Grant Identification Number 94/95M-39 - Antler Creek.

24604

Explore B.C.,Accelerated Mine Exploration Program Report (1994)

Placer Gold Exploration at Antler Creek, Cariboo Mining District, Barkerville Area.

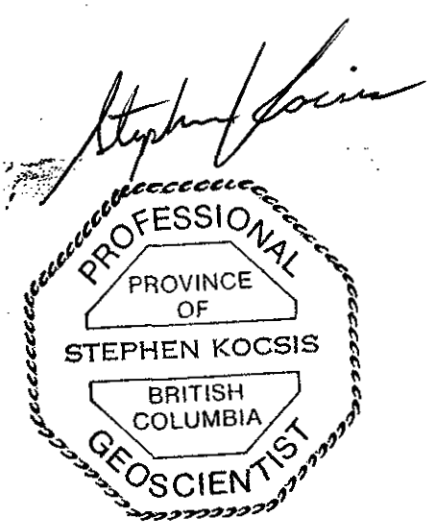
N.T.S. Map 93A14W, Latitude 52° 58′, Longitude 121° 24′

Author:

Stephen Kocsis, P.Geo.
301-776 Vaughan Street,
Quesnel, B.C.,
V2J 2T5

Phone: 1-604-992-9570

November 24, 1994



Index

Illustrations

Appendices

Introduction

This report is the summary of my Explore B.C. Accelerated Mine Exploration Program for the 1994 season. I investigated the potential for placer gold reserves on the Antler Creek Placer Mining Property - located in near Barkerville in the Cariboo Mining District. The work consisted of 346 seismic refraction survey stations, surficial geological surveying, and bulk sample tests involving 48 test pits. The program initiated on the month of June and was completed in October.

The work took place between two historical parts of Antler Creek. A large trench was cut and bulk sampled at the historical downstream location of Hazeltine Flats. Other exploration took place further upstream to the historical site of Old Antler Town and up to the confluence of Nugget Gulch. The work here consisted of a Seismic Refraction Survey and trenching.

An estimated 330,000 oz of placer gold was mined from shallow ground along a 2 km long section of Antler Creek during the gold rush of 1860 to 1862. The Property covers 1.8 km of this historically rich section. Bulk sampling has proven 9,158 g of gold reserves in shallow postglacial gravels along a small bench. Deep ground outlined by this years seismic work has potential for additional reserves in unworked gravels along the Property. The channel gravels remained unmined for two reasons; **1)** excessive flooding prevented the extraction of economic gravels from areas beneath the water table; and **2)** an average 5 m of overburden may have made hand mining of underlying auriferous gravels uneconomic. The unworked gravels may be successfully mined with the adaptation of modern open pit mining methods.

Project Location

The Exploration Program took place on my Property at Antler Creek. The Antler Creek area is part of the Cariboo Mining District and can be found on the northwest corner of map 93A14W (lat. 52° 58′ - long. 121° 24′). The exploration site is located about 13 km southeast of the historical site of Barkerville. The Property consists of the following 2 placer claims (figure 2):

Claim Name	Tenure Number	Expiry Date
Highgrade	307011	January 11, 1995
Bigtime	318158	June 16, 1995

Access

The Antler Creek Property can be reached by driving 5 km east along the Barkerville Highway (#26) from the community of Wells. From this point, drive 0.5 km north along the Bowron Lake Road and 12.8 km east along the 3100 Road. From here drive 3.5 km south along the Upper Antler Creek Road to reach the north limit of the property or the Initial Post for the Highgrade claim. Continue south for 2.5 km along the road to reach the southern portion of the property near Nugget Gulch. All roads are accessible by a 2-wheel drive pickup truck.

Prospecting Targets

The main target at Antler Creek is placer gold. In the area, placer gold is mostly hosted near or on top of bedrock in postglacial fluvial gravels. The auriferous gravels are covered by 1 to 5 m of barren fine-grained alluvium. The targets are benches or large workable areas located on the east and west sides of Antler Creek.

Regional Geology

The Cariboo Mining District covers a large portion of central British Columbia and lies within the northern extension of the Quesnel Highlands. The topography is a deeply dissected undulating plateau with mountains reaching 2100 m a.s.l. Regional bedrock consists of four geological terranes; part of the western margin of the Omineca Crystalline Belt.

The four tectonic and stratigraphic terranes consist of Proterozoic to Jurassic rocks and are separated by thrust and strike-slip faults. The rocks within each terrane formed by depositional processes in a marine environment. Each terrane eventually accreted to the western margin of the North America continent as the result of subducting intervening lithospheres. Rocks in the district vary, east to west, from continental shelf clastics and carbonates (Cariboo Terrane, C), through continental shelf and slope clastics, carbonates and volcaniclastics (Barkerville Terrane, B), and rift floor pillowed basalt and chert (Slide Mountain Terrane, SM), to island arc volcaniclastics and fine-grained clastics (Quesnel Terrane, Q) (Struik, 1988; figure 1).

Distances between each terrane have been shortened by Mesozoic and Tertiary faulting and stacking. The latter part of this period of faulting has shortened, translated and extended the stacked terranes. Most rocks show a chlorite grade of metamorphism.

Local Geology and Placer Gold Occurrences

In the Barkerville area lode gold is hosted by middle Paleozoic marbles and metabasalts of the Downey Succession. About 60% of the total placer gold produced (3 million ounces) from the Barkerville area is geographically associated with bedrock belonging to the Downey Succession. The Downey Succession is one of the carbonate-rich components of the Barkerville Terrane. The terrane consists of continental shelf and slope clastics, carbonates and volcaniclastics. Bedrock on the Property is dominated by green chloritic schist, grey marble, and dark grey phyllite.

Along Antler Creek, the Property covers part of a 2 km wide belt of Downey rocks. This belt extends 10 km southeast to upper Cunningham Creek where known gold/base metal occurrences were mined by the Cariboo Hudson Gold Mining Company. Lode gold was also mined from the Downey succession 13 km to the northwest, near Wells, at Cow Mountain and Island Mountain. About 1.2 million ounces was produced from the Wells mining camp. The gold was hosted in pyritic marbles and in epithermal quartz veins.

From young to old, the local surficial geology in the Barkerville area is characterized by three distinct sedimentological units; **1)** postglacial alluvium (<10,000 years before present); **2)** lodgement till and other glacial sediments that were deposited beneath the ~~mid~~ late Wisconsin ice sheet (10,000 to 30,000 y.b.p.); and **3)** preglacial alluvium (>30,000 y.b.p.). According to my studies, about 90% of the produced placer gold in the Cariboo District came from preglacial alluvium - predominantly buried coarse-grained fluvial gravels.

On the Antler Creek Property, preglacial gravels have been reworked during the ~~mid~~ late Wisconsin and postglacial periods. The mid Wisconsin till unit is missing throughout the Antler Creek valley. The nearest occurrence of the till unit is located 200 m up Nugget Gulch, at an elevation 300 feet higher than the present stream of Antler Creek. Two hypothesis argue the absence of the till unit; **1)** a high volume of meltwater has eroded the till unit along Antler Creek during the postglacial period; and **2)** prior to the progression of the mass ~~mid~~ late Wisconsin ice sheet, the valley was engulfed by a local piedmont-type glacier that originated at the head-waters of Antler Creek. This ice became stagnant and protected the valley from erosional and depositional processes of overriding ice during the peak of the ~~mid~~ Wisconsin period. In either case, old placers were reworked and enriched into shallow deposits by high volumes of meltwater during the postglacial period. The source for this volume of melt-waters may have involved the capture of the Swift River headwaters. A tributary called Sawflat Creek, located 2 km upstream from the worksite, forms a summit with the Swift River. The uppermost 5 km length of the Swift is relatively flat and may have flowed north with high volumes of melt-waters into Antler Creek during the early part of the postglacial.

Bulk Sample Tests at Hazeltine Flats

Sampling along the east bench at Hazeltine Flats involved 24 separate tests (see figures 2 and 3). Samples measuring between 1 and 50 m^3 were collected along portions of a large trench cut into the valley-side.

The material overlying bedrock on the east bench is comprised of 4 sedimentological units. Figure 4 illustrates the structure of the 4 units along a line striking parallel with the valley. **Unit 1** consists of 0.25 to 1 m of bedrock slide material - derived from a steep wall of bedrock located about 50 m up the valleyside. **Unit 2** is mostly fine to medium-grained sand with patches and beds of gravel - aggregate reaching cobble-size. **Unit 3** is made up of muddy gravels that resembles a clast-rich debris flow facies. **Unit 4** is a boulder-rich basal fluvial gravel with a clean, sandy matrix. Samples 1 to 21 were taken from unit 4 and samples 22 to 24 were from unit 3. Units 1 and 2 contain trace values of gold and are considered as overburden. Bedrock and pay-gravels were not reached in a deep crevice over site 21 (15 feet deep reached). The gold recovered and grades calculated from each sample-site is given below:

Test Pit	Sample Size m^3	Recovery g	Grade g/m^3
East Side of Antler Creek			
UNIT 4			
1	50	91.5	1.83
2	50	65.5	1.31
3	50	44.1	0.88
4	50	80.5	1.61
5	50	31.0	0.62
6	50	38.2	0.76
7	20	17.4	0.87
8	50	56.5	1.13
9	50	60.2	1.20
10	20	7.6	0.38
11	20	9.4	0.47
12	20	10.2	0.51
13	25	19.7	0.79
14	15	4.9	0.32
15	20	22.4	1.12
16	50	48.2	0.96
17	20	11.4	0.57
18	1	0.35	0.35
19	1	0.38	0.38
20	1	0.47	0.47
total/average	613	619.9	1.01

Test Pit	Sample Size m^3	Recovery g	Grade g/m^3
East Side of Antler Creek			
UNIT 3			
22	20	4.2	0.21
23	20	3.8	0.19
24	20	3.6	0.18
total/average	60	11.6	0.19
West Side of Antler Creek			
25	1	0.41	0.41
26	1	0.35	0.35
27	1	0.58	0.58
total/average	3	1.34	0.44

Samples 25 to 27 represents weathered bedrock - located beneath tailings over the main Hazeltine Workings on the west side of Antler Creek. This area was thoroughly worked by hand flume methods at an earlier period. The gold recovered in the tests comes from small crevices - unworkable earlier when the bedrock was unweathered and hard. Some of the gold may have been loss over flumes used by earlier operators.

Samples 28 to 31 were also taken from locations along the west side of Antler Creek - south of Hazeltine Flats. All of these test holes penetrated tailings or recent flood gravels. It was discovered that all of these test sites have been worked during the historical mining period. None of these samples were processed.

Discussion and Gold Reserves

Gold reserves along Hazeltine Flats is comprised of 3 auriferous zones. **Zone 1** consists of bedrock gravels (unit 4); located on the east side of Antler Creek. Unit 4 is the lower part of a fluvial bed that was deposited by a tributary flowing west into Antler Creek. The tributary was later buried by a debris flow made up of muddy gravels (unit 3), and by fine-grained alluvium (unit 2) that resulted from postglacial flooding along Antler Creek. The trench cut along the mouth of the tributary gives a 2-dimensional picture of auriferous gravels in unit 4. The average thickness of the unit is 1.4 m and the width is 70 m. Steep bedrock outcrops at two points about 40 m up the valley-side. The distance between the two outcrop points is 30 m. The separation between the outcrops is the estimated width of the tributary at this location. If the tributary extends 100 m further up the valley-side, then the total

area covered by unit 4, up to the trench-site, would be about 4,200 m^2. With an average thickness of 1.4 m, the total probable volume of auriferous gravels (average grade = 1.01 g/m^3) would equal 5,880 m^3 with a probable reserve of 5,939 g.

Pit numbers 18, 19 and 20 has identified a 1 m thick layer of gravel that is similar to unit 4. This reserve is estimated to contain 200 m^3 of auriferous gravels with an average grade of 0.40 g/m^3. This small reserve (80 g) is covered by 3 m of barren fine-grained alluvium.

Zone 2 consists of muddy gravels - unit 3. Along the face of the trench, unit 3 is 50 m wide and has an average thickness of 1.6 m. If the unit extends up the valley-side in the buried tributary, then the total probable volume of the auriferous gravels in this zone would equal 6,100 m^3. With an average grade of 0.19 g/m^3, the total probable reserve in zone 2 is 1,159 g.

Zone 3 lies on the west side of the valley; a location between the creek and access road. A total area measuring 30 by 150 m or 4,500 m^2 is part of the Hazeltine Flats old workings. The gold is in bedrock that is weathered up to 1 m deep. The overburden has been removed during the historical mining period, but inefficient mining methods has left grades averaging 0.44 g/m^3 on top and in 1 m of decomposed bedrock. The probable reserve in zone 3 is 1,980 g.

The total probable reserve in zones 1 to 3 equals 9,158 g.

As seen in figure 3, the grades are somewhat controlled by bedrock crevices that reach 1 to 2 m deep. For instance, sample 9 consisted of crevice gravels with a grade 3 times higher than grades in neighbouring gravels retrieved from sample-site 10. The overall average grade for 613 m^3 of gravels sampled from unit 4 equals 1.01 g/m^3. This value will dramatically fluctuate from gravels situated in bedrock lows - crevices, to gravels overlying bedrock highs.

Exploration at Old Antler Town Location

1994 Seismic Refraction Survey

Six seismic refraction survey lines were run across Antler Valley between the historical location of Old Antler Town and Nugget Gulch. Lines 1,3,4,5 and 6 strike 100° across Antler Creek and line 2 parallels (190°) the west side of the creek (see figure 5). Lines 1 and 3 are joined and forms a continuous profile across the west an east side of the valley.

The lines were spaced 50 to 100 m apart. Stations on lines 1 and 2 were spaced 15 feet apart and spacing of 10 feet was used on lines 3 to 6. Profiles retrieved from stations spaced 10 feet

apart provided more detail. This may be useful for identifying small gold-enriched crevice-controlled channels.

The lines cover workable benches on the east and west sides of Antler Creek. The west side consists of a bench with subsurface bedrock elevations equal or higher than the present level of Antler Creek. Bedrock on the east side is up to 20 feet lower than the creek.

Profiles generated from lines 1,3,4,5 and 6 are illustrated in figure 6 to give a 3-dimensional view. The vertical scales are exaggerated by a factor of 5.3 and 1.6. A possible bedrock channel is seen along the west bench in profiles 1 and 5. This channel is not apparent further upstream across profiles 4 and 6. The elevation of the channel bottom along profile 1 is about 5 feet higher than the bottom seen along profile 5. The channel appears to have formed from a stream flowing in a southerly direction - contrary to the present northerly flow of Antler Creek. This channel-like feature may be a large isolated hole that was formed by valley-side spilling of postglacial melt-waters. Isolated holes may have also formed by stream erosion of soft, weathered bedrock. The hole was partially mined during the historical period in Old Mine Pit 1 (see OMP 1, figure 5).

The seismic survey identified a deeper channel on the east side of the creek. The channel bottom is up to 25 feet deep and 100 feet wide. From the study of subsurface bedrock outcrops, it appears that the channel may be, in part, a string of isolated 'boil' holes. Bedrock in the area consists of upright marble and schist beds that strike northwest across Antler Valley. The pattern of holes situated along the channel coincides with softer schist beds. As in the case of the isolated hole identified on the west side of the creek, these holes probably formed by violent meltwater-flooding during the postglacial period.

Bedrock velocity measurements in the study area varies from 10,700 to 12,700 ft/sec (see appendix A). This velocity range coincides with an average velocity expected to be found in a mixture of schist and marble beds. Overburden velocities fall within the range expected to be found in wet gravels (1,500 ft/sec = velocity of sound in water). Material with velocities below 1,500 ft/sec is dry alluvium.

Test Pits at Old Antler Town Location

Test pits 32 to 48 (see figure 5) were excavated on the east and west benches along Antler Creek at locations upstream from the historical site of Old Antler Town:

Pit 32

Test pit 32 was excavated along seismic line 5, just north of old mine pit OMP1. Bedrock was reached at a depth of 8 feet. The

upper material consisted of fine-grained alluvium; mainly silt and sand measuring 5 feet thick. The lower material was gravel - cobble to boulder-size aggregate with a clean sandy matrix. A 1 m^3 sample was processed from the gravel bed and 0.62 g of gold was recovered. The grade equates to 0.62 g/m^3.

Pit 33

Pit 33 was also located along Line 5 at a location 50 feet west of pit 32. The depth to bedrock was 12 feet. The uppermost fine-grained alluvium bed measured 5 feet thick. The underlying 7 feet of material consisted of muddy gravels. The gravels probably derived from the incomplete fluvial processing of local till. A 1 m^3 sample of the material returned 0.15 g of gold. This low value is not unusual - the mud-rich component suggests the material lacked the necessary concentrate-forming mechanism and the placer became undeveloped. Another sample retrieved from a level overlying bedrock produced a similar value.

Pit 34

Pit 34 was excavated along line 5 on the east side of the Antler Creek access road in attempt to reach the deepest point of the channel. Ten feet of sand was penetrated, but the water table at a depth of 8 feet caused the hole to continuously slough-in and the pit was abandoned.

Pit 35

Depth to bedrock was 3 feet. The material consisted of old tailings; covering ground that was previously mined.

Pit 36

Bedrock was reached at a depth of 7 feet. The material consisted of a loosely-packed gravel with aggregate reaching cobble-size. Clasts in the gravel bed lacked uniform imbrication and bedding. The massive characteristic suggests that the gravel derived from an englacial source - material trapped in ice and deposited after melt. Only traces of gold was recovered. The bedrock at this site is highly weathered or rotted.

Pit 37

Pit 37 was excavated 50 feet north of pit 36. The material was identical to the englacial-derived gravels found in pit 36 and traces of gold was recovered.

Pit 38

This pit was located at the deepest point of the channel on line 1. As in pit 34, the water table caused the hole to continuously slough-in and the site was abandoned. The pit consisted of 15 feet of sand.

Pit 39

Pit 39 was located along line 4 on the west side of the Nugget Gulch access road. Bedrock was reached at a depth of 6 feet and only traces of gold was recovered from overlying gravels. The area was probably worked at an earlier time and was covered by tailings when the Nugget Gulch hydraulic mine operated in the late 1800's.

Pit 40

Pit 40 was located along line 6; over the deepest point of the buried channel on the east side of Antler Creek. The hole was abandoned at a depth of 12 feet. The material consisted of pebble to cobble-size gravel. The uncompacted nature of the material and the presence of water caused the hole to continuously collapse. The material is probably hydraulic tailings.

Pit 41

In attempt to hit shallower bedrock along line 6, pit 41 was excavated 50 feet east of pit 40. The pit was abandoned at the water table.

Pit 42

This pit was located on the west side of the Antler Creek Access Road near Old Mine Pit 3. Bedrock was reached at 9 feet. The upper 6 feet consisted of fine-grained alluvium. The lower 3 feet was made up of a boulder-rich gravel; similar to the auriferous unit 4 at Hazeltine Flats. A 1 m^3 sample of the lower 3 foot section only produced traces of placer gold.

Pits 43 to 47

These pits were excavated on the east side of Antler Creek with intentions to explore the deep buried channel. The water table prevented the excavation of deep holes and the channel bottom was not reached.

Pit 48

This pit was excavated along the base of the valley-side just adjacent Old Mine Pit 4. The face of the valley-side consists of 15 feet of coarse-grained alluvium - mainly sandy gravels with aggregate reaching cobble to small boulder-size. About 5 feet of fragmented and decomposed bedrock overlies solid bedrock. A 1 m^3 sample of alluvium and fragmented bedrock returned trace amounts of placer gold.

Discussion

The shallow portion of the buried channel, located on the west bench, was reached in pits 32 and 33 at depths of 8 and 12 feet.

The auriferous channel gravels found in pit 32 returned a grade equalling 0.62 g/m^3. In pit 33 the material overlying the bedrock resembled a poorly washed diamict and consequently is not a well developed placer - grade = 0.15 g/m^3. A developed placer may exist beneath the poorly washed material along deeper portions of the buried channel. Some of the shallow areas explored on the west bench have either been previously worked or consists of uneconomic englacial-derived morainic gravels.

The bottom of the deep channel on the east bench was not reached. A larger machine, capable of reaching 30 feet, will be required to excavate a large pit. Slope stability in the wet ground may be achieved in a pit measuring 100 feet across.

Summary

Bulk sampling at Hazeltine Flats has revealed a probable placer gold reserves of 9,158 g in 3 zones. A total of 632 g of gold was recovered from 666 m^3 of auriferous gravels at the bulk sample-site on the east side of the creek. The gold is hosted in 5,880 m^3 of postglacial gravels (zone 1 or unit 4) with a grade averaging 1.01 g/m^3. In places, this auriferous unit is covered by 5 to 2.5 m of barren fine-grained alluvium. In other places, the unit is covered by 1.5 m of gold-bearing muddy gravels (zone 2 or unit 3). Unit 3 is estimated to contain 6,100 m^3 of gravels with a grade averaging 0.19 g/m^3. The third zone consists of 4,500 m^3 of tailings and weathered bedrock averaging 0.44 g/m^3.

Results from test pits 28 to 31 concludes that the deep ground along this stretch of the valley was mined-out during the historical mining period. This area is situated between upper Hazeltine Flats and lower Old Antler Town.

The seismic survey of the area located between Old Antler Town and Nugget Gulch has identified a deep buried channel, up to 6 m deep, on the east side of Antler Creek. Seven pits were excavated in attempt to sample the channel bottom. The high water table caused all pits to continuously slough-in and the maximum depth reached was 4 m. The upper material consisted of porous, loosely packed pebble to cobble-sized gravel. Attempts to mine the deep channel were made by earlier miners in 3 old mine pits at locations downstream from seismic line number 5 (see OMP2, OMP3 and OMP4, figure xx). The deep channel appears to cross under Antler Creek to the west side of the valley between OMP2 and OMP3, and back to the east side towards OMP4. As discussed above, the deep channel is mined-out downstream from OMP4 to upper Hazeltine Flats. Portions of the buried channel that crosses beneath the present creek may have remained unmined At upper Hazeltine Flats, there were two locations investigated where bottom was not reached. The locations were under the settling pond used at the bulk sample site and an area 50 m upstream along the west side of Antler Creek. The

deep channel was probably not mined along this part of the valley.

The seismic survey also identified a 6 m deep channel-like feature on the west bench south of the Antler Creek and Nugget Gulch access road intersection. The deepest portion of the channel could not be reached - overlying wet sand continuously collapsed into the test pits. Bedrock was reached along a shallow portion of the channel. Here, the material overlying bedrock was an englacial derived morainic-type gravel containing low to trace amounts of gold.

Tests along the west bench, although incomplete, was disappointing. With 300,000 oz of past production along upper Antler, the large area of unworked ground on the west bench was initially considered as an appealing target. It now appears that the rich pay-streak was somehow controlled and confined to portions of the valley on the east side. The pay-streak, first discovered about 100 m upstream from Victorian Creek, must have been confined to fluvial gravels deposited on the south or east side of the valley. The only enriched zone on the west side of the valley occurs at Hazeltine Flats.

Recommendation

It is apparent that much of the shallow ground along upper Antler Creek has been thoroughly mined by earlier miners. A small bench was left unmined on the east side of Hazeltine Flats. This area can be mined by a small operation with expectations of recovering about 9,100 g of placer gold.

It appears that the deep east channel located above Old Antler Town was not mined. To determine grades along the channel bottom, a large open pit is necessary to deal with the wet conditions and the unstable overlying gravel formation. If sufficient grades exist, the deep channel can be worked where room is available. There are 2 workable areas; **1)** between seismic line 5 and to an area 50 m south of line 6; and **2)** a stretch of the east valley-side measuring 60 m long - adjacent the bulk sample site at upper Hazeltine Flats. Since gold concentrations are sporadically distributed and controlled by bedrock lows or crevices, drilling may not be a good solution for determining grades in the deep channel.

The surficial survey has found other areas along Antler Creek that warrants exploration. There appears to be unmined deep ground on the south side of Antler; starting at the hydraulic pit (HM1) and extending 100 m upstream past Victorian Creek. Other potential pay-gravels occur along the base of the west wall in hydraulic pit HM1.

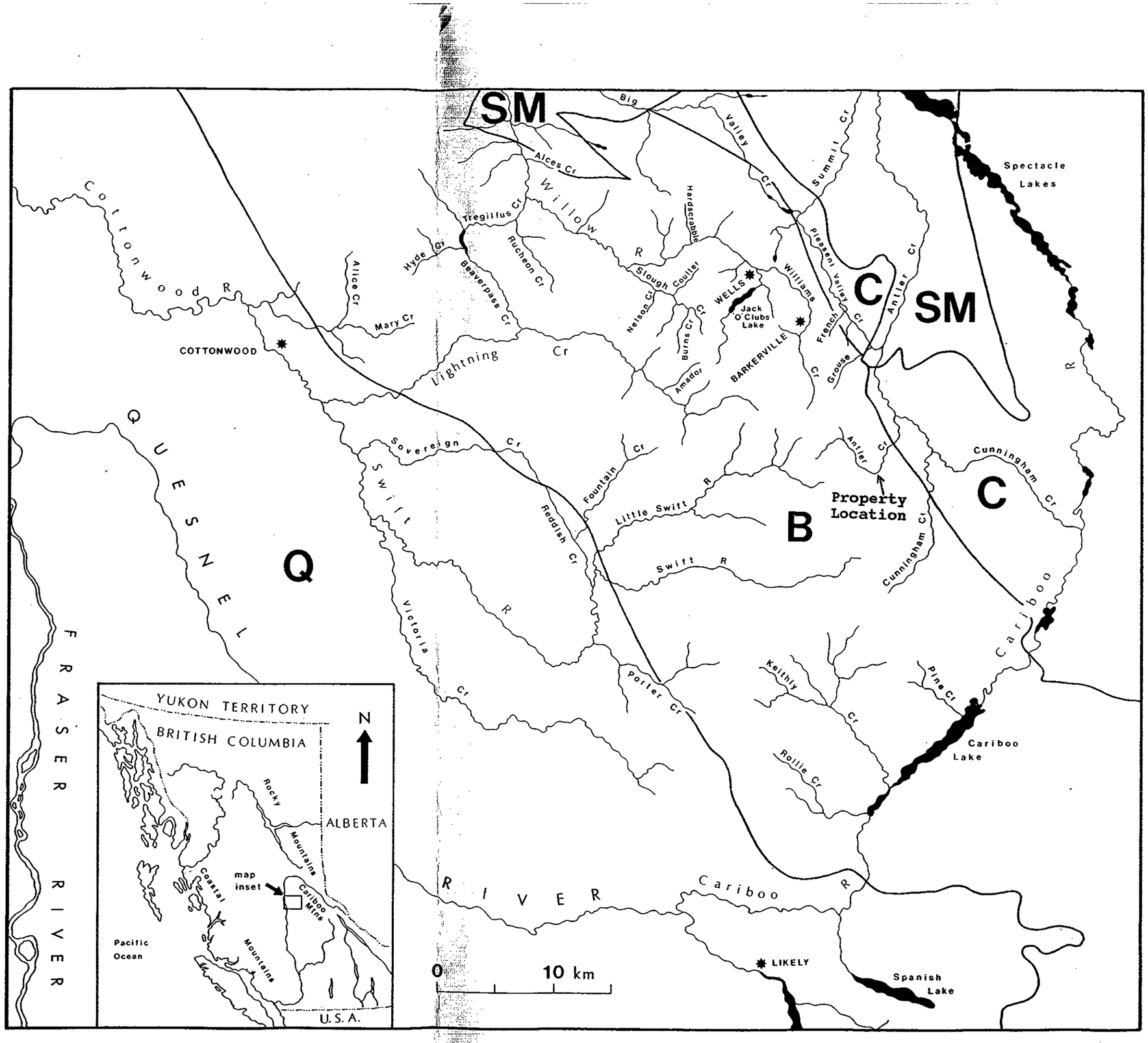
Deep alluvium covers a portion of the valley east of the confluence of Nugget Gulch and Antler Creek. The sediments derived from bedrock incised during the postglacial (see figure 5, PGI), and may

be covering unit-4 type auriferous gravels.

There are other locations along the east and west sides of Antler, mainly between Hazeltine Flats and upstream past Victorian Creek, that have potential for unit 4-type auriferous gravels. The gravels are located higher up the valley-side. These locations were not worked by the historical miners; overburden or unit 1-type gravels reached uneconomic thicknesses. Higher grades are expected along the east side of the valley (see Summary).

Figure 1.

Property Location showing 4 geological terranes; Quesnel **Q**, Barkerville **B**, Cariboo **C**, and Slide Mountain **SM** (Struick, 1988)



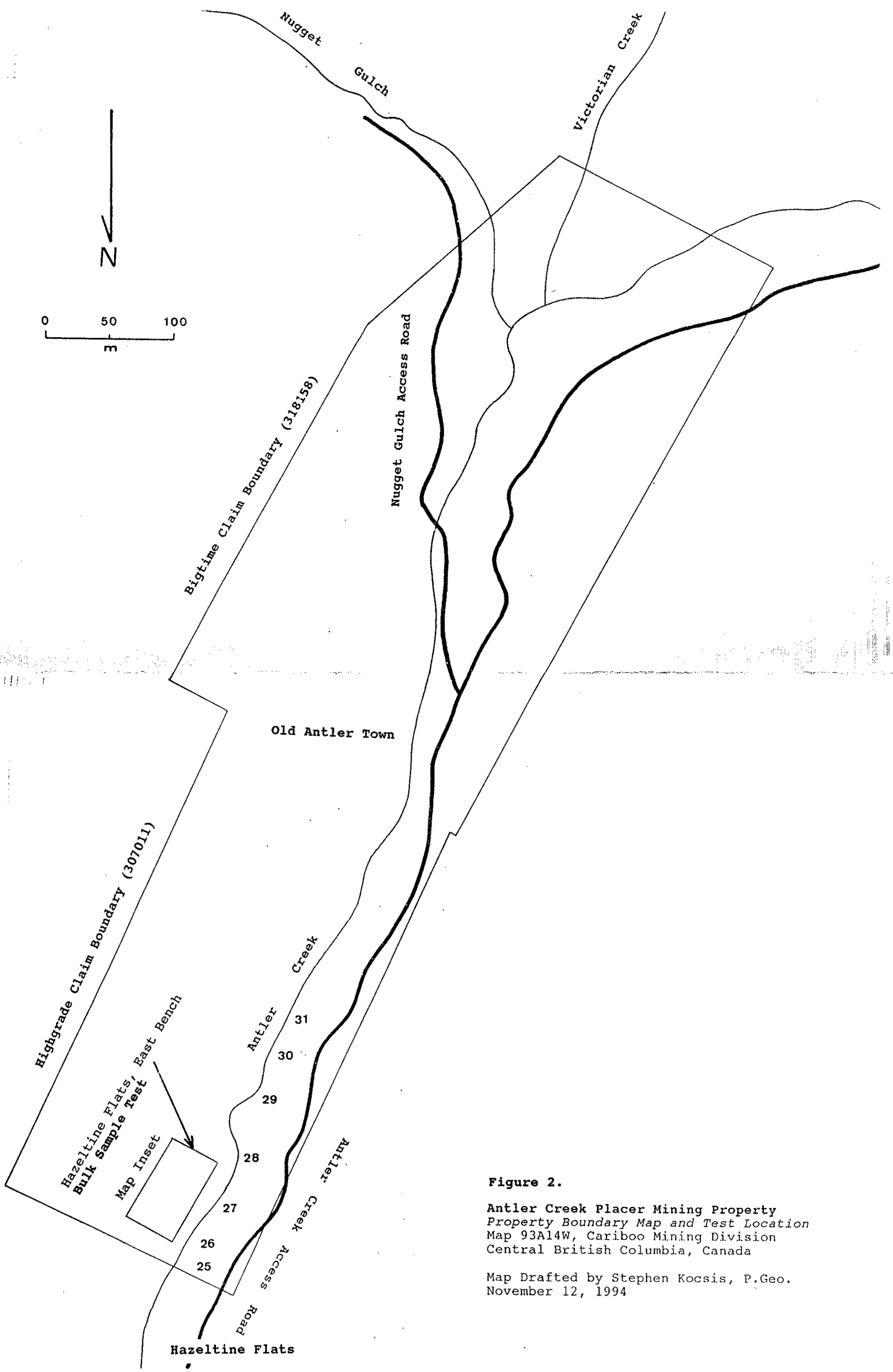


Figure 2.

Antler Creek Placer Mining Property
Property Boundary Map and Test Location
Map 93A14W, Cariboo Mining Division
Central British Columbia, Canada

Map Drafted by Stephen Kocsis, P.Geo.
November 12, 1994

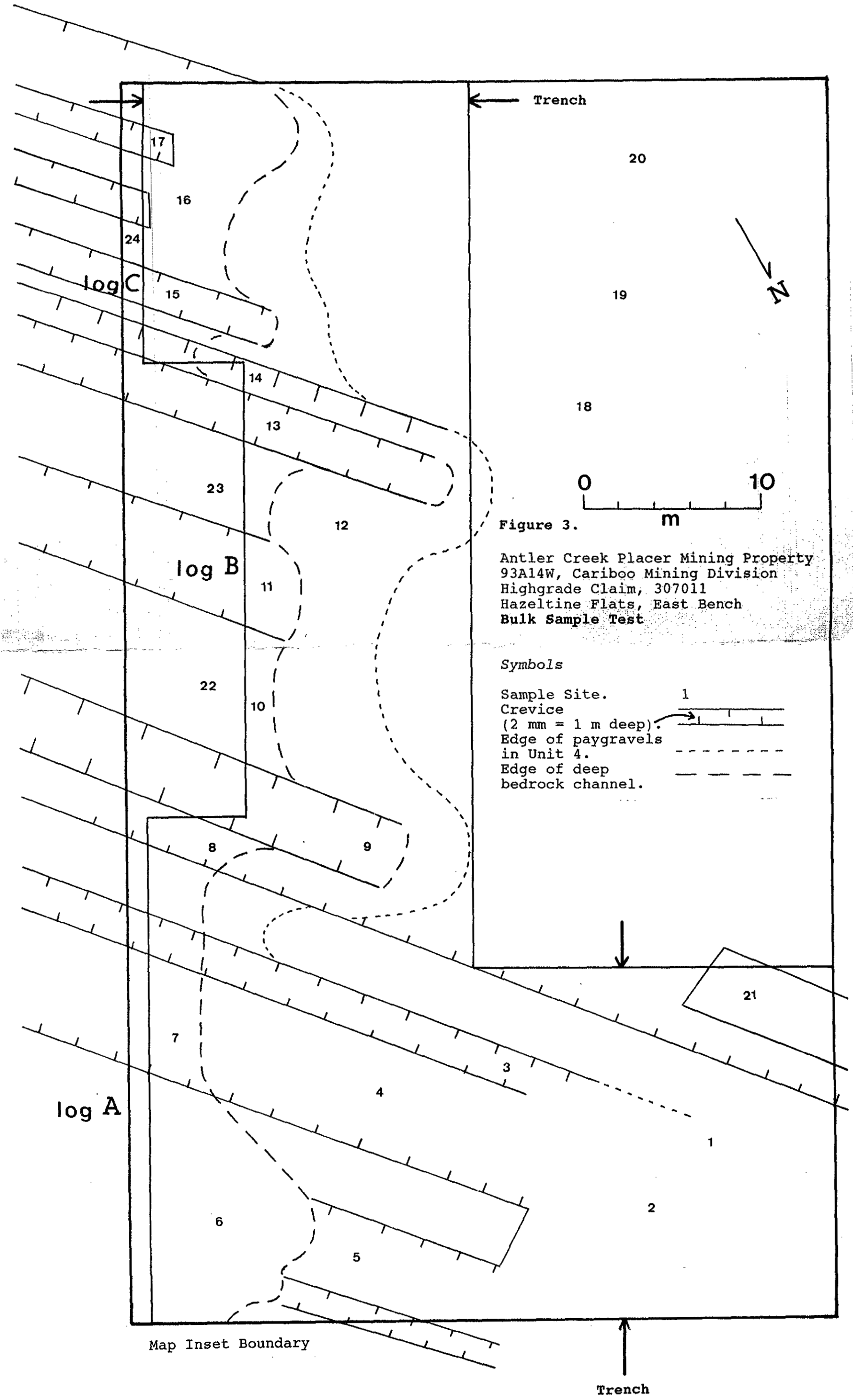
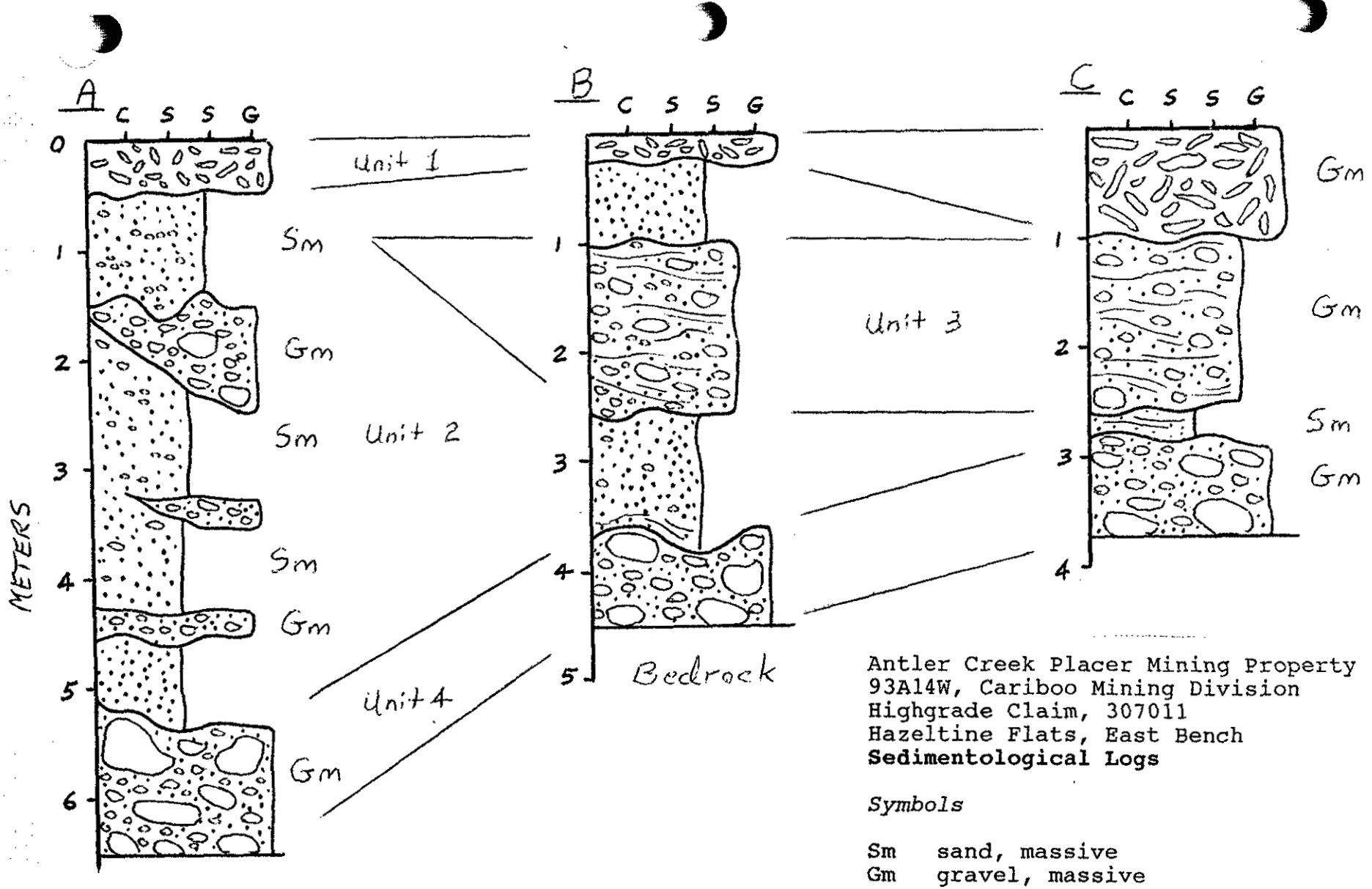


Figure 3.

Antler Creek Placer Mining Property
93A14W, Cariboo Mining Division
Highgrade Claim, 307011
Hazeltine Flats, East Bench
Bulk Sample Test

Symbols

Sample Site. 1
Crevice
(2 mm = 1 m deep).
Edge of paygravels
in Unit 4.
Edge of deep
bedrock channel.



Antler Creek Placer Mining Property
93A14W, Cariboo Mining Division
Highgrade Claim, 307011
Hazeltine Flats, East Bench
Sedimentological Logs

Symbols

Sm sand, massive
Gm gravel, massive

(matrix/aggregate - size)

C clay
S silt
S sand
G gravel

Figure 4.

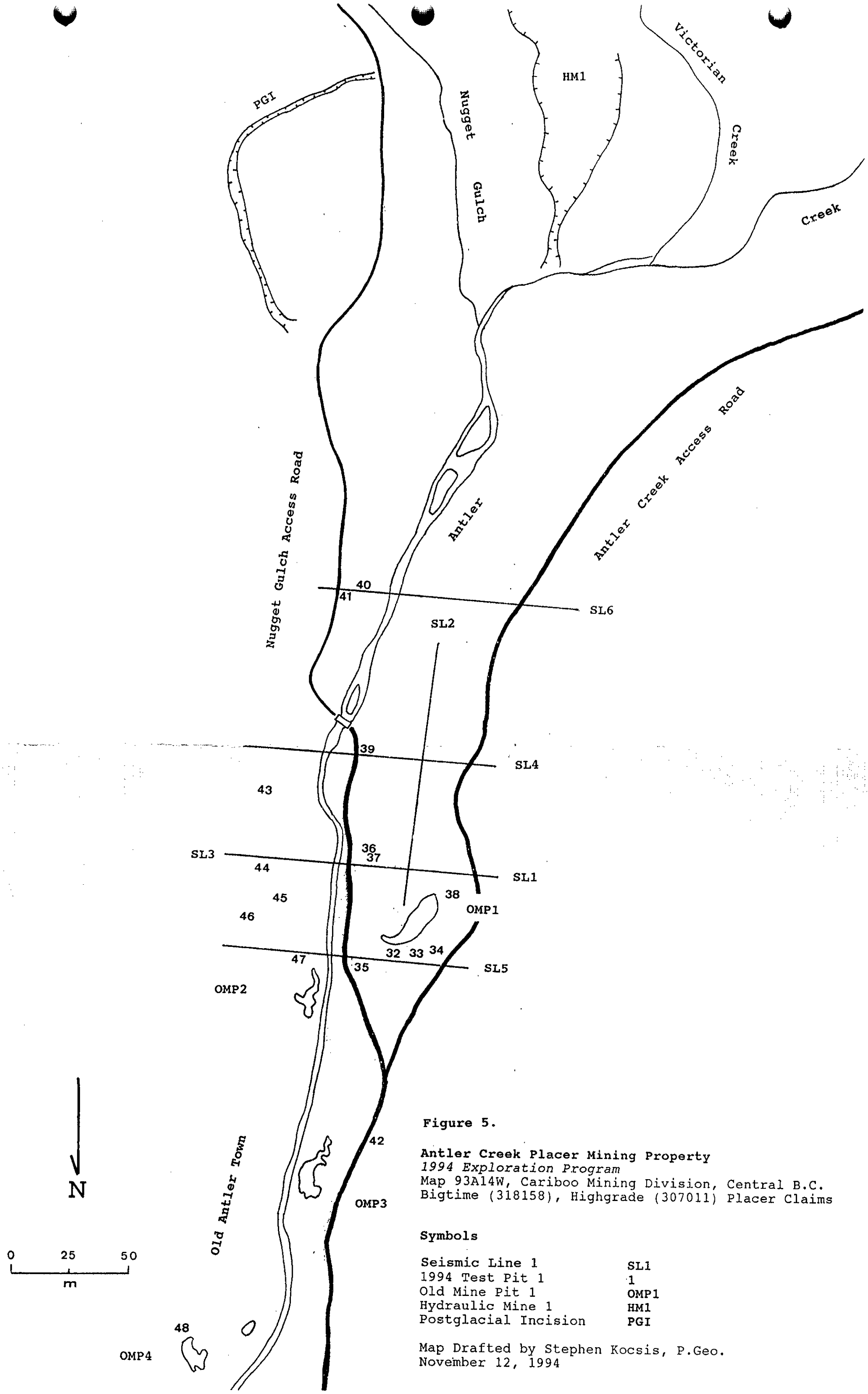


Figure 5.

Antler Creek Placer Mining Property
1994 Exploration Program
Map 93A14W, Cariboo Mining Division, Central B.C.
Bigtime (318158), Highgrade (307011) Placer Claims

Symbols

Seismic Line 1	SL1
1994 Test Pit 1	1
Old Mine Pit 1	OMP1
Hydraulic Mine 1	HM1
Postglacial Incision	PGI

Map Drafted by Stephen Kocsis, P.Geo.
November 12, 1994

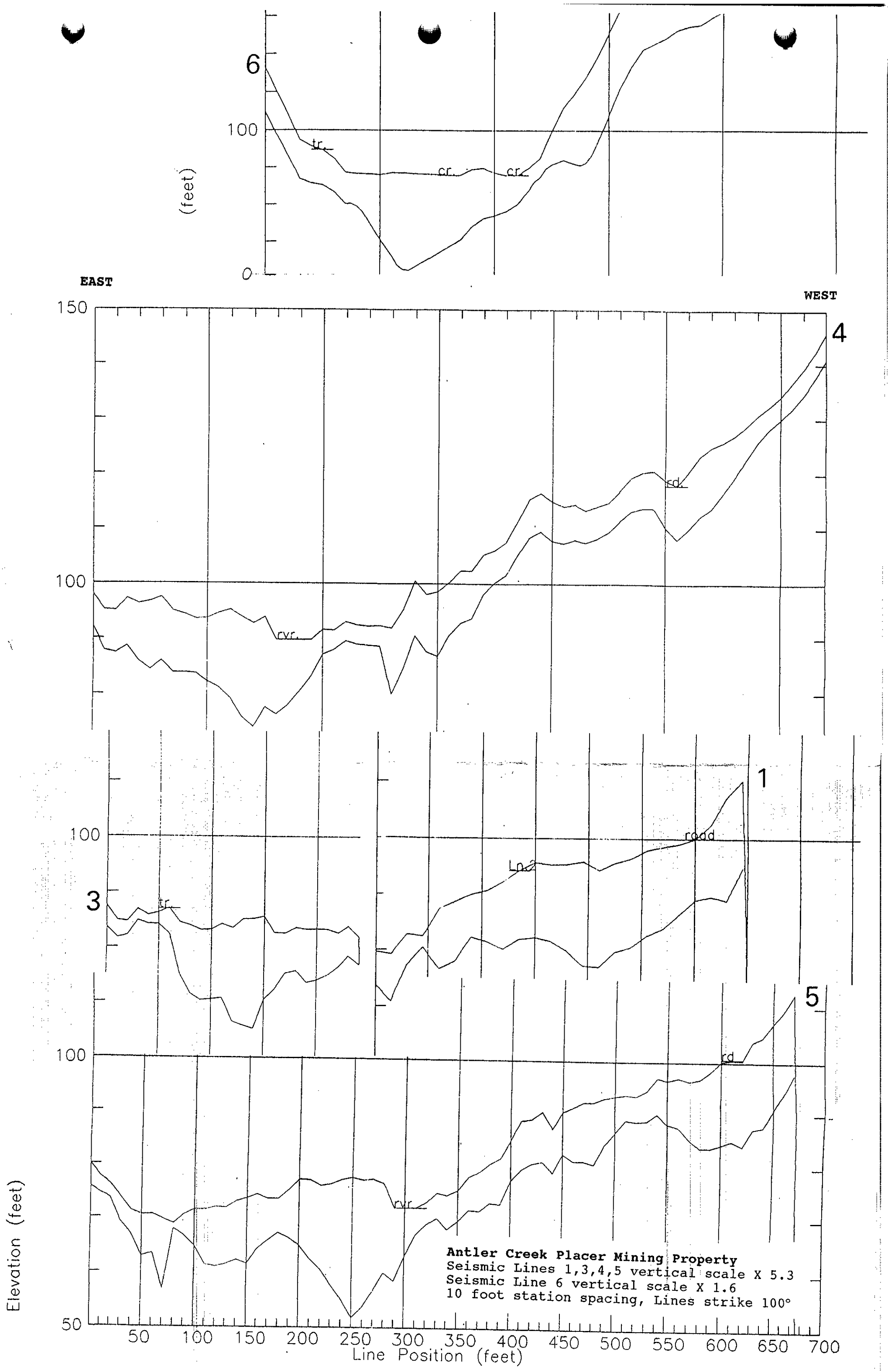

6
100
0
(feet)
tr.
cr.
cr.
EAST
WEST
150
4
100
rvr.
rd.
1
100
3
tr.
Ln 2
road
5
100
rd
rvr
Elevation (feet)
50
50
100
150
200
250
300
350
400
450
500
550
600
650
700
Line Position (feet)
Antler Creek Placer Mining Property
Seismic Lines 1,3,4,5 vertical scale X 5.3
Seismic Line 6 vertical scale X 1.6
10 foot station spacing, Lines strike 100°

Figure 6.

Stephen Kocsis, P.Geo.
301-776 Vaughan Street
Quesnel, B.C.
V2J 2T5. Tel: 604-992-9570

Mr. Dani Alldrick
Explore B.C. Program Manager
Ministry of Energy, Mines and Petroleum Resources
Room 5092
5th Floor, 1810 Blanshard Street
Victoria, B.C.
V8V 1X4. Tel: (604) 952-0412. Fax: (604) 952-0371.

Re: Grant Identification Number 94/95M-39 - Antler Creek.

Dear Mr. Alldrick:

As requested by your office, I completed a Geophysical Survey Report for Appendix A of my Exploration Program Report. I was the acting supervisor for the geophysical survey. Equipment and geophysical technicians were provided by Malcolm MacDonald of Calgary, Alberta. After discussing the matters of a formal report with Malcolm, we decided that I should be responsible for the completion of an official report since I hold a professional status in this province. I provided you with an invoice for the money I owe my company (Cariboo Geological Consulting Co.) for the work and report.

Can you please substitute the 2 Seismic Survey report copies for appendix A in my Exploration Program report copies.

Thankyou for your assistance.

Sincerely yours,

Stephen Kocsis
December 29, 1994

Appendix A

Seismic Refraction Survey
Report

Seismic Refraction Survey
at
Antler Creek, Barkerville Area, B.C.

Cariboo Mining District
NTS 93A14W
52° 58′ N, 121° 32′ W

By:

Stephen Kocsis, P.Geo.
Cariboo Geological Consulting Co.

June - August, 1994.

CONTENTS

ILLUSTRATIONS

1. INTRODUCTION

The Seismic Refraction Survey took place along upper Antler Creek; about 13 km southeast of Barkerville (figure 1). A total of 6 lines (1,000 m) were surveyed on benches located on the east and west sides of Antler Creek (figure 2). The survey area is situated 100 m north of the Nugget Gulch tributary and extends to the southern-most part of the historical Old Antler Town location.

The survey involved 6 field days between June 25 and October 21 of 1994. Three field technicians and the supervising geologist (Stephen Kocsis, P.Geo.) were present during the survey.

The purpose of the survey was to determine bedrock depths on benches located on the east and west sides of Antler Creek. The benches are favourable targets for buried placer gold deposits. At Antler Creek, placer gold grades in fluvial gravels are known to be the highest near bedrock and are controlled by bedrock channels.

2. REFRACTION SEISMIC SURVEY METHOD

2.1 Equipment Description

The digital field system used in the seismic refraction survey were dual 48 channel (1 ms sample rate) Texas Instrument DFS-V's. The system has a read-after-write head and is capable of translating 9-track data at 1600 bpi in SEG-B format. The record length is 1 second.

Marsh case-type SM-4 LD Superphone (10 Hz) geophones were used for the survey. These digital grade low distortion geophones were recommended for areas experiencing high level noise.

2.2 Survey Procedure

Each seismic line was surveyed by a single spread of cable stretched at 100° and 190° strikes. Geophones were spaced at 15 foot intervals for lines 1 and 2. To gain more detail on the controls of auriferous gravels, such as bedrock crevices, the geophone spacing was shortened to 10 foot intervals for the remaining lines.

Seventy-five percent Forcite was used as the energy source. One-half stick (30 g) buried 3 feet deep was adequate for each shot-point. Shot-points were located at the ends of each line and intermediate shots were recorded at 10 station intervals (150 foot intermediate shot intervals for lines 1 and 2, and 100 foot intervals for lines 3 to 6). One shot was recorded off the ends of

each line (100 to 150 feet) to ensure coverage of deep ground. Shots were detonated by a radio-controlled link to the recorder and arrival times were automatically received by the seismograph. All field data was recorded on tape. The data was converted to a SEGY file and hard copies were later processed by a 486 computer set up at the base camp.

Elevation points were surveyed at each geophone station using a Sunto Inclinometer. Surface profiles were plotted using angle and distant measurements between each station. The distance and elevation change between each line was also surveyed.

3. Seismic Refraction Analyses

3.1 Interpretive Method

First break arrival times were picked using Vista software. The refraction interpretation was processed by a Viewseis Refraction software package. The software produced the final hard copies of raw data and sectional profiles given in this report.

3.2 Limitations

Subsurface boundary depths measured by seismic refraction surveys are generally accepted to be accurate within 10% of the true depth. Some unusual conditions in the sedimentology may result in misleading travel time arrivals. Small hummocky surface features were present along portions of each survey line. Some of the features are believed to be hand-piled mounds of coarse tailings. Time arrivals recorded from geophones placed over such a mound may increase as wave velocities decrease through the tailings. The slight increase in the travel time arrival of the wave-form may falsely depict greater bedrock depths.

Loud background noise was present when surveying line 3. This portion of the survey took place in June after a night of heavy rainfall and stream run-off was near its peak level. The rushing water and/or movement of small boulders in Antler Creek may have been the source of the noise. The remaining portion of the survey was completed later in the season after the run-off subdued.

3.3 Interpretation

Surficial seismic velocities recorded at the survey site ranged from 1,000 to 5,000 ft/s (305 to 1,525 m/s). This range is normally expected for dry and wet unconsolidated alluvial sediments. The maximum velocity recorded agrees with the known travel-time measured in water (1,500 m/s). There were no obvious contrasts between refractive layers in the surficial material. The

surficial sedimentology is interpreted as a continuous section of alluvium. Layered beds of fine-grained material, such as sand, and coarser beds of gravel could not be distinguished by the survey.

In other parts of the Barkerville area, glacial sediments, such as highly compacted lodgement till, have signature velocities ranging from 700 to 1,100 m/s. The velocity of the wave-form increases with moisture content. A sharp refractive contrast is usually seen between overlying dry alluvium and underlying moist lodgemnet till. No sharp refractive contrasts were see and the till unit is probably absent at the survey site.

Plots of the average velocity measured in the surface material accompany each seismic profile. The degree of the average velocity directly correlates with the expected level of the ground water table. As the average velocity approaches the value of 1,500 m/s, wetter conditions or a higher water table can be expected.

The average velocity measured in bedrock at the survey site ranges from 11,000 to 12,500 ft/s (3,350 to 3,810 m/s). This range of average velocities agrees with bedrock outcrops mapped at different locations around the survey site. The bedrock mainly consists of phyllite (olive-colored metabasaltic and dark grey pelitic in origin) and lesser amounts of dark grey impure marble. The marble occurs as near vertical beds that are usually not more than 5 m thick. A compiled record of bedrock signatures measured over different parts of the Barkerville area shows an average velocity range of 2,750 - 3,300 m/s for phyllite and 5,000 - 5,900 m/s for impure marble.

4. GEOPHYSICAL RESULTS

Seismic refraction profiles for lines 1 to 6 are given in figures 3 to 8. The horizontal scale generated for each profile by the Viewseis software package is 1:909. The vertical scale for profiles 1 to 5 is exaggerated by a factor of 5.3 and by a factor of 1.6 for profile 6. Lines 1,3,4,5 and 6 strike 100° across Antler Creek and line 2 parallels the creek at a strike of 190°. The lines were spaced 50 to 100 m apart. Line 2 intersects the other lines at points 40 to 50 m west of Antler Creek.

The range of velocities measured in the survey area falls within the signature range for dry and wet alluvium (see Interpretation). The stratigraphy of local sediments were observed in old mine pits and in test pits excavated during and after this seismic survey. The stratigraphy recorded from top to bottom in various pits consists of 1 to 3 feet of silt and sand-rich soil, 0 to 15 feet of medium-grained sand, 0 to 18 feet of cobble gravel, and up to 6 feet of auriferous boulder gravel resting on bedrock. There were no sharp refraction contrasts recorded in the surficial material and individual beds of alluvium could not be distinguished in the

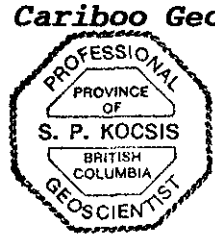
raw seismic data.

The main objective of the survey was to identify and delineate potential bedrock channels. Highest gold values along Antler Creek were historically and continue to be found in a layer of boulder gravels (up to 6 feet thick) resting on bedrock. Almost all of the shallow deposits have be mined-out. Information of test shafts located on the east side of Antler, just below Nugget Gulch, are given in Johnson and Uglows memoir 149. One test shaft encountered a deep channel with grades reaching 1 oz to the pan. High volumes of water and bad ground conditions forced the miners to abandon this location.

A bedrock channel up to 25 feet deep was identified across lines 3 to 6 on the east side of Antler Creek. The channel reaches a width of 100 feet. Between lines 4 and 3, the gradient of the deep channel bottom drops 9 feet over a horizontal distance of 150 feet. The present creek drops 10 feet over the same distance. From line 3 to line 5, the deep channel bottom drops 23 feet over a distance of 130 feet. The gradient between lines 3 and 5 appears to be misleading. A large hummocky area between line 5 positions 180 to 280 feet may consist of hand-piled coarse tailings and bedrock depth readings over this section may be exaggerated (see 3.2 Limitations).

Subsurface bedrock closely resembles surficial contours across lines 4 and 6 on the west side of the creek. On the same side of the creek, bedrock depressions up to 100 feet wide were identified on lines 1 and 5. It appears that a continuous bedrock channel does not exist on the west side of the creek. Isolated bedrock depression could have formed by valley-side spilling of postglacial melt-waters. If the placer gold-enrichment source is located further up Antler Creek, then isolated bedrock depressions on the west bench will probably contain low gold values.

Cariboo Geological Consulting Co.



Stephen Kocsis, P.Geo.
December 29, 1994

Invoice Number 2001

Cariboo Geological Consulting Co.
301-776 Vaughan Street
Quesnel, B.C., V2J 2T5
Phone: 1-604-992-9570. Fax contact: 1-604-992-5226.
GST Acc. No. 129953964

Payable by: Stephen Kocsis, Quesnel, B.C.

Job Description:

Seismic Refraction Survey at Upper Antler Creek, Cariboo Mining District, B.C. Six lines totalling 1,000 m (346 stations).

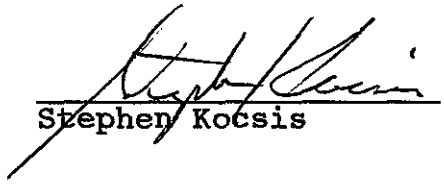
Seismic instruments were provided by Malcolm MacDonald (gephysical technician) of Calgary, Alberta. Equipment included dual 48 channel Texas Instrument DFS-V recorders, cables, geophones, computer processer, explosives, and other related gear.

The following cost per station includes expense for data processing and interpretation. Three geophysical technicians and one supervising Prof. Geologist were present on site during the survey:

Cost Break-down

Equipment and 3 Geophysical Technicians mobolize/demobolize cost from Calgary	$1,500.00
June (3 days) - 230 stations at $25 per station	$5,750.00
July (1 day) - 66 stations at $25 per station	$1,650.00
October (1 day) - 50 stations at $25 per station	$1,250.00
subtotal	$10,150.00
GST	$710.50
Total Cost	$10,860.50

Invoice Date: December 21, 1994



Stephen Kocsis

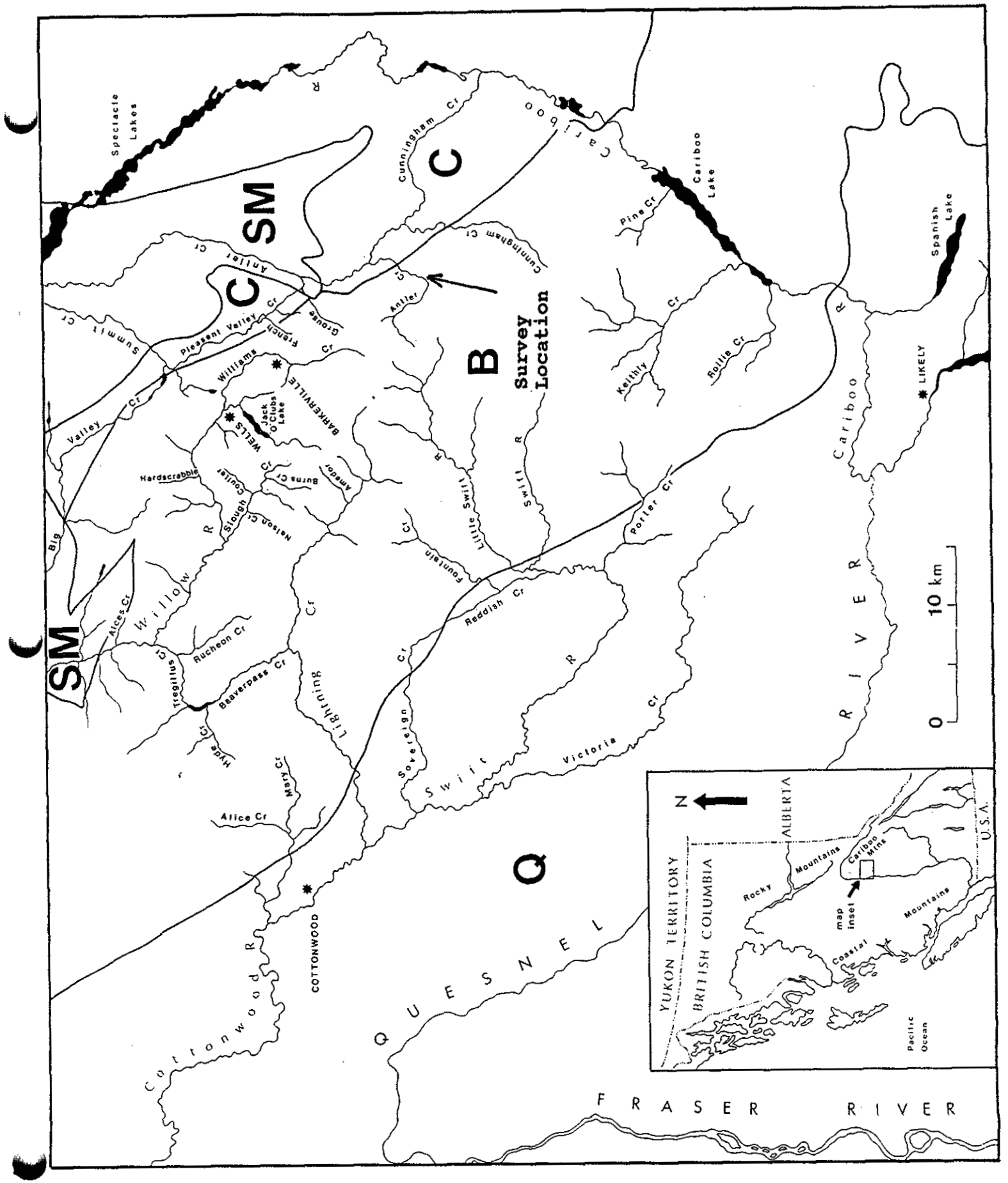


Figure 1. Seismic Refraction Survey Location showing 4 geological terranes; Quesnel **Q**, Barkerville **B**, Cariboo **C**, and Slide Mountain **SM** (Struick, 1988).

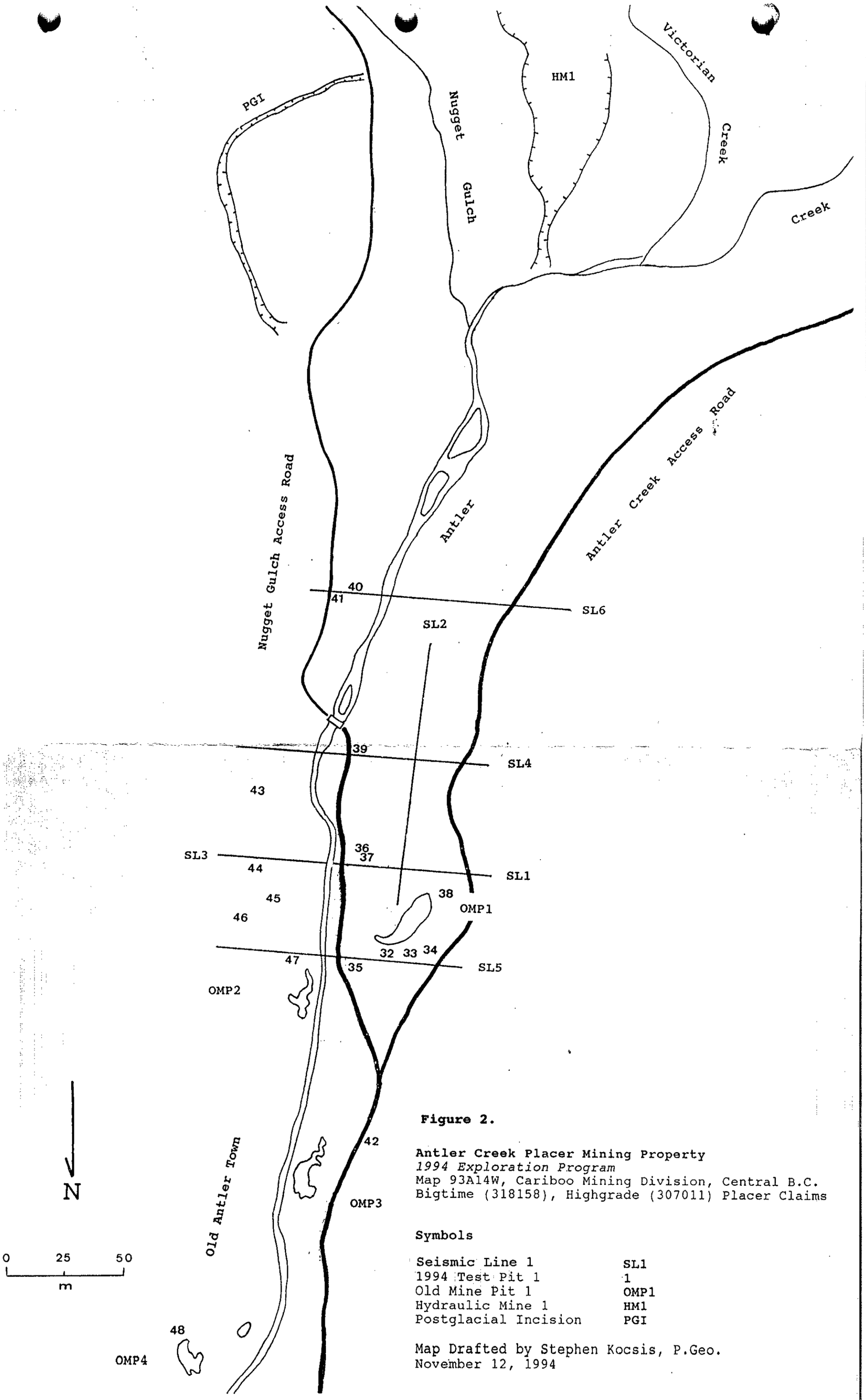


Figure 2.

Antler Creek Placer Mining Property
1994 Exploration Program
Map 93A14W, Cariboo Mining Division, Central B.C.
Bigtime (318158), Highgrade (307011) Placer Claims

Symbols

Seismic Line 1	SL1
1994 Test Pit 1	1
Old Mine Pit 1	OMP1
Hydraulic Mine 1	HM1
Postglacial Incision	PGI

Map Drafted by Stephen Kocsis, P.Geo.
November 12, 1994

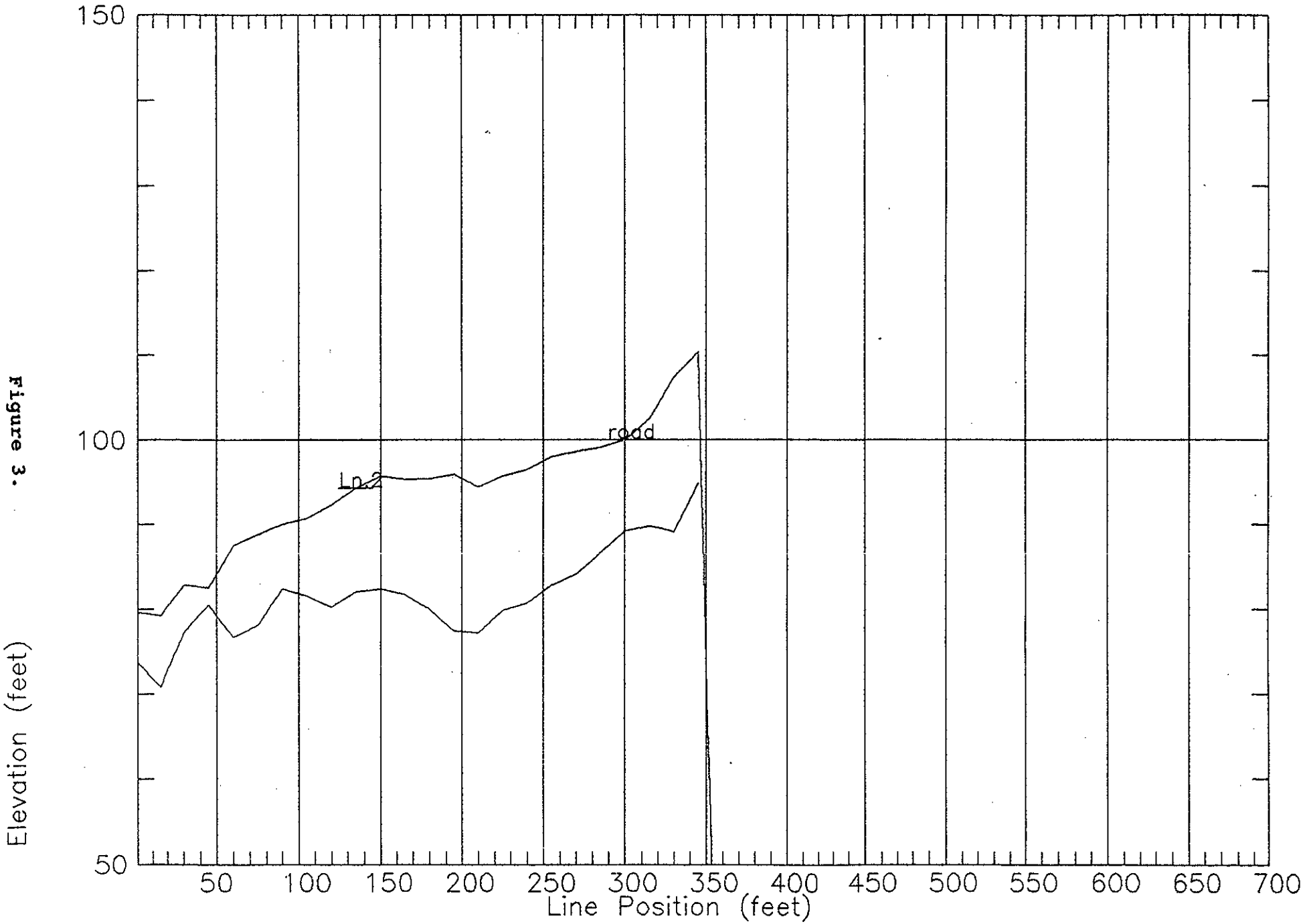


Figure 3.

Seismic Line 1

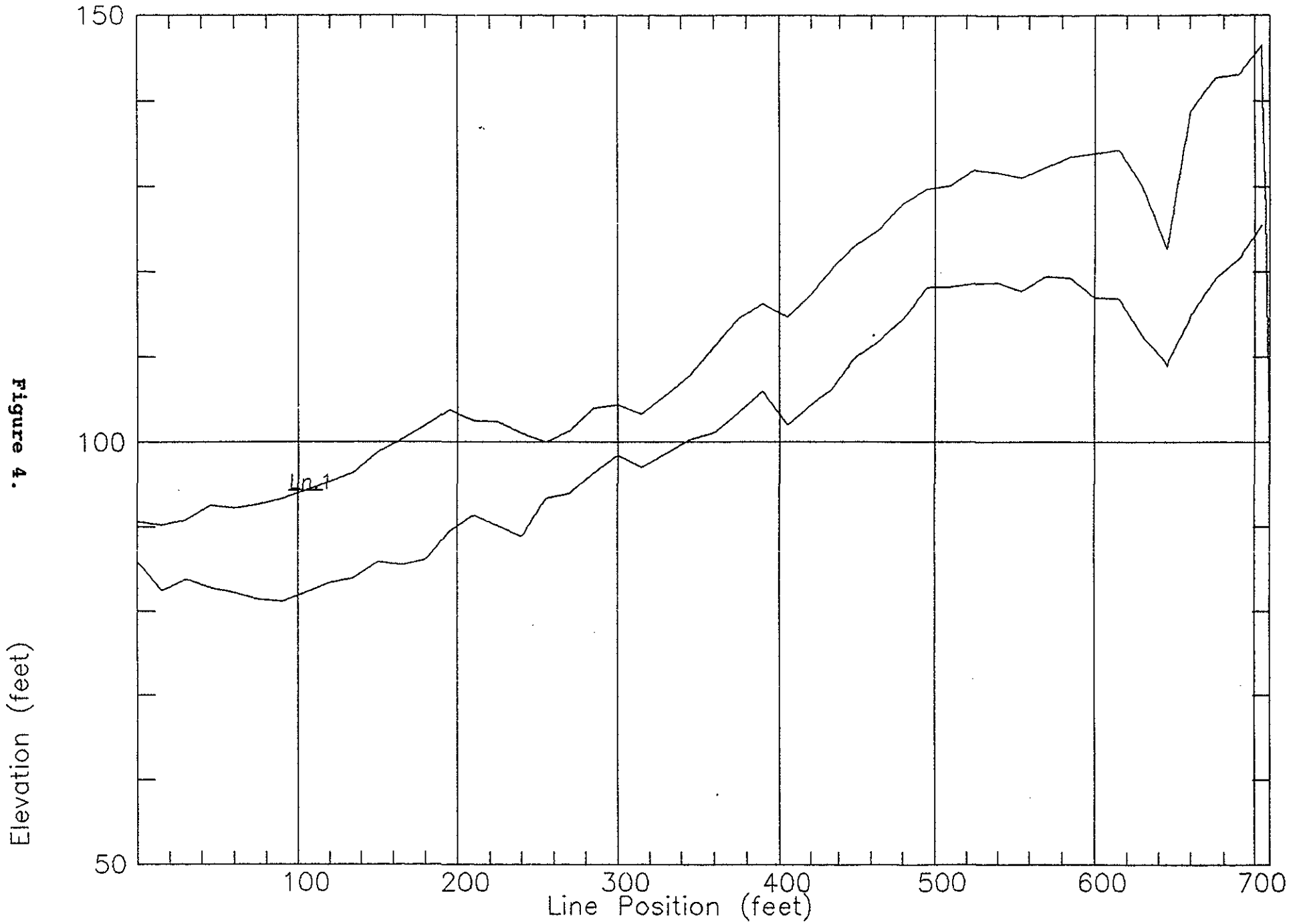


Figure 4.

Seismic Line 2

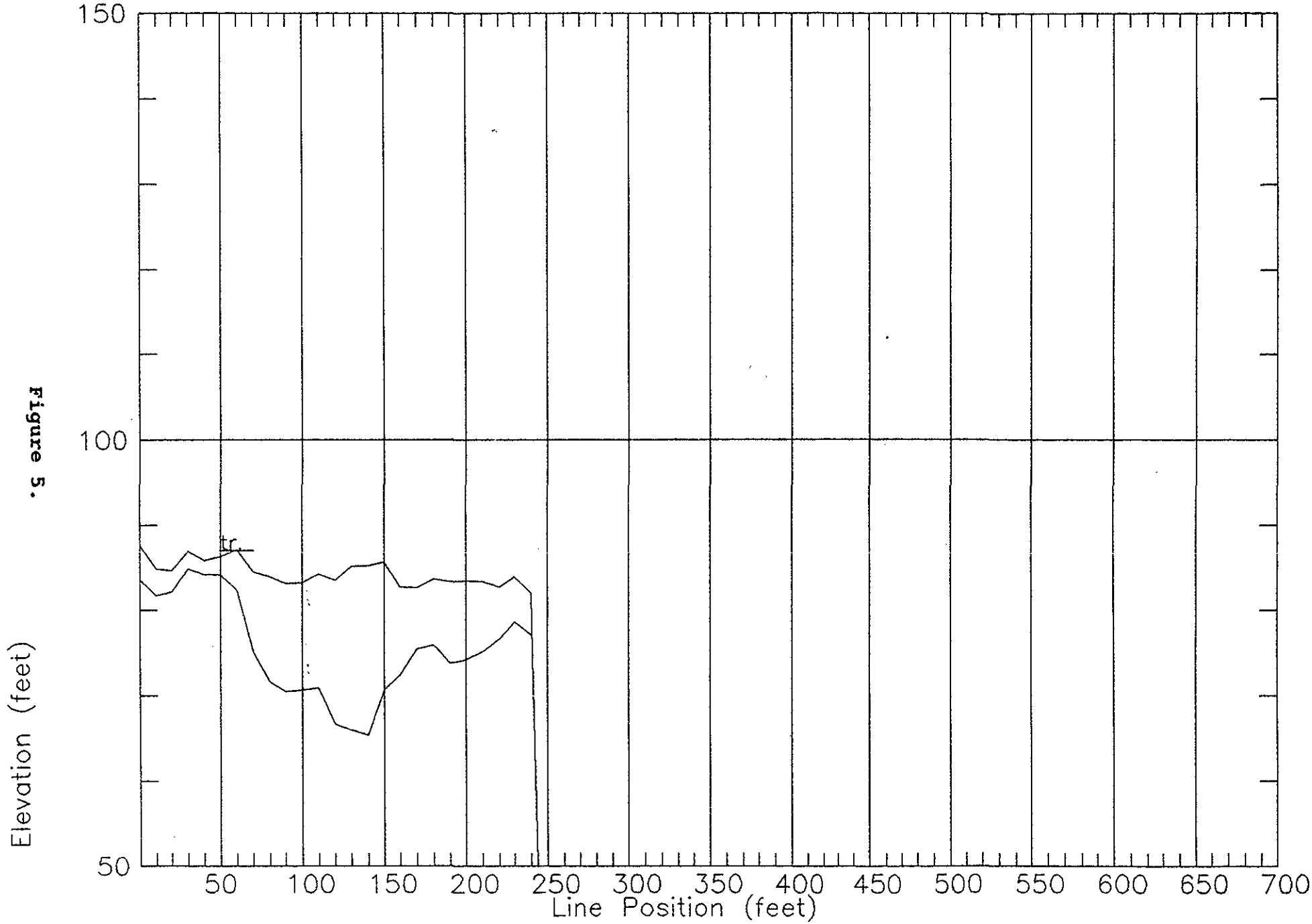


Figure 5.

Seismic Line 3

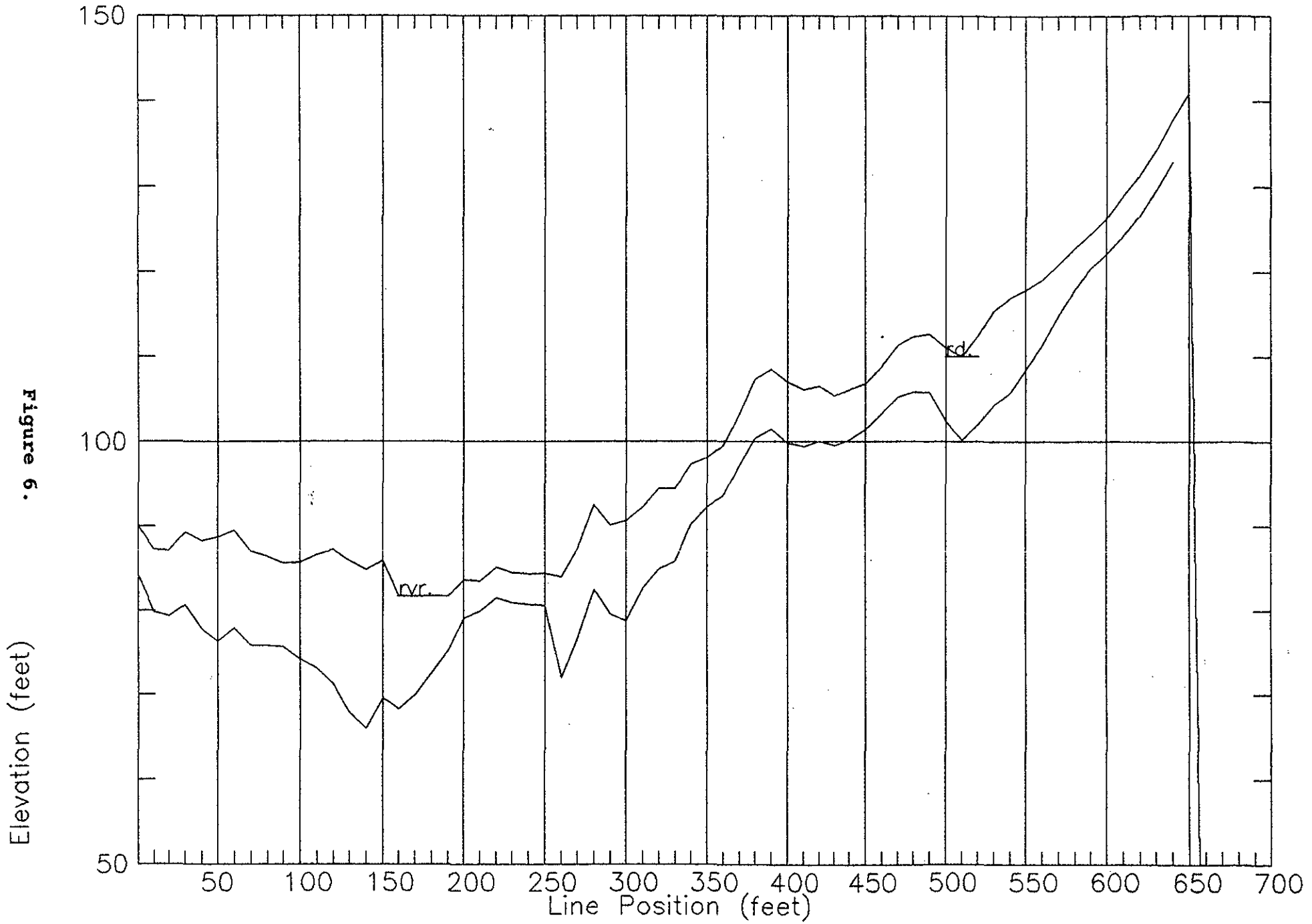


Figure 6.

Seismic Line 4

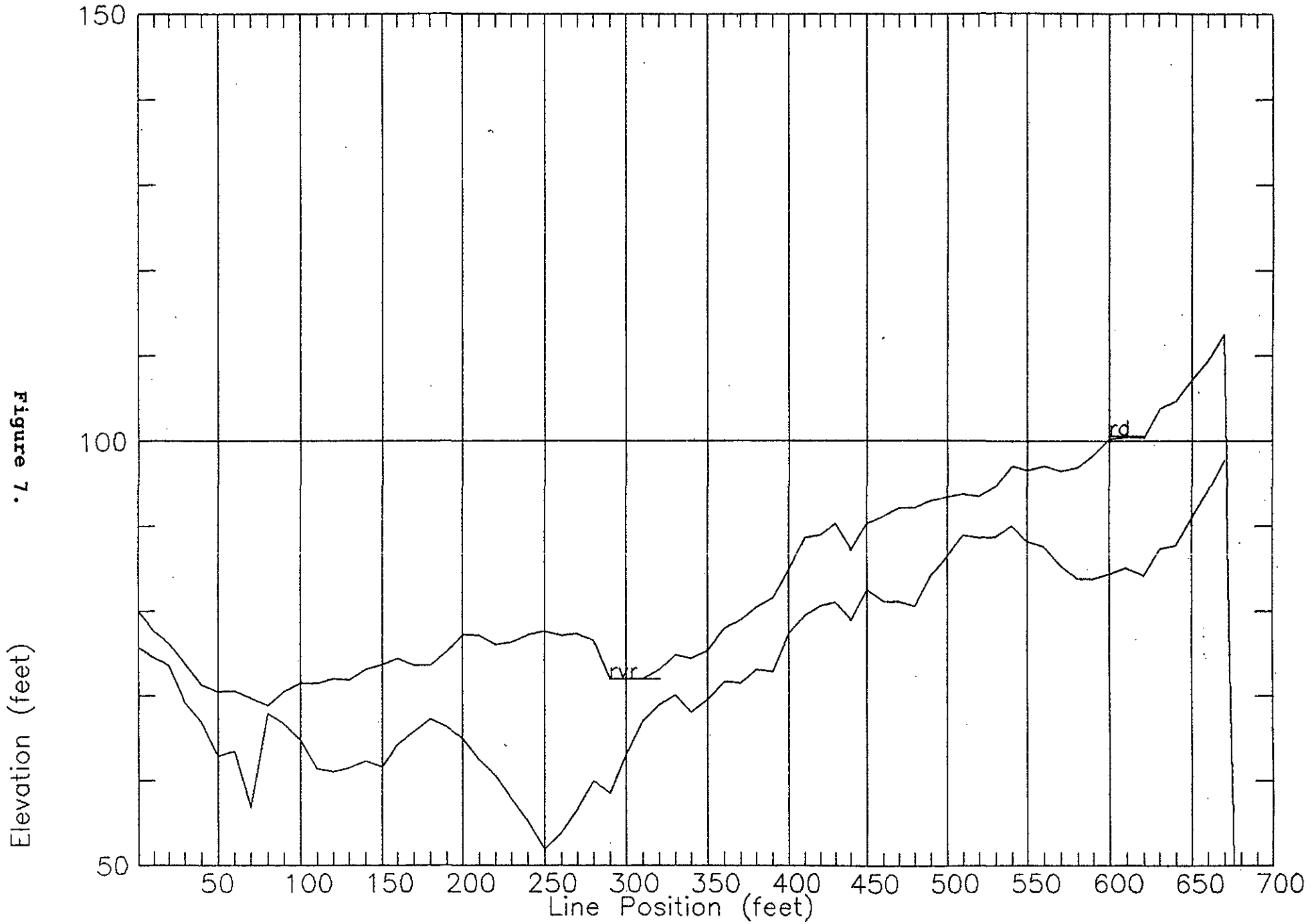


Figure 7.

Seismic Line 5

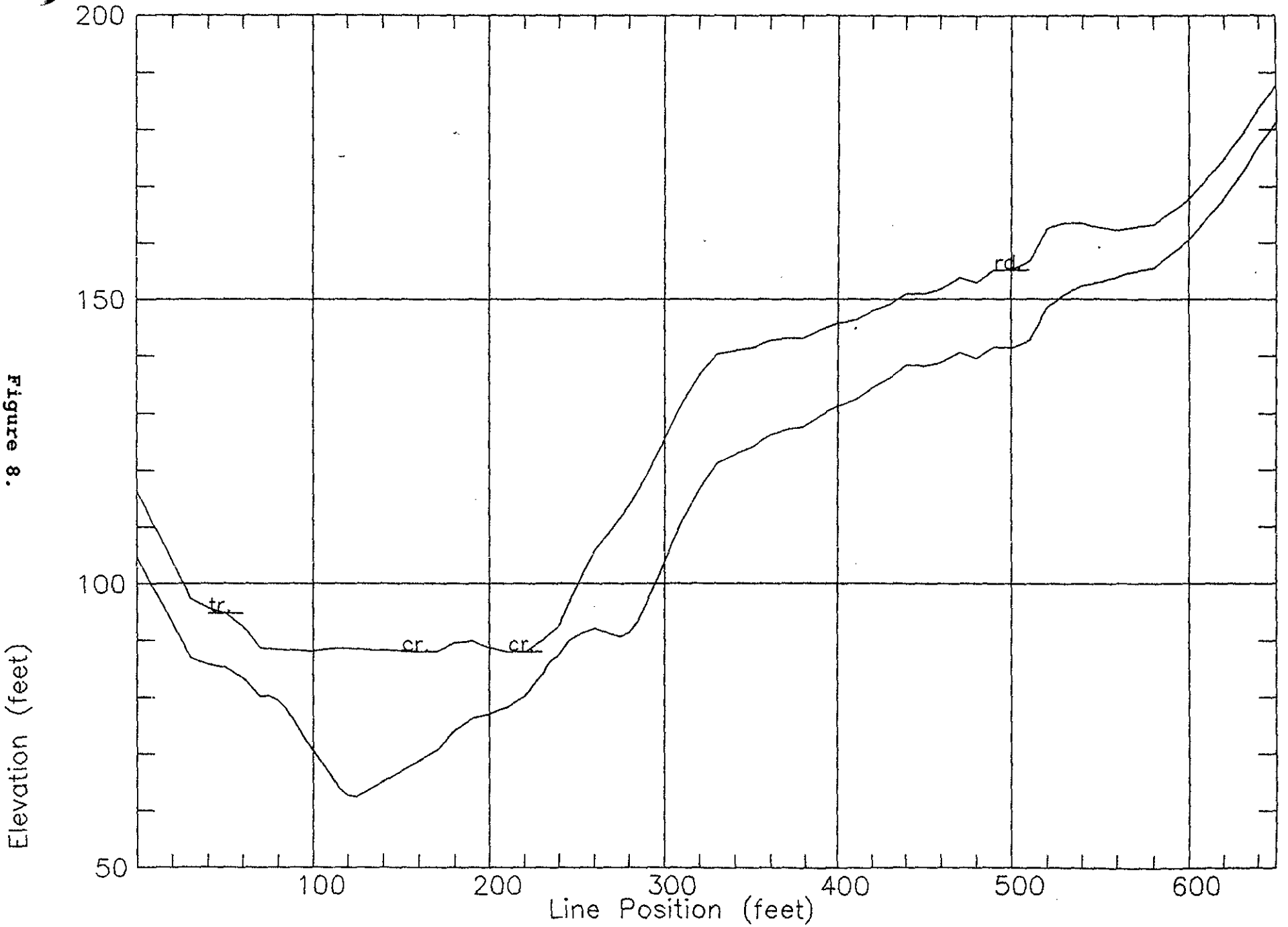


Figure 8.

Seismic Line 6

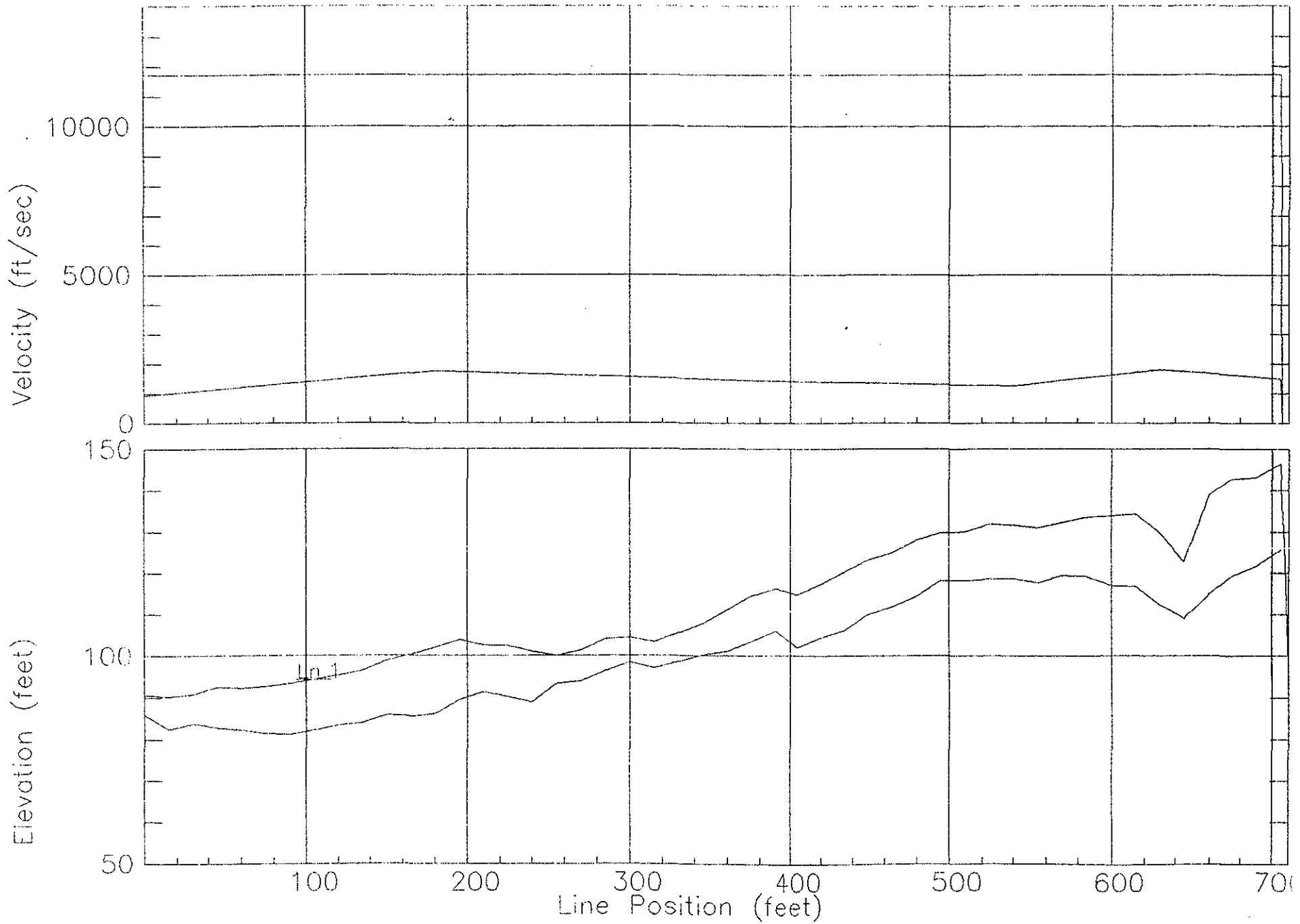


Figure 9.

Seismic Line 2

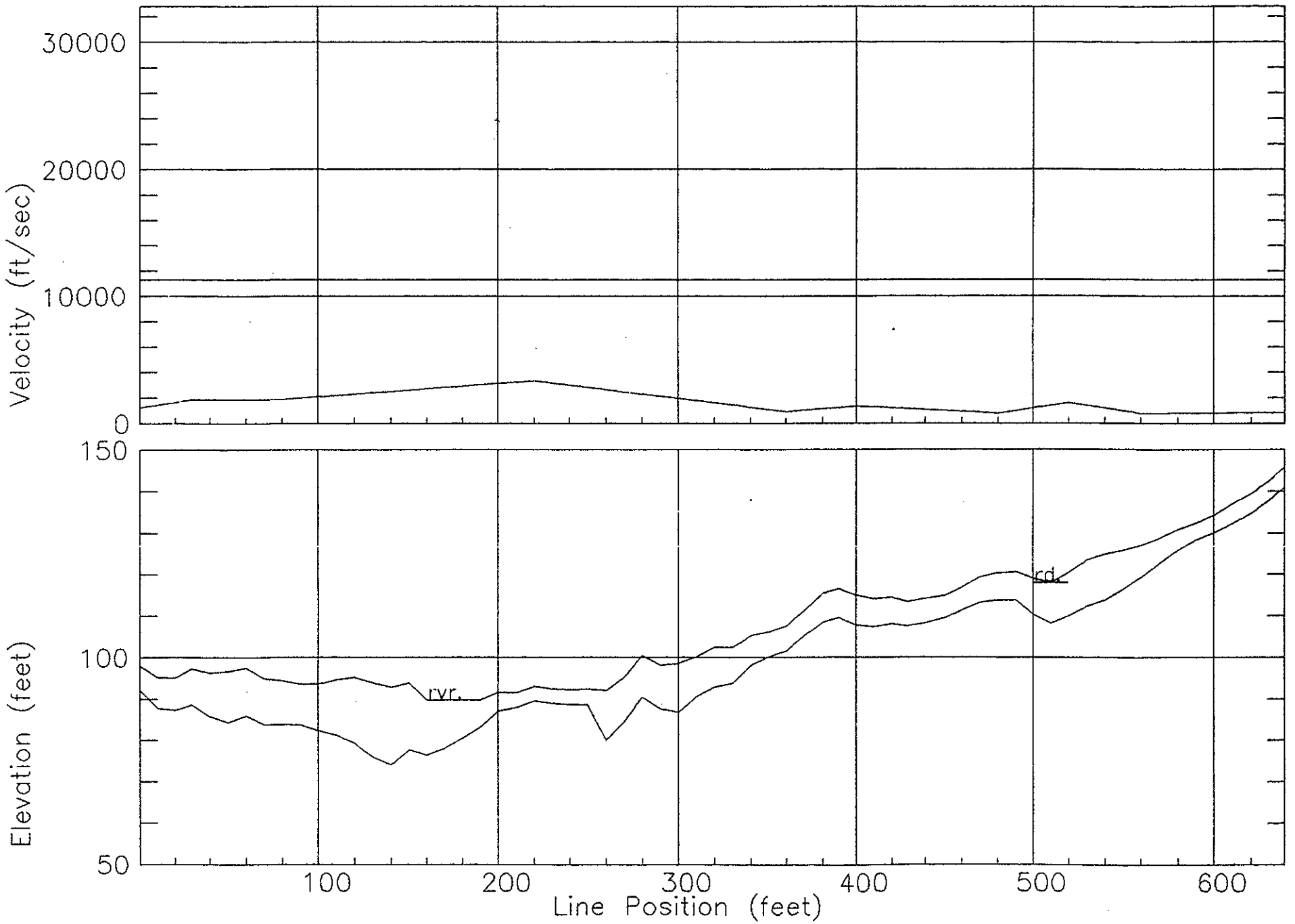


Figure 10.

Seismic line 4

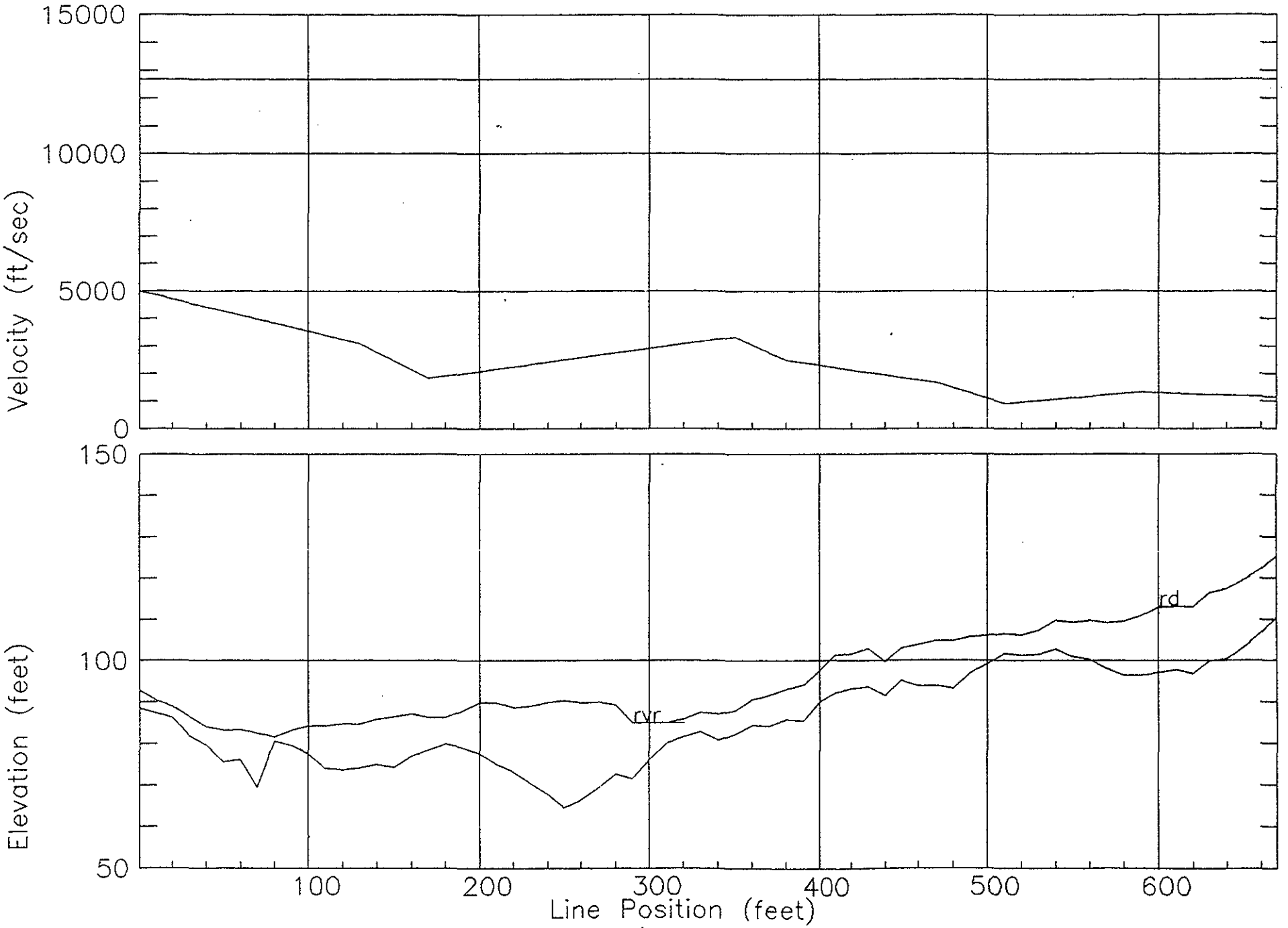
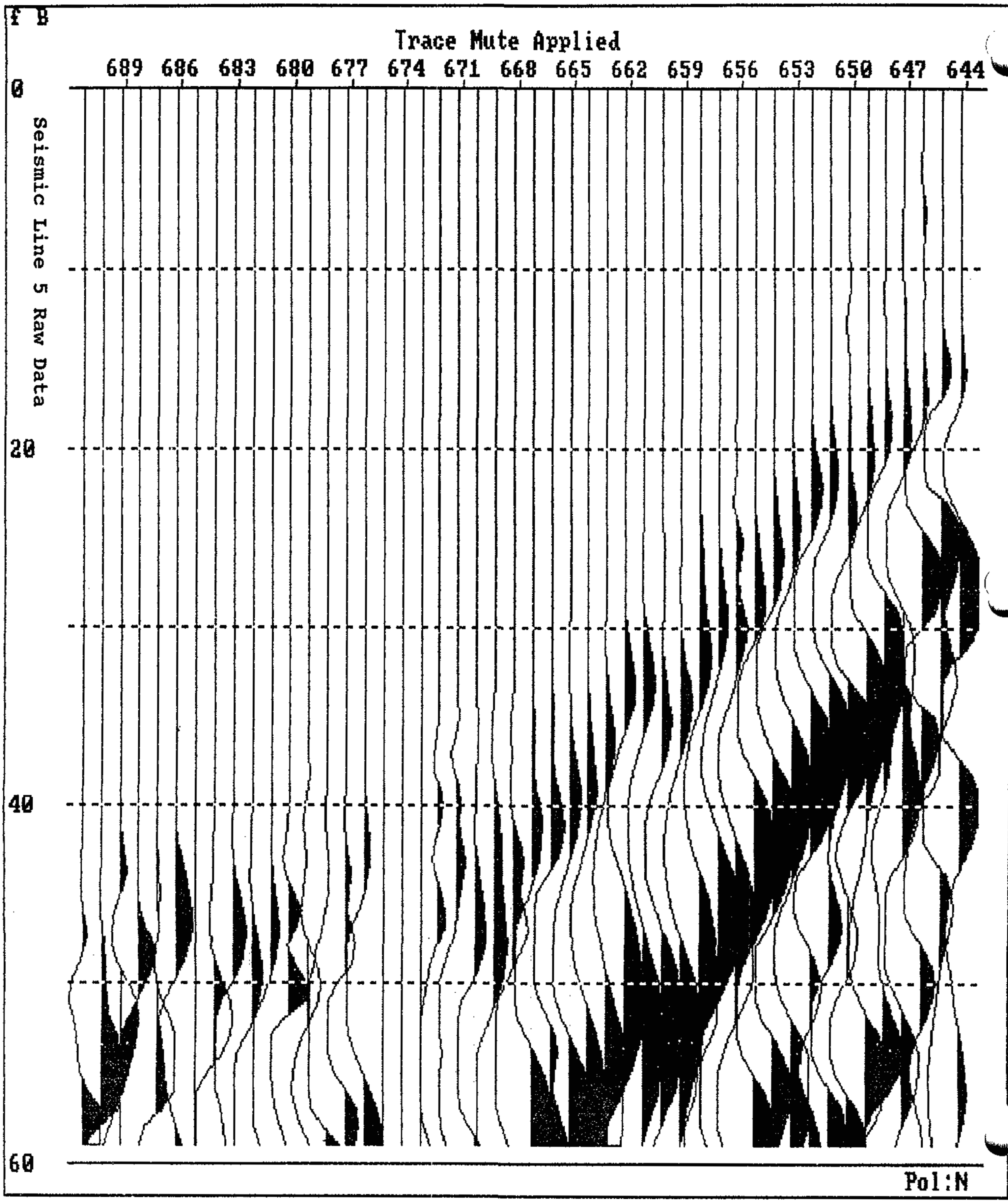


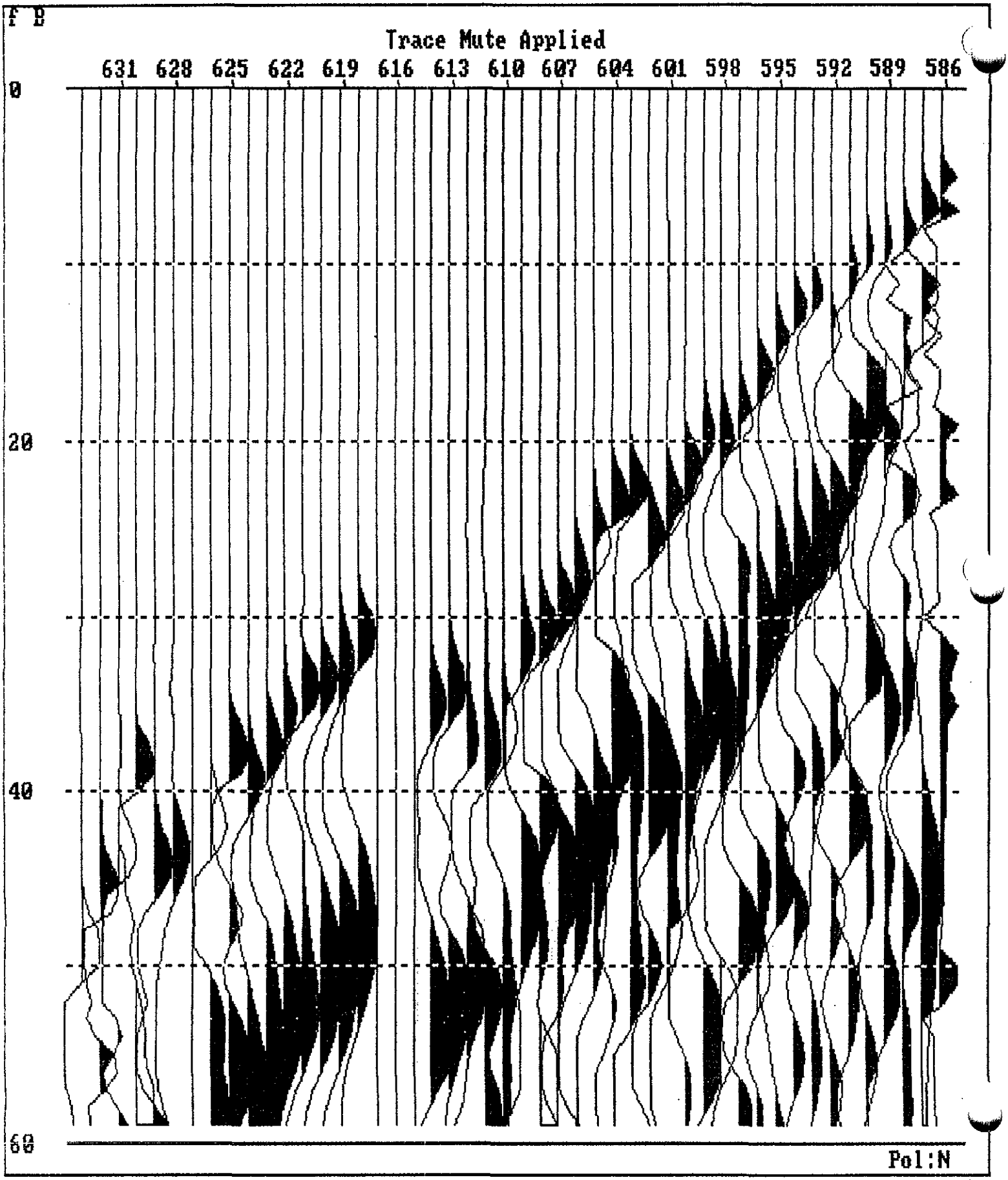
Figure 11.

Seismic Line 5

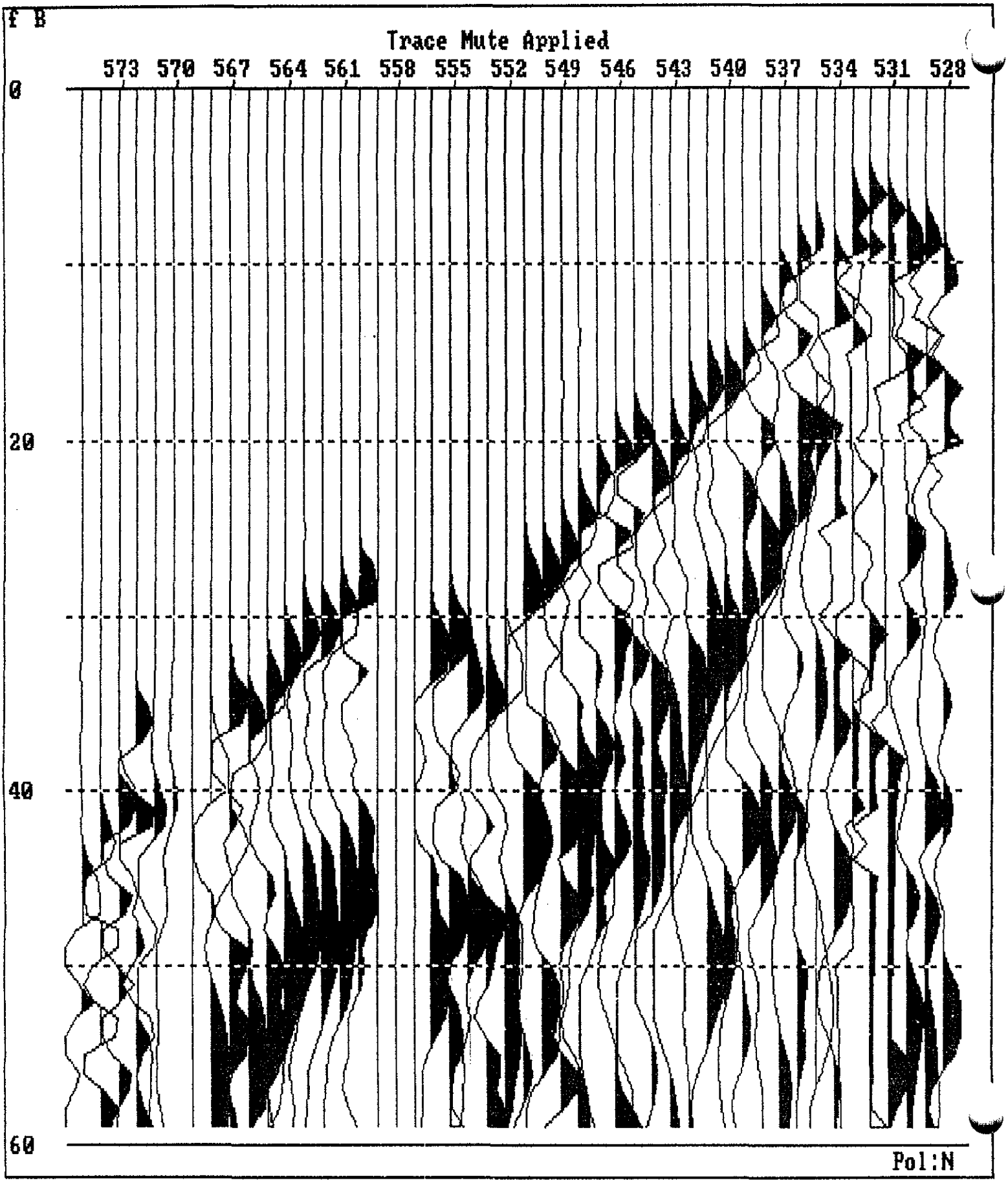
Figure 12. LINE 5 SP 88 OFFSET



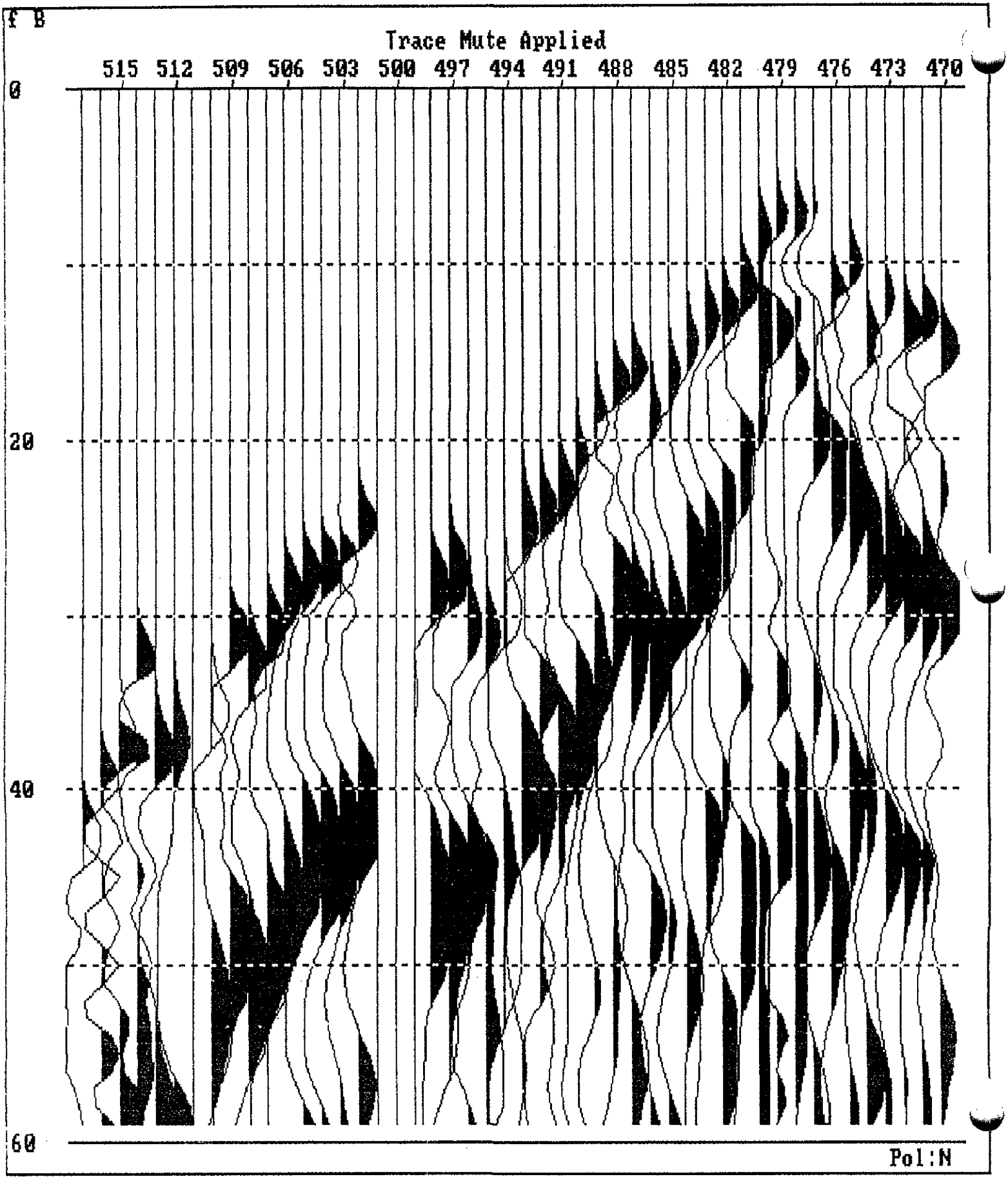
LINE 5 SP 93


F B
Trace Mute Applied
631 628 625 622 619 616 613 610 607 604 601 598 595 592 589 586
0
20
40
60
Pol:N

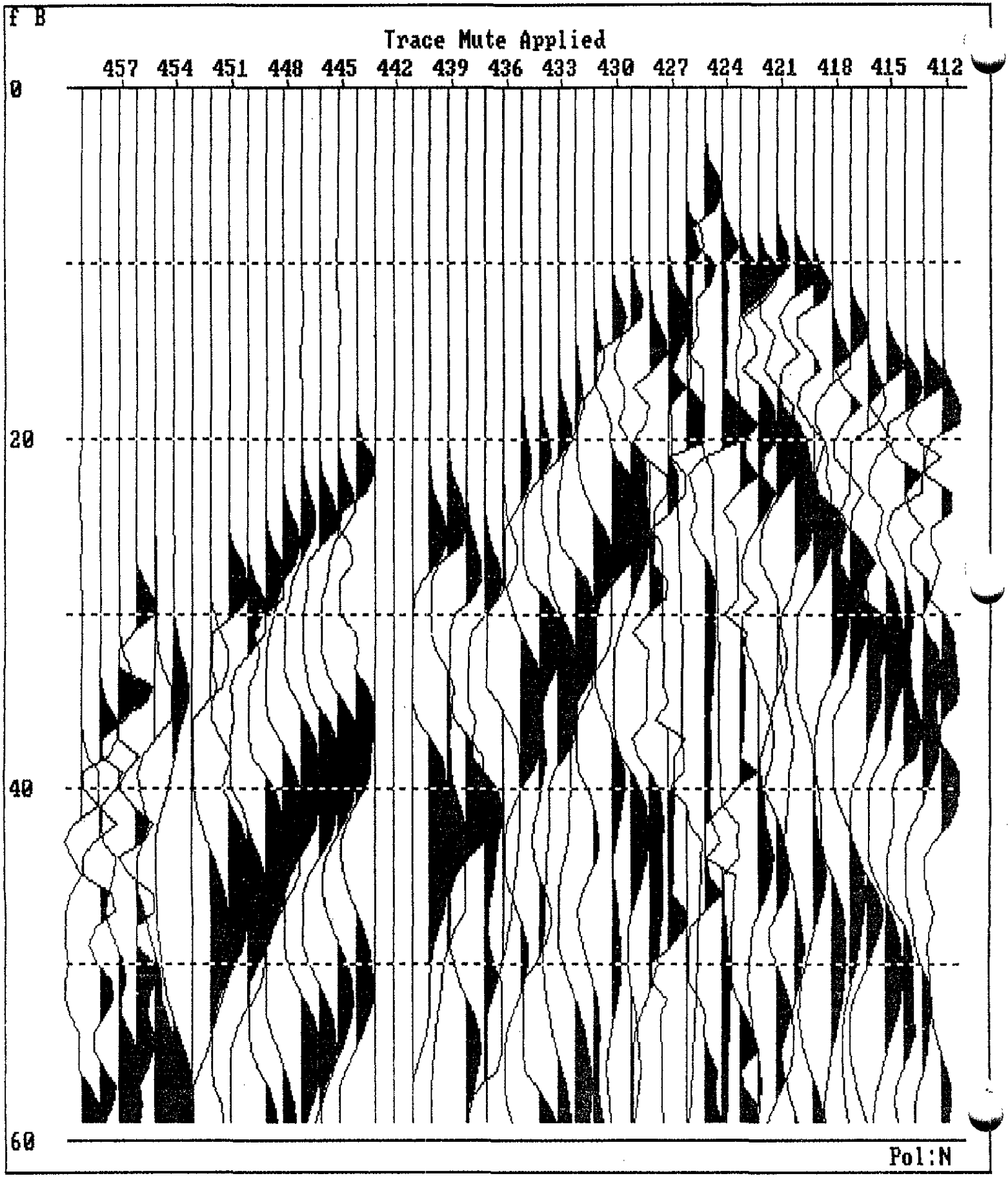
LINE 5 SP 97


f B
Trace Mute Applied
573 570 567 564 561 558 555 552 549 546 543 540 537 534 531 528
0
20
40
60
Pol:N

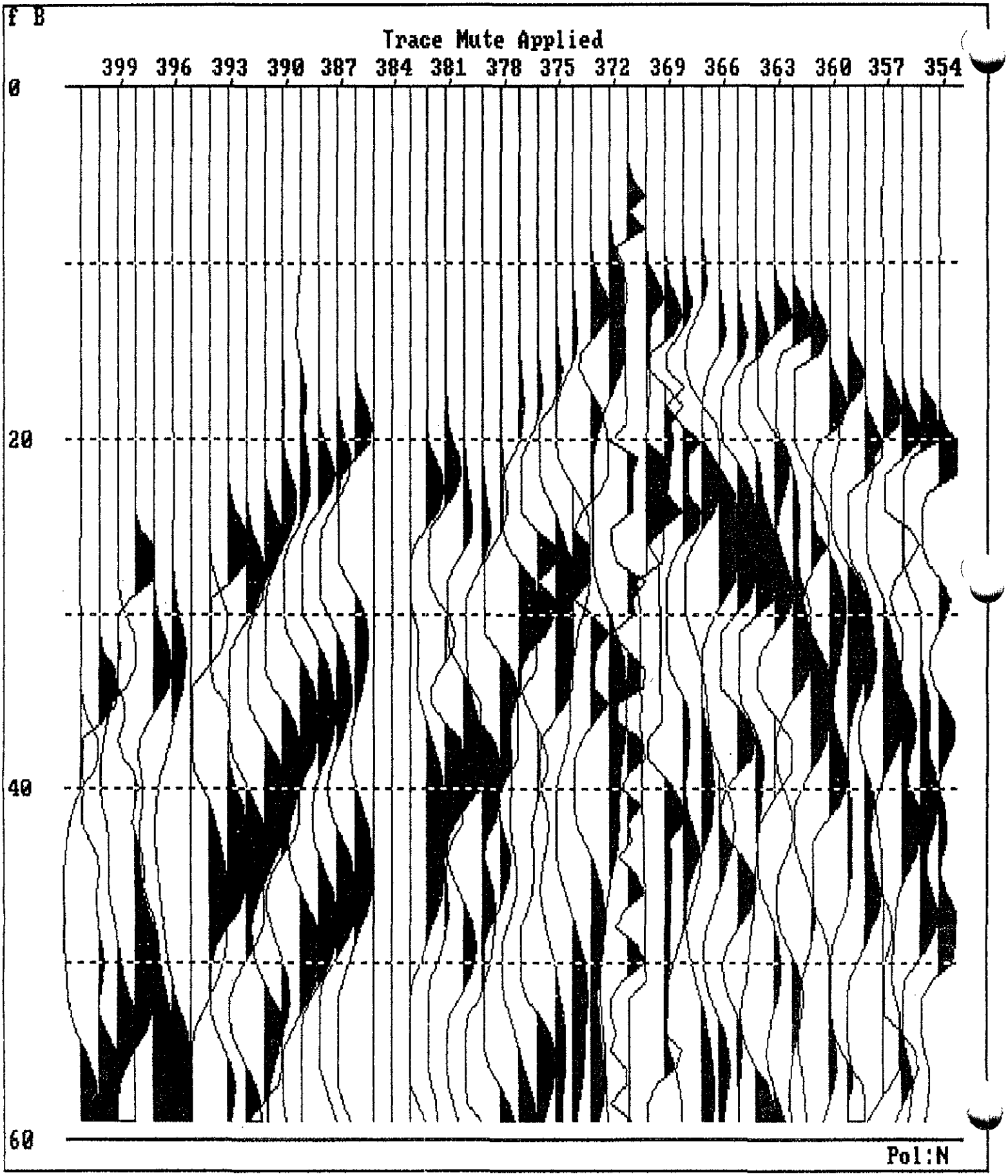
LINE 5 SP 102


F B
Trace Mute Applied
515 512 509 506 503 500 497 494 491 488 485 482 479 476 473 470
0
20
40
60
Pol:N

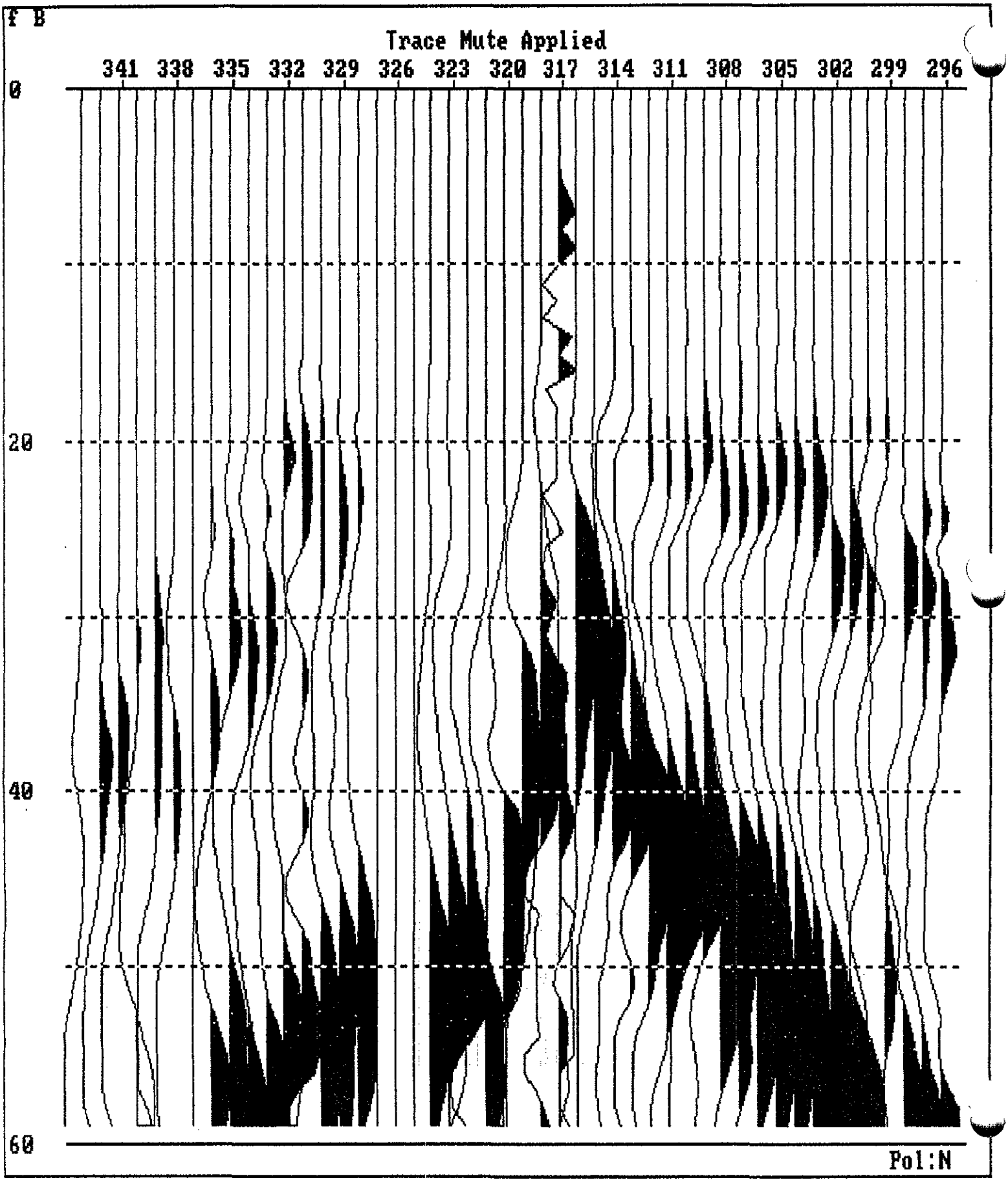
LINE 5 SP 106


f B
Trace Mute Applied
457 454 451 448 445 442 439 436 433 430 427 424 421 418 415 412
0
20
40
60
Pol:N

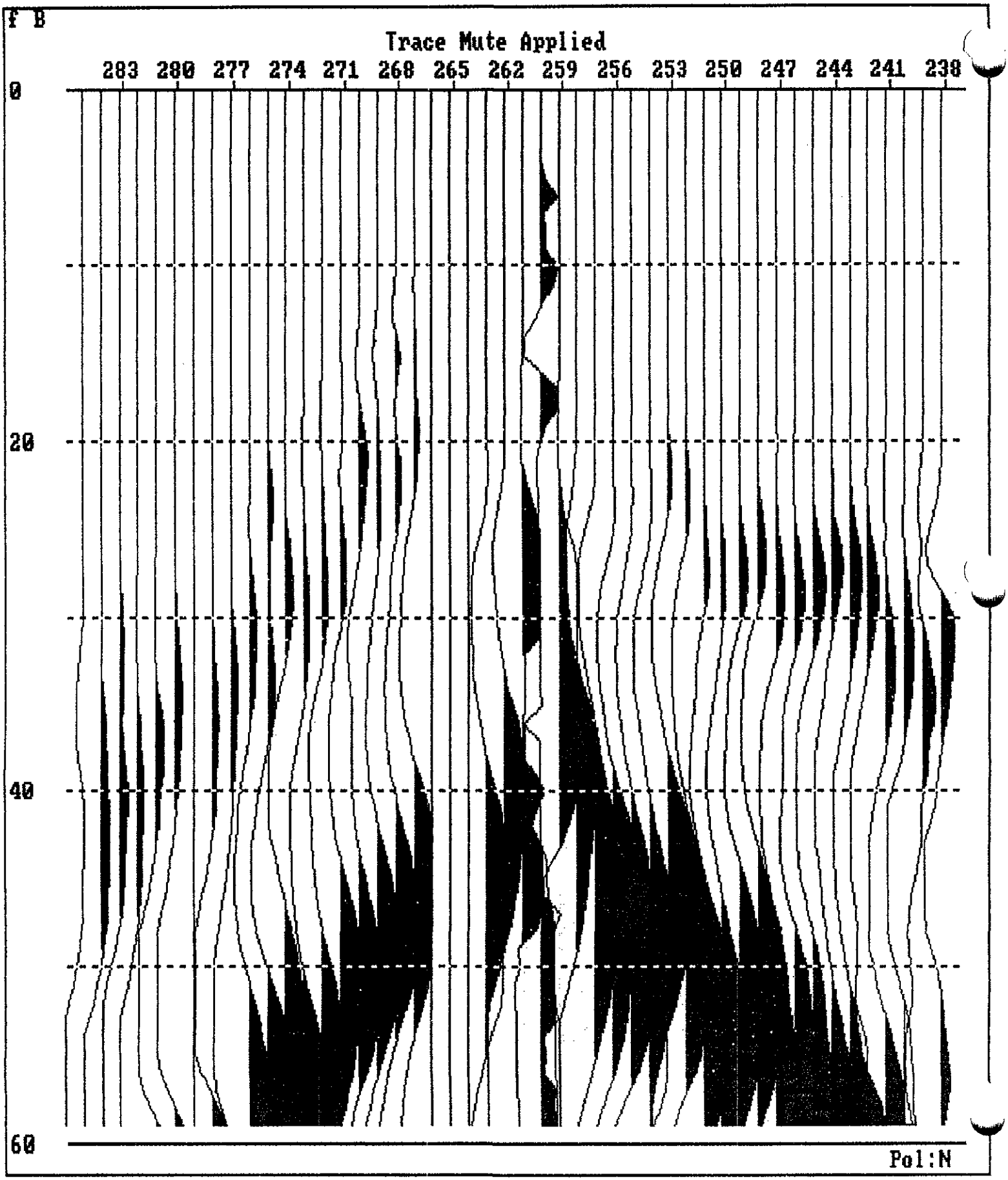
LINE 5 SP 110


f B
Trace Mute Applied
399 396 393 390 387 384 381 378 375 372 369 366 363 360 357 354
0
20
40
60
Pol:N

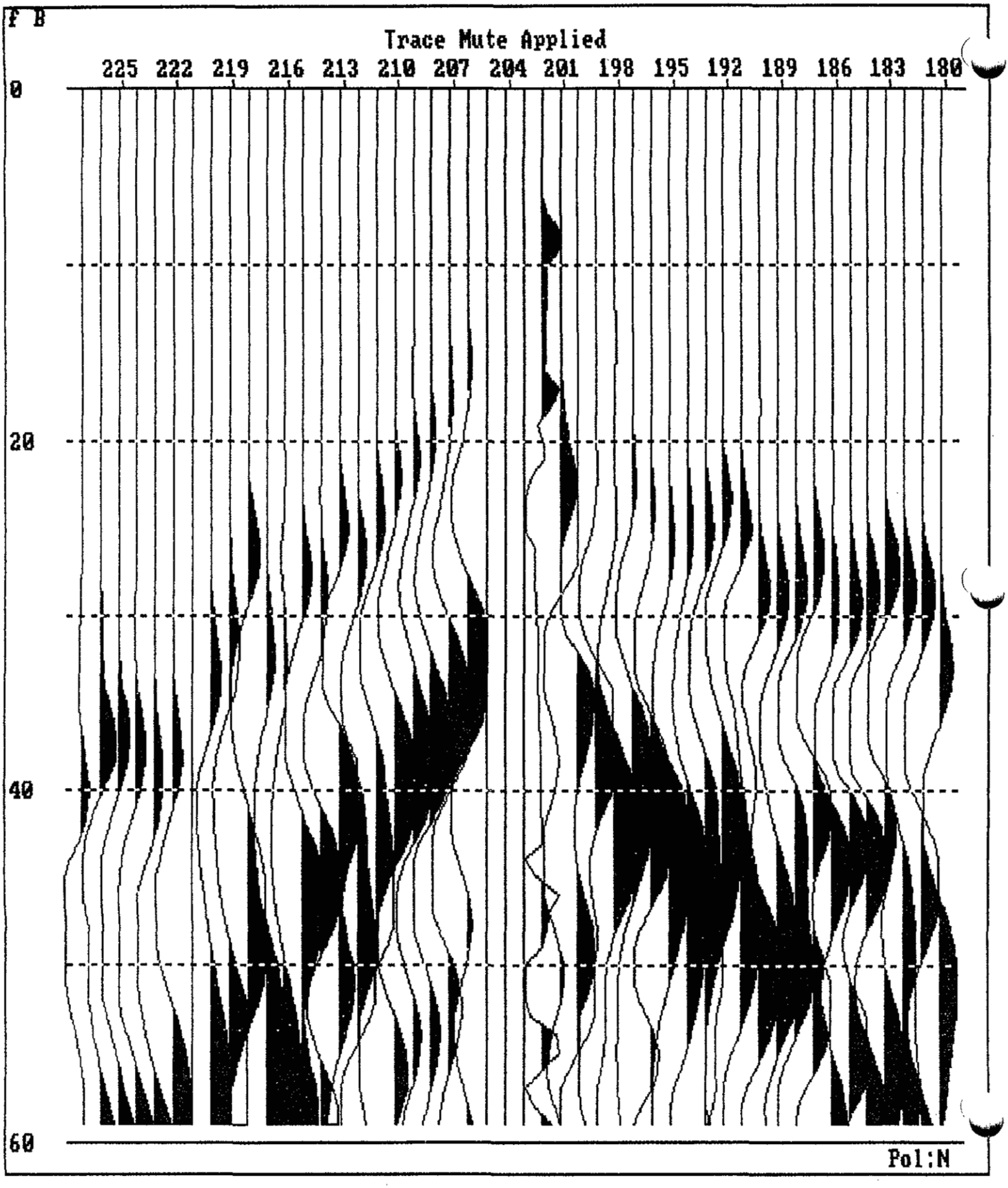
LINE 5 SP 114


f B
Trace Mute Applied
341 338 335 332 329 326 323 320 317 314 311 308 305 302 299 296
0
20
40
60
Pol:N

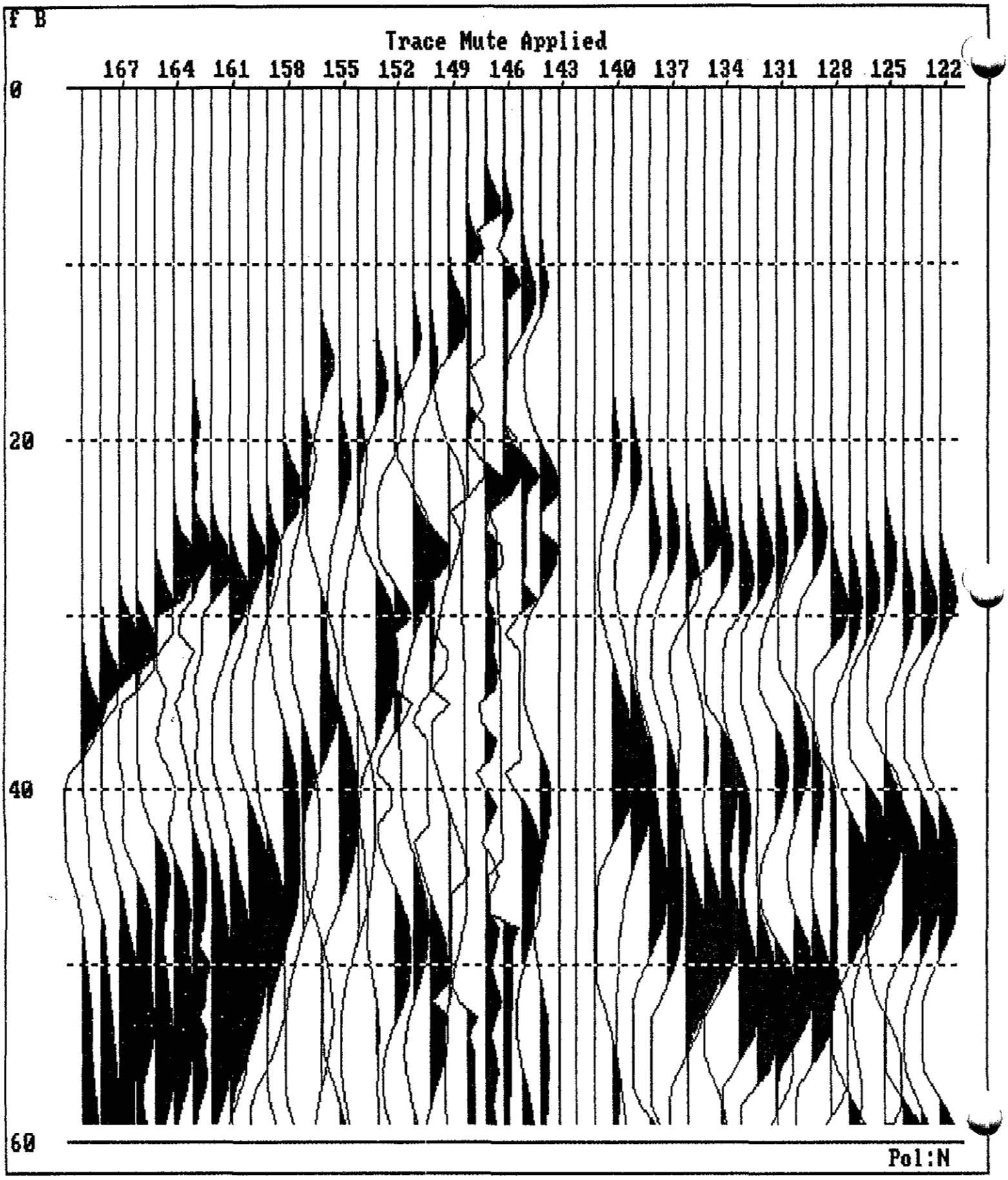
LINE 5 SP118


f B
Trace Mute Applied
283 280 277 274 271 268 265 262 259 256 253 250 247 244 241 238
0
20
40
60
Pol:N

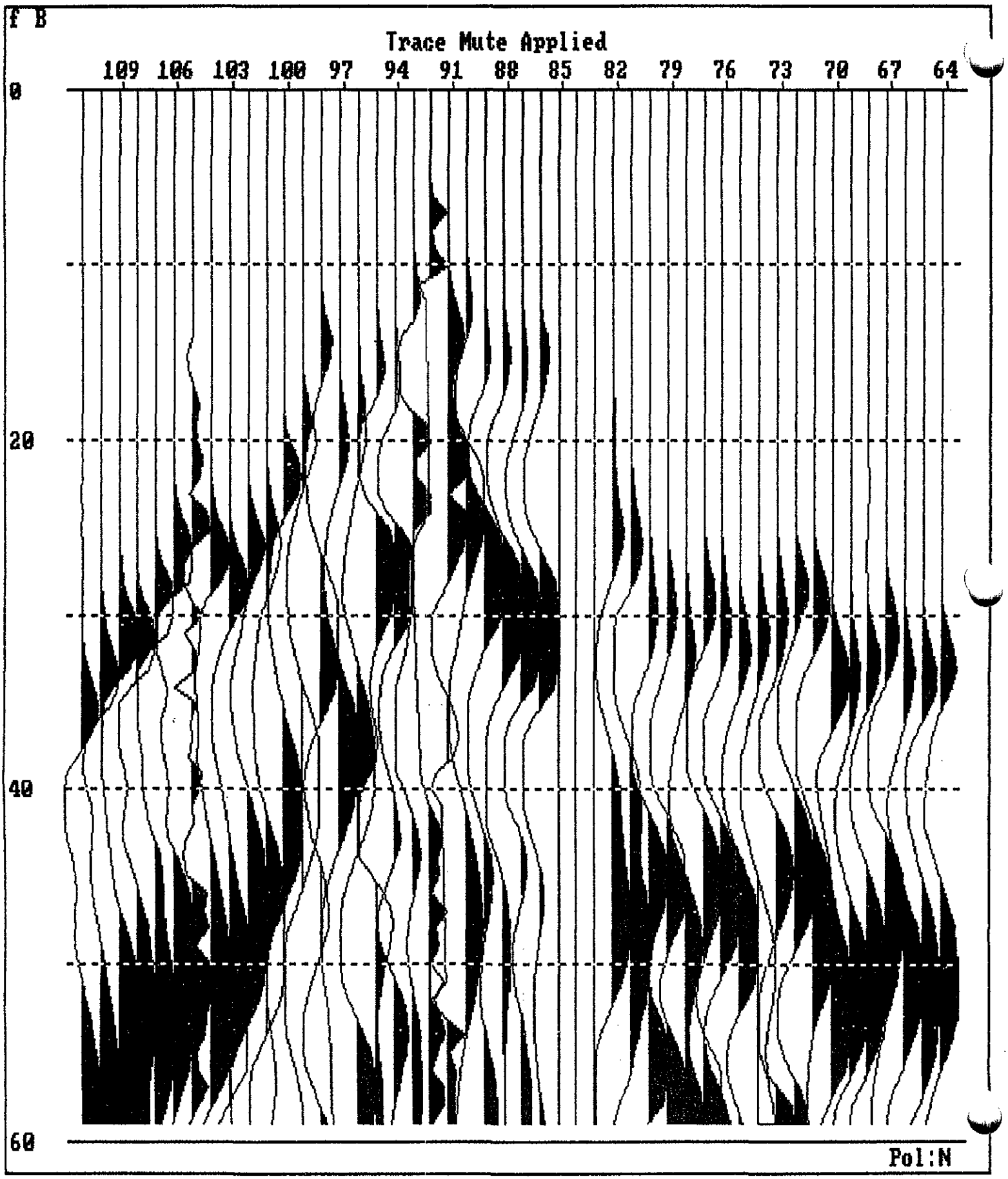
LINE 5 SP 121


F B
Trace Mute Applied
225 222 219 216 213 210 207 204 201 198 195 192 189 186 183 180
0
20
40
60
Pol:N

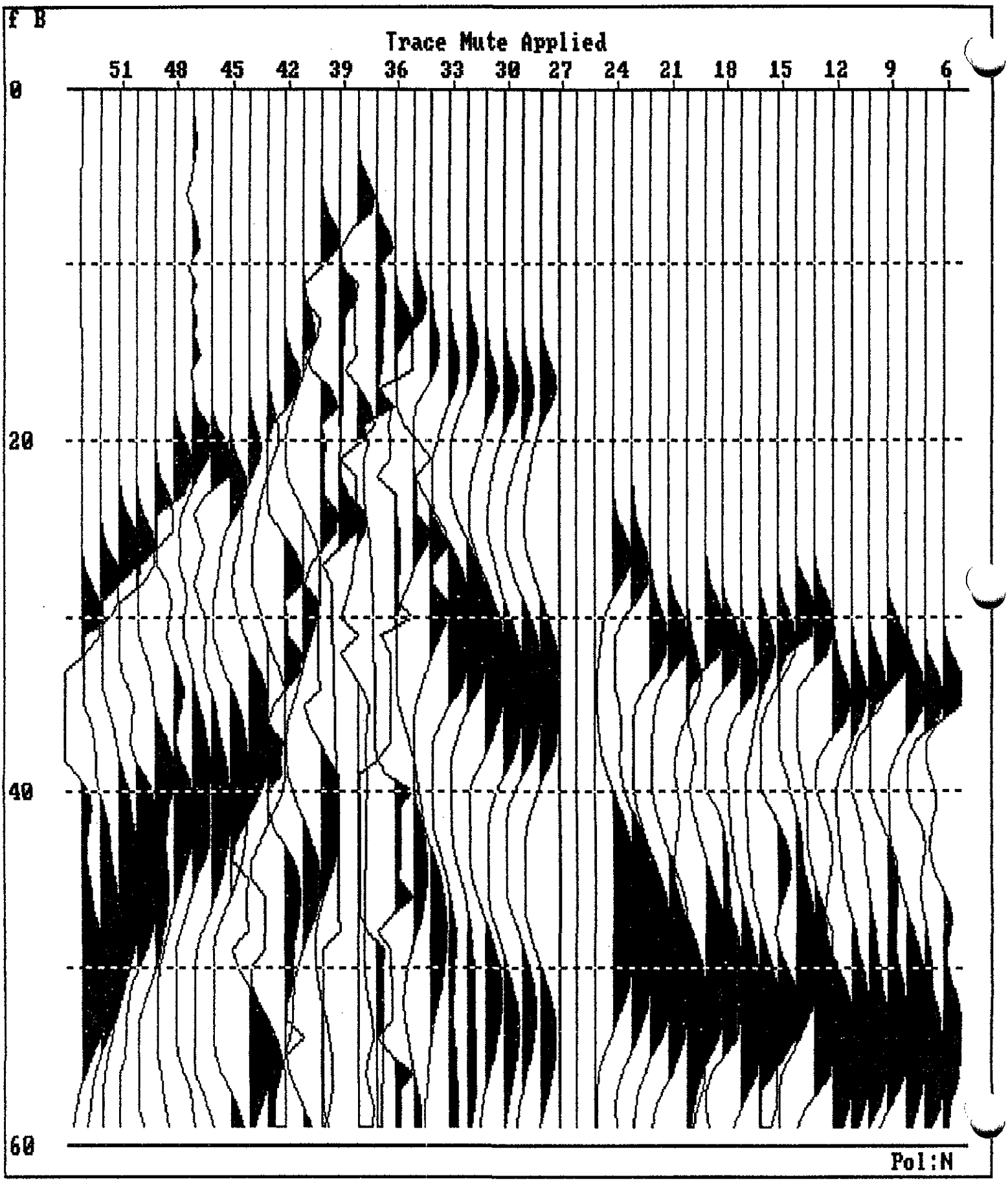
LINE 5 SP 128


F B
Trace Mute Applied
167 164 161 158 155 152 149 146 143 140 137 134 131 128 125 122
0
20
40
60
Pol:N

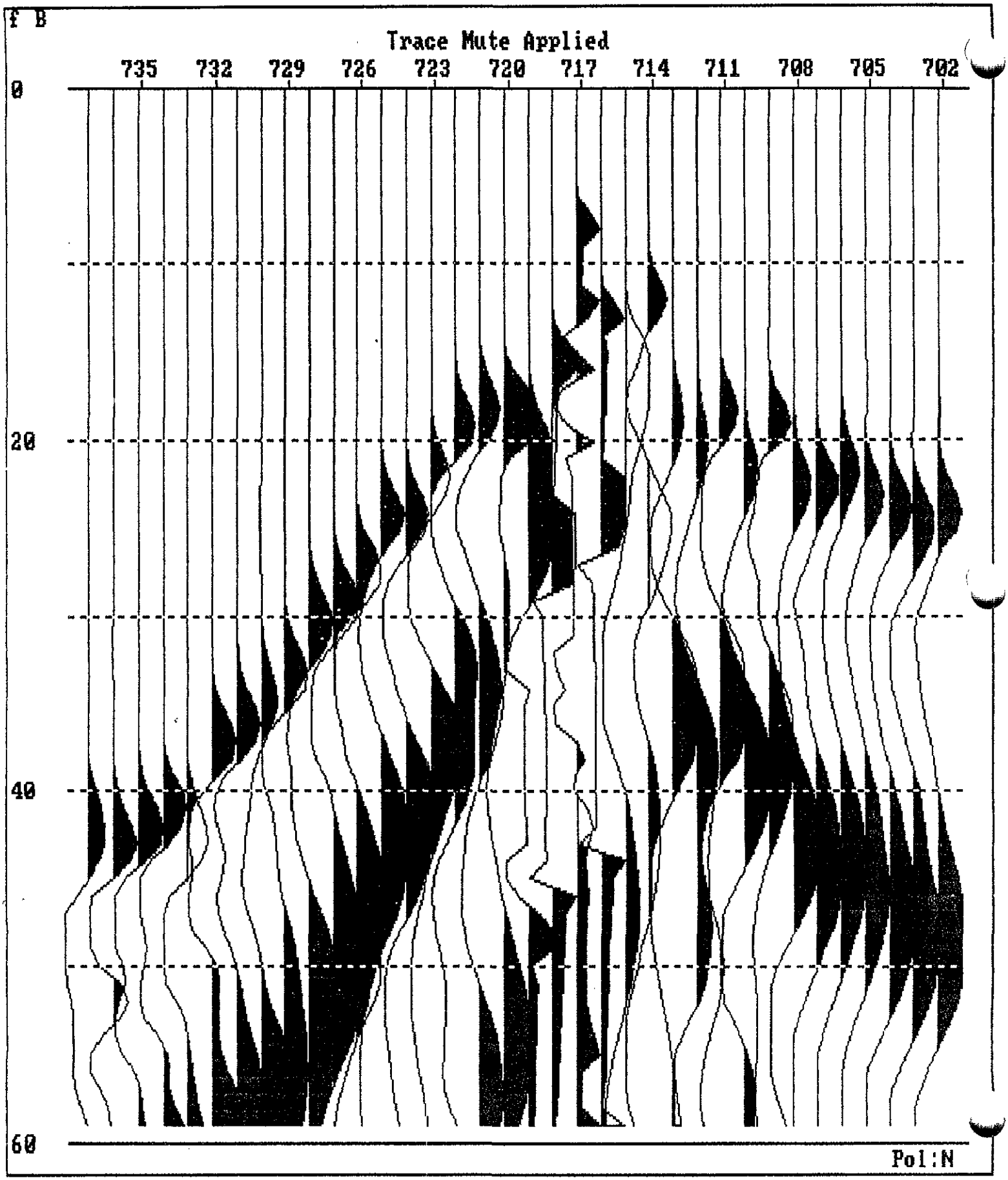
LINE 5 SP 131


f B
Trace Mute Applied
109 106 103 100 97 94 91 88 85 82 79 76 73 70 67 64
0
20
40
60
Pol:N

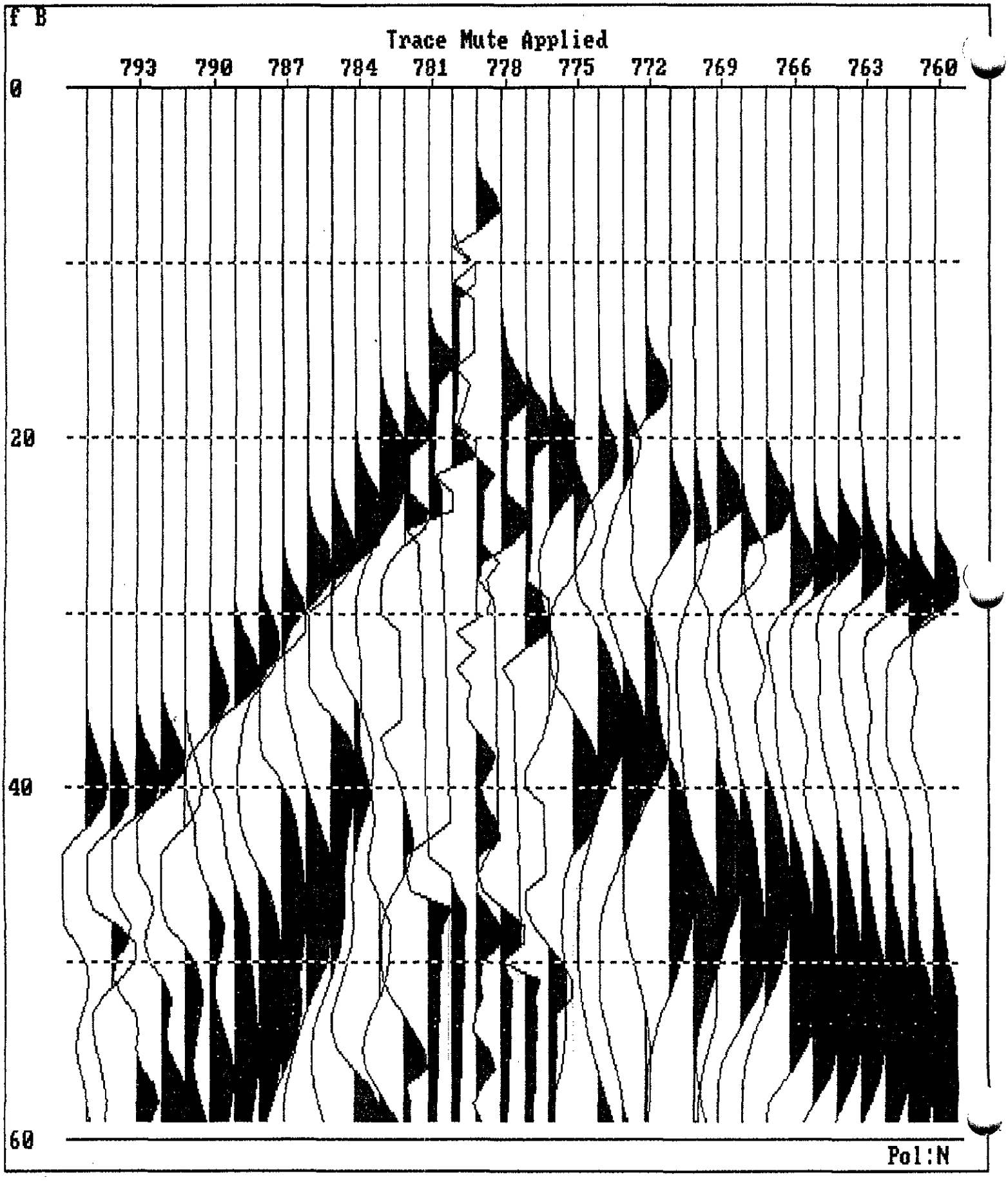
LINE 5 SP 135


f B
Trace Mute Applied
51 48 45 42 39 36 33 30 27 24 21 18 15 12 9 6
0
20
40
60
Pol:N

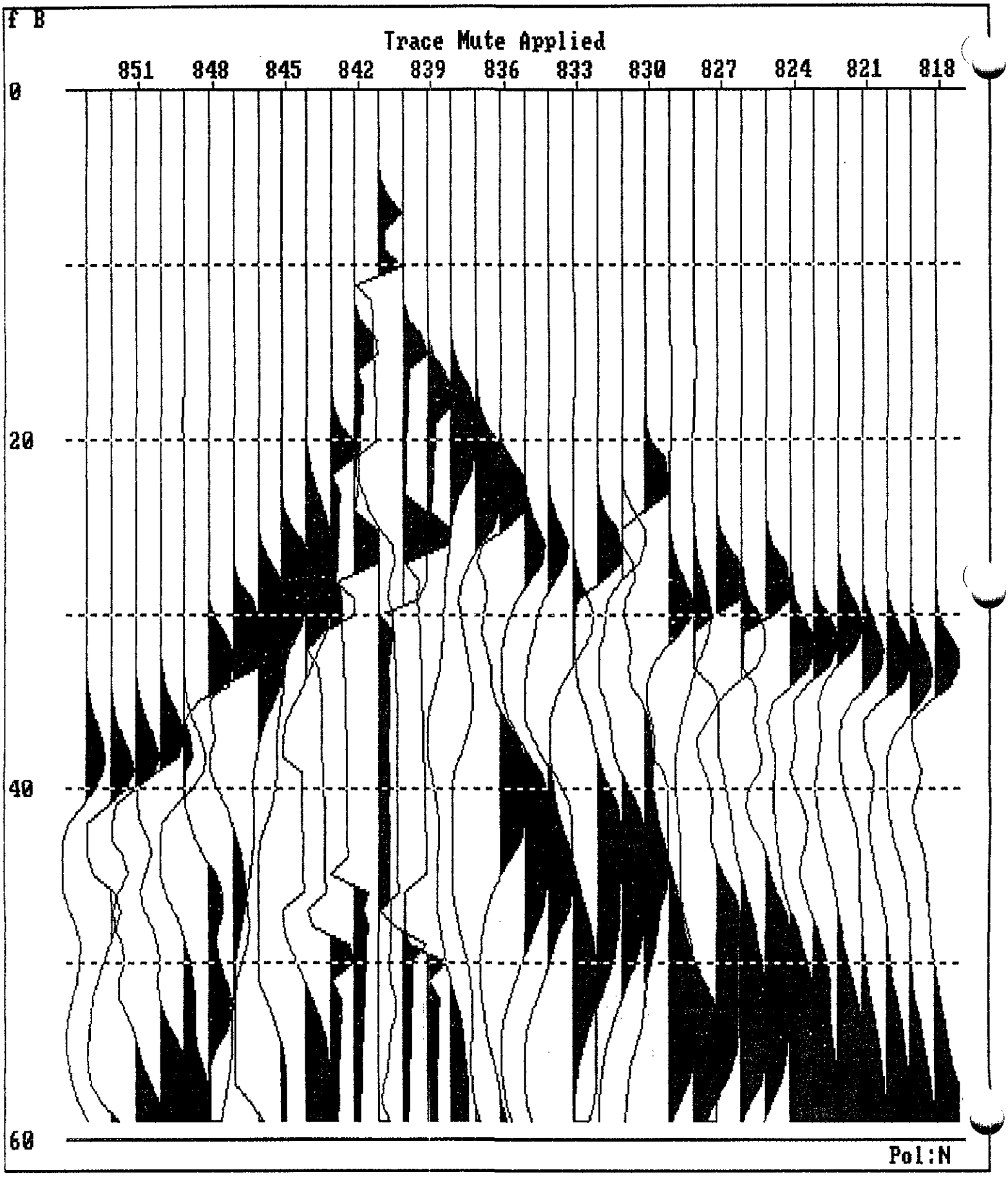
LINE 5 SP 140


f B
Trace Mute Applied
735
732
729
726
723
720
717
714
711
708
705
702
0
20
40
60
Pol:N

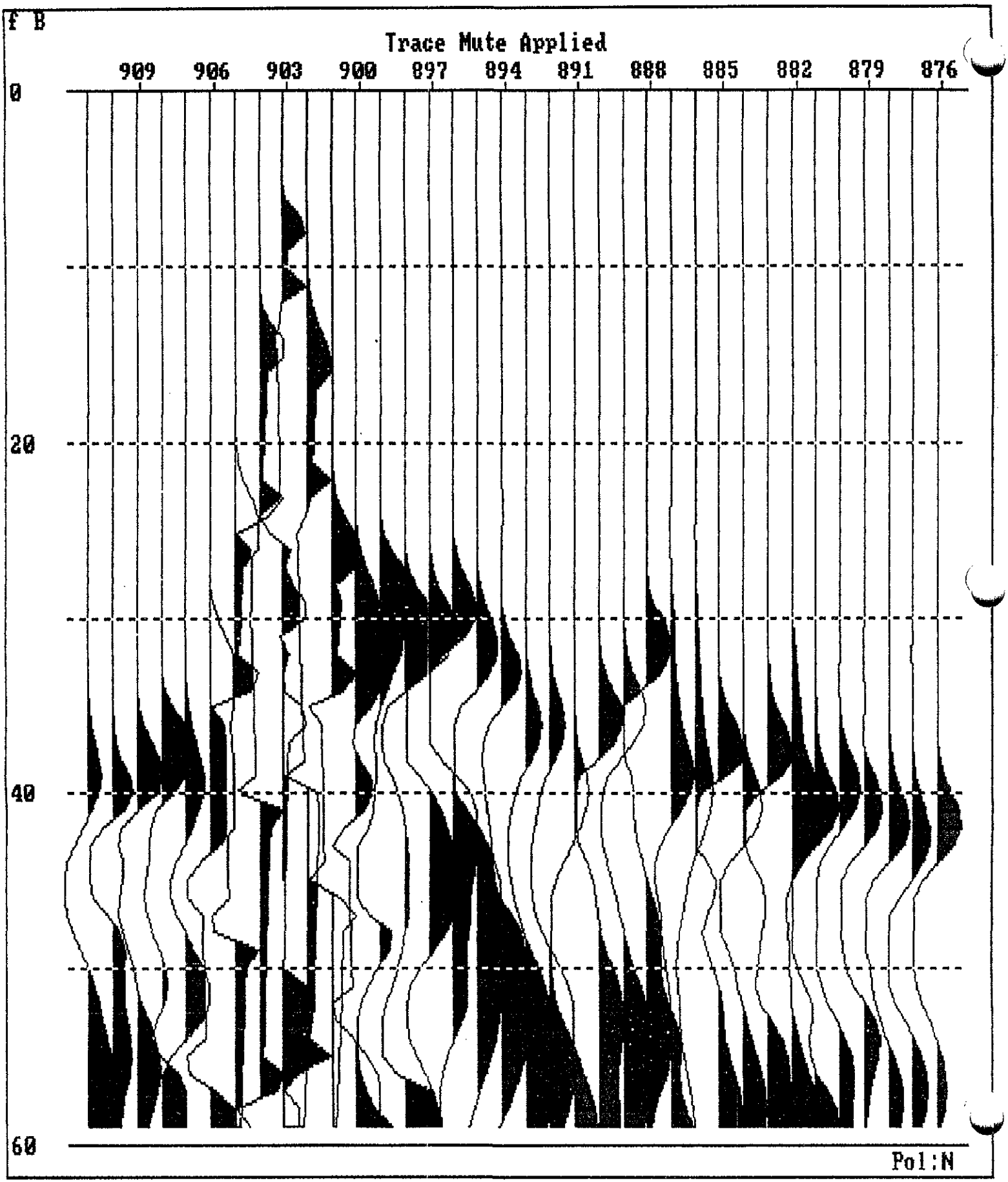
LINE 5 SP 144


F B
Trace Mute Applied
793
790
787
784
781
778
775
772
769
766
763
760
0
20
40
60
Pol:N

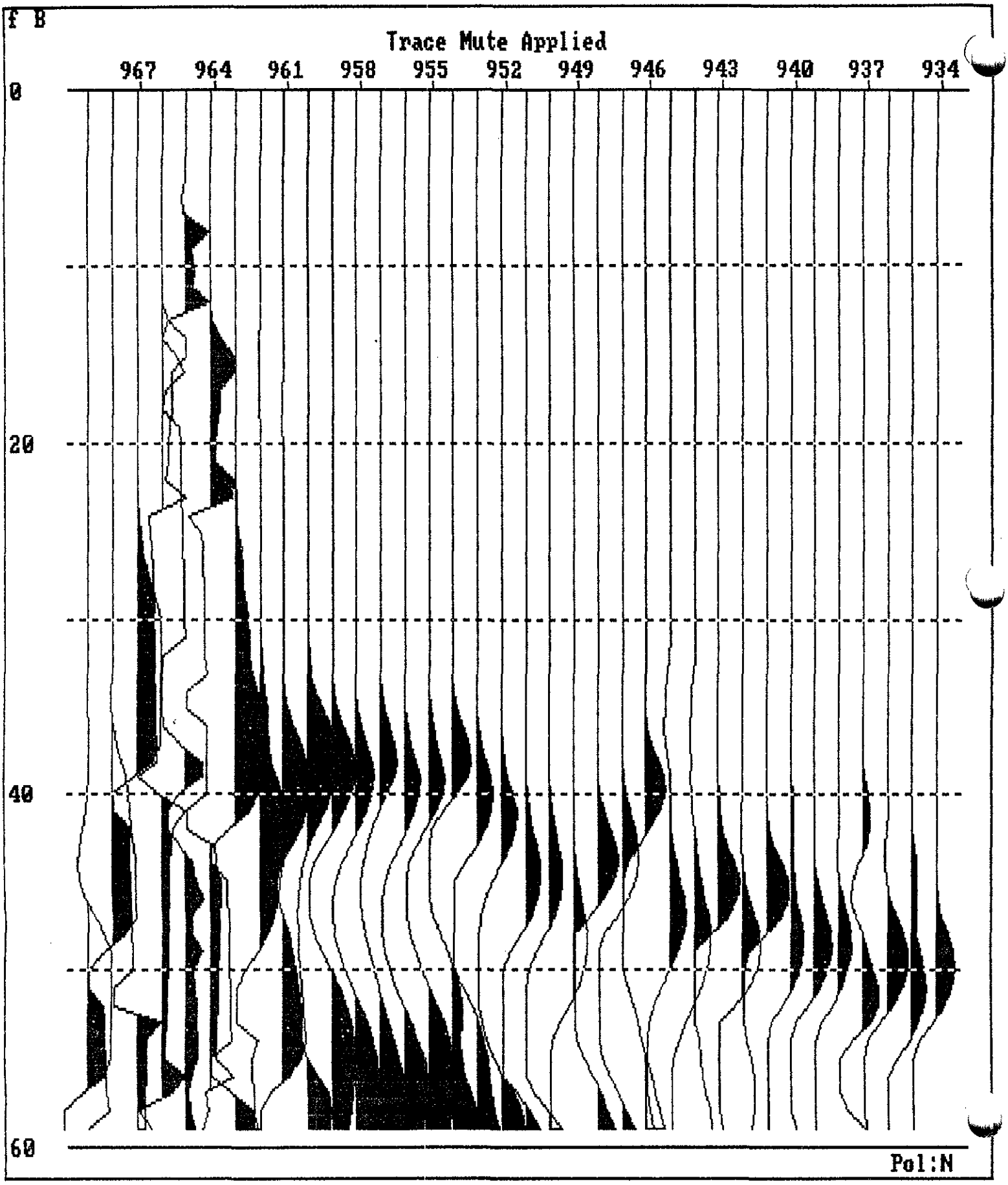
Line 5 SP 148


f B
Trace Mute Applied
851
848
845
842
839
836
833
830
827
824
821
818
0
20
40
60
Pol:N

LINE 5 SP 152

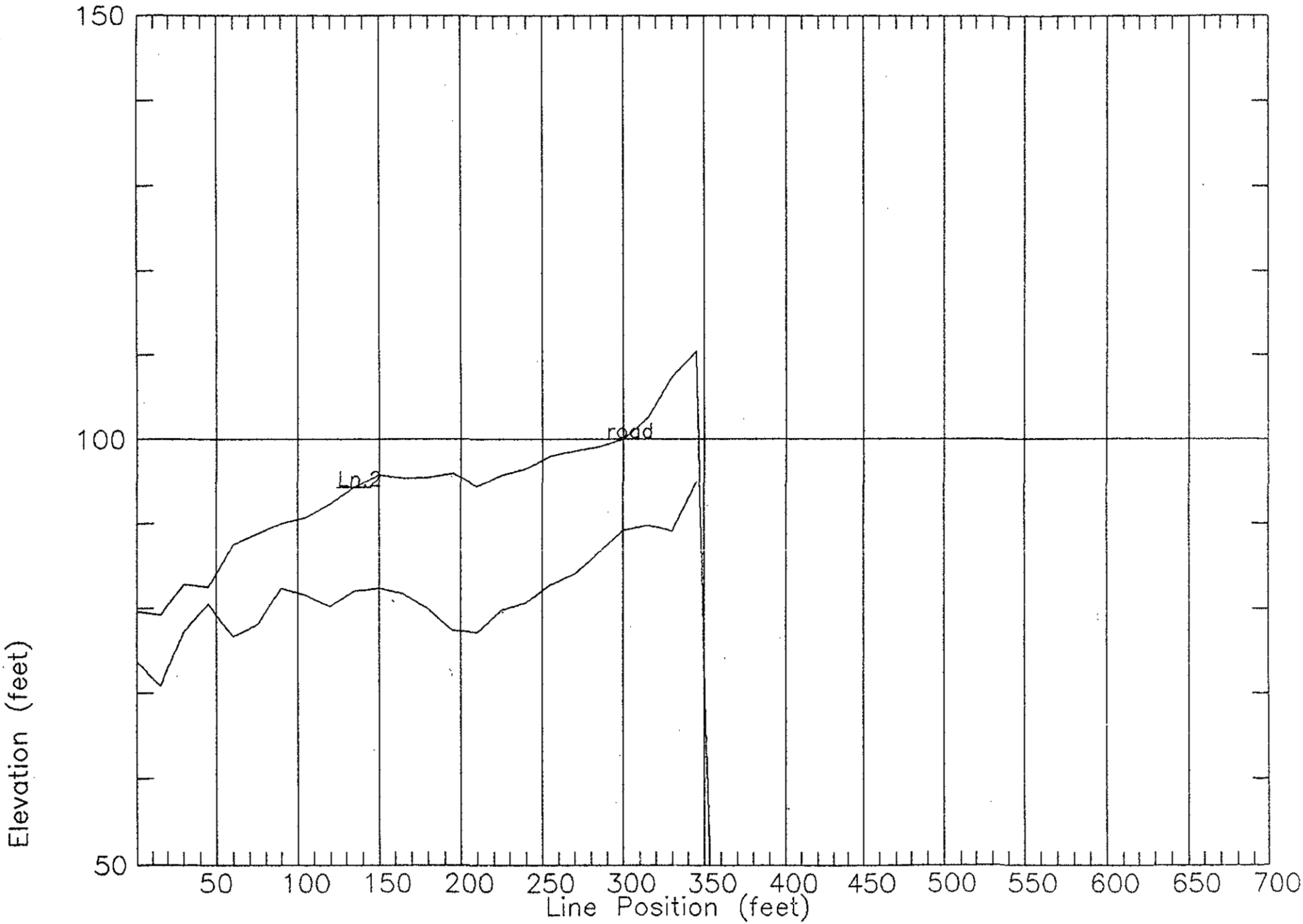

f B
Trace Mute Applied
909
906
903
900
897
894
891
888
885
882
879
876
0
20
40
60
Pol:N

LINE 5 SP 156

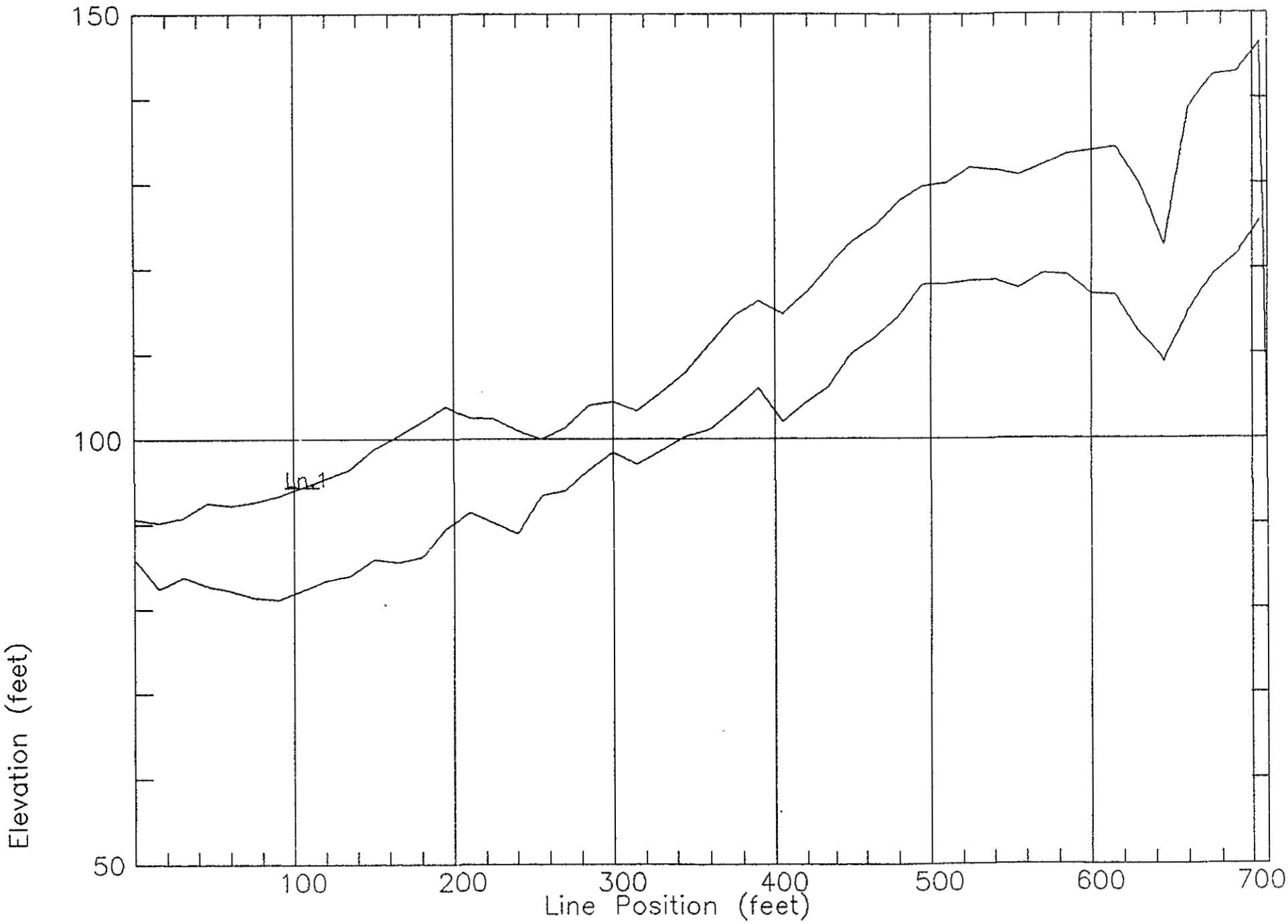

f B
Trace Mute Applied
967
964
961
958
955
952
949
946
943
940
937
934
0
20
40
60
Pol:N

Appendix A

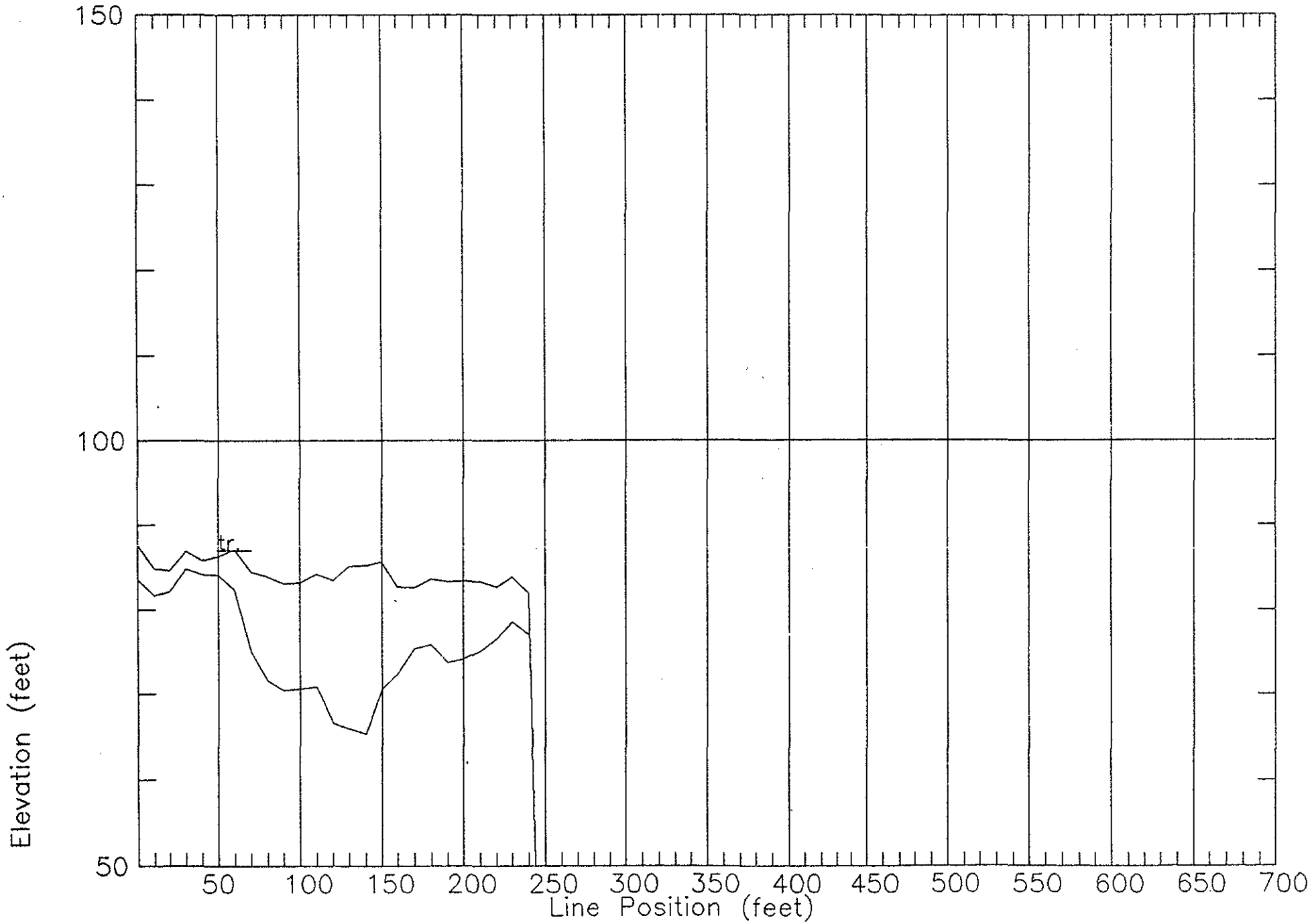
Seismic Profiles, Velocity Profiles,
and
Line 5 Raw Data



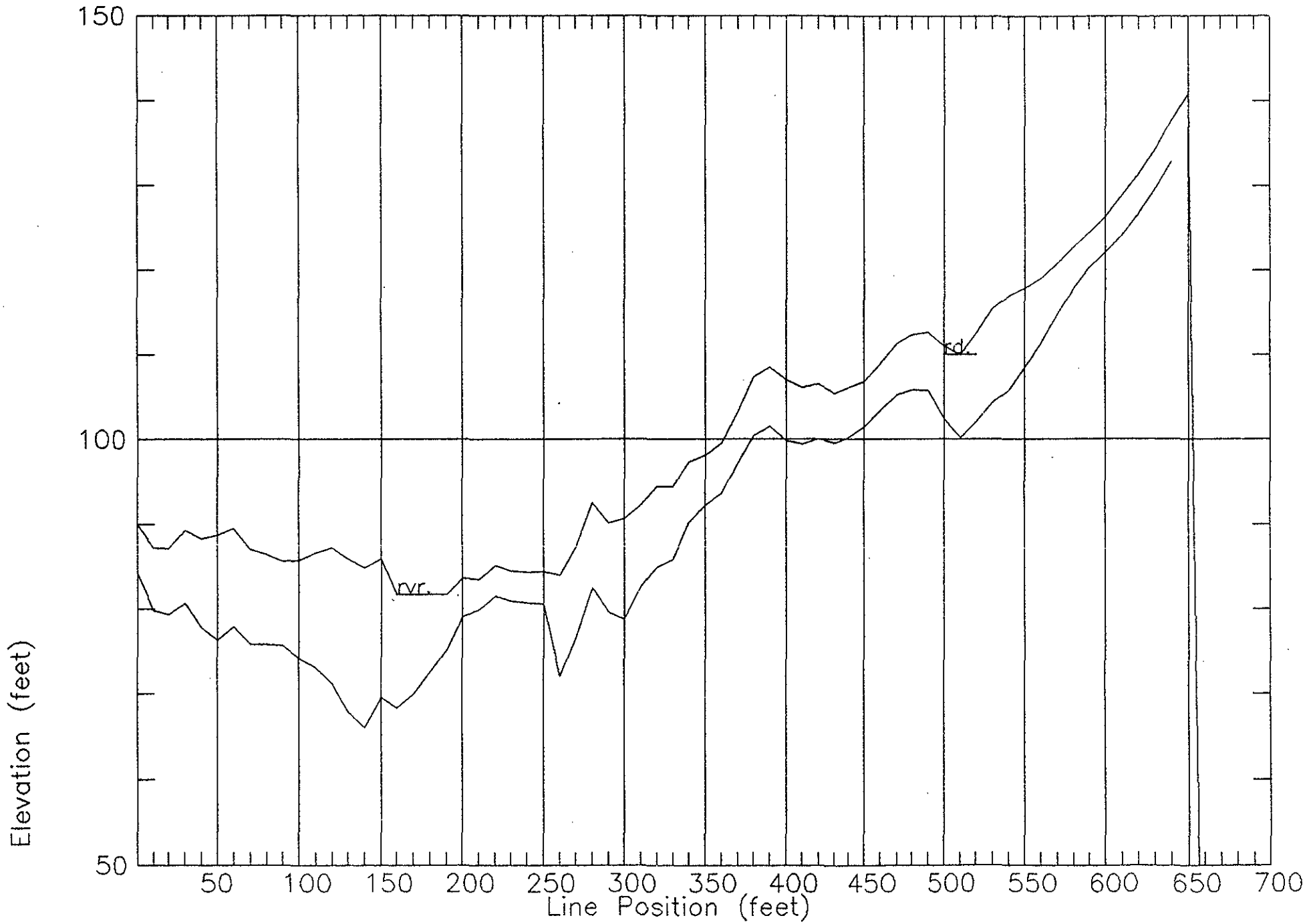
Seismic Line 1



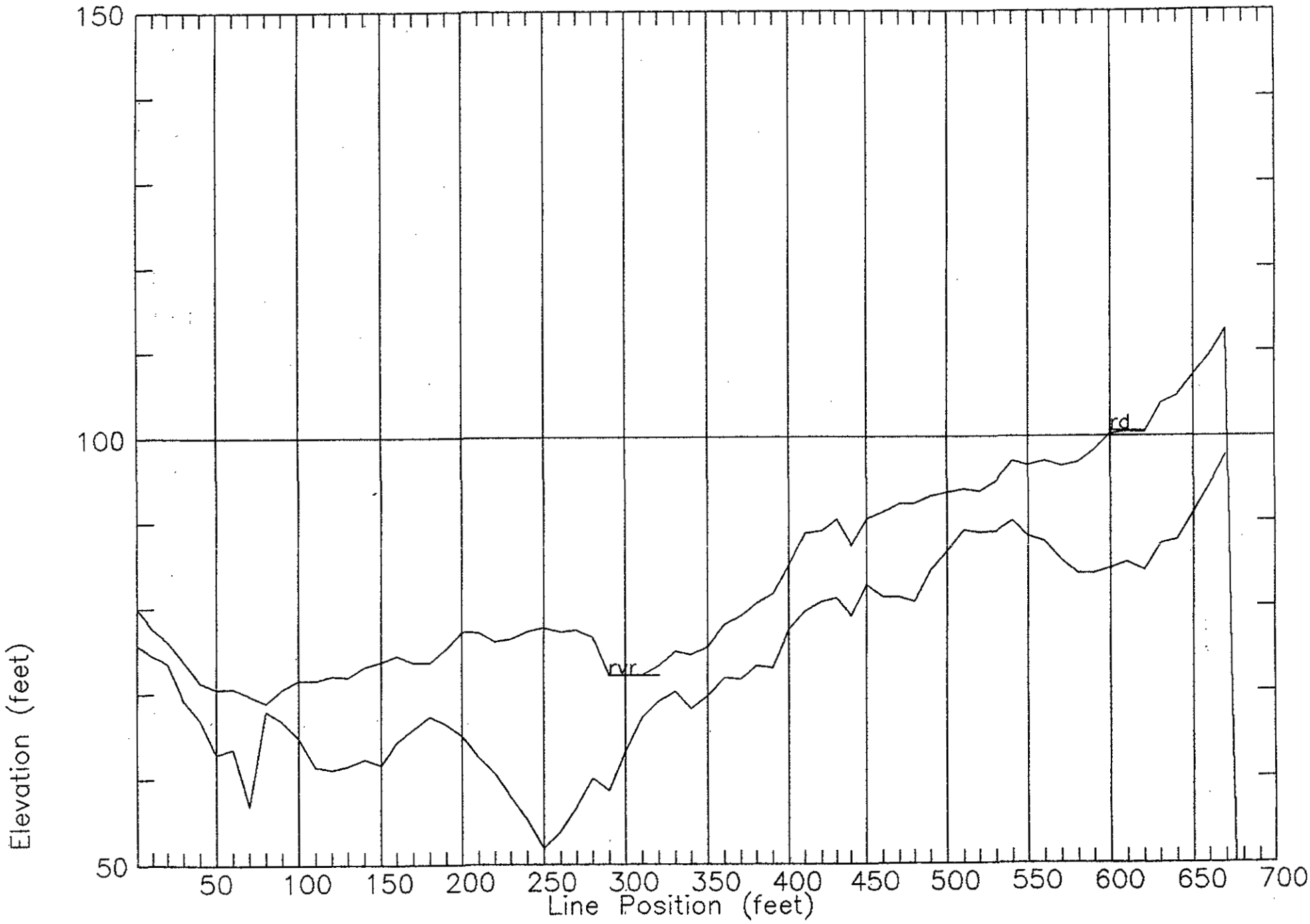
Seismic Line 2



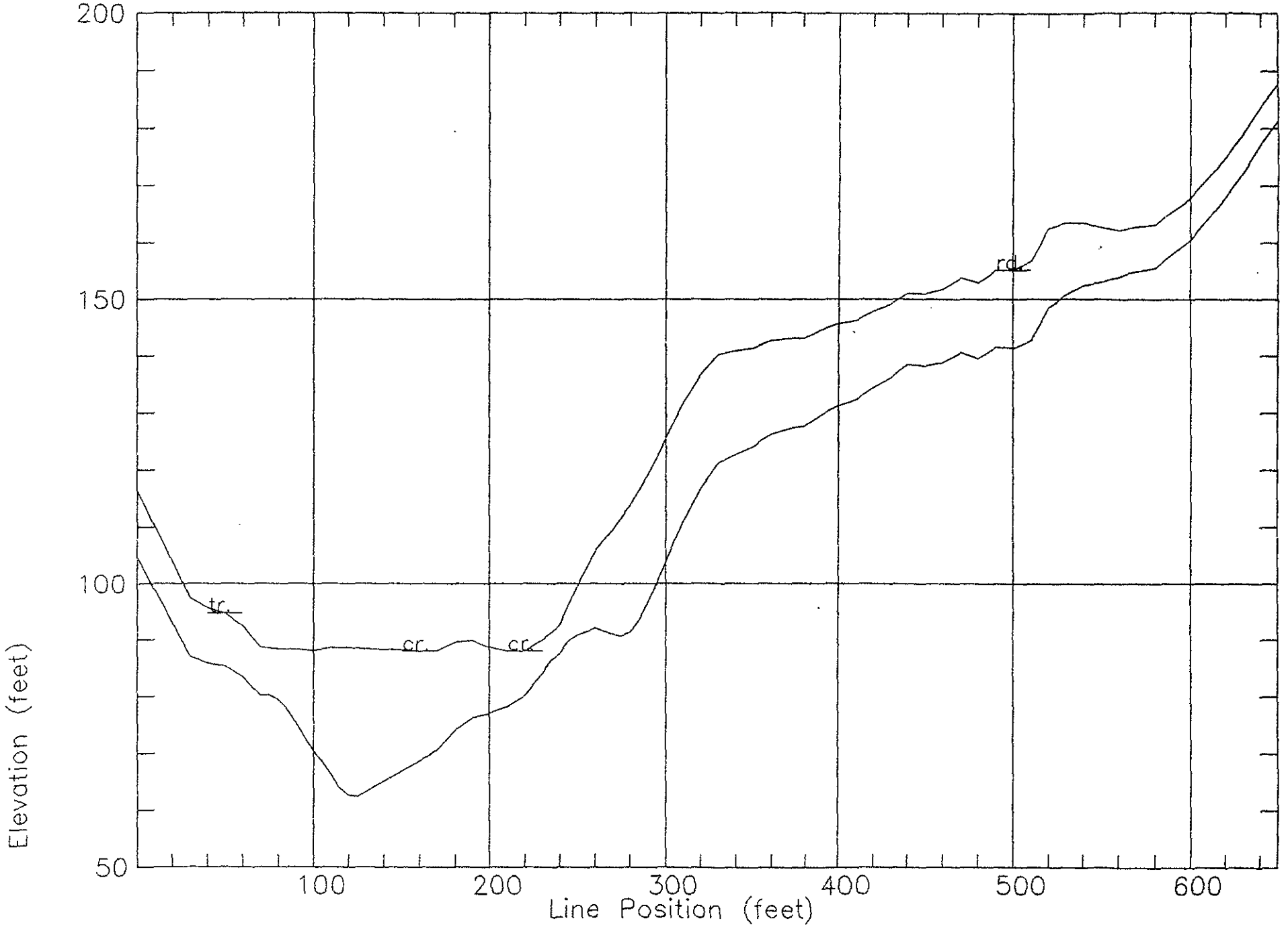
Seismic Line 3



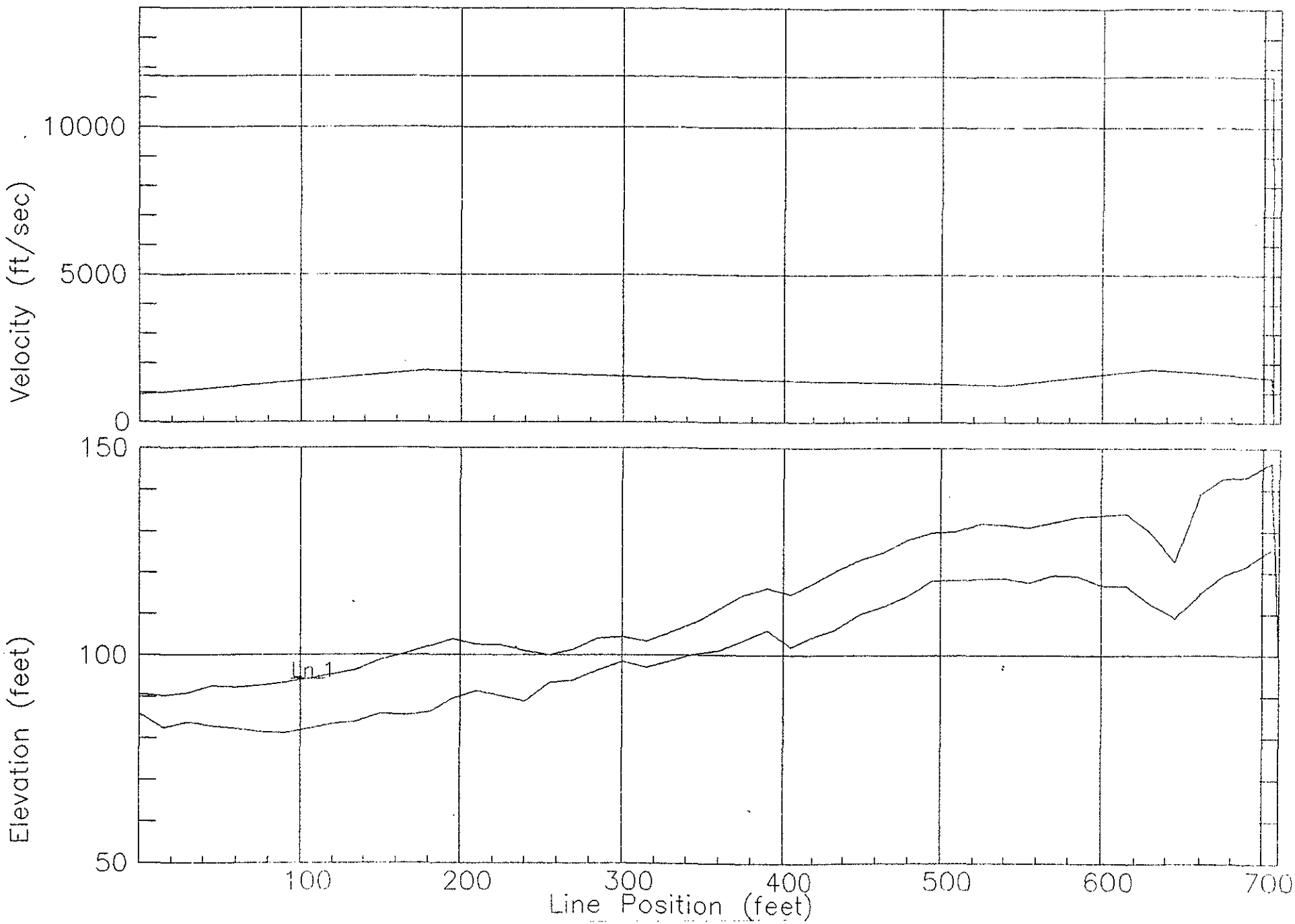
Seismic Line 4



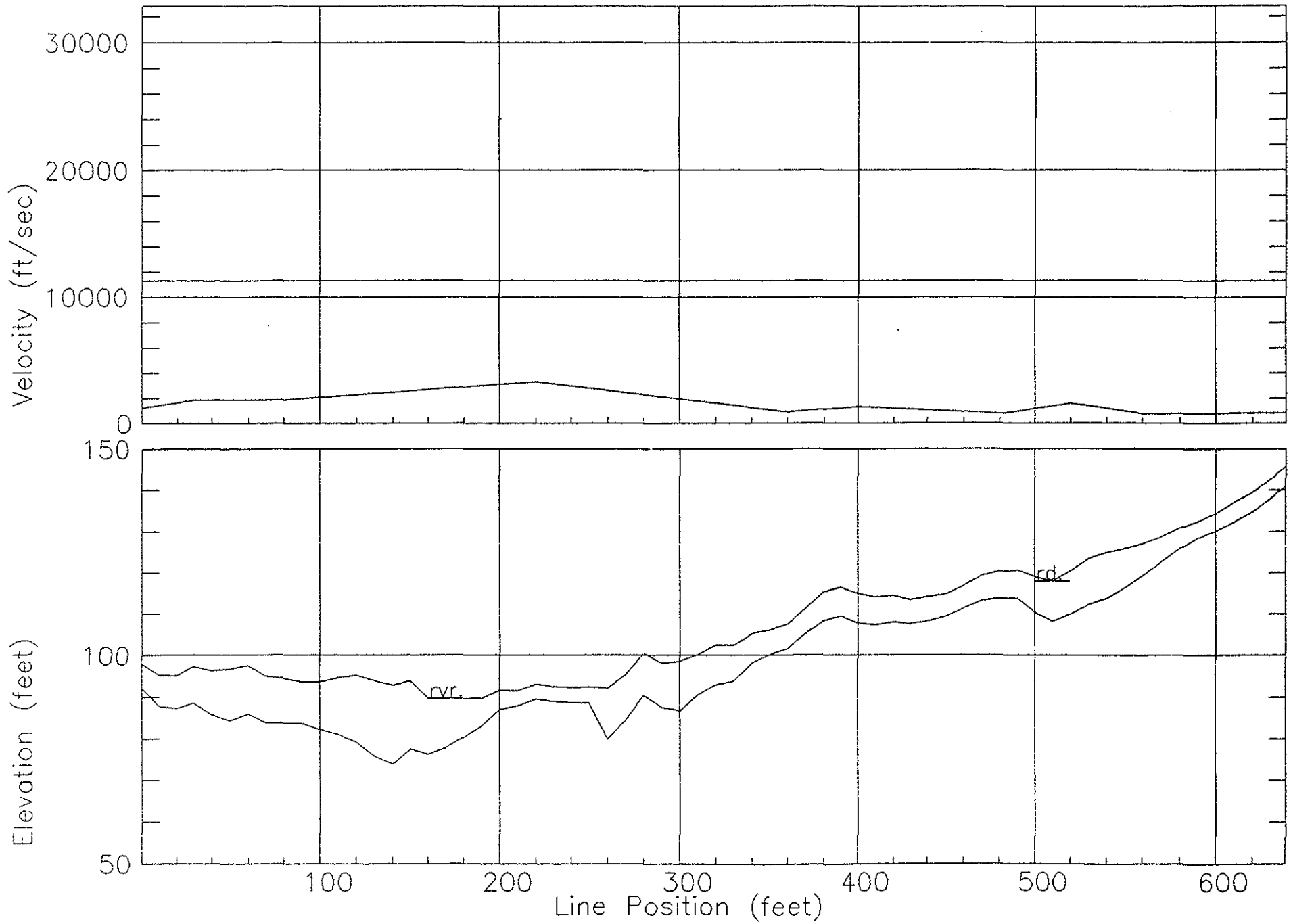
Seismic Line 5



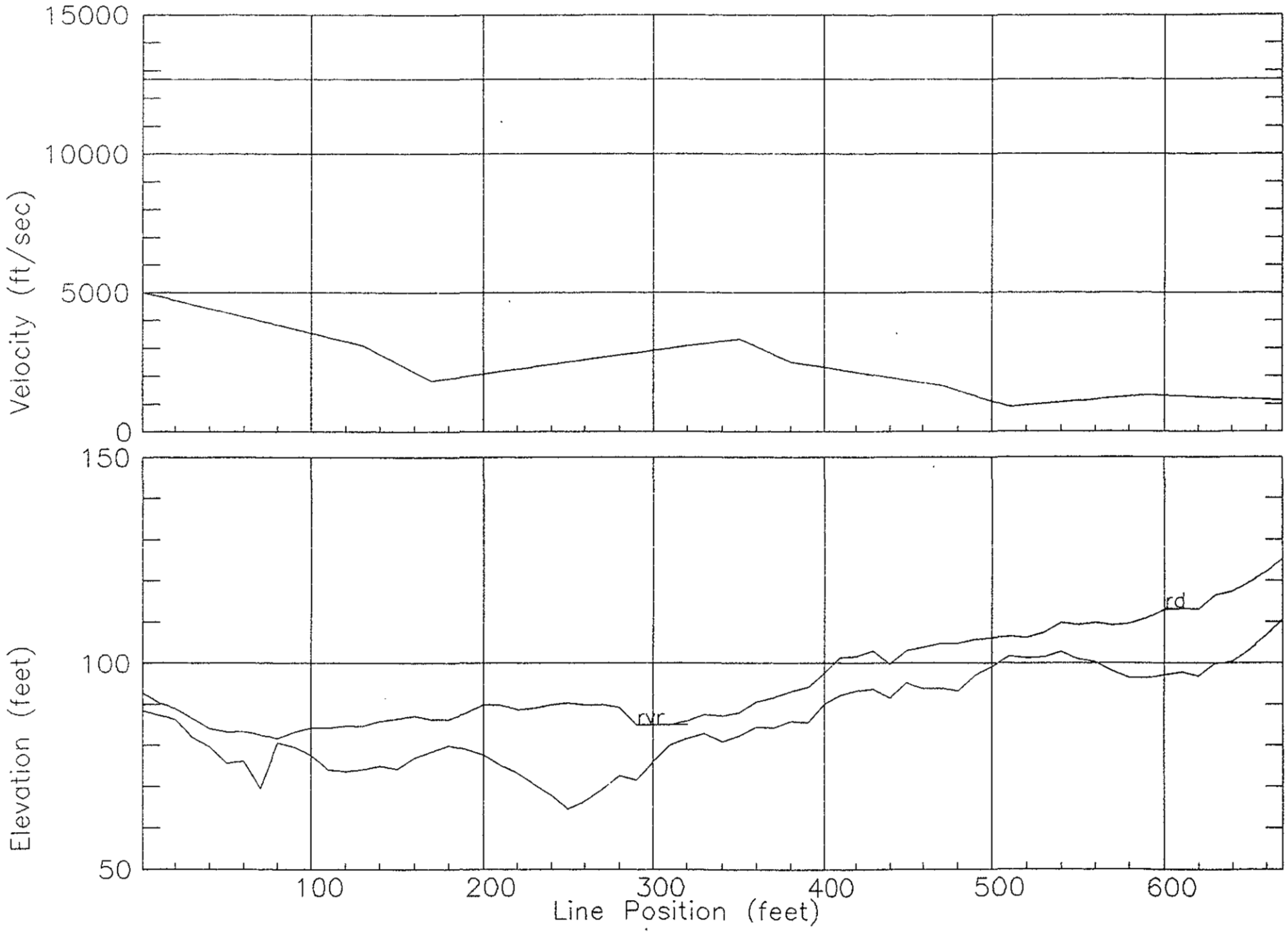
Seismic Line 6



Seismic Line 2

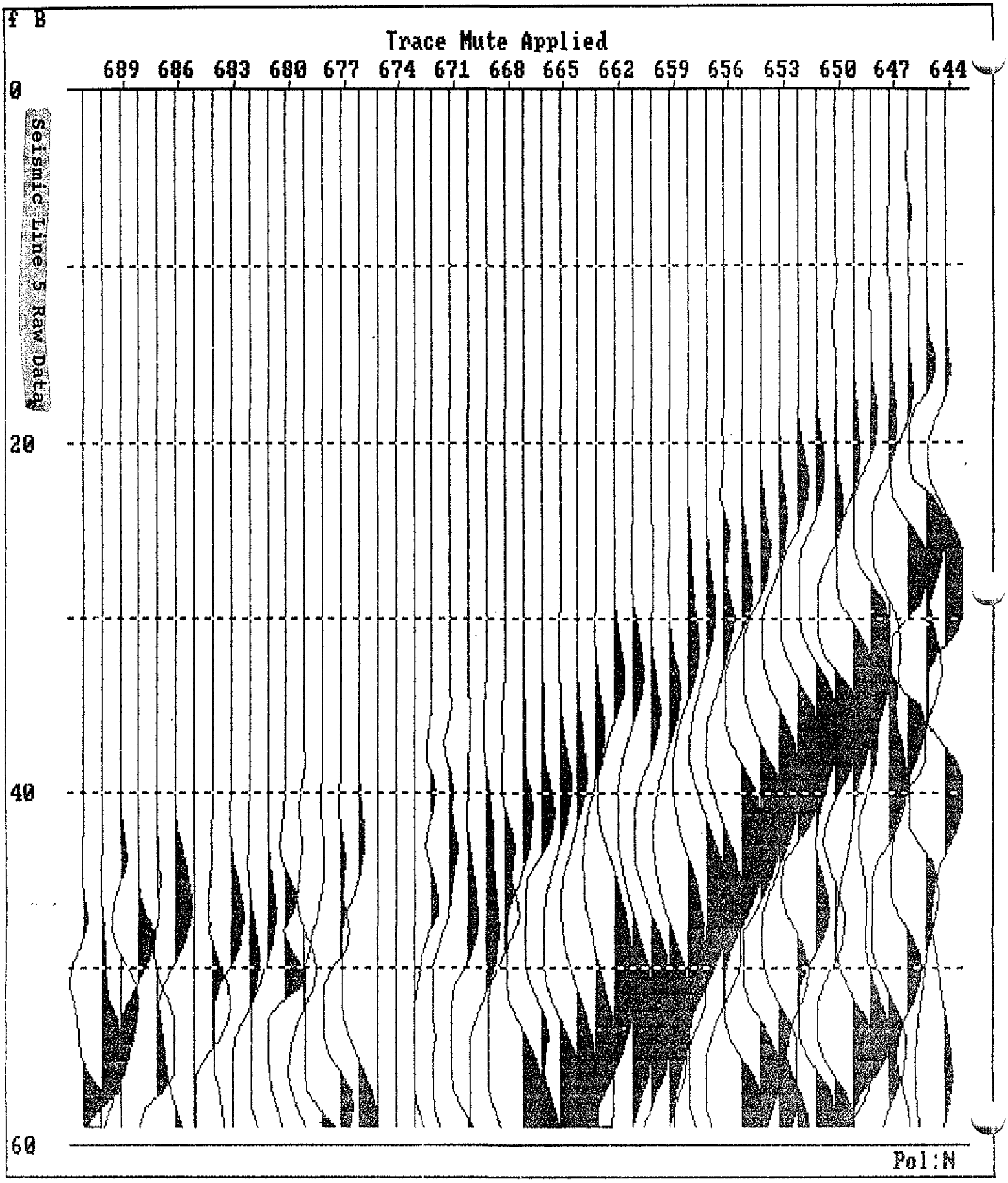


Seismic line 4

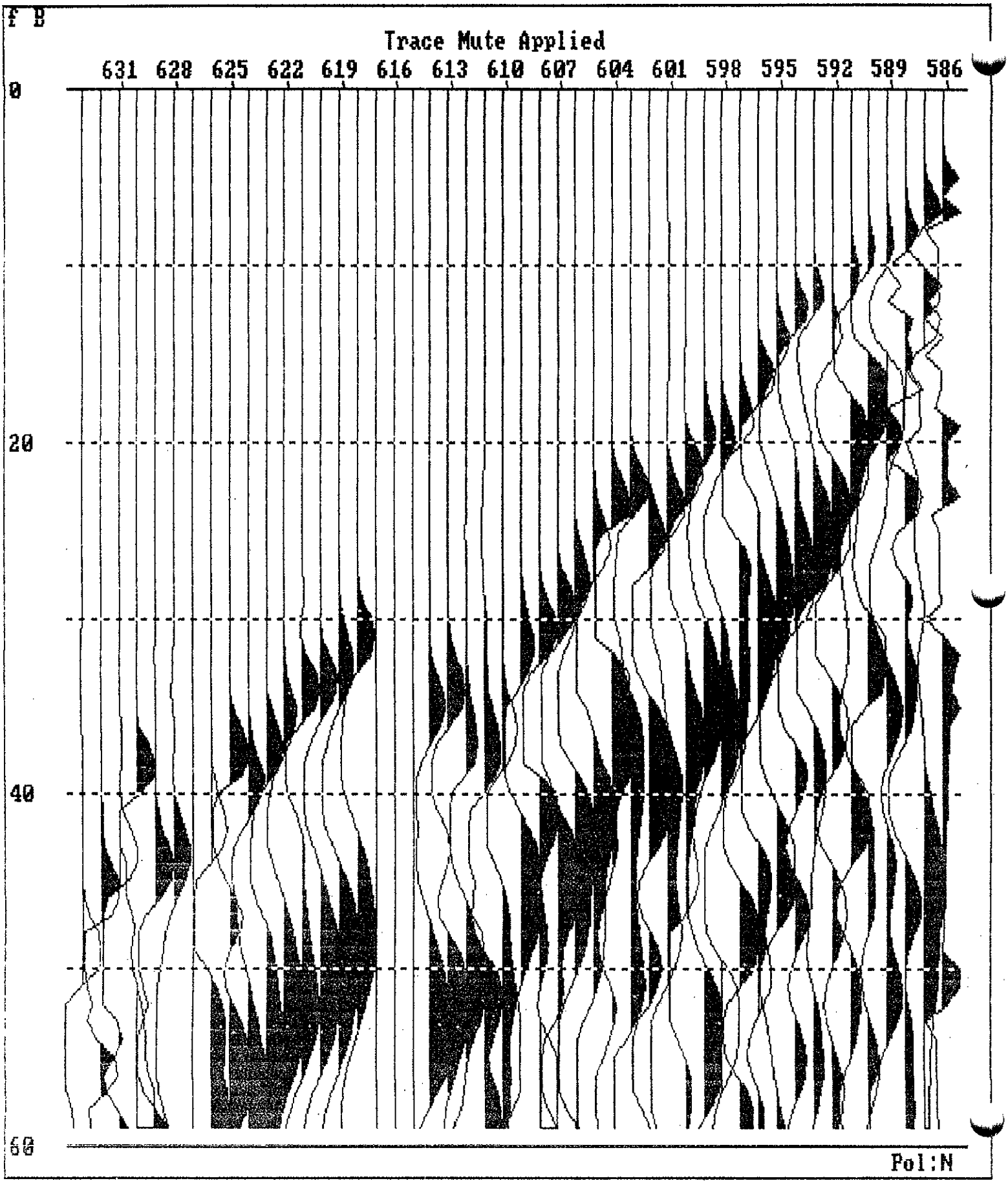


Seismic Line 5

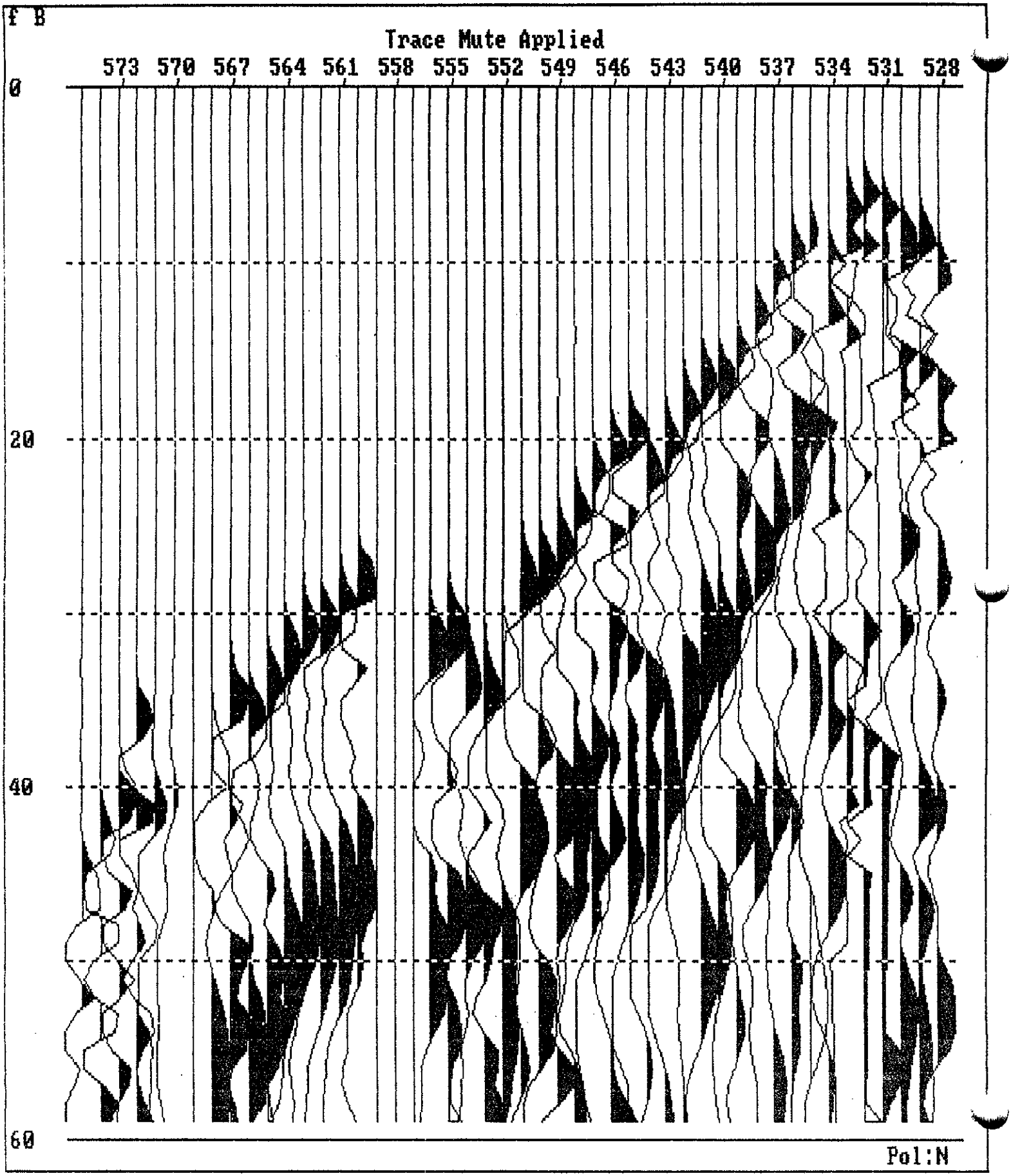
LINE 5 SP 88 OFFSET



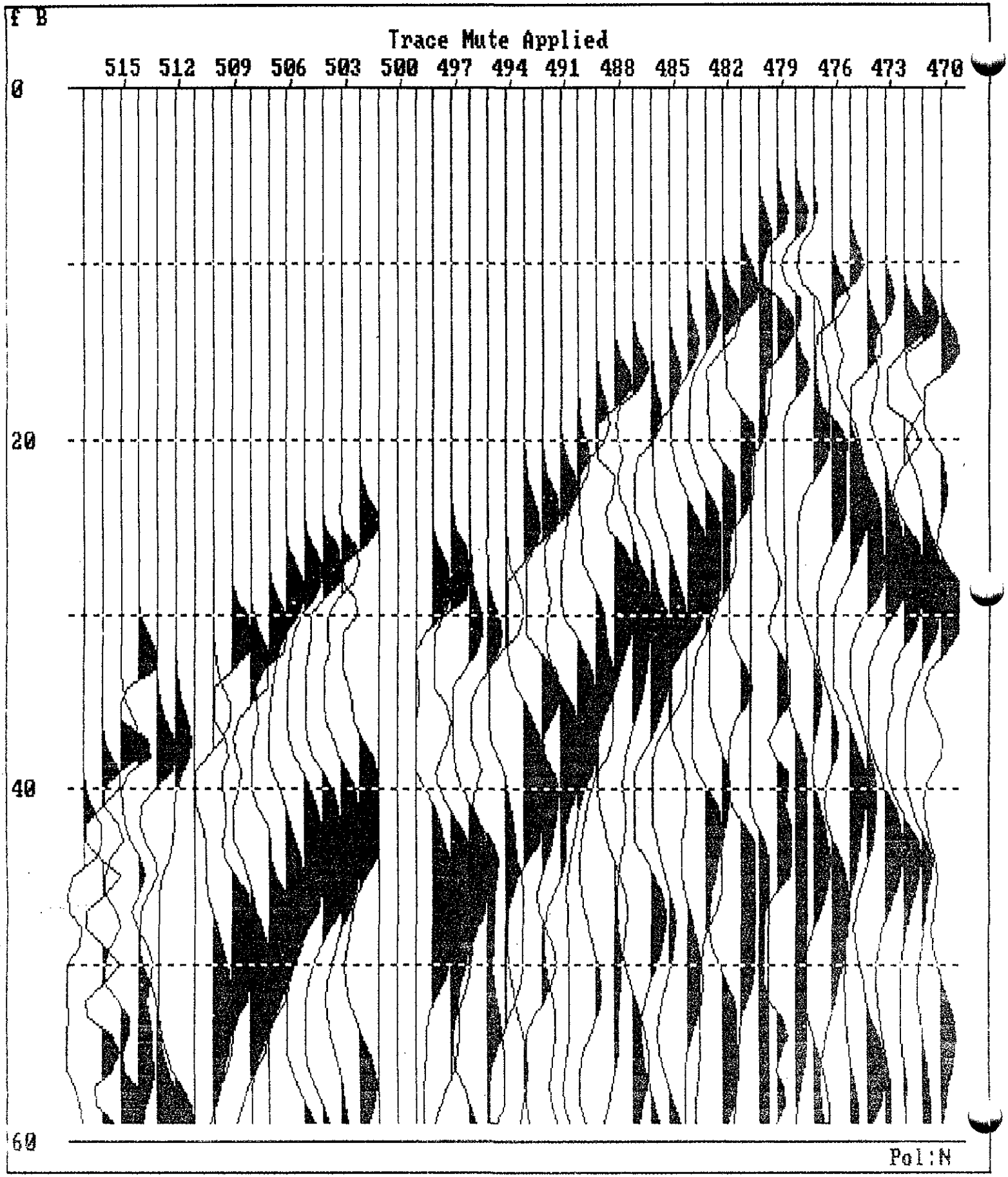
LINES SP93


f B
Trace Mute Applied
631 628 625 622 619 616 613 610 607 604 601 598 595 592 589 586
0
20
40
60
Pol:N

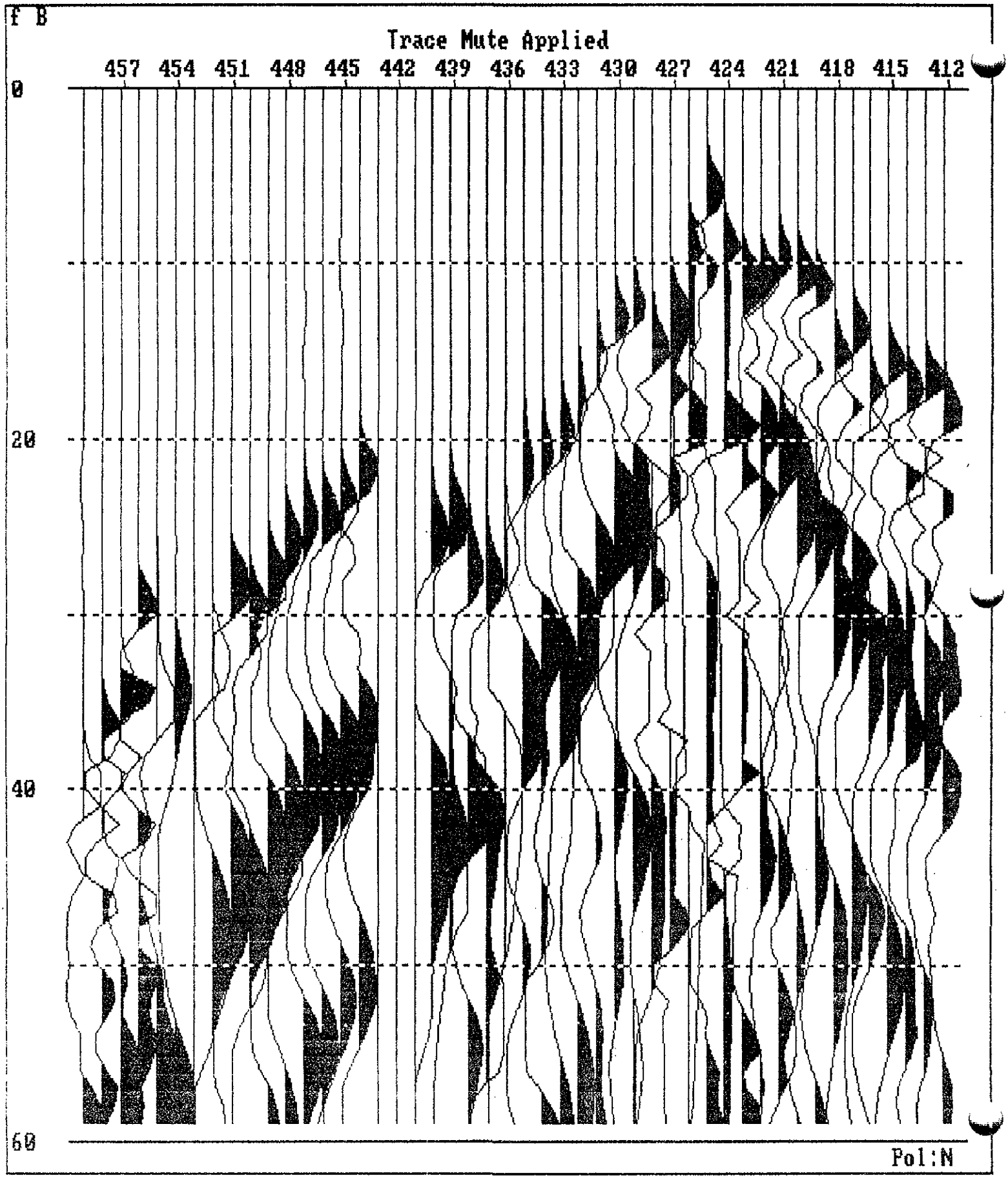
LINE 5 SP 97


F B
Trace Mute Applied
573 570 567 564 561 558 555 552 549 546 543 540 537 534 531 528
0
20
40
60
Pol:N

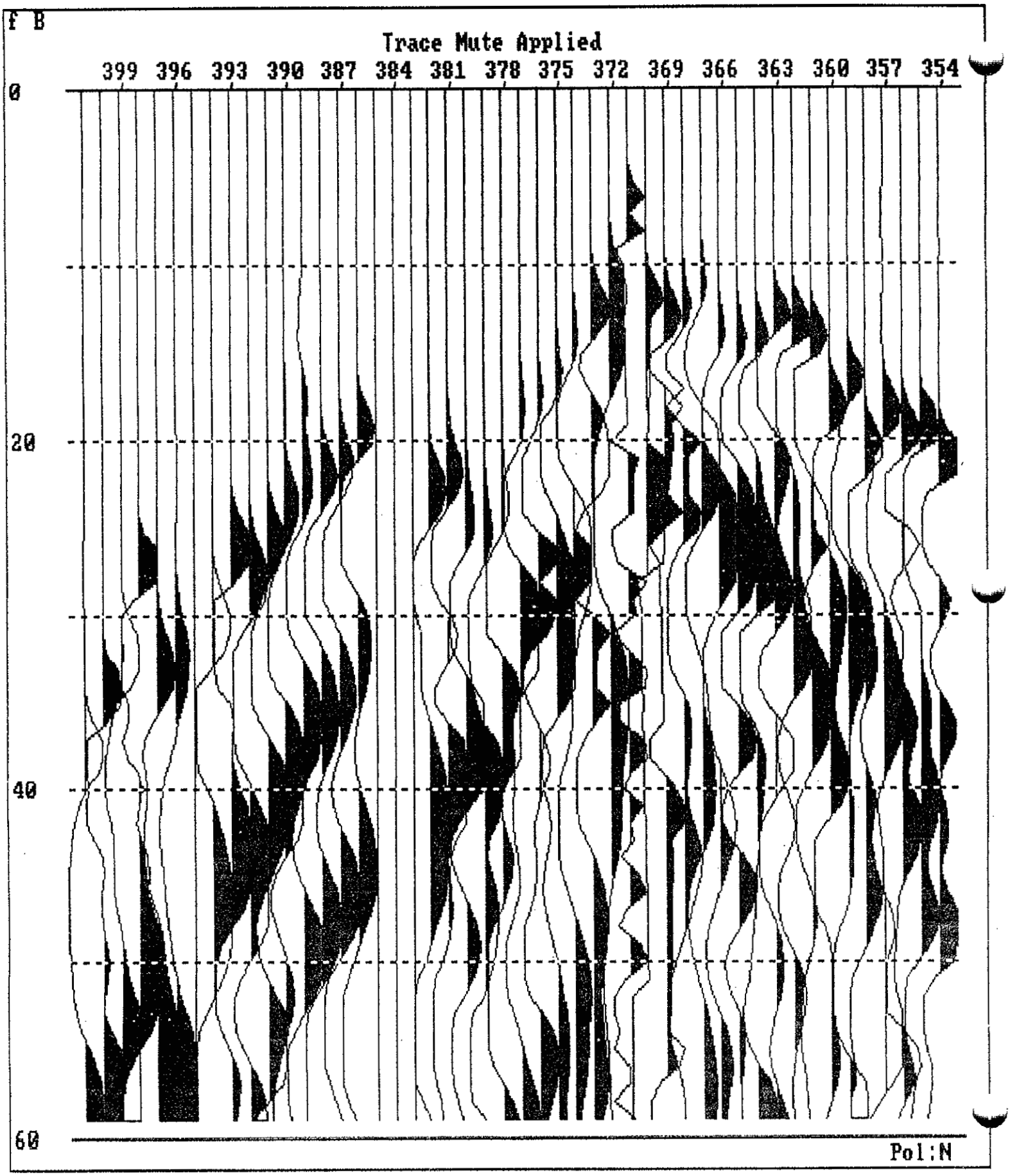
LINE 5 SP 102


F B
Trace Mute Applied
515 512 509 506 503 500 497 494 491 488 485 482 479 476 473 470
0
20
40
60
Pol:N

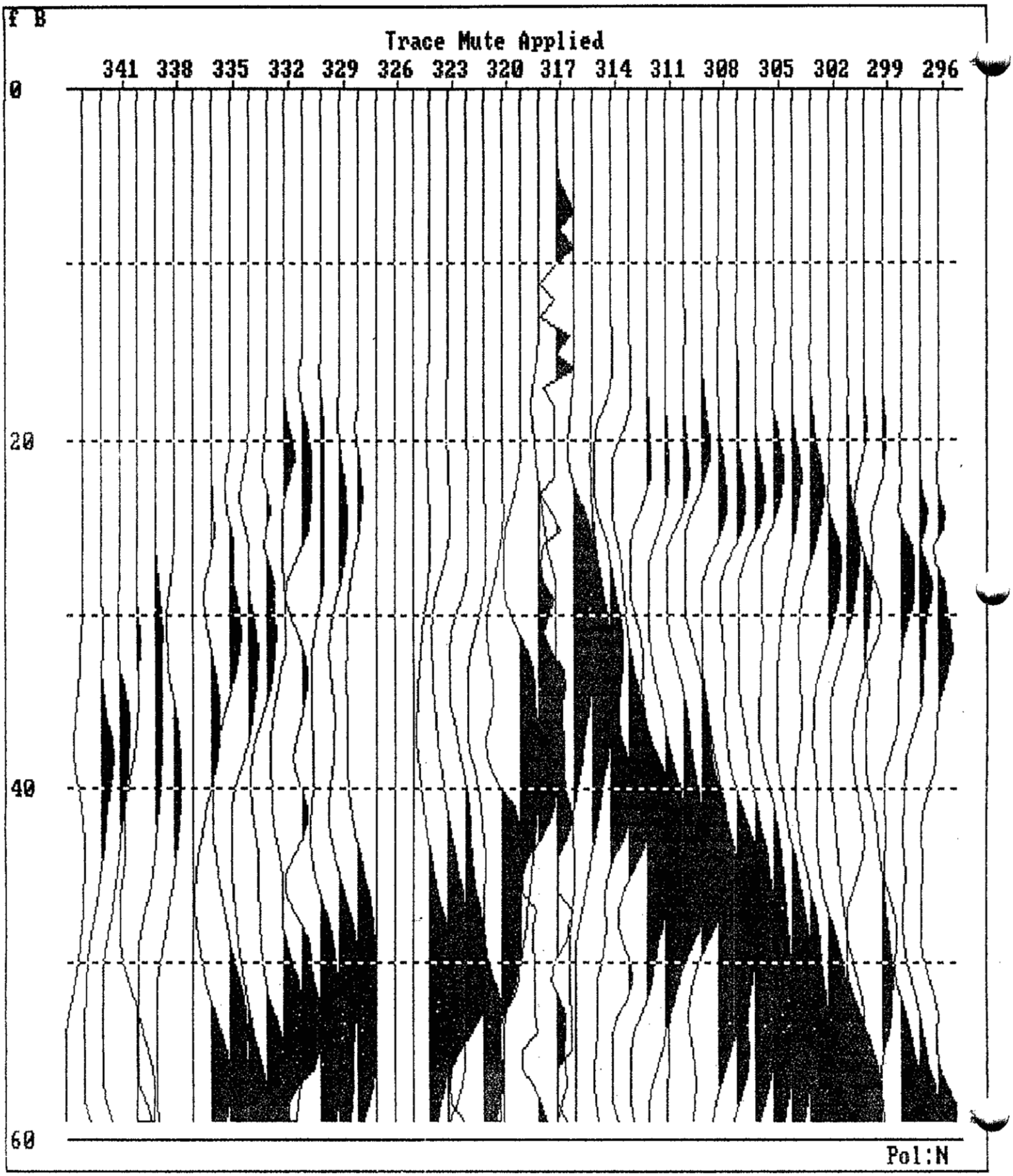
LINE 5 SP 106


f B
Trace Mute Applied
457 454 451 448 445 442 439 436 433 430 427 424 421 418 415 412
0
20
40
60
Pol:N

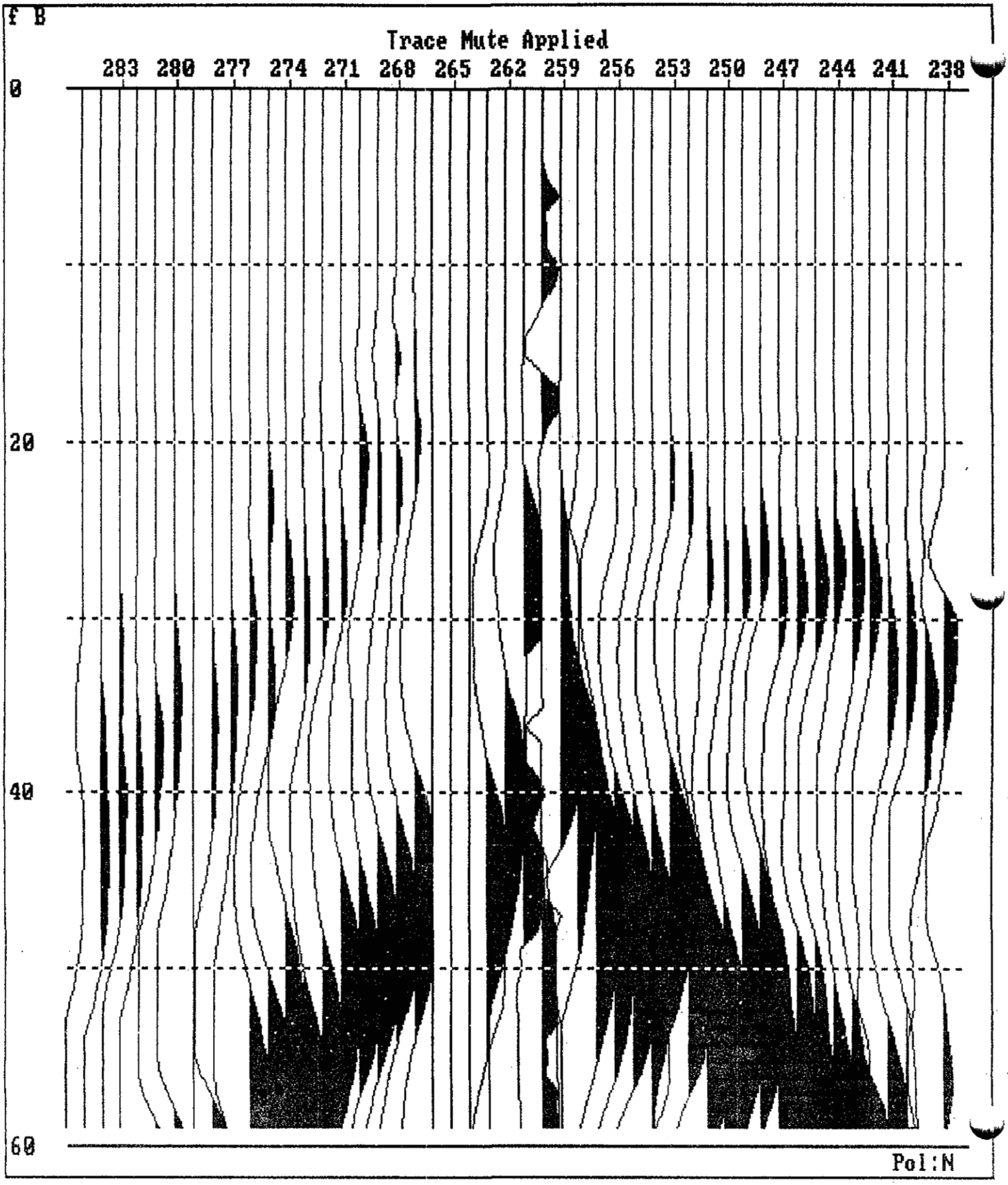
LINE 5 SP 110


f B
Trace Mute Applied
399 396 393 390 387 384 381 378 375 372 369 366 363 360 357 354
0
20
40
60
Pol:N

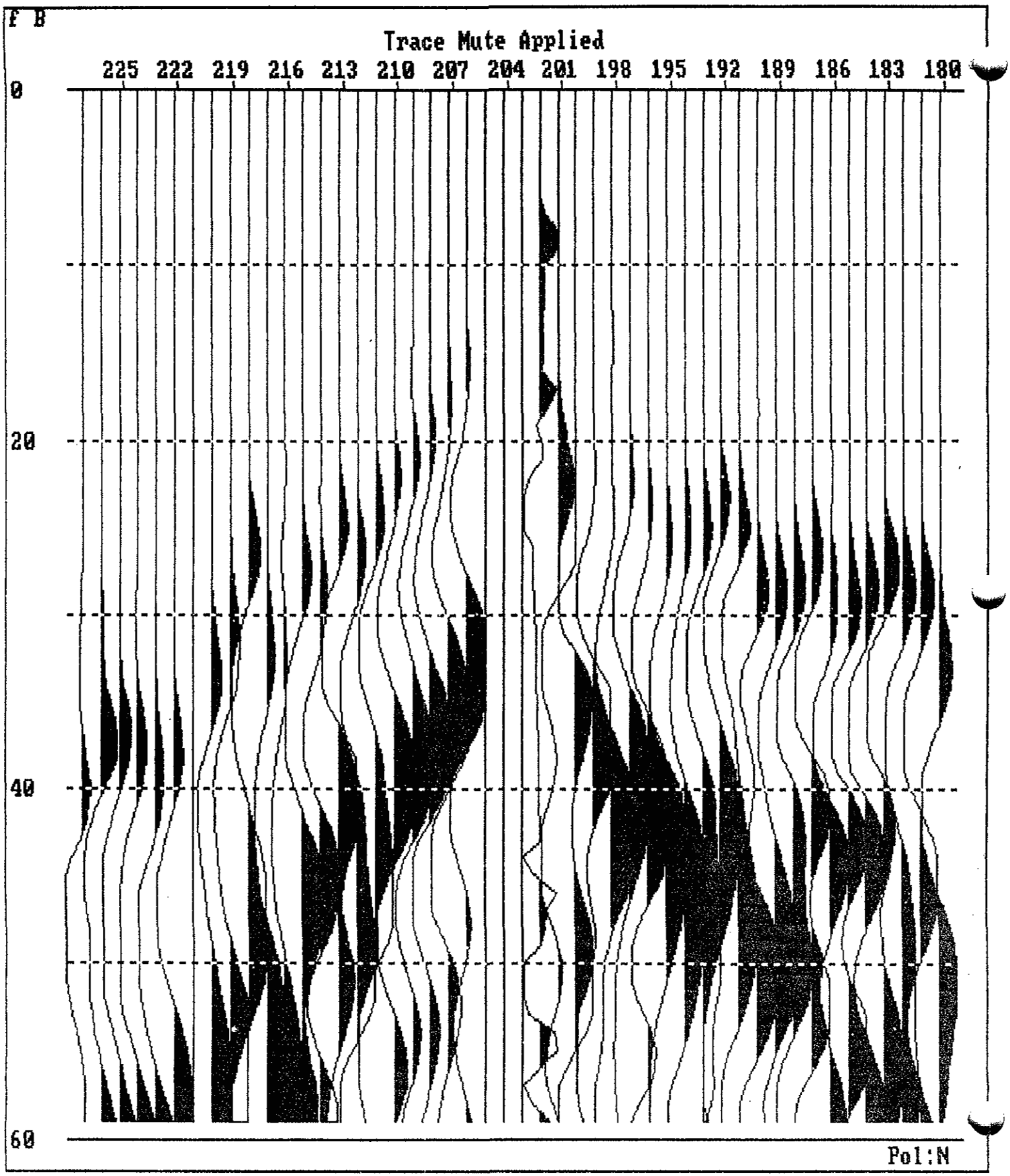
LINE 5 SP 114


f B
Trace Mute Applied
341 338 335 332 329 326 323 320 317 314 311 308 305 302 299 296
0
20
40
60
Pol:N

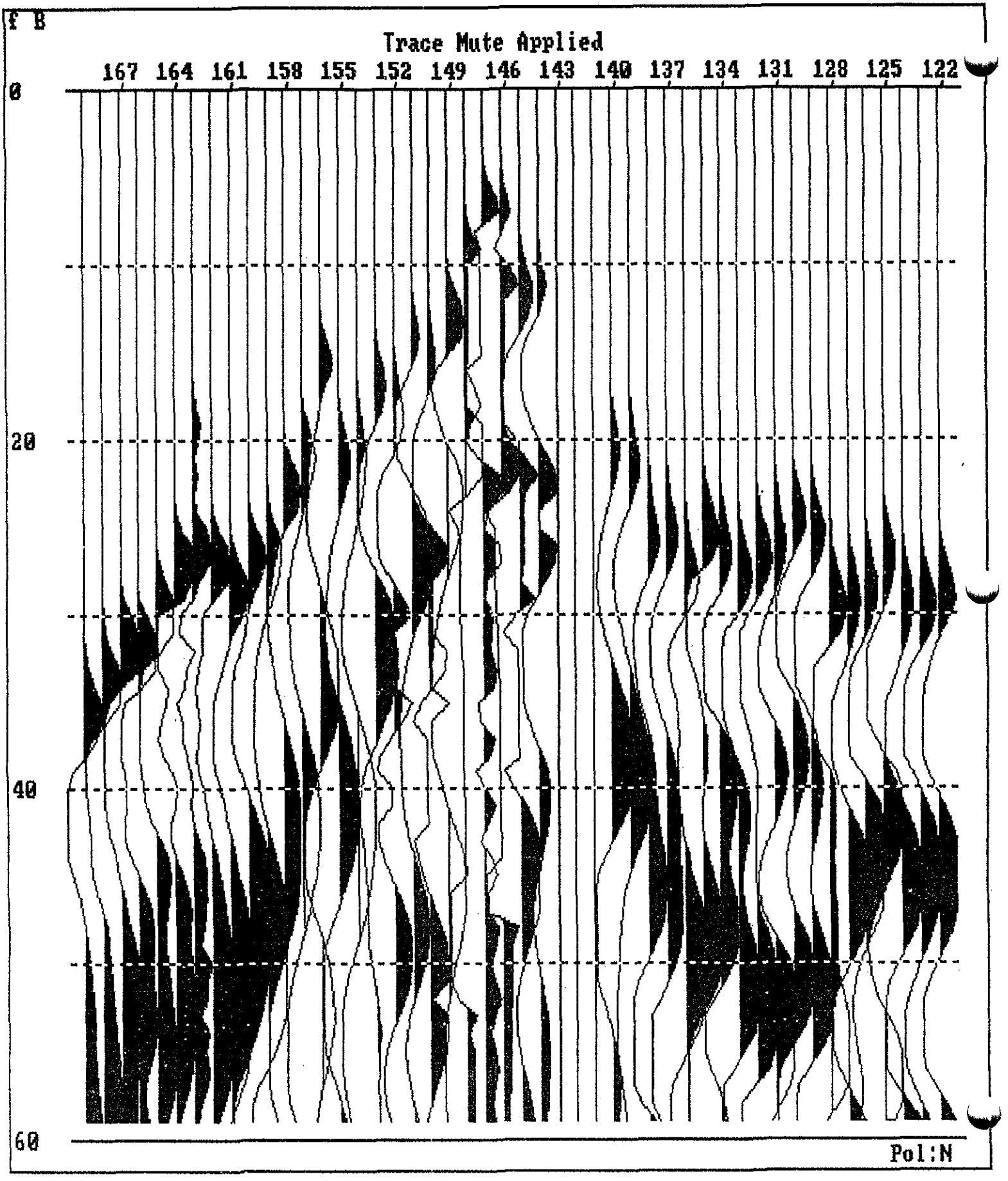
LINE 5 SP118


f B
Trace Mute Applied
283 280 277 274 271 268 265 262 259 256 253 250 247 244 241 238
0
20
40
60
Pol:N

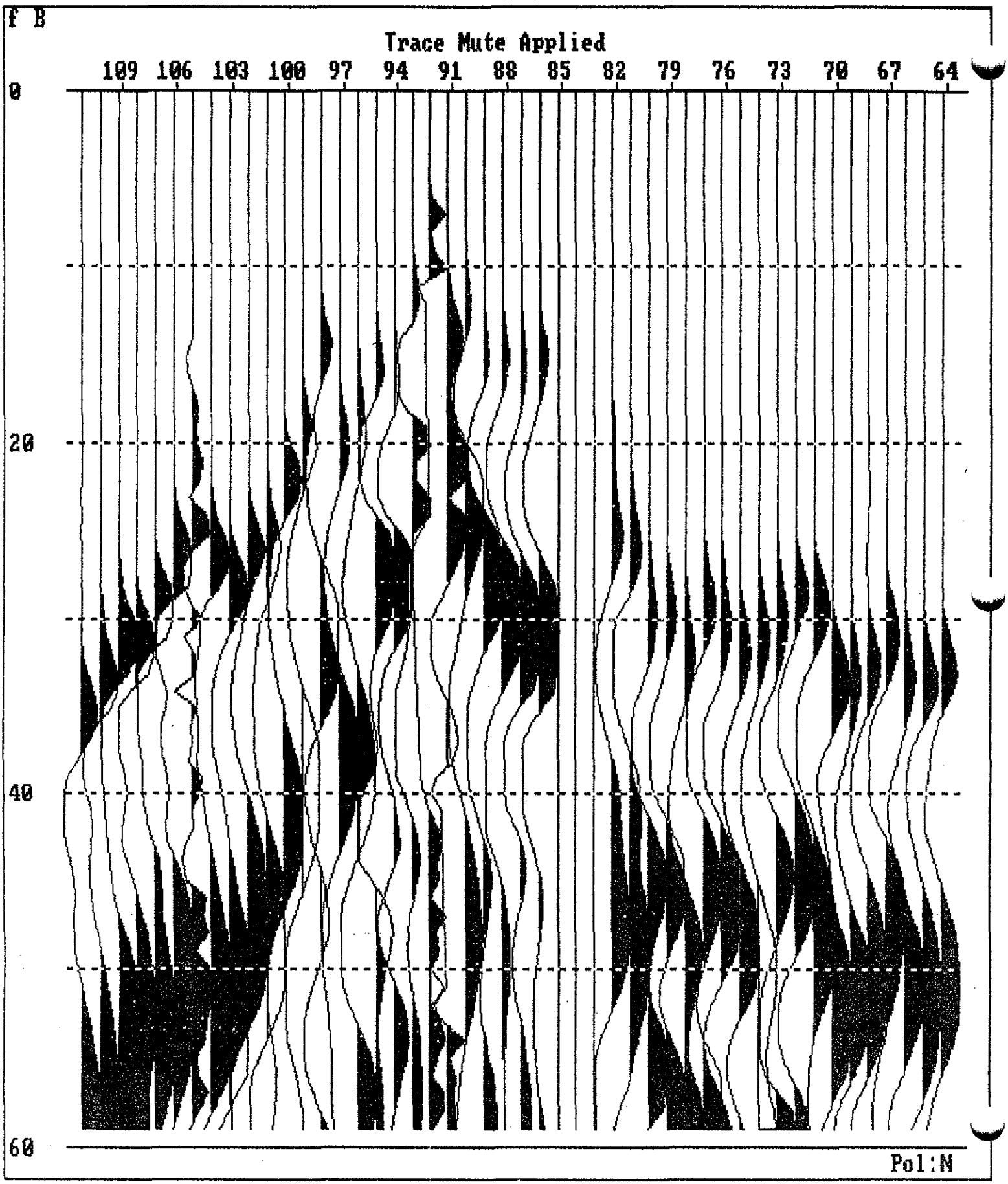
LINE 5 SP 121


F B
Trace Mute Applied
225 222 219 216 213 210 207 204 201 198 195 192 189 186 183 180
0
20
40
60
Pol:N

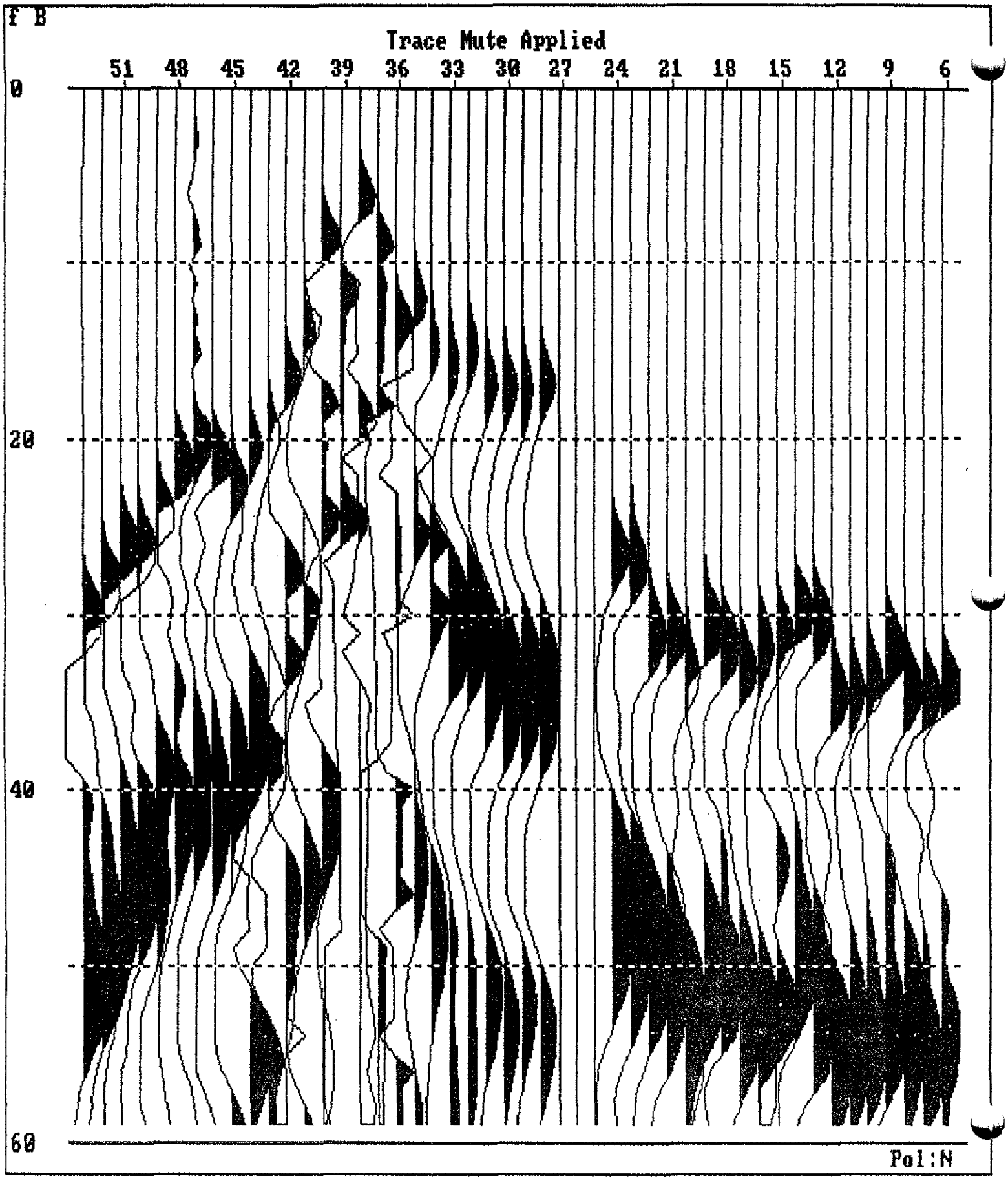
LINE 5 SP 128


F B
Trace Mute Applied
167 164 161 158 155 152 149 146 143 140 137 134 131 128 125 122
0
20
40
60
Pol:N

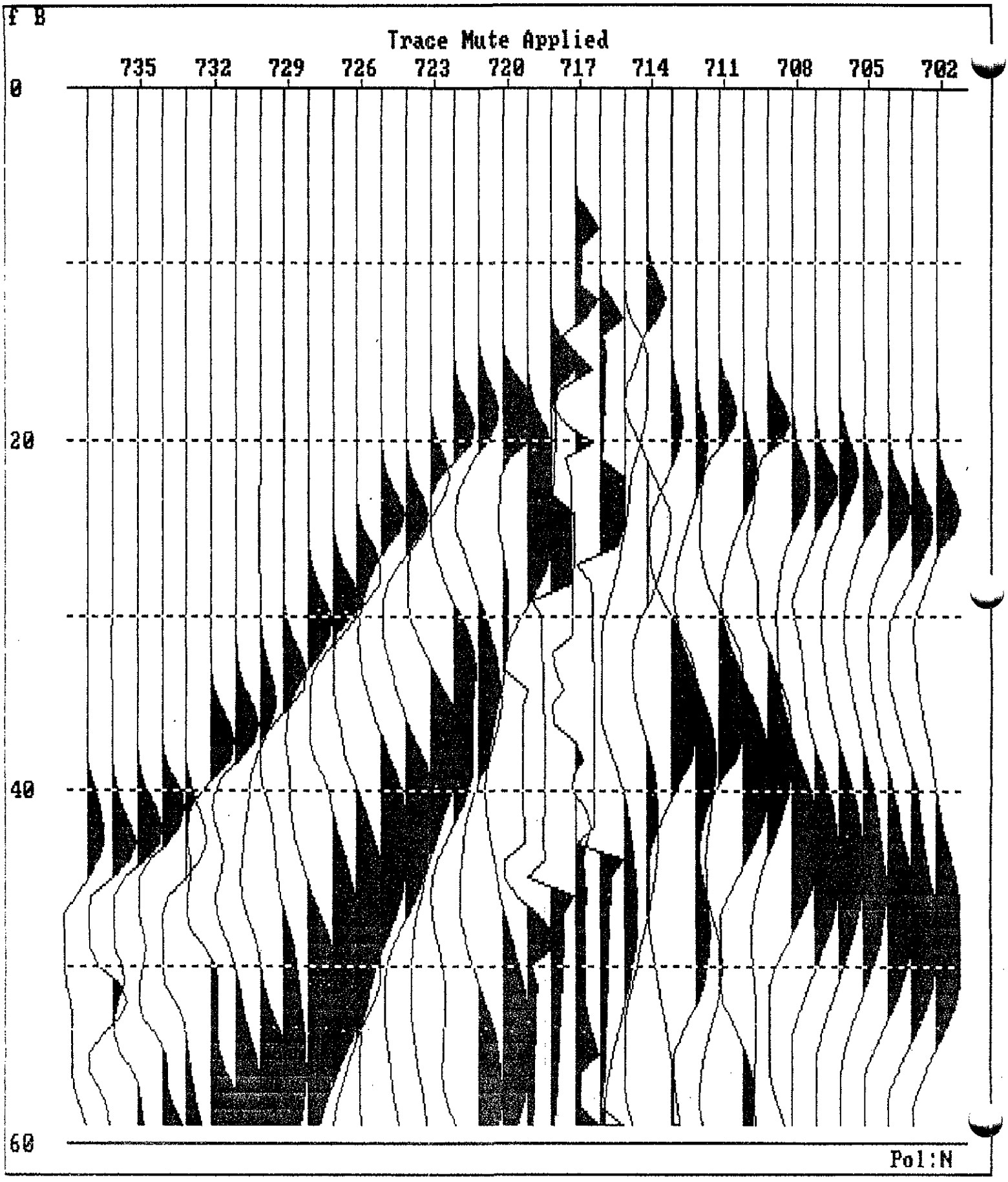
LINE 5 SP 131


f B
Trace Mute Applied
109 106 103 100 97 94 91 88 85 82 79 76 73 70 67 64
0
20
40
60
Pol:N

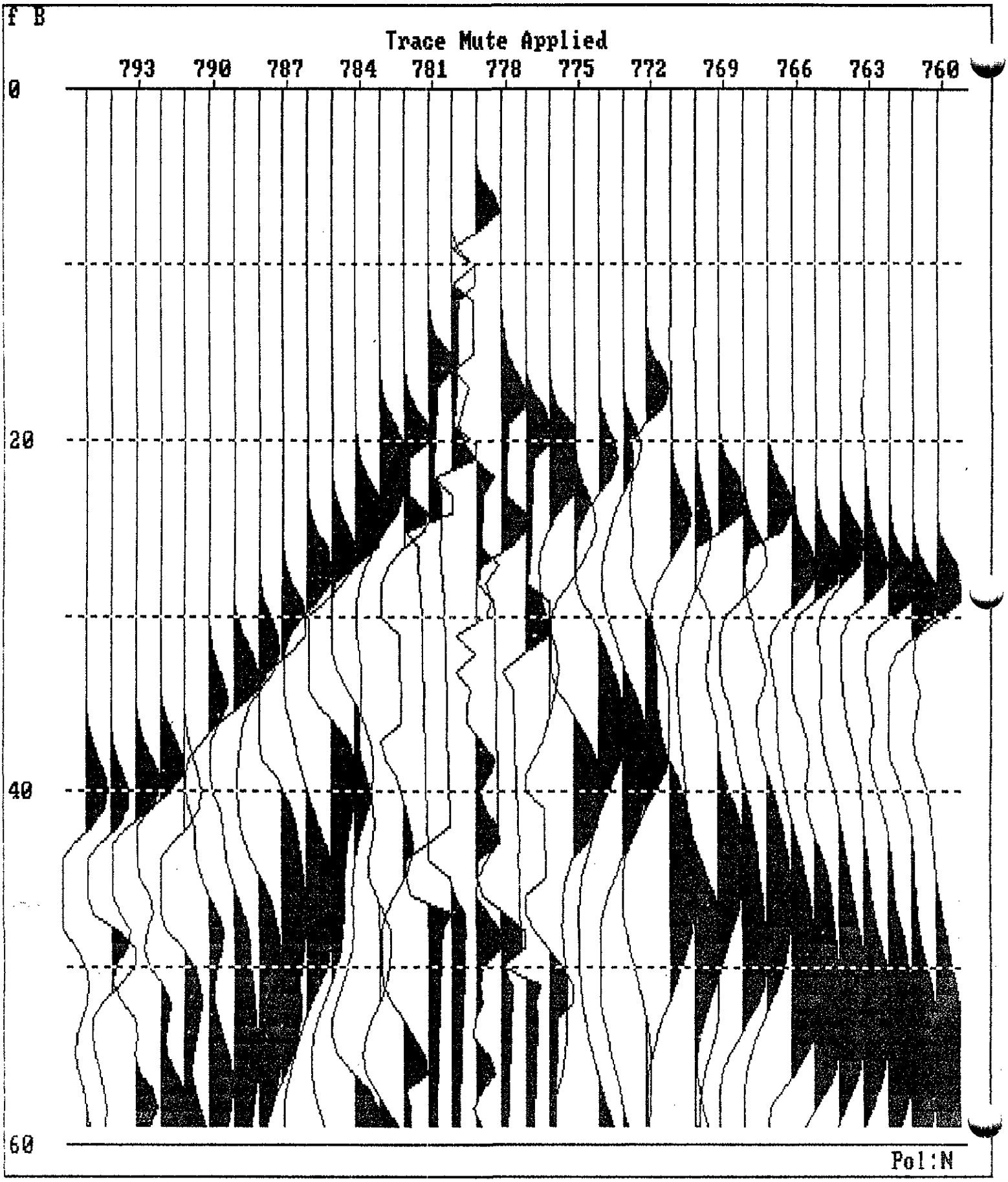
LINE 5 SP 135


f B
Trace Mute Applied
51 48 45 42 39 36 33 30 27 24 21 18 15 12 9 6
0
20
40
60
Pol:N

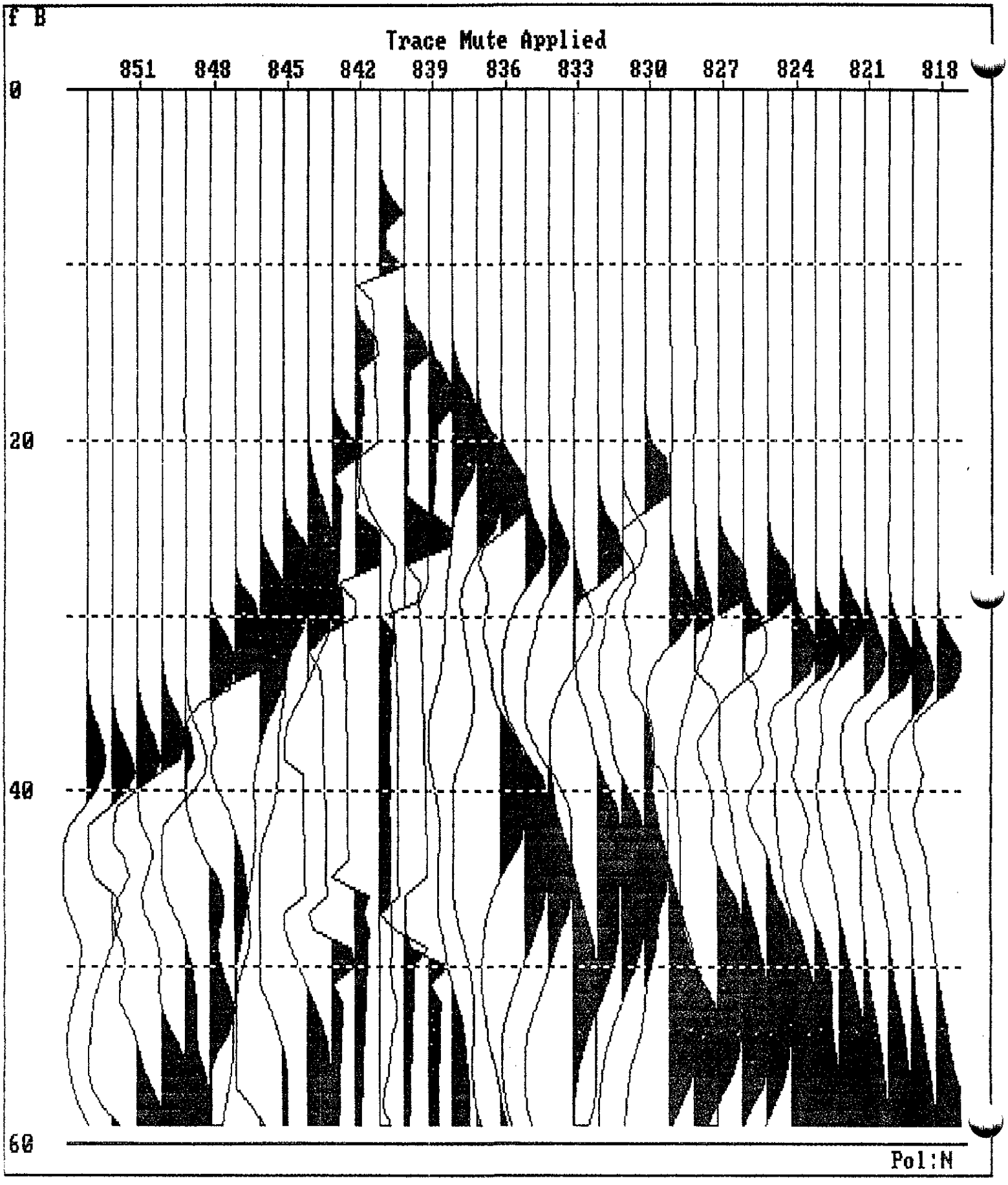
LINE 5 SP 140


f B
Trace Mute Applied
735
732
729
726
723
720
717
714
711
708
705
702
0
20
40
60
Pol:N

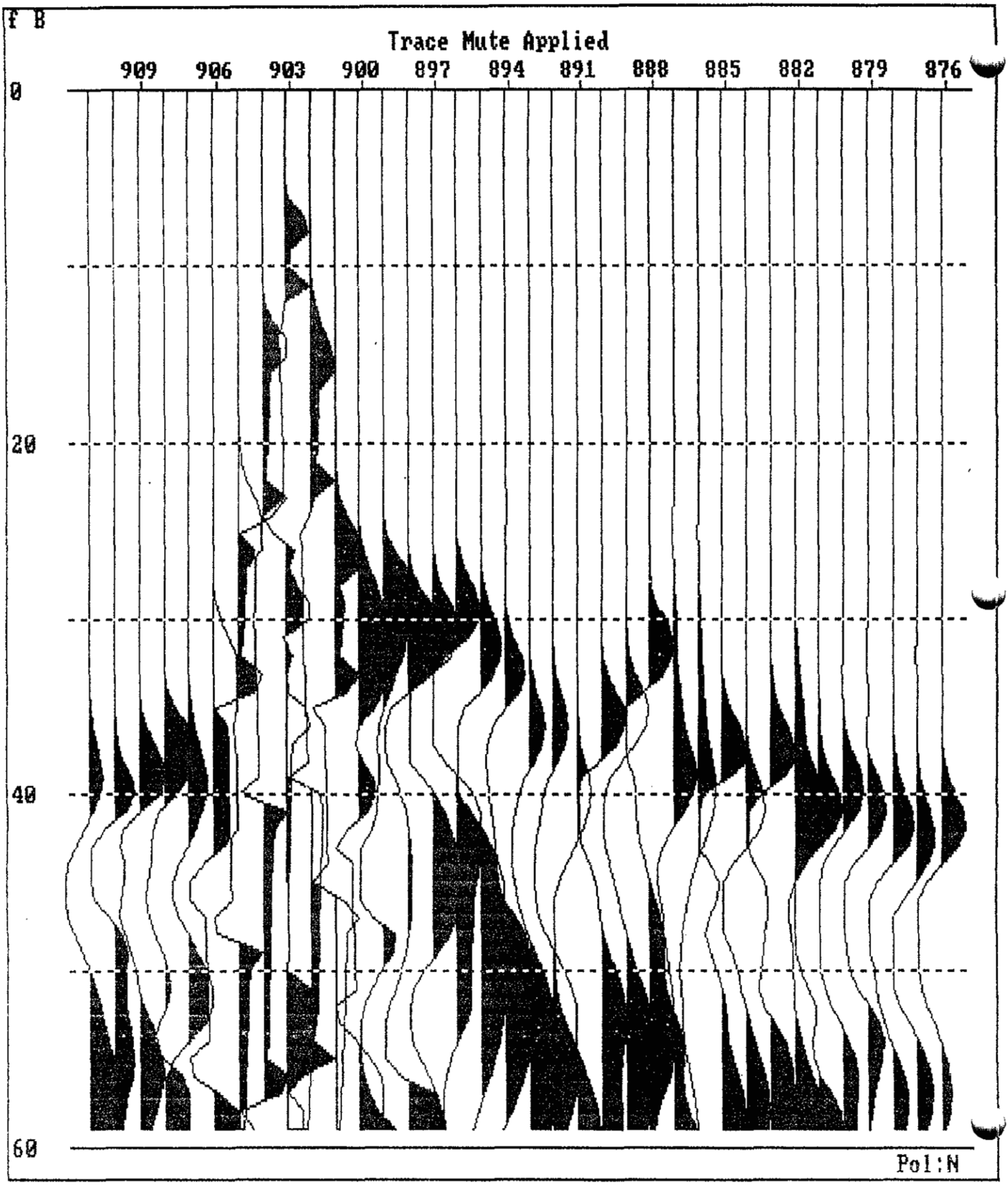
LINE 5 SP 144


f B
Trace Mute Applied
793
790
787
784
781
778
775
772
769
766
763
760
0
20
40
60
Pol:N

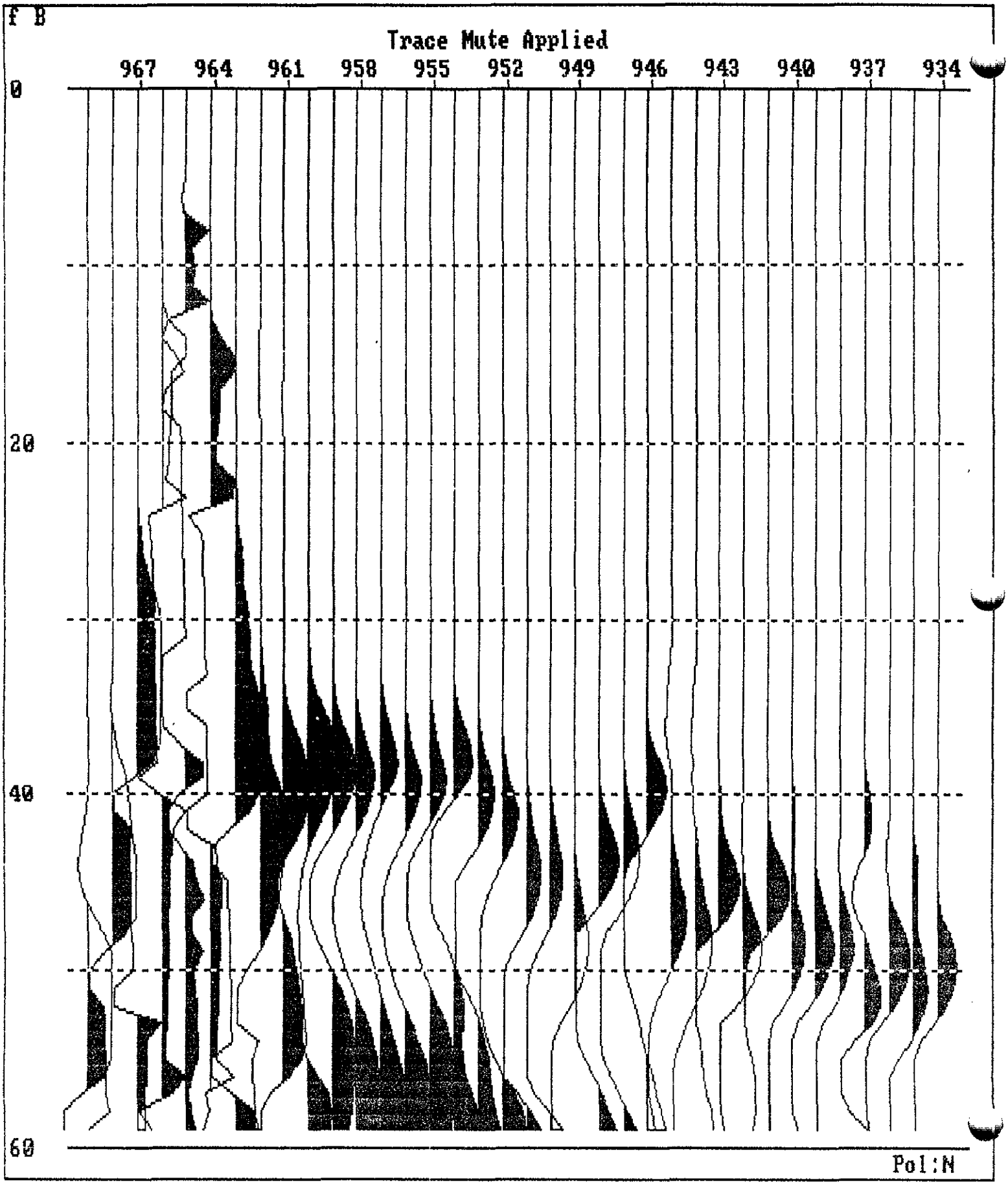
Line 5 SP 148


f B
Trace Mute Applied
851
848
845
842
839
836
833
830
827
824
821
818
0
20
40
60
Pol:N

LINE 5 SP 152


f B
Trace Mute Applied
909
906
903
900
897
894
891
888
885
882
879
876
0
20
40
60
Pol:N

LINE 5 SP 156


f B
Trace Mute Applied
967
964
961
958
955
952
949
946
943
940
937
934
0
20
40
60
Pol:N

Appendix B

Cash Flow Summary
and
Explore B.C. Program Application for Payment

1994 Cash Flow Summary

June

Geology

12 days geological supervion at $300/day	$3,600
12 days room and board at $60/day	$720
12 days 4X4 pickup truck at $50/day	$600
	$4,920

Geophysical

230 stations of Seismic Refraction Survey at $25/station	$5,750
mob/demob 3 man seismic crew from Calgary	$1,500
4 days 3 men room and board at $60 per man day	$720
4 days 4X4 pickup truck at $50/day	$200
	$8,170

Other Surveys (sampling and processing)

Cat 225 for 48 hrs at $94/hr	$4,512
lowbed for 12 hrs at $70/hr	$840
6 days room and board (cat operator) at $60/day	$360
6 days 4X4 pickup truck at $50/day	$300
6 days processing equipment at $150/day	$900
6 days labourer at $150/day	$900
6 days room and board at $60/day	$360
	$8,172

June Total Cash Flow **$21,262**

July

Geology

2 days geological supervion at $300/day	$600
2 days room and board at $60/day	$120
2 days 4X4 pickup truck at $50/day	$100
	$820

Geophysical

66 stations of Seismic Refraction Survey at $25/station	$1,650
1 day 3 men room and board at $60 per man day	$180
1 day 4X4 pickup truck at $50/day	$50
	$1,880

July Total Cash Flow **$2,700**

August

Geology

14 days geological supervion at $300/day	$4,200
14 days room and board at $60/day	$840
14 days 4X4 pickup truck at $50/day	$700
	$5,740

Other Surveys (sampling and processing)

Cat 225 for 112 hrs at $94/hr	$10,528
lowbed for 7.5 hrs at $85.60/hr to property	$642
14 days room and board (cat operator) at $60/day	$840
14 days 4X4 pickup truck at $50/day	$700
14 days processing equipment at $150/day	$2,100
7 days labourer at $150/day	$1,050
7 days room and board at $60/day	$420
	$16,622

August Total Cash Flow **$22,020**

September

Geology

3 days geological supervion at $300/day	$900
3 days room and board at $60/day	$180
3 days 4X4 pickup truck at $50/day	$150
	$1,230

Other Surveys (sampling, processing and reclamation)

Cat 225 for 40 hrs at $94/hr	$3,760
lowbed for 4 hrs at $85.60/hr from property	$342
5 days room and board (cat operator) at $60/day	$300
5 days 4X4 pickup truck at $50/day	$250
3 days processing equipment at $50/day	$150
	$4,802

September Total Cash Flow **$6,032**

October

Geology

1 day geological supervision at $300/day	$300
1 day room and board at $60/day	$60
1 days 4X4 pickup truck at $50/day	$50
10 days geological report preparation at $300/day	$3,000
stationary, misc. report expense	$300
	$3,710

Geophysical

50 stations of Seismic Refraction Survey at $25/station	$1,250
1 day 3 men room and board at $60 per man day	$180
1 day 4X4 pickup truck at $50/day	$50
	$1,480

October Total Cash Flow	**$5,190**

Total Project Cash Flow	**$57,204**