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MICHEL BERTRAND

SEISMIC REFRACTION SURVEY AND TRENCHING PROGRAM AT THE SUMMIT CREEK PROPERTY, LIVINGSTONE CREEK AREA, YUKON TERRITORY

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SEISMIC REFRACTION SURVEY AND TRENCHING PROGRAM AT THE SUMMIT CREEK PROPERTY, LIVINGSTONE CREEK AREA, YUKON TERRITORY

Mike Power, M.Sc , P Geoph

PLACER CLAIMS

AMBER	P46688
SPIRIT 1-8	P46970 - P46977
STEVEN	P46636
SUE	P46687

Location: 61° 21'N, 134° 21'W
NTS: 105 E8
Mining District: Whitehorse, YT
Date: December 20, 2000

SUMMARY

The Summit Creek Property consists of 11 placer claims staked on the lower end of Summit Creek in the Livingstone Creek area, Whitehorse Mining District, Yukon Summit Creek is a historical placer gold creek whose upper reaches have been mined since 1900. The lower end covered by the claims has not been extensively explored. A program of line cutting, seismic refraction surveys, road repair, road building and excavator trenching was conducted on the Summit Creek Property to evaluate the potential of the property to host significant placer gold deposits.

The line cutting consisted of installing a central base line and turning a series of seismic lines from the base line. The seismic lines were cut 1 5 m wide, transverse to the mean drainage direction. Only three of these lines were surveyed because of instrument problems.

The refraction seismic survey was conducted with a 24 channel seismograph using phones spaced at 5 m and shots spaced at 60 m. Five shots were fired per spread. These consisted of explosive charges, placed on surface and electrically initiated, fired 60 m off the ends of the line (2 shots), 5 m off the ends of the lines (2 shots) and 1 shot at mid-spread. The data was of poor quality due to rain noise and a low water table. The seismic data was interpreted using a delay time method and yielded depths to bedrock varying from 15 to 30 m along the three lines. Overburden along the creek had been drained and displayed a low seismic velocity.

Following the seismic survey, the washed out access road was repaired and extended north and downstream to the end of the claim block. Thereafter, 17 excavator pits dug to depths of 6 to 7 m were sited at points near the seismic lines These uncovered glaciofluvial gravels and glaciolacustrine sands which are known to cap auriferous gravels further up Summit Creek. The results of the excavator trenching and seismic survey program when considered in the light of the available placer geology suggest that auriferous placers are present in the section of the creek covered by the Summit Creek Property.

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1.0 INTRODUCTION

Amerok Geosciences Ltd. was retained by Michel Bertrand to conduct seismic refraction surveys on a series of placer claims on Summit Creek (Summit Creek Property). A total of 360 m were surveyed on three lines between August 19 to 21, 2000. The surveys were conducted to map bedrock topography in order to locate potential placer gold deposits. Following the seismic survey, a trenching and road building program was conducted on the property. This report describes the seismic surveys, road building and trenching work performed, the data derived from this work and the results.

2.0 LOCATION AND ACCESS

The Summit Creek Property is centred at 61° 21'N, 134° 21'W, approximately 2 km east of the Livingstone Airstrip on the South Big Salmon River. The property is located approximately 80 km northeast of Whitehorse (Figure 1) It is accessible by fixed wing aircraft from Whitehorse using the 1600 m unmanned Livingstone Creek airstrip. The property is also accessible by winter road from Whitehorse along a route stretching from Long Lake up the east side of Lake Laberge, thence east across the Teslin River and Semenof Hills to the old Livingstone Creek townsite.

3.0 PROPERTY

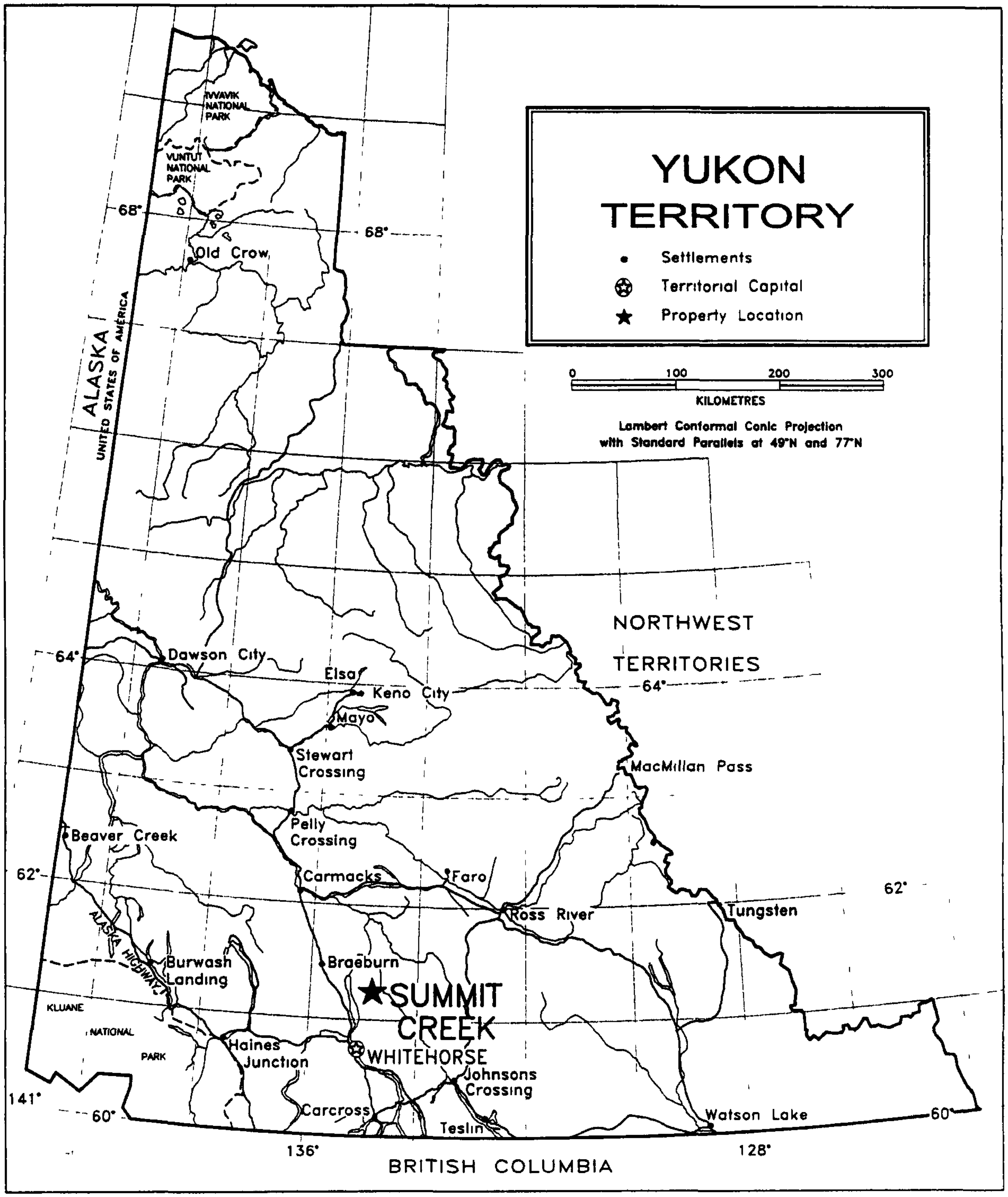
The Summit Creek Property consists of 10 un-surveyed placer claims staked under the Yukon Placer Mining Act in the Whitehorse Mining District. Claim locations are shown in Figure 2 and claim information[1] is summarized below:

Claim	Record Number	Expiry Date
AMBER	P46688	July 19, 2001
SPIRIT 1-7	P46970 - P46977	July 19, 2001
STEVEN	P46636	April 6, 2001
SUE	P46687	April 16, 2001

4.0 PHYSIOLOGY AND PLACER GEOLOGY

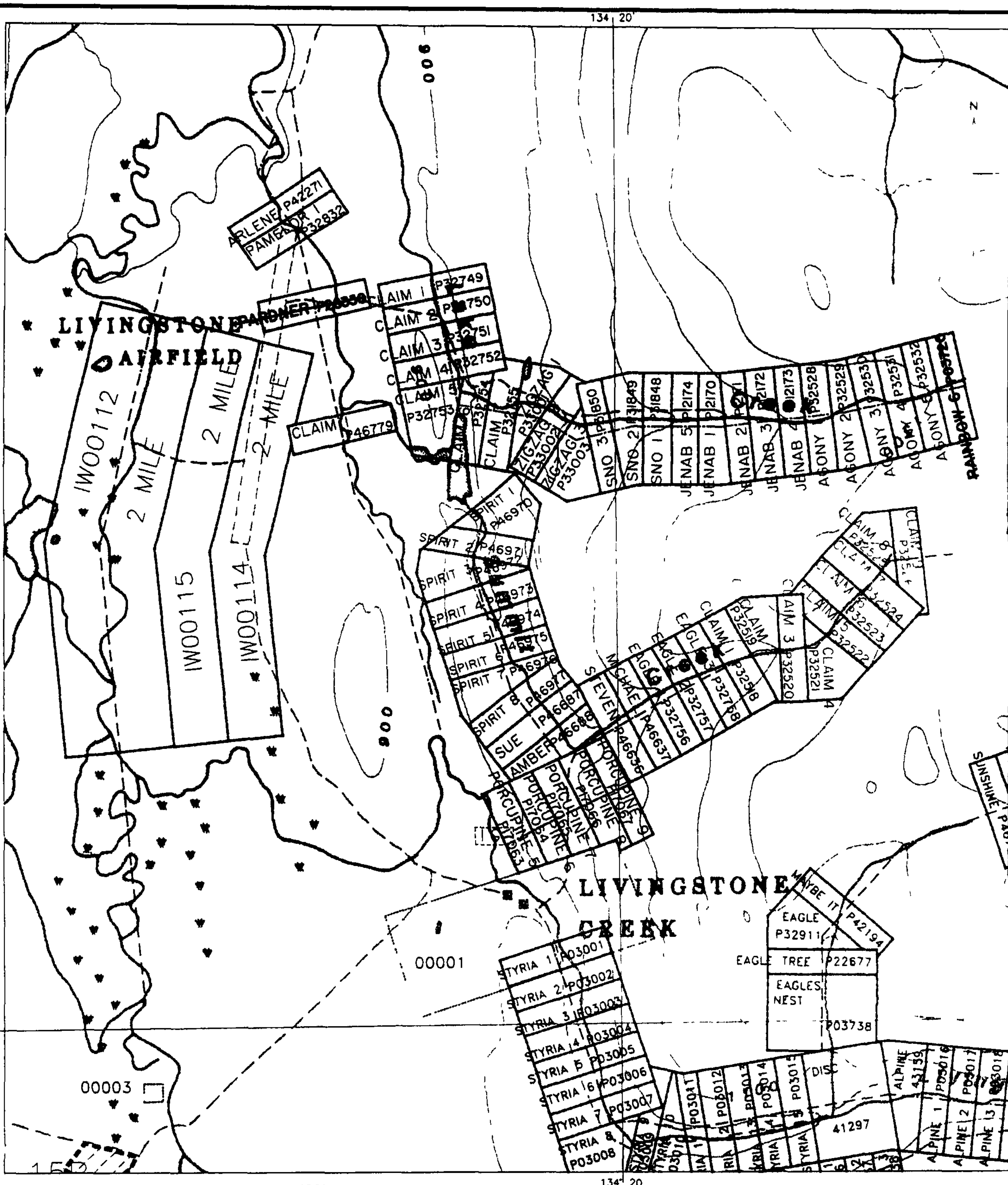
The physiology and placer geology of the Livingstone Creek area has been

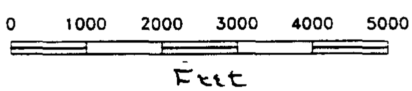
[1] Claim information provided by the Whitehorse Mining Recorder on December 18, 2000



PROFESSIONAL GEOSCIENTIST M. A. POWER BRITISH COLUMBIA

MITCH BERTRAND	SUMMIT CREEK PROPERTY	
PROPERTY LOCATION	MINING DISTRICT WHITEHORSE	
	NTS 105 E/8	SCALE 1 6 000 000
	DRAWN BY HDS	
Amerok Geosciences Ltd.	DATE 2000 10 16	FIGURE 1





PROFESSIONAL GEOSCIENTIST M.A. POWER

MITCH BERTRAND	SUMMIT CREEK PROPERTY
CLAIM LOCATION	MINING DISTRICT WHITEHORSE NTS 105 E/8 SCALE 1 30 480 DRAWN BY HDS
Amerok Geosciences Ltd	DATE 2000 10 17 FIGURE 2

described by McConnell (1901), Bostock (1931), Levson (1992) and Gordey and Makepiece (2000). The property is on the western boundary of the Big Salmon Range of the Pelly Mountains at elevations ranging from 900 to 1200 m. The Big Salmon Ranges, east of the property rise from a dissected plateau with base level of 1400 m to craggy cirques at elevations of up to 2000 m approximately 15 km east of the property. Drainages generally flow west although they are locally diverted to the north, possibly by bedrock structures.

The property area is subject to continental climatic conditions with short, occasionally damp summers from June through September and cold, dry winters from October through April. Temperatures range from 15° C during the summer period of mid-June through mid-August to -40° C during the coldest months of winter.

The Summit Creek Property is located in the Yukon Tanana Terrane of the northern Cordillera. The area drained by Summit Creek is underlain by a Proterozoic through Paleozoic assemblage of metamorphosed mafic to ultramafic rocks. M. Colpron (2000, *pers comm.*) states that the assemblage on the lower end of Livingstone Creek contains metamorphosed clastic sediments (phyllite and quartzite) as well as marbles and calcareous rocks. Rock strike predominantly north-northwest in the area of the property. The assemblage is bounded by the Big Salmon Fault in the lowlands of the Big Salmon River. This fault is mapped 1200 m west of the Summit Creek Property and strikes north-northwest, running along the front of the plateau containing the Big Salmon Range.

The major gold bearing creeks in the district including Livingstone, Summit and Lake creeks drain east from headwaters in the plateau through broad U-shaped valleys down to narrow (20 to 50 m) rock walled canyons and turn sharply to the north upon reaching a linear depression running along the eastern side of the valley containing the Big Salmon River. This depression is bounded on the west by hills up to 50 m high, on the east by the rising hills of the plateau and the trough extends for 6 km from Livingstone Creek in the south to Lake Creek in the North. The linear depression is parallel to the Big Salmon Fault, and to the general strike of stratigraphy in the area; it appears to be a bedrock-controlled feature.

There are several theories concerning the origin and preservation of placer deposits in the Livingstone Creek area. Gold appears to be derived from mesothermal quartz veins within nearby schists and phyllites. Auriferous placer deposits occur in coarse interglacial gravels preserved beneath fine grained glaciolacustrine deposits. The pay gravels contain boulders of local rock and granite, are poorly sorted, subangular to subrounded, and are reportedly iron stained in many localities (Bostock, 1931). Levson (1992) points out that thick sediments derived from ice marginal lakes blanket the placer deposits and likely assisted in preserving them. McConnell (1901) asserts that the orientation of the gold-bearing drainages transverse to the mean direction of local ice flow may also have played a part in the preservation of placer deposits in the area.

In summary, auriferous placer deposits in the Livingstone Creek area are found in coarse, commonly iron stained gravels on bedrock within the active stream beds and on benches marginal to the present drainages. The placer deposits are preserved beneath a sequence of sands, silts, gravel and lesser clay, locally up to 60 m thick. Individual pay streaks are in the order of 3 to 5 m thick and 10 to 20 m wide.

5.0 SURVEY GRID

The location of the seismic survey grid is shown in Figure 3. Lines were turned at right angles from a central base line coincident with the claim location line. The base line was picketed at 25 m intervals and the survey lines were marked at 10 m intervals. The lines were cut 1.5 m wide and the stations were straight chained and not slope corrected.

6.0 PERSONNEL AND EQUIPMENT

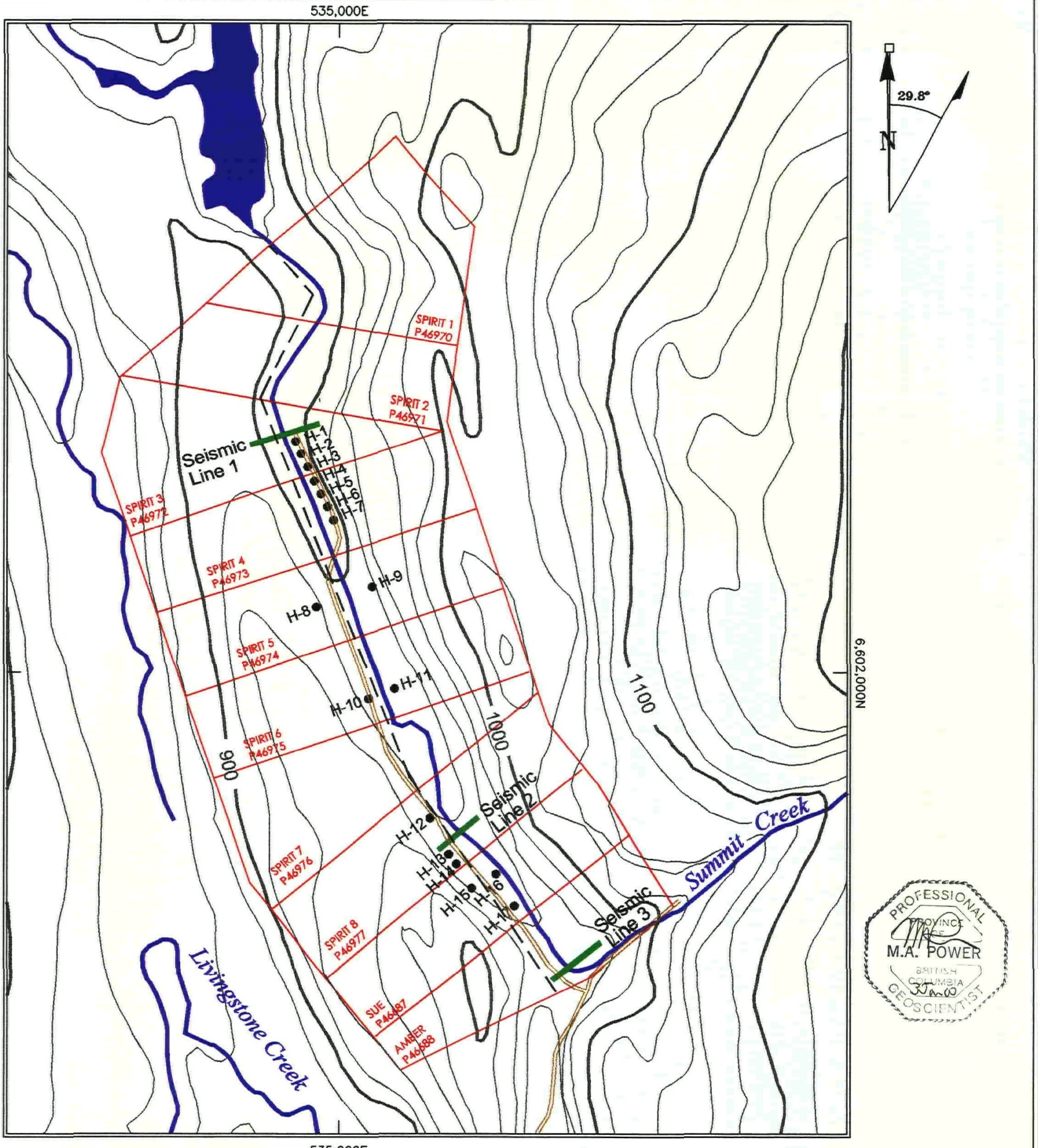
The seismic survey was conducted by a two man crew consisting of the following personnel:

Mike Power	Geophysicist
Michel Bertrand	Helper

They were equipped with the following instruments and equipment:

<u>Instruments:</u>	1 -Strataview 24 Channel digital engineering seismograph.
<u>Data processing:</u>	486DX66 or better laptop computer, colour printer.
<u>Other</u>:	Radios, blasting cables, explosives, spare parts, tools

The geophysical crew spent a total of 2.5 man-days on the property. The geophysical survey log is attached as Appendix B. Access to the survey area was on foot as the main road to Summit Creek had been washed out by diversion of the creek down a dry re-entrant. This was the result of heavy rains prior to and throughout the period of the survey. This problem together with a persistent instrument start-up malfunction severely limited production.



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LEGEND

- Road
- Grid Baseline
- Claim Boundary
- Seismic Line
- Test Pit

0 250
metres
Scale: 1:10,000

MICHEL BERTRAND	SUMMIT CREEK PROPERTY	
	NTS: 105 E1	Datum: NAD27
GRID AND EXCAVATION LOCATION MAP FIGURE 3.	Mining District: Whitehorse	
	Job: 00-06	Date: 18 Dec 00
	AMEROK GEOSCIENCES LTD.	

7.0 SURVEY SPECIFICATIONS

The seismic surveys were conducted according to the following specifications:

Phone spacing:	5 m
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).
Acquisition:	256 ms record length / sampled at 0.125 ms / hi-cut filter: 500 Hz
Topography:	Topography along the line was surveyed in with a clinometer. Line elevations (datums) were interpolated from topographic maps.

8.0 SEISMIC THEORY

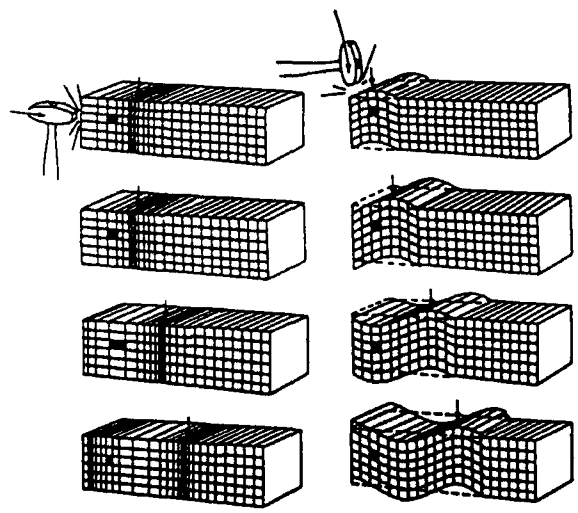
The theory behind the seismic refraction method is summarized in Sheriff and Geldart (1995) and Telford *et. al.* (1990). This section summarizes the basic theory underlying the seismic refraction method as applied in placer exploration and describes the methods used to interpret the data.

8.1 Basic theory

Seismic waves are mechanical perturbations, transmitted by compressing or shearing a medium as the wave passes through it. The elastic strain response of a solid body to stress is governed by Lame's Constants λ and μ λ is the strain response perpendicular to applied compressional force and is termed the *fluid incompressibility.* In effect it is the amount of elastic "lateral bulge" per unit volume when a mass is compressed. μ is the *shear modulus* or resistance to shearing that the medium possess. Any solid or semi-solid has a measurable shear modulus, a liquid does not as it cannot store elastic energy when sheared. The shear modulus of a rigid rock would be high whereas that of compacted clay would be small.

Seismic wave propagate through a medium in one of two ways, shown in Figure RS-1 (a) Straightforward compression of the medium, similar to the generation of a sound wave, is termed a P-wave because it is the primary or first arrival in an

(a) P-wave and S-wave motion (Press & Siever 1974)



(b) Seismic ray reflection and refraction

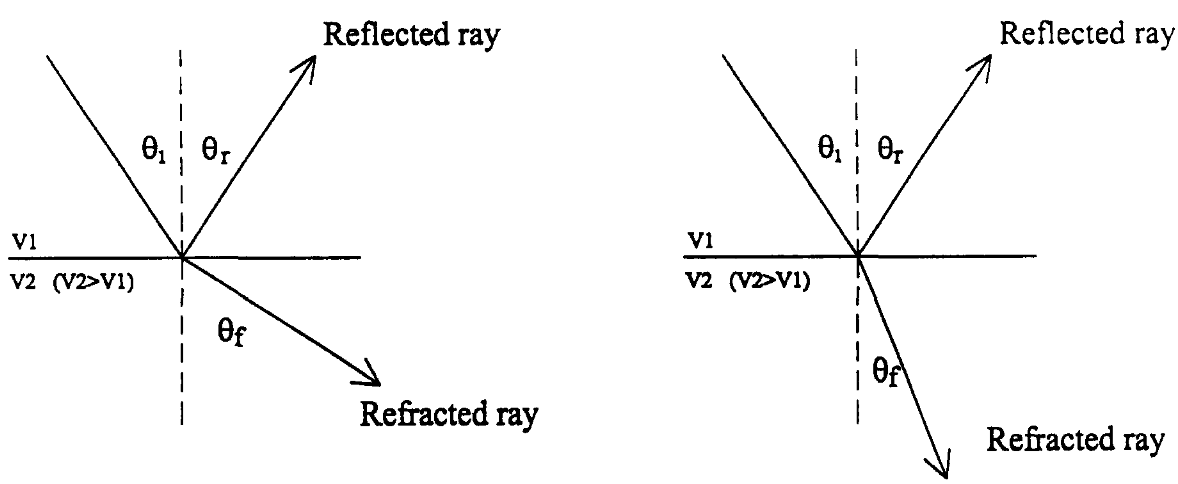


Figure SR-1. Seismic wave motion and behaviour at boundaries.

earthquake or seismic record. A second wave is generated in response to stress transverse to the propagation direction of the seismic wave; this is similar to the wave on a string and is termed the S-wave as it is the secondary arrival in the seismic wave train recorded in an earthquake record. The velocity of the P-wave is governed by:

$$V_p = \sqrt{\frac{\lambda + 2\mu}{\rho}} \qquad (1)$$

where ρ is the density of the rock and the other variables are defined as above The S-wave velocity is:

$$V_s = \sqrt{\frac{\mu}{\rho}} \qquad (2)$$

In water or air, the P-wave velocity reduces to:

$$V_p = \sqrt{\frac{\lambda}{\rho}} \qquad (3)$$

Seismic refraction methods rely upon measuring and analyzing the first P-wave arrivals It is apparent from the above relations that the velocity of a seismic wave decreases with increasing rock density but in practice, the increase in λ or μ is much greater as density increases and consequently, seismic velocity tends to increase with density. The range of P-wave velocities commonly encountered in placer seismic refraction work is summarized in Table II. P-waves are the fastest and strongest waves measured by conventional seismic instruments and the remainder of this discussion will focus exclusively on their properties

Seismic waves radiate away from a point source in all directions creating spherical wave fronts traveling through the medium. Huygen's Principle states that any point on a wave front is a point source for succeeding waves. The interference of these waves at any later time defines the new position of the moving wave front. It is useful to simplify a consideration of seismic wave motion by examining a ray path rather than the whole wave. Both the ray and wave obey the same physical laws but they are easier to visualize if the raypath is considered first. The wave front is nothing more than the sum of the possible ray paths.

Seismic waves are both reflected and refracted at the boundary between media with different seismic velocities. As shown in Figure RS-1(b), a portion of the seismic energy will reflect back towards the source and the residual will be transmitted through the boundary and be refracted upon entry into the second medium. For reflection, the angle of incidence - the angle between the incident ray and a normal to the reflecting surface - equals the angle of reflection. Refraction is governed by Snell's Law:

$$\frac{\sin\theta_i}{v_i} = \frac{\sin\theta_f}{v_f} \qquad (4)$$

If the velocity in the lower medium is faster than that of the upper medium $\theta_f > \theta_i$ and the ray will bend towards the velocity boundary. If the velocity in the lower medium is slower than that of the upper medium $\theta_f < \theta_i$ and the ray will bend away from the velocity boundary.

Table II. P-wave velocities of common rocks and sediments
(after Sheriff and Geldart (1995))

Material	P-wave velocity (m/s)
Air	330
Water	1550
Gravel or sand (water saturated)	1500 - 1900
Gravel or sand (dry)	500 - 1500
Ice or permafrost	3500
Granite	4000 - 5500
Gabbro	5000 - 7000
Shale or schist	2000 - 5000

8.2 Seismic refraction surveys

Seismic survey methods involve placing vertical component microphones (geophones) with centre frequencies in the order of 10 Hz to 100 Hz in the ground and recording the arrivals of seismic waves after applying a shock to the ground using an energy source. For placer work, energy sources consist of small explosive charges at surface, 12 gauge shotgun slugs, rifle bullets, dropped weights or sledge hammer blows. The geophones are uniformly spaced at from 2 to 5 m depending upon the resolution required and are strung in line down the seismic survey line In placer exploration surveys, the seismic lines are cut so as to cross the long axis of the stream bed and the geophone array is thus run across the stream channel to yield a profile of the stream channel once the data is interpreted A trigger is connected from the energy source or its initiator back to the seismograph to start the seismograph when the energy is released The trigger can be a switch which is momentarily opened and closed (hammer switch), a pulse from a blasting box or the simple breaking of a circuit if a wire is wrapped around explosives.

The seismic energy travels through the earth via a number of paths. In Figure RS-2(a) we consider the simple case of flat bedrock beneath overburden A direct wave travels from the energy source directly through the low velocity near surface material. Near the energy source, this is the first wave to arrive At greater distances, refracted waves are the first arrivals.

At a distance from the source termed the critical distance, the angle of refraction becomes 90^0 and the refracted energy travels along the bedrock interface, generating upward traveling return waves as it skims along bedrock The refracted wave will travel along bedrock at the faster velocity of bedrock and at a distance termed the cross-over distance, the first wave to reach the geophone will be the refracted rather than the direct wave. The refracted waves which travel into the lower medium in turn may be critically refracted along higher velocity boundaries in bedrock and also return to the surface although they will be refracted at the bedrock boundary on their return journey

Seismic refraction data is collected by putting energy into the ground at a number of "shot points" while keeping the geophone array fixed. It is fairly common practice in seismic refraction work to take 5 shots: 2 at a considerable distance from either end of the geophone array, 2 at either end of the geophone array and 1 in the middle of the array The shot pattern is sketched in Figure RS-2(b) Following or prior to the survey it is important to survey in the relative elevations of the geophones and the shot points in order to correct the data for surface elevation changes If not corrected, these will appear as bedrock topography in the final interpreted section.

Seismic refraction data is processed and plotted in a very simple manner The shot record or seismogram from each shot is examined to determine when the first energy was received at each geophone. This first deflection (first break) is timed and plotted in a graph of arrival time (vertically) versus distance (horizontally) (Figure RS-2(c)). The break in slope along the T-X curve indicates the cross over distance where the refracted energy overtook the direct wave energy to become the first arrival Knowing the geometry of the geophone array and shot point, it is possible to analyze the graph and determine the velocity of the gravel and bedrock and from that, determine the depth to bedrock In the simple case of a flat bedrock surface and overburden with a single velocity (V_1) slower than bedrock (V_2) , the velocities of the bedrock and overburden are the reciprocals of the slopes of the lines along the refracted and direct wave arrivals respectively. The equation of the line connecting the refracted arrivals is

$$t = \frac{x}{v_2} + t_i \qquad (5)$$

where t_i is the intercept time and x is the distance from the energy source The velocities of the overburden and bedrock can be used to determine the critical angle

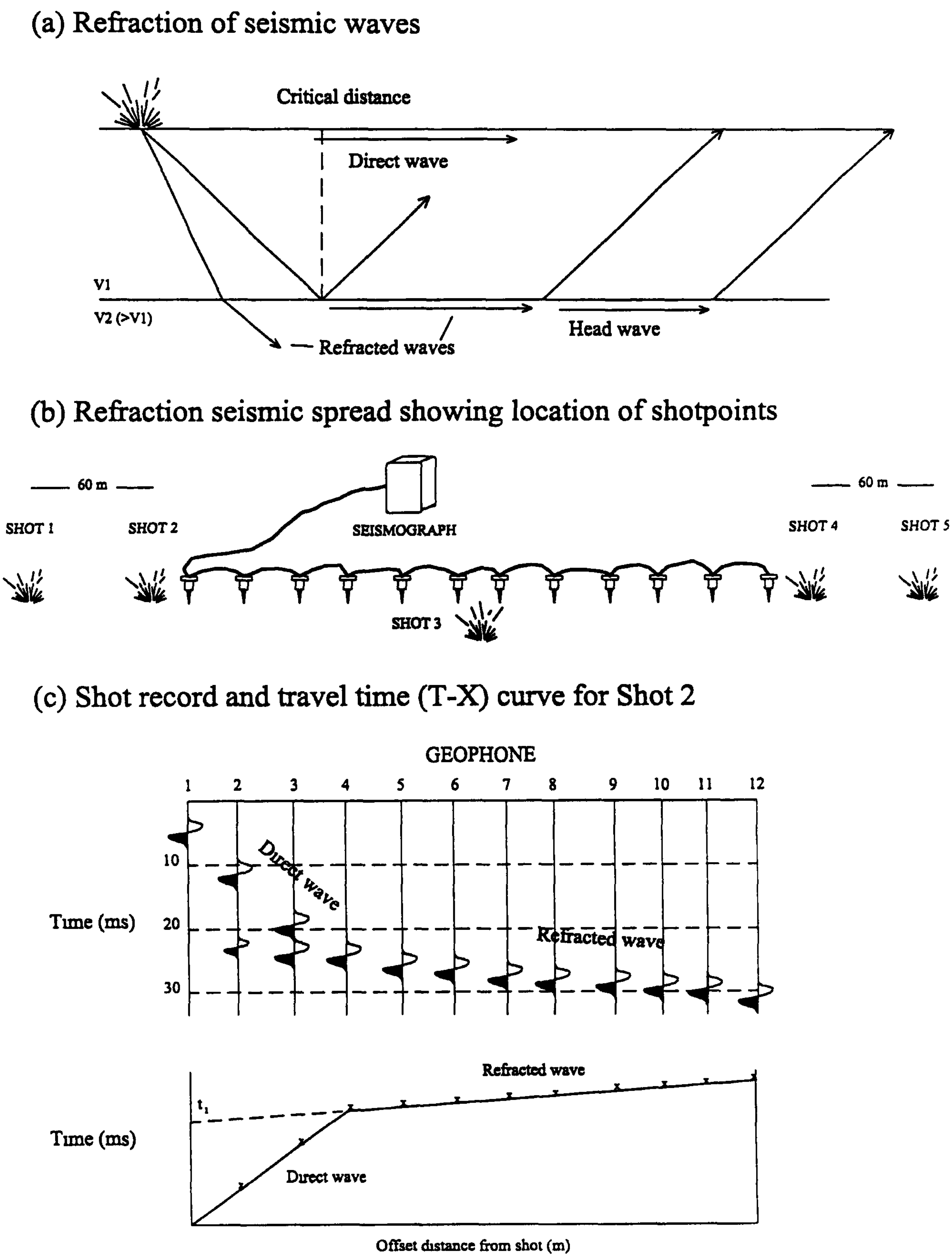


Figure SR-2. Seismic refraction method.

$$\theta_c = \arcsin\frac{v_1}{v_2} \tag{6}$$

and this angle can be used to calculate the depth to bedrock from the known velocities and the intercept time:

$$z = \frac{v_1 t_i}{2\cos\theta_c} \tag{7}$$

This method works only on the very simplest case of flat bedrock beneath homogeneous overburden. Seismic refraction interpretation methods must account for several velocity layers (eg. dry overburden, wet overburden, bedrock) and be able to map irregular boundaries. A following section describes delay time methods commonly used to deal with these circumstances.

8.3 Sources of error

Seismic refraction surveys are prone to several sources of error. The first class of problems are directly related to acquisition problems and the second concern violation of the underlying assumptions behind the interpretation of refraction data.

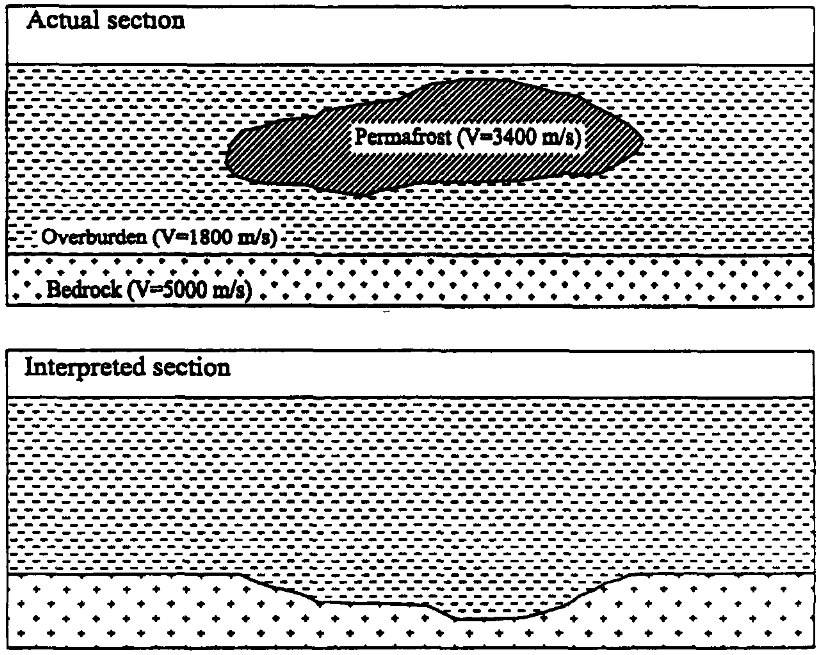
Sources of error in acquisition include poor elevation surveys, timing errors (either shot or geophone), static errors and phase shifts. The requirement for elevation surveys was discussed above. Small near surface elevation errors can translate into large bedrock topography errors because the near surface velocity is very slow - commonly 1/4 to 1/3 that of the underlying overburden Thus a one metre error in near surface elevation can translate into a 3 or 4 metre error in bedrock elevation

Timing errors occur if there is a delay in initiating an energy source (eg. slow cap) or if a phone is not properly planted or the first arrival properly identified. A shot timing error affects all the arrivals from the shot and is sometimes difficult to identify or discriminate from a geological feature. A timing error for an individual geophone is generally more easily spotted and corrected.

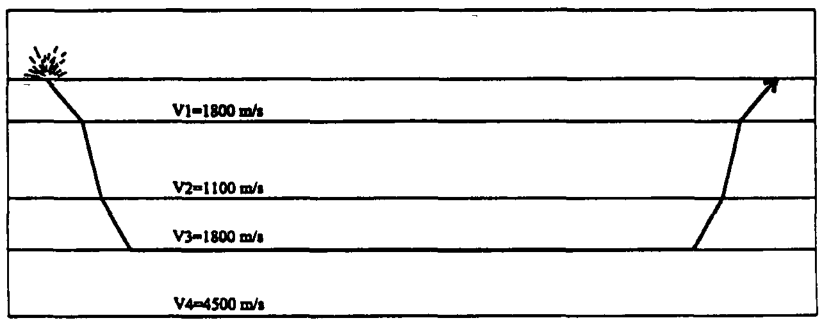
Sometimes a geophone is planted in particularly slow ground (eg. squirrel's nest or duff) and all the arrival times recorded at that geophone from every shot appear to be slow. These errors are termed static errors and are often visible in the T-X curve when the arrival at a phone is "pulled up" on every T-X curve

The final source of error is phase shift or change in shape of the first arriving energy The strength and shape of the first arrival will change with offset distance from the source as different waves at different angles of incidence are recorded as first arrivals at each geophone A common error, particularly with a weak energy source, is to lose a first arrival train and start picking second or third arrivals which are much clearer and coherent, lower down in the seismic record. These errors, if not detected, can results in calculated bedrock depths which are too great and

(a) Variation in top layer velocity



(b) Velocity inversion



(c) Blind layer problem

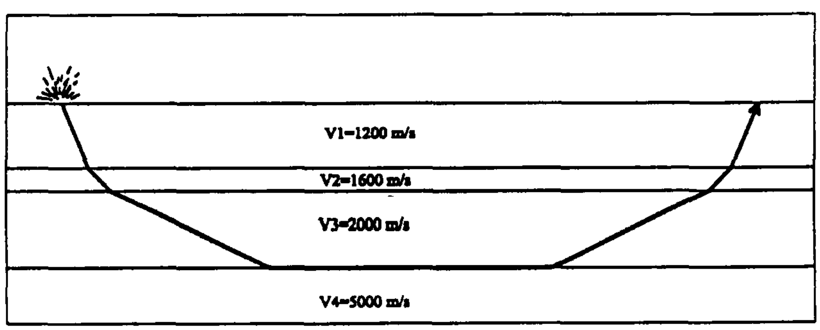


Figure SR-3. Problems with the seismic refraction method.

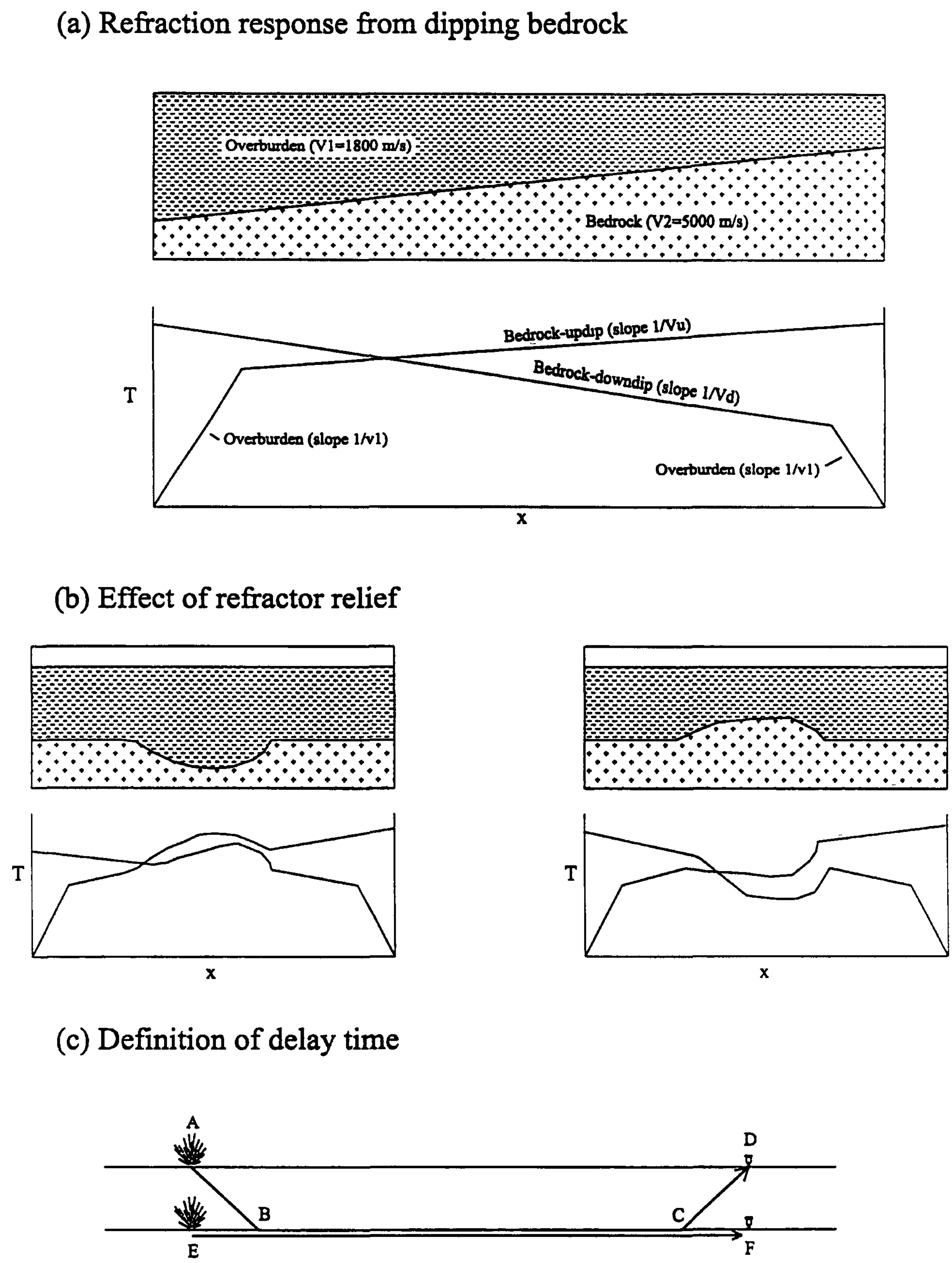


Figure SR-4. Refraction interpretation.

topography which is in error.

The second class of errors directly affects the interpretation method. The seismic refraction method, properly employed and interpreted, will yield depth determinations accurate to within ± 10% provided the following underlying assumptions are valid

a. The earth consists of several layers with relatively uniform velocity

b. The velocity of each layer is lower than the velocity of the layer beneath it

c The layer boundaries are relatively smooth and continuous.

d The layers are thick enough to be resolved by the geophone array being used.

The validity of these assumptions determines the accuracy of the bedrock profile derived from the refraction data. If the velocity of the overburden varies dramatically along a seismic line over a distance equal to or less than a spread length, the interpretation will yield a bedrock surface with relief introduced solely by the varying overburden velocity (Figure SR-3(a)).

If the overburden contains a low velocity layer, then the refracted wave will bend downwards and there will be no indication of this refraction in the travel time curve (Figure SR-3(b)) Instead, the seismic velocity of the overburden will be over-estimated and the depths to bedrock will be too deep This situation - termed a velocity inversion - is common in areas with discontinuous permafrost where thawed ground may occur below faster frozen ground and bedrock. This is the principle reason seismic refraction surveys are not recommended in areas affected by discontinuous permafrost.

A third problem occurs if there is a thin, high velocity layer which is too thin to produce a discernable response in the travel time curve. The seismic velocity of the overburden will be underestimated and the calculated depth to bedrock will be too shallow This situation could be caused by a thin bed of frozen ground in otherwise thawed overburden. It is normally the least significant of the three problems.

8.4 Refraction interpretation methods

The simple depth determination method outlined in Section 8.2 is suitable only for a very preliminary field approximation of depth. Increasingly complex calculations are required to deal with multiple planar refractors and with refractors of varying dip It is worthwhile to consider qualitatively several aspects of refractor responses visible in the T-X curves.

Figure SR-4(a) shows the response from a single dipping refractor measured with a single spread and two shots at either end. The portions of the travel time curves from the uppermost layers have the same slope ($1/V_1$) while the slopes of the T-X curves from the refractors differ. The shot placed on the down-dip side of the refractor (ie. shooting up dip) has a faster apparent velocity ($1/V_u$) than the down-dip apparent velocity ($1/V_d$). The average of the two velocities is a close approximation to the true refractor velocity.

So far, this summary has been confined to the refraction response of planar refractors Figure SR-4(b) illustrates the effect of an irregular refractor on the T-X curves If the refractor contains either a depression or rise, indications of these will appear in mirror images on the T-X curve. A depression will increase the travel time in the vicinity of the low and a high will decrease the travel time in the area of a high It is useful to qualitatively identify possible refractor relief in order to assess the results of more formal automated interpretation.

The data described in this report was interpreted using a computerized delay time method. The theory behind this method is summarized in Telford *et. al.* (1990), Sheriff and Geldart (1995) and Scott (1973). The delay time is defined with reference to Figure SR-4(c), considering the simplest possible case. For a shot at point A and a geophone at D, the total travel time includes the time to cover sections AB, BC and CD Now suppose that the shot point and geophone were moved vertically down to the first refractor and shot from there. The travel time along EF would be much faster, traveling with velocity V2 along the refractor. The delay time is the difference between the travel time along ABCD less the travel time along EF Since the transit time along BC is common, the delay time can be calculated from

$$\delta = \left(\frac{AB}{V_1} - \frac{EB}{V_2}\right) + \left(\frac{CD}{V_1} - \frac{CF}{V_2}\right) = \delta_s + \delta_g \qquad (8)$$

where δ_s and δ_g are the shot and geophone delay times respectively For a horizontal to shallow dipping refractor, the horizontal distance between the shot and geophone (AD) is the same as EF. The velocities V1 and V2 can be determined from the reciprocals of the slopes of the T-X curves. Thus it is easy to calculate the delay time as this will be the observed travel time less the calculated travel time along the refractor·

$$\delta = t_{AD} - \frac{EF}{V_2} \qquad (9)$$

The shot delay time can be calculated for any shot if two or more geophones recorded the shot. Similarly, the geophone delay time at any phone can be calculated if two or shots are recorded at the geophone. Thus it is easy to solve for the shot and phone delay times for any reversed spread (ie. a spread where shots are fired from either side of the geophone.

Scott (1973) describes a computerized application of delay time analysis to seismic refraction data. This method has been repackaged for commercial use as the Rimrock Geophysics SIP (seismic interpretation program) software package and was used to invert the data collected during this project. The basic steps in the algorithm are:

1. Operator assigns layers to various segments of the refractor T-X curve (ie identify the number of velocity layers and which portions of the travel time curve are from each segment.)

2. Analyze each segment using least-squares analysis to determine a best-fit velocity

3 Correct geophone arrival times and shot times for local static errors and for elevation above a datum within the top layer. This correction is applied using the calculated upper layer velocity (V1).

4. For the first refractor, calculate total delay times for each shot and calculate individual shot point and geophone delay times From these, calculate the position of the points where the rays intercept the first refractor (ie. shot entry points and geophone exit points). Average points to determine the mean position of the refractor.

5. Verify the refractor location by ray tracing each shot from the shot point to the geophones Adjust the position of the refractor by moving the shot entry and geophone exit points iteratively where necessary to optimize the fit

6 Strip away the delay times and reposition the shots and geophones on the next refractor

7 Repeat steps 4 through 6 for the second and subsequent refractors until all the layers identified by the operator in step 1 have been processed and a solution for their location determined.

It is critical to the inversion that the interpreter accurately determine the number of layers apparent in the T-X curves. It is possible to derive an apparently good solution to the interpretation problem which is completely incorrect if a layer is missed. The common sources of error in this process are irregular refractors which are misinterpreted as indicating extra layers. Alternatively, two layers may be grouped together and identified as being a single refractor with a depression in it. A knowledge of the local geology is essential in discriminating between the various possible scenarios.

The results of the inversion show the locations of the calculated ray entry and exit points. In a good solution, these tend to be clustered about the mean refractor location; in a poor solution these are scattered. An additional check on accuracy is to compare the overburden velocities for adjacent spreads; in most areas these should not change significantly

9.0 RESULTS

The field shot records are contained in Appendix D and the final automated inversion results are contained in Appendix E. In general, the seismic data was of poor quality. This was caused by persistent rain during most of the survey and by attenuation in unconsolidated overburden. The velocities of the upper layers are quite low compared with those encountered elsewhere in the Livingstone Creek area and the water table also appears to be low. This too contributed to poor data quality

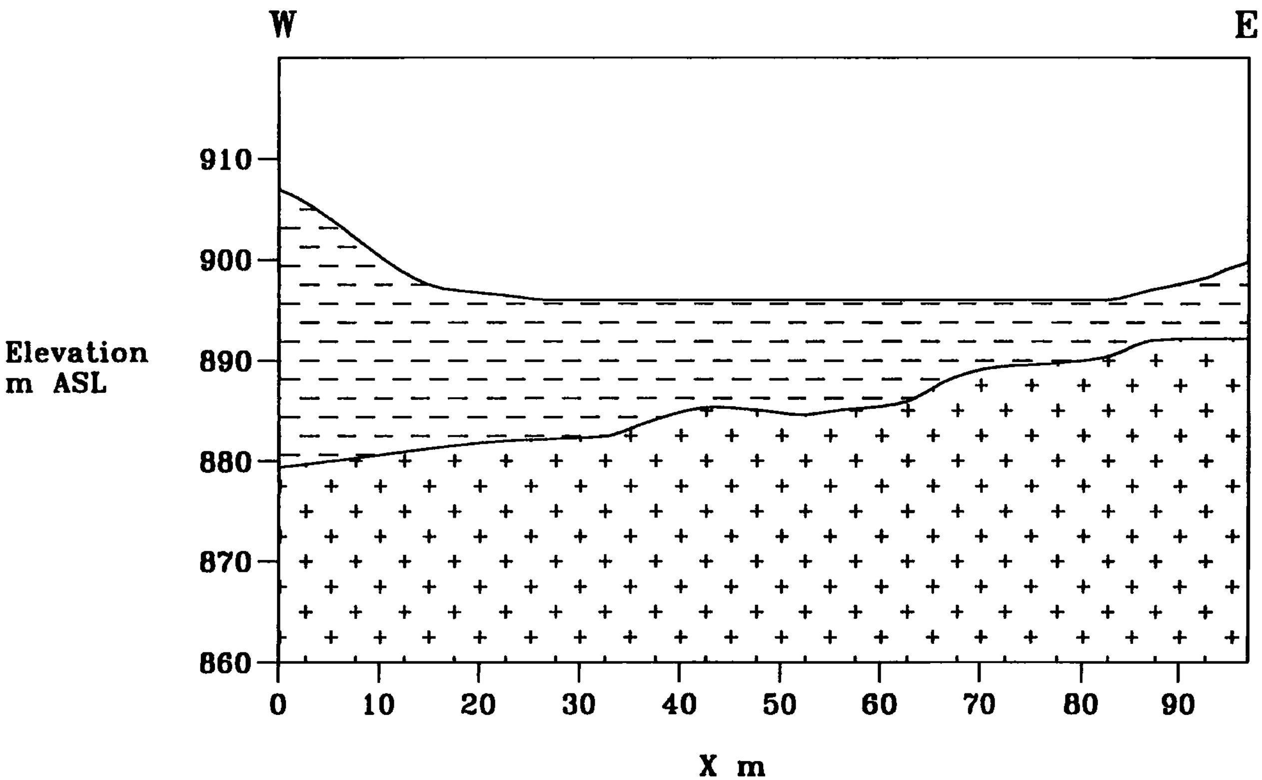
Refraction seismic line profiles from lines 1 through 3 are displayed in Figures 4 through 6 In each profile, the interpreted bedrock profile is the lowest unit in the section. The elevation datums for each section are interpolated from topographic maps and may be in error by as much as ± 4 m. The relative error in bedrock elevations across each section is estimated to be in the order of 10% to 15% of the indicated depth - barring errors from misidentified refractors. These may have occurred given the quality of the data and it is possible that this could introduce more significant errors in depth determination into the final solutions.

Line 1 was sited at the bend in Summit Creek where it exits an upper rock walled canyon and turns sharply to the north along a linear valley, similar to that containing Livingstone Creek, 1 km to the west. The results from Line 1 suggest the presence of two refractors. The upper layer velocity of 435 m/s suggests that the material is poorly consolidated overburden. The middle layer velocity of 935 m/s suggests that this material involved is dry, consolidated overburden The bedrock velocity of 4824 m/s is in the range expected for the metamorphic rocks in the area and similar to results obtained several kilometres to the south on Livingstone Creek.

The two layers detected in the survey may be separate overburden units. Sediments at the mouth of the canyon form an alluvial fan and much of this material may be stripped overburden from a mining operation further up stream. The overburden contains scrap metal, plastic and milled timbers. This material may form the upper layer along Line 1. The lower layer appears to be more consolidated, given its seismic velocity, and its topography does not mimic the present surface topography. The survey results suggest bedrock is at a depth of 30 m and an elevation of 930 m.

The results along Line 2 suggest bedrock is at a depth of 15 to 20 m beneath poorly consolidated overburden Bedrock velocity is slightly lower in this area (4350 m/s) compared with Line 1. There is very little bedrock topography in this section, suggesting that the steep walls of the creek bed in this area may be cored by colluvium rather than bedrock.

The results along Line 3 are similar to those along Line 2. The overburden velocity is that expected of non-water saturated, poorly consolidated overburden while the bedrock velocity (4940 m/s) is quite similar to that encountered on Line 1. The bedrock surface dips uniformly to the west, increasing from 5 m at the base of the

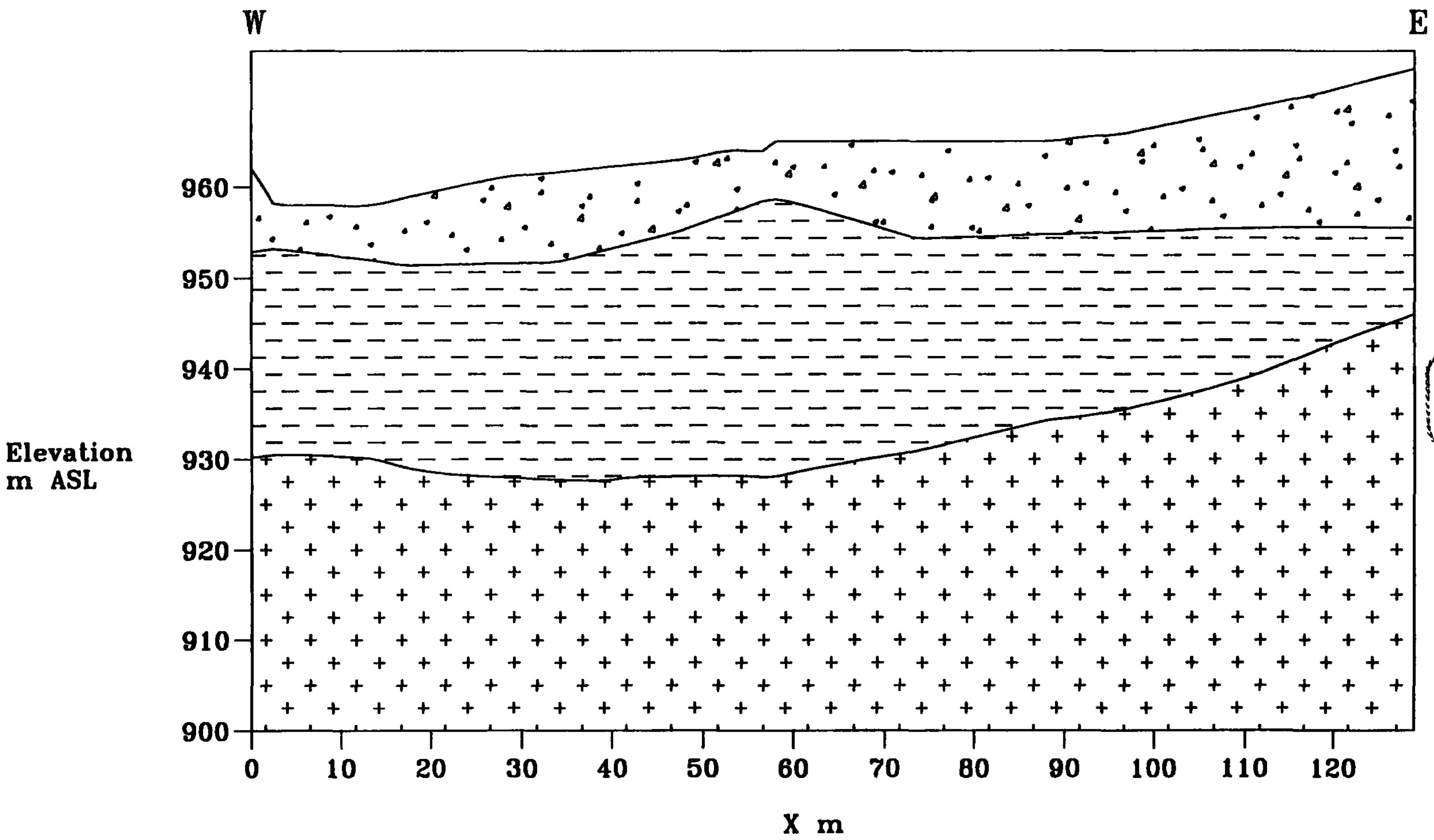


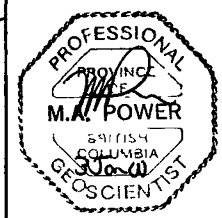
0 20
metres
Scale: 1:750

– Dry overburden (v= 657 m/s)

– Bedrock (v=4936 m/s)

MICHEL BERTRAND	SUMMIT CREEK PROPERTY
	NTS: 105 E8 / Datum: NAD27
SEISMIC REFRACTION SURVEY LINE 3 FIGURE 6.	MINING DISTRICT: WHITEHORSE
	JOB: 00-06 / DATE: 20 DEC 00
	AMEROK GEOSCIENCES LTD.

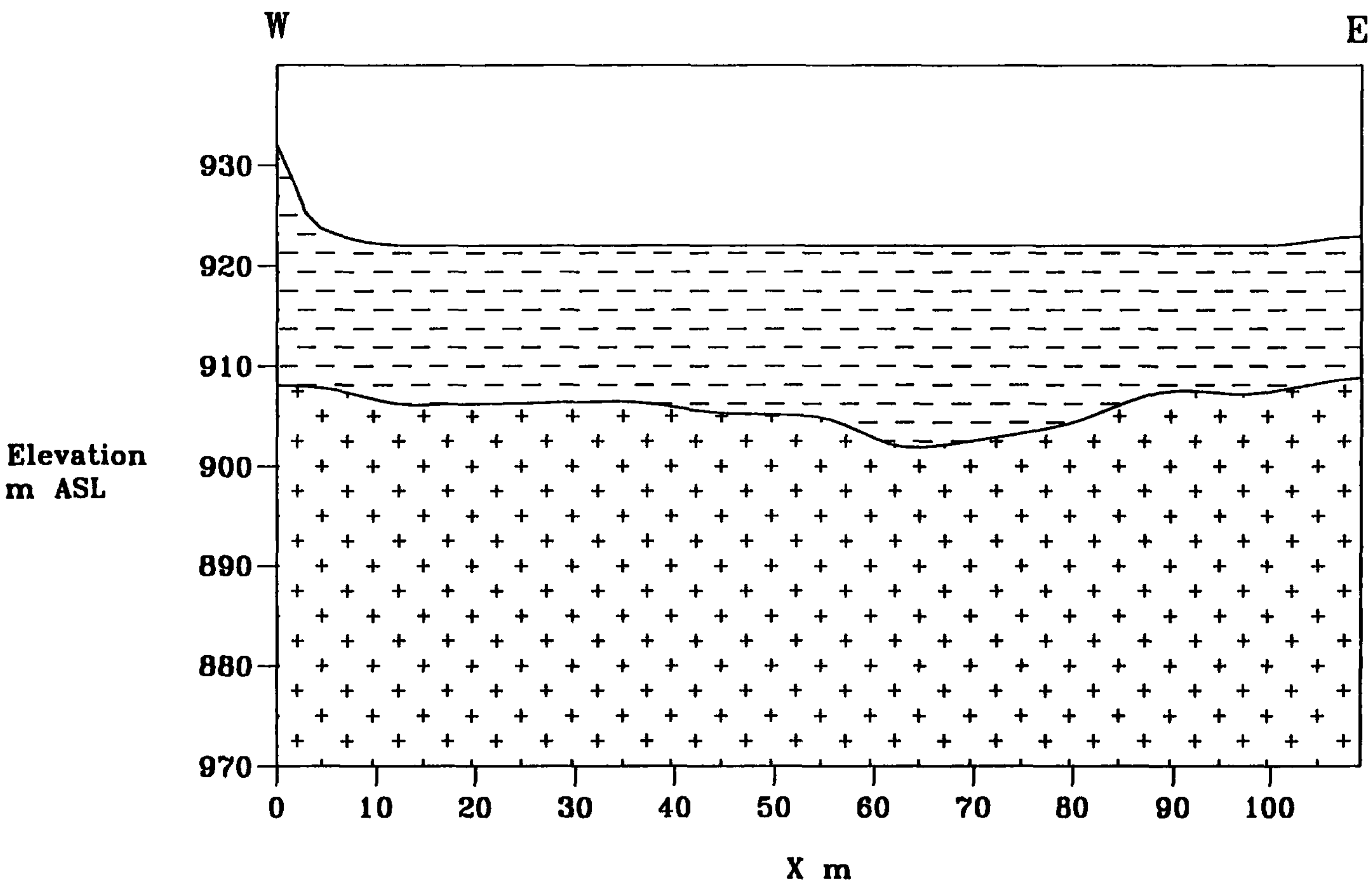


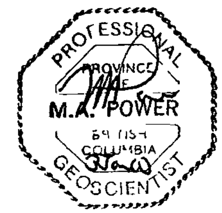


- Loose overburden (v=435 m/s)
- Consolidated overburden (v=935 m/s)
- Bedrock (v=4824 m/s)

0 20
metres
Scale: 1:750

MICHEL BERTRAND	SUMMIT CREEK PROPERTY	
	NTS: 105 E8	Datum: NAD27
SEISMIC REFRACTION SURVEY LINE 1 FIGURE 4.	MINING DISTRICT: WHITEHORSE	
	JOB: 00-06	DATE: 20 DEC 00
	AMEROK GEOSCIENCES LTD.	





0 20
metres
Scale: 1:750

- Dry overburden (v=533 m/s)
- Bedrock (v=4532 m/s)

MICHEL BERTRAND	SUMMIT CREEK PROPERTY
	NTS: 105 E8 | Datum: NAD27
SEISMIC REFRACTION SURVEY	MINING DISTRICT: WHITEHORSE
LINE 2	JOB: 00-06 | DATE: 20 DEC 00
FIGURE 5.	AMEROK GEOSCIENCES LTD.

overburden slope on the east to 15 m on the west. The west end of the line is at the base of a hill which has apparent bedrock exposed in it, 60 m to the west and 30 m to the south. The seismic survey results suggest that there may be a hole or cut-off channel in this area, beneath the overburden covered ridge.

10.0 TRENCHING PROGRAM

Max Fuerstner Jr. described the trenching and road building program to the author and the following summary is based on his descriptions, notes and photographs. A program of road building and excavator trenching was conducted after the seismic survey, between September 15 and October 15, 2000 when conditions permitted. The road work and excavation was conducted by A. Serafinchon using a Terrex D-800 bulldozer (CAT D-9 equivalent) and a JCB-7C excavator (CAT 225 equivalent). The locations of the road construction and test pits are shown in Figure 3. The heavy rain and consequent diversion of Summit Creek along a south draining re-entrant destroyed the access road during August 2000. The road was reconstructed and extended north down Summit Creek from a branch point on the Amber Claim to Line 3. Following this, 17 excavator pits, 6 to 7 m deep, were dug to test the results of the seismic surveys. Material from each pit was stacked adjacent to it to permit subsequent sampling.

The test pits were all dry when excavated with no evidence of near surface ground water. This is surprising but confirms the results of the seismic surveys which failed to detected water saturated sediments along the creek. Holes 1 through 7 eventually filled with water but this may have been surface runoff from Summit Creek as it was diverted back into its north flowing channel prior to the excavator trenching. It is possible that the diversion of Summit Creek to the south allowed the area north of the canyon to drain prior to the seismic survey and excavator trenching. Similar ground on Livingstone Creek north of its bend to the north below a bedrock canyon has a high water table within 20 feet of surface. It thus appears that simply diverging Summit Creek to the south would be sufficient to drain this portion of the creek for stripping

None of the excavator trenches reached bedrock and it appears unlikely that they exposed interglacial pay gravel. The material excavated from the trenches changes character from coarse, angular, clast supported gravel through sandy gravel to predominantly sand moving downstream from Hole 17 to Hole 1 (see Figure 7) The upstream gravels are grey, thick bedded, apparently imbricated, and contain clasts of locally derived schist. The gravels are moderately well sorted with few boulders Further downstream, in the vicinity of Holes 10 and 11, the gravels are thinner and interbedded with sand. Holes 1 through 7 intersected primarily massive sand with some thin gravel beds An ash layer is exposed in several trenches at an apparent depth of 2 m

(a) (b) (c)

Figure 9. Photographs of excavator pits on Summit Creek. (a) Massive gravels from H-16. (b) Gravel and sand from H-10. (c) Sand from H-2. All photographs by M. Fuerstner Jr.

11.0 DISCUSSION

There are many similarities between Livingstone and Summit Creeks. While Livingstone Creek is 5 times longer than Summit, both rise in the eastern plateau and drain to the west through the same geology. To the west, both cut through steep, rock walled canyons where the stream bed narrows to 10 to 20 m. At both creeks, gold was initially discovered in the canyons and placer miners worked up stream, following paystreaks beneath the present stream channel or on low benches beside the present creek channel. At the western ends of the canyons on both Livingstone and Summit Creeks, the stream channels divert sharply north along apparently bedrock controlled depressions parallel to the Big Salmon Fault On Livingstone Creek, Bostock (1931) describes good pay in deep and difficult ground below the canyon on the north draining portion of the creek. The area being explored on Summit Creek is geologically very similar to this promising ground on Livingstone Creek.

Levson (1992) describes a section on Summit Creek, approximately 1 km above (ie. east) of the canyon and compares this with similar sections on Livingstone and Martin Creeks to the south. In essence the sequence consists of four major units, from base to top.

1. *Basal gravels*: poorly sorted, clast supported, predominantly subangular to subrounded, clasts to boulder size with most of local provenance [interglacial fluvial auriferous gravels]

2 *Thin clastics*· horizontally stratified sands.[glaciolacustrine sediments]

3. *Pebble to cobble gravels:* predominantly inclined, clast supported, moderately to well sorted, angular to subangular clast. [glaciofluvial sediments]

4 *Diamicton*· Clast to matrix supported, poorly sorted [glacial till]

Levson believes that this sequence records the deposition of gold bearing stream gravels, their subsequent burial by ice-dammed lake sediments, debris flows and ice marginal stream deposits and finally, the deposition of glacial till during the final ice advance. The orientation of the gold bearing streams perpendicular to the mean direction of ice flow and, more importantly, the presence of a thick blanket of glaciolacustrine and glaciofluvial sediments were the keys to preserving the interglacial placer deposits.

The sections exposed in the excavator trenching clearly resemble units 2 and 3 of Levson's Summit Creek section. It appears that there is a blanket of ice-marginal sediments at least 6 m thick on the lower end of Summit Creek. The presence of the fine clastics of unit 2 is most propitious as this suggests that if any auriferous interglacial gravels were deposited in this section of the creek, they are likely preserved beneath the sands and gravels exposed in the excavator trenching.

The gradient of the bedrock surface, estimated from the seismic data is 40 m per km, compared with roughly 14 m per km on the lower end of Livingstone Creek (measured by seismic, confirmed where tested by drilling). This discrepancy may be a function of stream length as Livingstone Creek drains a much larger area and consequently would be expected to have a lower gradient in its lower reaches when compared with Summit Creek.

In summary, seismic refraction data and excavator trenching suggest that the portion of Summit Creek covered by the Summit Creek Property may host placer gold deposits similar to those on the lower end of Livingstone Creek. On both Livingstone and Summit Creeks, auriferous gravels occur both in and above their respective lower canyons. At Livingstone Creek, pay gravels persist below the lower canyon in deep ground along the north draining section of the creek. On Summit Creek, it seems very likely that similar pay gravels may be further found downstream in the area covered by the Summit Creek Property. If they are present, they are probably preserved beneath a blanket of glaciolacustrine sand and glaciofluvial gravels.

12.0 CONCLUSIONS

The results of the seismic refraction survey and excavator trenching conducted on the Summit Creek Property support the following conclusions:

a. Bedrock occurs at a depth of 15 to 30 m along Summit Creek north of the big bend in the creek at the lower canyon. The depth to bedrock decreases slightly moving downstream and the gradient of bedrock is approximately 40 m per kilometre.

b. Sediments excavated from 6 to 7 m pits on the Summit Creek Property appear to be angular to subangular, moderately sorted glaciofluvial gravels and laminated glaciolacustrine sands. In the Livingstone Creek district, these commonly overlie auriferous interglacial pay gravels and their presence suggests that if such pay gravels were deposited in Summit Creek, they would likely have been protected from glacial erosion and are present beneath the capping sands and gravels.

c The sediments on the lower portion of Summit Creek are permeable and drain readily. It appears that the entire section north of the canyon was drained in as little as one month following catastrophic natural diversion of the creek.

d. The depth of sediments indicated by the seismic survey and the results of excavator trenching indicate that the geology along the lower Summit Creek drainage strongly resembles that found on the lower portion of Livingstone Creek. The strong similarities between placer deposits on both Livingstone and Summit Creeks and the presence of placer deposits below the canyon on Livingstone Creek suggest that there is a strong possibility that auriferous placers will be found in the area covered by the Summit Creek Property.

13.0 RECOMMENDATIONS

The following recommendations are made based on the conclusions of this work:

a. The seismic refraction results should be confirmed by selective drilling along the seismic lines at points where bedrock depressions are indicated in the seismic section. It must be stressed that there are inherent uncertainties in the seismic refraction method and that the data was not of high quality. It is essential that the seismic refraction results be checked before significant exploration is undertaken based on the seismic interpretations in this report.

b. If the seismic refraction survey results are found to be reliable, further surveys should be conducted to map the bedrock along Summit Creek prior to extensive drilling.

c. The creek should be drill tested prior to contemplating extensive mining operations. Ideally, a drill program should be guided by the seismic survey results to position the minimum number of holes required to test for an economic deposit and verify bedrock topography for subsequent mine planning.

Respectfully submitted,
AMEROK GEOSCIENCES LTD.

Michael A. Power, M.Sc. P Geo
Geophysicist

REFERENCES CITED

Bostock, H.S.
1931: The Mining Industry of the Yukon. in: Bostock, H.S. (1957) Yukon Territory - Selected Reports 1898-1933. Ottawa: Department of Energy, Mines and Resources. Geological Survey of Canada Memoir 284. p620-623.

Levson, V.
1992: The sedimentology of Pleistocene deposits associated with placer gold bearing gravels in the Livingstone Creek area, Yukon Territory, Canada. in: INAC. Yukon Geology Volume 3 1992. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

Gordey, S.P. and Makepiece, A.J.
2000: Yukon Digital Geology (interactive compact disc). Exploration and Geological Services Division, Yukon: Open File 1999-1D.

McConnell, R.G.
1901: Salmon River gold field including Livingstone and neighboring creeks in: Bostock, H.S. (1957) Yukon Territory - Selected Reports 1898-1933. Ottawa: Department of Energy, Mines and Resources. Geological Survey of Canada Memoir 284.

Scott, J.H.
1973: Seismic refraction modeling by computer. Geophysics Vol. 38, No. 2.

Sheriff, R.E. and Geldart, L.P.
1995: Exploration Seismology. Toronto: Cambridge University Press.

Telford, W.M., L.P. Geldart and R E. Sheriff
1990: Applied Geophysics (2nd Edition) New York: Cambridge University Press.

APPENDIX A. CERTIFICATE

I, Michael Allan Power, with residence and business address in Whitehorse, Yukon Territory do hereby certify that:

1. I hold a B.Sc. (Honours) in Geology granted in 1986 and M.Sc. in Geophysics granted in 1988, both from the University of Alberta.

2. I have been actively involved in mineral exploration in the northern Cordillera and in the Northwest Territories since 1988. I am a professional geoscientist registered with the Association of Professional Engineers and Geoscientists of British Columbia (Registration number 21131) and a professional geophysicist registered by the Northwest Territories Association of Professional Engineers, Geologists and Geophysicists (licensee L942).

3 I conducted the geophysical surveys described in this report, interpreted the data collected and prepared this report.

4. I have no interest, direct or indirect, nor do I hope to receive any interest, direct or indirect, in the property of Michel Bertrand.

Dated this 20th day of December 2000 in Whitehorse, Yukon Territory.

Michael A. Power, M.Sc P.Geo
Geophysicist

APPENDIX B. SURVEY LOG

JOB 00-006
SUMMIT CREEK PROJECT
JULY 8 - OCTOBER 15, 2000

08 Jul 2000	Moblilize MB and SH into property.
09 Jul 2000 to 17 Jul 2000	Line cutting, gridding.
18 Jul 2000	Line cutting; demobilized to Whitehorse late in the day
08 Aug 2000	Remobilize MB into property
09 Aug 2000 to 13 Aug 2000	Line cutting
14 Aug 2000 to 18 Aug 2000	Prospecting, CAT repair, prospecting
19 Aug 2000	MP and seismic gear into Livingstone strip for seismic survey late in the day.
20 Aug 2000	Seismic survey - Line 1 and 2
21 Aug 2000	Seismic survey - Line 3 / demobe MP late in the day
22 Aug 2000	Camp clean up and demobe MB to Whitehorse
15 Sep 2000 to 15 Oct 2000	Road repair and excavator trenching performed intermittently between other tasks by AS. Total hours. 58 hrs Terrex D-800 / 82 hrs JCB 7C.

PERSONNEL

Line cutters / helpers	Michel Bertrand (MB) 155 Graham Lane Timmins ON P4N 7Z5
	Stephan Humphries (SH) 1123 Cherry Street Nelson, B.C. V1L 6C1
Geophysicist	Mike Power (MP) Box 5808 Whitehorse YT Y1A 5L6
Equipment operator	Al Serafinchon (AS) 139 Wilson Drive Whitehorse, YT Y1A 5R2

APPENDIX C. STATEMENT OF EXPENDITURES

Line cutting	$8,250.00
Camp rental	$1,700.00
Groceries	$1,050.00
Flights	$1,510.05
Saw rental	$1,080.00
ATV rental	$1,500.00
Fuel	$96.00
Misc. field supplies	$107.30
Seismic	$2,599.60
Caps	$333.76
CAT	$11,791.40
Excavator	$10,967.50
Final report	$1,712.00
Total project expenses	**$42,697.61**

The foregoing summary is based on information provided to the author by Michel Bertrand. I certify that these expenses are correct to the best of my knowledge.

Michael A. Power, M.Sc., P.Geo., P.Geoph
Geophysicist

APPENDIX D. INSTRUMENT SPECIFICATIONS

Record Lengths:	24,000 samples per channel for 12 or 24 channels, 12,000 for 36 channels or more
Line Testing:	Real-time full wave form noise monitor.
Power Consumption:	30 W plus 1.0 W per channel
Data Formats	SEG-2, SEG-Y, real-time to disk, off-line to tape.

Pretrigger Data:	Up to 4096 samples.
Stacker:	Full 32-bit
Acquisition and Display Filters:	Low cut: out, 10, 15, 25, 35, 50, 70, 100, 140, 200, 280, 400 Hz, 24 or 48 dB / Octave, Butterworth. Display filters do not affect data.
Correlator:	Hardware full precision correlator. Operates either before or after stack.
Automatic Gain Control:	Digital AGC with user adjustable window. Display only - does not affect raw data.
Number of channels:	12 to 72 channels per 12V portable module. 12 to 132 channels per rack mount module (NX series only). Modules stackable to form systems up to 600 channels, controlled internally from one keypad or externally by a PC based computer (discuss detailed configurations with the Geometrics' sales department).

Home | StrataView RX | Features | Specifications | Configuration

GEOMETRICS

StrataView RX Specifications

R Series Specifications

A/D Conversion:	24 bit A/D process using 32 kHz over sampling, digital anti-alias and decimation to users selected sample rate
Dynamic Range:	135 dB theoretical, 113 dB measured @ 2 ms, 3 to 150 Hz
Distortion:	0.005% @ 2 ms, 3 to 150 Hz
Bandwidth:	3.0 to 14 kHz,
Common Mode Rejection:	> -90 dB @
Crosstalk:	-85 dB @ 24 Hz
Noise Floor:	0.25 uV, RFI @ 2 ms, 3 to 150 Hz
Trigger Accuracy:	1 microsecond
Maximum Input Signal:	300 mV, P-P
Preamplifier Gains:	36 dB, followed by 24 dB floating point amplifier
Anti-alias Filters:	Digital, automatically selected to correspond to sample rate 3 dB corner frequency, down 80 dB at Nyquist, except 74 dB when sampling at 16 kHz and none at 32 kHz
Sample Interval:	0.032, 0.064, 0.128, 0.25, 0.5, 1.0, 2.0 ms

APPENDIX E. SHOT RECORDS

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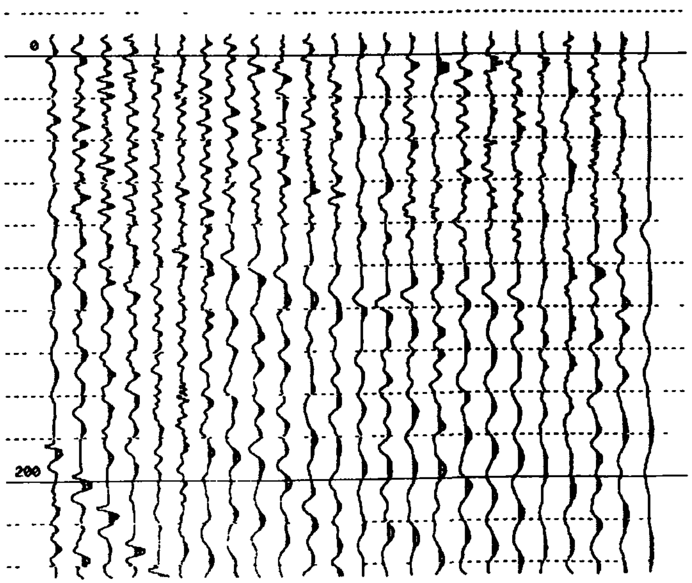

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DISP FILT HI CUT 500HZ HI CUT 250HZ AGC 300

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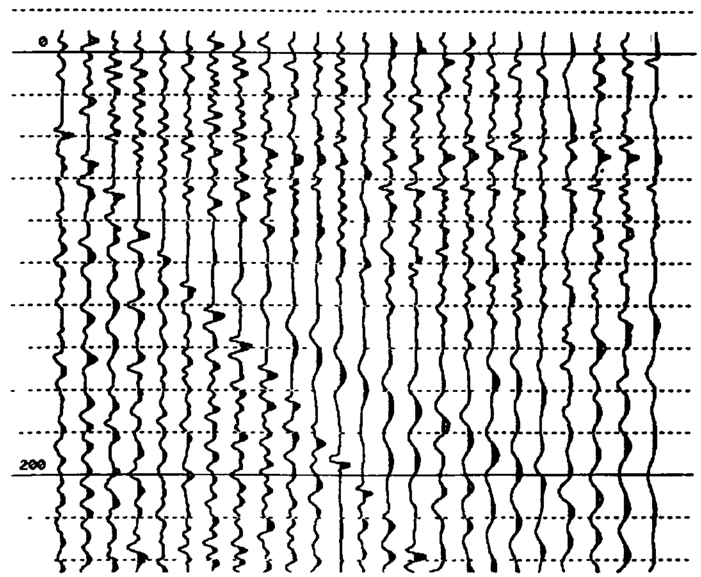

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DISP FILT HI CUT 500HZ HI CUT 250HZ AGC 300

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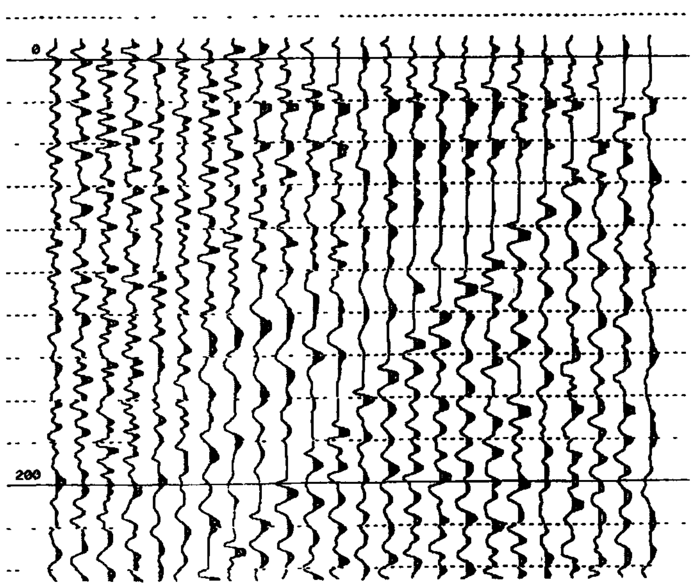

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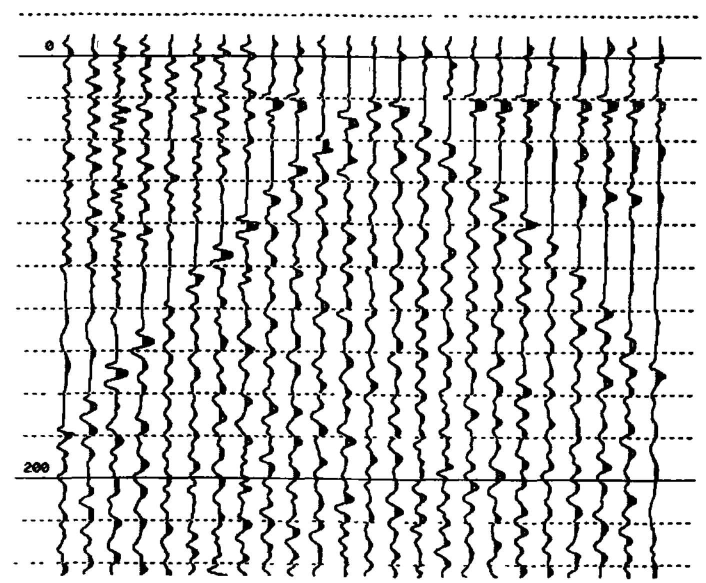

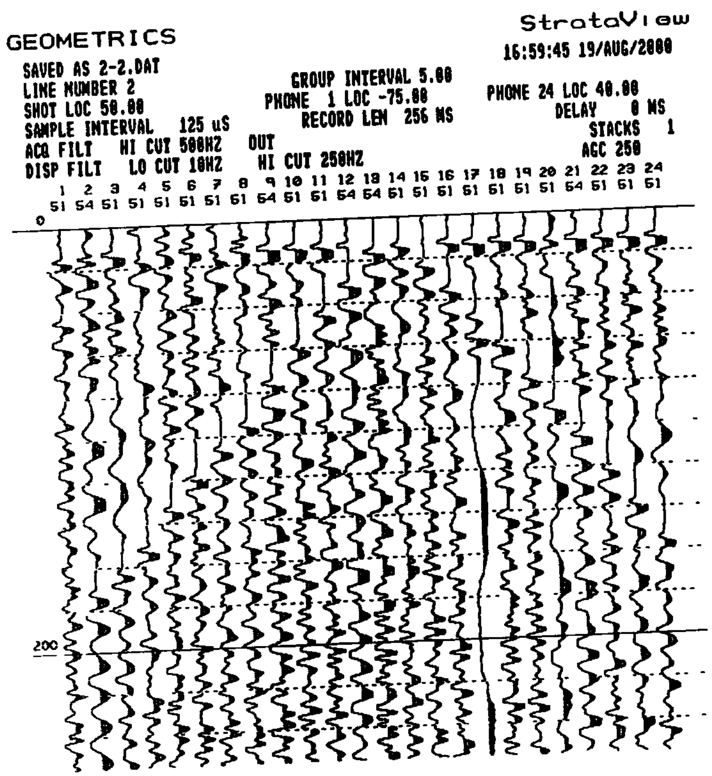
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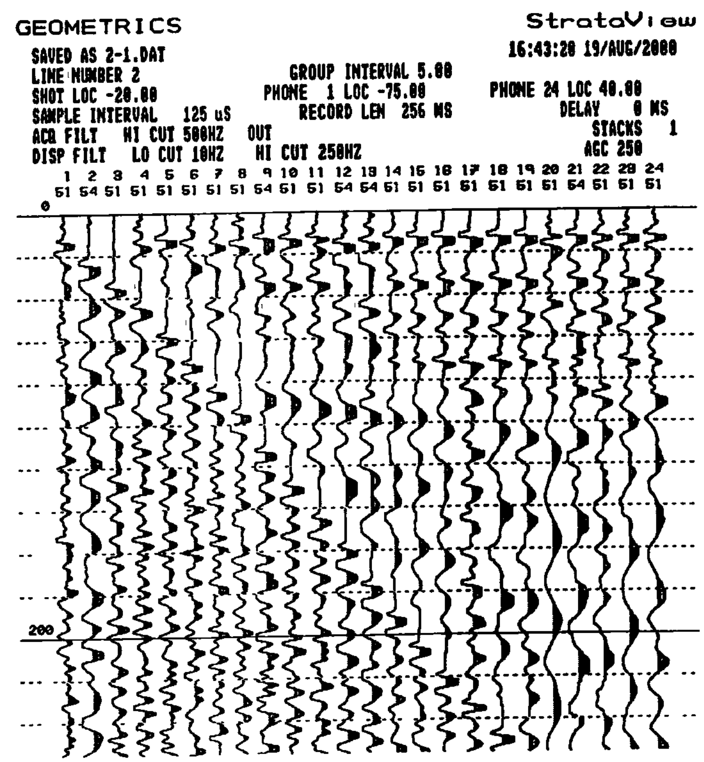
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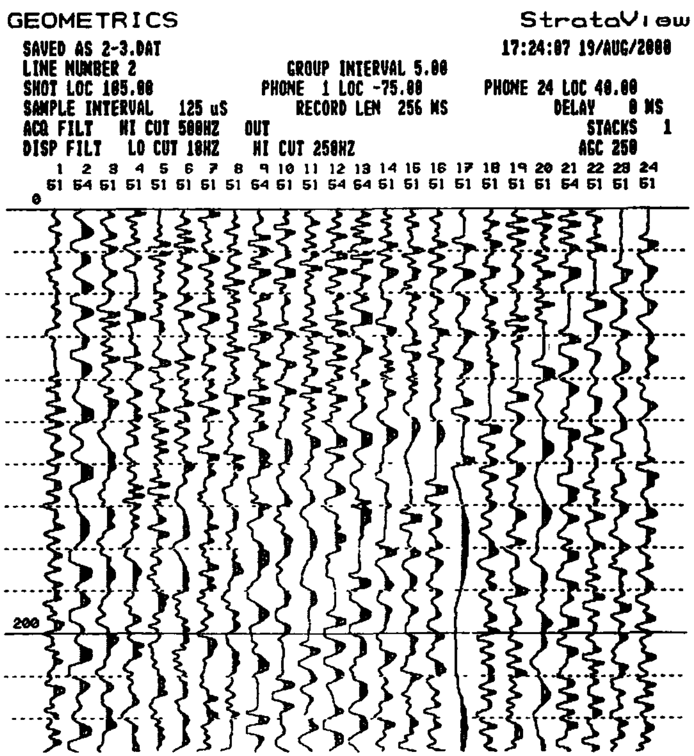
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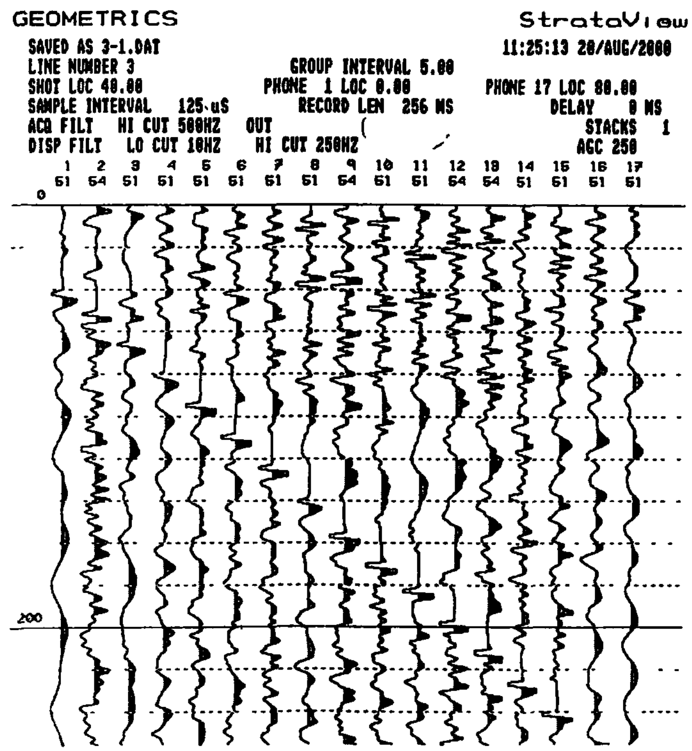
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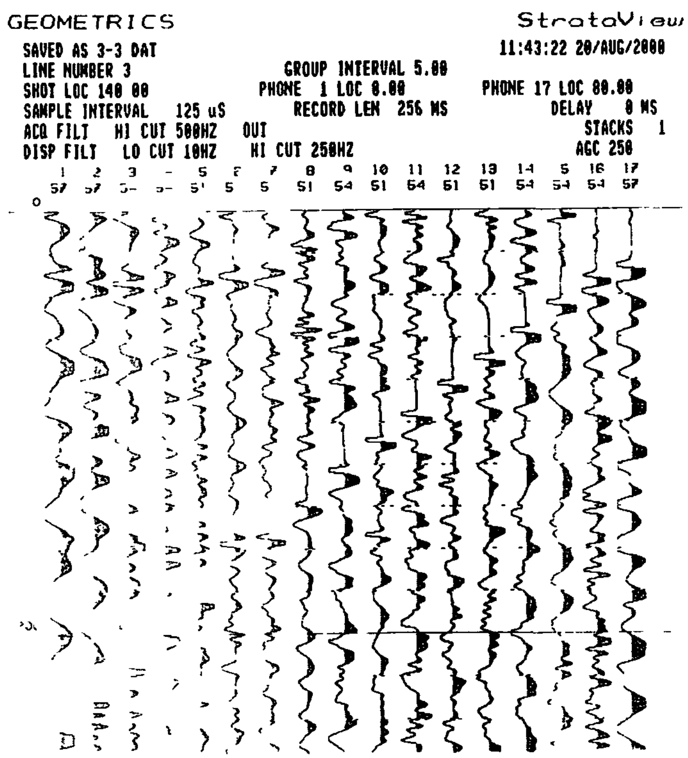
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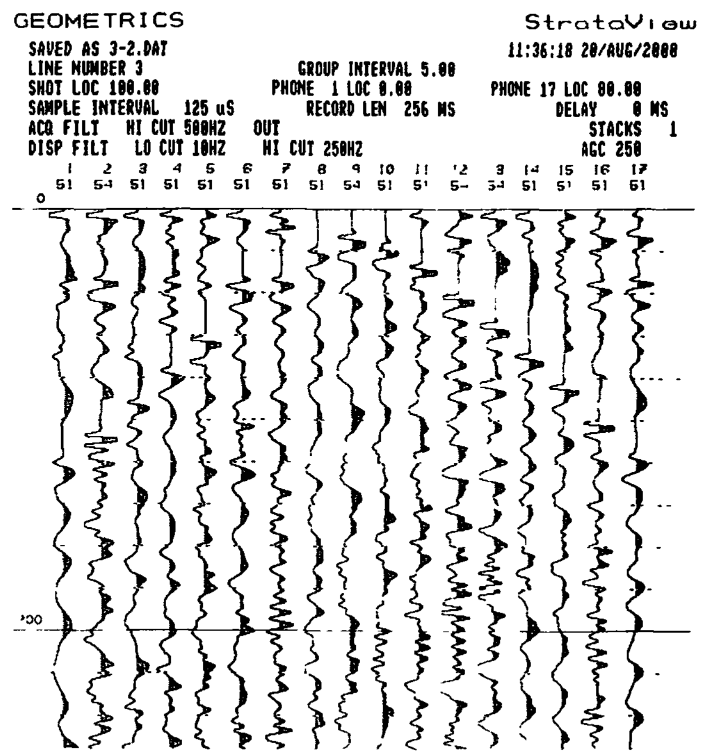
LINE NUMBER 3
GROUP INTERVAL 5.00
SHOT LOC 140 00
PHONE 1 LOC 0.00
PHONE 17 LOC 80.00
SAMPLE INTERVAL 125 uS
RECORD LEN 256 MS
DELAY 0 MS
ACQ FILT HI CUT 500HZ OUT
STACKS 1
DISP FILT LO CUT 10HZ HI CUT 250HZ
AGC 250


GEOMETRICS
StrataView
SAVED AS 3-2.DAT
11:36:18 20/AUG/2000
LINE NUMBER 3
GROUP INTERVAL 5.00
SHOT LOC 100.00
PHONE 1 LOC 0.00
PHONE 17 LOC 80.00
SAMPLE INTERVAL 125 uS
RECORD LEN 256 MS
DELAY 0 MS
ACQ FILT HI CUT 500HZ OUT
STACKS 1
DISP FILT LO CUT 10HZ HI CUT 250HZ
AGC 250

APPENDIX F. INVERSION RESULTS

LINE 1 INVERSION

SIPT2 V-4.1 --- SEISMIC REFRACTION INTERPRETATION PROGR

DATA FILE: LINE1.SIP PRINT FILE: C:\DATA\LIVING~1\LINE1\

TITLE: Summit Creek - Line 1 - Mitch Bertrand

PROGRAM CONTROL DATA

				Printer	Plot	Scales	Datum	Plane	Control	Po
				Elev	Horiz	Time	P o i	n t 1	P o i	n
Sprds	Exit	Layers	V-Over	m/col	m/row	ms/col	Elev	X-Loc	Elev	X
1	6	3	0	0.0	0.0	0.0	0.0	0.0	0.0	

SHOTPOINT AND GEOPHONE INPUT DATA for LINE1.SIP

Spread A, 4 Shotpoints, 24 Geophones, X-Shift = 0.0, X-True = 0, Units: Meters

SP	Elev	X-Loc	Y-Loc	Depth	UpHole T	Fudge T	End SP
A	113.0	-62.0	0.0	0.0	0.0	0.0	0
B	103.0	-12.0	0.0	0.0	0.0	0.0	1
C	94.0	60.0	5.0	0.0	0.0	0.0	0
D	92.0	120.0	0.0	0.0	0.0	0.0	2

Arrival Times + Fudge T and Layers represented

Geo	Elev	X-Loc	Y-Loc	SP A T	SP A L	SP B T	SP B L	SP C T	SP C L	SP D T	SP D L
1	100.0	0.0	0.0	75.00	3	32.37	1	116.00	2	112.200	3
2	99.0	5.0	0.0	78.50	3	46.00	1	113.80	2	112.500	3
3	98.0	10.0	0.0	82.75	3	56.12	1	109.50	1	111.800	3
4	97.0	15.0	0.0	85.00	3	67.50	1	98.37	1	111.000	3
5	96.0	20.0	0.0	86.50	3	76.62	2	92.25	1	110.500	3
6	95.5	25.0	0.0	86.50	3	81.75	2	81.75	1	110.600	3
7	95.0	30.0	0.0	86.25	3	86.37	2	68.00	1	110.600	3
8	95.0	35.0	0.0	86.50	3	91.75	2	58.25	1	109.800	3
9	95.0	40.0	0.0	87.75	3	98.25	2	51.37	1	107.500	3
10	95.0	45.0	0.0	88.75	3	105.50	2	44.00	1	103.700	3
11	95.0	50.0	0.0	91.00	3	110.20	2	33.87	1	101.000	3
12	95.0	55.0	0.0	93.75	3	115.20	2	16.37	1	99.120	3
13	95.0	60.0	0.0	97.25	3	118.50	2	14.62	1	97.370	3
14	94.0	65.0	0.0	99.50	3	121.70	2	17.12	1	94.870	3
15	93.0	70.0	0.0	99.75	3	123.20	3	27.75	1	91.250	2
16	92.5	75.0	0.0	99.50	3	123.70	3	36.00	1	82.250	2
17	92.0	80.0	0.0	99.25	3	122.30	3	43.50	1	74.870	2
18	91.5	85.0	0.0	99.00	3	122.80	3	50.75	1	66.370	2
19	91.0	90.0	0.0	98.50	3	121.00	3	62.00	1	63.250	2
20	90.0	95.0	0.0	97.00	3	122.70	3	73.87	2	56.620	1
21	89.0	100.0	0.0	94.50	3	122.20	3	81.25	2	45.750	1
22	88.0	105.0	0.0	89.25	3	120.10	3	91.25	3	33.120	1
23	88.0	110.0	0.0	84.13	3	116.20	3	94.50	3	14.750	1
24	88.0	115.0	0.0	79.00	3	107.30	3	92.12	3	7.125	1

Layer 1 Velocity from direct arrivals

Spread A	SP	Geo	DD	V	Avg V
	B	1	12.0	371	

```
               B    2    17.0     369
               B    3    22.0     392
               B    4    27.0     400
                                         383
               C    3    50.6     462
               C    4    45.7     464
               C    5    40.8     442
               C    6    35.8     438
               C    7    30.9     454
               C    8    26.0     446
               C    9    21.1     410
               C   10    16.3     370
               C   11    11.6     343
               C   12     7.5     456
               C   13     5.1     350
               C   14     6.7     391
               C   15    10.6     384
               C   16    15.2     423
               C   17    20.0     460
               C   18    24.9     491
               C   19    29.8     481
                                         427
               D   20    22.9     404
               D   21    18.1     397
               D   22    13.6     411
               D   23     8.9     606
               D   24     5.0     702
                                         504
----------------------------------------------
Wtd Avg Velocity computed for Layer 1 =    435

Layer 2 Velocity computed by regression of datum-corrected arrivals

 Spread A
    V      Ti     Geos   <-SP->  Geos    Ti       V         Avg V   Avg Ti    Pts
 ------   ----   -----    ---   -----   ----   ------      ------   ------    ---
                           B     5 14   44.8    1103        1103     44.8     10
   5134  100.5    1  2     C    20 21   12.1     573        1031     56.3      4
    699   11.4   15 19     D                                 699     11.4      5
                                                           ------             ---
                                                   Avg =     945      for      19 Pts

Layer 2 Velocity computed by Hobson-Overton method

        Not enough points.
----------------------------------------------
Wtd Avg Velocity computed for Layer 2 =    945
------------------------------------------------------------------------------

Layer 3 Velocity computed by regression of datum-corrected arrivals

 Spread A
    V      Ti     Geos   <-SP->  Geos    Ti       V         Avg V   Avg Ti    Pts
 ------   ----   -----    ---   -----   ----   ------      ------   ------    ---
                           A     1 24   77.4    9289        9289     77.4     24
                           B    15 24  131.7    5785        5785    131.7     10
                           C    22 24   99.4    7590        7590     99.4      3
   3141   70.2    1 14     D                                3141     70.2     14
                                                           ------             ---
                                                   Avg =    5565      for      51 Pts
```

Layer 3 Velocity computed by Hobson-Overton method

Spread A SPs	Geos	V	Avg TdSP	Std Err Overall	4 Highest Std Err at geophones Err	Geo	Err	Geo	Err	Geo	Err	Geo
A D	1 14	3475	-21.8	3.200	-5.627	8	5.164	14	-4.930	9	-3.827	7

Avg = 3475 for 14 Pts

Wtd Avg Velocity computed for Layer 3 = 4824

Arrival times Td corrected to datum. (Datum Elev = 99.020 - 0.094x) for LINE1.S

Spread A				SP A	SP B	SP C	SP D
Datum Elev				104.7	100.1	93.4	88.0
Geo		X-Loc	Cor T	0.0	-6.6	-1.5	-9.2
---		-----	-----	--Td--	--Td--	--Td--	--Td--
1	99.0	0.0	-2.3	72.7	23.5	112.3	100.7
2	98.6	4.9	-1.0	77.5	38.4	111.3	102.3
3	98.1	9.8	0.2	83.0	49.7	108.2	102.8
4	97.6	14.7	1.5	86.5	62.3	98.3	103.2
5	97.2	19.6	2.7	89.2	72.7	93.5	104.0
6	96.7	24.6	2.8	89.3	77.9	83.0	104.1
7	96.2	29.5	2.8	89.1	82.6	69.3	104.2
8	95.8	34.5	1.7	88.2	86.9	58.5	102.3
9	95.3	39.5	0.7	88.4	92.3	50.5	98.9
10	94.8	44.5	-0.4	88.3	98.4	42.1	94.0
11	94.3	49.5	-1.5	89.5	102.1	30.9	90.3
12	93.9	54.5	-2.6	91.2	106.0	12.3	87.3
13	93.4	59.5	-3.7	93.6	108.2	9.5	84.5
14	92.9	64.4	-2.4	97.1	112.6	13.2	83.2
15	92.5	69.3	-1.2	98.5	115.4	25.1	80.8
16	92.0	74.3	-1.1	98.4	115.9	33.4	71.9
17	91.5	79.3	-1.1	98.2	114.6	41.0	64.6
18	91.1	84.3	-1.0	98.0	115.2	48.3	56.1
19	90.6	89.2	-0.9	97.6	113.4	59.6	53.1
20	90.1	94.1	0.3	97.3	116.4	72.7	47.7
21	89.7	99.0	1.5	96.0	117.1	81.3	38.1
22	89.2	103.9	2.8	92.0	116.3	92.5	26.7
23	88.7	108.9	1.7	85.8	111.3	94.7	7.2
24	88.3	113.9	0.6	79.6	101.3	91.2	-1.5

Arrival times Tc corrected to top of Layer 2 and Elev of top of Layer 2 for LIN

Spread A				SP A	SP B	SP C	SP D
Elev				0.0	85.5	88.6	82.9
Geo		X-Loc	Cor T	40.3	40.3	12.5	20.9
---		-----	-----	--Tc--	--Tc--	--Tc--	--Tc--
1	85.6	0.0	33.1	27.8	0.0	70.4	58.2
2	85.5	4.9	31.0	33.3	0.0	70.3	60.6
3	85.4	9.8	29.0	39.6	0.0	0.0	61.9

4	85.2	14.7	27.0	43.8	0.0	0.0	63.1
5	85.1	19.6	25.1	47.3	11.2	0.0	64.5
6	84.9	24.6	24.3	48.1	17.2	0.0	65.4
7	84.8	29.5	23.5	48.7	22.6	0.0	66.3
8	84.6	34.5	23.8	48.6	27.7	0.0	65.1
9	84.5	39.5	24.1	49.5	33.8	0.0	62.5
10	84.6	44.5	23.8	50.8	41.4	0.0	59.0
11	86.1	49.5	20.4	56.4	49.5	0.0	59.7
12	87.6	54.5	17.0	62.6	57.9	0.0	61.2
13	88.7	59.5	14.4	68.7	63.8	0.0	62.1
14	87.0	64.4	16.2	69.2	65.2	0.0	57.8
15	85.2	69.3	18.0	67.7	64.9	0.0	52.4
16	83.9	74.3	19.7	65.7	63.7	0.0	41.7
17	82.7	79.3	21.4	63.7	60.6	0.0	32.6
18	81.7	84.3	22.4	62.4	60.1	0.0	23.1
19	81.6	89.2	20.7	63.6	60.0	0.0	21.6
20	81.5	94.1	19.0	63.8	63.4	42.3	0.0
21	81.4	99.0	17.4	63.0	64.5	51.4	0.0
22	82.0	103.9	15.3	59.8	64.5	63.5	0.0
23	82.6	108.9	13.2	56.8	62.7	68.9	0.0
24	83.2	113.9	11.0	53.8	56.0	68.6	0.0

LINE1.SIP
Summit Creek - Line 1 - Mitch Bertrand

```
 S                           Time-Distance Plot  --  Raw data with no correctio
 p  G
 r  e  S
 e  o  P                                T i m e   ( m i l l i   s e c o n d s )
 a
 d
         0        15        30        45        60        75        90        10
         +---------+---------+---------+---------+---------+---------+---------
         -                                     :
 A     B +         +         +         +         +         +         +
         -    :                                    :
         -        :                                   :
         -             :                                :
         -                  :                             :
 A  1    +                     1                           3
         -                           :                       :
 A  2    +                              1                    3
         -                                  :                  :
 A  3    +                                    1                 3
         -                                          :            :           :
 A  4    +                                            1           3        1
 A  5    +                                                  2      3   1
         -                                                   :     : :
 A  6    +                                                      #  3
         -                                                   :  :  :
 A  7    +                                            1            #
         -                                           :             ::
 A  8    +                                      1                  3  2
         -                                     :                   :   :
 A  9    +                                 1                        3      2
         -                                :                         :       :
 A 10    +                            1                             3         3
         -                           :                               :        :
 A 11    +                      1                                     3     3
```

```
        -                  :                                         :     :
A 12    +          1                                                   3  3
        -          :                                                   :  :
A 13    +         1                                                      #
A     C + :       +         +         +         +         +         +   ::
A 14    +          1                                                   3  3
        -            :                                                 :  :
A 15    +                  1                                         2     3
        -                   :                                      :      :
A 16    +                       1                              2          3
        -                         :                          :            :
A 17    +                            1                    2               3
        -                              :                :                 :
A 18    +                                 1         2                     3
        -                                   :       :                     :
A 19    +                                        12                       3
        -                                        :  :                    :
A 20    +                                     1          2               3
        -                                   :               :           :
A 21    +                              1                      2        3
        -                          :                             :    :
A 22    +                     1                                     33
        -                :                                        :   :
A 23    +         1                                             3      3
        -       :                                              :      :
A 24    +    1                                               3       3
A     D + :       +         +         +         +         +         +
        -
        -
        +---------+---------+---------+---------+---------+---------+---------
        0        15        30        45        60        75        90       10
```

PRINTER PLOT SCALES

```
---------------------
Time:    1.50 ms/col
Dist:    2.50  m/row
```

Summit Creek - Line 1 - Mitch Bertrand

Spread A   Points of emergence of refracted rays below target geophones for

Geo		SP A	L	SP B	L	SP C	L	SP D	L
1	X-Loc	-6.9	3	---	1	7.0	2	0.0	3
	Elev	75.0		---		85.5		73.2	
2	X-Loc	-3.1	3	---	1	11.5	2	5.7	3
	Elev	72.0		---		85.3		71.7	
3	X-Loc	3.8	3	---	1	---	1	9.4	3
	Elev	69.2		---		---		70.2	
4	X-Loc	7.5	3	---	1	---	1	10.8	3
	Elev	67.3		---		---		69.4	
5	X-Loc	7.6	3	13.6	2	---	1	19.6	3
	Elev	66.4		85.3		---		66.2	
6	X-Loc	10.0	3	18.8	2	---	1	26.0	3
	Elev	66.5		85.1		---		64.5	
7	X-Loc	19.4	3	24.0	2	---	1	30.4	3
	Elev	64.7		85.0		---		63.3	

8	X-Loc	25.9 3	28.9 2	--- 1	34.6 3
	Elev	64.6	84.8	---	63.0
9	X-Loc	30.2 3	33.8 2	--- 1	39.3 3
	Elev	64.3	84.7	---	63.3
10	X-Loc	34.5 3	38.7 2	--- 1	44.6 3
	Elev	64.0	84.5	---	63.8
11	X-Loc	39.1 3	43.6 2	--- 1	48.9 3
	Elev	62.2	84.4	---	63.2
12	X-Loc	41.9 3	53.8 2	--- 1	57.8 3
	Elev	60.2	87.4	---	61.7
13	X-Loc	43.8 3	58.1 2	--- 1	62.3 3
	Elev	58.3	88.7	---	61.3
14	X-Loc	46.2 3	60.4 2	--- 1	66.1 3
	Elev	57.0	88.9	---	61.8
15	X-Loc	57.2 3	57.1 3	--- 1	70.2 2
	Elev	55.9	55.7	---	84.9
16	X-Loc	64.2 3	64.0 3	--- 1	78.2 2
	Elev	56.5	55.9	---	82.9
17	X-Loc	70.8 3	70.8 3	--- 1	82.3 2
	Elev	57.0	57.0	---	82.2
18	X-Loc	78.0 3	78.0 3	--- 1	86.1 2
	Elev	57.7	57.3	---	81.3
19	X-Loc	84.0 3	84.0 3	--- 1	96.9 2
	Elev	58.1	58.4	---	81.1
20	X-Loc	88.0 3	87.7 3	85.6 2	--- 1
	Elev	58.3	57.0	81.4	---
21	X-Loc	98.4 3	98.3 3	96.6 2	--- 1
	Elev	59.7	57.5	81.1	---
22	X-Loc	103.3 3	103.2 3	103.2 3	--- 1
	Elev	61.7	57.9	59.2	---
23	X-Loc	105.7 3	105.0 3	104.6 3	--- 1
	Elev	64.2	59.8	57.7	---
24	X-Loc	110.6 3	110.1 3	109.1 3	--- 1
	Elev	66.6	64.0	58.8	---

Spread A Points of entry of refracted rays below source shotpoints:

L=2	Right	X-Loc	---	-2.5	60.6	---
		Elev	---	85.6	88.6	---
L=2	Left	X-Loc	---	---	58.8	112.4
		Elev	---	---	88.8	83.3
L=3	Right	X-Loc	-10.3	-10.3	63.4	---
		Elev	69.7*	69.7	57.3	---
L=3	Left	X-Loc	---	---	---	112.9
		Elev	---	---	---	60.6

Summit Creek - Line 1 - Mitch Bertrand

Spread A Depth and Elev of layers directly beneath SPs and Geos for LINE1.

	Surface		Layer 2		Layer 3	
SP	X-Loc	Elev	Depth	Elev	Depth	Elev
---	-----	------	-----	------	-----	------
B	-11.6	103.0	17.5	85.5	27.0	76.0
C	60.0	94.0	5.4	88.6	36.0	58.0
D	116.9	92.0	9.1	82.9	31.8	60.2
Geo						

1	0.0	100.0	14.4	85.6	28.4	71.6
2	4.9	99.0	13.5	85.5	29.3	69.7
3	9.8	98.0	12.6	85.4	29.9	68.1
4	14.7	97.0	11.8	85.2	30.2	66.8
5	19.6	96.0	10.9	85.1	30.3	65.7
6	24.6	95.5	10.6	84.9	30.7	64.8
7	29.5	95.0	10.2	84.8	30.8	64.2
8	34.5	95.0	10.4	84.6	32.0	63.0
9	39.5	95.0	10.5	84.5	33.2	61.8
10	44.5	95.0	10.4	84.6	34.3	60.7
11	49.5	95.0	8.9	86.1	35.1	59.9
12	54.5	95.0	7.4	87.6	36.0	59.0
13	59.5	95.0	6.3	88.7	37.0	58.0
14	64.4	94.0	7.0	87.0	35.8	58.2
15	69.3	93.0	7.8	85.2	34.9	58.1
16	74.3	92.5	8.6	83.9	34.5	58.0
17	79.3	92.0	9.3	82.7	34.4	57.6
18	84.3	91.5	9.8	81.7	33.7	57.8
19	89.2	91.0	9.4	81.6	33.0	58.0
20	94.1	90.0	8.5	81.5	31.7	58.3
21	99.0	89.0	7.6	81.4	30.1	58.9
22	103.9	88.0	6.0	82.0	27.9	60.1
23	108.9	88.0	5.4	82.6	27.6	60.4
24	113.9	88.0	4.8	83.2	27.5	60.5

LINE1.SIP

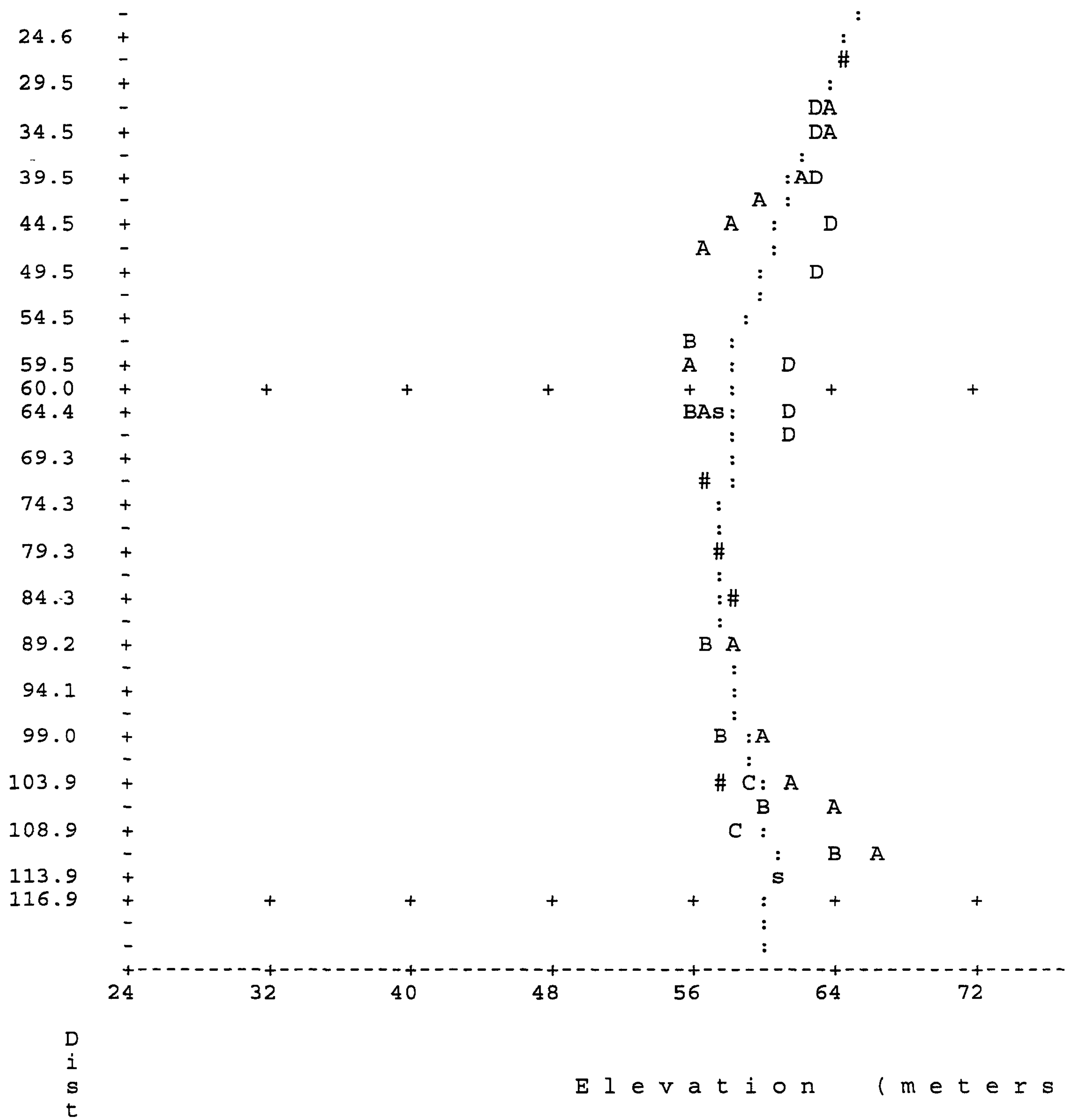
Velocities used, Spread A

	Layer 1	Layer 2	Layer 3
Vertical	435	945	
Horizontal		945	4824

LINE1.SIP
Summit Creek - Line 1 - Mitch Bertrand

```
        D
        i
        s                                   E l e v a t i o n   ( m e t e r s
        t

           24        32        40        48        56        64        72
            +---------+---------+---------+---------+---------+---------+------
            -                                                              :
     -11.6  +         +         +         +         +         +         +    :
            -                                                         s     :
            -                                                              :A
            -                                                           A:
            -                                                           :
       0.0  +                                                          :  D
            -                                                       A:
       4.9  +                                                       :  D
            -                                                   AA : D
       9.8  +                                                   A : D
            -                                                     :
      14.7  +                                                    :
      19.6  +                                                  A:D
```

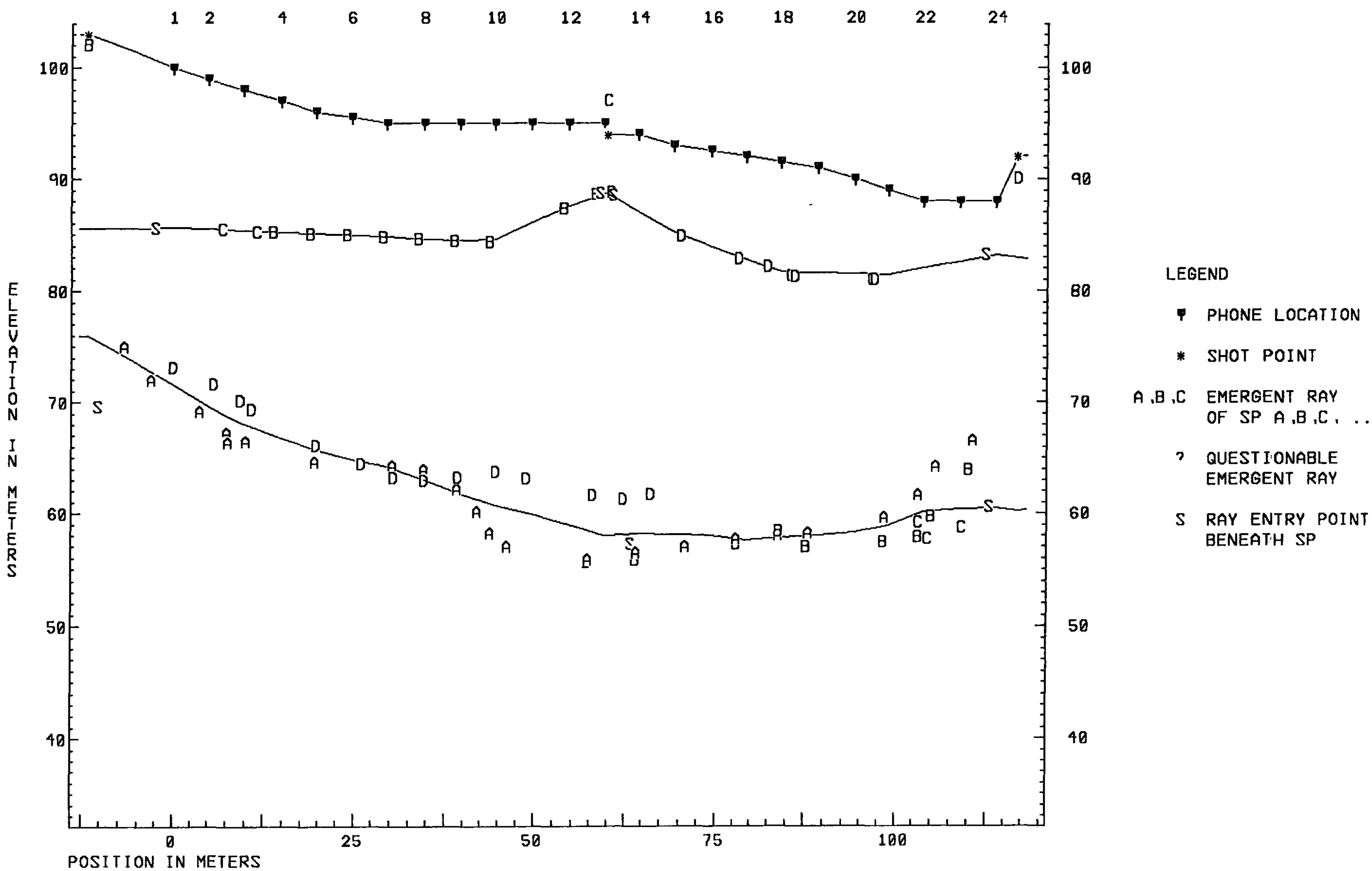


PRINTER PLOT SCALES		
Elev:	0.80	m/col
Dist:	2.50	m/row

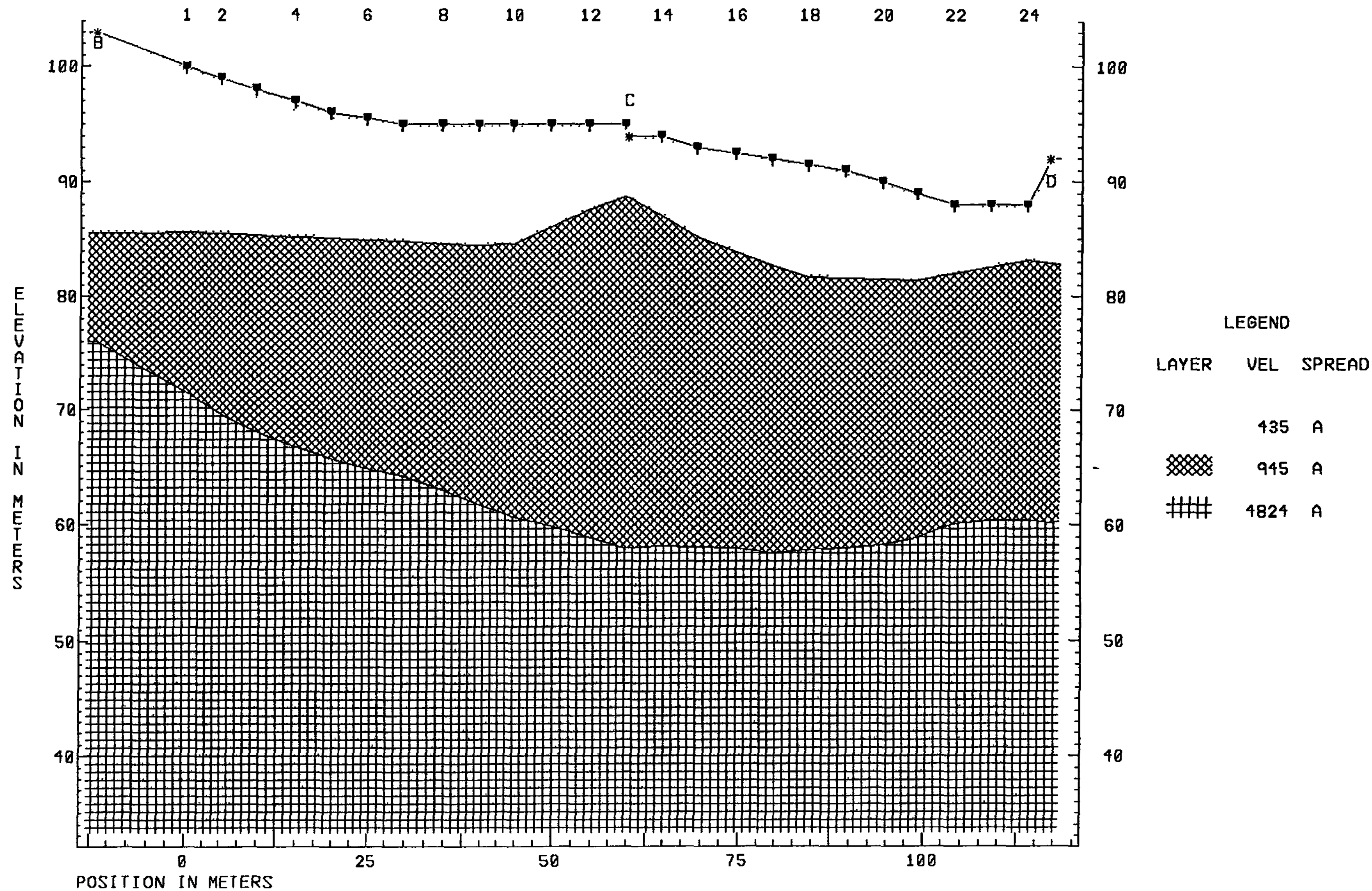
L E G E N D	
>	Geophone Location
*	Shotpoint Location
A,B,C	Emergent Ray; Source SP A,B,C,...
?	Questionable Emergent Ray
s	Ray Entrypoint Beneath SP
#	More Than One Symbol to Plot Here
+	Grid Mark

FILE   LINE1 SIP
SUMMIT CREEK - LINE 1 - MITCH BERTRAND

SPREAD A



FILE LINE1 SIP
SUMMIT CREEK - LINE 1 - MITCH BERTRAND
SPREAD A



LINE 2 INVERSION

SIPT2 V-4.1 --- SEISMIC REFRACTION INTERPRETATION PROGR

DATA FILE: LINE2.SIP PRINT FILE: C:\DATA\LIVING~1\LINE2\

TITLE: Summit Creek - Line 2 - Mitch Bertrand

PROGRAM CONTROL DATA

				Printer	Plot	Scales	Datum	Plane	Control	Po
				Elev	Horiz	Time	P o i n t 1		P o i n	
Sprds	Exit	Layers	V-Over	m/col	m/row	ms/col	Elev	X-Loc	Elev	X
1	6	2	0	0.0	0.0	0.0	0.0	0.0	0.0	

SHOTPOINT AND GEOPHONE INPUT DATA for LINE2.SIP

Spread A, 3 Shotpoints, 24 Geophones, X-Shift = 0.0, X-True = 0, Units: Meters

SP	Elev	X-Loc	Y-Loc	Depth	UpHole T	Fudge T	End SP
A	110.0	-80.0	0.0	0.0	0.0	0.0	1
B	100.0	-10.0	5.0	0.0	0.0	0.0	0
C	102.0	45.0	0.0	0.0	0.0	0.0	2

Arrival Times + Fudge T and Layers represented

Geo	Elev	X-Loc	Y-Loc	SP A ---T---	L	SP B ---T---	L	SP C ---T---	L
1	107.0	-75.0	0.0	8.625	1	84.370	2	112.200	2
2	102.0	-70.0	0.0	14.120	1	84.500	2	111.600	2
3	101.0	-65.0	0.0	18.620	1	82.250	2	114.100	2
4	100.0	-60.0	0.0	32.000	1	90.250	2	115.700	2
5	100.0	-55.0	0.0	44.500	1	92.620	2	113.500	2
6	100.0	-50.0	0.0	53.500	1	99.750	0	109.800	2
7	100.0	-45.0	0.0	65.000	1	101.000	0	105.700	2
8	100.0	-40.0	0.0	72.370	2	91.120	2	105.300	2
9	100.0	-35.0	0.0	75.750	2	72.250	1	104.300	2
10	100.0	-30.0	0.0	79.500	2	54.870	1	104.200	2
11	100.0	-25.0	0.0	82.750	2	38.620	1	103.500	2
12	100.0	-20.0	0.0	83.750	2	25.120	1	100.200	2
13	100.0	-15.0	0.0	85.750	2	9.375	1	97.000	2
14	100.0	-10.0	0.0	86.870	2	8.125	1	97.000	2
15	100.0	-5.0	0.0	87.870	2	18.620	1	100.100	2
16	100.0	0.0	0.0	89.620	2	31.370	1	100.700	2
17	100.0	5.0	0.0	90.250	2	43.500	1	99.620	2
18	100.0	10.0	0.0	92.370	2	57.870	1	93.000	1
19	100.0	15.0	0.0	92.870	2	73.370	1	74.870	1
20	100.0	20.0	0.0	93.870	2	85.120	1	68.500	1
21	100.0	25.0	0.0	93.870	2	92.370	2	52.750	1
22	100.8	30.0	0.0	92.620	2	96.750	2	36.000	1
23	101.0	35.0	0.0	87.620	2	97.000	2	10.000	1
24	102.0	40.0	0.0	82.120	2	93.120	2	3.750	1

Layer 1 Velocity from direct arrivals

Spread A	SP	Geo	DD	V	Avg V
	A	1	5.0	580	
	A	2	8.9	633	

A	3	12.7	680	
A	4	17.0	533	
A	5	21.3	478	
A	6	25.8	482	
A	7	30.5	469	
				551
B	9	30.6	424	
B	10	25.7	468	
B	11	20.8	539	
B	12	16.0	637	
B	13	11.4	1212	
B	14	7.2	888	
B	15	5.0	269	
B	16	6.9	221	
B	17	11.0	253	
B	18	15.6	270	
B	19	20.4	278	
B	20	25.3	297	
				480
C	18	34.9	375	
C	19	29.9	399	
C	20	24.9	364	
C	21	19.9	378	
C	22	14.9	415	
C	23	9.9	995	
C	24	5.0	1333	
				608

Wtd Avg Velocity computed for Layer 1 = 533

Layer 2 Velocity computed by regression of datum-corrected arrivals

Spread A

V	Ti	Geos	<-SP->	Geos	Ti	V	Avg V	Avg Ti	Pts
			A	8 24	60.1	7307	7307	60.1	17
1837	117.4	1 8	B	21 24	101.6	4836	2443	109.5	10
5458	87.3	1 17	C				5458	87.3	17
						Avg =	4615	for	44 Pts

Layer 2 Velocity computed by Hobson-Overton method

Spread A

SPs	Geos	V	Avg TdSP	Std Err Overall	4 Highest Std Err at geophones Err	Geo	Err	Geo	Err	Geo	Err	Geo
A C	8 17	3772	-16.4	2.867	5.195	13	3.682	14	-3.468	17	-3.394	8
	Avg =	3772	for 10 Pts									

Wtd Avg Velocity computed for Layer 2 = 4352

Arrival times Td corrected to datum. (Datum Elev = 100.322 - 0.011x) for LINE2.

Spread A	SP A	SP B	SP C
Datum Elev	101.2	100.4	99.9

Geo	.	X-Loc	Cor T	-16.5	0.8	-4.0
---	.	-----	-----	--Td--	--Td--	--Td--
1	101.2	-75.0	-10.9	-18.8	74.2	97.3
2	101.2	-75.0	-1.6	-3.9	83.8	106.1
3	101.1	-70.1	0.2	2.4	83.3	110.3
4	101.1	-65.2	2.0	17.5	93.0	113.7
5	101.0	-60.2	1.9	29.9	95.3	111.4
6	100.9	-55.2	1.8	38.8	102.3	107.6
7	100.9	-50.2	1.7	50.2	103.5	103.4
8	100.8	-45.2	1.6	57.5	93.5	102.9
9	100.8	-40.2	1.5	60.7	74.5	101.8
10	100.7	-35.2	1.3	64.4	57.0	101.6
11	100.7	-30.2	1.2	67.5	40.7	100.8
12	100.6	-25.2	1.1	68.4	27.1	97.4
13	100.5	-20.2	1.0	70.3	11.2	94.0
14	100.5	-15.2	0.9	71.3	9.9	93.9
15	100.4	-10.2	0.8	72.2	20.3	96.9
16	100.4	-5.2	0.7	73.9	32.9	97.4
17	100.3	-0.2	0.6	74.4	44.9	96.2
18	100.3	4.8	0.5	76.4	59.2	89.5
19	100.2	9.8	0.4	76.8	74.6	71.3
20	100.2	14.8	0.3	77.7	86.2	64.8
21	100.1	19.8	0.2	77.6	93.4	49.0
22	100.0	24.7	-1.4	74.7	96.1	30.6
23	100.0	29.7	-1.9	69.2	95.9	4.1
24	99.9	34.6	-3.9	61.8	90.1	-4.1

Arrival times Tc corrected to top of Layer 2 and Elev of top of Layer 2 for LIN

Spread A				SP A	SP B	SP C
	Elev			86.1	80.4	88.1
Geo	.	X-Loc	Cor T	44.7	36.7	26.0
---	.	-----	-----	--Tc--	--Tc--	--Tc--
1	85.9	-75.0	39.5	0.0	8.2	46.7
2	85.9	-75.0	39.5	0.0	8.3	46.1
3	85.7	-70.1	28.7	0.0	16.9	59.4
4	84.1	-65.2	29.9	0.0	23.7	59.8
5	84.2	-60.2	29.7	0.0	26.3	57.8
6	84.3	-55.2	29.5	0.0	0.0	54.3
7	84.4	-50.2	29.3	0.0	0.0	50.4
8	84.5	-45.2	29.1	-1.5	25.4	50.2
9	84.2	-40.2	29.6	1.4	0.0	48.6
10	83.4	-35.2	31.2	3.6	0.0	47.0
11	83.2	-30.2	31.6	6.5	0.0	45.9
12	83.0	-25.2	31.9	7.1	0.0	42.2
13	81.9	-20.2	33.9	7.2	0.0	37.1
14	79.9	-15.2	37.7	4.4	0.0	33.2
15	80.4	-10.2	36.7	6.4	0.0	37.4
16	81.0	-5.2	35.7	9.2	0.0	39.0
17	82.1	-0.2	33.6	11.9	0.0	39.9
18	84.3	4.8	29.5	18.1	0.0	0.0
19	85.4	9.8	27.4	20.8	0.0	0.0
20	84.8	14.8	28.4	20.7	0.0	0.0
21	85.3	19.8	28.3	20.8	27.4	0.0
22	85.7	24.7	28.2	19.7	31.9	0.0
23	86.9	29.7	26.4	16.5	33.9	0.0

```
 24    87.4       34.6   27.3      10.1      29.2       0.0

LINE2.SIP
Summit Creek - Line 2 - Mitch Bertrand

 S                           Time-Distance Plot  --  Raw data with no correctio
 p  G
 r  e  S
 e  o  P                                T i m e   ( m i l l i   s e c o n d s )
 a
 d
         0        15        30        45        60        75        90        10
         +---------+---------+---------+---------+---------+---------+---------
         -
 A     A +         +         +         +         +         +         +
         -   :
 A  1    +        1                                              2
 A  2    +           :                                          :
 A  3    +           1                                          2
         -                  :                                       :
 A  4    +                    1                                      2
         -                           :                                :
 A  5    +                             1                               2
         -                                 :                              :
 A  6    +                                   1                              0
         -                                        :                         :
 A  7    +                                          1                       0
         -                                              :              :
 A  8    +                                               2            2
         -                                                 ::
 A  9    +                                               1  2
         -                                       :           :                :
 A 10    +                                    1               2               2
         -                            :                         :             :
 A 11    +                         1                            2             2
         -                  :                                    :          :
 A 12    +                1                                      2          2
         -        :                                               :       :
 A 13    +     1                                                  2       2
         -     :                                                   :      :
 A 14    +    1                                                    2      2
         -          :                                              :       :
 A 15  B +           1                                              2       2
         -              :                                           :       .
 A 16    +                    1                                      2      2
         -                          :                                :      :
 A 17    +                            1                              2     2
         -                                   :                        : :
 A 18    +                                      1                      #
         -                                             :      :        :
 A 19    +                                                11           2
         -                                              :       :      :
 A 20    +                                             1          1     2
         -                                     :                     :  :
 A 21    +                                  1                          22
 A 22    +                       1                                     2  2
         -                   :                                        :   :
 A 23    +      1                                                  2      2
         -     :                                                   :     :
```

```
A 24     +  1                                                                   2       2
         - :
A      C +:       +         +         +         +         +         +
         -
         -
         +---------+---------+---------+---------+---------+---------+--------
         0        15        30        45        60        75        90        10
```

```
PRINTER PLOT SCALES
---------------------
Time:    1.50 ms/col
Dist:    2.50  m/row
```

Summit Creek - Line 2 - Mitch Bertrand

Spread A   Points of emergence of refracted rays below target geophones for

Geo		SP A	L	SP B	L	SP C	L
1	X-Loc	---	1	-70.6	2	-70.6	2
	Elev	---		86.2		86.2	?
2	X-Loc	---	1	-71.7	2	-71.7	2
	Elev	---		86.1		86.1	?
3	X-Loc	---	1	-72.3	2	-72.3	2
	Elev	---		86.1		86.1	?
4	X-Loc	---	1	-69.1	2	-69.1	2
	Elev	---		85.7		85.7	?
5	X-Loc	---	1	-65.9	2	-65.9	2
	Elev	---		84.0		84.0	?
6	X-Loc	---	1	---	0	-47.1	2
	Elev	---		---		83.0	?
7	X-Loc	---	1	---	0	-44.8	2
	Elev	---		---		84.6	?
8	X-Loc	-44.5	2	-43.7	2	-43.7	2
	Elev	84.5		84.5		84.5	?
9	X-Loc	-42.6	2	---	1	-40.6	2
	Elev	84.4		---		84.4	?
10	X-Loc	-39.6	2	---	1	-34.4	2
	Elev	84.3		---		83.2	?
11	X-Loc	-33.6	2	---	1	-27.4	2
	Elev	83.1		---		83.0	?
12	X-Loc	-26.6	2	---	1	-24.4	2
	Elev	83.0		---		83.0	?
13	X-Loc	-23.7	2	---	1	-22.6	2
	Elev	82.9		---		82.8	?
14	X-Loc	-22.4	2	---	1	-14.2	2
	Elev	82.8		---		79.4	
15	X-Loc	-14.3	2	---	1	-2.8	2
	Elev	79.5		---		81.4	?
16	X-Loc	-2.8	2	---	1	3.3	2
	Elev	81.4		---		83.8	?
17	X-Loc	3.4	2	---	1	4.7	2
	Elev	83.8		---		84.4	?
18	X-Loc	5.3	2	---	1	---	1
	Elev	84.5		---		---	
19	X-Loc	8.8	2	---	1	---	1
	Elev	85.4		---		---	

20	X-Loc	11.1 2	--- 1	--- 1
	Elev	85.4	---	---
21	X-Loc	13.9 2	13.9 2	--- 1
	Elev	84.7	84.7	---
22	X-Loc	26.0 2	26.0 2	--- 1
	Elev	85.9	85.9 ?	---
23	X-Loc	31.6 2	31.6 2	--- 1
	Elev	87.5	87.5 ?	---
24	X-Loc	31.9 2	31.9 2	--- 1
	Elev	87.5	87.5	---

Spread A   Points of entry of refracted rays below source shotpoints:

L=2	Right	X-Loc	-76.3	2.0	---
		Elev	85.9	82.6	---
L=2	Left	X-Loc	---	-14.1	39.7
		Elev	---	79.4	87.9

Summit Creek - Line 2 - Mitch Bertrand

Spread A   Depth and Elev of layers directly beneath SPs and Geos for LINE2.

	Surface		Layer 2	
SP	X-Loc	Elev	Depth	Elev
A	-79.0	110.0	23.9	86.1
B	-10.0	100.0	19.6	80.4
C	39.6	102.0	13.9	88.1
Geo				
1	-75.0	107.0	21.1	85.9
2	-75.0	102.0	16.1	85.9
3	-70.1	101.0	15.3	85.7
4	-65.2	100.0	15.9	84.1
5	-60.2	100.0	15.8	84.2
6	-55.2	100.0	15.7	84.3
7	-50.2	100.0	15.6	84.4
8	-45.2	100.0	15.5	84.5
9	-40.2	100.0	15.8	84.2
10	-35.2	100.0	16.6	83.4
11	-30.2	100.0	16.8	83.2
12	-25.2	100.0	17.0	83.0
13	-20.2	100.0	18.1	81.9
14	-15.2	100.0	20.1	79.9
15	-10.2	100.0	19.6	80.4
16	-5.2	100.0	19.0	81.0
17	-0.2	100.0	17.9	82.1
18	4.8	100.0	15.7	84.3
19	9.8	100.0	14.6	85.4
20	14.8	100.0	15.2	84.8
21	19.8	100.0	14.7	85.3
22	24.7	100.8	15.1	85.7
23	29.7	101.0	14.1	86.9
24	34.6	102.0	14.6	87.4

Velocities used, Spread A

	Layer 1	Layer 2
Vertical	533	
Horizontal		4352

LINE2.SIP
Summit Creek - Line 2 - Mitch Bertrand

```
        D
        i
        s                                   E l e v a t i o n   ( m e t e r s
        t

           72        76        80        84        88        92        96
            +---------+---------+---------+---------+---------+---------+------
            -                                       :
    -79.0   +         +         +         +    :    +         +         +
            -                                  s
    -75.0   +                                  :
            -                                 :##
    -70.1   +                                 #
            -                             #:
    -65.2   +                             :
            -                             :
    -60.2   +                             :
            -                              :
    -55.2   +                              :
            -                              :
    -50.2   +                              :
            -                           ?  :
    -45.2   +                              #
            -                              #
    -40.2   +                              A
            -                            :
    -35.2   +                           #
            -                           :
    -30.2   +                           :
            -                          #:
    -25.2   +                          #
            -                         :#
    -20.2   +                        :
            -                    :
    -15.2   +                  s:
            -                    :
    -10.0   +         +         +:        +         +         +         +
            -                     :
     -5.2   +                     :#
            -                       :
     -0.2   +                        : s
            -                            # ?
      4.8   +                              A
            -                                :A
      9.8   +                                 A
            -                               #
     14.8   +                               :
            -                                :
     19.8   +                                :
```

```
24.7   +                                 :
       -                                  #
29.7   +                                    :
       -                                     :#
34.6   +                                      :
       -                                      :
39.6   +         +         +         +         s         +         +
       -                                        :
       -                                        :
       +---------+---------+---------+---------+---------+---------+------
       72        76        80        84        88        92        96

   D
   i
   s                                 E l e v a t i o n   ( m e t e r s
   t
```

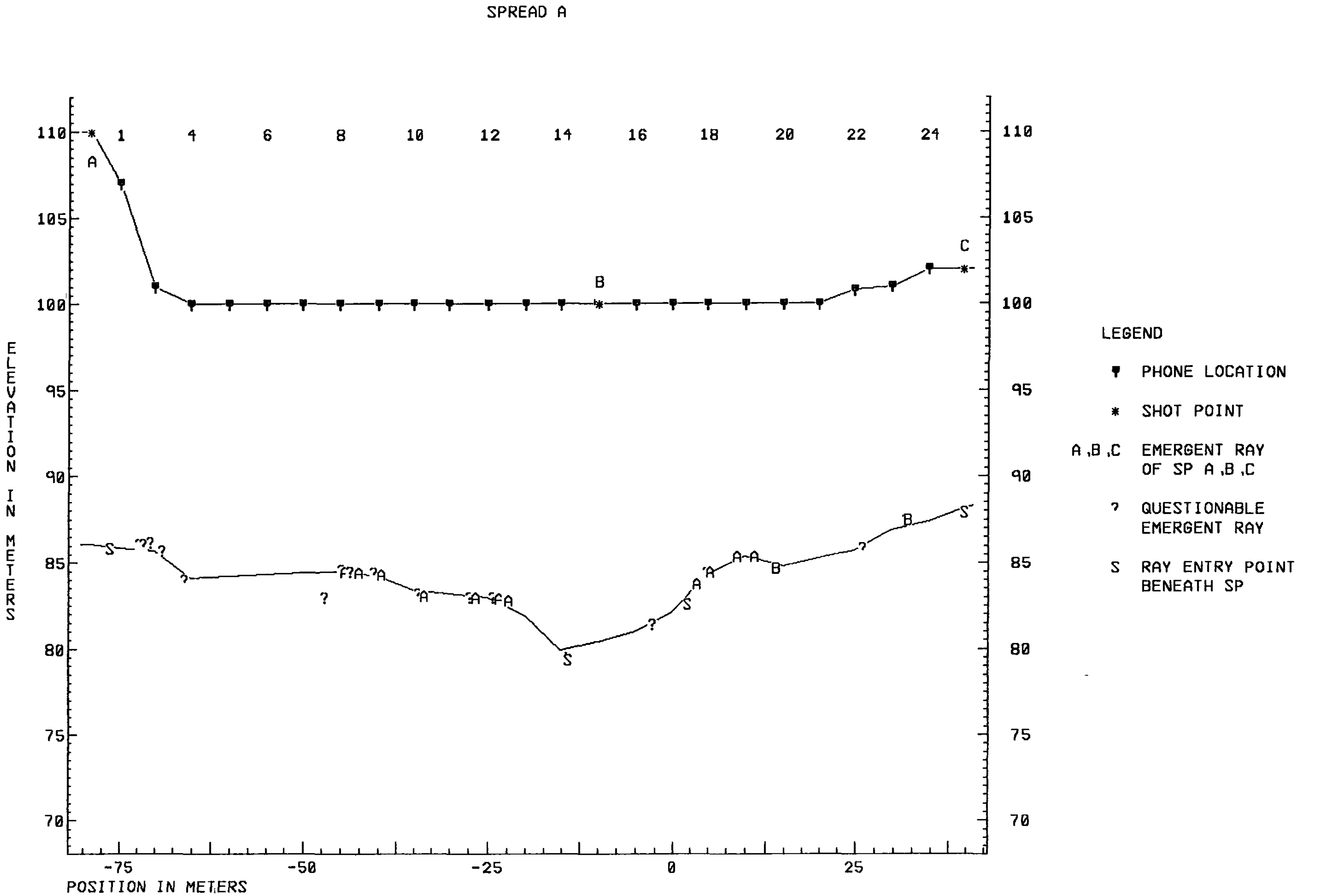
PRINTER PLOT SCALES		
Elev:	0.40	m/col
Dist:	2.50	m/row

L E G E N D

>	Geophone Location
*	Shotpoint Location
A,B,C	Emergent Ray; Source SP A,B,C
?	Questionable Emergent Ray
s	Ray Entrypoint Beneath SP
#	More Than One Symbol to Plot Here
+	Grid Mark

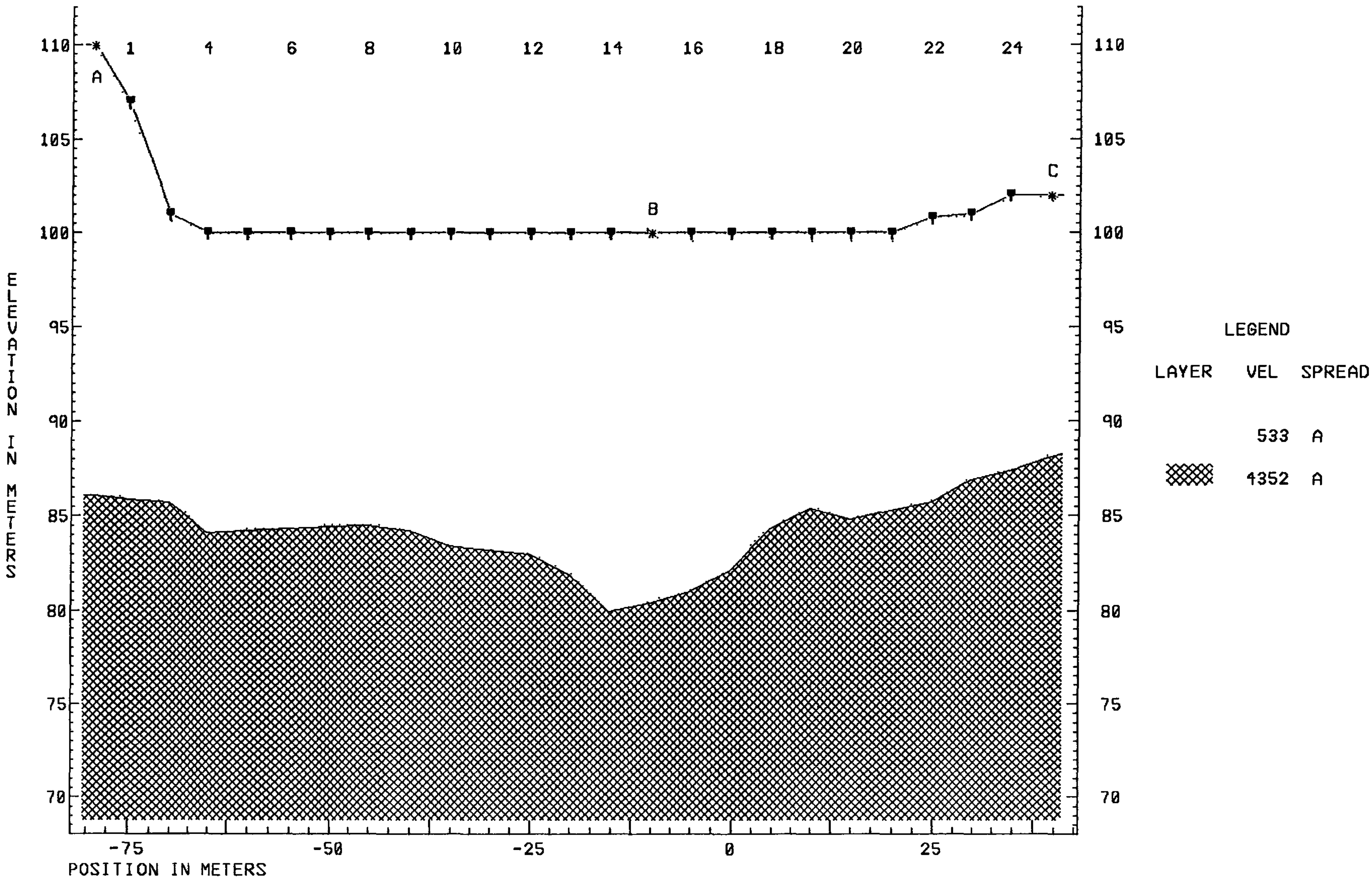
```
@@PJL USTATUS JOB = ON
@PJL USTATUS PAGE = OFF
@PJL USTATUS DEVICE = ON
@PJL USTATUS TIMED = 0
```

FILE LINE2 SIP
SUMMIT CREEK - LINE 2 - MITCH BERTRAND



FILE   LINE2.SIP
SUMMIT CREEK - LINE 2 - MITCH BERTRAND

SPREAD A



LINE 3 INVERSION

SIPT2 V-4.1 --- SEISMIC REFRACTION INTERPRETATION PROGR

DATA FILE: LINE3.SIP PRINT FILE: C:\DATA\LIVING~1\LINE3\

TITLE: Line 3 - Summit Creek - Mitch Bertrand

PROGRAM CONTROL DATA				Printer	Plot	Scales	Datum	Plane	Control	Po
				Elev	Horiz	Time	Point 1		Poin	
Sprds	Exit	Layers	V-Over	m/col	m/row	ms/col	Elev	X-Loc	Elev	X
1	6	2	0	0.0	0.0	0.0	0.0	0.0	0.0	

SHOTPOINT AND GEOPHONE INPUT DATA for LINE3.SIP

Spread A, 3 Shotpoints, 17 Geophones, X-Shift = 0.0, X-True = 0, Units: Meters

SP	Elev	X-Loc	Y-Loc	Depth	UpHole T	Fudge T	End SP
A	111.0	-20.0	0.0	0.0	0.0	0.0	1
B	100.0	40.0	5.0	0.0	0.0	0.0	0
C	104.0	80.0	12.0	0.0	0.0	0.0	2

Arrival Times + Fudge T and Layers represented

Geo	Elev	X-Loc	Y-Loc	SP A T	SP A L	SP B T	SP B L	SP C T	SP C L
1	101.0	0.0	0.0	10.87	1	71.870	2	61.00	2
2	100.5	5.0	0.0	22.75	1	73.120	2	60.12	2
3	100.0	10.0	0.0	35.50	1	72.120	2	59.12	2
4	100.0	15.0	0.0	43.62	1	60.370	1	57.57	2
5	100.0	20.0	0.0	58.87	1	52.870	1	56.87	2
6	100.0	25.0	0.0	70.37	2	31.870	1	55.87	2
7	100.0	30.0	0.0	74.87	2	24.620	1	55.32	2
8	100.0	35.0	0.0	76.12	2	14.250	1	54.25	2
9	100.0	40.0	0.0	74.87	2	5.625	1	53.62	2
10	100.0	45.0	0.0	73.62	2	6.000	1	52.00	2
11	100.0	50.0	0.0	69.00	2	19.750	1	51.75	2
12	100.0	55.0	0.0	66.62	2	34.120	1	50.12	2
13	100.0	60.0	0.0	65.37	2	41.120	1	47.52	2
14	100.0	65.0	0.0	65.25	2	47.120	1	45.12	2
15	101.0	70.0	0.0	66.25	2	60.250	1	40.25	1
16	102.0	75.0	0.0	65.75	2	76.620	1	28.62	1
17	104.0	80.0	0.0	68.62	2	84.870	1	19.87	1

Layer 1 Velocity from direct arrivals

Spread A	SP	Geo	DD	V	Avg V
	A	1	20.0	1840	
	A	2	24.6	1083	
	A	3	29.4	828	
	A	4	34.1	782	
	A	5	38.9	660	
					1039
	B	4	25.5	423	
	B	5	20.7	391	
	B	6	15.9	498	

B	7	11.2	456	
B	8	7.1	499	
B	9	5.0	889	
B	10	7.0	1173	
B	11	11.1	564	
B	12	15.8	462	
B	13	20.6	500	
B	14	25.4	540	
B	15	30.3	503	
B	16	35.2	459	
B	17	39.8	470	
				559
C	15	15.6	387	
C	16	13.0	454	
C	17	12.0	604	
				482

Wtd Avg Velocity computed for Layer 1 = 657

Layer 2 Velocity computed by regression of datum-corrected arrivals

Spread A

V	Ti	Geos	<-SP->	Geos	Ti	V		Avg V	Avg Ti	Pts
			A	6 17	67.9	4523		4523	67.9	12
4760	79.5	1 3	B					4760	79.5	3
5402	41.5	1 14	C					5402	41.5	14
							Avg =	4936	for	29 Pts

Layer 2 Velocity computed by Hobson-Overton method

Not enough points.

Wtd Avg Velocity computed for Layer 2 = 4936

Arrival times Td corrected to datum. (Datum Elev = 99.712 + 0.020x) for LINE3.S

Spread A

				SP A	SP B	SP C
Datum Elev	. . . .			99.4	100.5	101.3
Geo		X-Loc	Cor T	-17.7	0.8	-4.1
---		-----	-----	--Td--	--Td--	--Td--
1	99.7	0.0	-2.0	-8.8	70.7	54.9
2	99.8	5.0	-1.0	4.0	72.8	54.9
3	99.9	9.9	-0.1	17.7	72.7	54.8
4	100.0	14.9	0.0	25.9	61.1	53.4
5	100.1	19.9	0.2	41.3	53.8	52.9
6	100.2	24.9	0.3	53.0	32.9	52.0
7	100.3	29.9	0.5	57.6	25.8	51.6
8	100.4	34.9	0.6	59.0	15.6	50.7
9	100.5	39.9	0.8	57.9	7.2	50.2
10	100.6	44.9	0.9	56.8	7.7	48.8
11	100.7	49.9	1.1	52.4	21.6	48.7
12	100.8	54.9	1.2	50.1	36.1	47.2
13	100.9	59.9	1.4	49.0	43.2	44.7
14	101.0	64.9	1.5	49.1	49.4	42.5

15	101.1	69.8	0.1	48.7	61.2	36.3
16	101.2	74.7	-1.2	46.8	76.1	23.2
17	101.3	79.3	-4.1	46.8	81.5	11.6

Arrival times Tc corrected to top of Layer 2 and Elev of top of Layer 2 for LIN

Spread A				SP A	SP B	SP C
	Elev			83.4	89.2	96.2
Geo	.	X-Loc	Cor T	41.9	16.4	11.8
---	.	-----	-----	--Tc--	--Tc--	--Tc--
1	85.5	0.0	23.6	0.0	31.8	25.6
2	86.0	5.0	22.1	0.0	34.6	26.2
3	86.2	9.9	21.4	0.0	34.3	25.9
4	86.4	14.9	20.8	0.0	0.0	25.0
5	88.0	19.9	18.2	0.0	0.0	26.9
6	89.3	24.9	16.2	12.2	0.0	27.9
7	89.1	29.9	16.6	16.3	0.0	26.9
8	88.6	34.9	17.3	16.9	0.0	25.1
9	89.2	39.9	16.4	16.5	0.0	25.4
10	89.8	44.9	15.5	16.2	0.0	24.7
11	92.3	49.9	11.7	15.3	0.0	28.2
12	93.4	54.9	10.1	14.6	0.0	28.2
13	93.7	59.9	9.5	13.9	0.0	26.2
14	94.3	64.9	8.6	14.7	0.0	24.7
15	96.0	69.8	7.6	16.8	0.0	0.0
16	96.2	74.7	8.9	15.0	0.0	0.0
17	96.2	79.3	11.8	14.9	0.0	0.0

LINE3.SIP
Line 3 - Summit Creek - Mitch Bertrand

```
  S                           Time-Distance Plot  --  Raw data with no correctio
  p  G
  r  e  S
  e  o  P                               T i m e   ( m i l l i   s e c o n d s )
  a
  d
          0        10        20        30        40        50        60        7
          +---------+---------+---------+---------+---------+---------+---------
          -        :
  A  1    +          1                                                 2
          -                :                                           :
  A  2    +                      1                                    2
          -                            :                              :
  A  3    +                                   1                      2
          -                                       :                 :       :
  A  4    +                                           1             2 1
          -                                                  :     :
  A  5    +                                                    1   2 1
          -                                         :             :        :
  A  6    +                               1                       2
          -                           :                           :
  A  7    +                         1                            2
          -                  :                                   :
  A  8    +             1                                       2
          -         :                                           :
```

```
A  9  B +     1                                               2
        -  :                                                 :
A 10    +     1                                             2
        -            :                                      :
A 11    +                   1                               2                2
        -                          :                       :                :
A 12    +                                 1               2                2
        -                                     :          :                :
A 13    +                                        1      2                2
        -                                           : :                  :
A 14    +                                            2 1                 2
        -                                          :          :           :
A 15    +                                       1                   1     2
        -                                 :                               :  :
A 16    +                            1                                    2
        -                      :                                           :
A 17  C +                   1                                                2
        -
        +---------+---------+---------+---------+---------+---------+--------
        0        10        20        30        40        50        60        7
```

PRINTER PLOT SCALES

Time: 1.00 ms/col
Dist: 2.50 m/row

Line 3 - Summit Creek - Mitch Bertrand

Spread A   Points of emergence of refracted rays below target geophones for

Geo		SP A	L	SP B	L	SP C	L
1	X-Loc	---	1	2.7	2	2.7	2
	Elev	---		86.0	?	86.0	
2	X-Loc	---	1	6.6	2	6.6	2
	Elev	---		85.9	?	85.9	
3	X-Loc	---	1	13.0	2	13.0	2
	Elev	---		85.7	?	85.7	
4	X-Loc	---	1	---	1	21.1	2
	Elev	---		---		88.4	
5	X-Loc	---	1	---	1	23.6	2
	Elev	---		---		89.2	
6	X-Loc	25.5	2	---	1	25.3	2
	Elev	89.6		---		89.6	
7	X-Loc	27.4	2	---	1	29.9	2
	Elev	89.4		---		89.0	
8	X-Loc	30.5	2	---	1	33.0	2
	Elev	89.0		---		88.4	
9	X-Loc	43.7	2	---	1	46.2	2
	Elev	89.0		---		90.7	
10	X-Loc	47.8	2	---	1	48.9	2
	Elev	91.5		---		92.1	?
11	X-Loc	50.2	2	---	1	52.1	2
	Elev	92.6		---		92.9	?
12	X-Loc	54.8	2	---	1	56.2	2
	Elev	93.4		---		93.5	?
13	X-Loc	59.5	2	---	1	61.6	2

	Elev	93.7	---	93.9 ?
14	X-Loc	64.9 2	--- 1	67.5 2
	Elev	94.3	---	95.3 ?
15	X-Loc	70.3 2	--- 1	--- 1
	Elev	96.2	---	---
16	X-Loc	74.0 2	--- 1	--- 1
	Elev	96.2	---	---
17	X-Loc	78.3 2	--- 1	--- 1
	Elev	96.2	---	---

Spread A Points of entry of refracted rays below source shotpoints:

L=2	Right	X-Loc	-11.0	---	---
		Elev	84.8	---	---
L=2	Left	X-Loc	---	43.8	80.1
		Elev	---	89.0	96.3

Line 3 - Summit Creek - Mitch Bertrand

Spread A Depth and Elev of layers directly beneath SPs and Geos for LINE3.

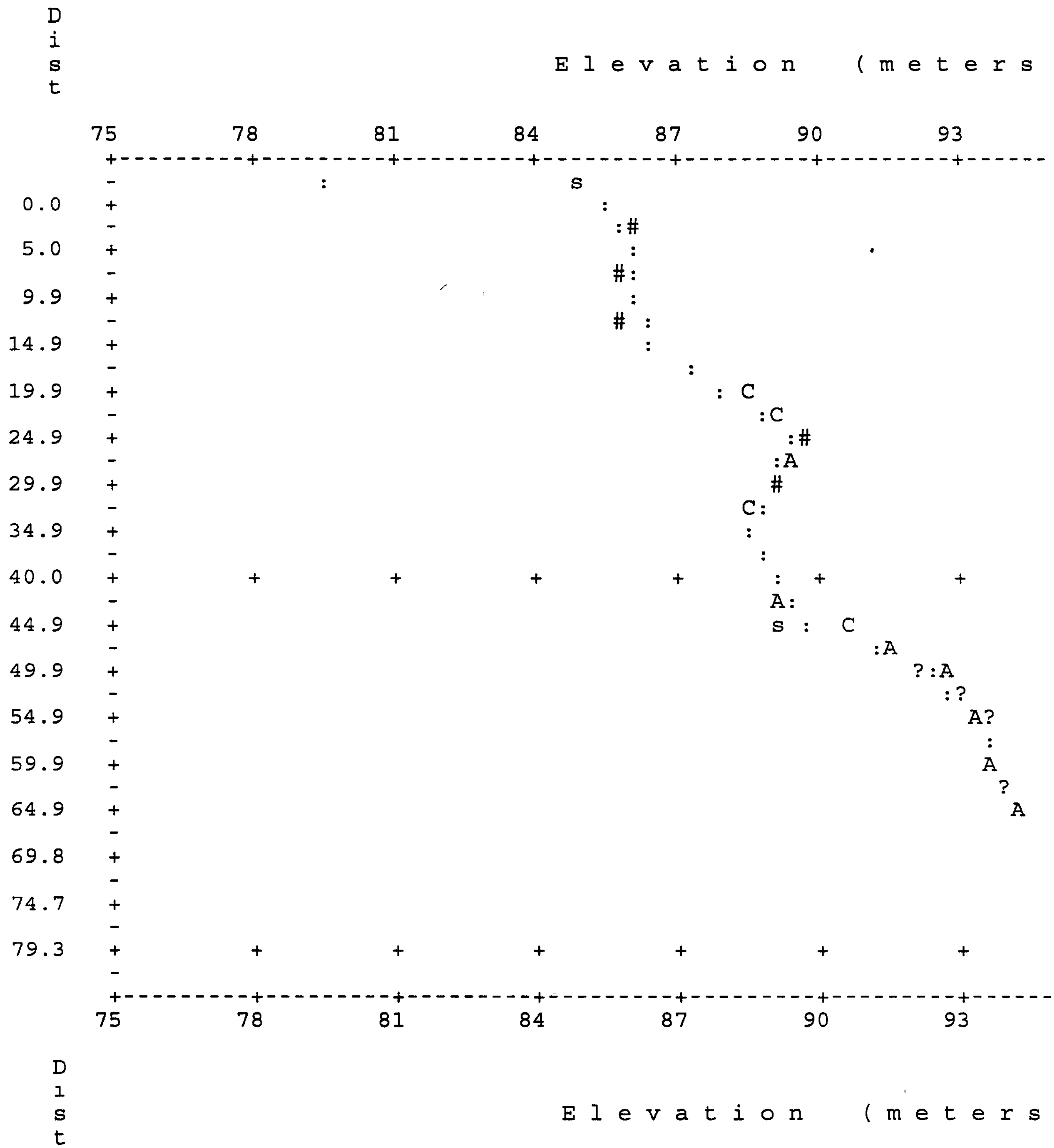
	Surface		Layer 2	
SP	X-Loc	Elev	Depth	Elev
A	-17.3	111.0	27.6	83.4
B	40.0	100.0	10.8	89.2
C	79.3	104.0	7.8	96.2
Geo				
1	0.0	101.0	15.5	85.5
2	5.0	100.5	14.5	86.0
3	9.9	100.0	13.8	86.2
4	14.9	100.0	13.6	86.4
5	19.9	100.0	12.0	88.0
6	24.9	100.0	10.7	89.3
7	29.9	100.0	10.9	89.1
8	34.9	100.0	11.4	88.6
9	39.9	100.0	10.8	89.2
10	44.9	100.0	10.2	89.8
11	49.9	100.0	7.7	92.3
12	54.9	100.0	6.6	93.4
13	59.9	100.0	6.3	93.7
14	64.9	100.0	5.7	94.3
15	69.8	101.0	5.0	96.0
16	74.7	102.0	5.8	96.2
17	79.3	104.0	7.8	96.2

LINE3.SIP

Velocities used, Spread A

	Layer 1	Layer 2
Vertical	657	
Horizontal		4936

LINE3.SIP
Line 3 - Summit Creek - Mitch Bertrand

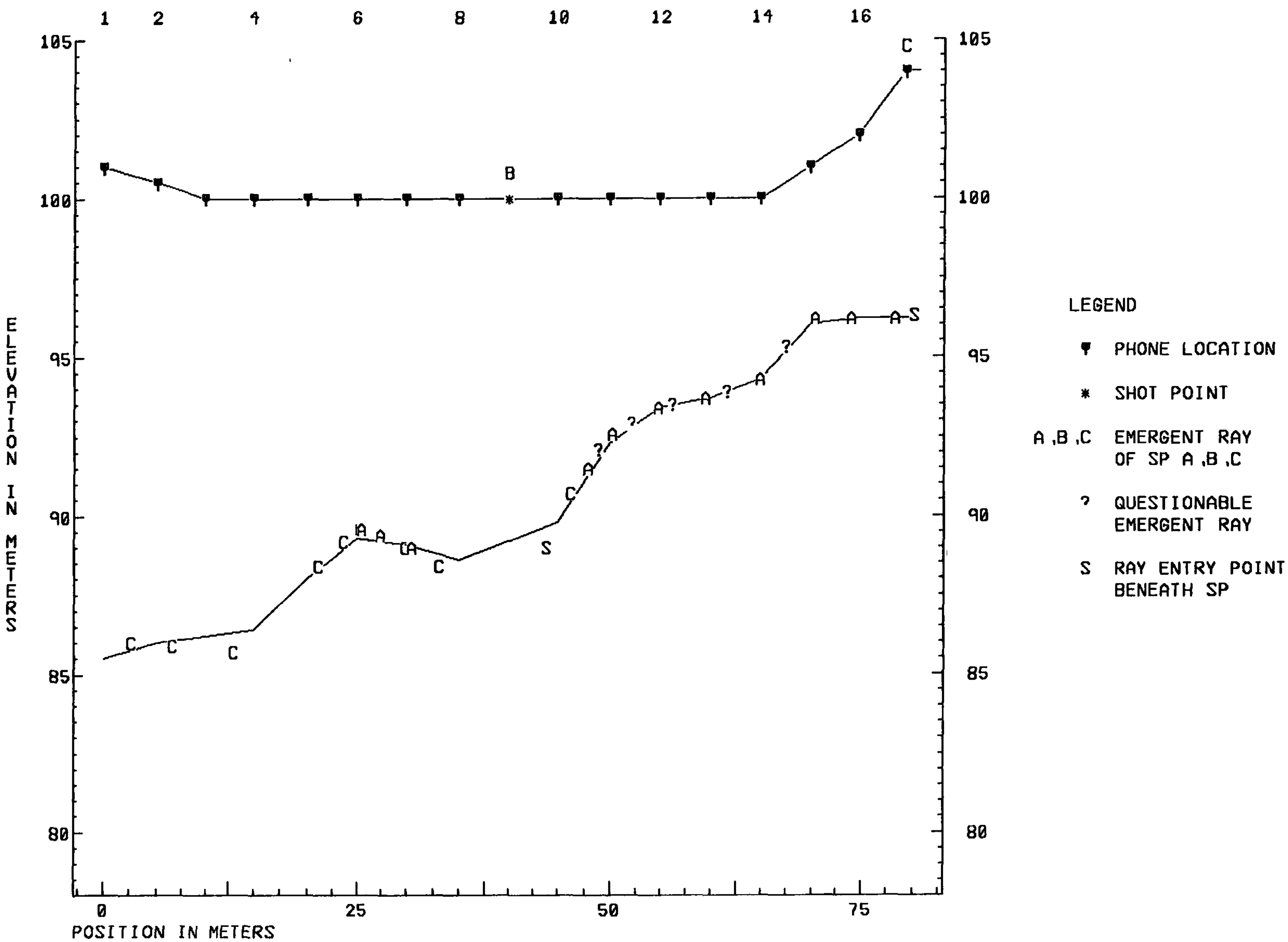


PRINTER PLOT SCALES		
Elev:	0.30	m/col
Dist:	2.50	m/row

LEGEND	
>	Geophone Location
*	Shotpoint Location
A,B,C	Emergent Ray; Source SP A,B,C
?	Questionable Emergent Ray

s	Ray Entrypoint Beneath SP
#	More Than One Symbol to Plot Here
+	Grid Mark

FILE LINE3 SIP
LINE 3 - SUMMIT CREEK - MITCH BERTRAND
SPREAD A



FILE LINE3 SIP
LINE 3 - SUMMIT CREEK - MITCH BERTRAND
SPREAD A