MAP NO.:	**PLACER ASSESSMENT REPORT**	**X**	**DOCUMENT NO: 120196**
	PROSPECTUS		**MINING DISTRICT: Mayo**
105M 10	**CONFIDENTIAL**	**X**	**TYPE OF WORK: Refraction Seismic Survey**
	OPEN FILE		

REPORT FILED UNDER: Ralph Barchen

DATE PERFORMED: October 10, 2001 **DATE FILED:** October 22, 2001

LOCATION: **LAT.: 63°44'48" N** **AREA:** Owl Creek

LONG.: 135°07'39"W **VALUE $:** 2466.35

CLAIM NAME & NO.:

WORK DONE BY: Aurora Geosciences Ltd.

WORK DONE FOR: Ralph Barchen

DATE TO GOOD STANDING :

REMARKS:
A seismic refraction survey was completed and bedrock profiles were generated.

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AURORA GEOSCIENCES LTD.
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Whitehorse, YT Y1A 5P7
www.aurorageosciences.com
aurora@klondiker.com

RECEIVED
OCT 22 2001
MINING RECORDER
MAYO, Y.T.
INDIAN & NORTHERN AFFAIRS

MEMORANDUM

To: Ralph Barchen **Date:** 17 Oct 01

120196

From: Mike Power

Re: Refraction Seismic Survey - Owl Creek

This report describes refraction seismic surveys conducted on Owl Creek on October 10, 2001. The purpose of the survey was to determine the depth to bedrock.

a. Personnel and equipment. The survey was performed by Mike Power, P.Geoph. with your assistance. The following equipment was used in the survey:

Instruments:	Strataview 24 Channel digital engineering seismograph. Impulse laser range finder Garmin 12XL non-differential GPS
Data processing:	P-166 laptop computer, colour printer.
Other:	VHF radios, blasting cables, explosives, spare parts and tools and truck.

b. Survey specifications. The survey was conducted according to the following specifications:

Lines: sited by the client and cut to 1.5 m. The start and end points of the lines were registered with the non-differential GPS receiver in NAD27 UTM coordinates. Stations along the line were surveyed with the laser range finder to horizontal and vertical accuracies of ± 0.1 m. Off line shot points were surveyed directly where possible or interpolated using apparent slope measurements.

Phone spacing: 5 m

This report has been examined by the Geological Evaluation Unit under Section 41 Yukon Placer Mining Act and is recommended as allowable representation work in the amount of $ 2466. 35 .

for Chief Geologist, Exploration and Geological Services Division, Northern Affairs Program for Commissioner of Yukon Territory.

No. of channels: 24 (total spread length 115 m)

Shot locations: 2 shots at least 60 m off either end of each spread
2 shots at either end of the spread
1 shot at mid-spread

Shots: 2 to 8 sticks of Forcite or Geogel initiated with seismic grade electrical caps (seismocaps).

Topography: Topography along the lines and the relative elevations of the lines were surveyed to a common floating datum. The elevation of phone 1 on all lines was set to 100.0 m.

c. Data processing and interpretation. The seismic data was interpreted in a three stage process. The first stage included balancing the seismic trace amplitudes and picking the first arrivals. In the second stage, the picked first breaks and the station / shot geometry was entered into the processing software package. The data was interpreted using the Rimrock Geophysics SIP software package originally developed by the US Geological Survey. The interpretation algorithm incorporates a modified delay time method. The third stage included interactive assignment of layers to the arrivals on the time - distance (T-X) plots, minor adjustments to arrival times for static errors and final inversion to produce the depth sections.

d. Products. The following products are attached to this report:

Depth sections showing calculated depth points
Depth sections showing layer boundaries

e. Results. The data was interpreted using a 3 layer model as this scenario best fits the majority of placer settings. If the stratigraphy on a creek and its correlation with seismic velocities are well known, additional layers can used in the interpretation. In this case, only a three layer case is justified. In general terms, these layers from top to bottom correspond to relatively dry overburden (v=330 to 900 m/s), water saturated overburden (v=1400 - 1600 m/s) and bedrock. The inversion algorithm calculates apparent layer velocities based on the arrival times and phone/shot geometries and uses these in the inversion. They can be overridden if they appear to be inappropriate or if a slightly different velocity yields better results. The Owl Creek data yielded consistent bedrock velocities in the range from 3900 to 4050 m/s. The close agreement of bedrock velocities on all three lines is remarkable and in agreement with your observation that the area may be underlain by thin bedded quartzites. On Lines 1 and 2, two separate velocity layers are apparent in the time-distance (T-X) plots, in accordance with the general observations cited above. On Line 3, only two layers were apparent in the T-X plots. The upper layer (Layer 1) corresponds to non-water saturated overburden and the lower layer has a velocity which appears to correspond to that of bedrock, or possibly, permafrost.

The results of the interpretation algorithm are best viewed in the depth sections showing the calculate depth points. The depth points are calculated from each of the five shots (labelled A through E) and the lines shown are a best fit line through the cluster of depth points. Those sections of the layer boundaries displaying a good solution show the depth points clustered about the best fit line. Portions of the layer boundaries with poor fits show a broader cluster of points about the best fit line and this is a measure of potential inaccuracy in the location of the layer boundary. In general, the accuracy error in the depth to the bedrock layer is greatest at either end of the survey lines. In addition, the reader is cautioned not to put too much faith in the presence of any small features in the bedrock surface shown in the depth sections as these are likely artifacts of the interpretation process.

The coordinates of the start and end points of Line 1 in NAD27 UTM coordinates are as follows:

Phone 1 (NW)	493762E	7068864N
Phone 24 (SE)	493850E	7068780N

The creek crosses the line at phone 7. The inversion was performed with unconstrained velocities and the velocities derived from the inversion are reasonable in a placer setting with the Layer 2 (water saturated overburden) velocity being a bit low. The depth point cluster indicates an apparent error in depth in the order of 4 m in the centre of the plot. The low velocity (Layer 1) layer is relatively thick and this layer may be relatively unconsolidated tailings, based on your excavation results. The flattening of the Layer 1 / Layer 2 boundary on the SE side of the plot may be an artifact as there are too few depth points to image it properly.

The coordinates of the start and end points of Line 2 in NAD27 UTM coordinates are as follows:

Phone 1 (NW)	493713E	7068647N
Phone 24 (SE)	493825E	7068623N

The creek crosses the line at phones 8 and 9. The inversion was performed with the Layer 2 velocity fixed at that expected for water saturated gravel. There was a considerable spread between calculated Layer 2 velocities and this average value was selected as it produced the best inversion results. The depth point cluster indicates an apparent error in depth in the order of 4 m in the centre of the plot. The sharp dip to accommodate a calculated ray entry point beneath phone 23 on the east end of the section is almost certainly an artifact and the apparent bedrock surface likely continues to climb in this area.

The coordinates of the start and end points of Line 3 in NAD27 UTM coordinates are as follows:

Phone 1 (NW)	493664E 7068549N
Phone 24 (SE)	493752E 7068499N

The creek crosses the line at phone 7. After inspection of the T-X curves and a number of attempts to invert the data with 3 layers, a 2-layer inversion was conducted. Layer 1 has a velocity of 930 m/s and is likely thawed overburden, probably not water saturated. The lowermost layer (Layer 2) has an apparent velocity of 3918 m/s and may be either bedrock or permafrost. The seismic velocity of permafrost depends upon the water content of the rock or overburden. Studies of seismic p-wave velocity on unconsolidated frozen overburden[1] demonstrate that at low water saturations (0% to 20%), seismic (p-wave) velocity ranges from 3800 to 4100 m/s. The absence of any apparent refractions in the T-X curves with velocities in the range of 1400 to 1600 m/s suggests that no water saturated overburden layer is present. Consequently, it is reasonable to assume that, if permafrost were present, it would not be water saturated and consequently high seismic velocities might be found within it.

Further evidence that this shallow high velocity layer might be permafrost is based on your observation that the overburden cannot be ripped with a D-9. Caterpillar Tractor Co. Ltd. asserts that material with seismic velocities above 3000 m/s cannot be ripped with available heavy equipment. I have attached extracts from the rippability chart and the paper referenced to below for your records.

It is disconcerting to note that permafrost in non-watersaturated overburden has a seismic velocity expected from that of consolidated bedrock. It appears however, that on Lines 1 and 2, water-saturated overburden overlies the underlying high velocity layer. In this setting, it would be unlikely that the lowermost layer (Layer 3 - inferred bedrock) were permafrost given the high velocity of this layer and the high water saturation of the overlying sediments. Permafrost with high water saturation would be expected to yield a p-wave seismic velocity much closer to 3000 m/s. Consequently, the lowermost layer (Layer 3) on Lines 1 and 2 appears to be bedrock while that on Line 3 is probably permafrost.

The results of any seismic survey should be checked in several areas by excavation, drilling or shafting prior to commencing any significant testing or mining activity. There are inherent ambiguities in the interpretation of the data which result in depth errors in the order of 10% under optimum circumstances. In addition, the method can only

[1] King, M.S., R.W. Zimmerman and R.F. Corwin (1988) Seismic and electrical properties of unconsolidated permafrost. Geophysical Prospecting, Vol. 36, pp349-364.

determine the depth to the boundaries of layers with contrasting seismic velocity and cannot determine what is the cause of the contrast in seismic velocity. Finally, conditions where high velocity material overlies low velocity material create a velocity inversion which causes depth estimates to layer boundaries to be incorrect.

Thank you for the opportunity to assist you with this interesting project. If we can be of any further assistance, please contact me in Whitehorse.

Respectfully submitted,
AURORA GEOSCIENCES LTD.

PROFESSIONAL REGISTERED GEOPHYSICIST M.A. POWER LICENSEE N.W.T.

Mike Power, M.Sc., P.Geoph.
Geophysicist

/attach.

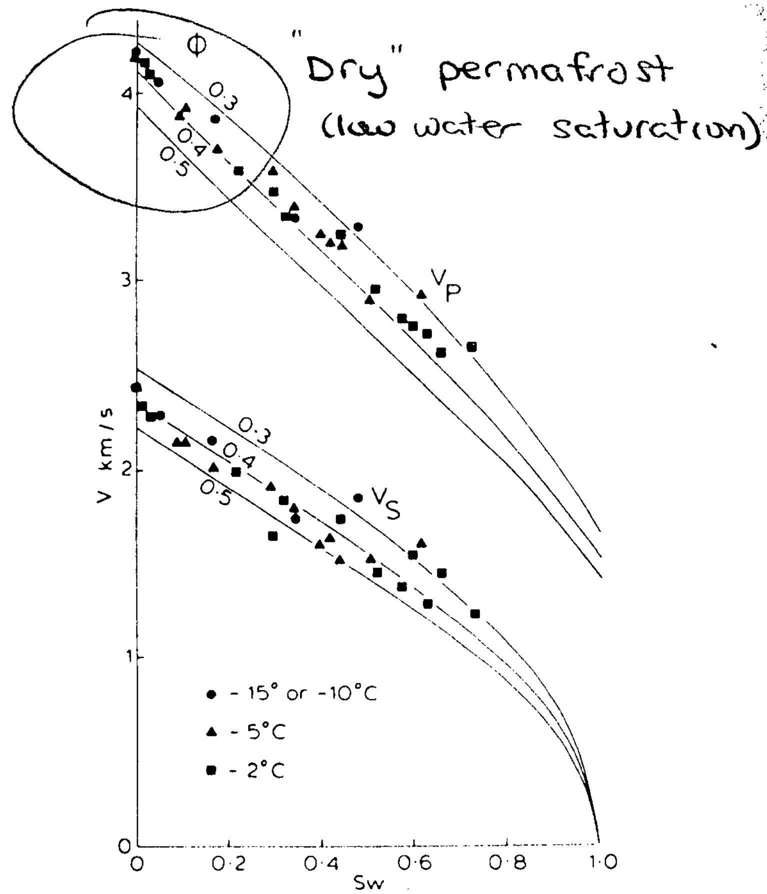

FIG. 4. Measured P- and S-wave velocities (V_p and V_s) for frozen sands and silts as a function of water saturation (S_w). Prediction of V_p and V_s by the model for porosities (ϕ) of 0.3, 0.4 and 0.5.

between theory and experimental results must necessarily be indirect. The experimental results are shown in Figs 2 and 3 in a manner which does not explicitly involve the unknown water saturations. In Fig. 2, V_p is plotted as a function of V_s for the permafrost sands and silts for 31 measured data pairs, at temperatures in the range $-15°C$ to $-2°C$. In Fig. 3, V_p is plotted as a function of V_s for the permafrost clays for 44 measured data pairs in the same temperature range. Both figures also show the theoretical relations for porosities $\phi = 0.30$ and 0.50. The experimental data agrees fairly well with the theory, with better agreement at the higher velocities, i.e. when the extent of freezing increases. The relatively close agreement between theory and experimental data shown in Figs 2 and 3 strongly supports the soundness of the model.

Another test of the theory is to use the measured P- and S-wave velocities, along with the known porosities, to infer different values of S_w. While V_p and V_s always

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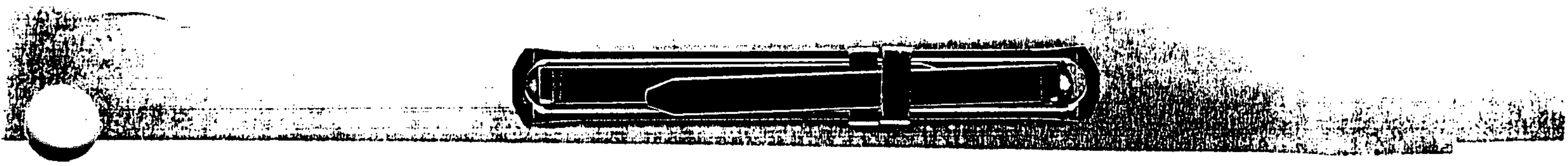

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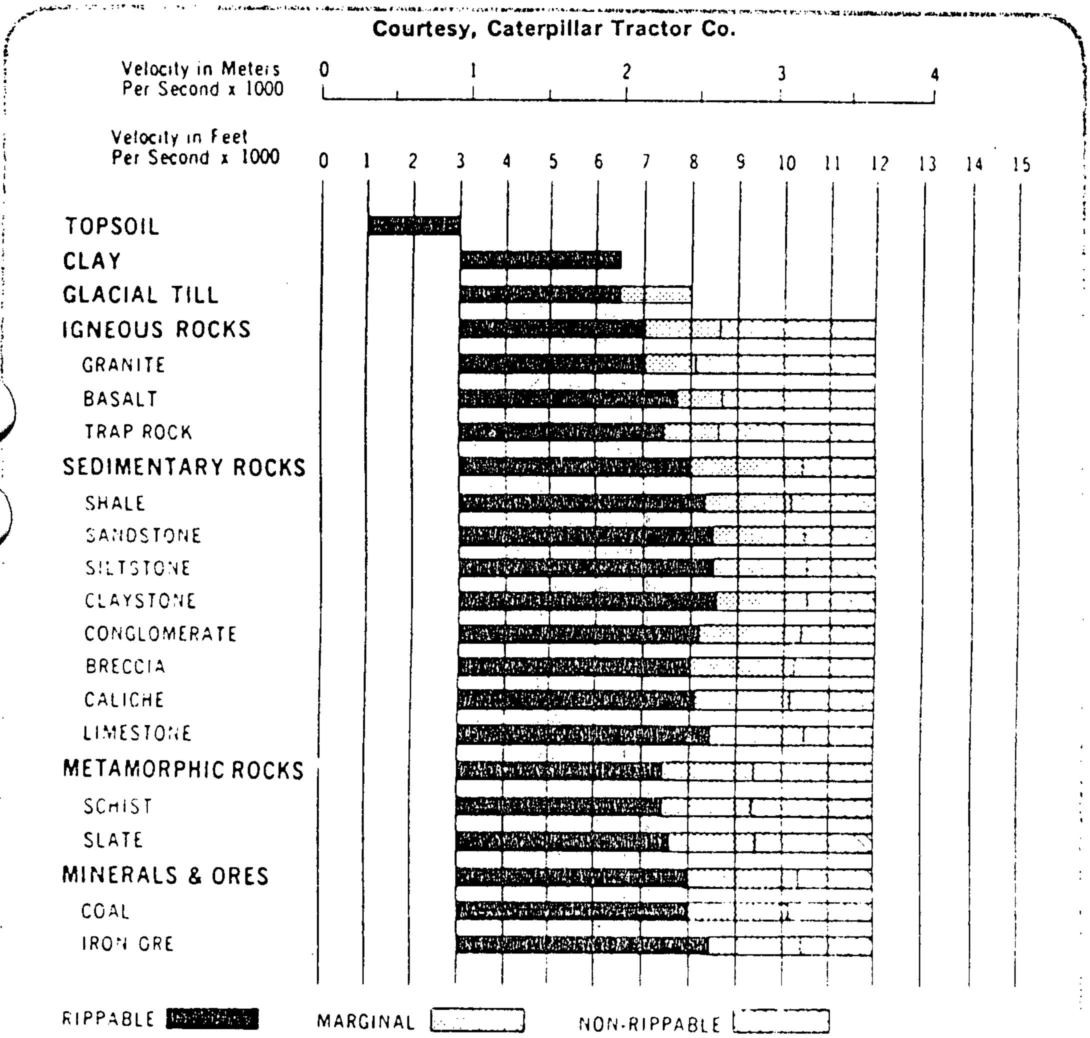

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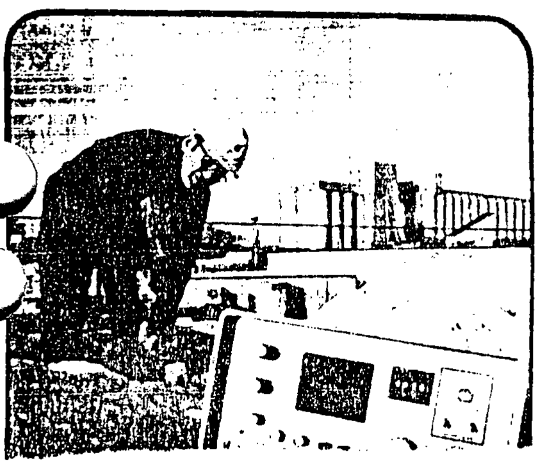

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FILE LINE1.SIP
OWL CREEK - LINE 1 (W TO E)

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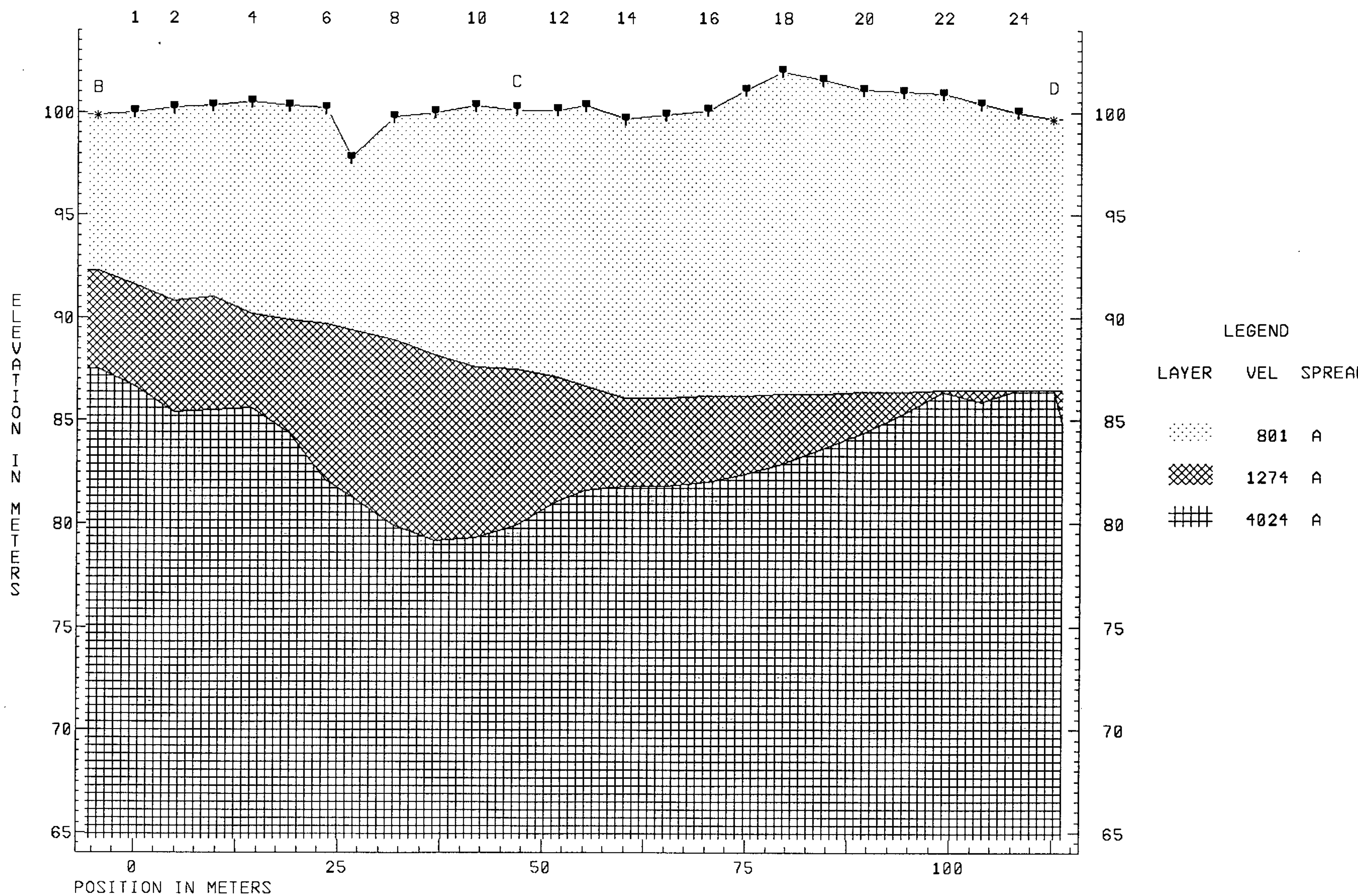

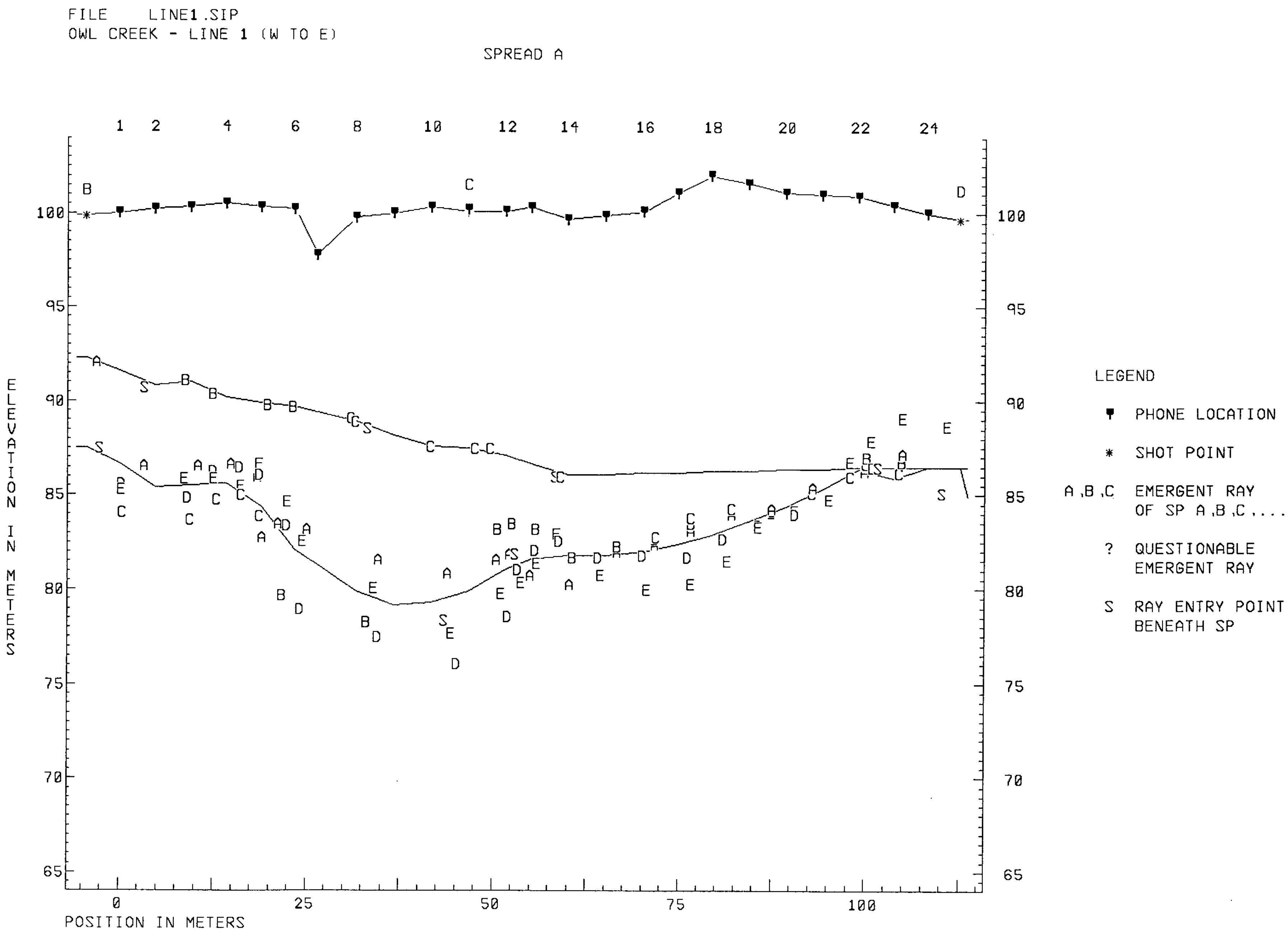

FILE LINE1.SIP
OWL CREEK - LINE 1 (W TO E)
SPREAD A
ELEVATION IN METERS
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FILE LINE2.SIP
OWL CREEK - LINE 2 (W TO E)

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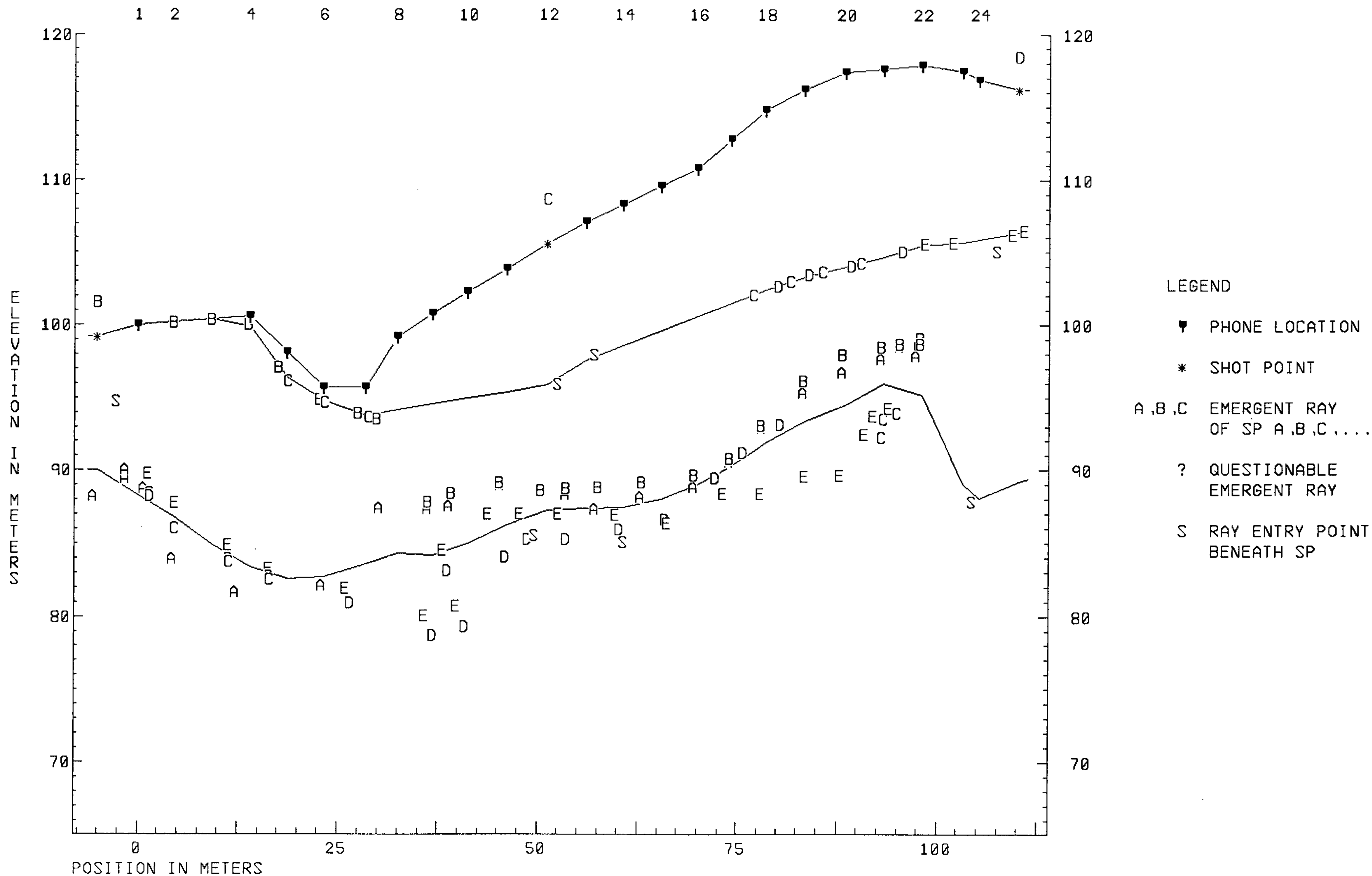
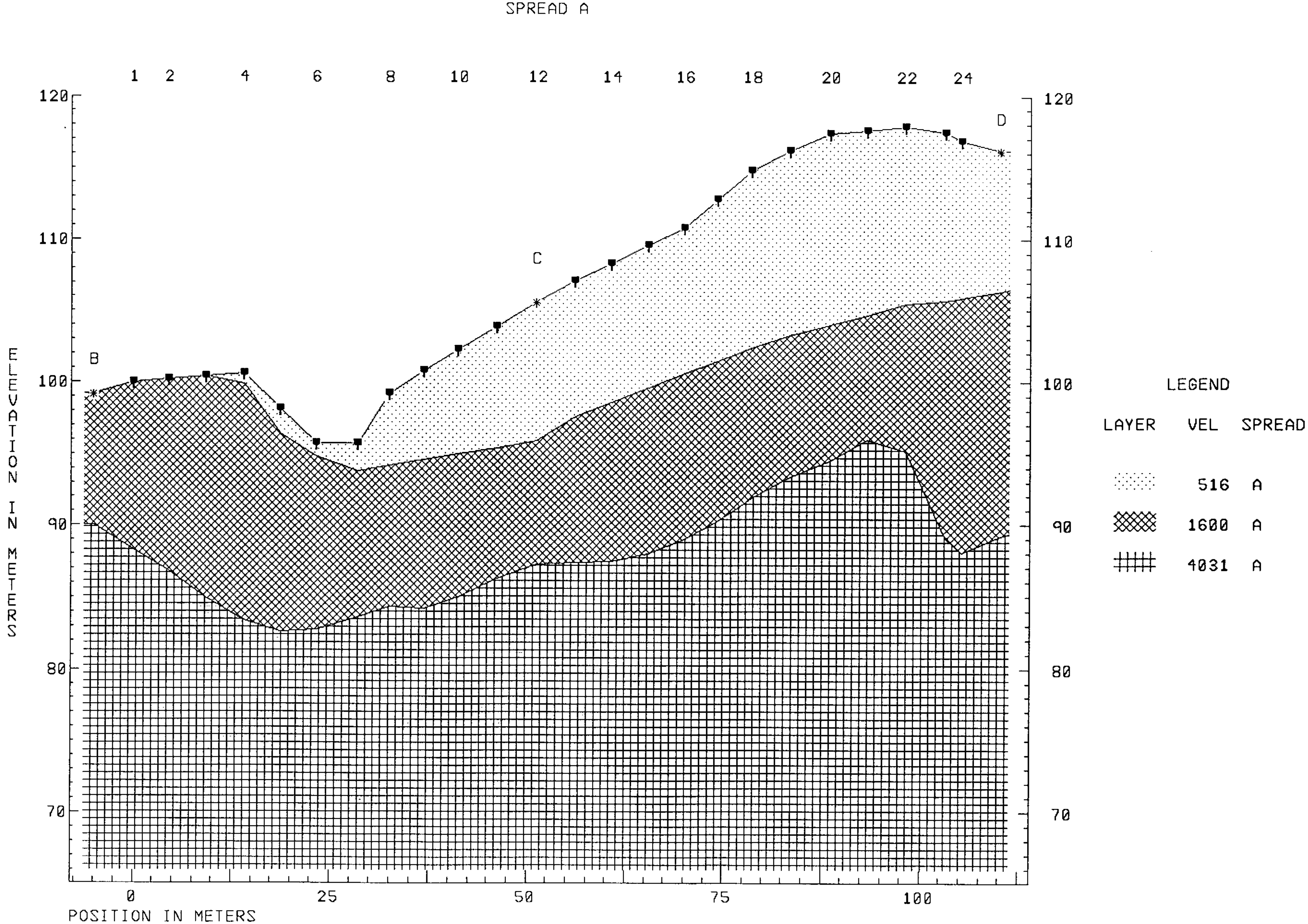


FILE LINE2.SIP
OWL CREEK - LINE 2 (W TO E)



FILE LINE3A.SIP
OWL CREEK - LINE 3 (W TO E)

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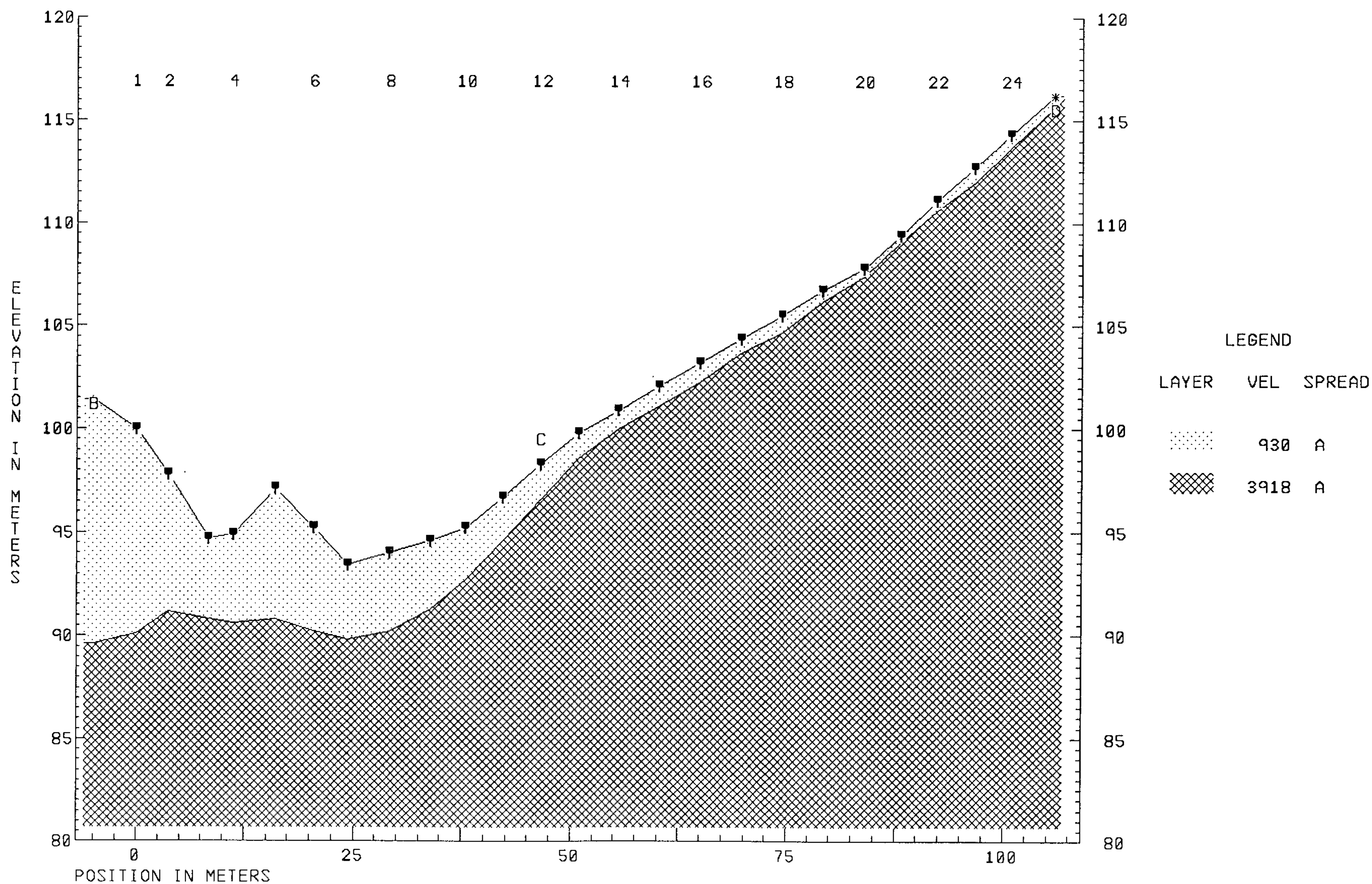

FILE   LINE3A.SIP
OWL CREEK - LINE 3 (W TO E)

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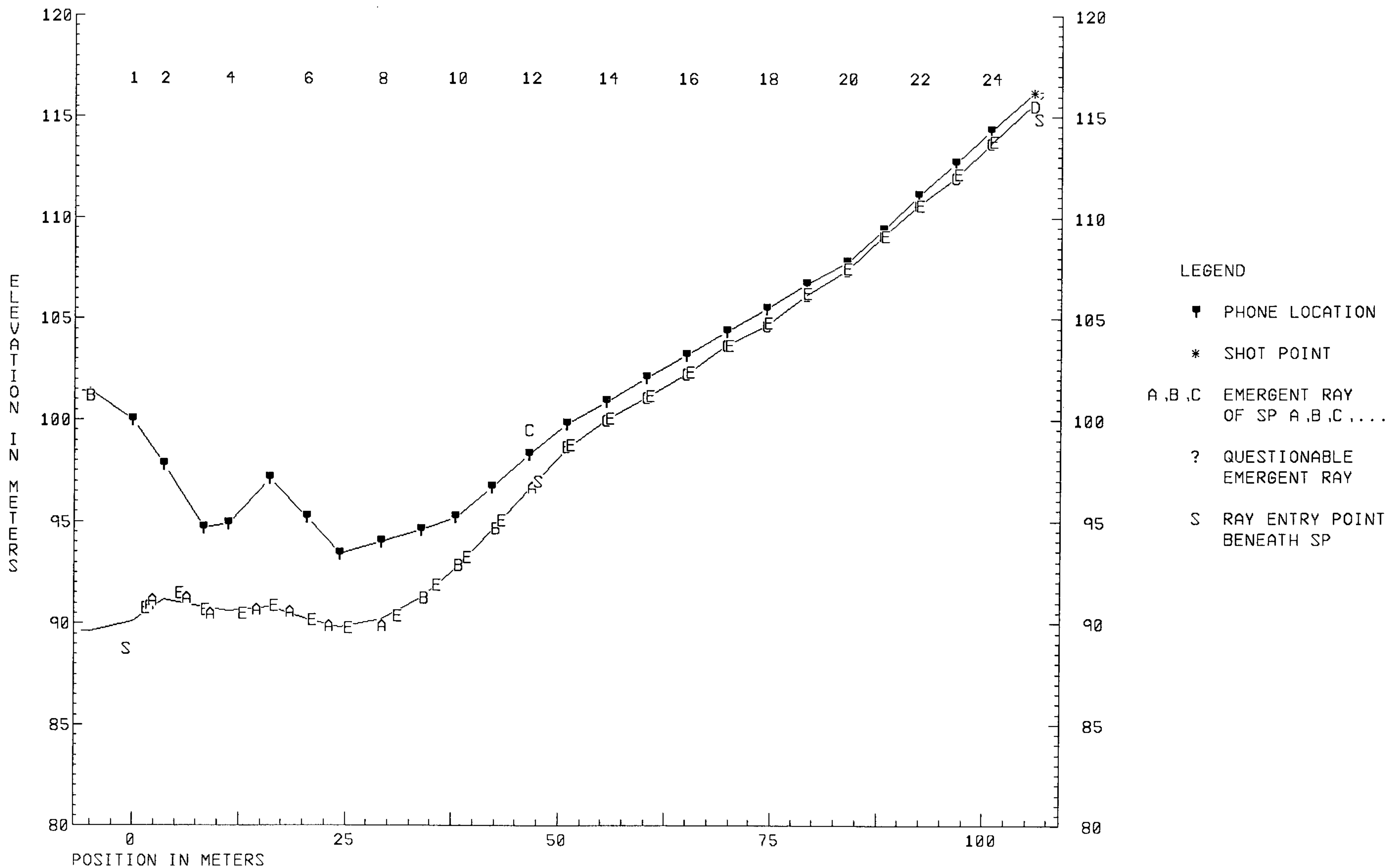

AURORA GEOSCIENCES LTD.
GEOLOGY & GEOPHYSICS

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INVOICE

GST No.: RT886365816
File:

Invoice 01-055
October 18, 2001

In account with: **Mr. Ralph Barchen**
Box 272
Mayo, Yukon
Y0B 1M0

Re: Owl Creek Refraction Survey

Professional Services

Mobe/Demobe fixed cost		$600.00
Seismic Survey 1 day @ $1,050.00/day		$1,050.00
Final Report 1 copy as requested		$450.00
	Subtotal	**$2,100.00**

Disbursements

Yukon Explosives		$205.00
	Subtotal	**$2,205.00**
	Federal GST	$161.35
	Amount Owing	**$2,466.35**

Terms: Net 15 days. Interest charged at 2% per month on overdue accounts