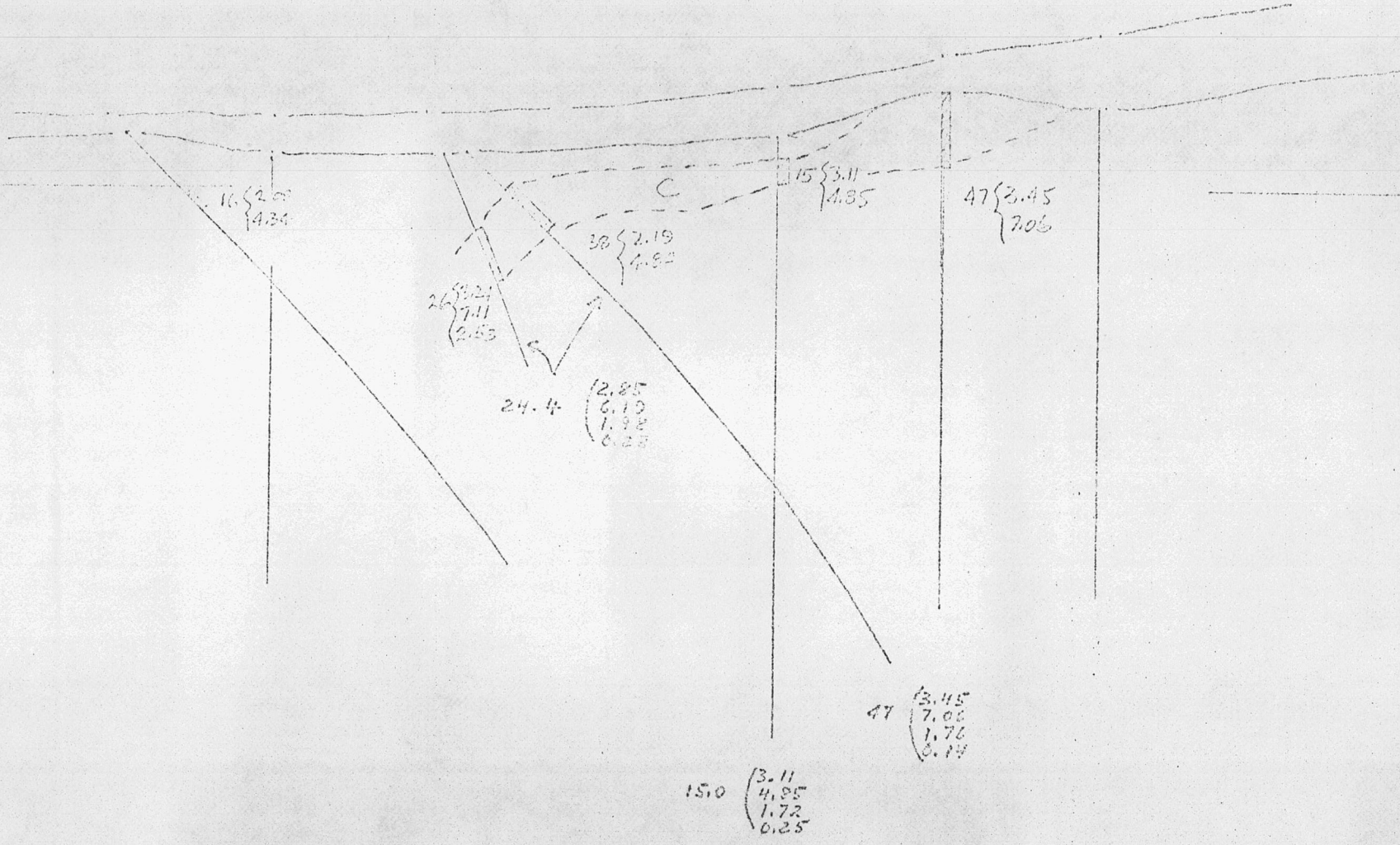
112

11&12

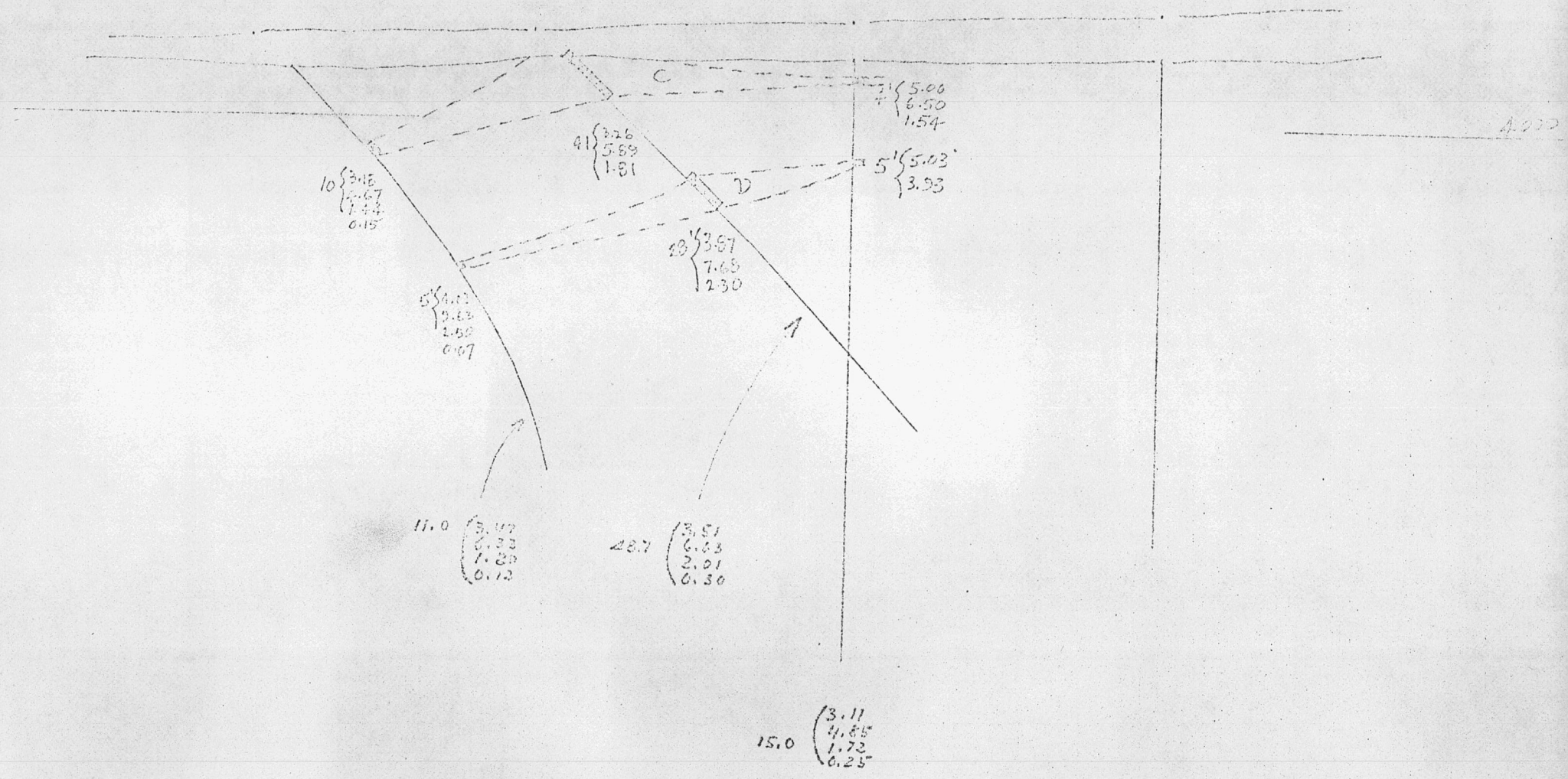
72

109

71



VANCOUVER
SECTION 11
LOOKING NW



WINDGORDA
 SECTION 12
 LOOKING NW

100

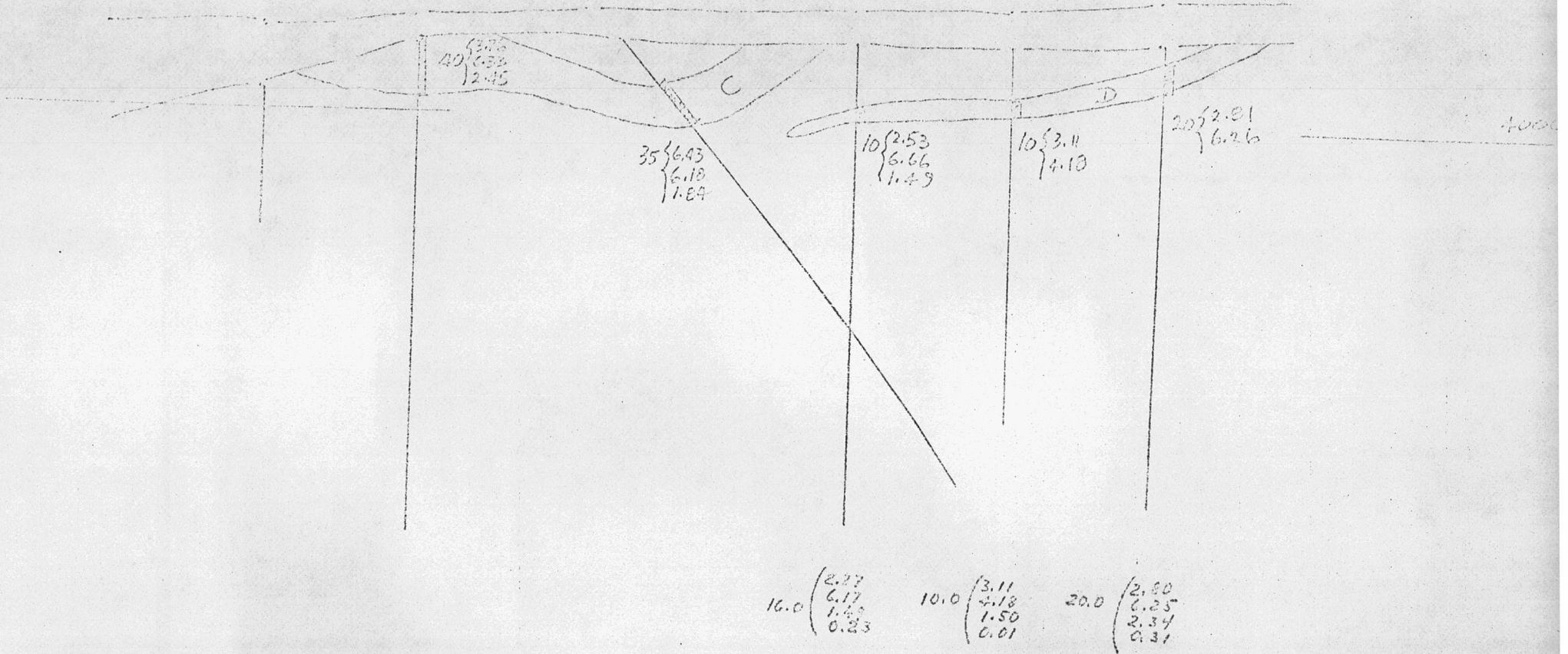
58

9

78

99

77



UNIFORD A
SECTION 13
LOOKING NW

54

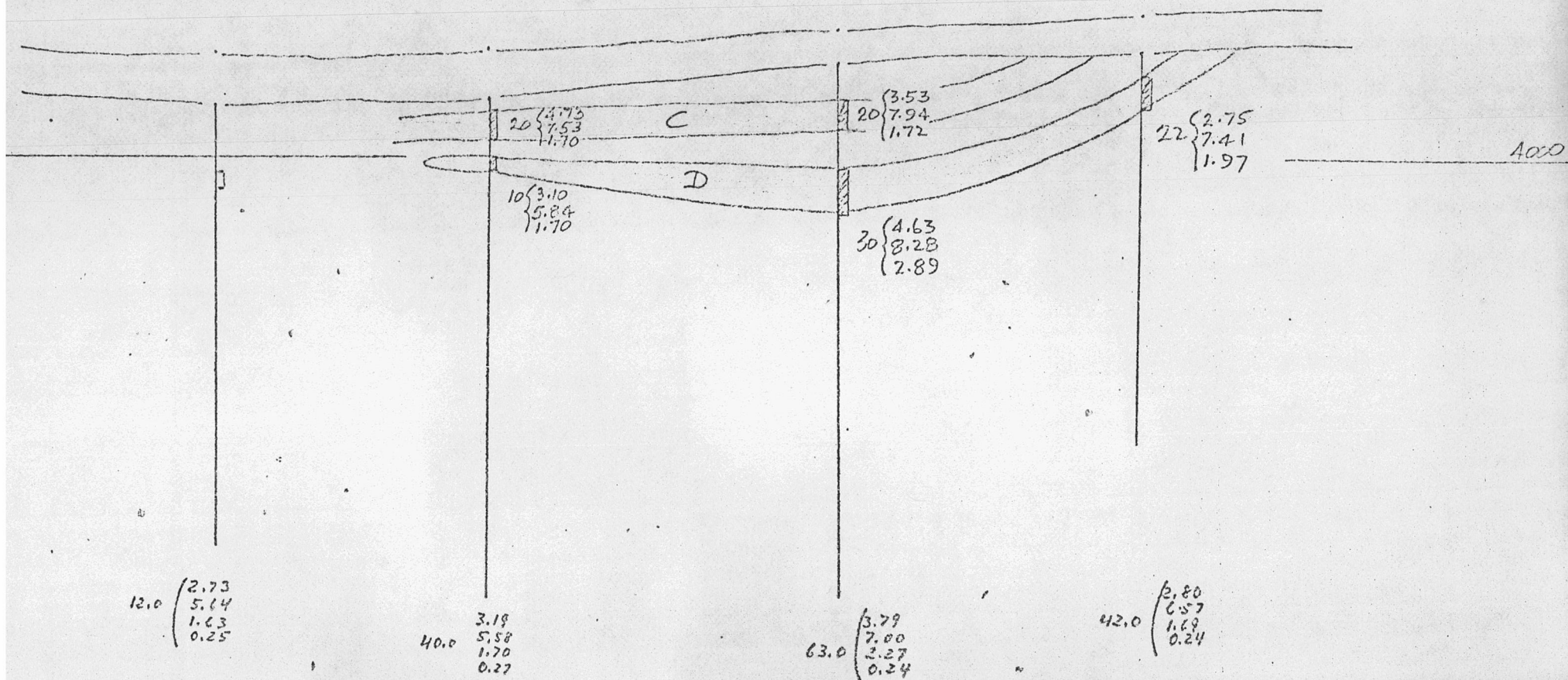
93

91

81

80

113



VANGORDA
SECTION 14
LOOKING NW

102

101

120

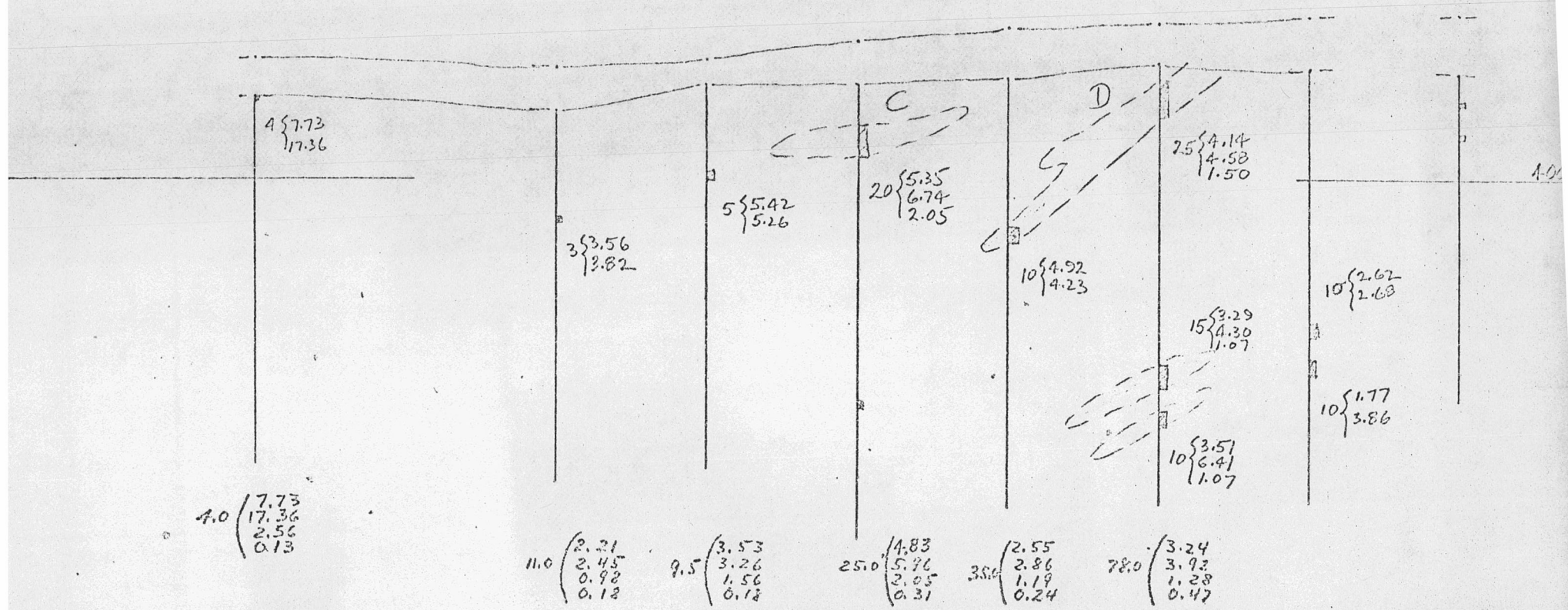
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118

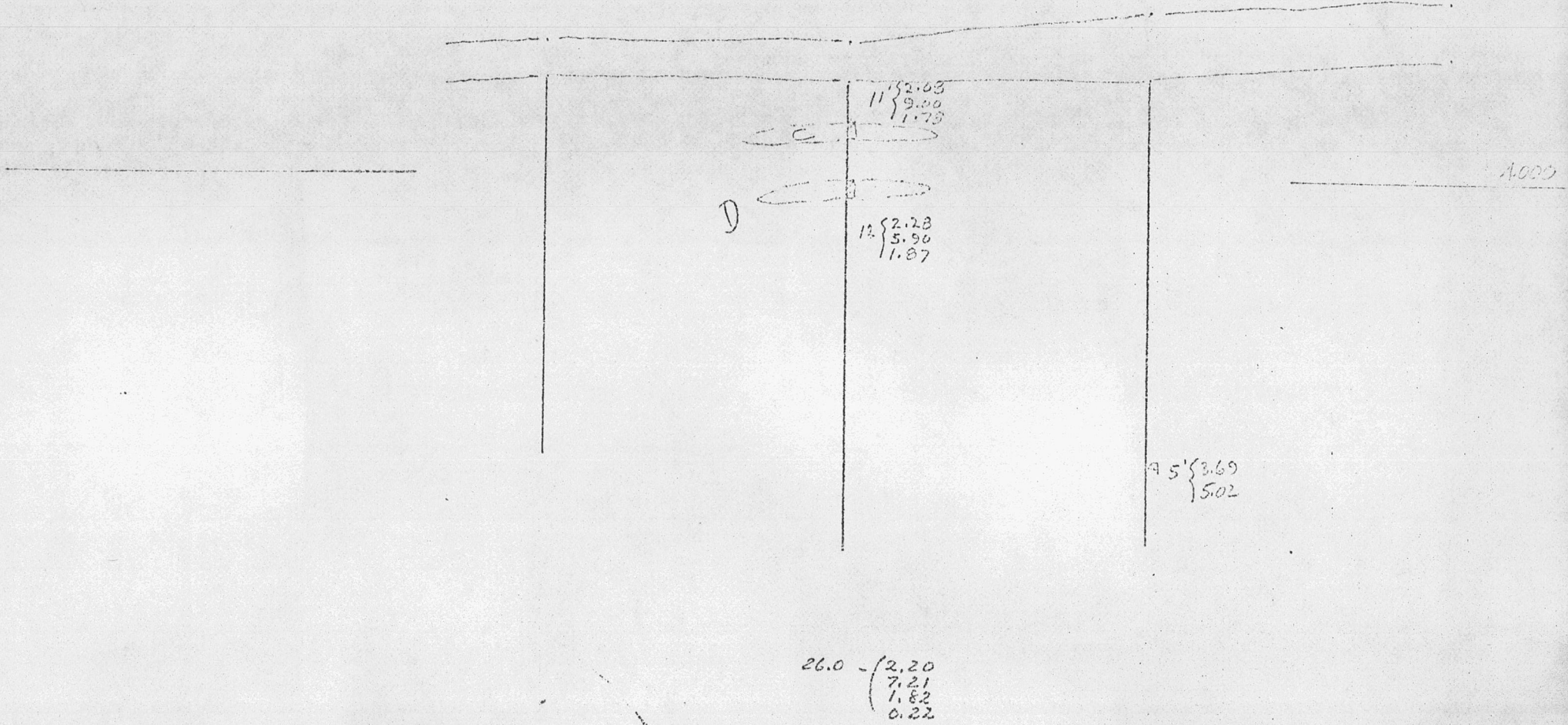
55

116

109



VANCORDA
SECTION 15
LOOKING NW



WINGORDA
SECTION 16
LOOKING NW

HOLE NOS. →

105

125

89

121

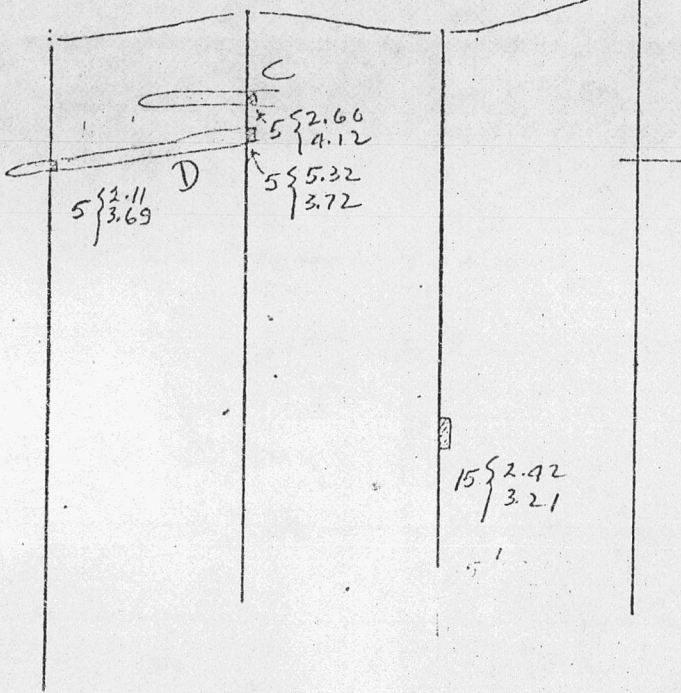
85

128

ELEVATION

Surface
Overburden

4000



LEGEND

Vertical Hole

FT.

10' { 2.60 % pb
5.23 % Zn
1.82 % Ag
0.32 % Cu
0.01 % Au

DATA FOR
WILTON ESTIMATES

VERTICAL THICKNESSES
USED BY PROSPECTORS
AIRWAYS IN THEIR
ESTIMATES

50' { 2.11
3.69
1.18
0.23

100' { 3.96 Pb
3.92 Zn
1.76 Ag
0.29 Cu

15' { 2.25
4.75
1.77

DATA FOR PROSPECTORS
AIRWAYS ESTIMATES

VANGORDA

SECTION -17-

LOOKING NW

-17-

1" = 100'

Oct 27/75

Vancouver
25 P

Jan.

This is about the best report available on which a reevaluation of the Vanguard deposit may be made. Please note that the Swin Deposit is included in this particular study, but it is readily separated - Nevada's concern would be only with the Vanguard.

I have also included a few updating memoranda which simply reflect reassessment under varying metal prices. Least changes in costs and metal prices make these somewhat academic.

To this point in time the cost/metal price ratio has deteriorated to the point where the Vanguard deposit is even less attractive than indicated in the 1970 study on its own. This of course is balanced somewhat by mill availability either on a cost or equity basis.

Dec 1975
We haven't moved
on this yet
will return
to you
1/1/76