

Shear-wave Database for Quaternary and Bedrock Geologic Units, Washington State

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WASHINGTON
DIVISION OF GEOLOGY
AND EARTH RESOURCES

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WASHINGTON STATE DEPARTMENT OF
Natural Resources
Doug Sutherland - Commissioner of Public Lands

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ABSTRACT

The Department of Natural Resources, Division of Geology and Earth Resources has compiled a state-wide geologic unit correlated shear wave velocity database as part of a FEMA grant administered by the Washington Emergency Management Division. The goal of this grant was to prepare state-wide National Earthquake Hazard Reduction Program (NEHRP) site class maps. These maps require an average measurement of the shear wave velocity of the upper 30 meters of the soil-rock column. We measured 712 shallow seismic shear wave velocities in 48 different Quaternary and bedrock units. The resulting geologic unit correlated shear wave velocity database, including a compilation of other published and unpublished shallow seismic measurements conducted in the region, is presented in Microsoft Access 2000 format.

INTRODUCTION

The most damaging effect of an earthquake is strong shaking at the ground surface. For more than a century, engineers and seismologists have known that ground shaking during an earthquake is strongest in areas of soft soils, such as in river valleys or along the shorelines of bays and lakes. Measurements of earthquake ground motions made in the last few decades have allowed seismologists to more fully understand the physics of this long-observed phenomenon. Earthquake wave velocity is slower in soils than in the underlying rock of the Earth's crust. The difference in wave velocity between rock and soil causes the shaking at the ground surface to be amplified. Generally, the greater the wave velocity difference, the greater the amplification of ground surface shaking. Consequently, ground shaking in areas of soft soils underlain by stiffer soils or rock is generally stronger than in areas where there is little or no variation between the surface and substratum. This has been observed time and again in past earthquakes.

In the mid-1990s, a simplified method for characterizing the ground-motion amplifying effects of soft soils was developed by Roger Borcherdt of the U.S. Geological Survey, based on data collected from the Loma Prieta and Northridge earthquakes in California (Borcherdt, 1994). His empirical study related the average shear wave velocity (V_s) in the upper 100 feet (30 meters) of the soil-rock column to the amplification of shaking at ground surface. Shear waves are the earthquake waves that create the strongest horizontal shaking and are the most damaging to buildings and structures.

Borcherdt's method subdivides the near-surface geology into a number of site classes where each site class is defined by a unique range of average Vs in the upper 100 feet (30 meters). A modification of Borcherdt's empirical method was implemented by the Building Seismic Safety Council (BSSC) and the Federal Emergency Management Agency in the 1997 edition of the National Earthquake Hazard Reduction Program (NEHRP) Recommended Provisions for Seismic Regulations for New Buildings and Other Structures (BSSC, 1997). Borcherdt's designation of site classes was simplified in BSSC (1997), and these simplified site class groupings are commonly referred to as NEHRP site classes. In 1997, this modified method of accounting for soil-column amplification effects was adopted by the International Conference of Building Officials in the Uniform Building Code (International Conference of Building Officials, 1997). This method of designating site classes for determination of seismic design ground motions is used in the 2003 version of the International Building Code (International Code Council, 2003), which was the current building code adopted for use in Washington State at the time this work was done.

There are no published correlations of age and type of geologic deposit with NEHRP site classes. Such correlations are necessary for constructing a statewide site class map using the available 1:100,000-scale geologic mapping. To establish such correlations, we collected Vs data in a variety of geologic units throughout the state. We used shear wave refraction surveys to obtain these Vs data. We also compiled published (Wong and others, 2003; Mabey and others, 1993) and unpublished (Matthew Mabey, Oregon Dept. of Transportation, written commun., 2003) Vs data for the Seattle, Olympia, and Portland areas. In addition, a small collection of unpublished Vs data from various locations in western Washington was compiled from a variety of sources and used in the development of this Vs database. The result of the data collection is a database of 712 Vs measurements in 48 different Quaternary and bedrock units from around Washington State. The database is presented in Microsoft Access 2000 format and as a series of three comma-delimited ASCII text files included in this report.

SHEAR-WAVE REFRACTION SURVEY METHODOLOGY

We chose shear wave refraction surveys as the least complex, direct method of measuring Vs in near surface (~100 ft) geologic material. Fieldwork for the shear wave velocity database was accomplished during the summer months of 2003 and 2004. Minimizing expenses was important to successfully collecting as many Vs measurements as possible over two field summers. After the initial cost of geophysical and field support supplies, travel costs for two field employees were the only expenditure directly related to the physical surveys. In addition, refraction methods are non-evasive, resulting in school districts allowing us access to their sports fields as well as private landowners offering their lands to perform surveys on.

Suitable Survey Locations

In order to relate Vs measurements to mapped surficial geology, sites were selected where the geology is relatively straightforward. Shear wave velocity surveys were conducted on a wide variety of Quaternary units by using the available 1:100,000 scale Washington statewide geology (Washington Division of Geology and Earth Resources staff, 2003) and, where available, more recent 1:24,000 scale geologic mapping to target our surveys to specific geologic units. Surficial

geology was generally verified by searching out road- or stream-cuts near the prospective survey site or by checking proximal water well borings. In locations where this type of verification was not available, we would dig shallow test pits or rely on the available geologic mapping.

The distance between shear wave source and receiver (the total length of the survey line) and the relative Vs contrast between layers at a refraction interface dictate the depth at which we could measure Vs. In practice, we found that in order to measure Vs down to a depth of approximately 100 ft, we had to use a 300 ft survey line. We also found that areas with relatively little vegetation cover or well-mown areas helped to eliminate acoustic noise generated by vegetation swaying in the wind or wind blowing plants against the geophones. Allowing for these factors, the best survey sites were sparsely vegetated areas that had at least 300 ft of relatively flat ground. We tried to satisfy these survey location requirements by conducting surveys on play fields and post harvest agricultural fields as much as possible.

Equipment

The main equipment used in conducting the Vs surveys were a 24 channel Geometrics SmartSeis seismograph powered by a 12-volt marine battery (Fig. 1), 24 horizontal motion (shear wave) geophones (Figs. 2 and 3), a nine foot long 6x10" wood beam with 1.5" thick protective steel end caps, and an energy source. The horizontal motion geophones manufactured by Sercel of Houston, Texas, have a natural frequency of 14 Hz. The geophones were coupled to the ground with a 3-inch spike and included a carpenter level bubble on each to ensure proper horizontal orientation. The wood beam was coupled to the ground by parking the front two wheels of a field vehicle on top of the beam. We generated shear waves by striking one end of the beam. This caused a horizontal (shear) motion to be imparted to the ground. The 1.5" thick steel end caps fitted on the beam acted as both a buffer between the wood and the impacting source, preventing splintering, and as one side of a switch that triggered the seismograph to begin recording upon contact. The shear wave energy source for the 2003 field season was a 12 lb sledgehammer brandished by a field geologist. Between the 2003 and 2004 summer field seasons we designed and had fabricated a spring powered shear wave source (SPSW). During the 2004 field season we deployed the SPSW (Figs. 4 and 5) with the effect of reducing strain on field geologists and providing perfectly repeatable shear wave initiation shots. The SPSW operates by drawing an impactor head back on a stiff spring with a worm-drive winch (Fig. 4). The impactor is then held in the cocked position by electromagnets powered by a 12-volt marine battery, and fired by shutting off the electromagnets (Figs. 4 and 5). The SPSW delivers more mass at a lower velocity compared to the 12 lb sledge swing, striking the beam with similar or greater kinetic energy. The SPSW is superior to a human wielded 12 lb sledge, however, because the impactor strikes the beam with the same force and with the same pitch each time it is fired, creating a consistently repeatable shear wave source.

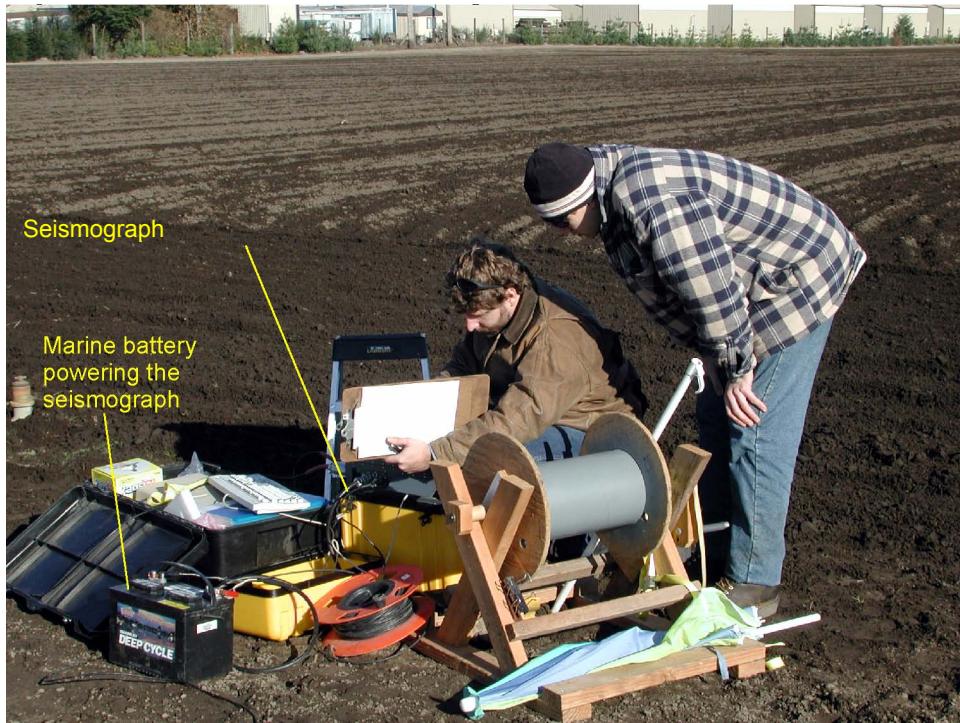


Figure 1. Geometrics SmartSeis in operation.



Figure 2. Survey setup including most of the geophones, the seismograph location, and the shear-wave source location.



Figure 3. Survey setup including some of the geophones, the spring-powered shear-wave source, and the beam.

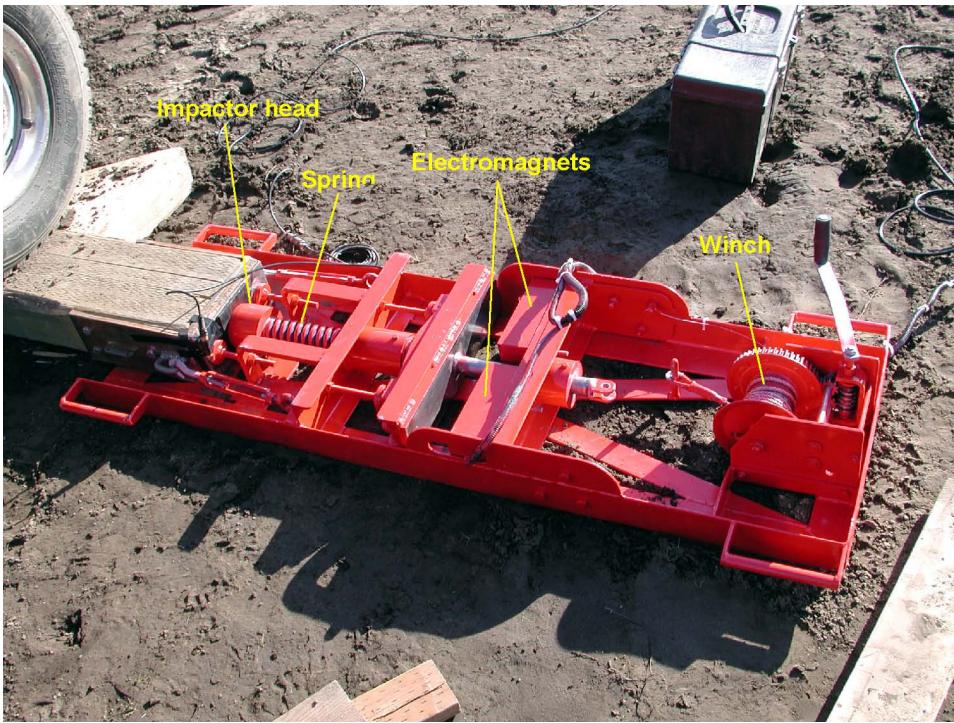


Figure 4. Diagram of the working parts of the spring-powered shear-wave source.



Figure 5. Diagram showing the power source and switch for the electromagnets and the contact trigger that starts the seismograph recording.

Survey Setup

After selecting a site, gaining access, and identifying the local surficial geology, the refraction survey was laid out based on a standard survey setup form (Appendix A). The standard survey setup form served two purposes: first, the form recorded many of the variables for each survey and second, the form helped make the survey process consistent. The most important survey variables included: the slope of the survey ground, possible sources of acoustic interference, and the geometry of the specific survey line. If the ground to be surveyed was sloping or uneven along the survey line, we used a stadia rod and a clinometer to complete a survey of the relative vertical displacement of each geophone. This data was later entered in as part of data processing.

The two most pervasive sources of acoustic interference that we encountered were wind and automobile traffic noise. In order to reduce wind interference we routinely buried the geophones six inches to a foot deep at survey environments that exhibited strong wind noise. Acoustic interference from proximal traffic was less easily dealt with; we were limited to timing our shear wave source shots to coincide with breaks in the flow of traffic. We always used a 24-geophone survey line. Typically we used a ~ 10 ft (3m) spread between geophones and a ~ 30 ft (10m) offset between the shear wave source shotpoint and the last geophone in the spread, for a total length between the last receiver in the line and the source of ~ 260 ft (79m). We only completed surveys that recorded shotpoints at each end of the survey line in order to correctly resolve the dip of any refracting unit and to enable calculation of the true Vs. In some instances we recorded a shotpoint in the middle of a survey line, which helped to image near surface layers and generally refine the data set. At each shotpoint we stacked the shear wave data 4 to 12 times to increase the signal-to-noise ratio. Stacking involved repeated source impacts recorded into the

same seismic data file. Theoretically, the seismic signal from each stack arrived at the same time from each refracting layer and thus was enhanced, while acoustic noise was random and tended to be reduced or canceled. The use of the Geometrics SmartSeis seismograph enabled the monitoring of background acoustic noise, stacking of signal, and the on screen manipulation and filtering of recorded signal.

DATA PROCESSING

All shear wave refraction data were processed using Rimrock Geophysics' software DOS-based application SIP version 4.1. SIP enabled filtering of the acquired data, picking first shear signal arrivals, assignment of velocity layers, and the calculation of Vs and depth to the layer. In order to ensure that the filtering and picking of first arrivals for the shear wave data from each shotpoint in a survey was treated equally, we used a standard signal picking form (Appendix B). After the data was successfully filtered for background noise and the first breaks were picked, individual velocity layers were assigned by plotting the first break picks on a time-distance plot. At this point, SIP allowed a correction to be applied if the survey was undertaken on uneven ground and the relative vertical displacement of each geophone had been recorded. With the potential different velocity layers assigned, SIP then used the Hobson-Overton least-squares method (Scott, 1977; Scott and others, 1972) to calculate layer velocities, and iterative ray tracing to obtain a first approximation depth model. An estimated minimum depth of the investigation was also calculated for all survey locations that did not encounter high Vs bedrock. This was accomplished by entering a velocity override into the SIP parameters for a higher velocity final layer. The probable geologic unit of this deepest minimum depth estimate layer was assigned based on knowledge of the local geology, and the velocity of this unit was arrived at through a compilation of average Vs data for each possible minimum depth unit surveyed during the 2003 field season (Table 1).

Table 1. Compilation of the average shear-wave velocities used for all minimum-depth units.

Minimum depth rock type	Average shear-wave velocity (m/s)
glacial and flood sand & silt	400
Ringold Formation	410
Latah Formation	550
weathered granite	820
Troutdale gravel	830
glacial (till & outwash) & flood gravel	860
sandstone	860
sedimentary deposits, undivided	900
generic slow bedrock	1500
granite	1740
basalt	2470

limestone	3000
gneiss	3190

Included in Appendix C of this report are screen captures of every step of the SIP process for each site surveyed. The appendix includes the following for each site surveyed: first break picks, layer assignment, depth model, and, in cases where no bedrock was encountered, a minimum depth model.

DATABASE STRUCTURE

The Vs database is presented in Microsoft Access 2000 format and as a series of three comma-delimited ASCII text files included with this report. The database is composed of three tables: Unitdescription, Location, and Velocity. The Unitdescription table lists our naming convention for geologic units and number of measurements for each geologic unit in the database. This table also includes brief descriptions of the geologic units. We adopted our own naming convention for the Quaternary sedimentary units in Washington State in order to group the vast number of Quaternary units by properties that shear wave velocity is sensitive to, such as grain size and depositional history, including compaction. Our naming convention was arrived at by reviewing the descriptions of all Quaternary sedimentary units described in the map reports for each of the published 1:100,000-scale geologic quadrangle maps. We classified each of these Quaternary sedimentary units with our naming convention using the report descriptions and our own professional observations and judgment. Tables 2, 3 and 4 illustrate our naming convention for the Quaternary sedimentary units.

Table 2. Geologic age naming convention.

Age	Definition	Designation
Holocene	Deposits younger than the end of either the Fraser or Wisconsin glaciations, depending on location	H
younger Pleistocene	Deposits that would yield a finite radiocarbon date (roughly younger than about 40,000 years before present)	yP
older Pleistocene	Deposits that would yield an infinite radiocarbon date (roughly greater than about 40,000 years before present)	oP
Pleistocene	Deposits where radiocarbon dating is absent and stratigraphic relations are inadequate to discriminate between a younger or older Pleistocene age	P
undivided Quaternary	Deposits that either span the Holocene and Pleistocene	Q

	epochs, or where the epochal age cannot be determined	
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Table 3. Quaternary sedimentary deposit naming convention.

Depositional environment	Designation
artificial fill	afl
alluvium	al
colluvium	cv
alluvial fan deposits	af
beach deposits	b
aeolian	ae
lacustrine deposits	lc
mass-wasting and landslide deposits	ls
peat deposits	pt
terrace deposits	tr
sedimentary deposits	sd
talus deposits	tl
glacial advance outwash	gao
glacial recessional outwash	gro
glacial outwash	go
glaciolacustrine deposits	gl
glacial drift	gd
glacial till	gt
glacial outburst flood deposits	gf
glaciolacustrine and glacial outburst flood deposits	glf
glaciomarine drift	gmd
lahars	lh
tuff and tuff breccias	tf
volcaniclastic deposits	vc

Table 4. Grain texture naming convention.

Grain texture	Classification	Designation
predominately gravel and sand	coarse	c
predominately sand and silt	sandy	s
predominately silt and clay	fine	f
texture unknown or deposit well-graded and highly variable	texturally undifferentiated	no letter designation is used

The Location and Velocity tables are related by the unique identifier field Site_ID. The Location table gives an overview of each Vs survey including: the data source, the site name, the date the survey was completed, the depth surveyed, the number of geologic units measured at each site and the XY location where the survey was completed using the North American Datum (NAD) 1983 High Accuracy Reference Network (HARN) State Plane Washington South Federal Information Processing Standard 4062 coordinate system with US survey feet as the base unit. The Velocity table gives the result of the shear wave velocity surveys for each geologic unit. Appendix D provides an overview of the database structure summarizing the names, data types, and description of each field in the three tables.

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- Wong, Ivan; Sparks, Andrew; Thomas, Patricia; Nemser, Eliza, 2003, Evaluation of near-surface site amplification in the Seattle, Washington, metropolitan area—Final technical report: Seismic Hazards Group, URS Corporation [under contract to] U.S. Geological Survey, 1 v.

Appendix A

Standard survey setup form page 1.

Site Name:		Date:	Recorder's Name:
Location: N _____ W _____	Geologic Observations: (or geology to be tested, if known)		
Waypoint name: _____			
Projection: _____			
Photos: (name or number & brief description) _____ _____ _____ _____ _____ _____	Note any possible source of interference: (For example: close buildings, trees & wind, other weather, power lines, traffic)		
	Describe survey ground: (Is it flat? Is it dry or wet?)		
Geometry: Line Strike: _____		Phone # 1: Compass: _____ LOC: _____	
S-Wave phone polarity: _____		Phone # 24: Compass: _____ LOC: _____	
Phone Interval: _____			
Acquisition Setup:		Trigger mechanism: _____	
Directory: _____		S-wave sensitivity: _____	
		P-wave sensitivity: _____	
Sample interval: S-wave: _____ P-wave: _____		Acquisition Filter:	
		Filter #1: _____	
Record Length: S-wave: _____ P-wave: _____		Filter #2: _____	
Background Noise:			
S-Wave phones: _____ (mV) <u>Is it consistent?</u>		P-Wave phones: _____ (mV) <u>Is it consistent?</u>	
Notes: (Site contact information or other notes)			

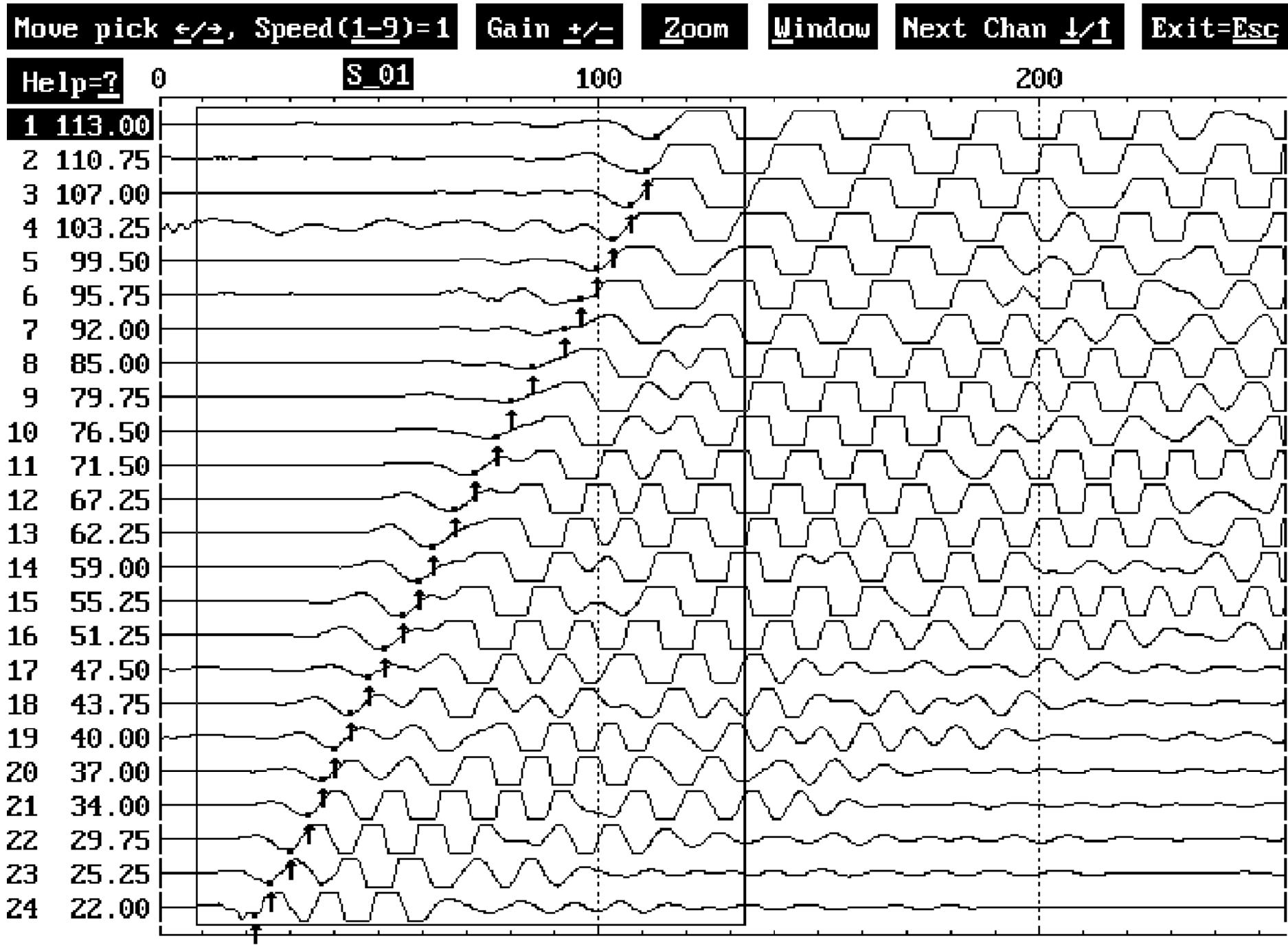
Appendix A

Standard survey setup form page 2.

Appendix B

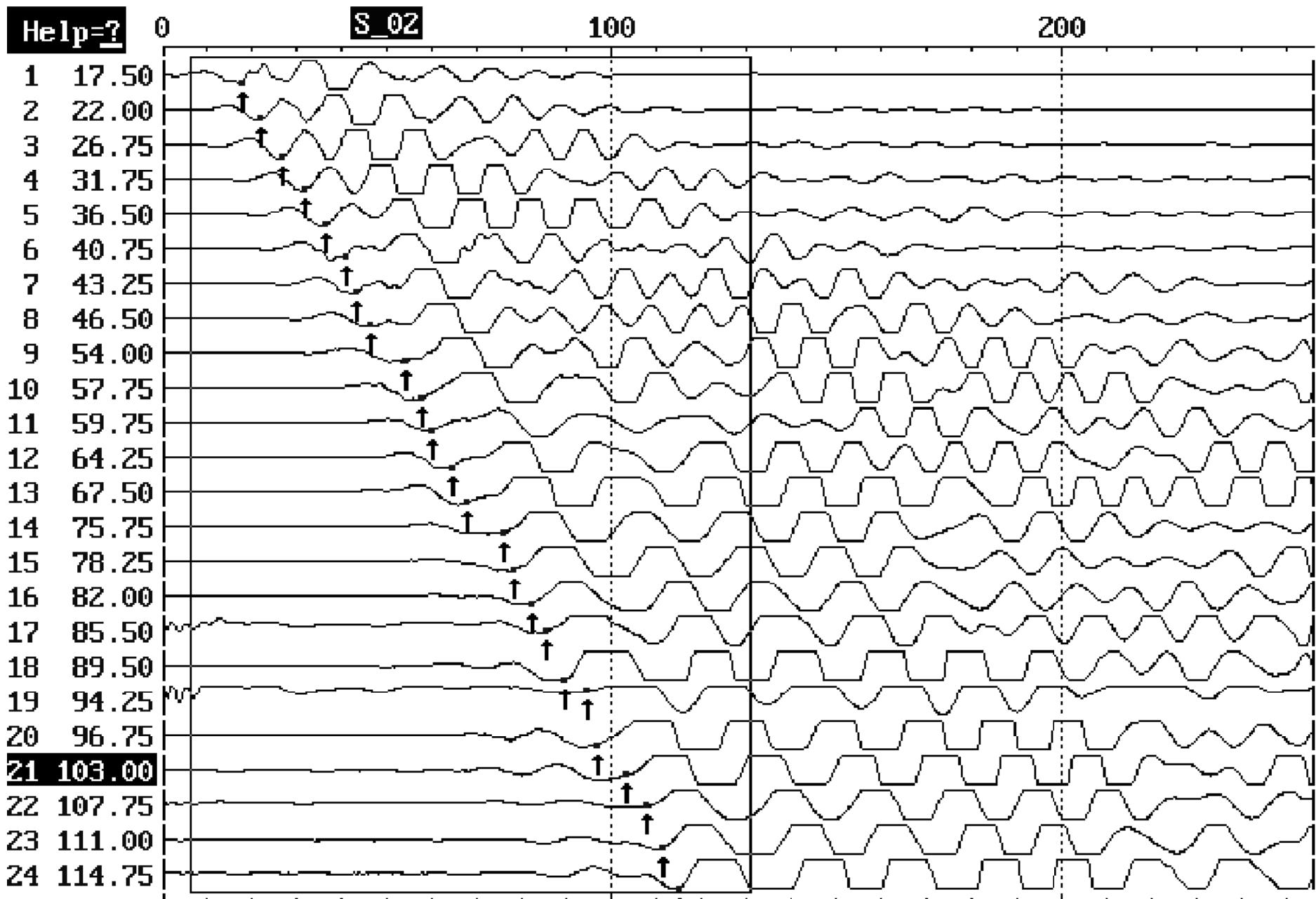
Standard first shear-wave arrival picking form.

Site Name:	Date:	Recorder's Name:
Name of the file Read: _____	Sample Points Read:	
	<input type="checkbox"/> Just the left half.	<input type="checkbox"/> Every 2nd point.
Frequency Filters:		
<u>Filter Applied:</u>	<u>Number of Applications:</u>	
Filter 1: _____ Hz	_____	
Filter 2: _____ Hz	_____	
Filter 3: _____ Hz	_____	
Filter 4: _____ Hz	_____	
Filter 5: _____ Hz	_____	
Arrival Times:		
First arrival time: _____ ms	Last arrival time: _____ ms	
Pick Offset (Time increment for picking behind first break)		
Phone/trace of time measurement: _____		
Time increment: _____ ms		
Phones/traces adjusted: _____		
<input type="checkbox"/> Did you save the image of the final First Break Picks?		
★ When finished with all *.dat files in a survey remember to save/print images of the SIPIN final layer assignments and the SIPT2 depth models with the calculated layer velocities indicated. ★ After the depth models have been produced, do minimum depth calculations for all S-wave surveys that require a minimum depth to characterize the site.		

202nd Place S-wave

202nd Place S-wave

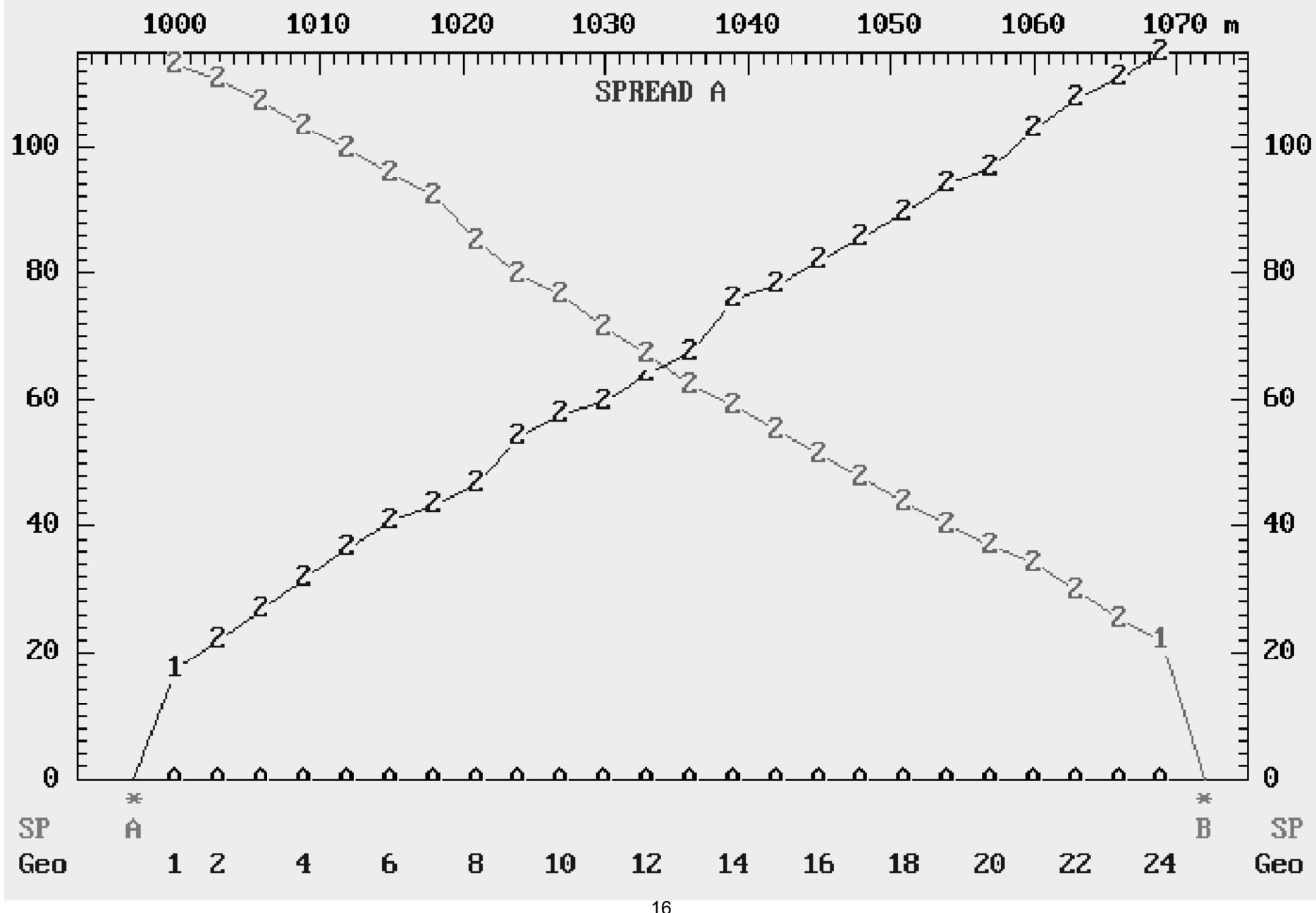
Move pick ←/→, Speed(1-9)=1 Gain ±/- Zoom Window Next Chan ↓/↑ Exit=Esc



Appendix C

202nd Place S-wave

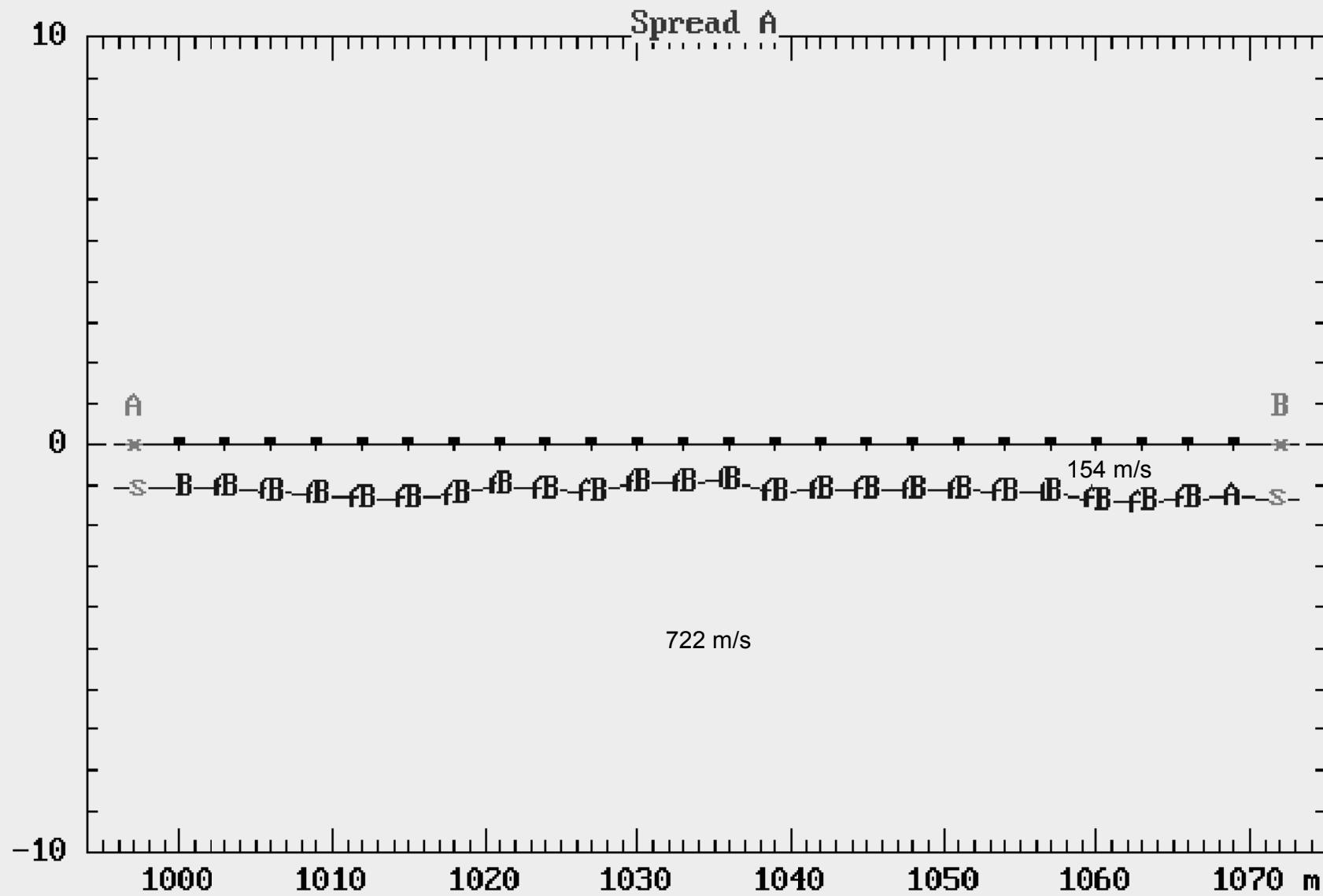
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



202nd Place S-wave

Press Esc to EXIT

202SWAVZ.SIP: 202 Palce S-waves

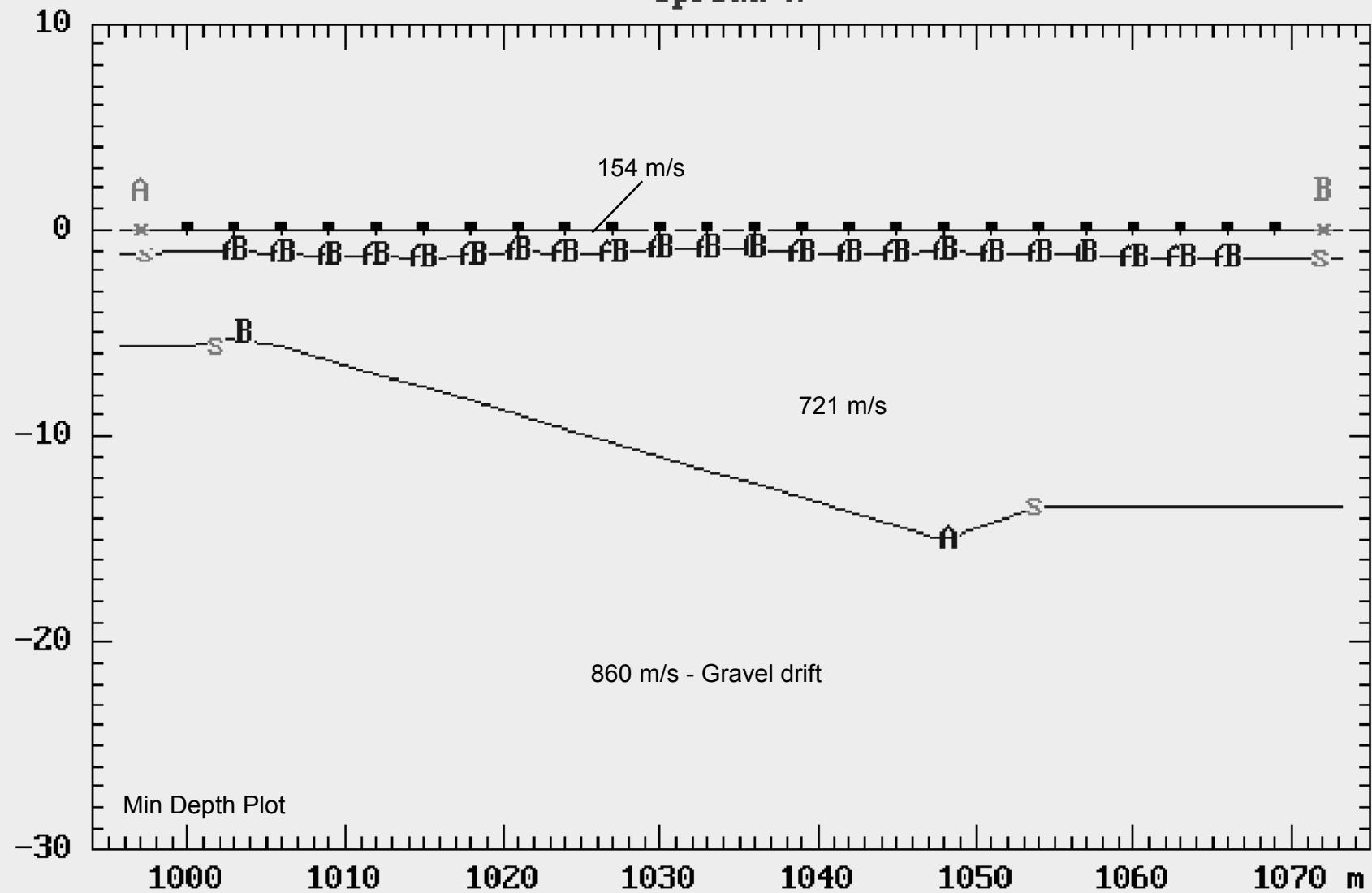


202nd Place S-wave

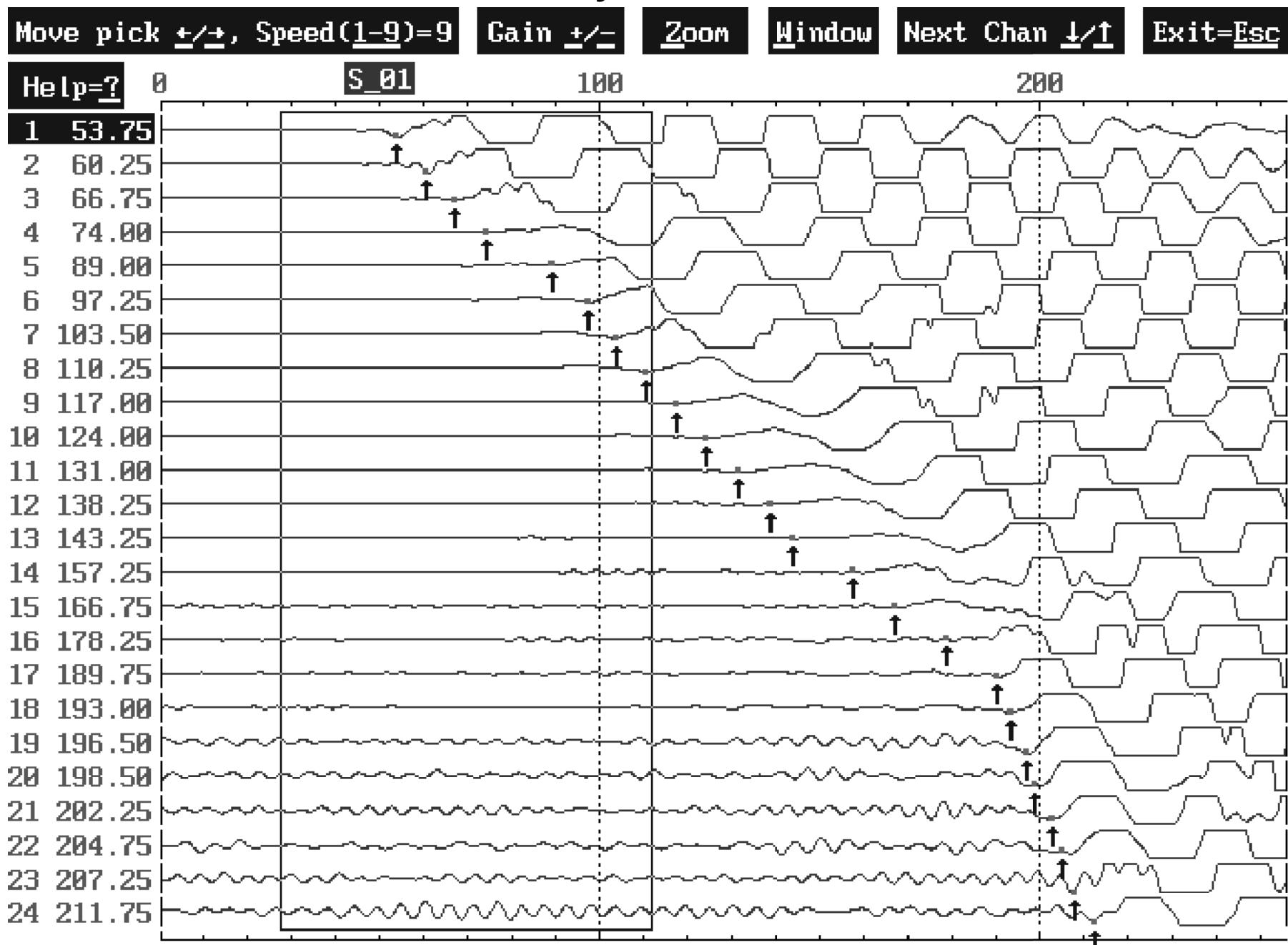
Press Esc to EXIT

202SMIN2.SIP: 202 Palce S-waves

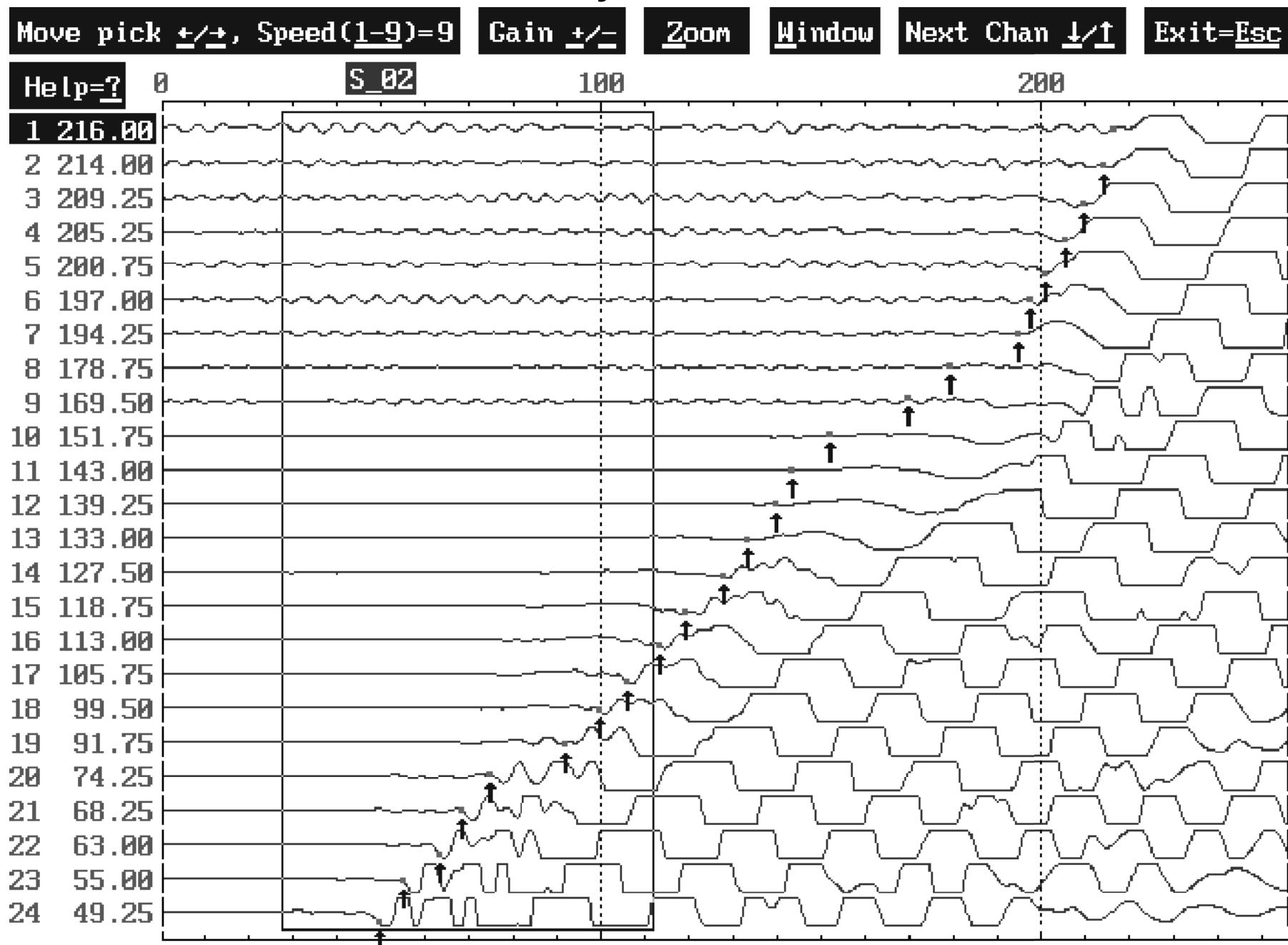
Spread A



Clark County 389th ST S-wave

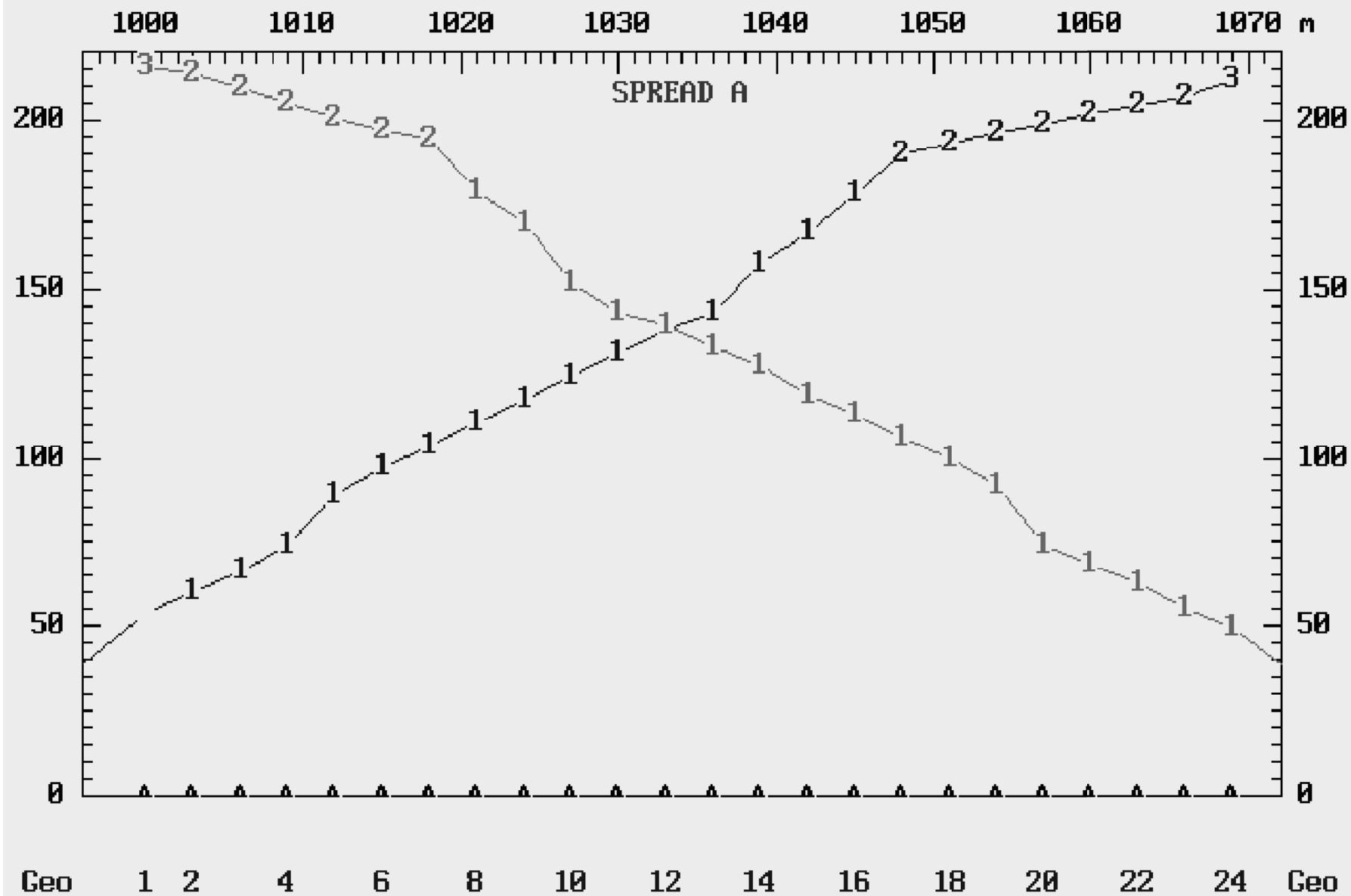


Clark County 389th ST S-wave



Clark County 389th ST S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

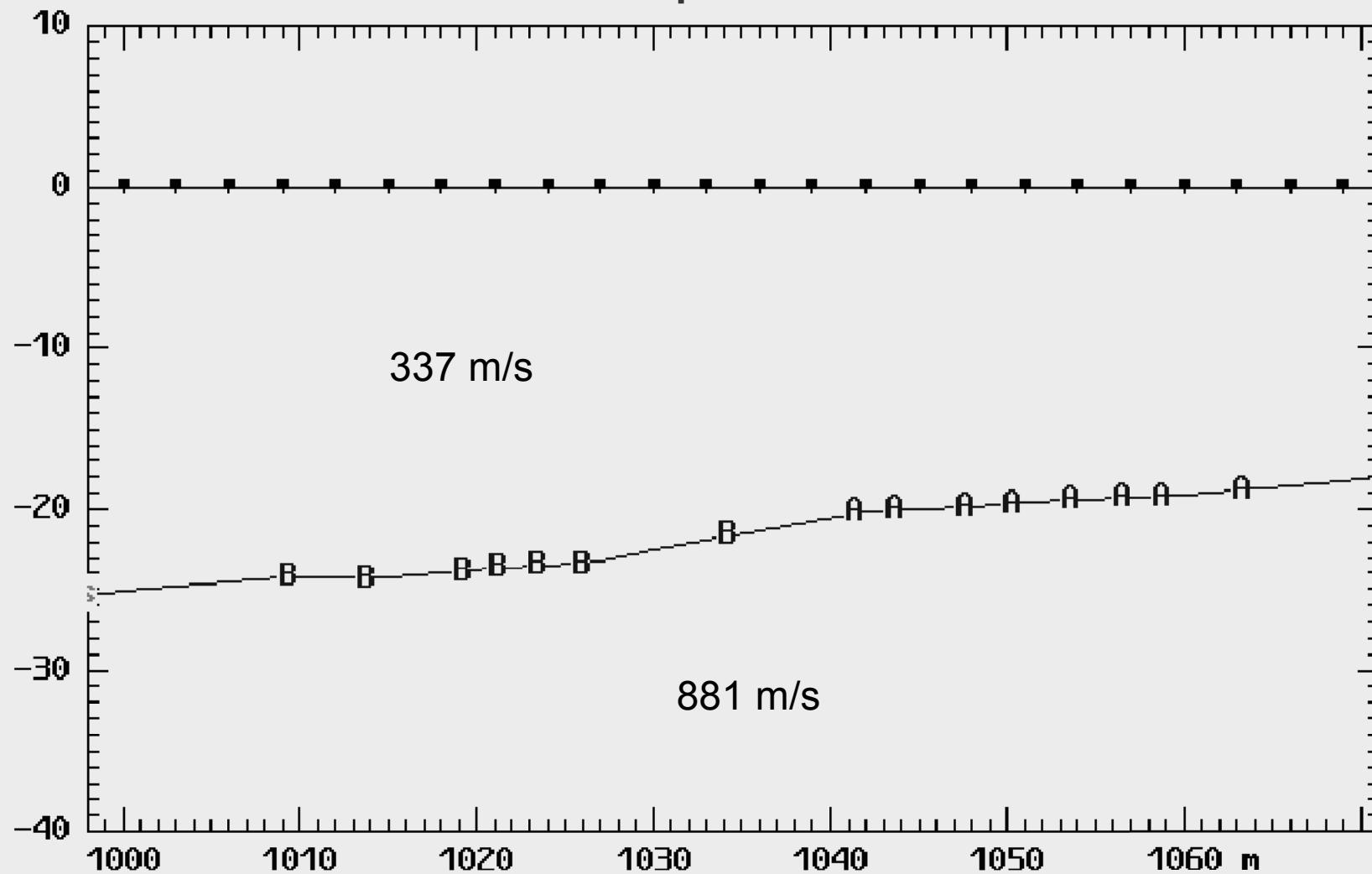


Clark County 389th ST S-wave

Press Esc to EXIT

389_SWA2.SIP: 389 th Street S-wave

Spread A

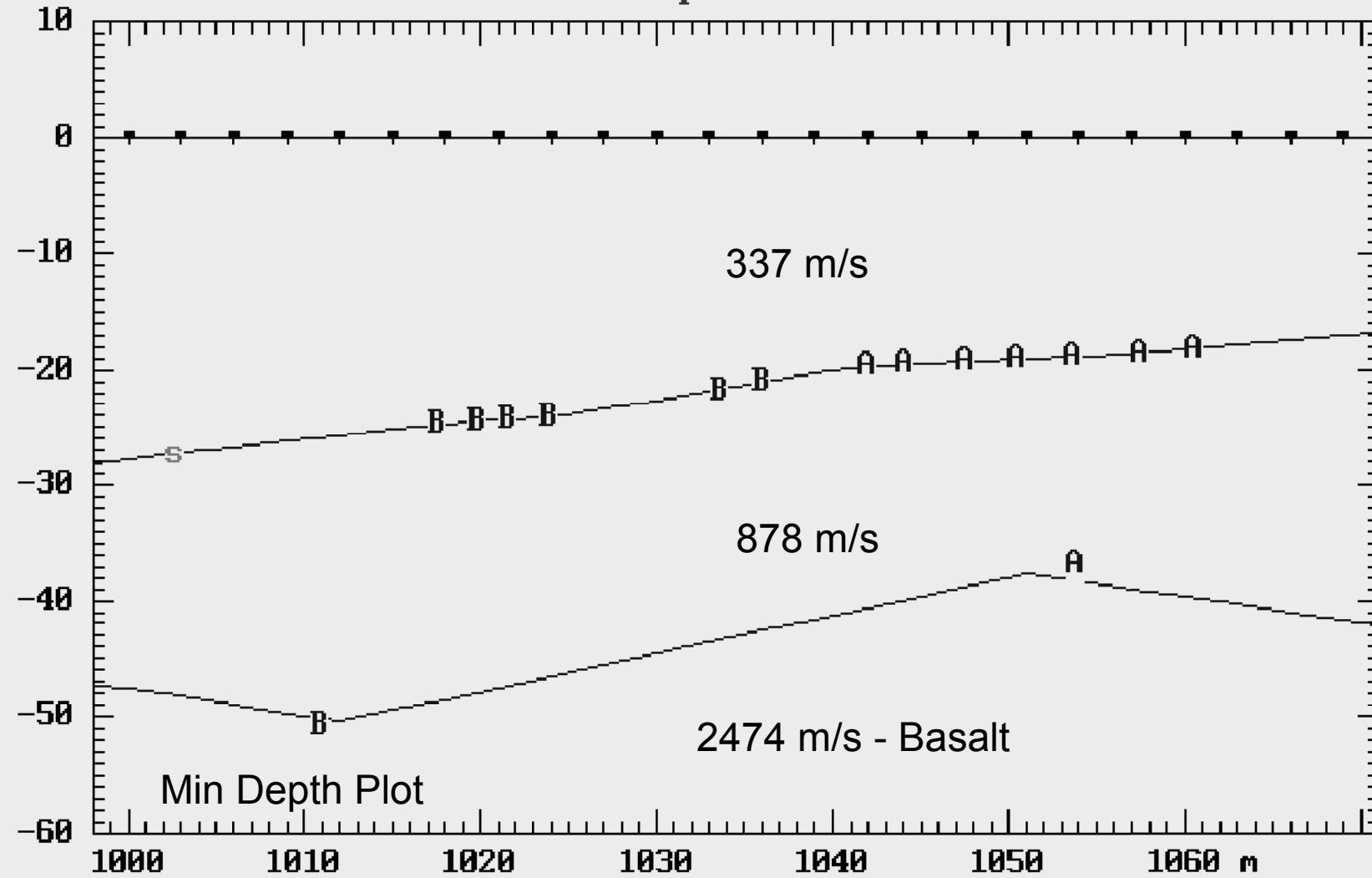


Clark County 389th ST S-wave

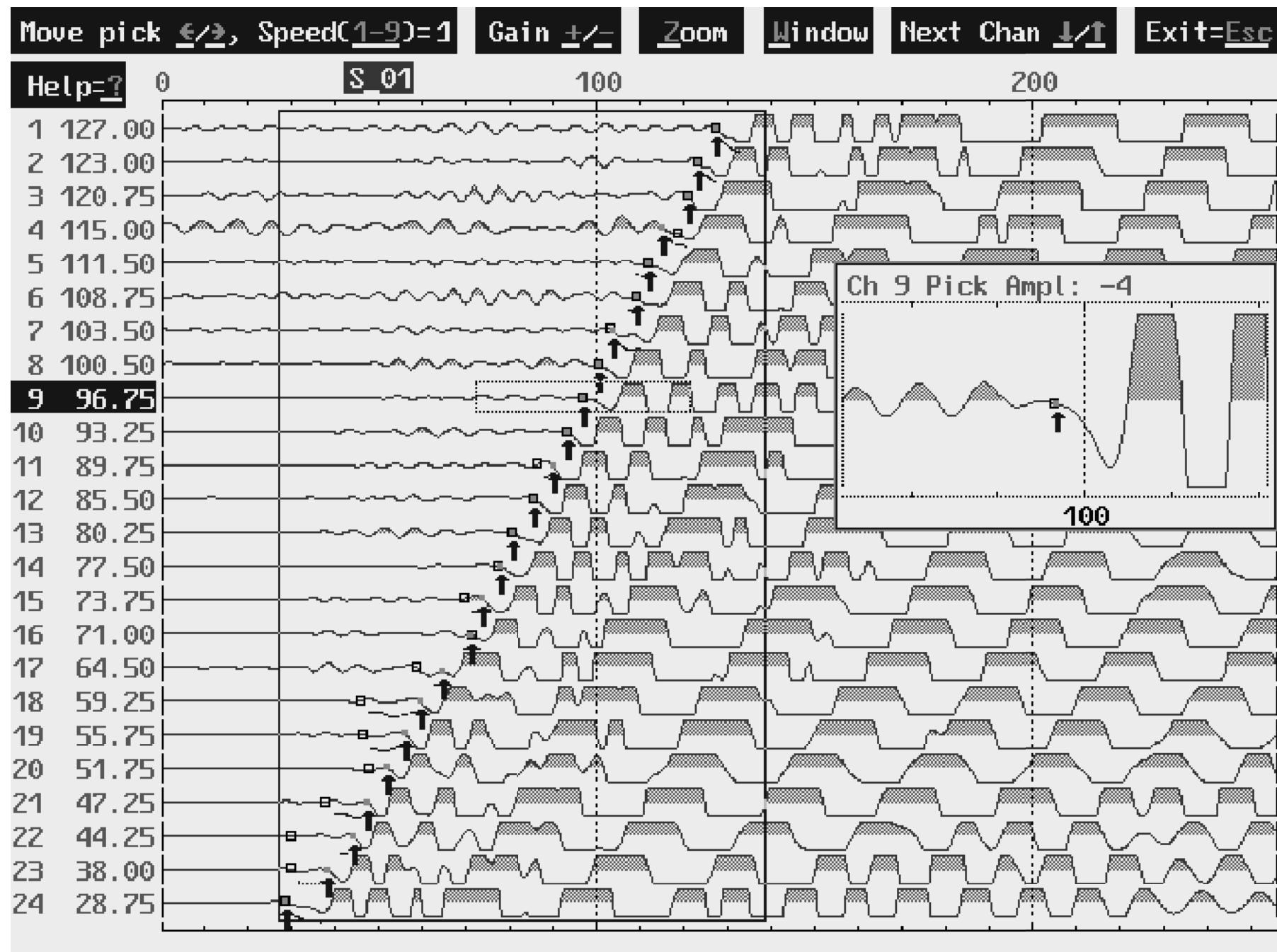
Press Esc to EXIT

389_SMIN.SIP: 389 th Street S-wave

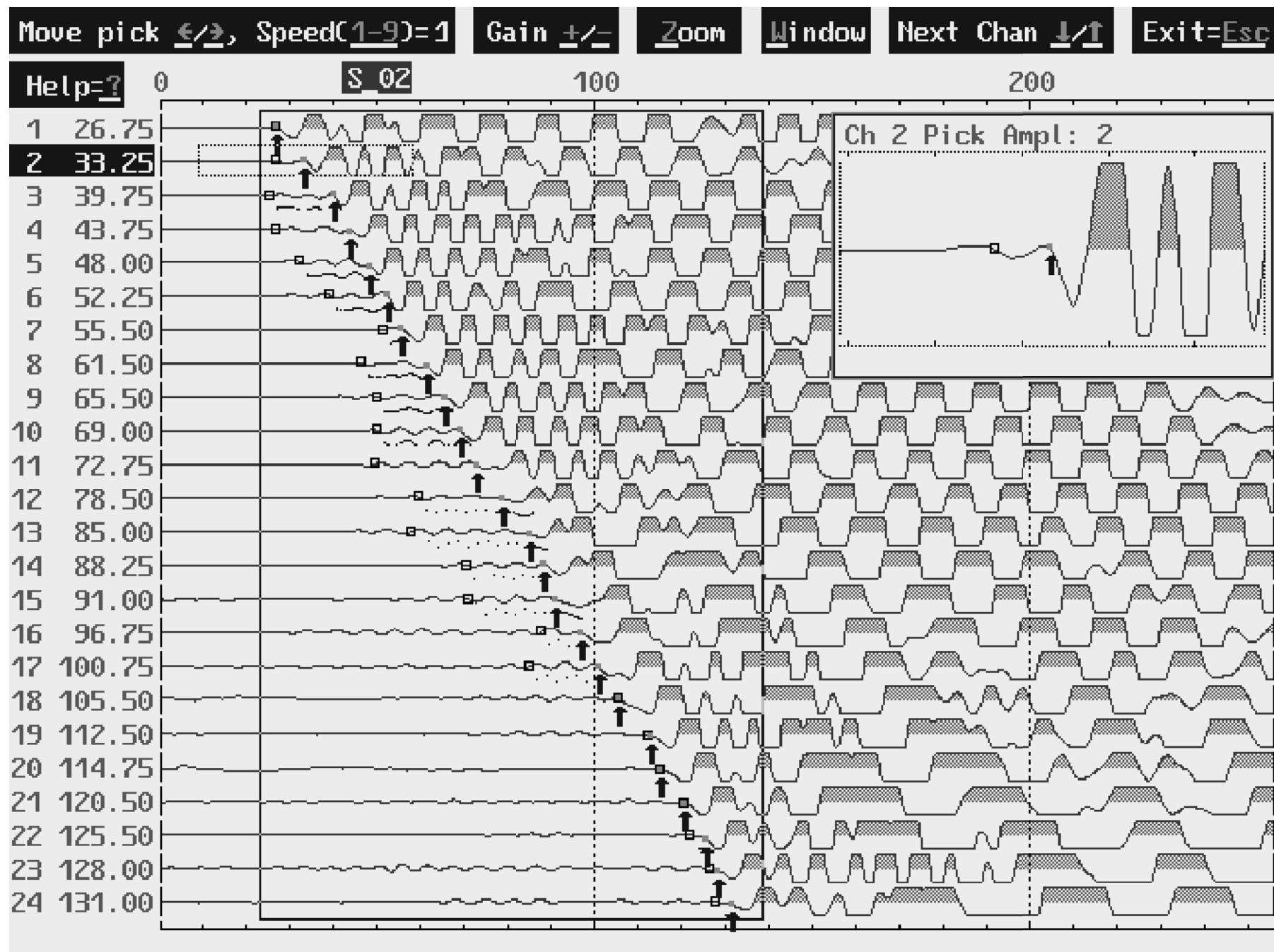
Spread A



68th Ave Snohomish County S-wave

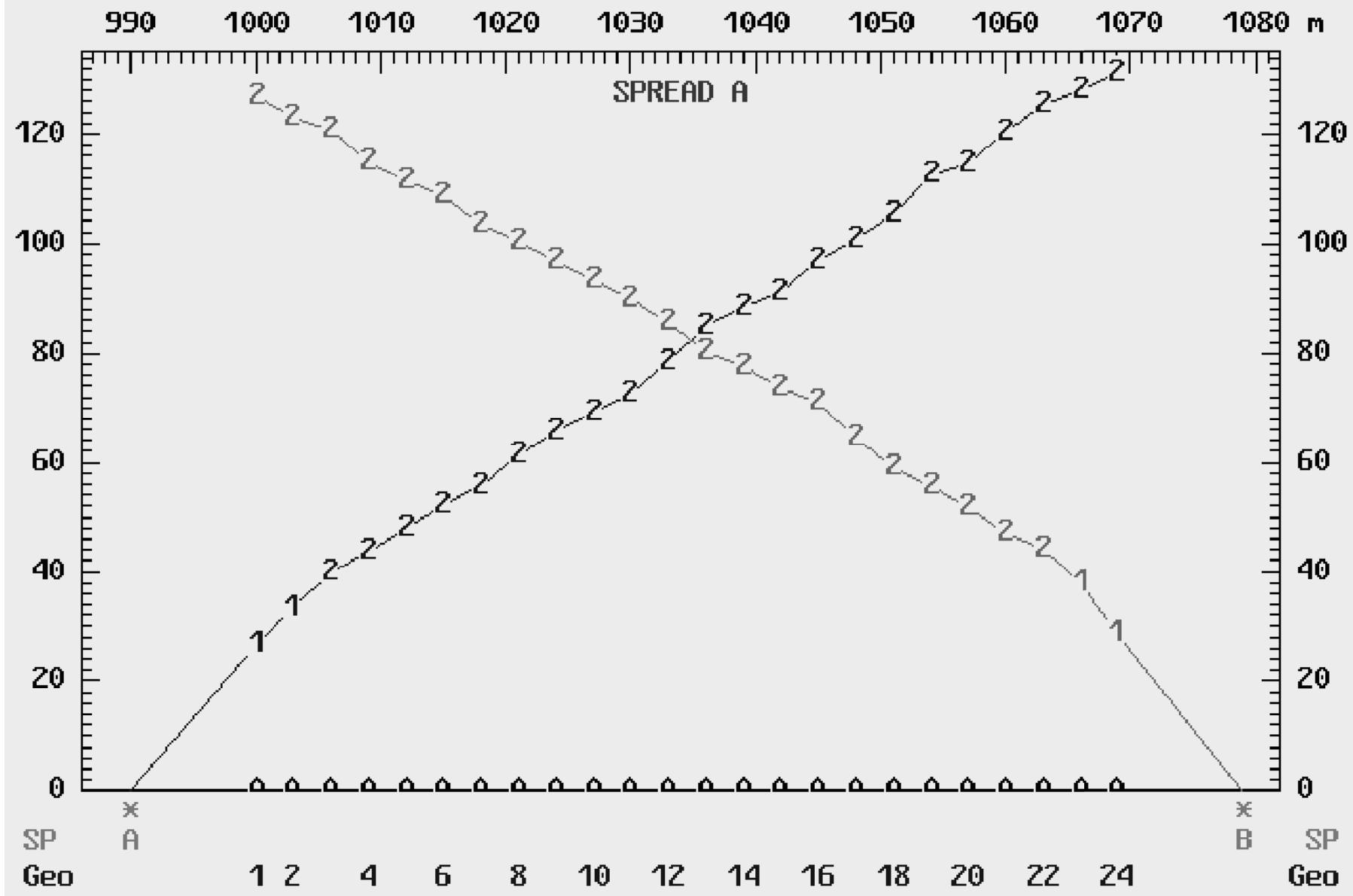


68th Ave Snohomish County S-wave



68th Ave Snohomish County S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

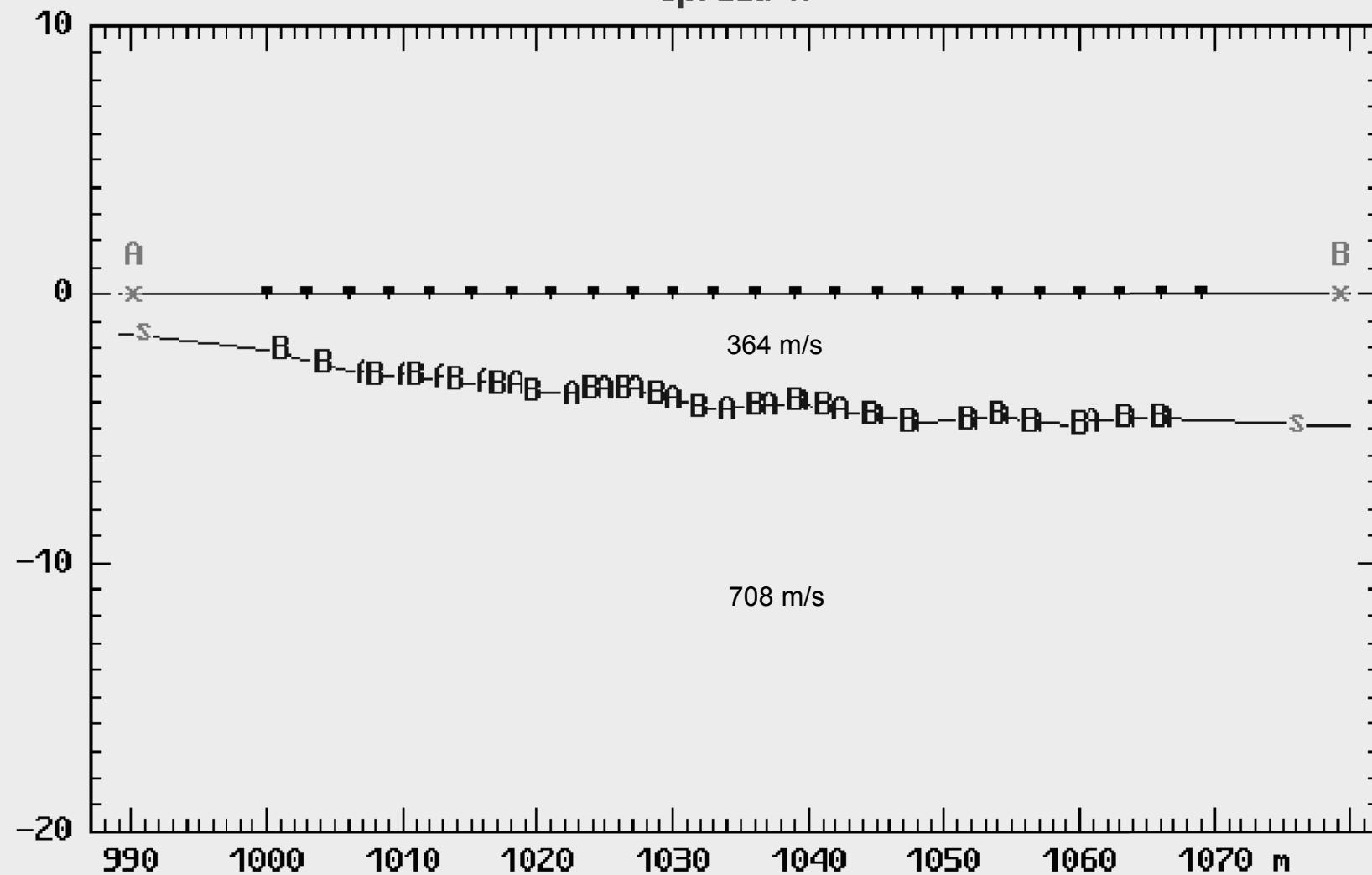


68th Ave Snohomish County S-wave

Press Esc to EXIT

68THSWAV.SIP: 68th Ave Snohomish S-Waves

Spread A

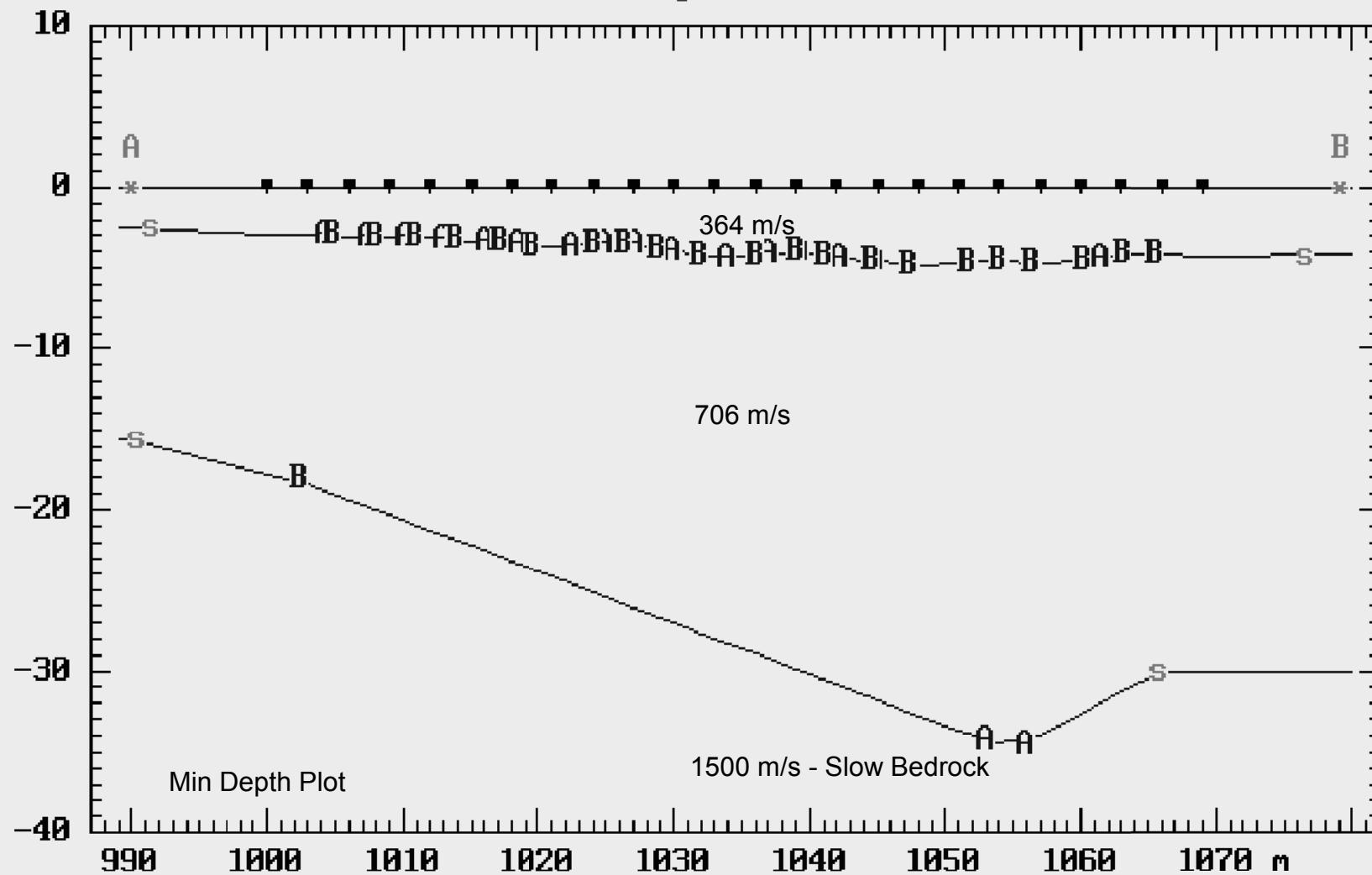


68th Ave Snohomish County S-wave

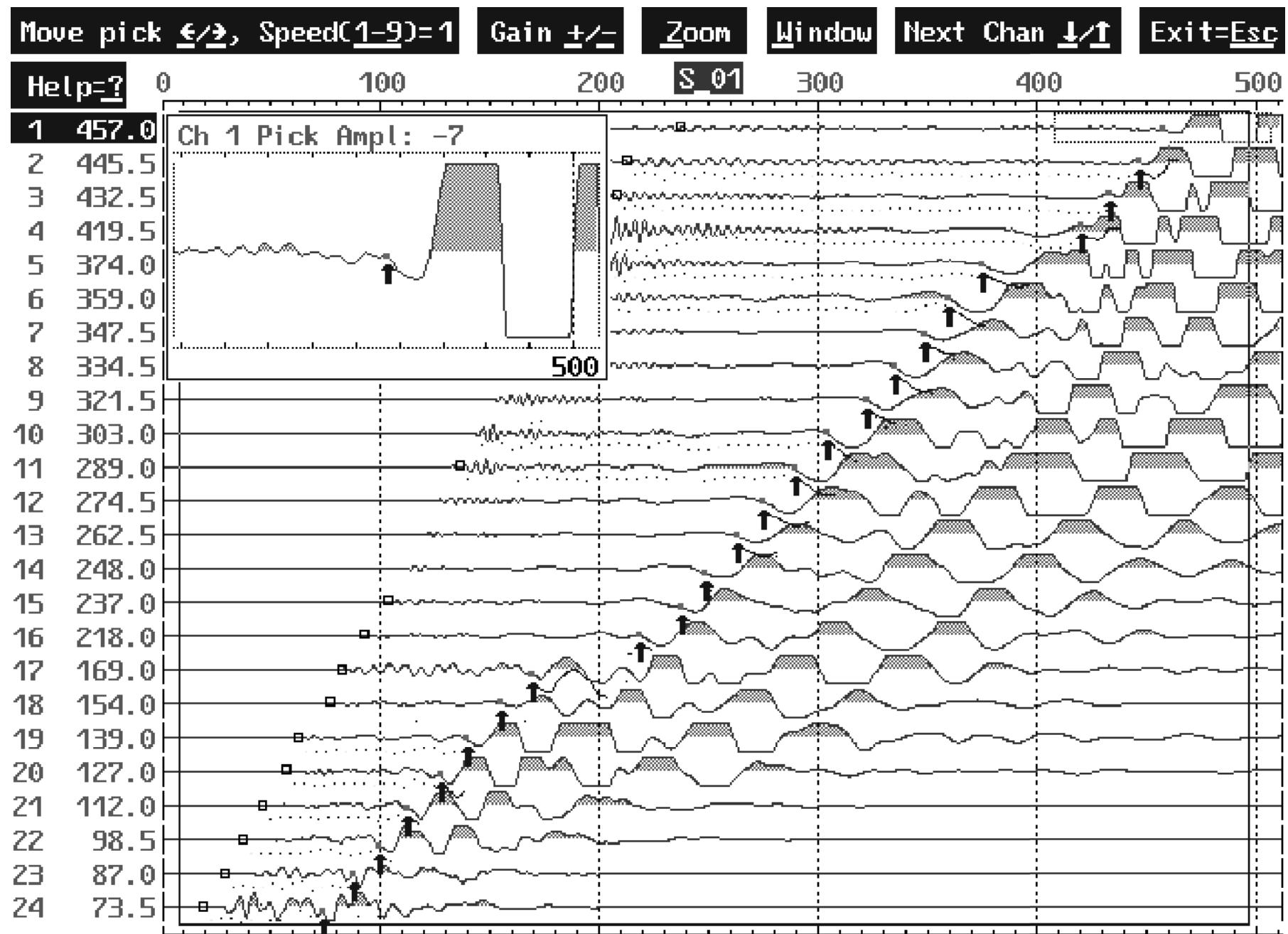
Press Esc to EXIT

68THSMIN.SIP: 68th Ave Snohomish Minimum Depth Plot

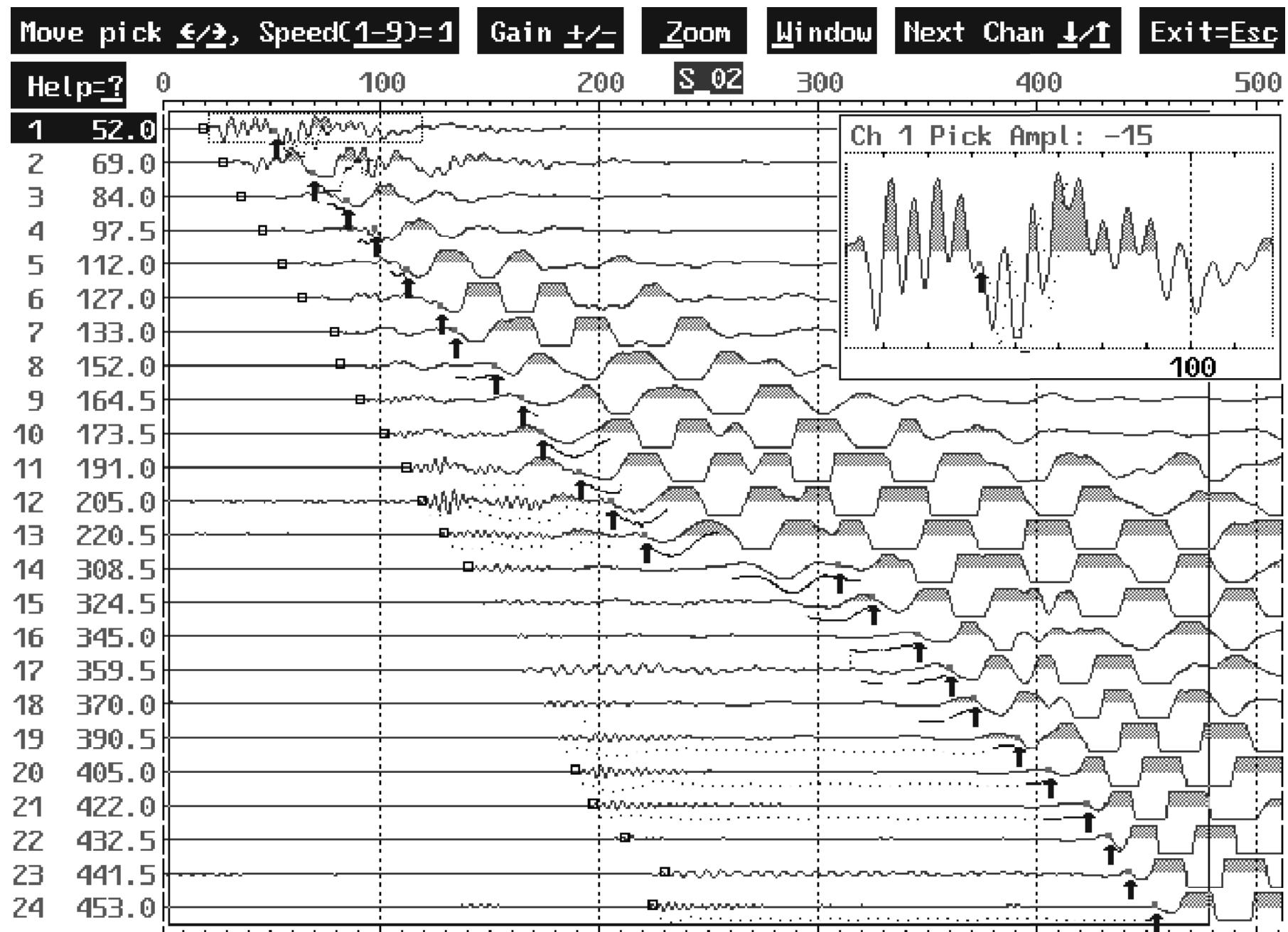
Spread A



Abbot Road S-wave

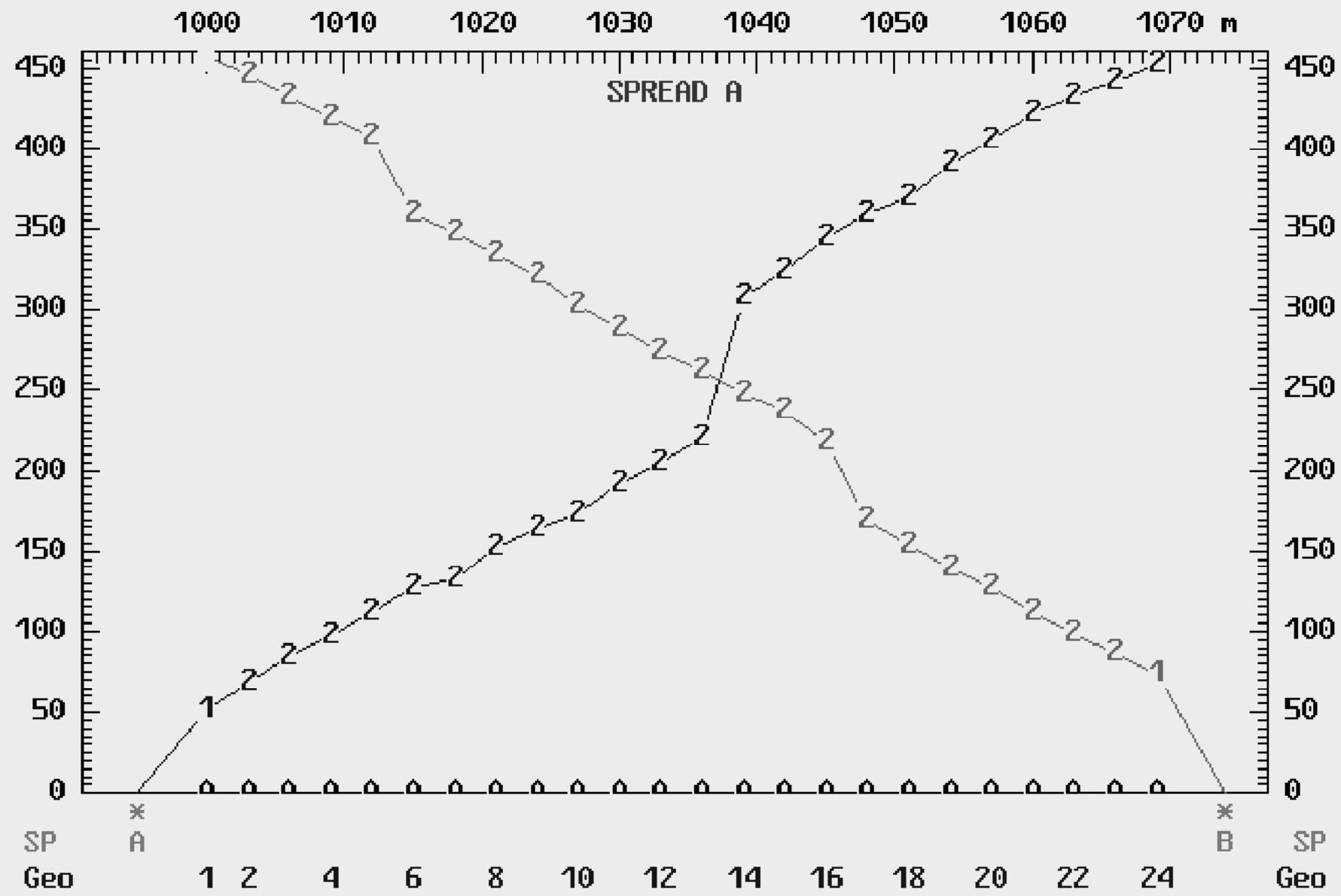


Abbot Road S-wave



Abbot Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

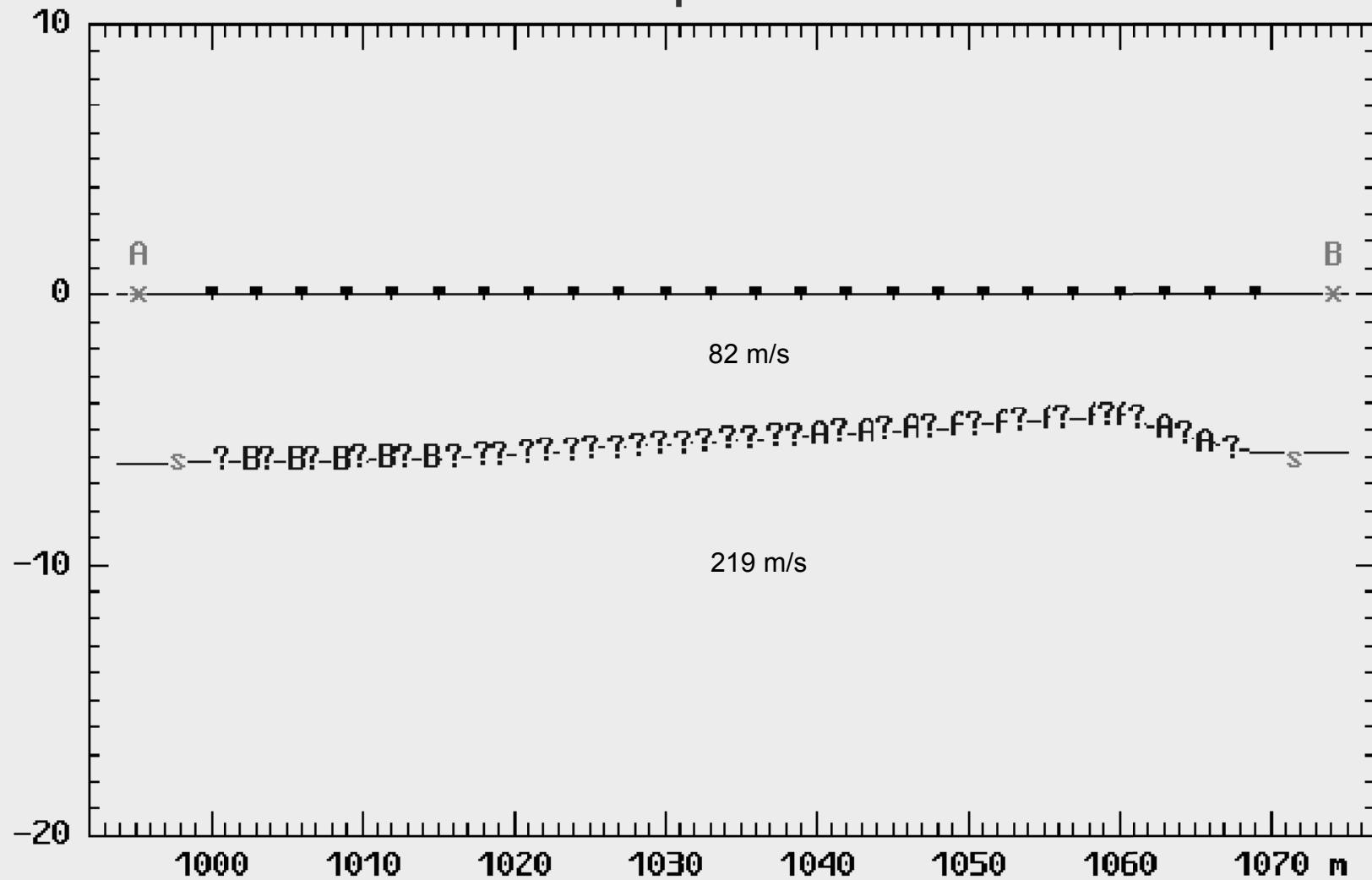


Abbot Road S-wave

Press Esc to EXIT

ABBTSWA2.SIP: Abbot Rd S-Waves

Spread A

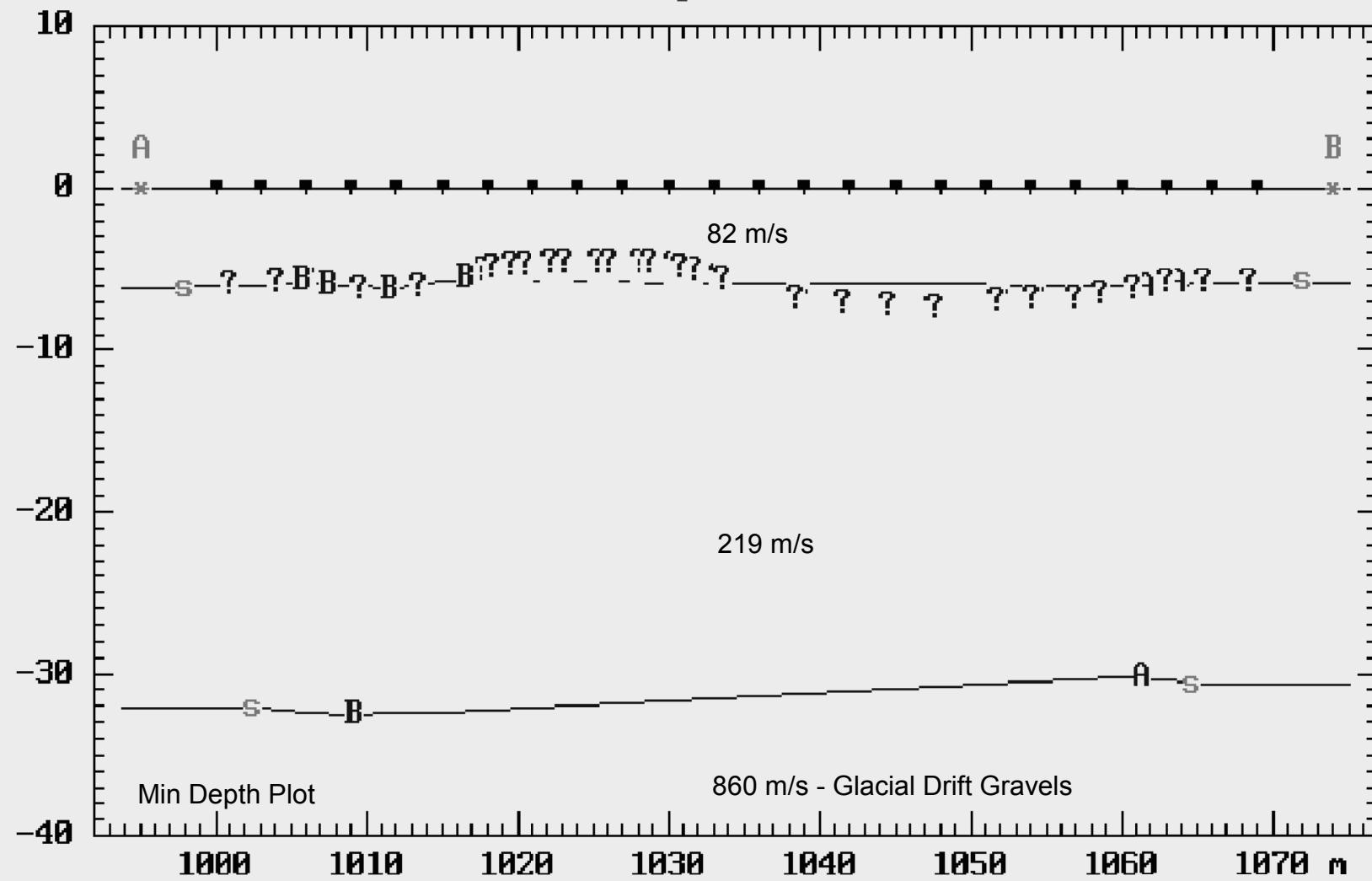


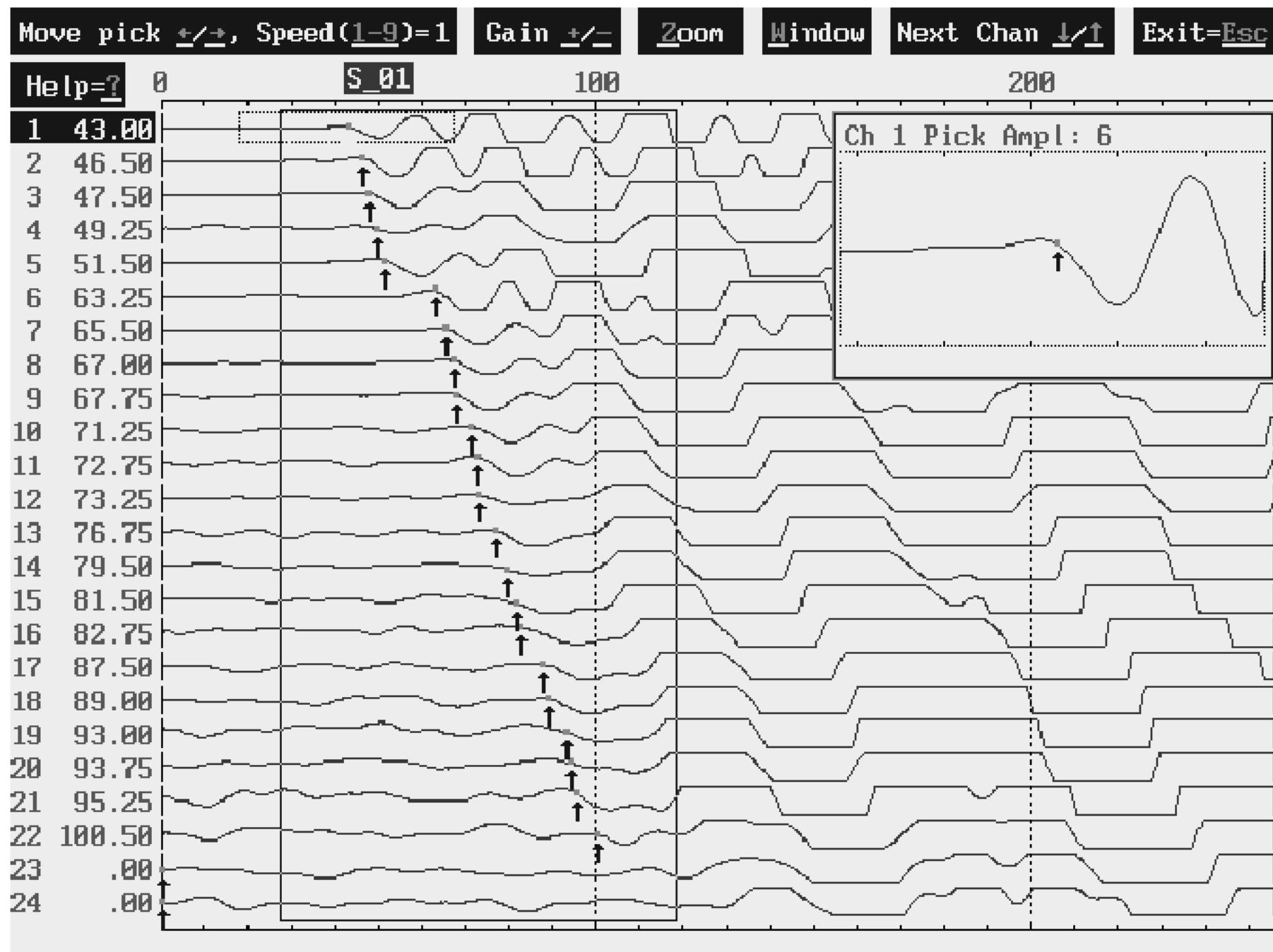
Abbot Road S-wave

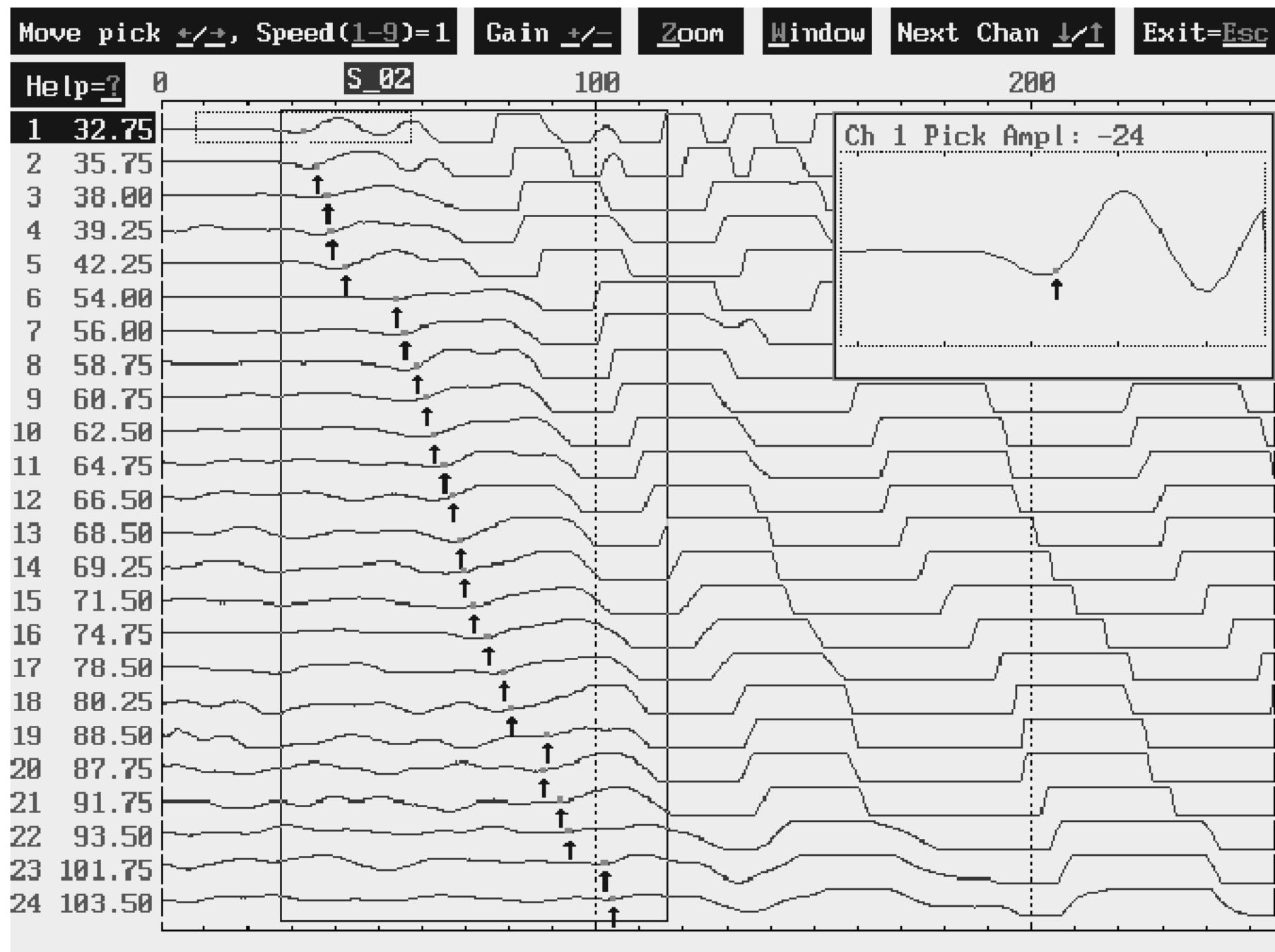
Press Esc to EXIT

ABBTSMIN.SIP : Abbot Rd Minimum Depth

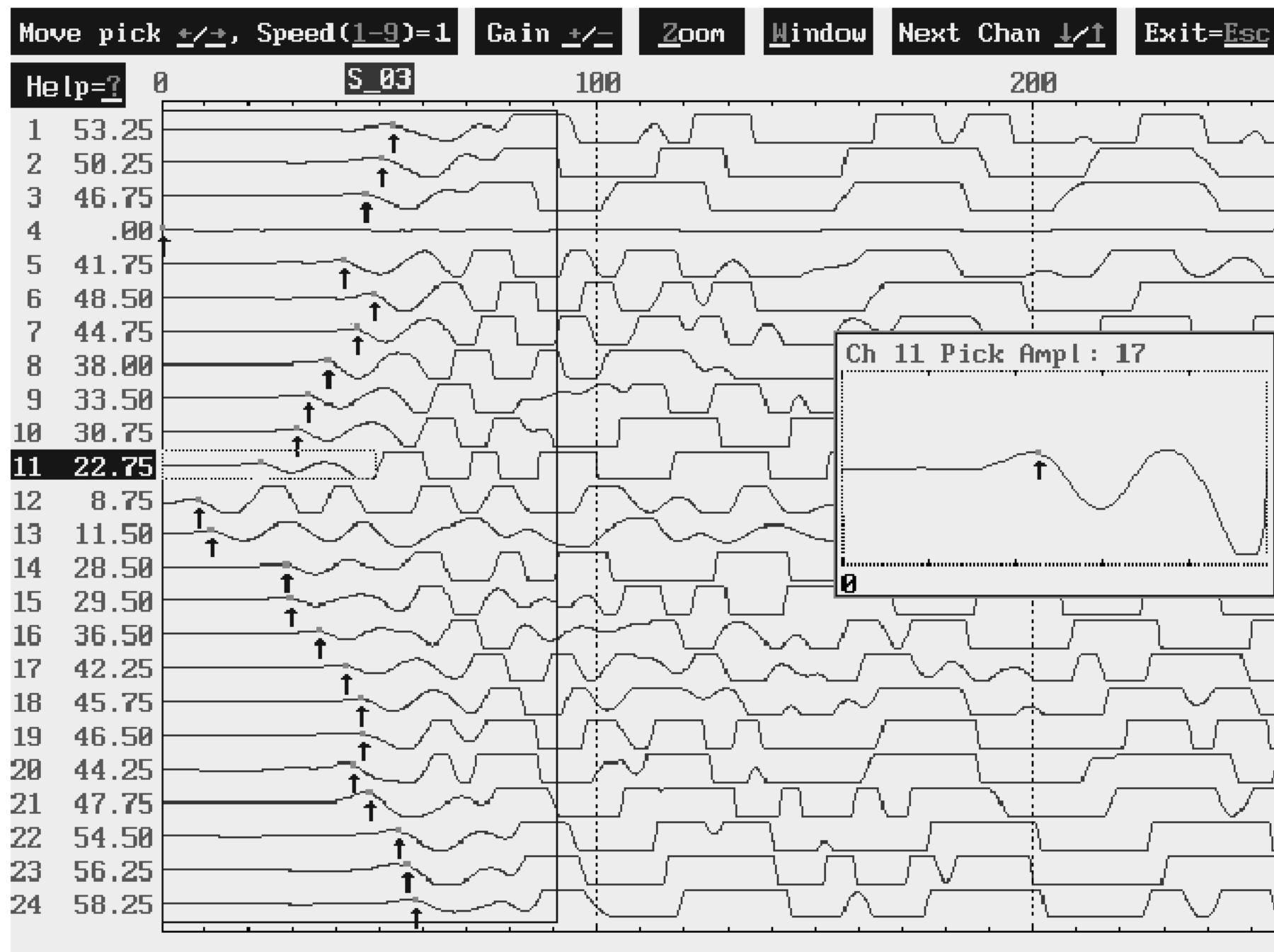
Spread A



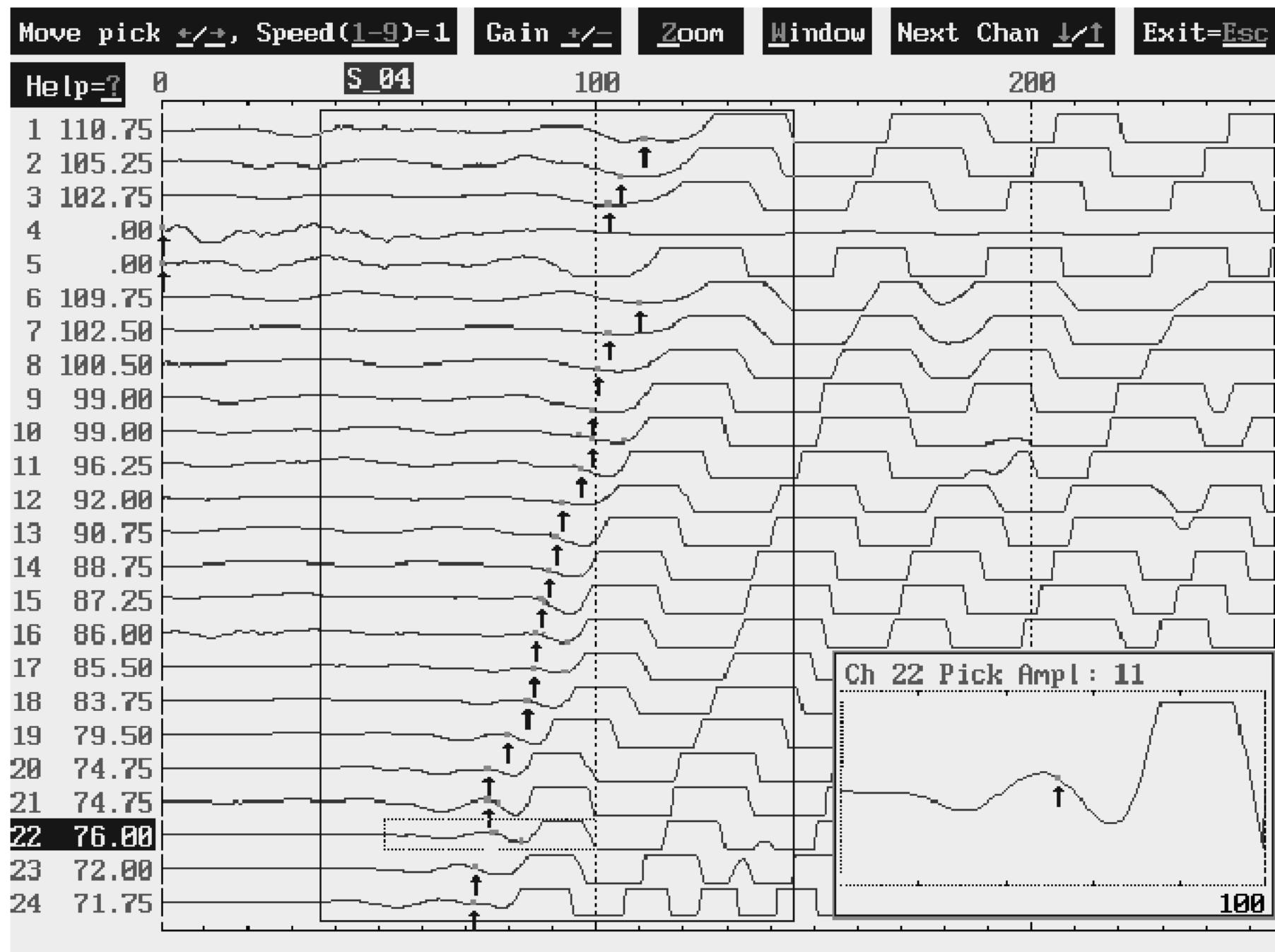
Ahtanum Valley Elementary S-wave

Ahtanum Valley Elementary S-wave

Ahtanum Valley Elementary S-wave

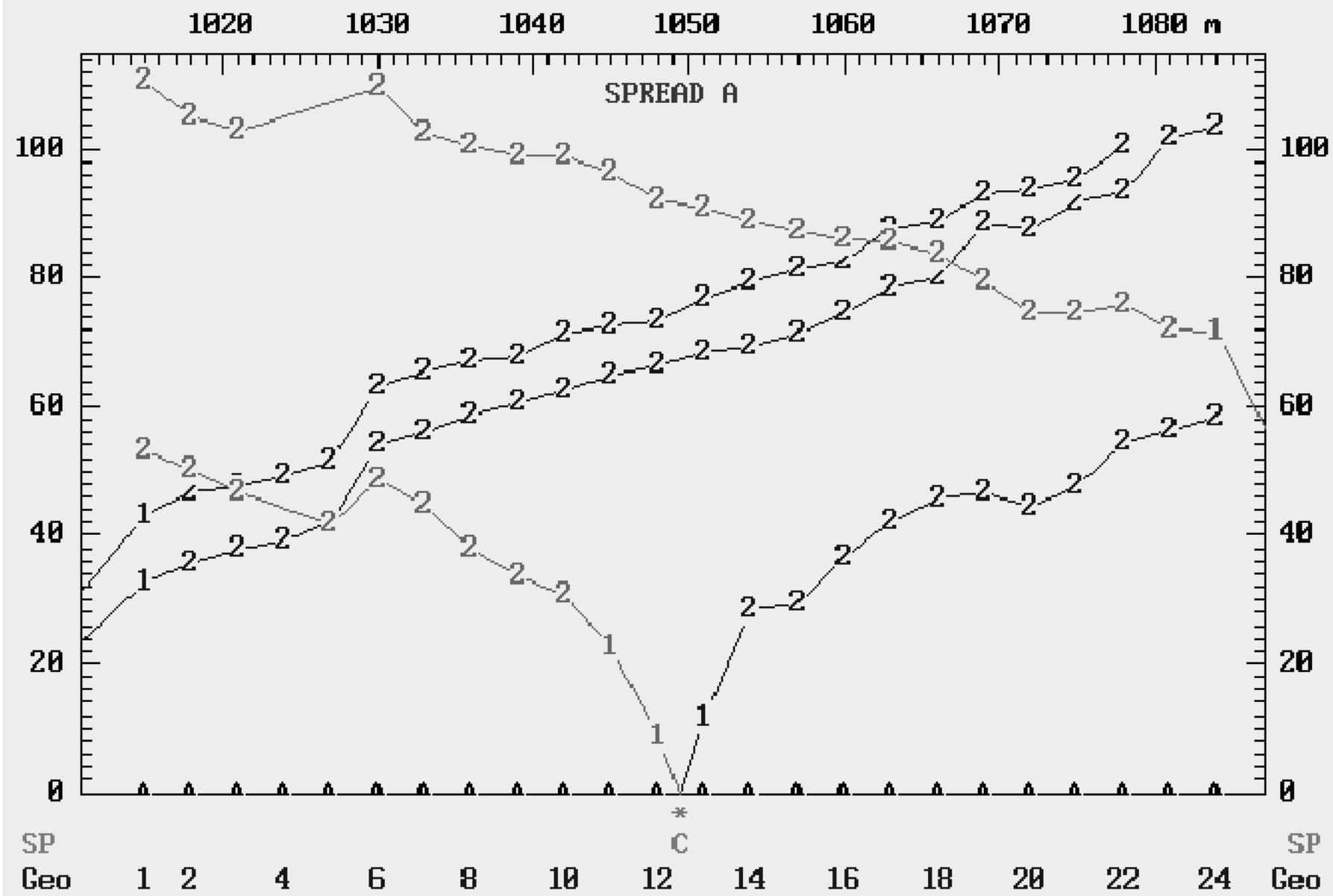


Ahtanum Valley Elementary S-wave



Ahtanum Valley Elementary S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

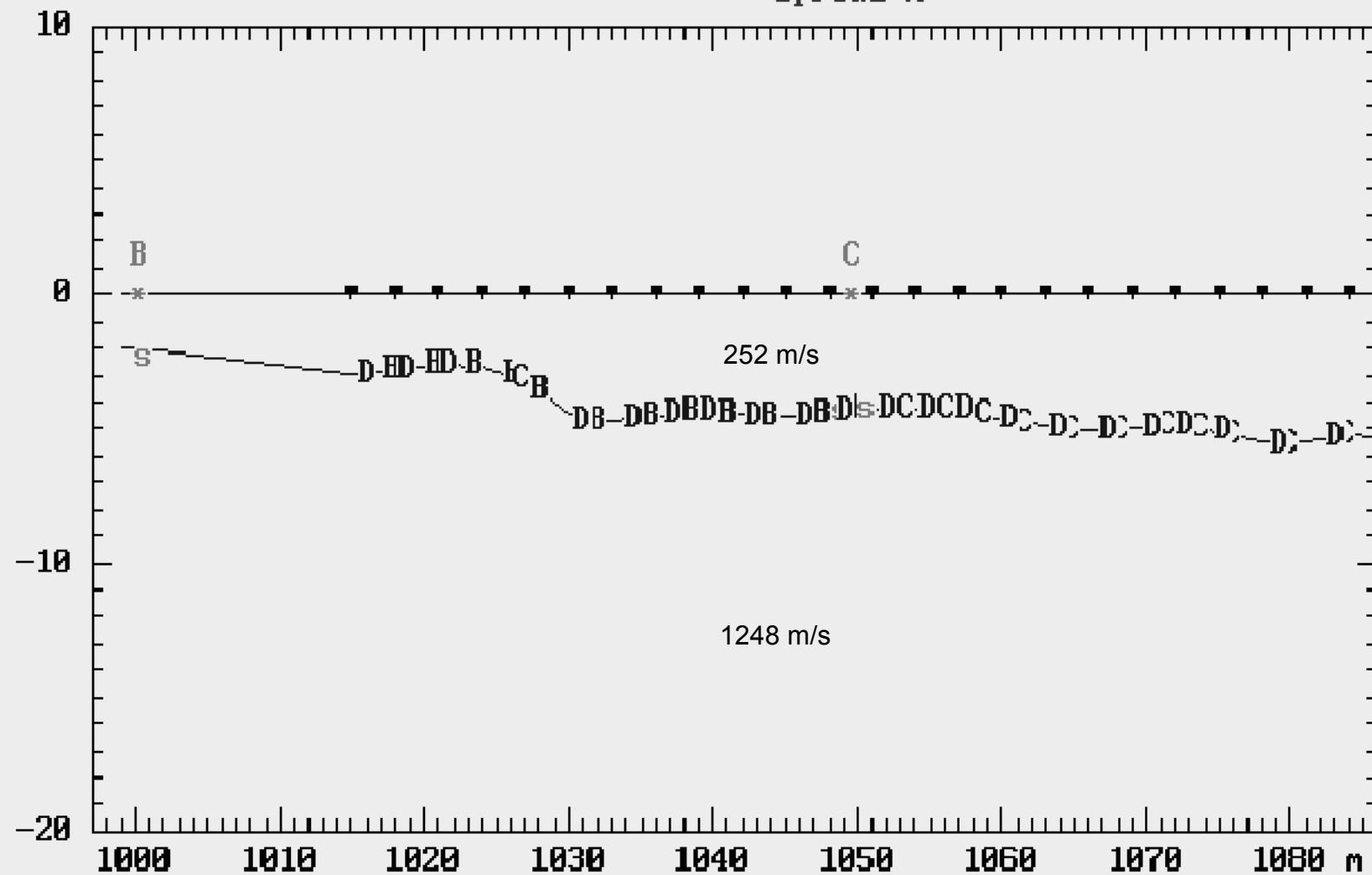


Ahtanum Valley Elementary S-wave

Press Esc to EXIT

AHTUSWAU.SIP: Ahtanum Valley Elementary S-Waves

Spread A

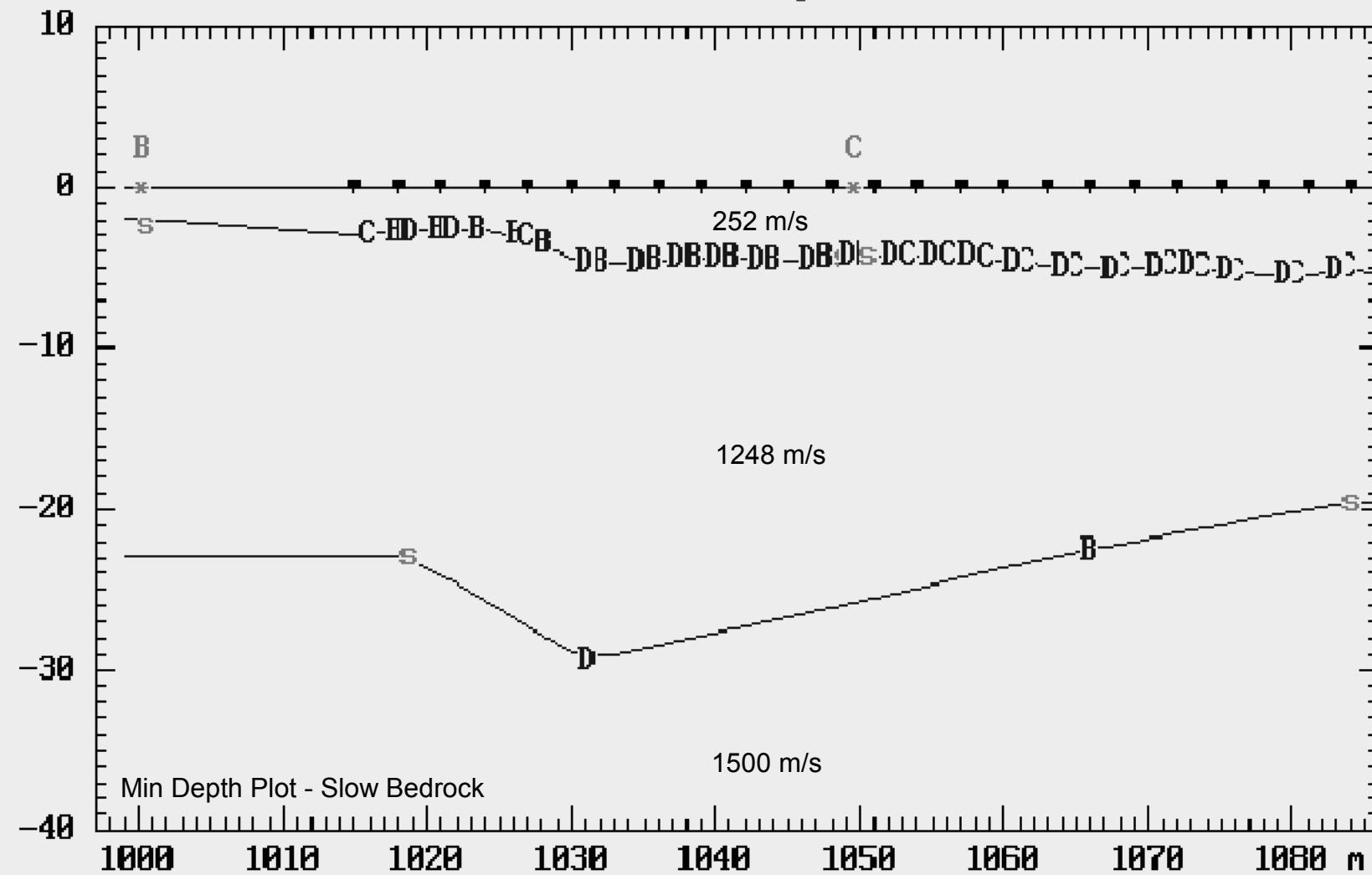


Ahtanum Valley Elementary S-wave

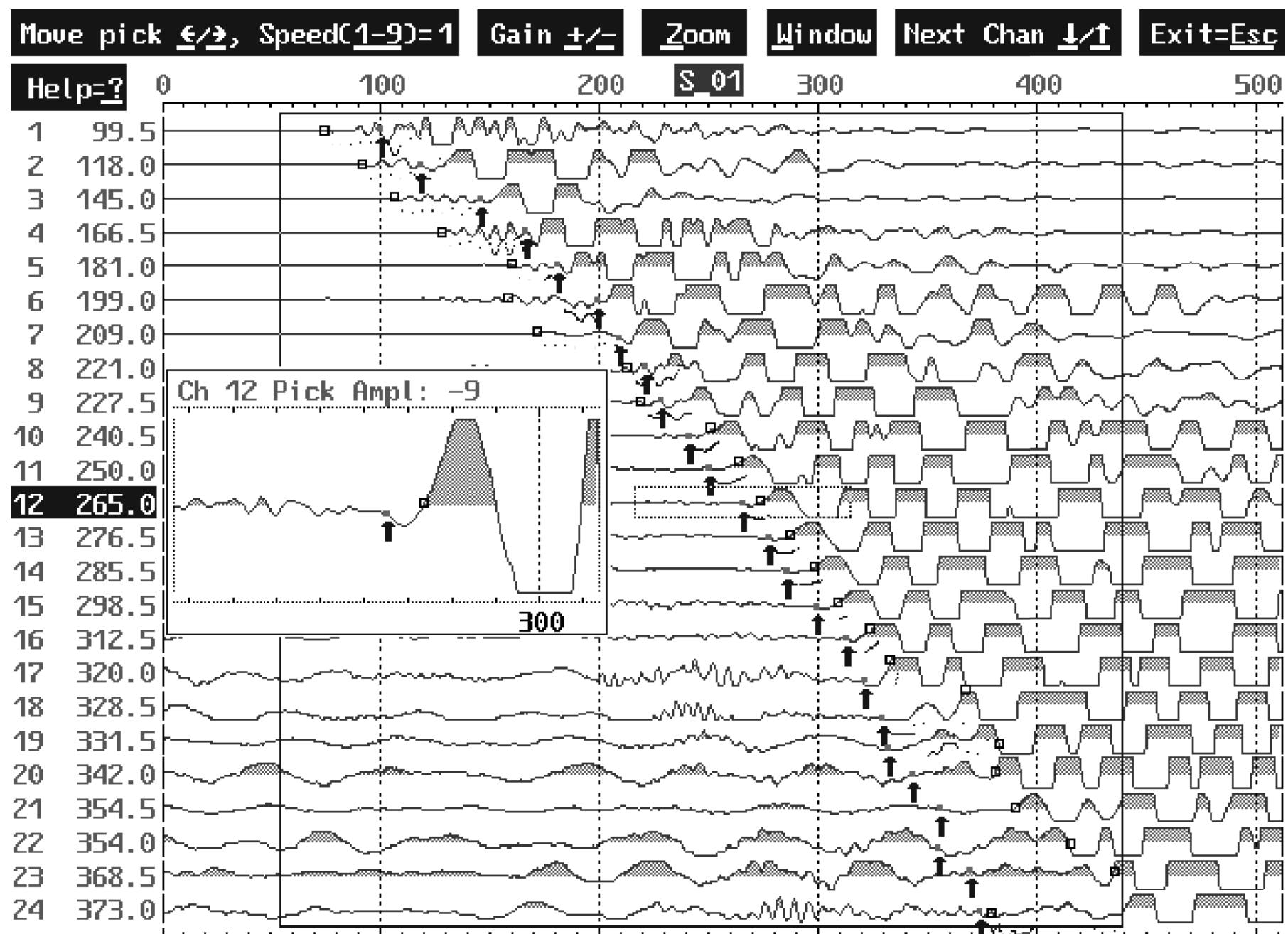
Press Esc to EXIT

AHTUSMIN.SIP: Ahtanum Valley Elementary S-Waves Minimum Depth Plot

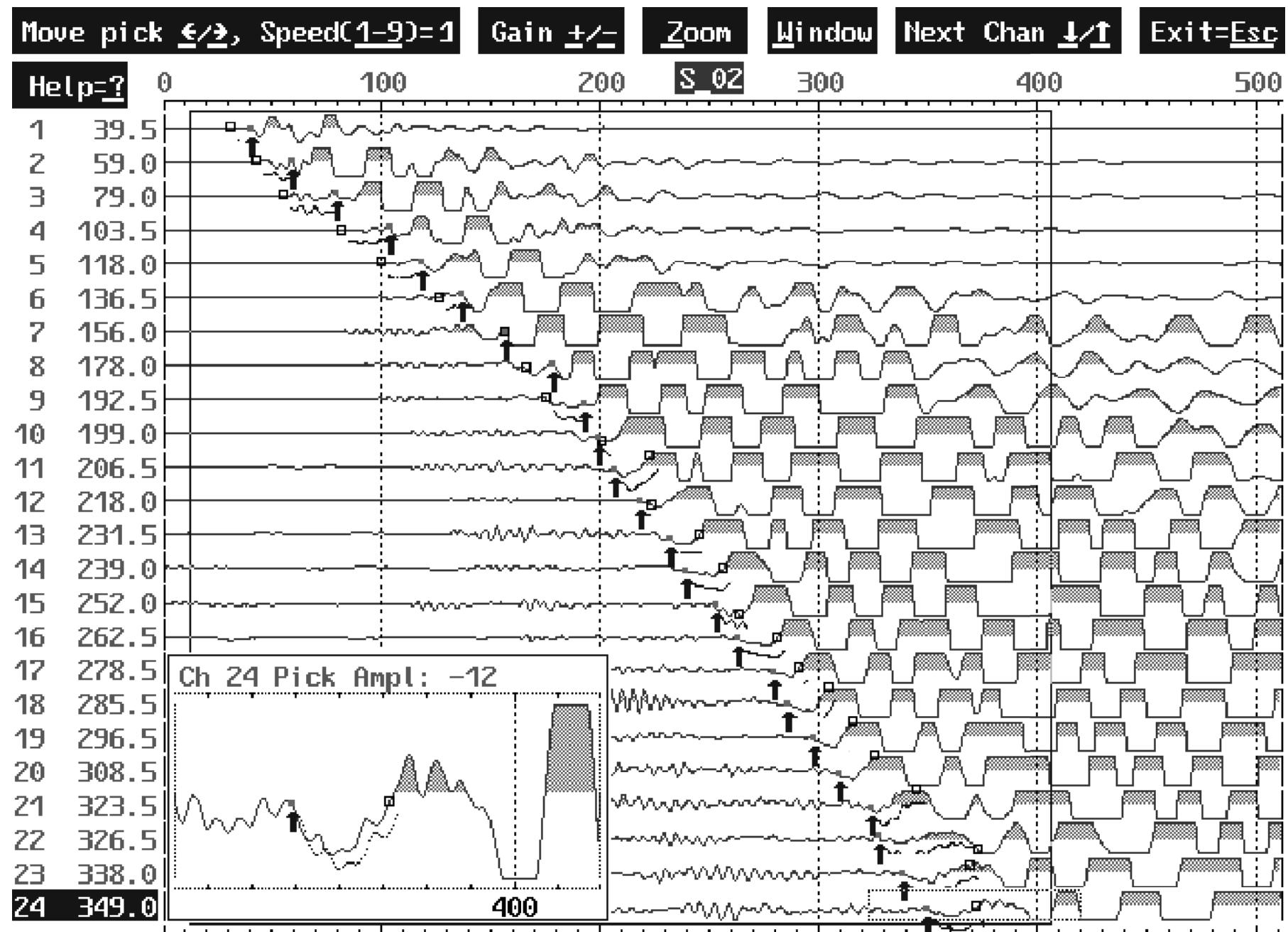
Spread A



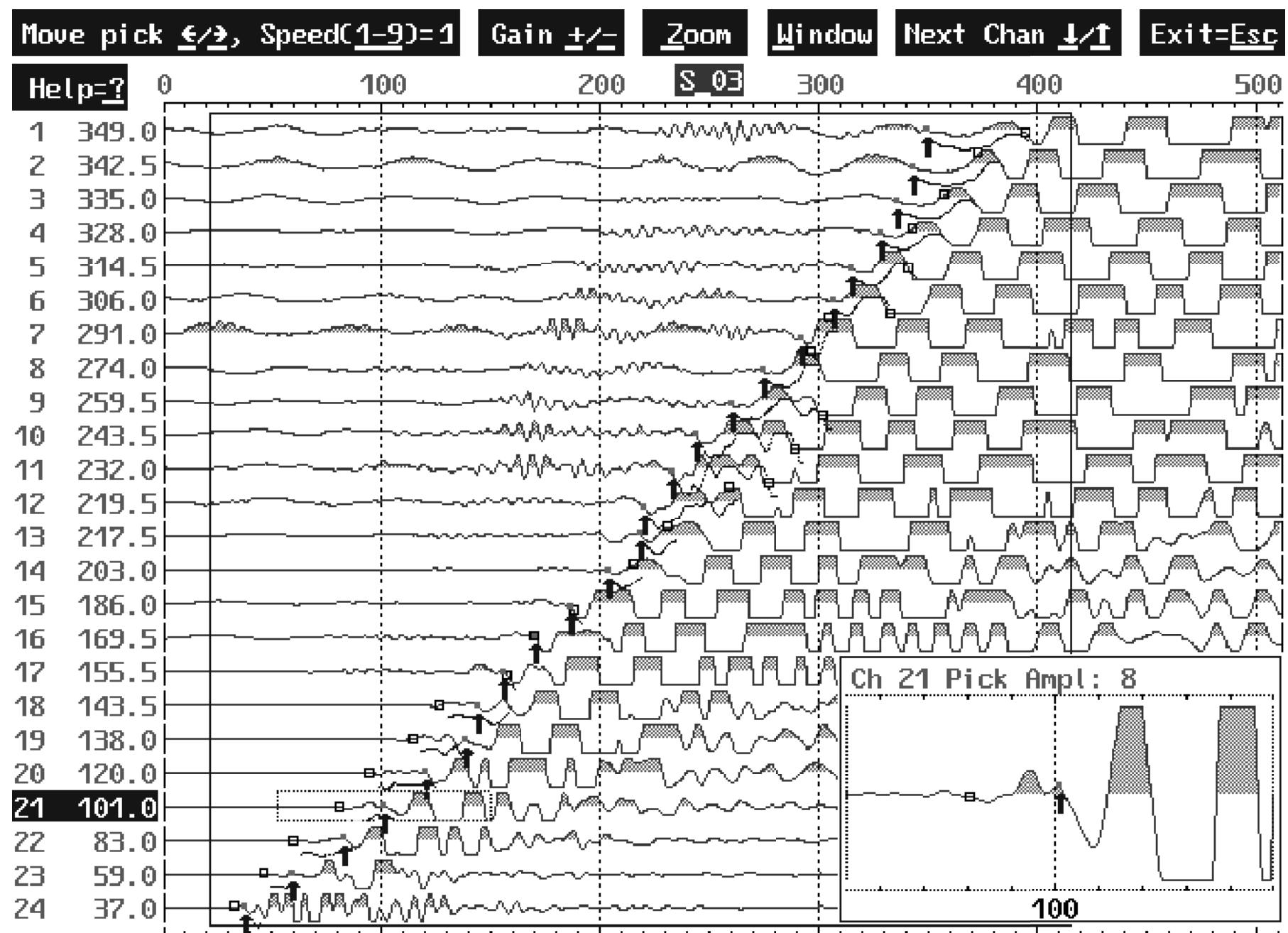
Allen Play Field S-wave



Allen Play Field S-wave

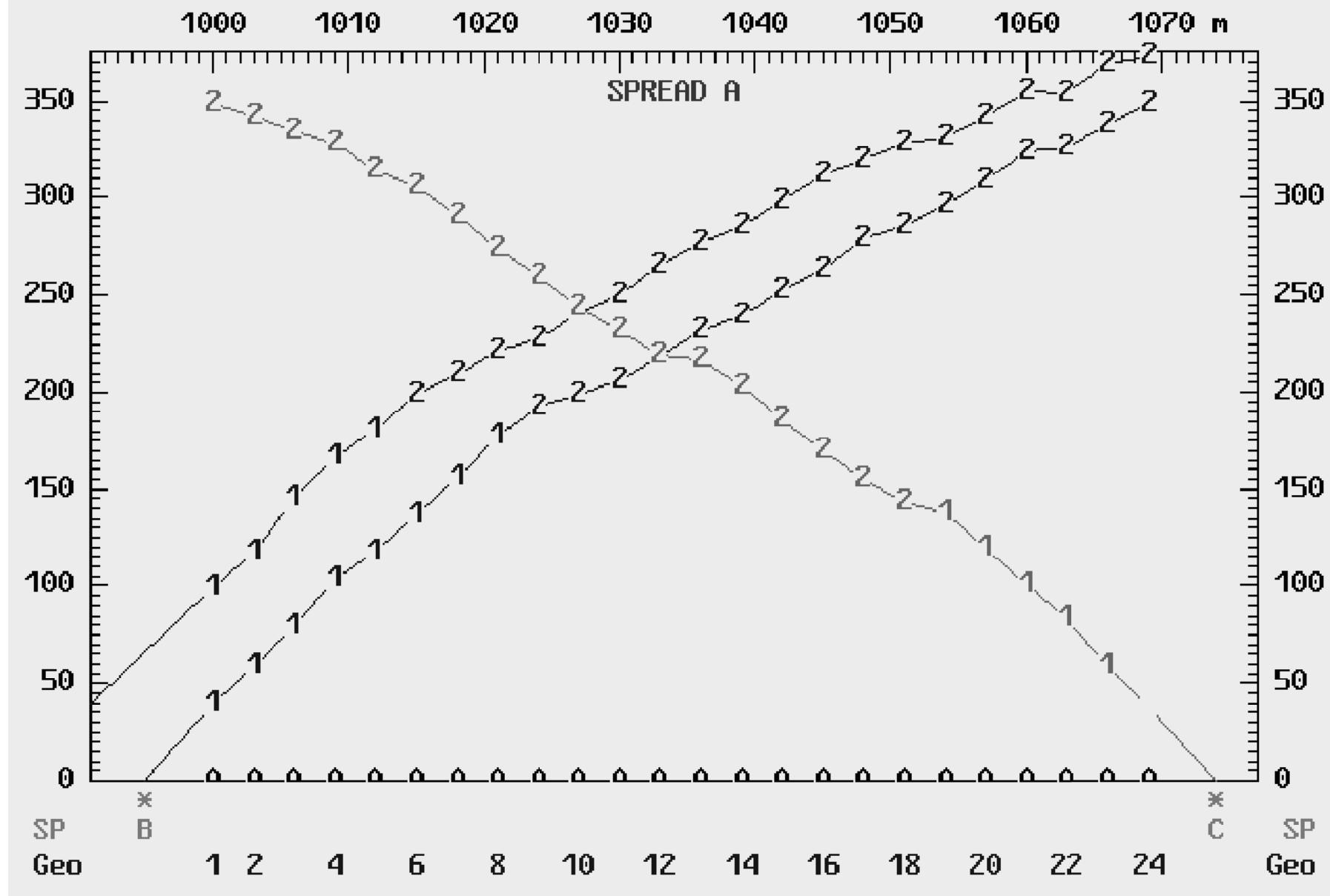


Allen Play Field S-wave



Allen Play Field S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

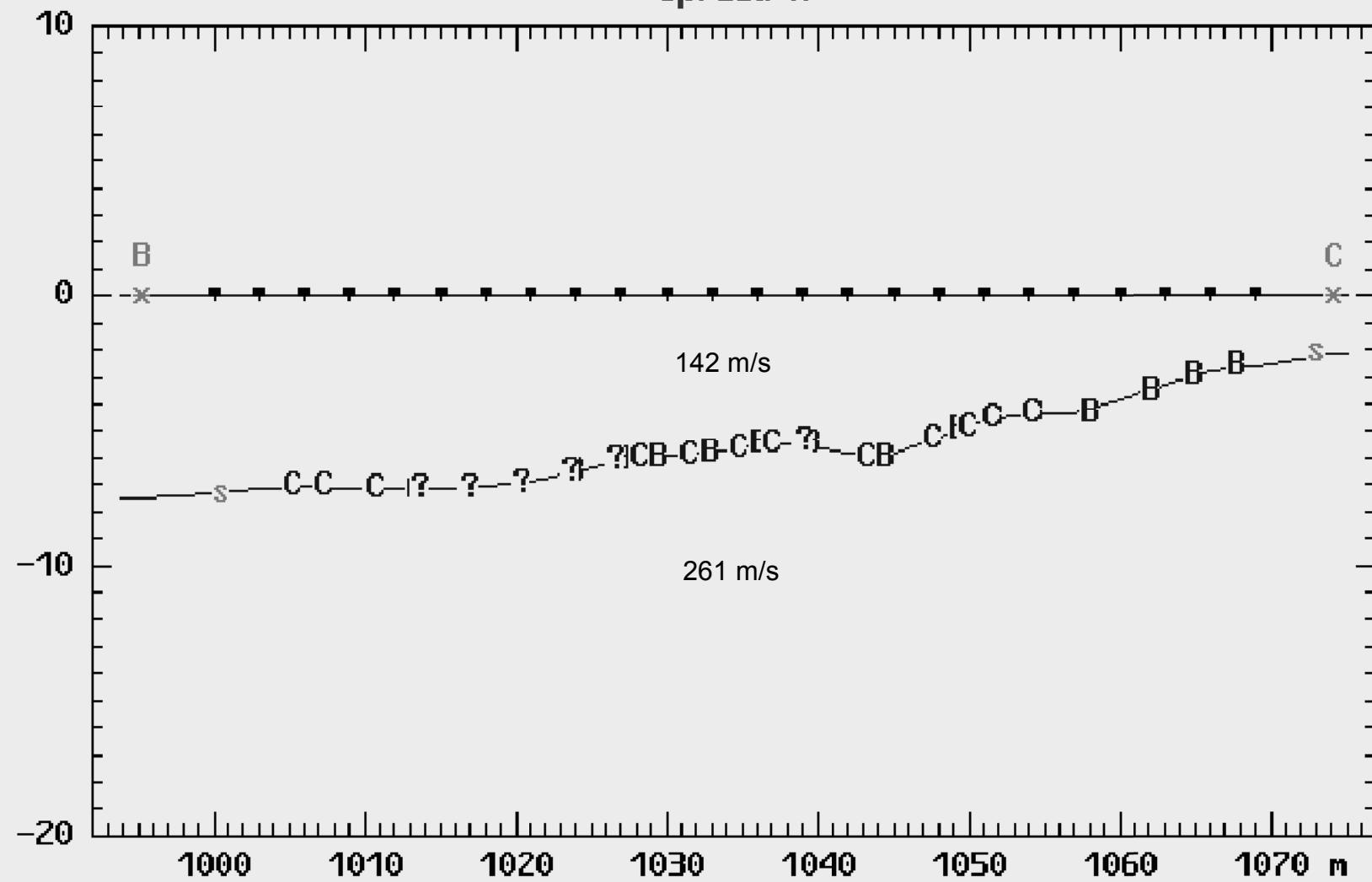


Allen Play Field S-wave

Press Esc to EXIT

ALLNSWAV.SIP: Allen Community Playfield S-Waves

Spread A

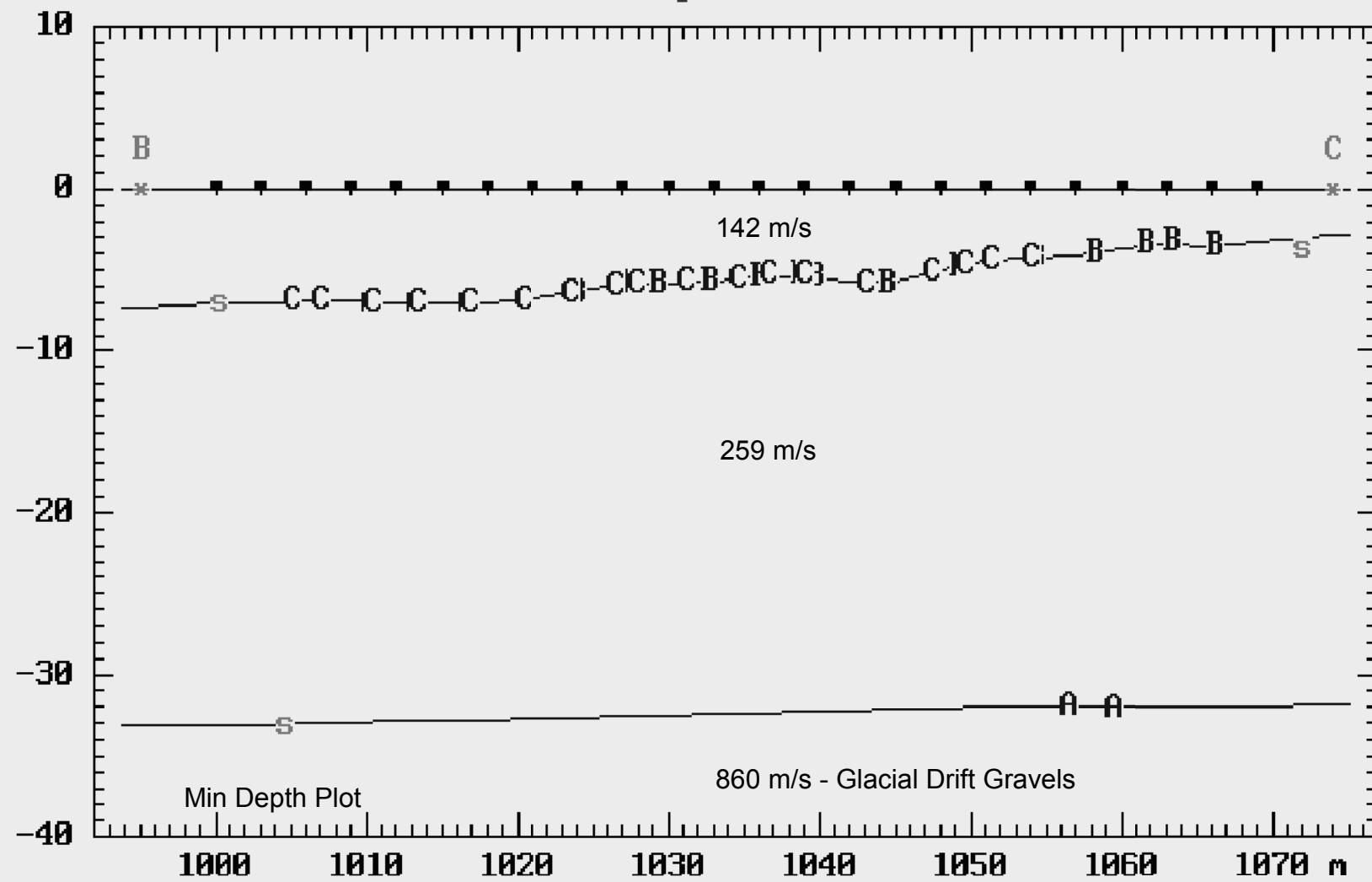


Allen Play Field S-wave

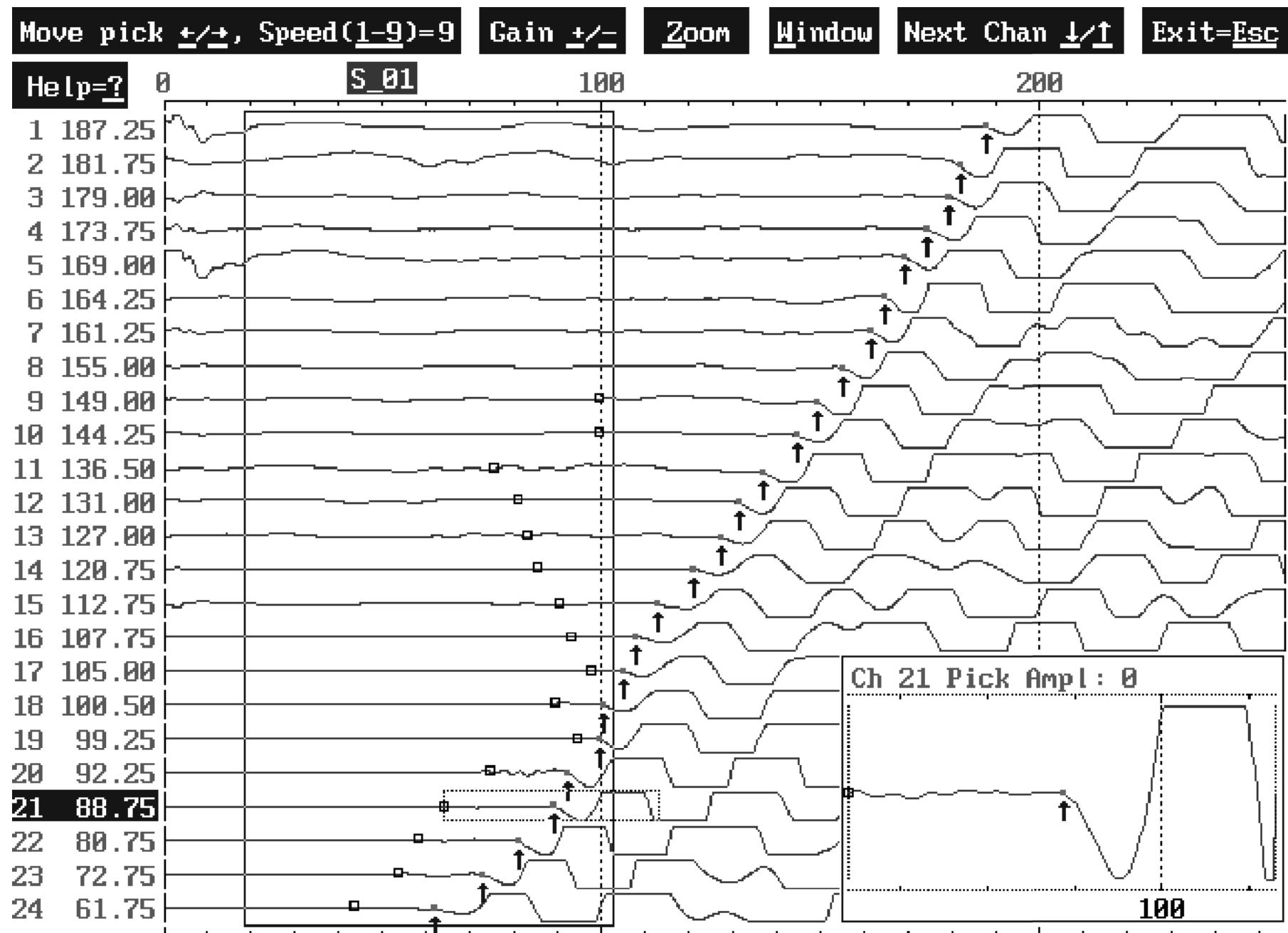
Press Esc to EXIT

ALLNSMIN.SIP: Allen Community Playfield Minimum Depth Plot

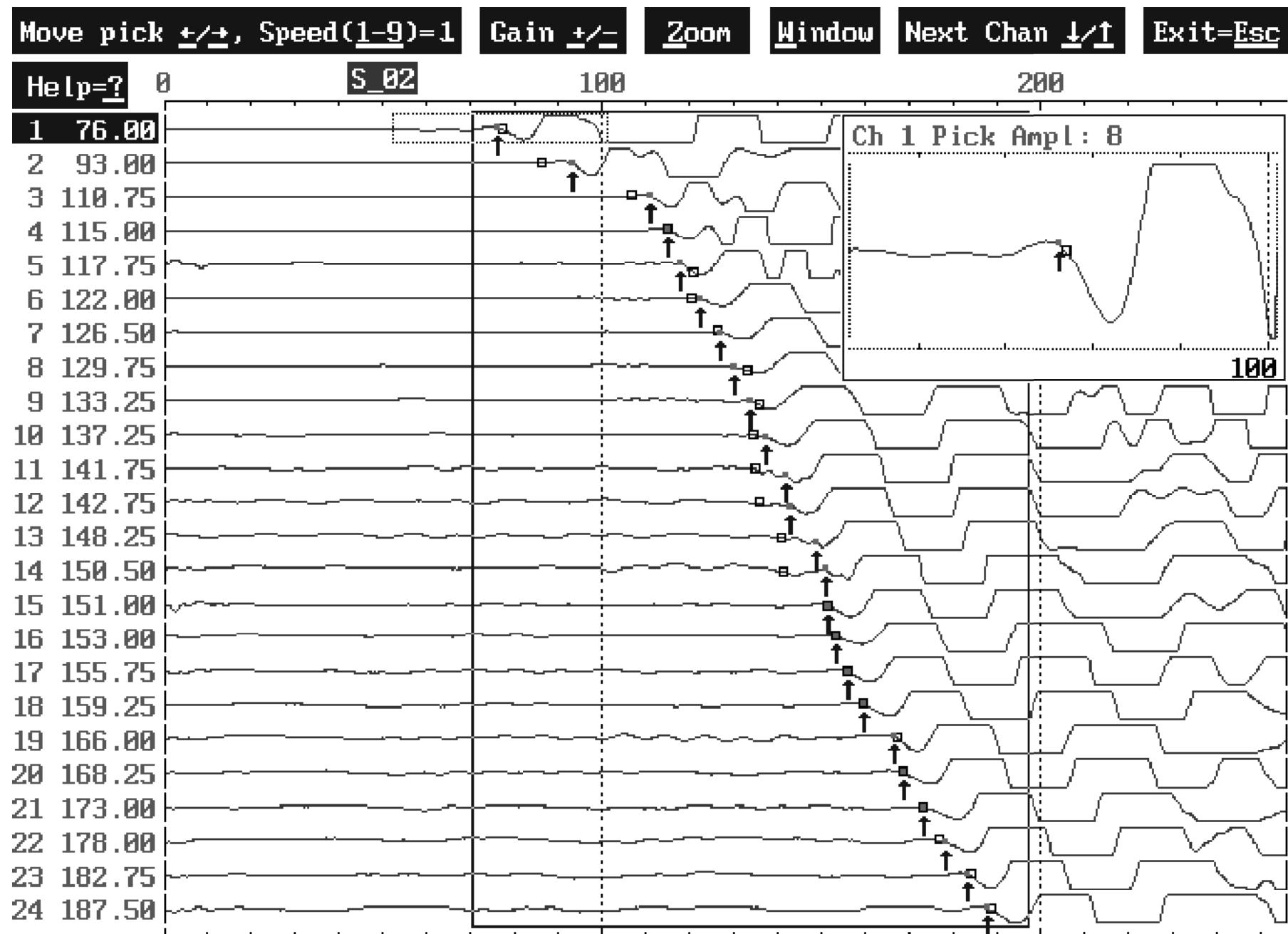
Spread A



Allen Creek Elementary Field S-wave

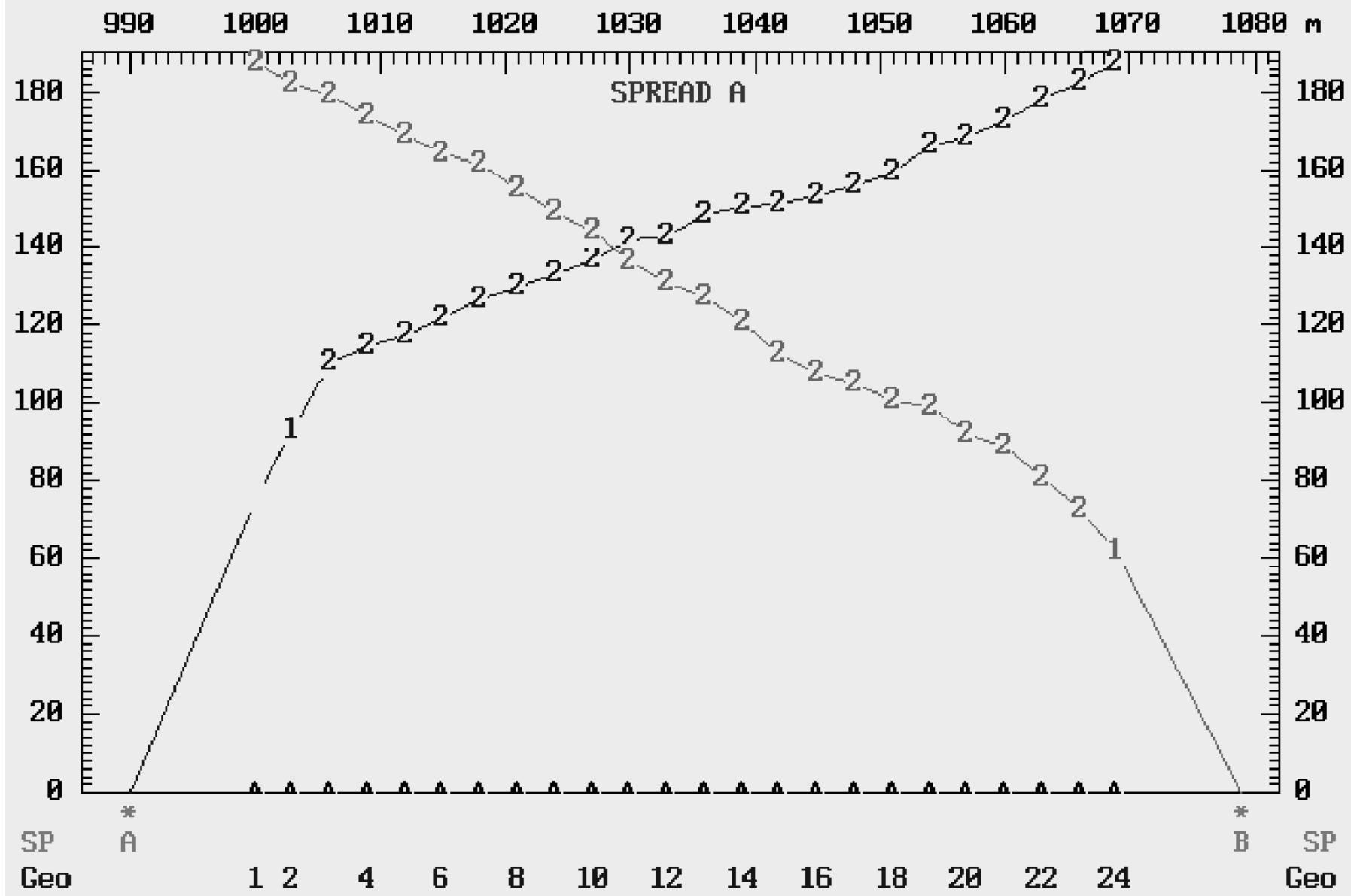


Allen Creek Elementary Field S-wave



Allen Creek Elementary Field S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

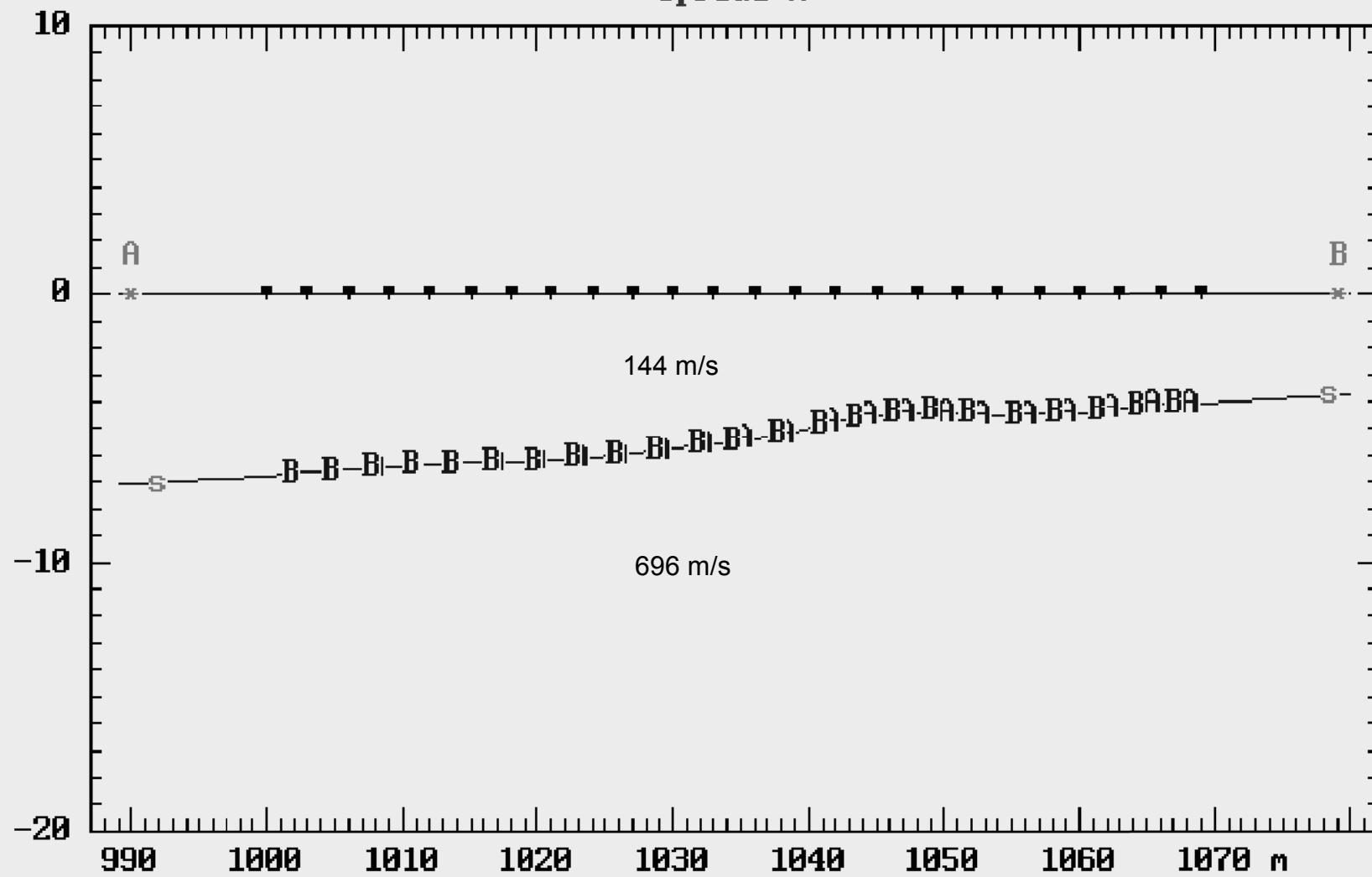


Allen Creek Elementary Field S-wave

Press Esc to EXIT

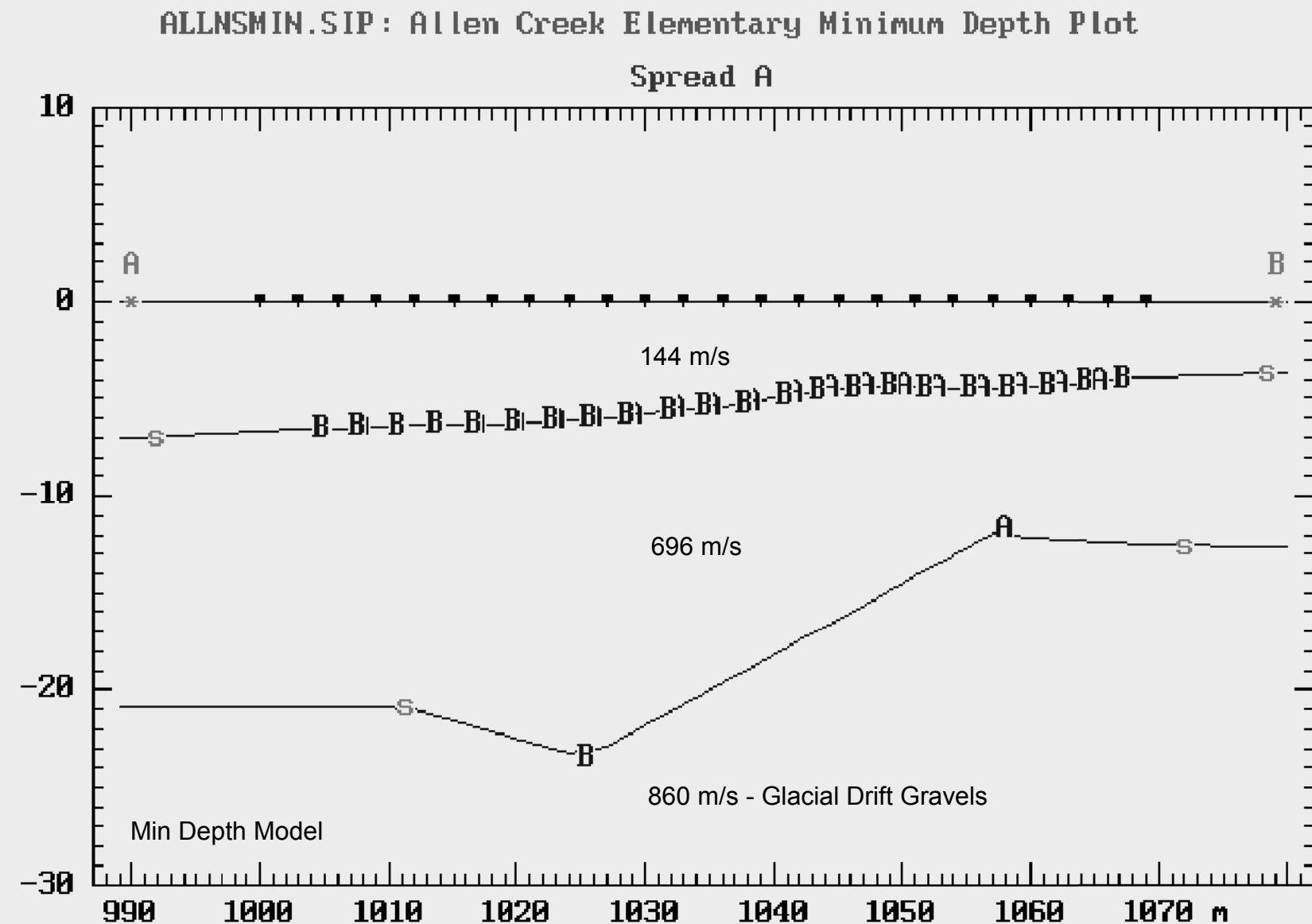
ALLNSWAU.SIP: Allen Creek Elementary S-Waves

Spread A



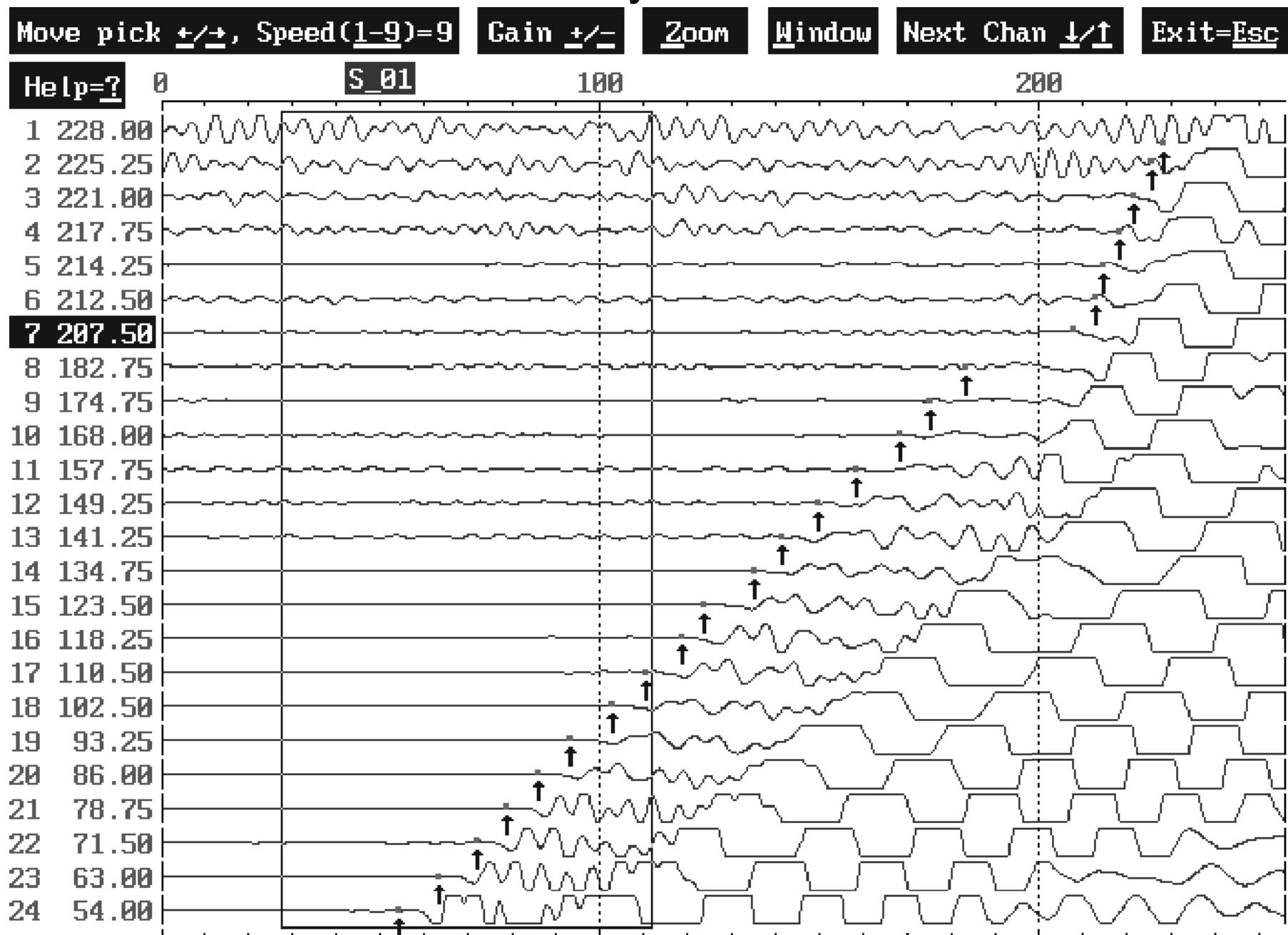
Allen Creek Elementary Field S-wave

Press Esc to EXIT

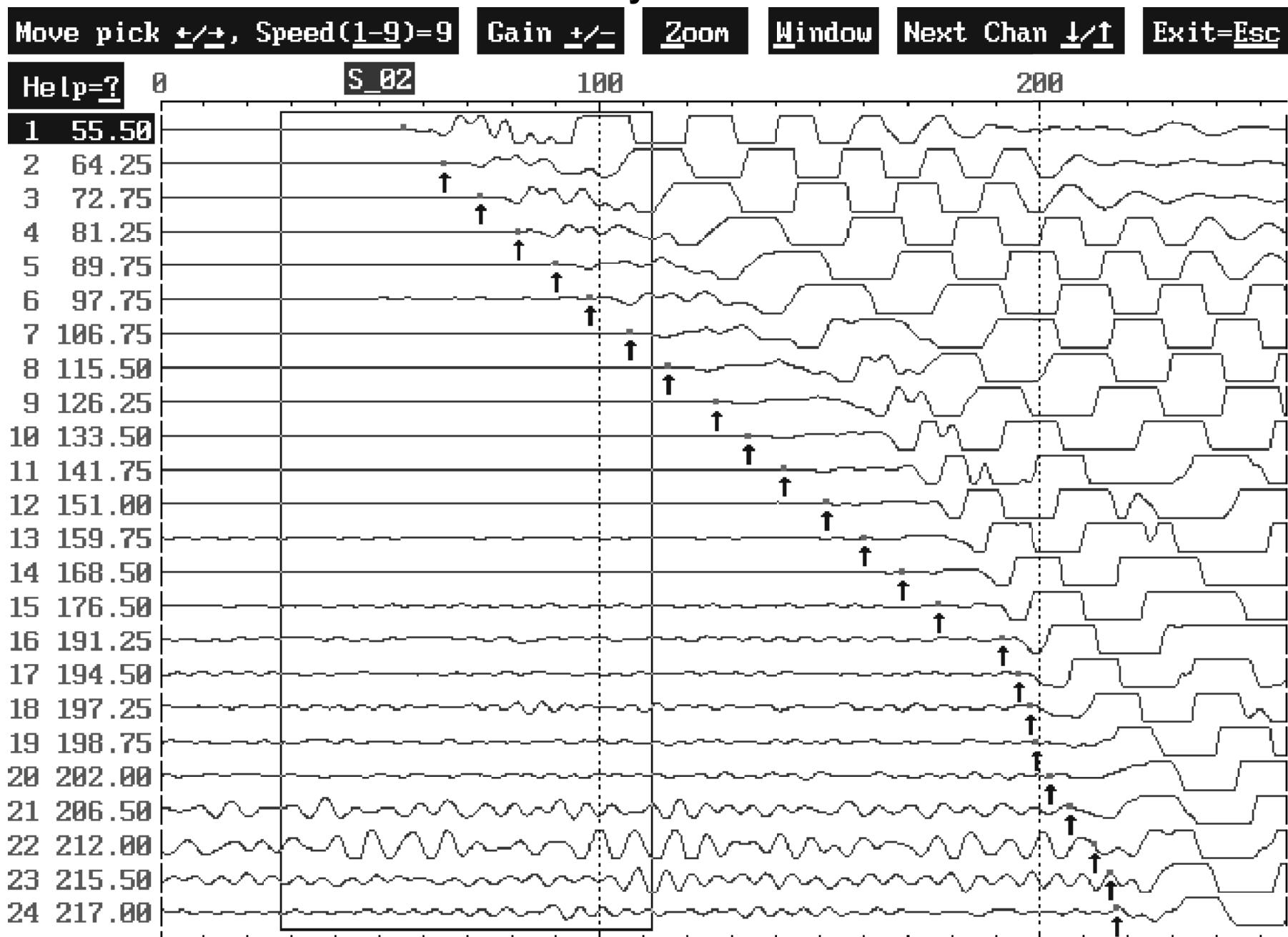


Appendix C

Annie's Berry Farm S-wave

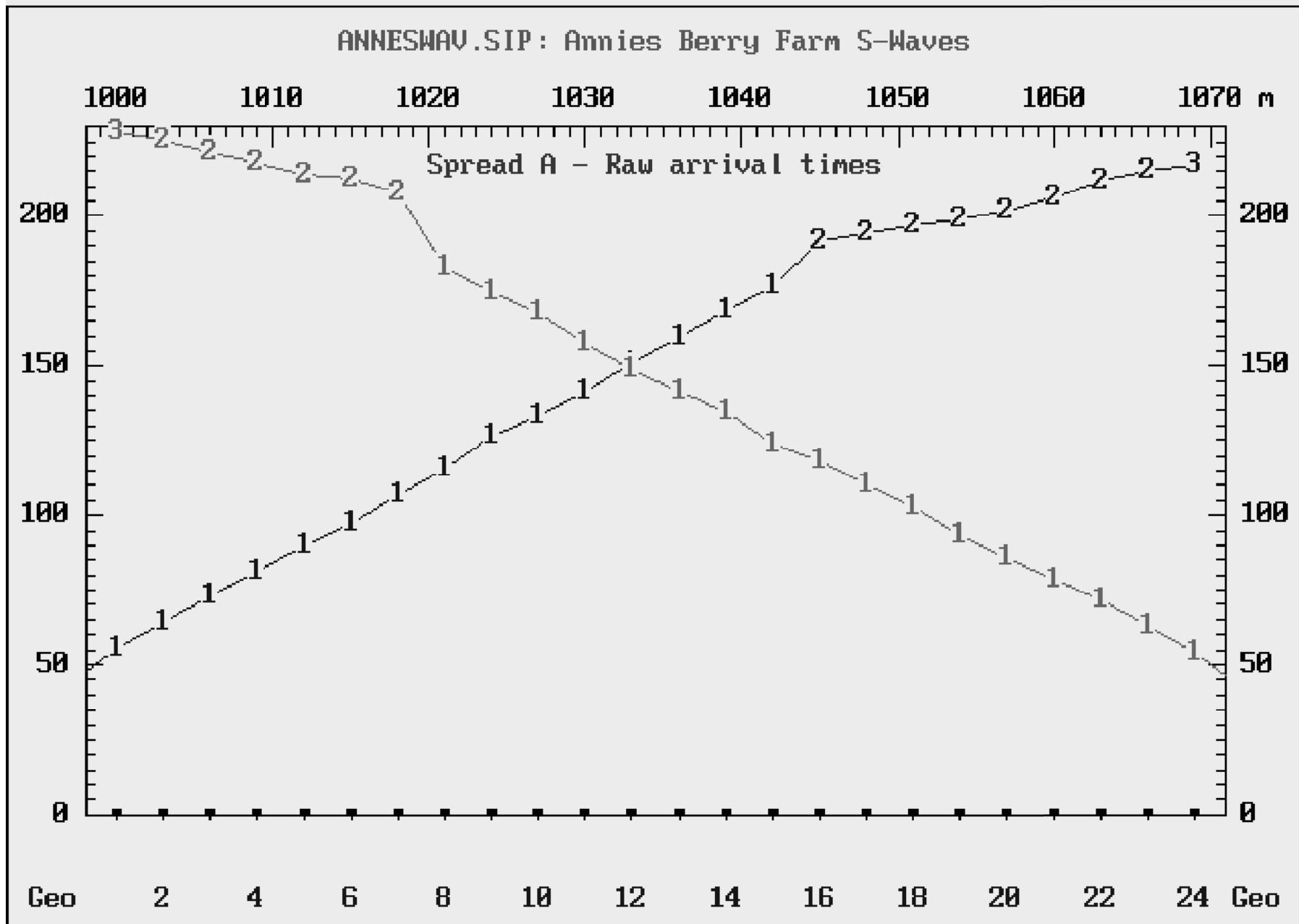


Annie's Berry Farm S-wave



Annie's Berry Farm S-wave

Press Esc to EXIT

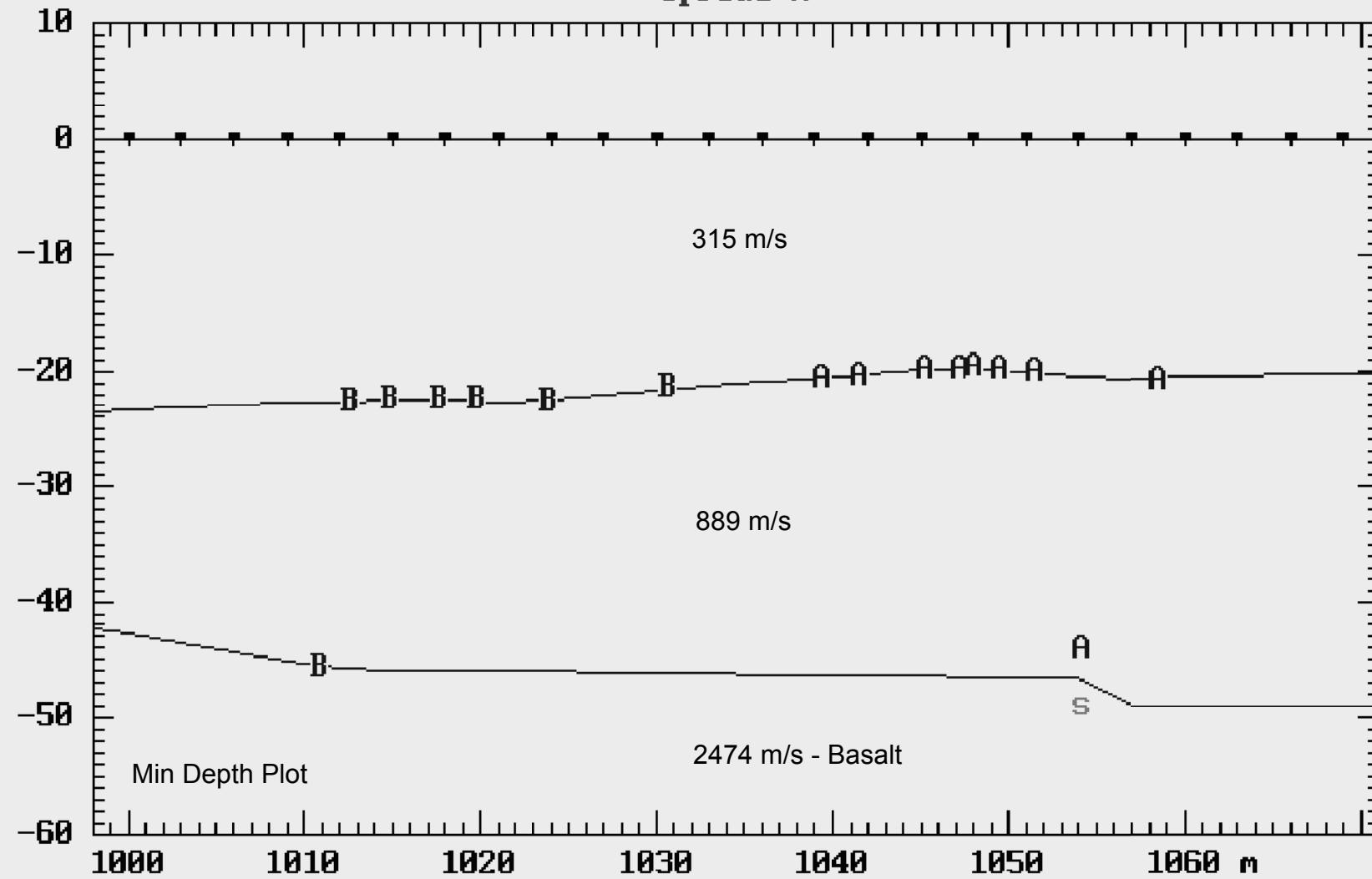


Annie's Berry Farm S-wave

Press Esc to EXIT

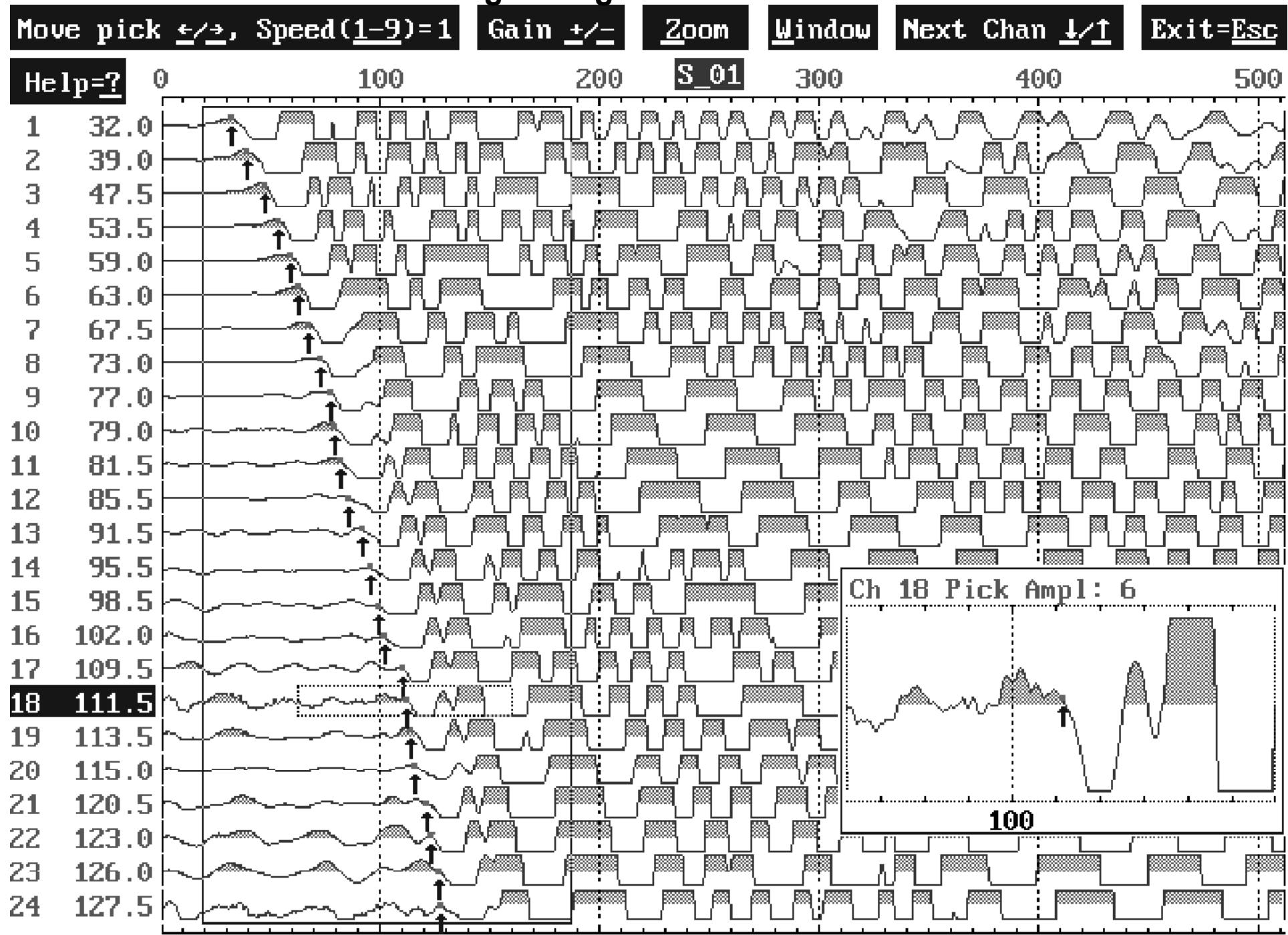
ANNESWAU.SIP: Annies Berry Farm S-Waves

Spread A



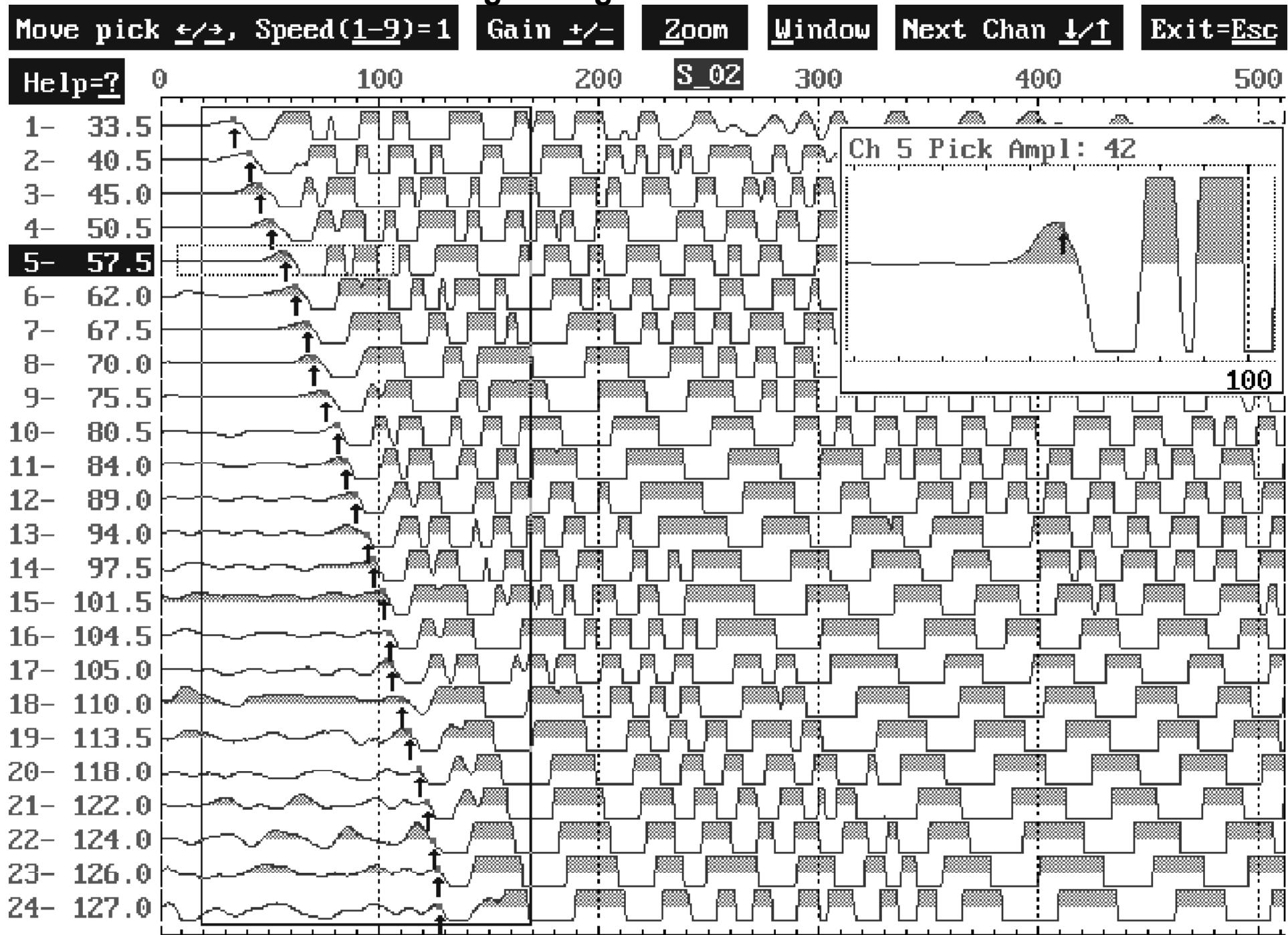
Appendix C

Arlington High School S-wave

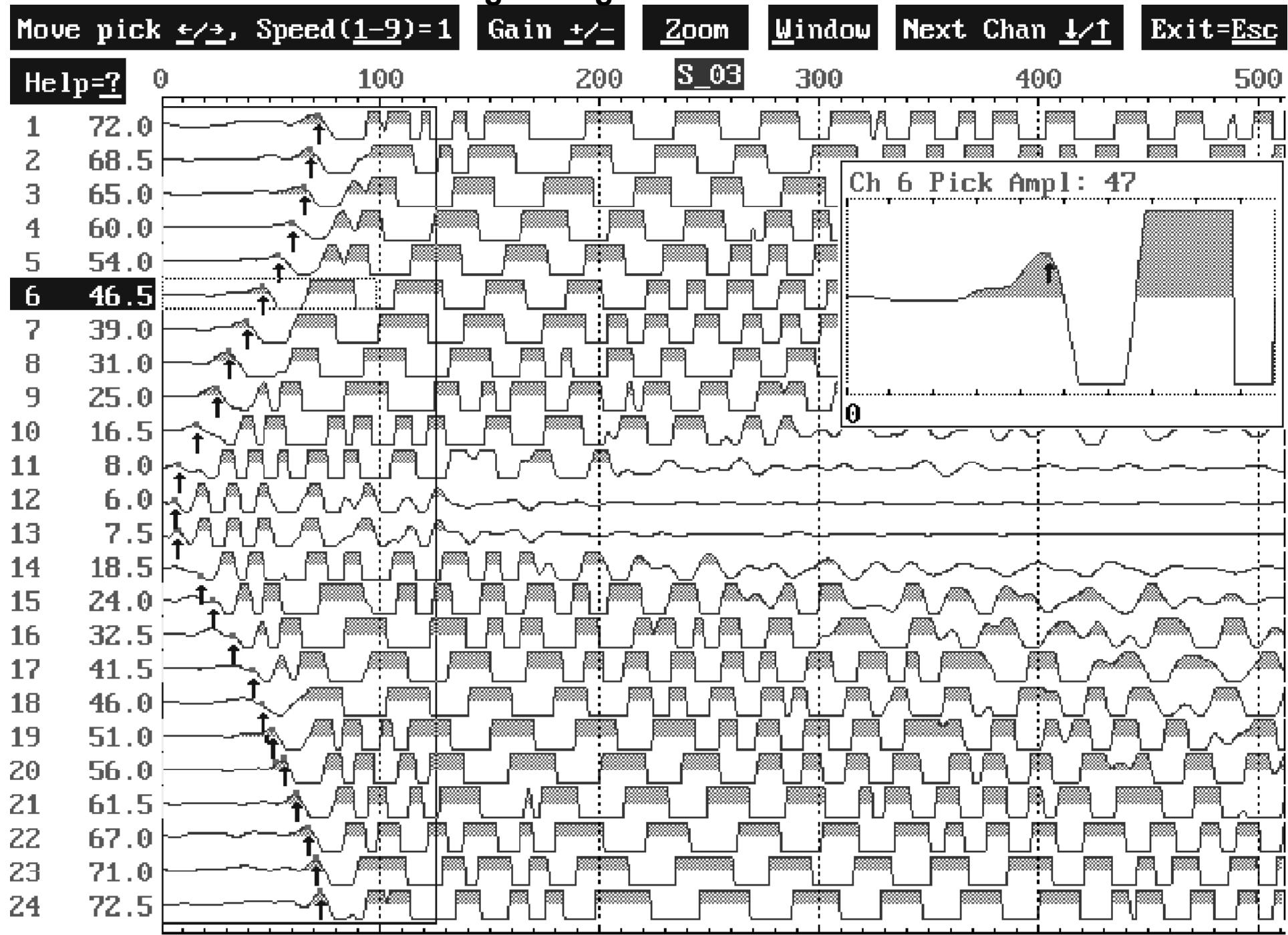


Appendix C

Arlington High School S-wave

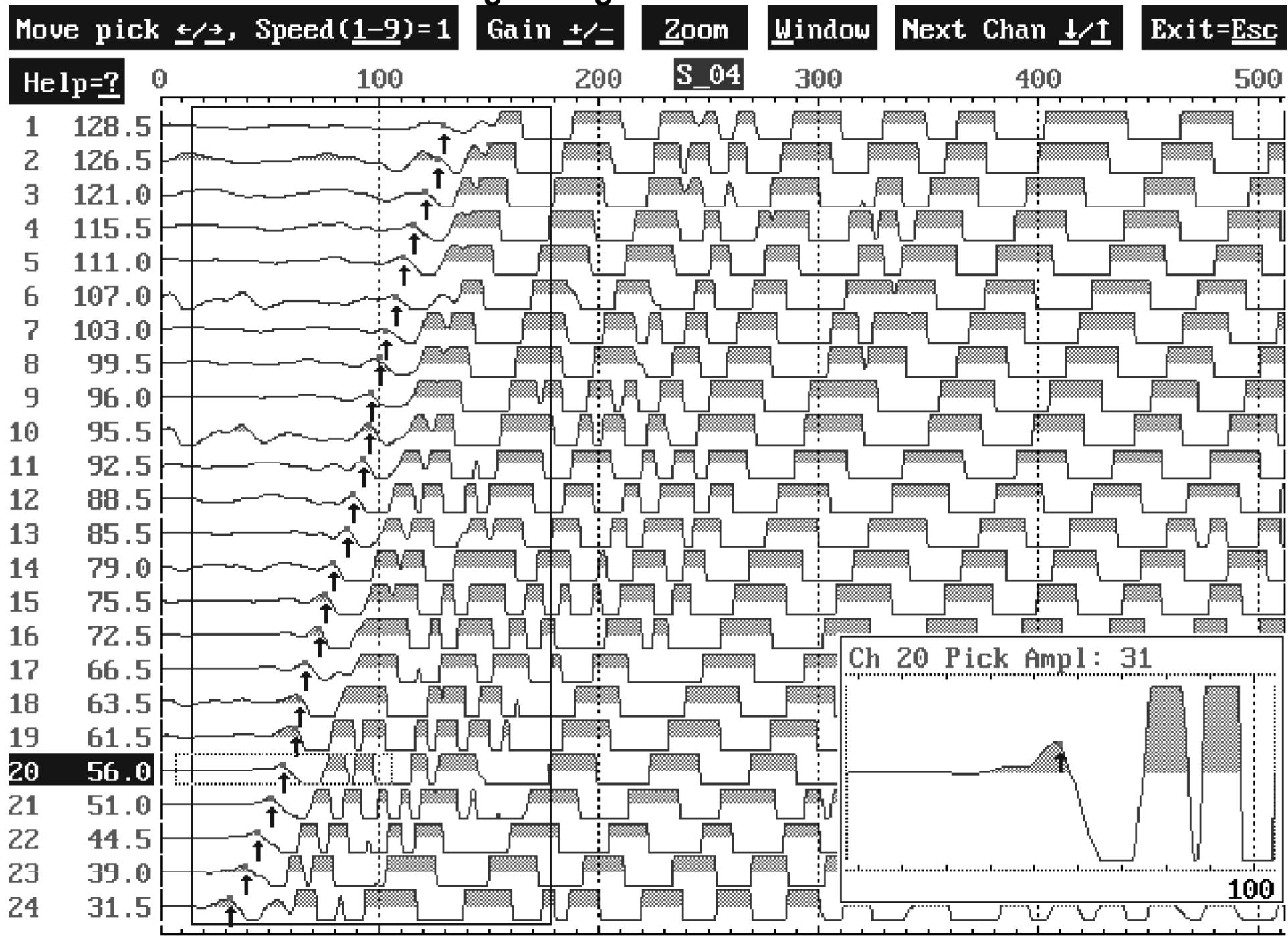


Arlington High School S-wave



Appendix C

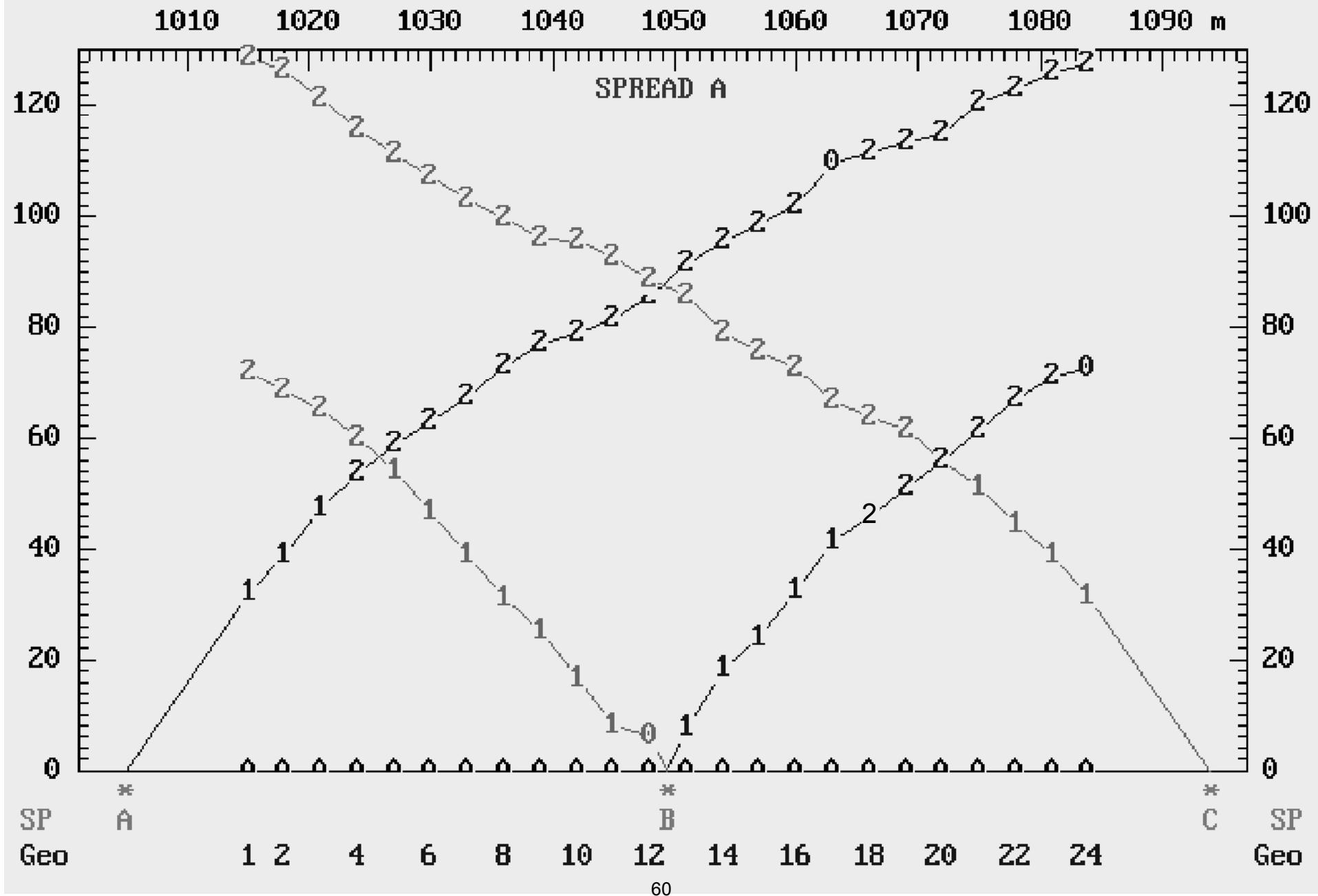
Arlington High School S-wave



Appendix C

Arlington High School S-wave

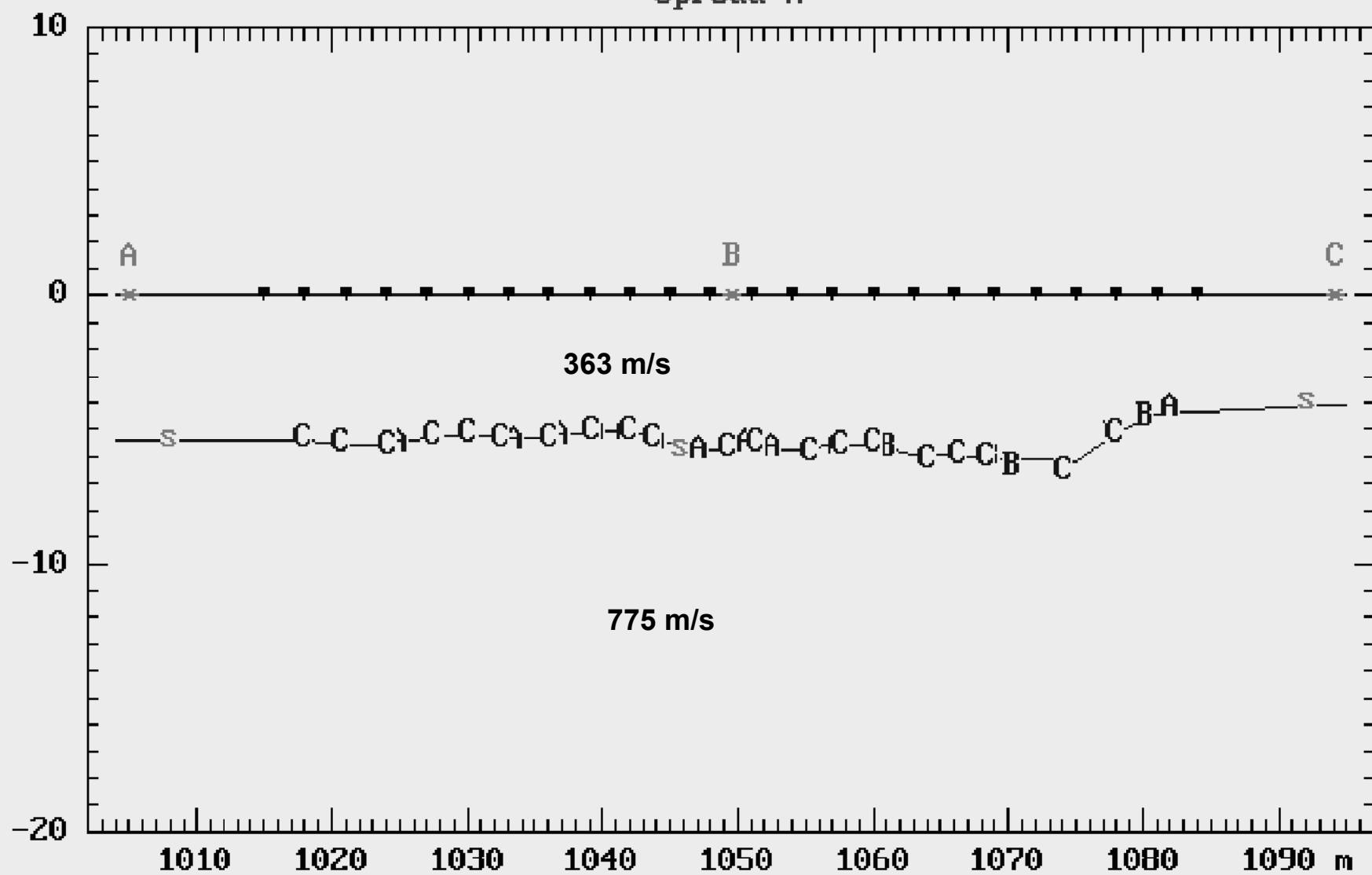
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Arlington High School S-wave
Press Esc to EXIT

ARLISWAU.SIP: Arlington High school Shear Wave

Spread A



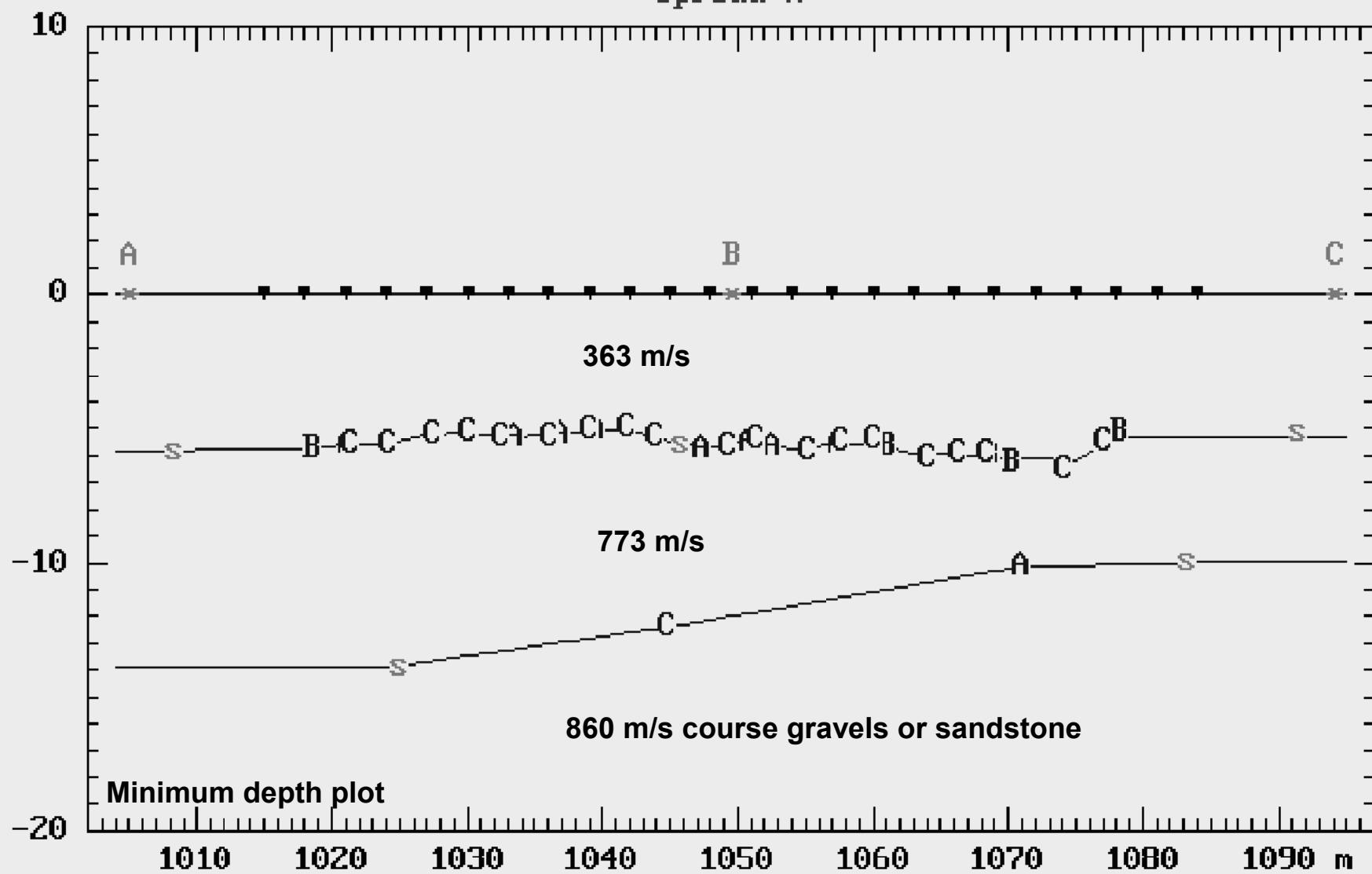
Arlington High School S-wave

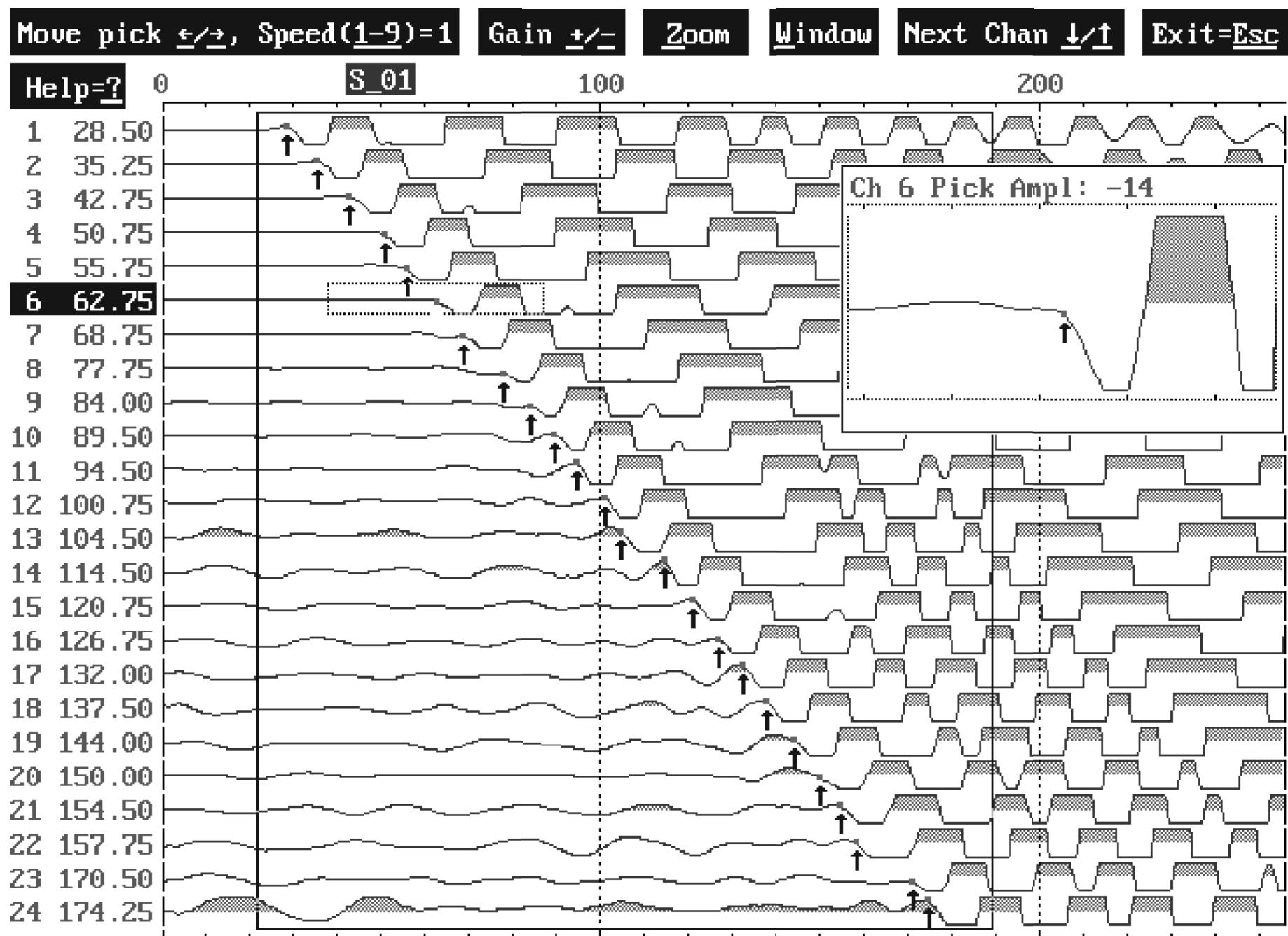
Press Esc to EXIT

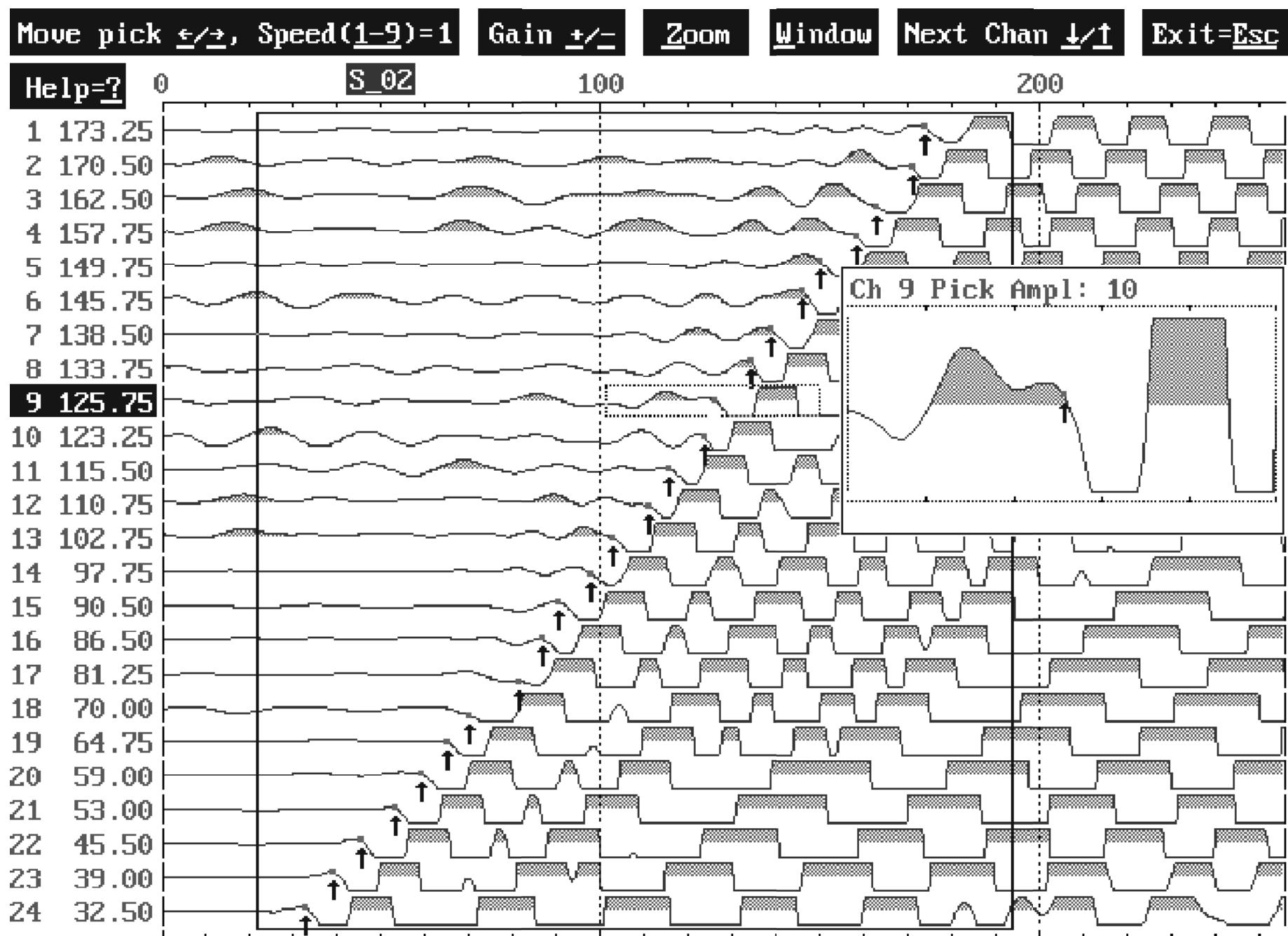
Minimum Depth

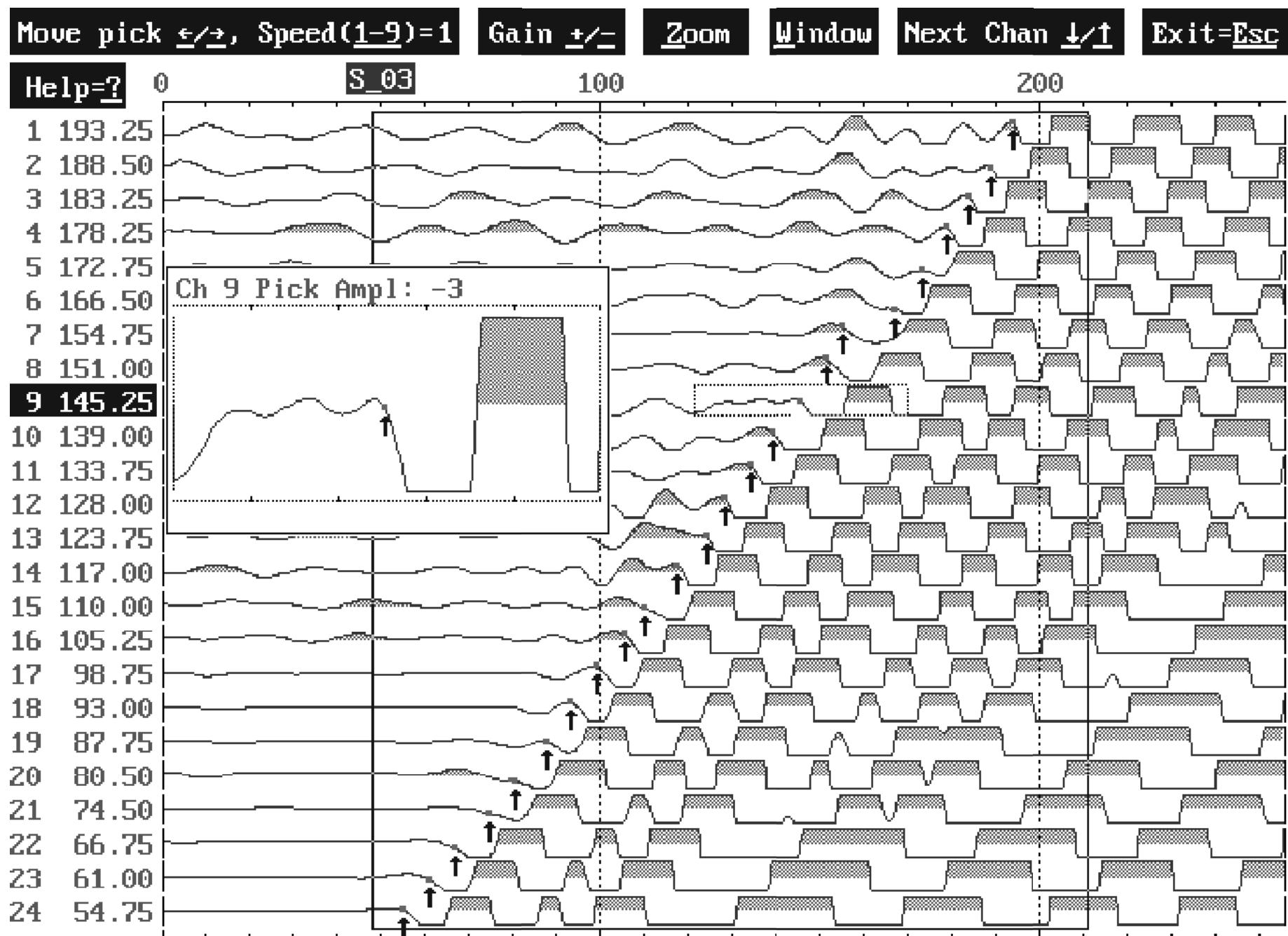
ARLISMIN.SIP: Arlington High school Shear Wave

Spread A



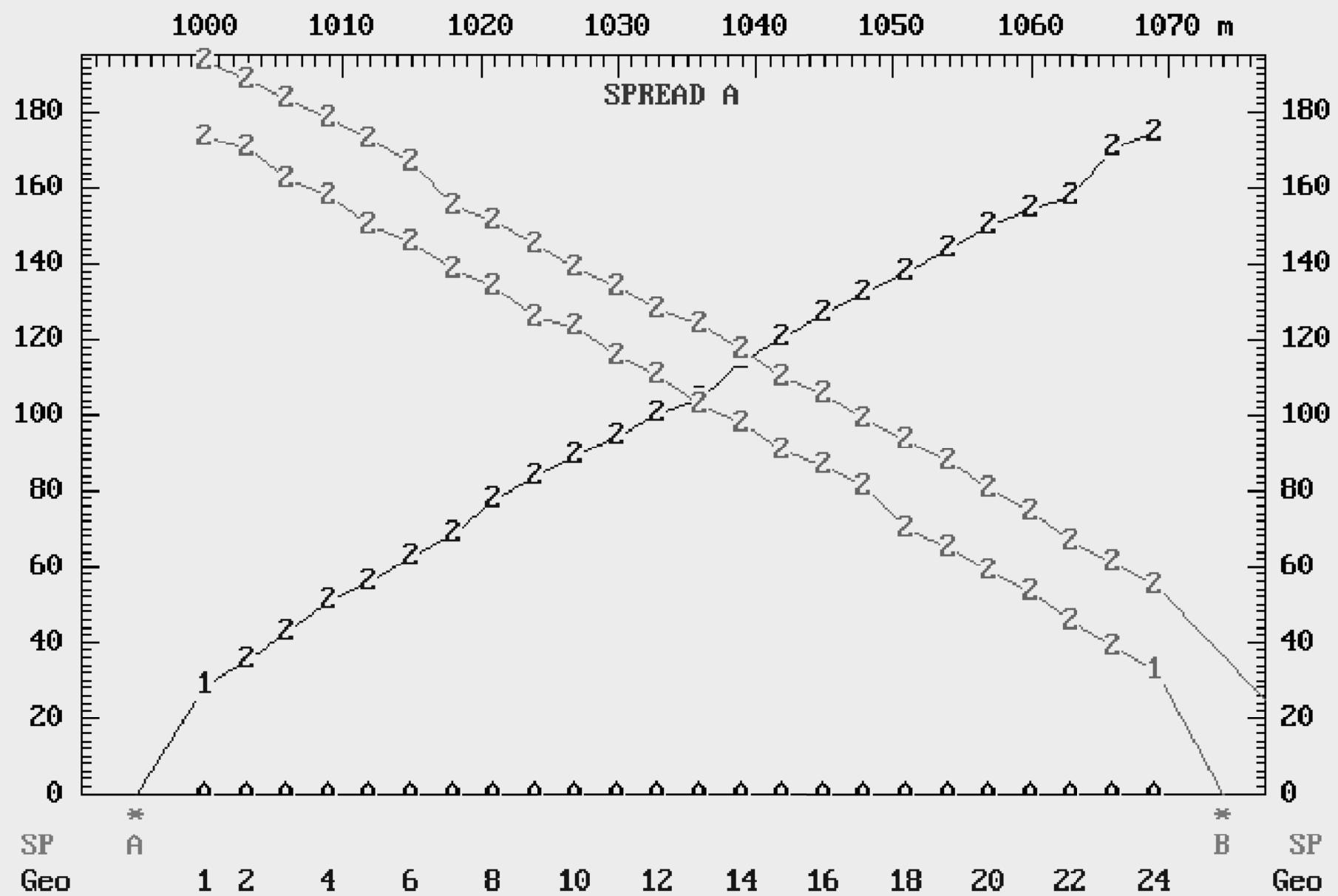
Bald Road S-wave

Bald Road S-wave

Bald Road S-wave

Bald Road S-wave

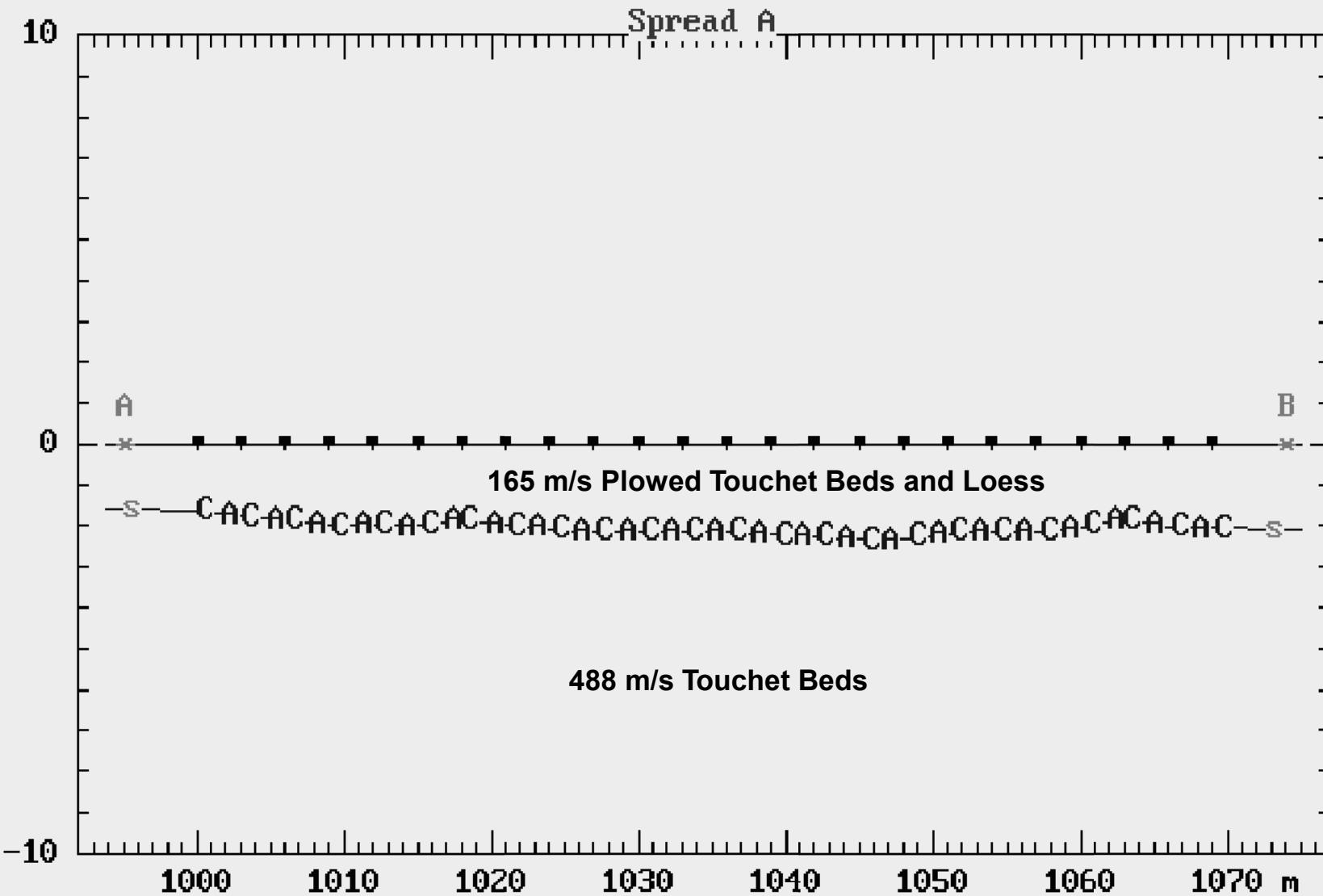
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Bald Road S-wave

Press Esc to EXIT

BALD_SW1.SIP: Bald Road Shear Wave Survey

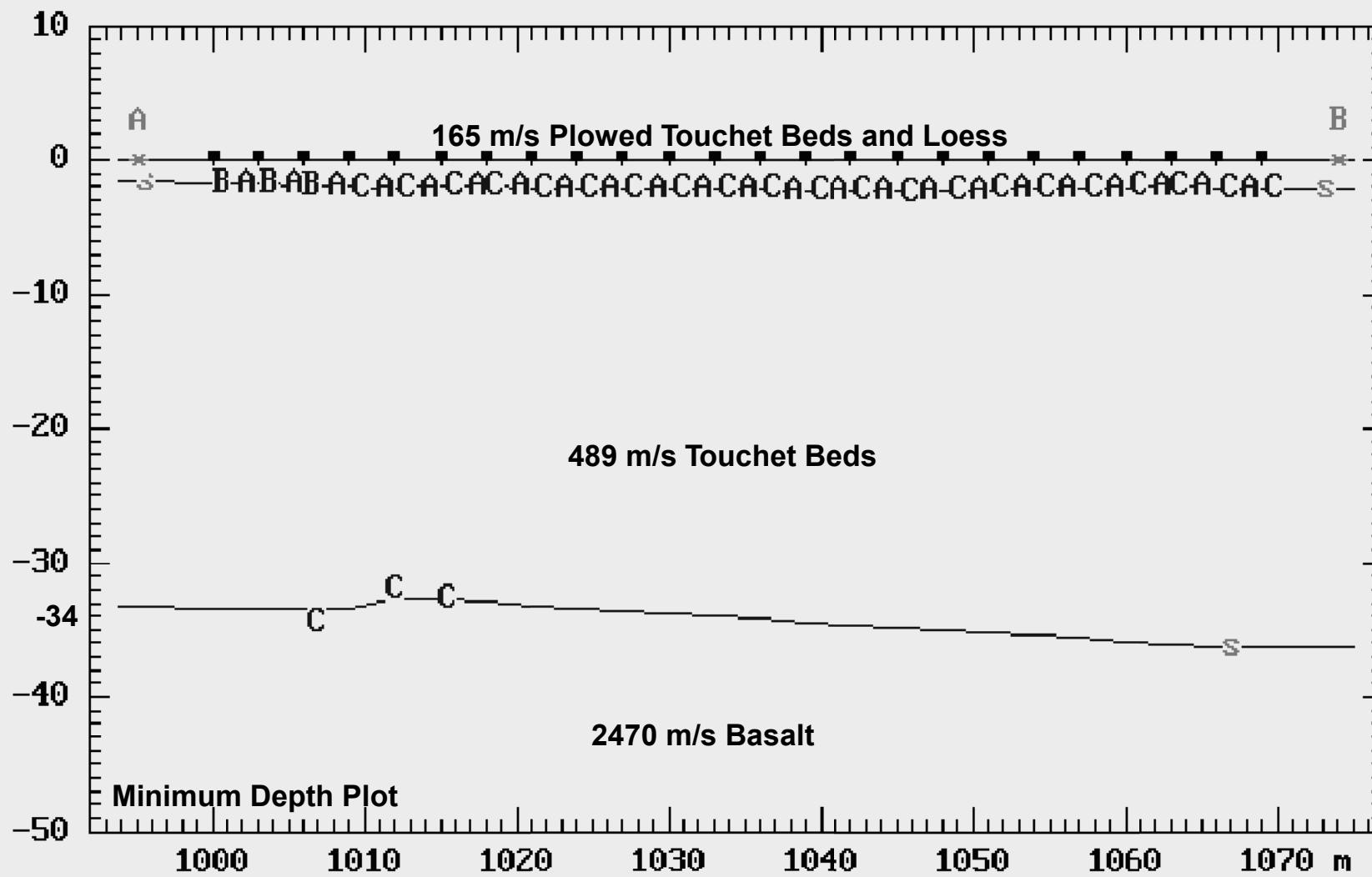


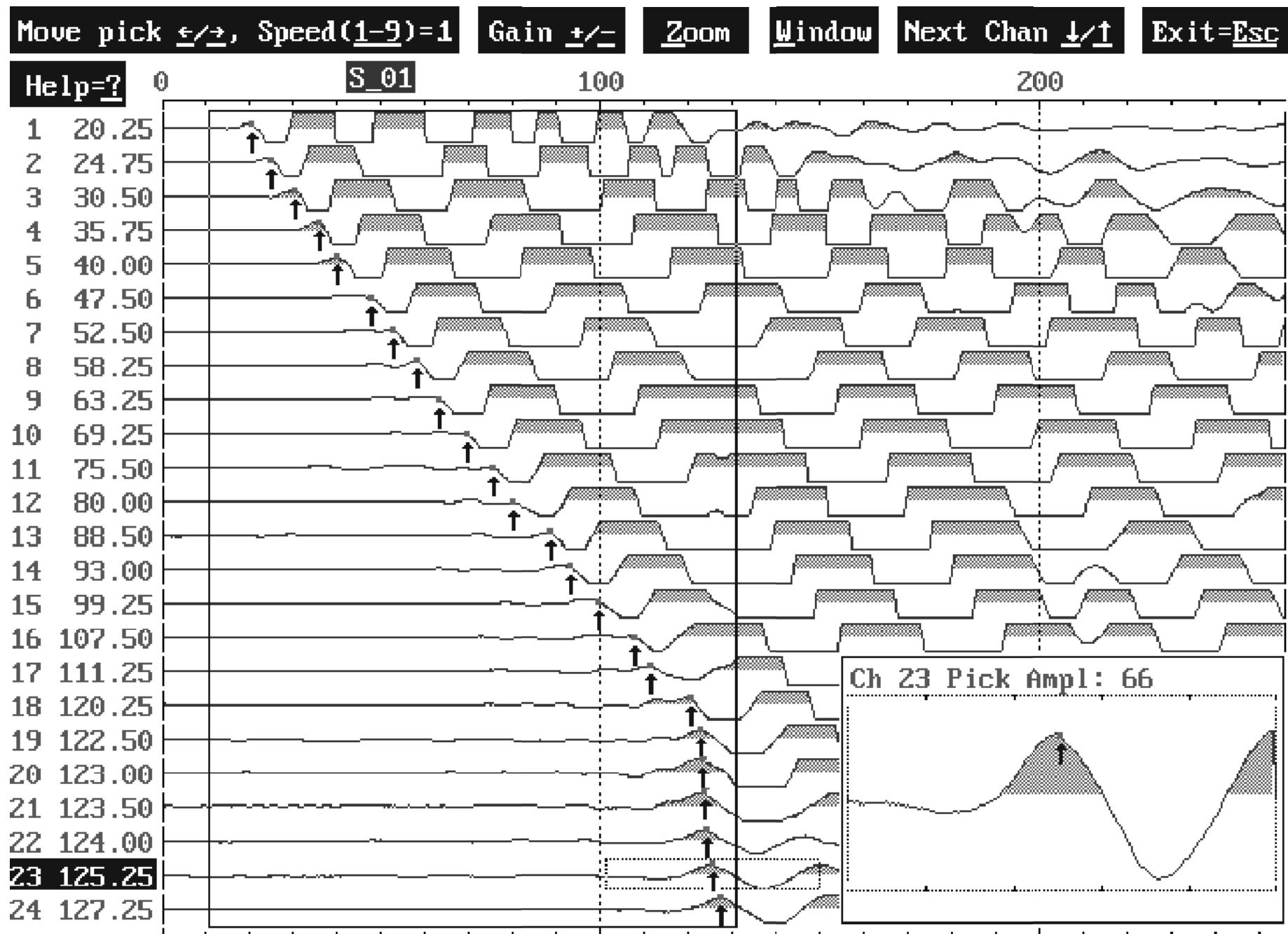
Bald Road S-wave

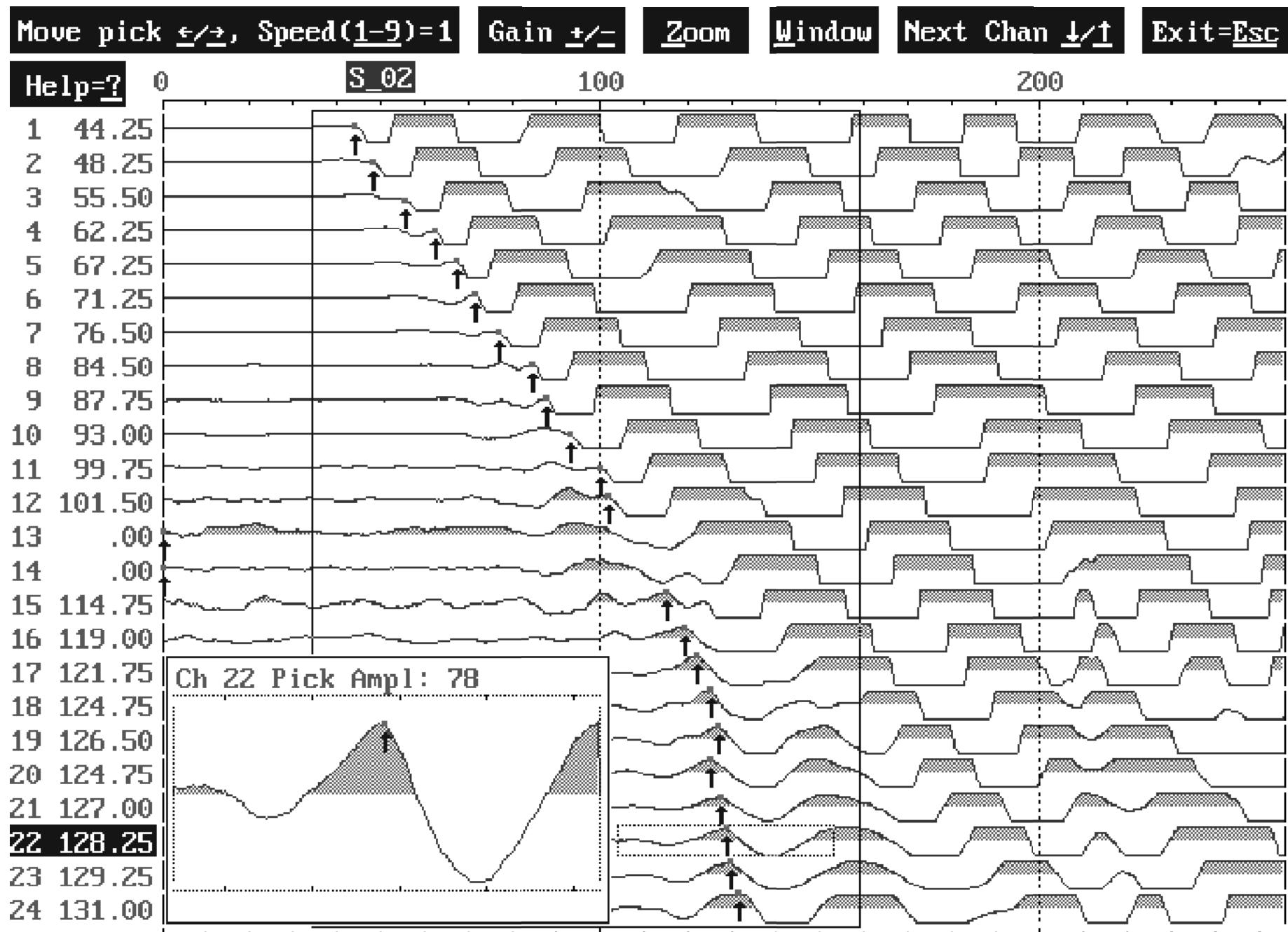
Press Esc to EXIT

BALD_SW2.SIP: Bald Road Shear Wave Survey

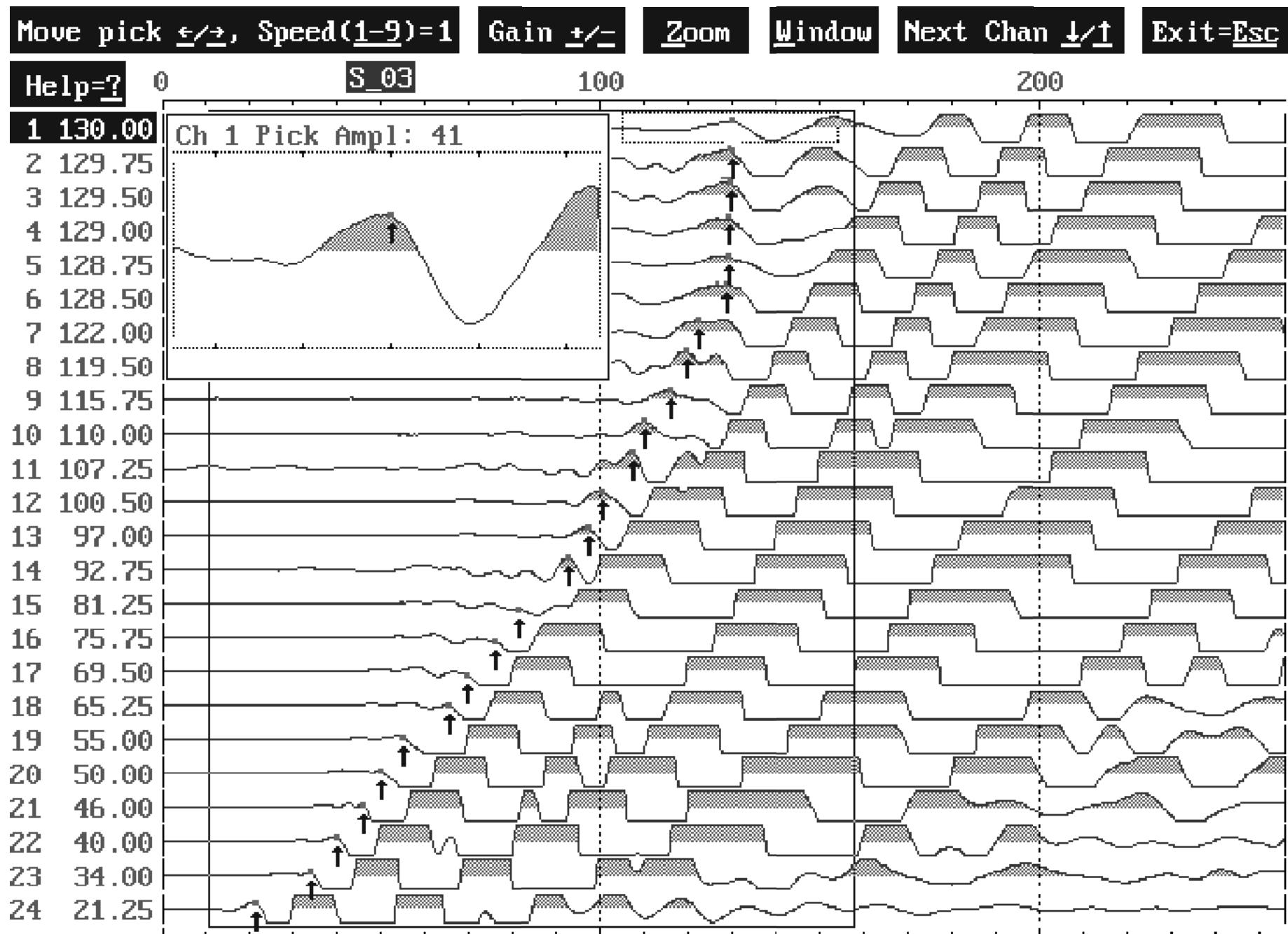
Spread A

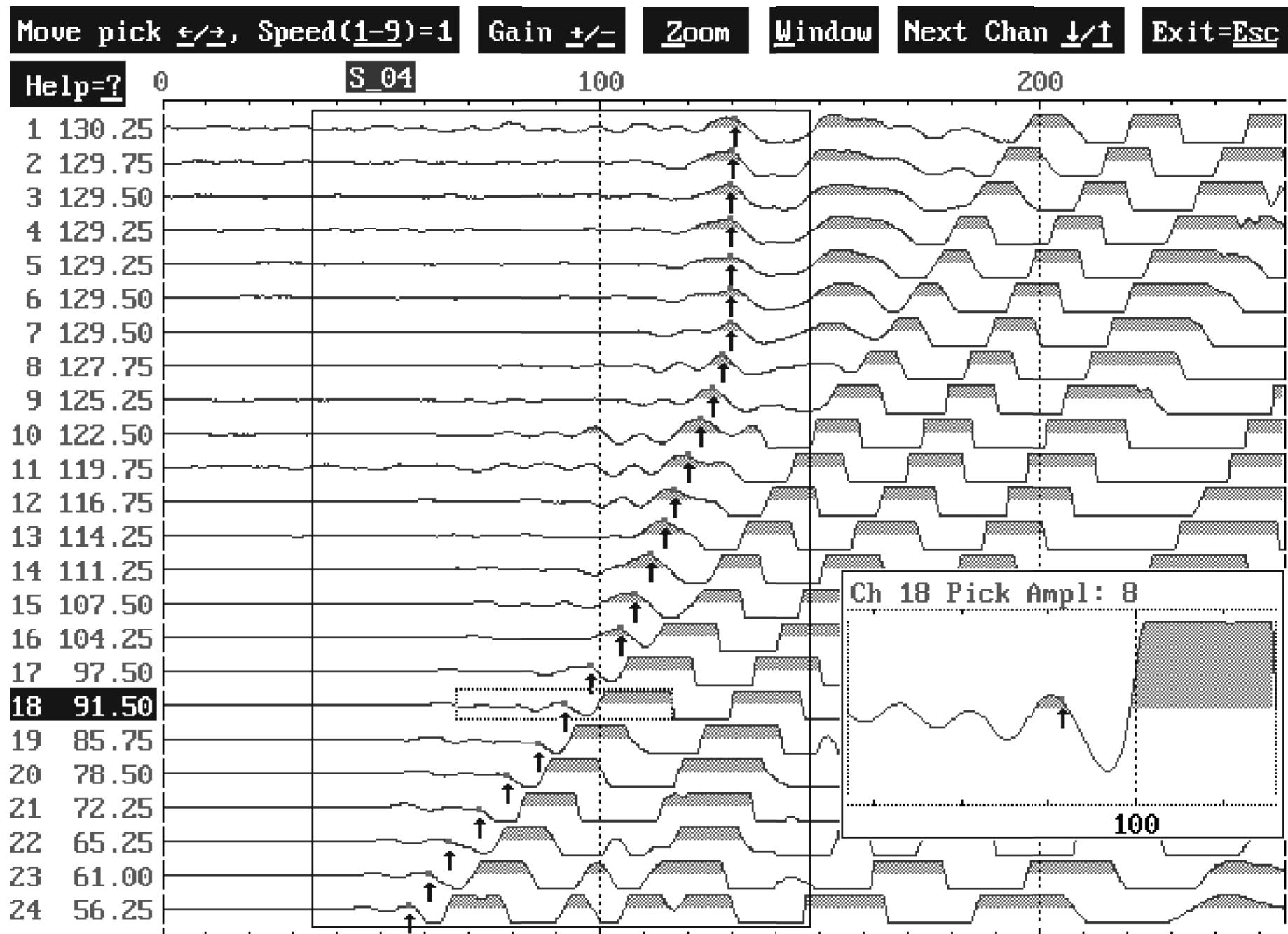


Barker Road South S-wave

Barker Road South S-wave

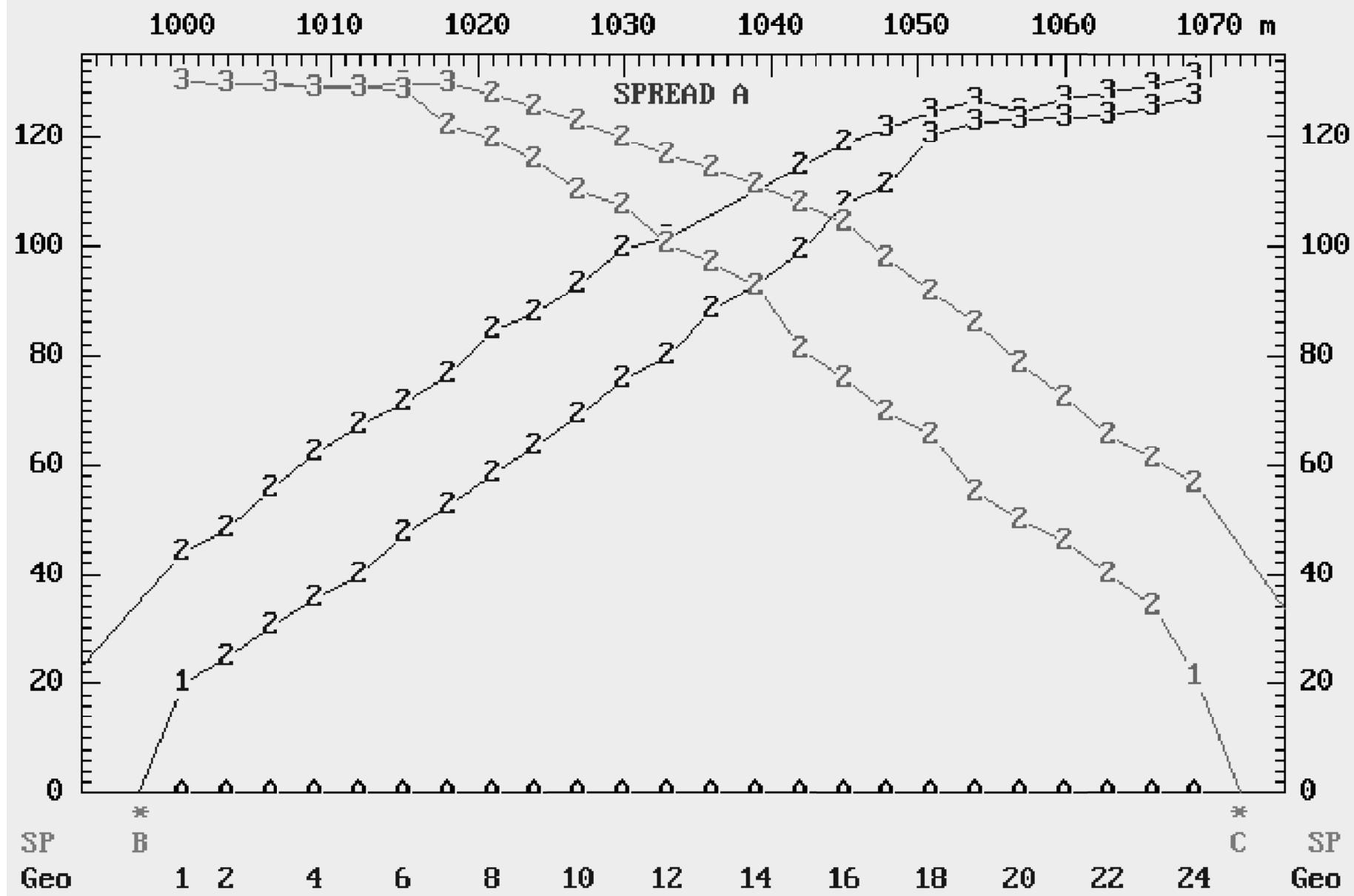
Barker Road South S-wave



Barker Road South S-wave

Barker Road South S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for **MAIN MENU**.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

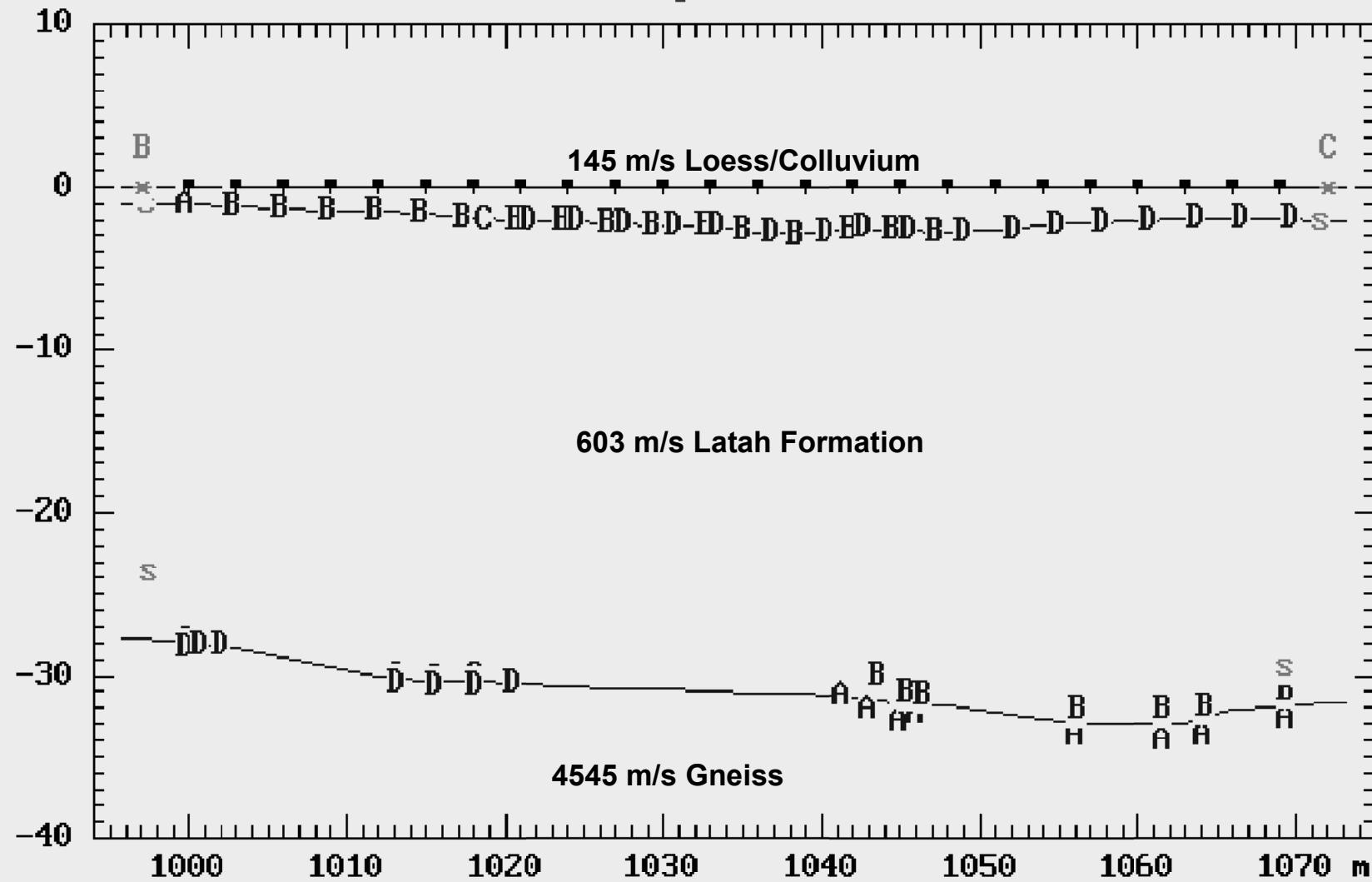


Barker Road South S-wave

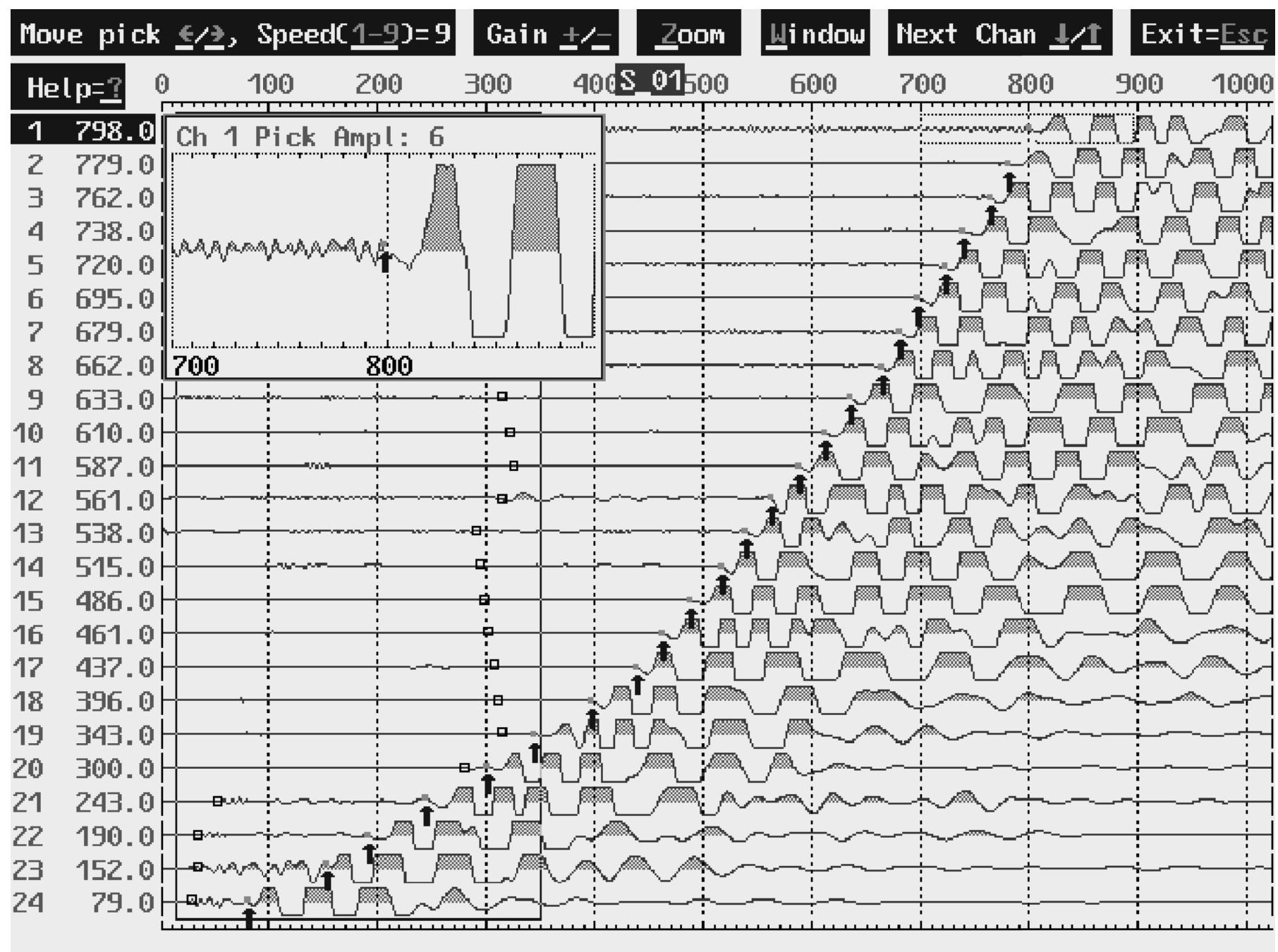
Press Esc to EXIT

BARKS_SW.SIP: Barker RD South S Wave Survey

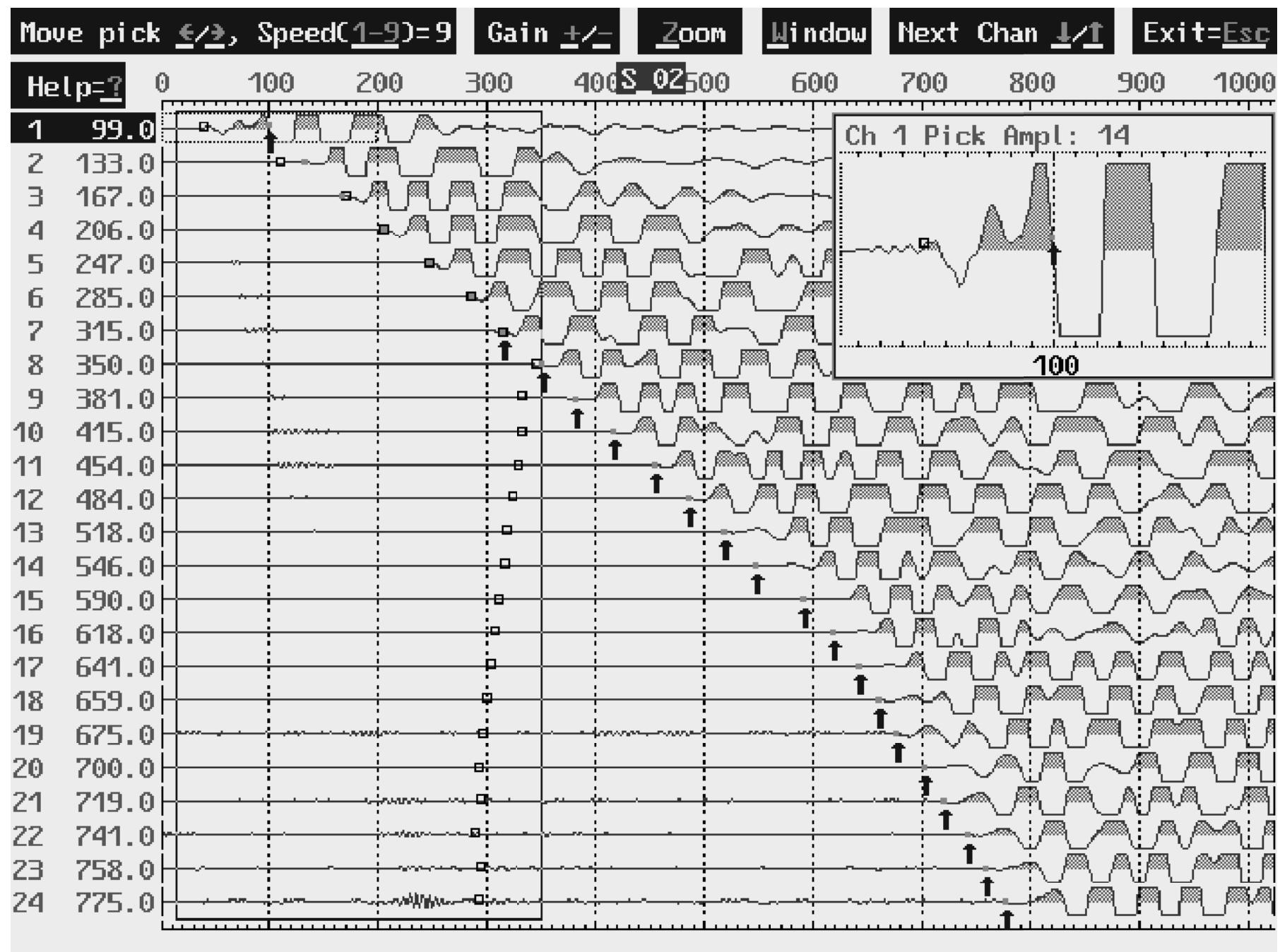
Spread A



Barlow Point RD S-wave

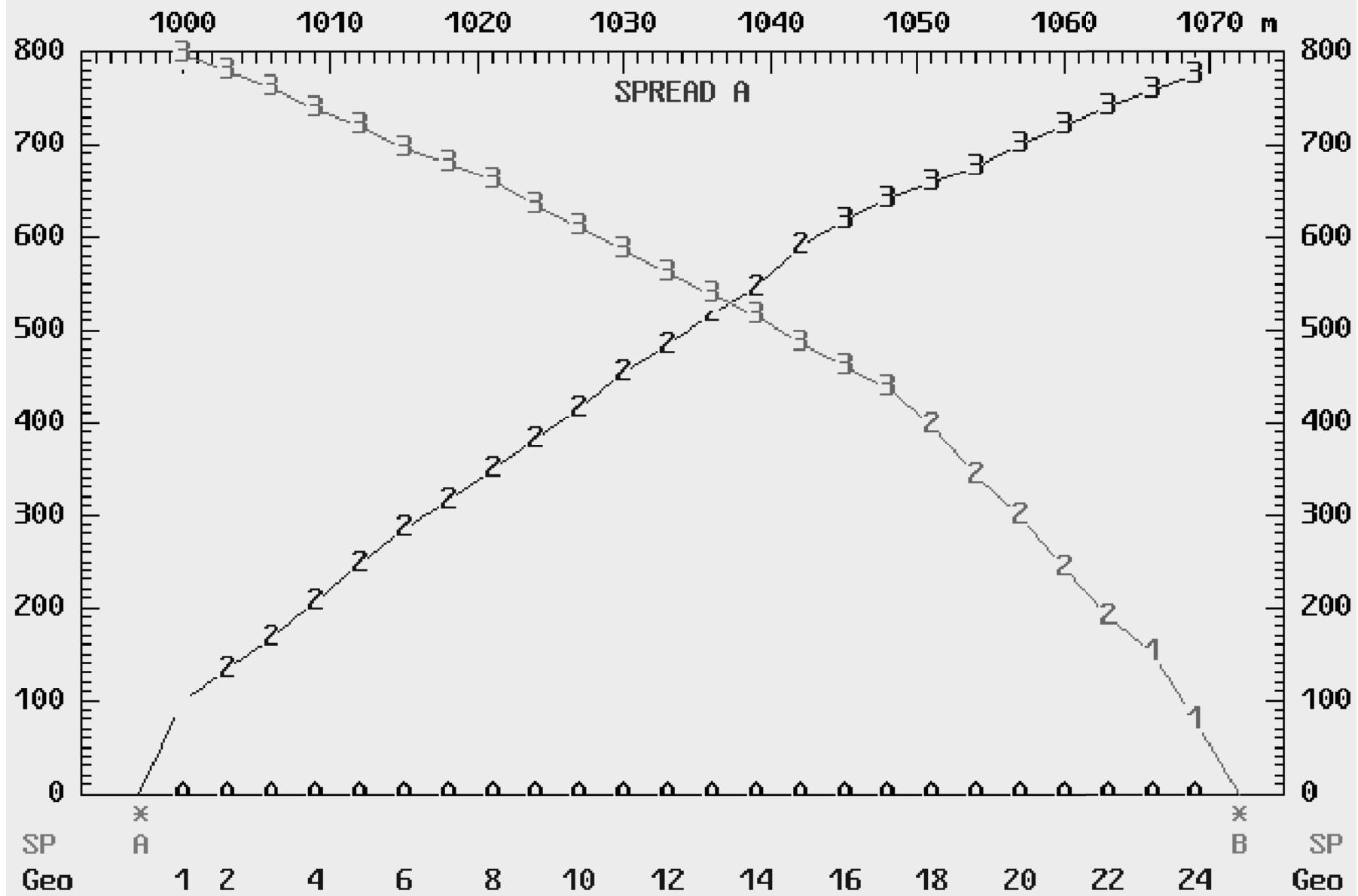


Barlow Point RD S-wave



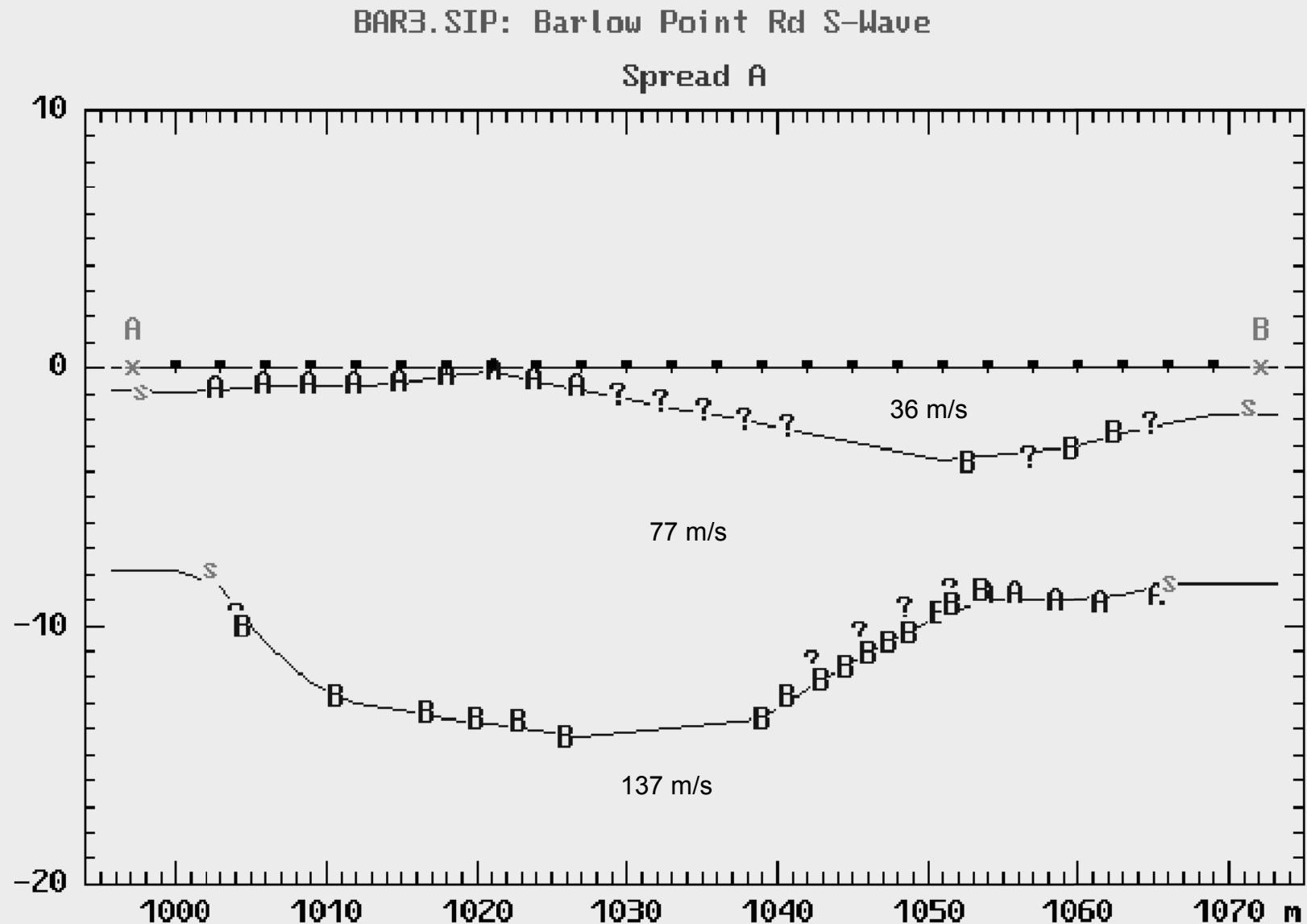
Barlow Point RD S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Barlow Point RD S-wave

Press Esc to EXIT

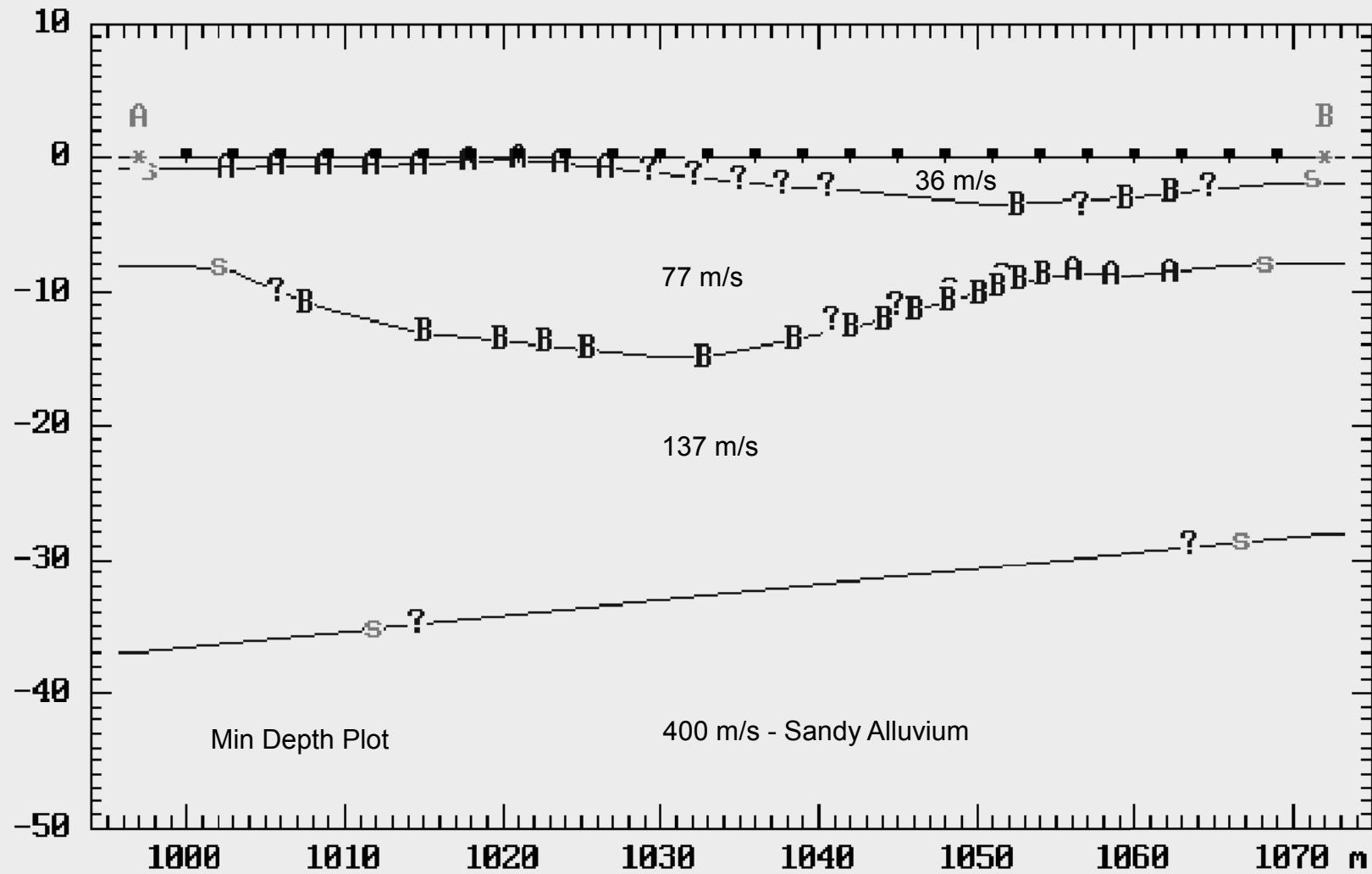


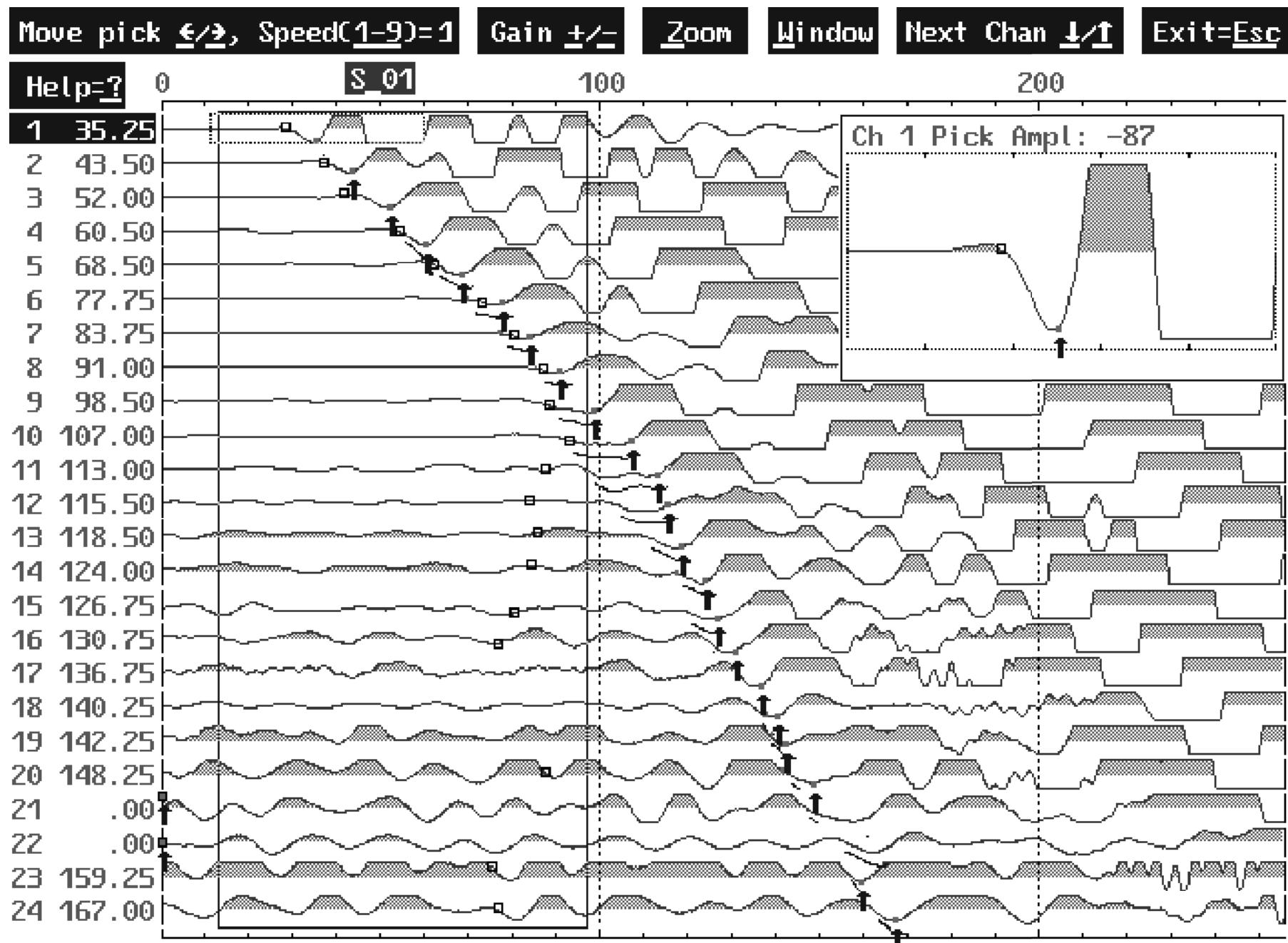
Barlow Point RD S-wave

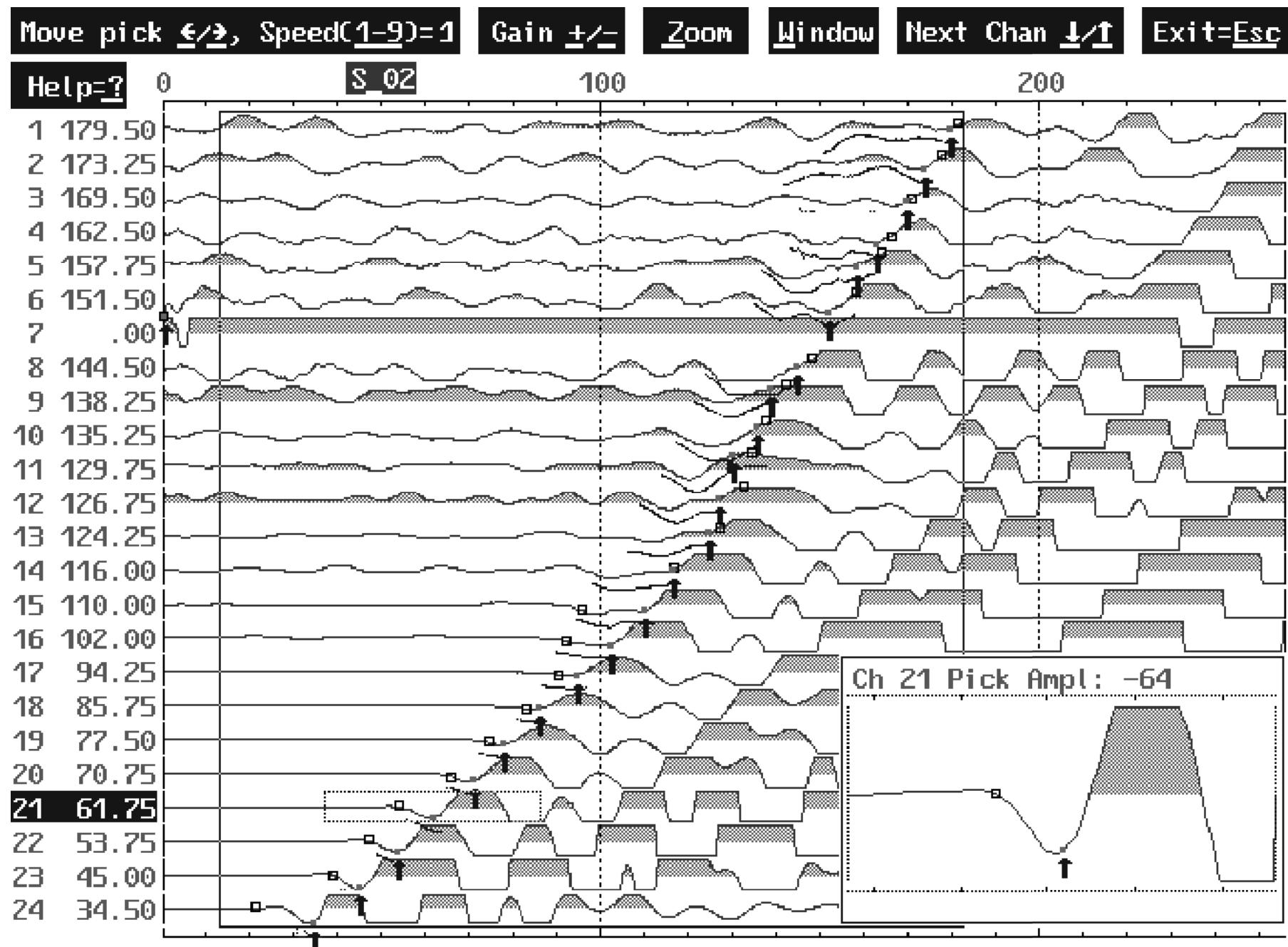
Press Esc to EXIT

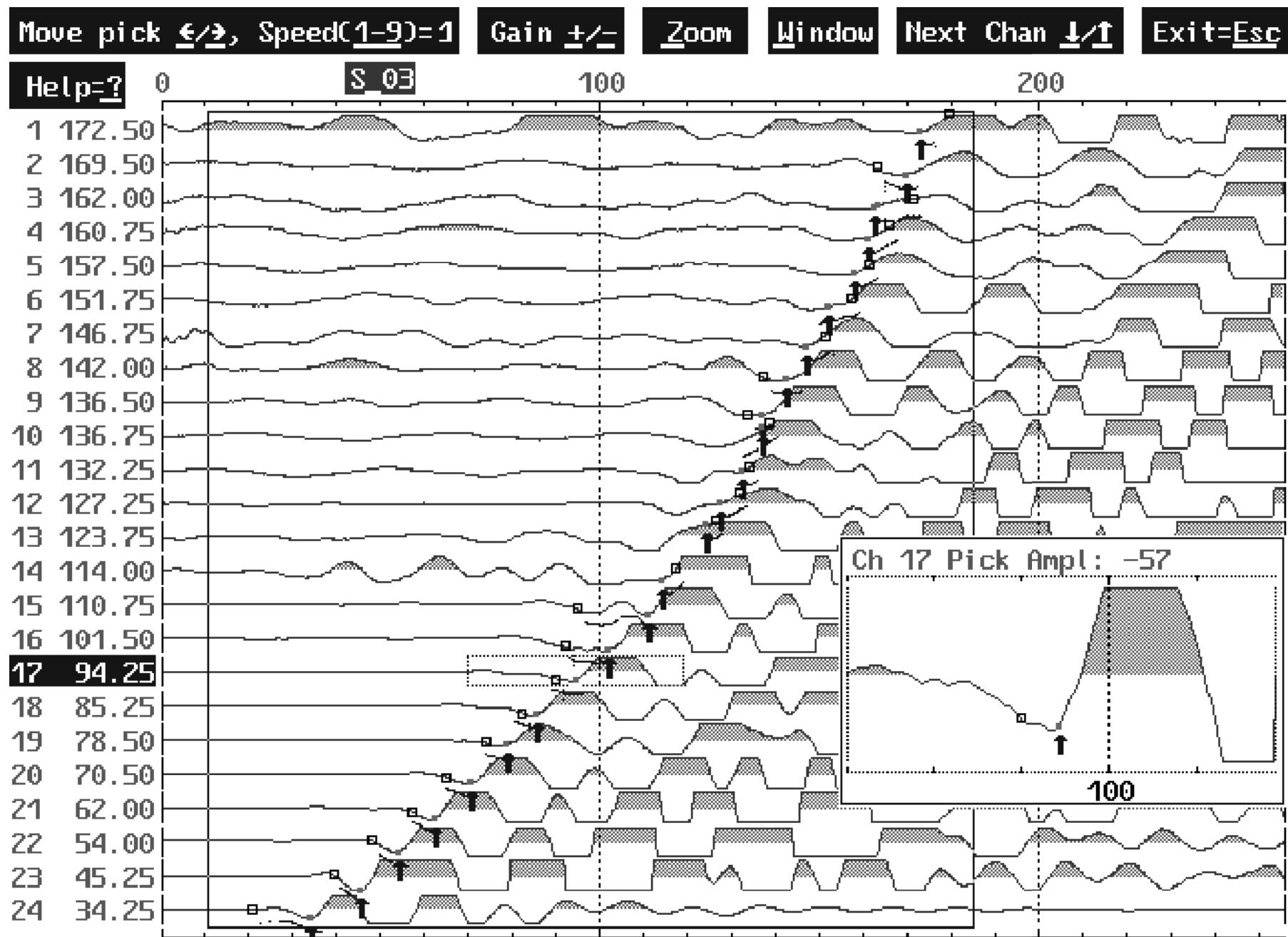
BARSMIN.SIP : Barlow Point Rd S-Wave Min Depth

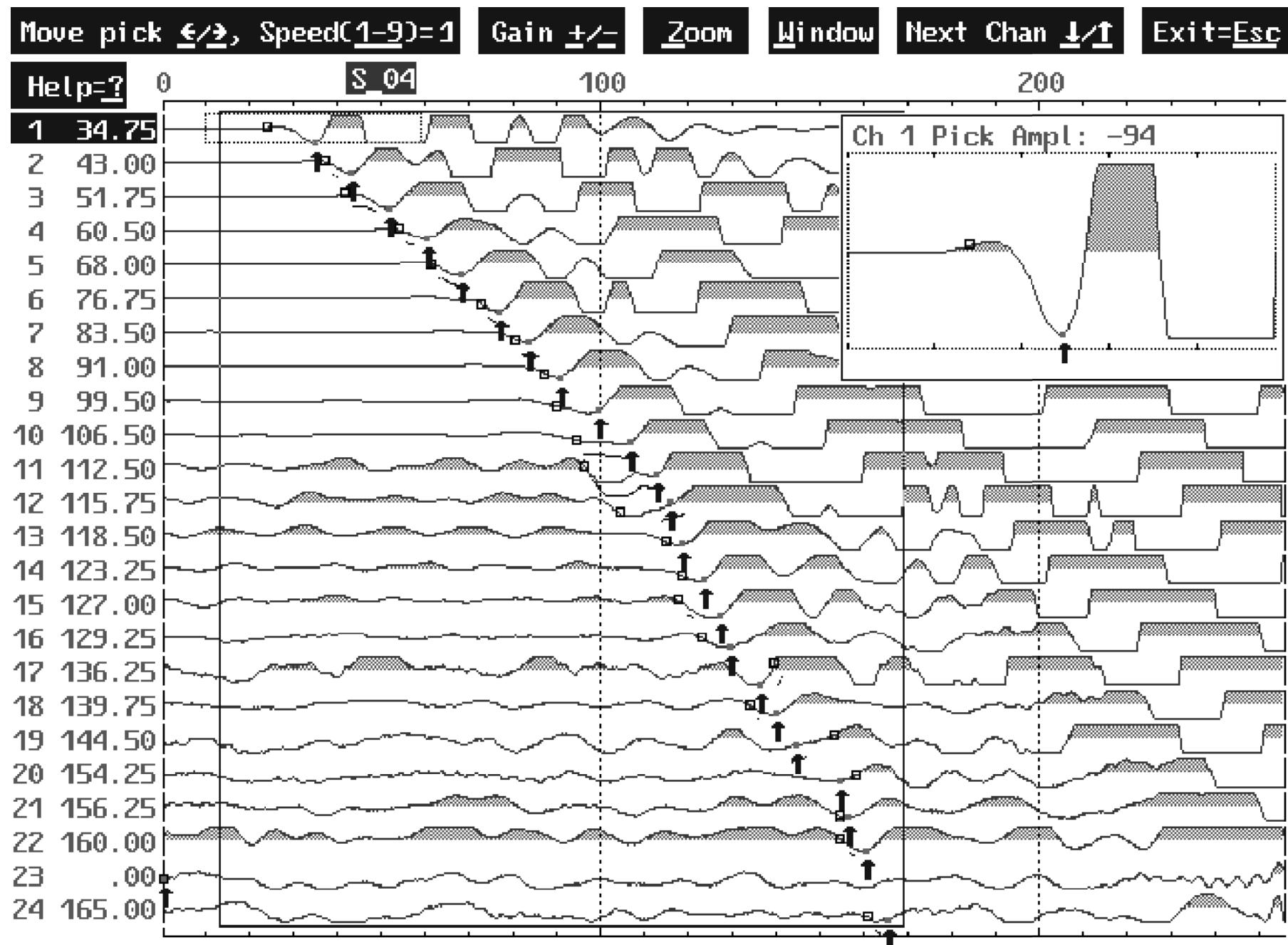
Spread A



Big George S-wave

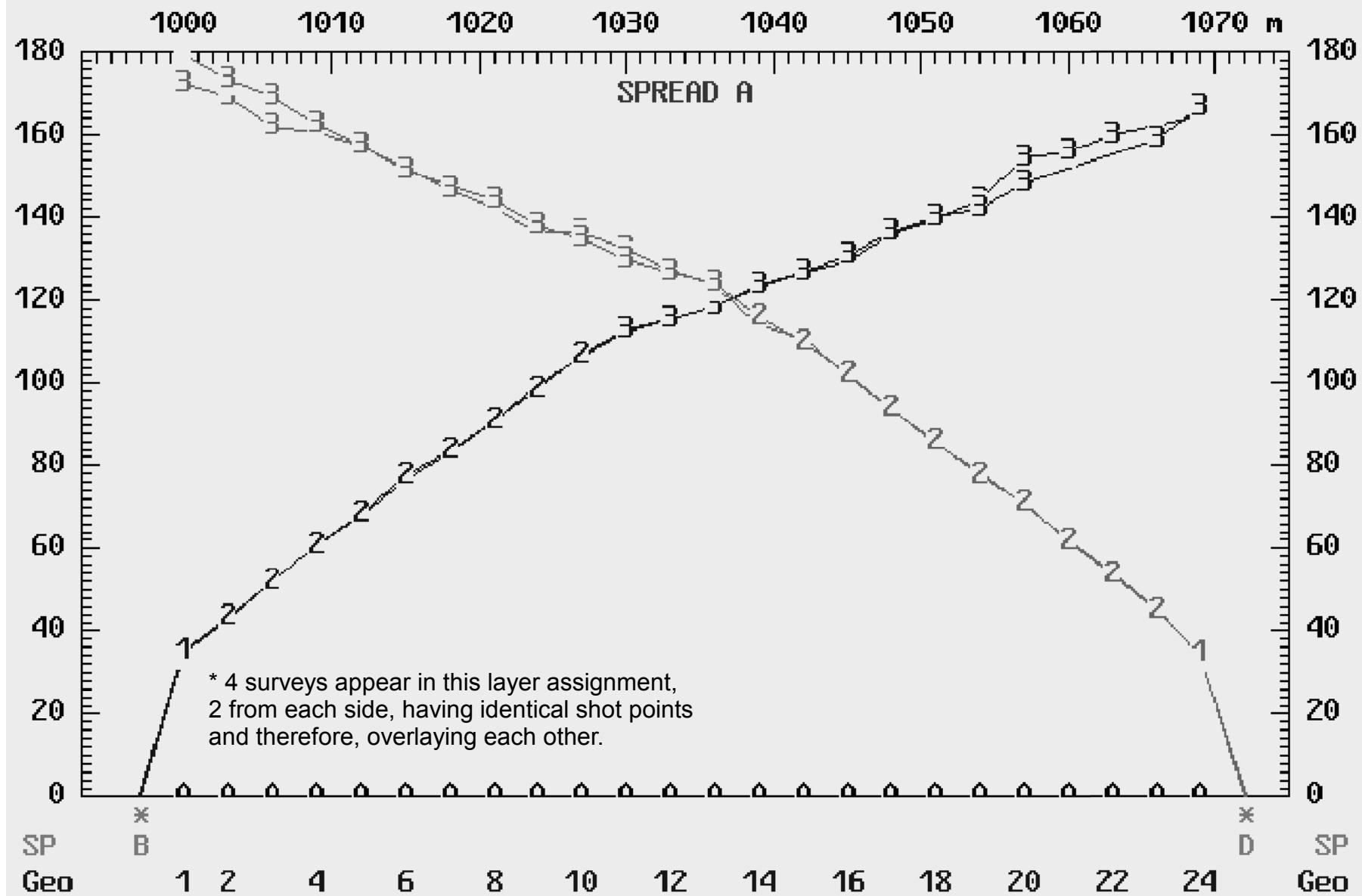
Big George S-wave

Big George S-wave

Big George S-wave

Big George S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

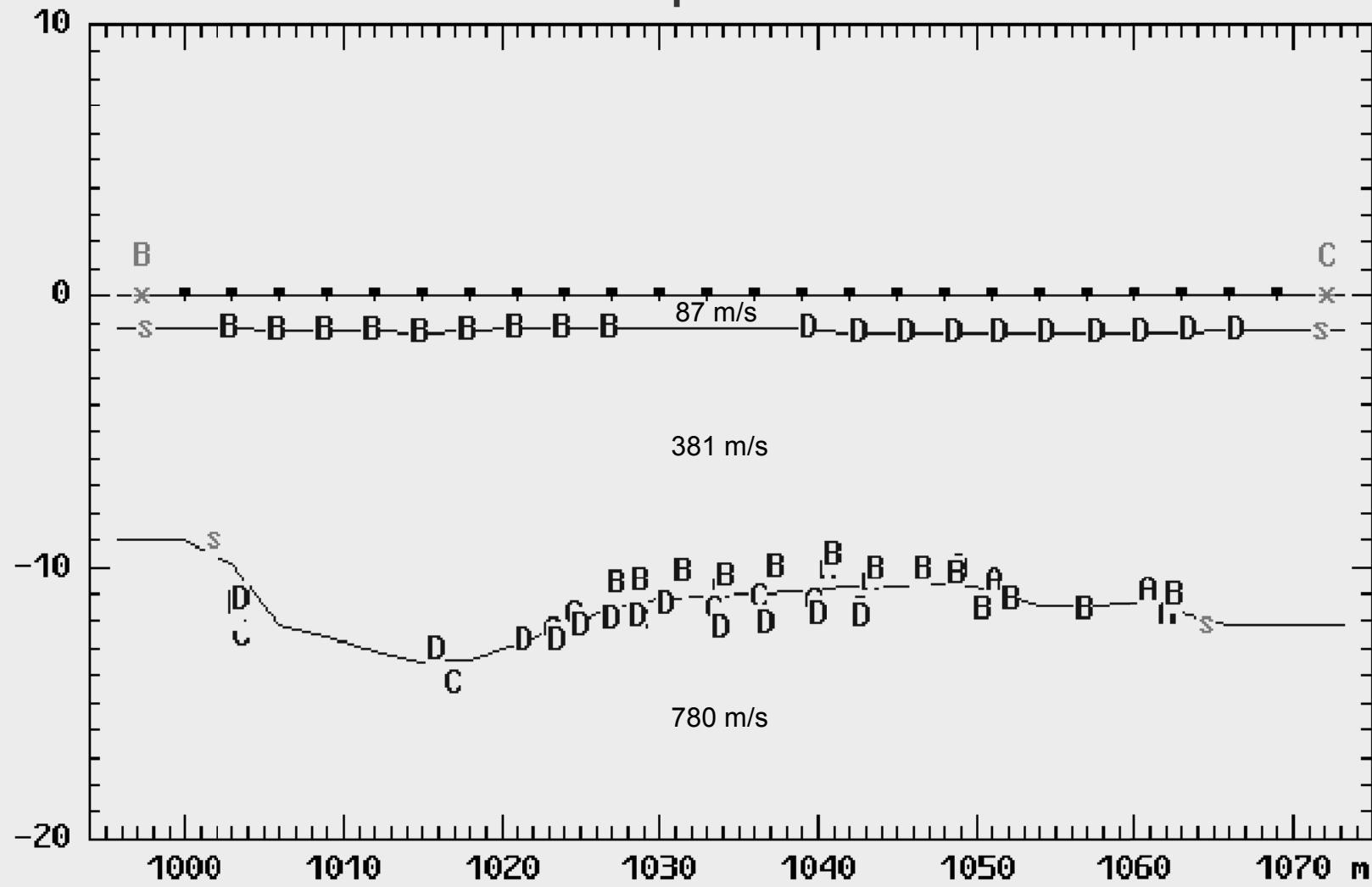


Big George S-wave

Press Esc to EXIT

BIGGSWAU.SIP: Big George S-Waves

Spread A

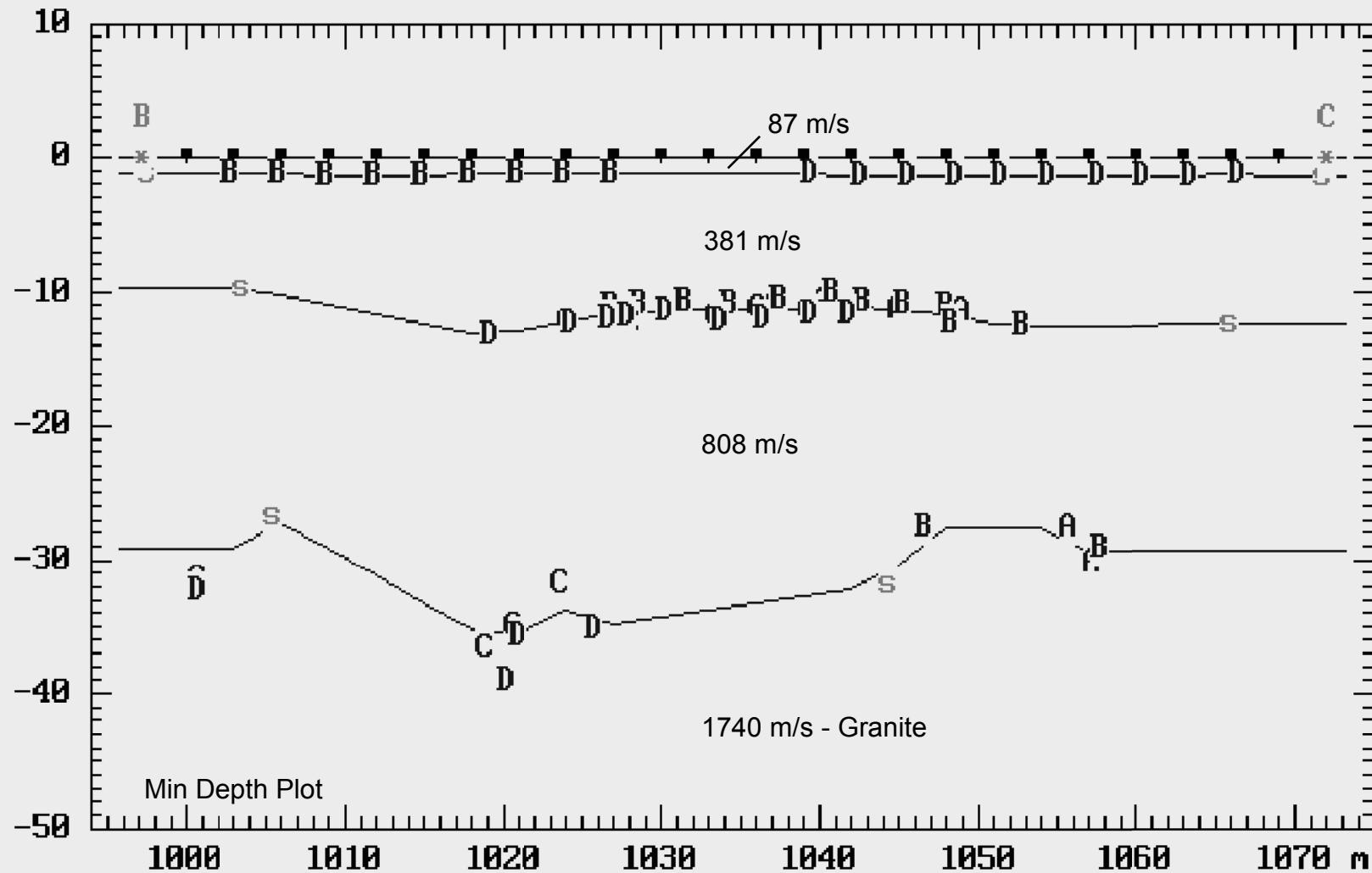


Big George S-wave

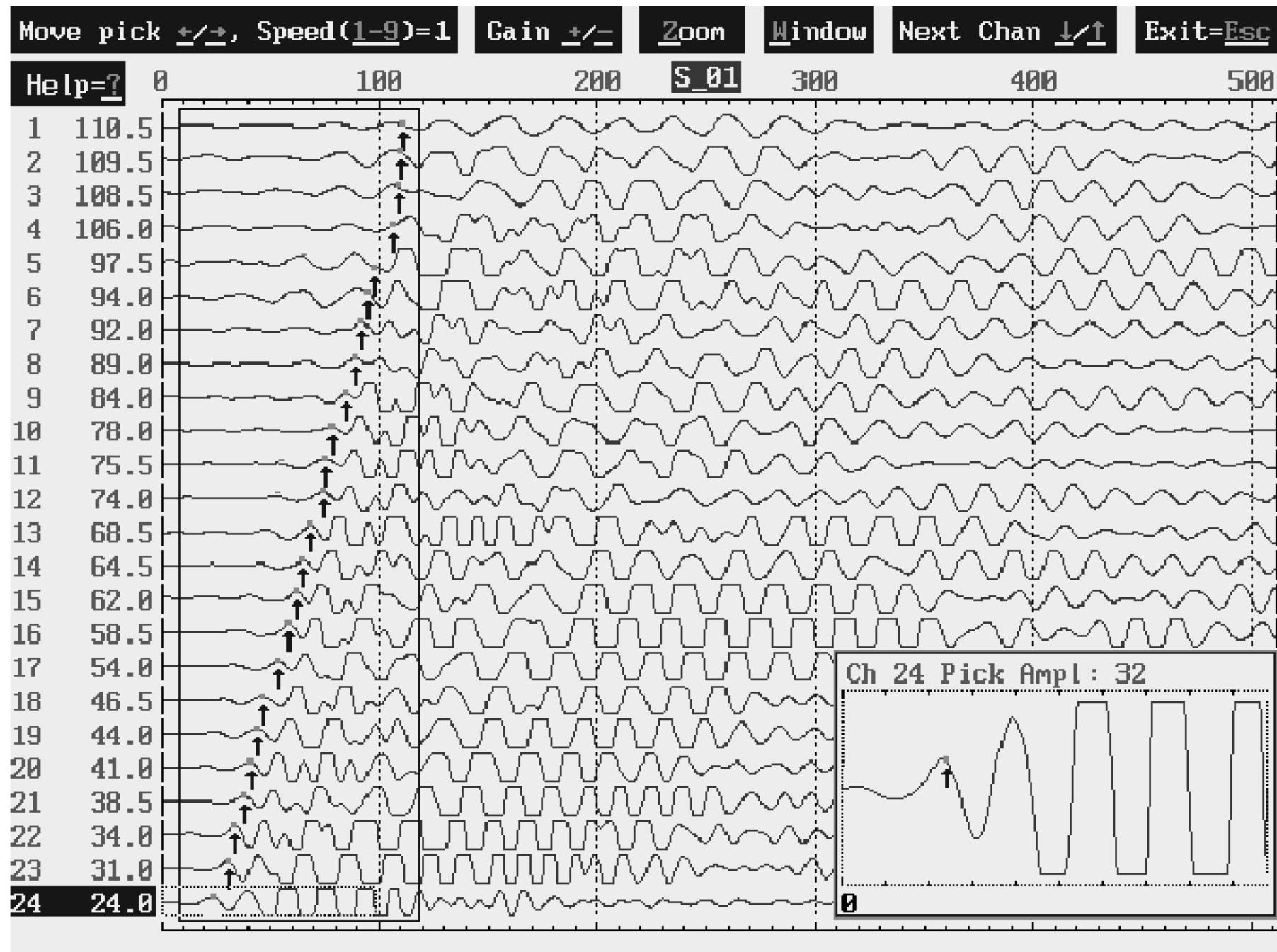
Press Esc to EXIT

BIGGSMIN.SIP: Big George Minimum Depth Plot

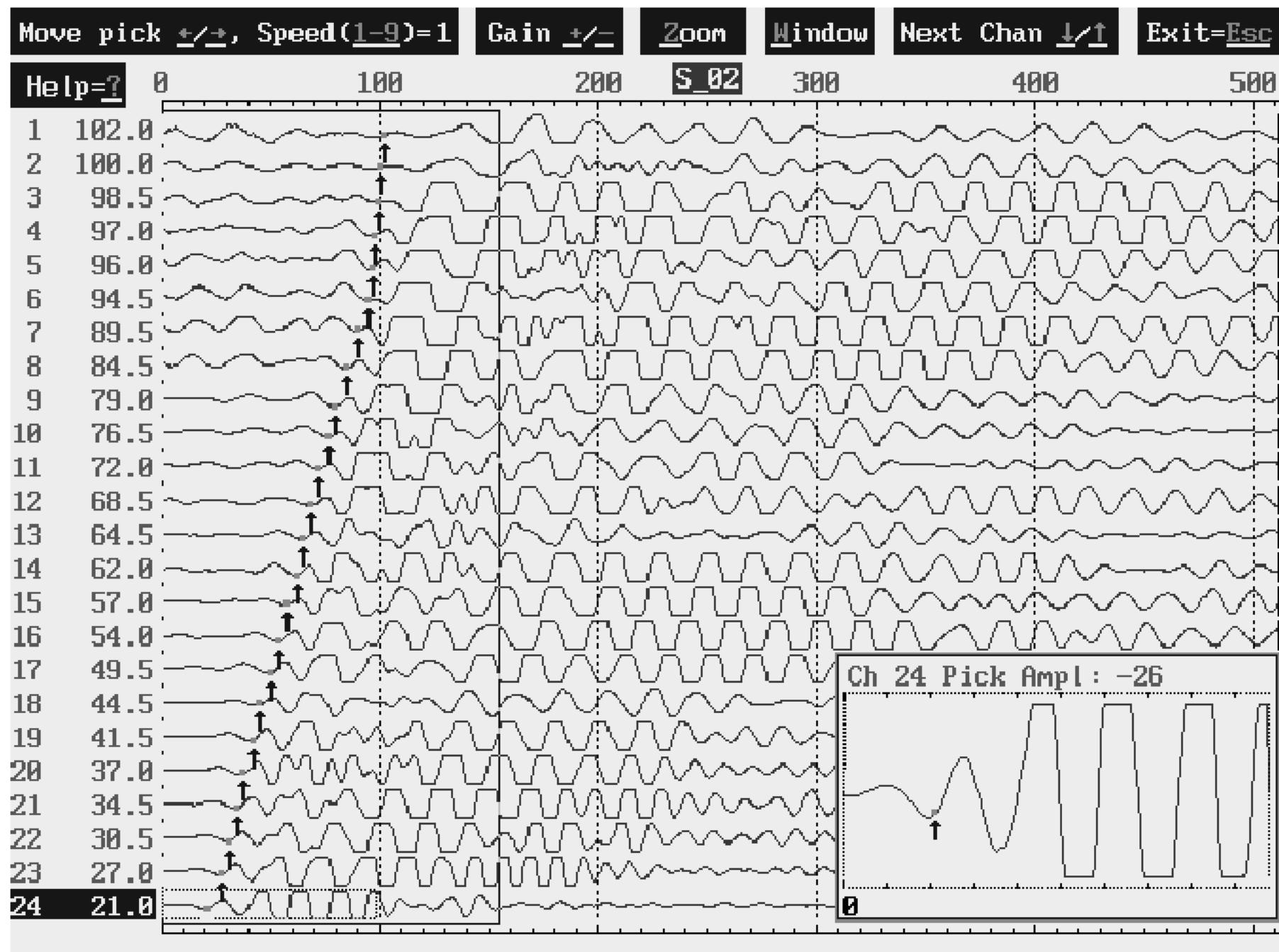
Spread A



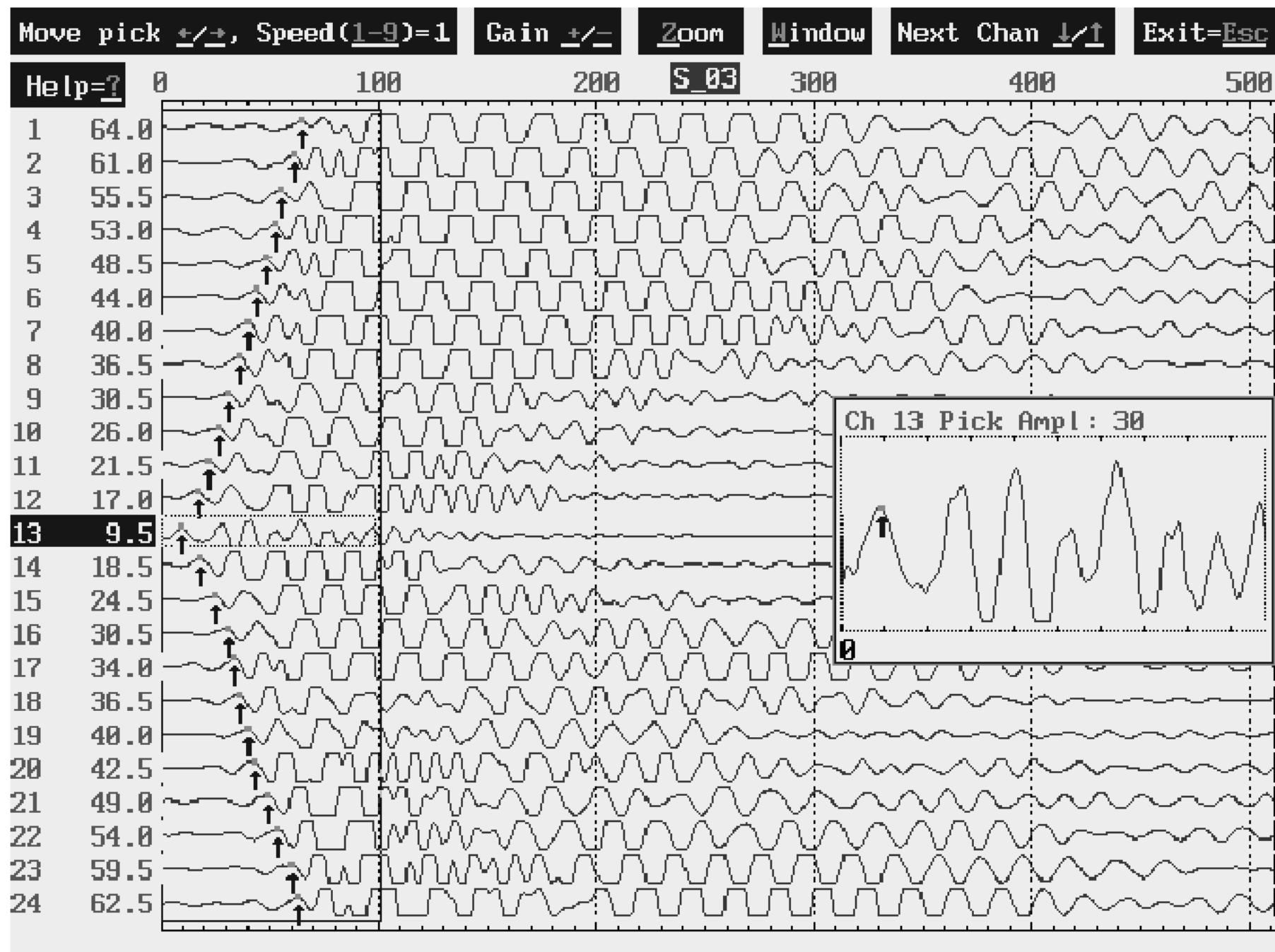
Branch Farm S-wave



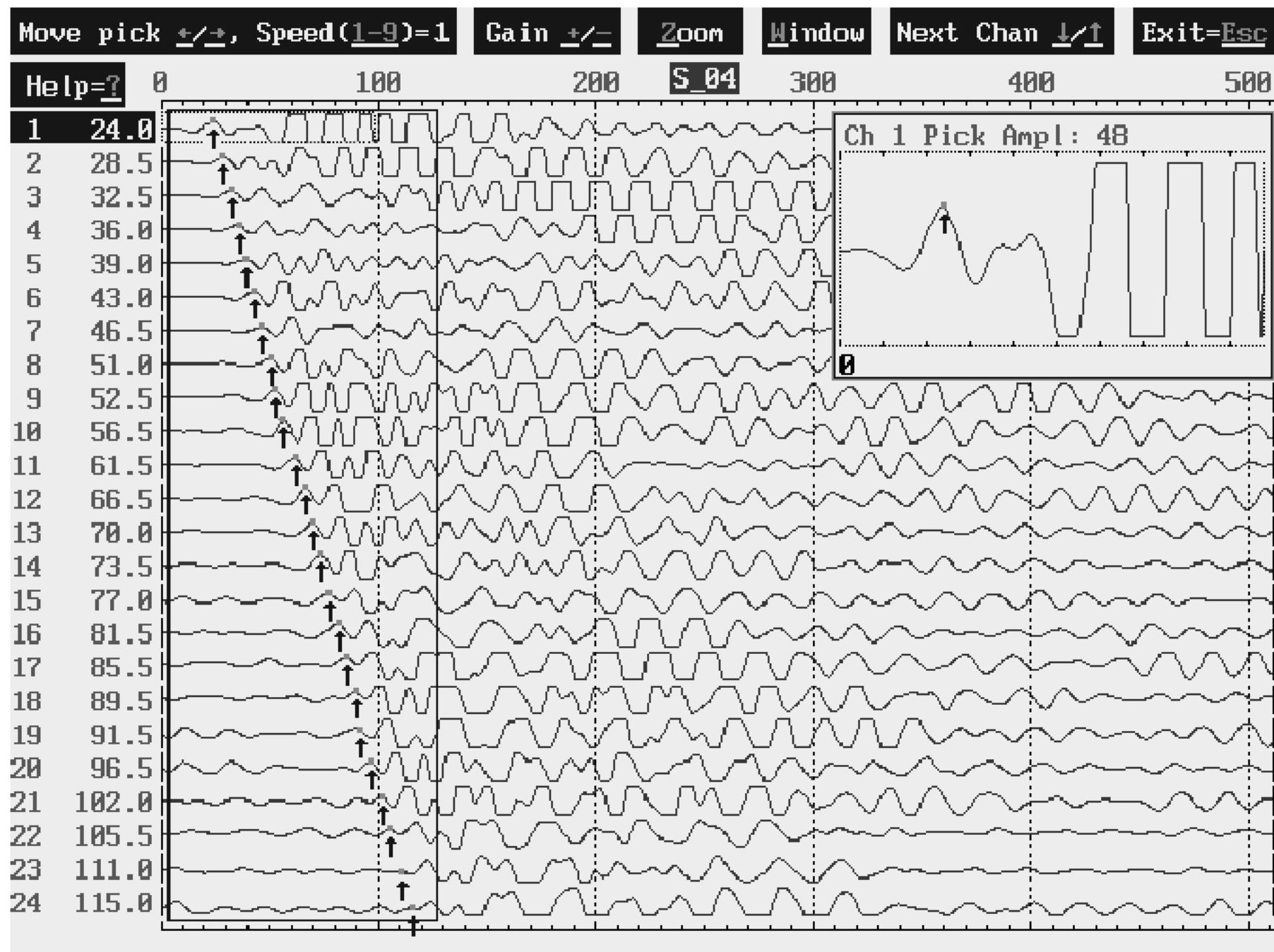
Branch Farm S-wave



Branch Farm S-wave

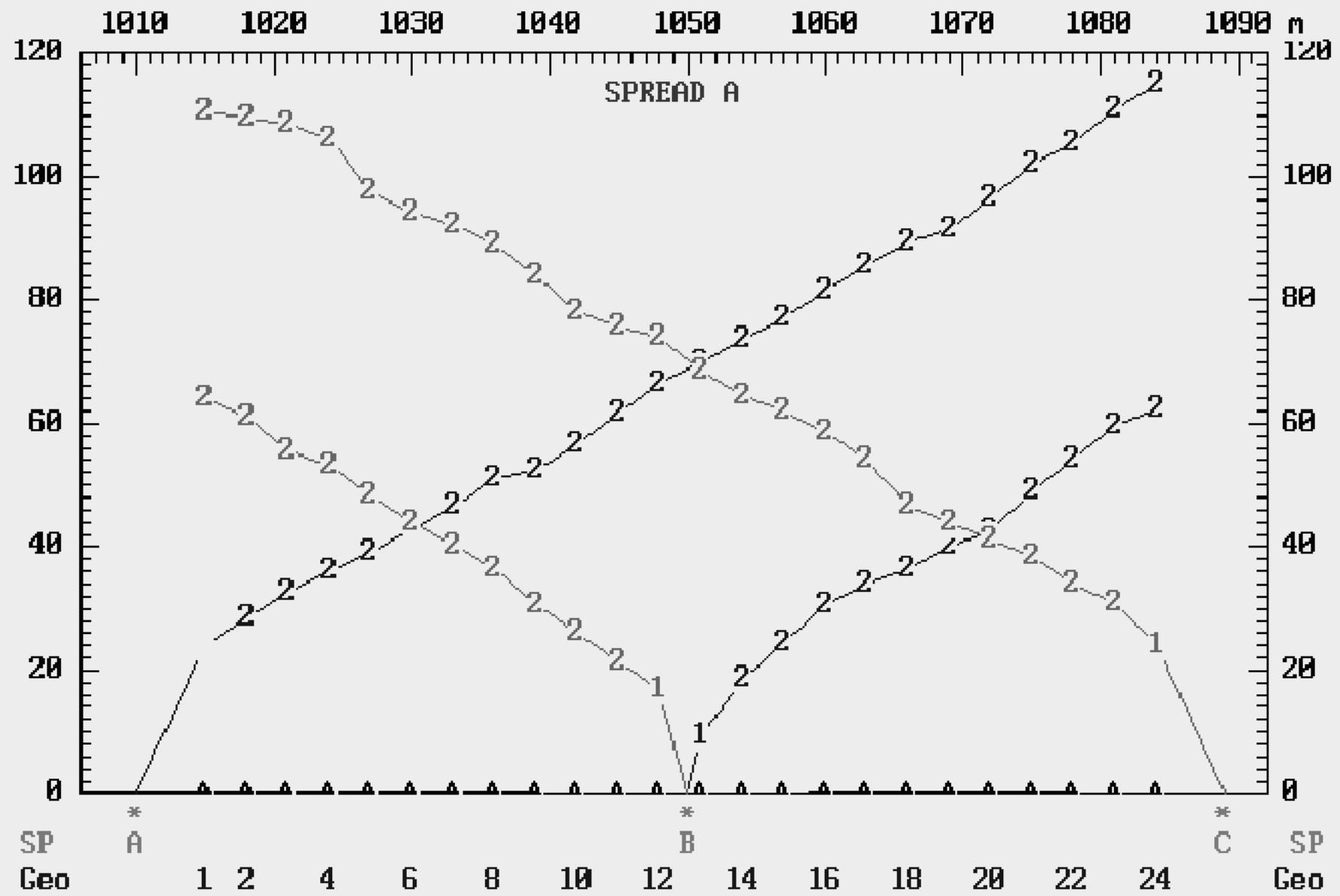


Branch Farm S-wave



Branch Farm S-wave

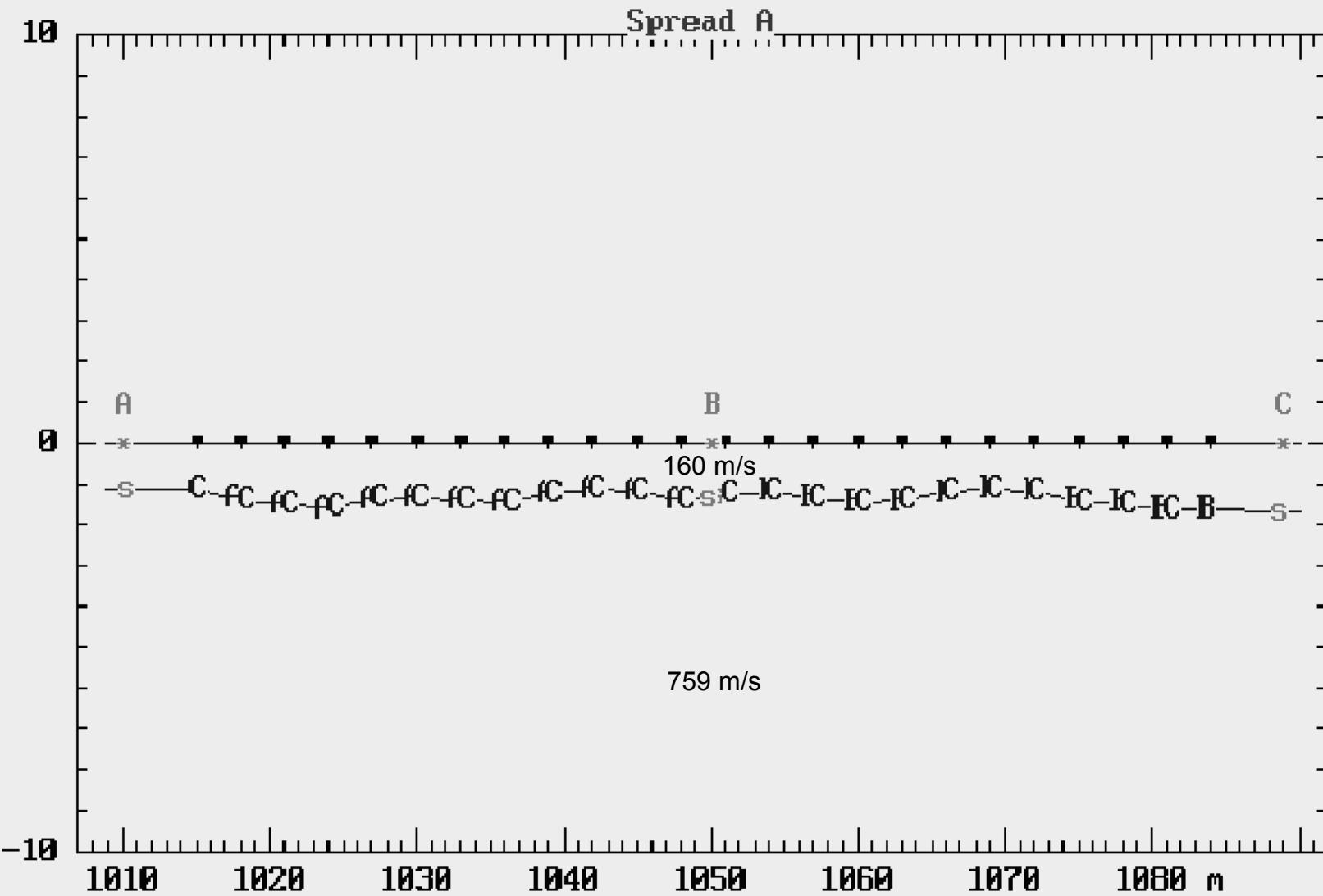
Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Branch Farm S-wave

Press Esc to EXIT

BRANSWAU.SIP: Branch Farm S-Waves

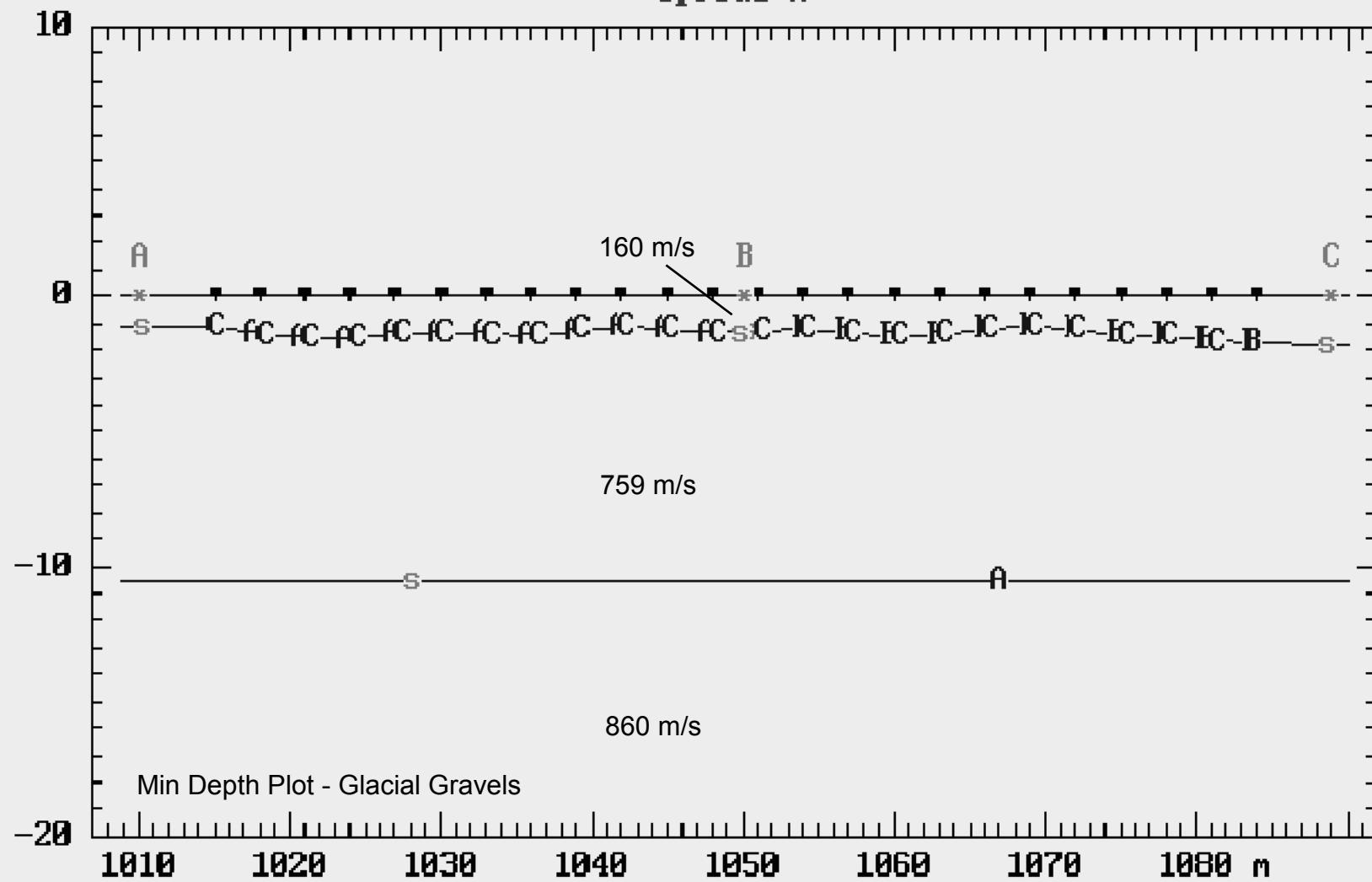


Branch Farm S-wave

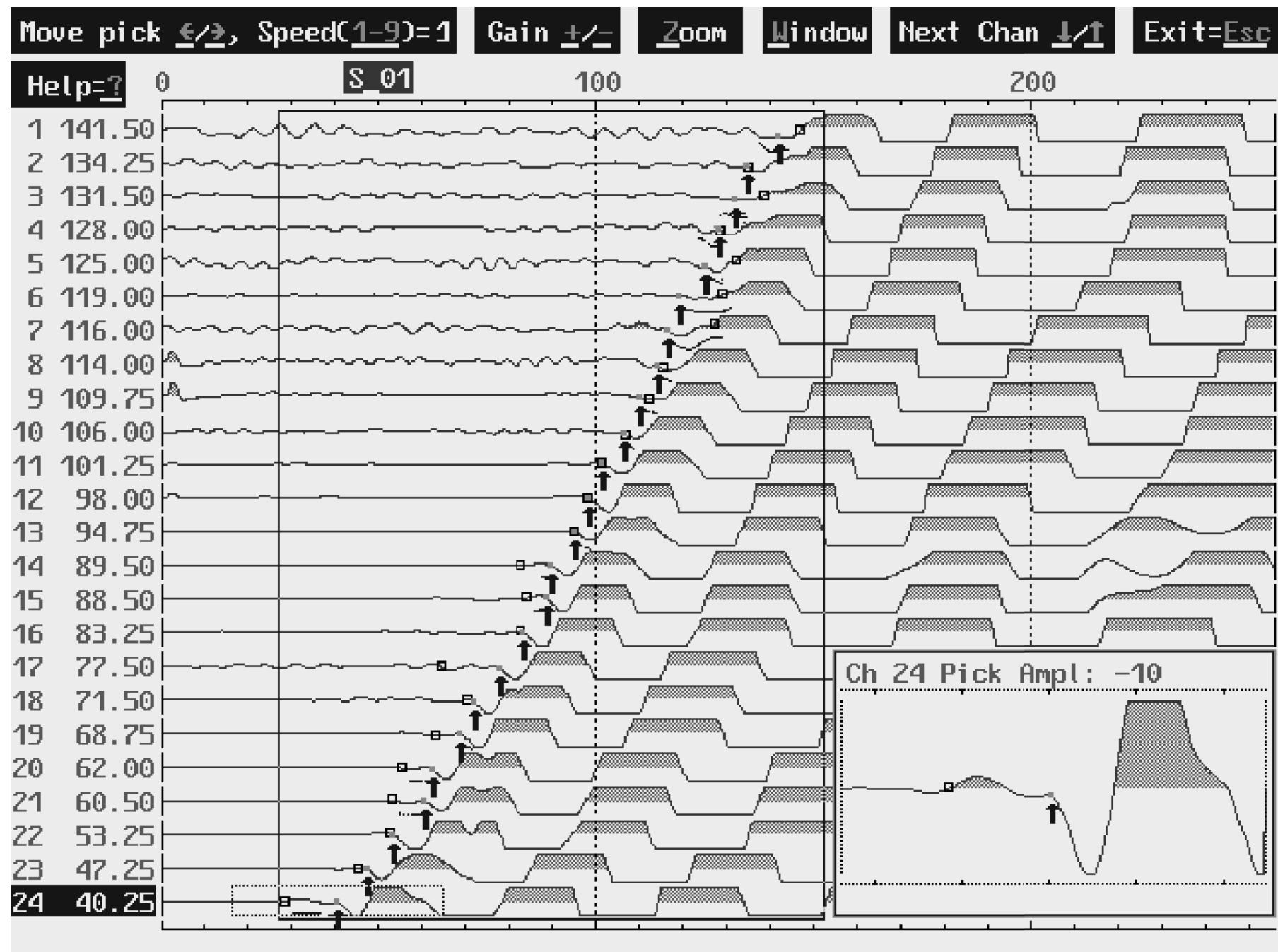
Press Esc to EXIT

BRANSMIN.SIP: Branch Farm S-Waves

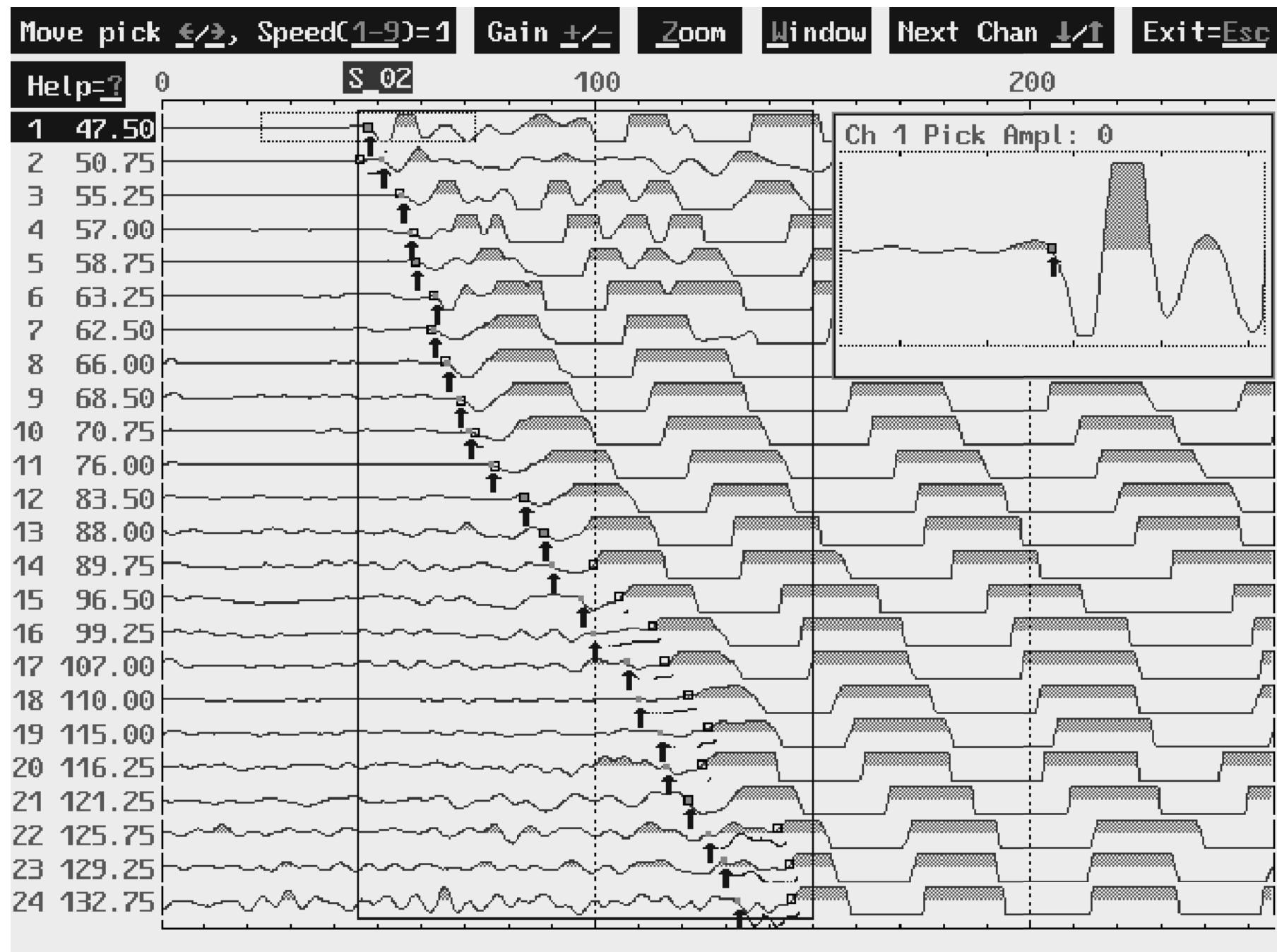
Spread A



Brandstrom Rd S-wave

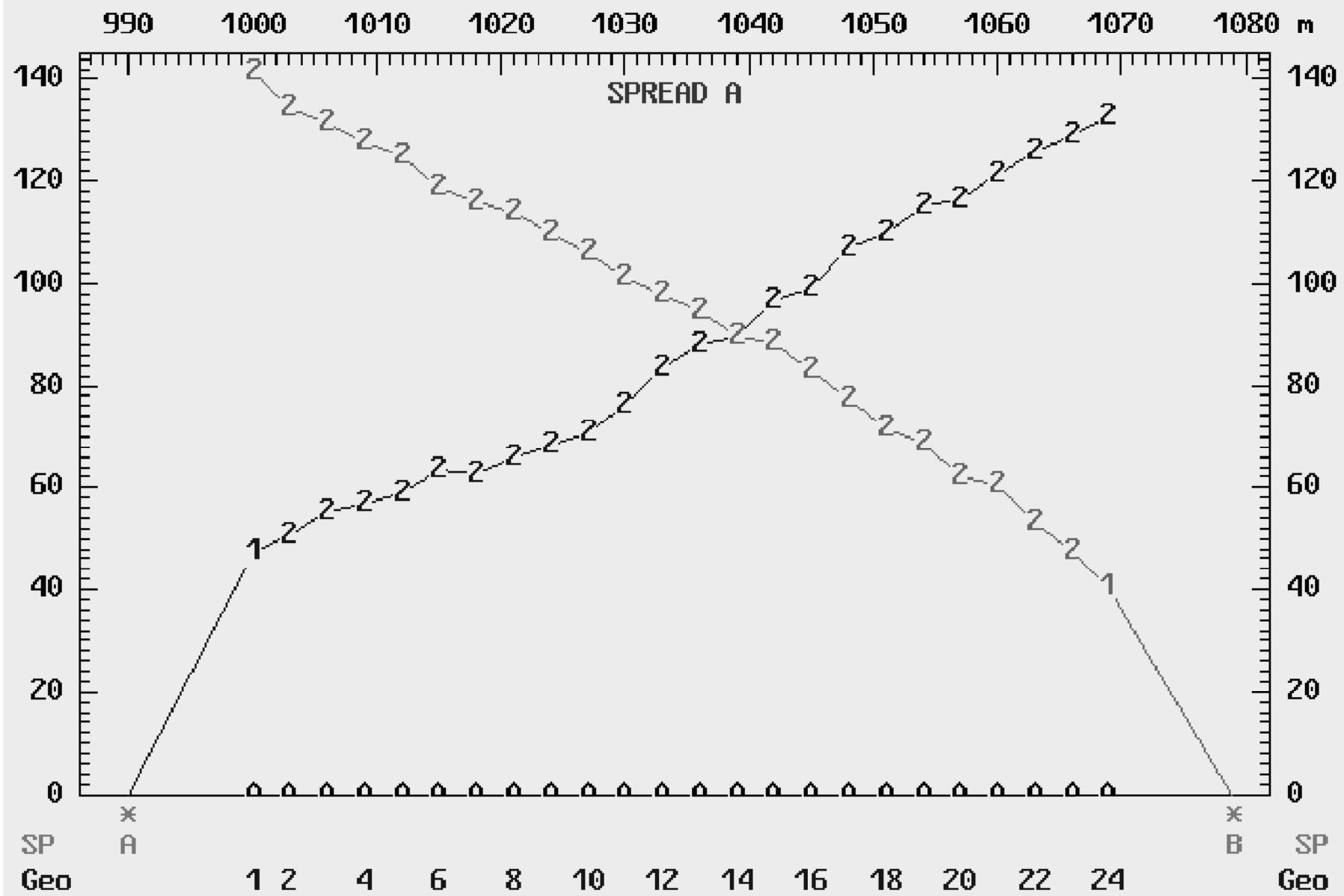


Brandstrom Rd S-wave



Brandstrom Rd S-wave

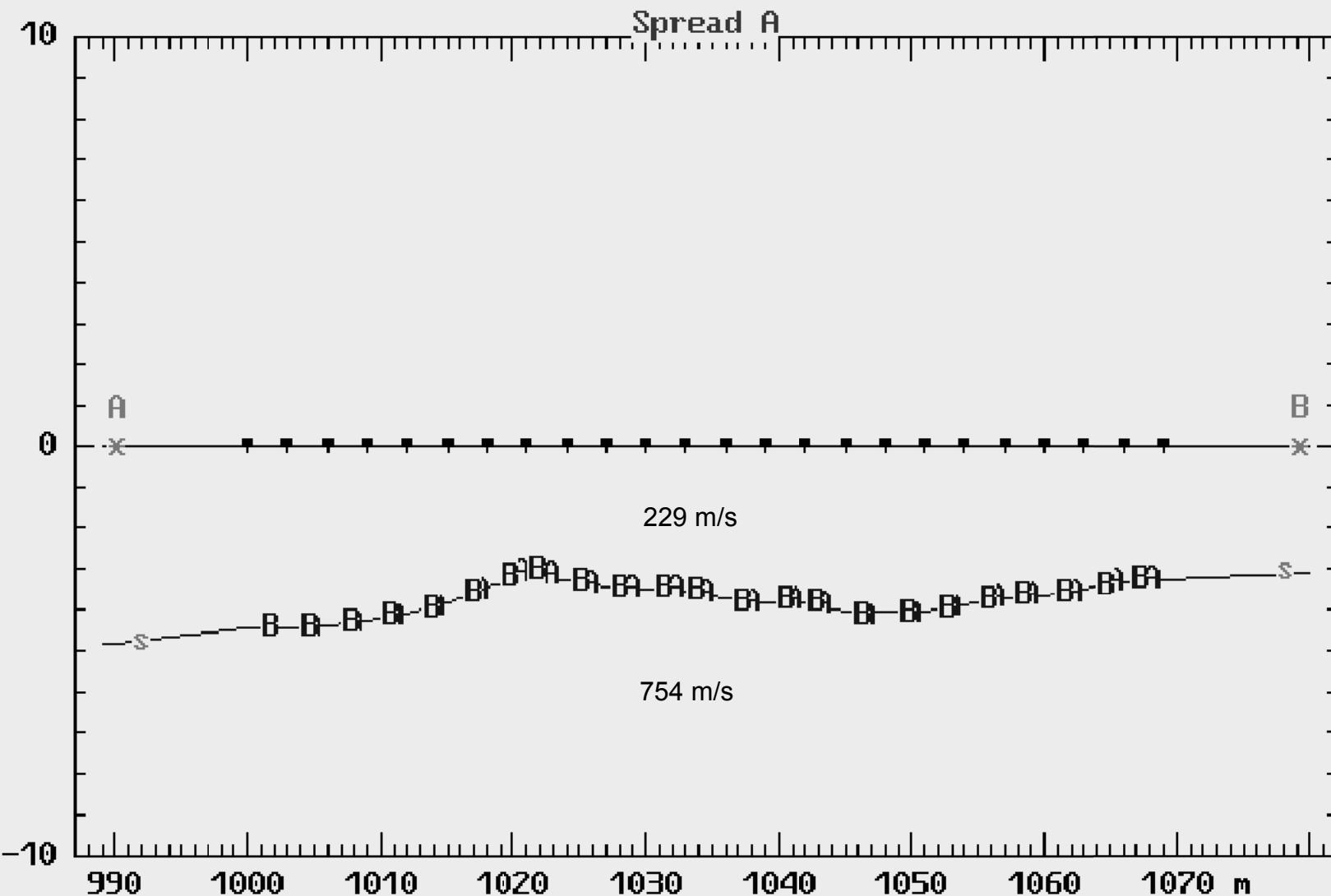
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Brandstrom Rd S-wave

Press Esc to EXIT

BRANSWAV.SIP: Brandstrom Rd S-Waves

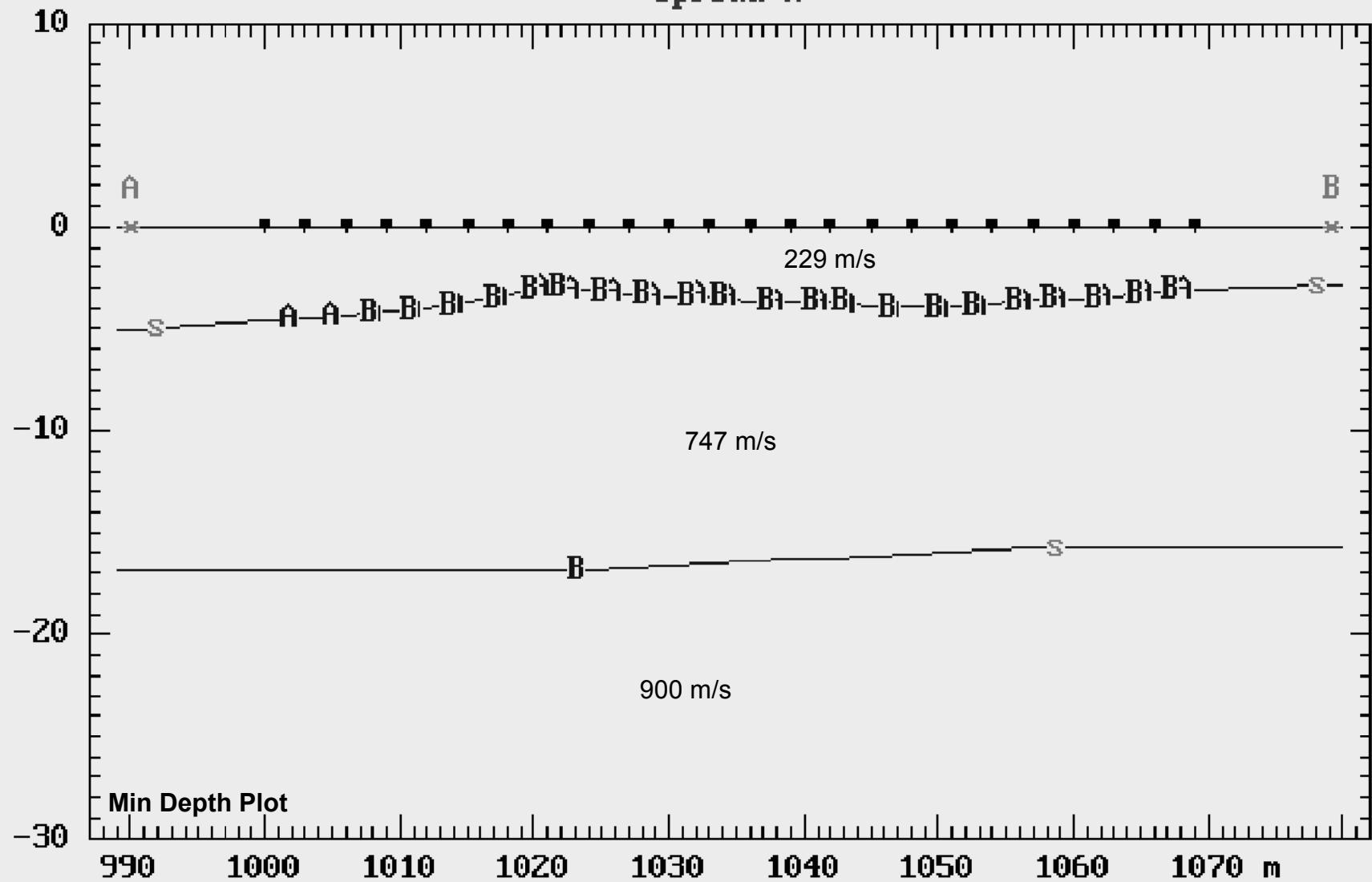


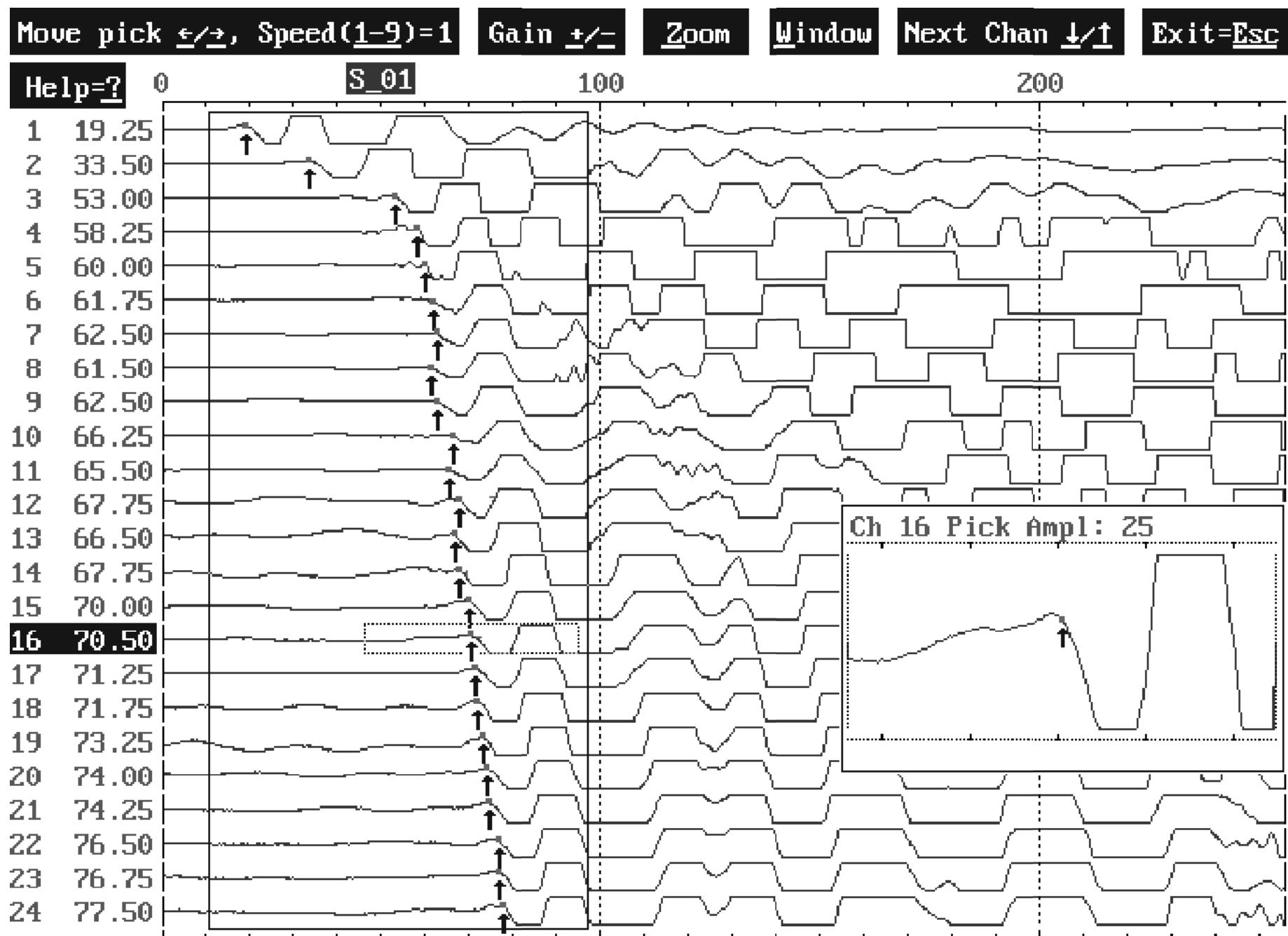
Brandstrom Rd S-wave

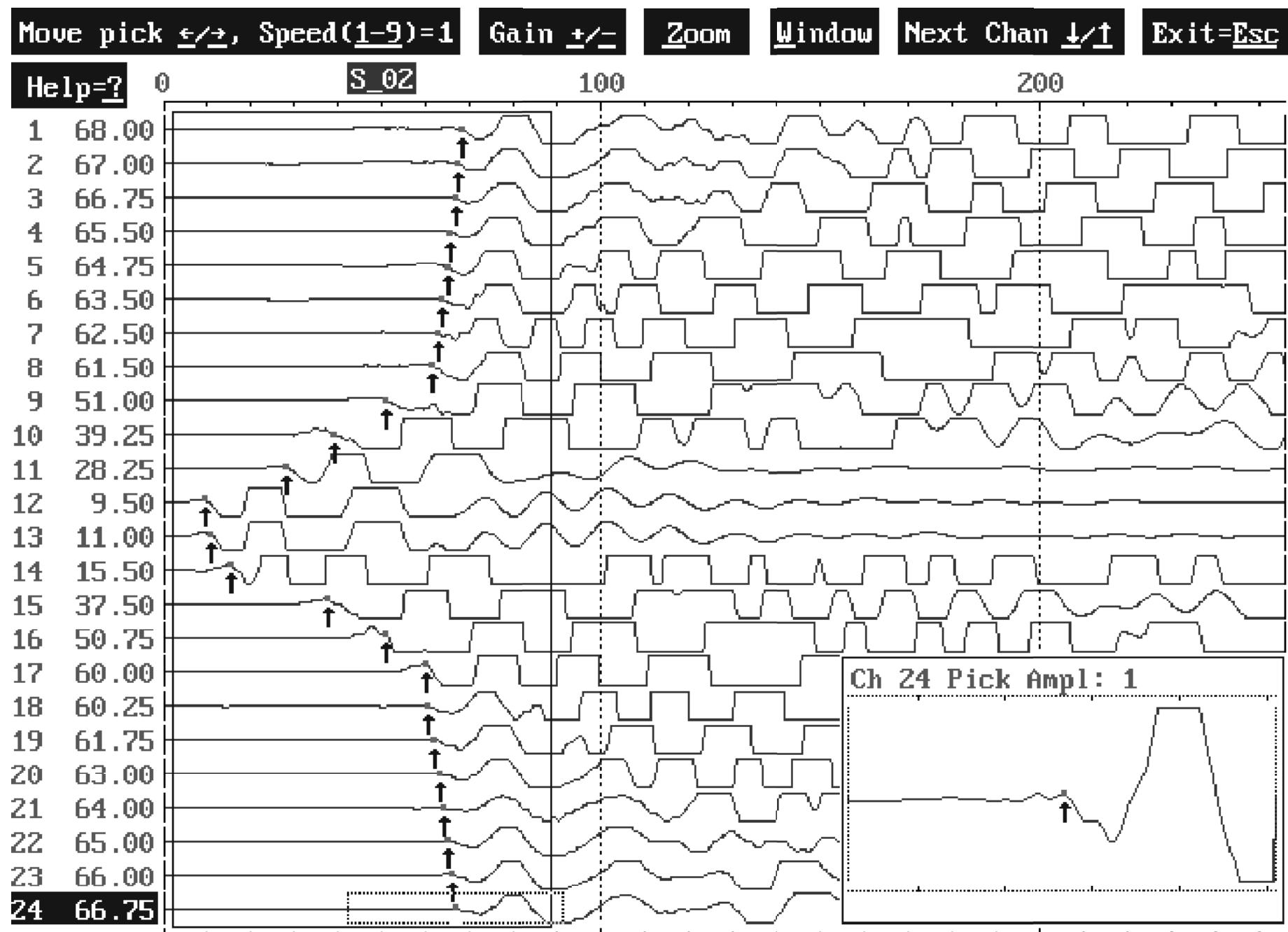
Press Esc to EXIT

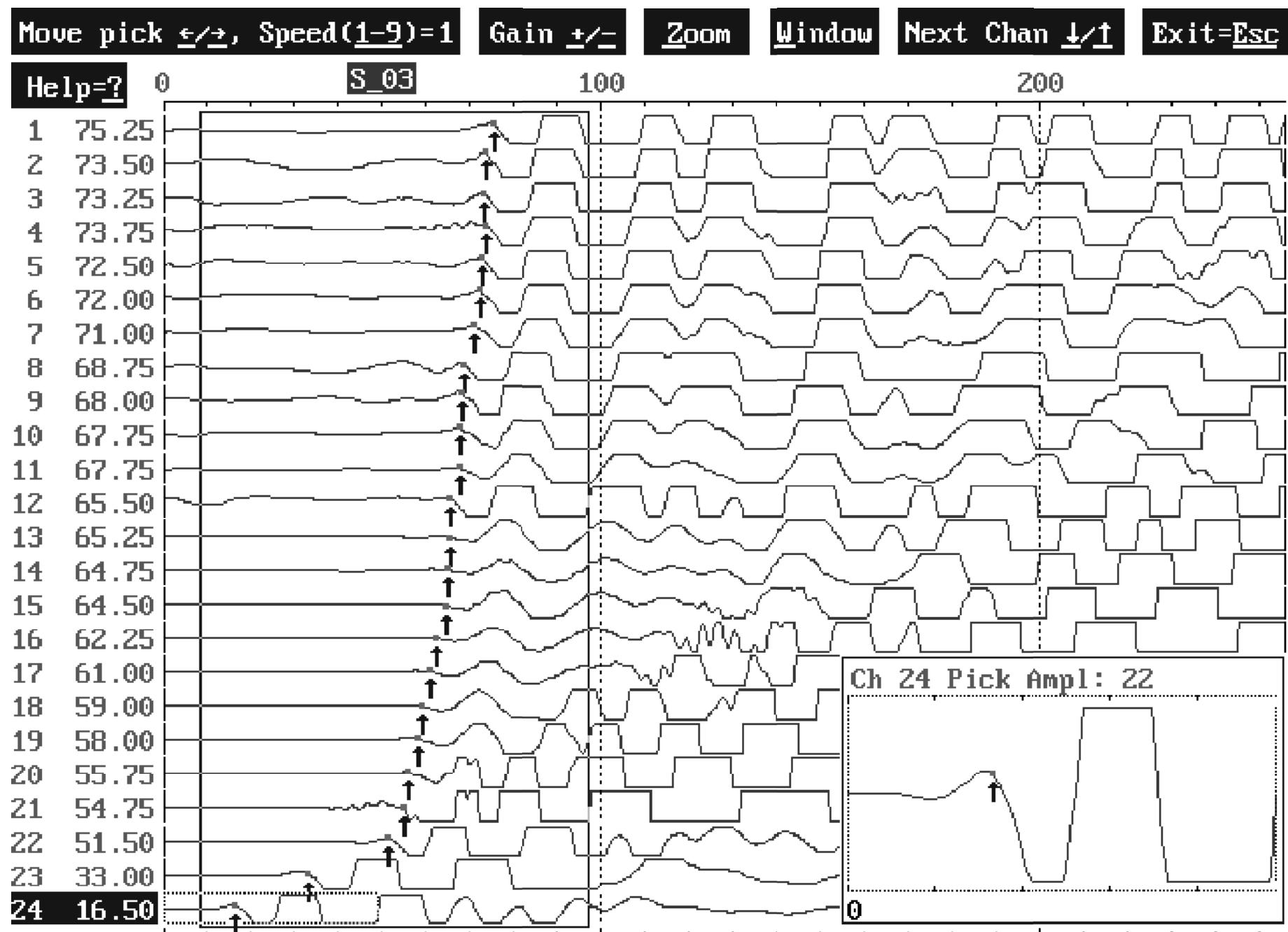
BRANSMIN.SIP: Brandstrom Rd S-Waves MinDepth Plot

Spread A



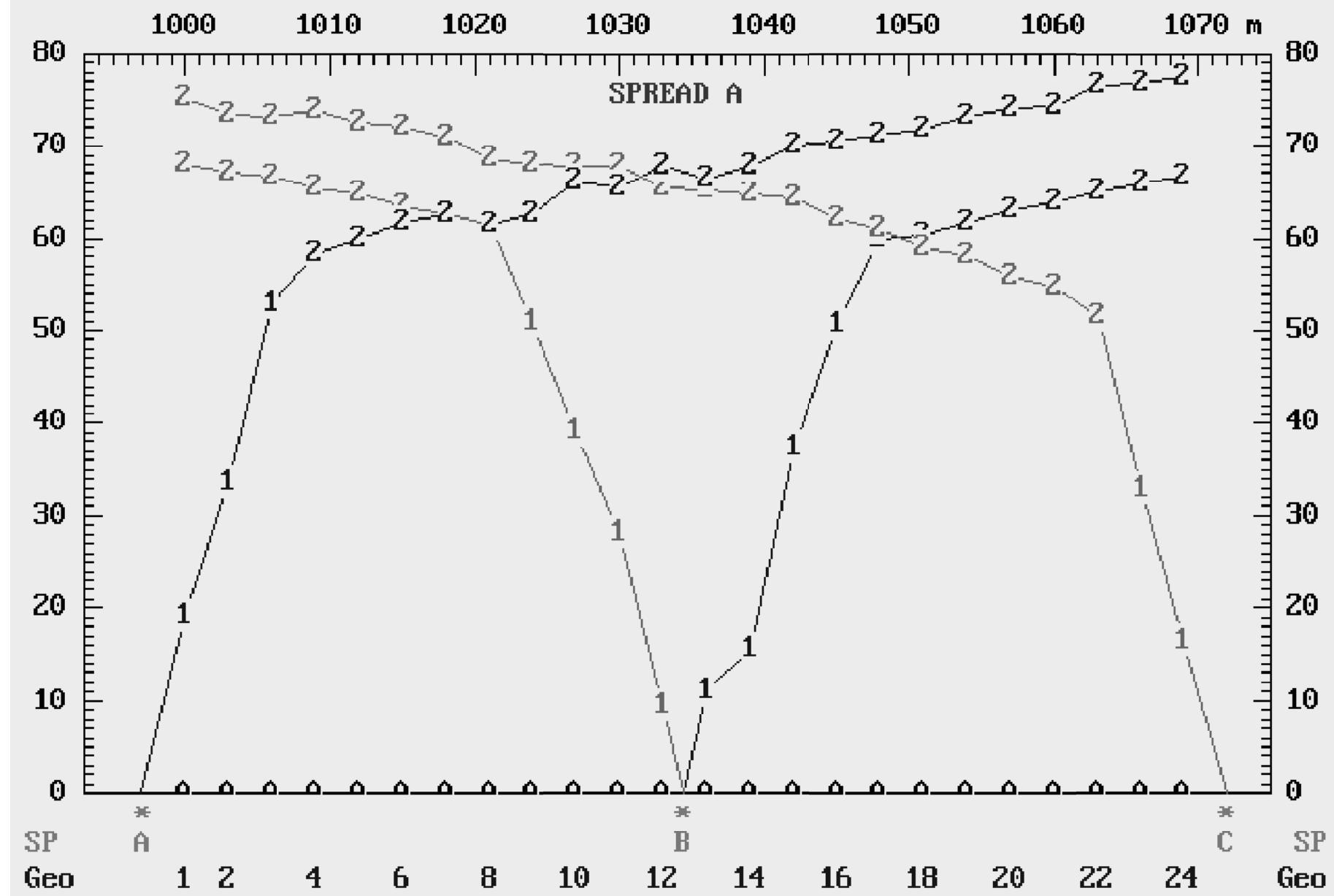
Brown Road S-wave

Brown Road S-wave

Brown Road S-wave

Brown Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

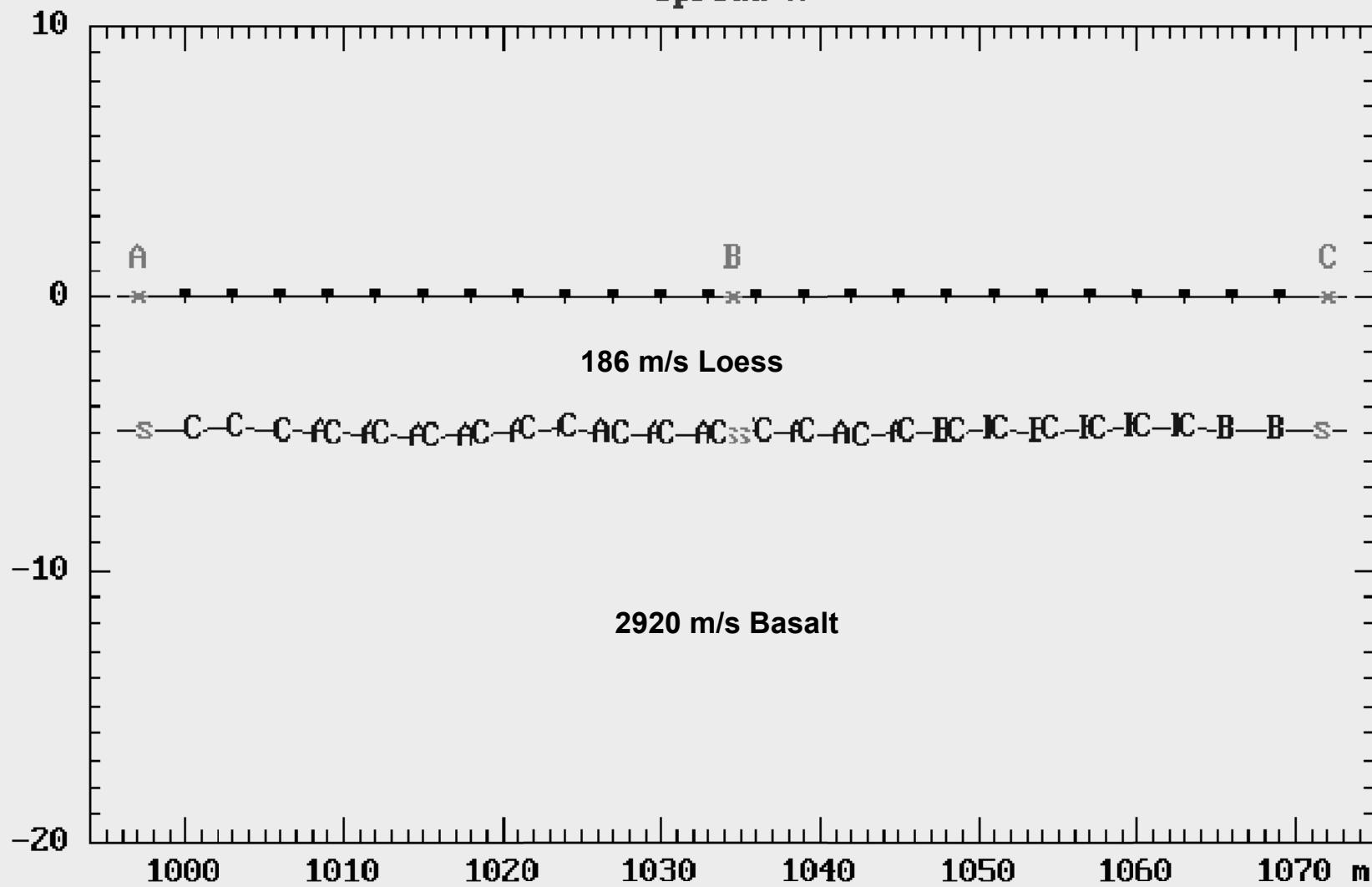


Brown Road S-wave

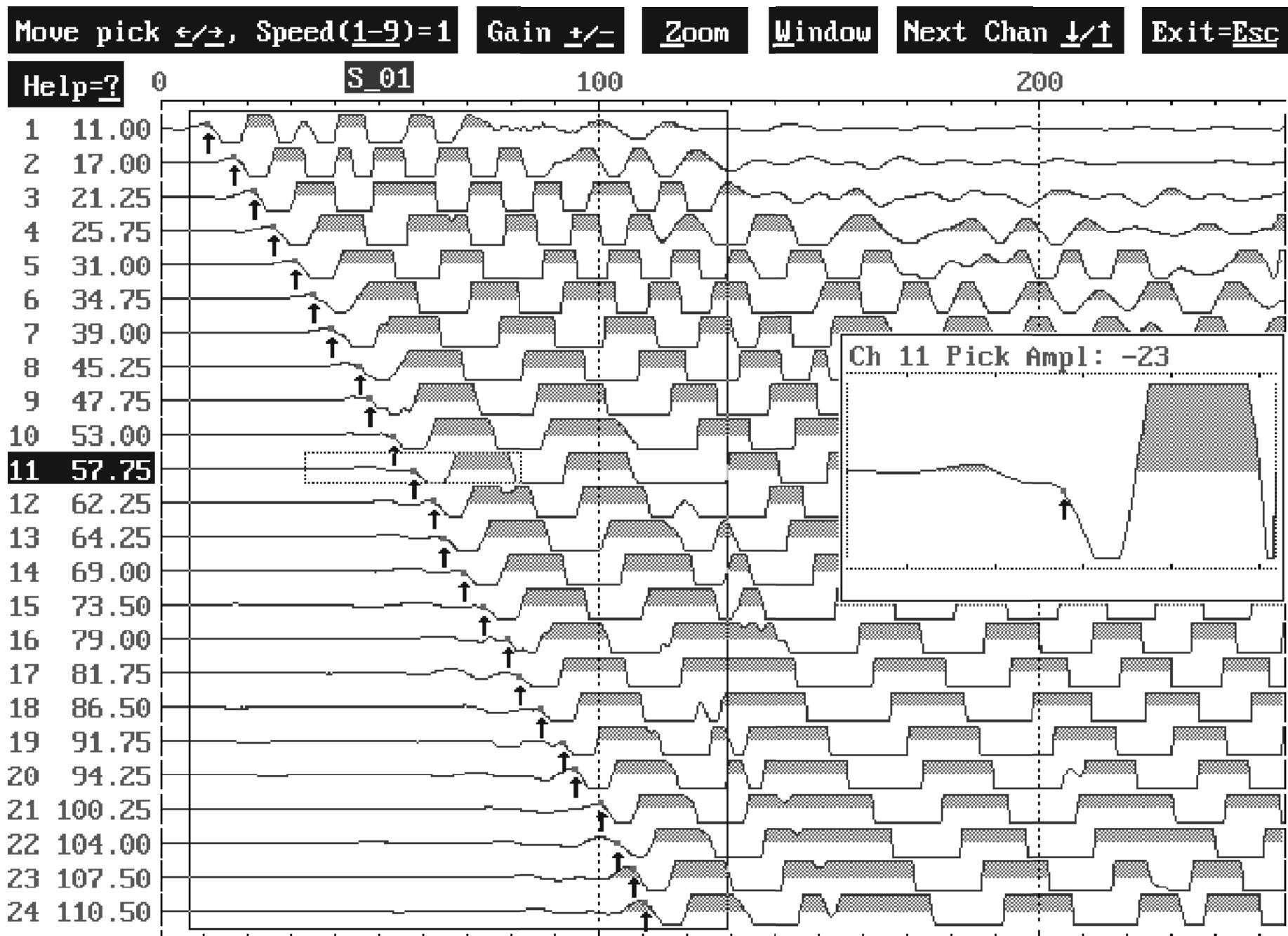
Press Esc to EXIT

BROWN_SW.SIP: Brown Road S wave Survey

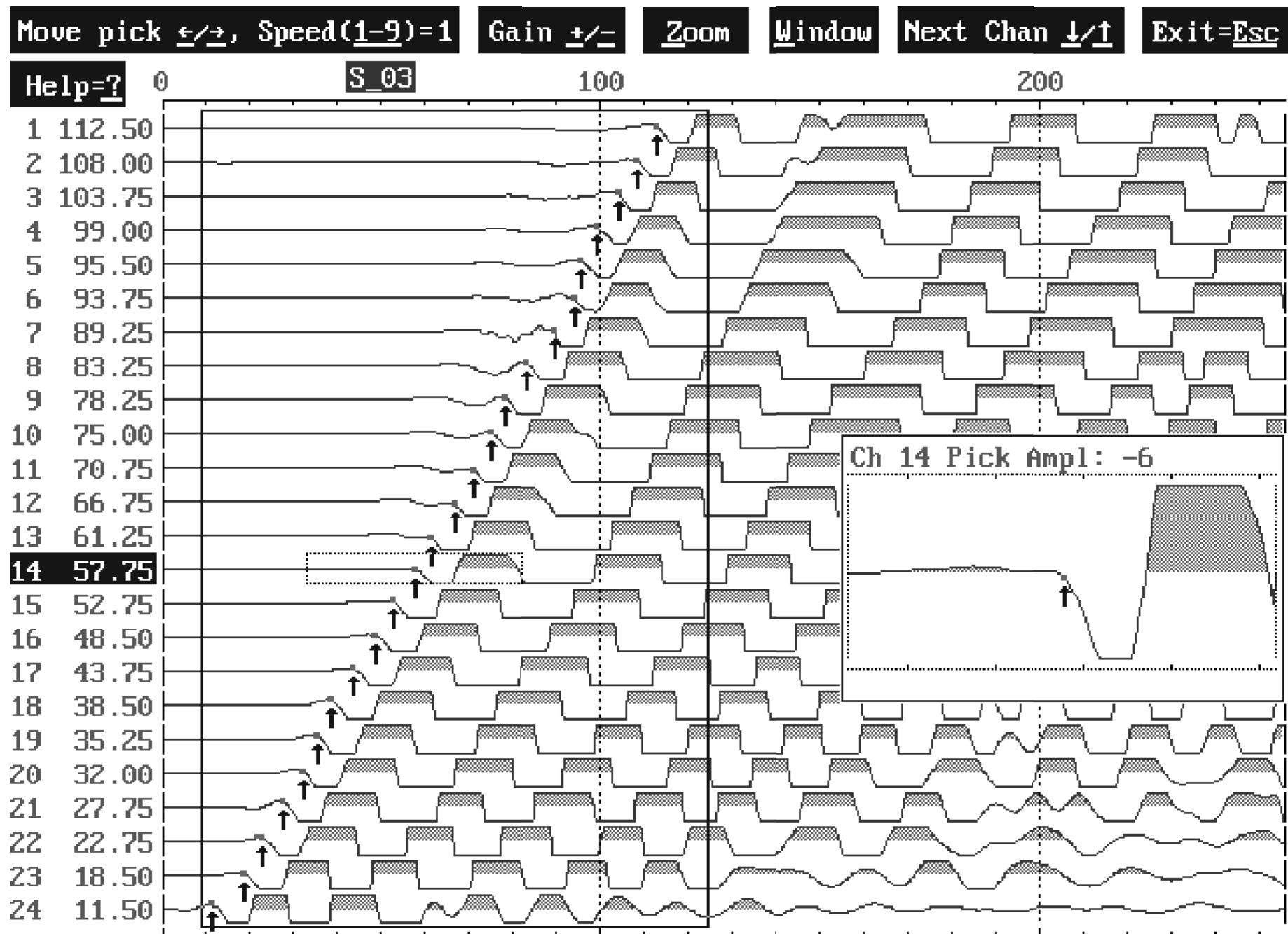
Spread A



Burlingame Canyon S-wave

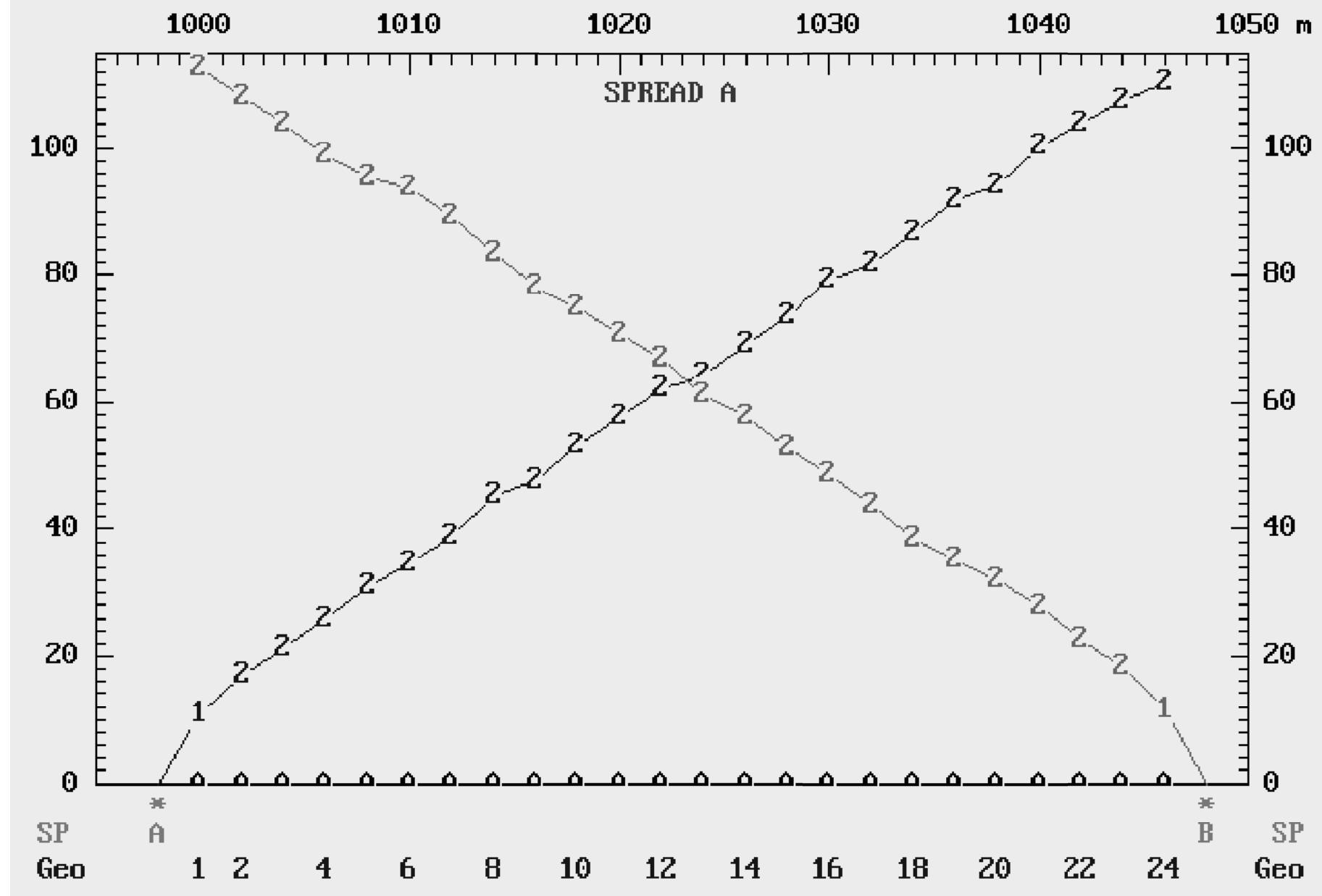


Burlingame Canyon S-wave



Burlingame Canyon S-wave

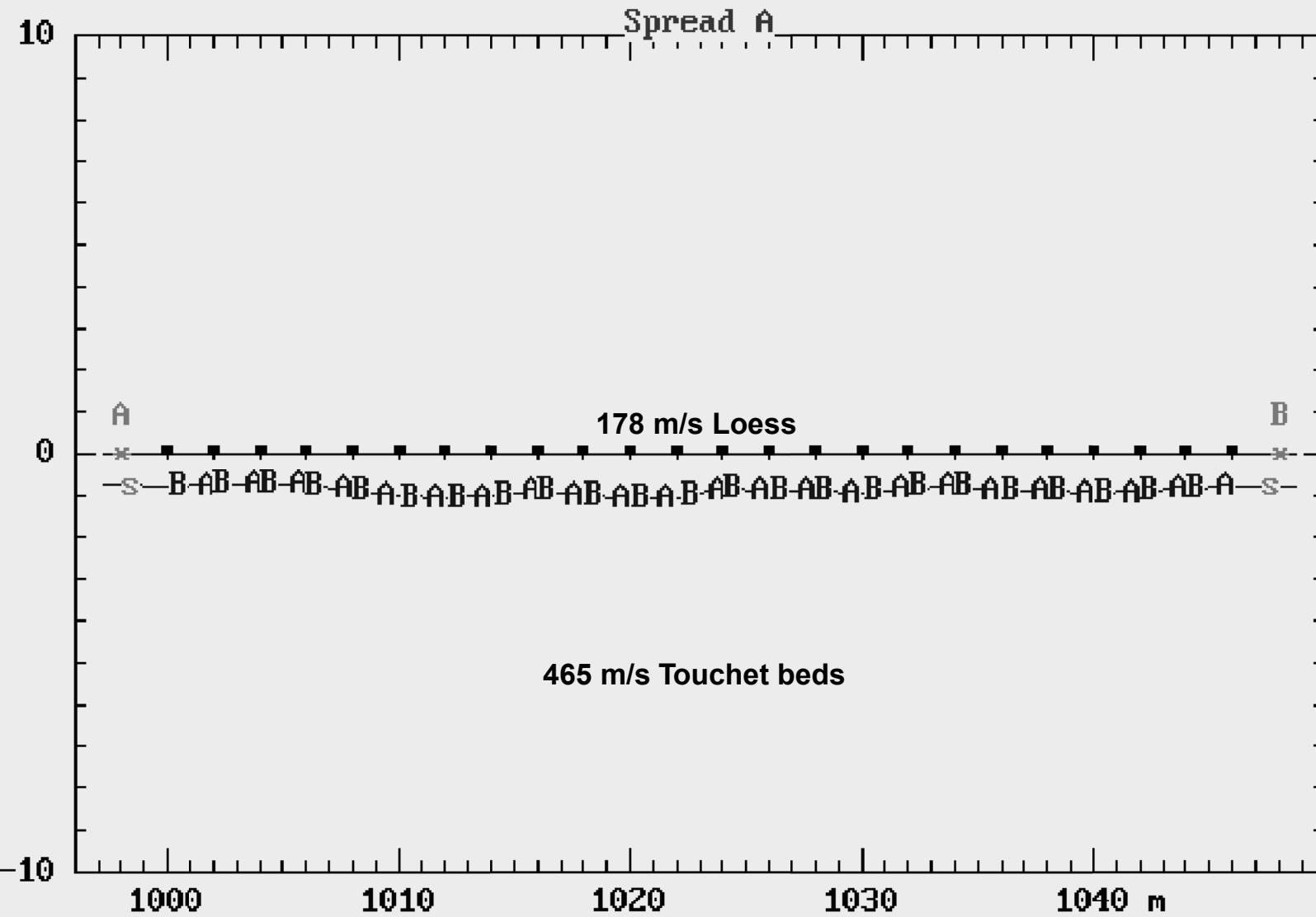
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Burlingame Canyon S-wave

Press Esc to EXIT

BURL_SW1.SIP: Burlingame Canyon Shear Wave Survey

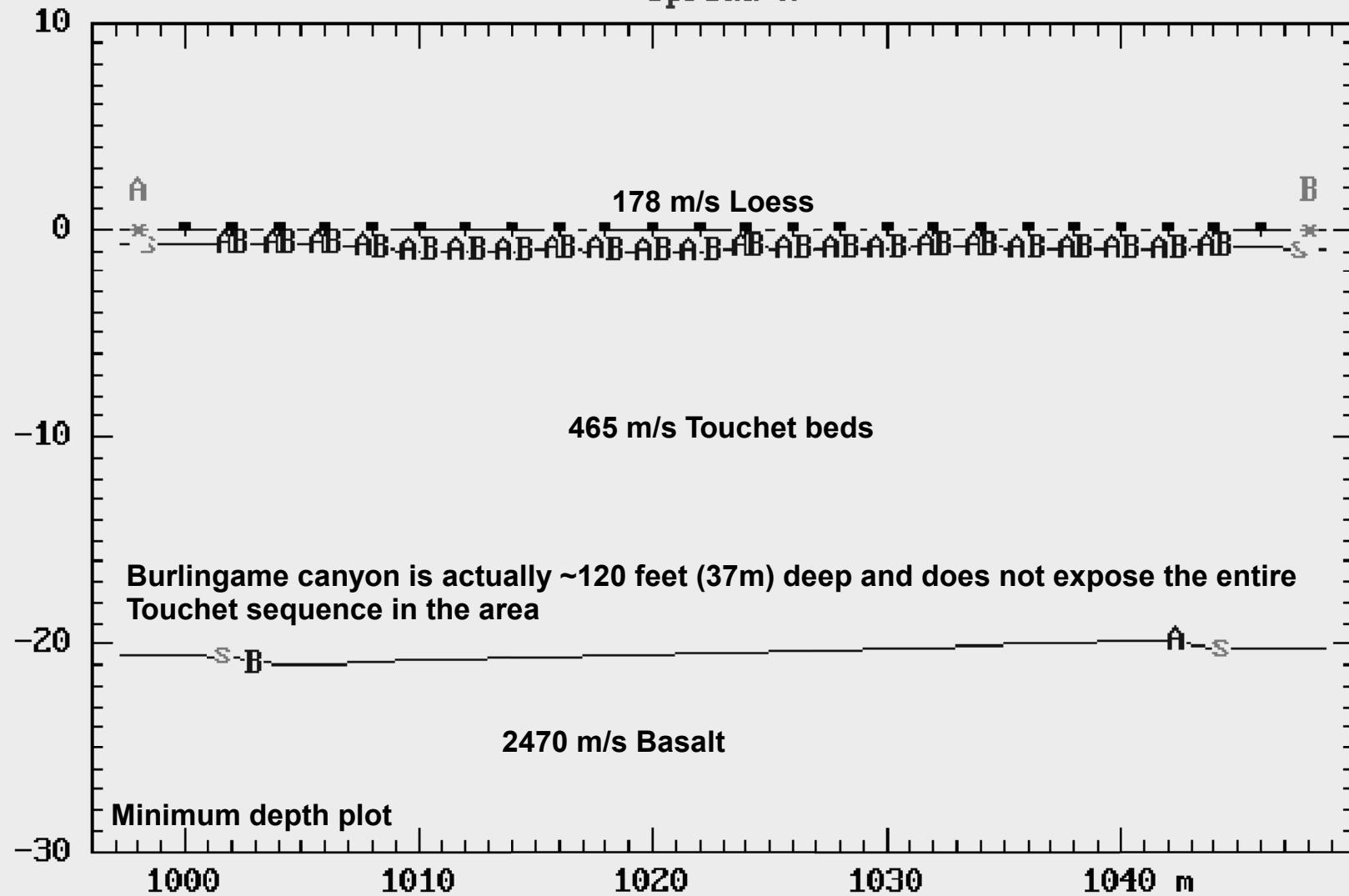


Burlingame Canyon S-wave

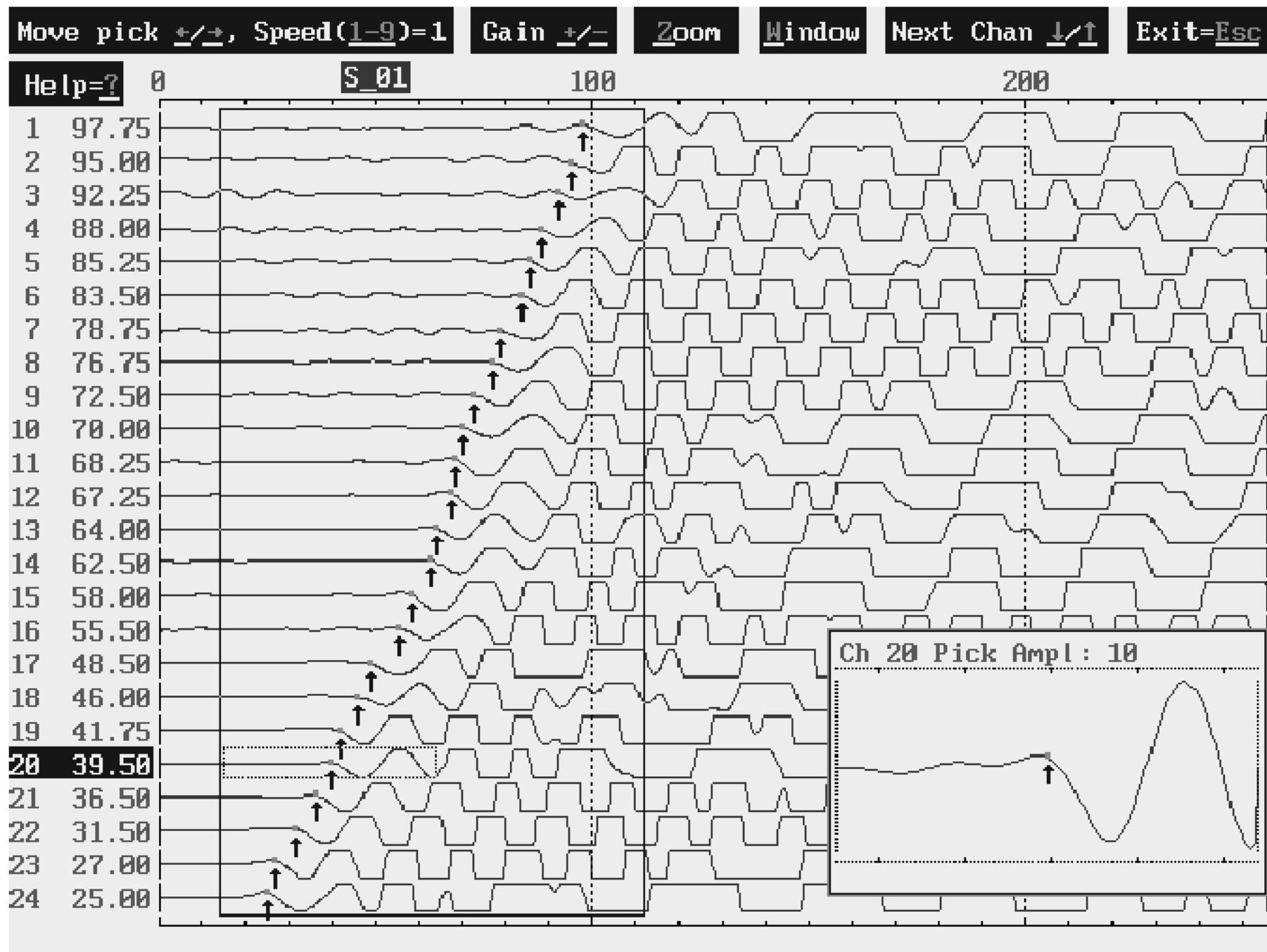
Press Esc to EXIT

BURL_SW2.SIP: Burlingame Canyon Shear Wave Survey

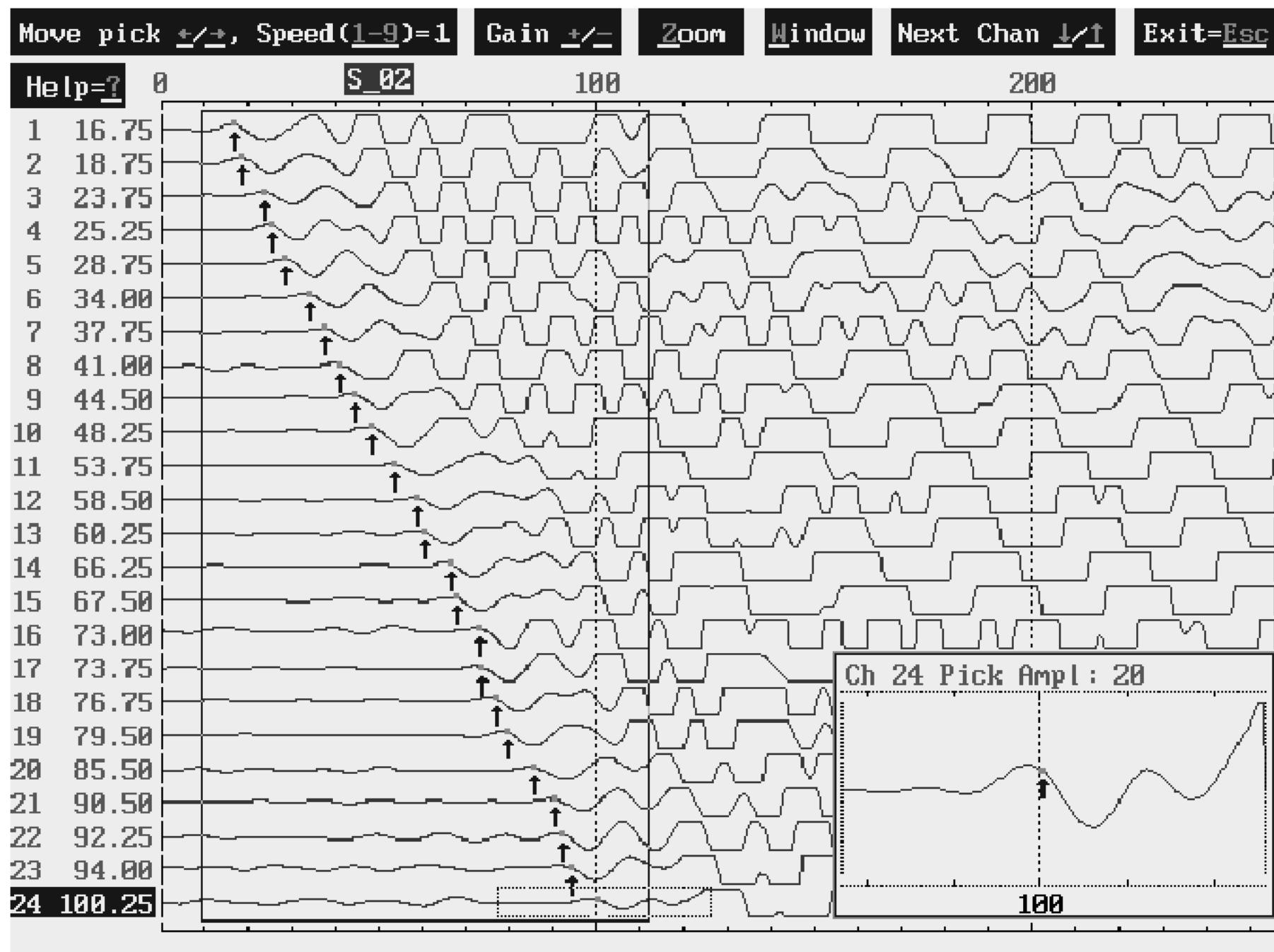
Spread A



Cariker Farm S-wave

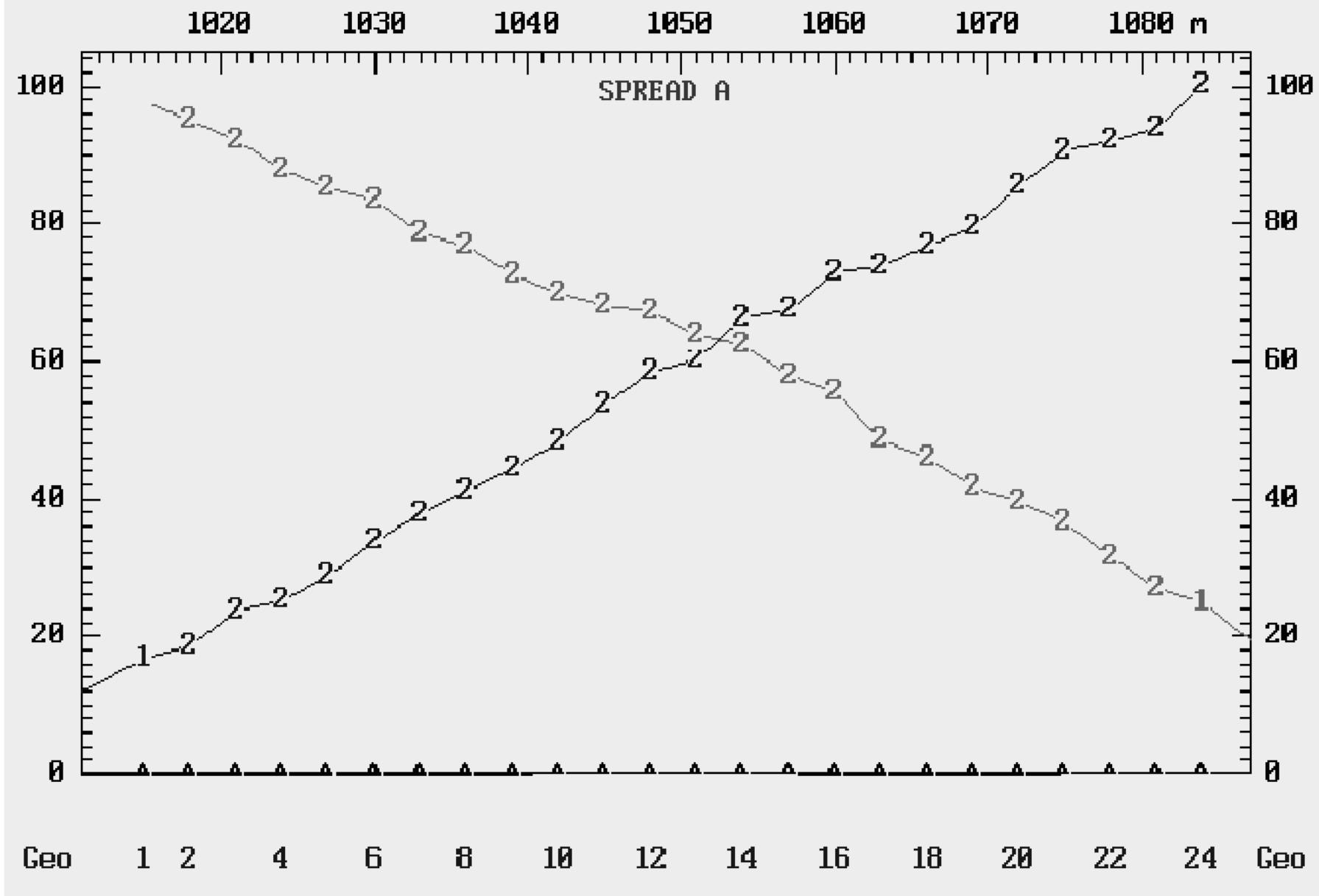


Cariker Farm S-wave



Cariker Farm S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

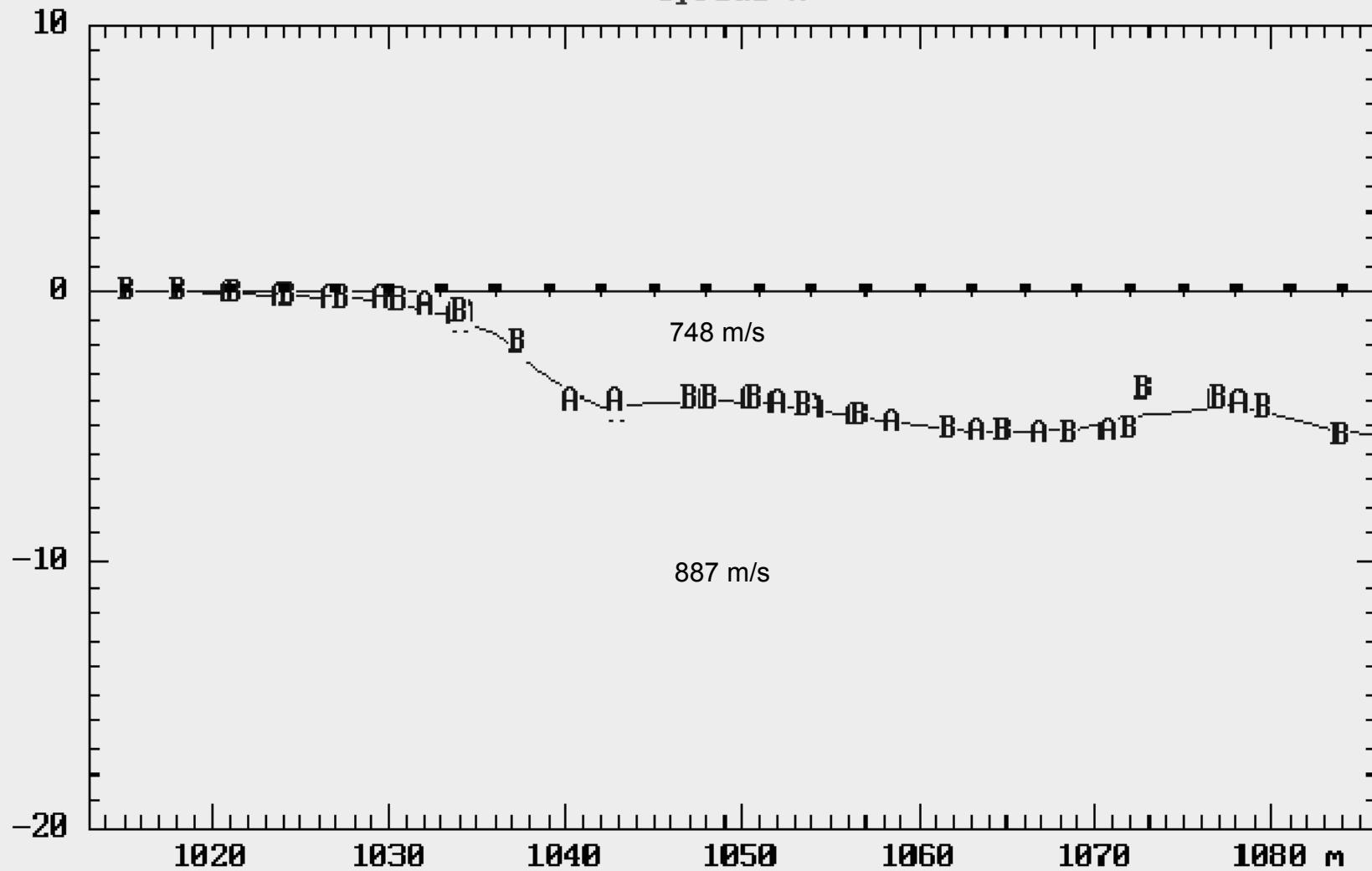


Cariker Farm S-wave

Press Esc to EXIT

CARISWA3.SIP : Cariker Farm S-Waves

Spread A

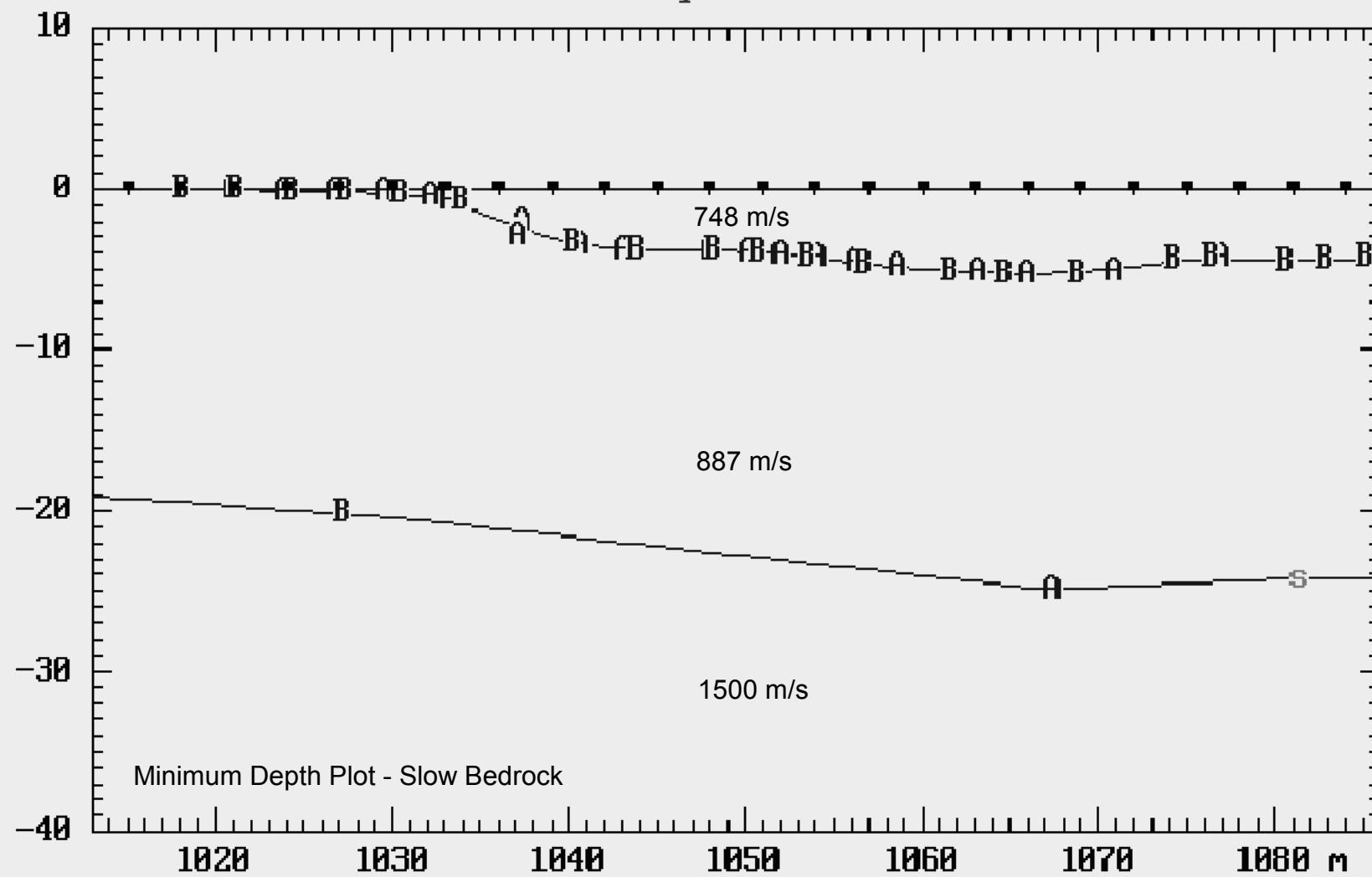


Cariker Farm S-wave

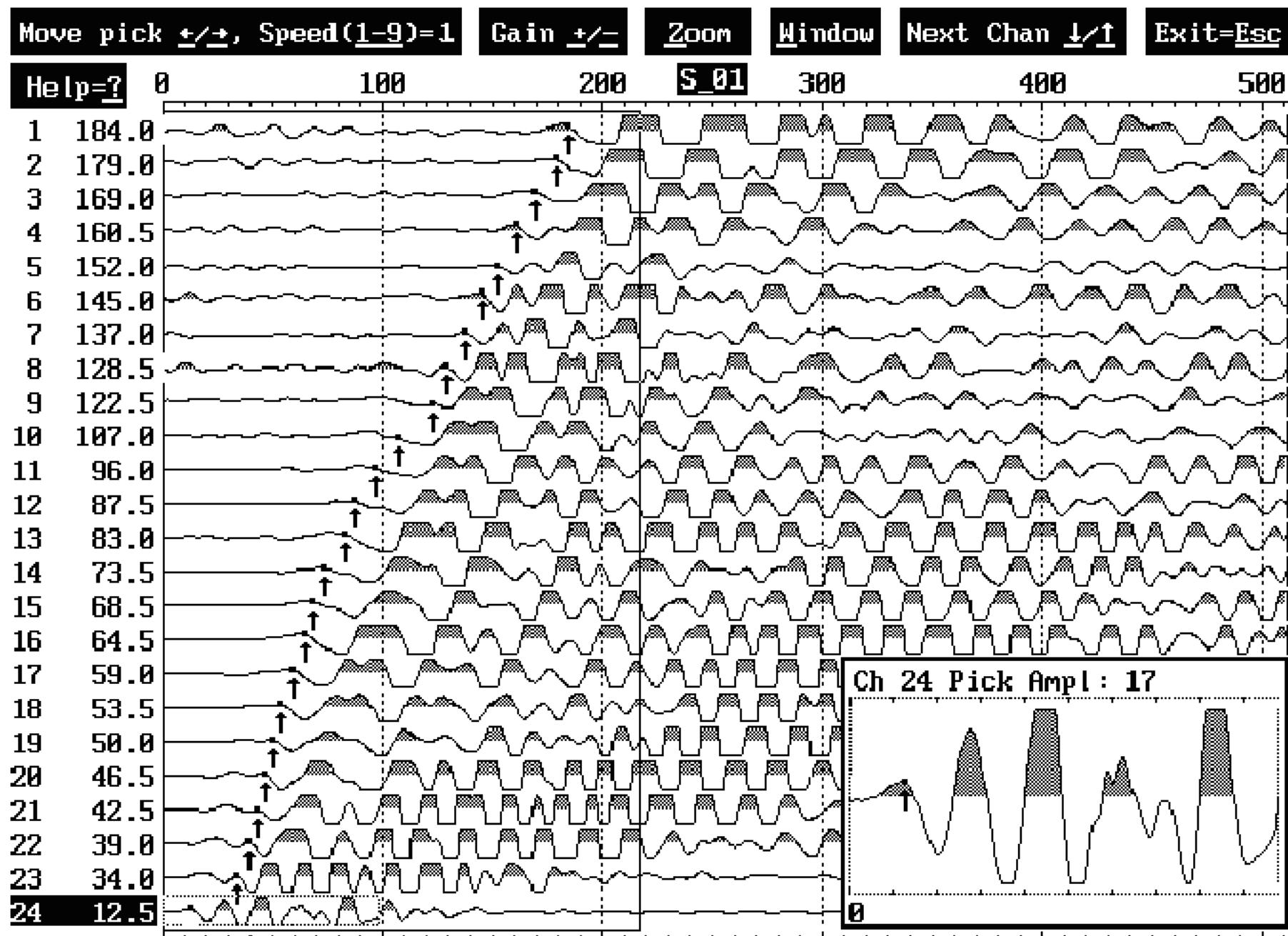
Press Esc to EXIT

CARISMIN.SIP: Cariker Farm S-Wave Minimum Depth Plot

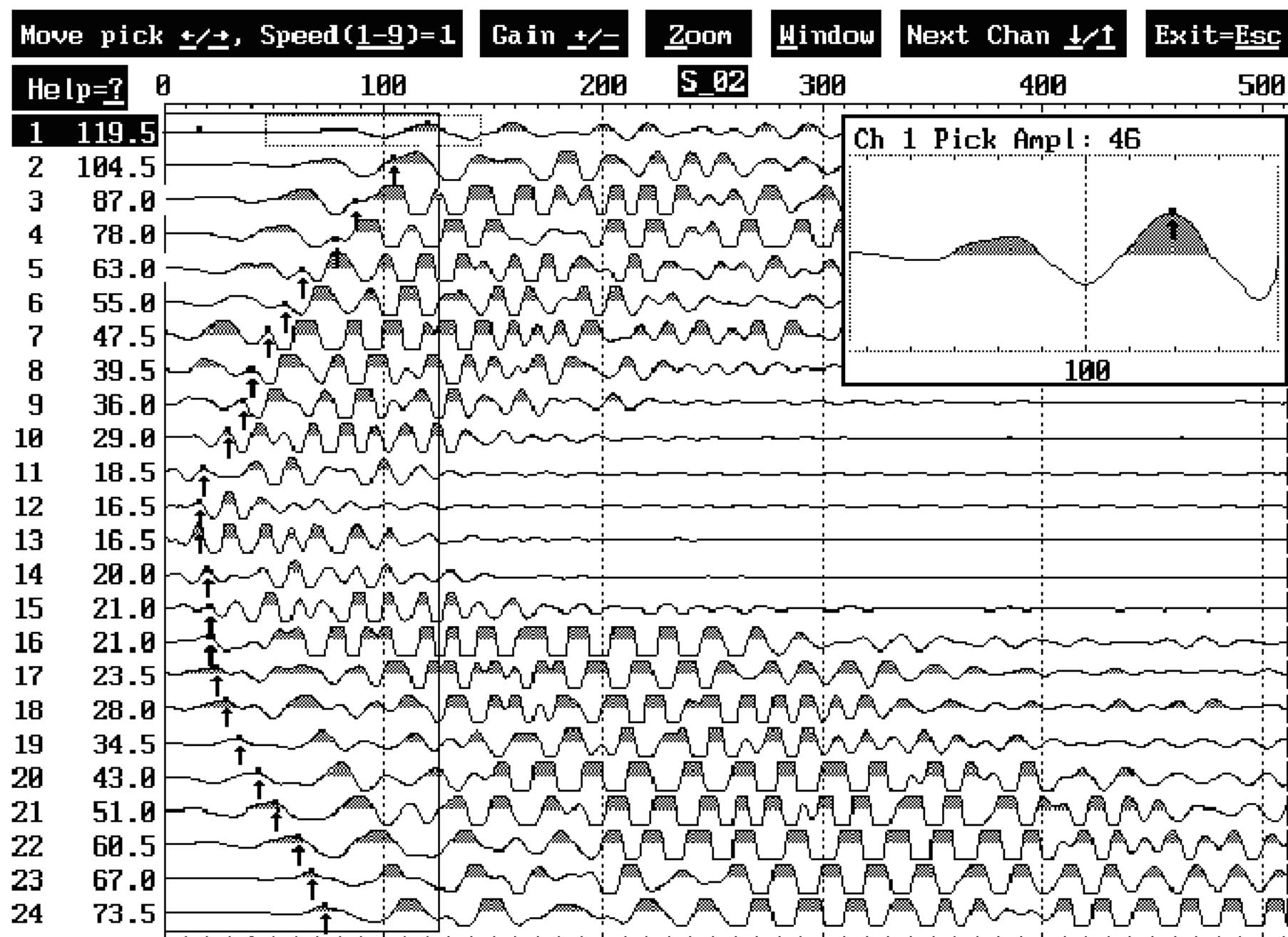
Spread A



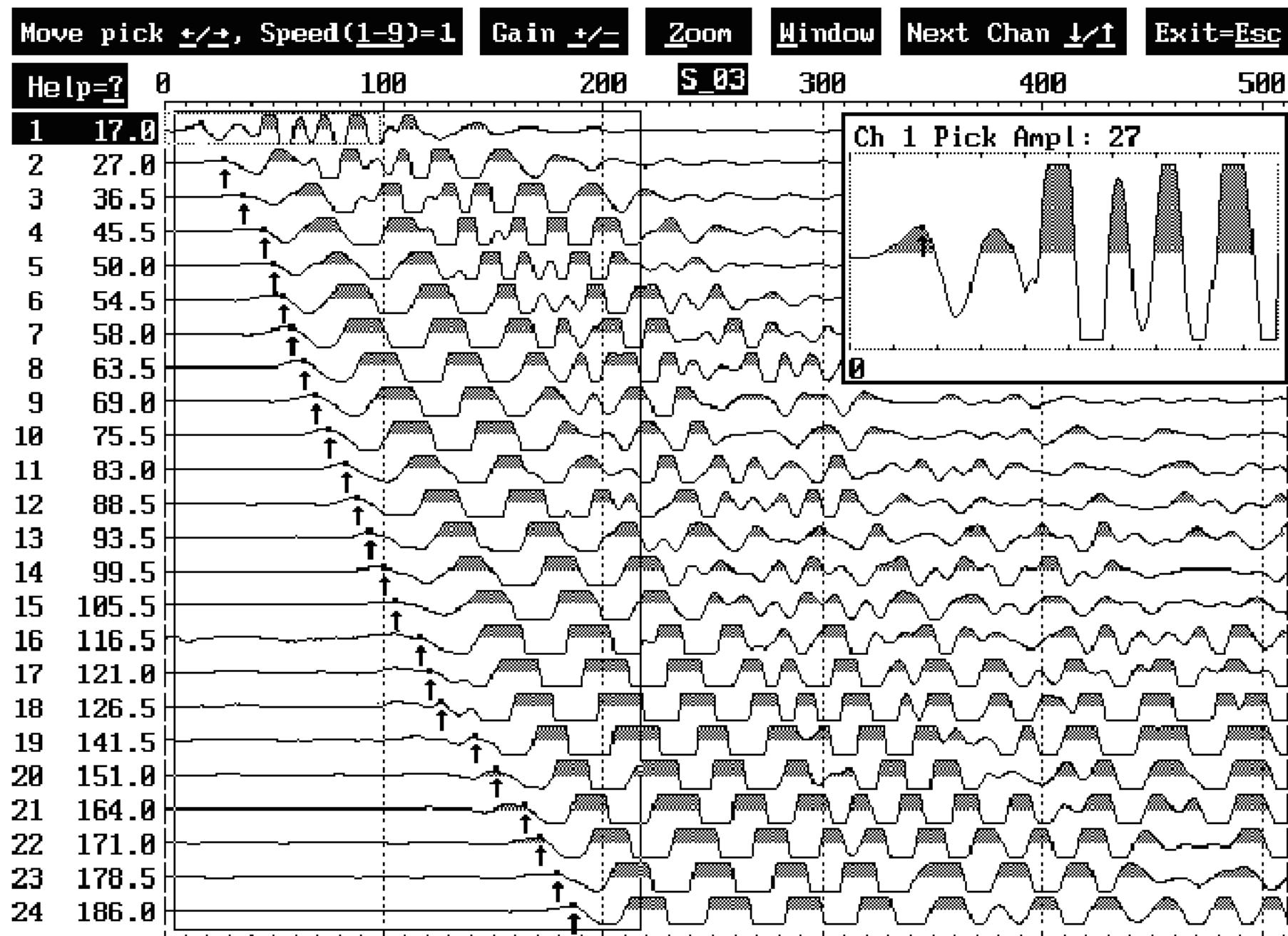
Carleton Farm S-wave



Carleton Farm S-wave

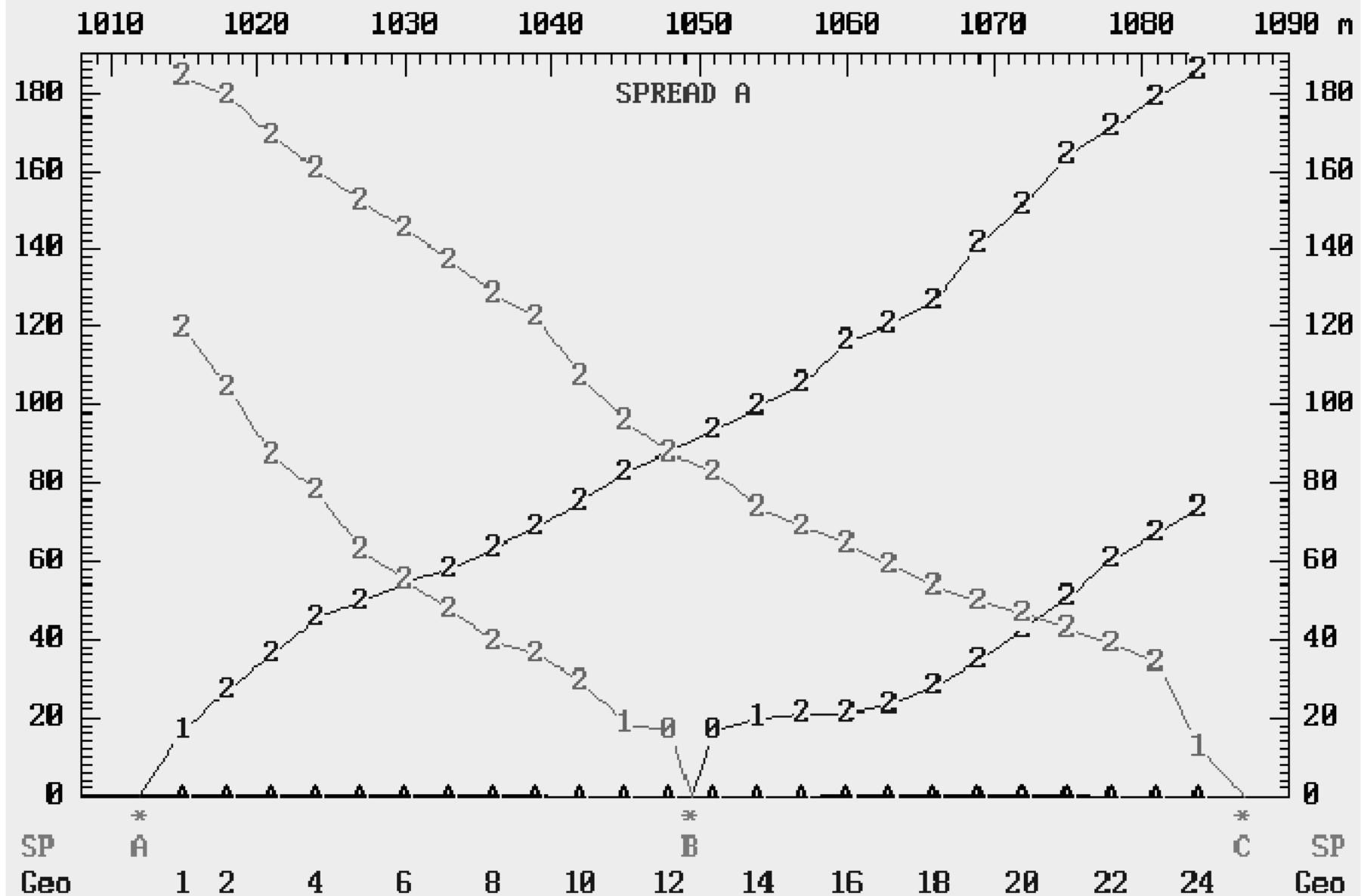


Carleton Farm S-wave



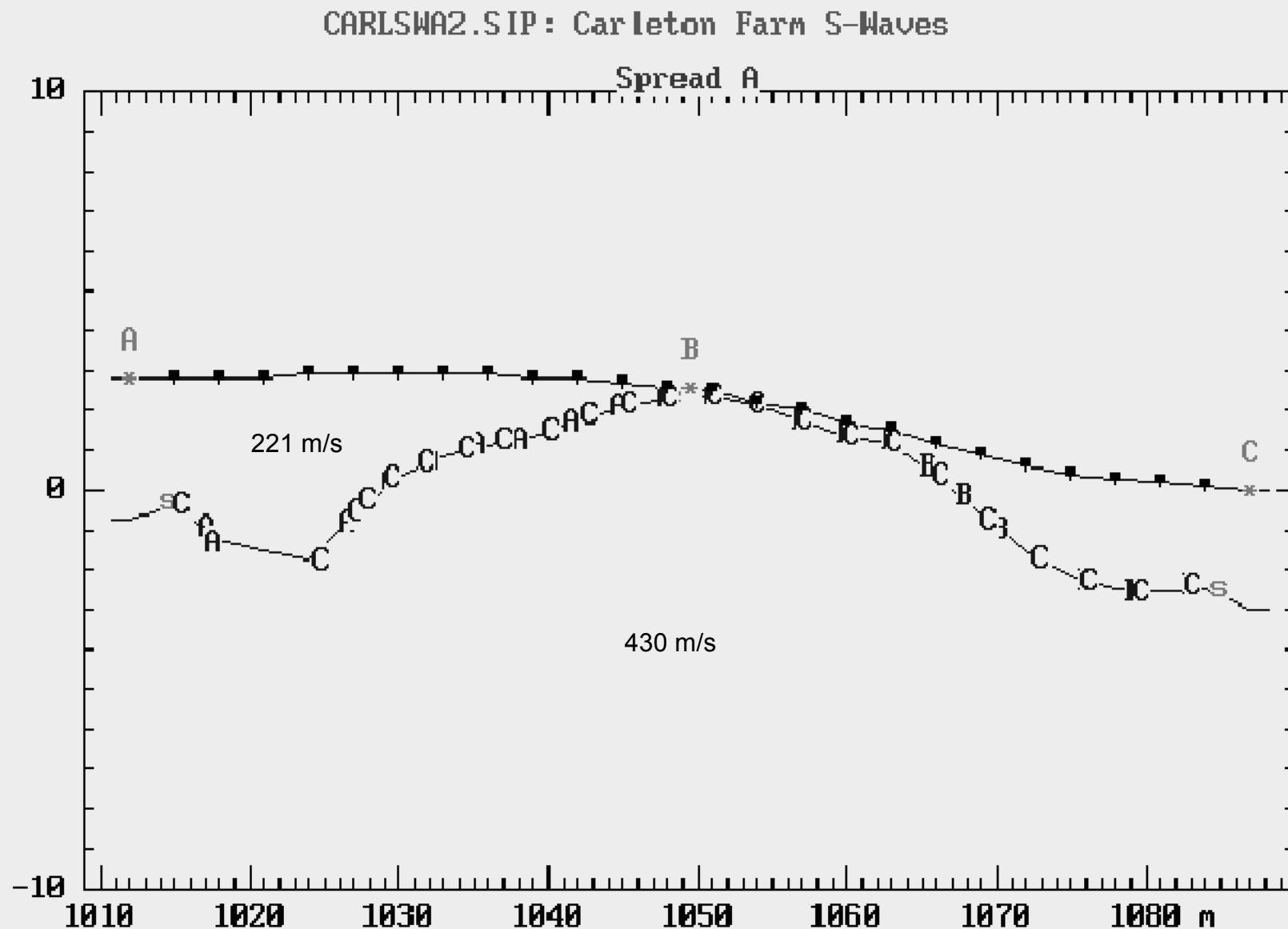
Carleton Farm S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Carleton Farm S-wave

Press Esc to EXIT

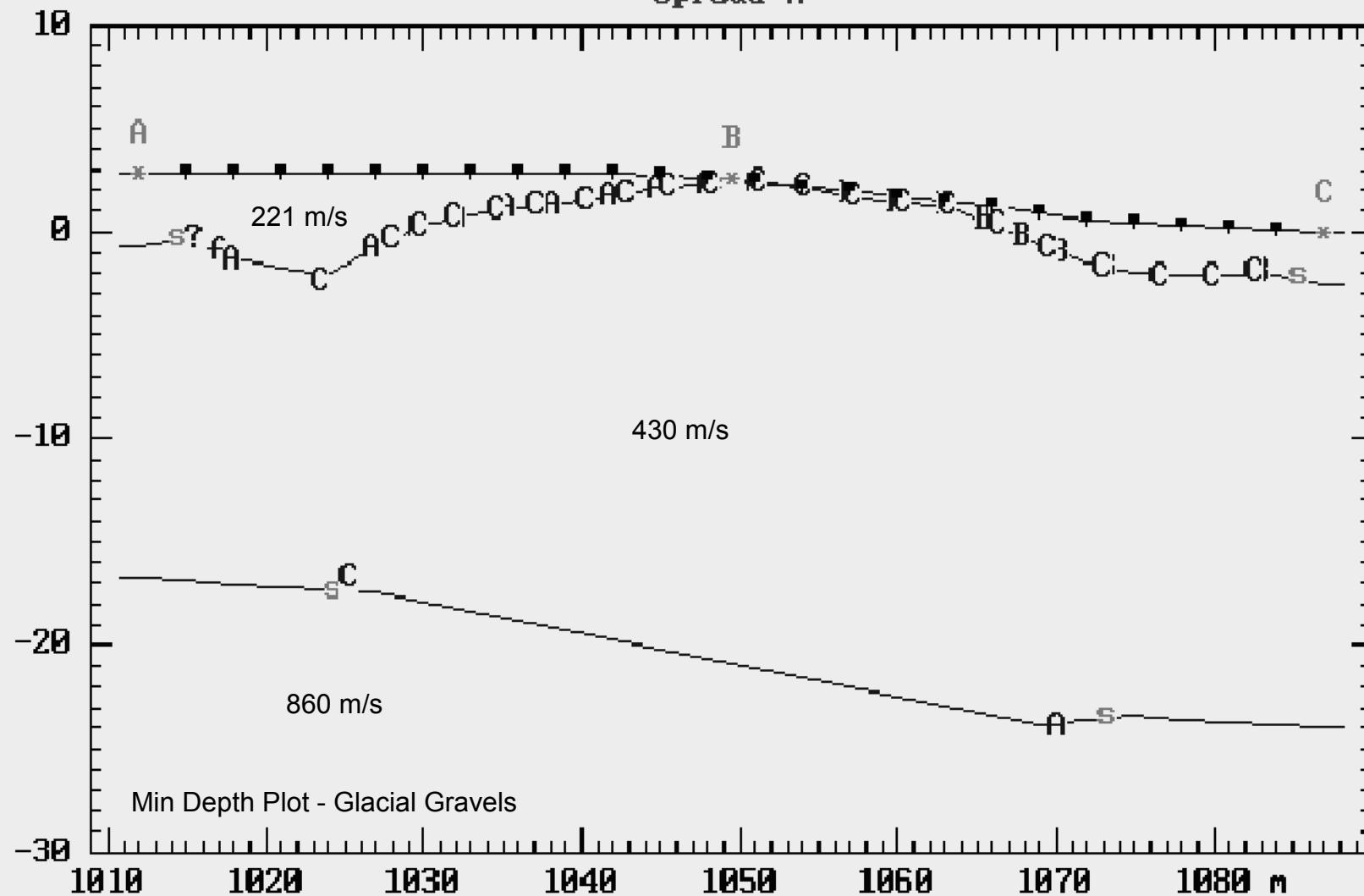


Carleton Farm S-wave

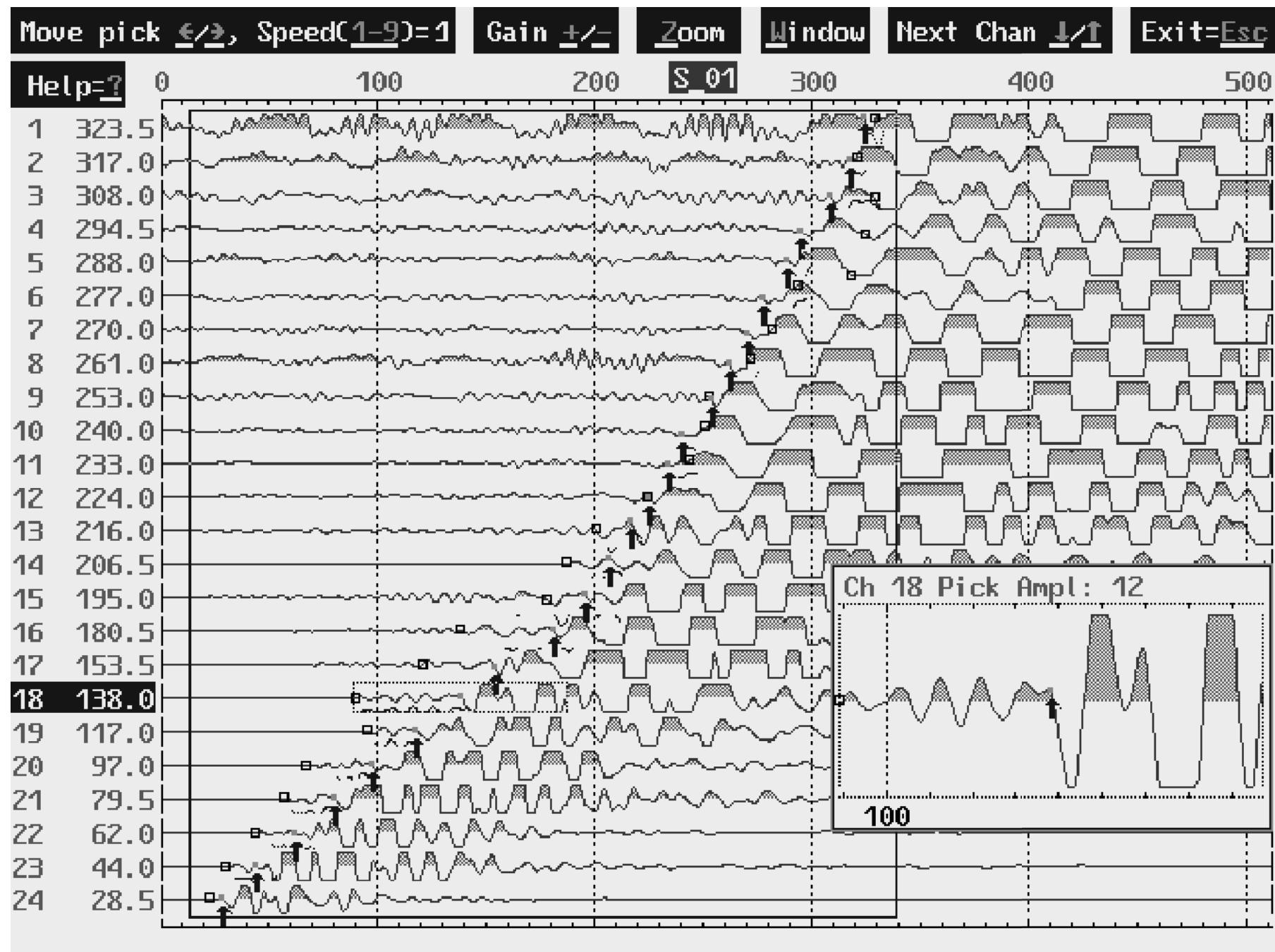
Press Esc to EXIT

CARLSMIN.SIP : Carleton Farm S-Waves Minimum Depth Plot

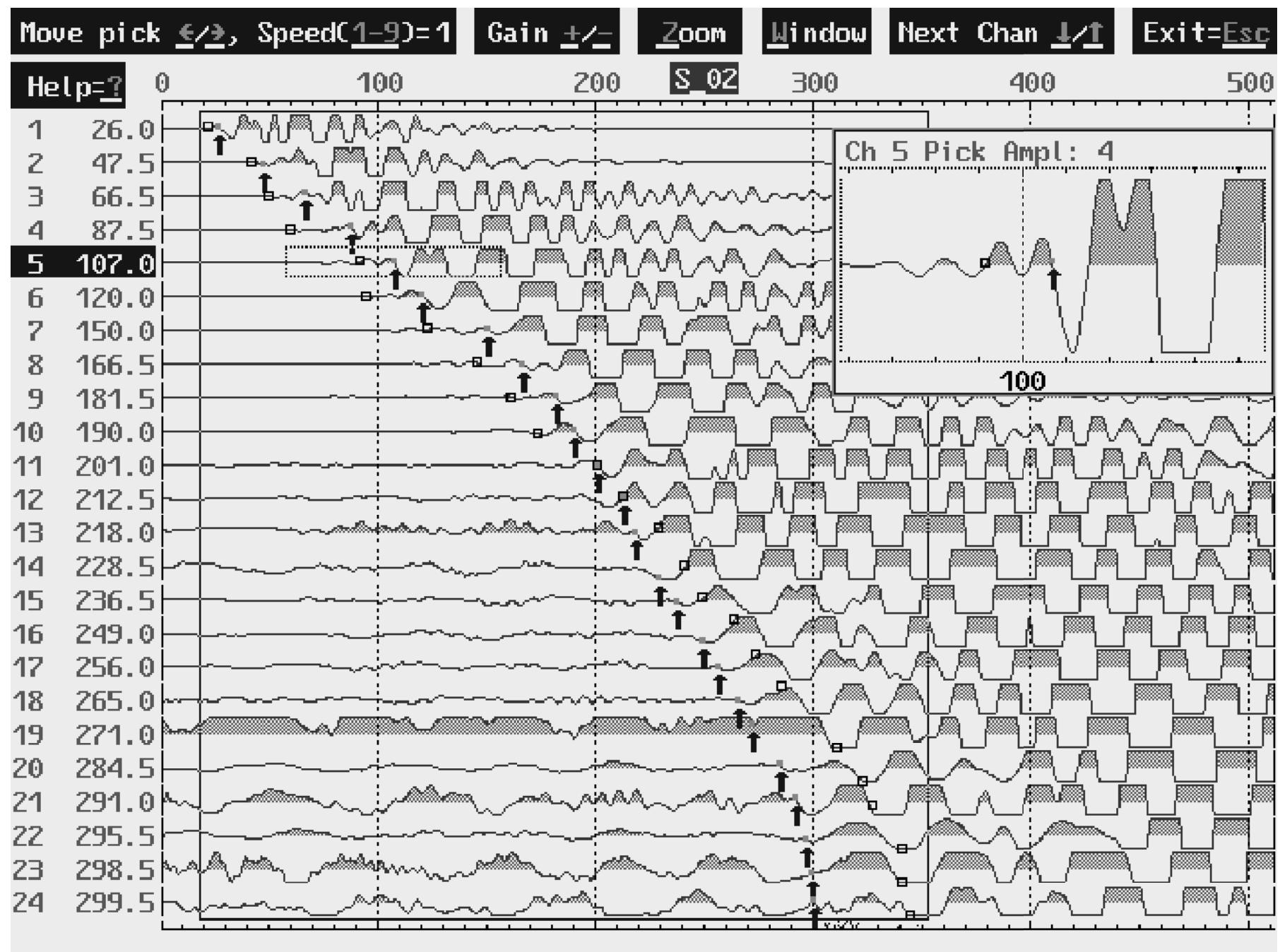
Spread A



Cascade Middle School S-wave

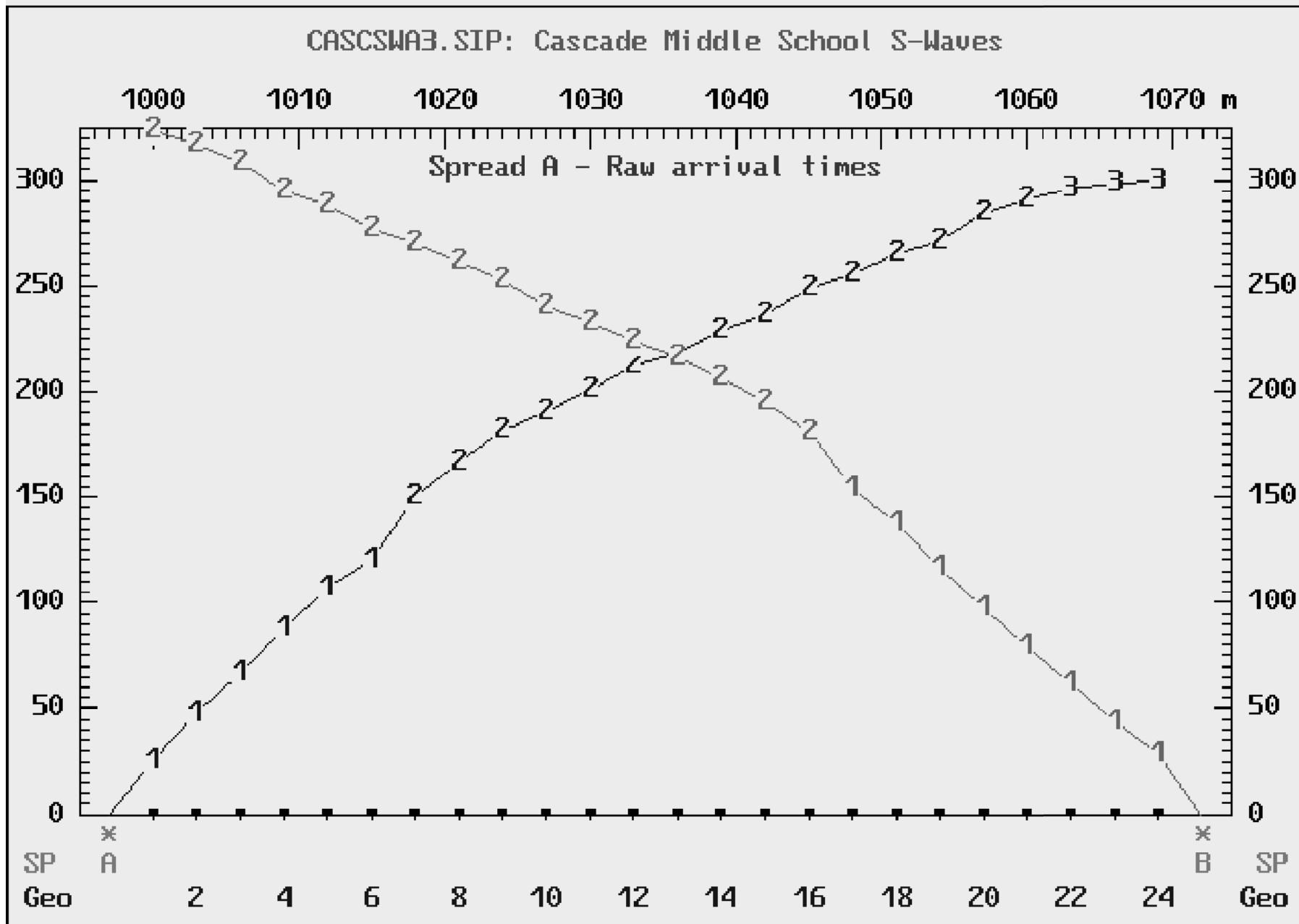


Cascade Middle School S-wave



Cascade Middle School S-wave

Press Esc to EXIT

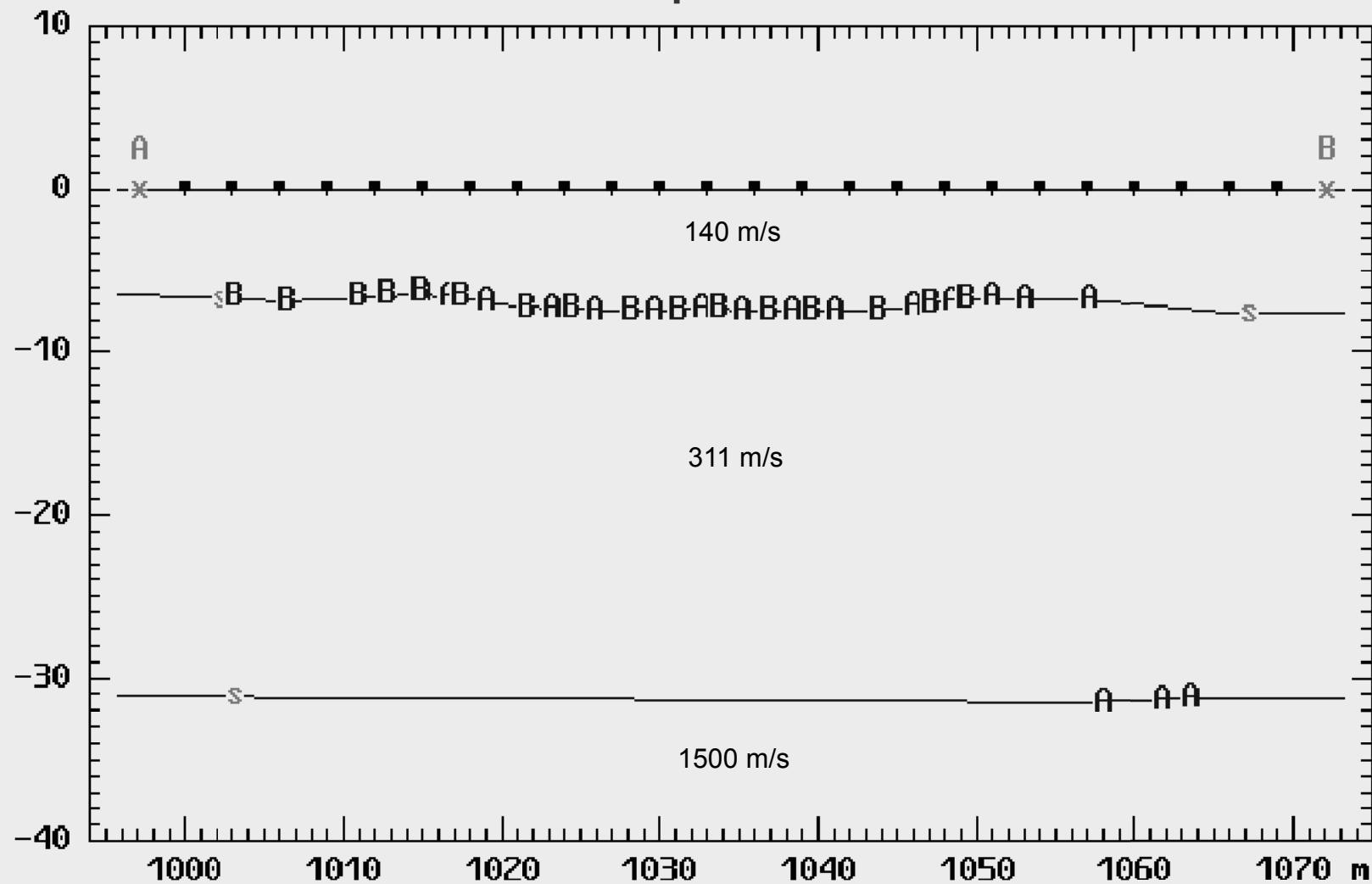


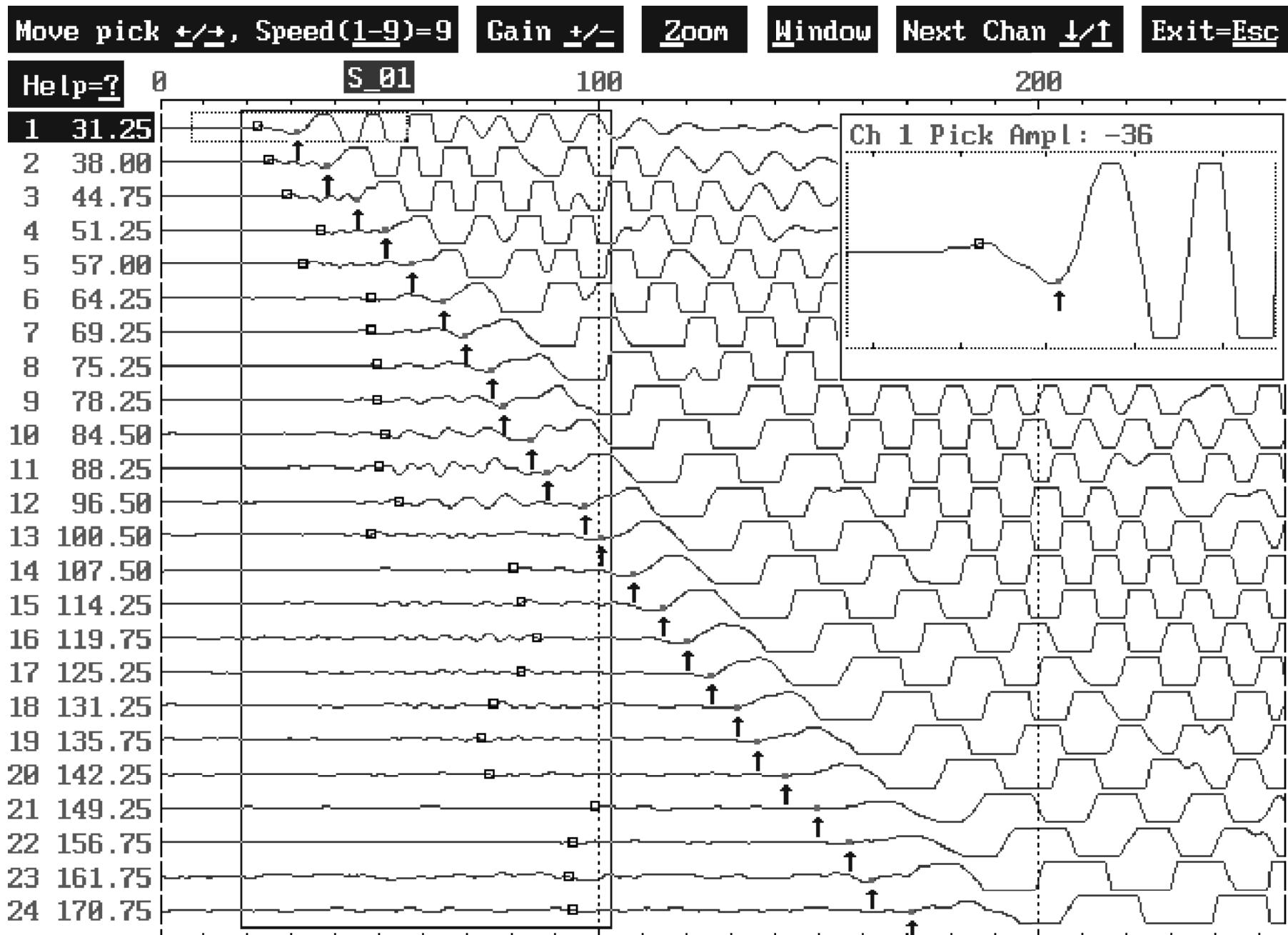
Cascade Middle School S-wave

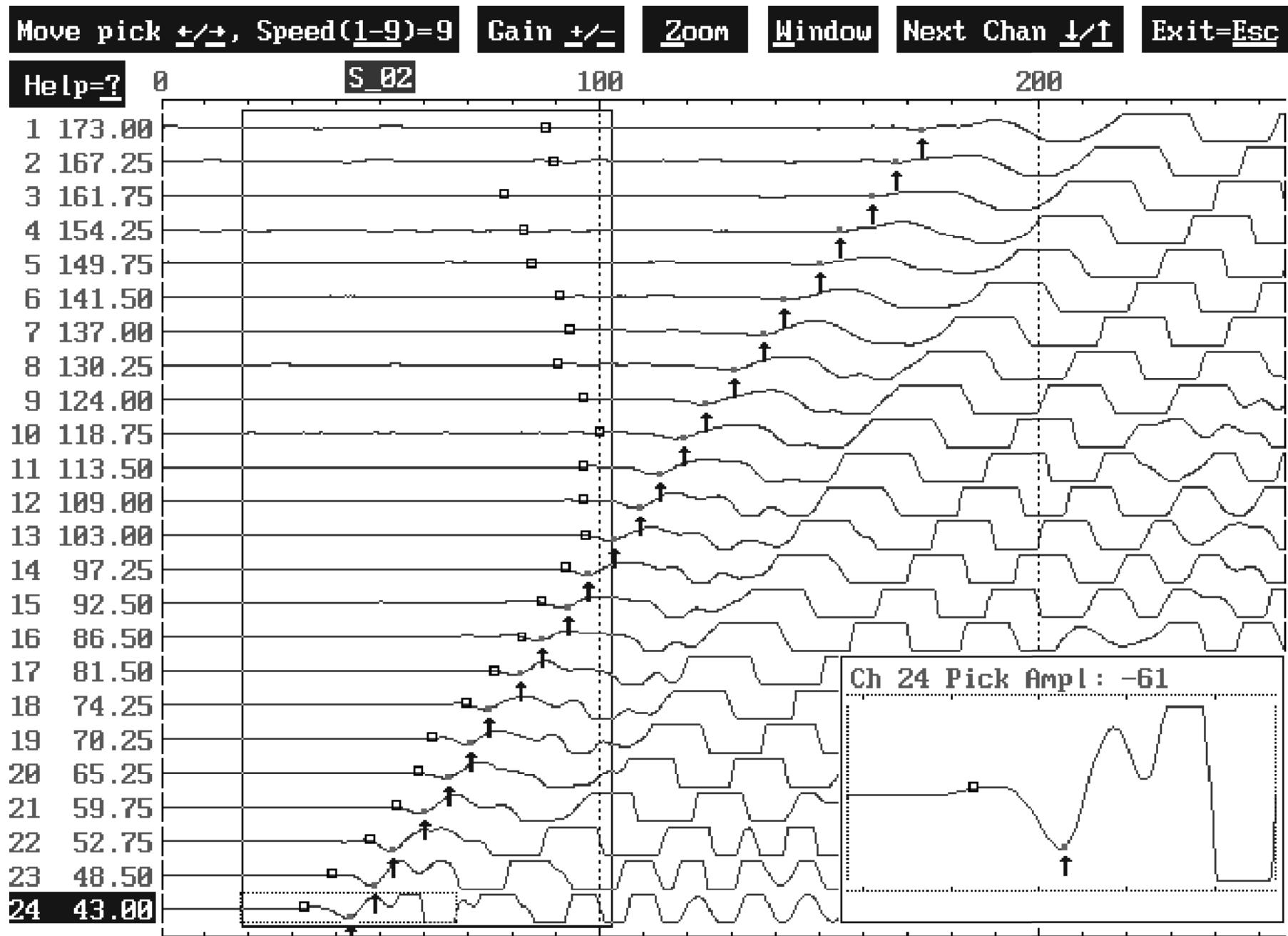
Press Esc to EXIT

CASCSWA3.SIP: Cascade Middle School S-Waves

Spread A

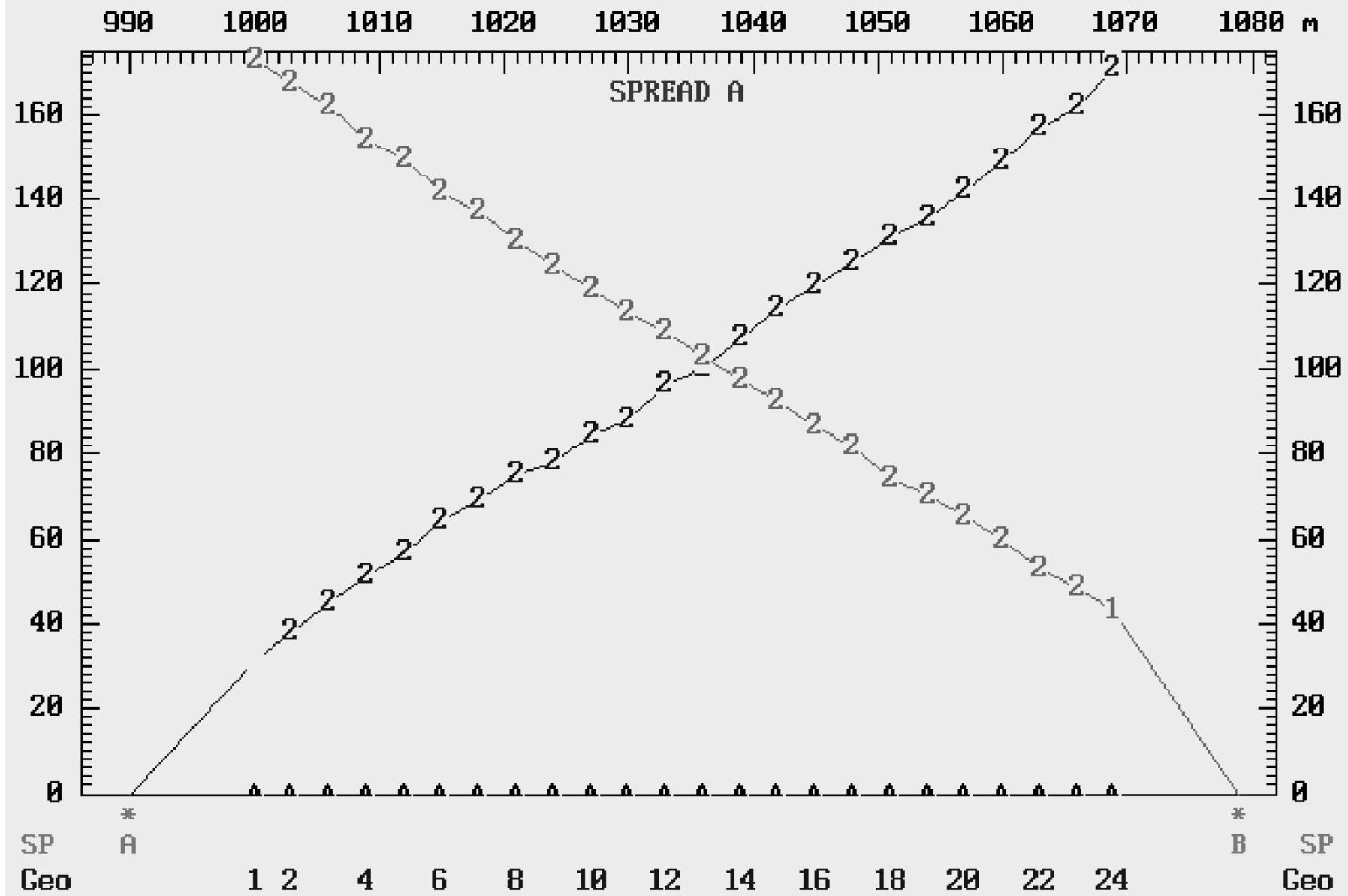


Cascade View Elementary S-wave

Cascade View Elementary S-wave

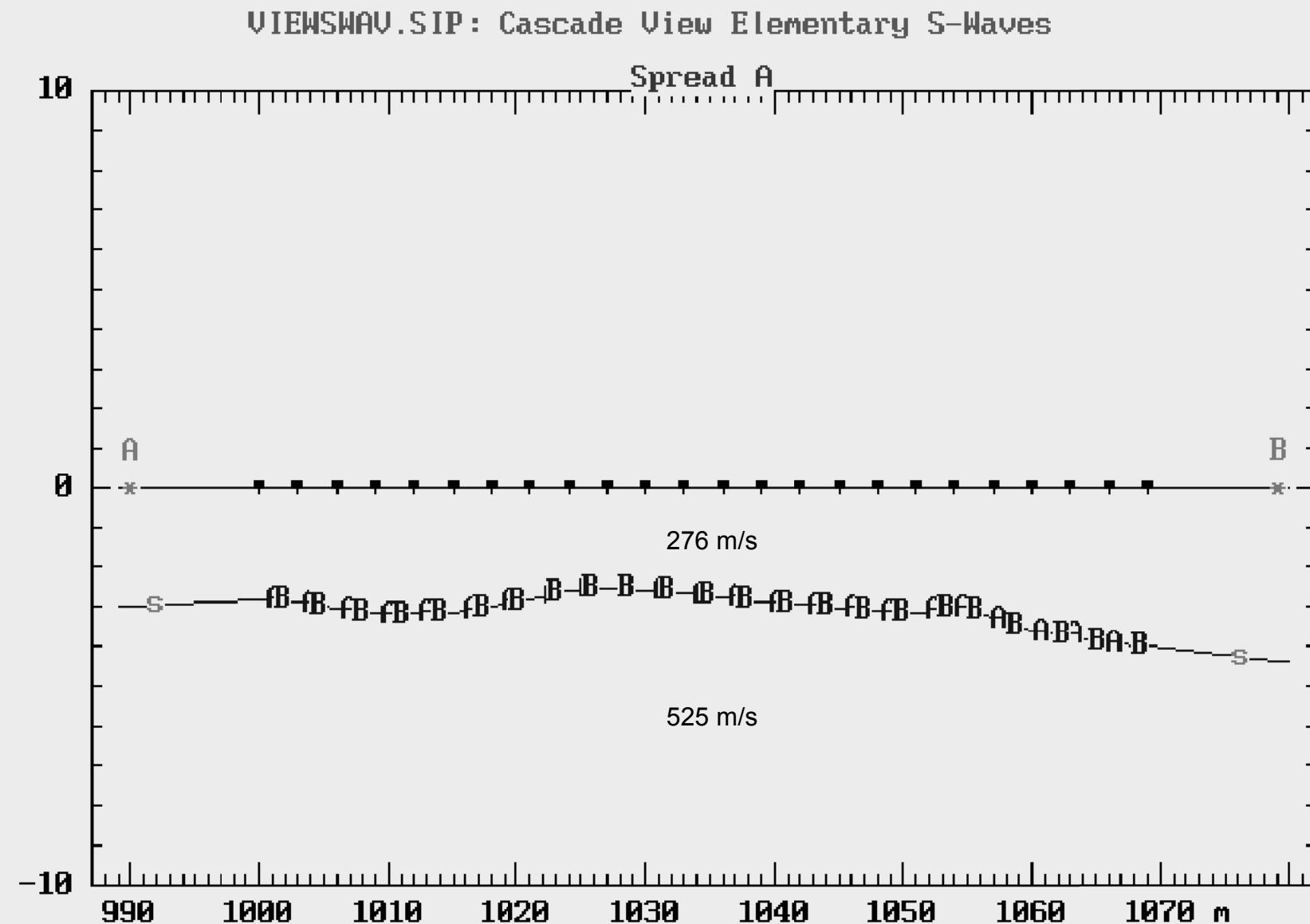
Cascade View Elementary S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Cascade View Elementary S-wave

Press Esc to EXIT

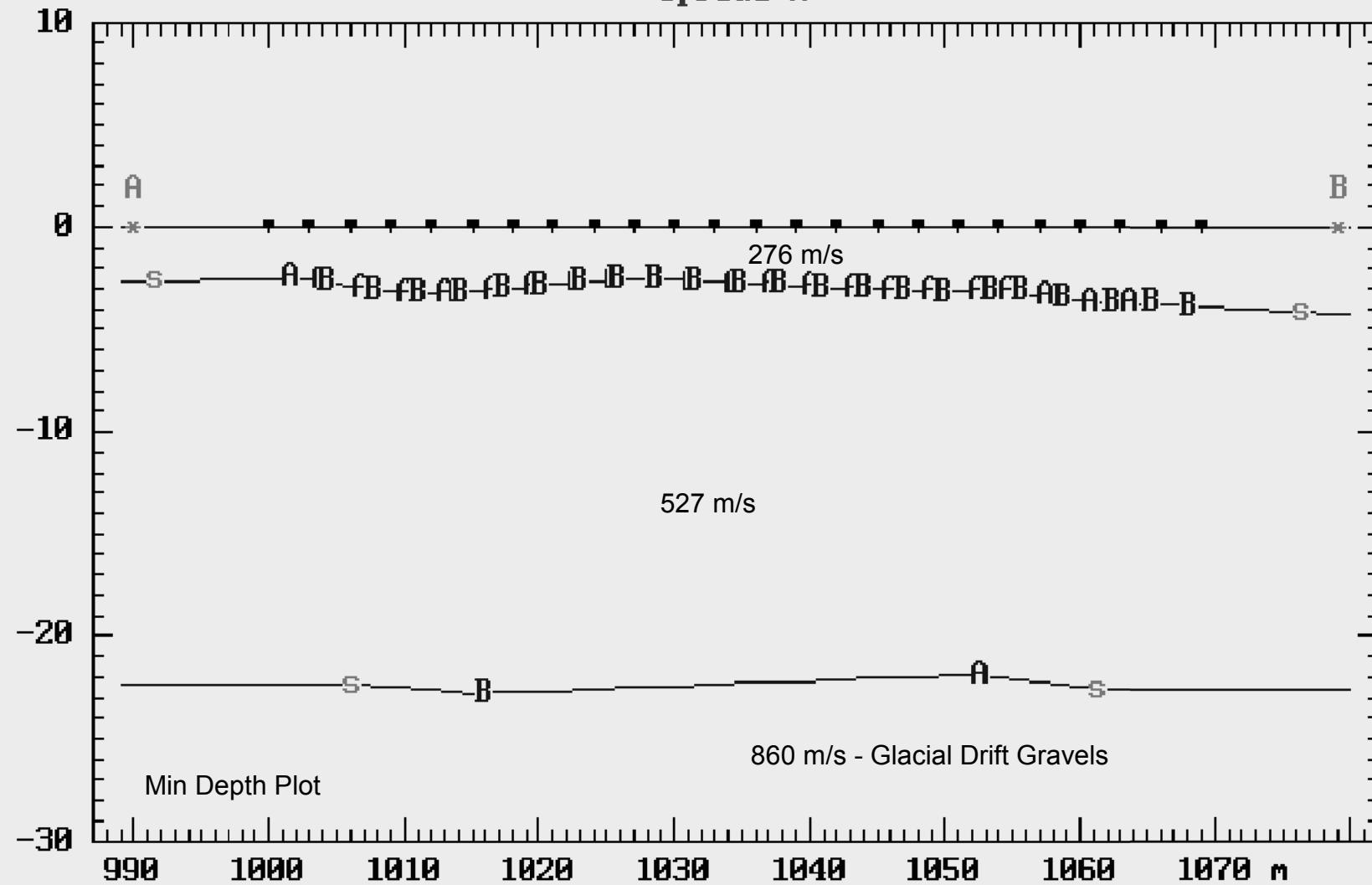


Cascade View Elementary S-wave

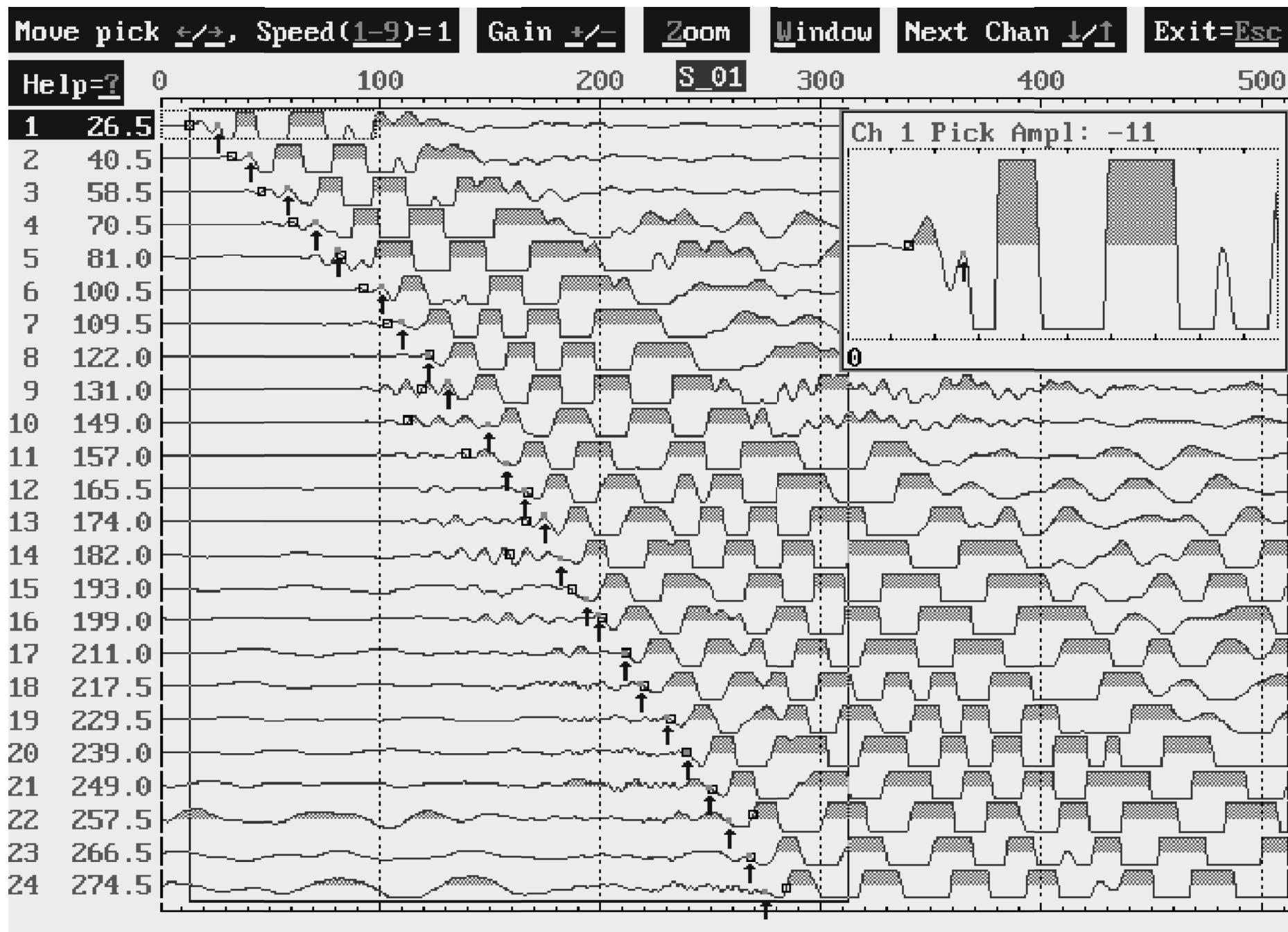
Press Esc to EXIT

VIEWSMIN.SIP : Cascade View Elementary Minimum Depth Plot

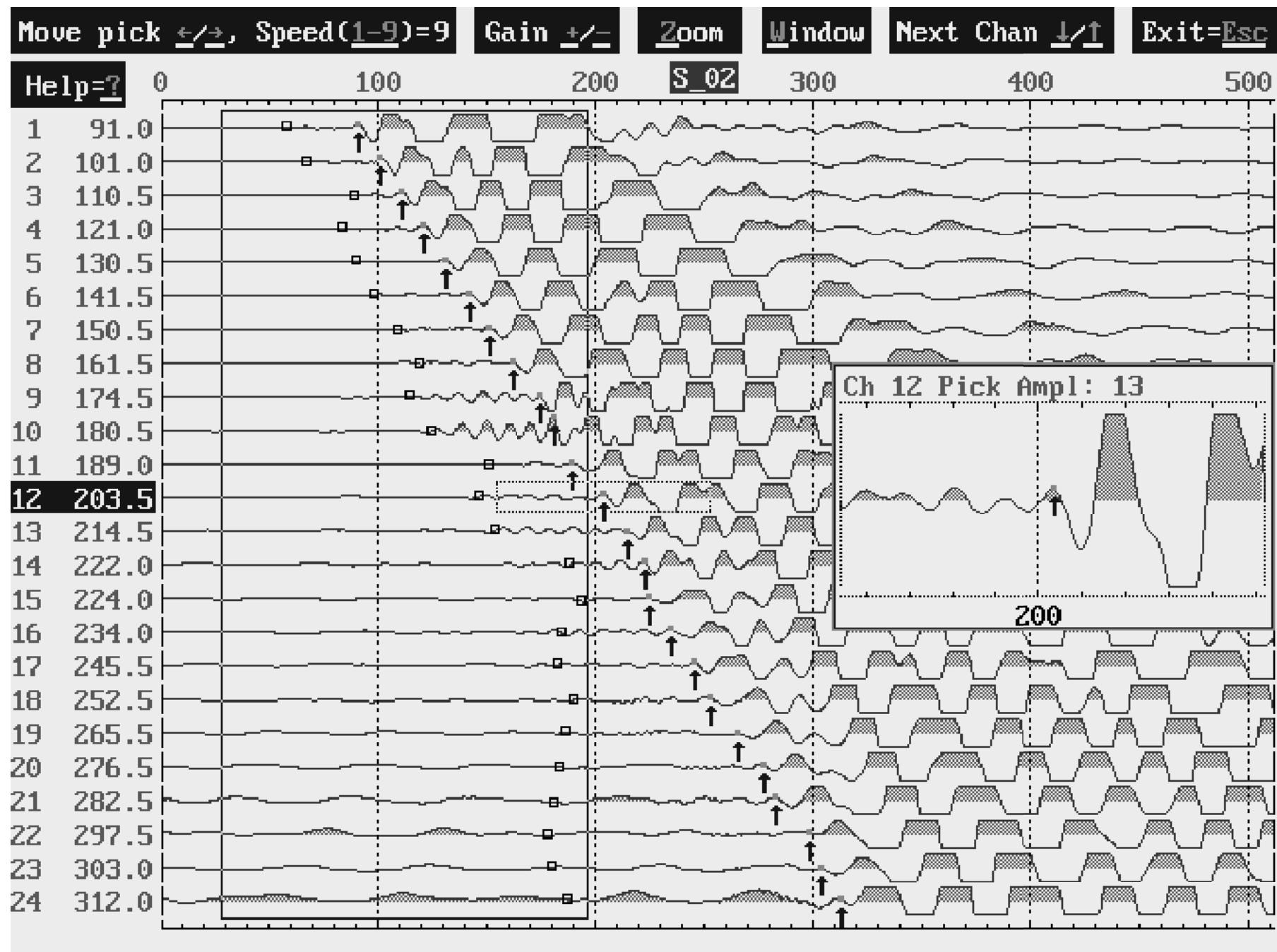
Spread A



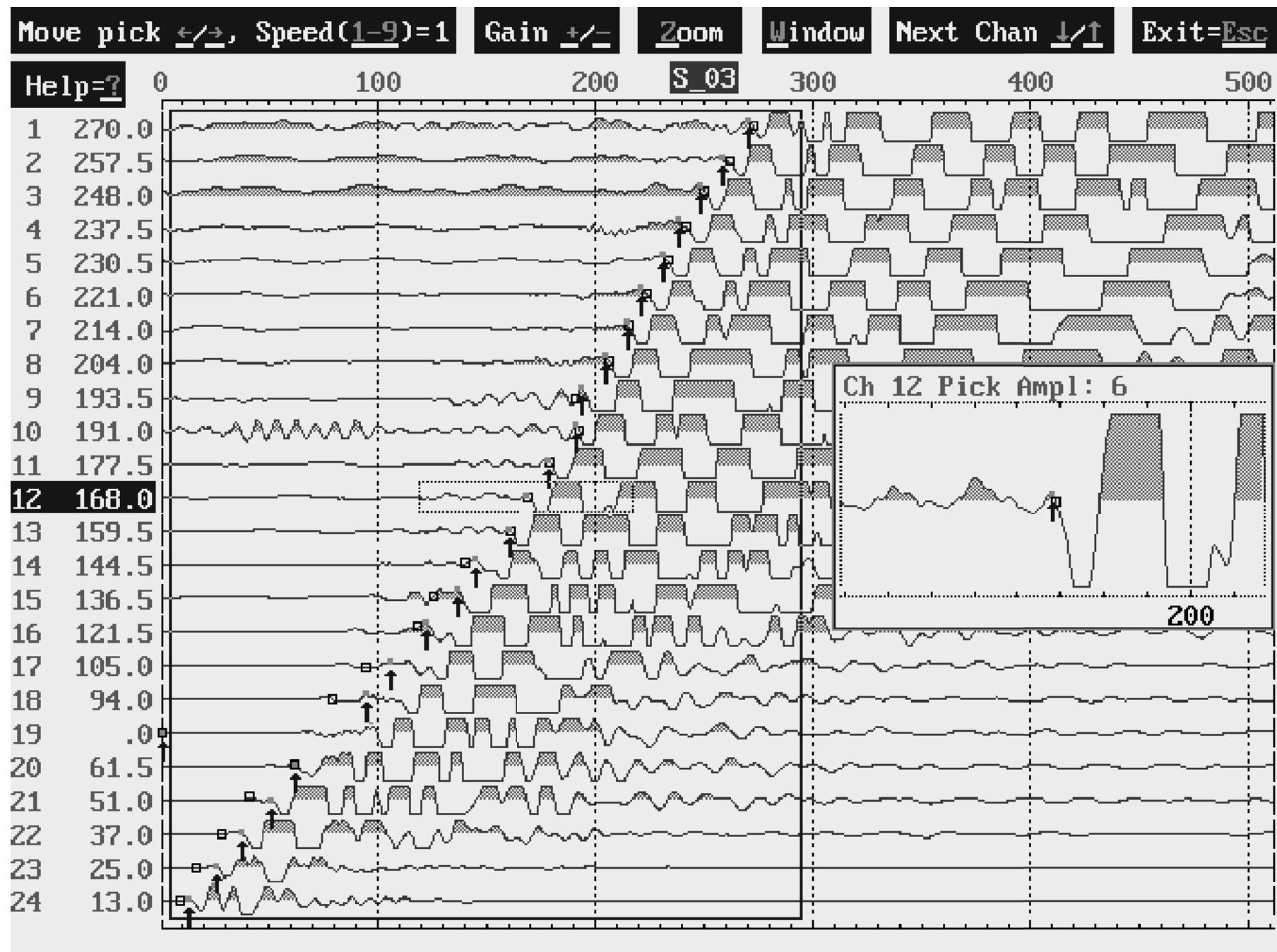
Cavlar Lumber S-wave



Cavlar Lumber S-wave

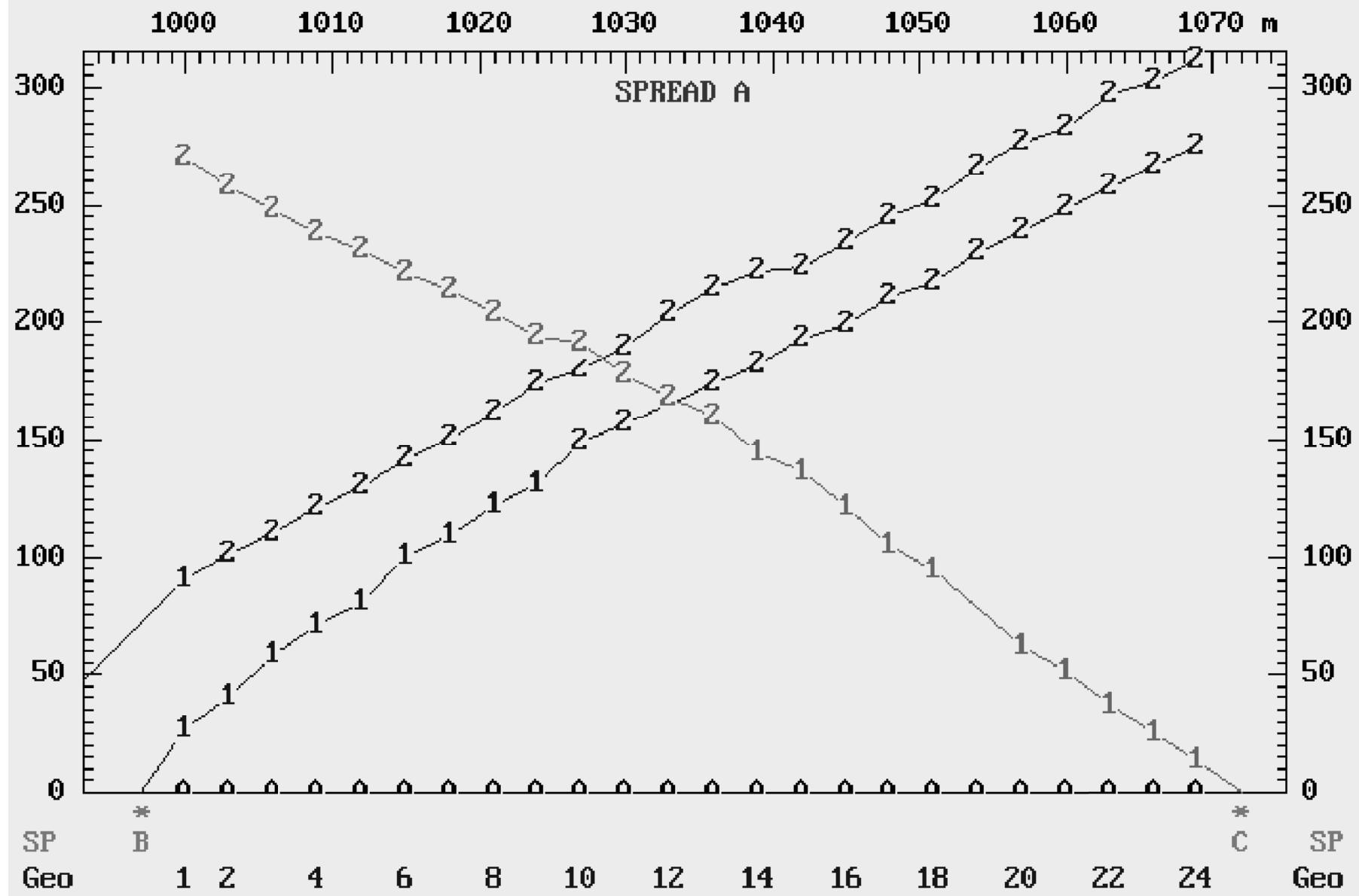


Cavlar Lumber S-wave



Cavilar Lumber S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

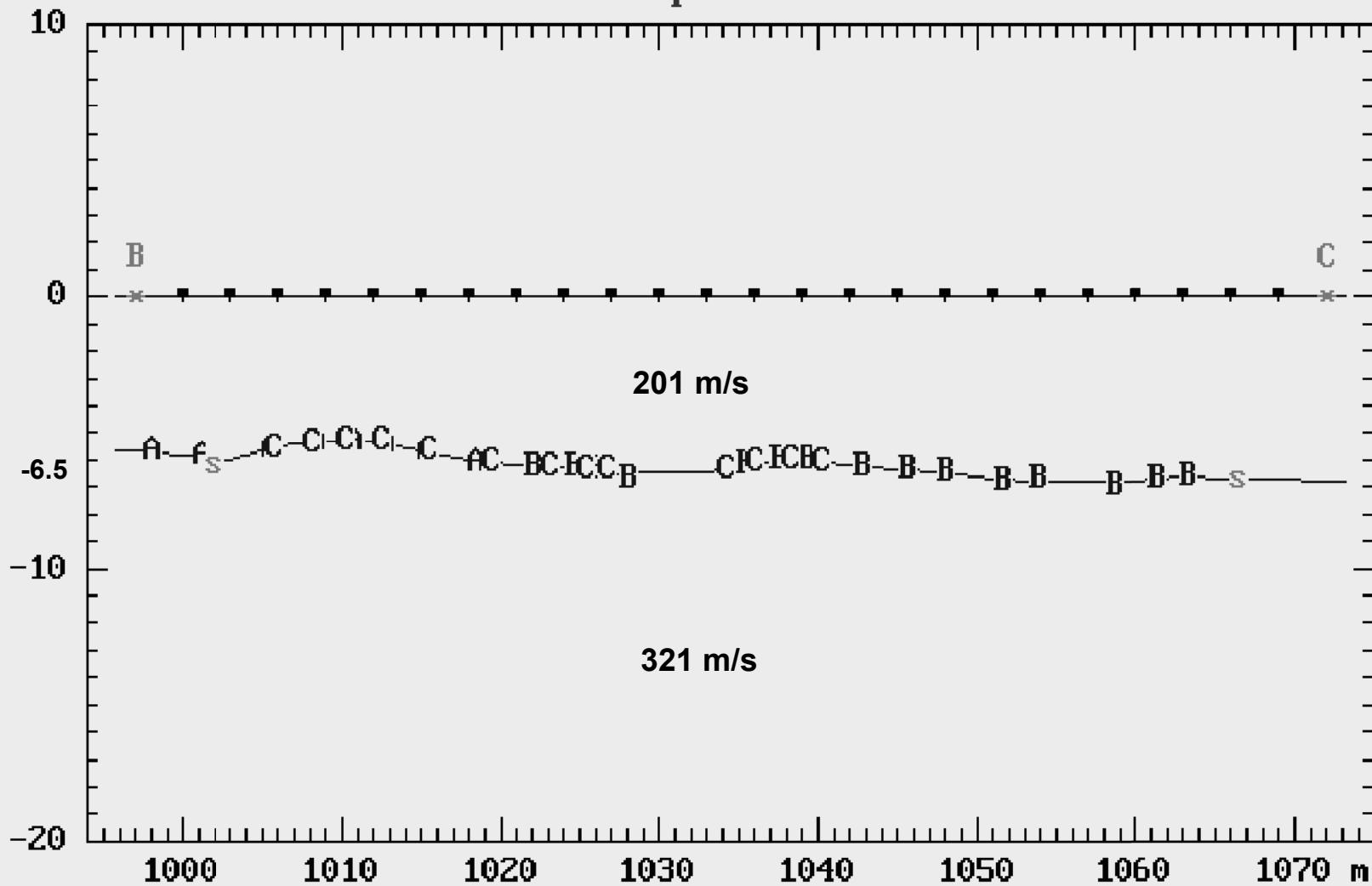


Cavlar Lumber S-wave

Press Esc to EXIT

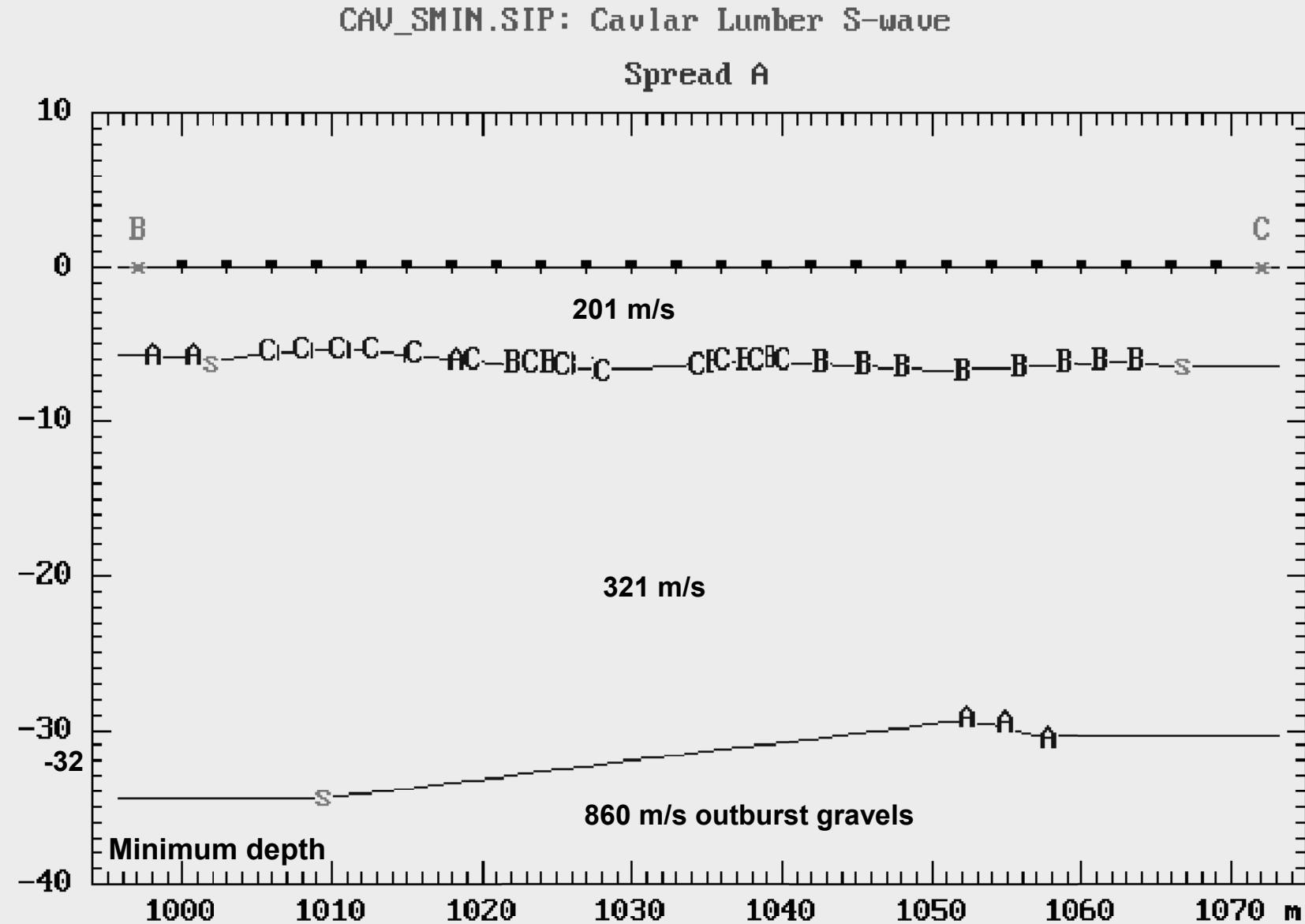
CAVULAR_S.SIP: Cavlar Lumber S-wave

Spread A

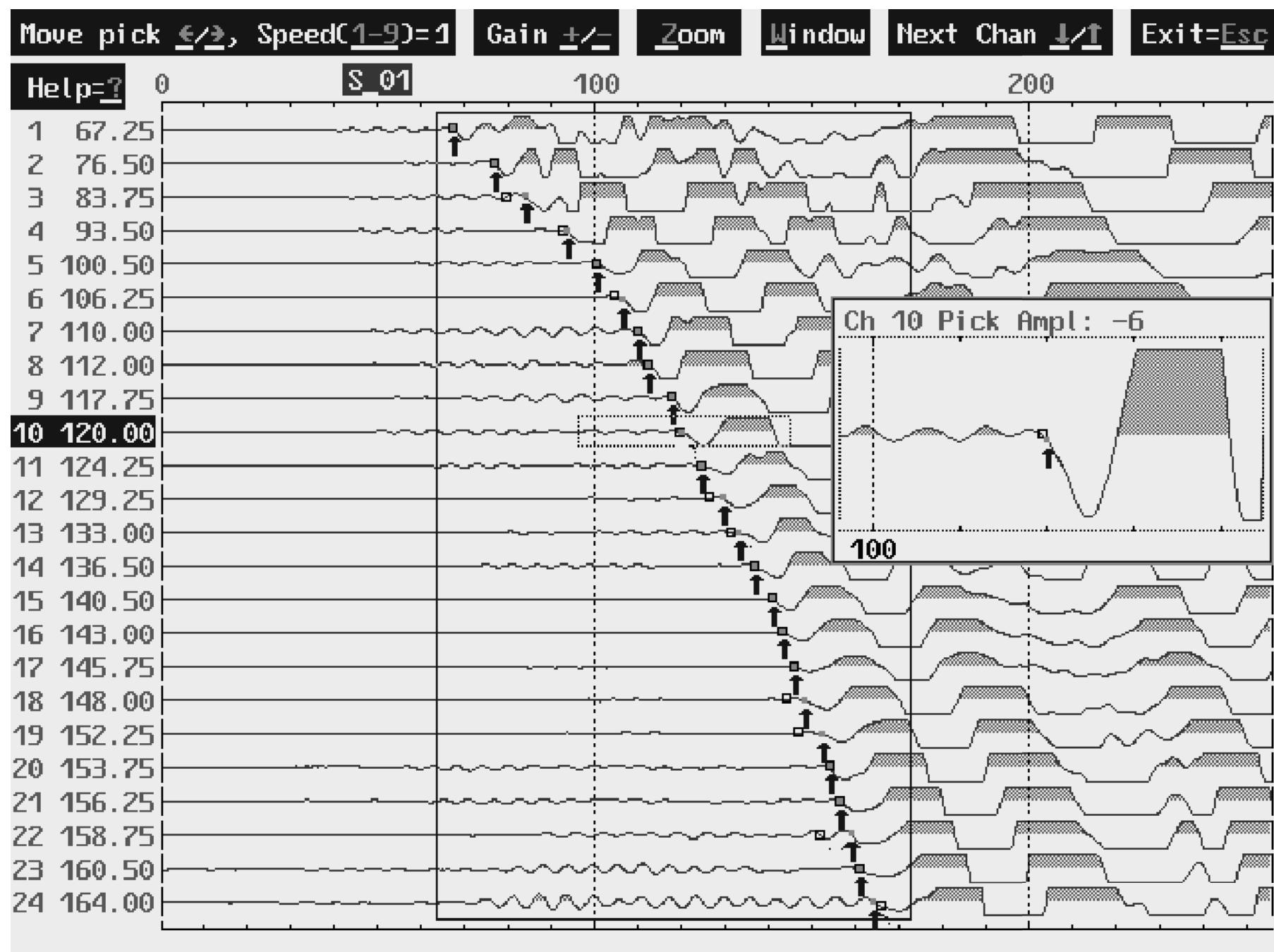


Cavlar Lumber S-wave

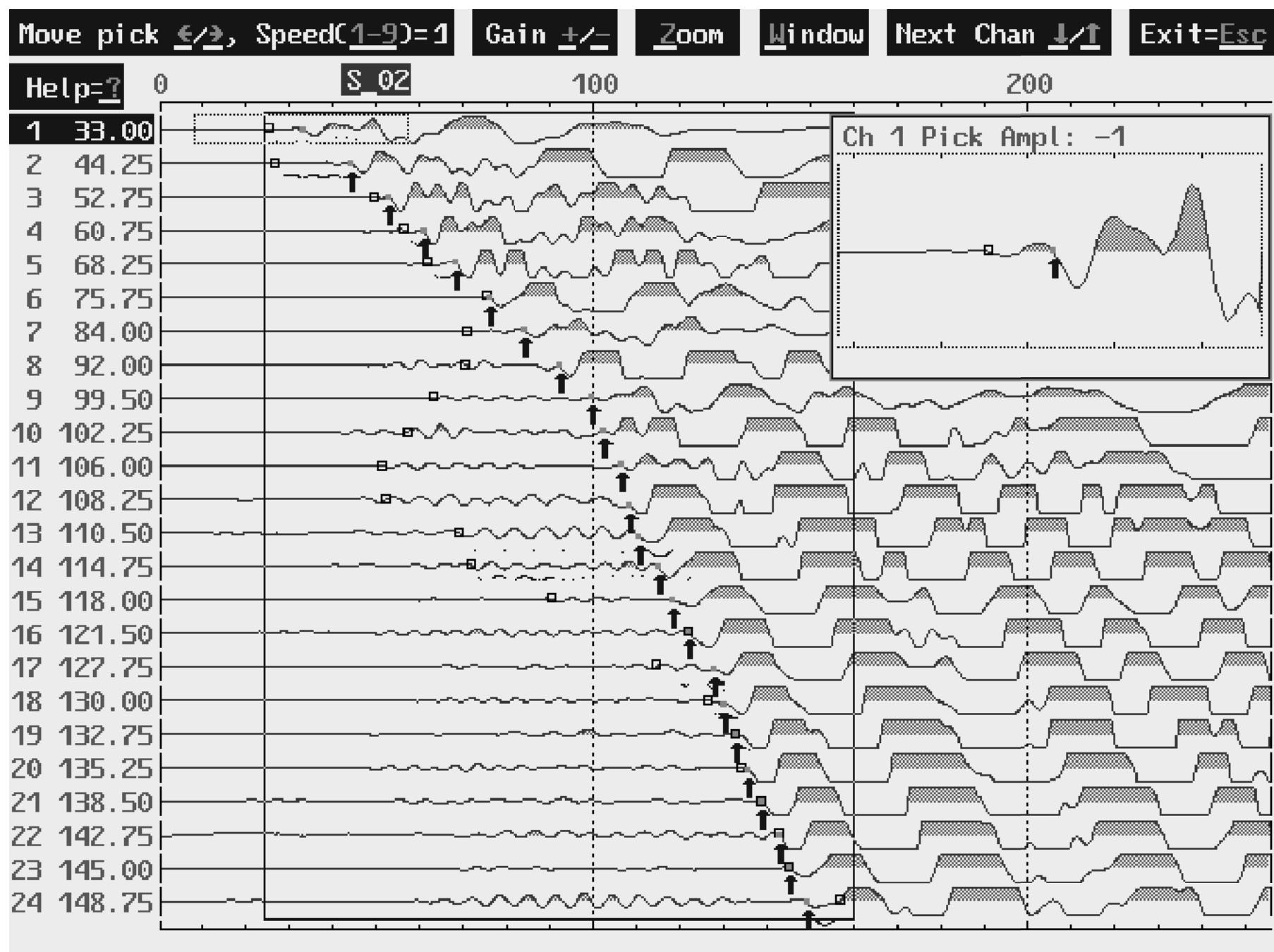
Press Esc to EXIT



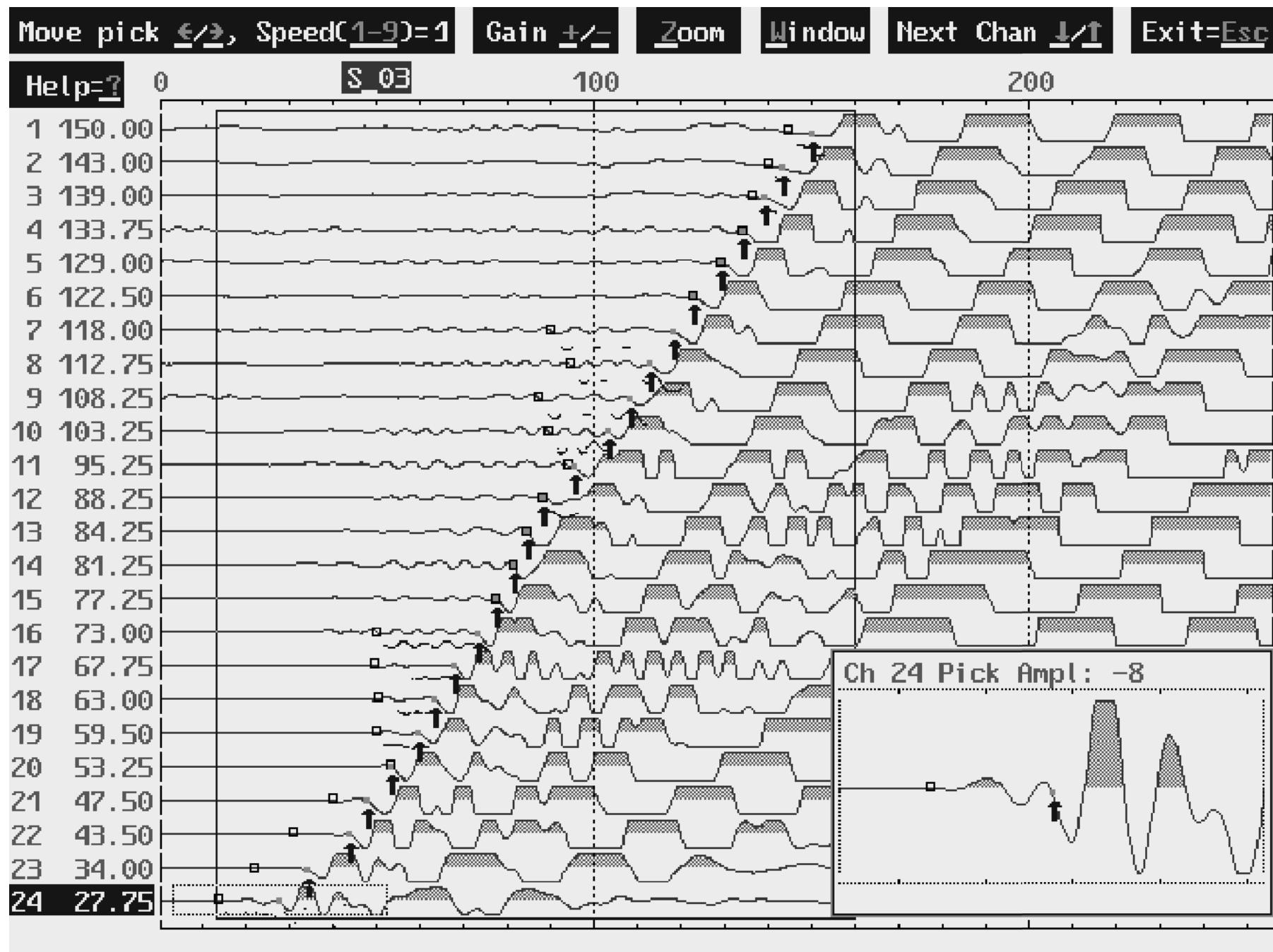
Cedarhome Elementary S-wave



Cedarhome Elementary S-wave

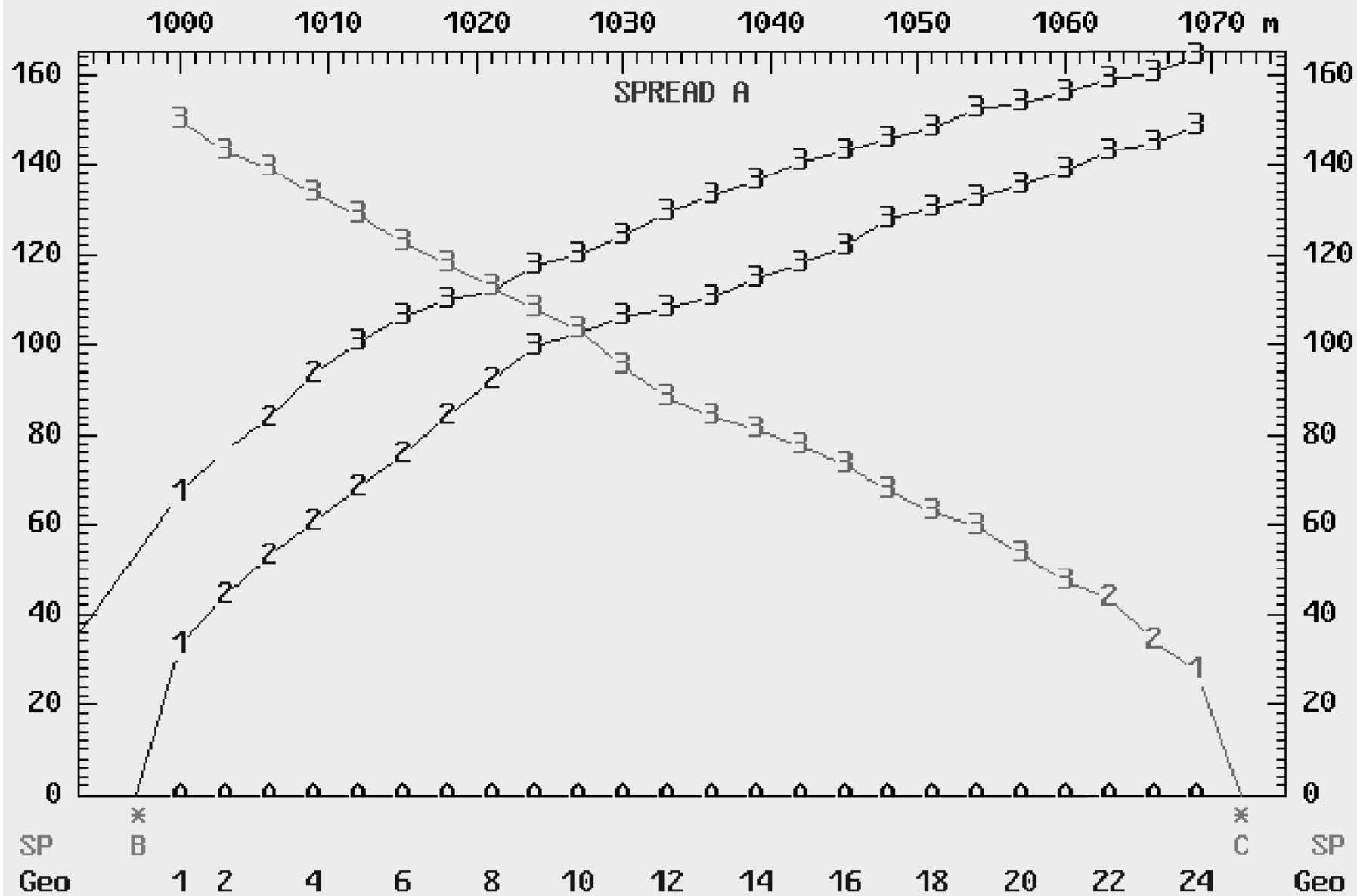


Cedarhome Elementary S-wave



Cedarhome Elementary S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

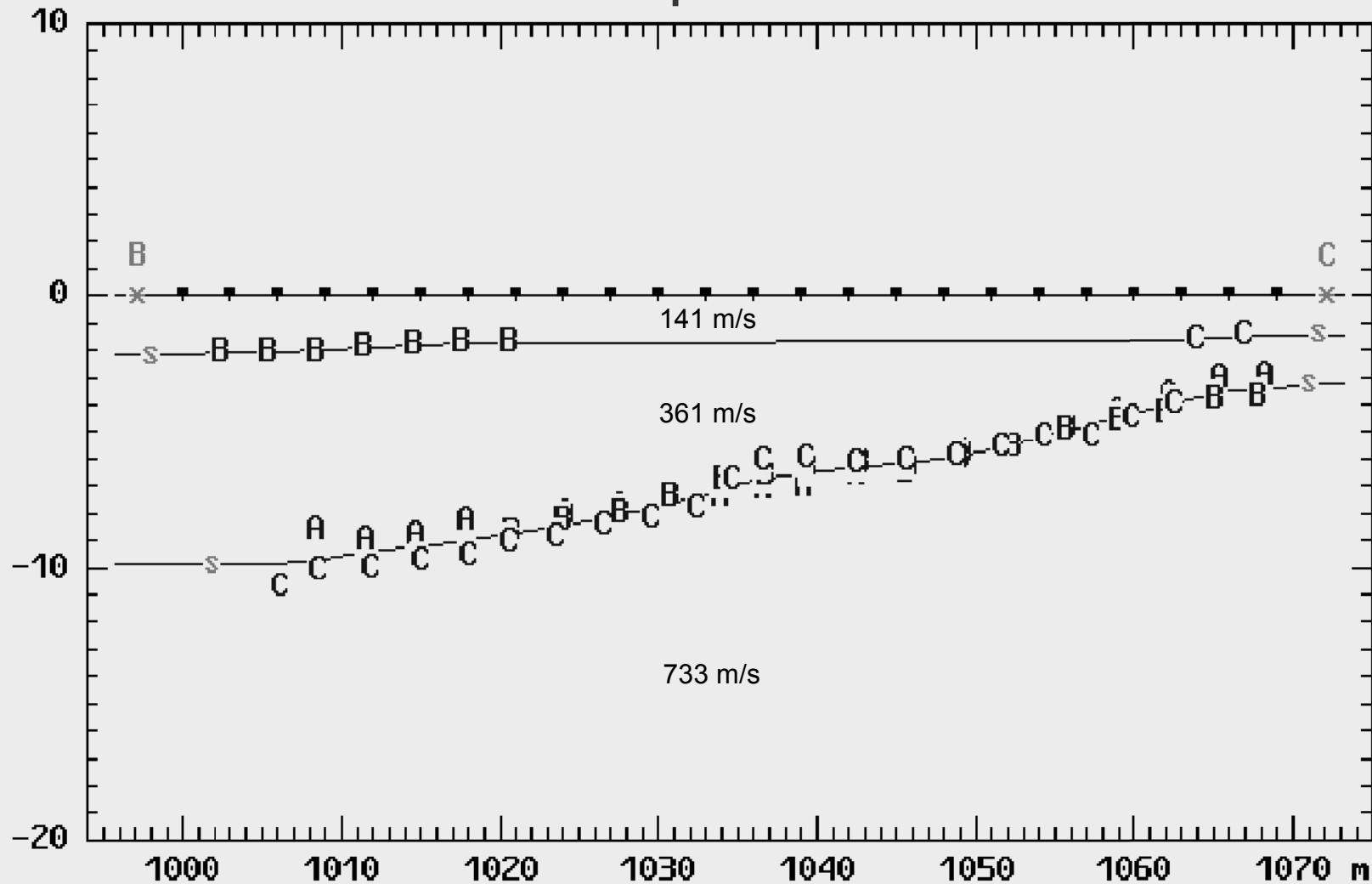


Cedarhome Elementary S-wave

Press Esc to EXIT

CEDRSWAU.SIP: Cedarhome Elementary S-Waves

Spread A

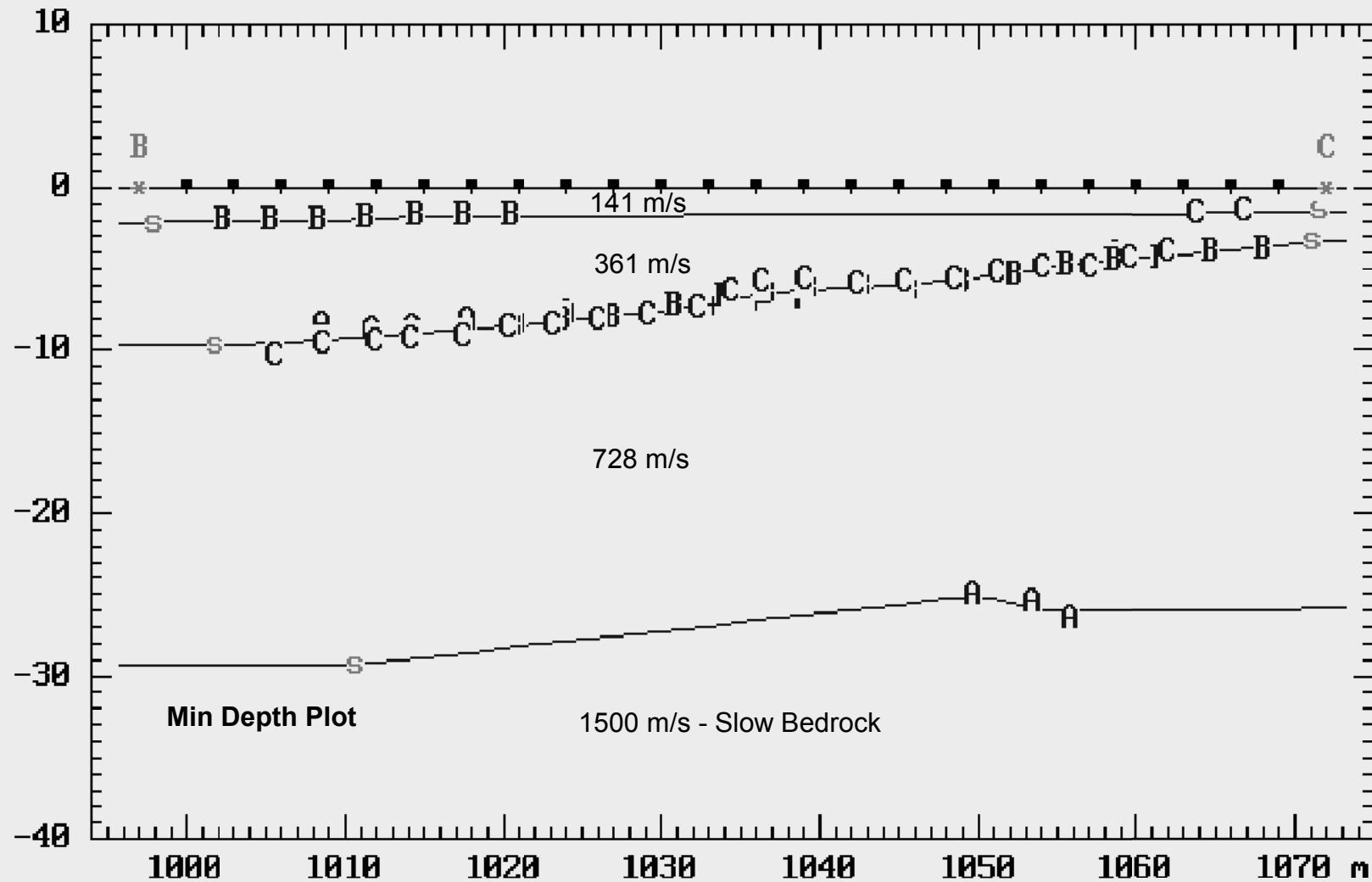


Cedarhome Elementary S-wave

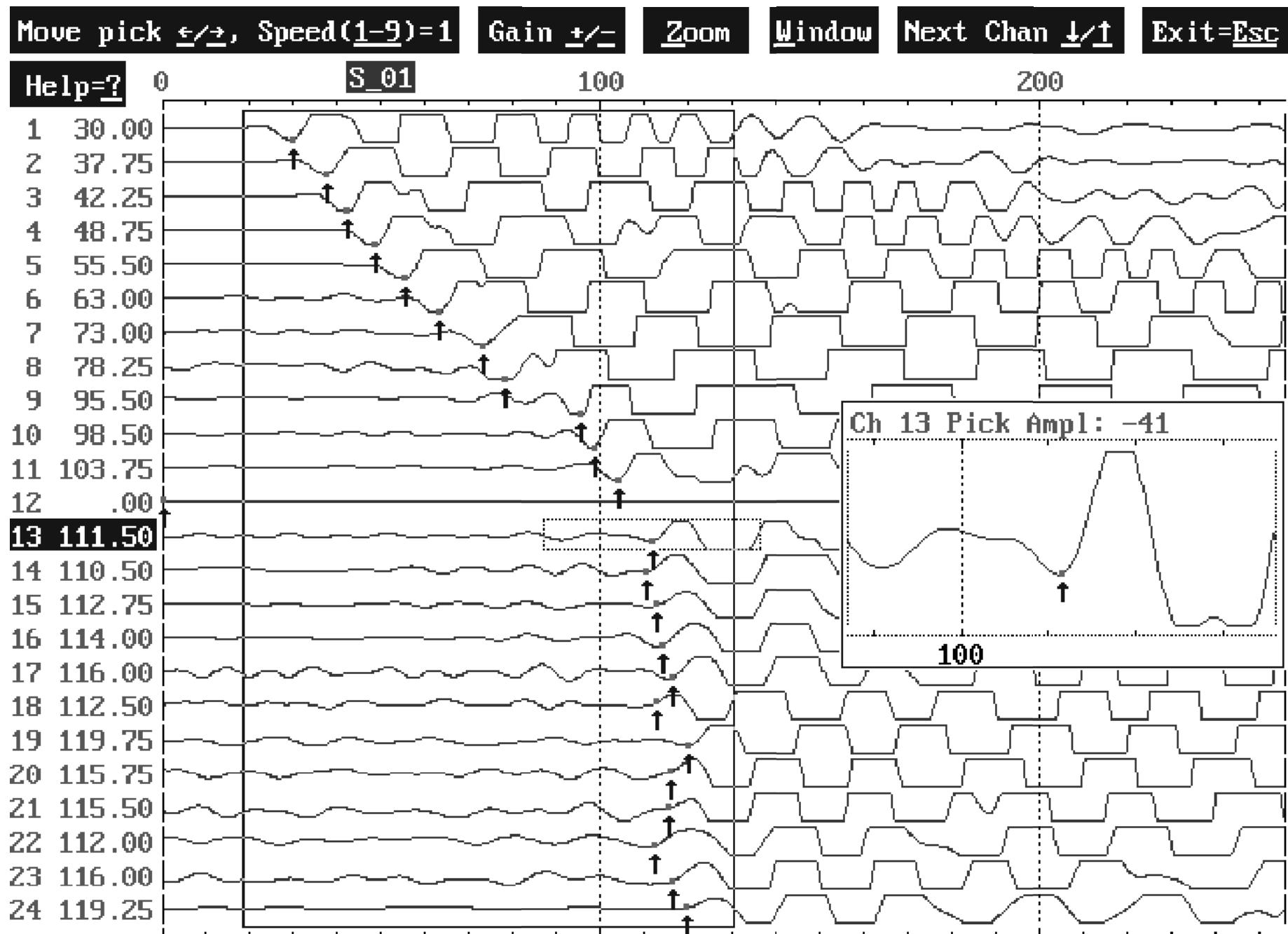
Press Esc to EXIT

CEDRSMIN.SIP: Cedarhome Elementary Minimum Depth Plot

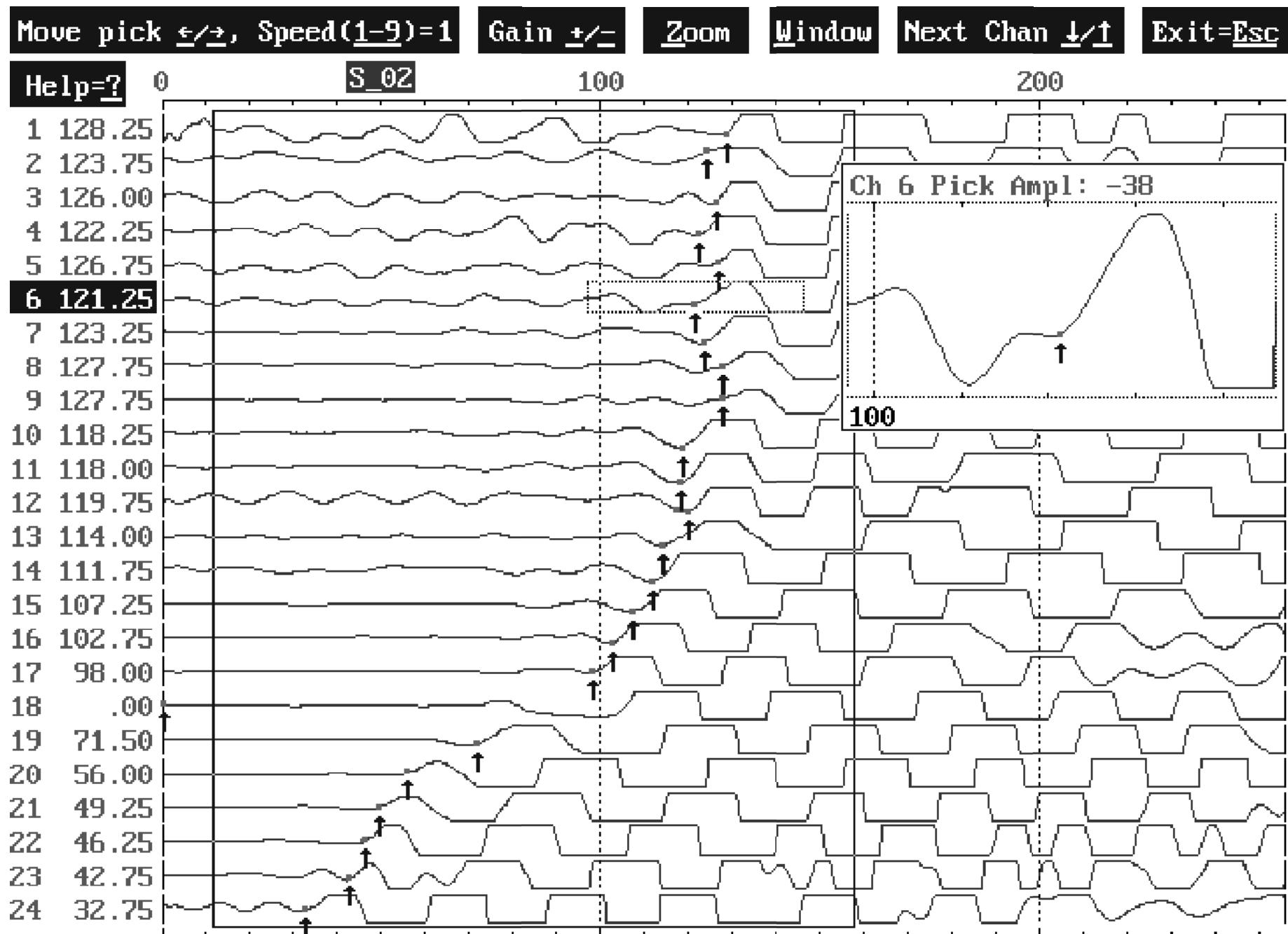
Spread A



Clear Lake S-wave

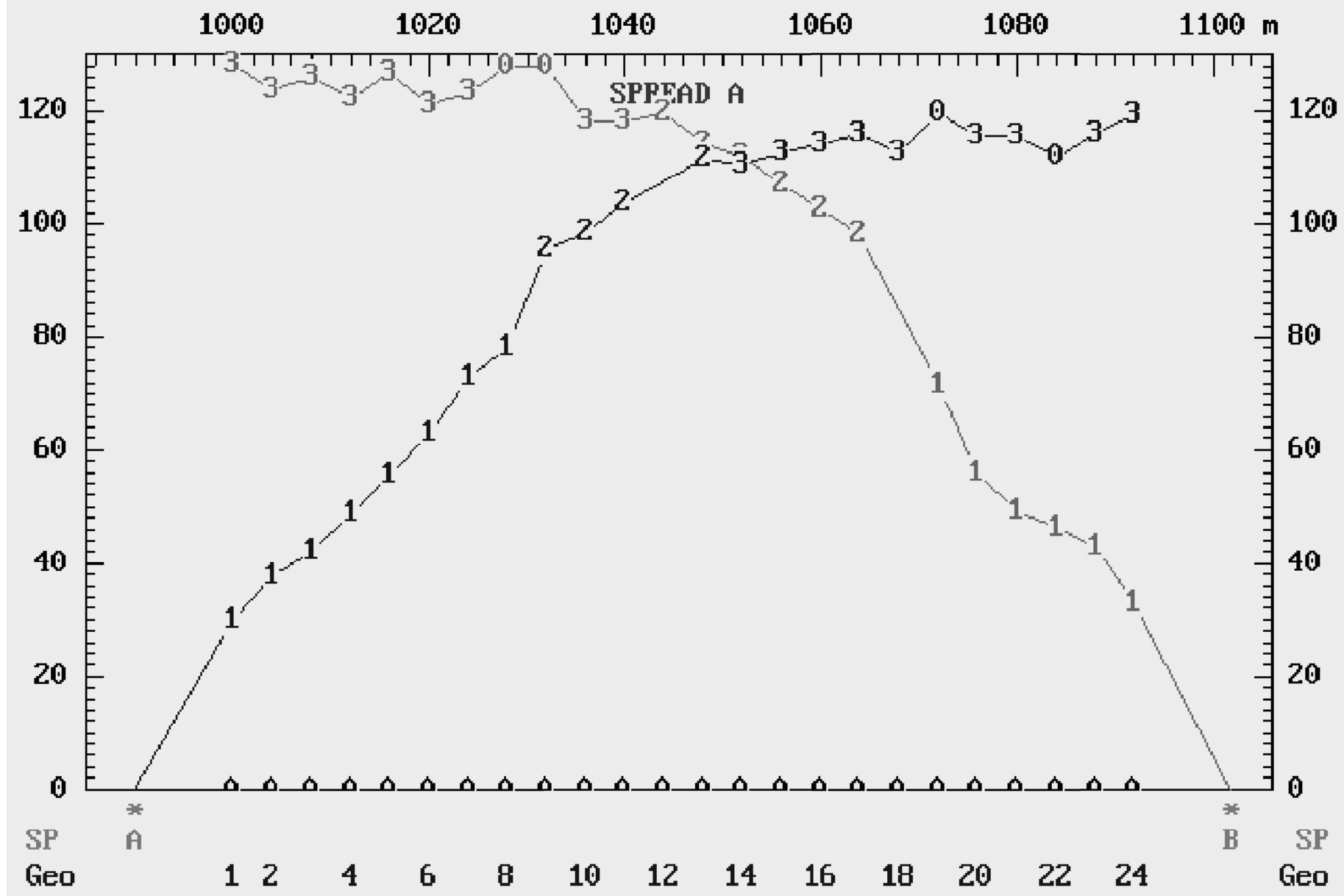


Clear Lake S-wave



Clear Lake S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for **MAIN MENU**.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

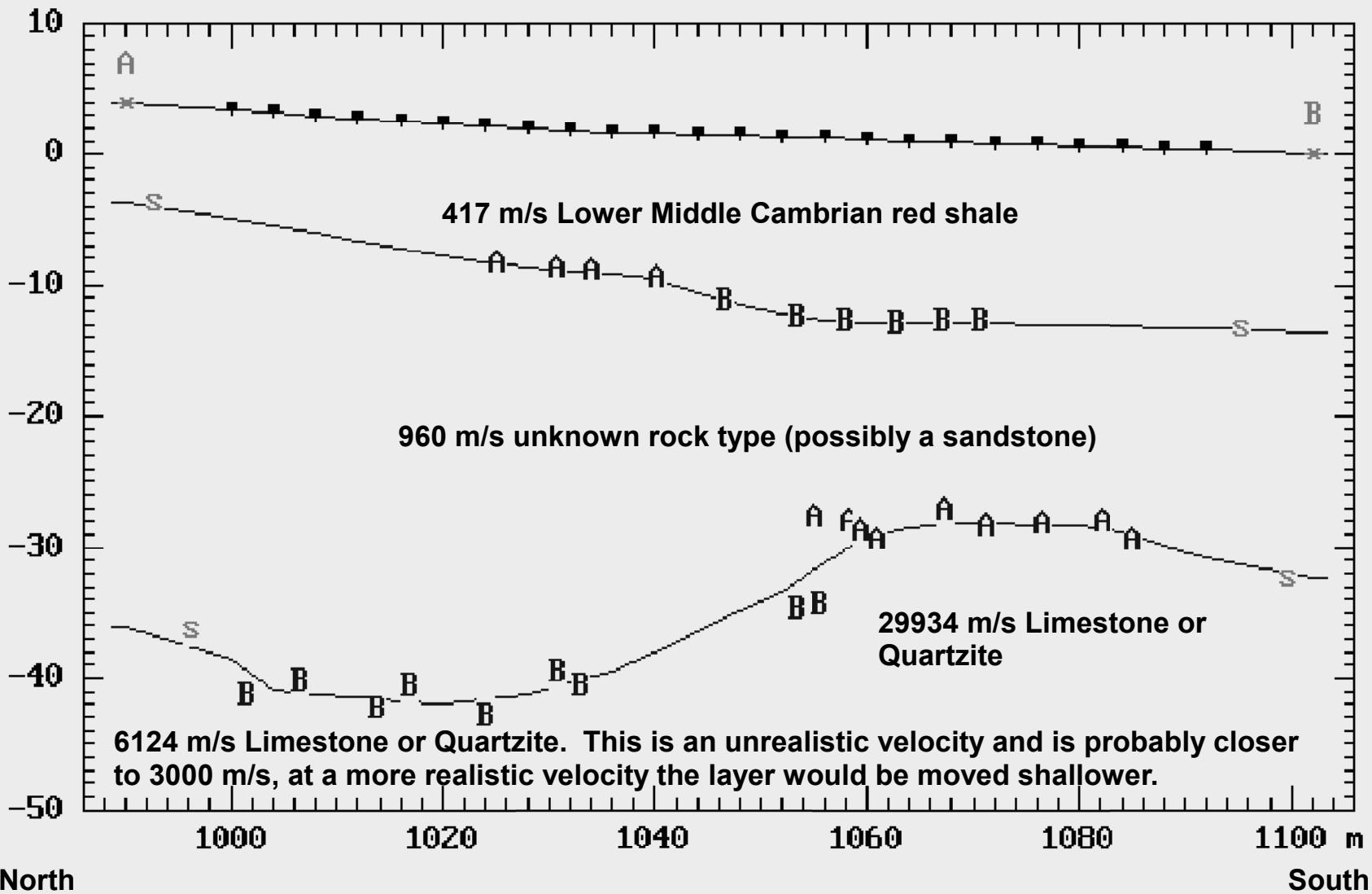


Clear Lake S-wave

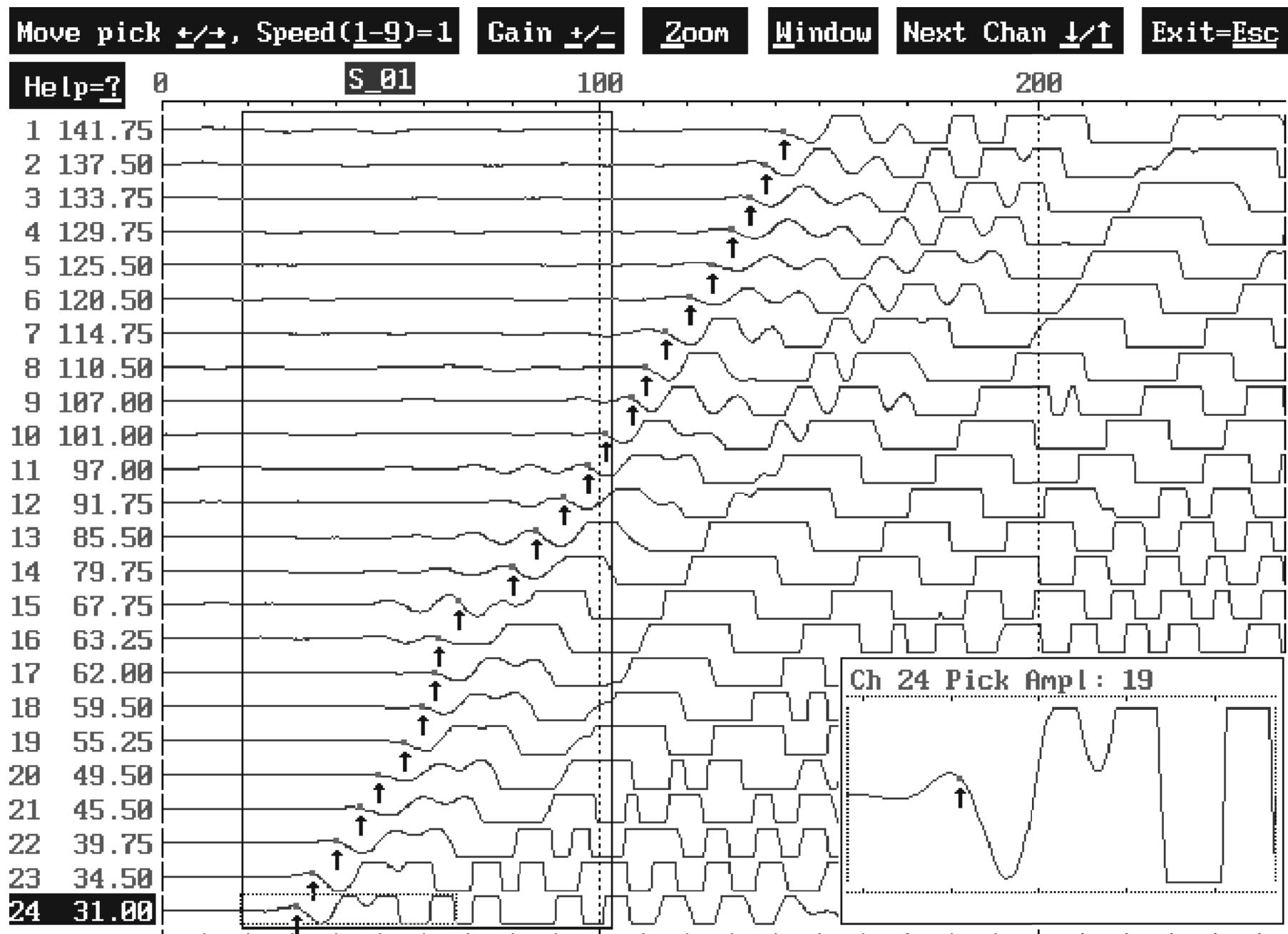
Press Esc to EXIT

CLEAR_SW.SIP: Clear Lake S wave Survey

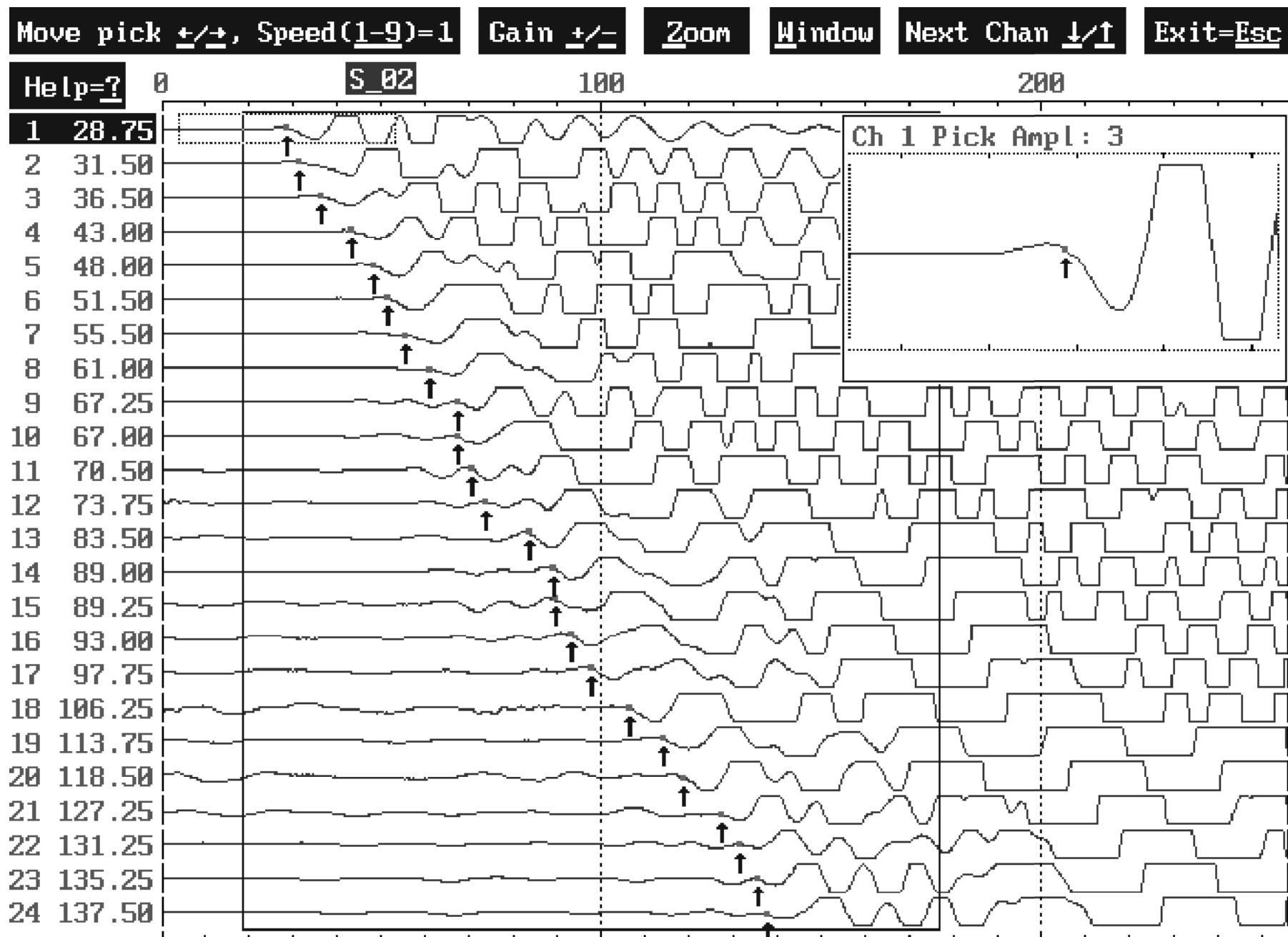
Spread A



Cypress Advent Church S-wave

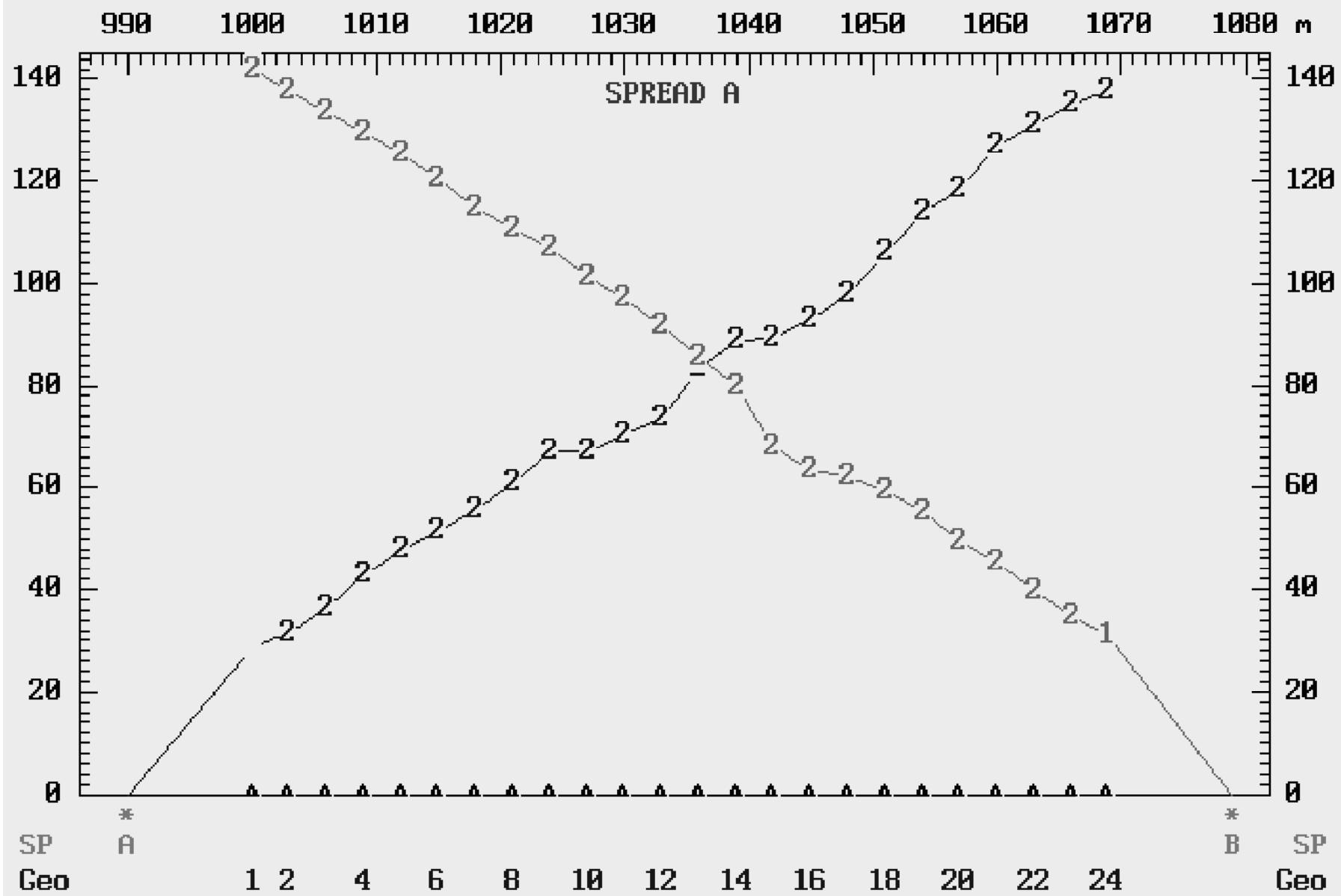


Cypress Advent Church S-wave



Cypress Advent Church S-wave

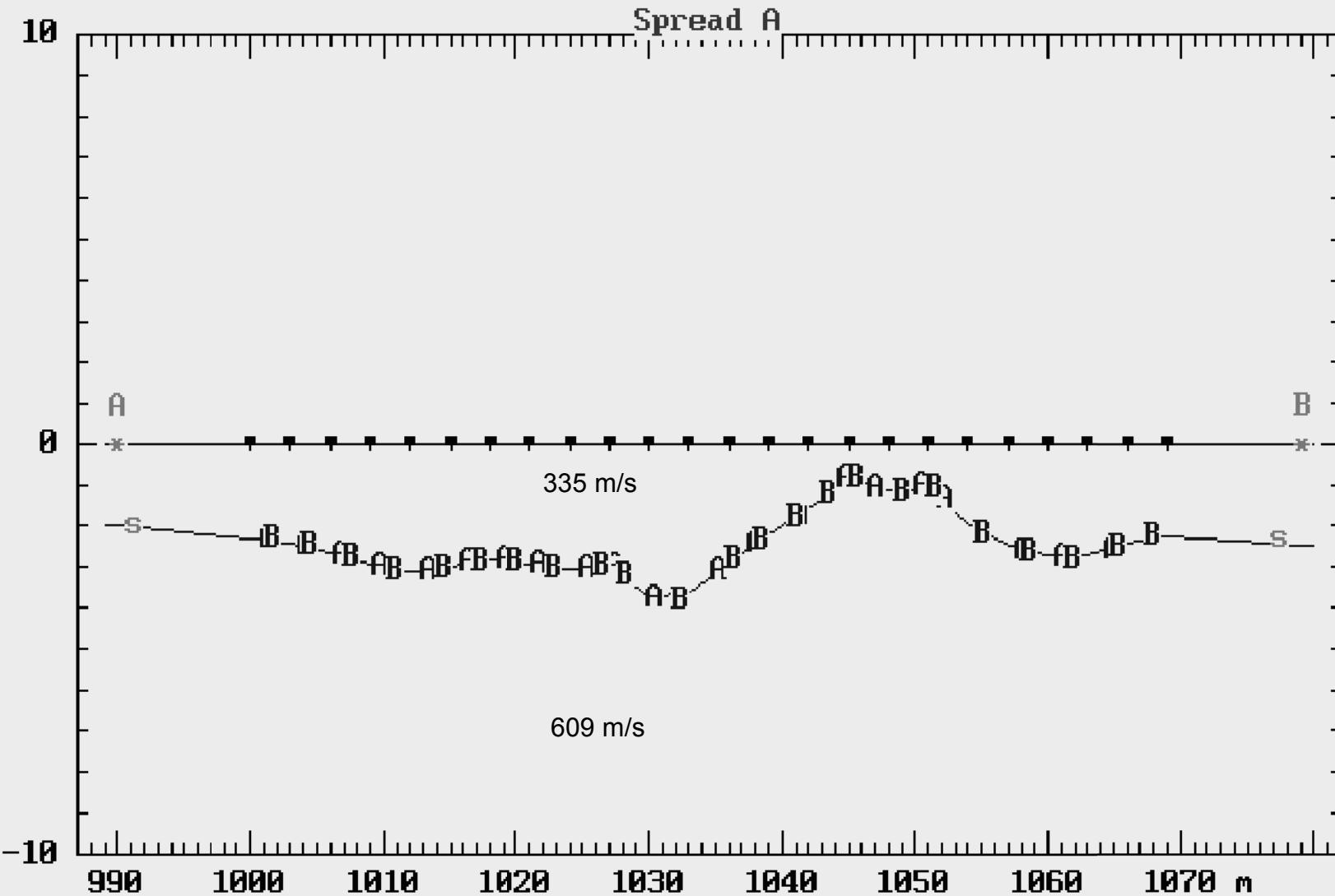
Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Cypress Advent Church S-wave

Press Esc to EXIT

CYPRSWAV.SIP : Cypress Advent S-Waves

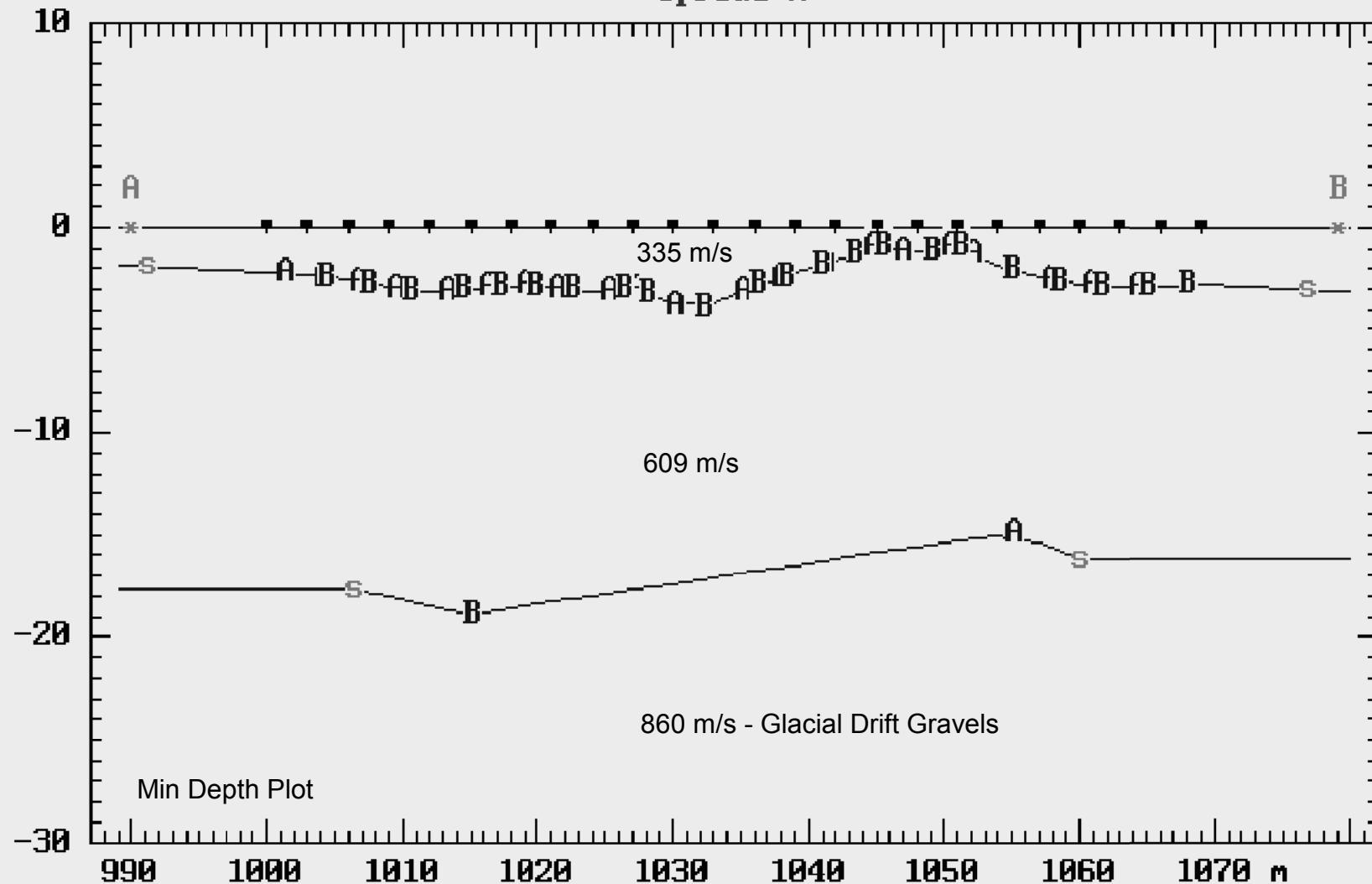


Cypress Advent Church S-wave

Press Esc to EXIT

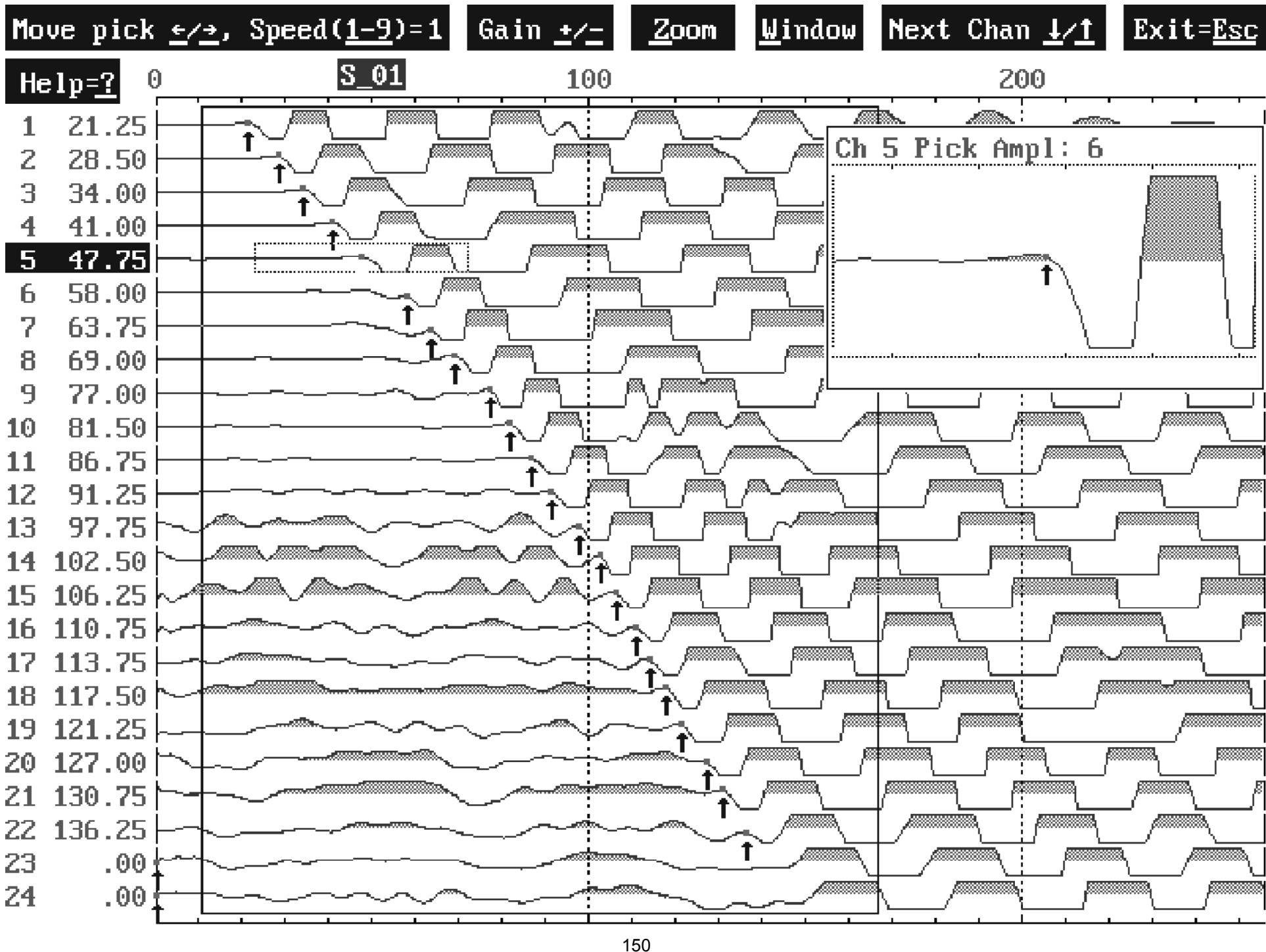
CYPRSMIN.SIP : Cypress Advent Minimum Depth Plot

Spread A



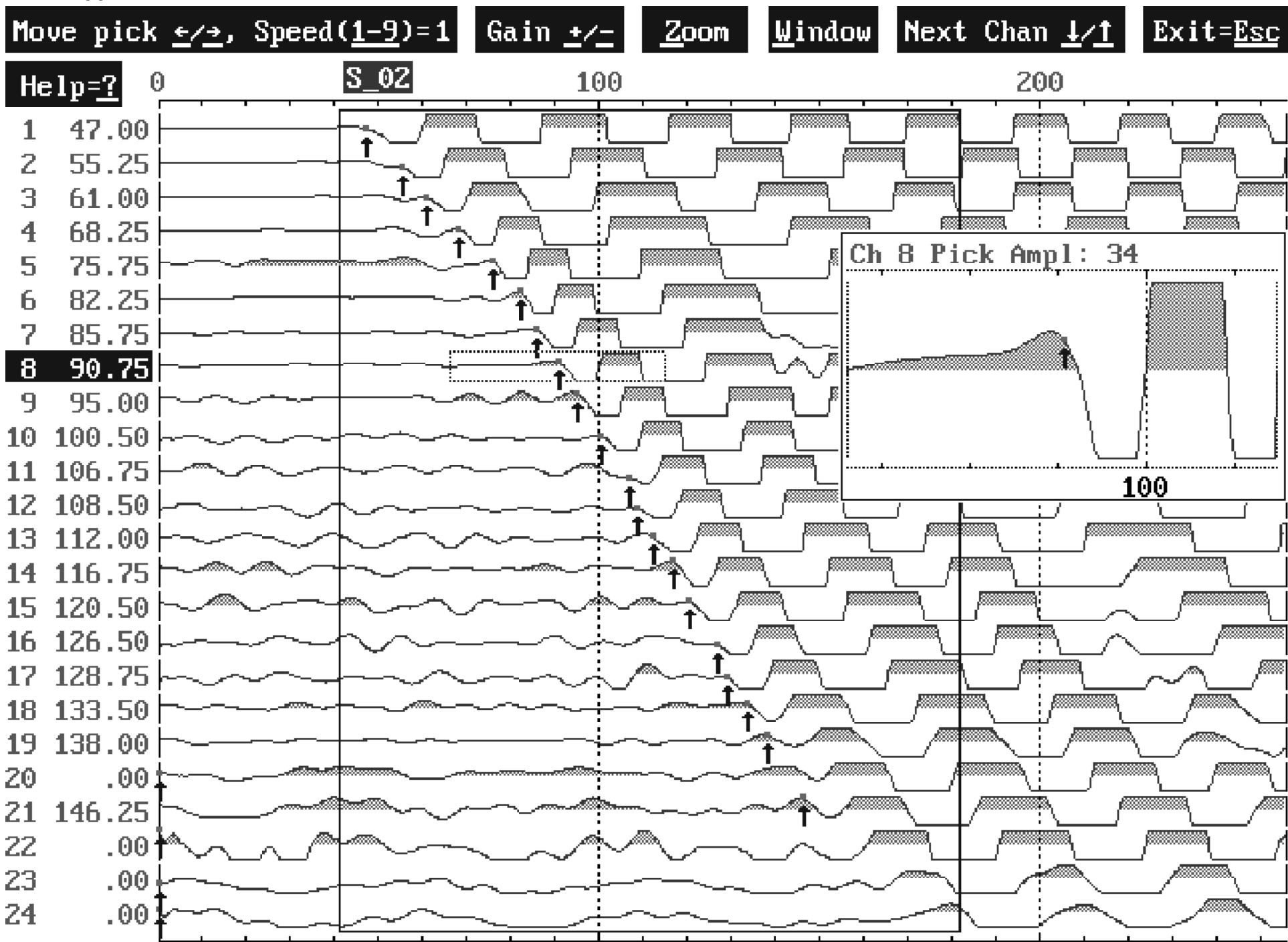
Appendix C

DNR Central S-wave



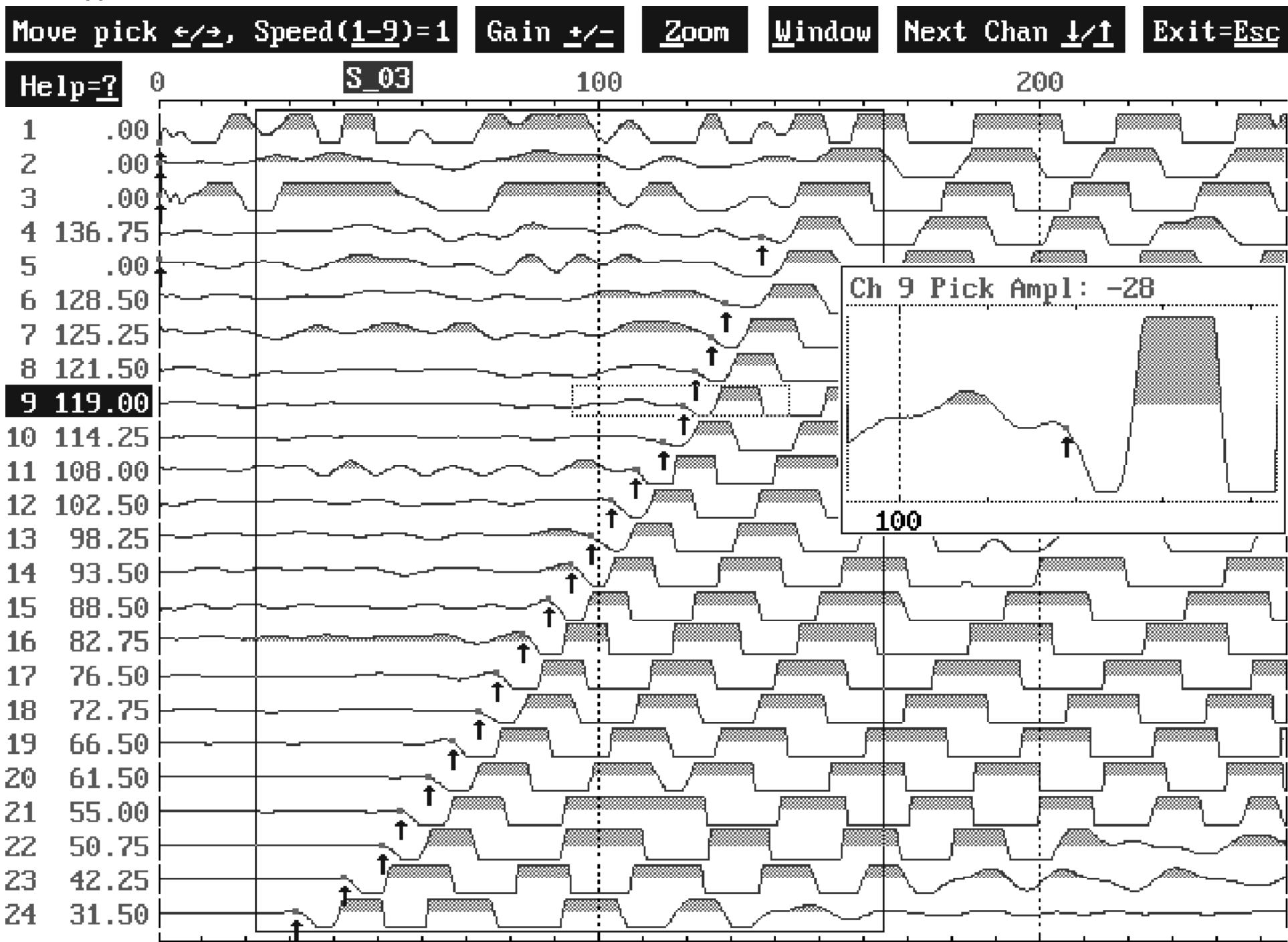
Appendix C

DNR Central S-wave



Appendix C

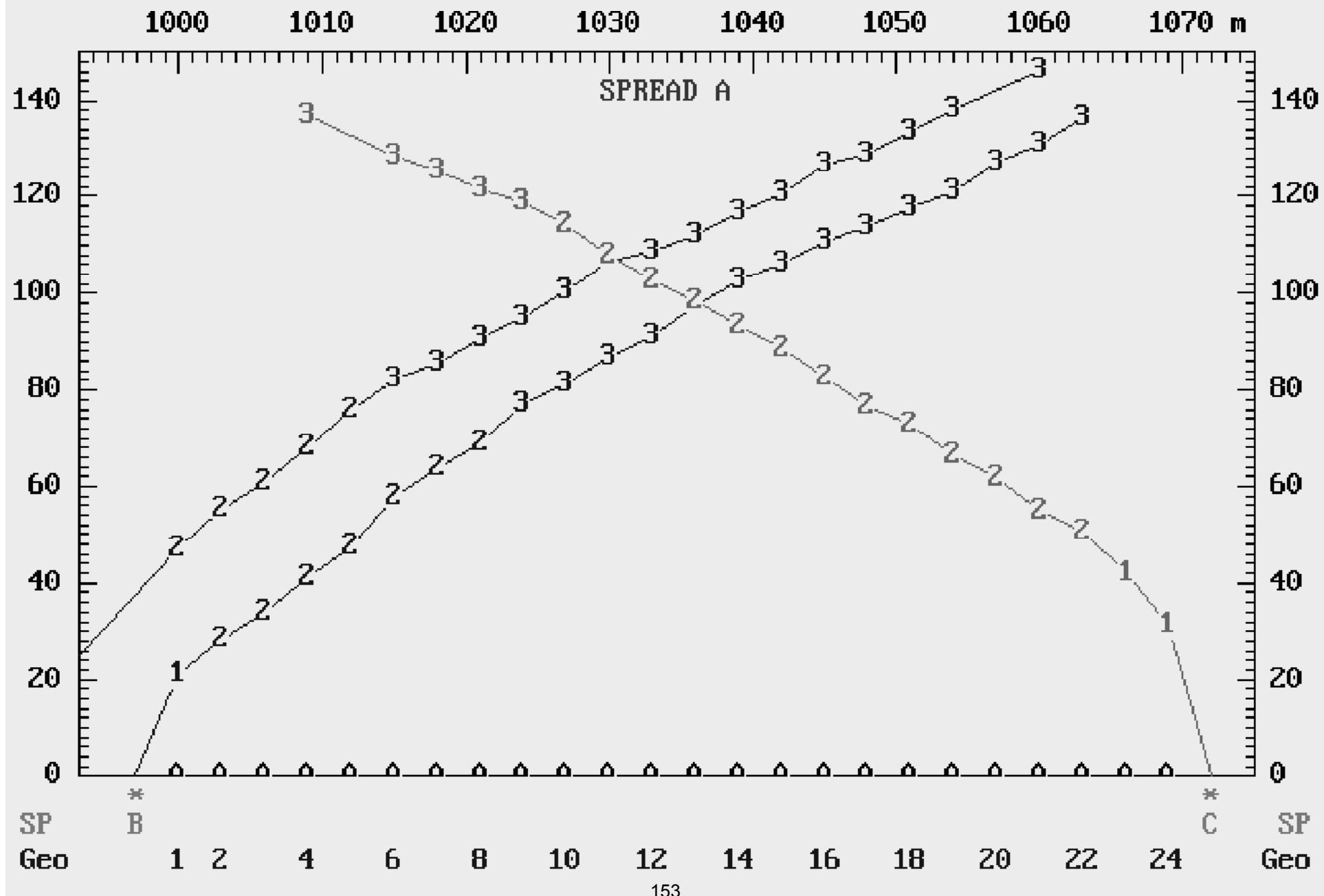
DNR Central S-wave



Appendix C

DNR Central S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point: type in Layer Number.
Press Esc when finished.

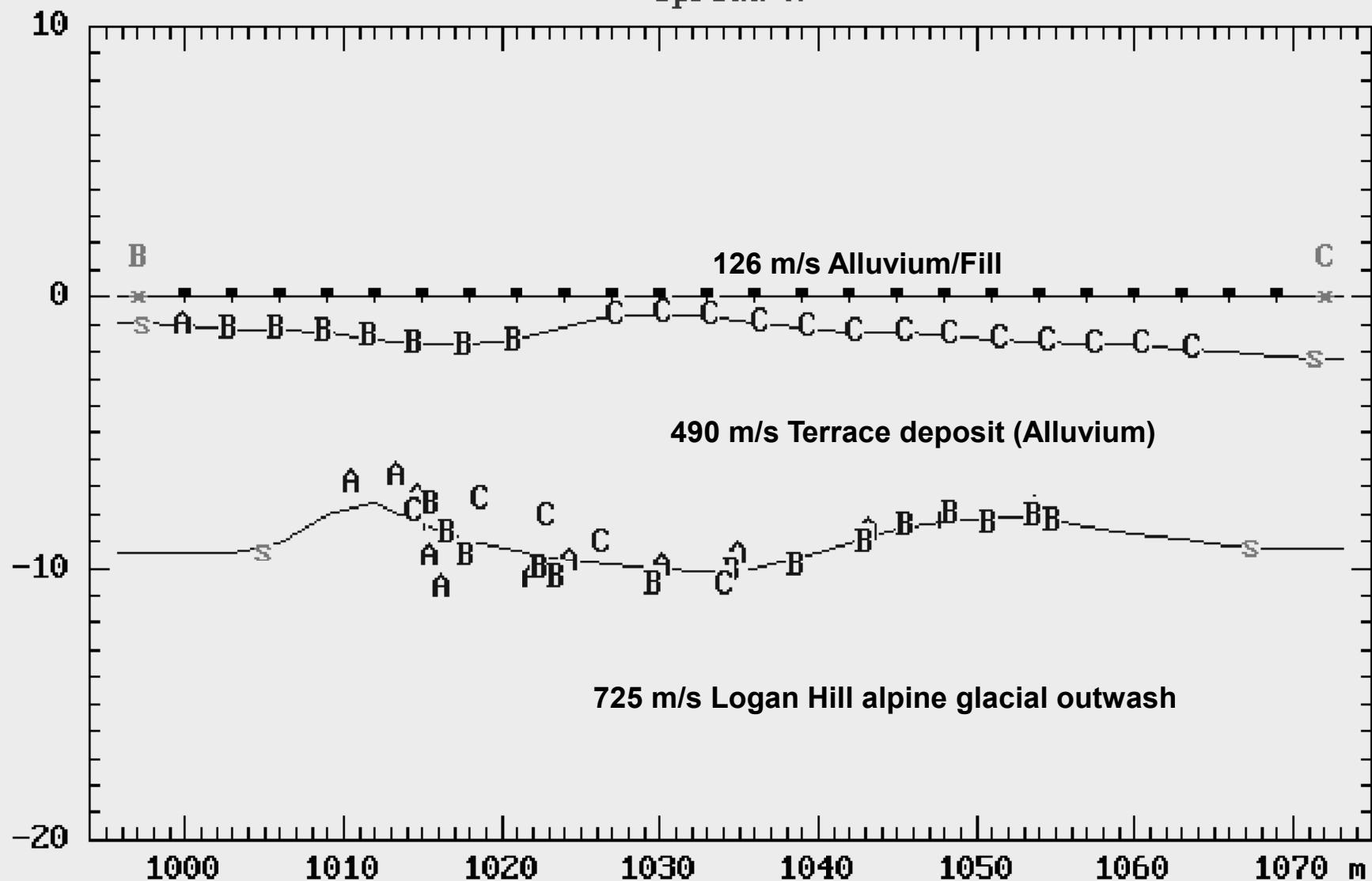


DNR Central S-wave

Press Esc to EXIT

DCNT_SW1.SIP: DNR Central Shear Wave Survey

Spread A

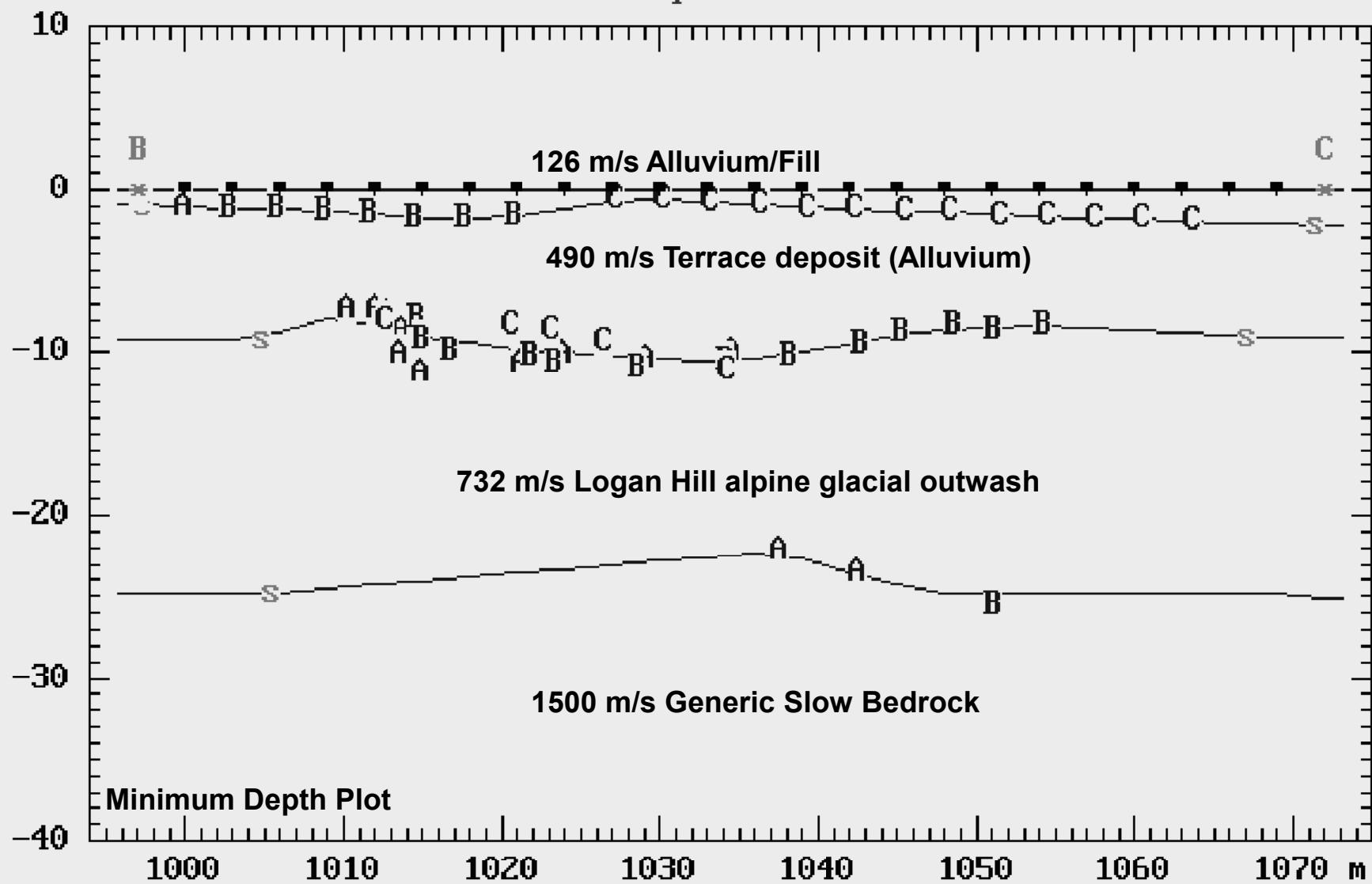


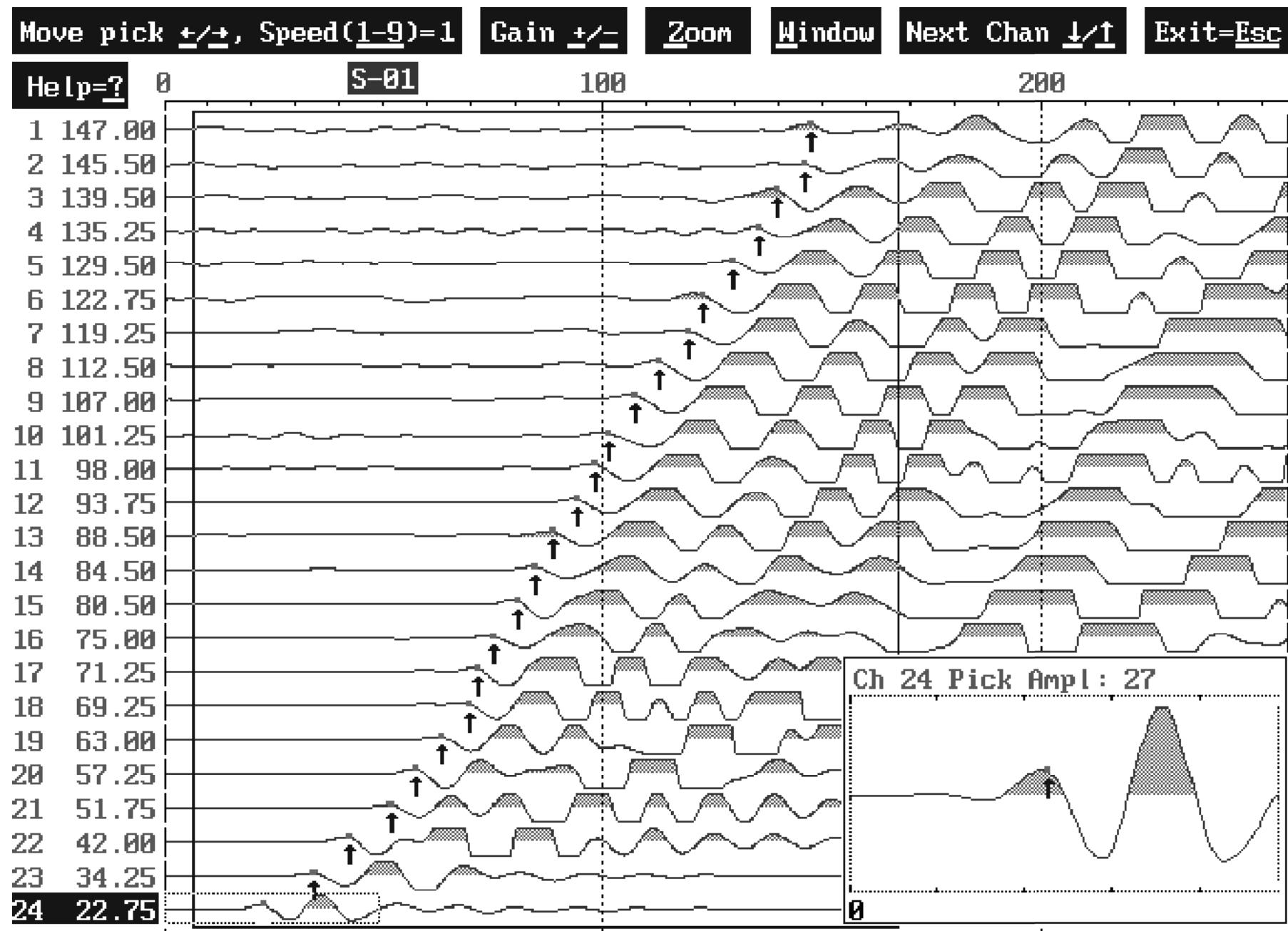
DNR Central S-wave

Press Esc to EXIT

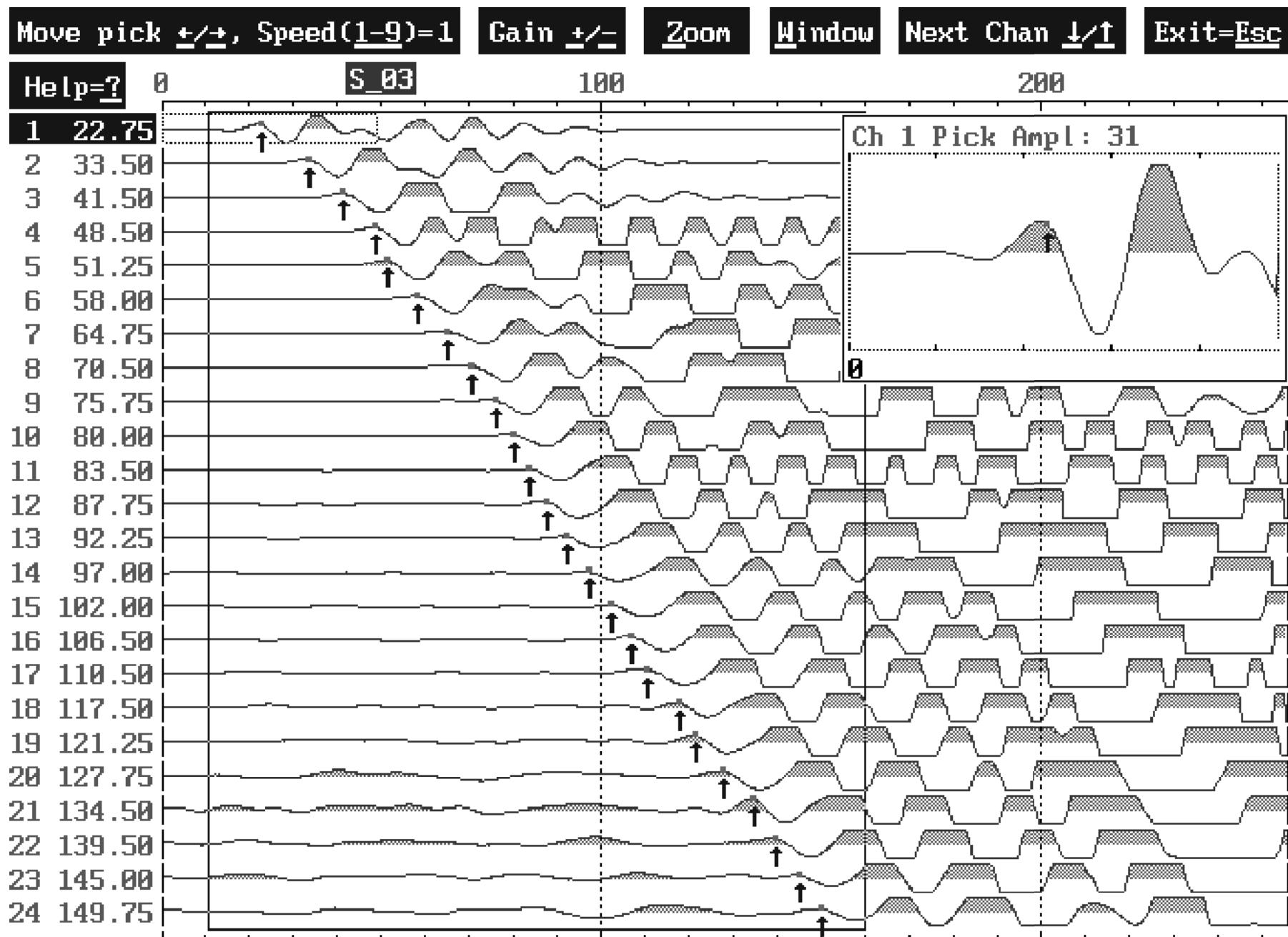
DCNT_SW2.SIP: DNR Central Shear Wave Survey

Spread A



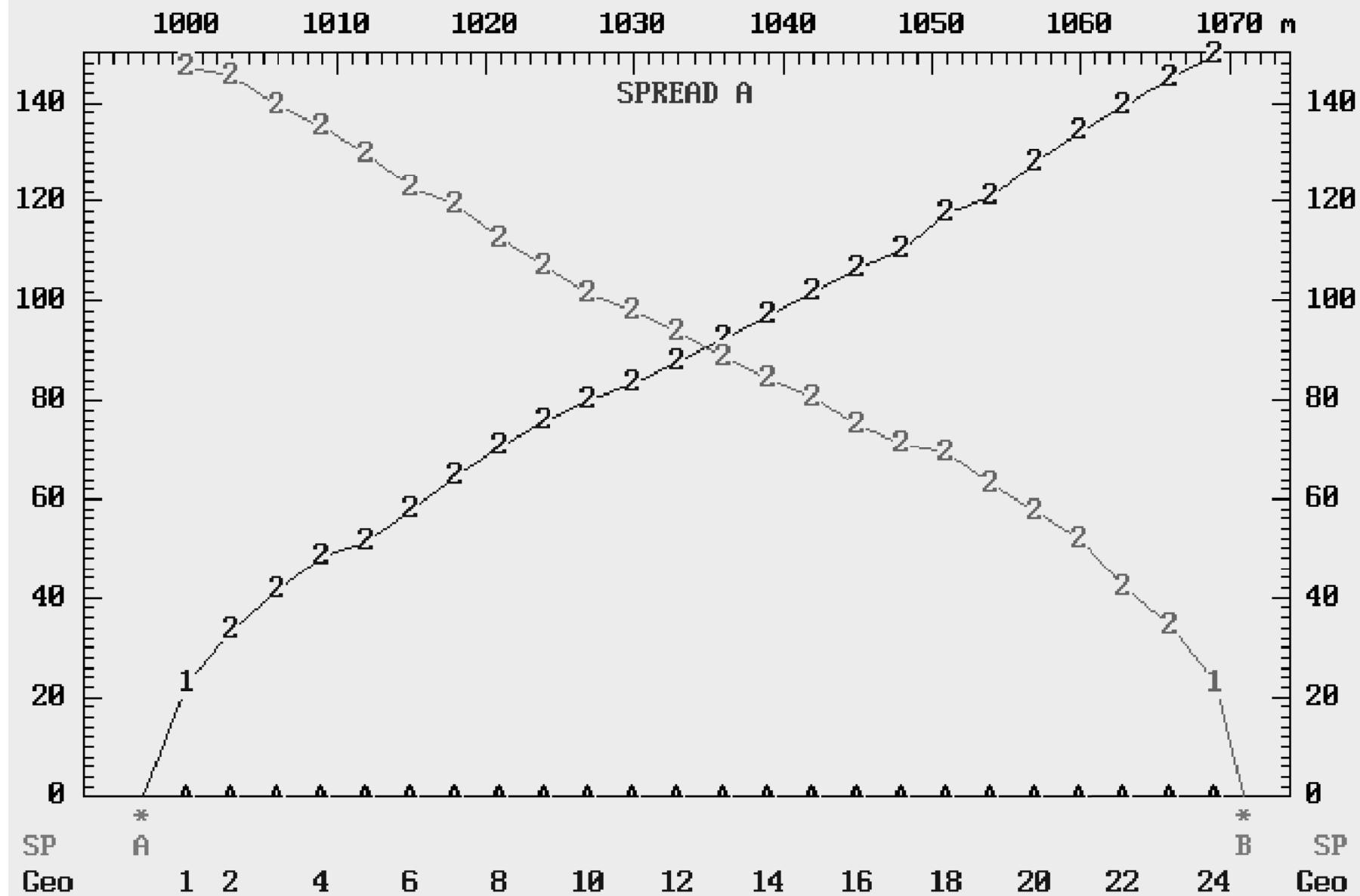
DNR Compound S-wave

DNR Compound S-wave



DNR Compound S-wave

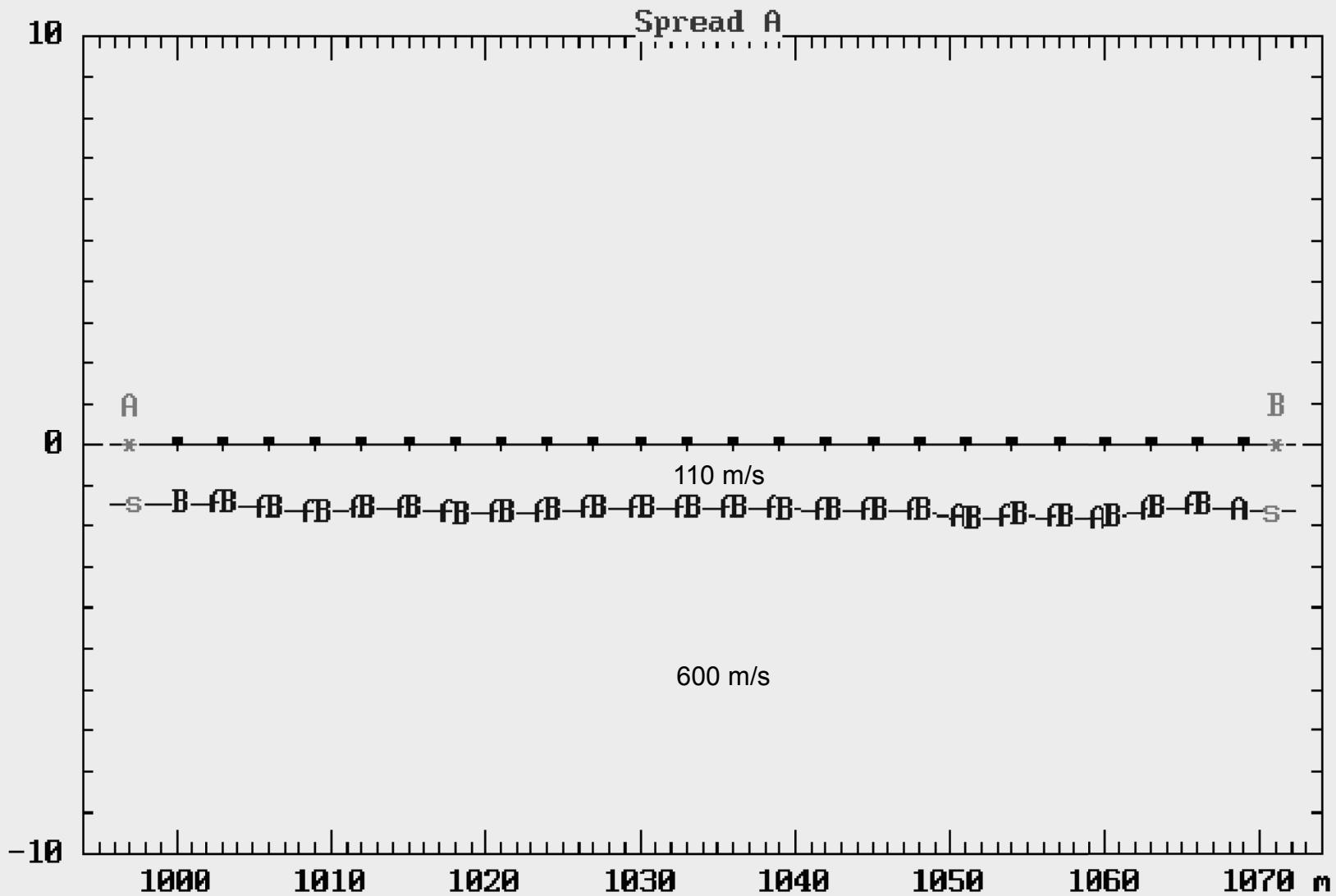
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



DNR Compound S-wave

Press Esc to EXIT

COMPSWAU.SIP: DNR Compound S-Waves

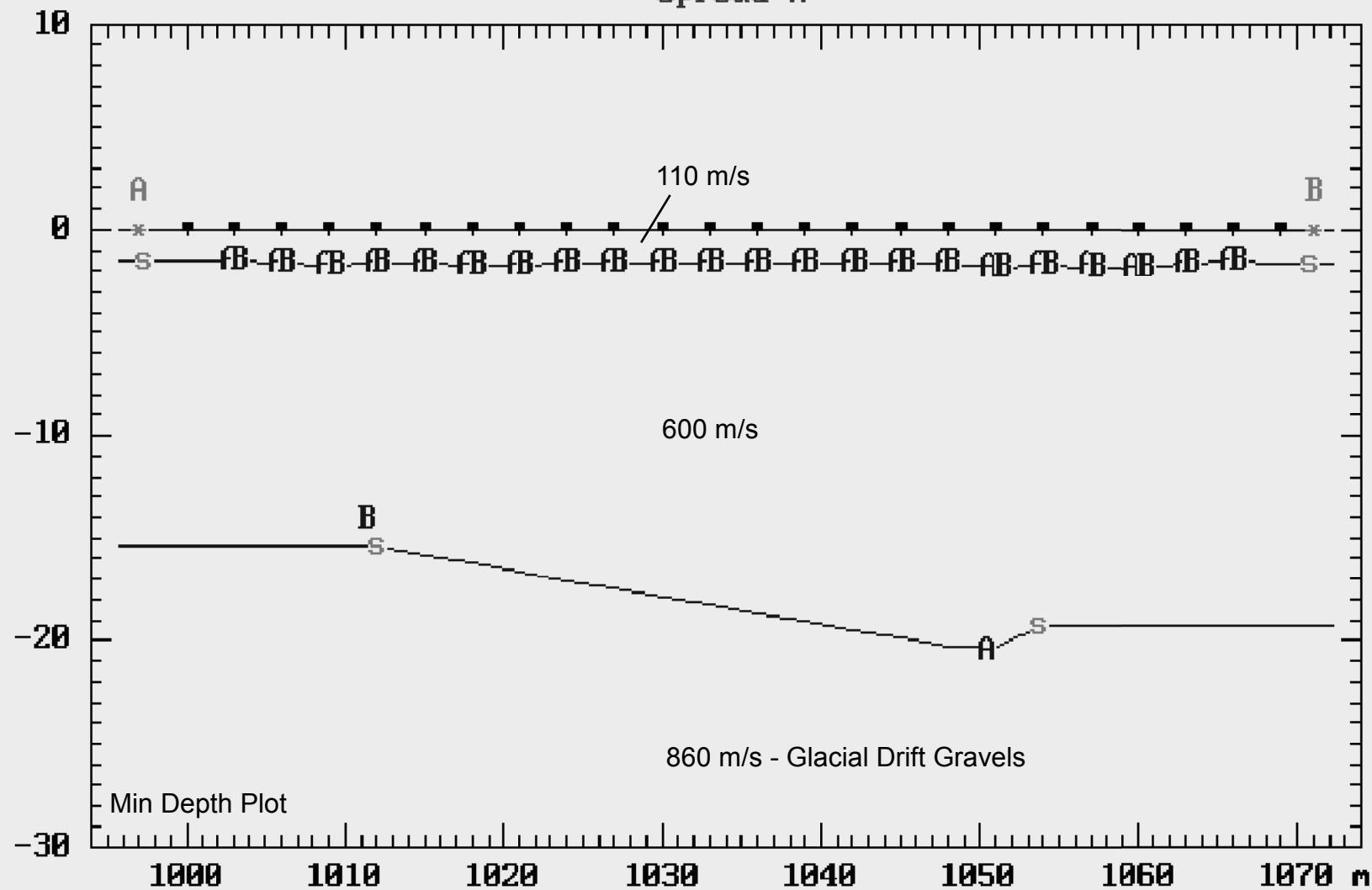


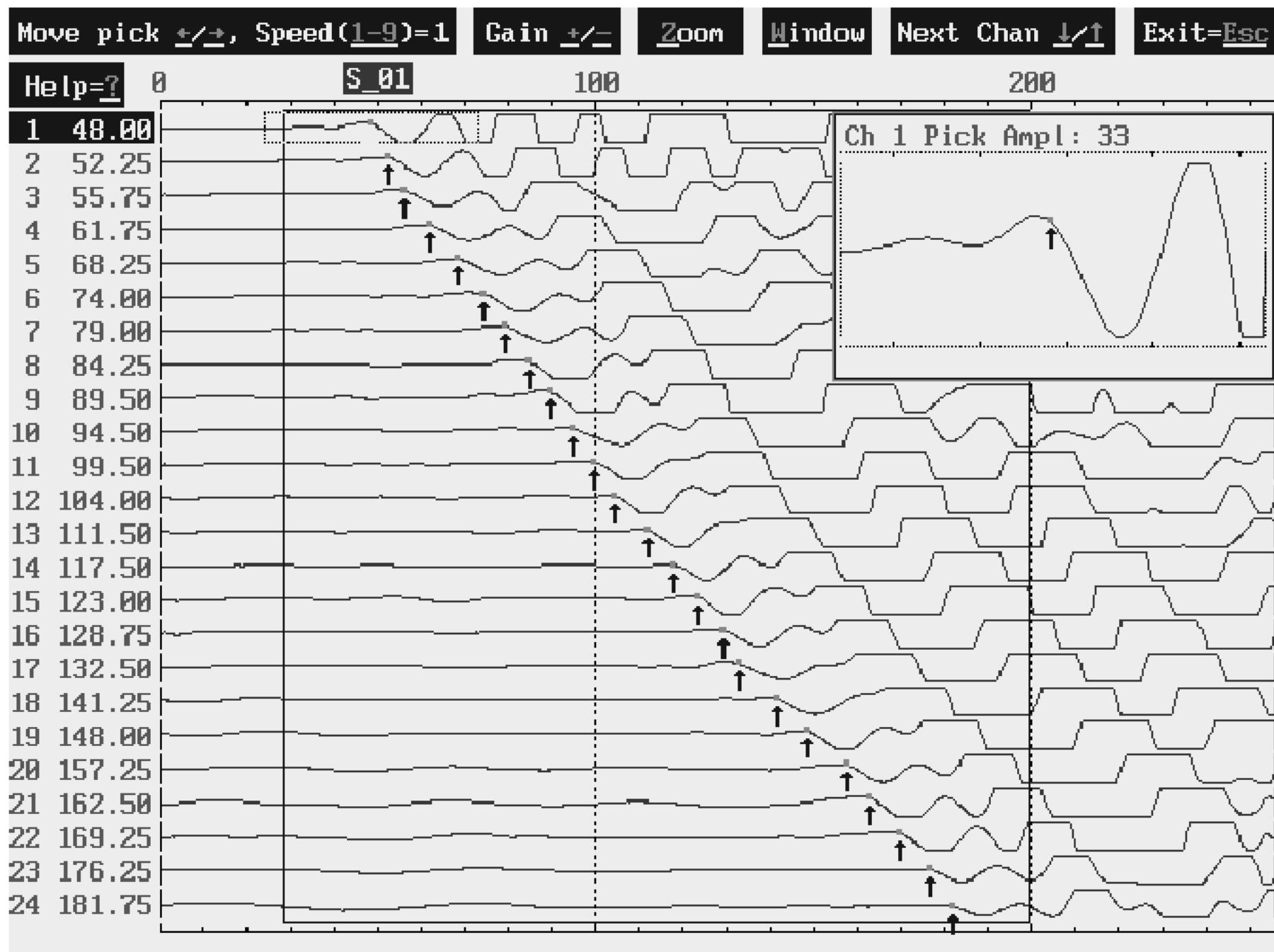
DNR Compound S-wave

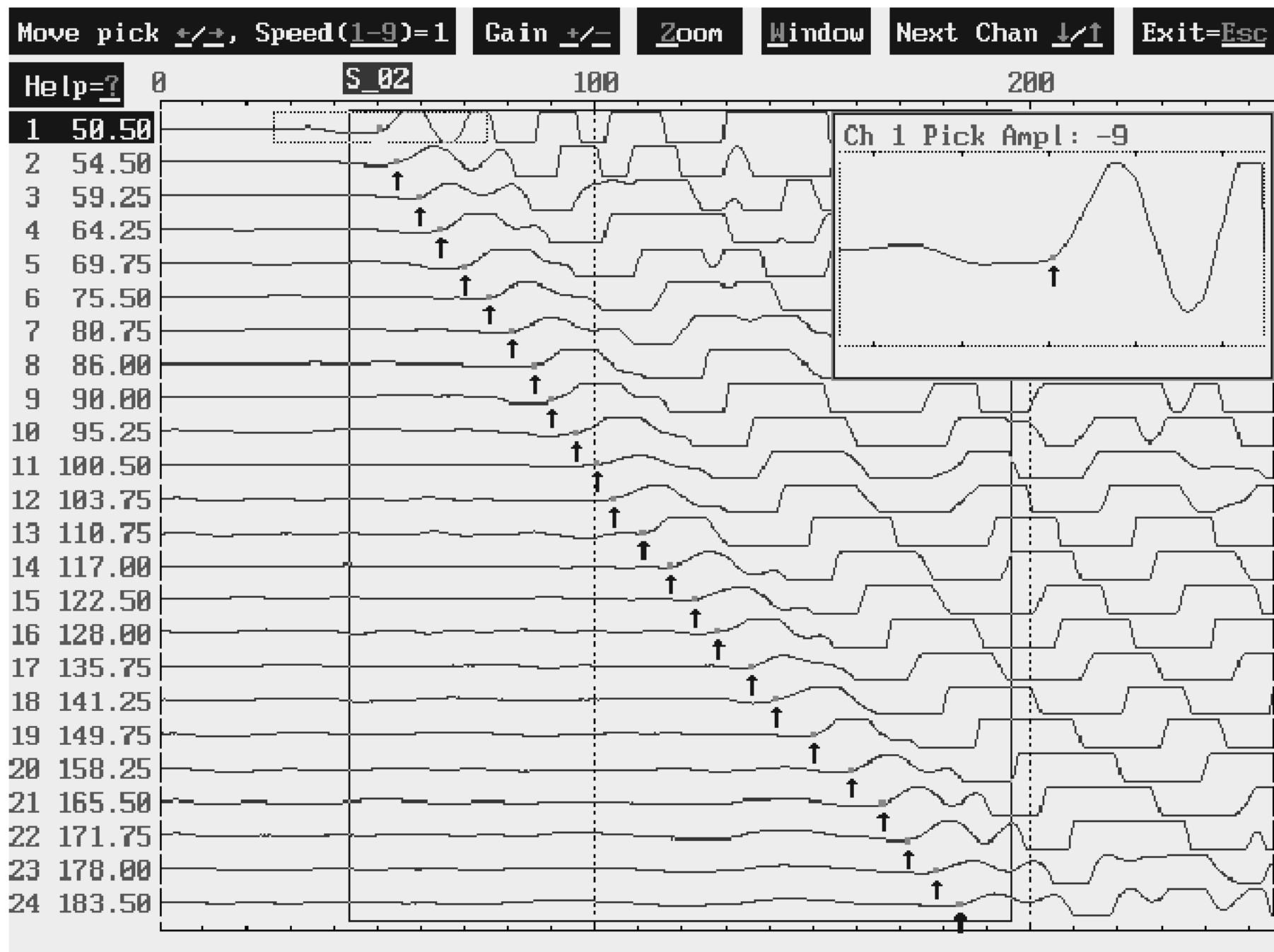
Press Esc to EXIT

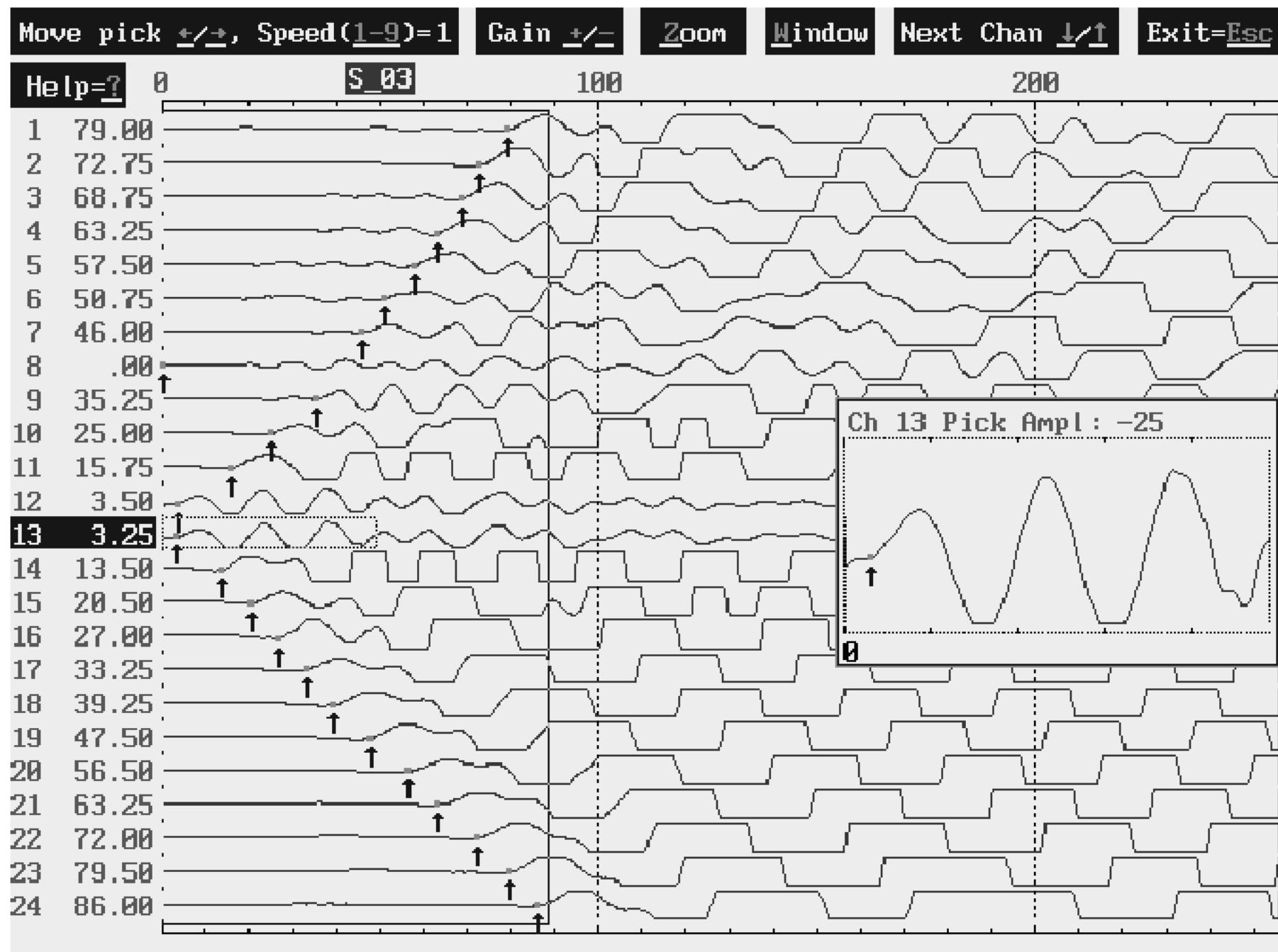
COMPSMIN.SIP: DNR Compound S-Waves Minimum Depth Model

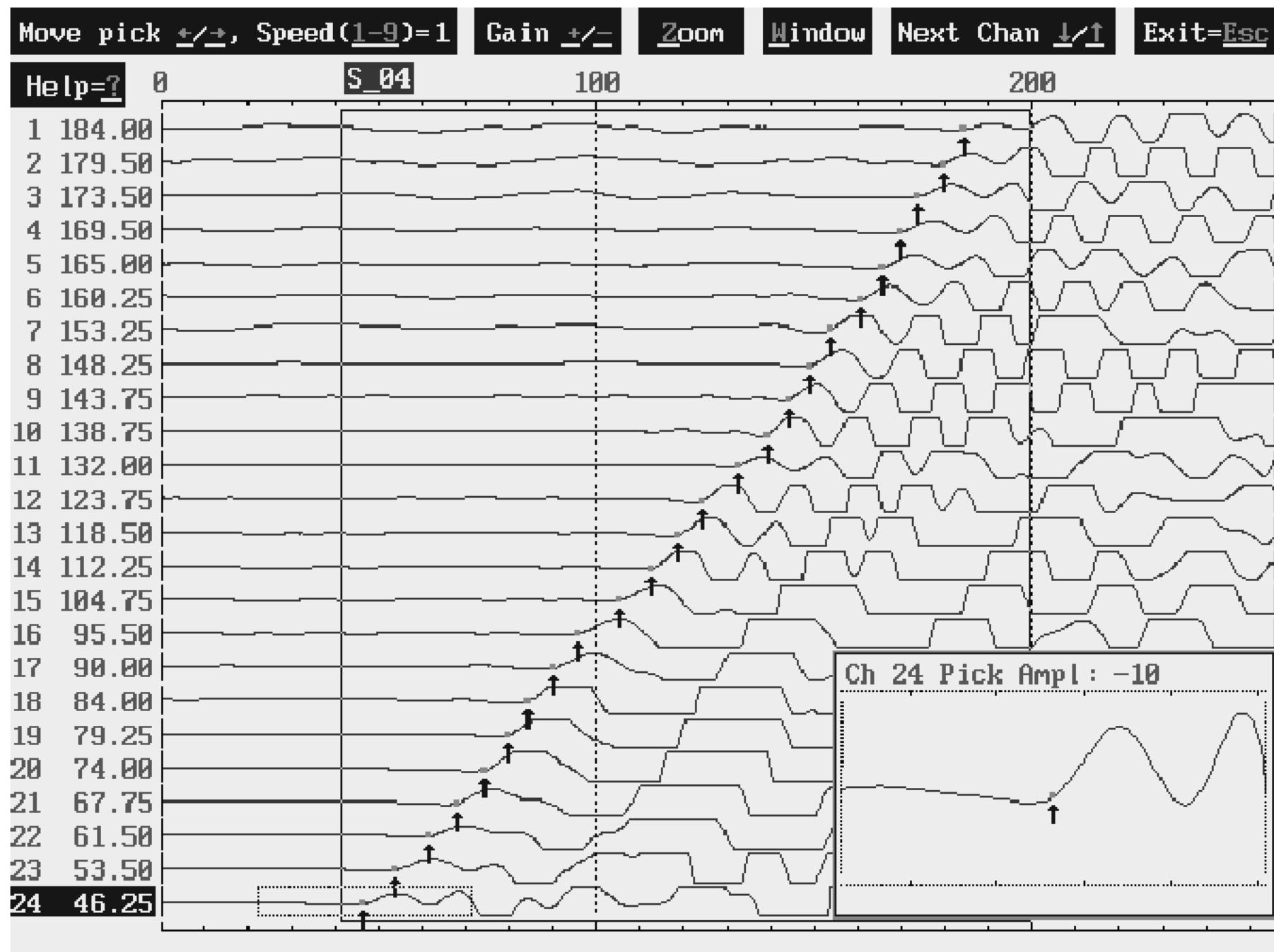
Spread A



Everett Community College S-wave

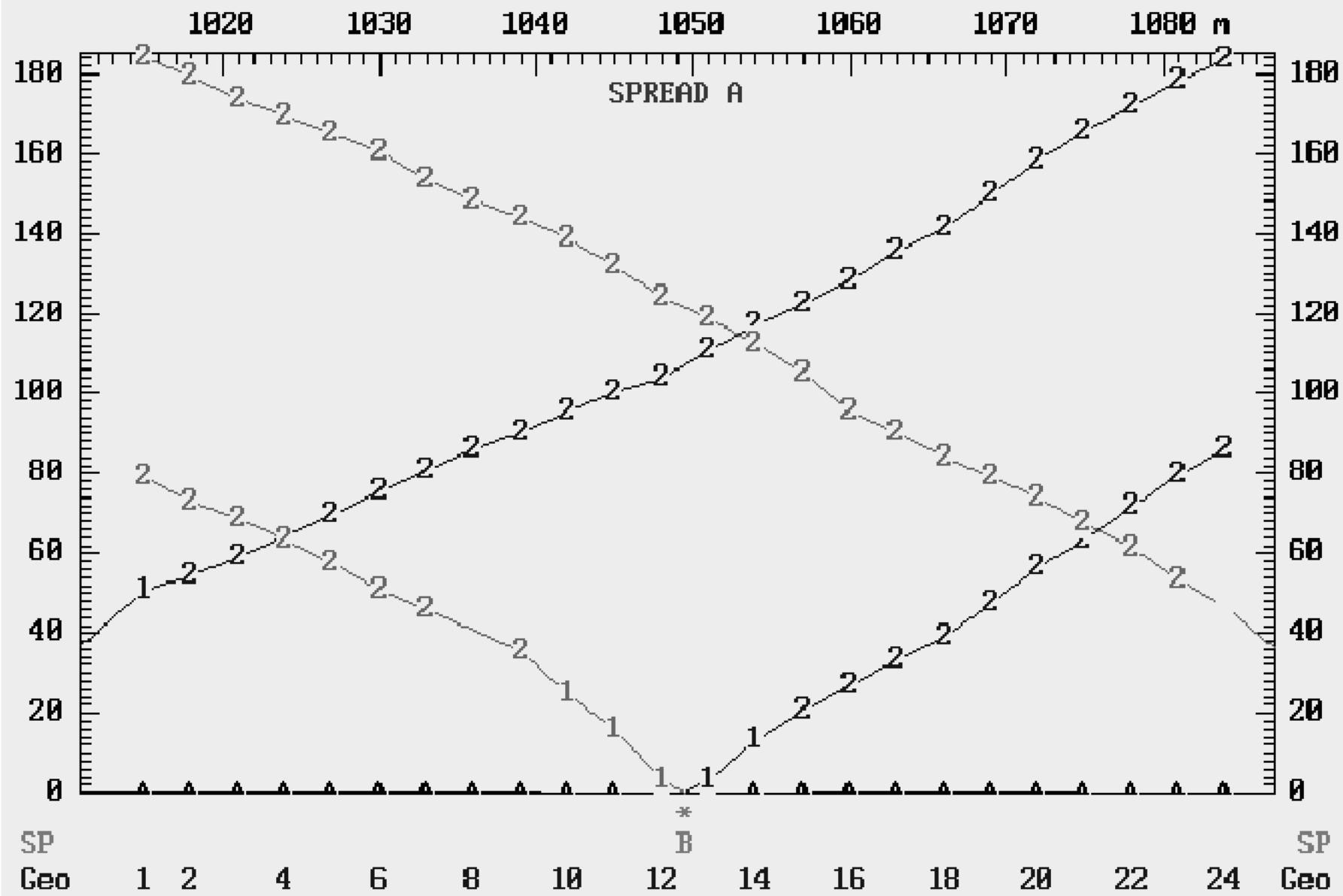
Everett Community College S-wave

Everett Community College S-wave

Everett Community College S-wave

Everett Community College S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

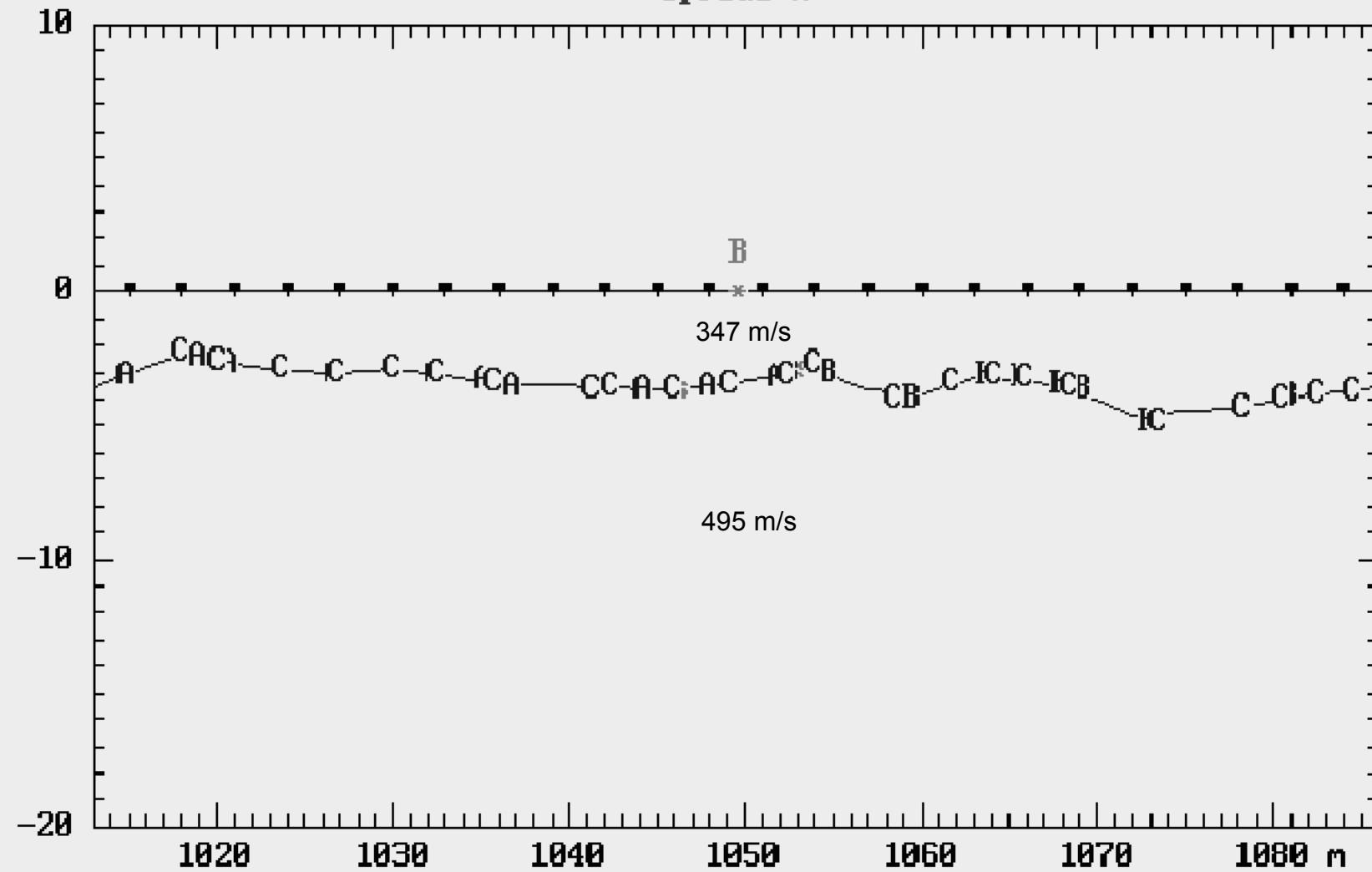


Everett Community College S-wave

Press Esc to EXIT

EVERSWAV.SIP: Everett C.C. S-Waves

Spread A

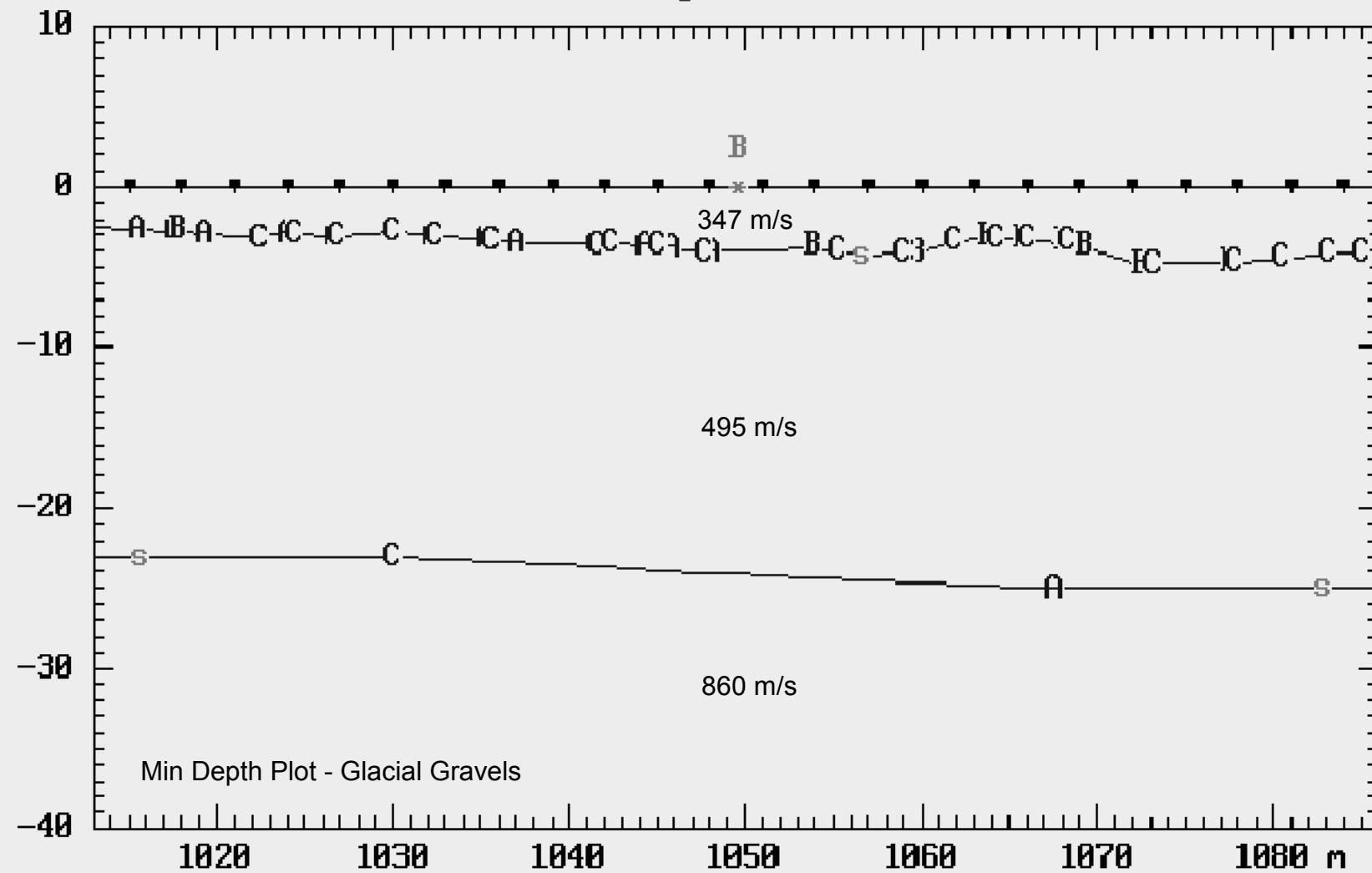


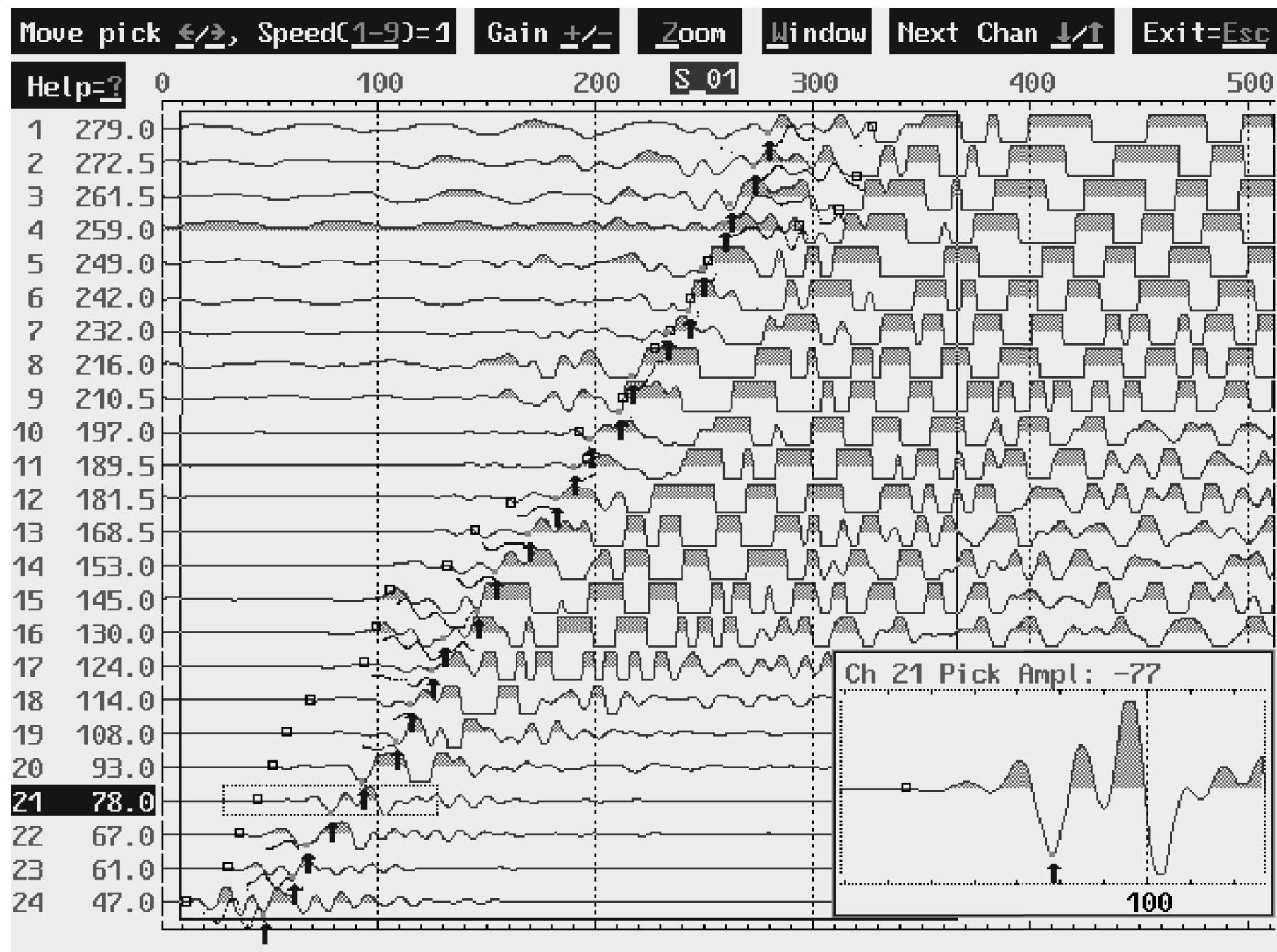
Everett Community College S-wave

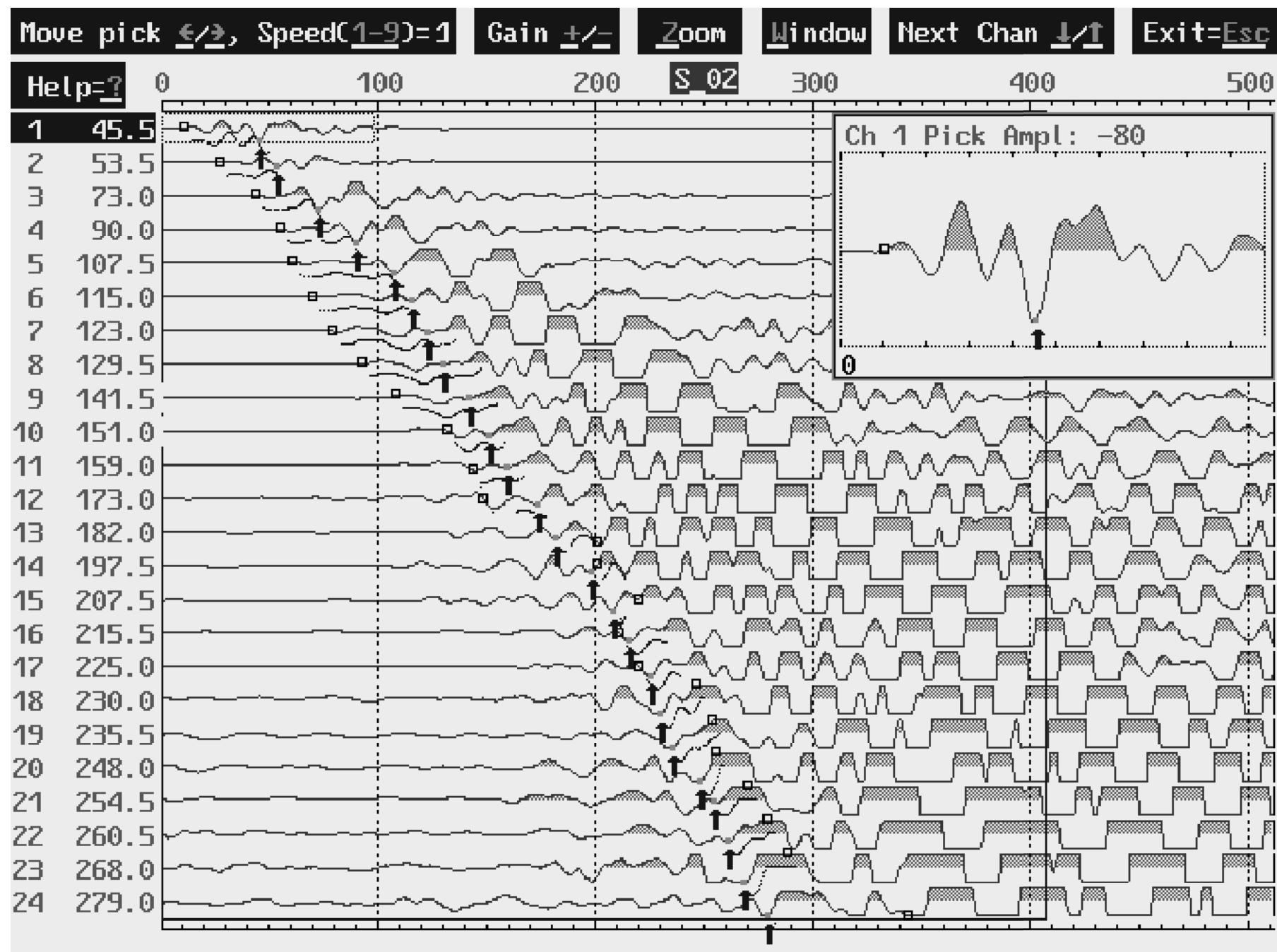
Press Esc to EXIT

EVERSMIN.SIP: Everett C.C. S-Wave Minimum Depth Plot

Spread A

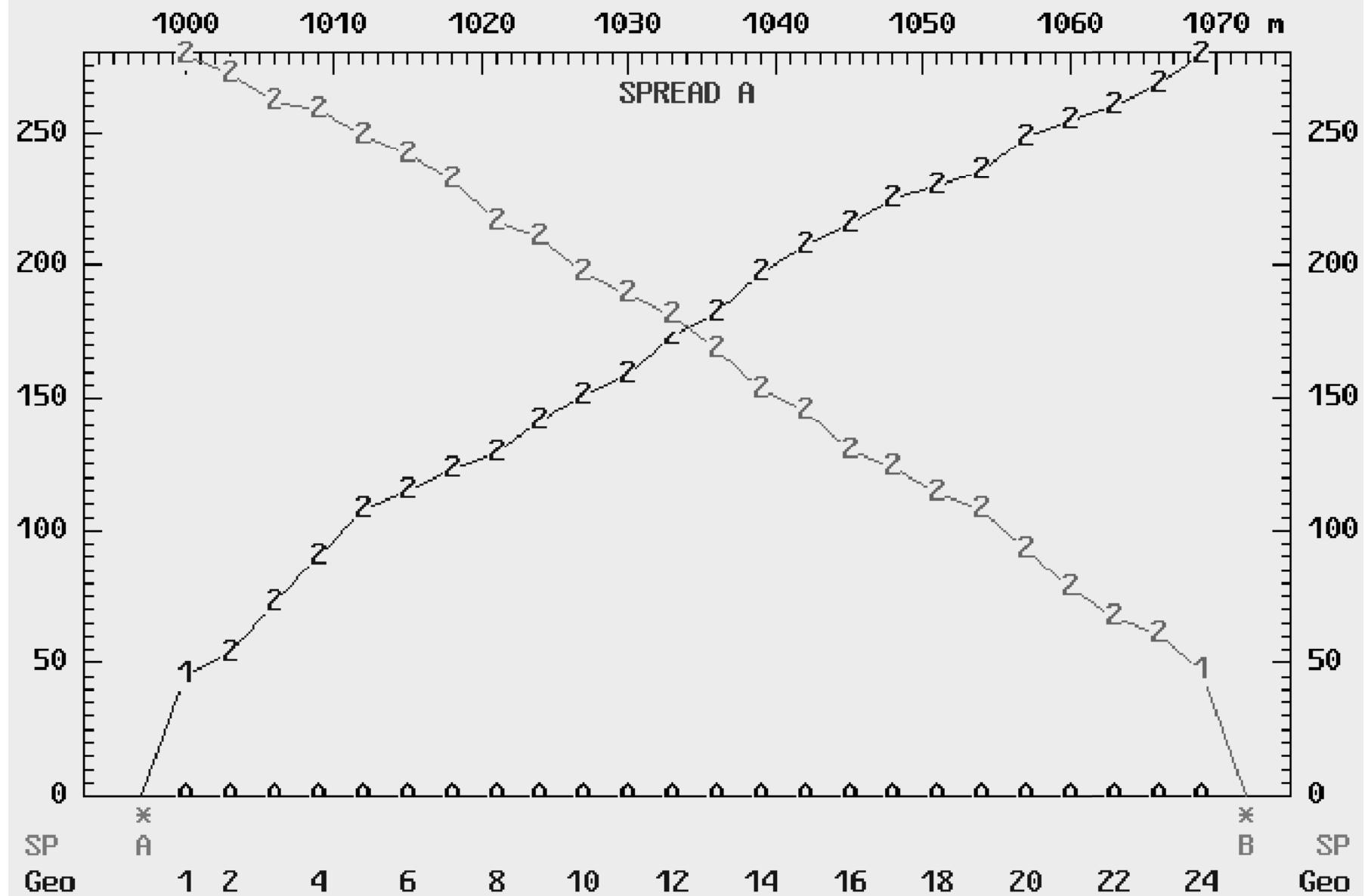


Fisher Elementary S-wave

Fisher Elementary S-wave

Fisher Elementary S-wave

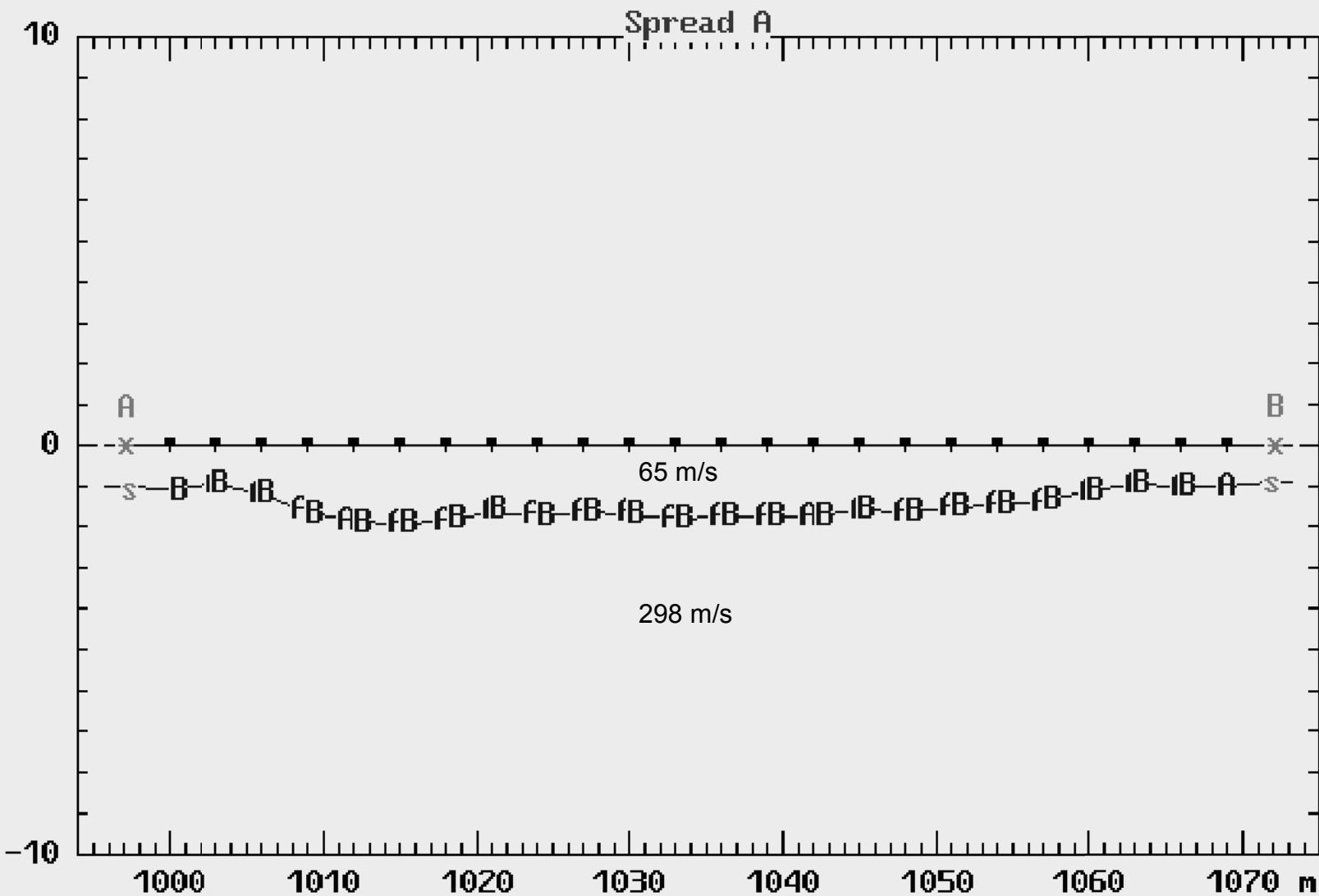
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Fisher Elementary S-wave

Press Esc to EXIT

FISHSWAV.SIP: Fisher Elementary S-Waves

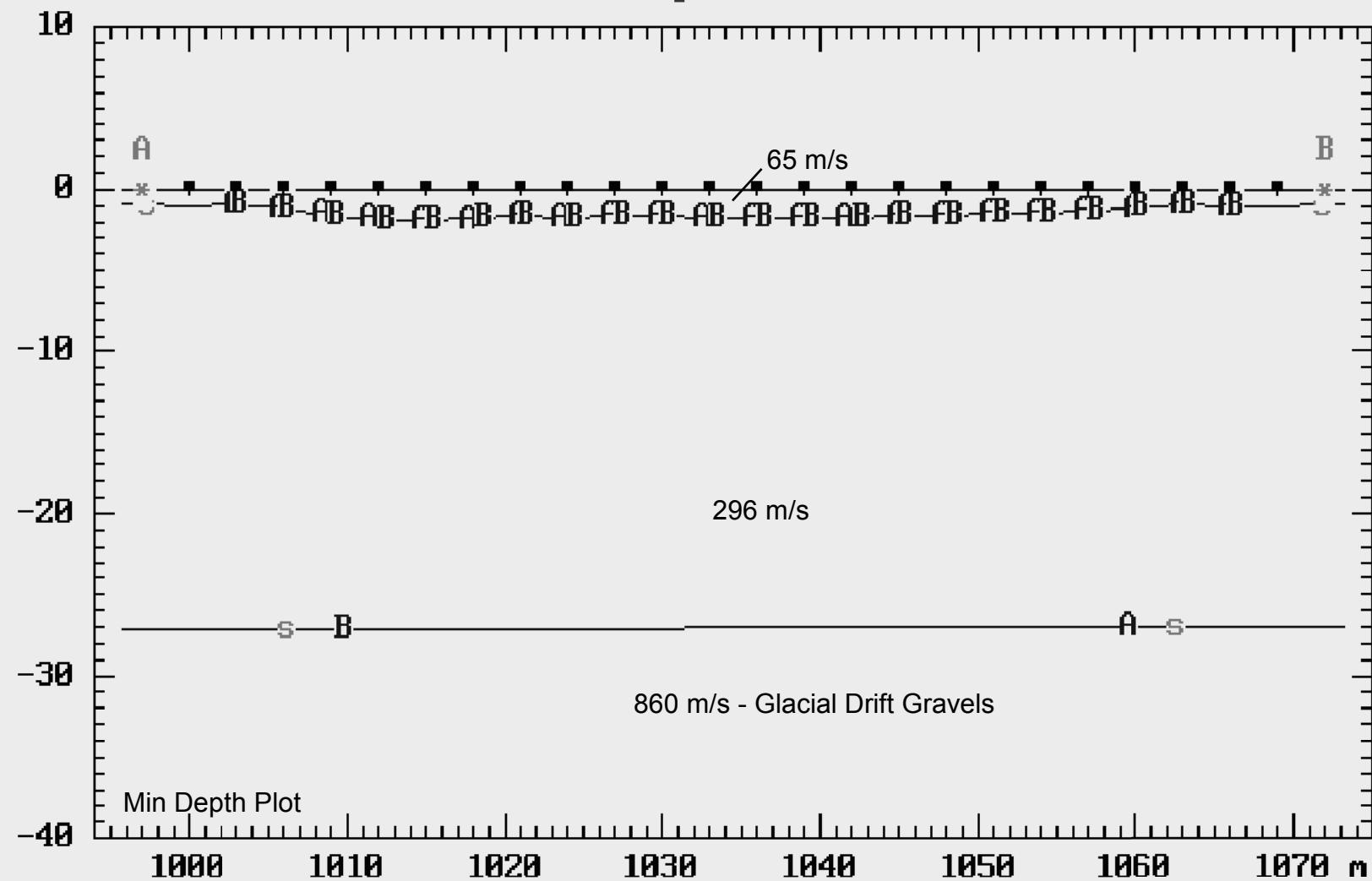


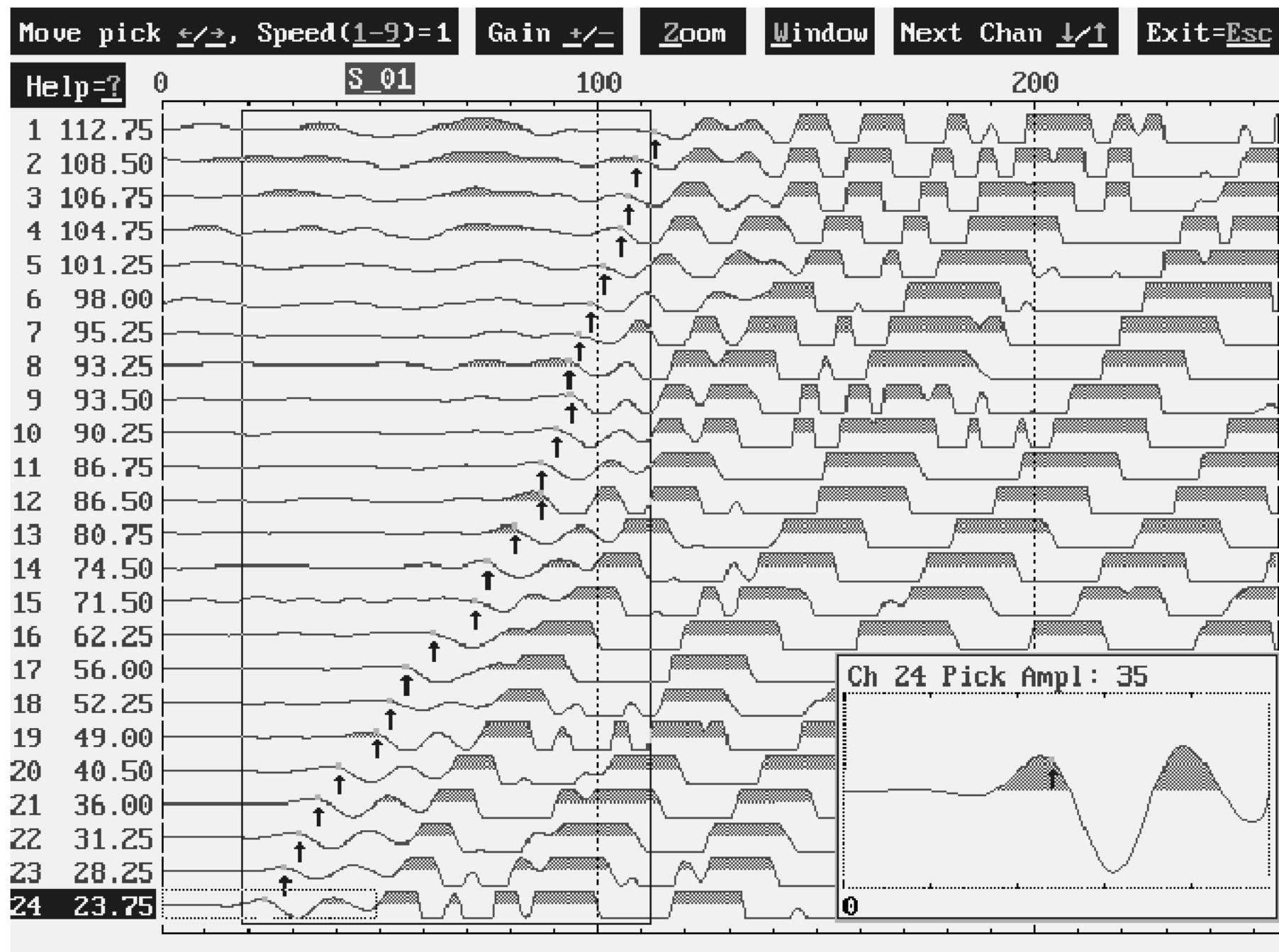
Fisher Elementary S-wave

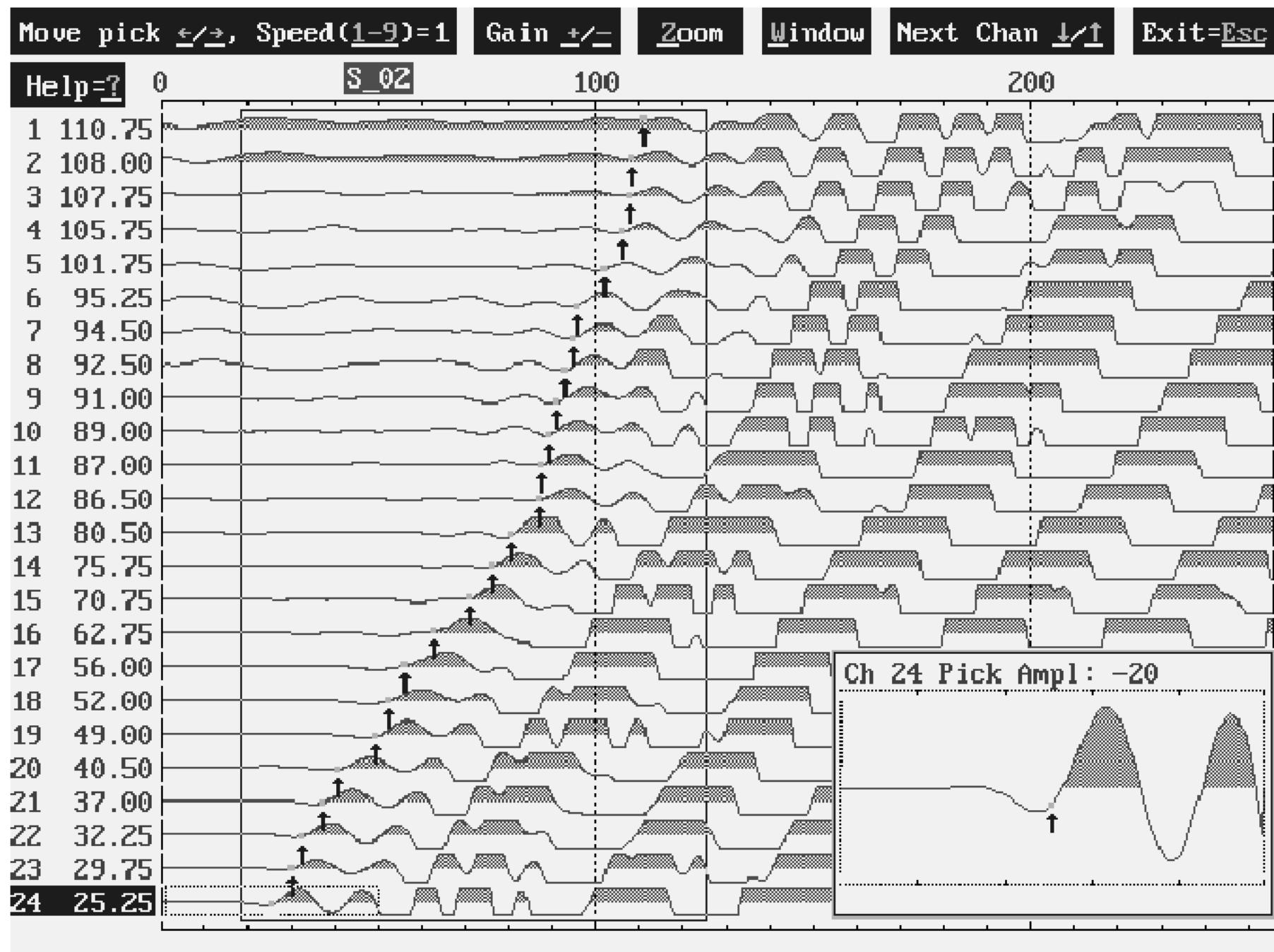
Press Esc to EXIT

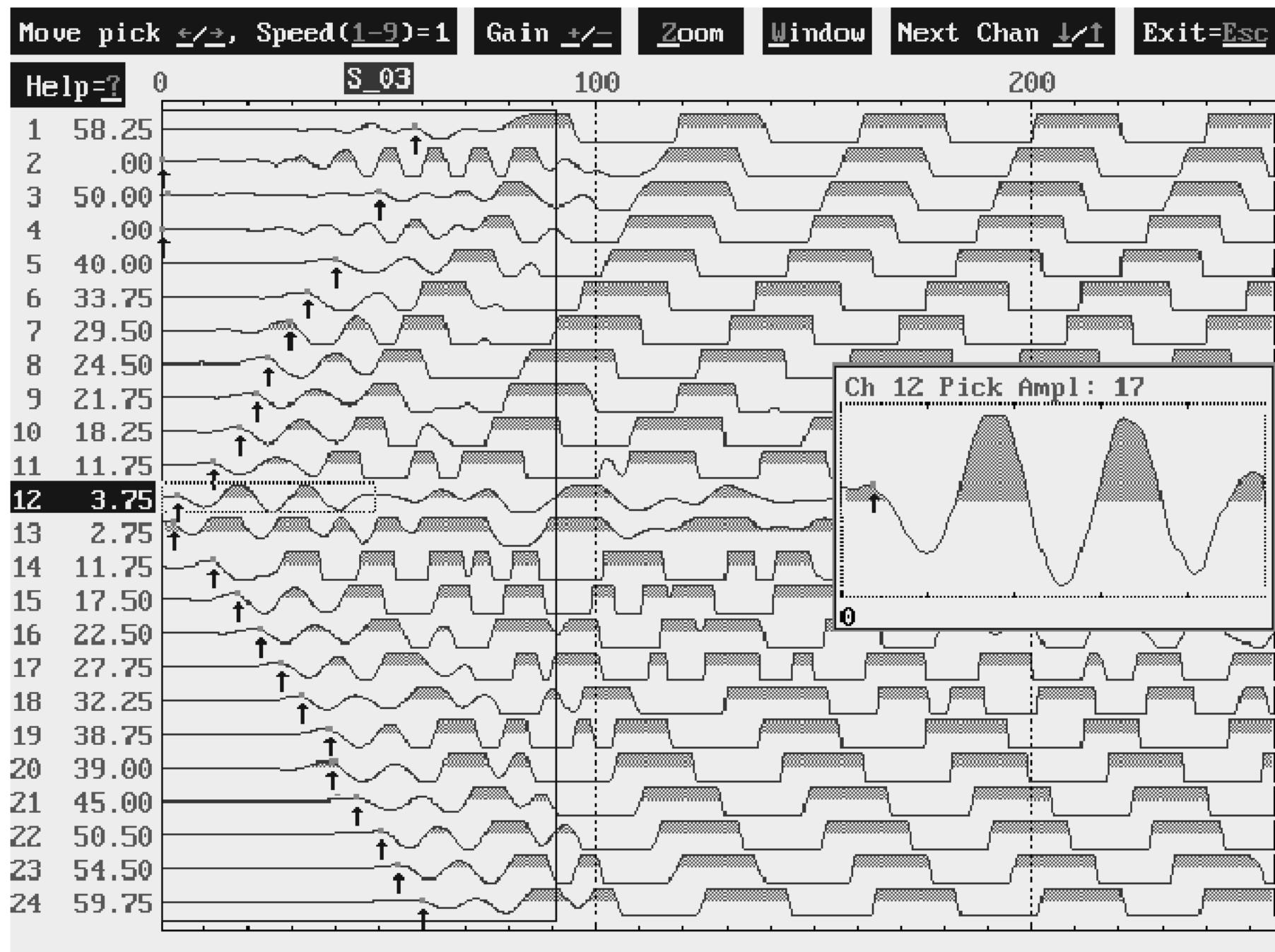
FISHSMIN.SIP: Fisher Elementary Minimum Depth Plot

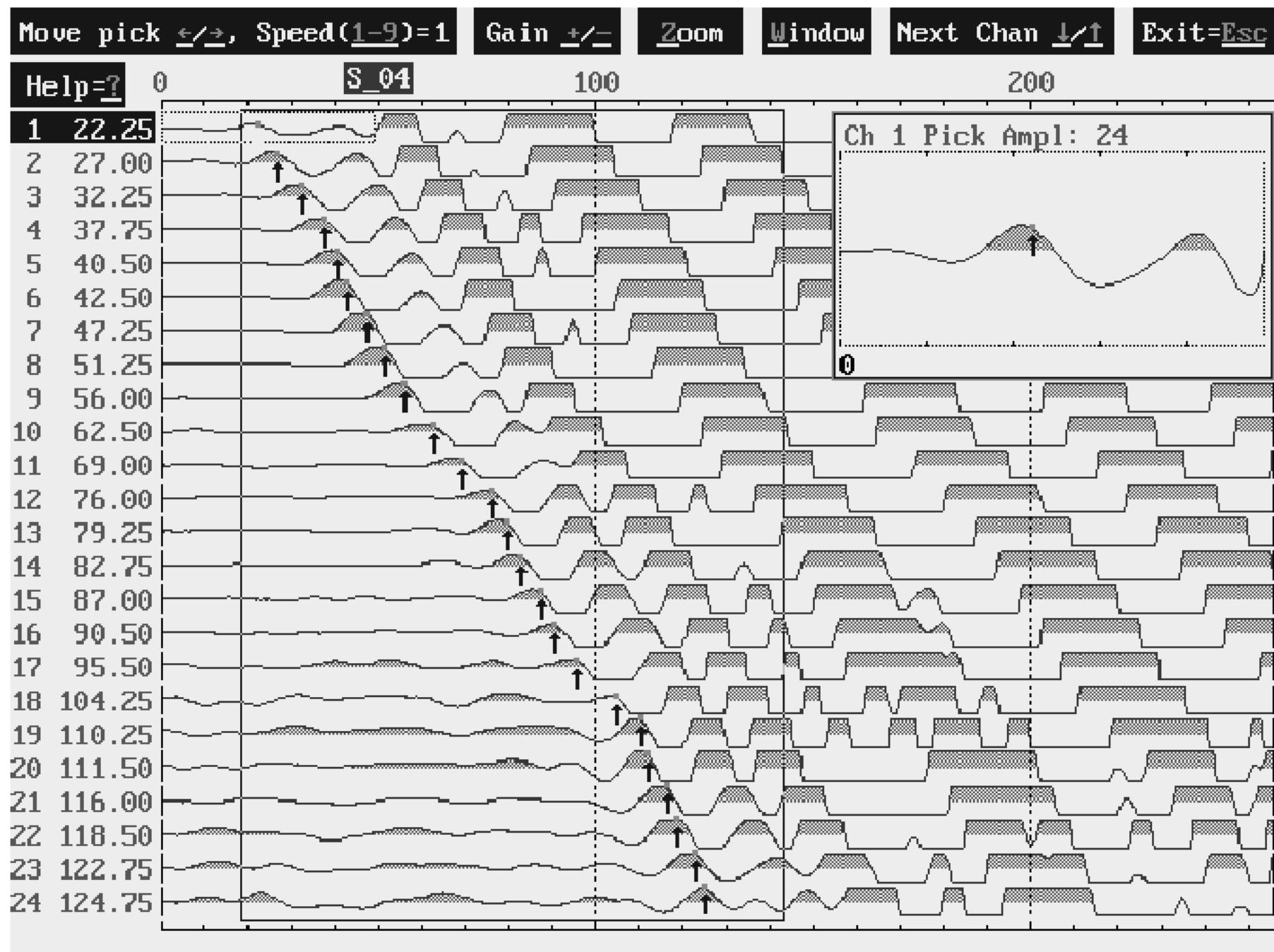
Spread A



Gilbert Elementary S-wave

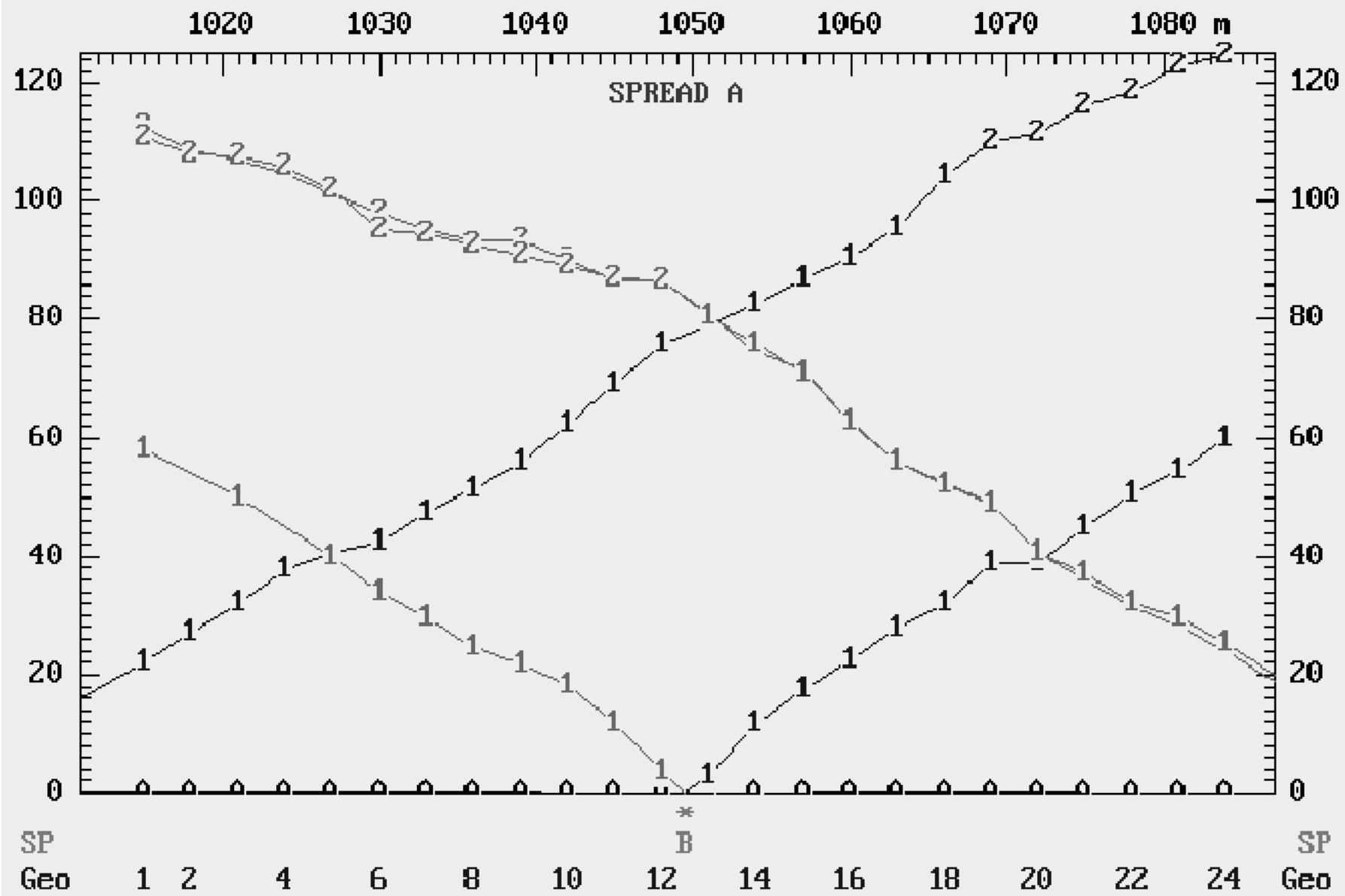
Gilbert Elementary S-wave

Gilbert Elementary S-wave

Gilbert Elementary S-wave

Gilbert Elementary S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

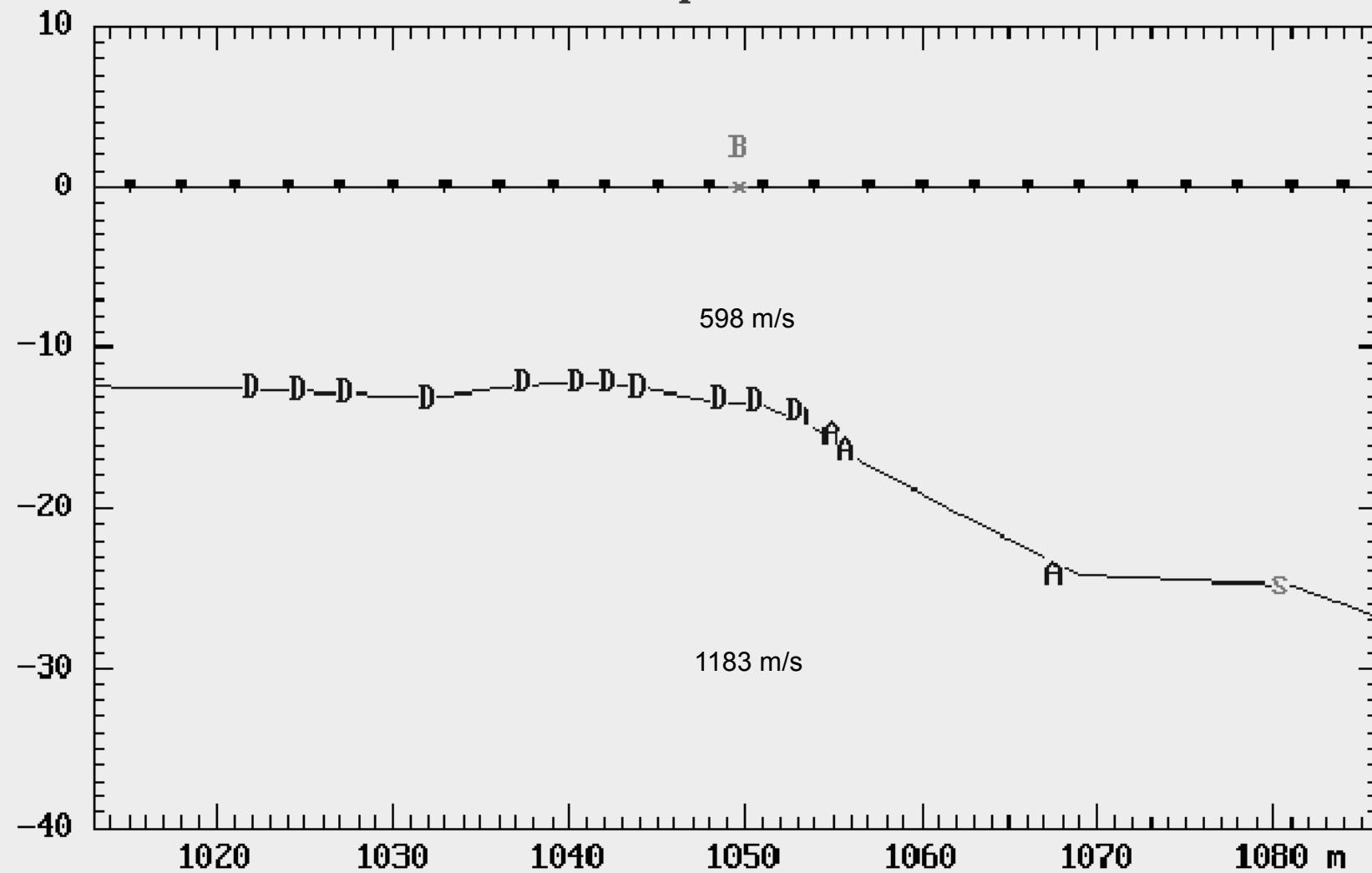


Gilbert Elementary S-wave

Press Esc to EXIT

GILBSWAU.SIP: Gilbert Elementary S-Waves

Spread A

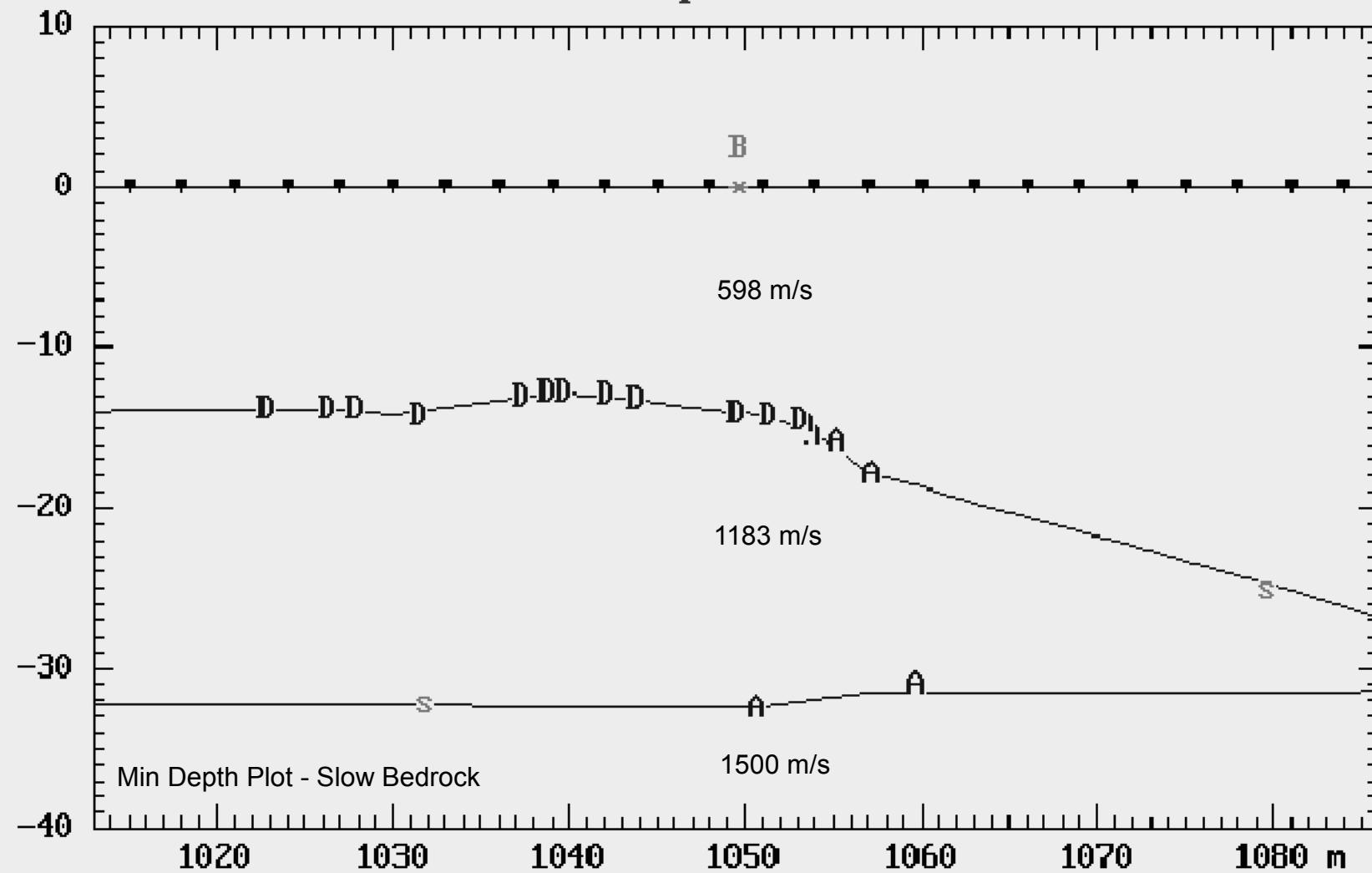


Gilbert Elementary S-wave

Press Esc to EXIT

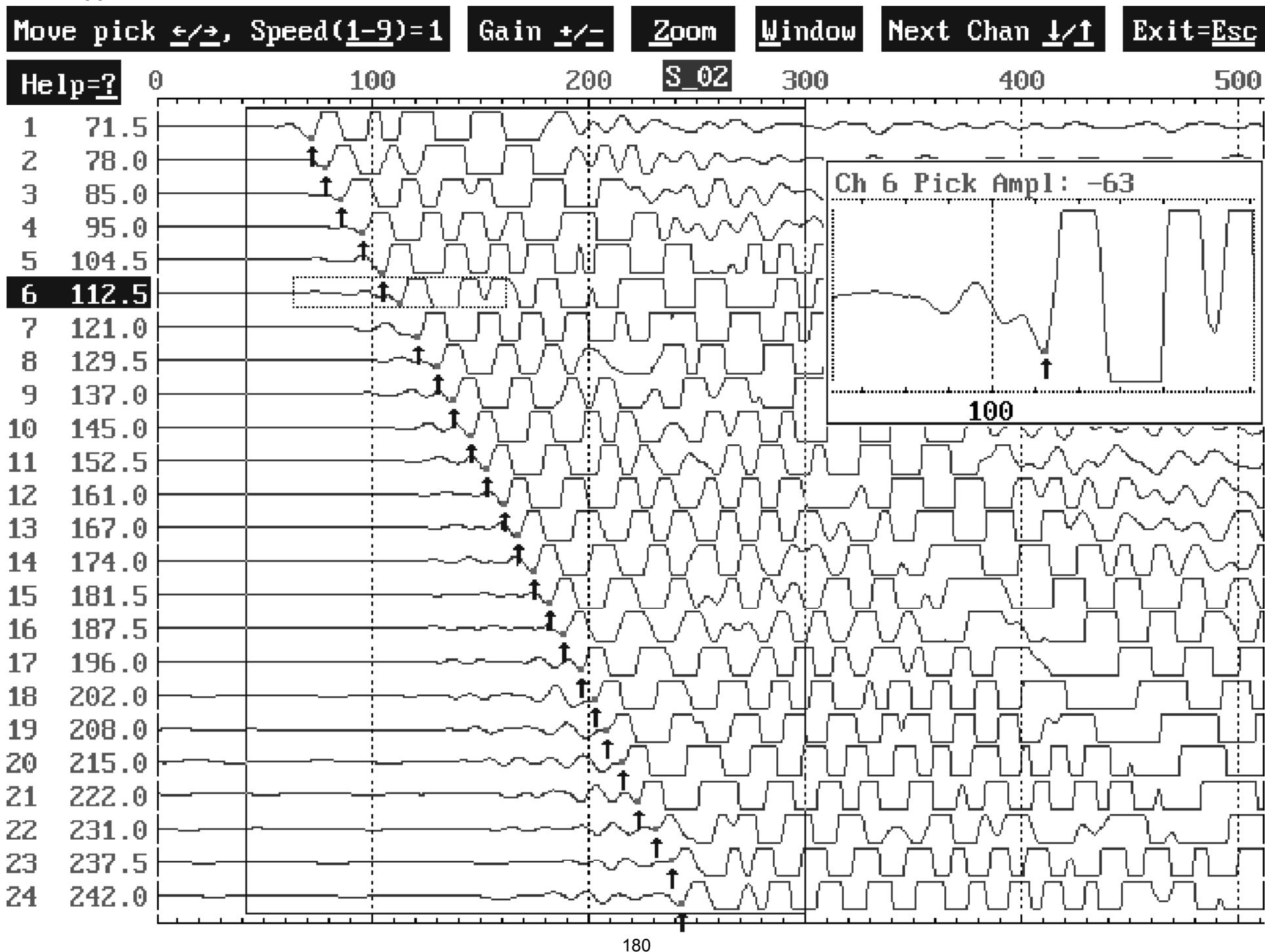
GILBSMIN.SIP: Gilbert Elementary S-Waves Minimum Depth Plot

Spread A

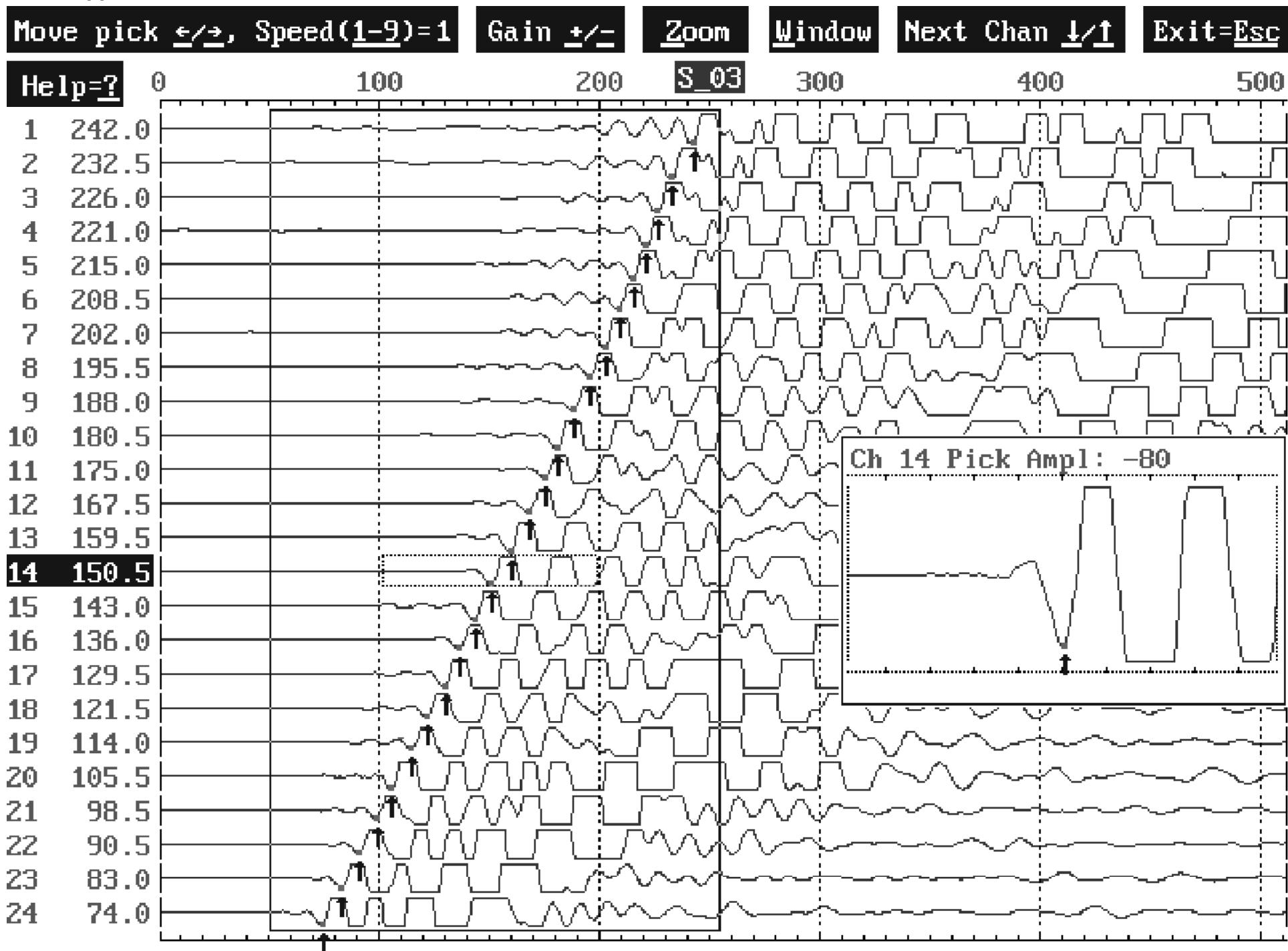


Appendix C

Glade North Road S-wave



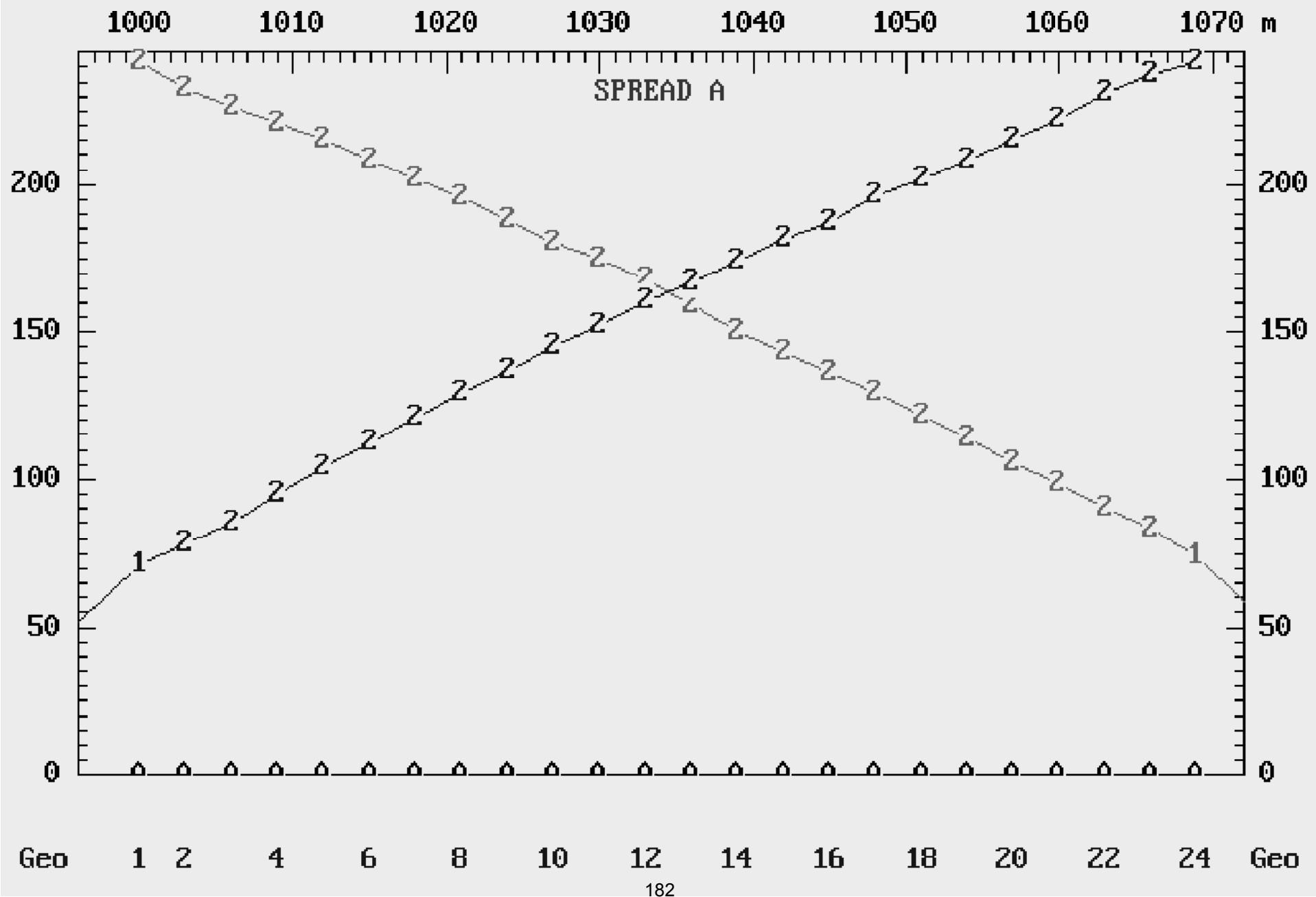
Glade North Road S-wave



Appendix C

Glade North Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point: type in Layer Number.
Press Esc when finished.

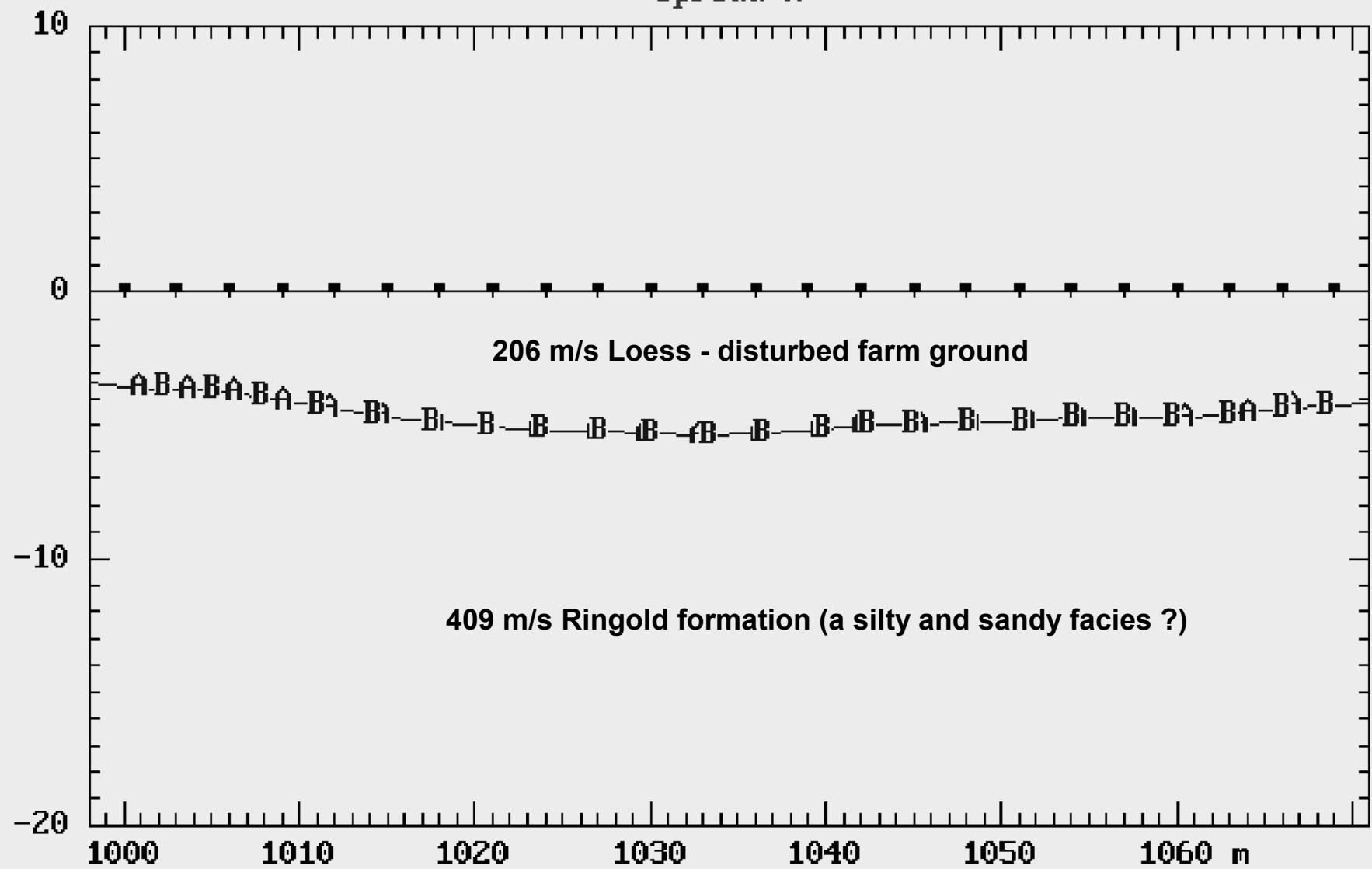


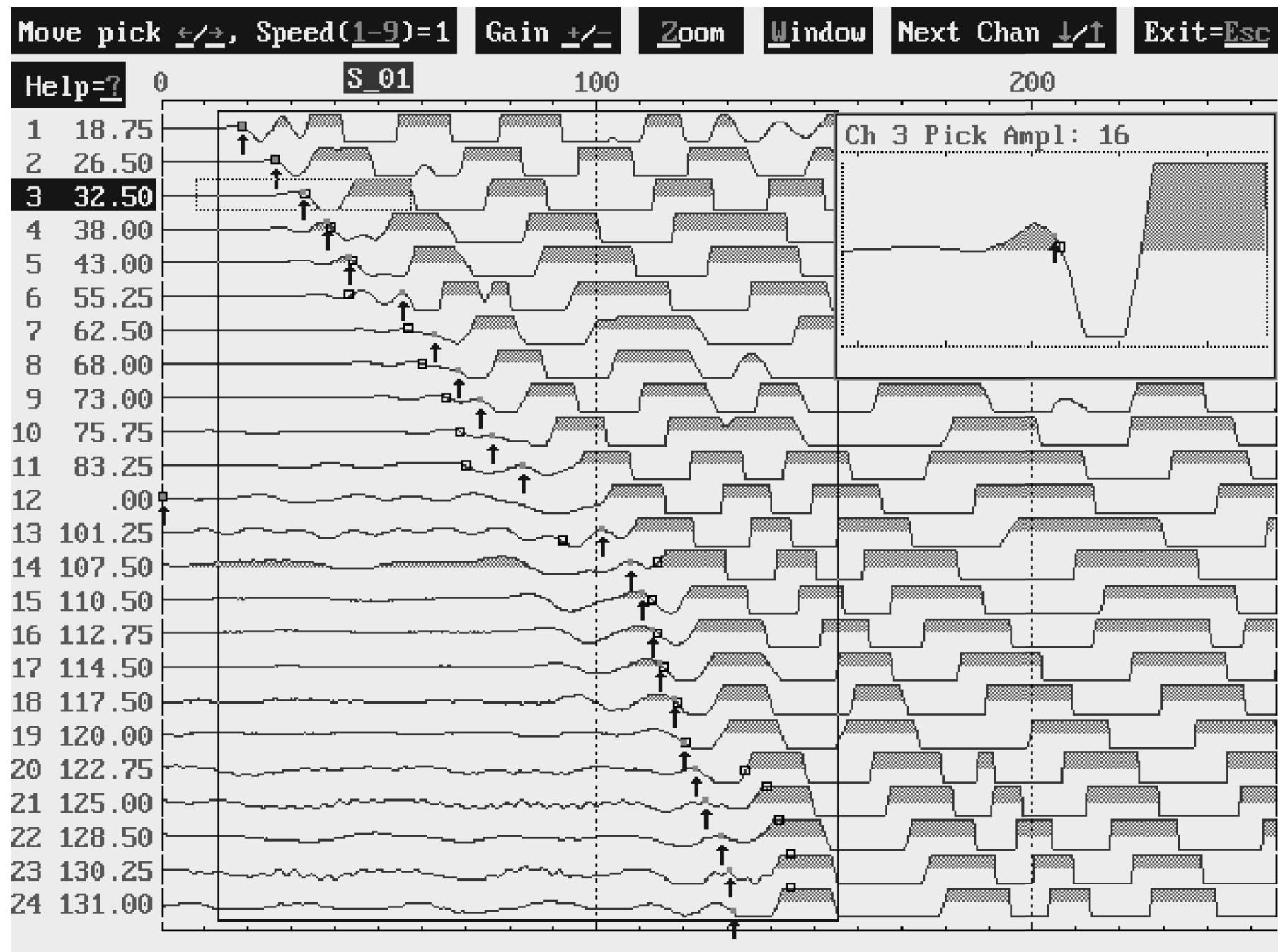
Glade North Road S-wave

Press Esc to EXIT

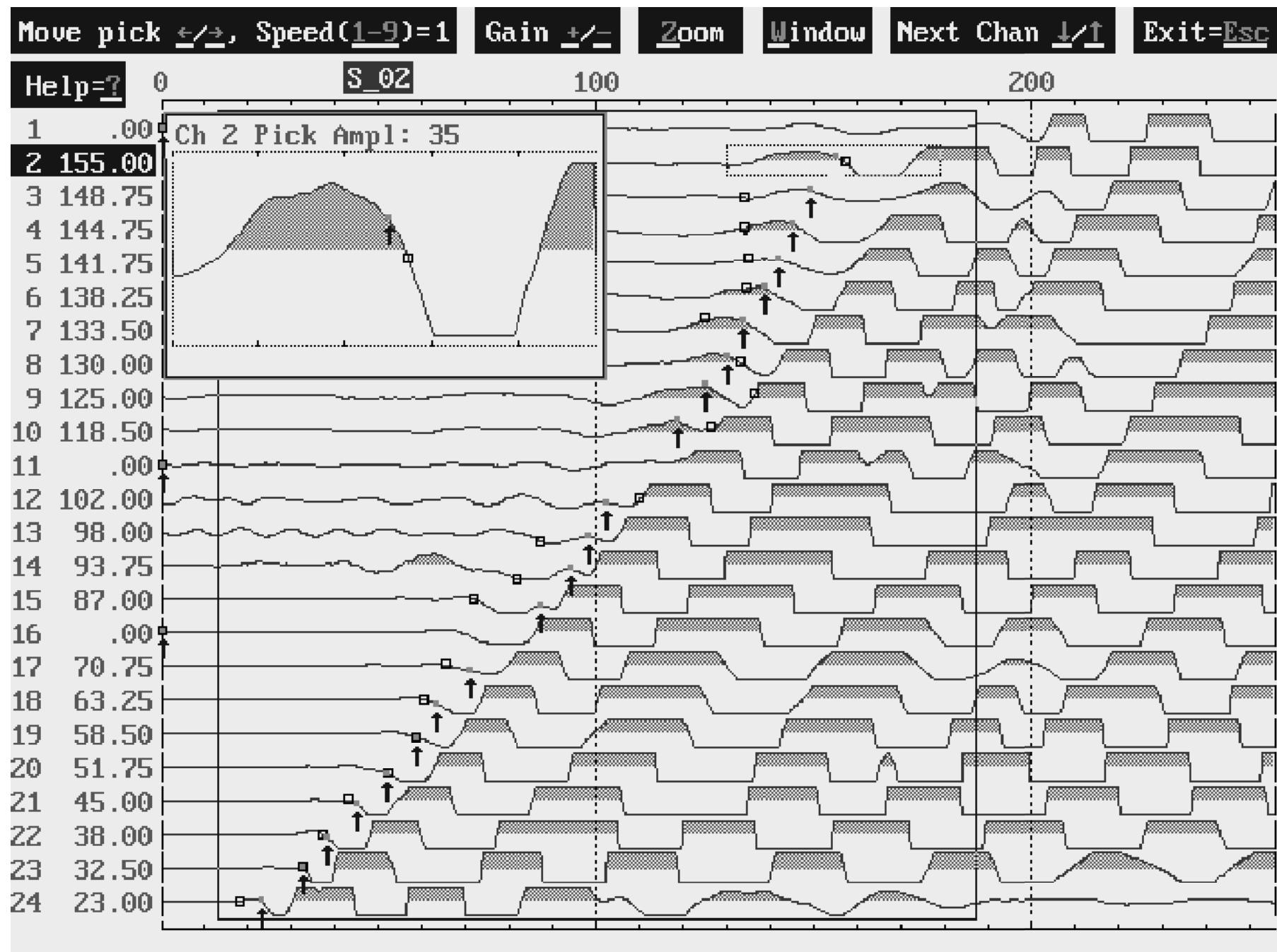
GLADE_SW.SIP: Glade North S wave survey

Spread A



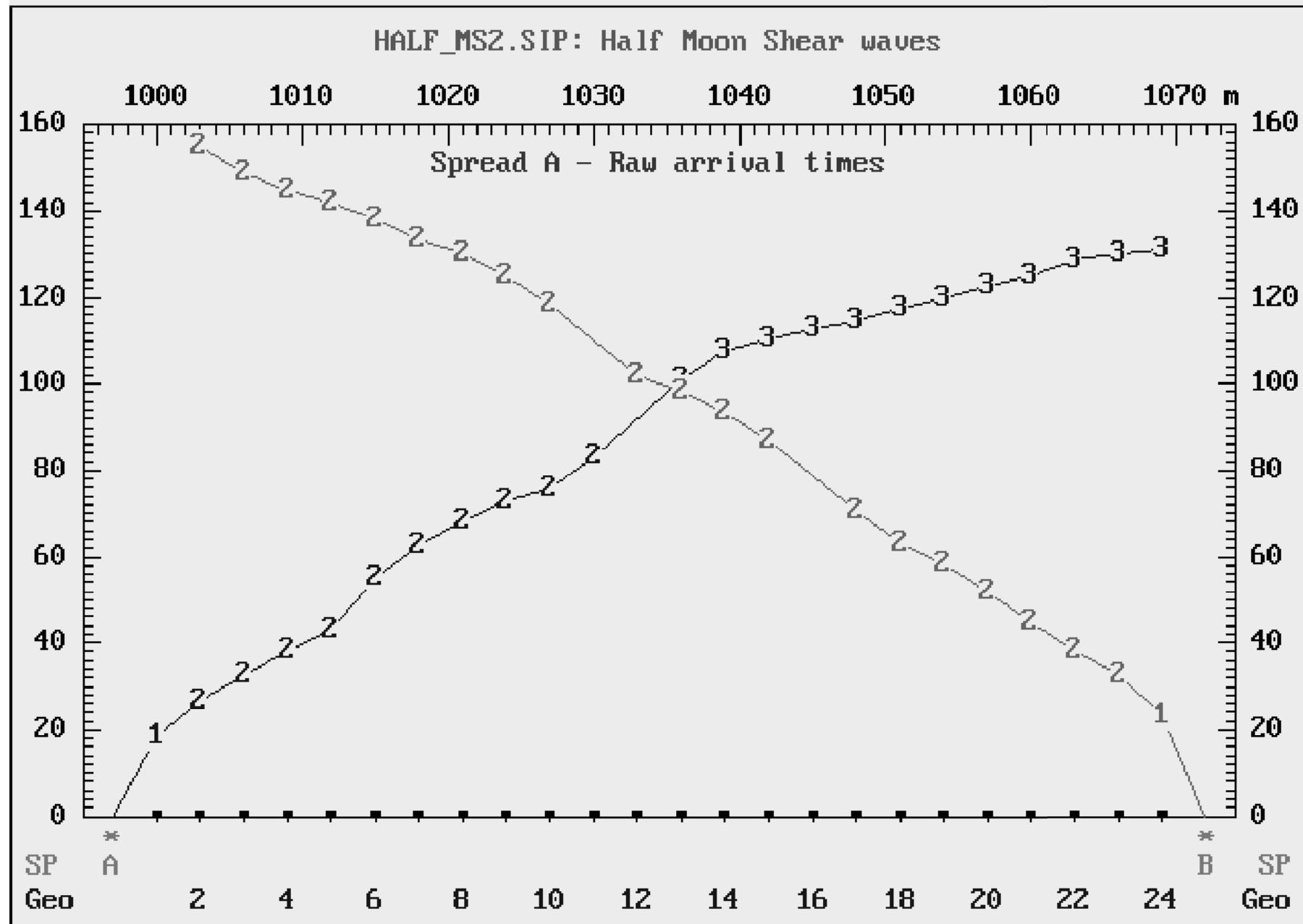
Half Moon S-wave

Half Moon S-wave



Half Moon S-wave

Press Esc to EXIT

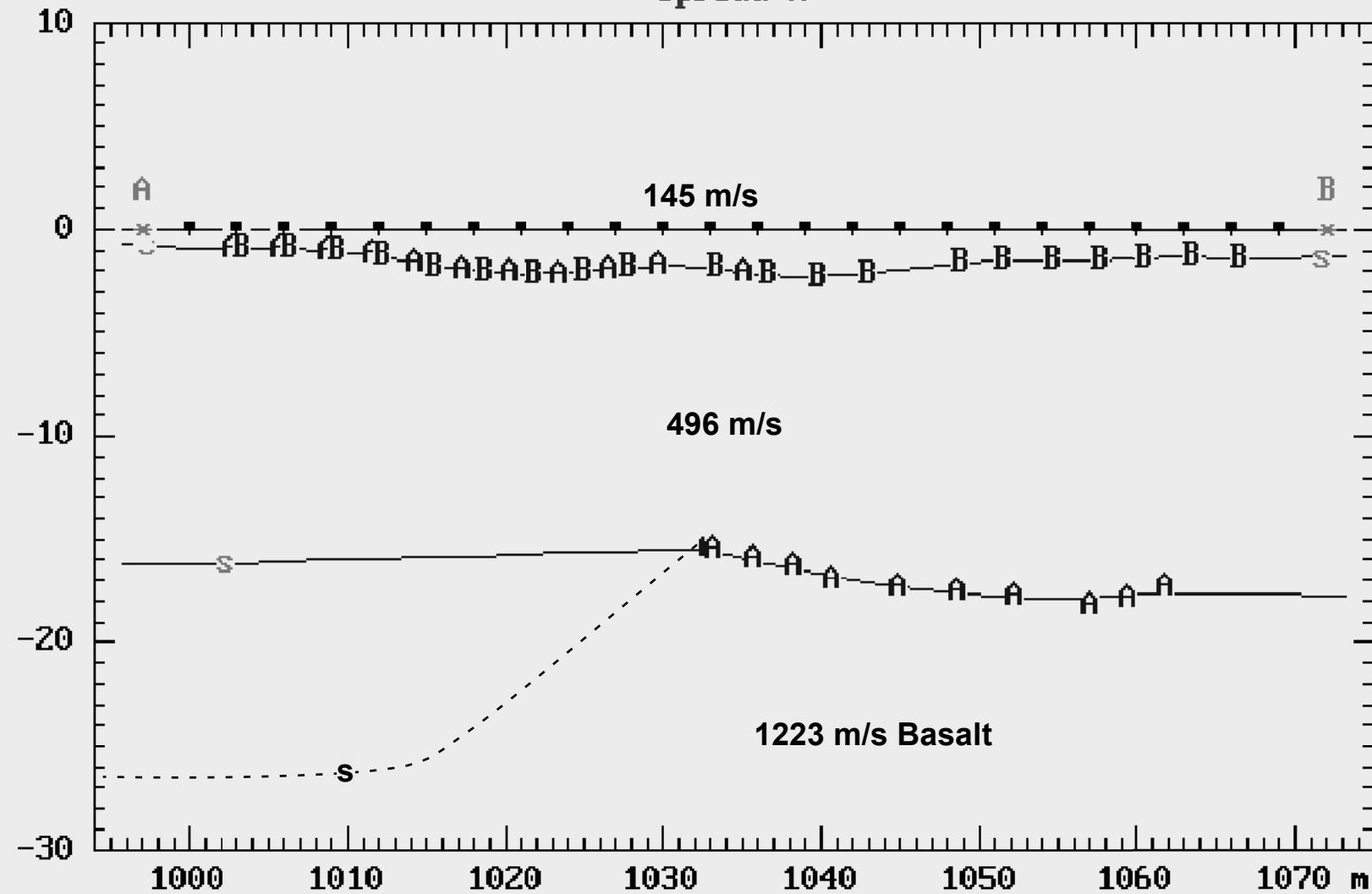


Half Moon S-wave

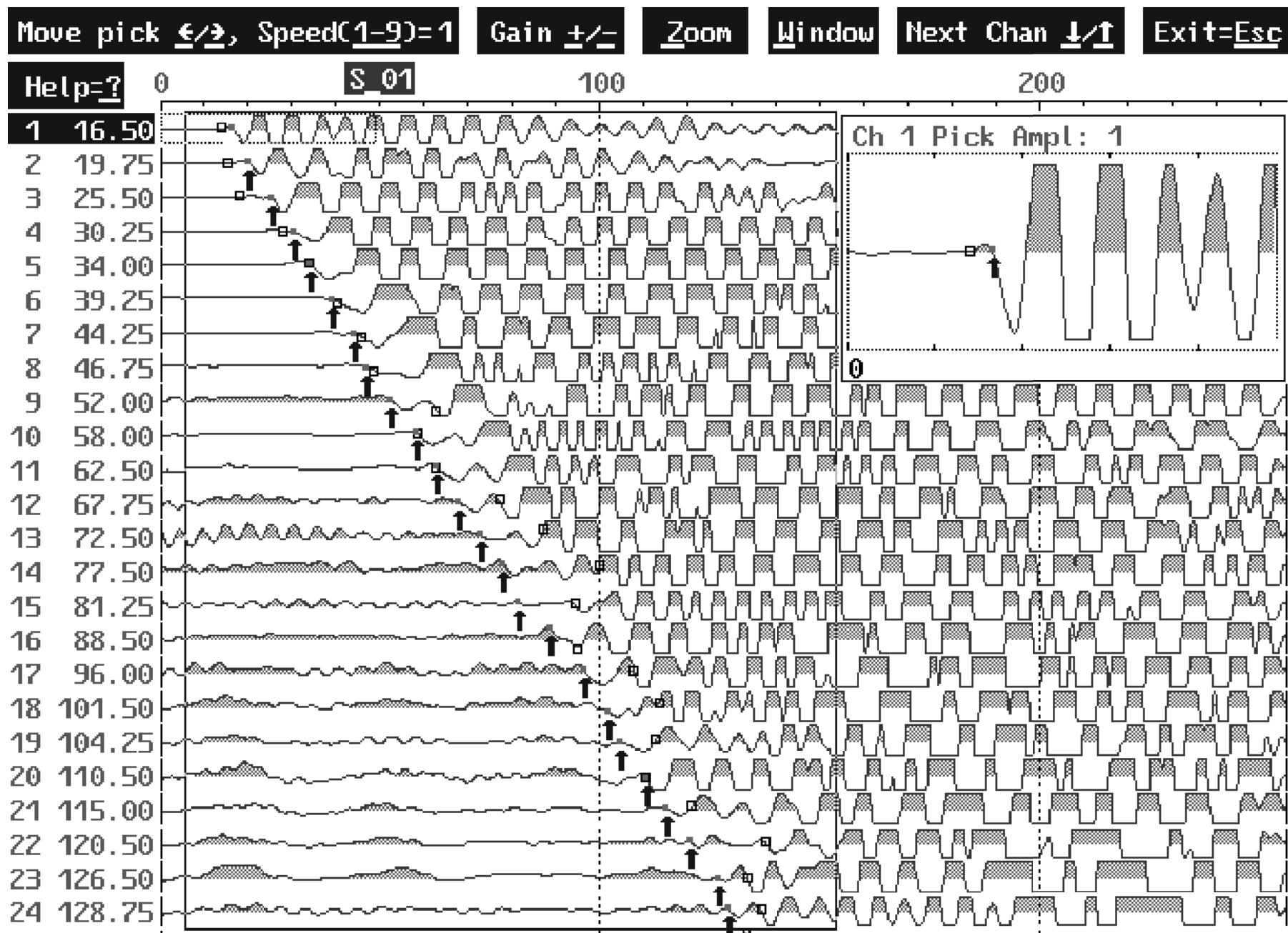
Press Esc to EXIT

HALF_MS2.SIP: Half Moon Shear waves

Spread A

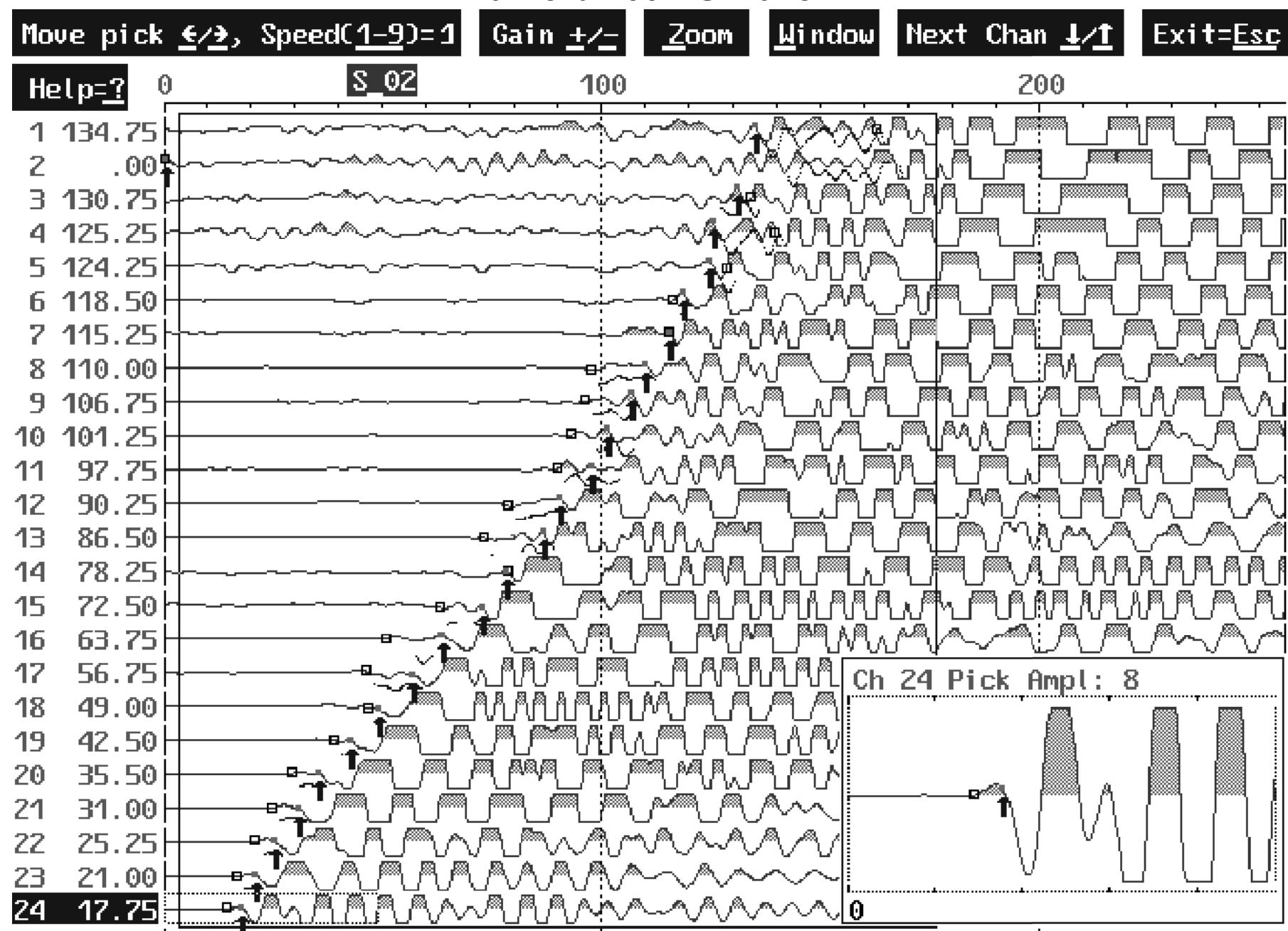


Hanford 100K S-wave



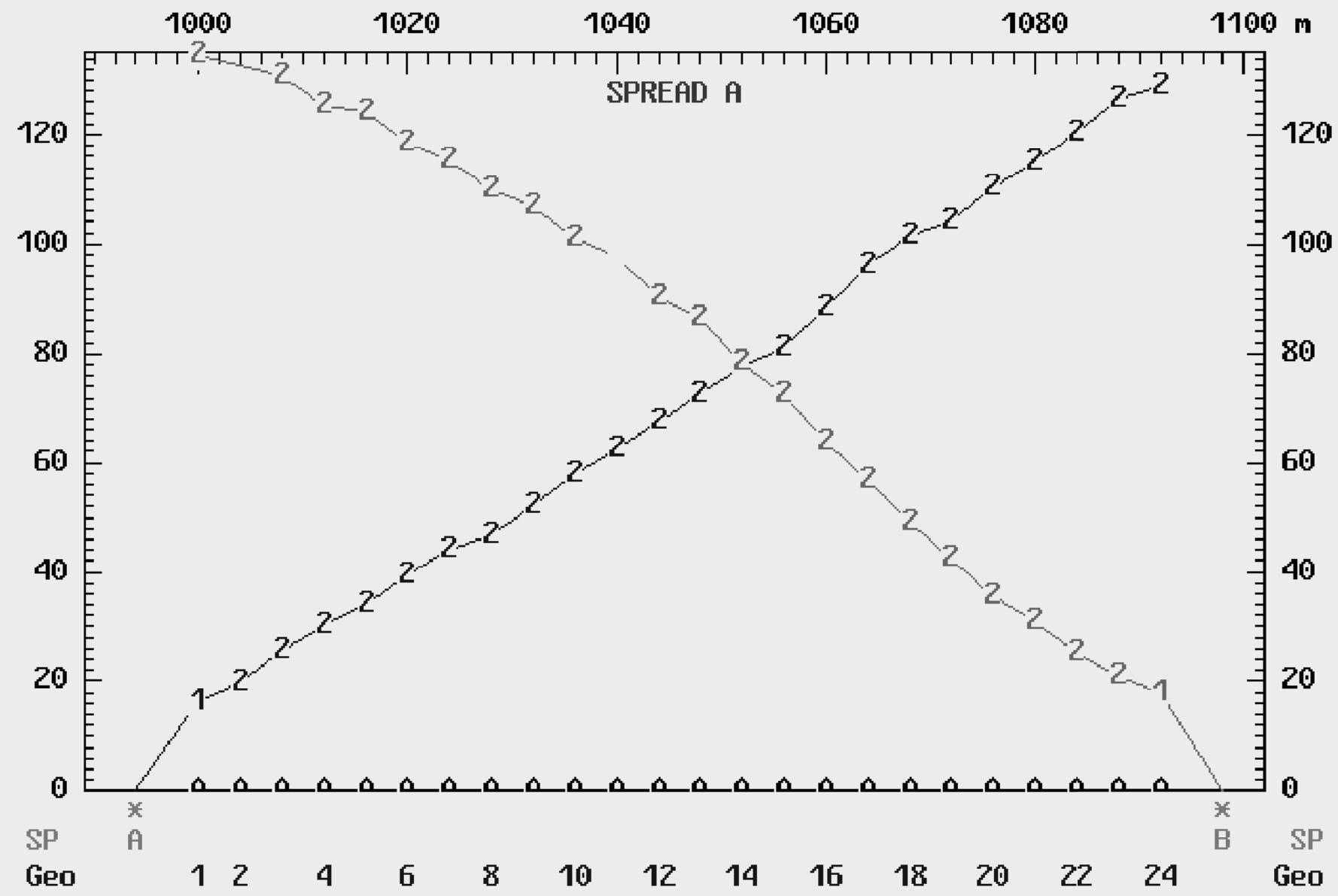
Appendix C

Hanford 100K S-wave



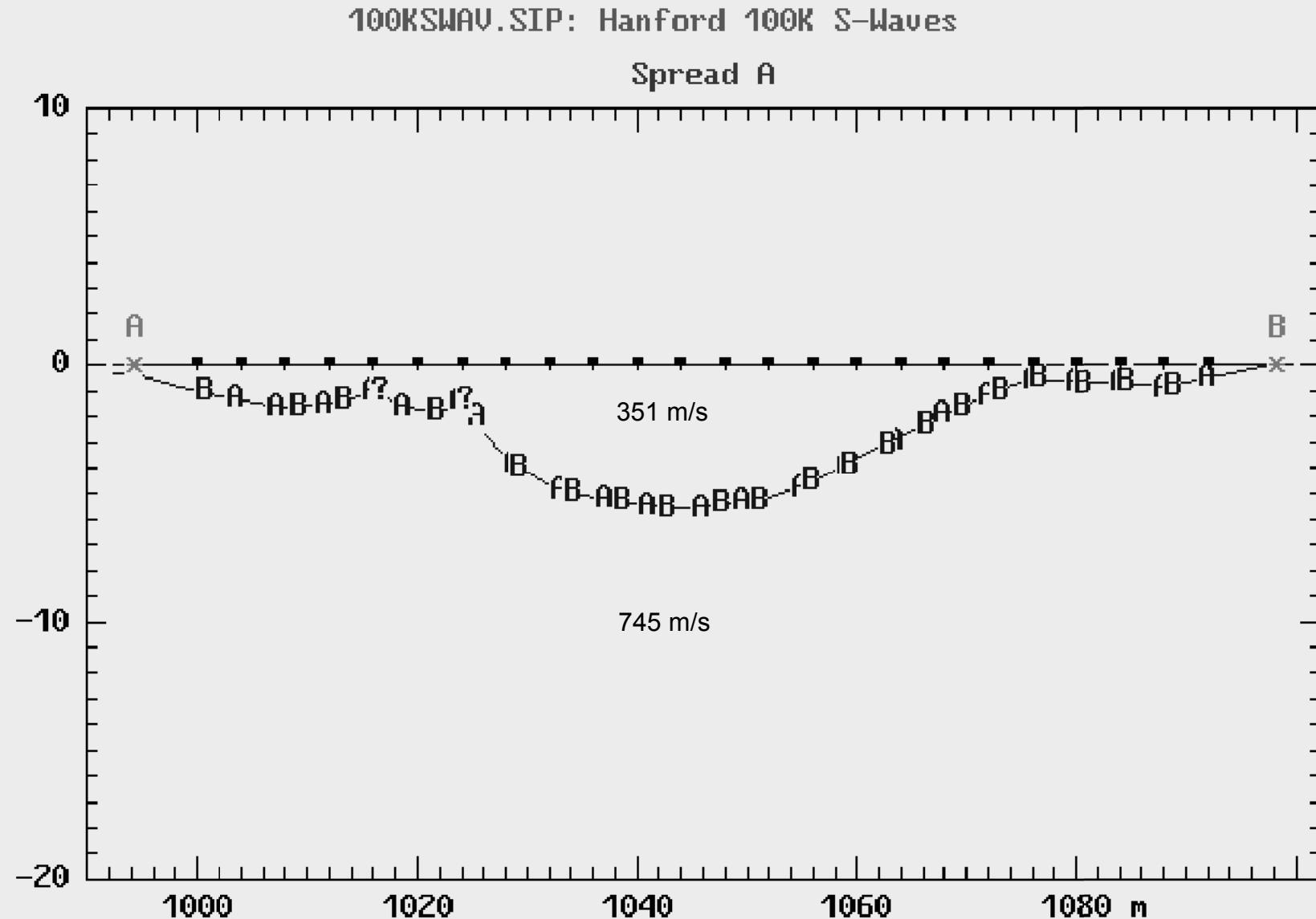
Hanford 100K S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



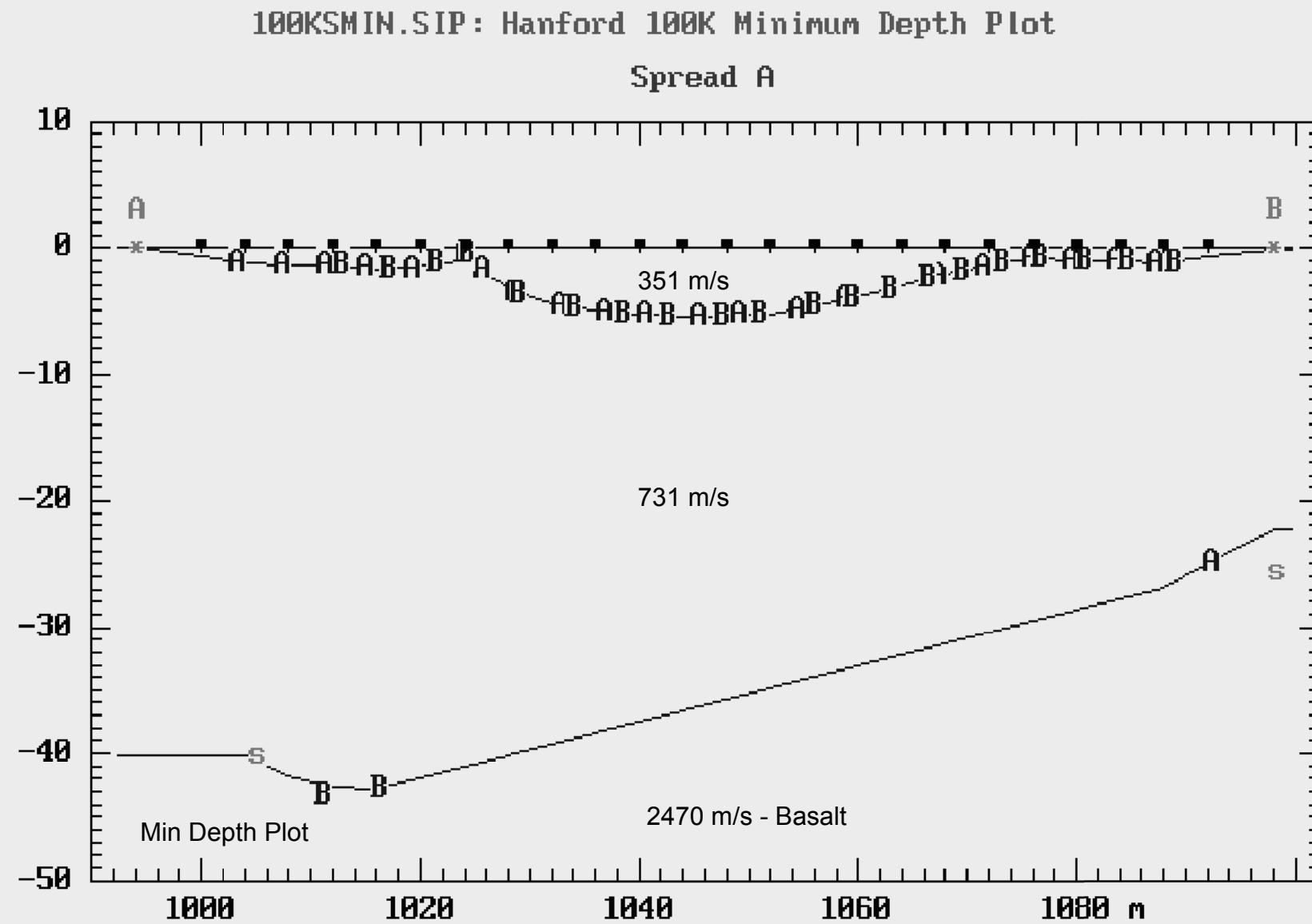
Hanford 100K S-wave

Press Esc to EXIT

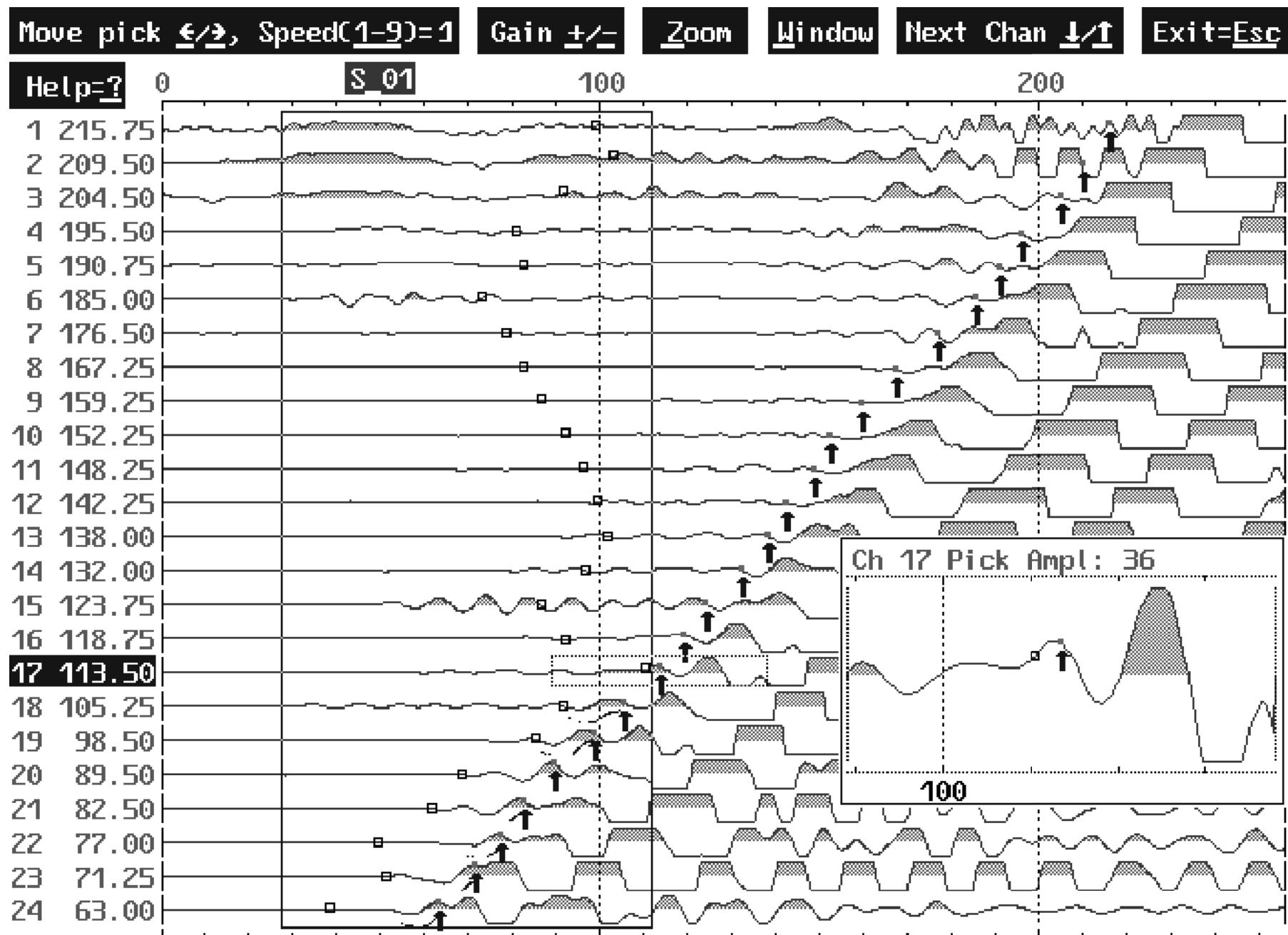


Hanford 100K S-wave

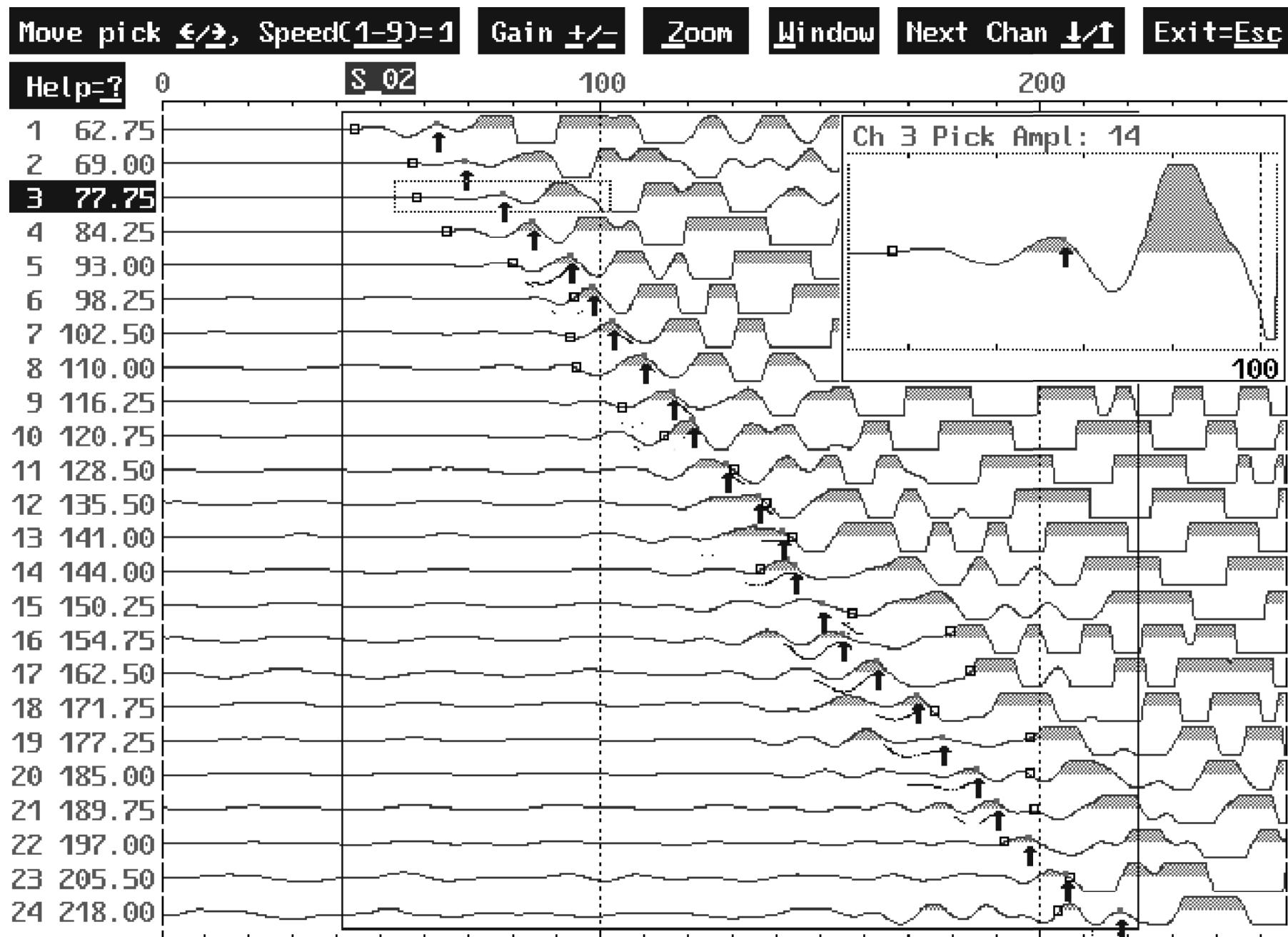
Press Esc to EXIT



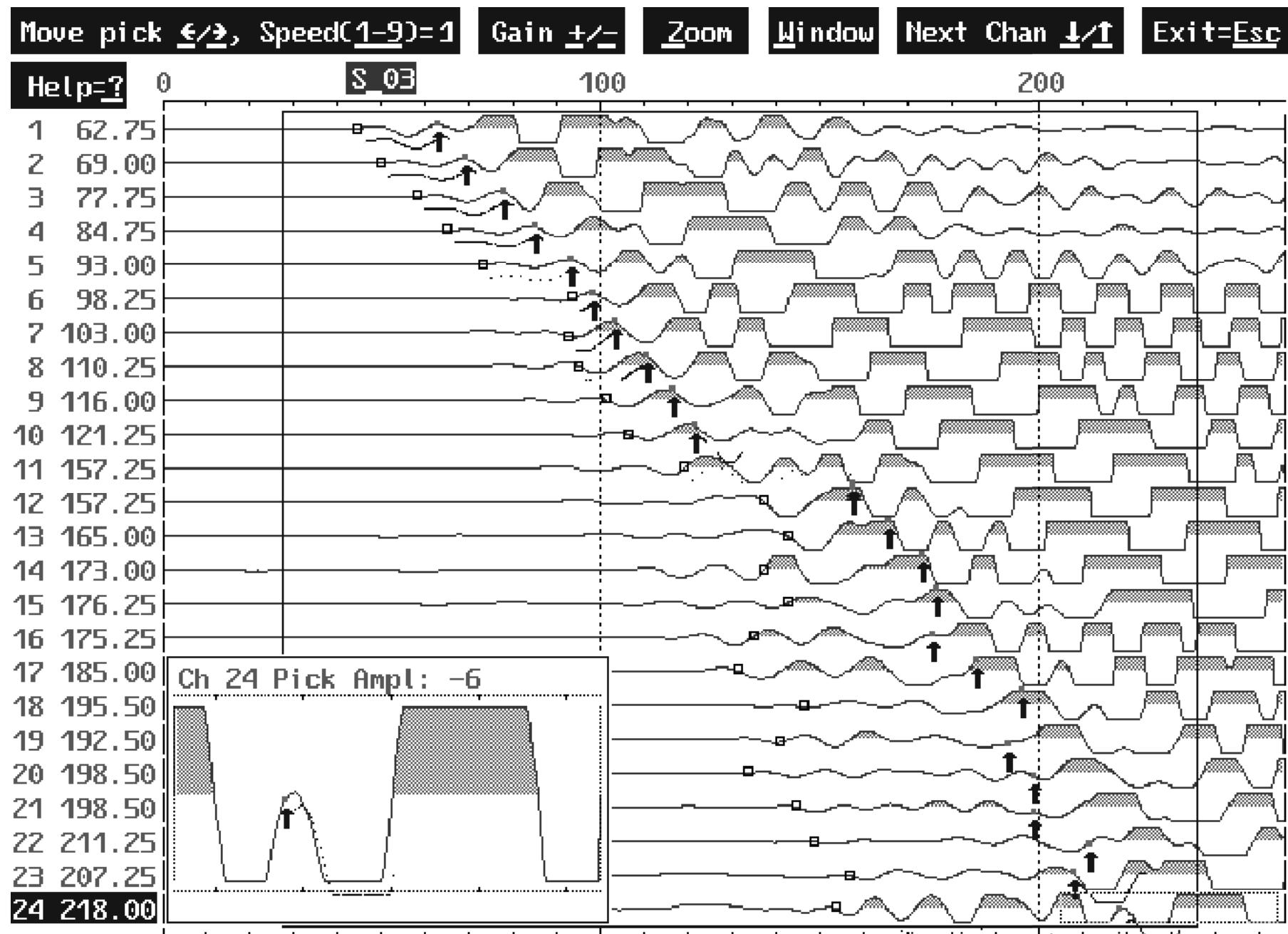
Hanford 200E S-wave



Hanford 200E S-wave

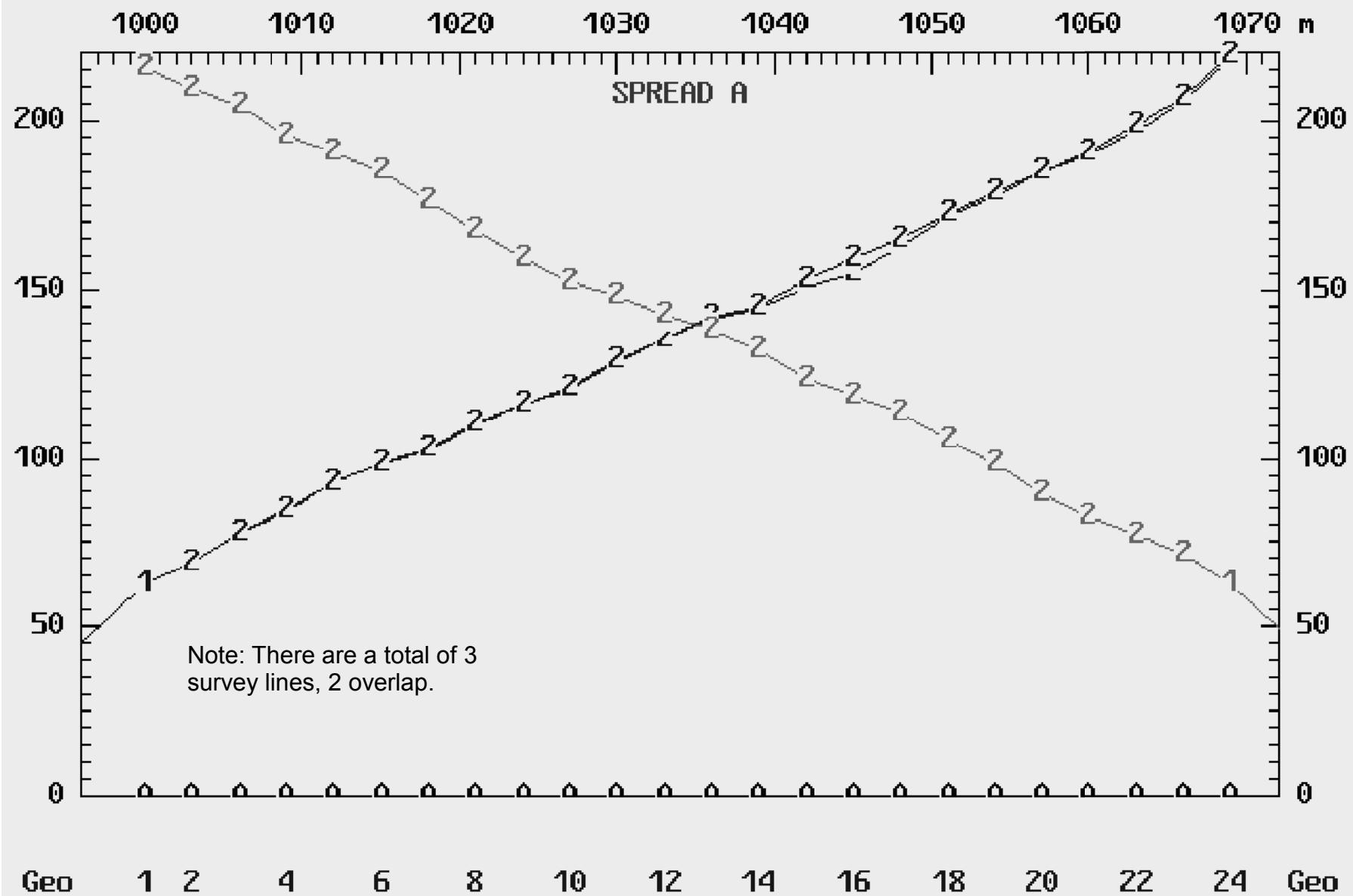


Hanford 200E S-wave



Hanford 200E S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

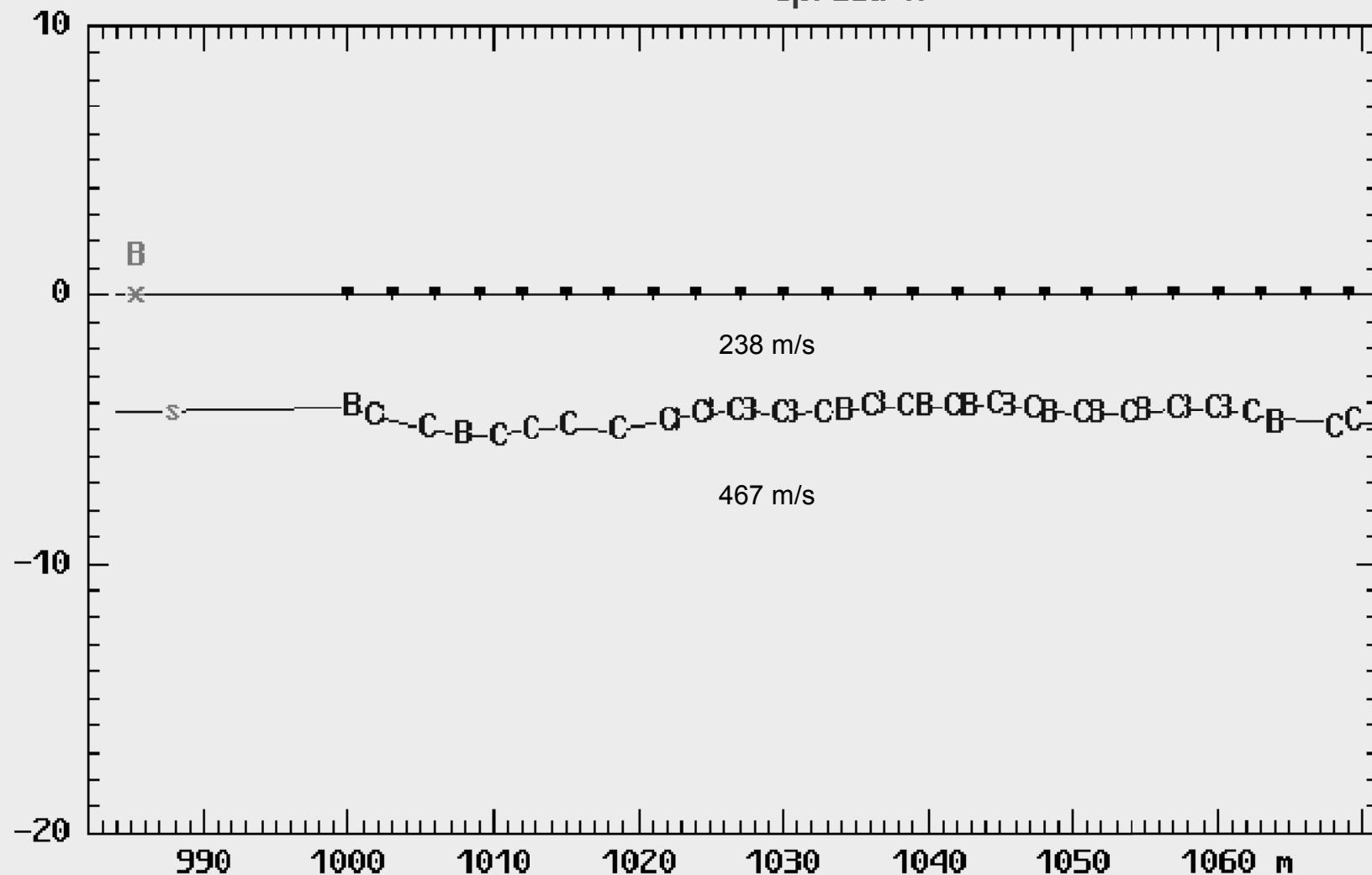


Hanford 200E S-wave

Press Esc to EXIT

200ESWAV.SIP: Hanford 200E S-Waves

Spread A

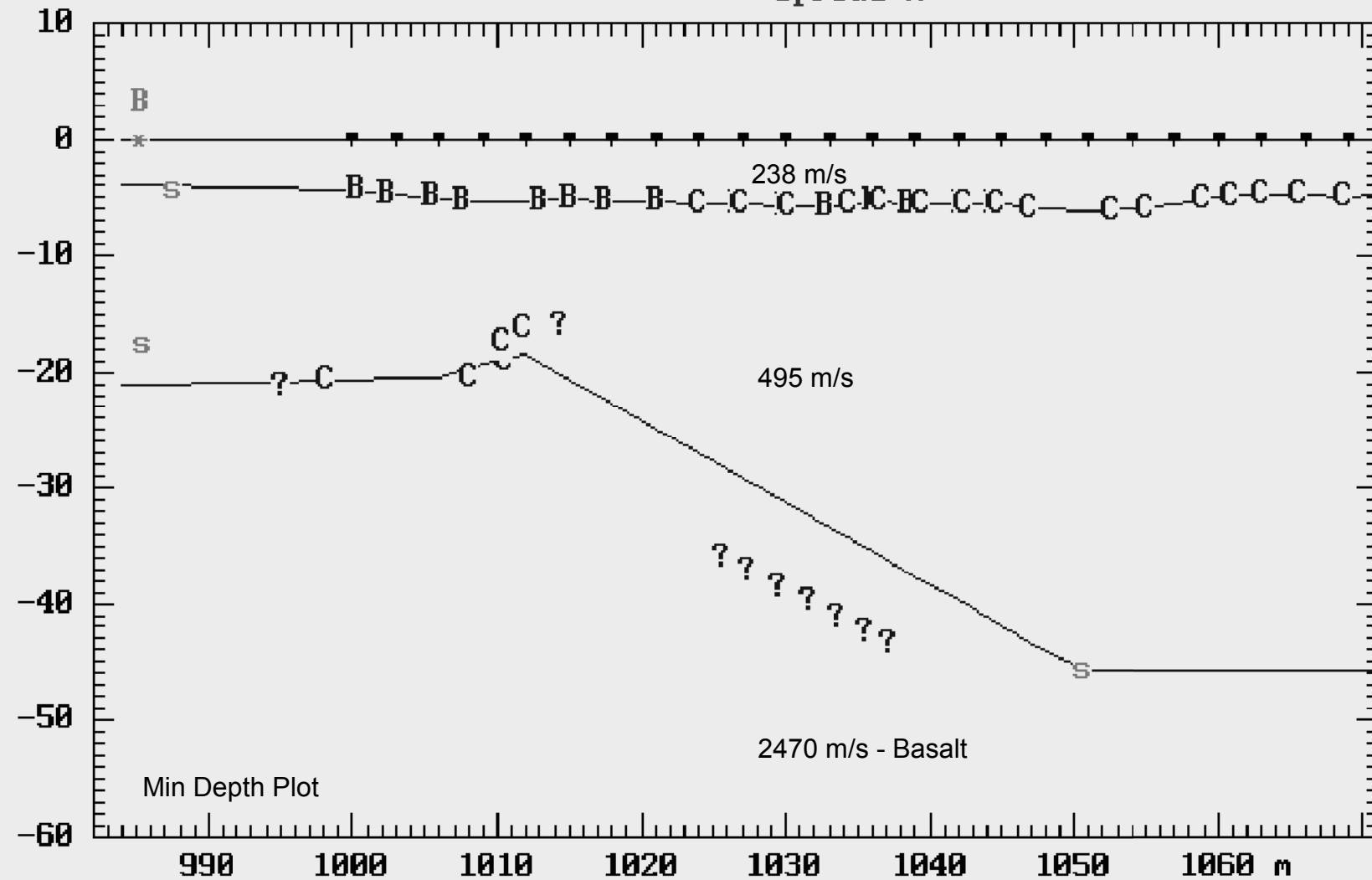


Hanford 200E S-wave

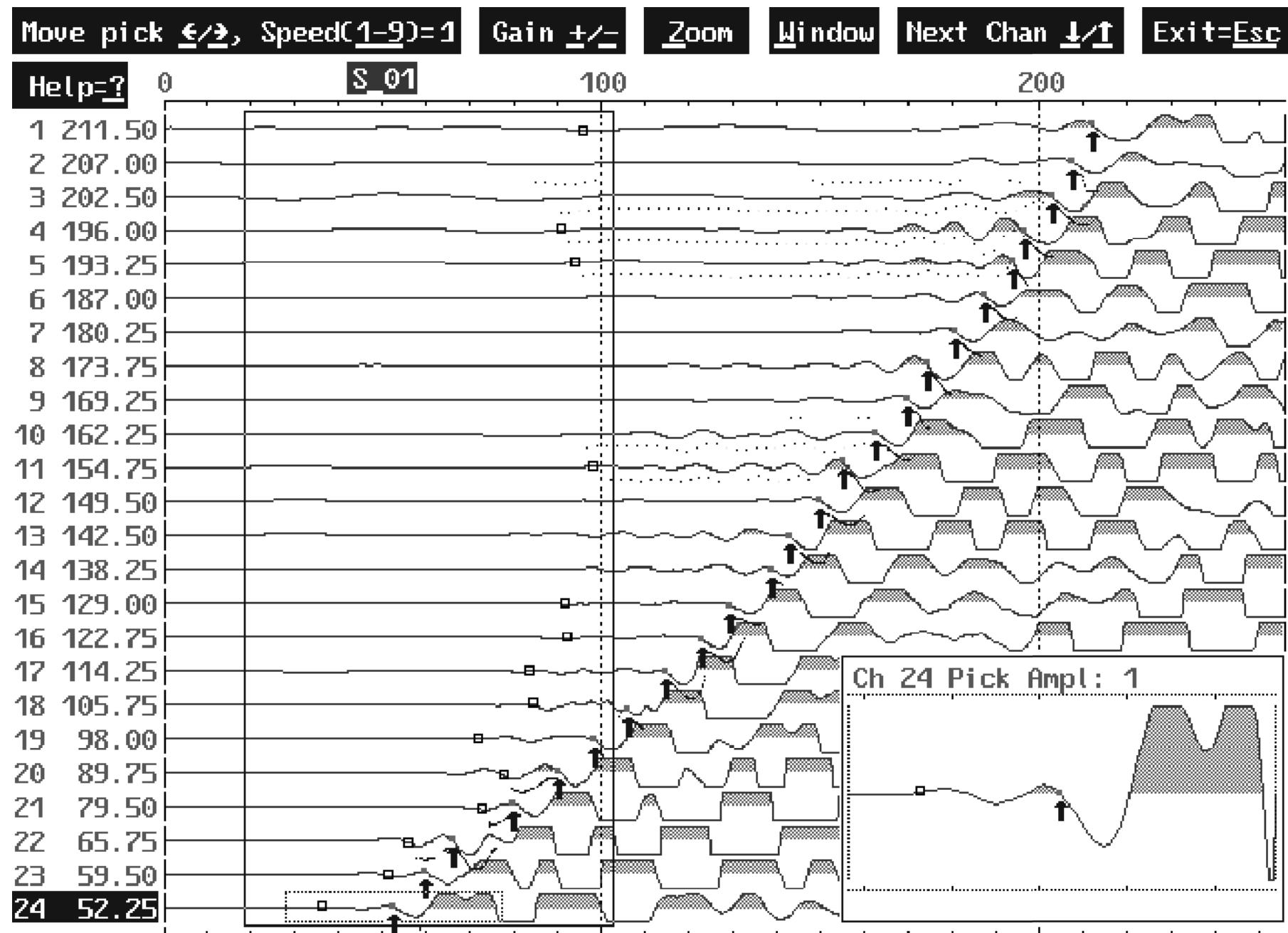
Press Esc to EXIT

200ESMIN.SIP: Hanford 200E Minimum Depth Plot

Spread A

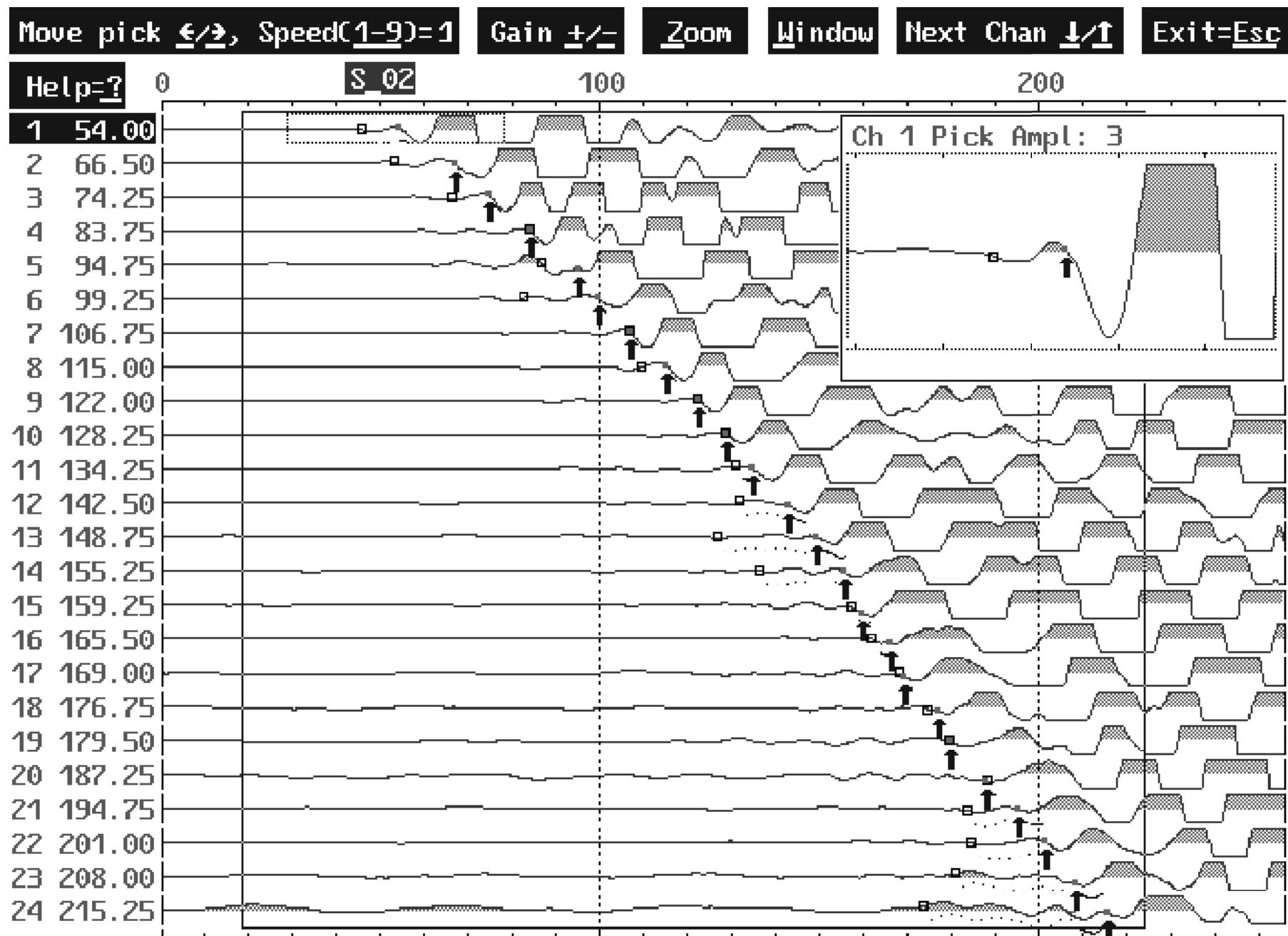


Hanford 200W S-wave



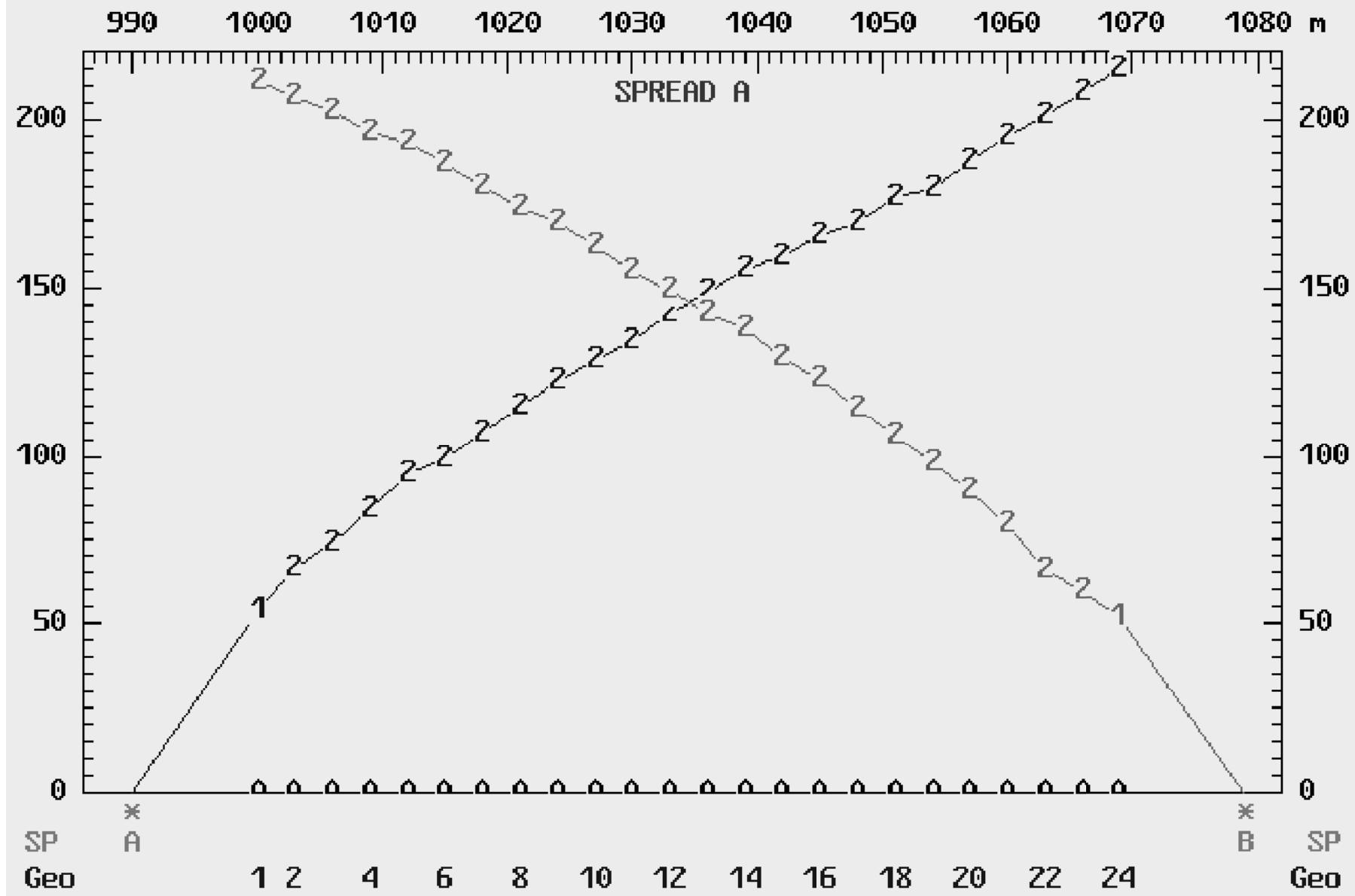
Appendix C

Hanford 200W S-wave



Hanford 200W S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

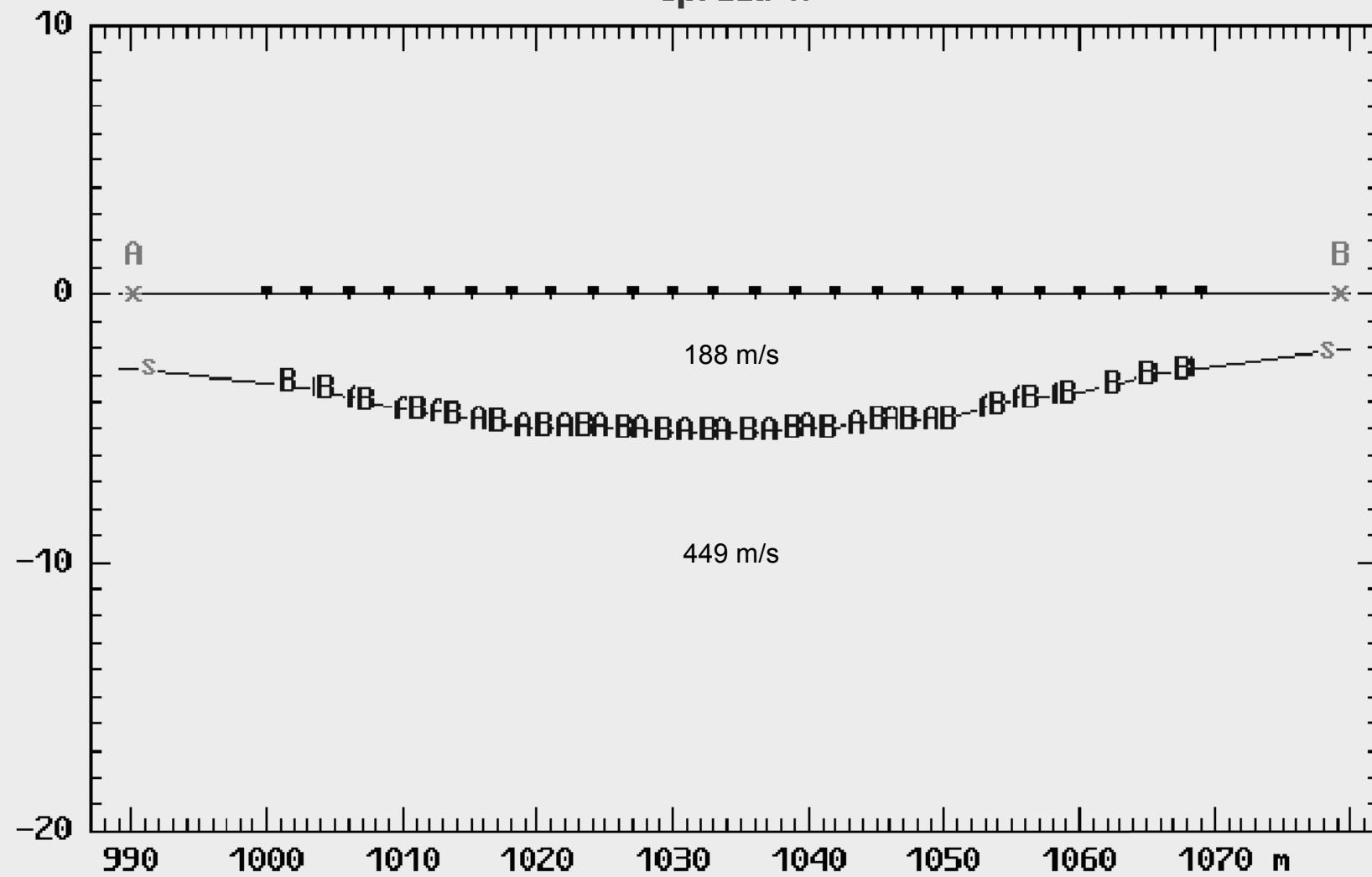


Hanford 200W S-wave

Press Esc to EXIT

200WSWAU.SIP: Hanford 200W S-Waves

Spread A

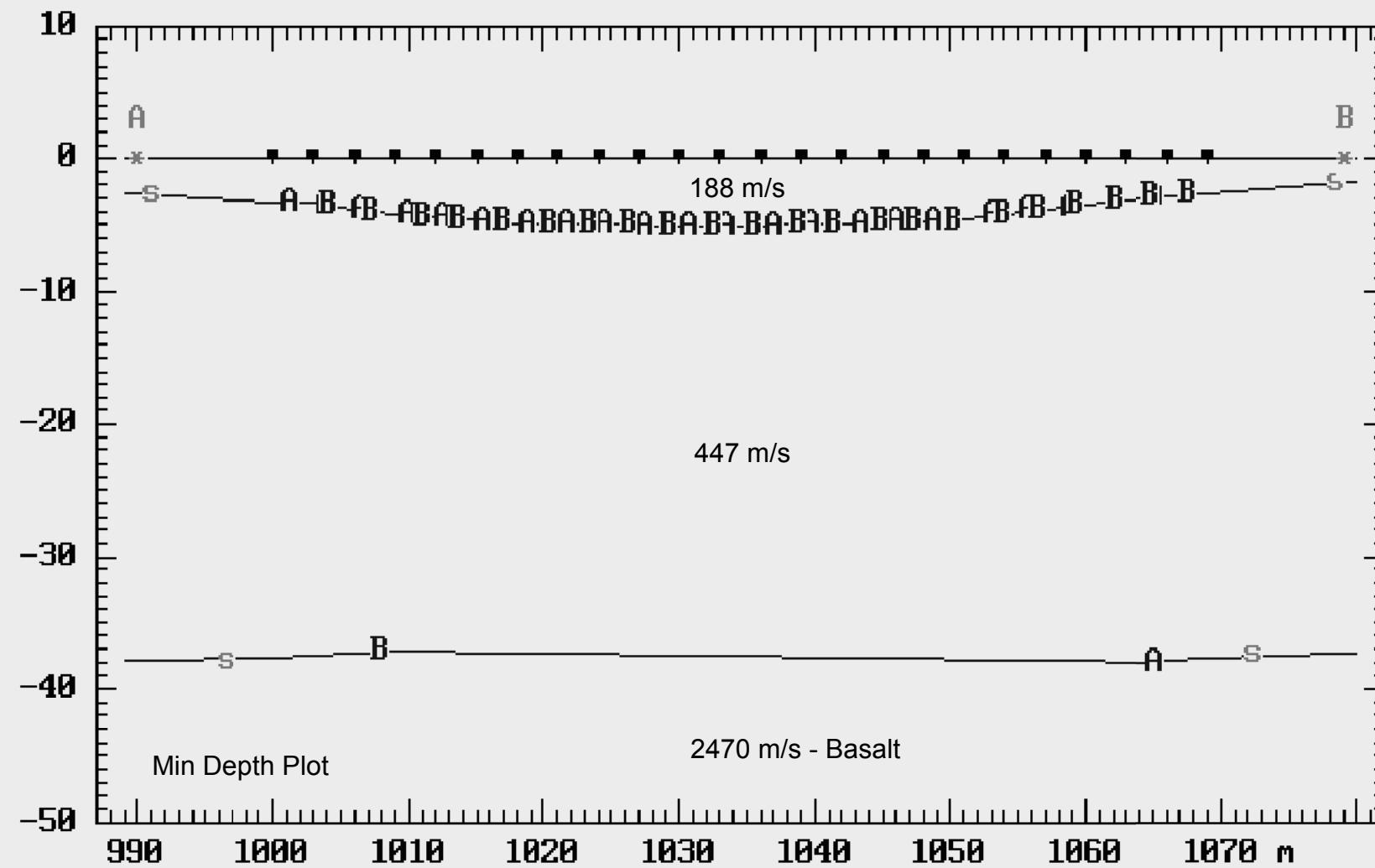


Hanford 200W S-wave

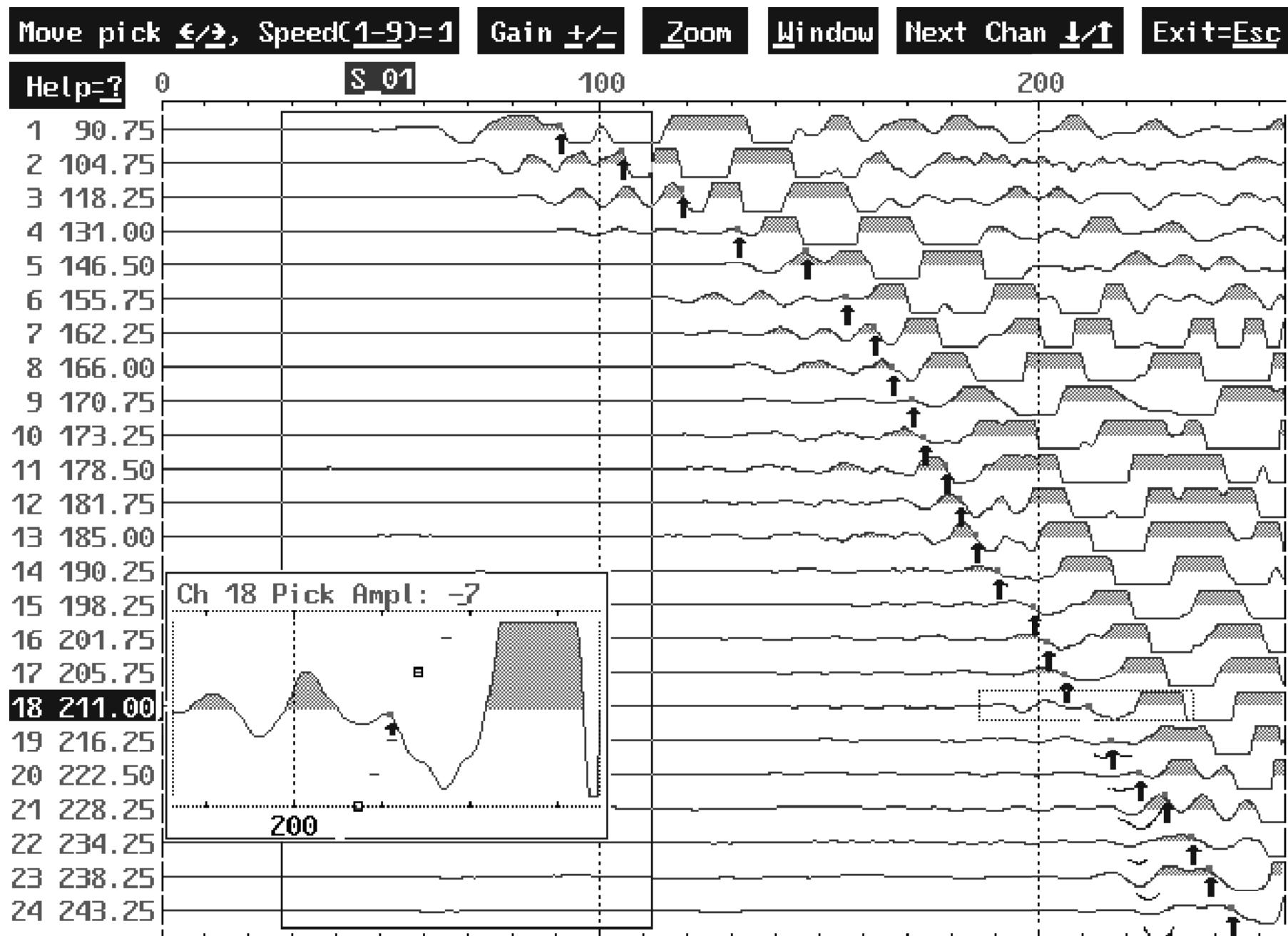
Press Esc to EXIT

200WSMIN.SIP: Hanford 200W Minimum Depth Plot

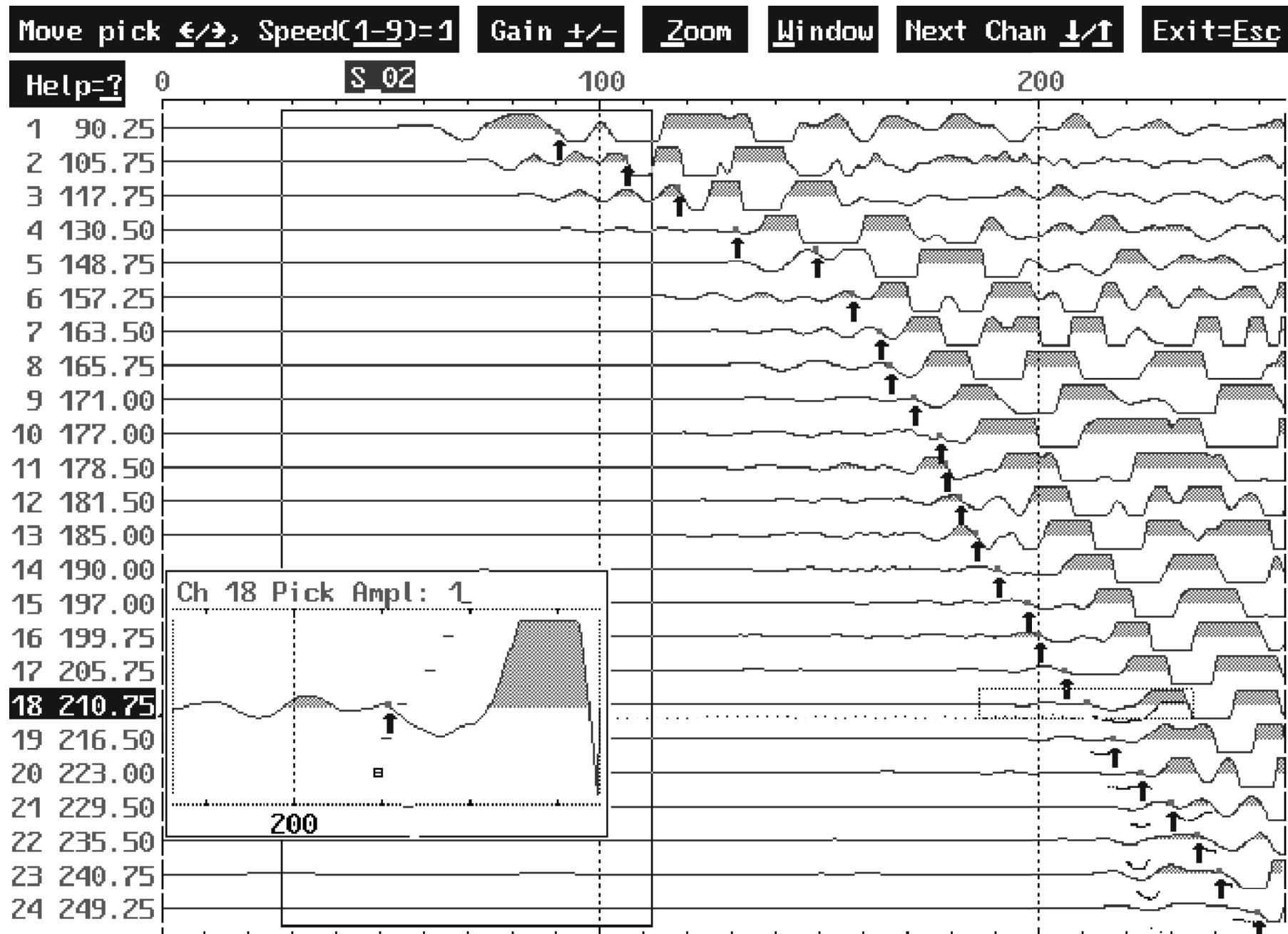
Spread A



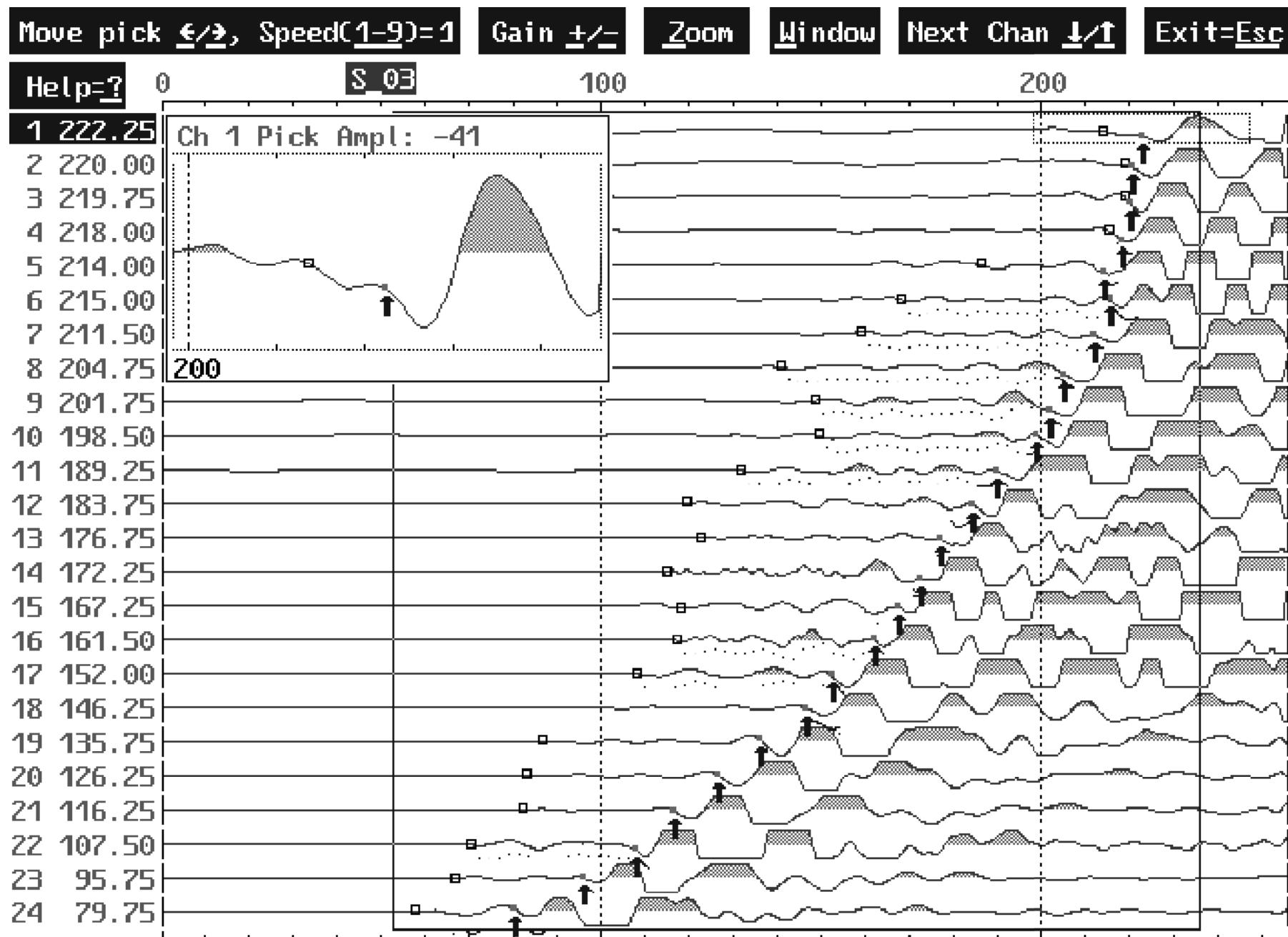
Hanford 400A S-wave



Hanford 400A S-wave



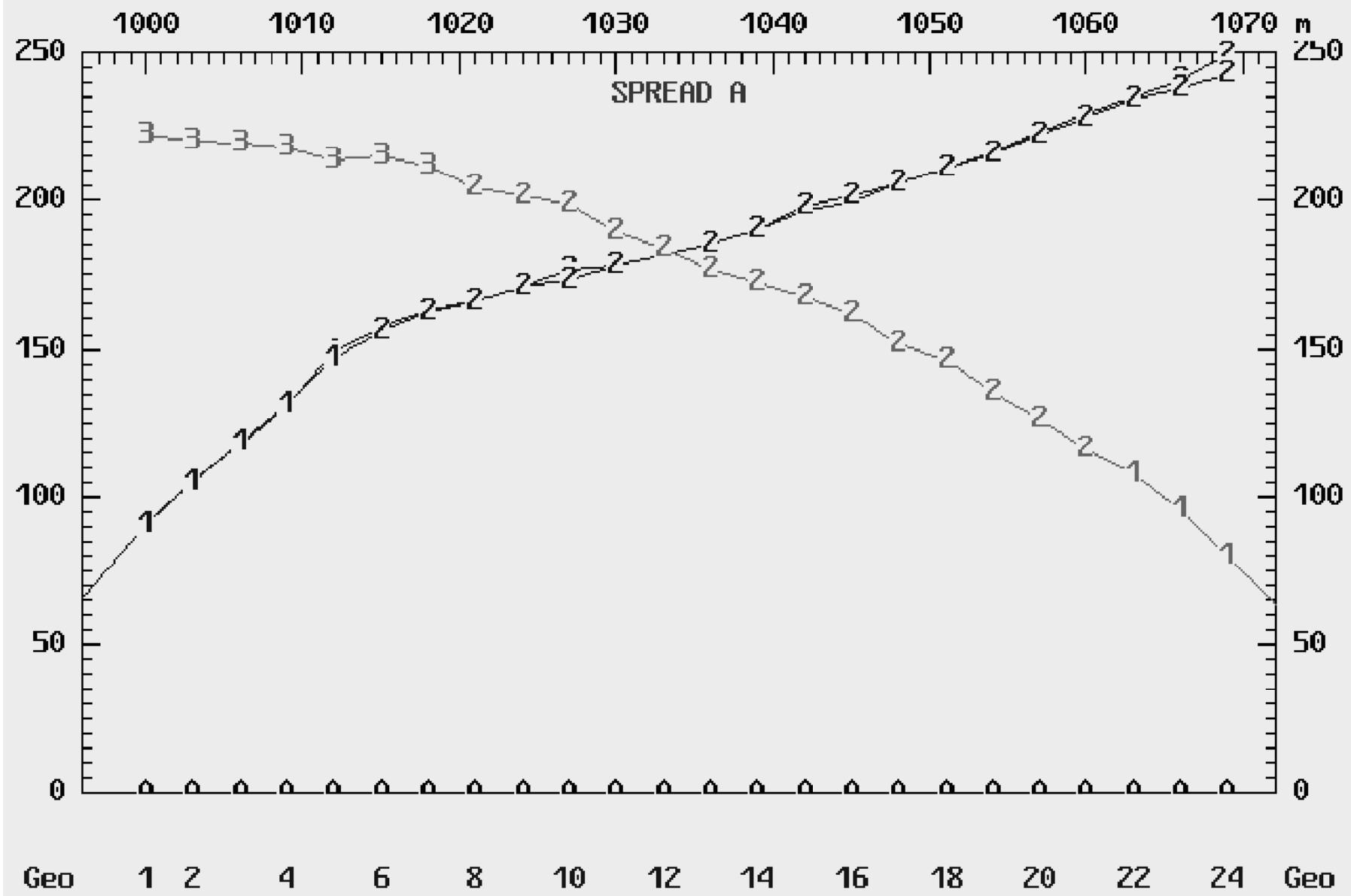
Hanford 400A S-wave



Appendix C

Hanford 400A S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

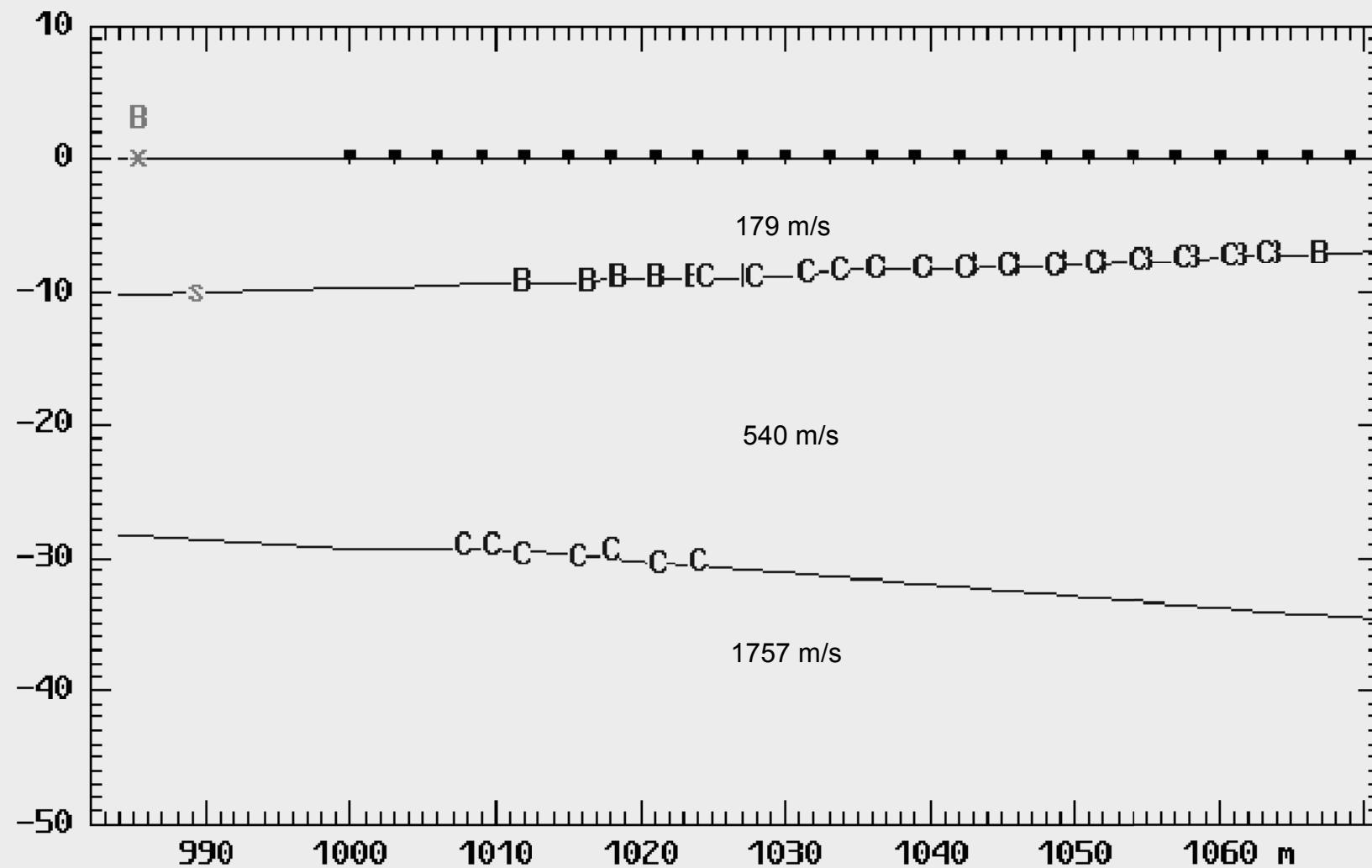


Hanford 400A S-wave

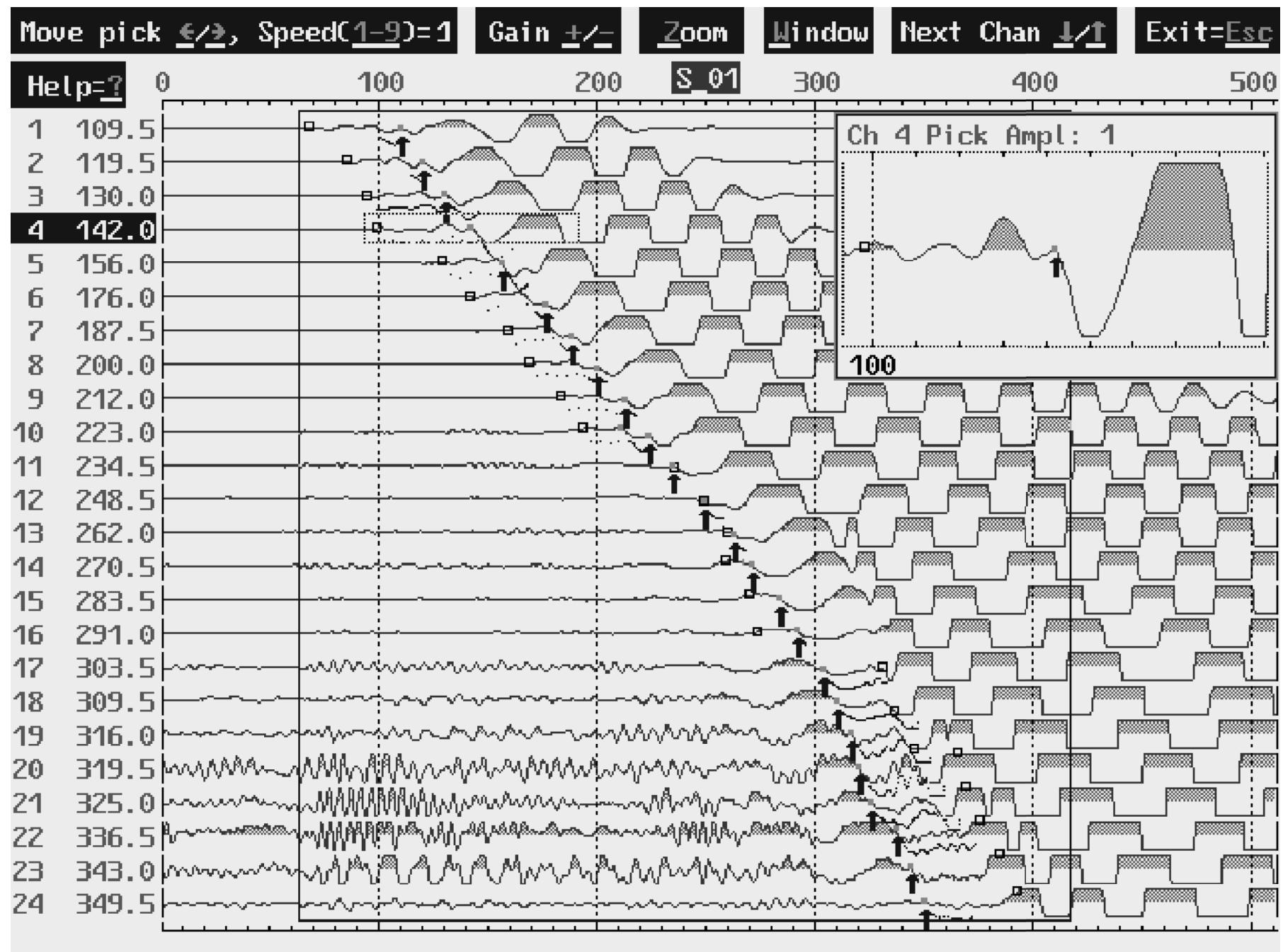
Press Esc to EXIT

400ASWAV.SIP: Hanford 400A S-Waves

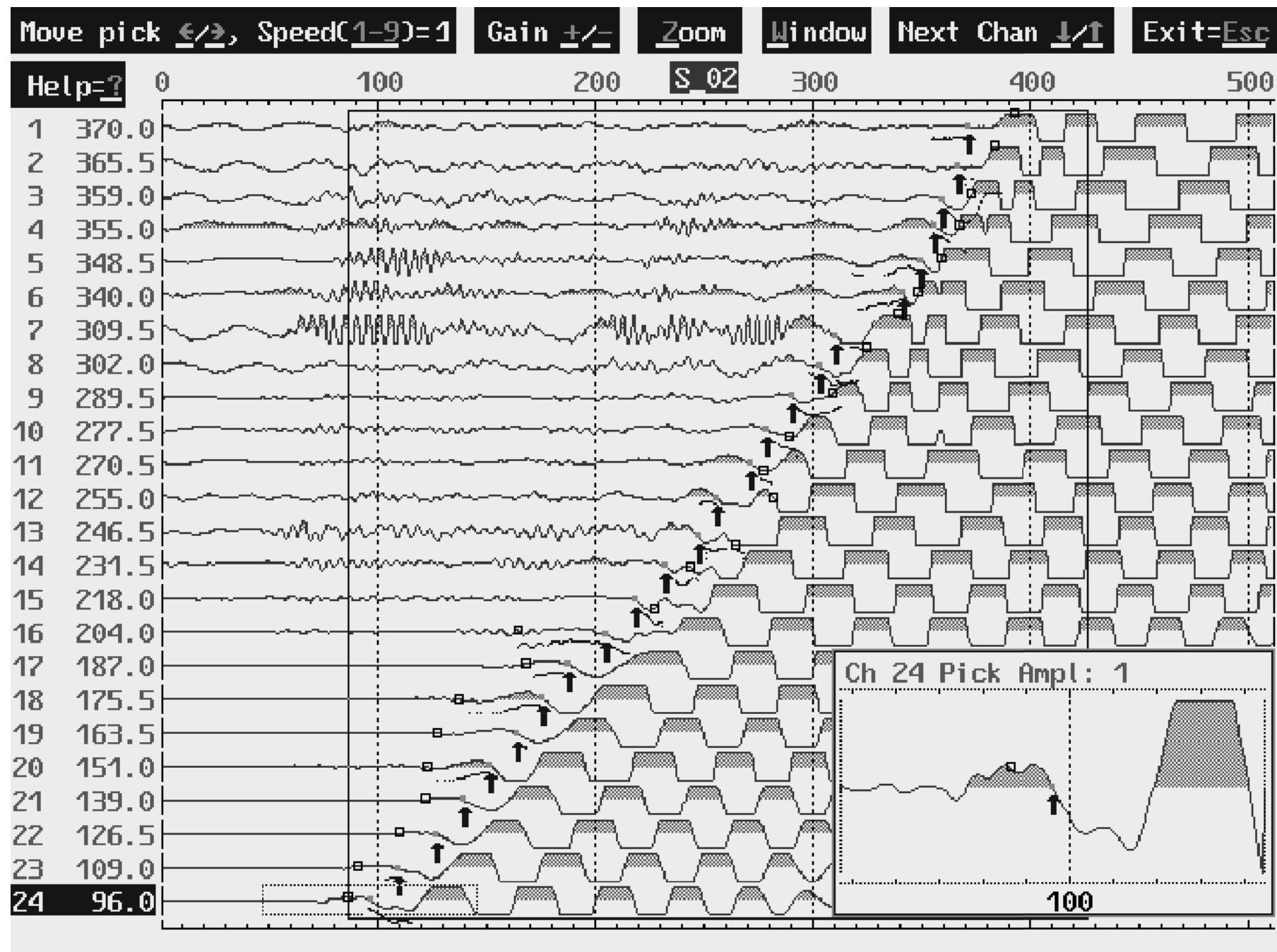
Spread A



Harmony Elementary S-wave

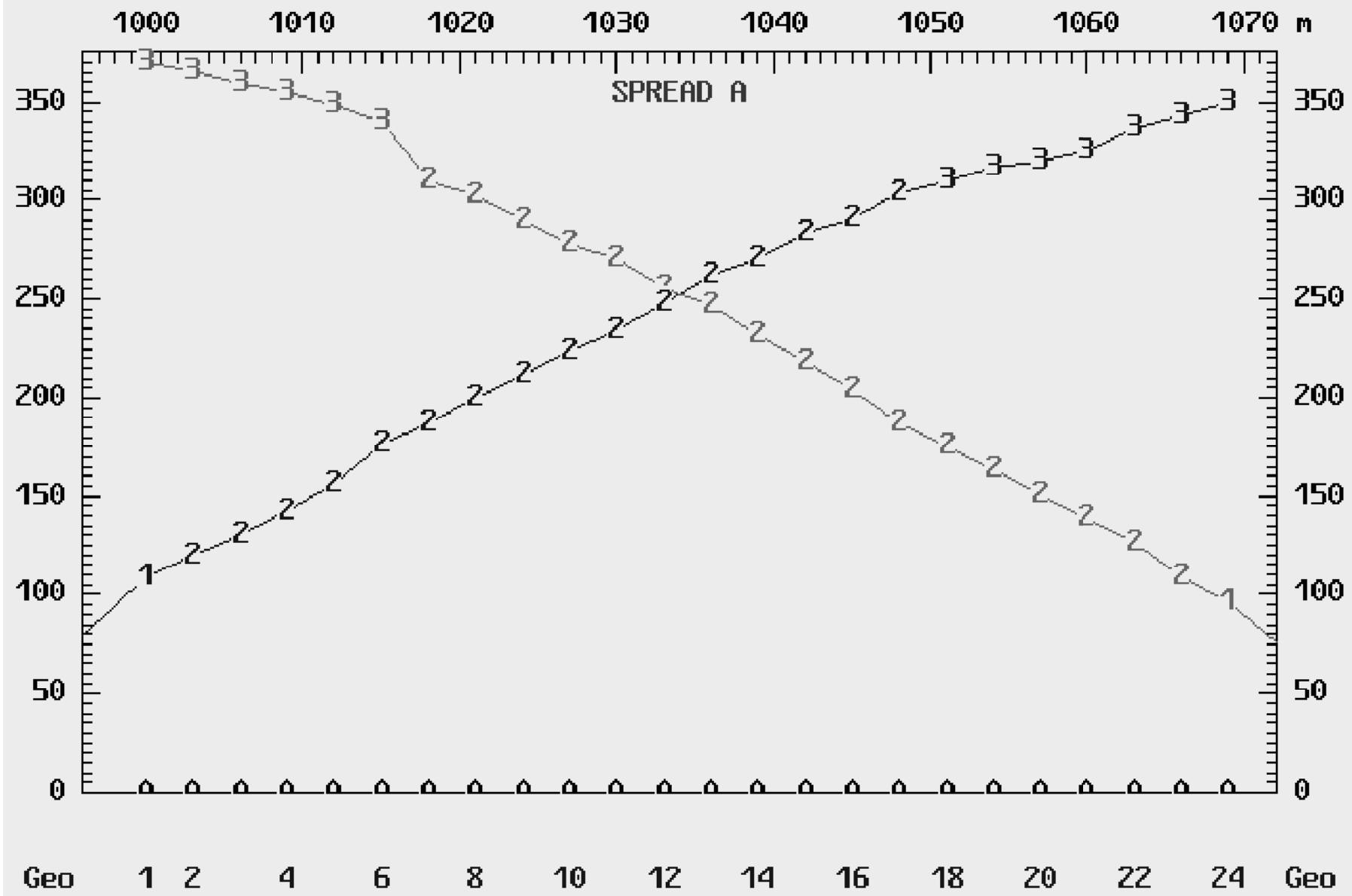


Harmony Elementary S-wave



Harmony Elementary S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

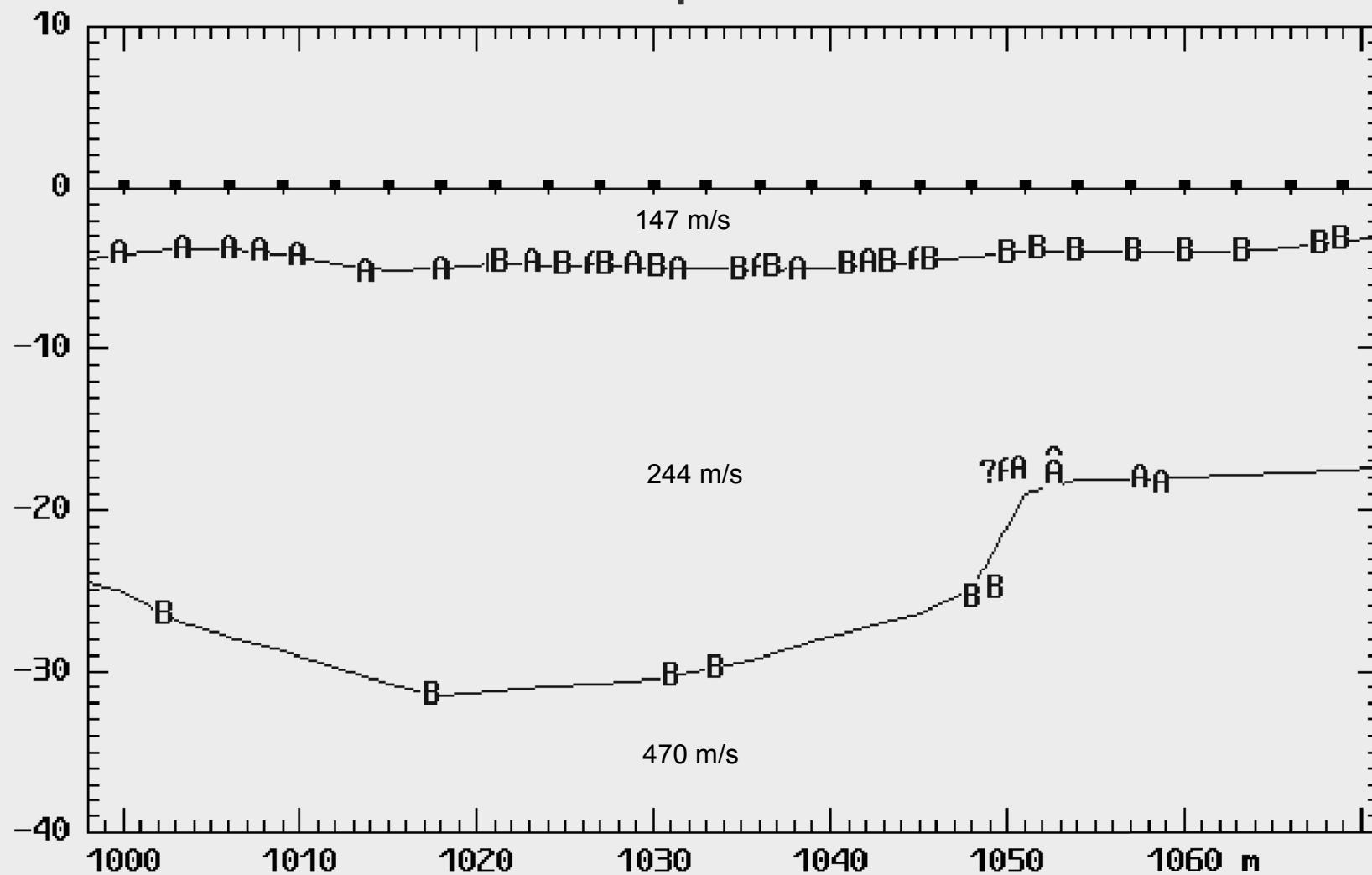


Harmony Elementary S-wave

Press Esc to EXIT

HARMSWAU.SIP: Harmony Elementary S-Waves

Spread A

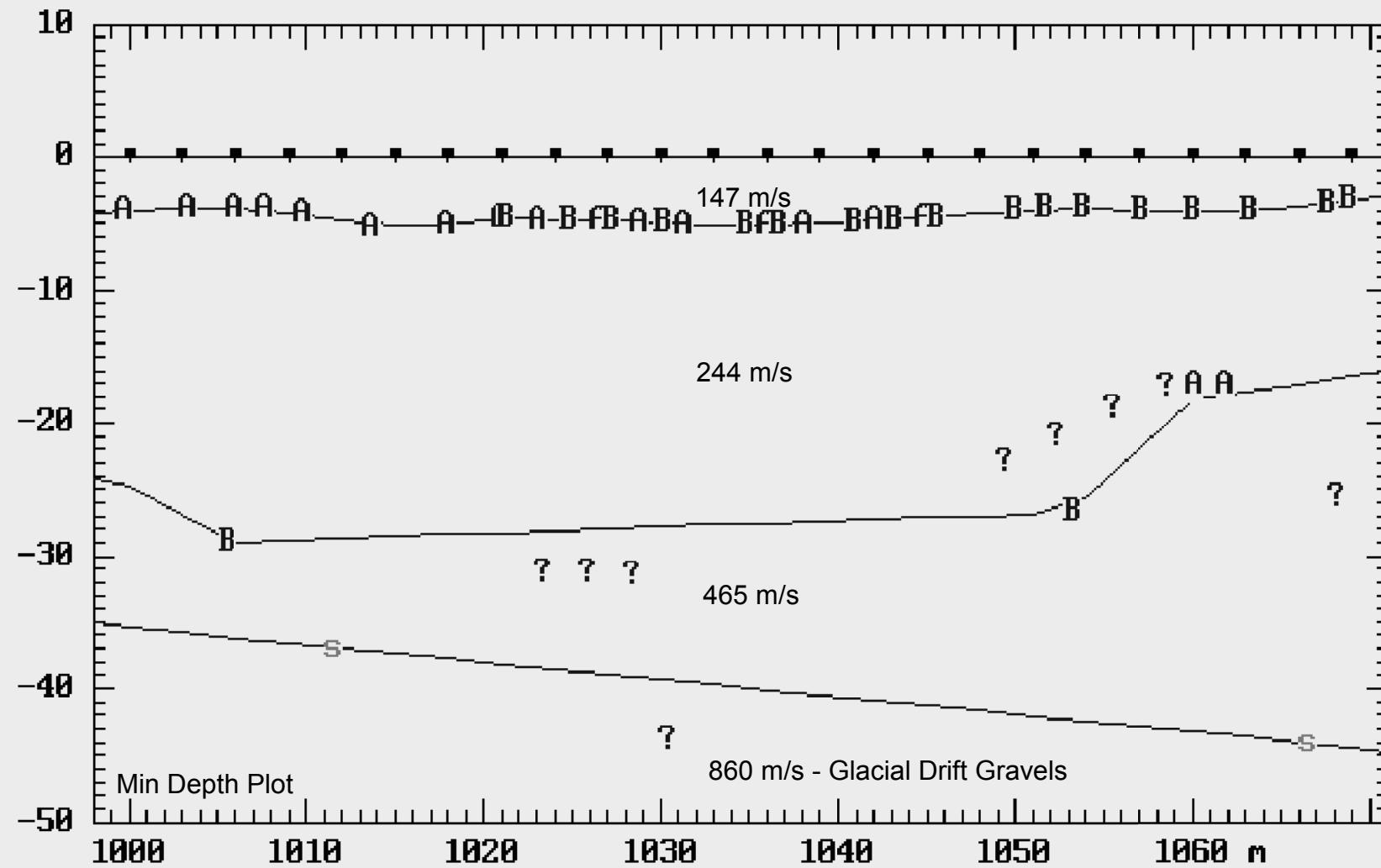


Harmony Elementary S-wave

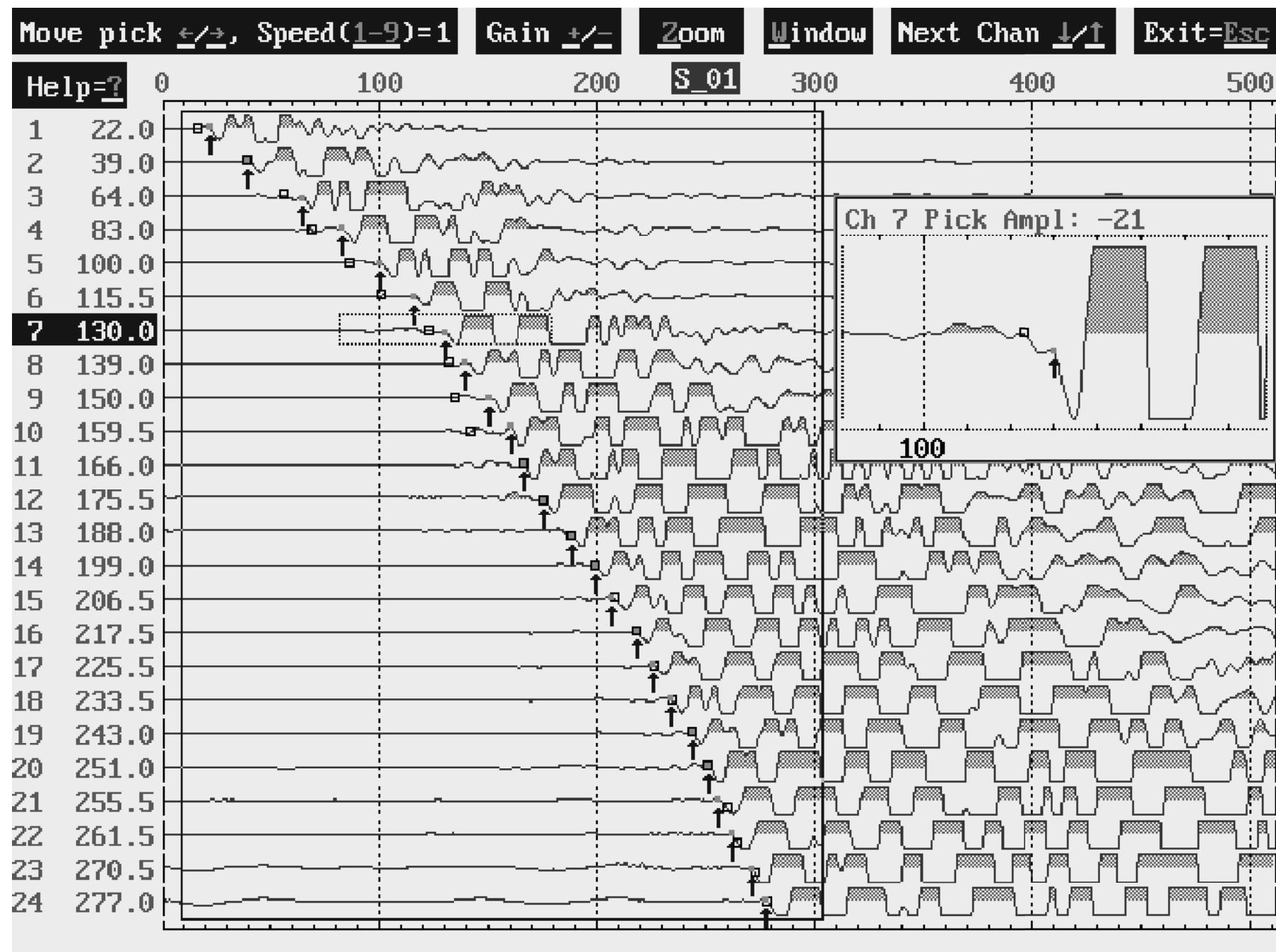
Press Esc to EXIT

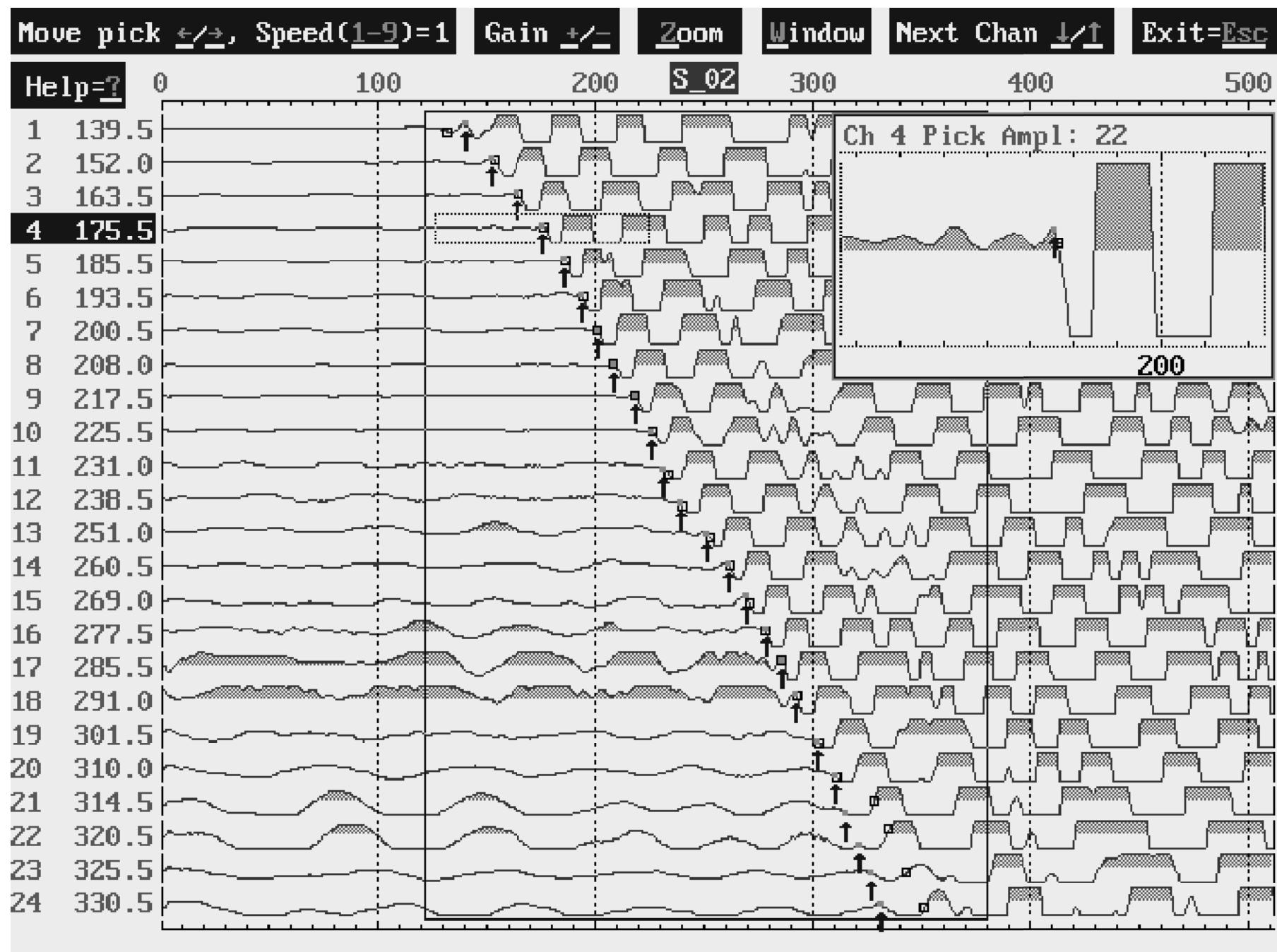
HARMSMIN.SIP: Harmony Elementary Minimum Depth Plot

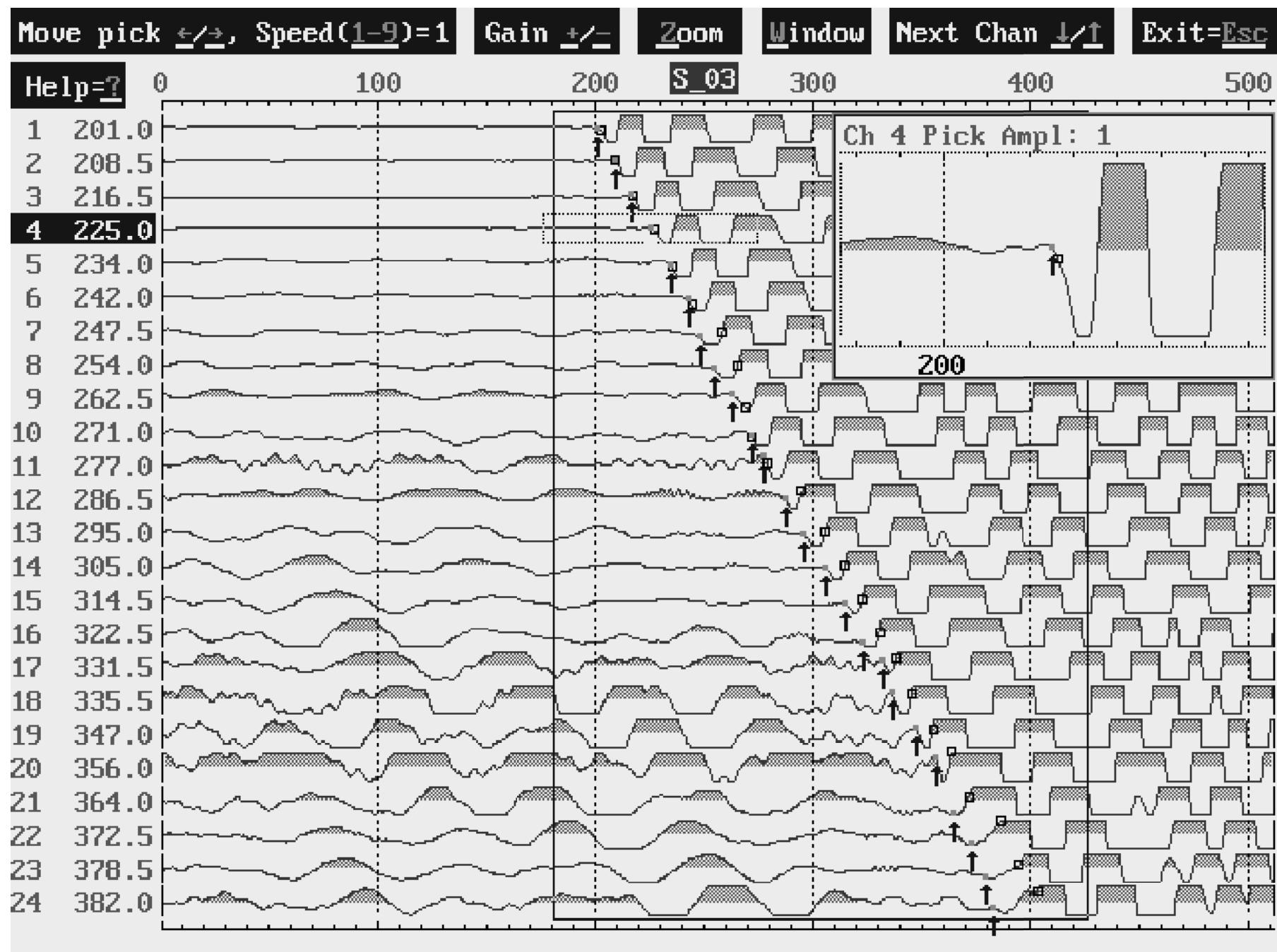
Spread A

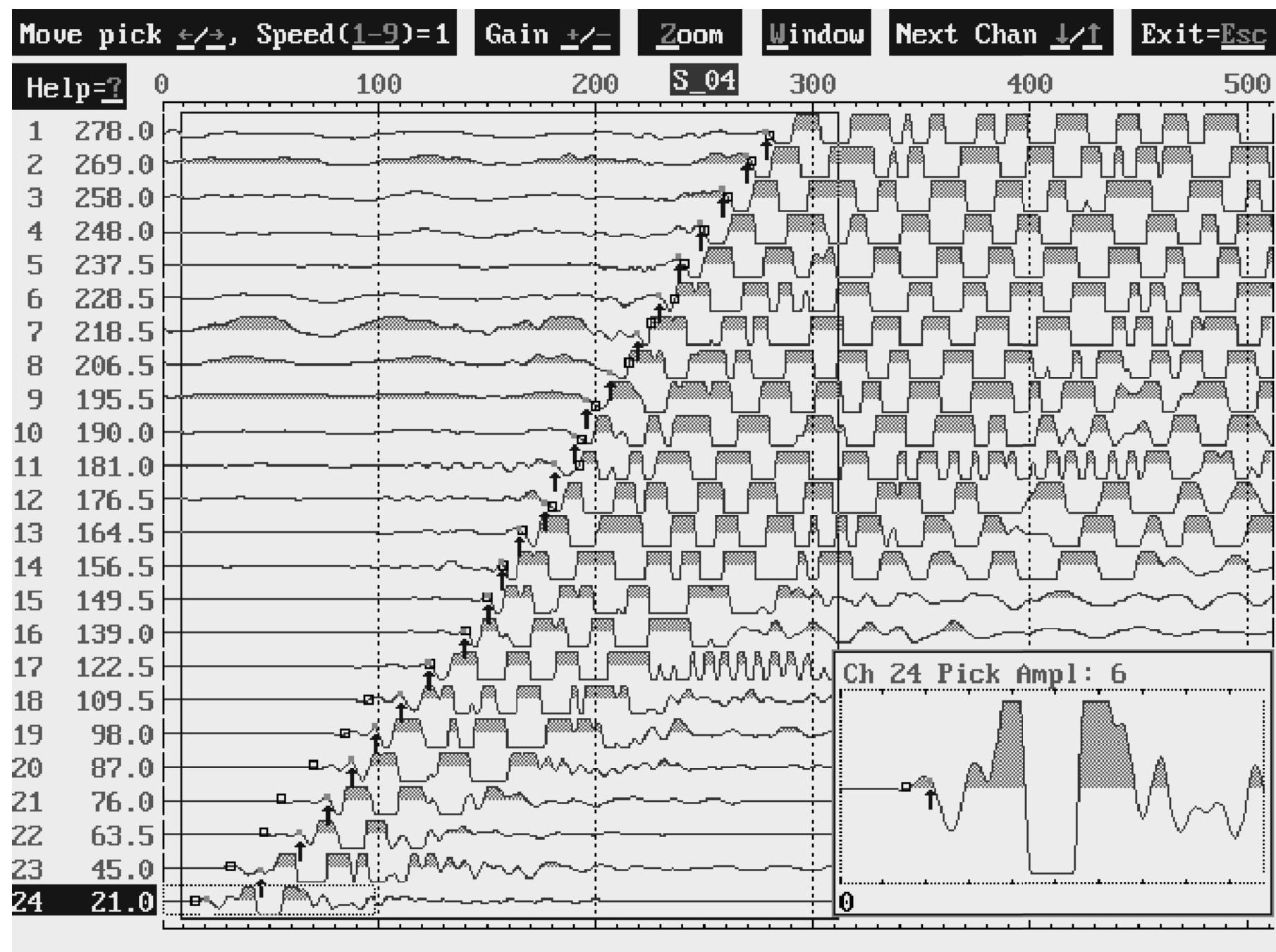


Hatch Road S-wave



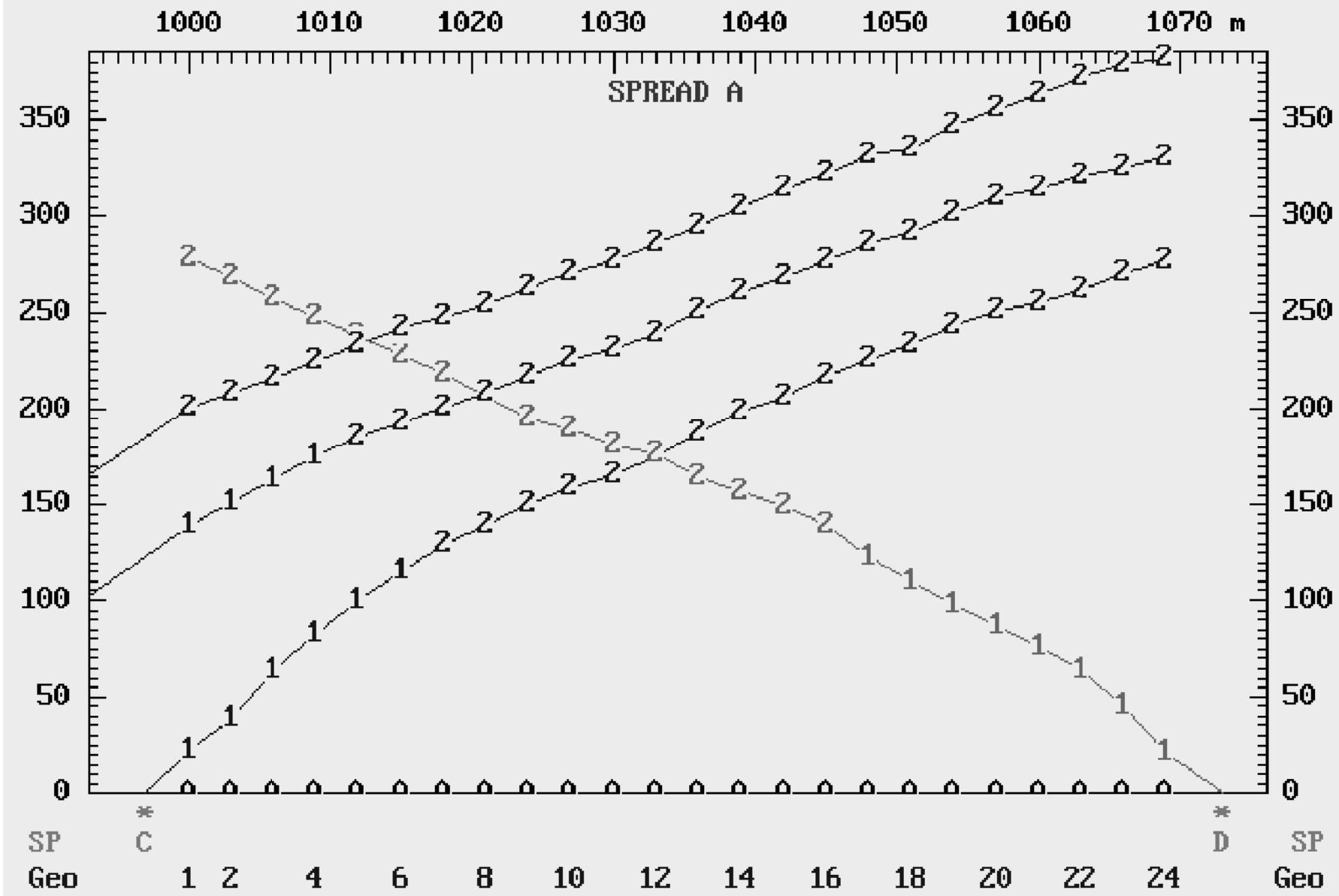
Hatch Road S-wave

Hatch Road S-wave

Hatch Road S-wave

Hatch Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

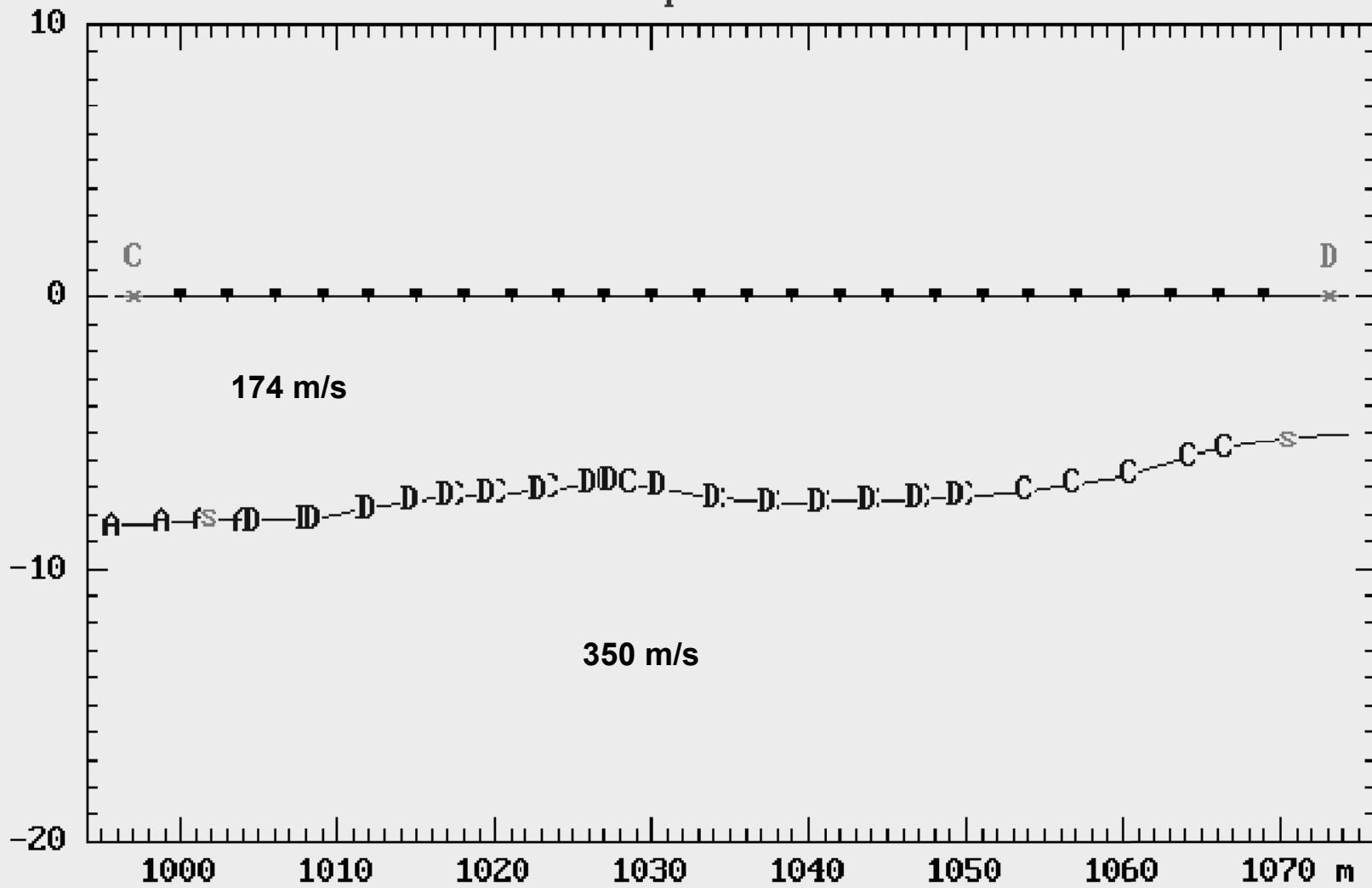


Hatch Road S-wave

Press Esc to EXIT

HATCH_SW.SIP: Hatch Road S-waves

Spread A

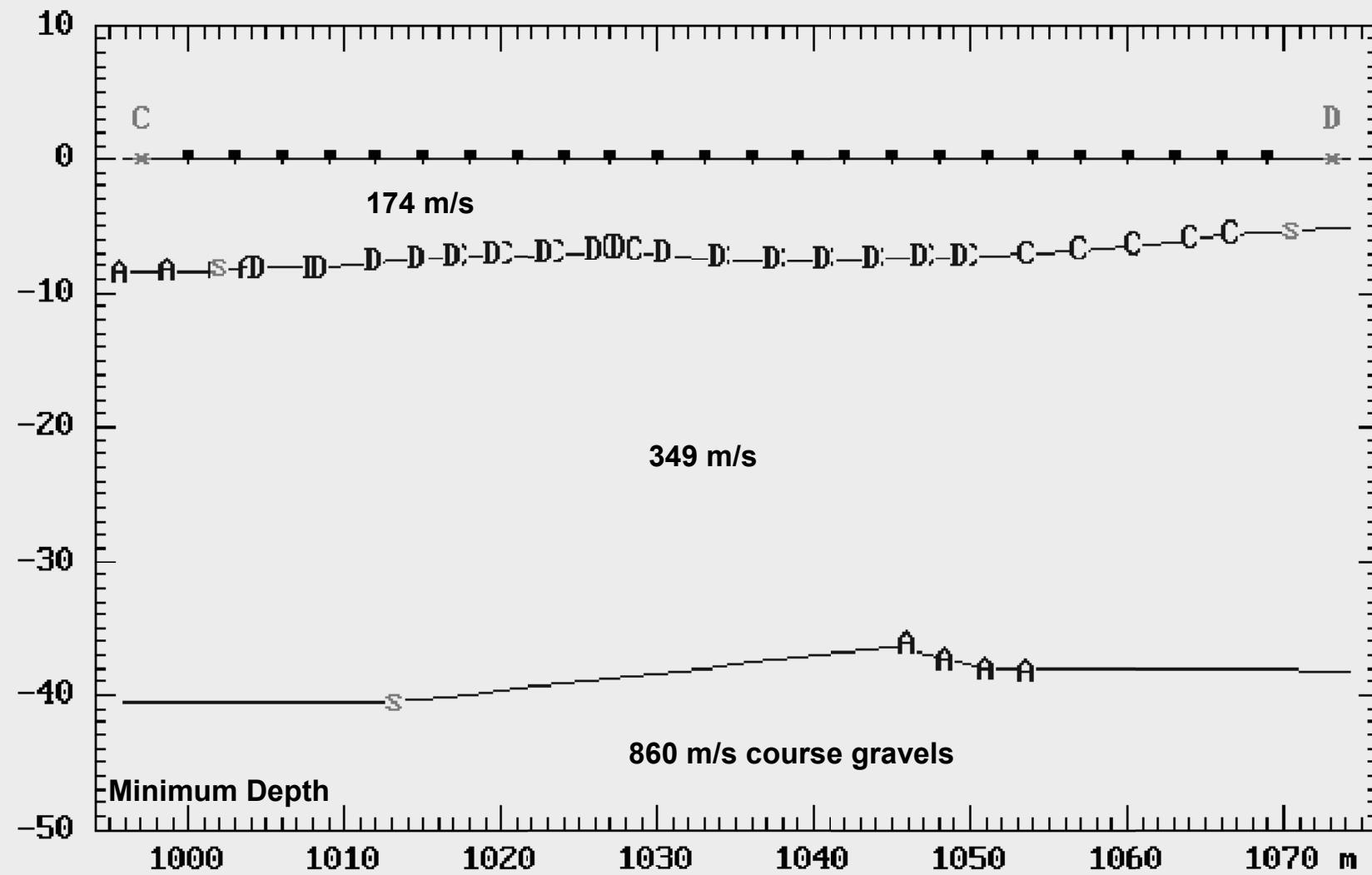


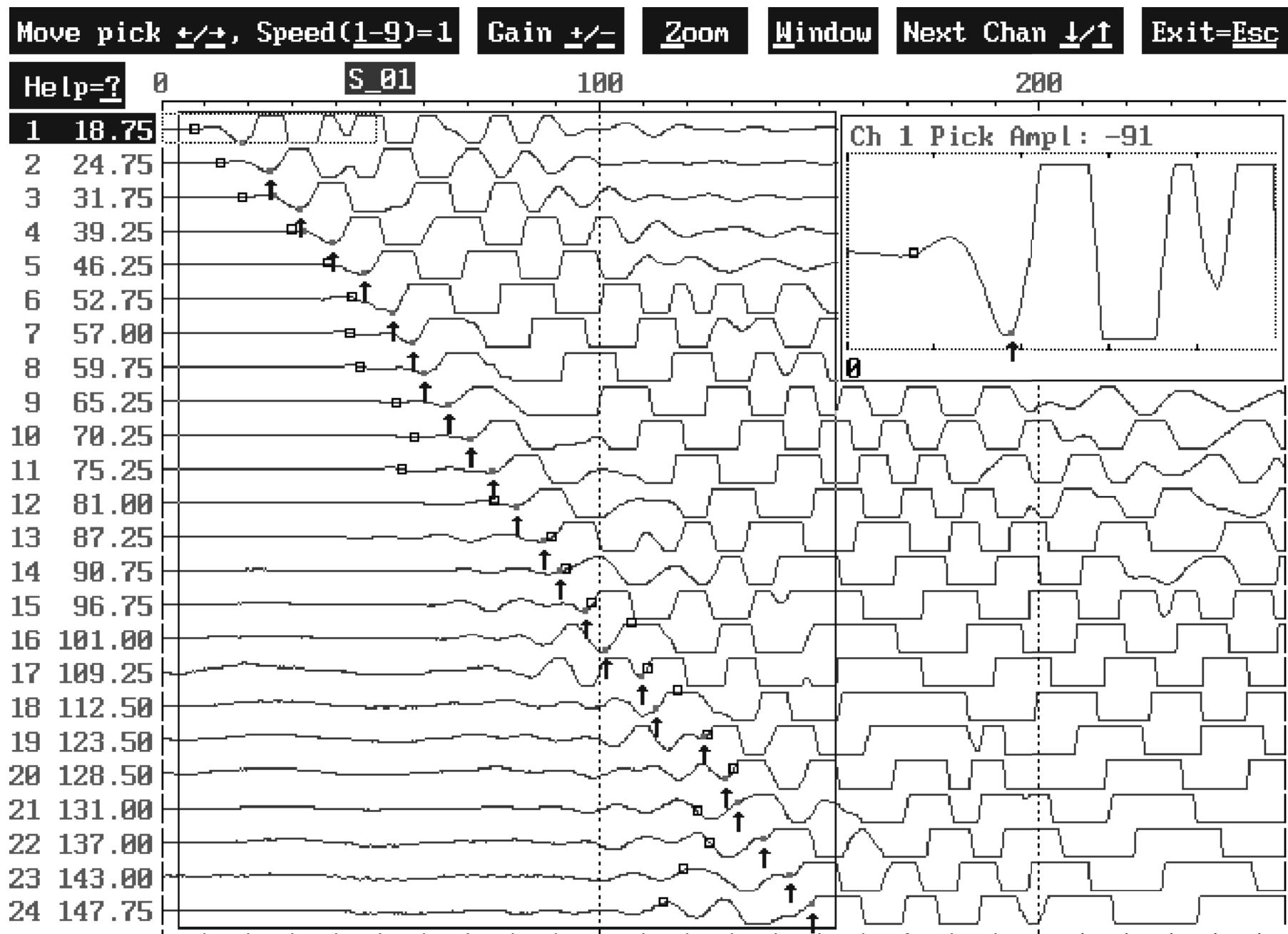
Hatch Road S-wave

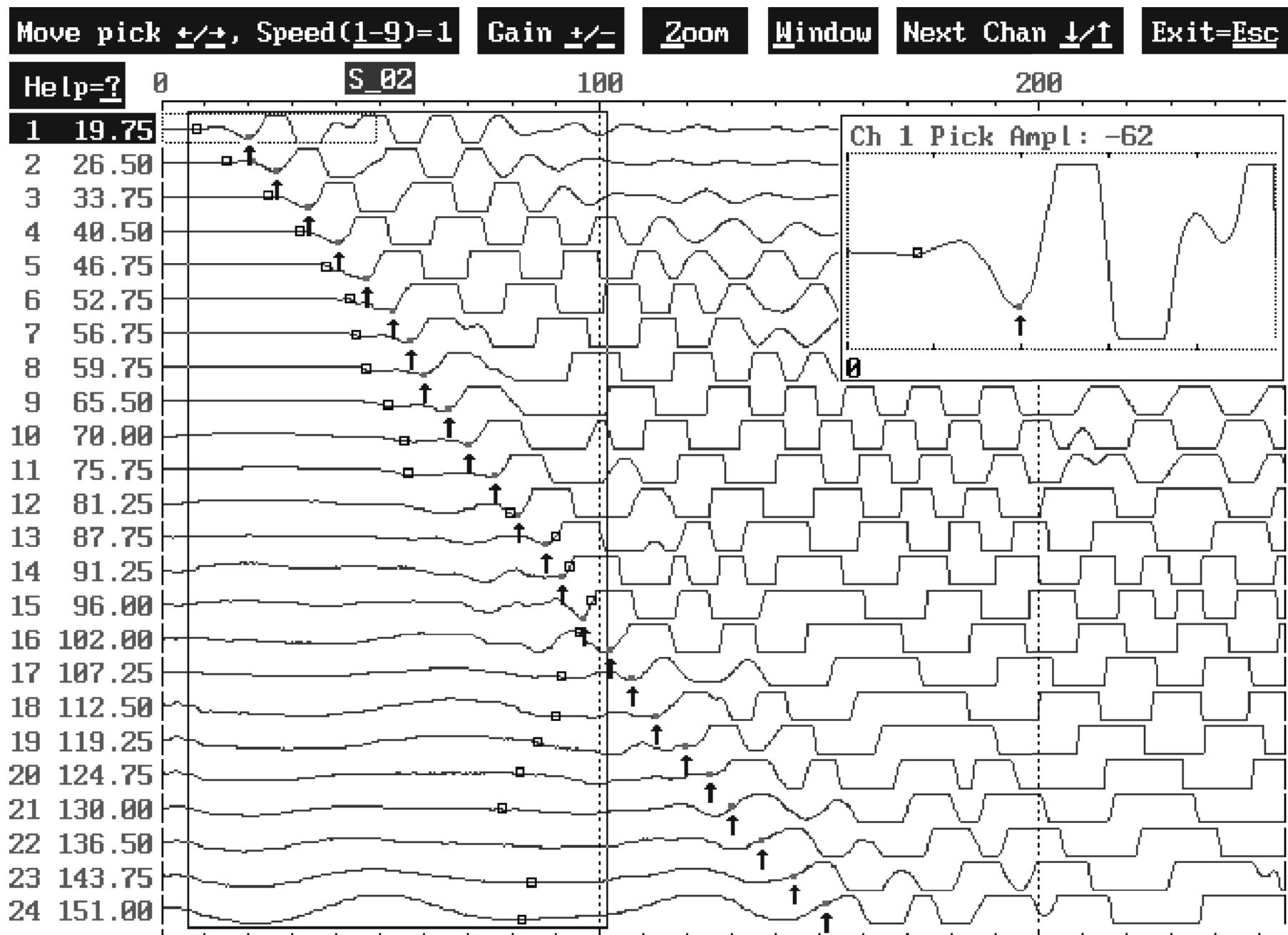
Press Esc to EXIT

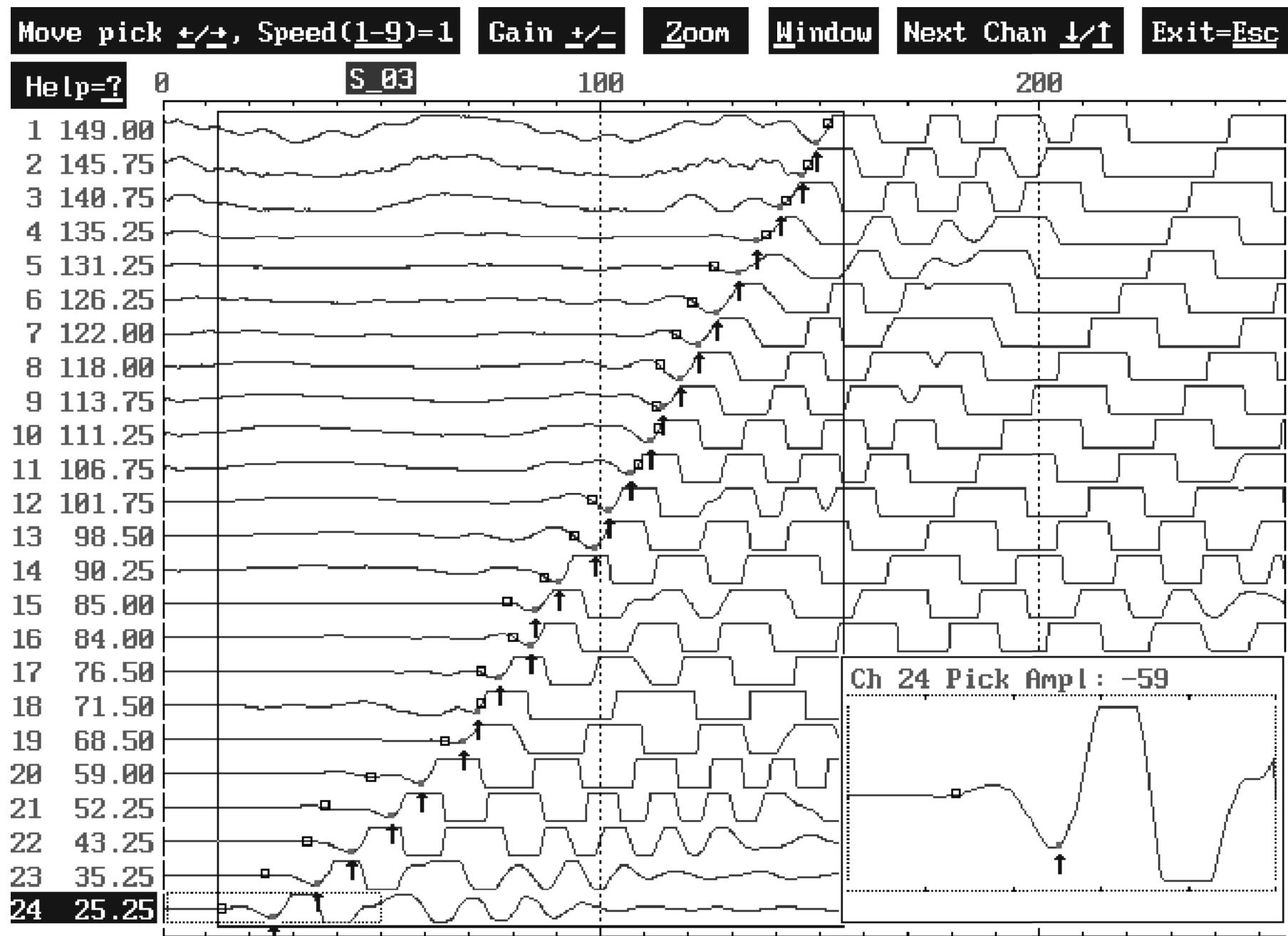
HAT_SMIN.SIP: Hatch Road S-waves

Spread A



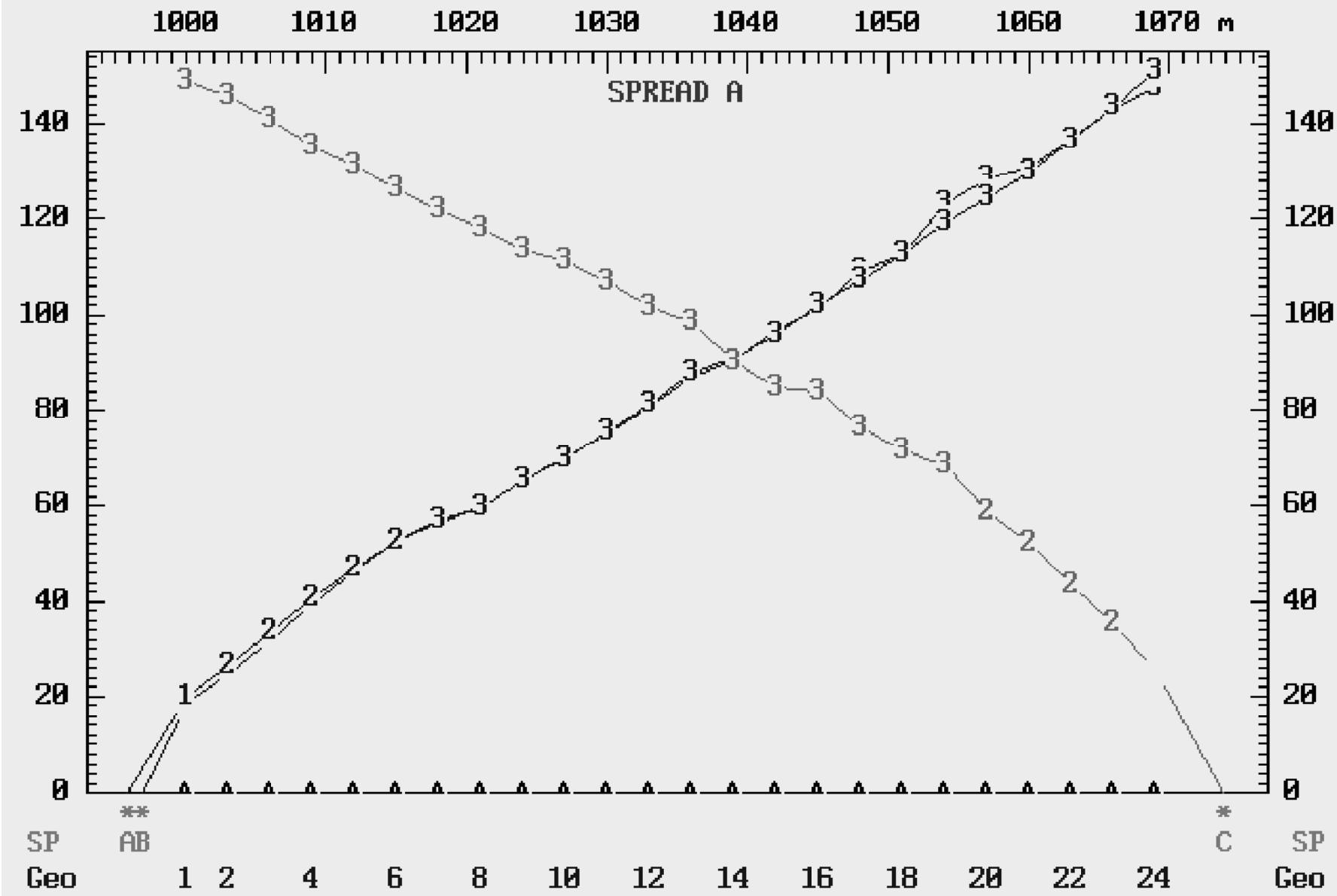
Hayford S-wave

Hayford S-wave

Hayford S-wave

Hayford S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

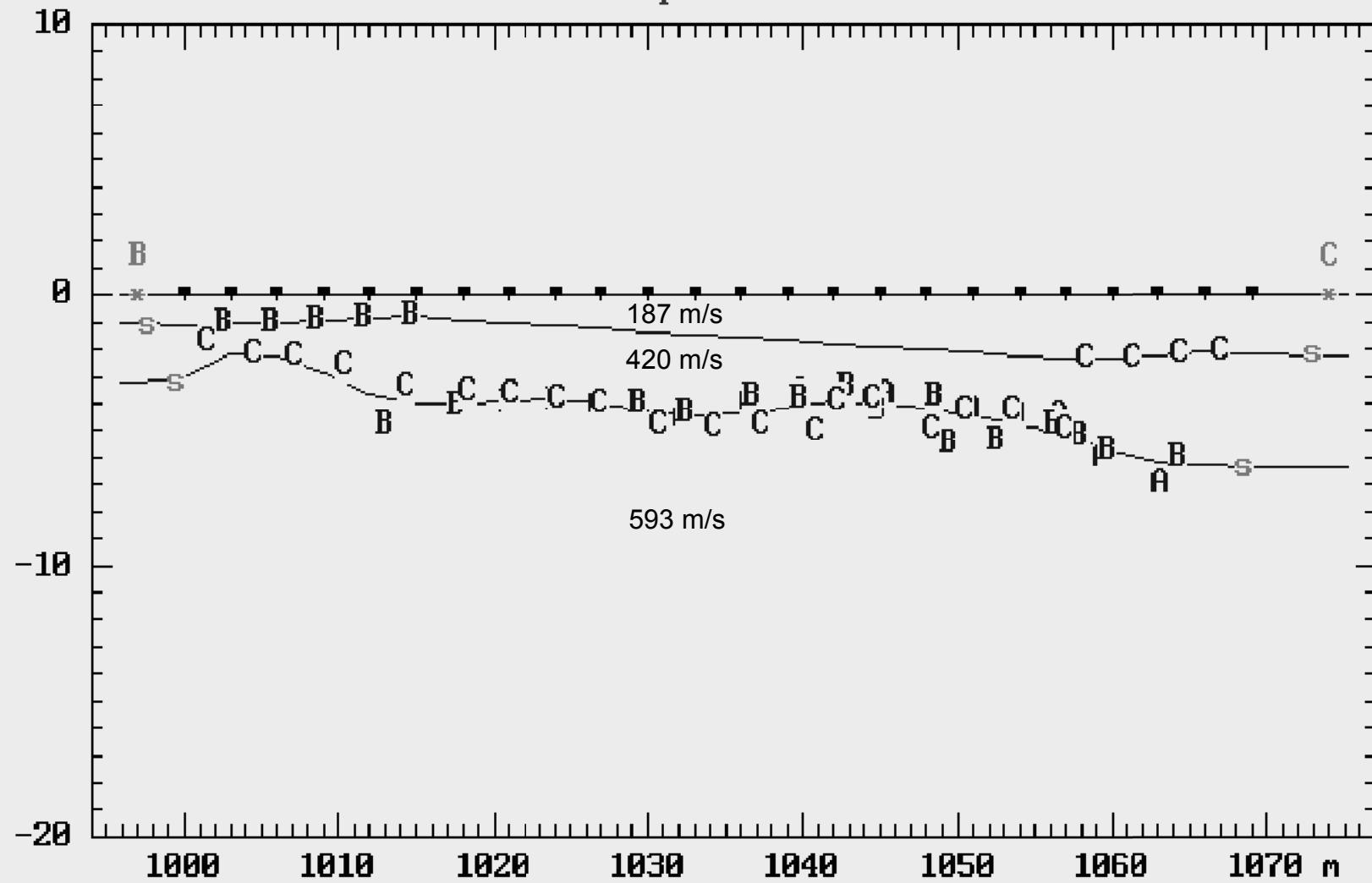


Hayford S-wave

Press Esc to EXIT

HAYFSWAU.SIP : Hayford S-Waves

Spread A

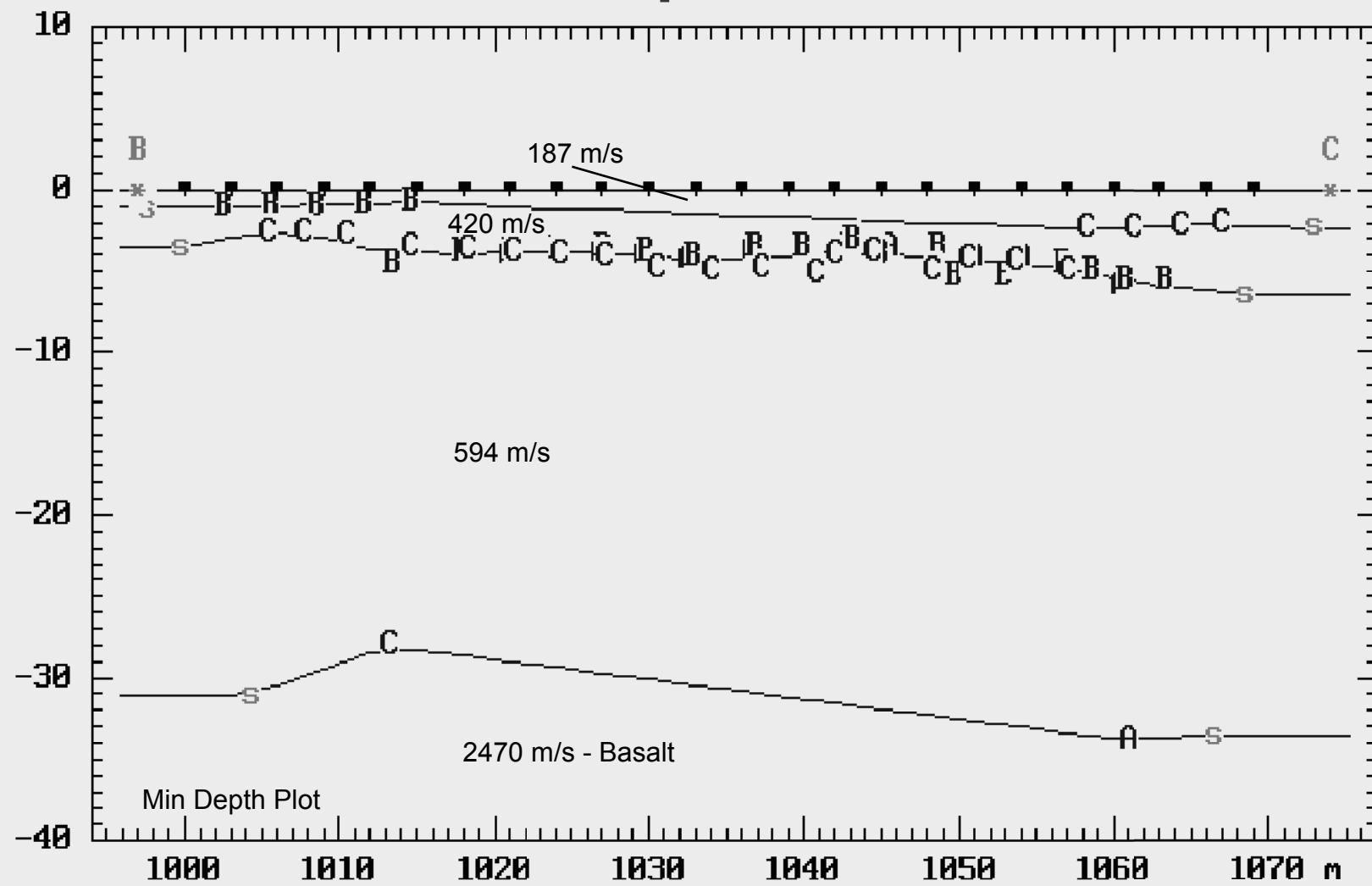


Hayford S-wave

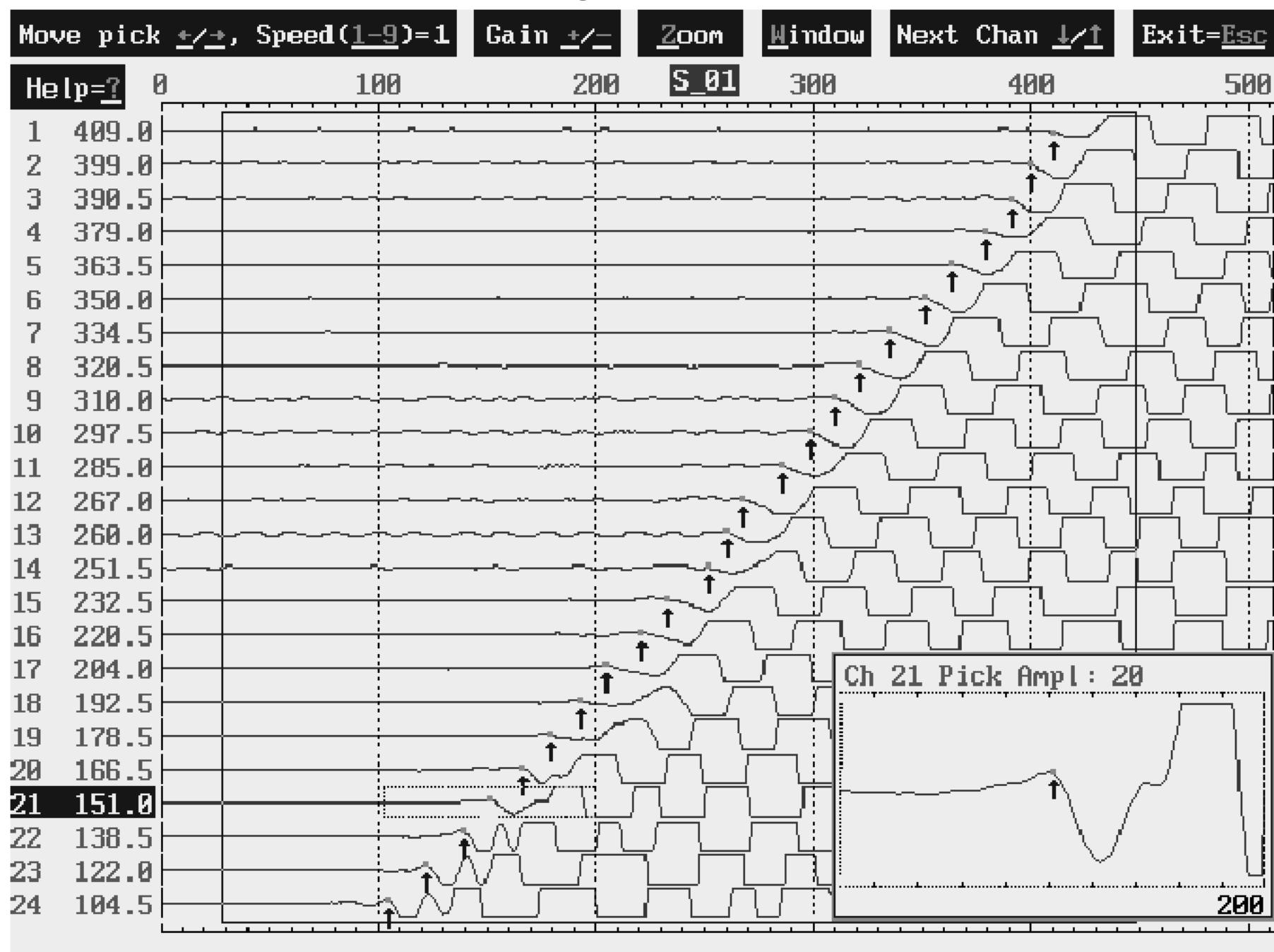
Press Esc to EXIT

HAYFSMIN.SIP: Hayford Minimum Depth Plot

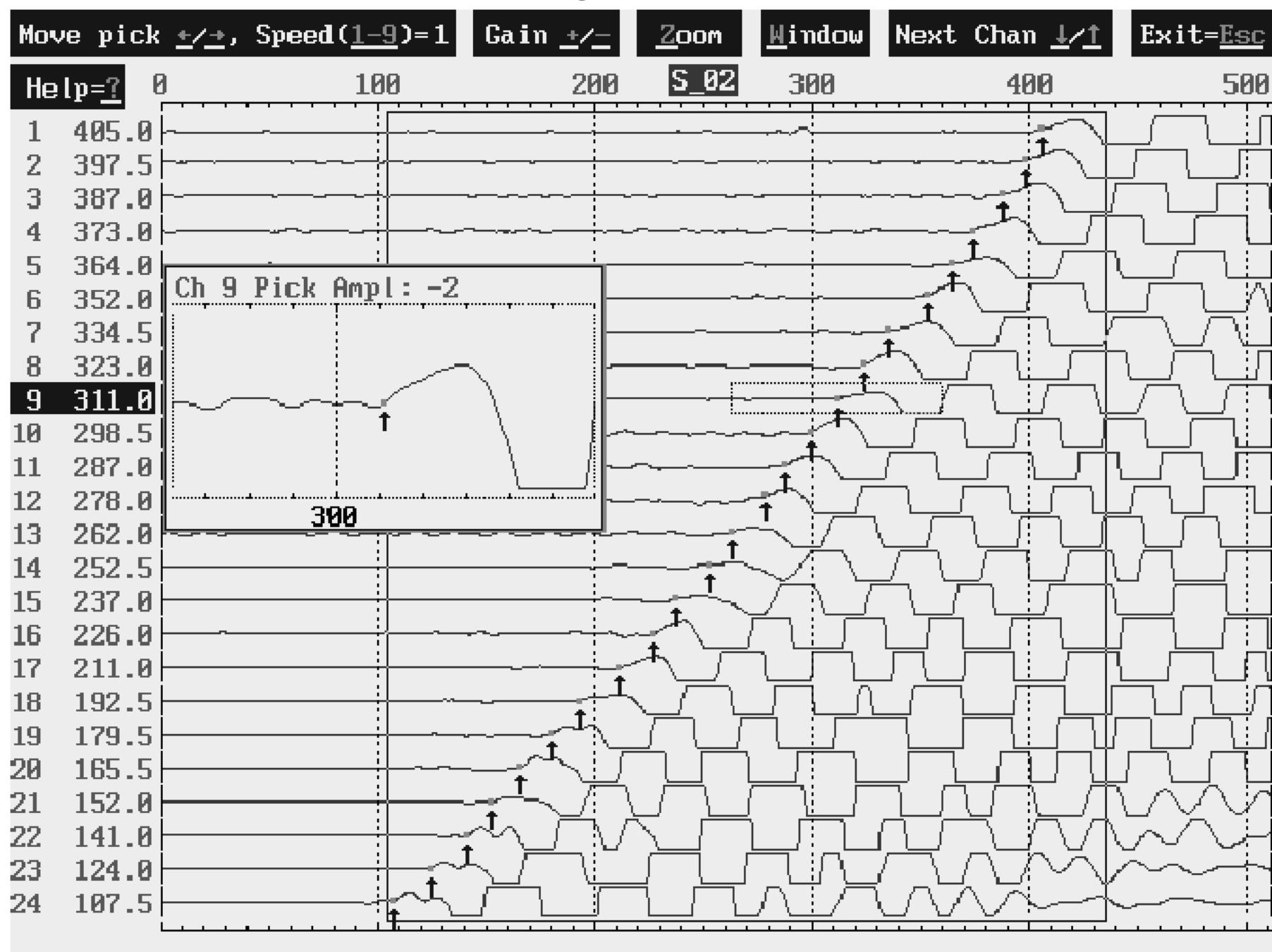
Spread A



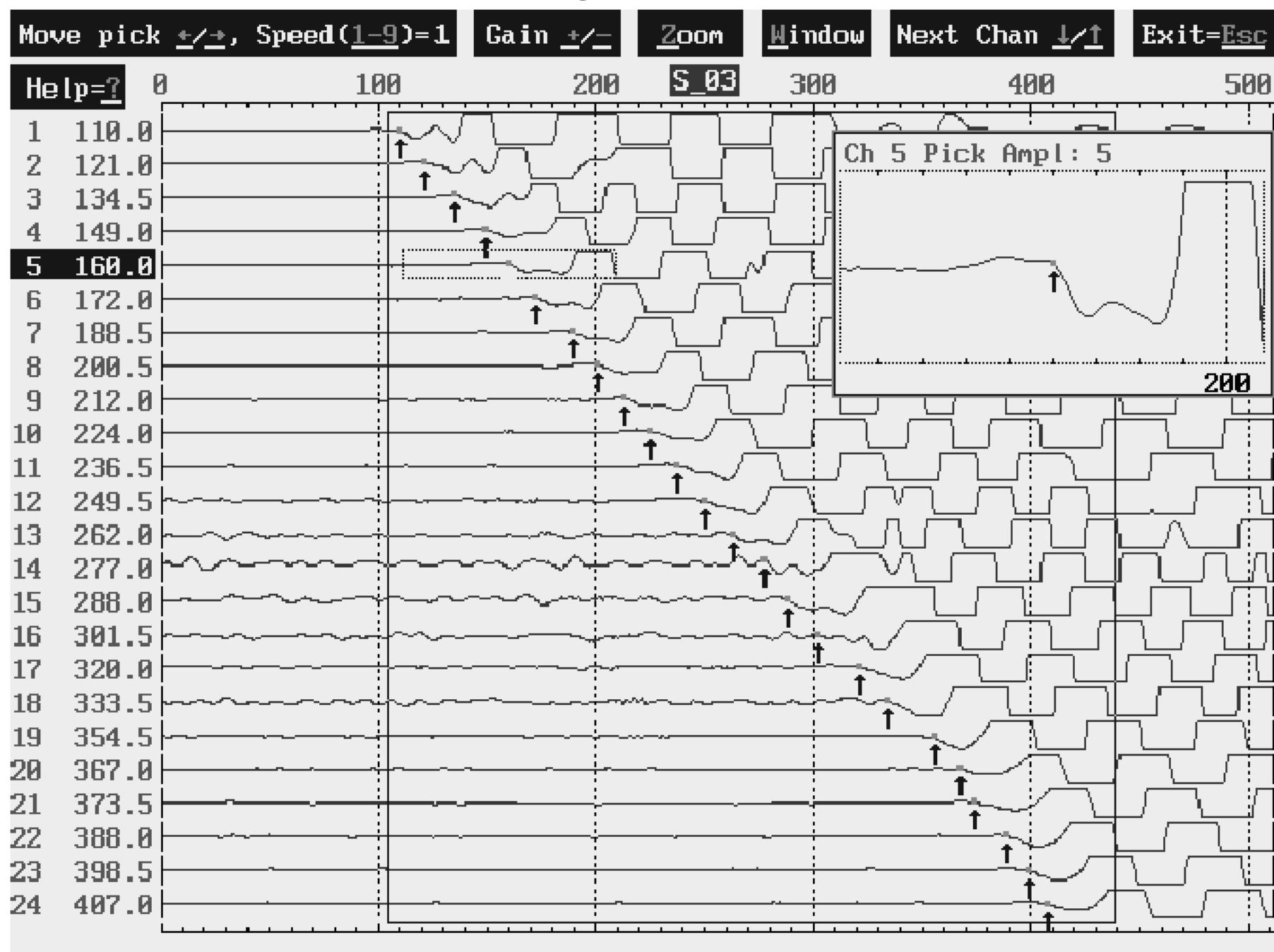
Henning Farm S-wave



Henning Farm S-wave

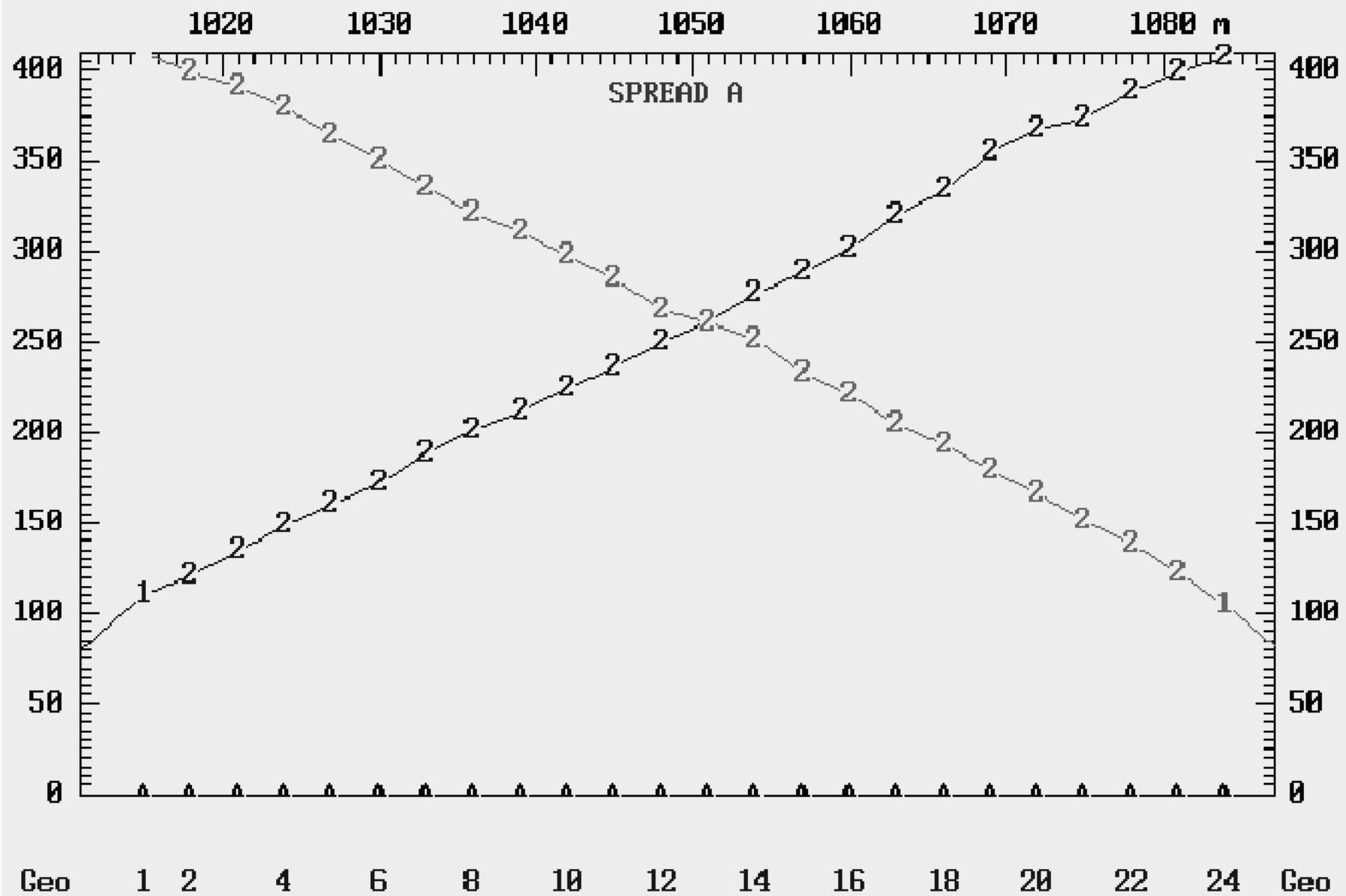


Henning Farm S-wave



Henning Farm S-wave

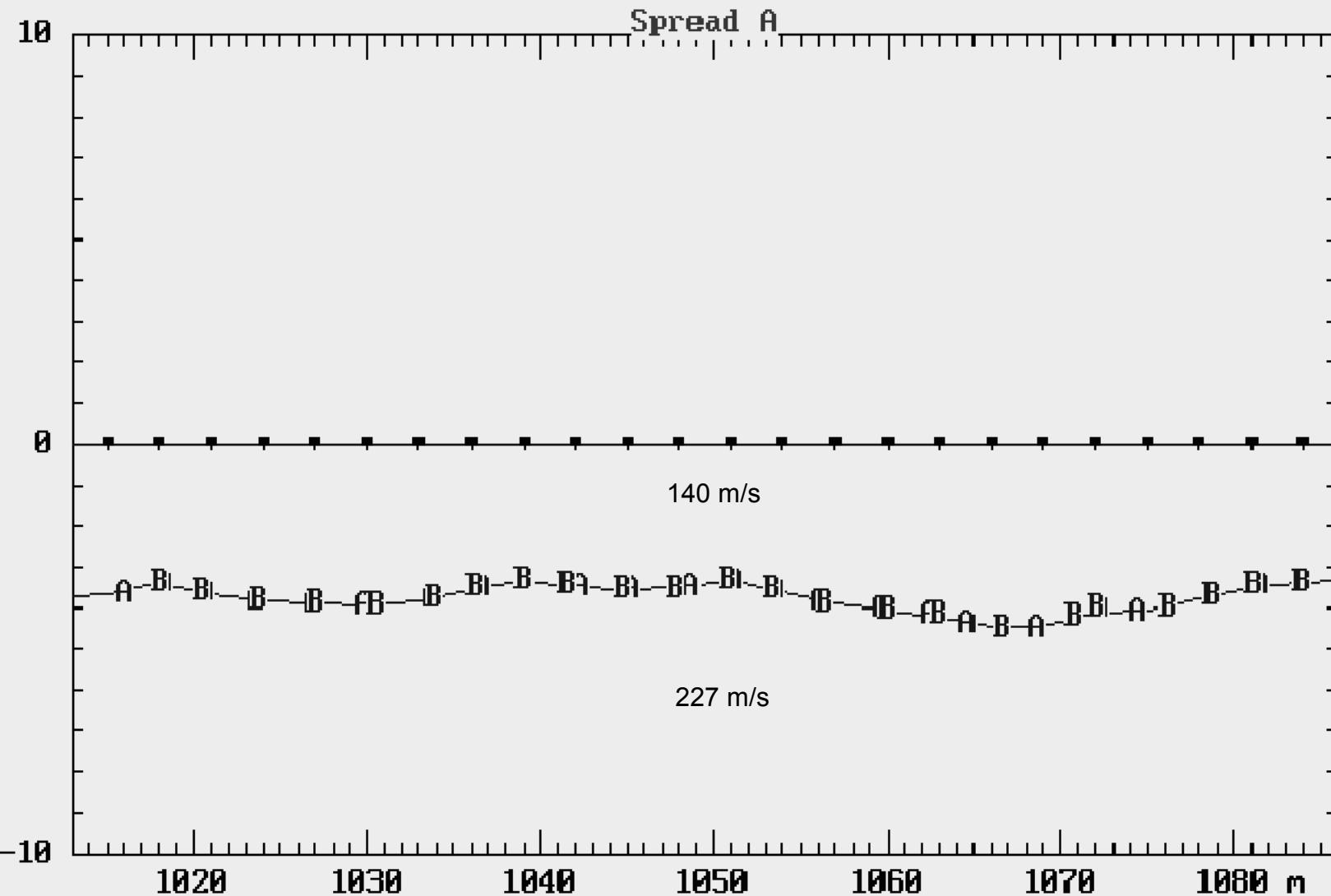
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Henning Farm S-wave

Press Esc to EXIT

HENNSWAU.SIP : Henning Farm S-Waves

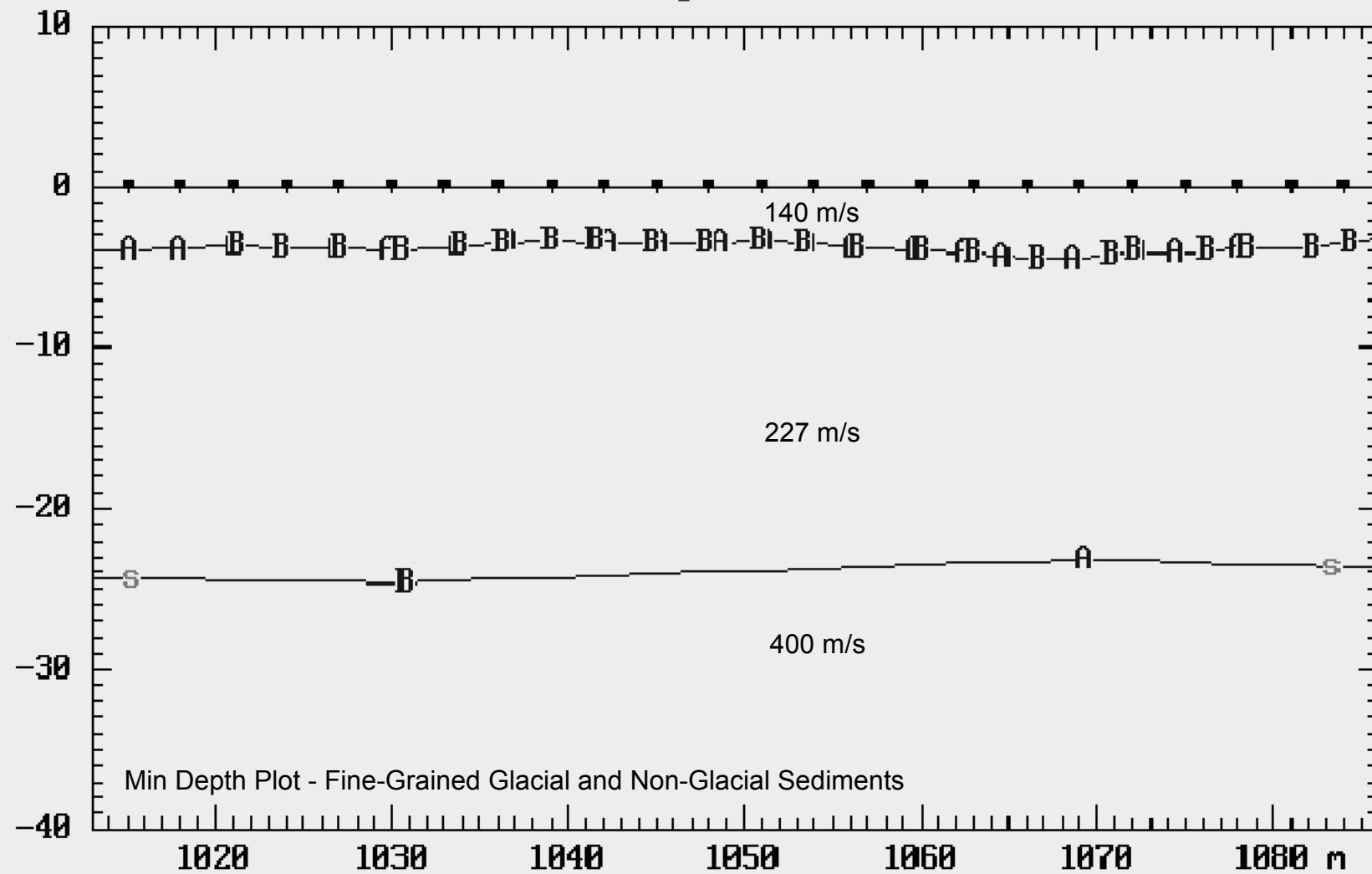


Henning Farm S-wave

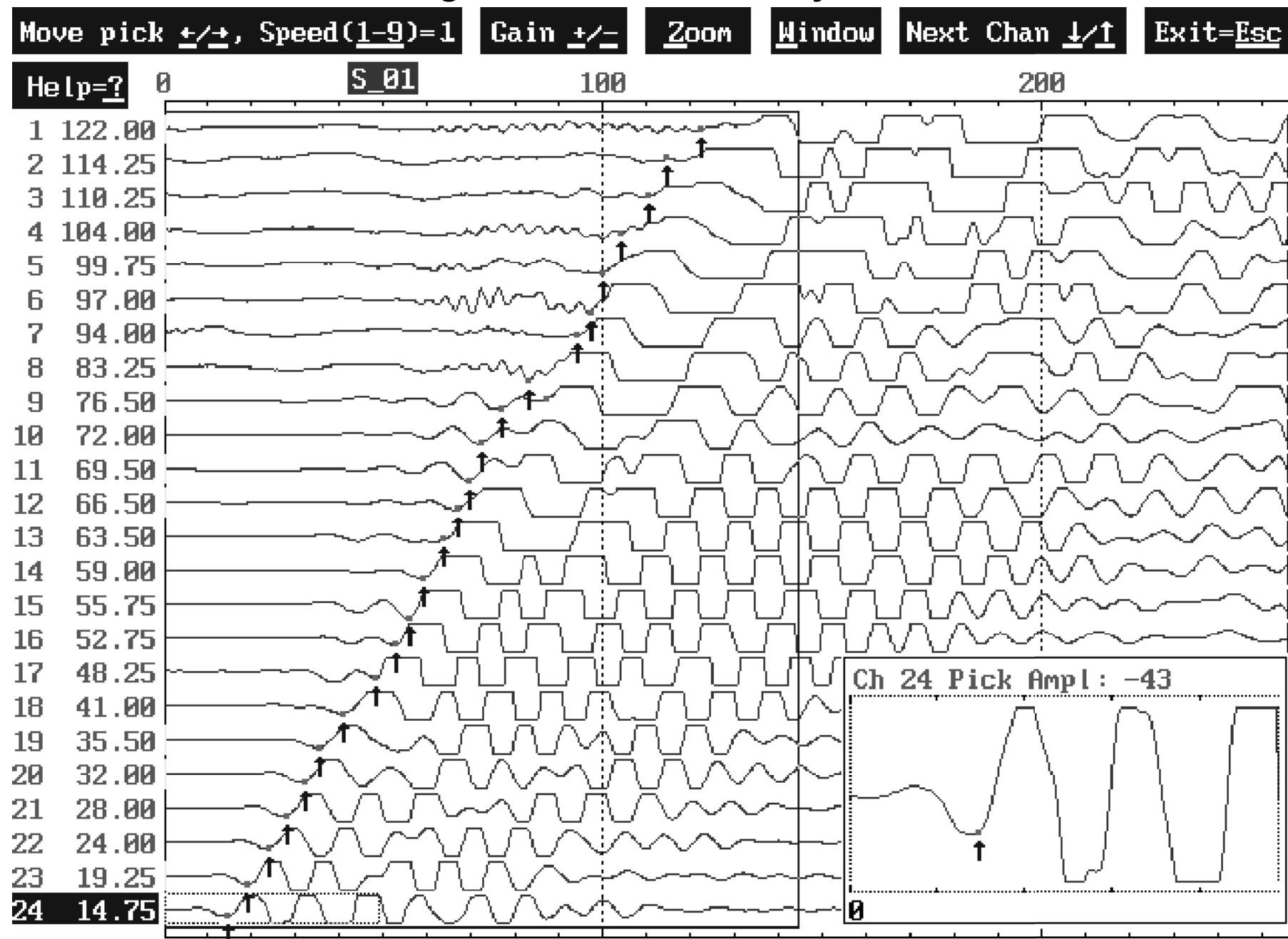
Press Esc to EXIT

HENNSMIN.SIP : Henning Farm S-Waves Minimum Depth Model

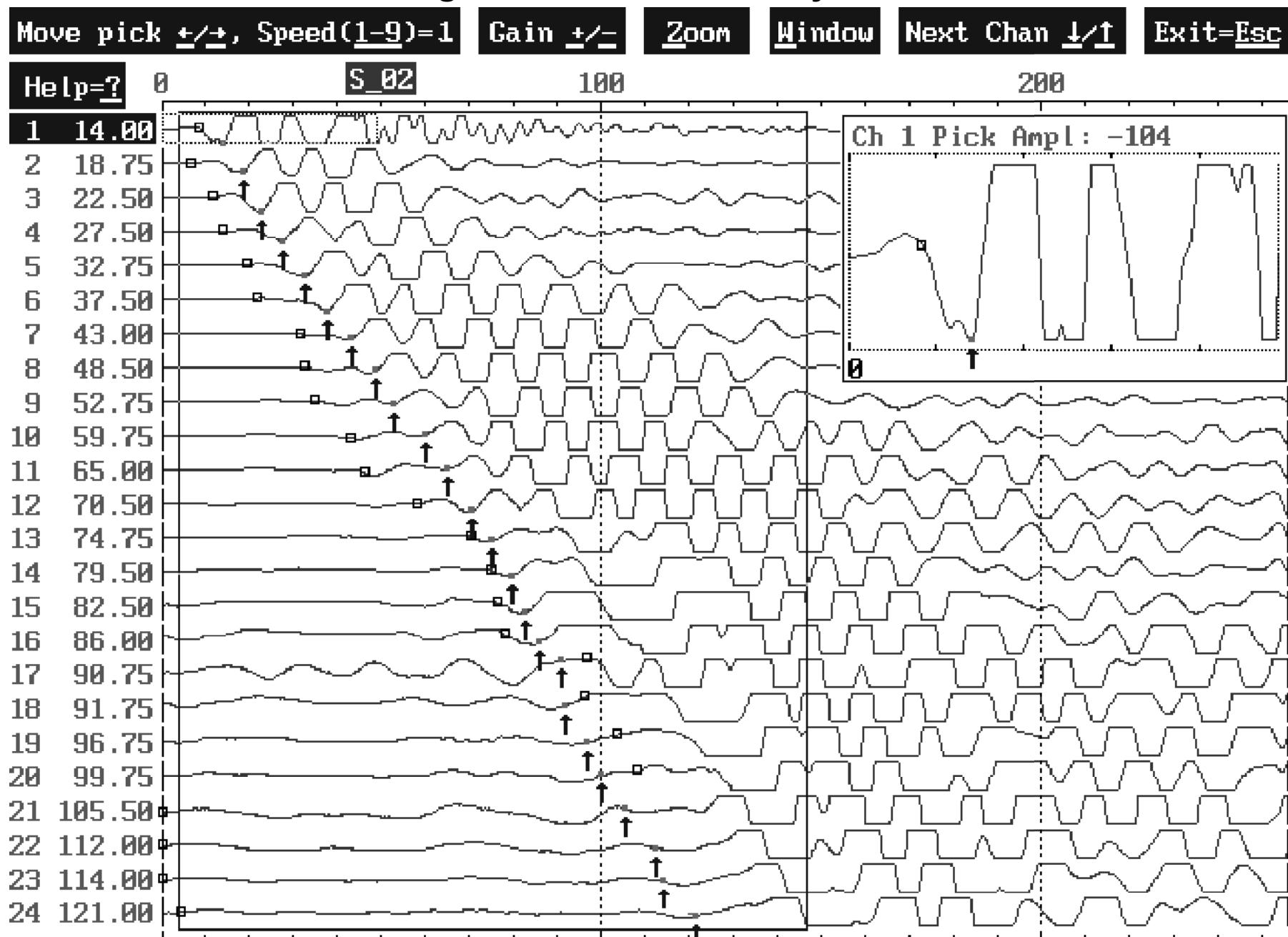
Spread A



Heritage Christian Elementary S-wave

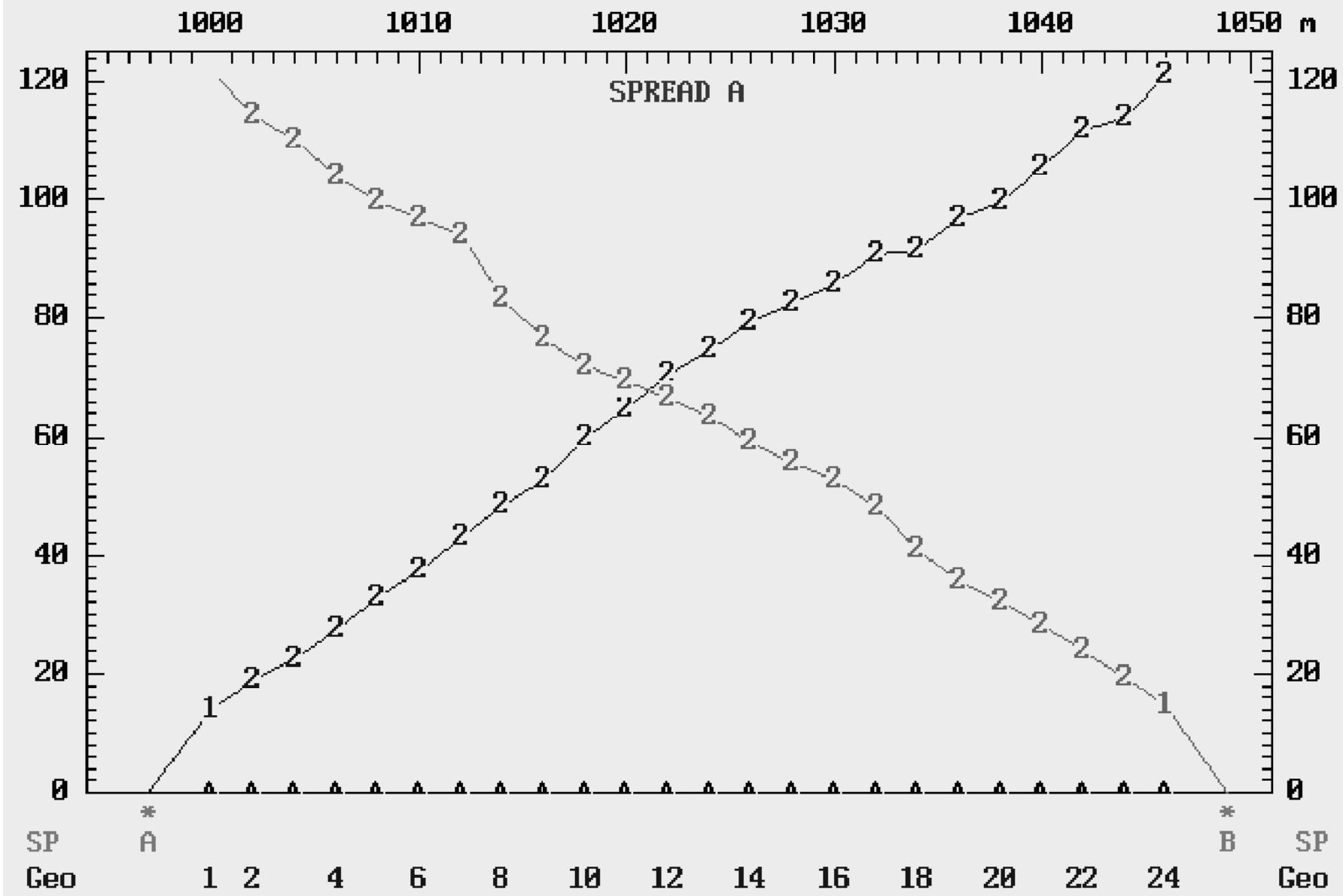


Heritage Christian Elementary S-wave



Heritage Christian Elementary S-wave

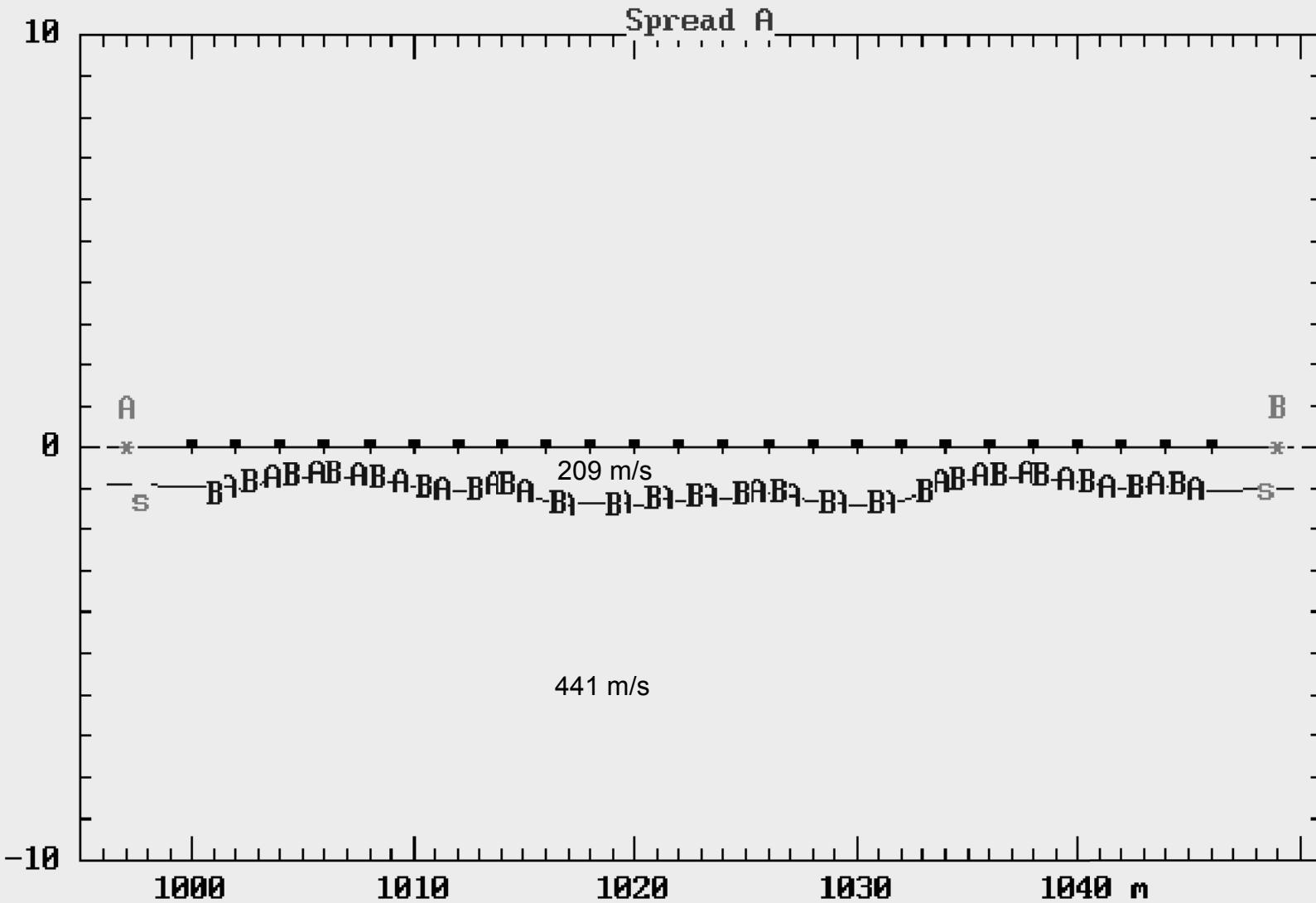
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Heritage Christian Elementary S-wave

Press Esc to EXIT

HERISWAU.SIP: Heritage Christian Elementary School S-Waves

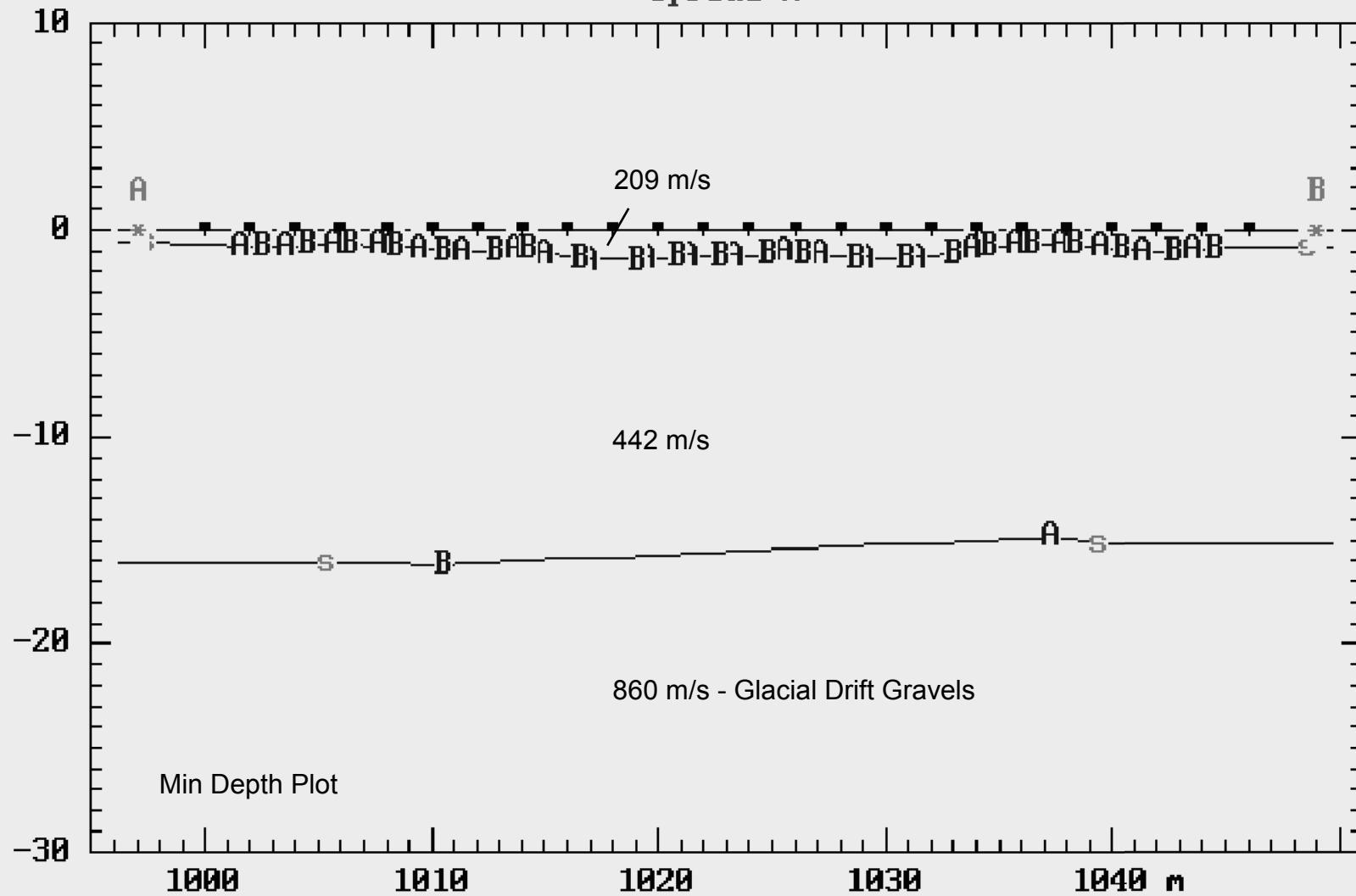


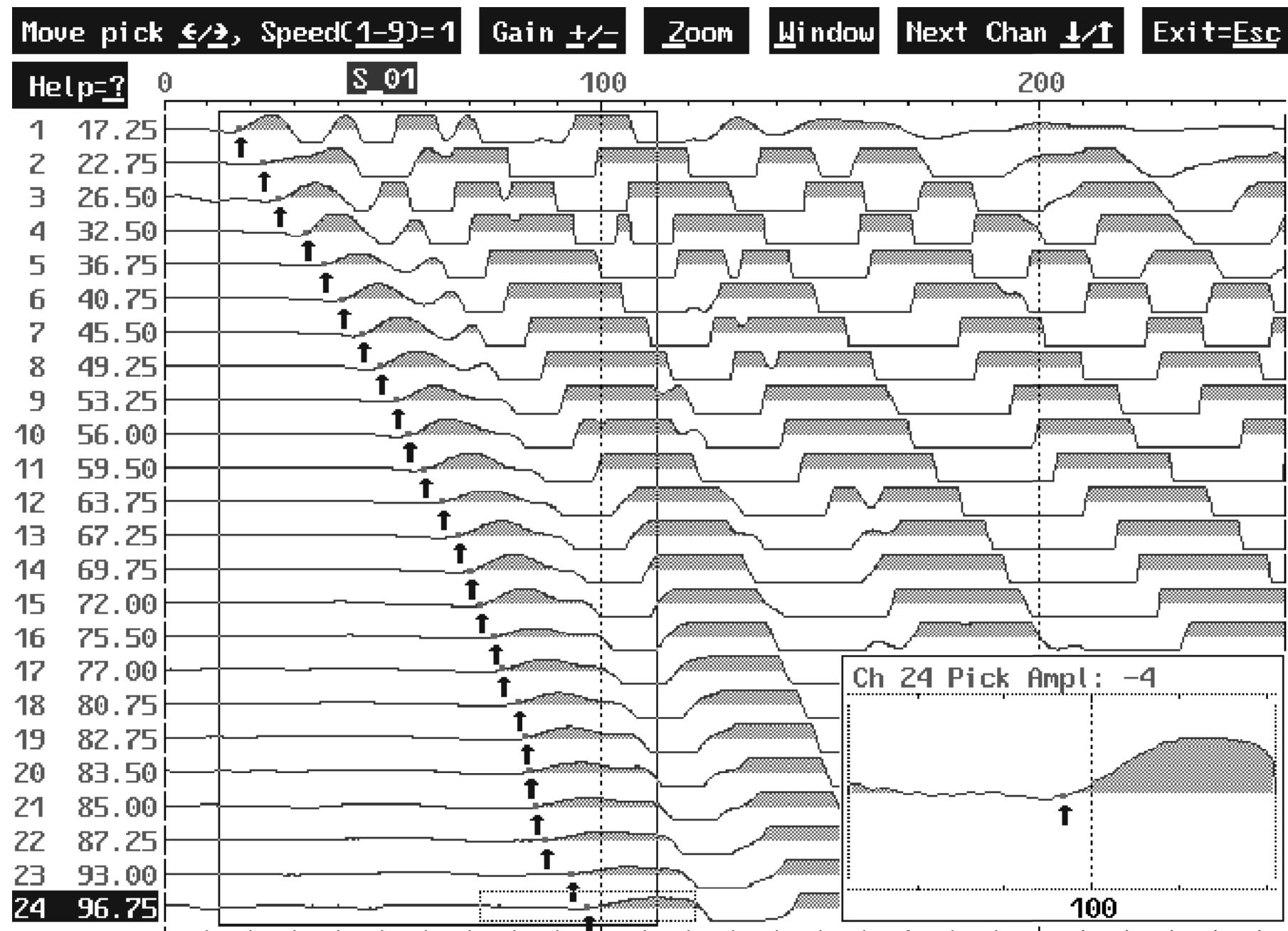
Heritage Christian Elementary S-wave

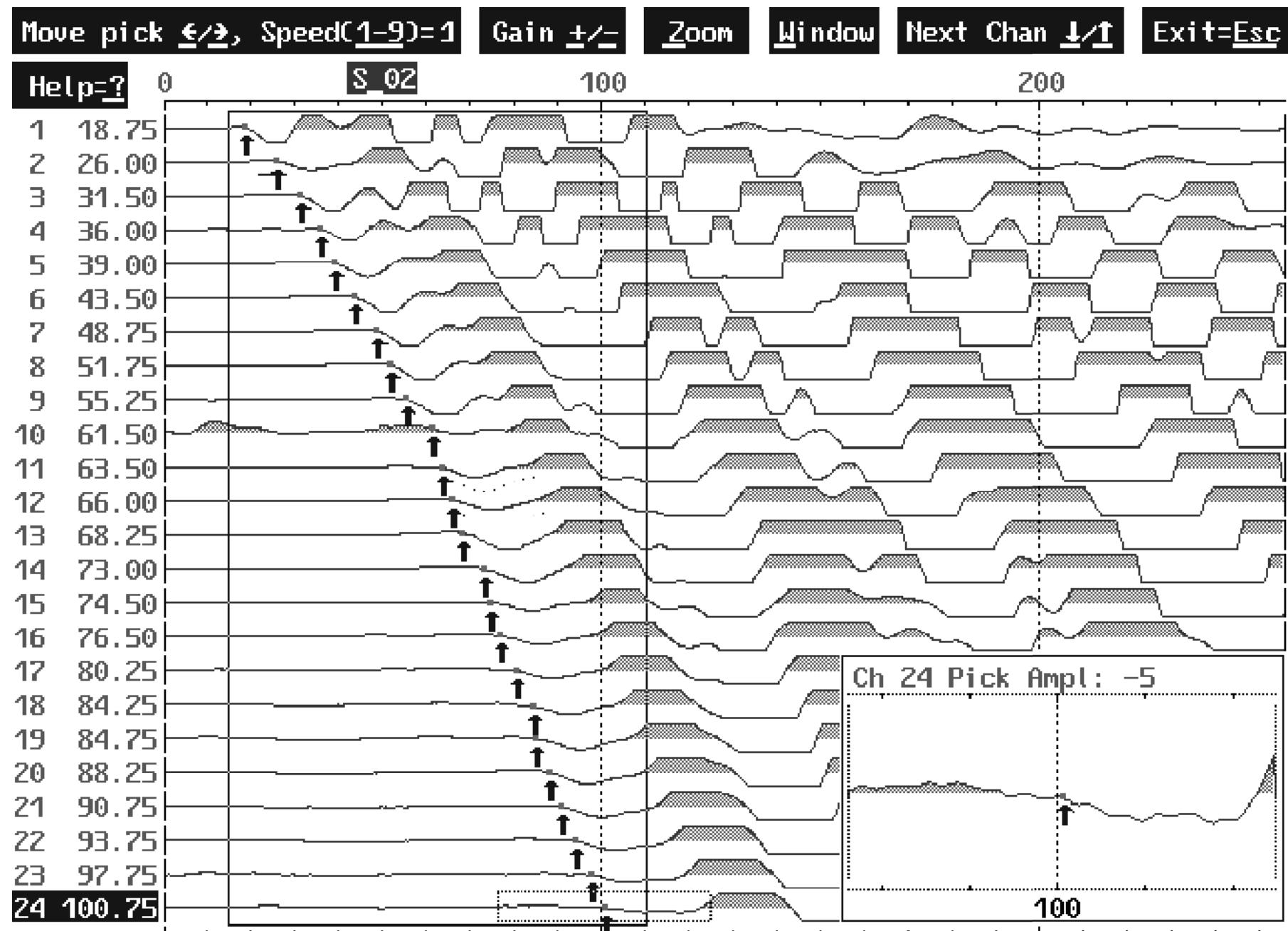
Press Esc to EXIT

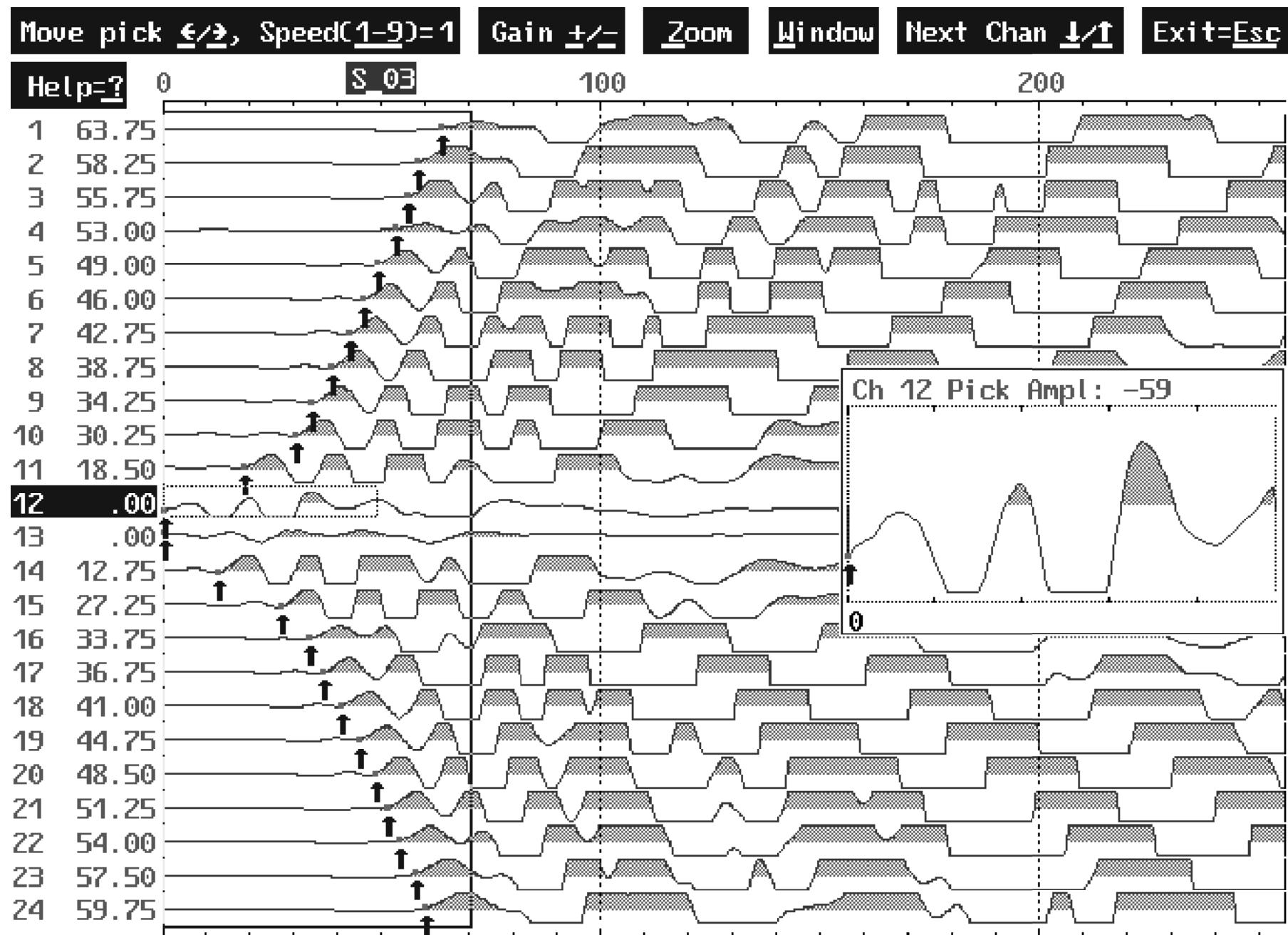
HERISMIN.SIP : Heritage Christian Elementary Minimum Depth Plot

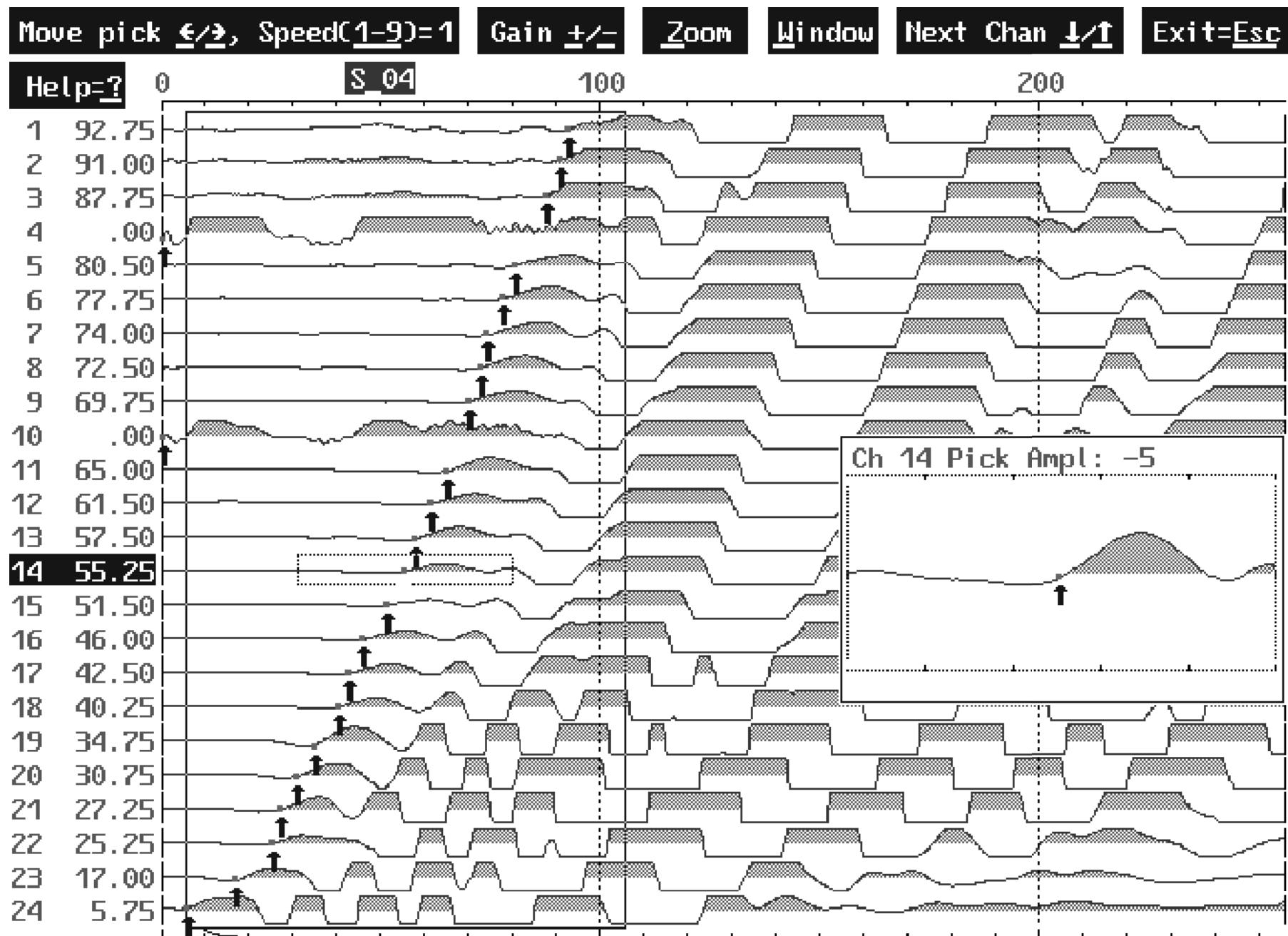
Spread A



Hess Farm S-wave

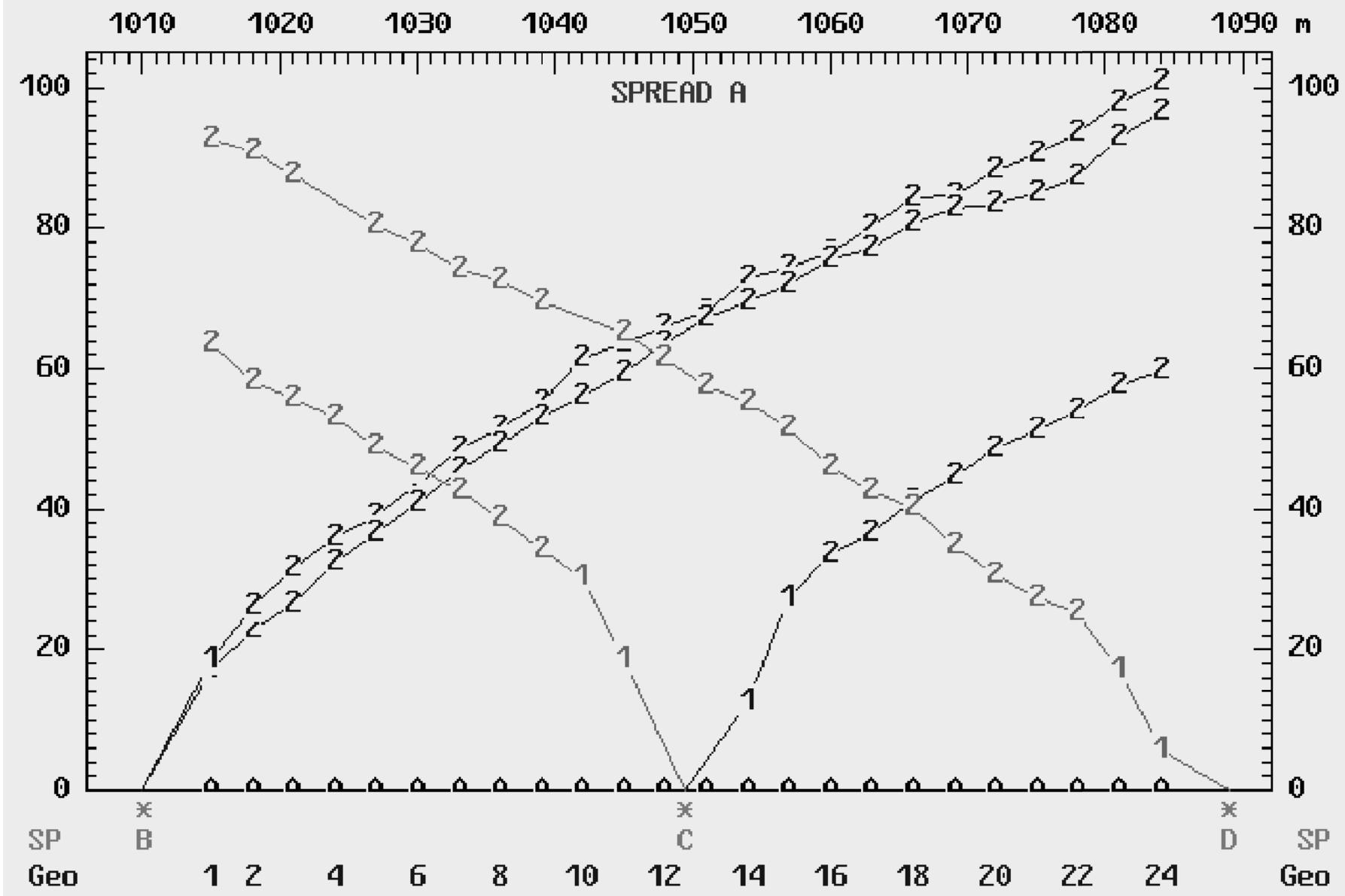
Hess Farm S-wave

Hess Farm S-wave

Hess Farm S-wave

Hess Farm S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

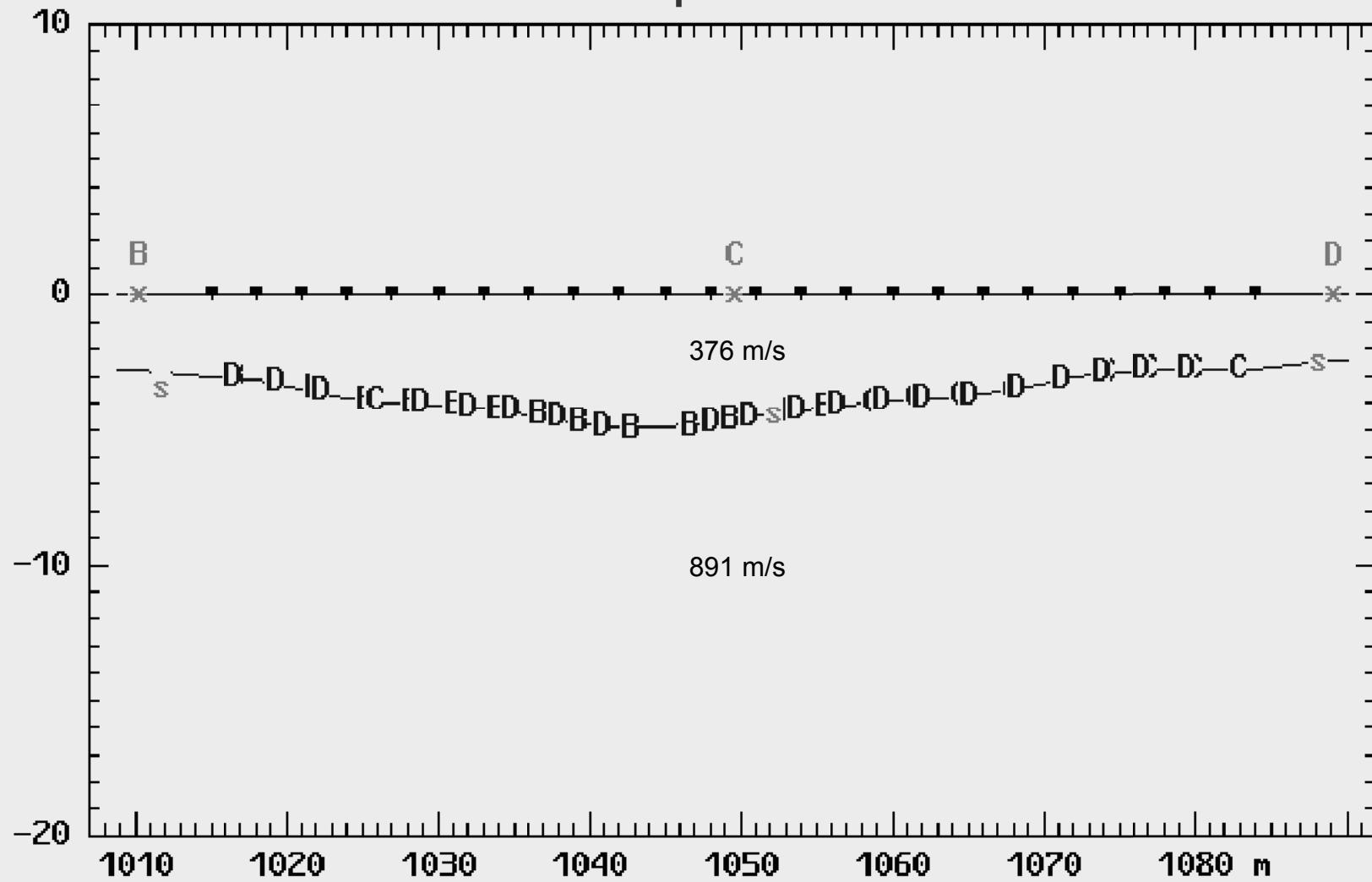


Hess Farm S-wave

Press Esc to EXIT

HESSSWAV.SIP: Hess Farm S-Waves

Spread A

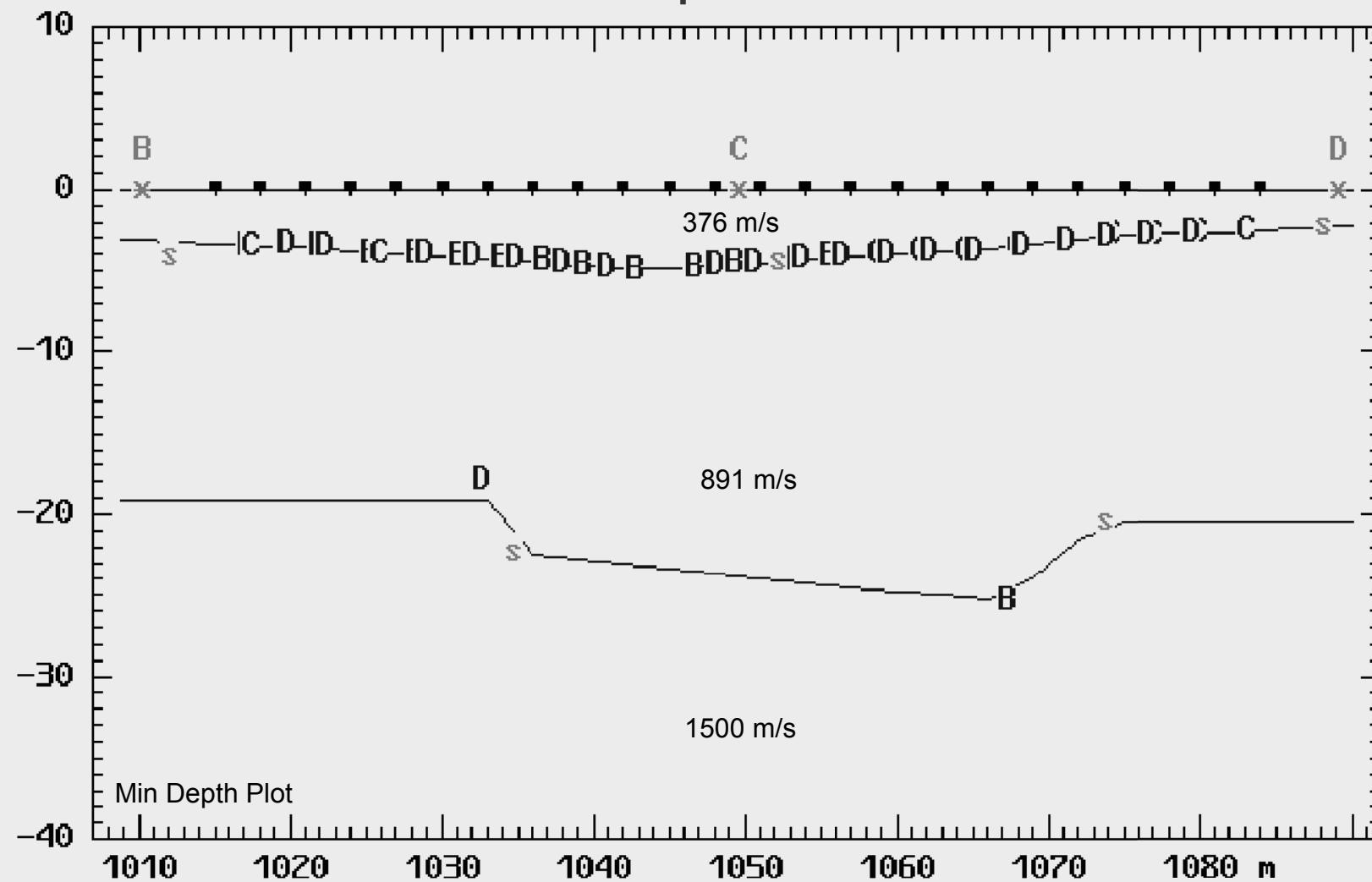


Hess Farm S-wave

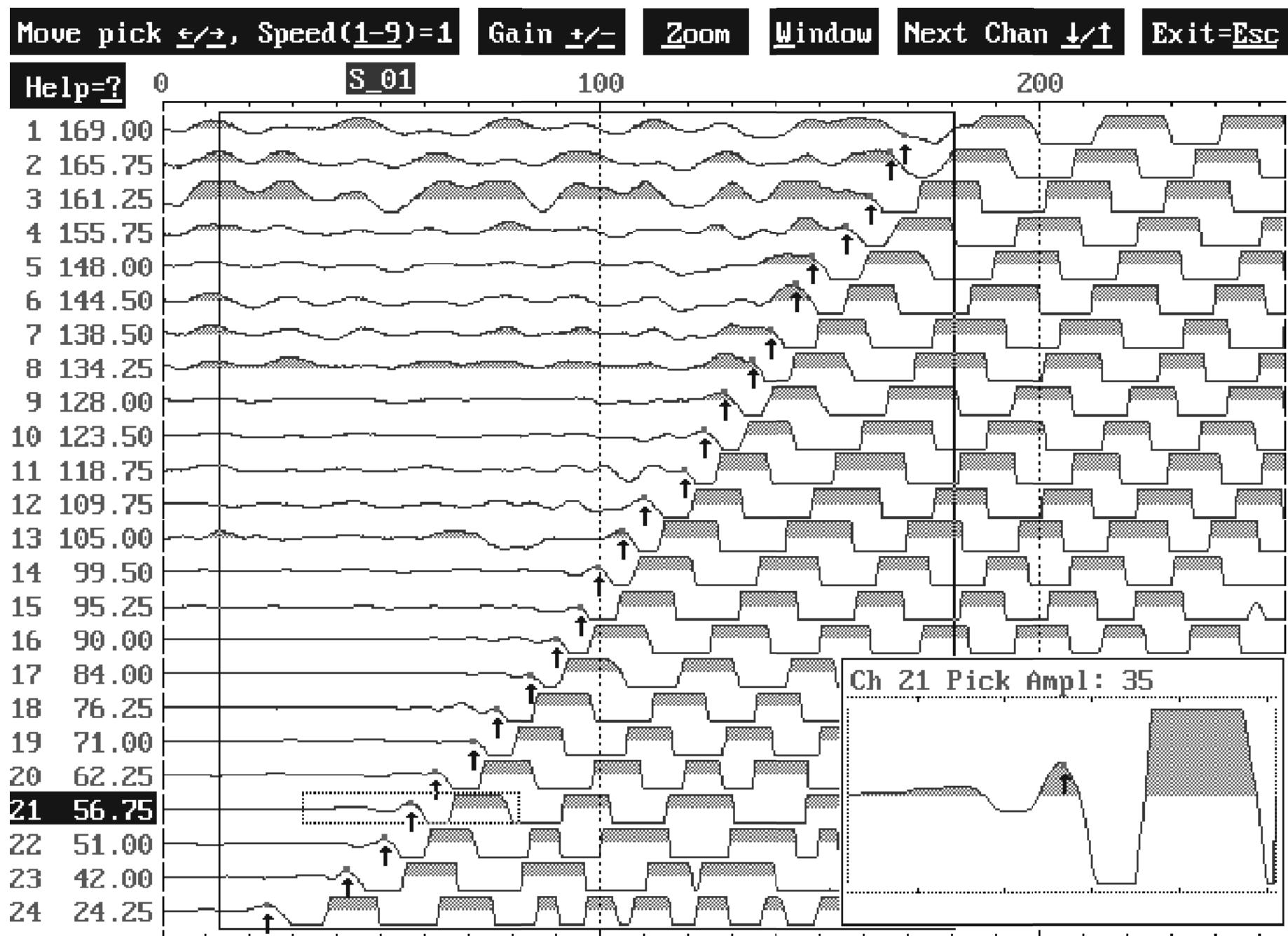
Press Esc to EXIT

HESSMIN.SIP: Hess Farm S-Waves Minimum Depth Plot

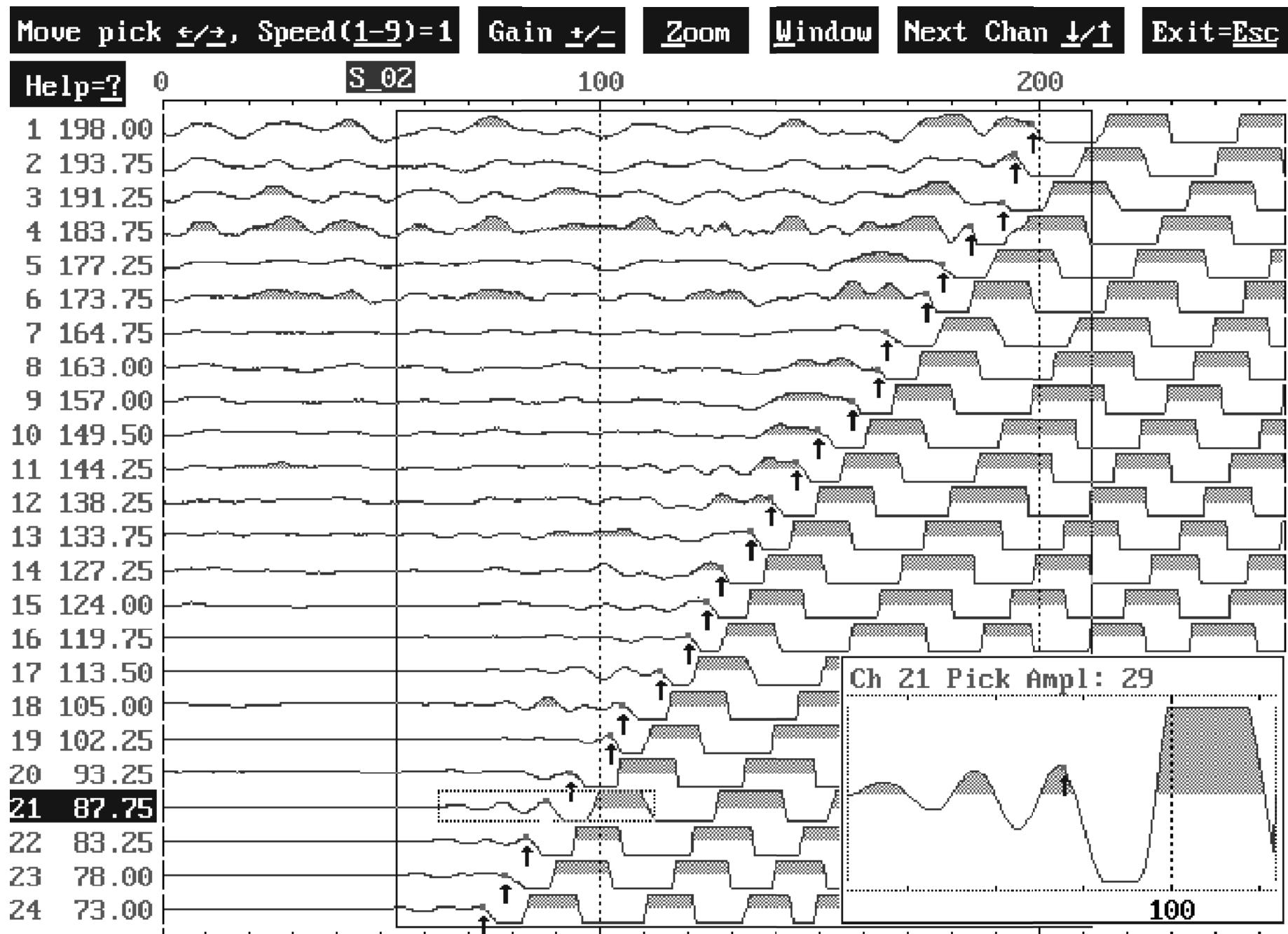
Spread A



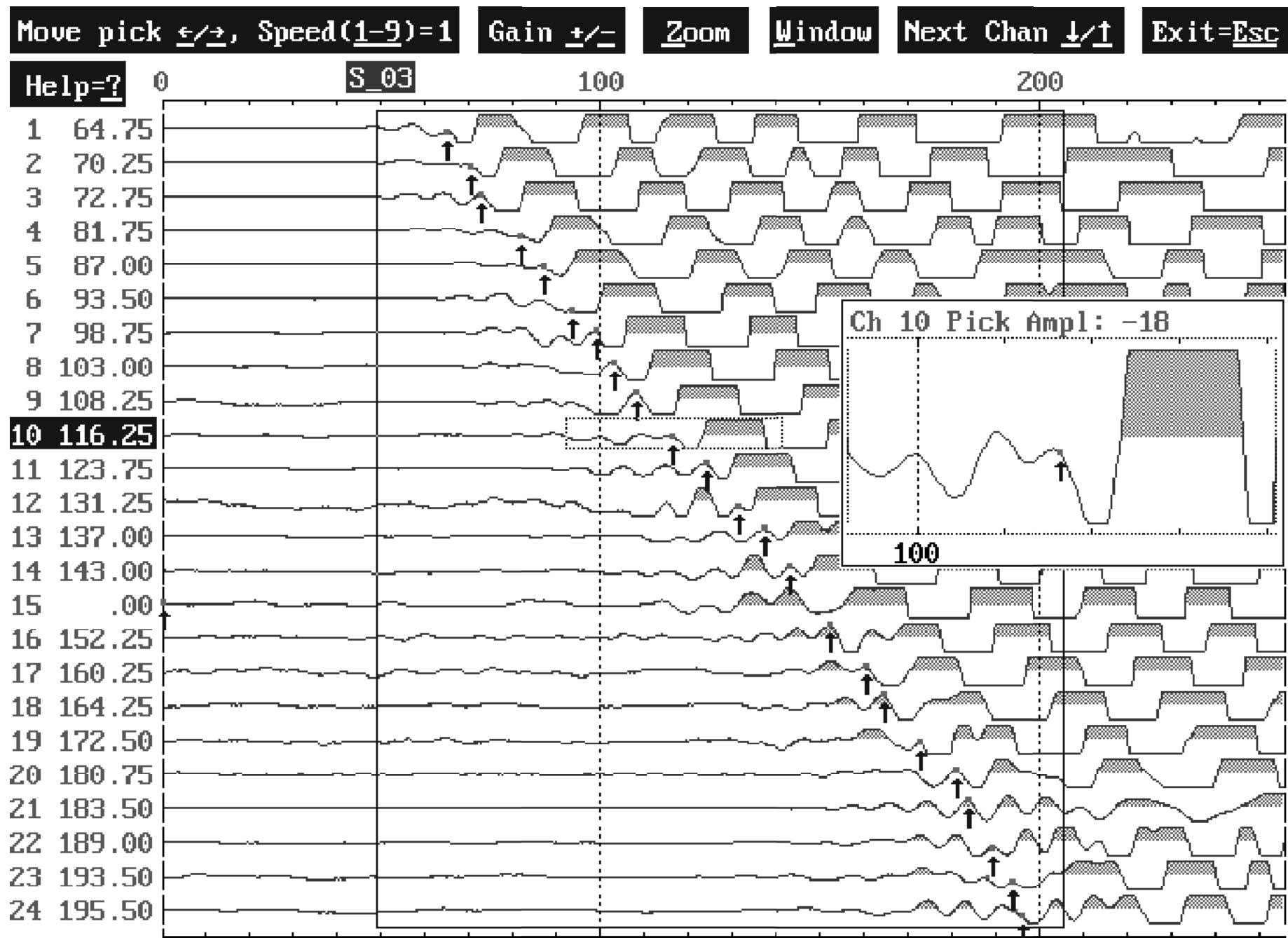
Hope Lane S-wave



Hope Lane S-wave

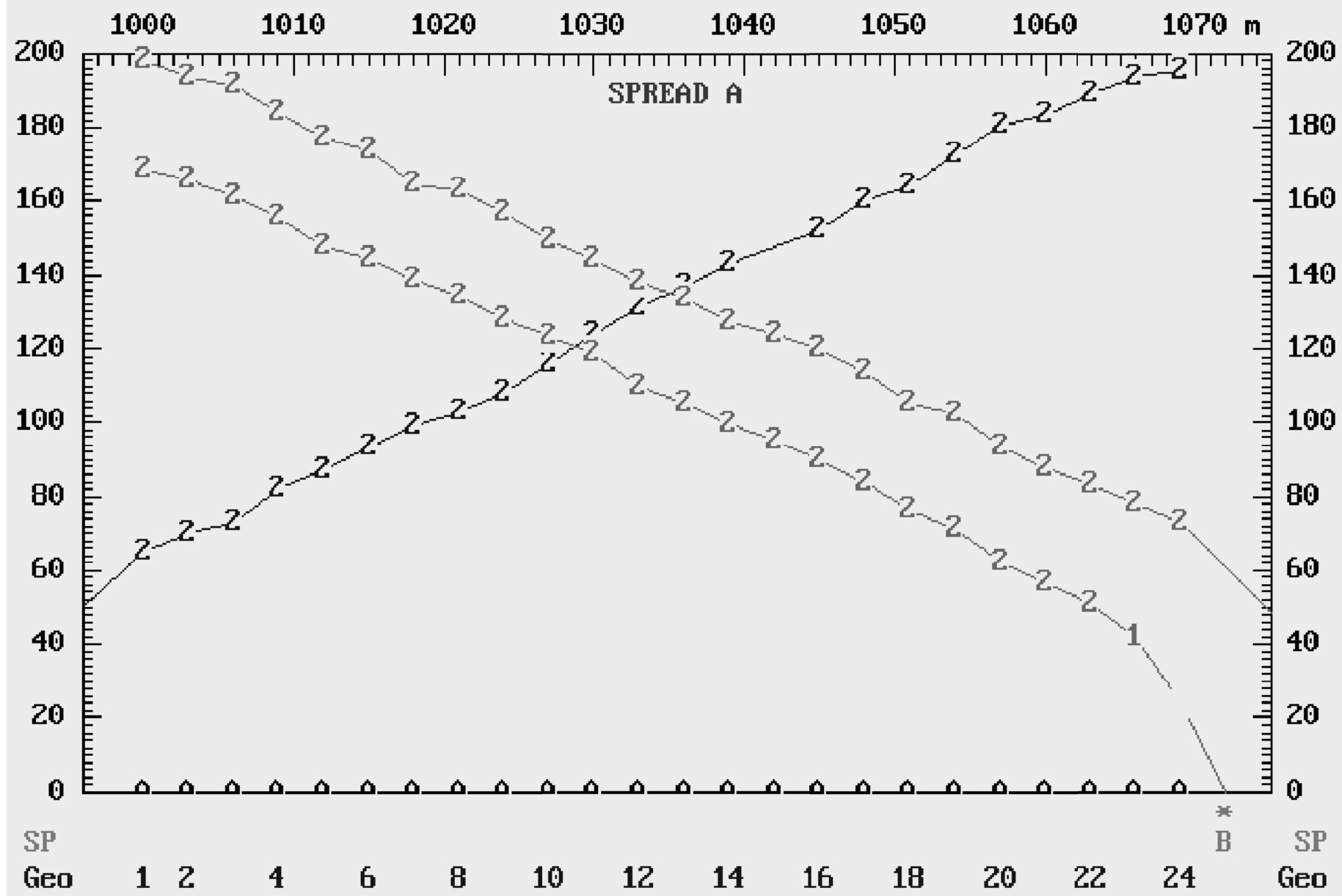


Hope Lane S-wave



Hope Lane S-wave

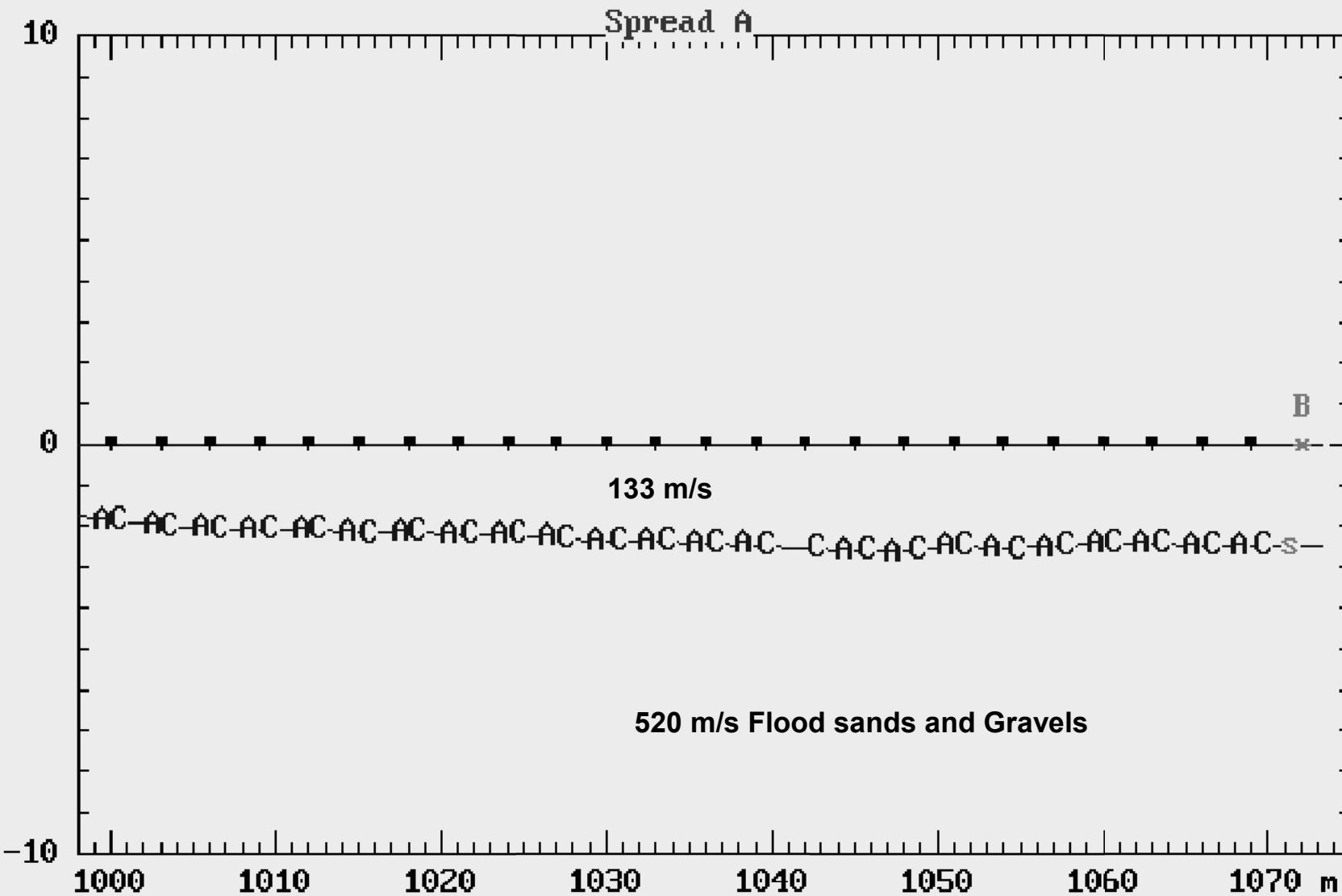
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Hope Lane S-wave

Press Esc to EXIT

HOPE_SW1.SIP: Hope Lane Shear Wave Survey

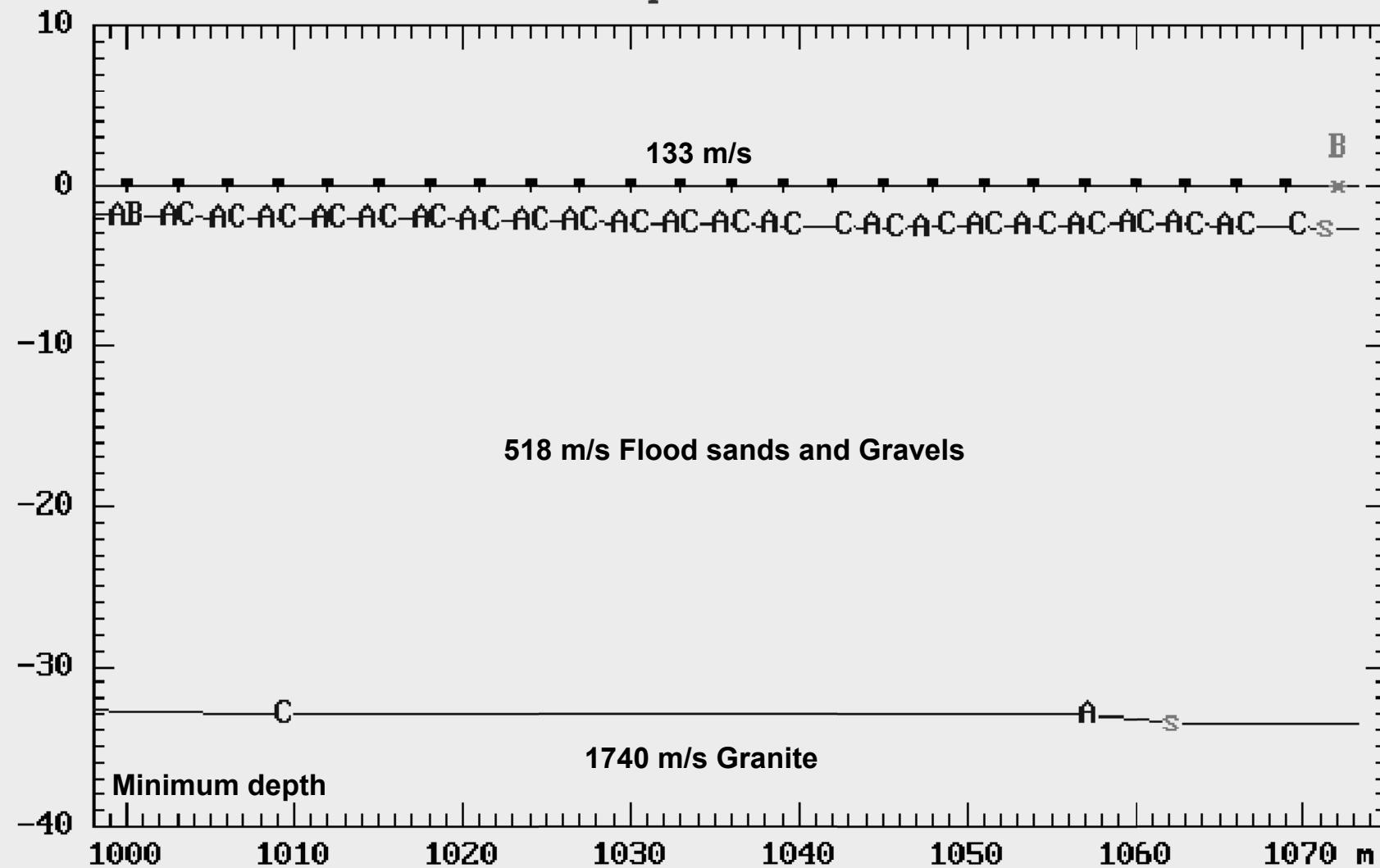


Hope Lane S-wave

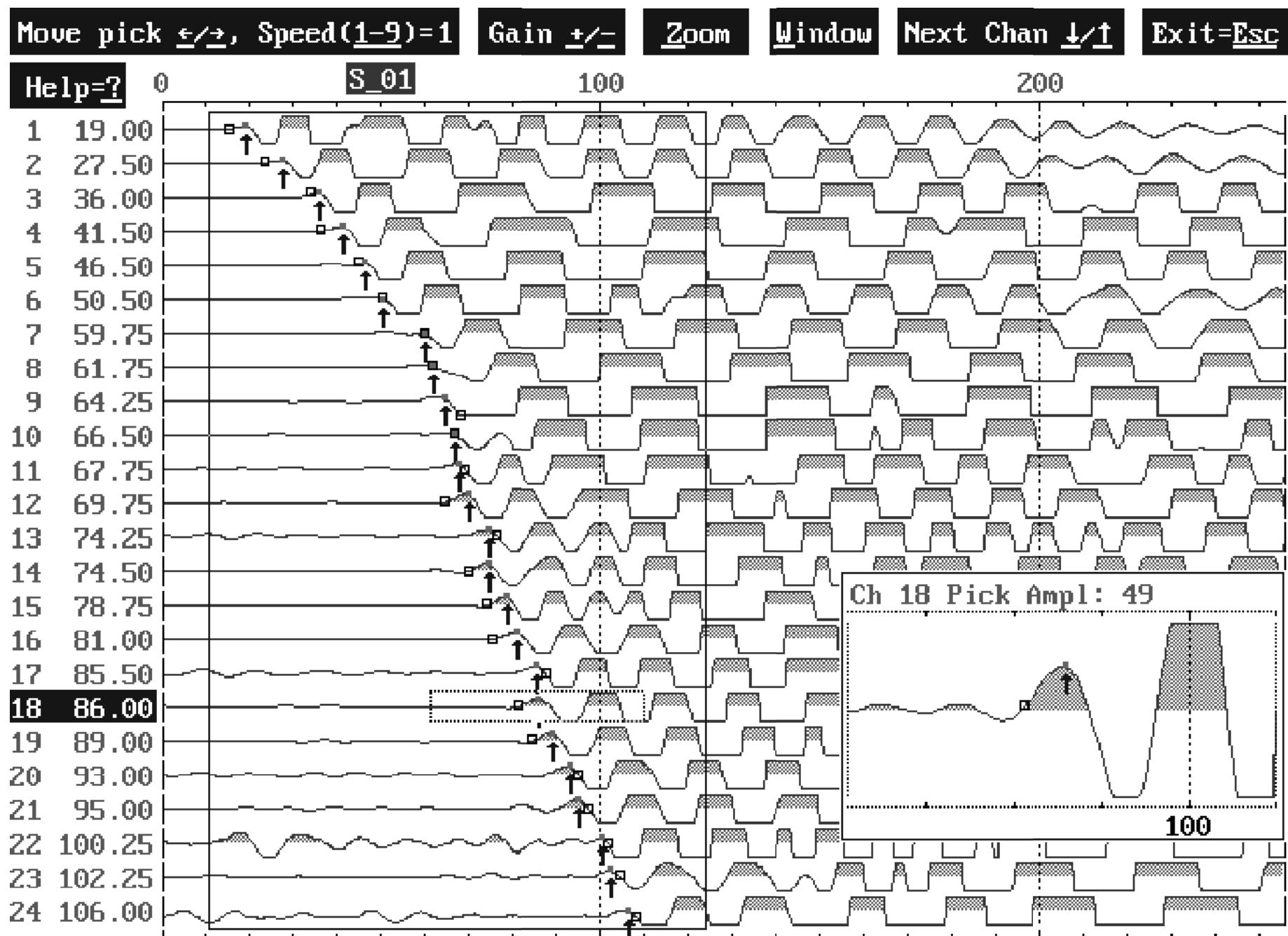
Press Esc to EXIT

HOPE_SW3.SIP: Hope Lane Shear Wave Survey

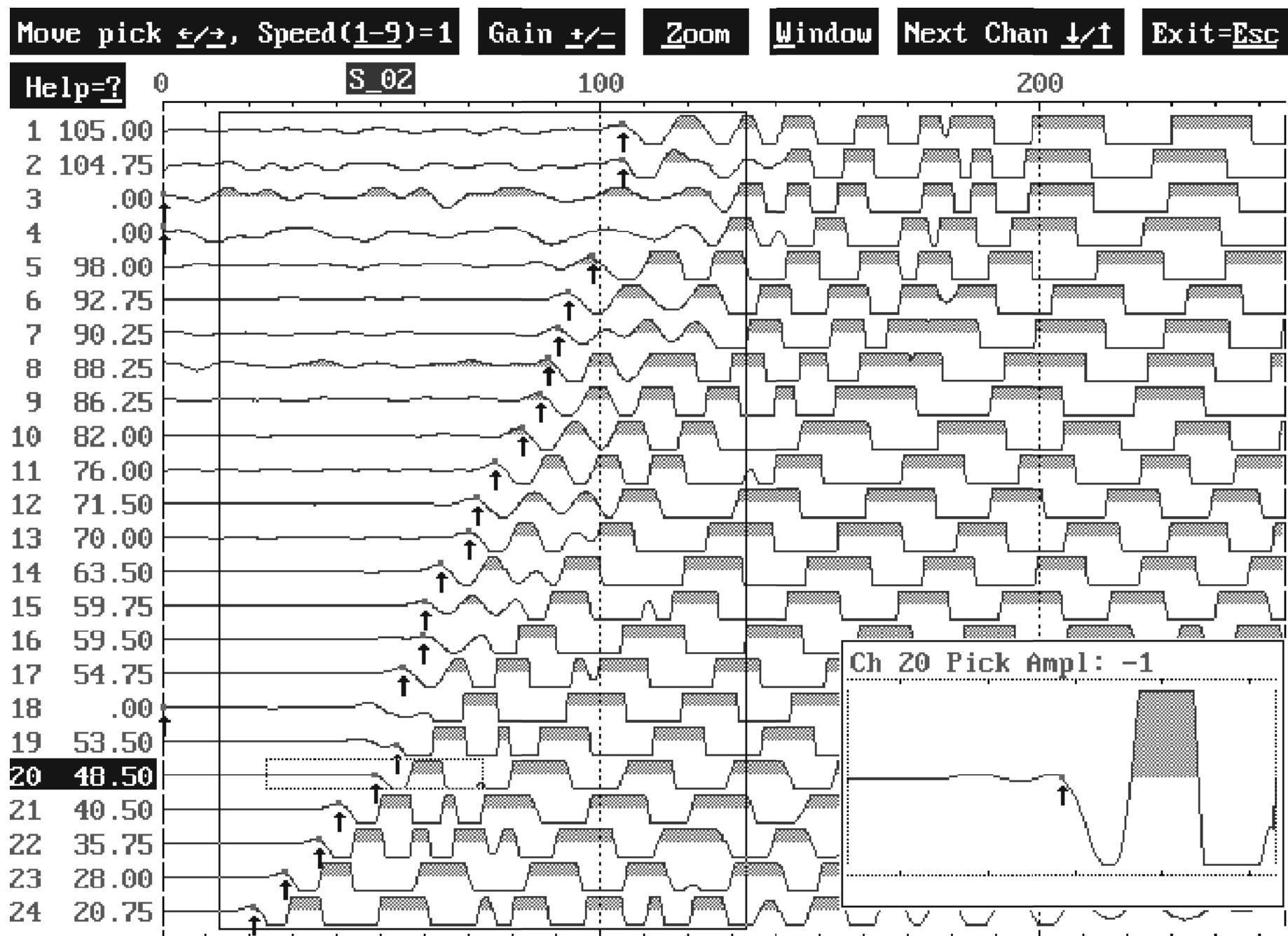
Spread A



Idaho Road #1 S-wave

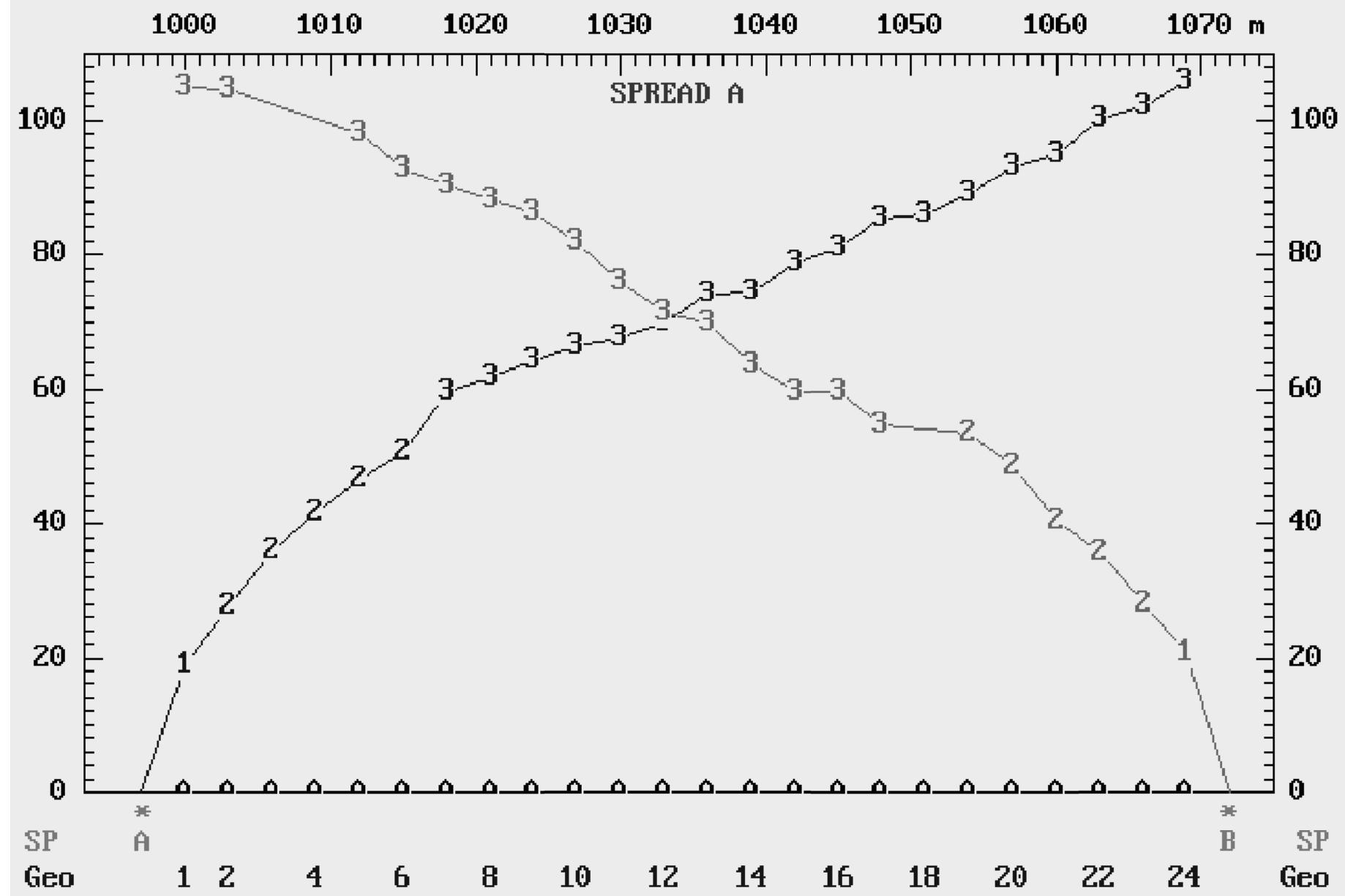


Idaho Road #1 S-wave



Idaho Road #1 S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

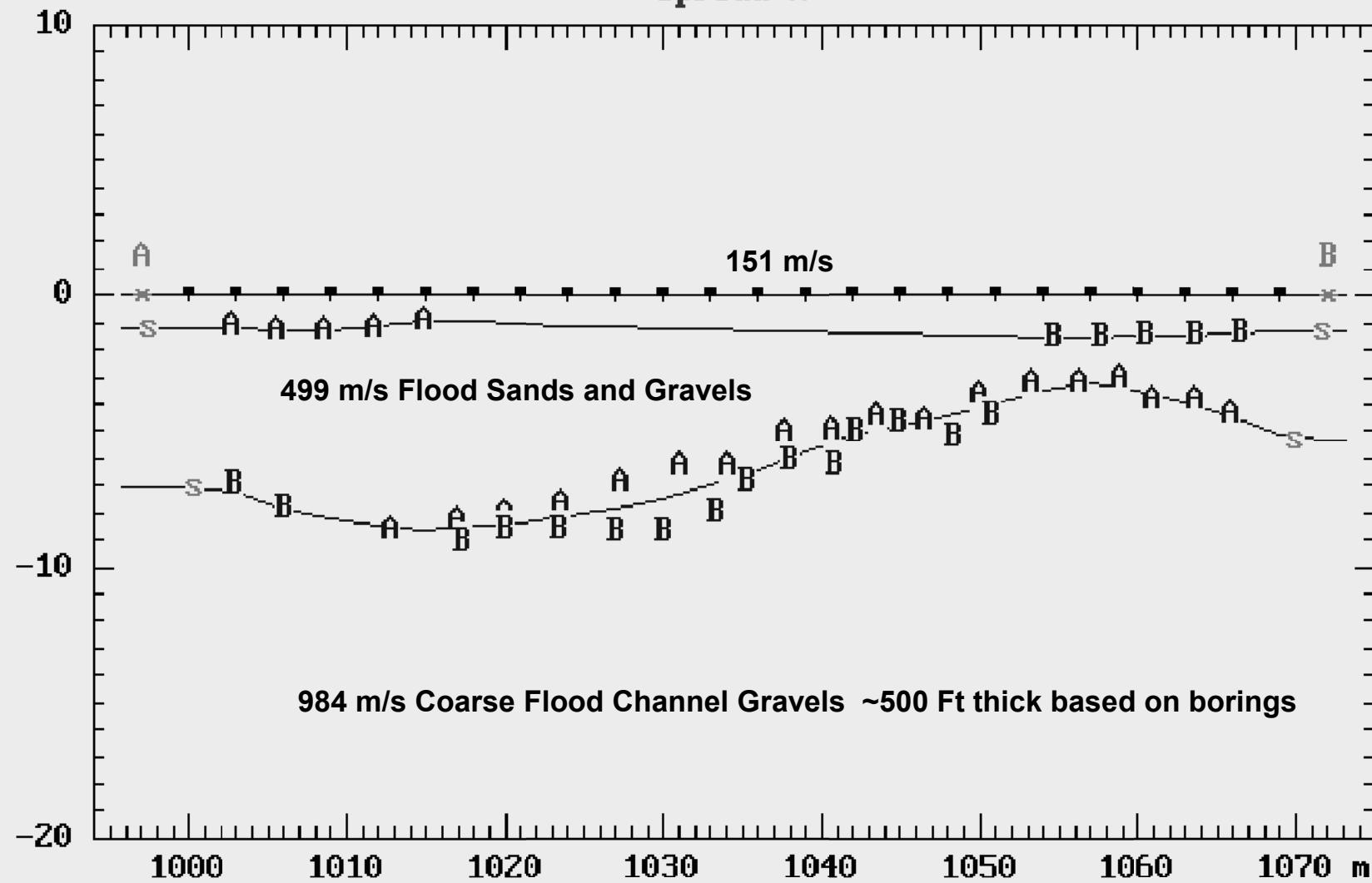


Idaho Road #1 S-wave

Press Esc to EXIT

IDAHO_SW.SIP: Idaho RD #1 S-waves

Spread A

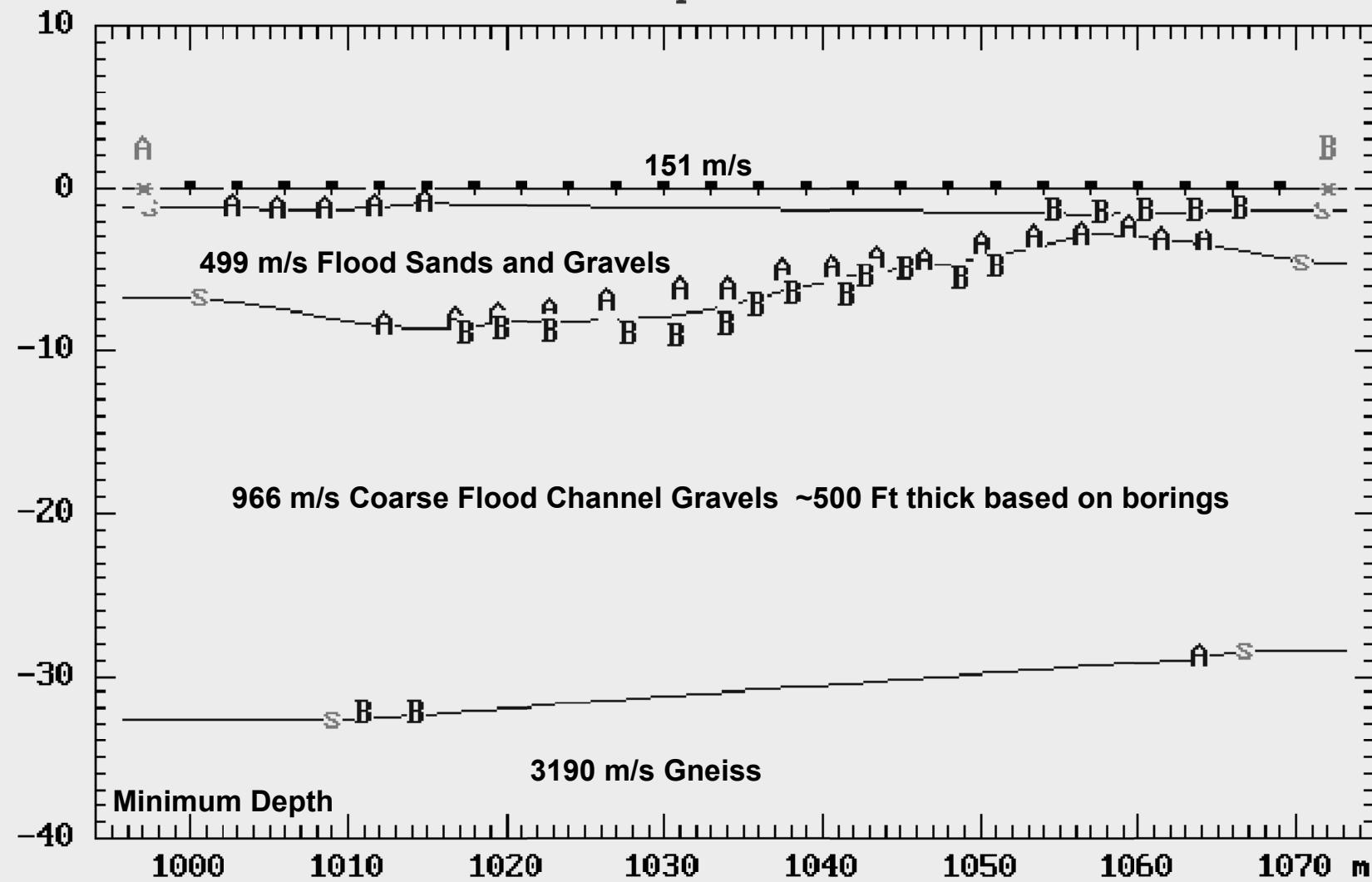


Idaho Road #1 S-wave

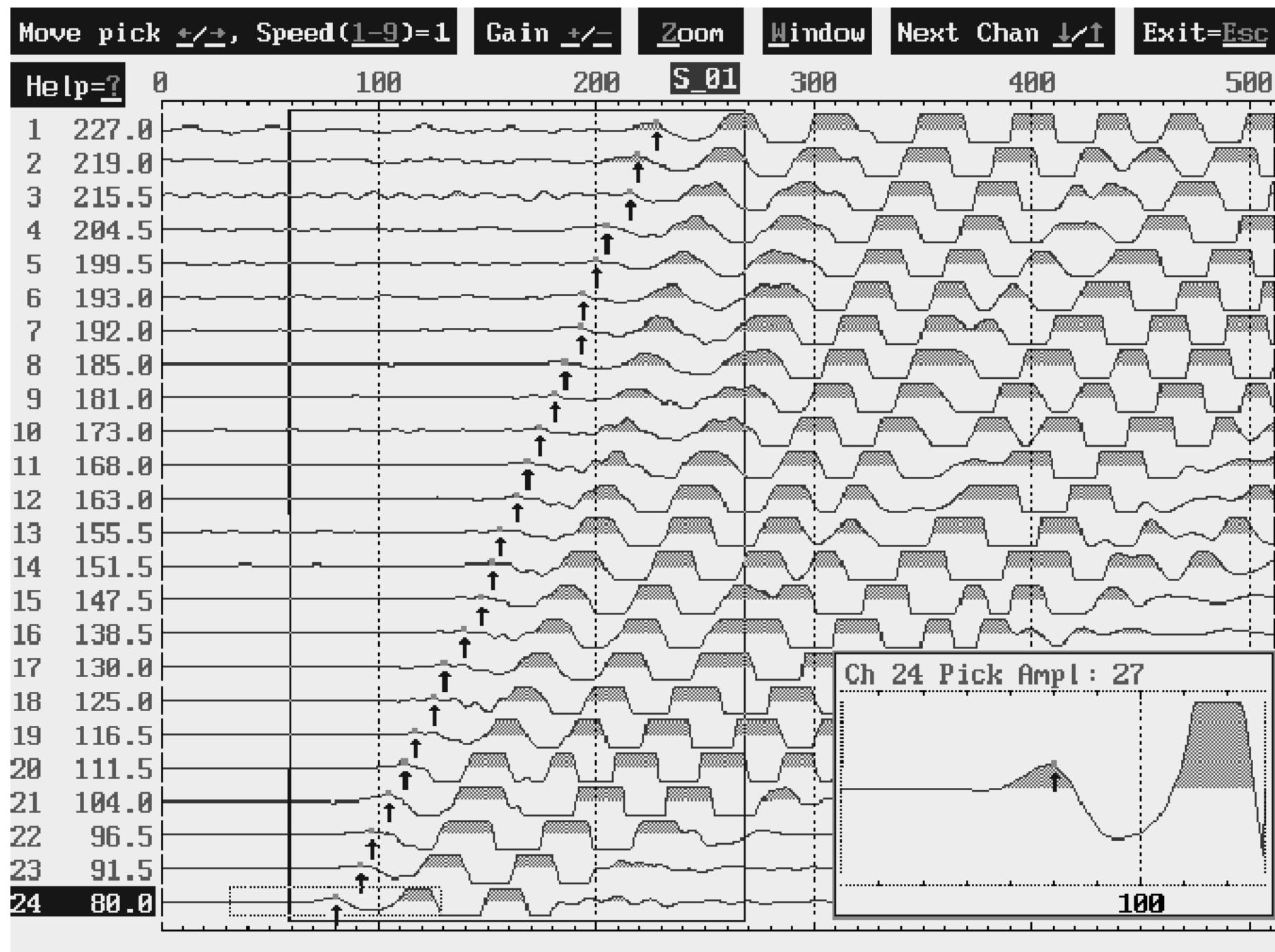
Press Esc to EXIT

ID_SWMIN.SIP: Idaho RD #1 S-waves

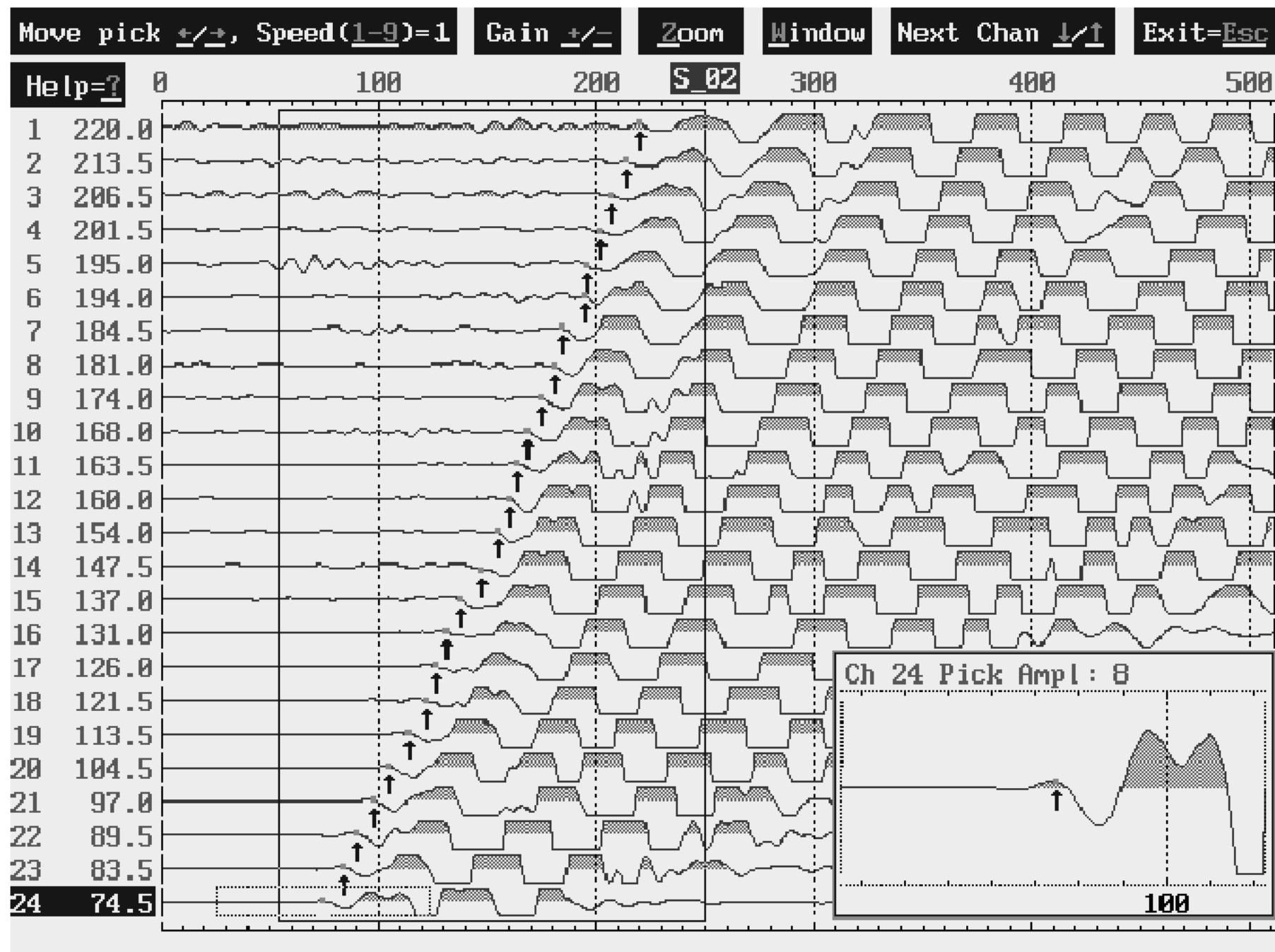
Spread A



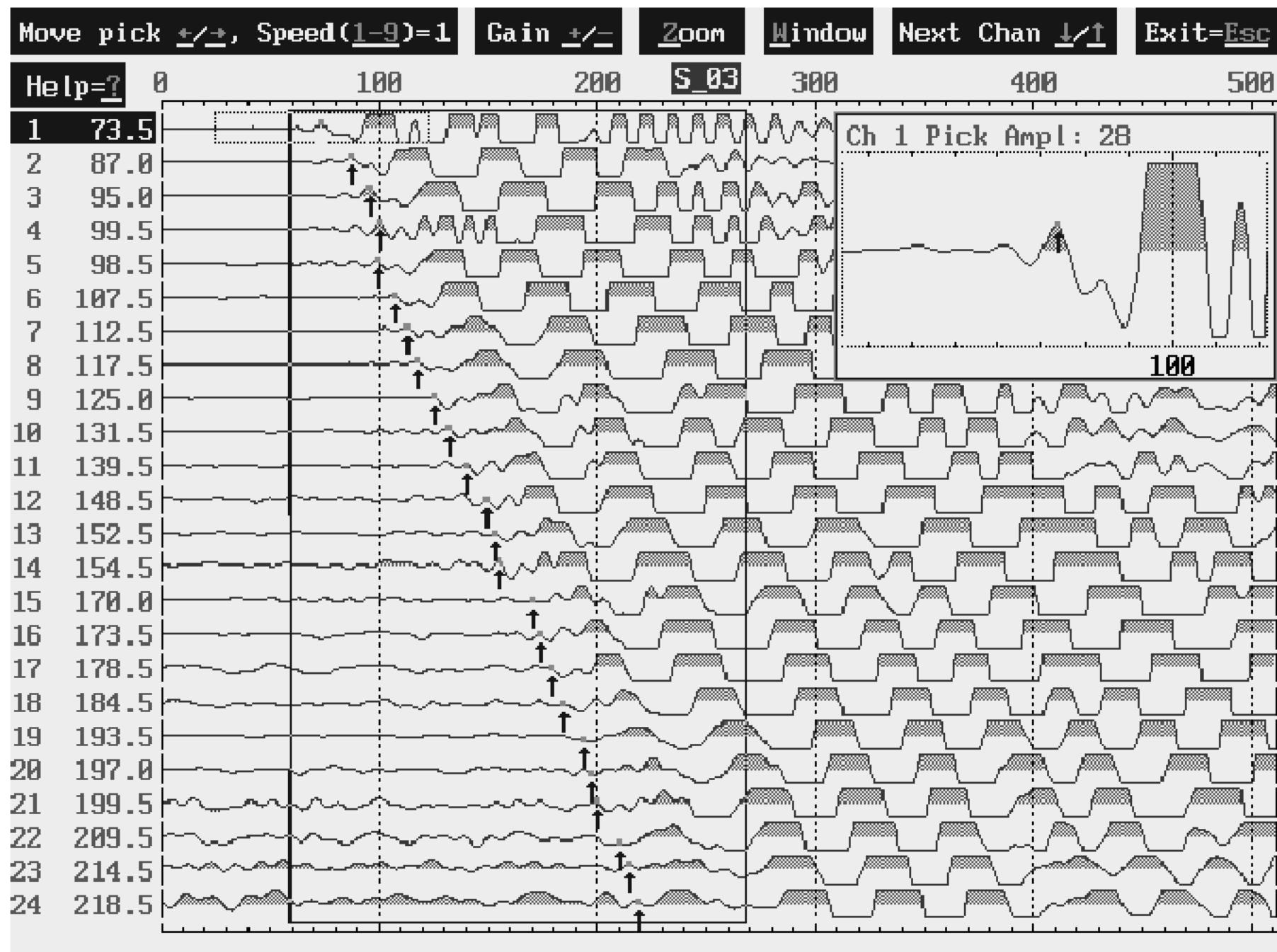
Kenmore Middle School S-wave



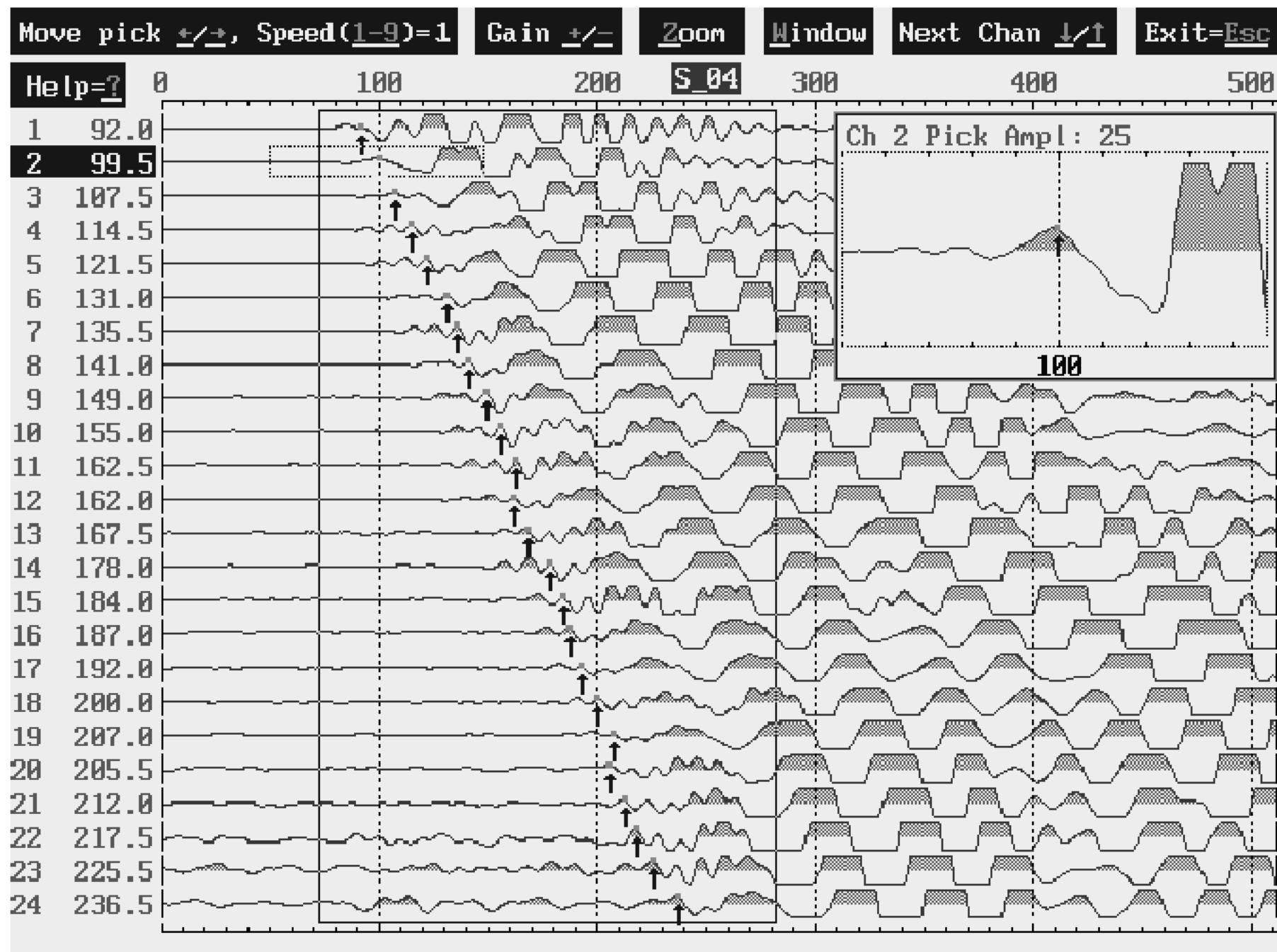
Kenmore Middle School S-wave



Kenmore Middle School S-wave

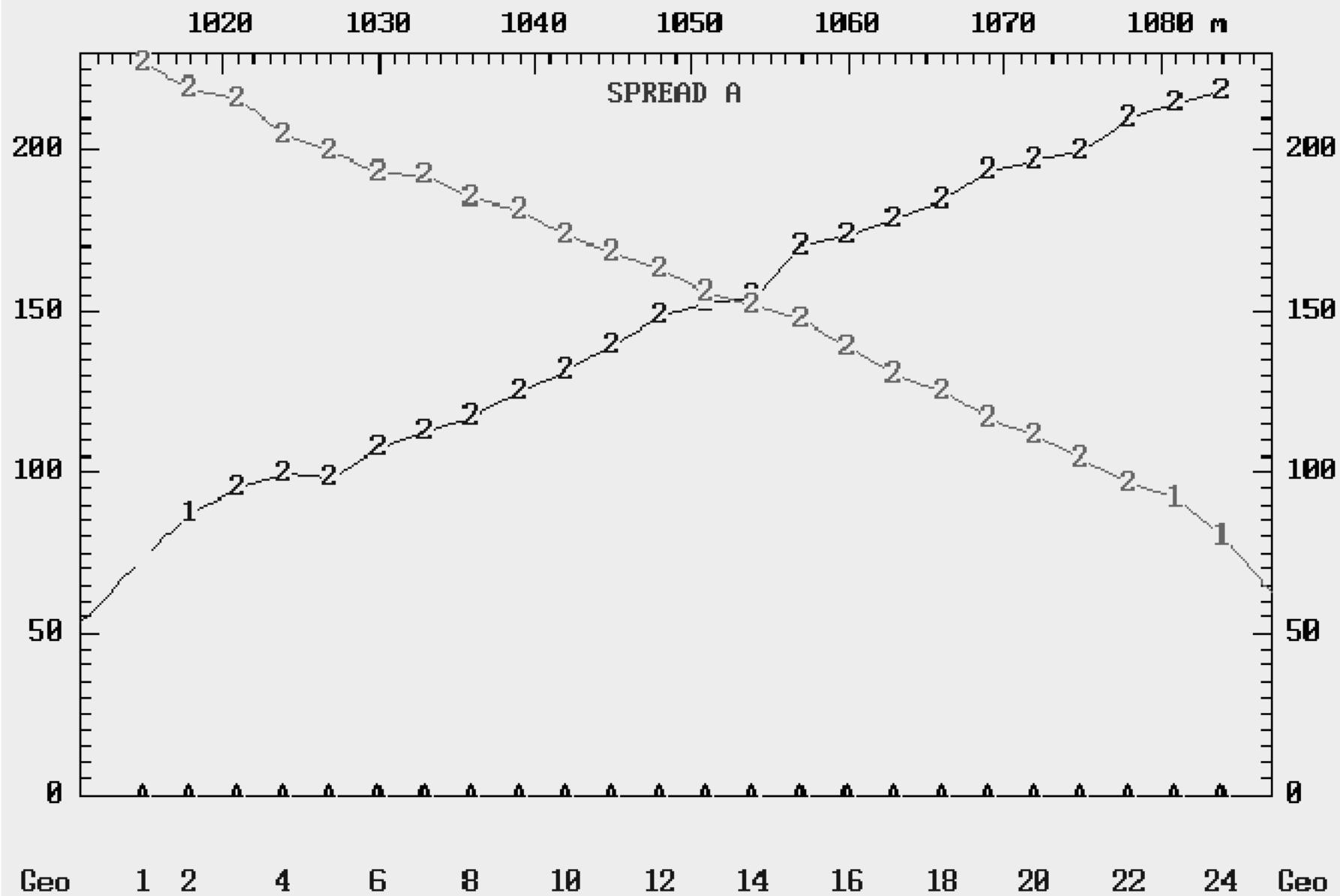


Kenmore Middle School S-wave



Kenmore Middle School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

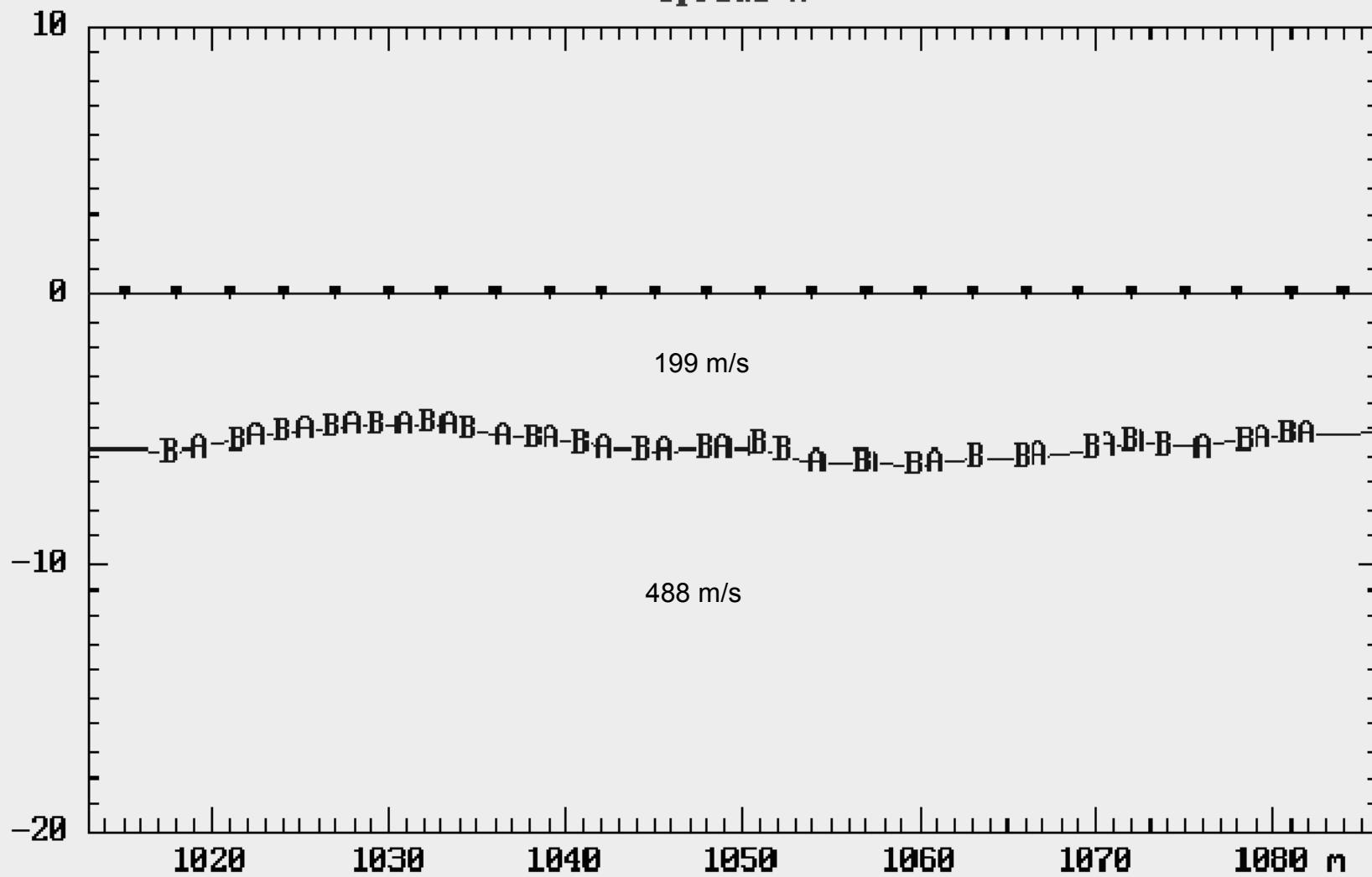


Kenmore Middle School S-wave

Press Esc to EXIT

KENMSWAV.SIP: Kenmore Middle School S-Waves

Spread A

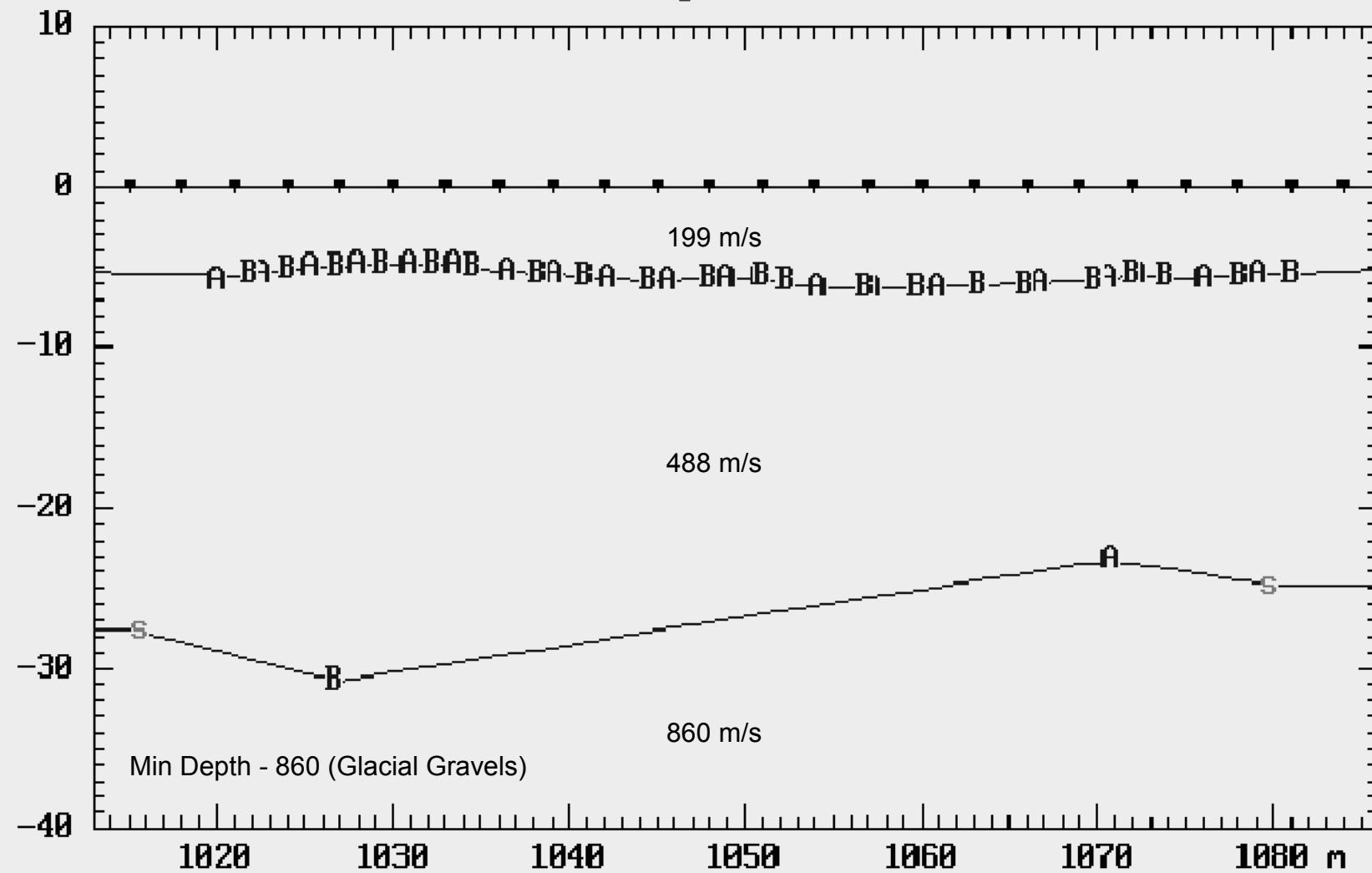


Kenmore Middle School S-wave

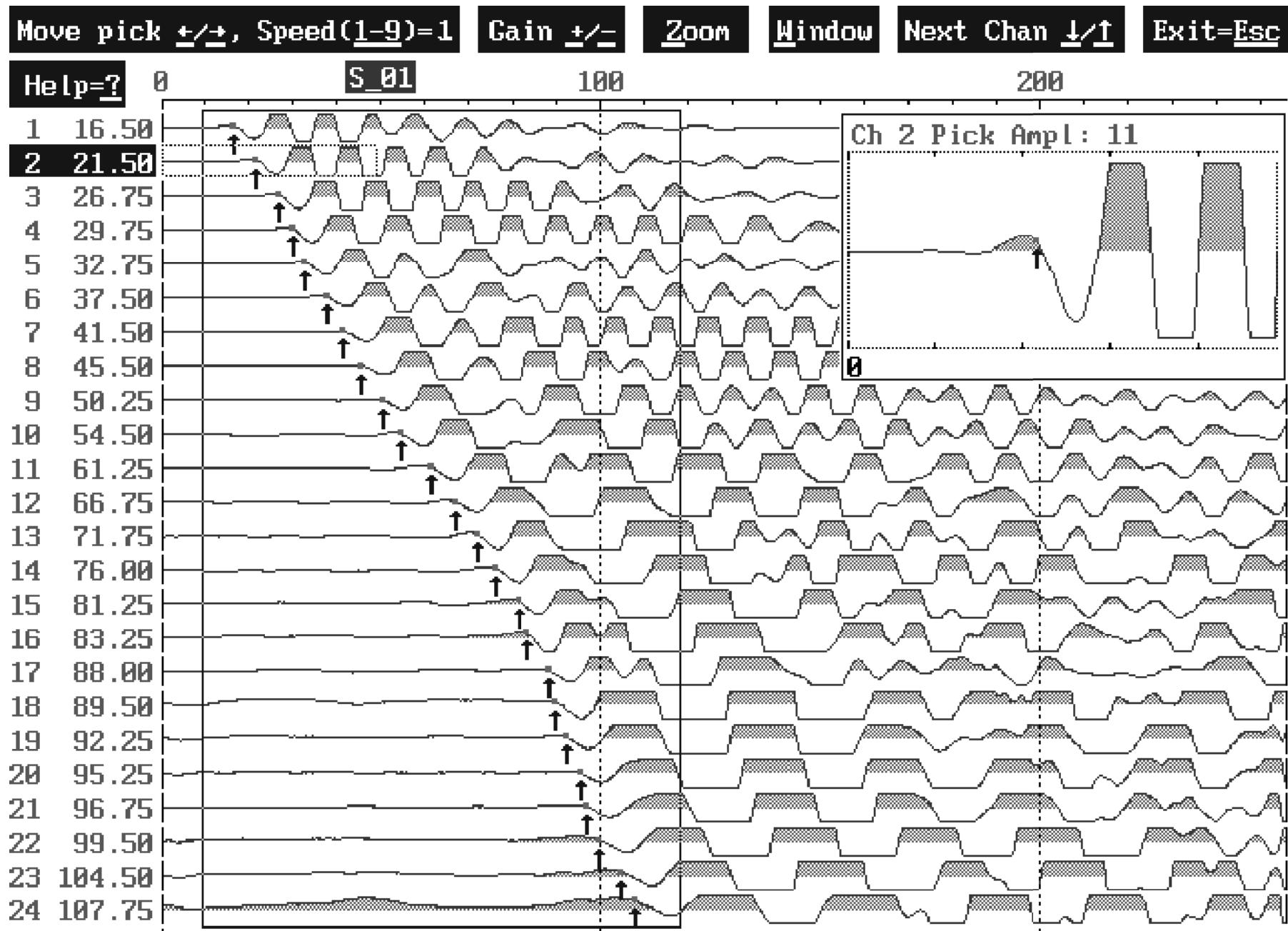
Press Esc to EXIT

KENMSMIN.SIP: Kenmore Middle School S-Waves Minimum Depth Model

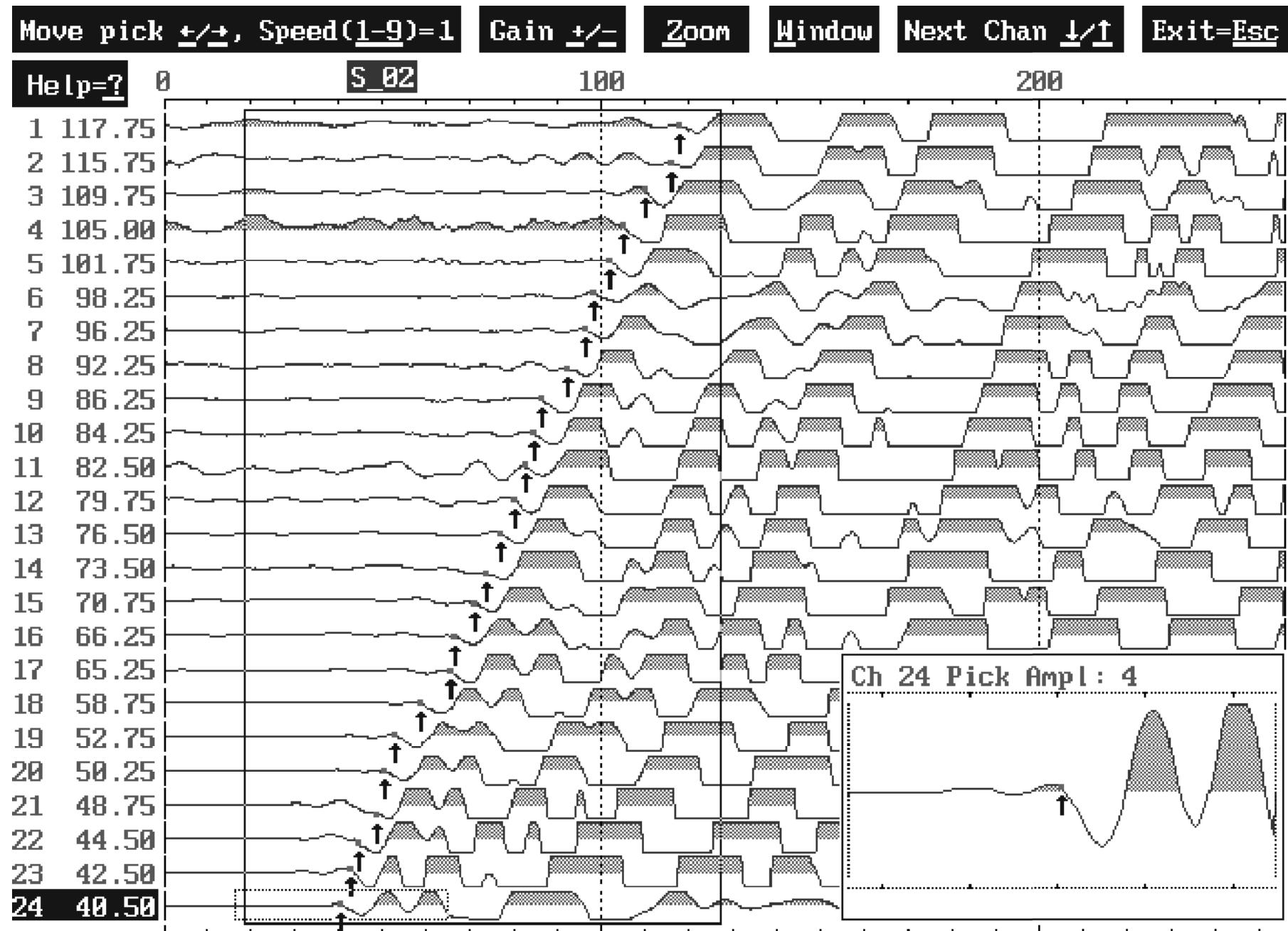
Spread A



Lake Stevens Middle School S-wave

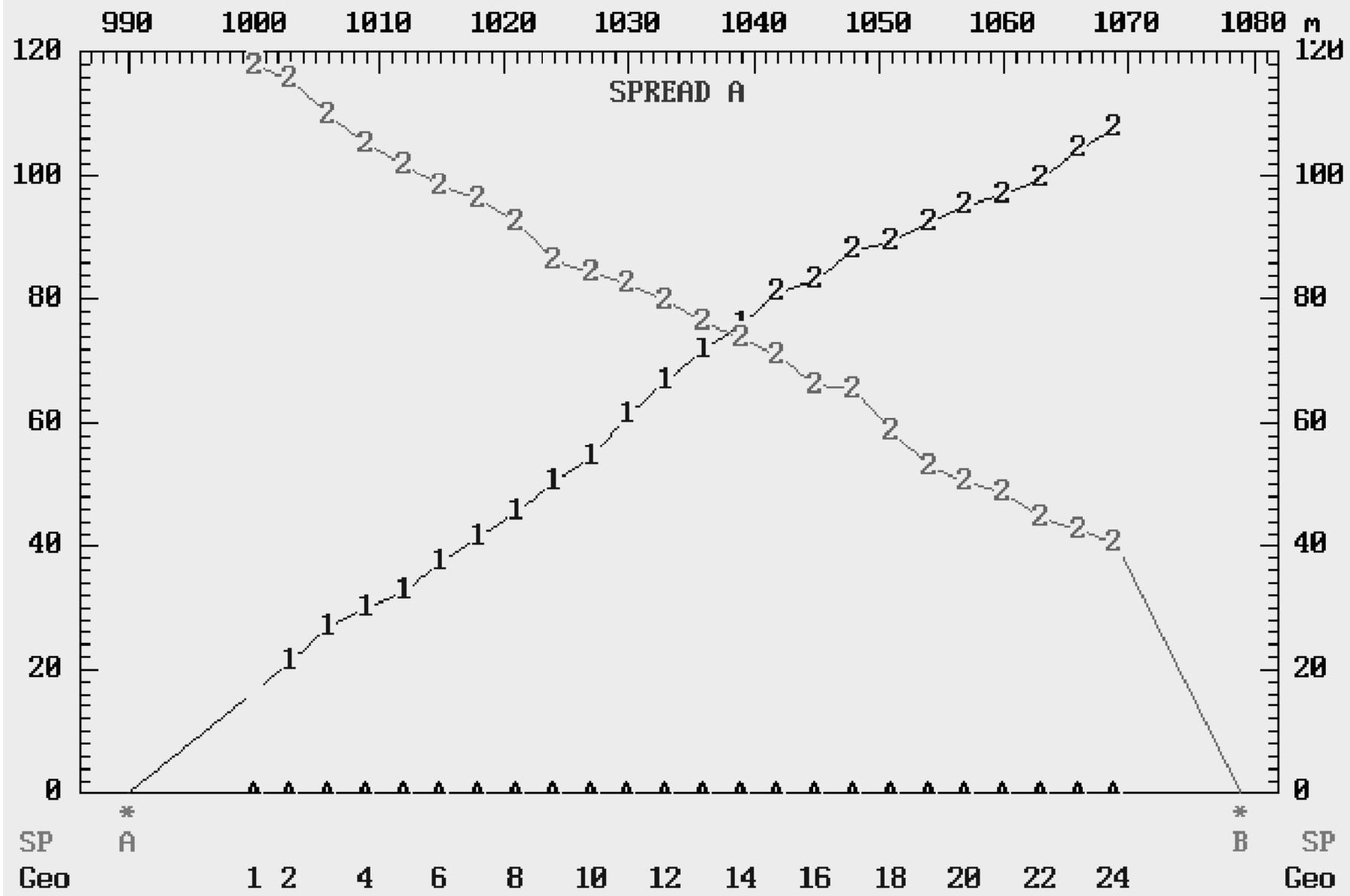


Lake Stevens Middle School S-wave



Lake Stevens Middle School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

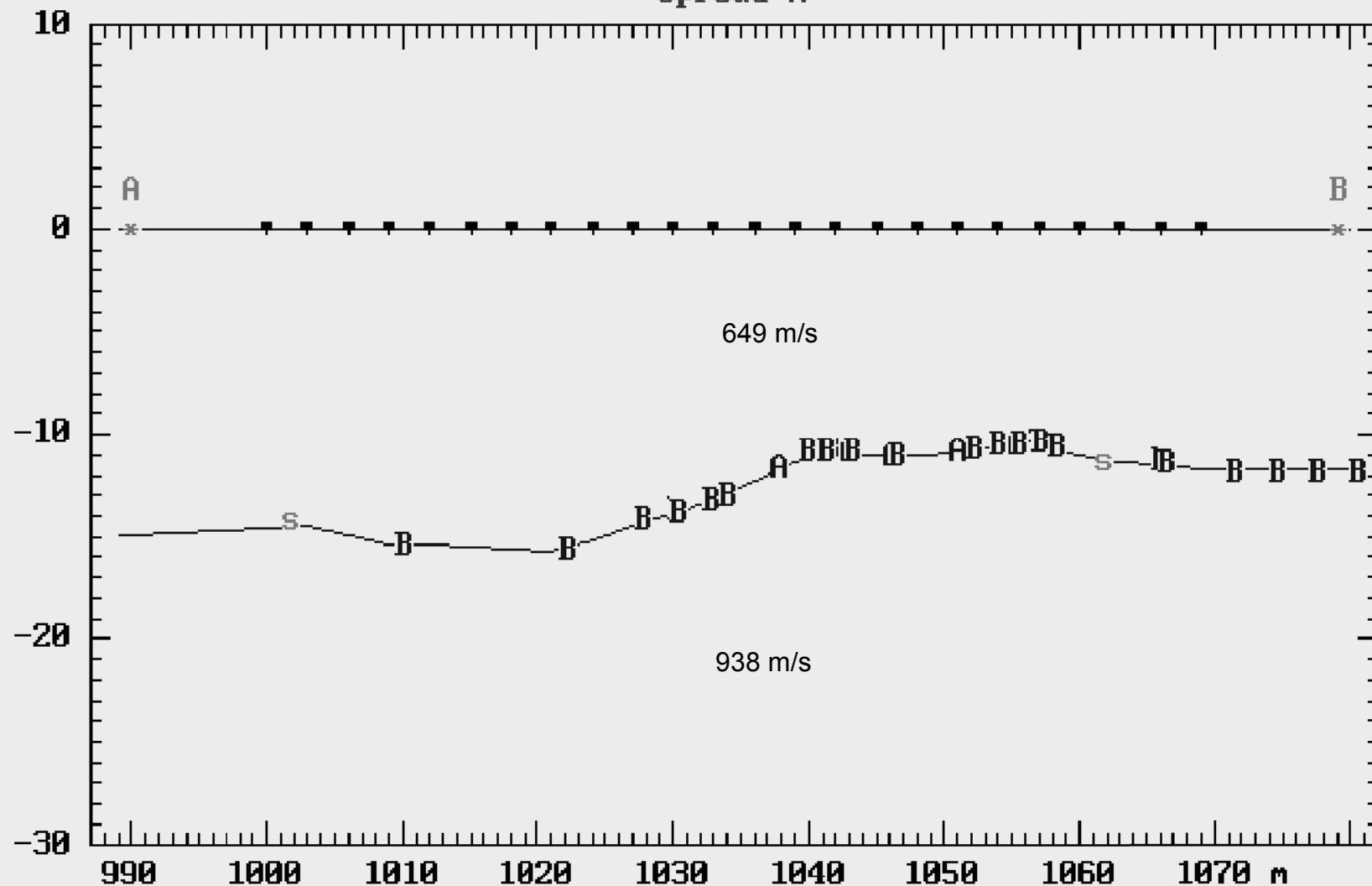


Lake Stevens Middle School S-wave

Press Esc to EXIT

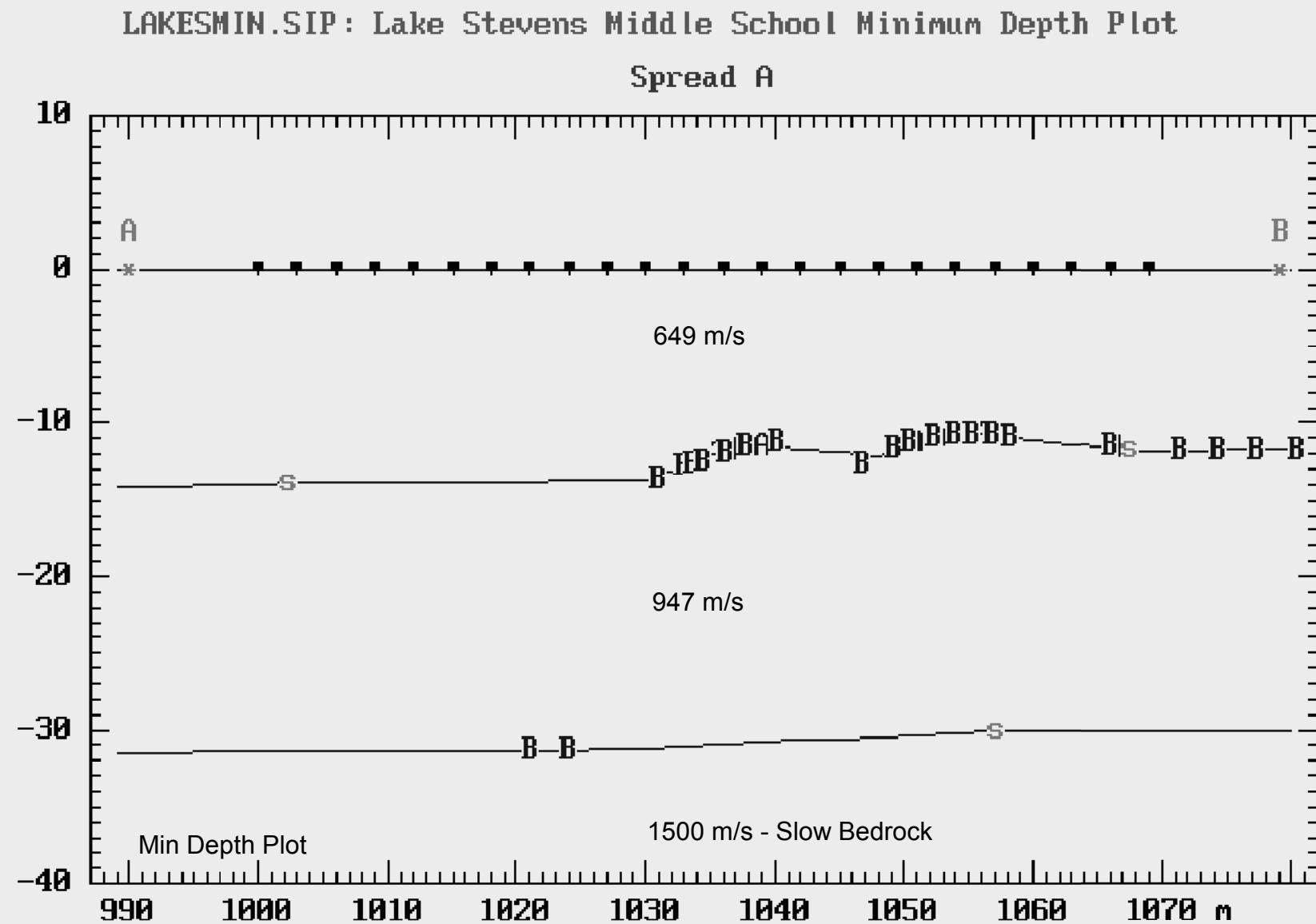
LAKEWA2.SIP: Lake Stevens Middle School S-Waves

Spread A

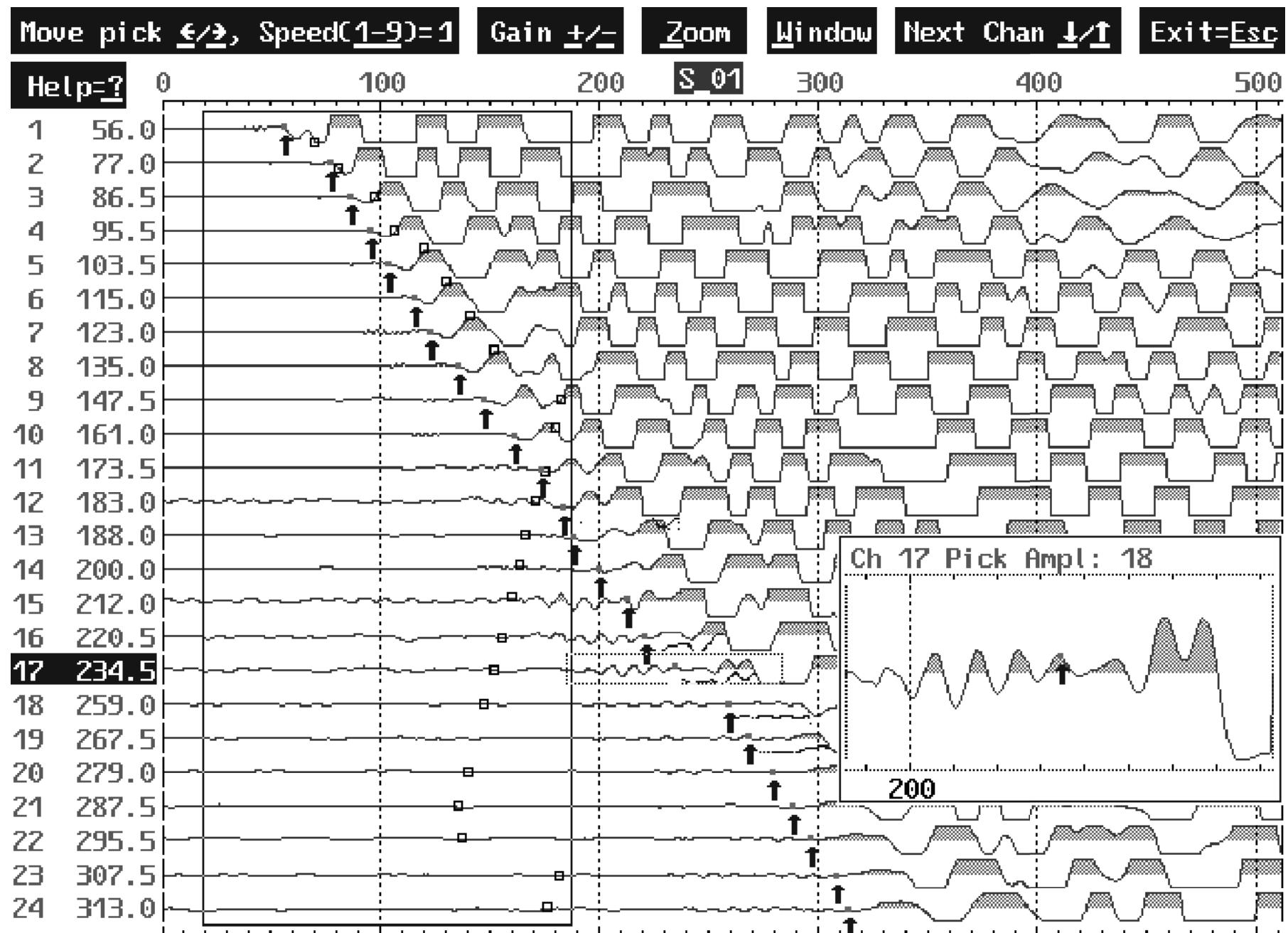


Lake Stevens Middle School S-wave

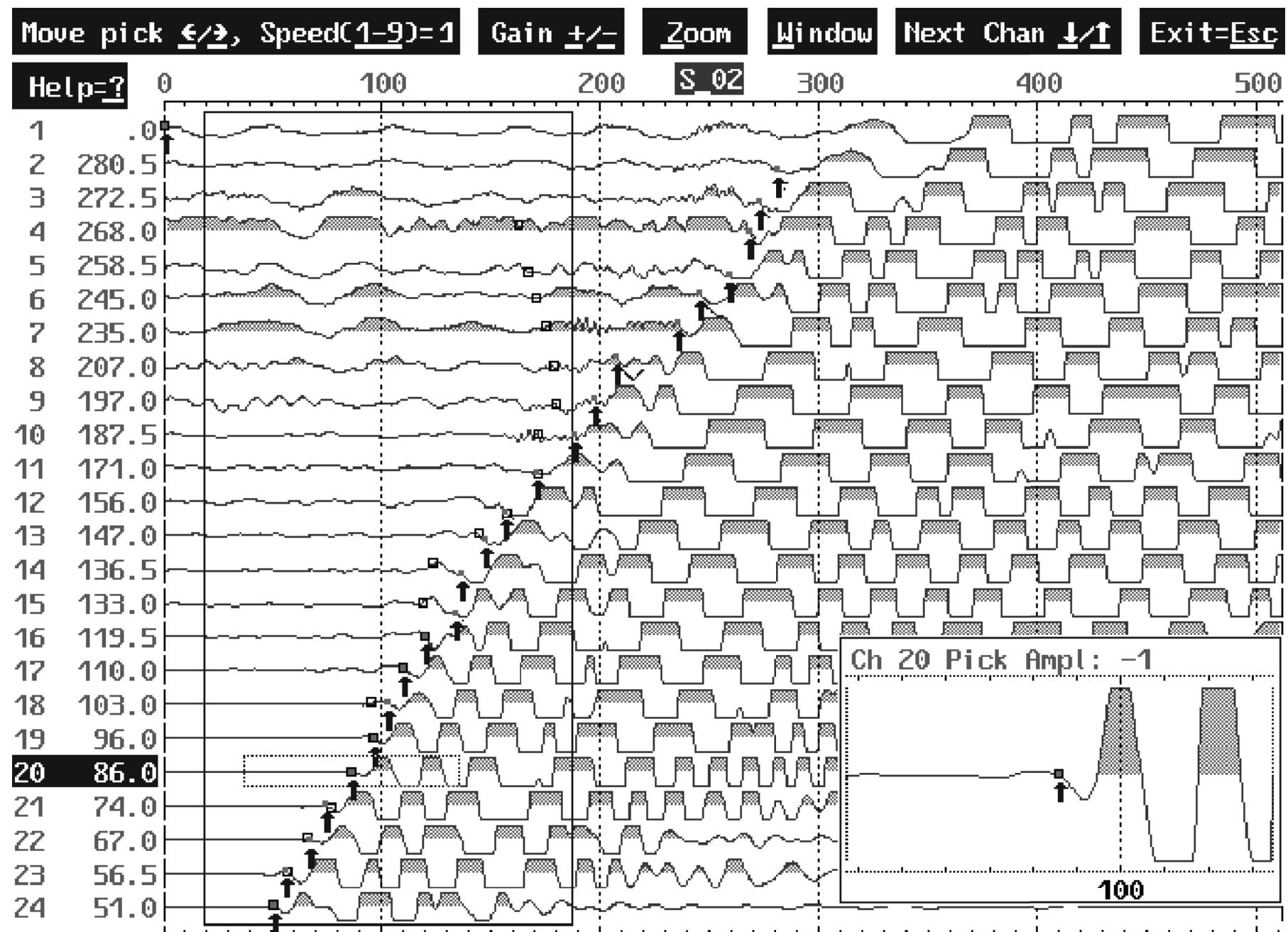
Press Esc to EXIT



Lake Tye Park S-wave

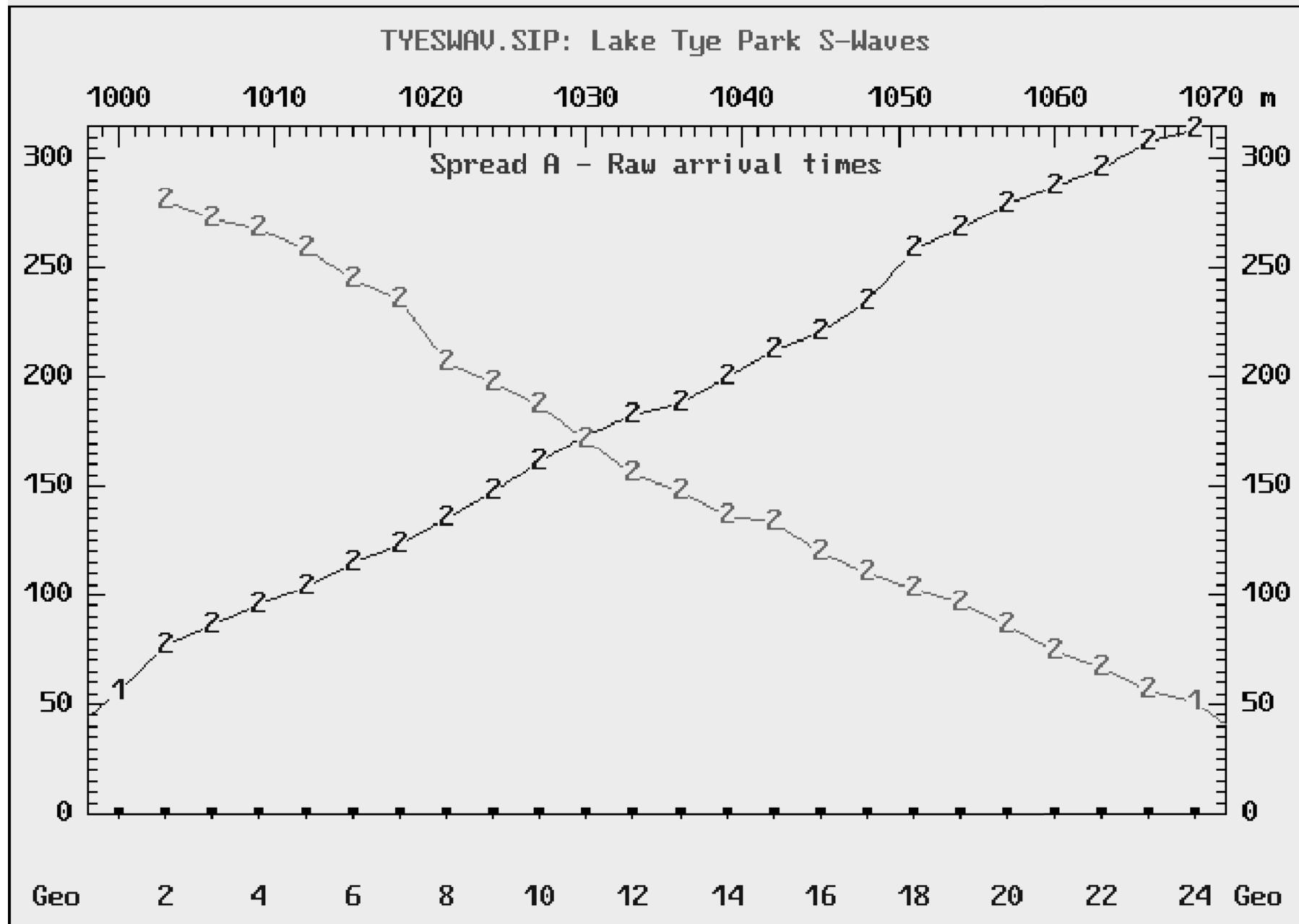


Lake Tye Park S-wave



Lake Tye Park S-wave

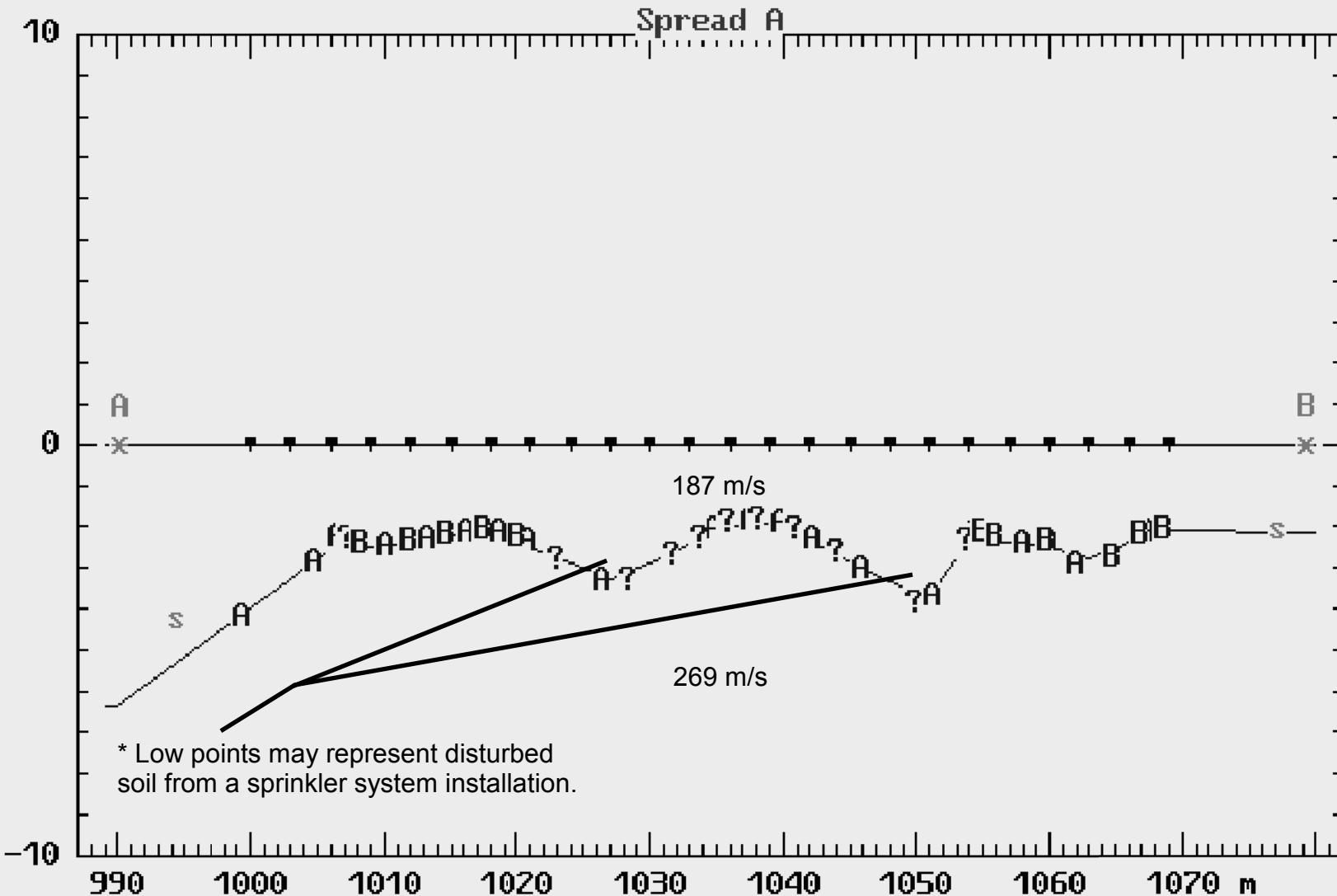
Press Esc to EXIT



Lake Tye Park S-wave

Press Esc to EXIT

TYESWAV.SIP: Lake Tye Park S-Waves

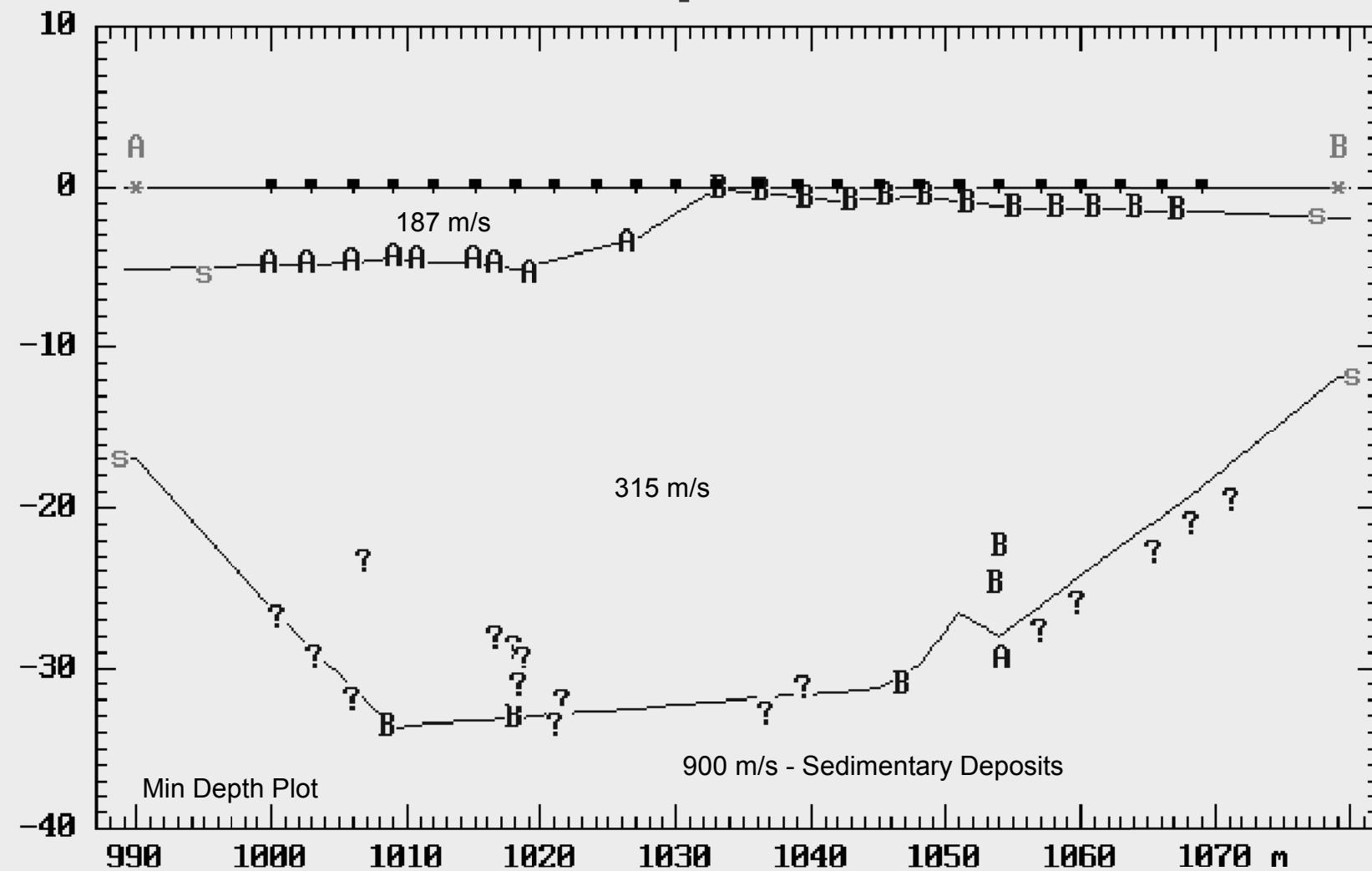


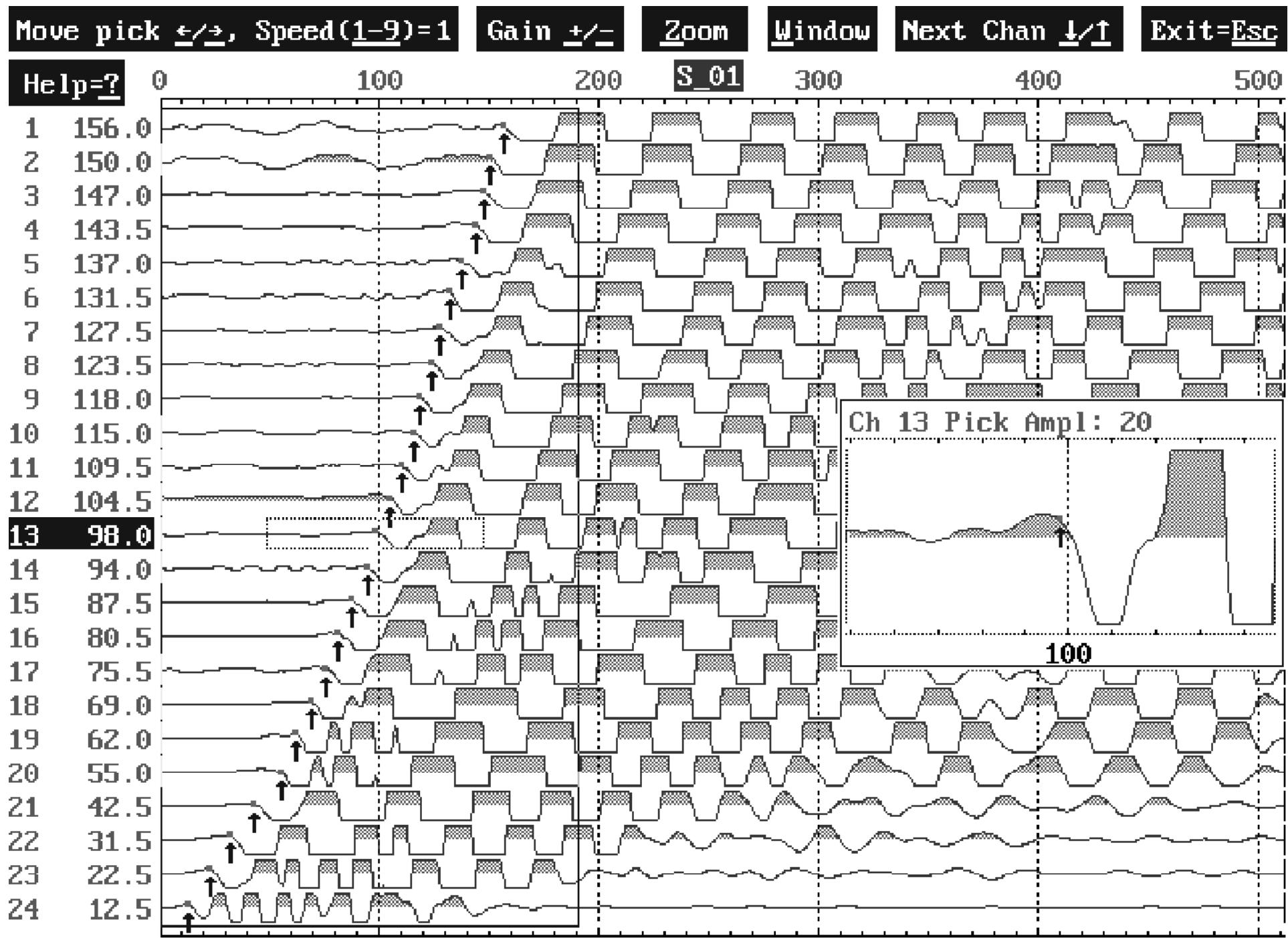
Lake Tye Park S-wave

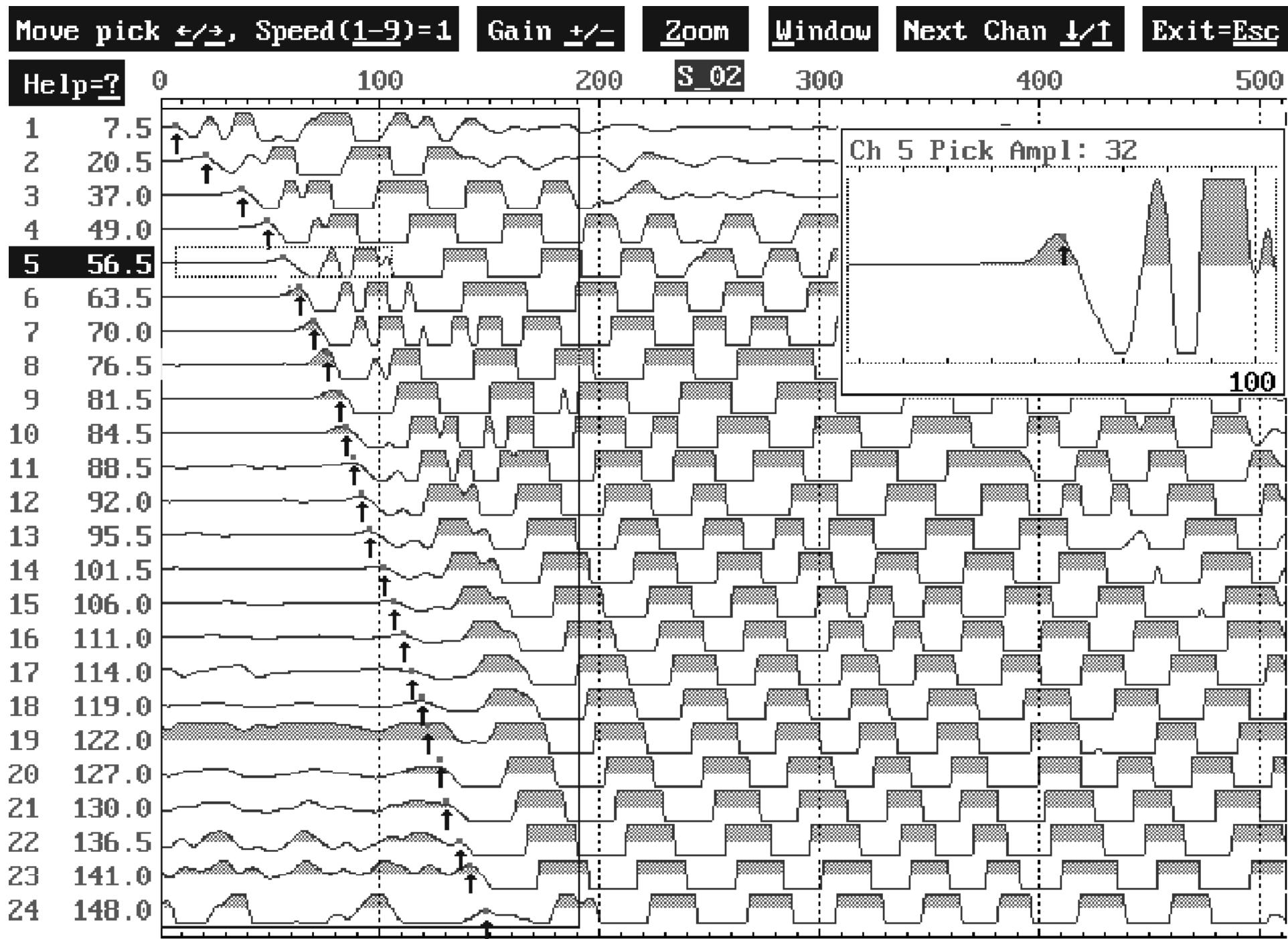
Press Esc to EXIT

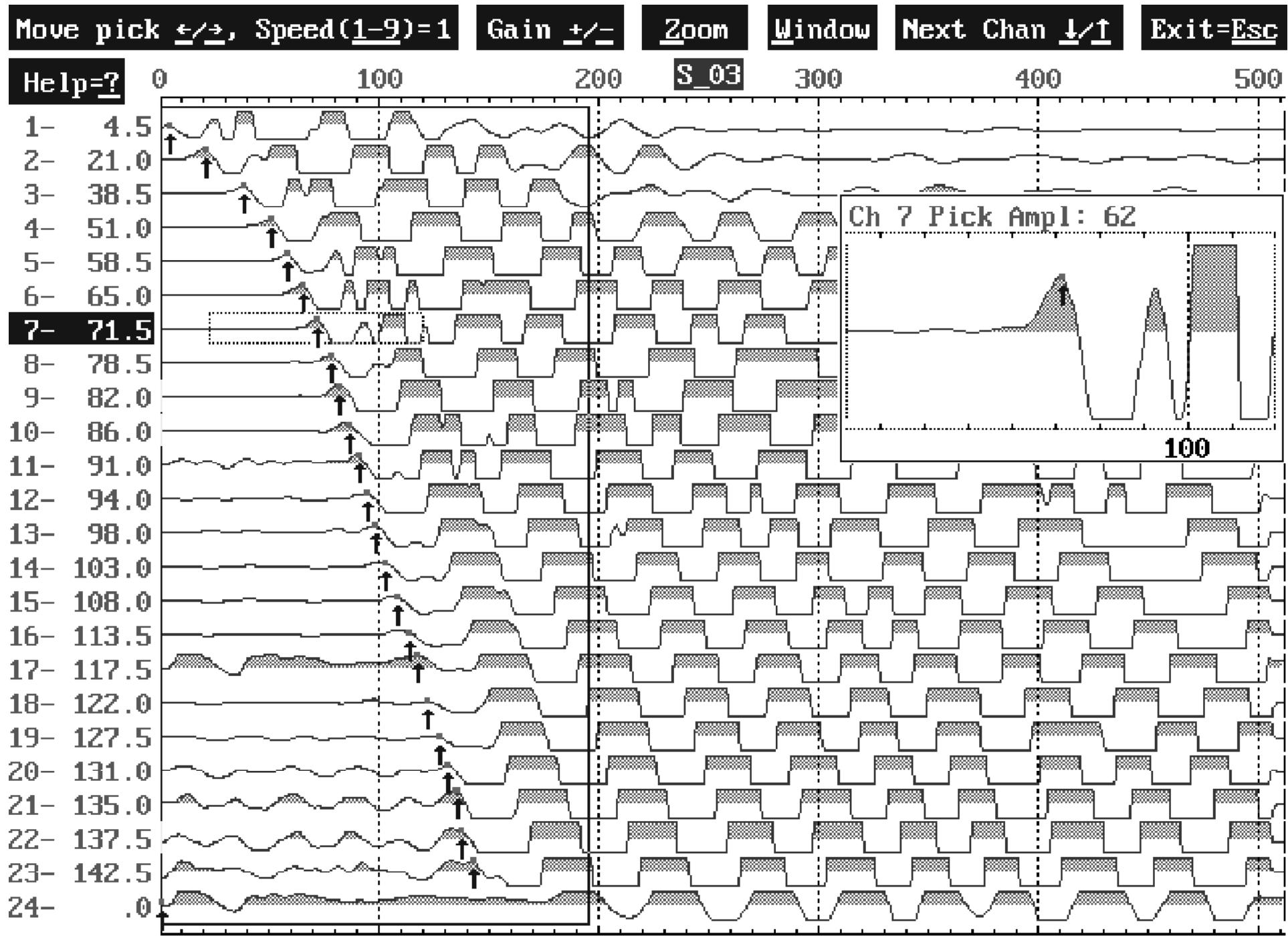
TYESMIN.SIP : Lake Tye Park Minimum Depth Plot

Spread A



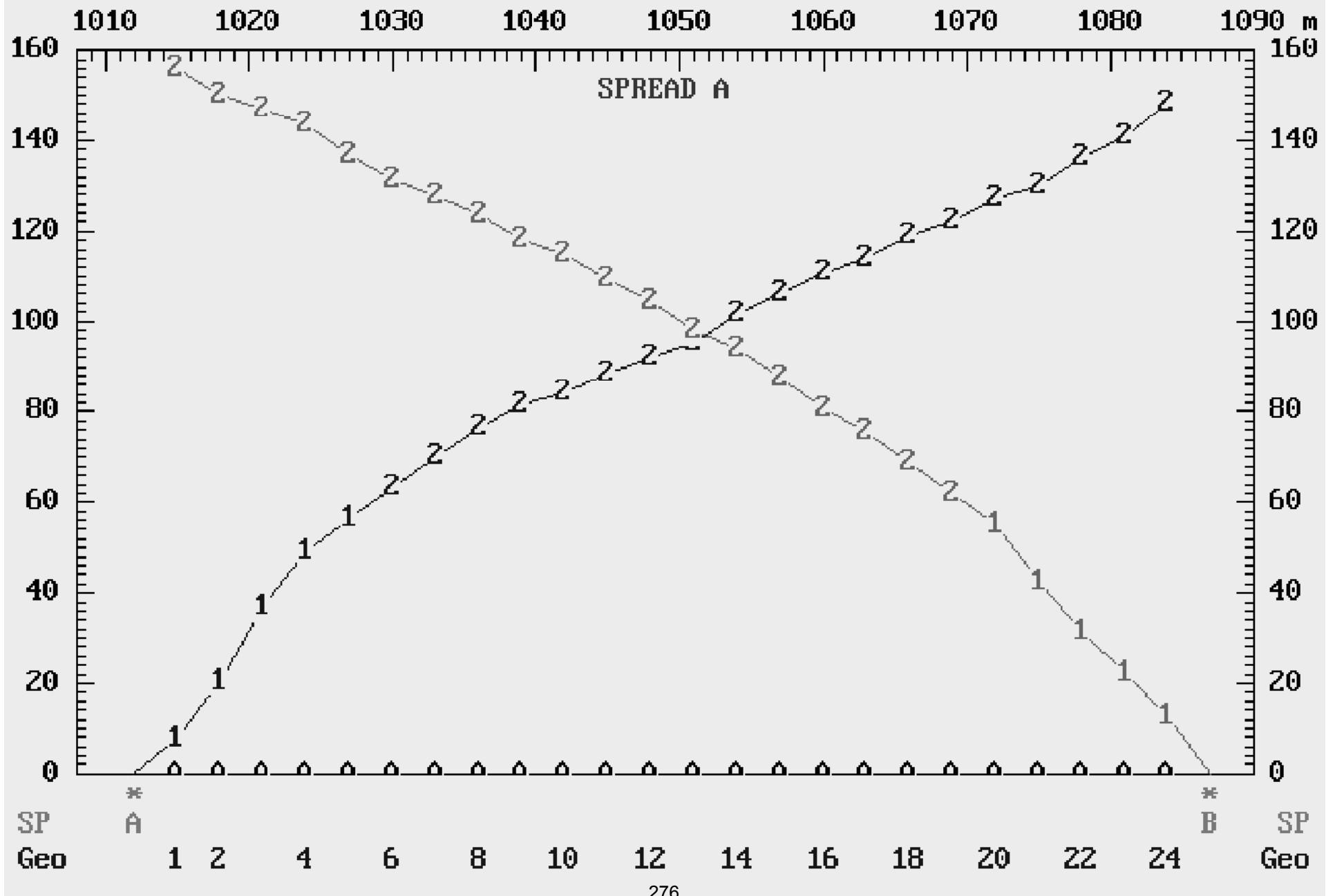
Lakewood High School S-wave

Lakewood High School S-wave

Lakewood High School S-wave

Lakewood High School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

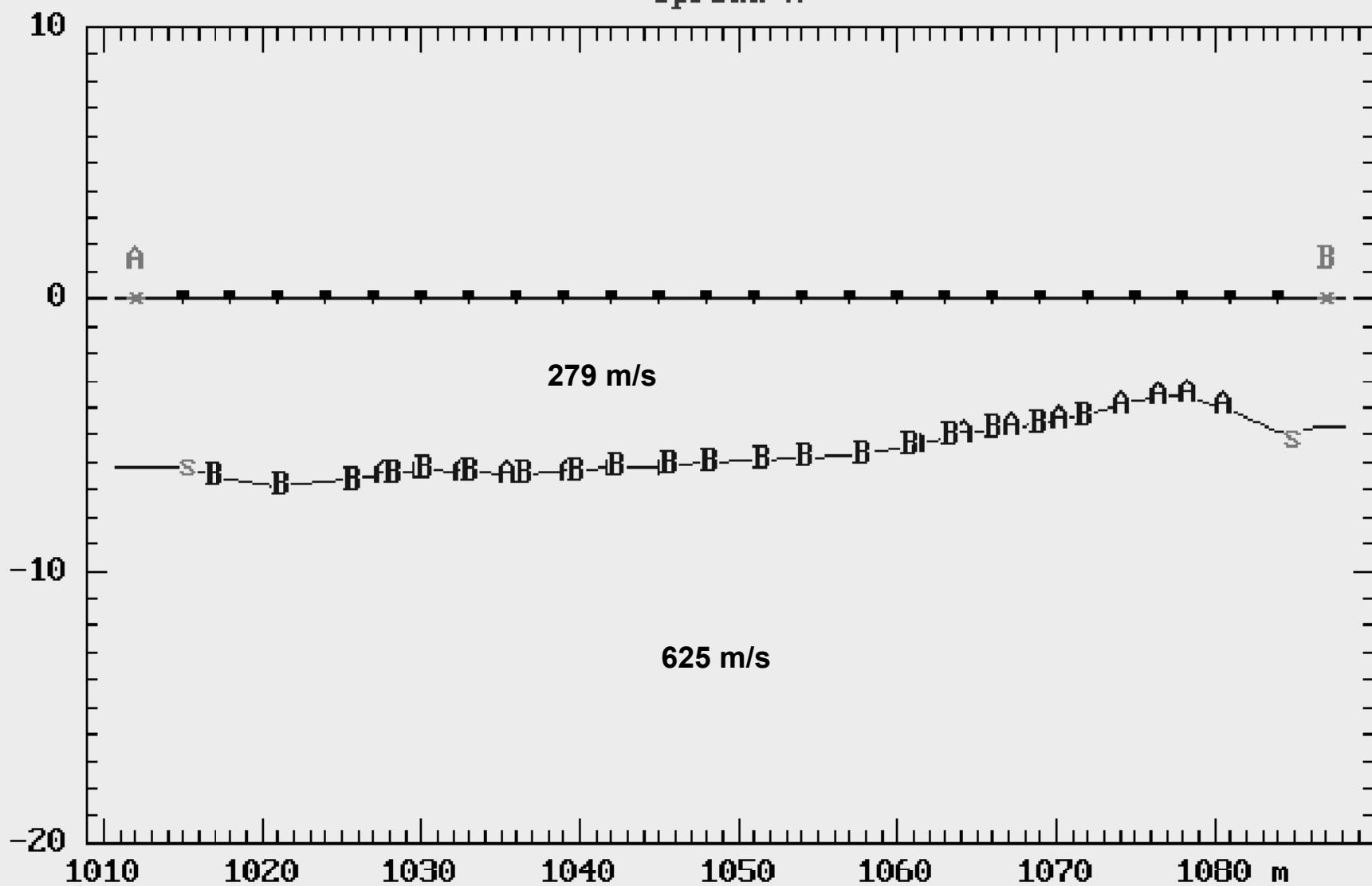


Lakewood High School S-wave

Press Esc to EXIT

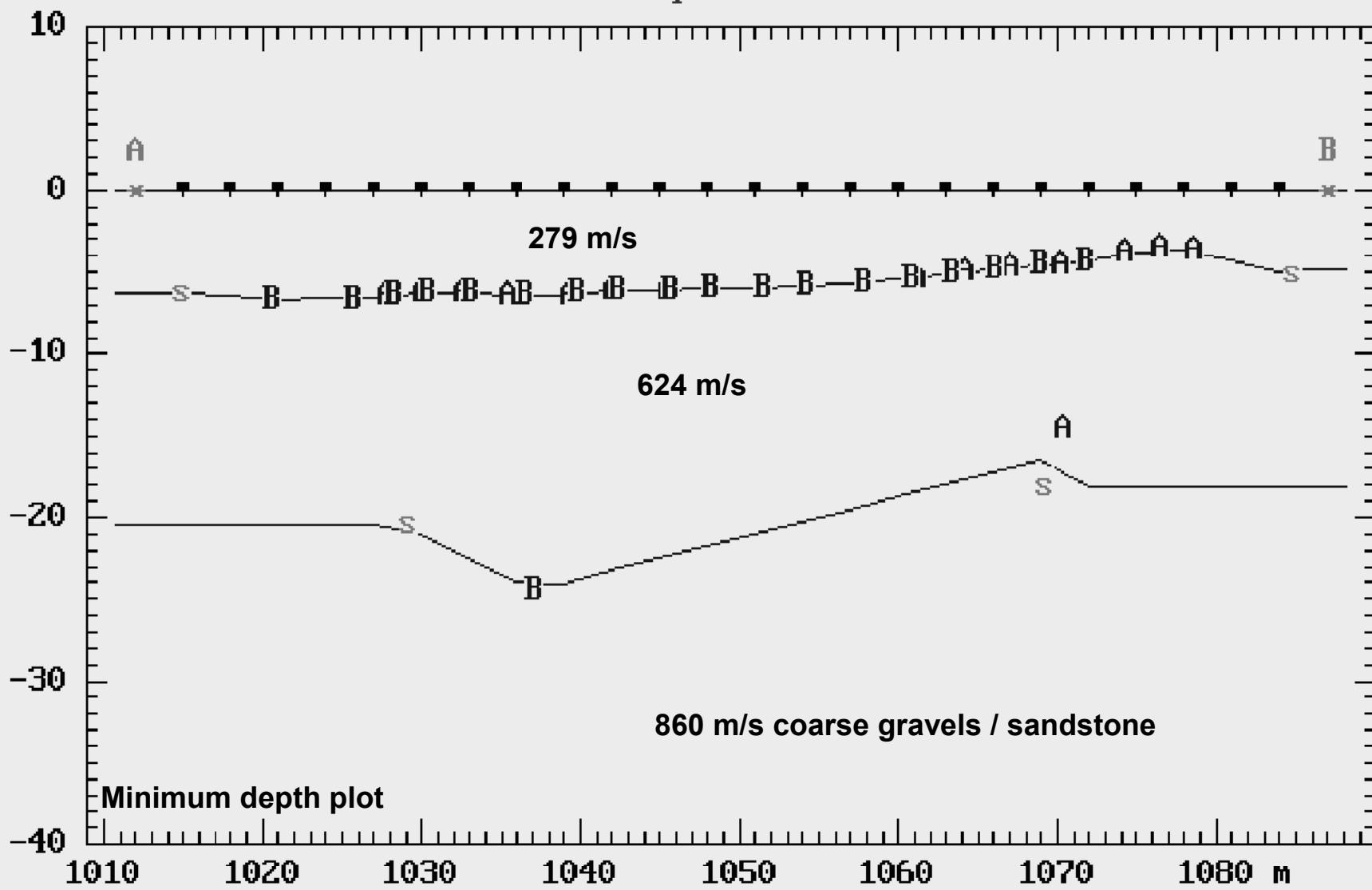
LAKESWAU.SIP: Lakewood High School Shear Wave

Spread A

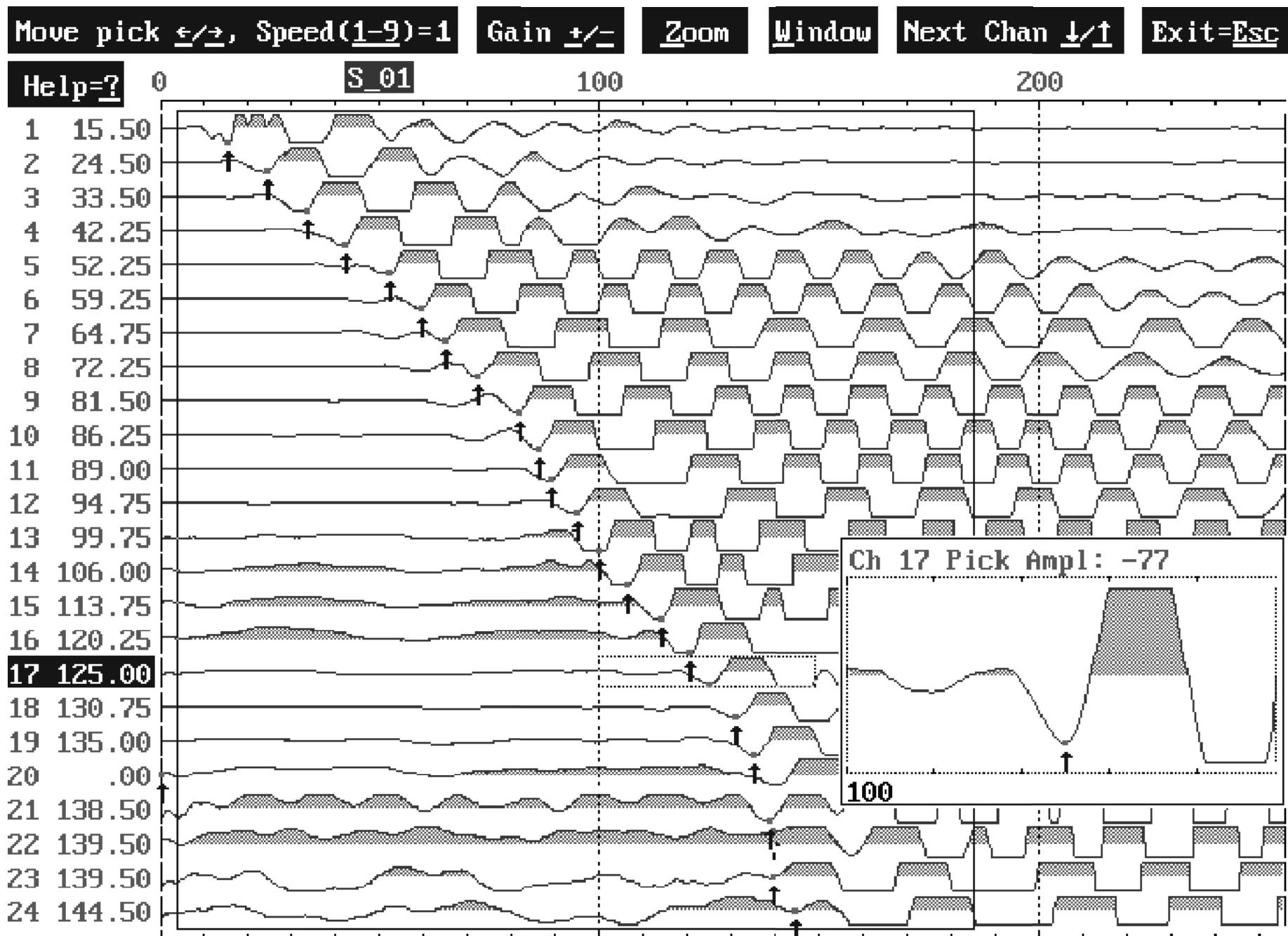


Lakewood High School S-wave

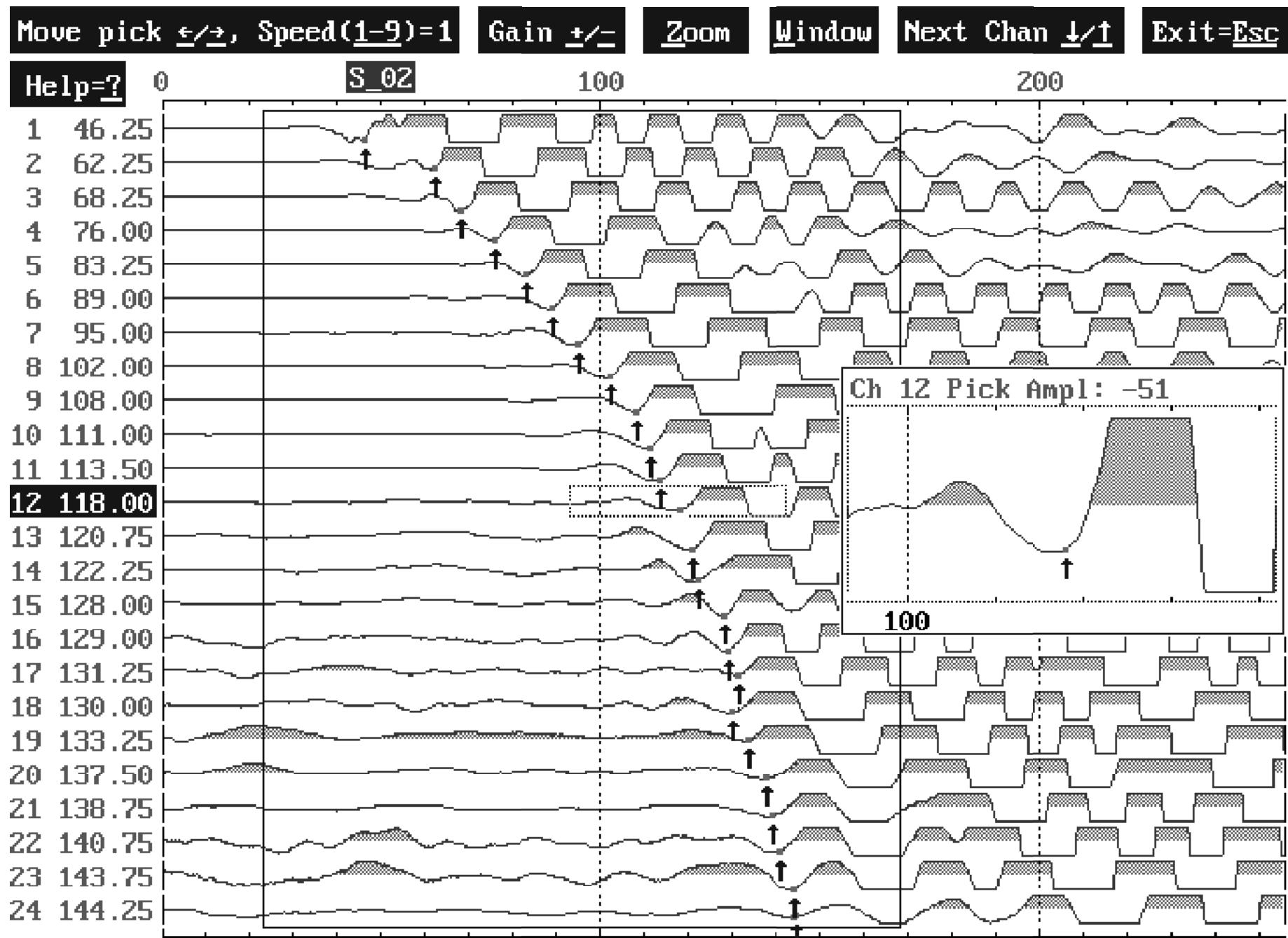
Press Esc to EXIT

Minimum Depth**LAKESMIN.SIP: Lakewood High School Shear Wave****Spread A**

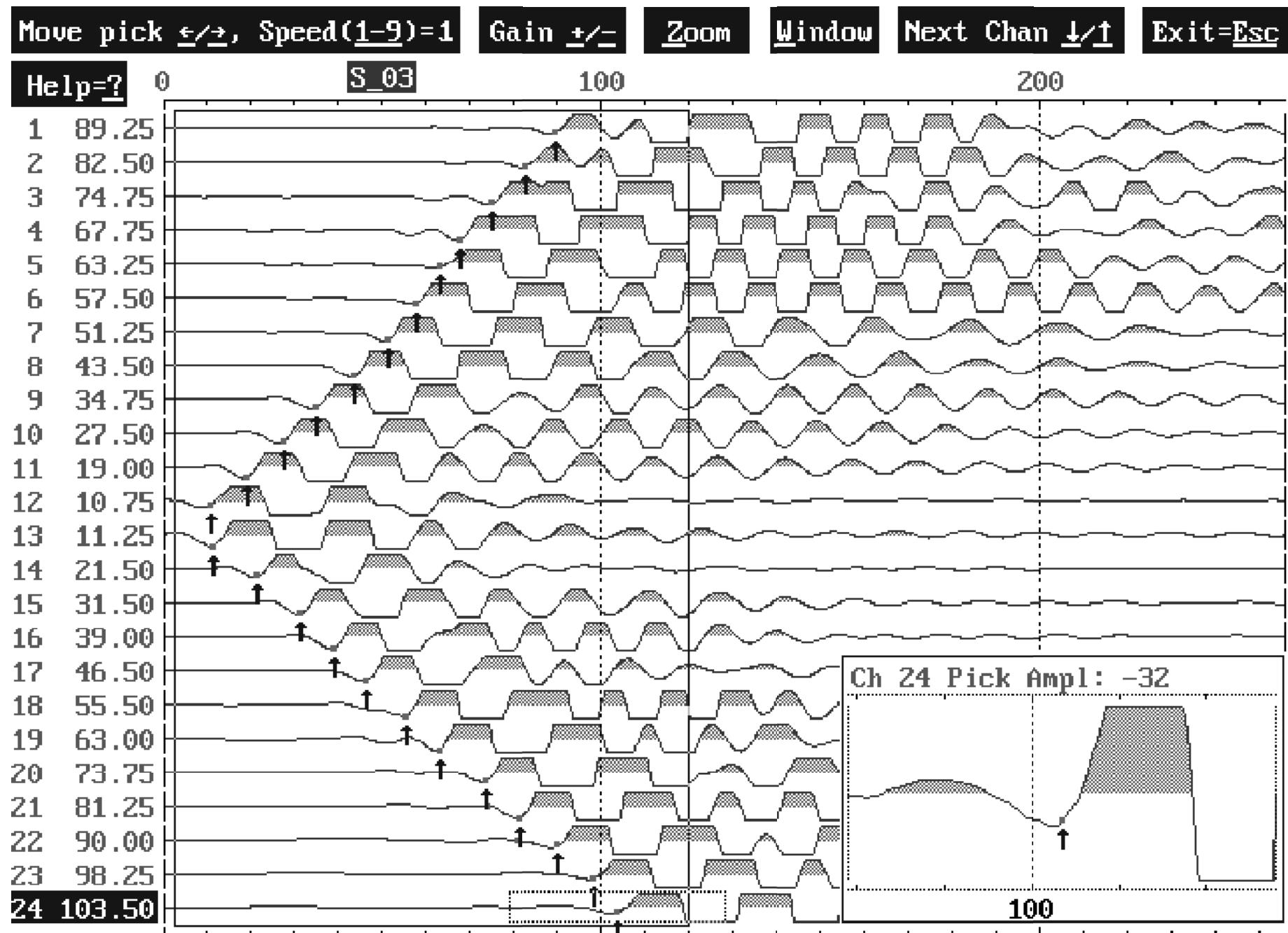
Liberty Lake S-wave



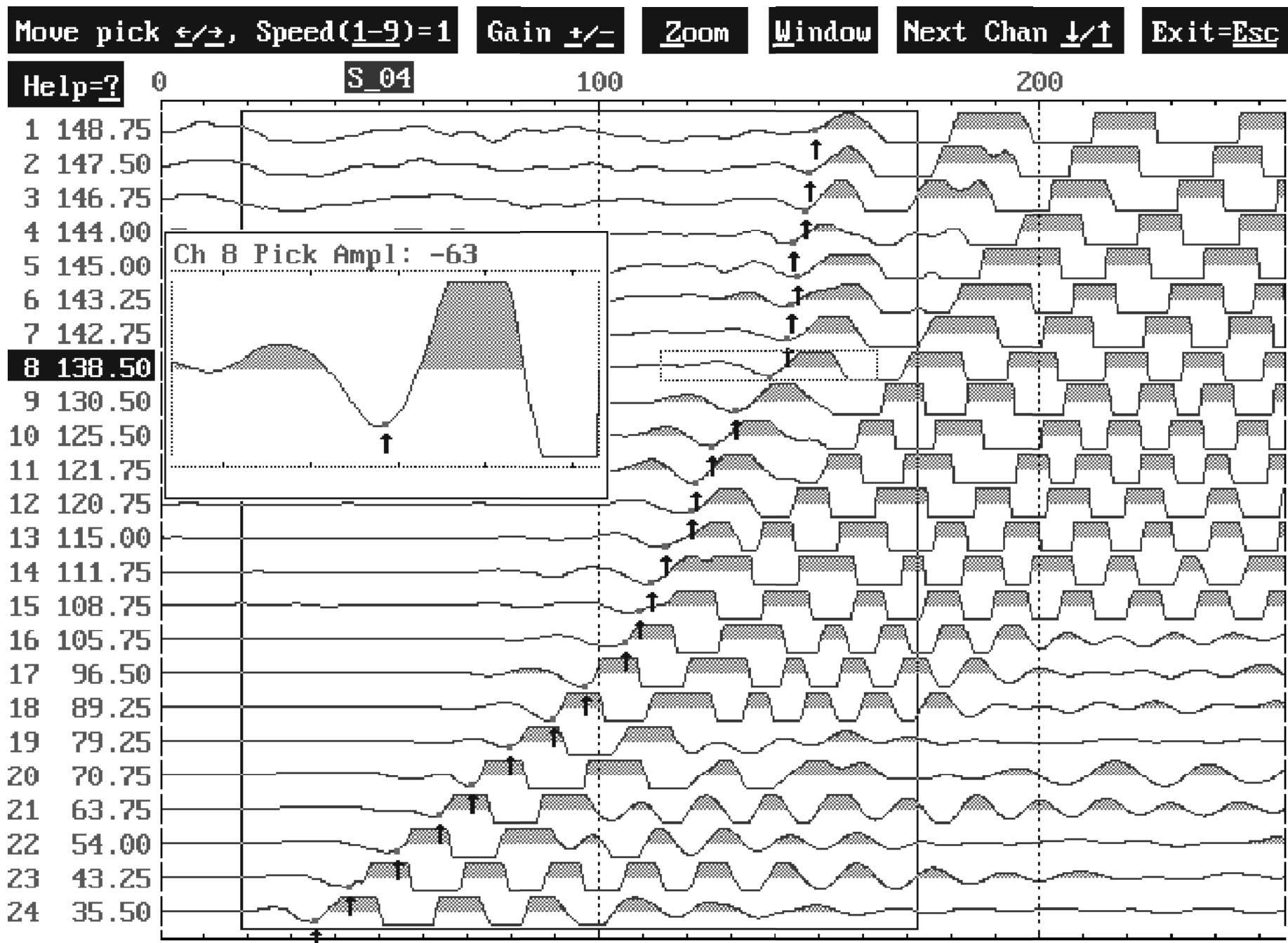
Liberty Lake S-wave



Liberty Lake S-wave



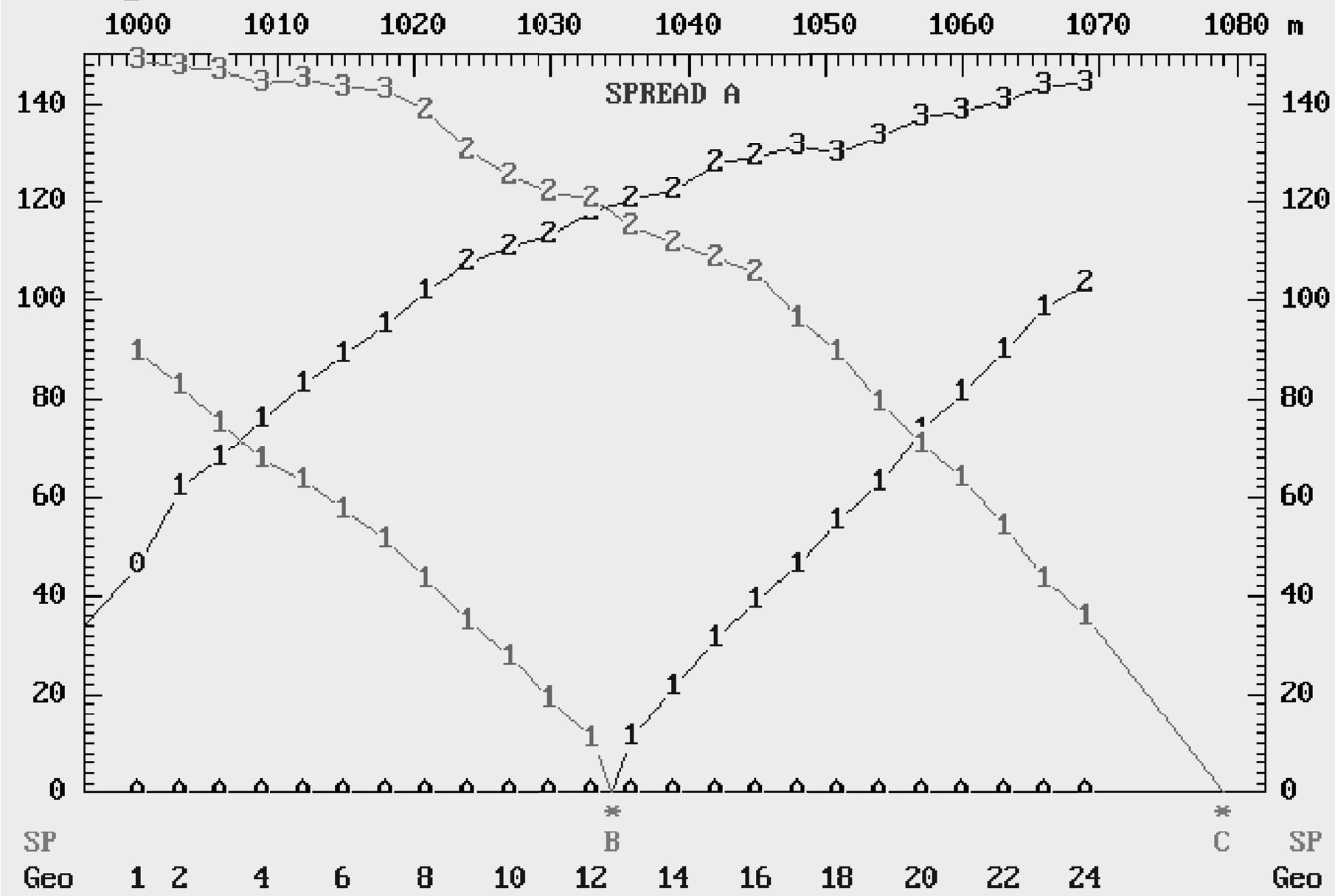
Liberty Lake S-wave



Liberty Lake S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

LIB_SW1.SIP

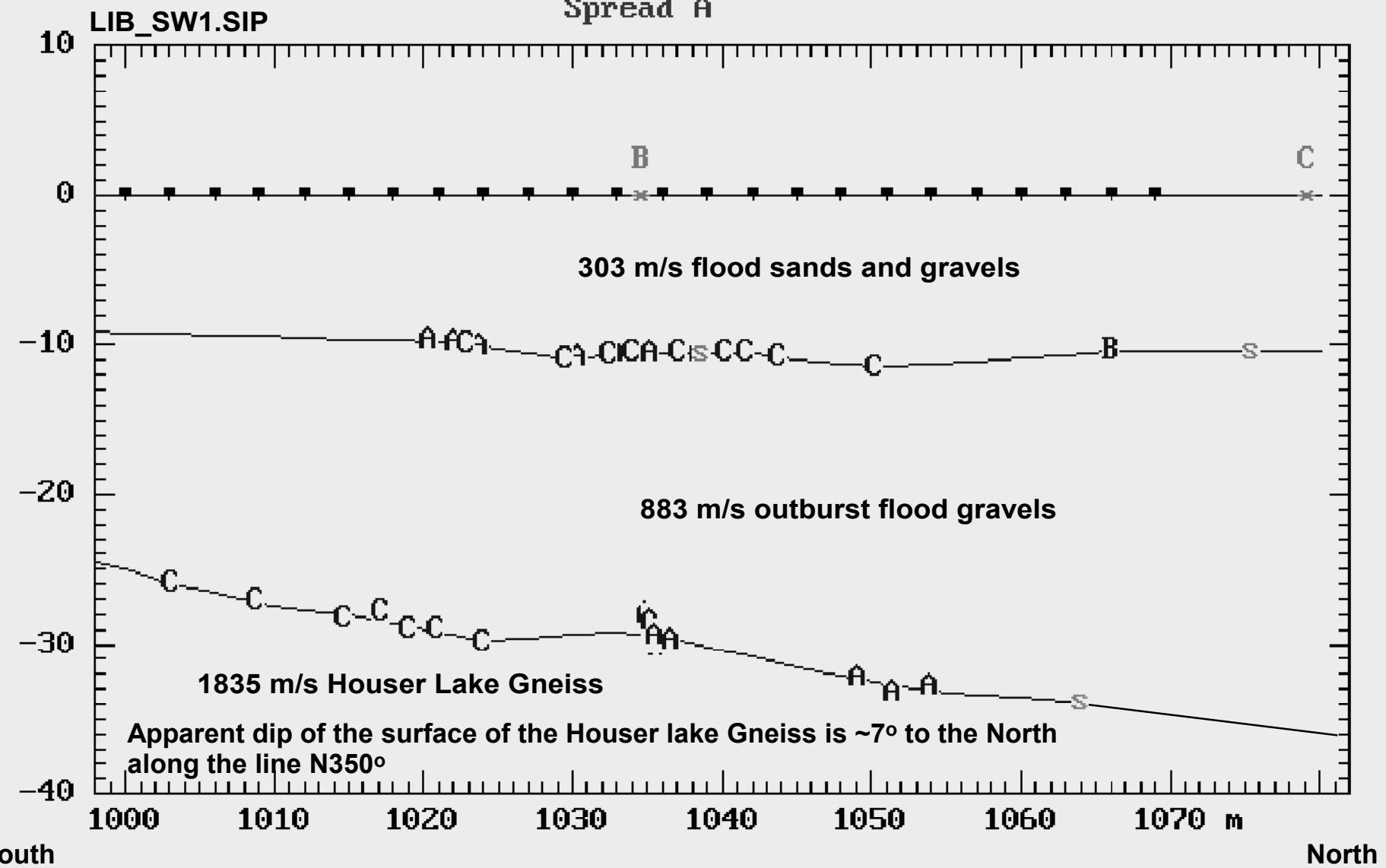


Liberty Lake S-wave

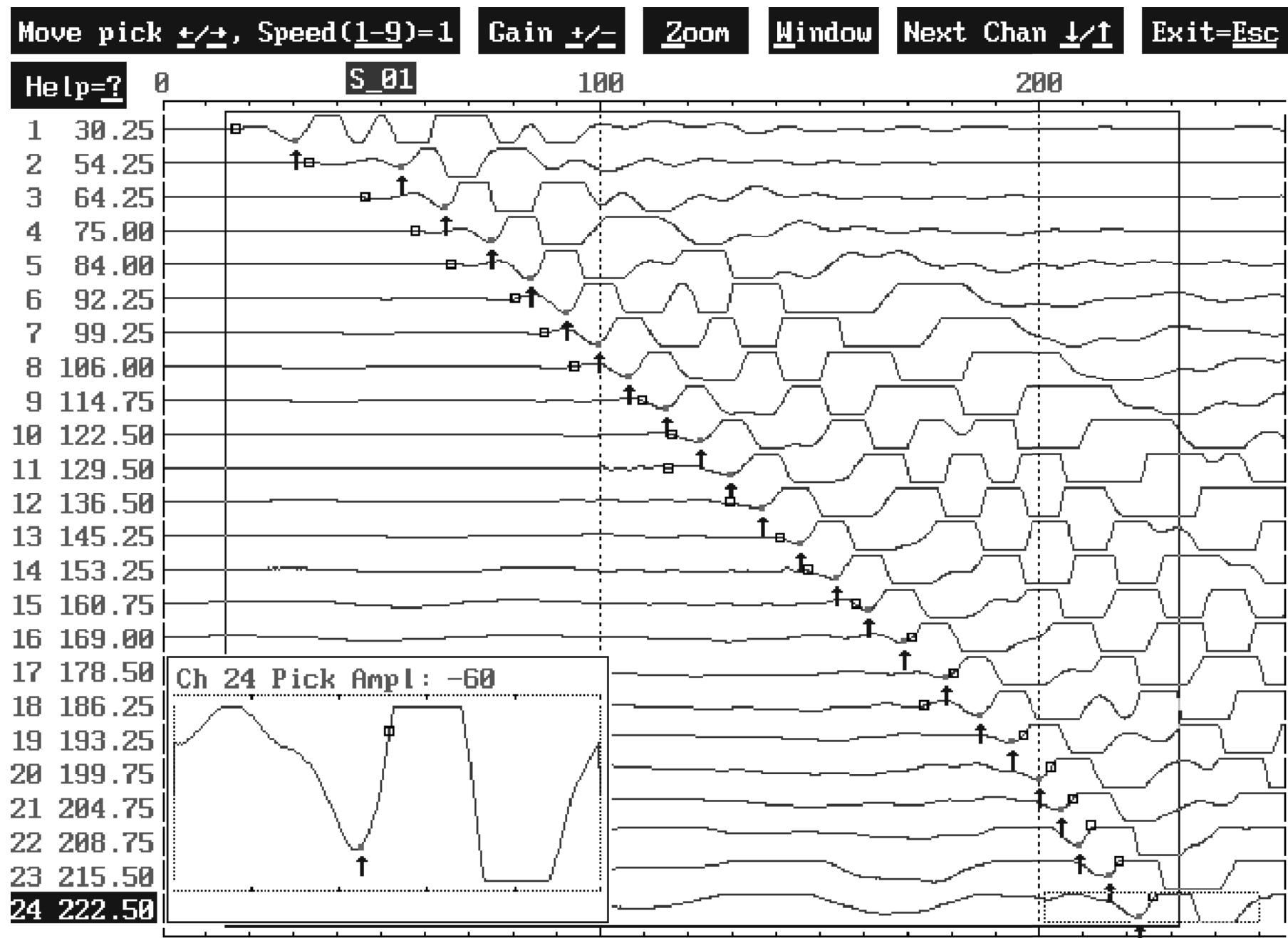
Press Esc to EXIT

LIB_SW1.SIP: Liberty Lake S wave Survey

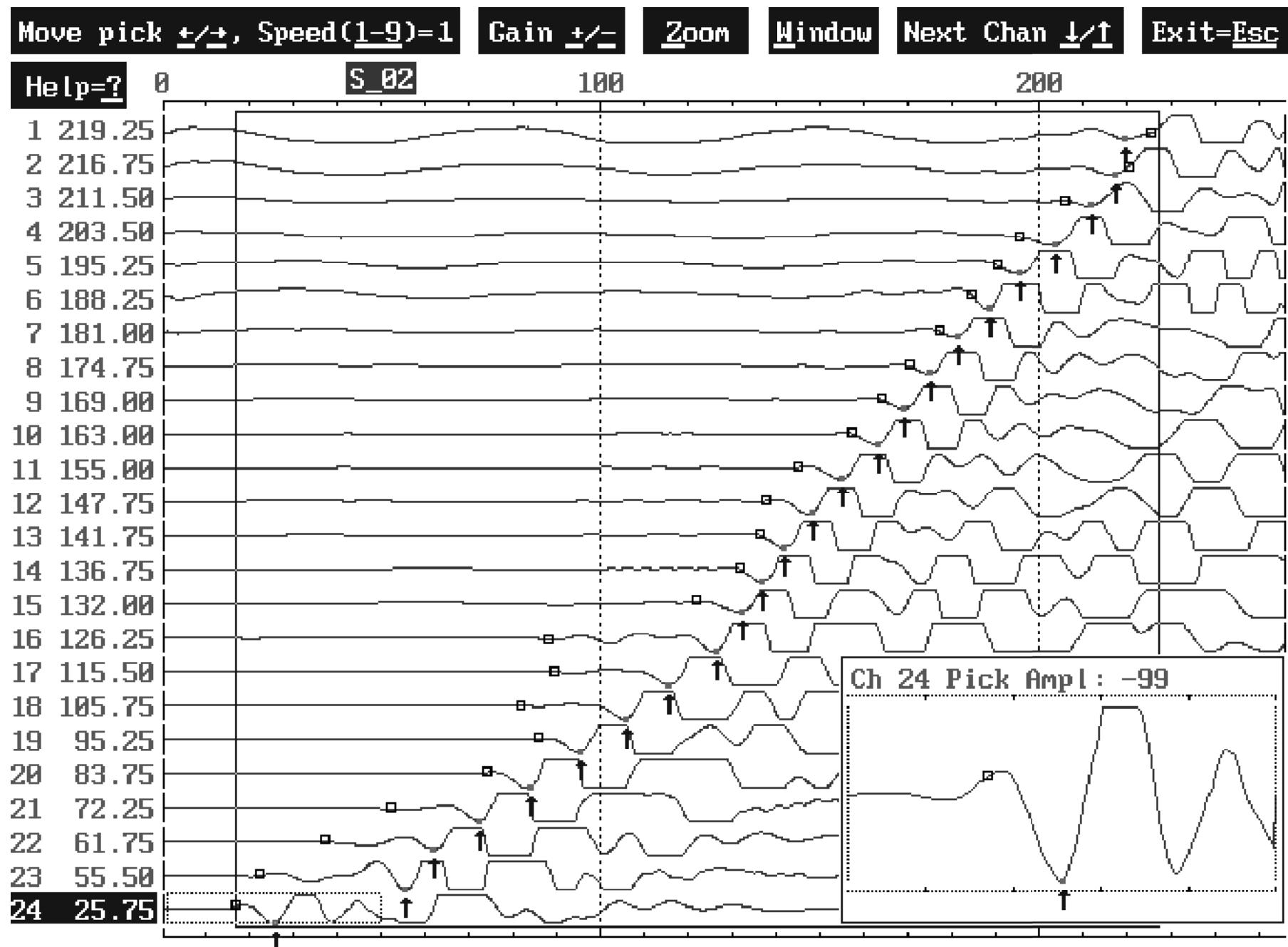
Spread A



Lincoln Road S-wave

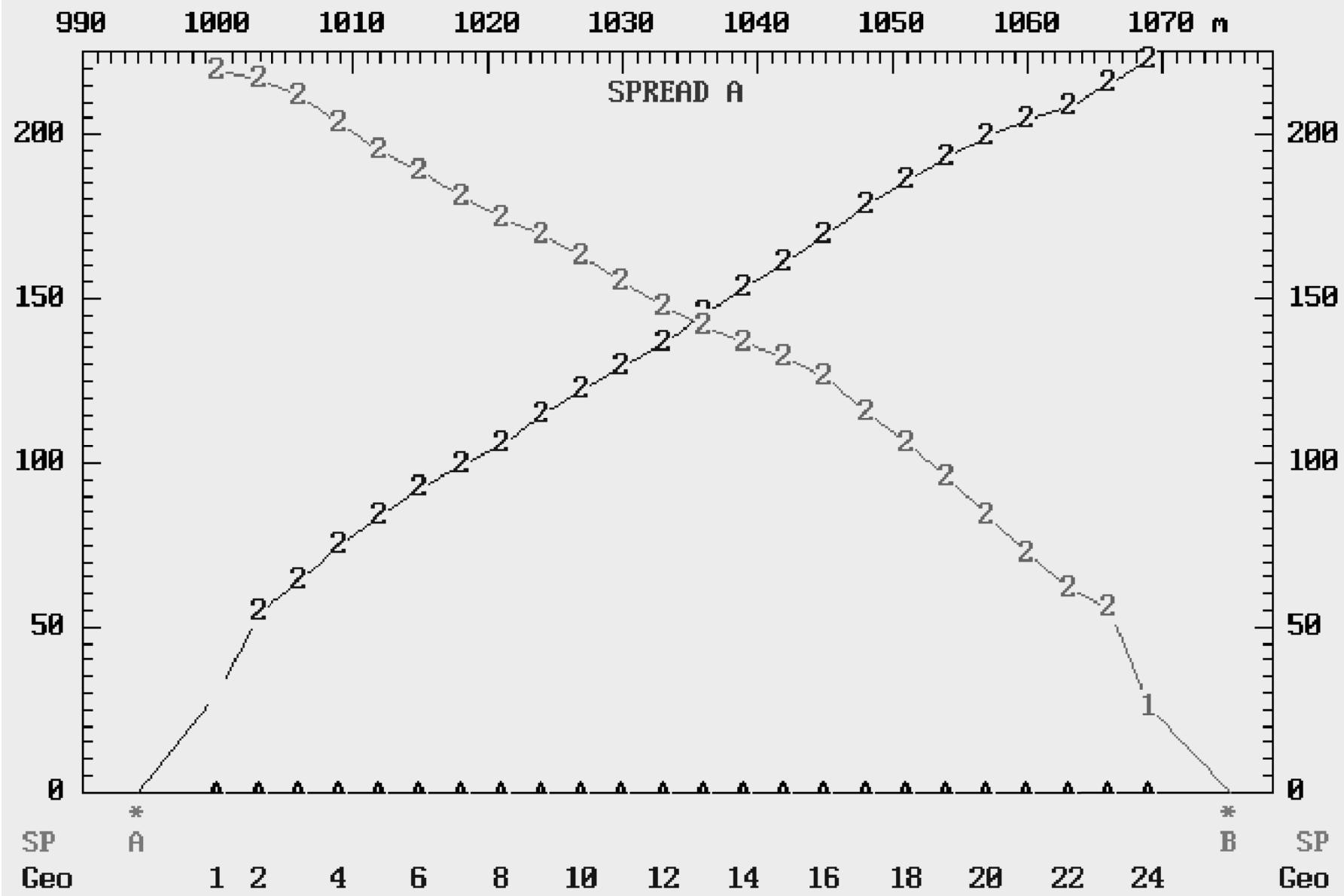


Lincoln Road S-wave



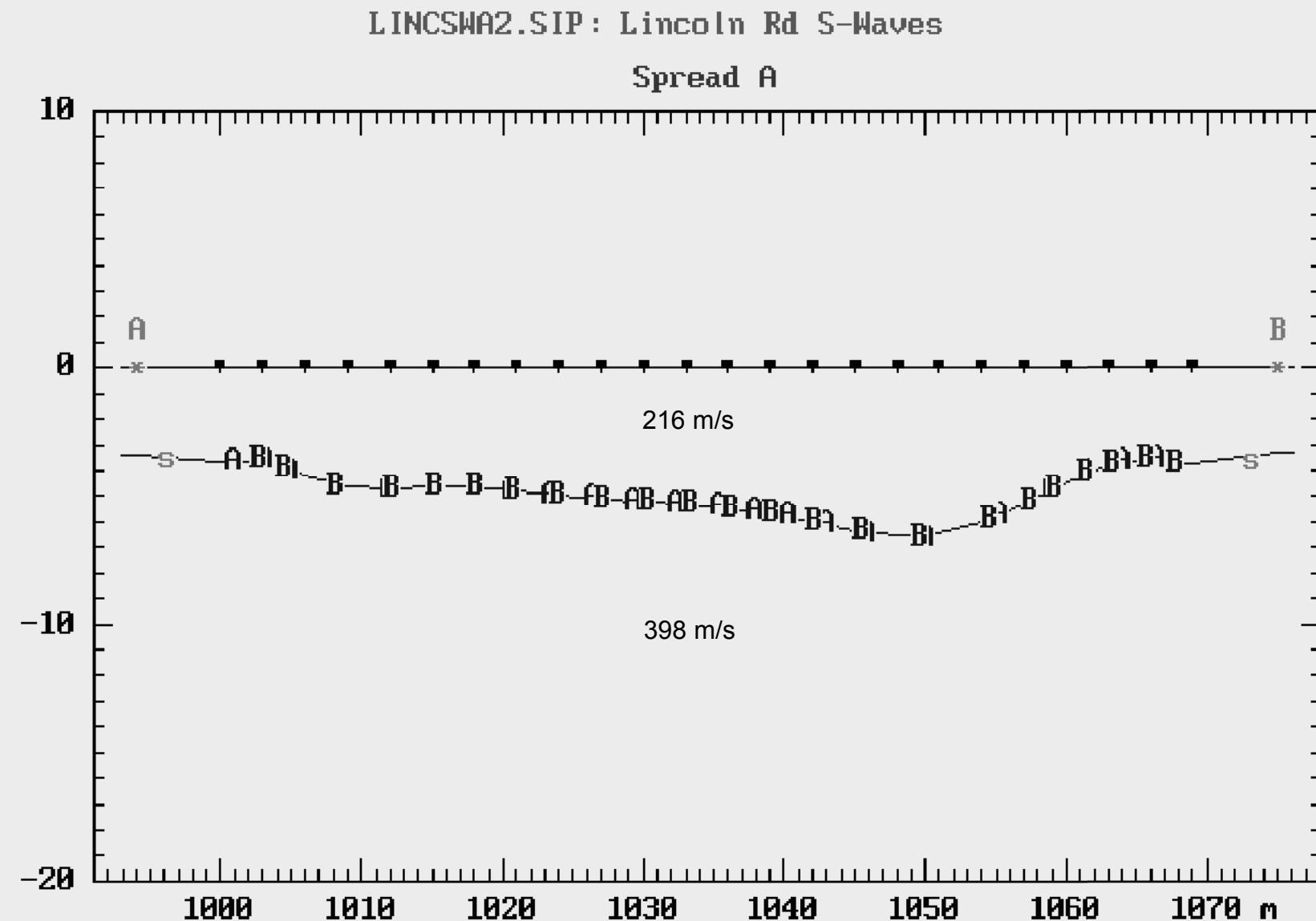
Lincoln Road S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Lincoln Road S-wave

Press Esc to EXIT

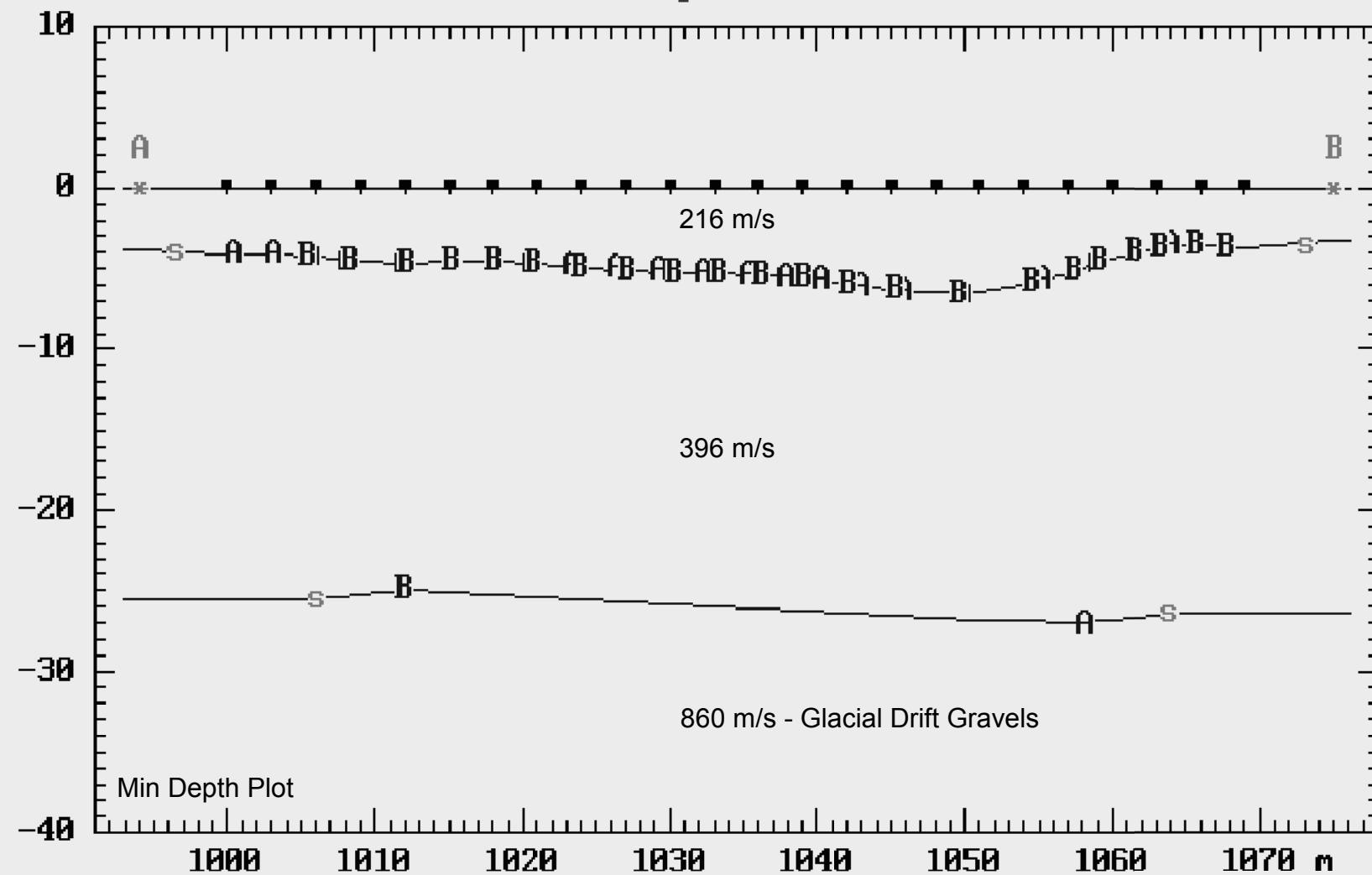


Lincoln Road S-wave

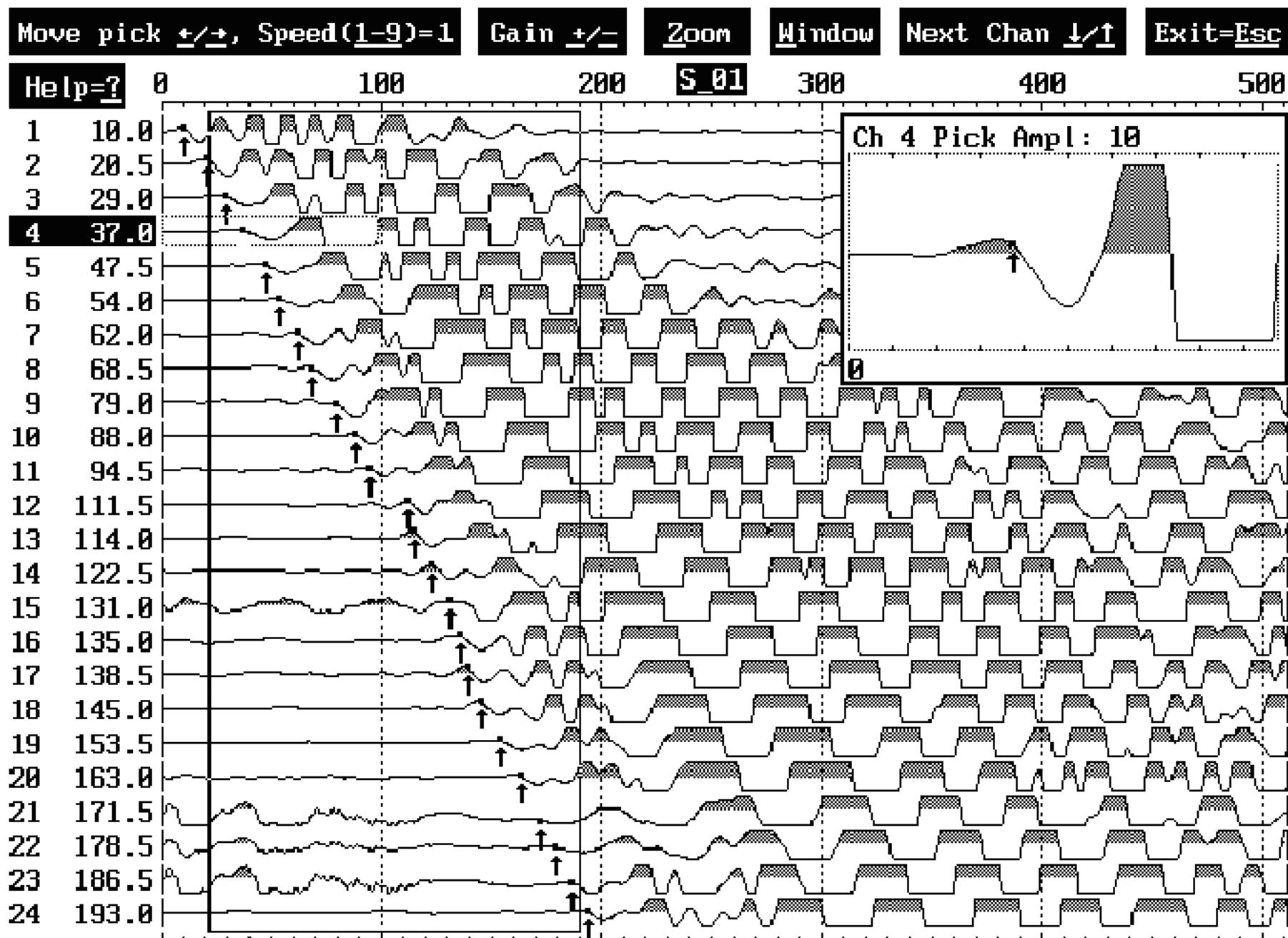
Press Esc to EXIT

LINCSMIN.SIP: Lincoln Rd Minimum Depth Plot

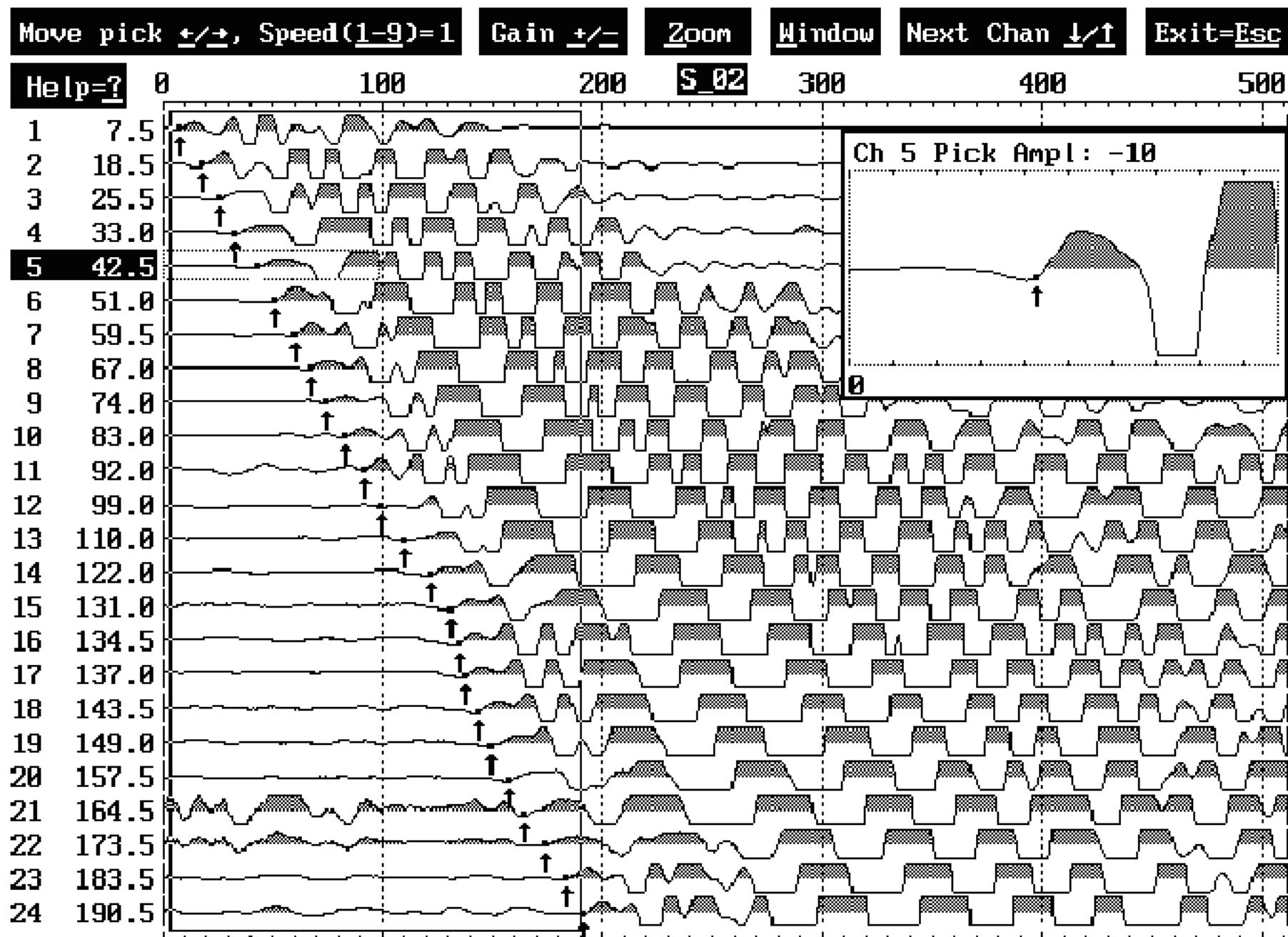
Spread A



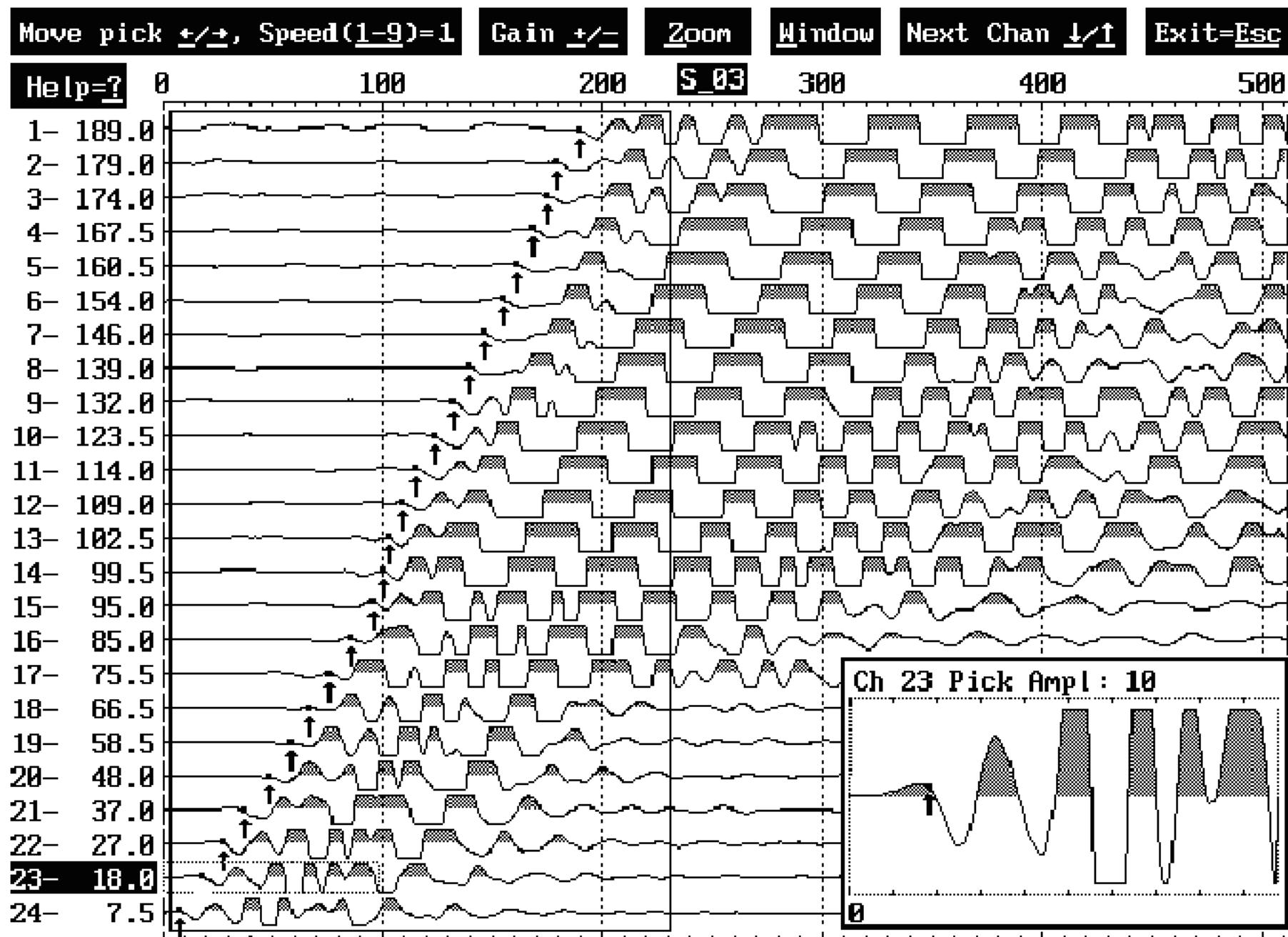
Logan Park S-wave



Logan Park S-wave

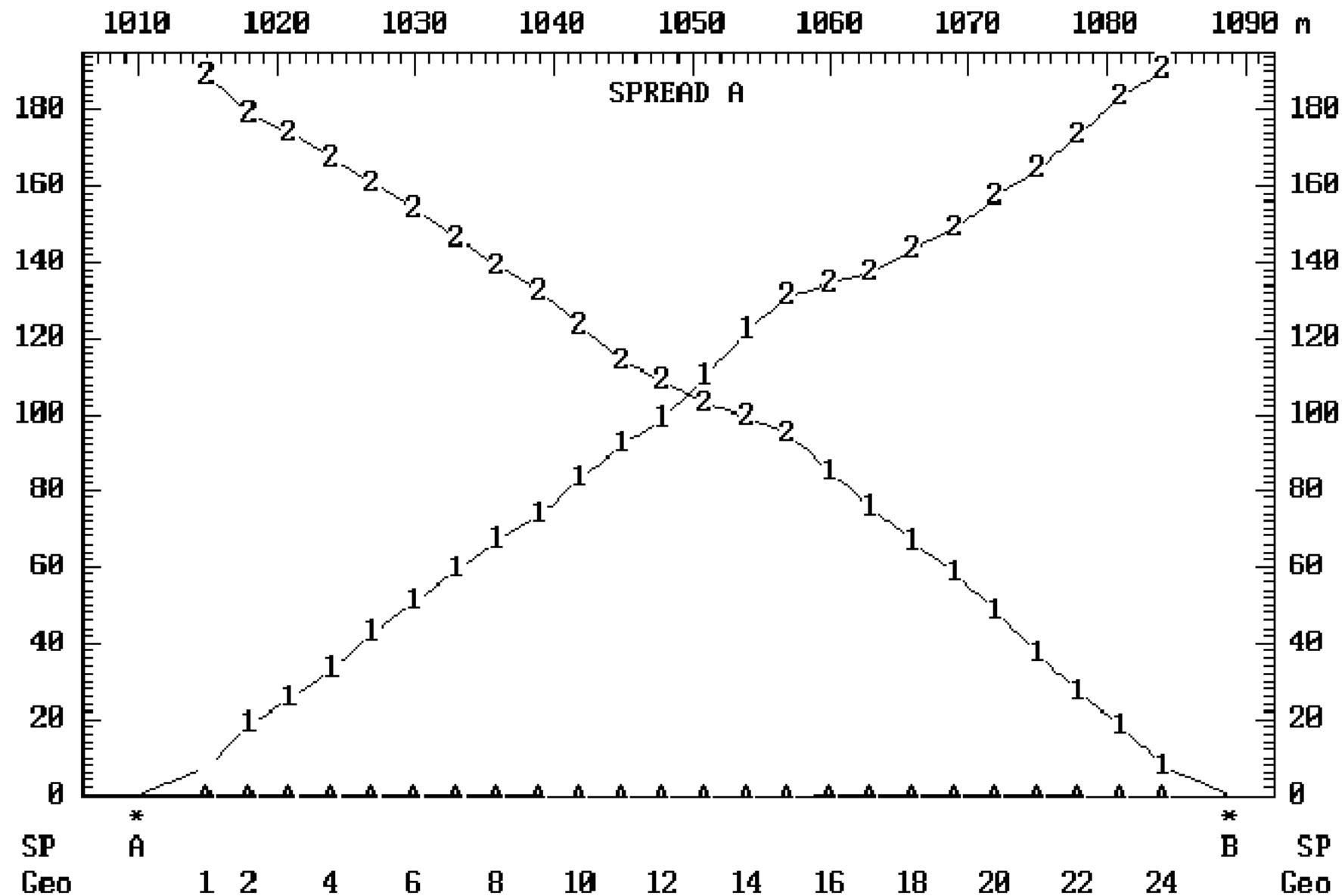


Logan Park S-wave



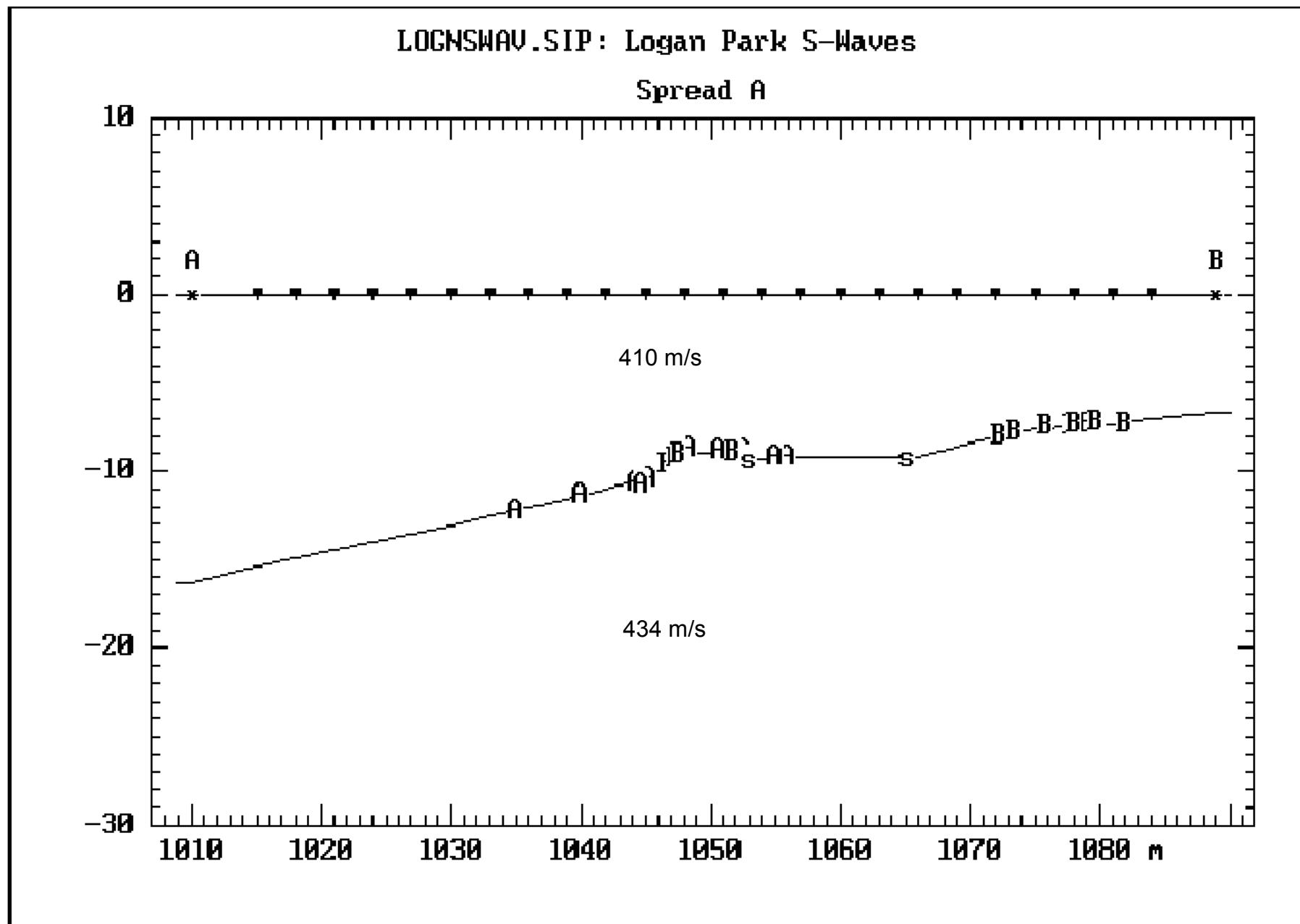
Logan Park S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Logan Park S-wave

Press Esc to EXIT

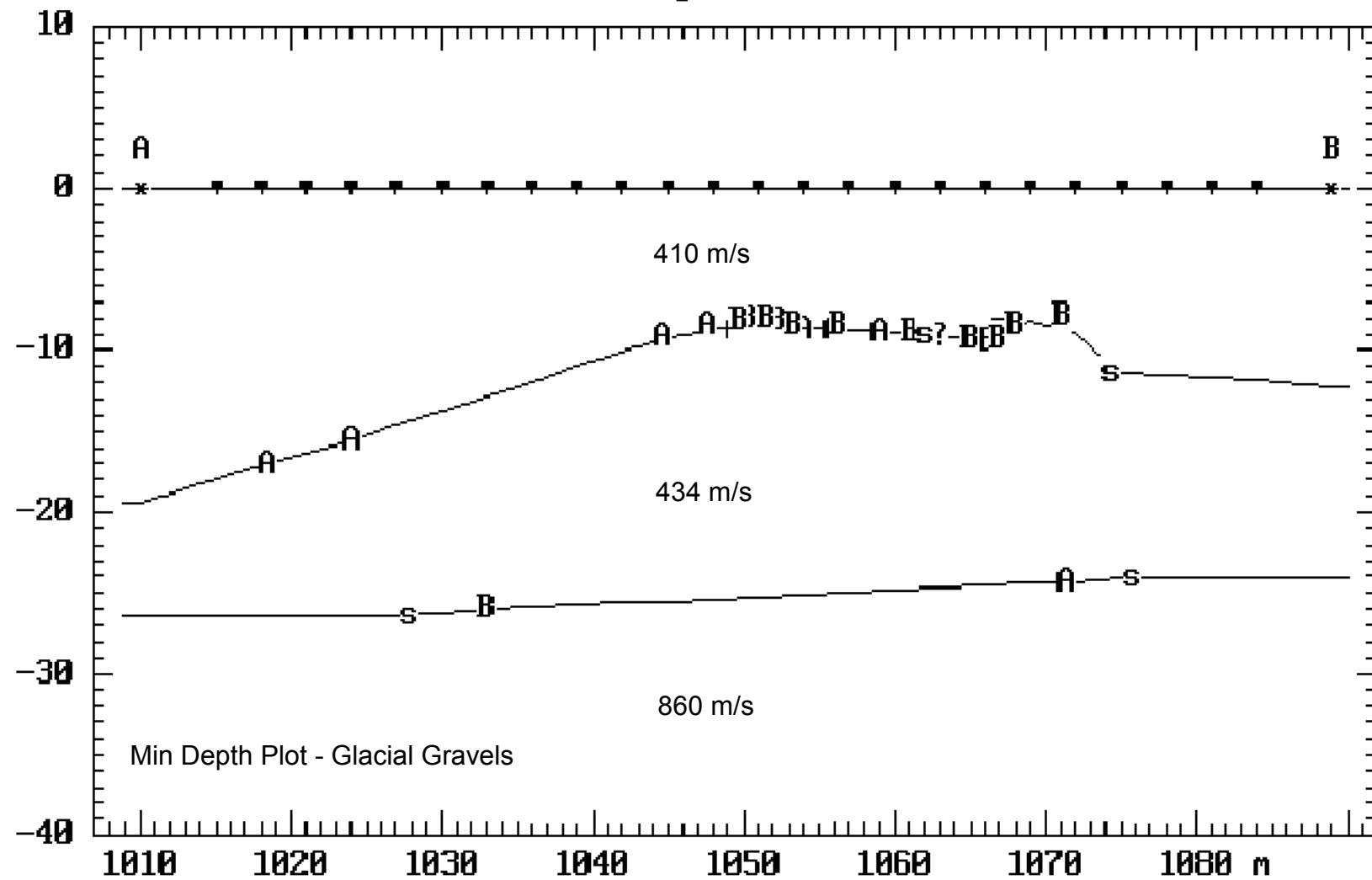


Logan Park S-wave

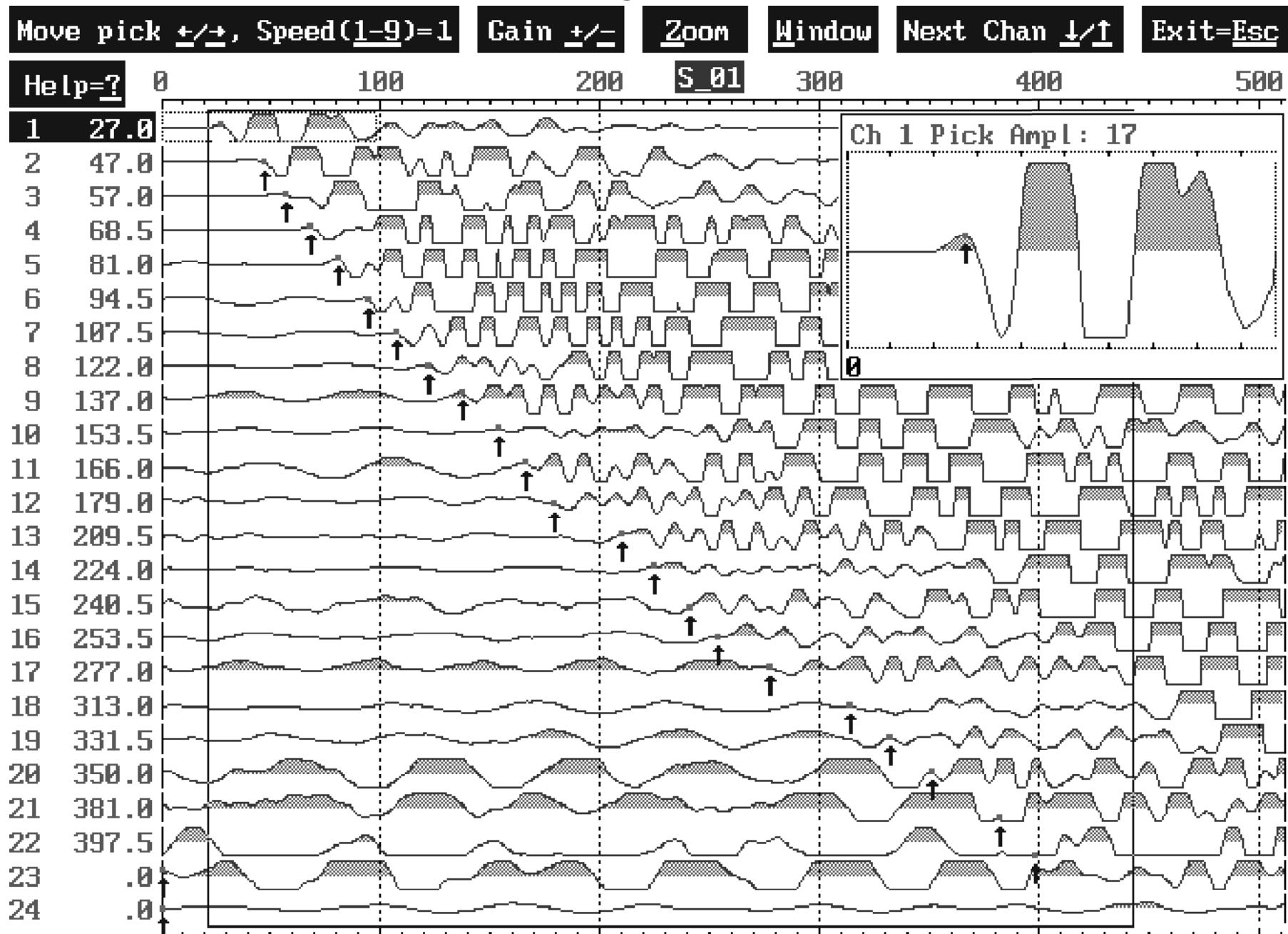
Press Esc to EXIT

LOGNSMIN.SIP: Logan Park S-Waves Minimum Depth Plot

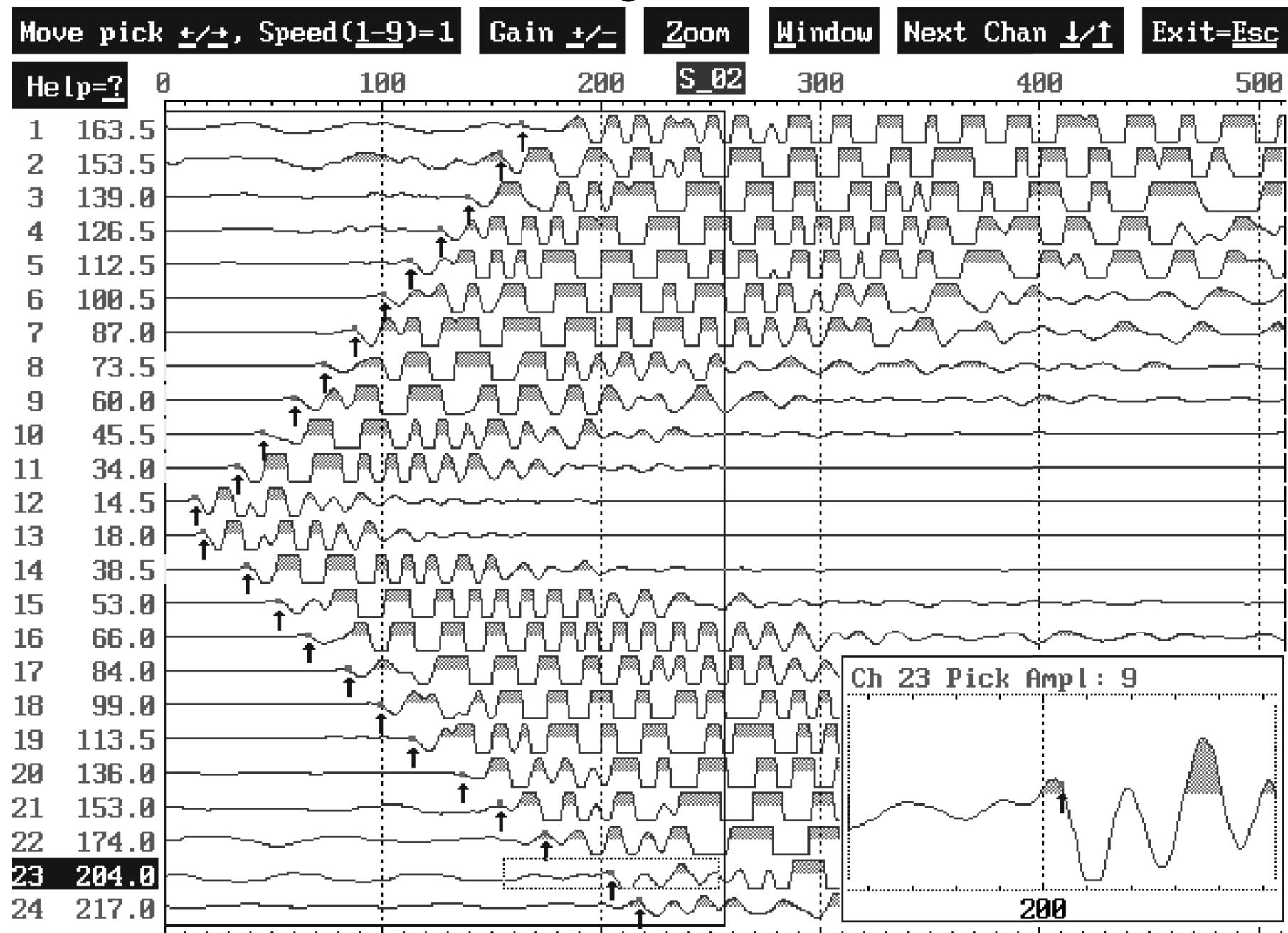
Spread A



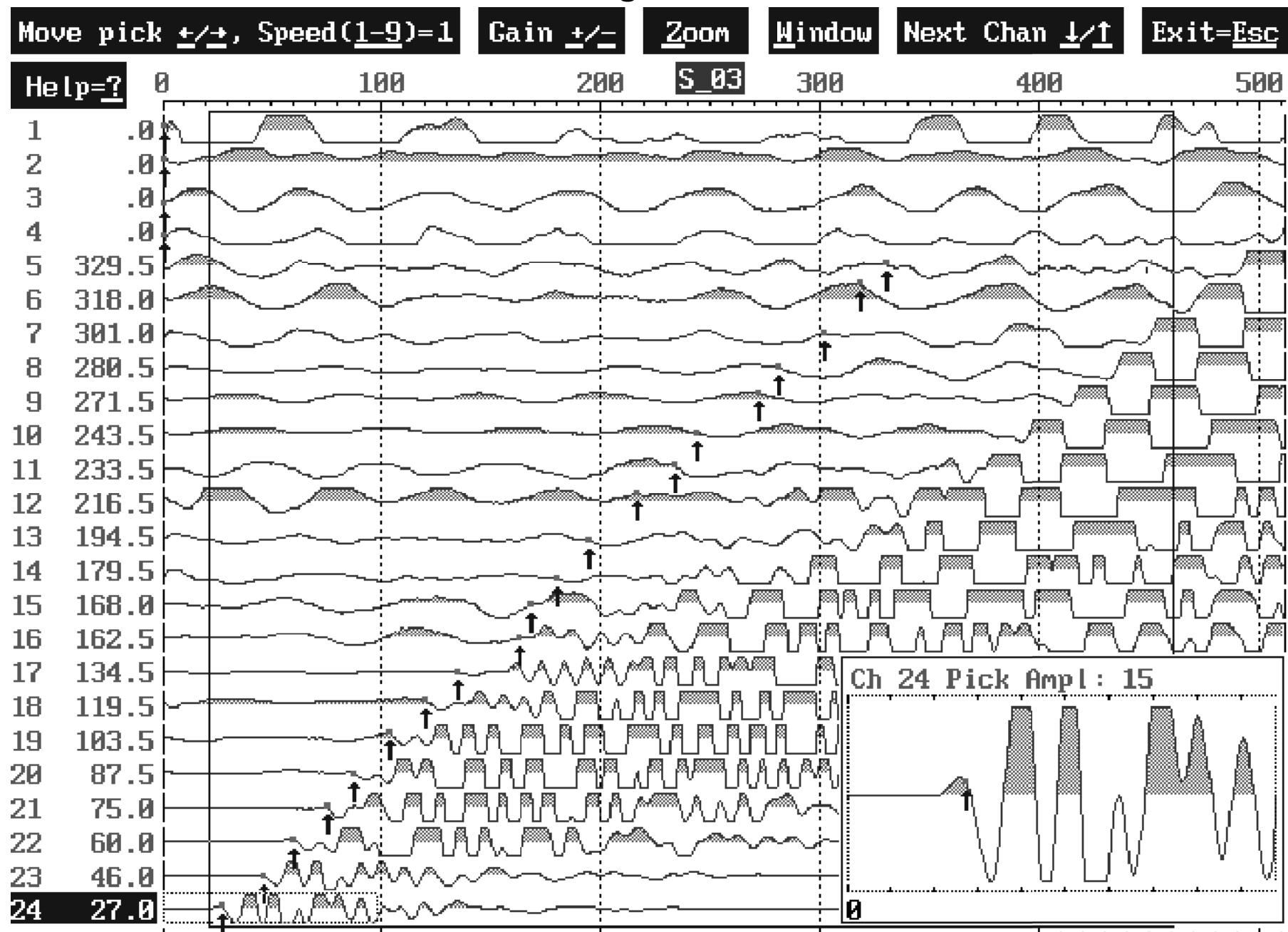
Mark Morris High school S-wave



Mark Morris High school S-wave

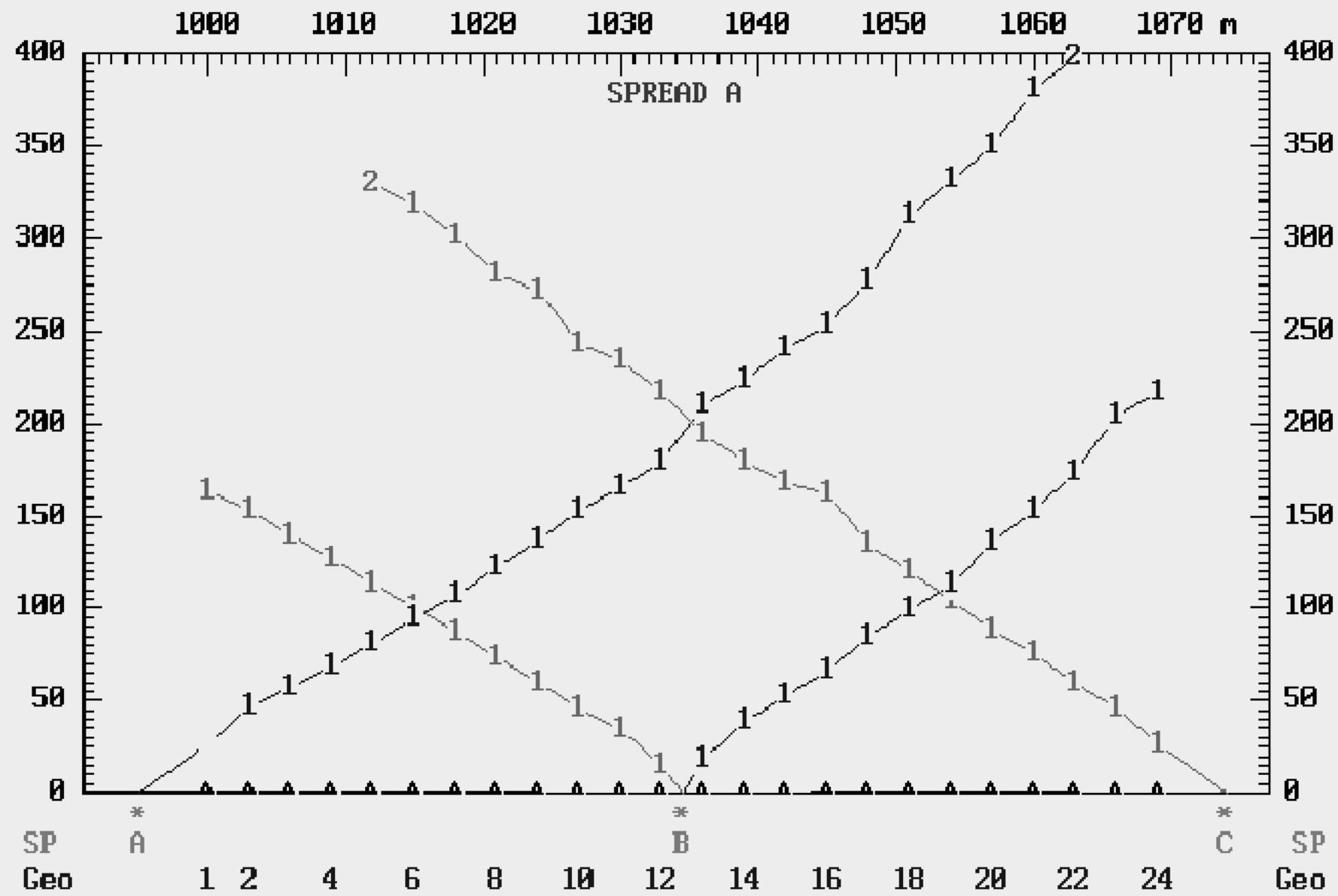


Mark Morris High school S-wave



Mark Morris High school S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

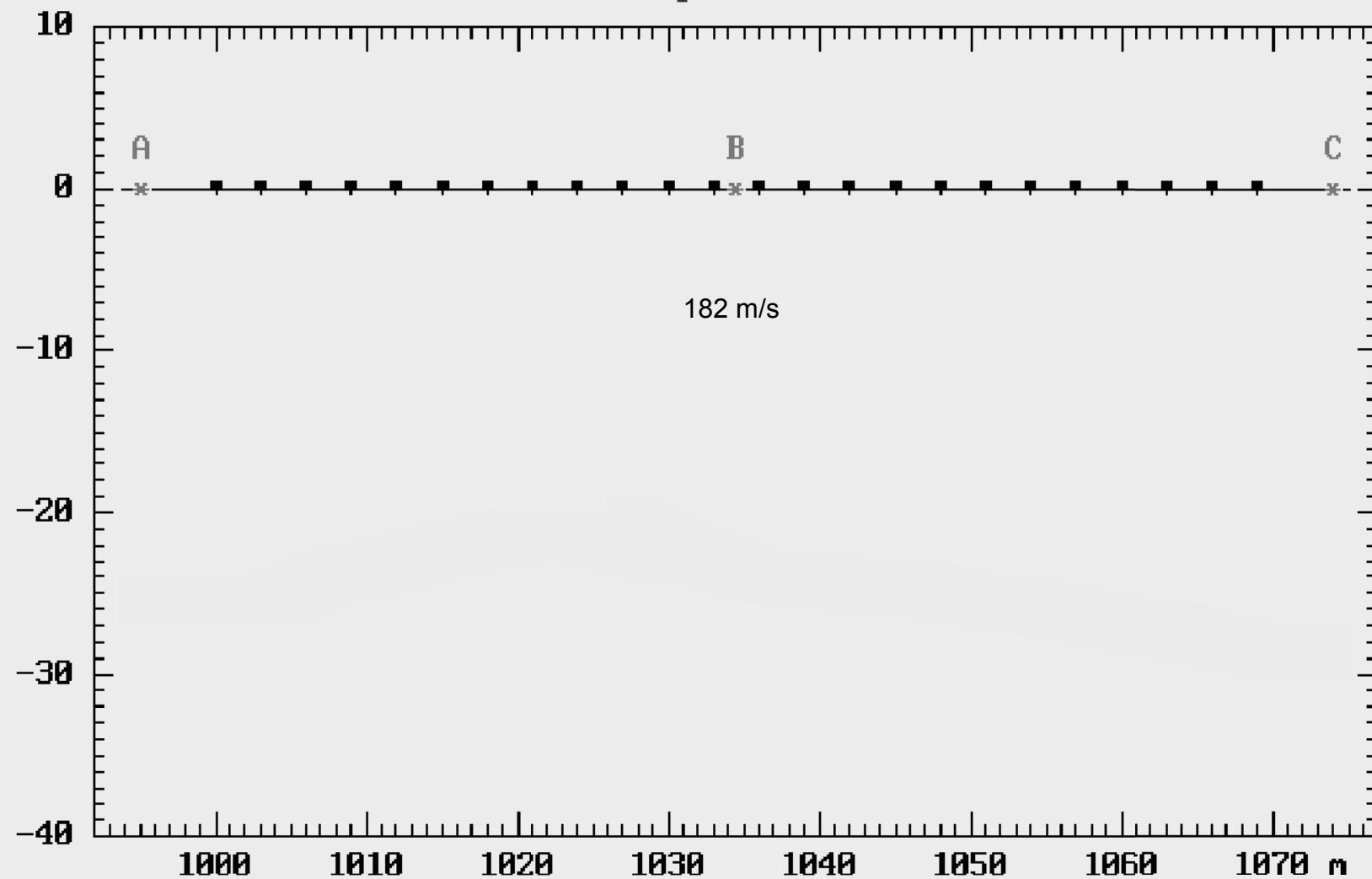


Mark Morris High school S-wave

Press Esc to EXIT

MARKSWAV.SIP: Mark Morris High School S-Waves

Spread A

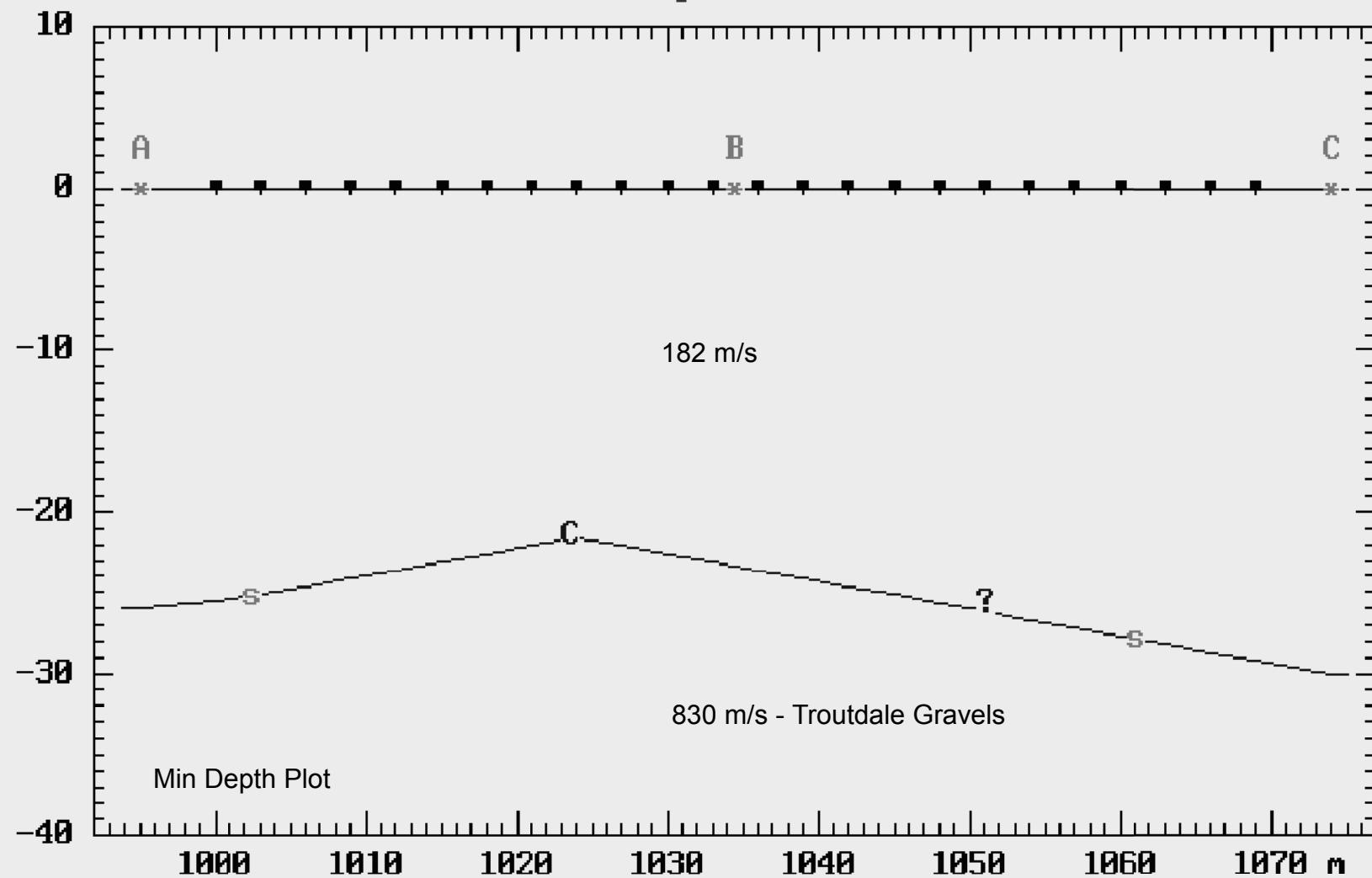


Mark Morris High school S-wave

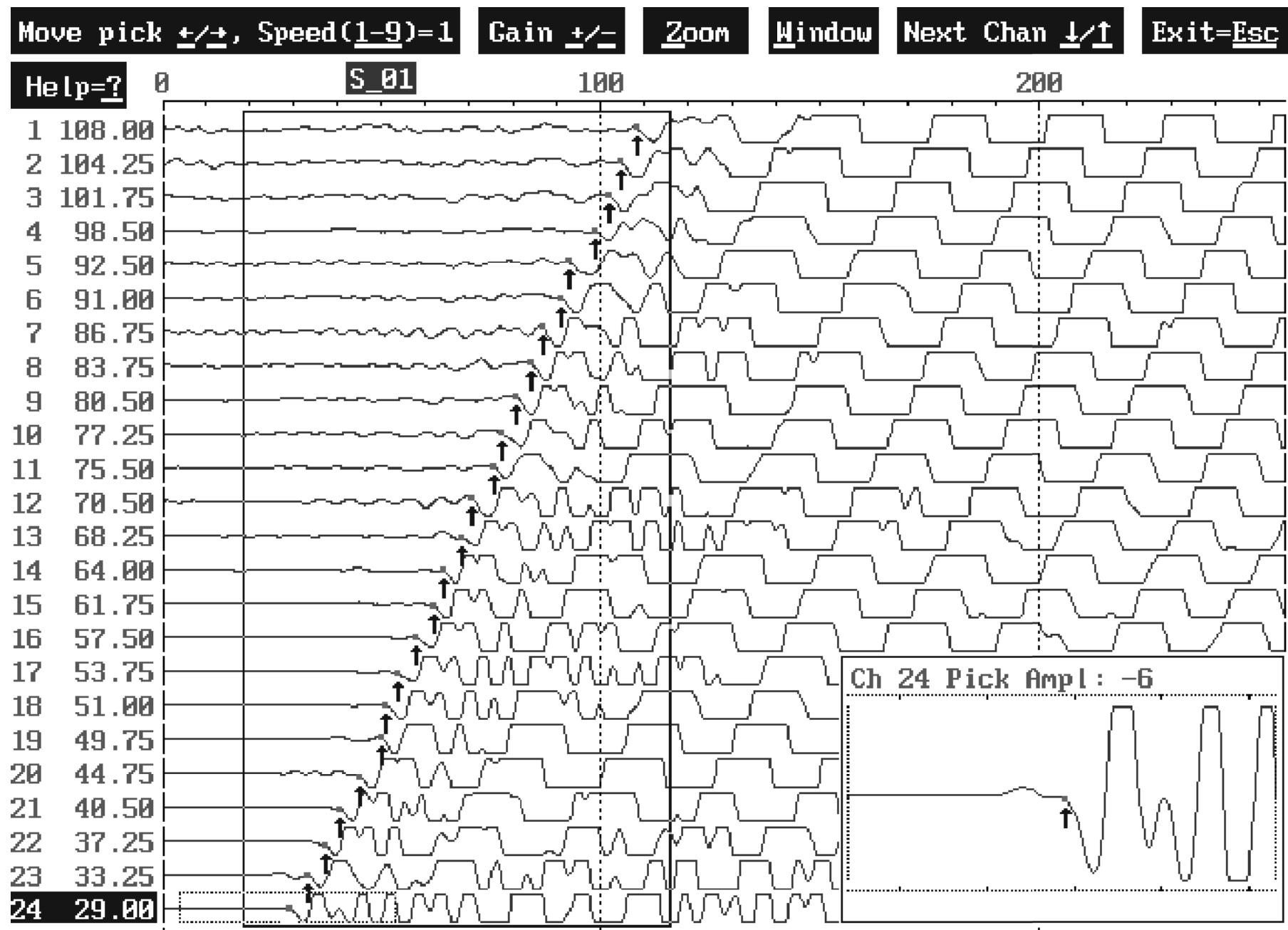
Press Esc to EXIT

MARKSWAV.SIP: Mark Morris High School S-Waves

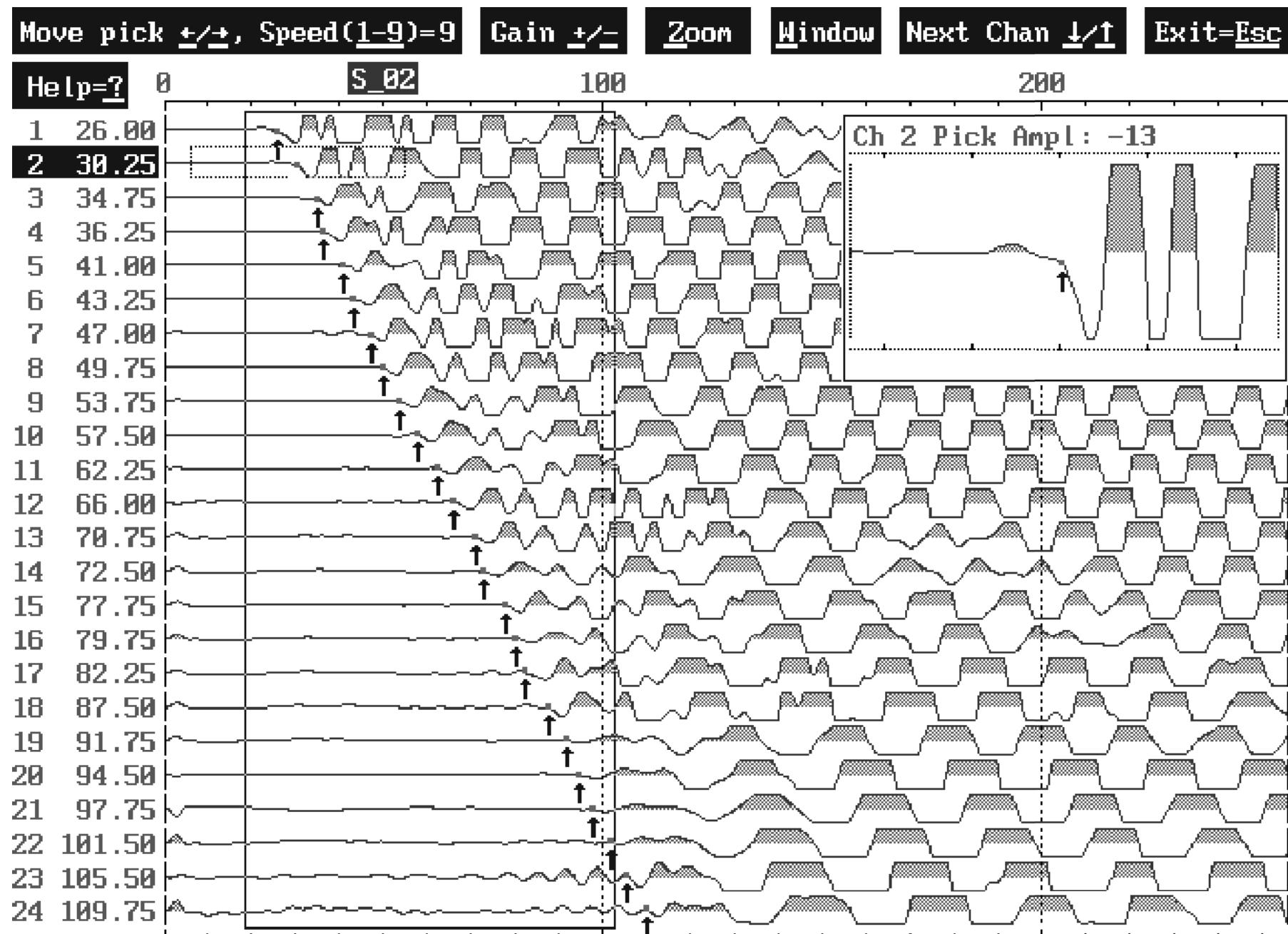
Spread A



Martha Lake Elementary S-wave



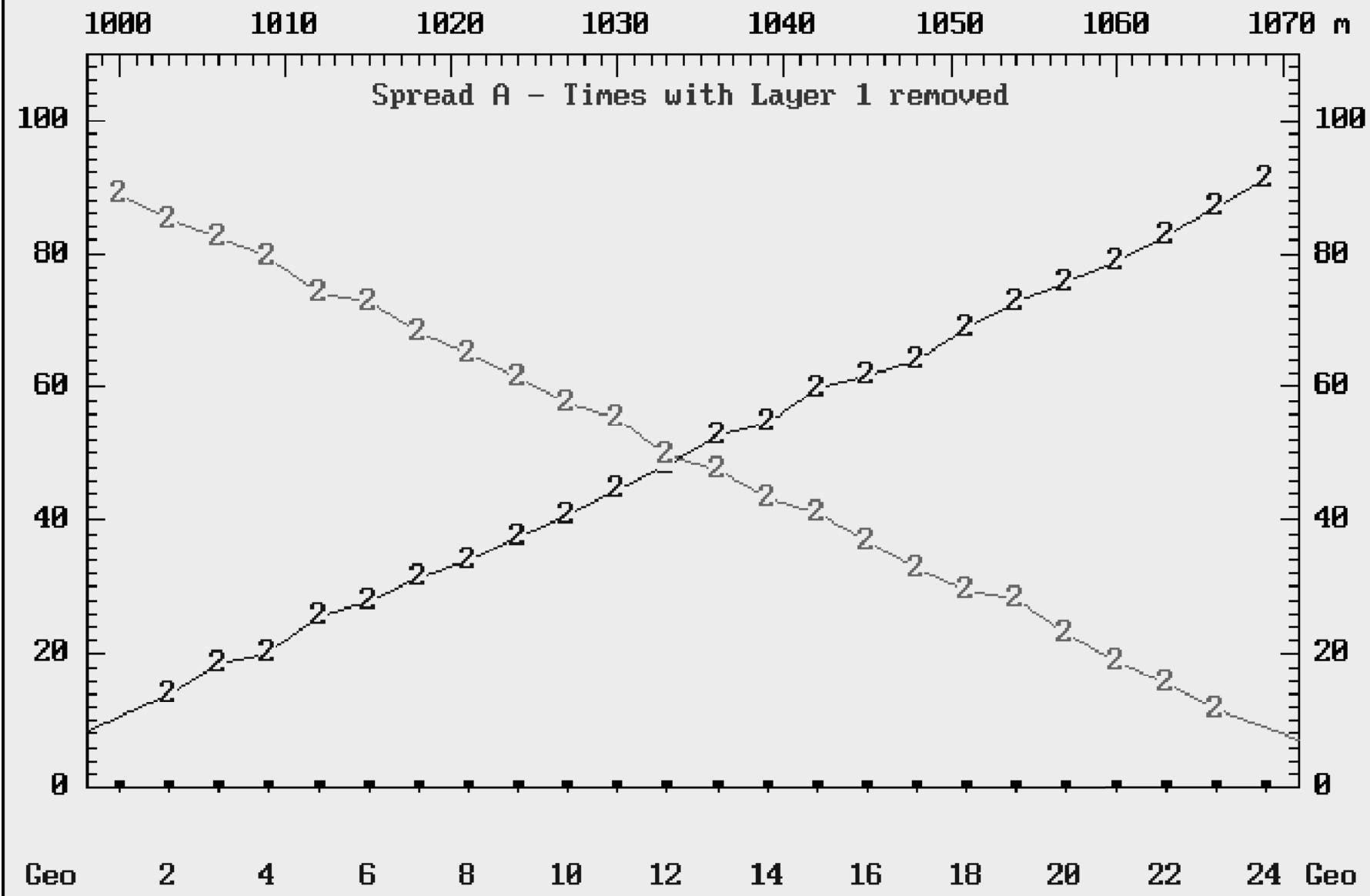
Martha Lake Elementary S-wave



Martha Lake Elementary S-wave

Press Esc to EXIT

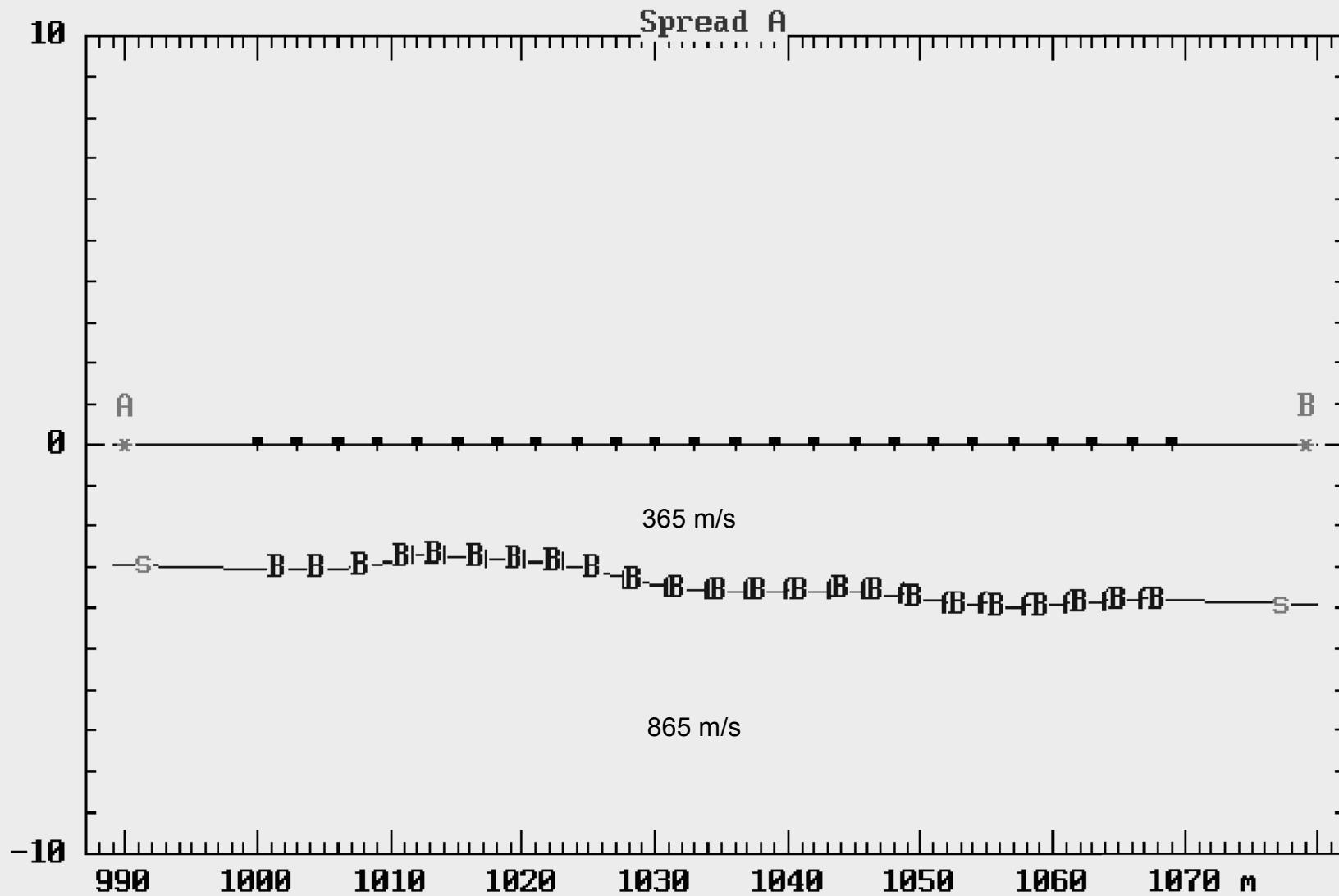
MARTSWAV.SIP: Martha Lake Elementary S-Waves



Martha Lake Elementary S-wave

Press Esc to EXIT

MARTSWAV.SIP: Martha Lake Elementary S-Waves

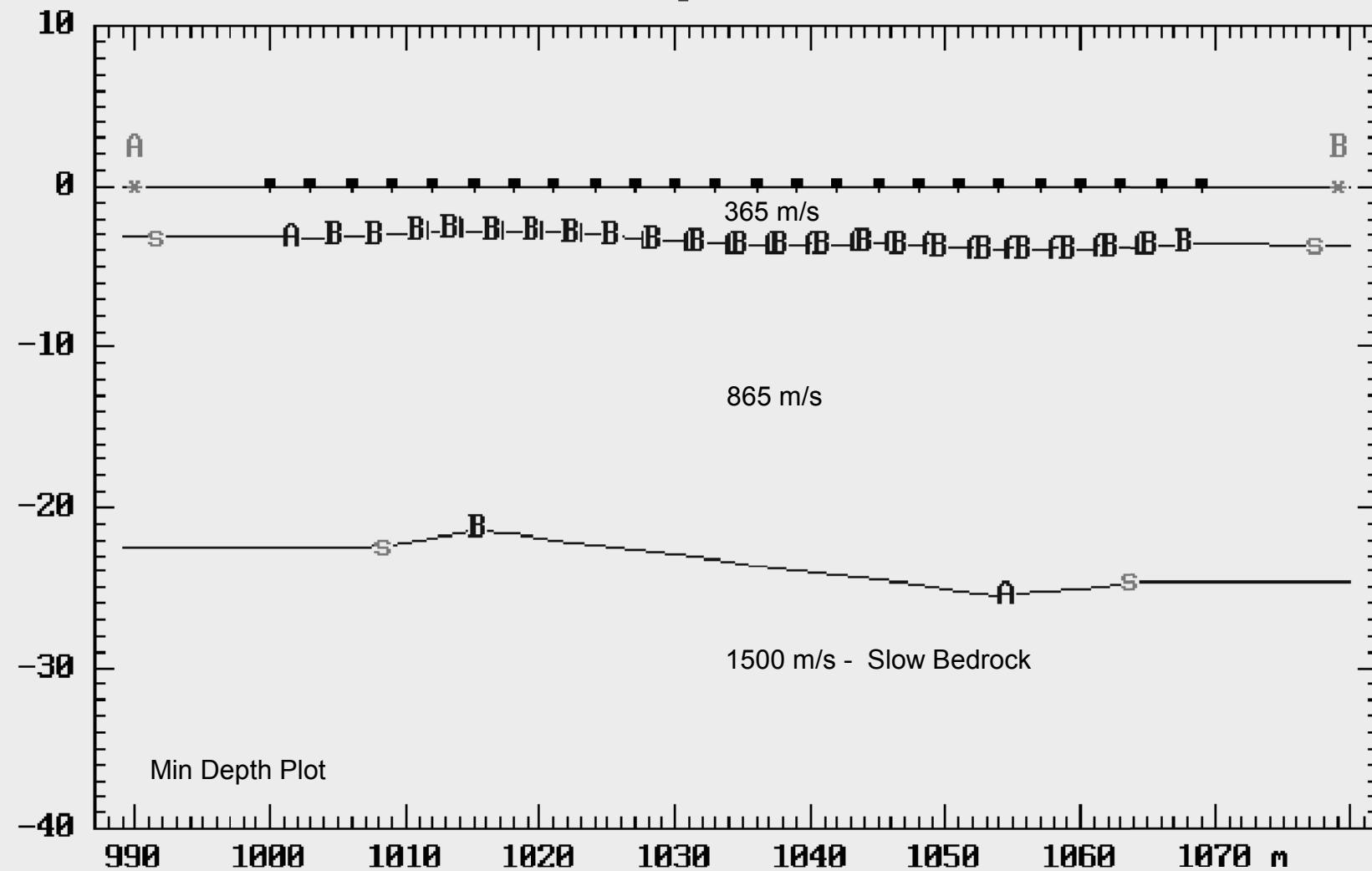


Martha Lake Elementary S-wave

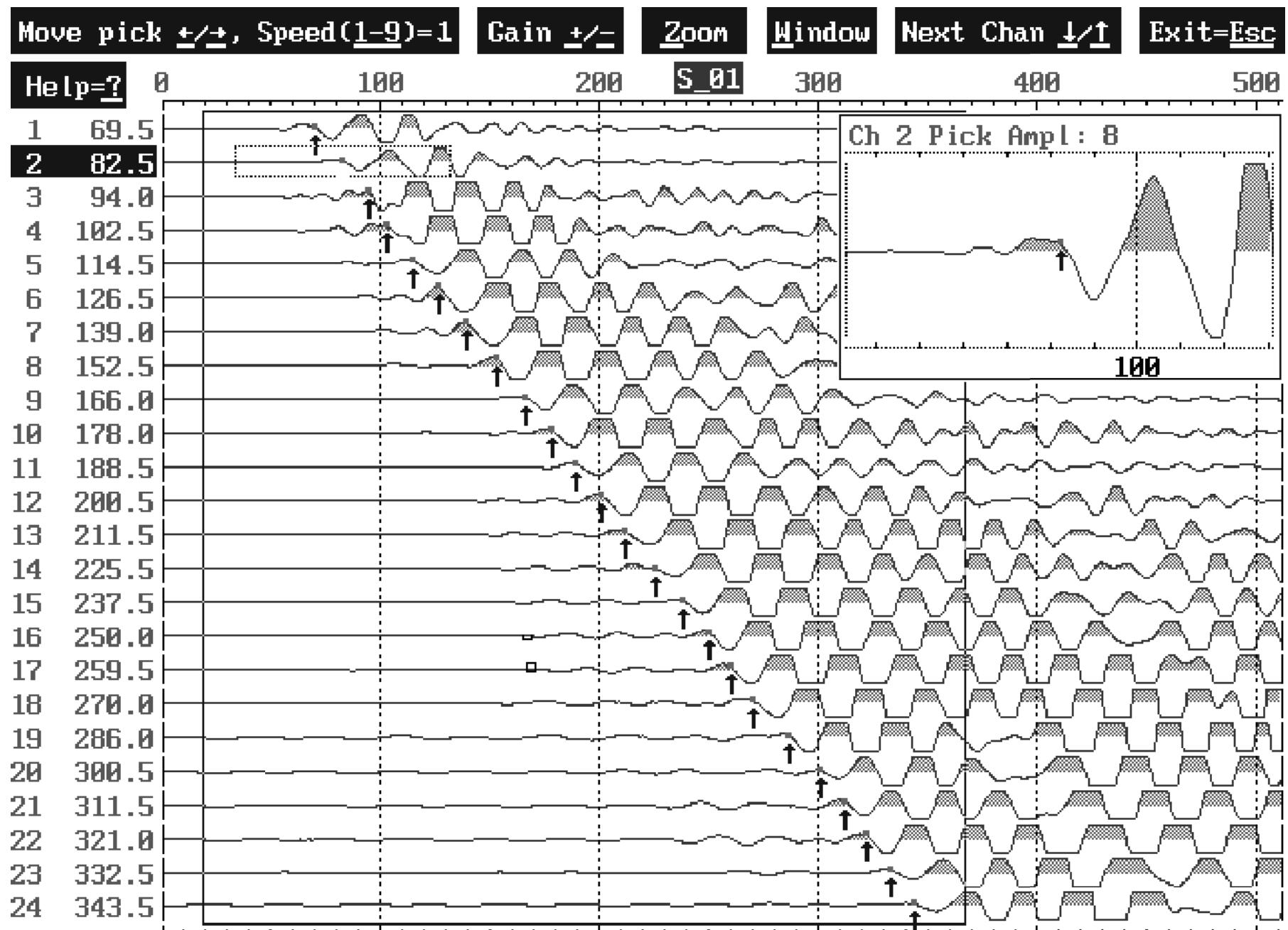
Press Esc to EXIT

MARTSMIN.SIP : Martha Lake Elementary Minimum Depth Model

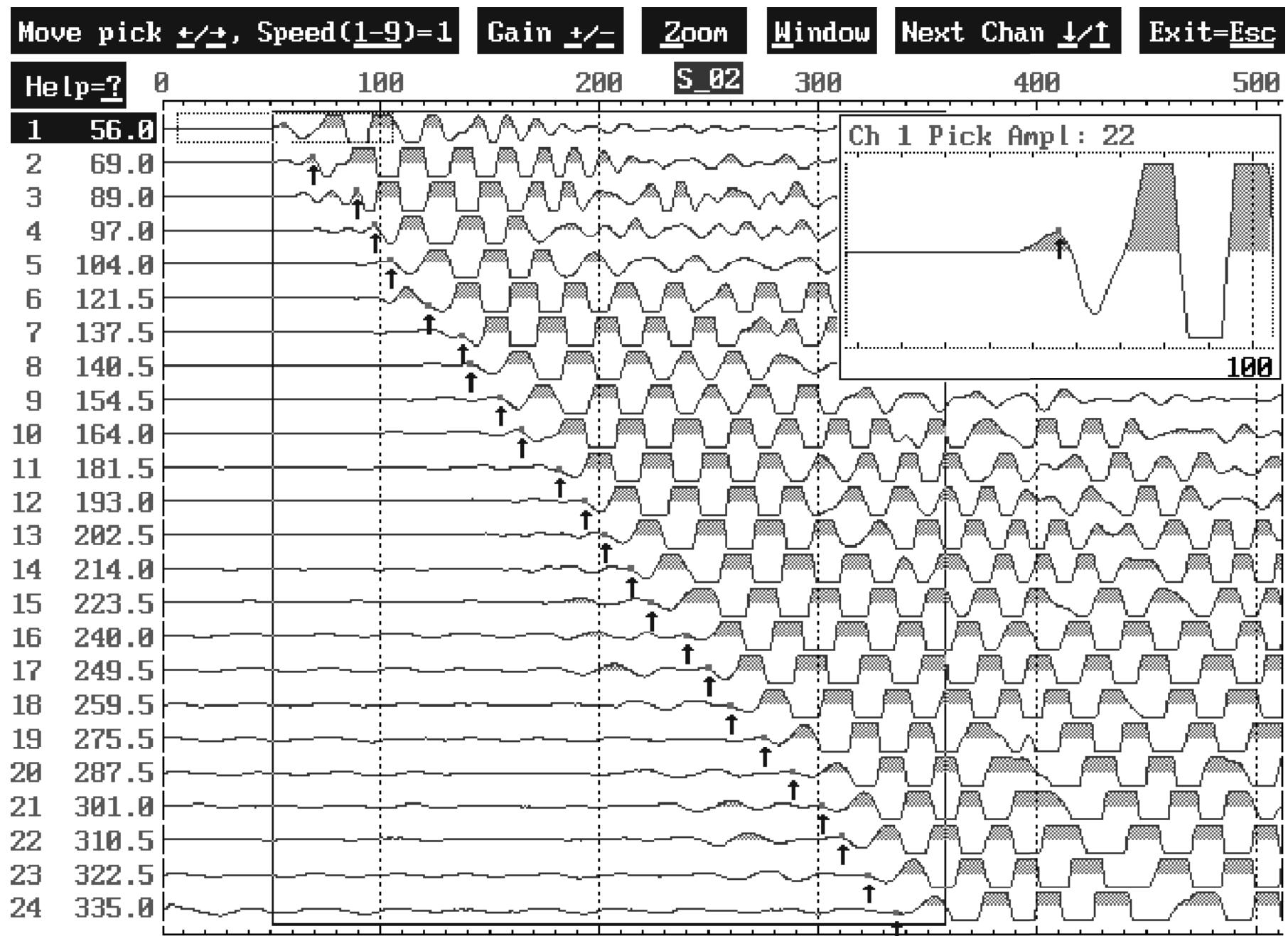
Spread A



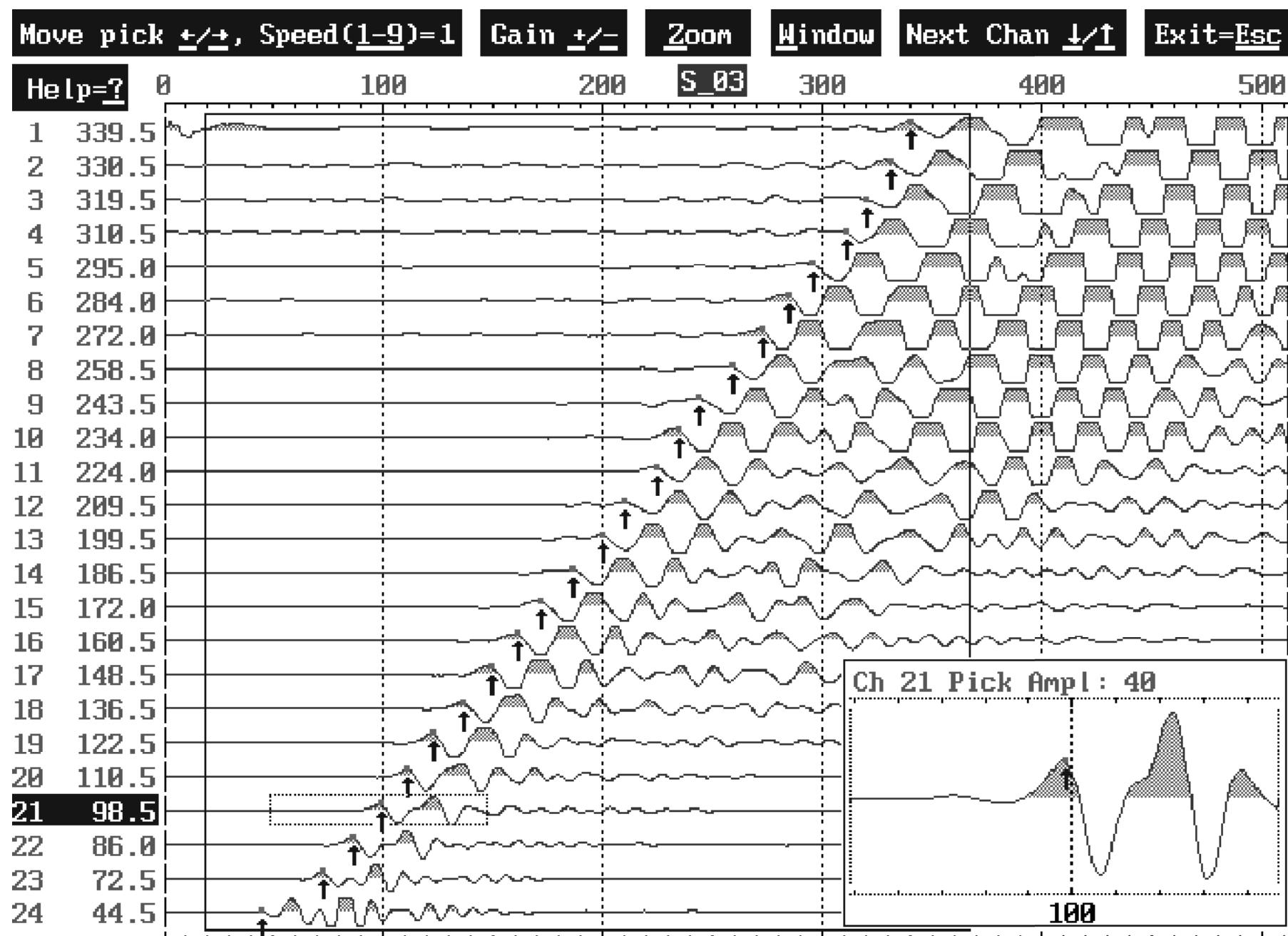
Marymoor Park S-wave



Marymoor Park S-wave

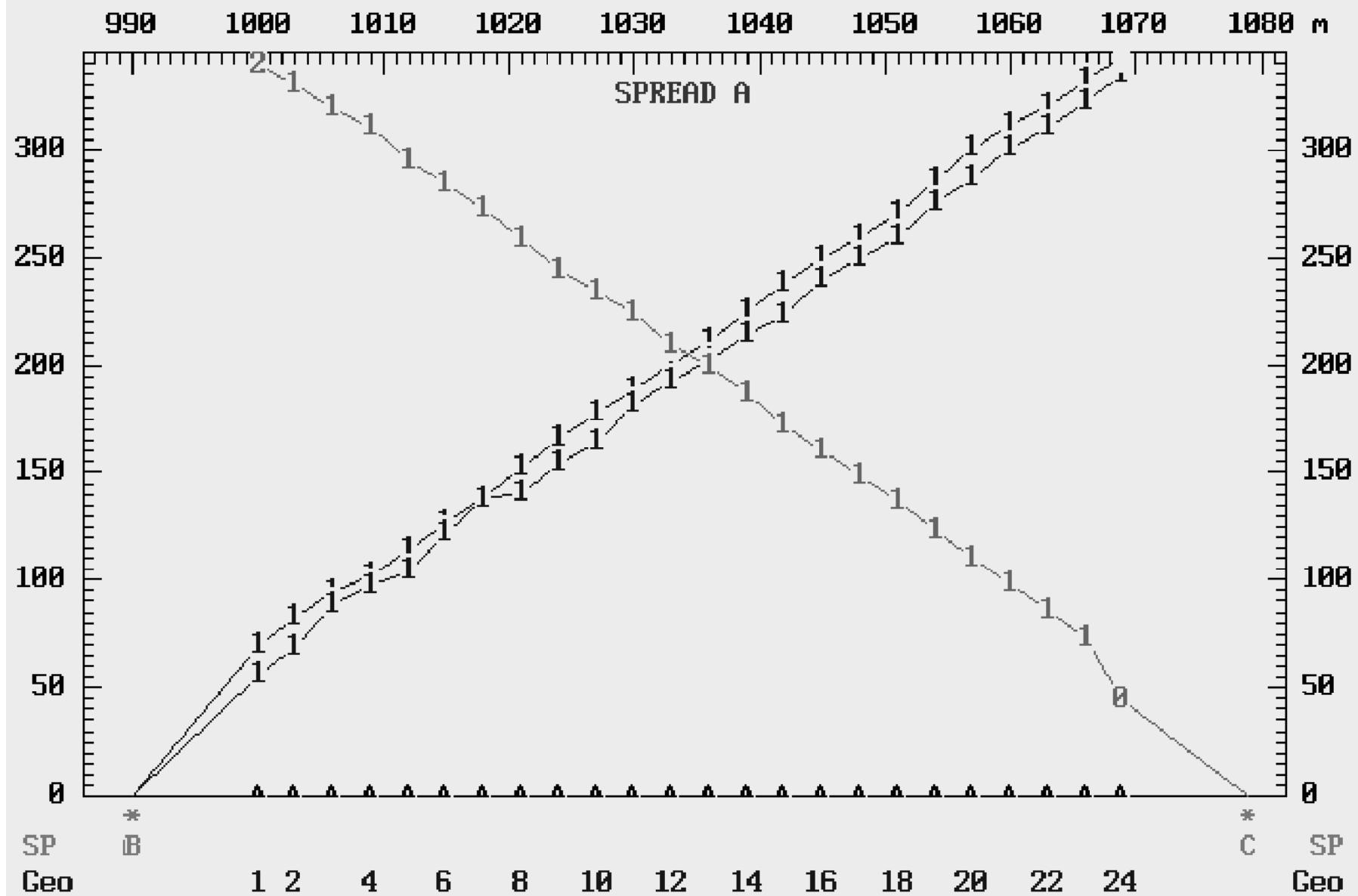


Marymoor Park S-wave



Marymoor Park S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

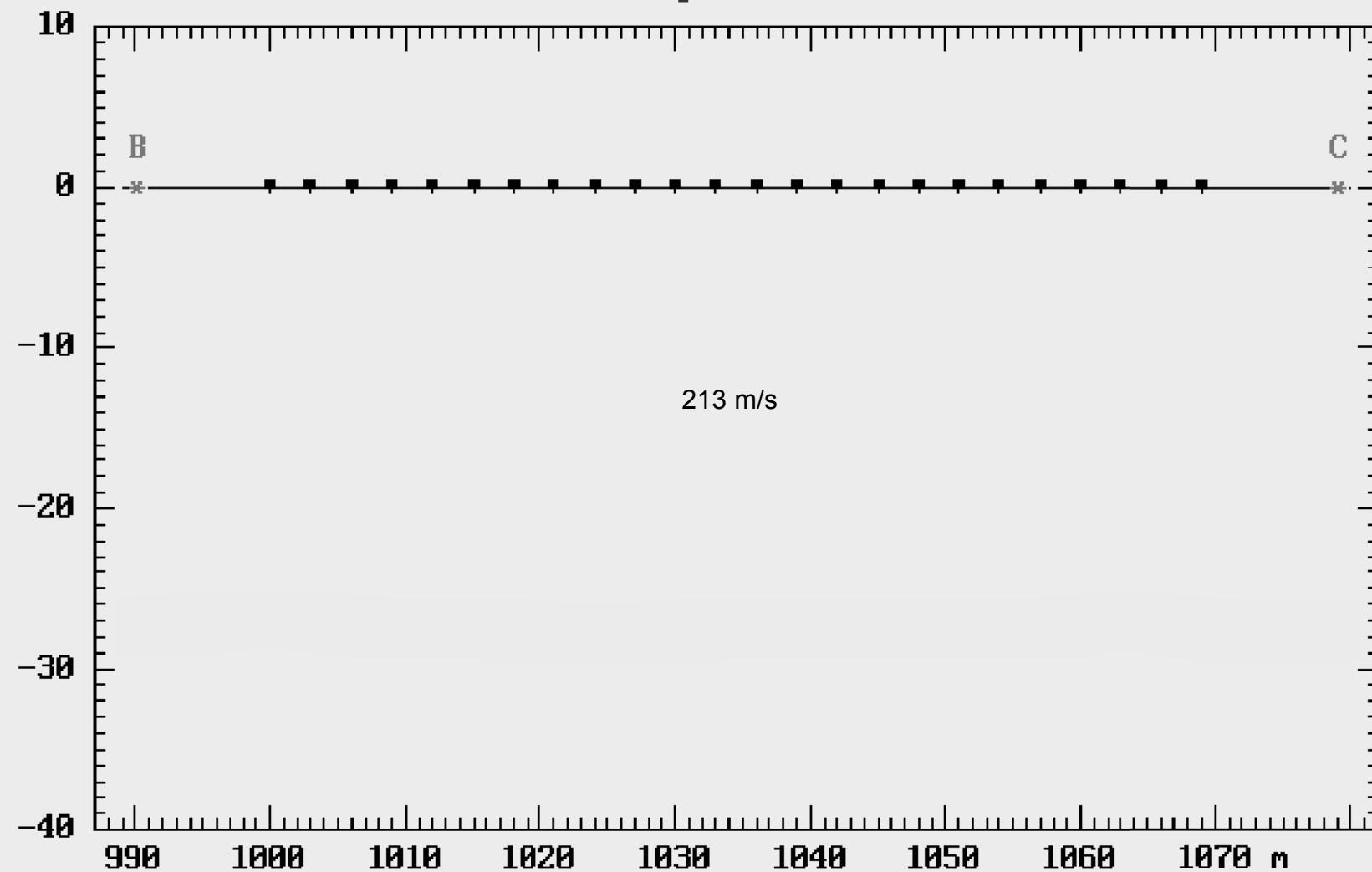


Marymoor Park S-wave

Press Esc to EXIT

MARYSWAV.SIP: Marymoor Park S-Waves

Spread A

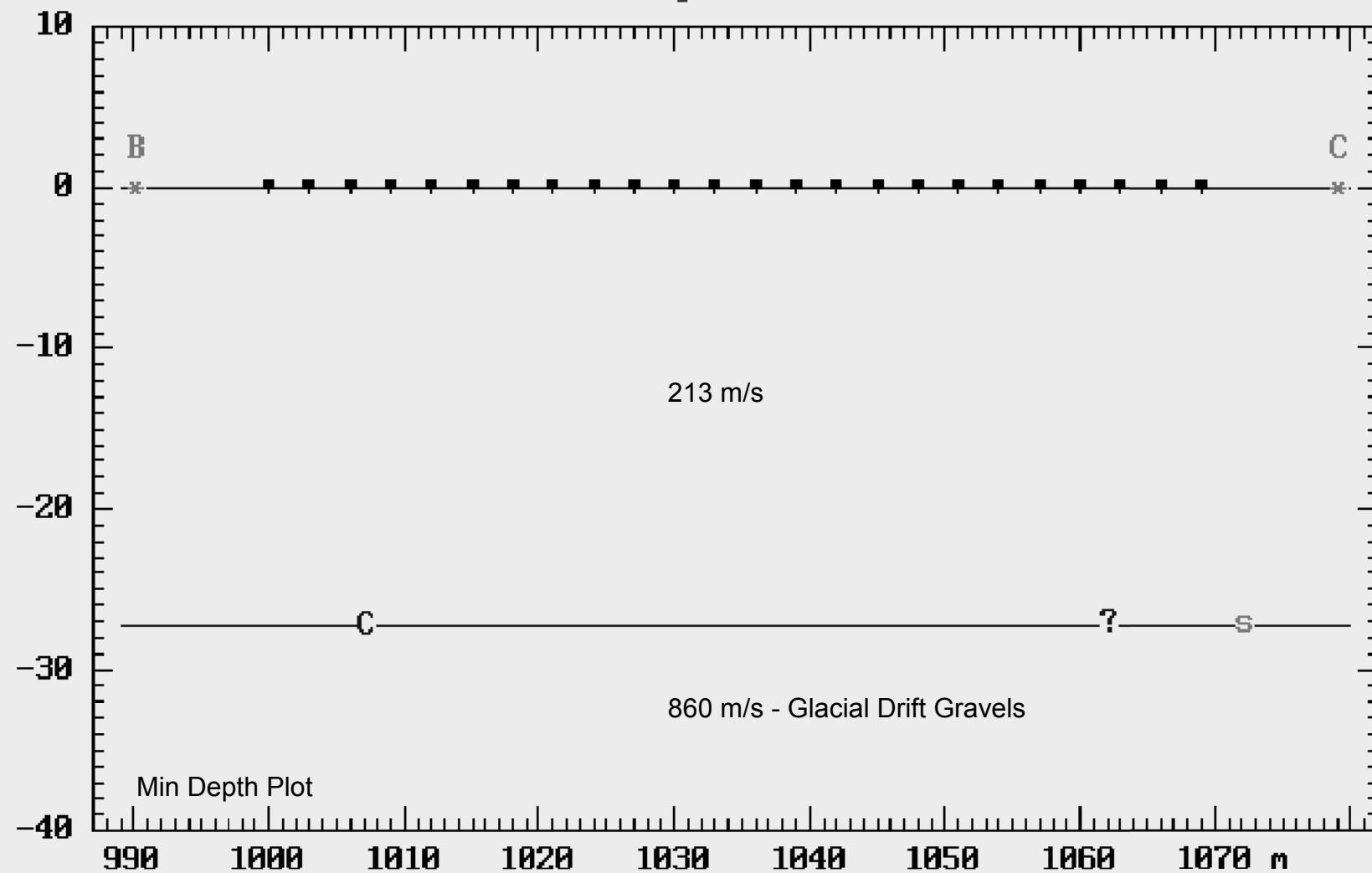


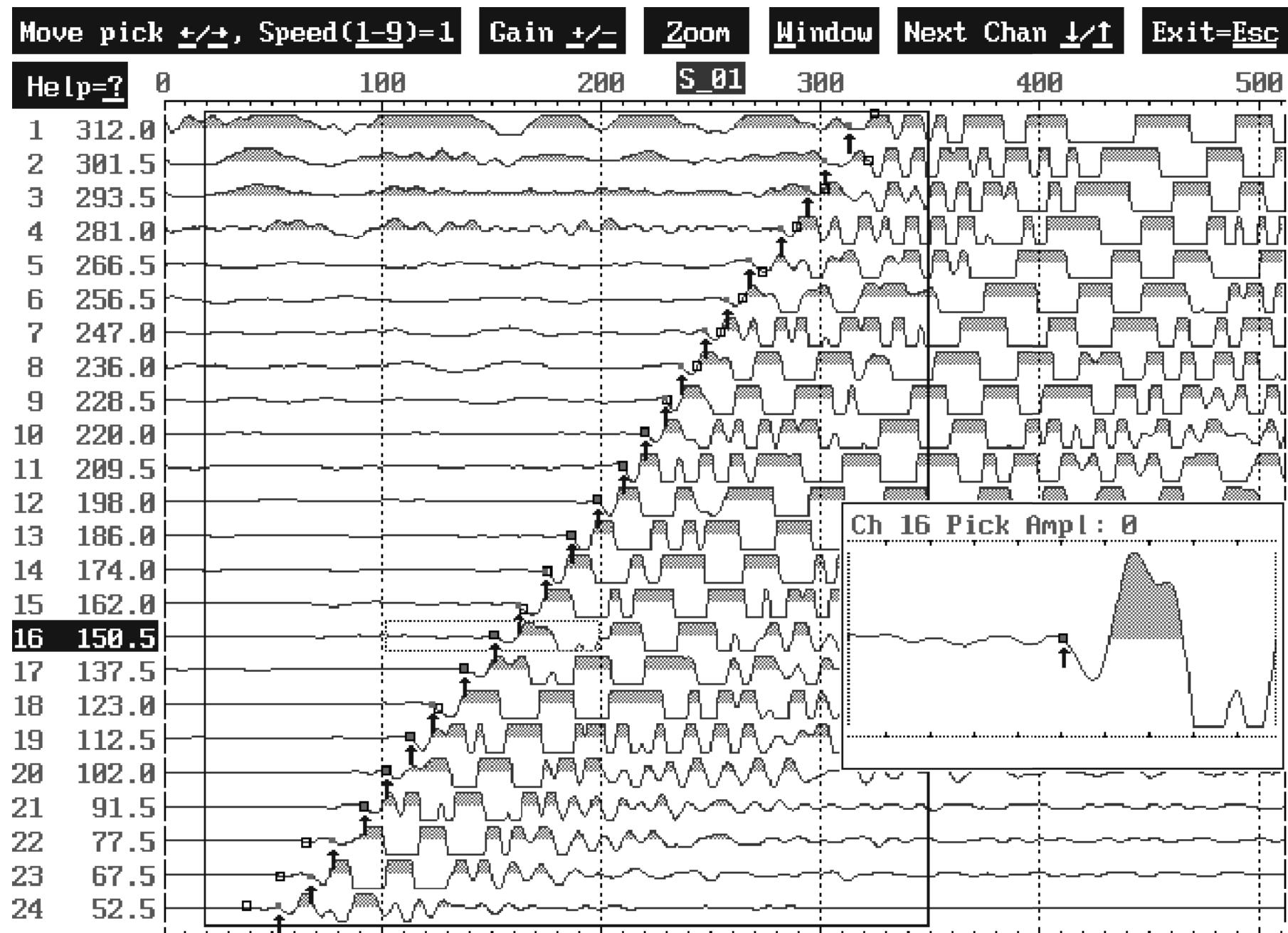
Marymoor Park S-wave

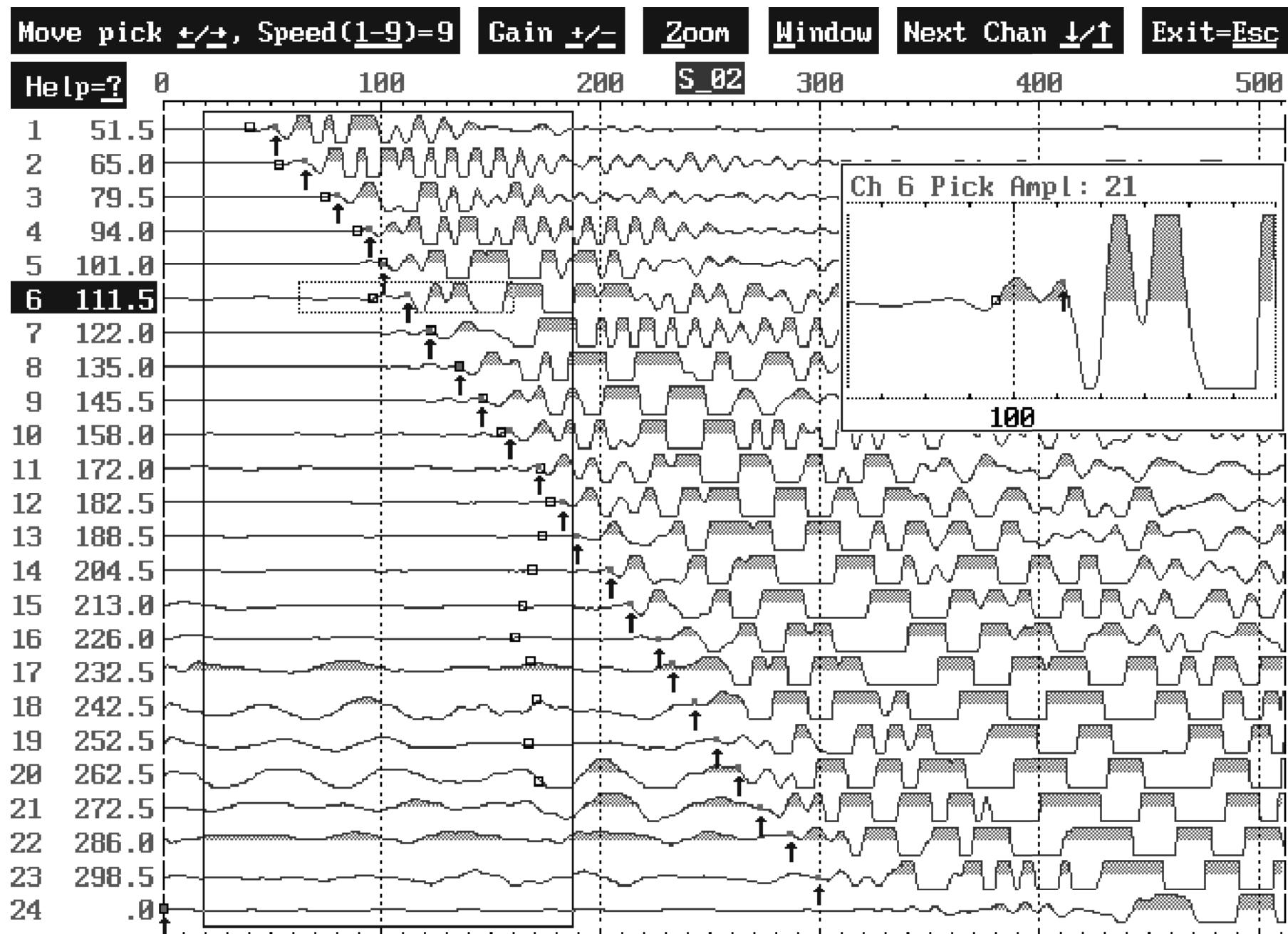
Press Esc to EXIT

MARYSWAV.SIP: Marymoor Park S-Waves

Spread A

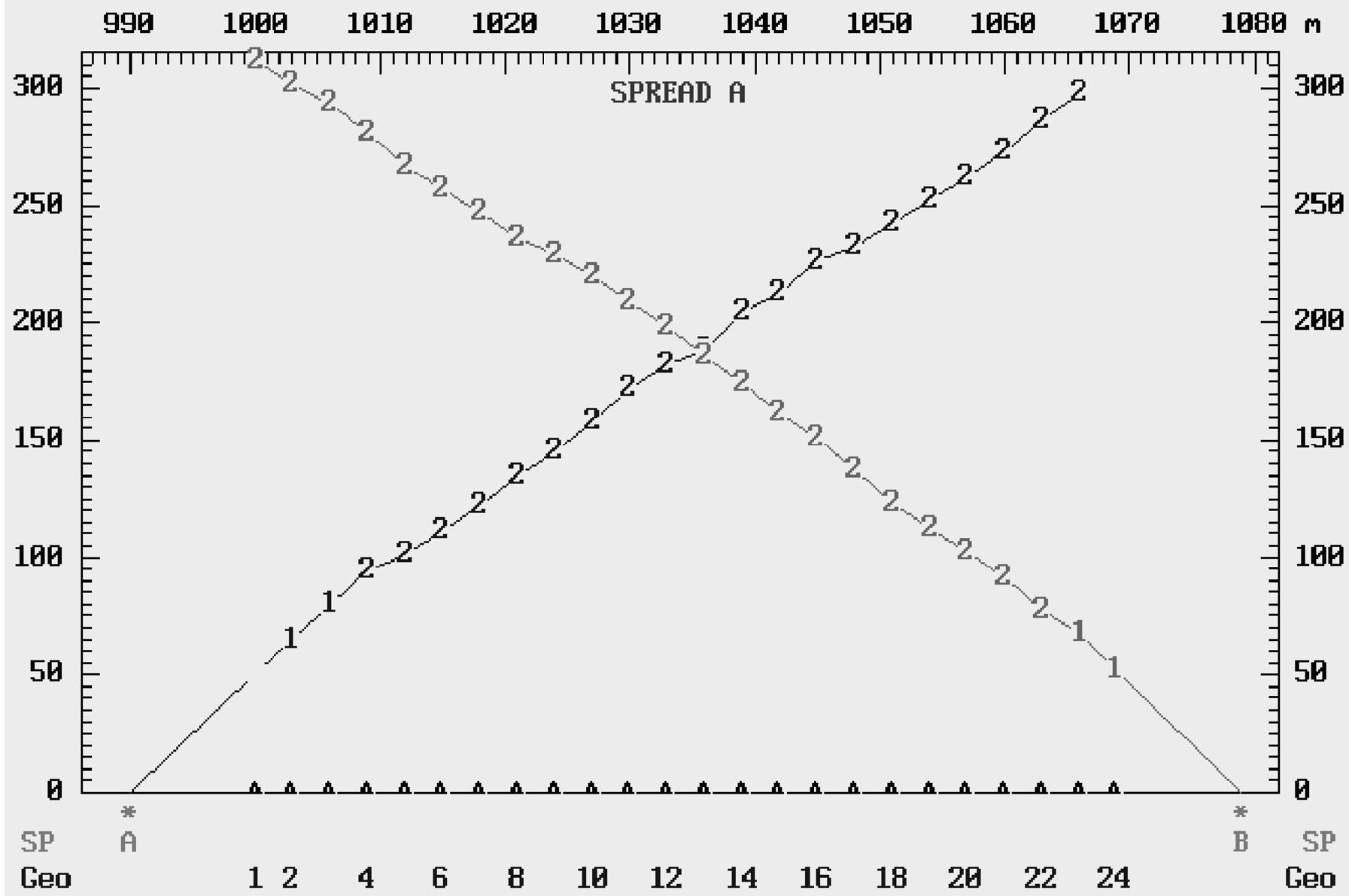


Marysville Middle School S-wave

Marysville Middle School S-wave

Marysville Middle School S-wave

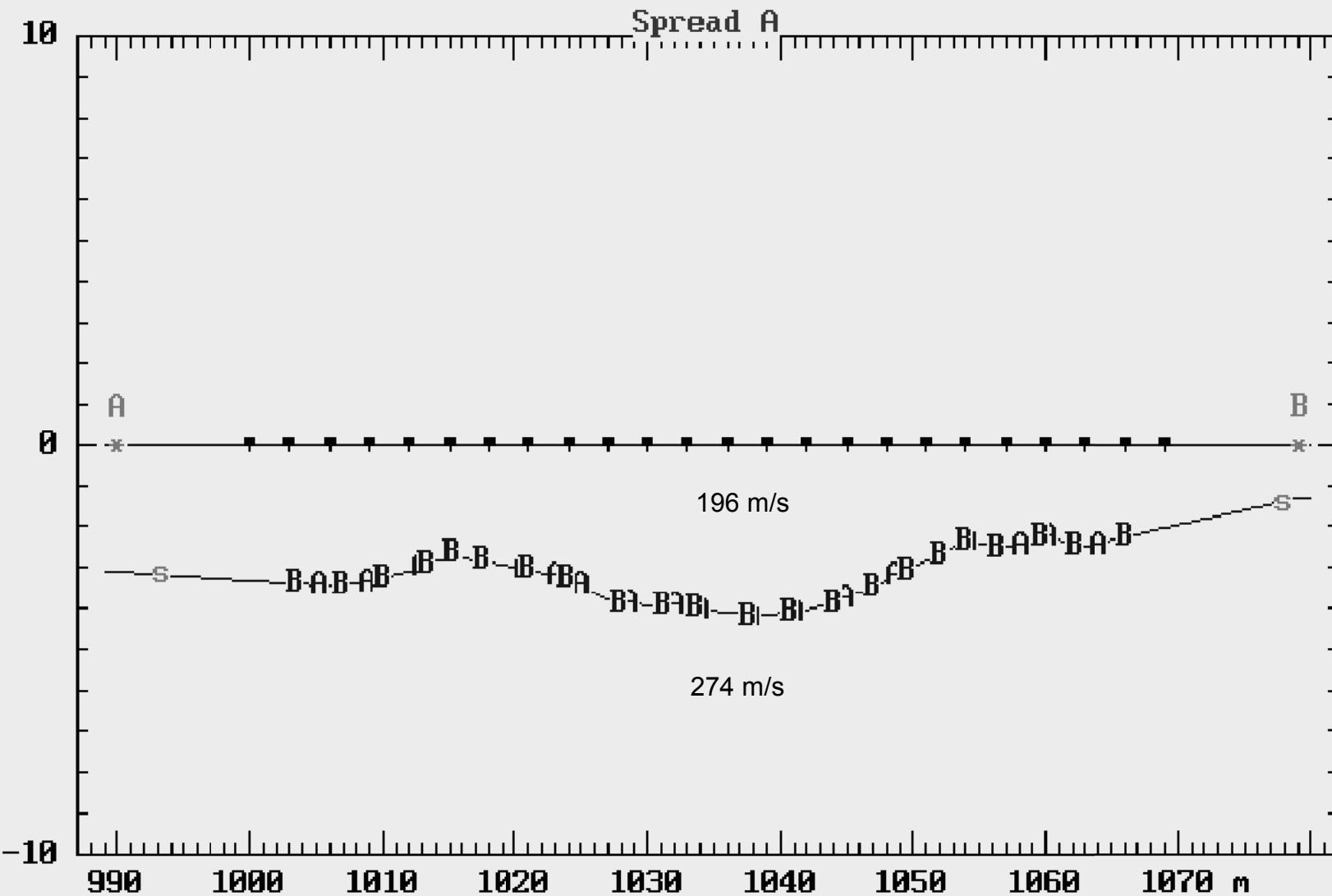
Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Marysville Middle School S-wave

Press Esc to EXIT

MARYSWA2.SIP : Marysville Middle School S-Waves

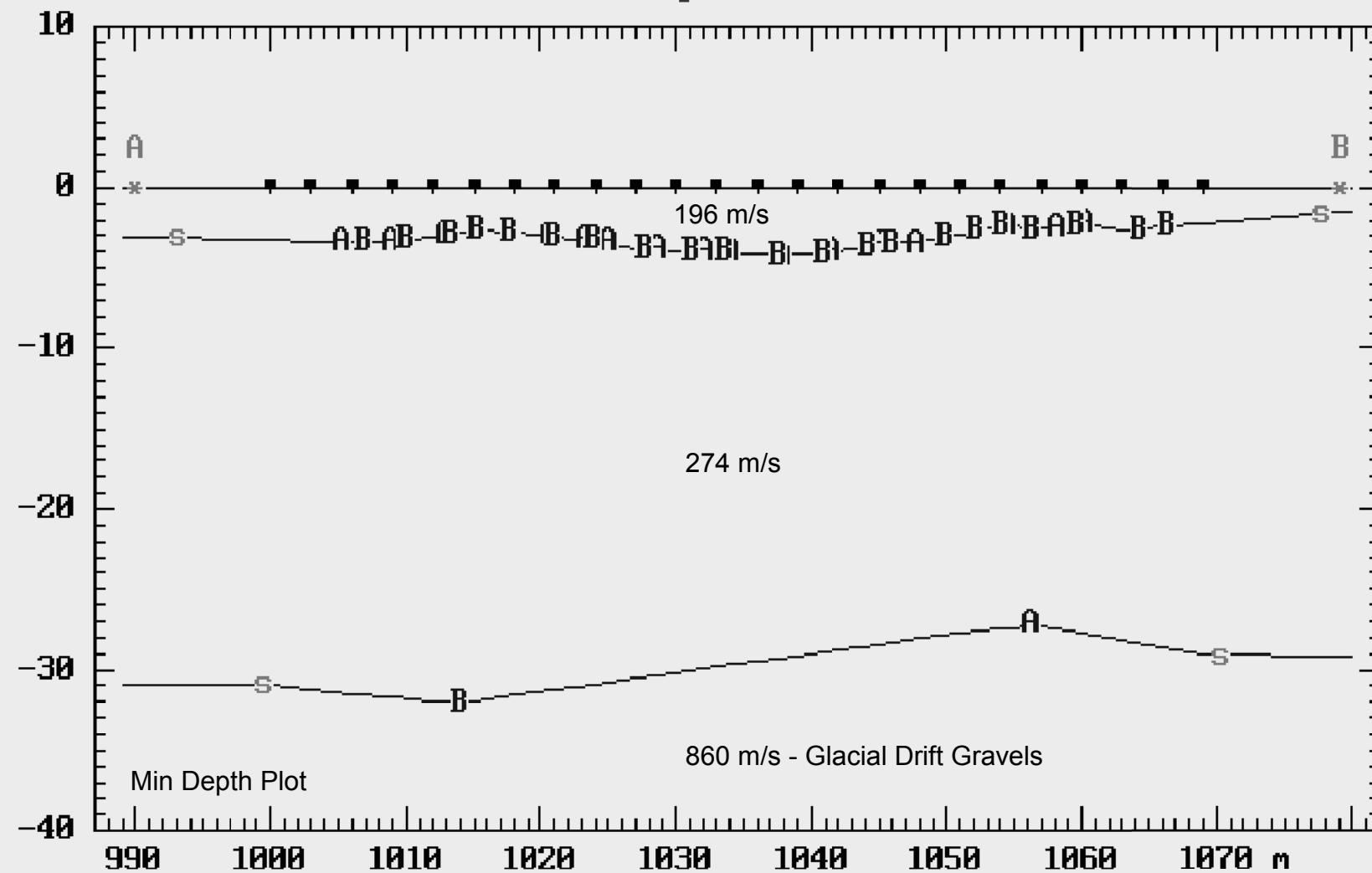


Marysville Middle School S-wave

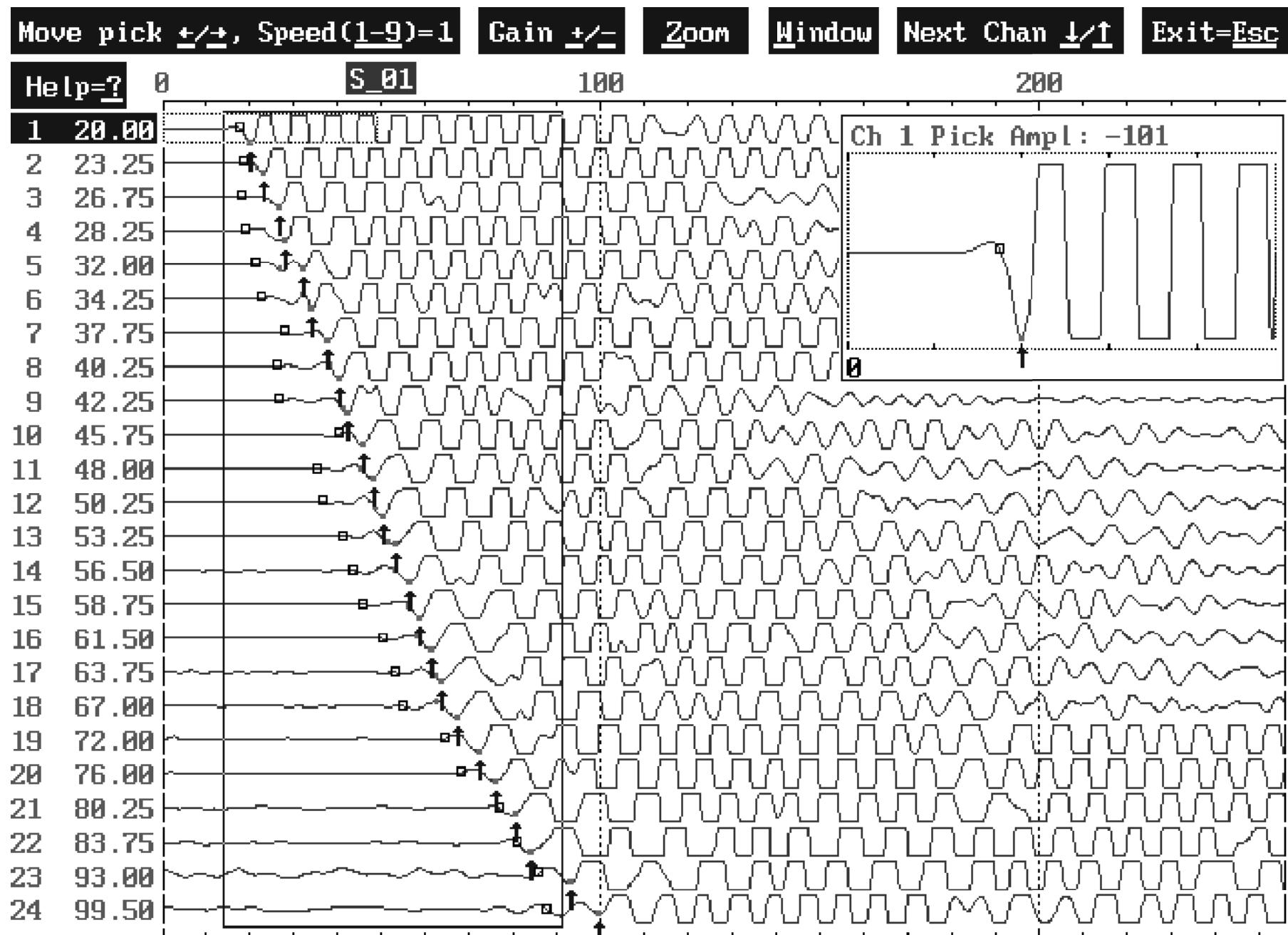
Press Esc to EXIT

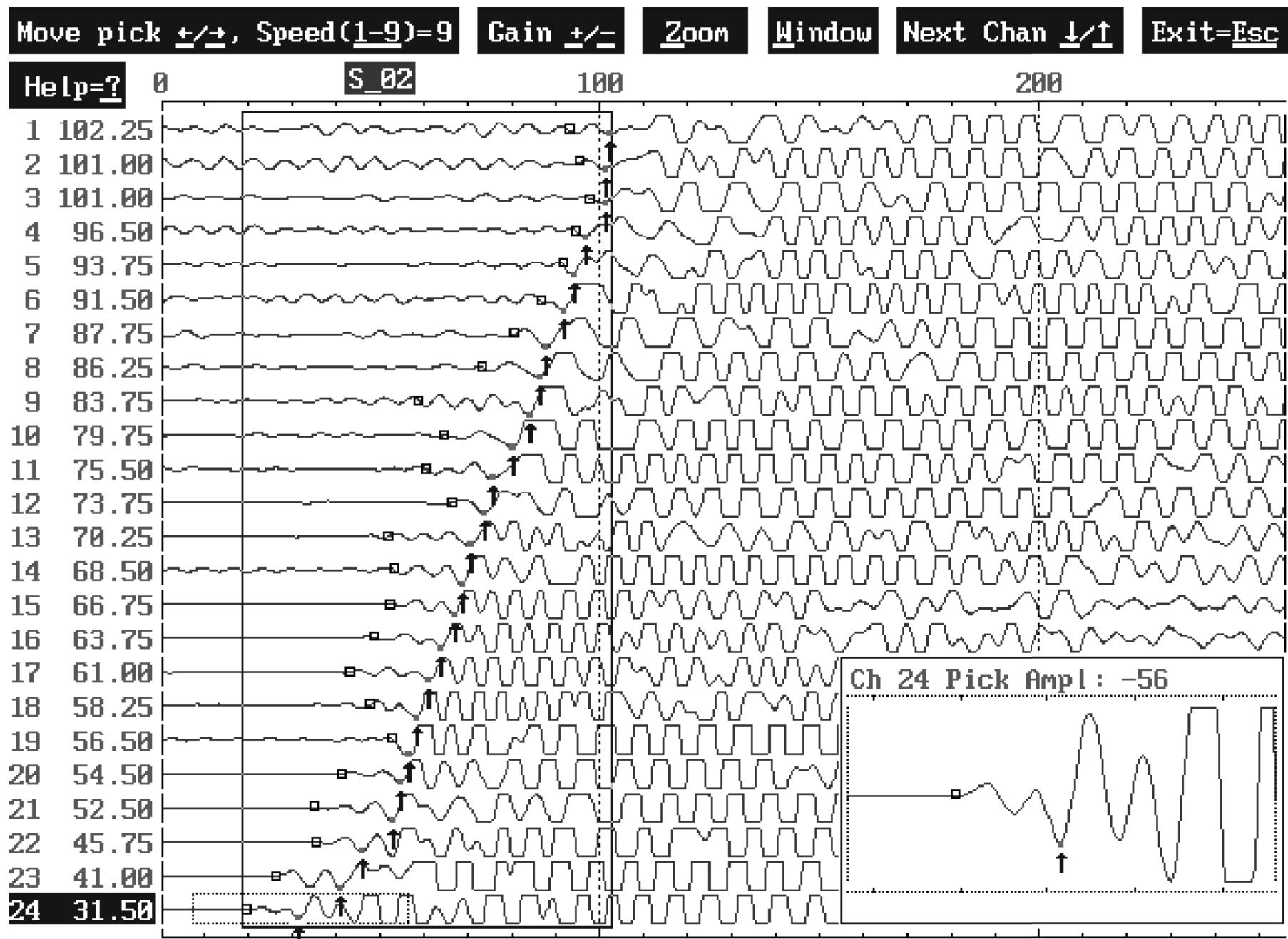
MARYSMIN.SIP : Marysville Middle School Minimum Depth Plot

Spread A



Meadow Middle School S-wave

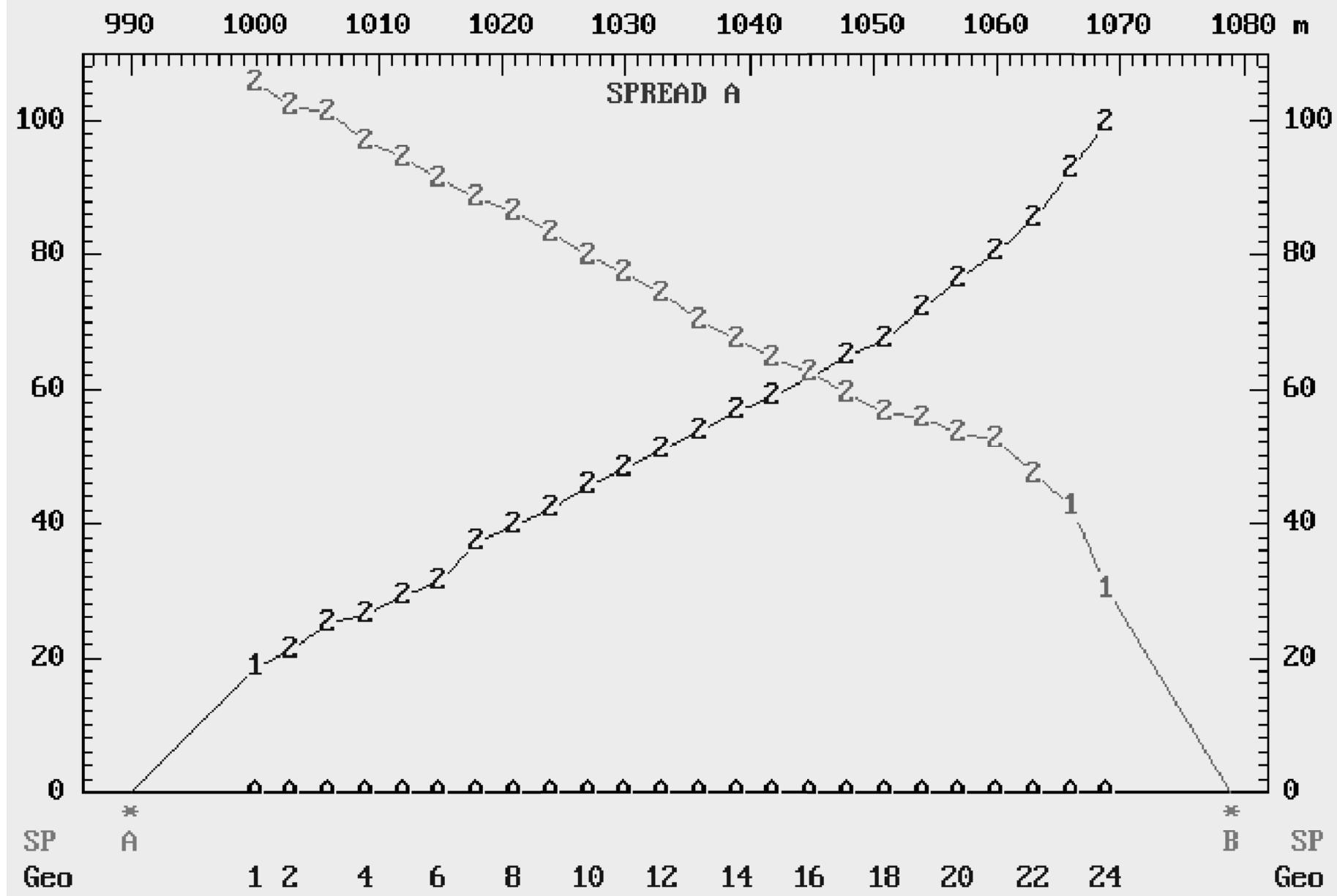


Meadow Middle School S-wave

Appendix C

Meadow Middle School S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

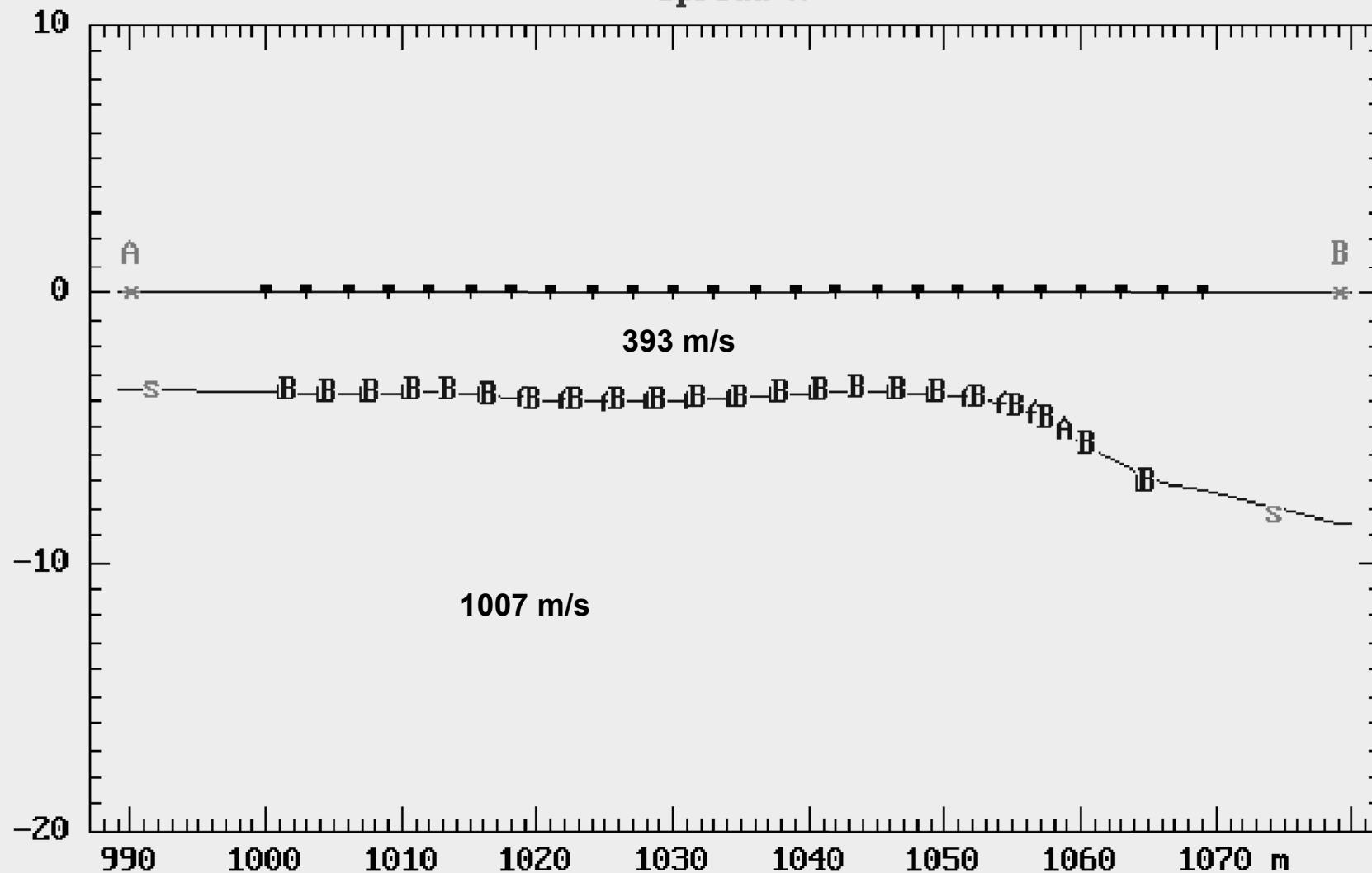


Meadow Middle School S-wave

Press Esc to EXIT

MEAD_SW1.SIP: Meadow Middle school Shear Wave Survey

Spread A

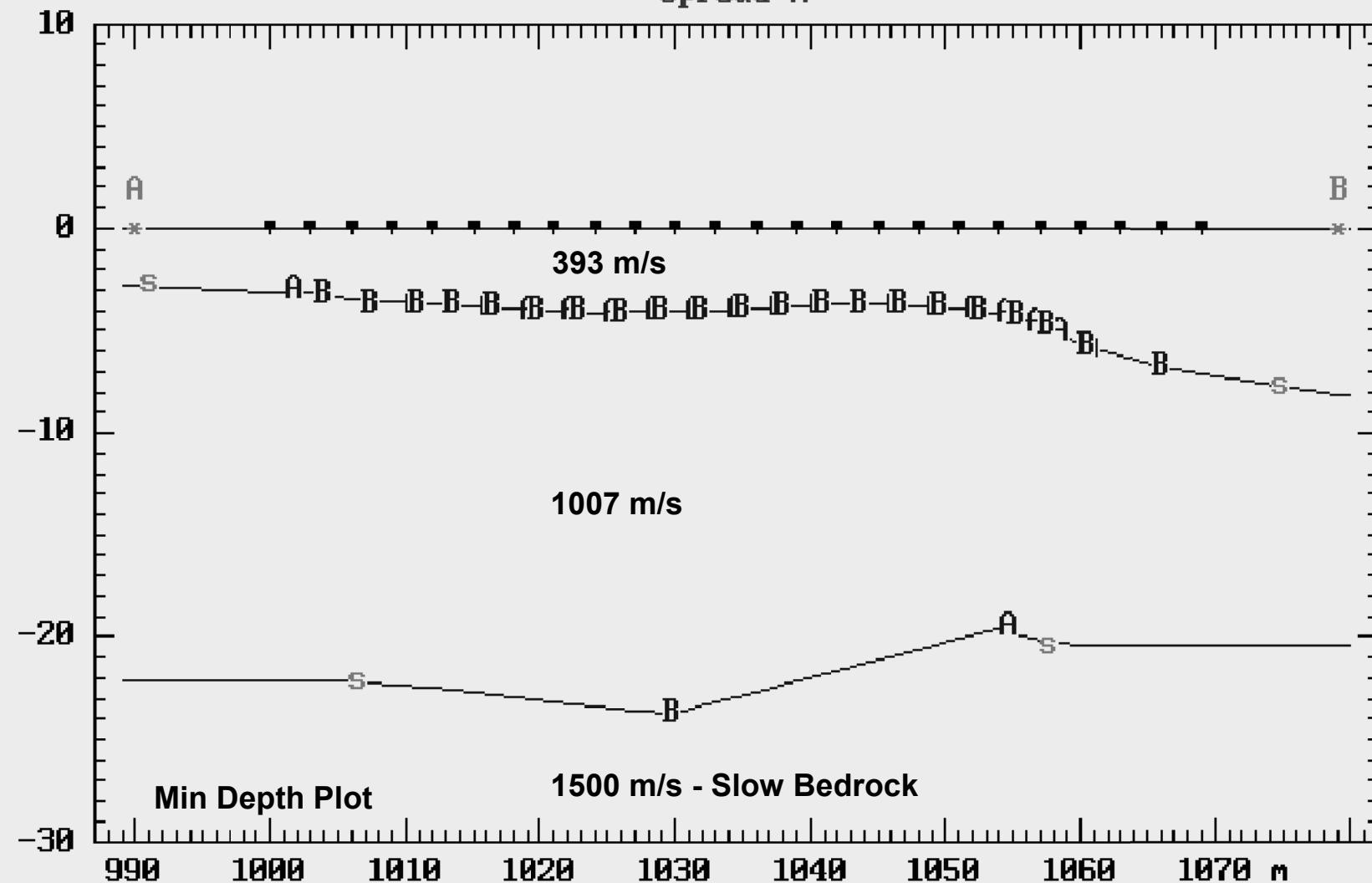


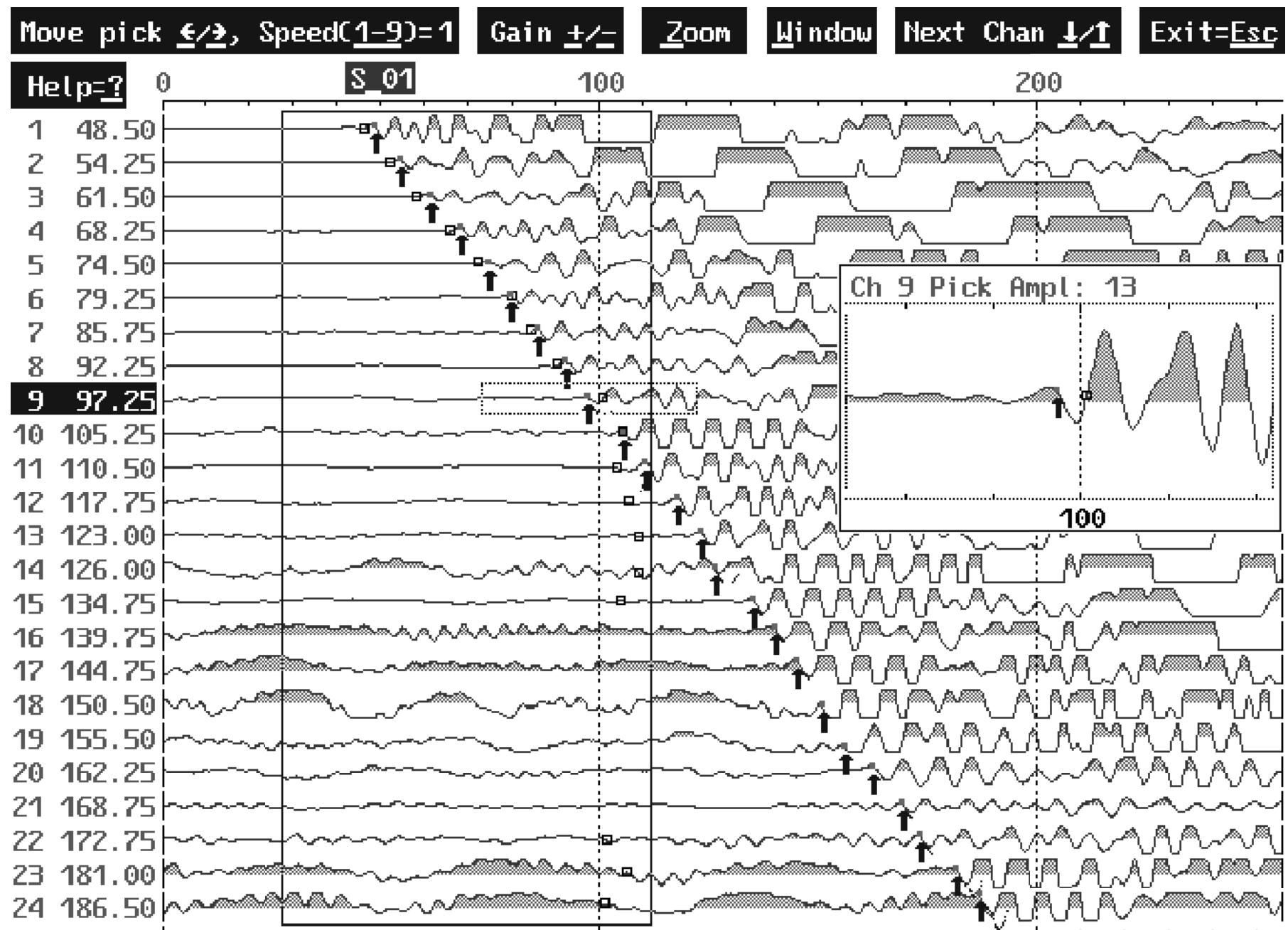
Meadow Middle School S-wave

Press Esc to EXIT

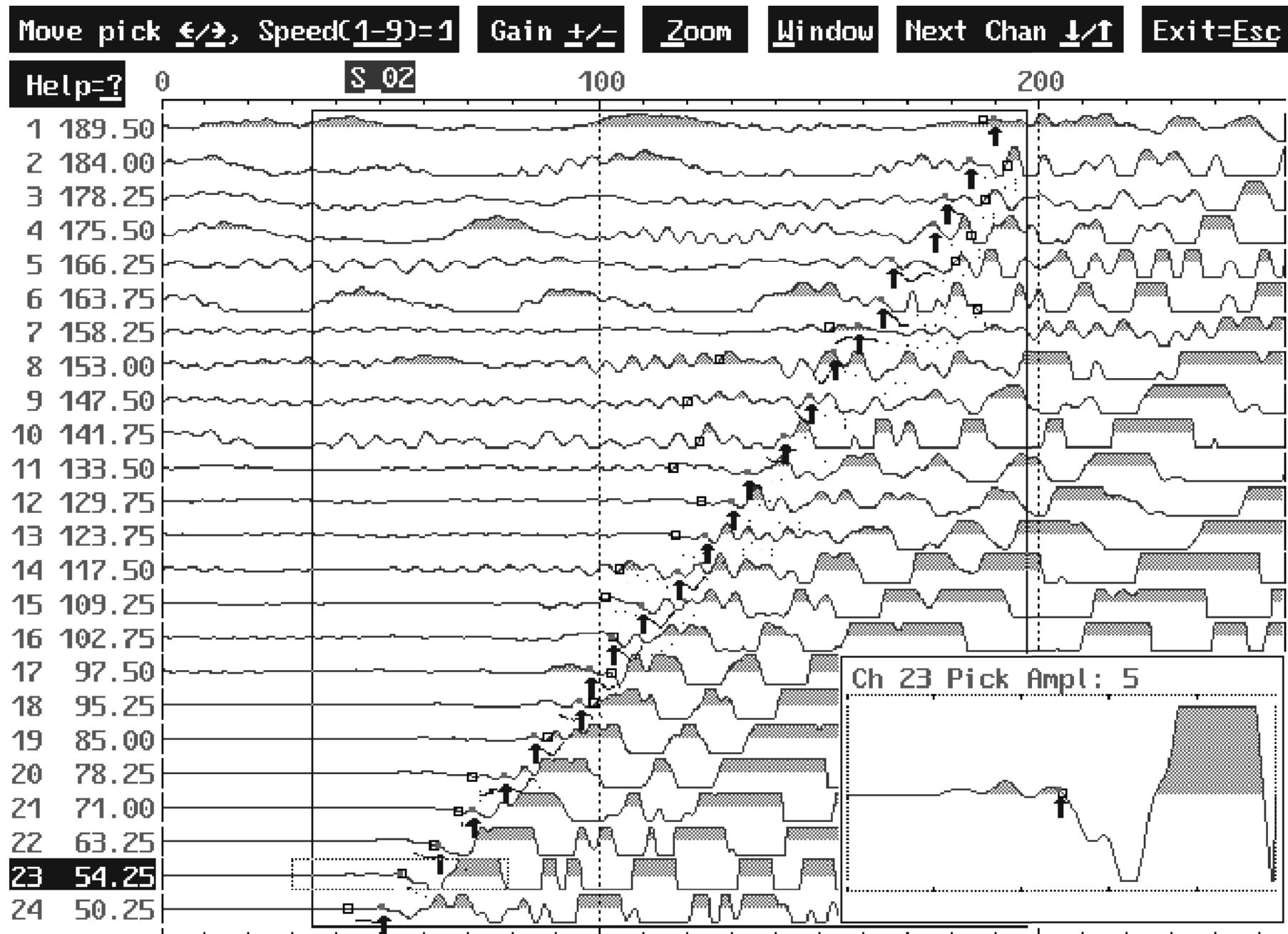
MEADSMIN.SIP: Meadow Middle School Minimum Depth Model

Spread A



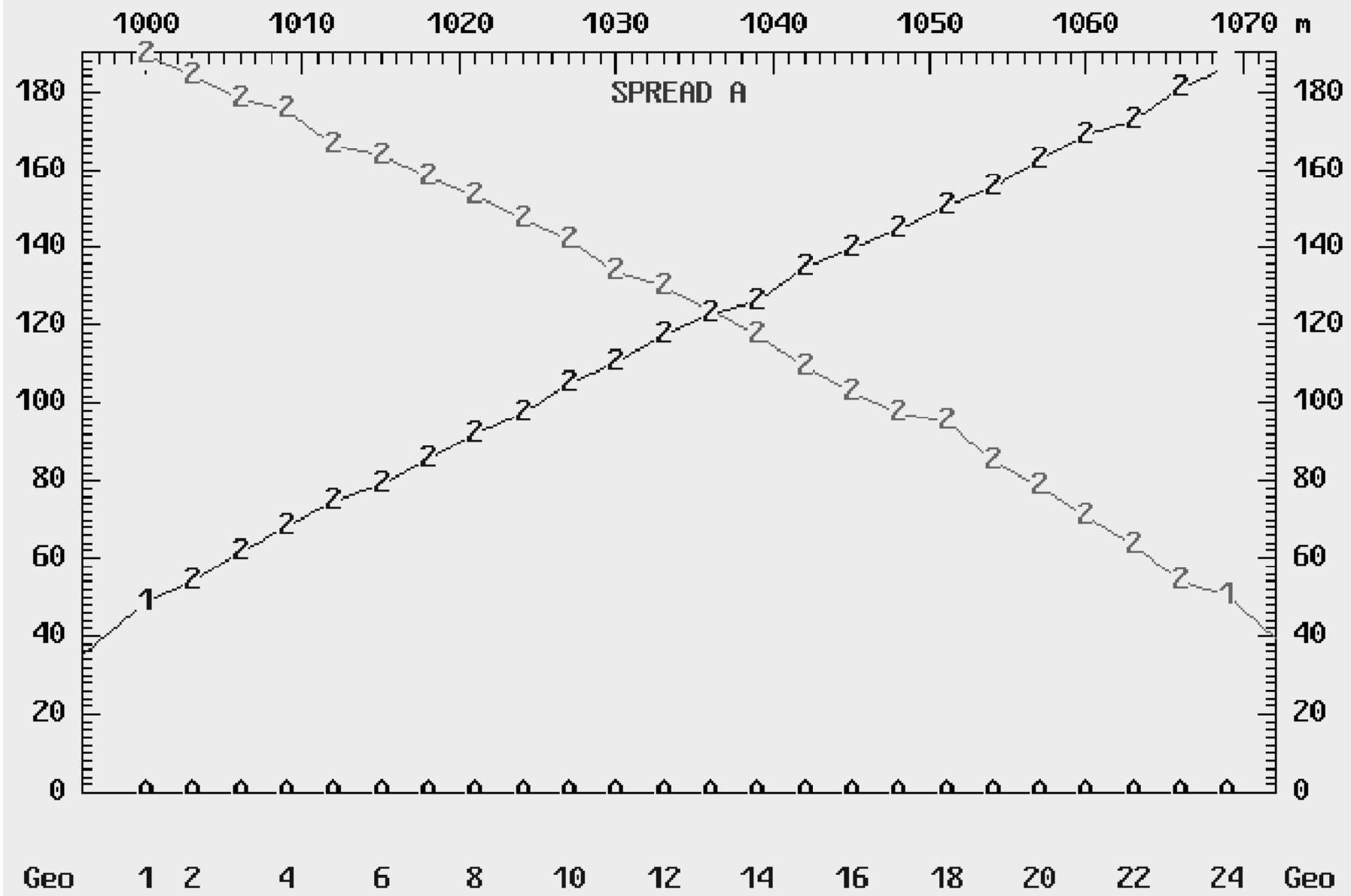
Meridian Middle School S-wave

Meridian Middle School S-wave



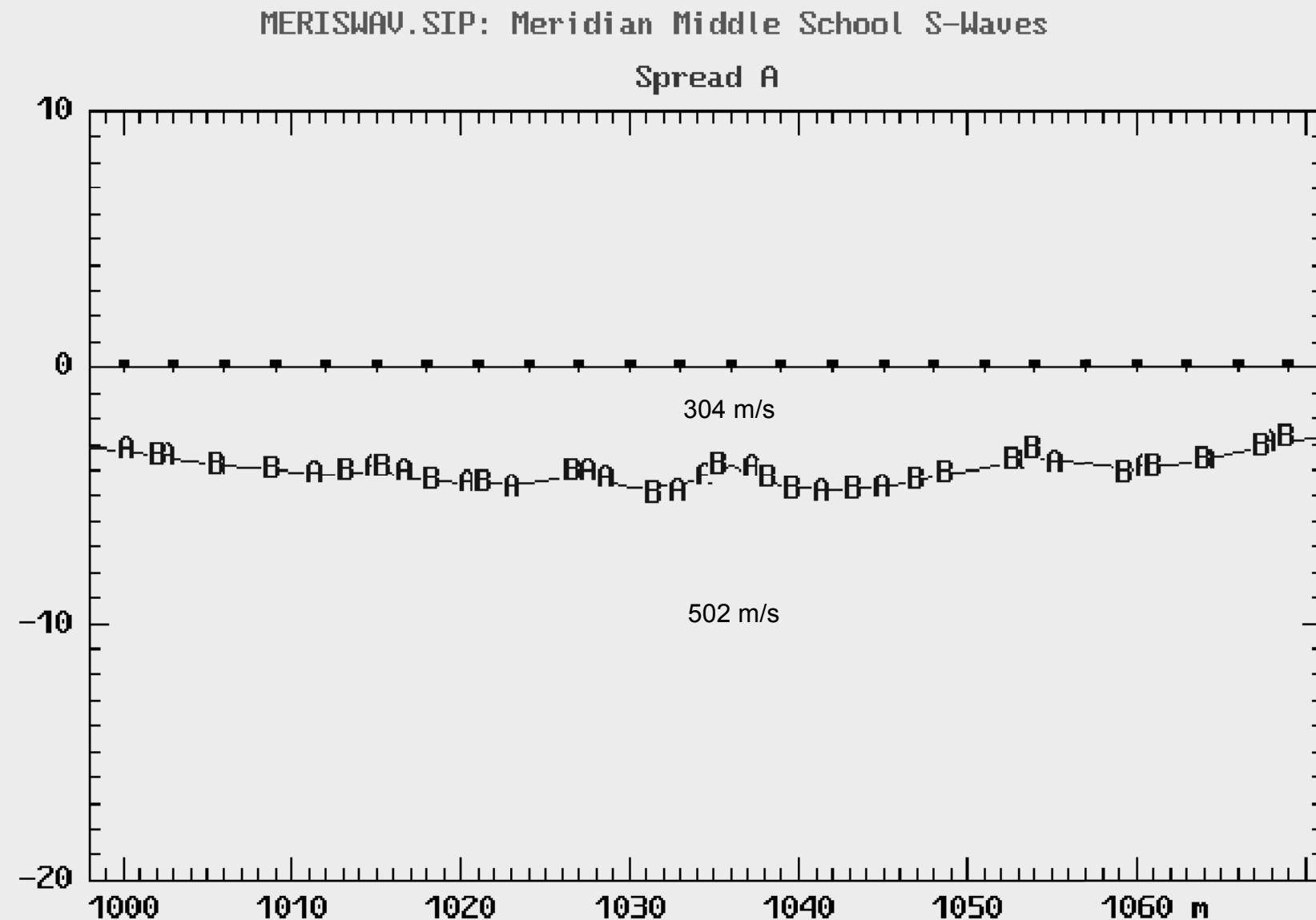
Meridian Middle School S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



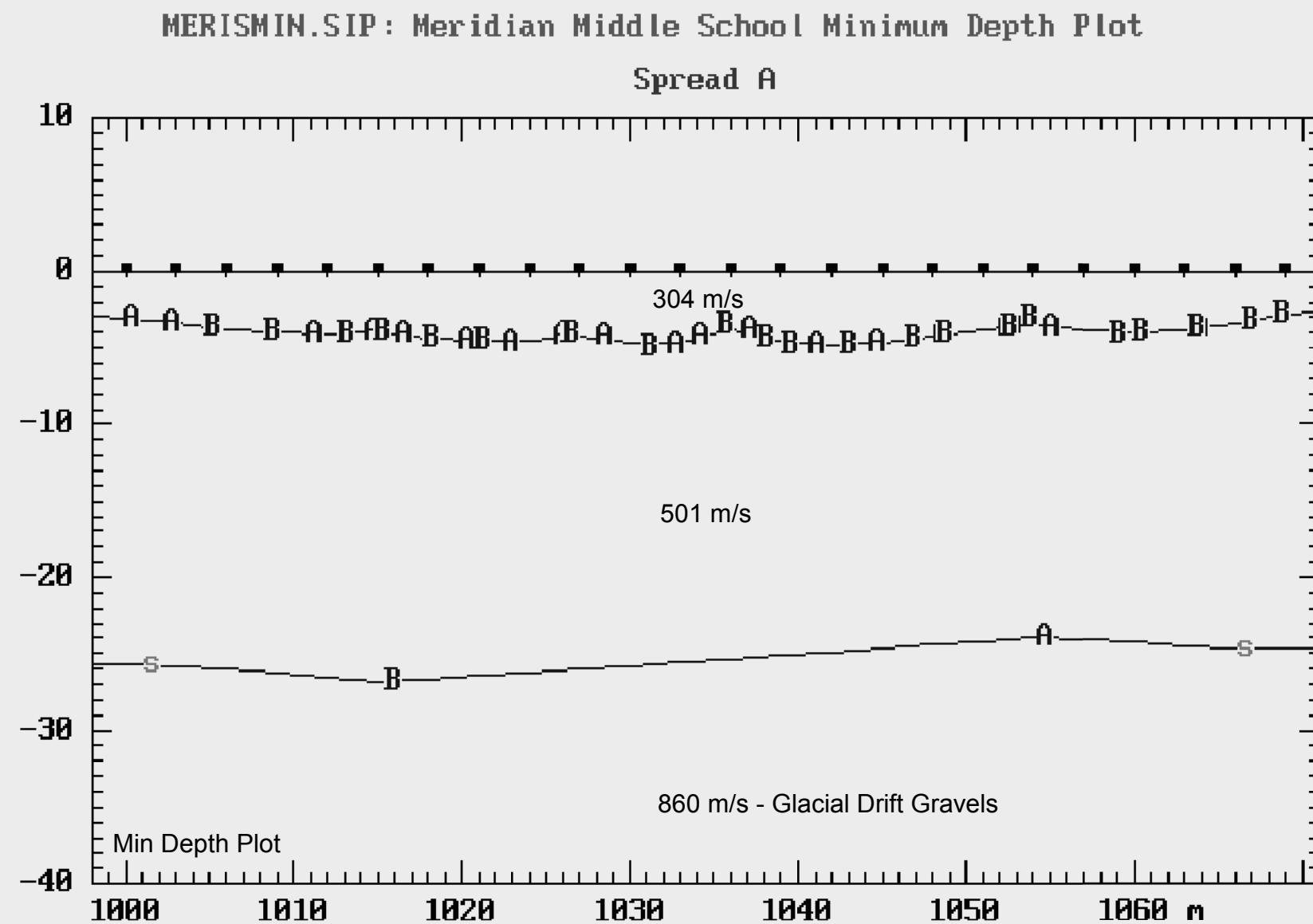
Meridian Middle School S-wave

Press Esc to EXIT

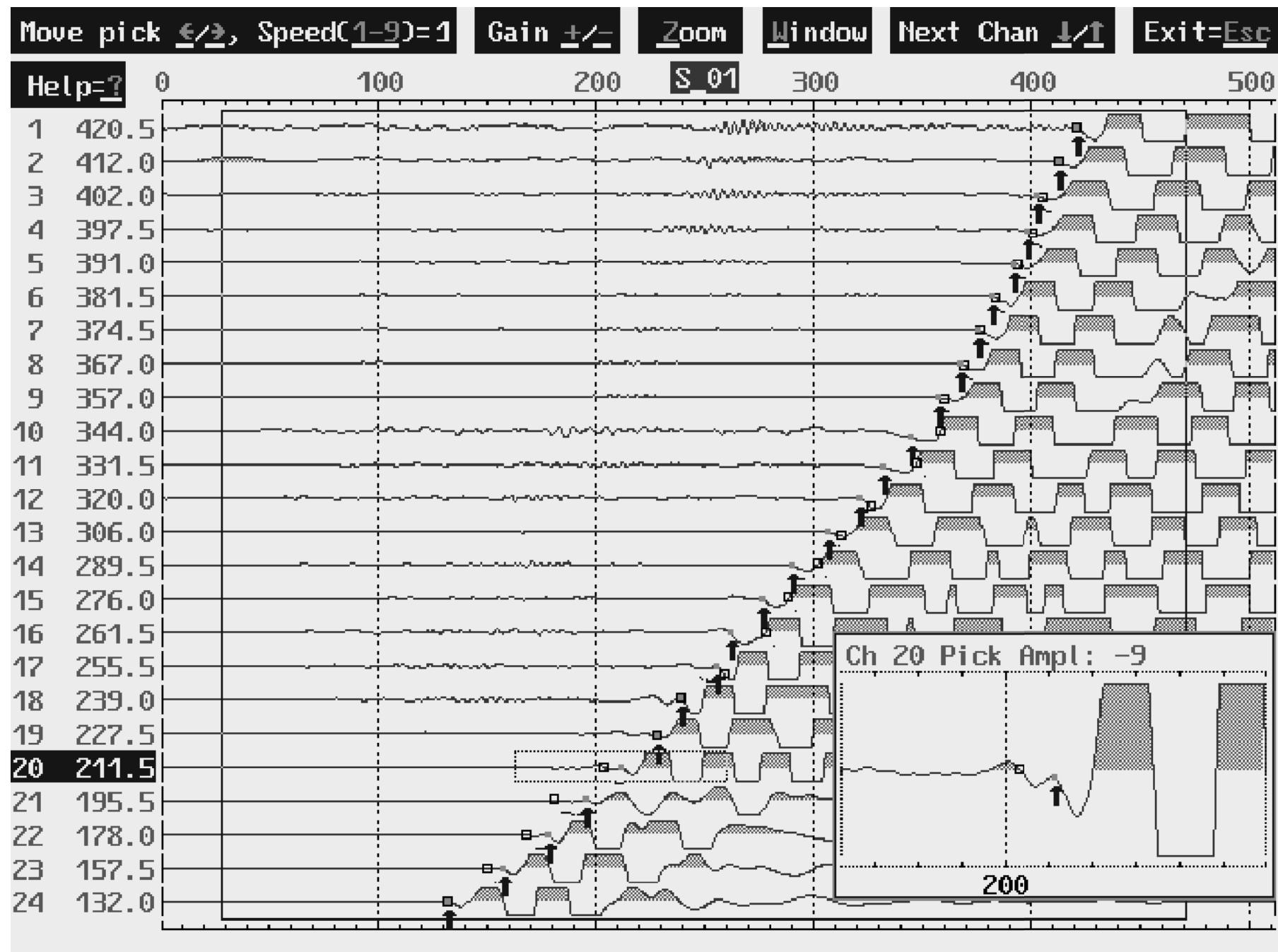


Meridian Middle School S-wave

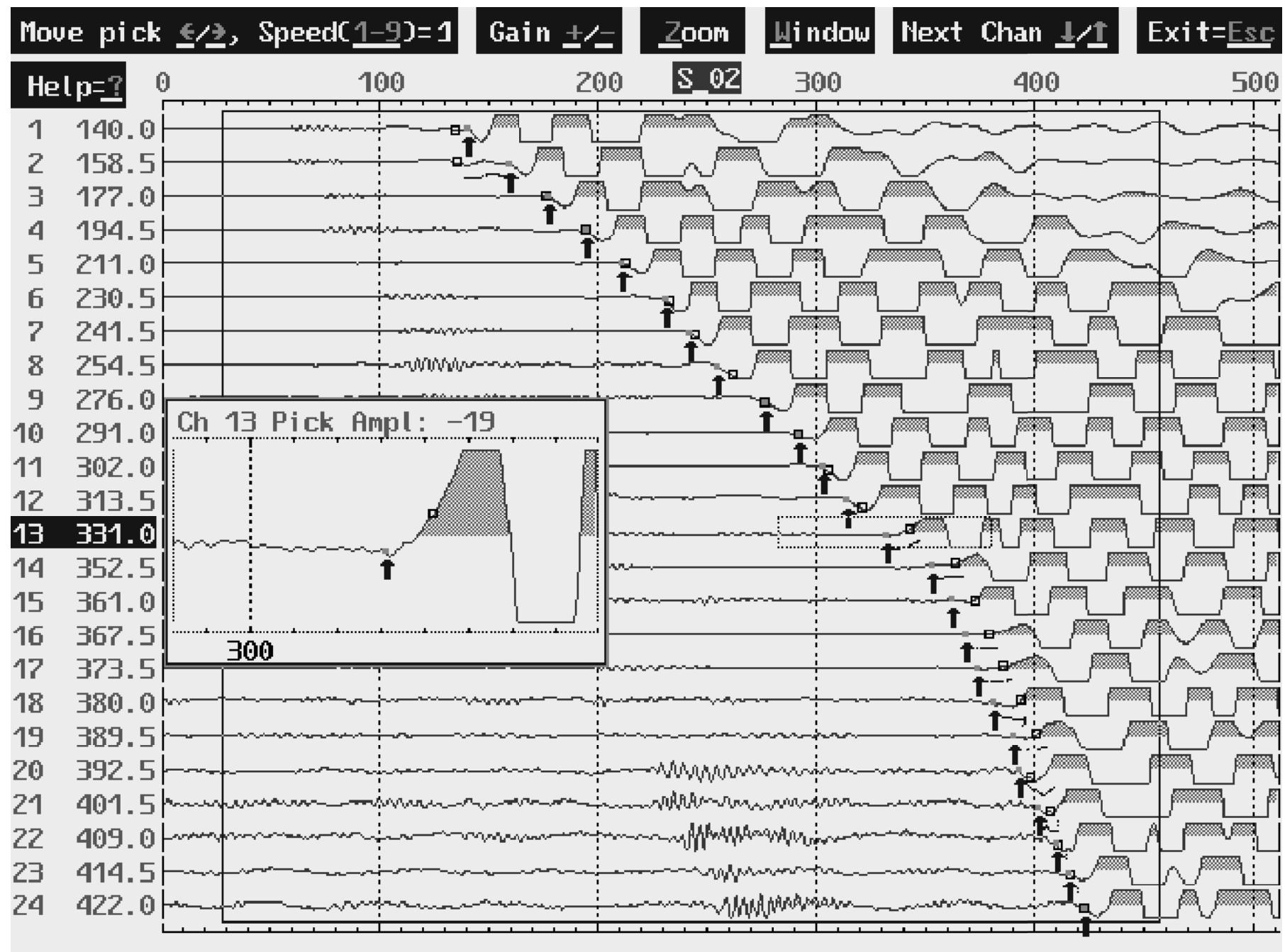
Press Esc to EXIT



Miller Road - Snohomish S-wave

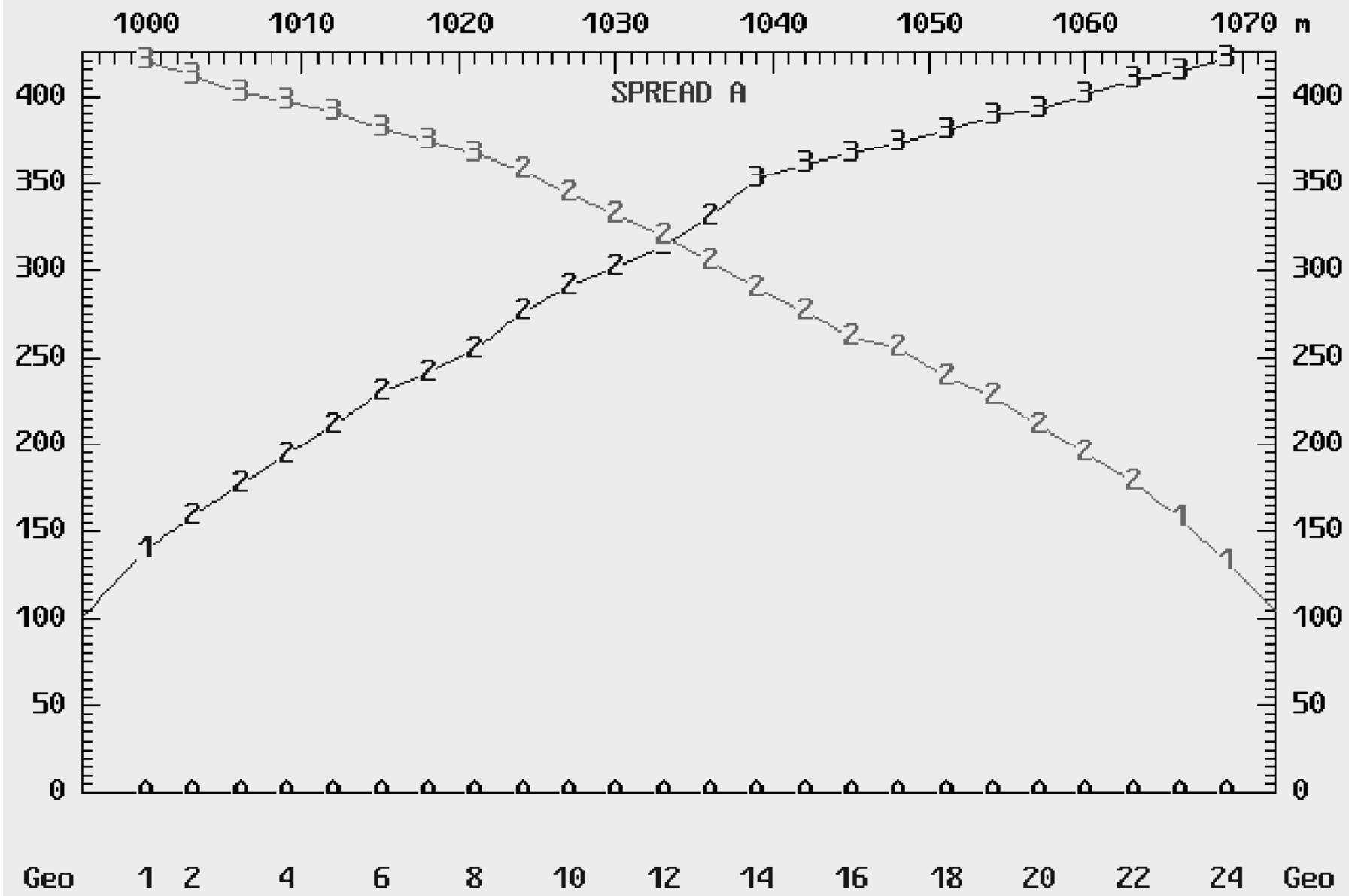


Miller Road - Snohomish S-wave



Miller Road - Snohomish S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

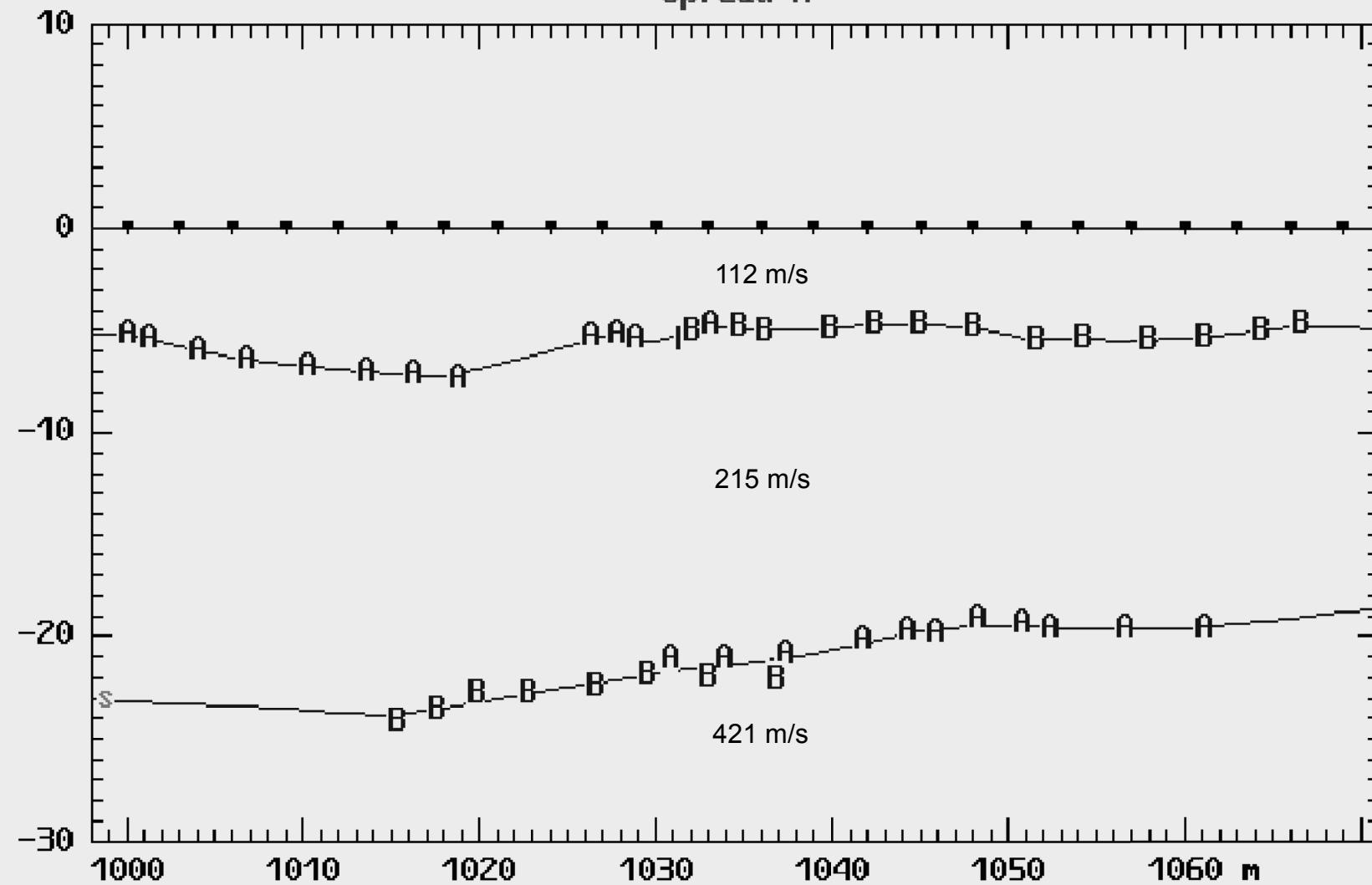


Miller Road - Snohomish S-wave

Press Esc to EXIT

MILS-WAV.SIP: Miller Rd Snohomish S-Waves

Spread A

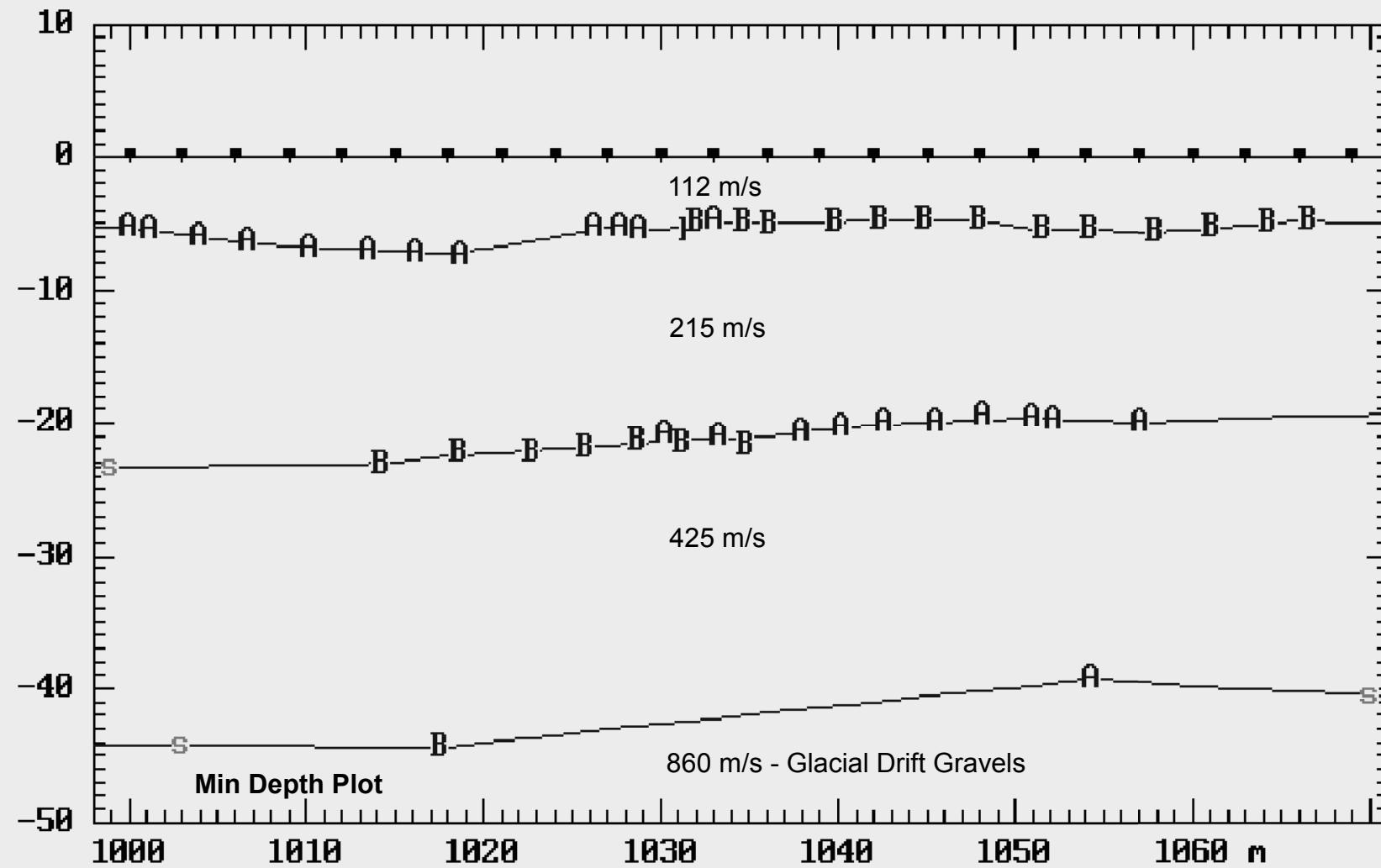


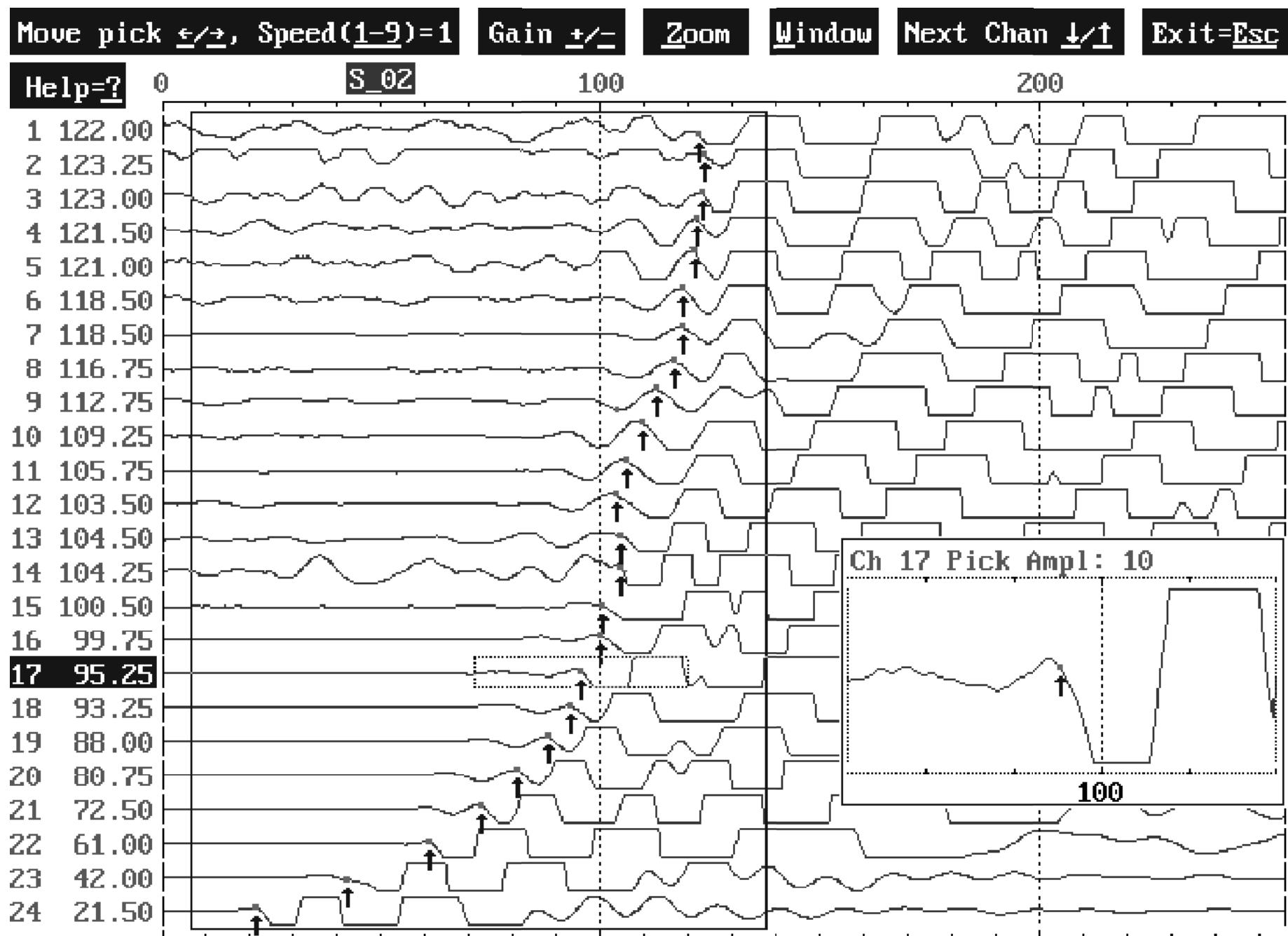
Miller Road - Snohomish S-wave

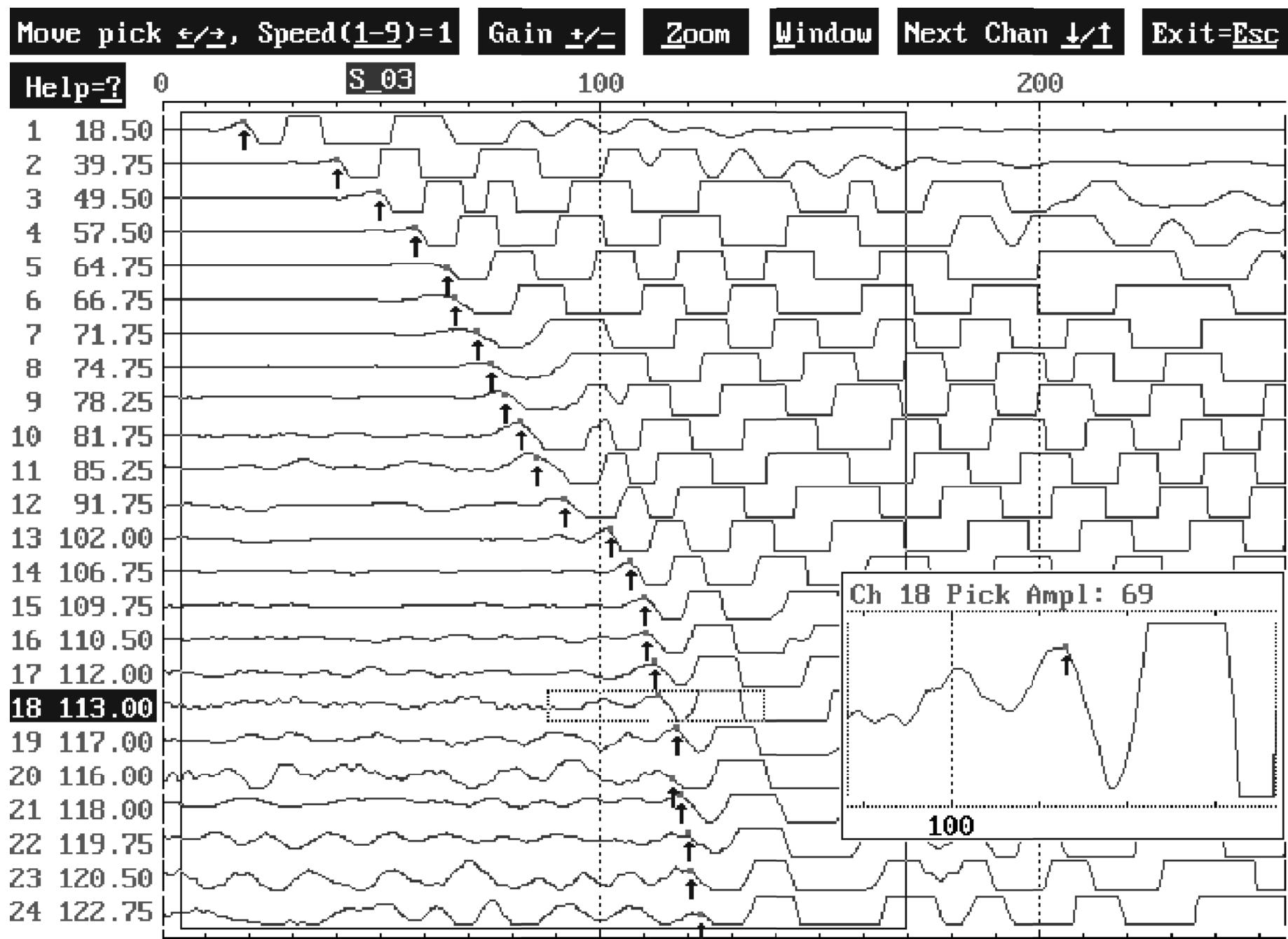
Press Esc to EXIT

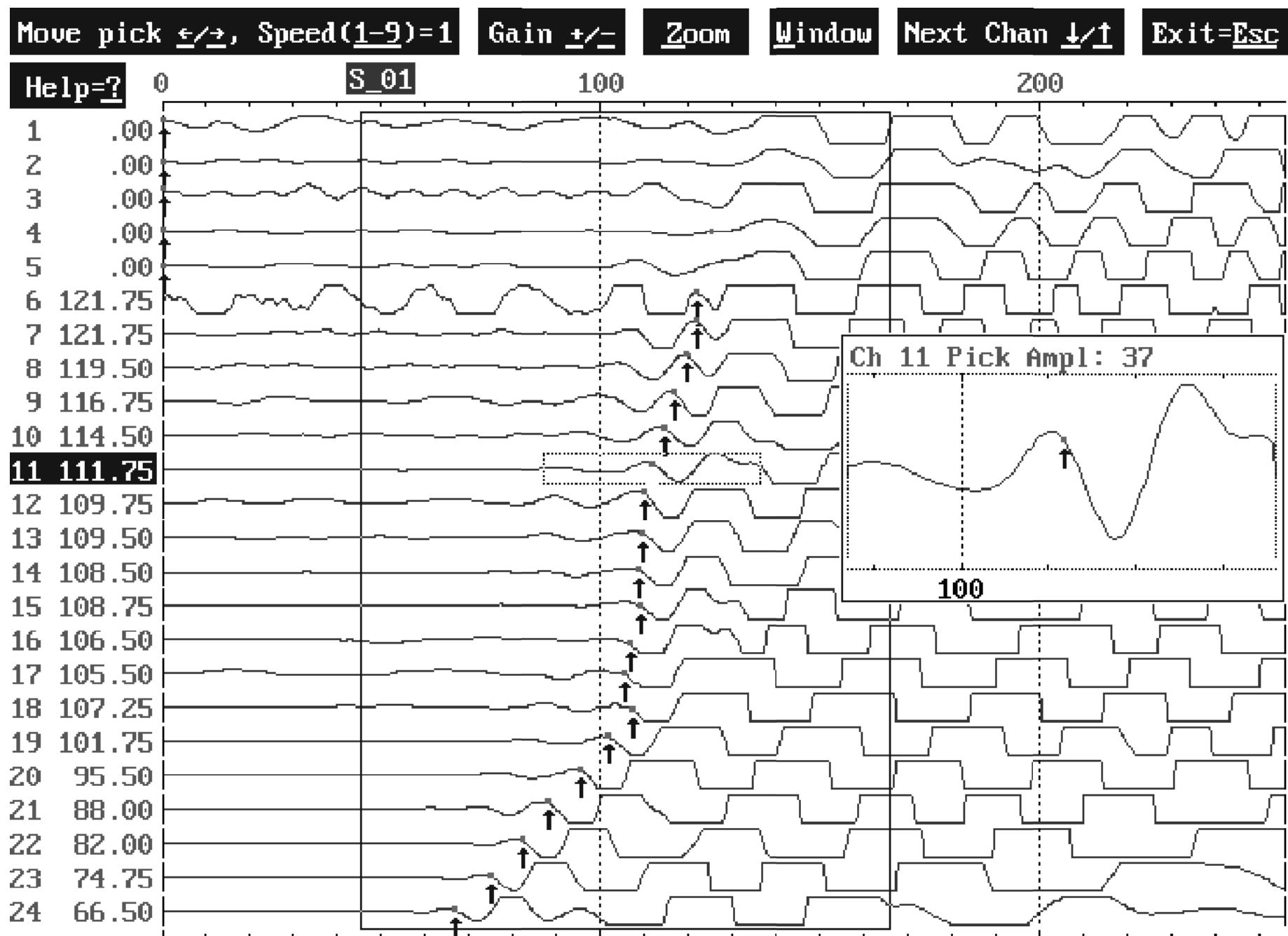
MILS-MIN.SIP: Miller Rd Snohomish S-Waves Min Depth

Spread A



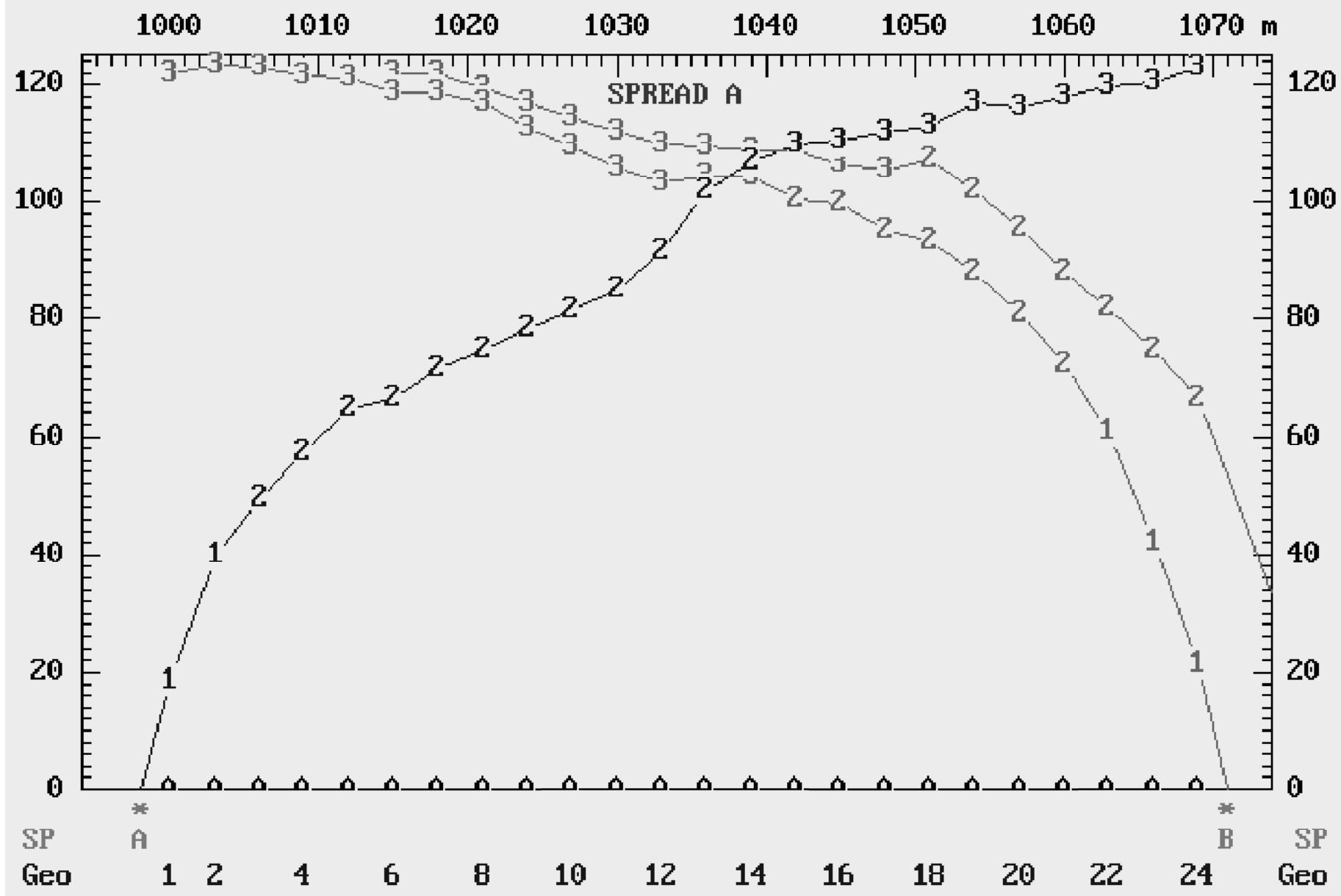
Miller Road S-wave

Miller Road S-wave

Miller Road S-wave

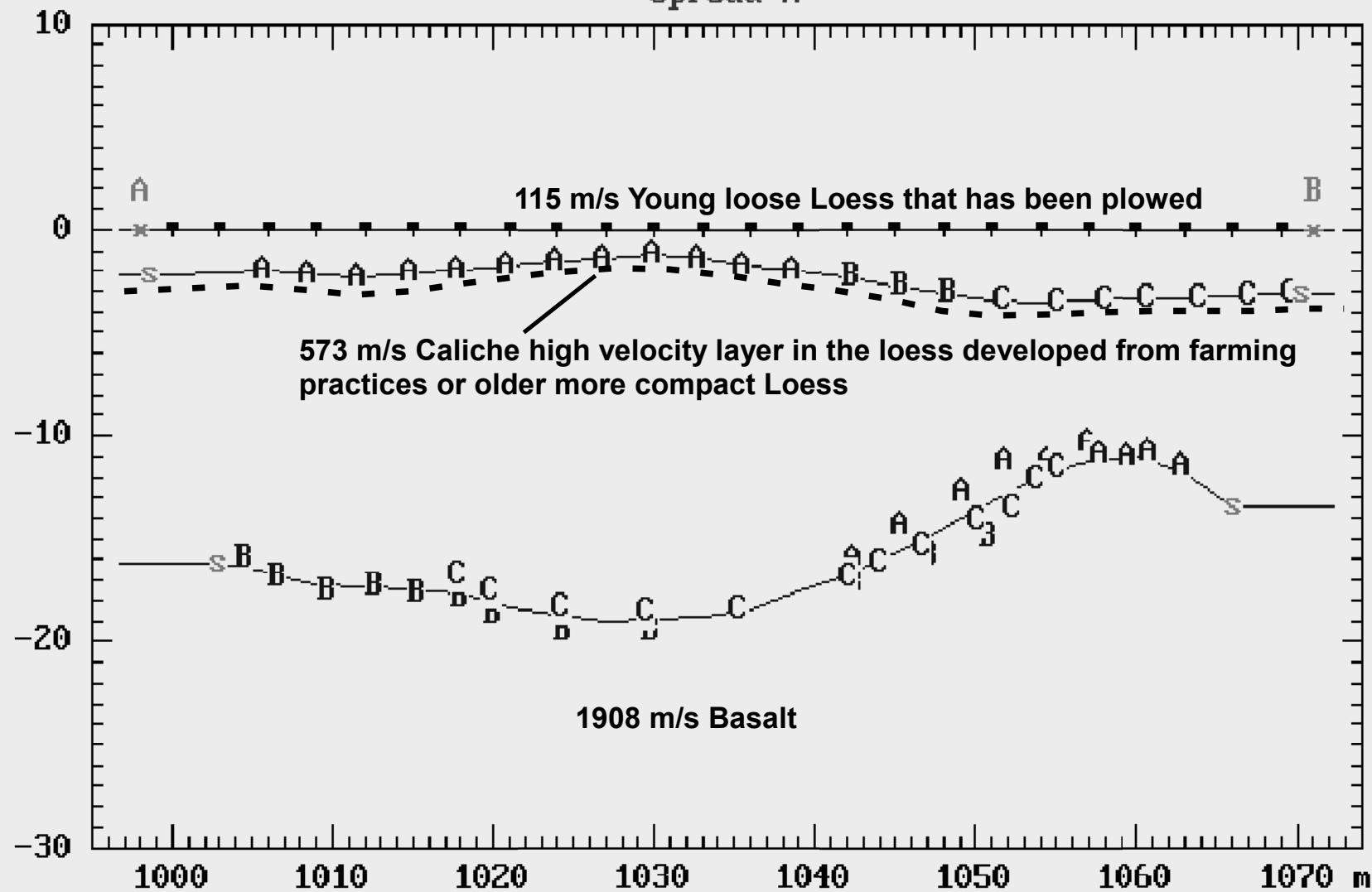
Miller Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

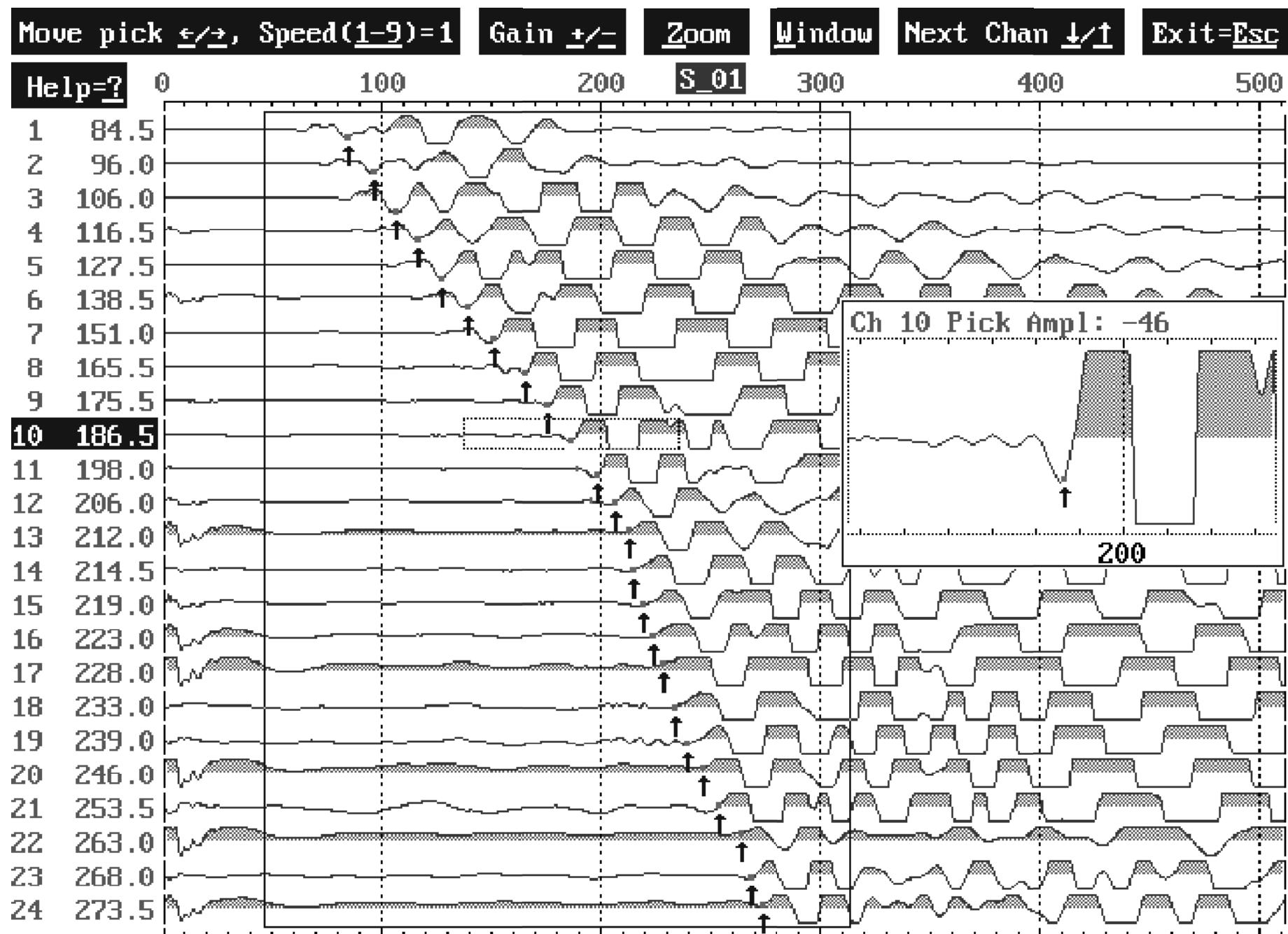


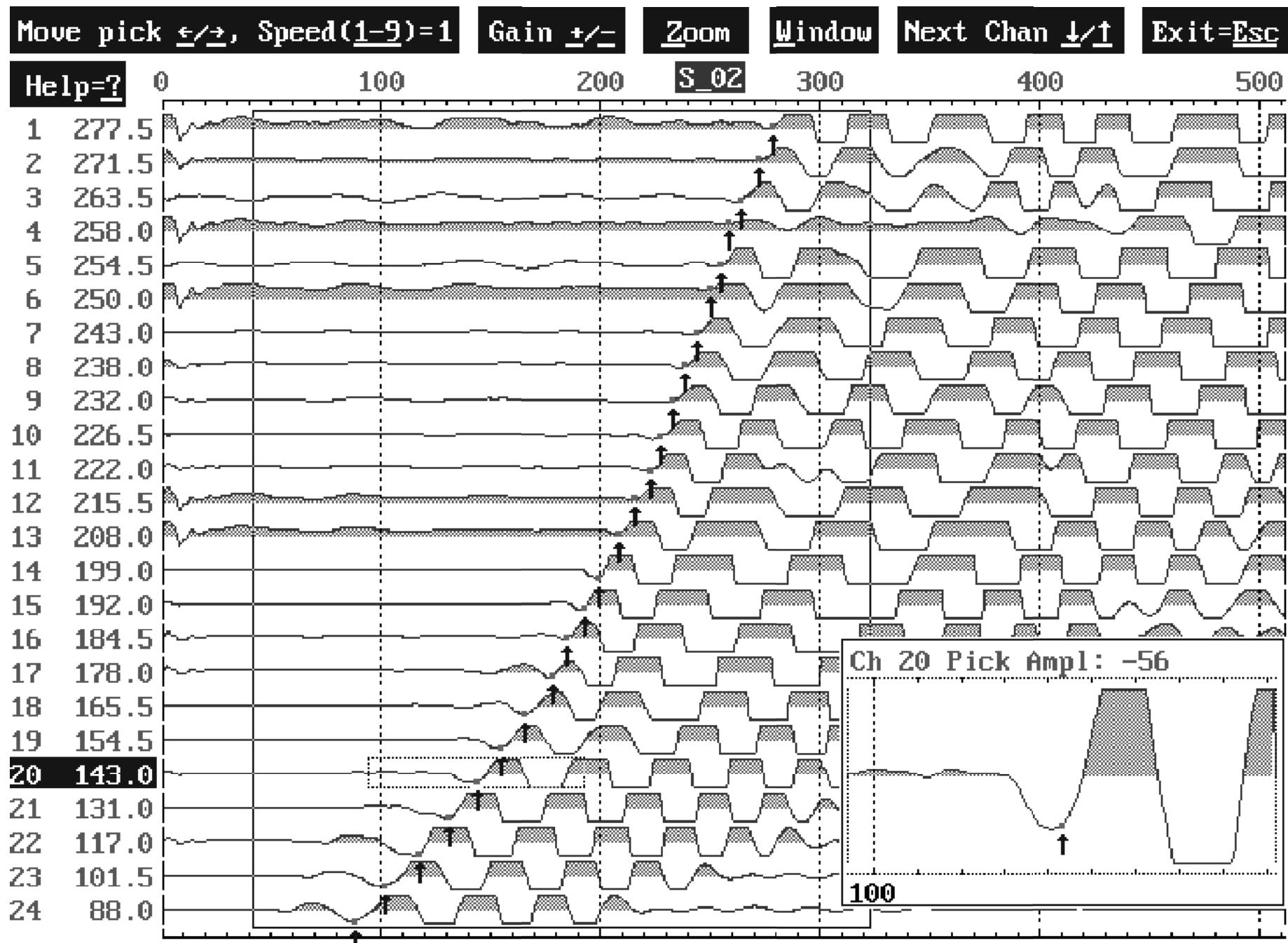
Miller Road S-wave

Press Esc to EXIT

MILER_SW.SIP: Miller Road S wave Survey**Spread A**

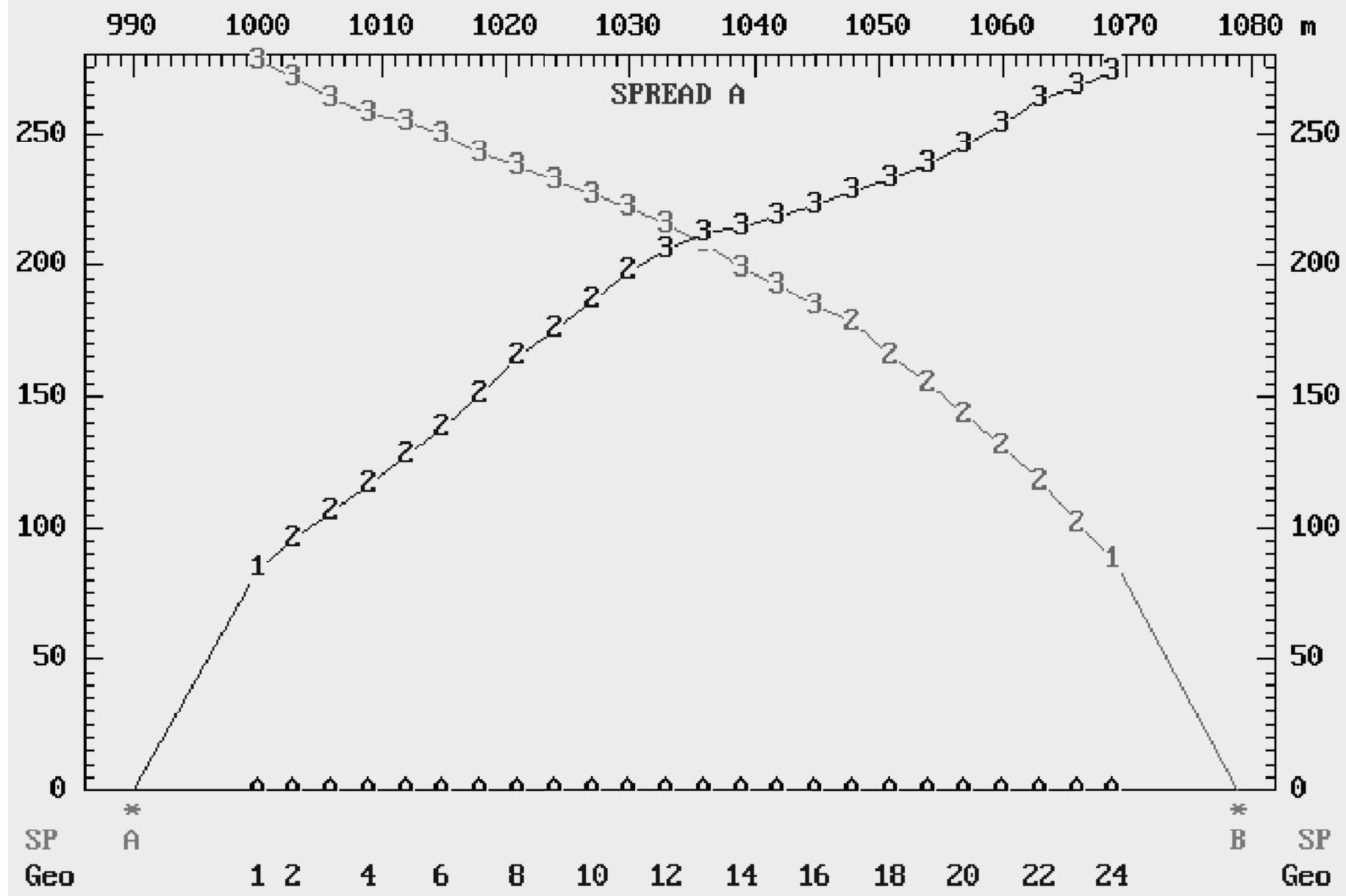
Monroe Correctional Complex S-wave



Monroe Correctional Complex S-wave

Monroe Correctional Complex S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

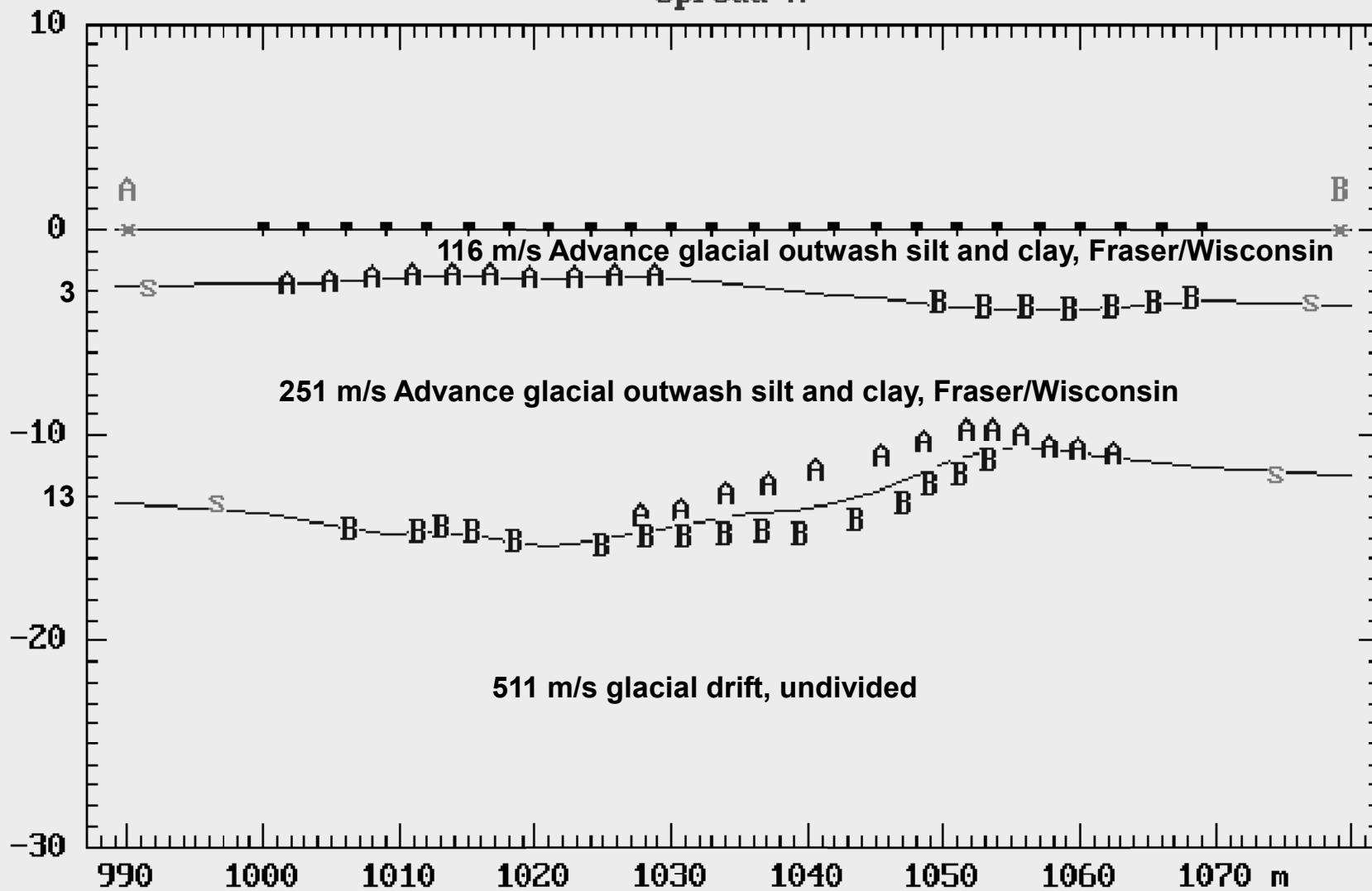


Monroe Correctional Complex S-wave

Press Esc to EXIT

MONR_SW1.SIP: Monroe Correctional Complex Shear Wave Survey

Spread A

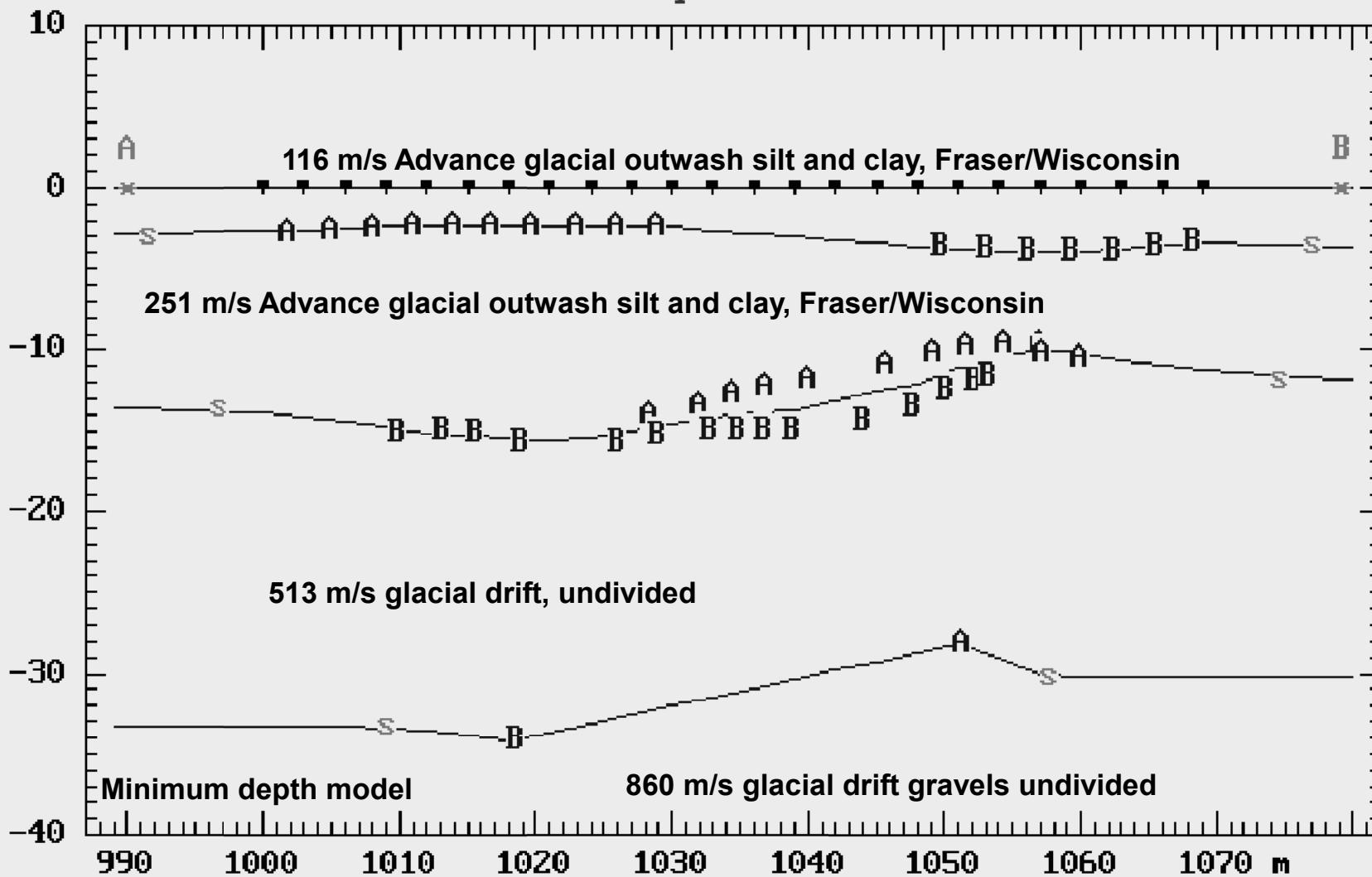


Monroe Correctional Complex S-wave

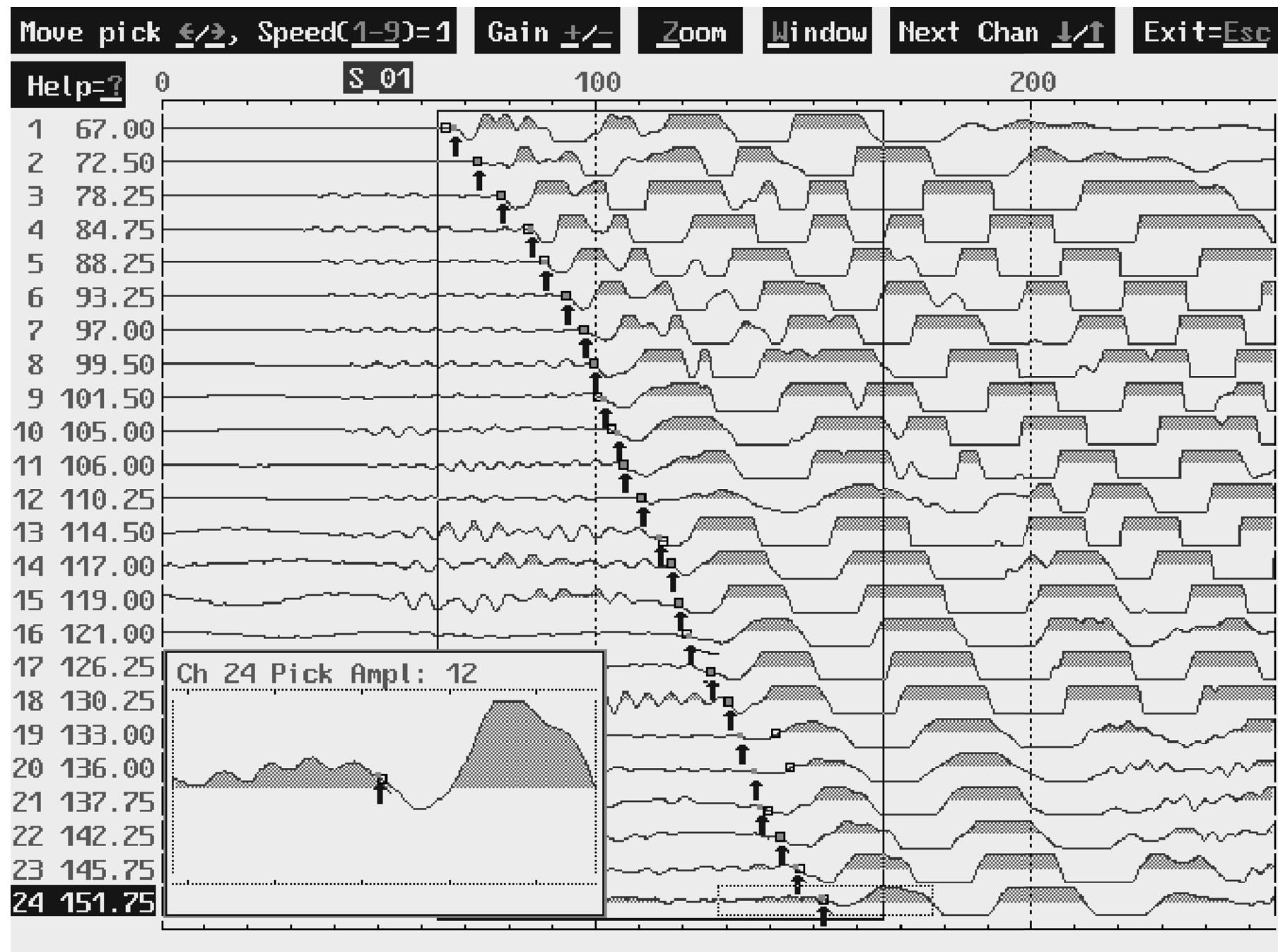
Press Esc to EXIT

MONR_SW2.SIP: Monroe Correctional Complex Shear Wave Survey

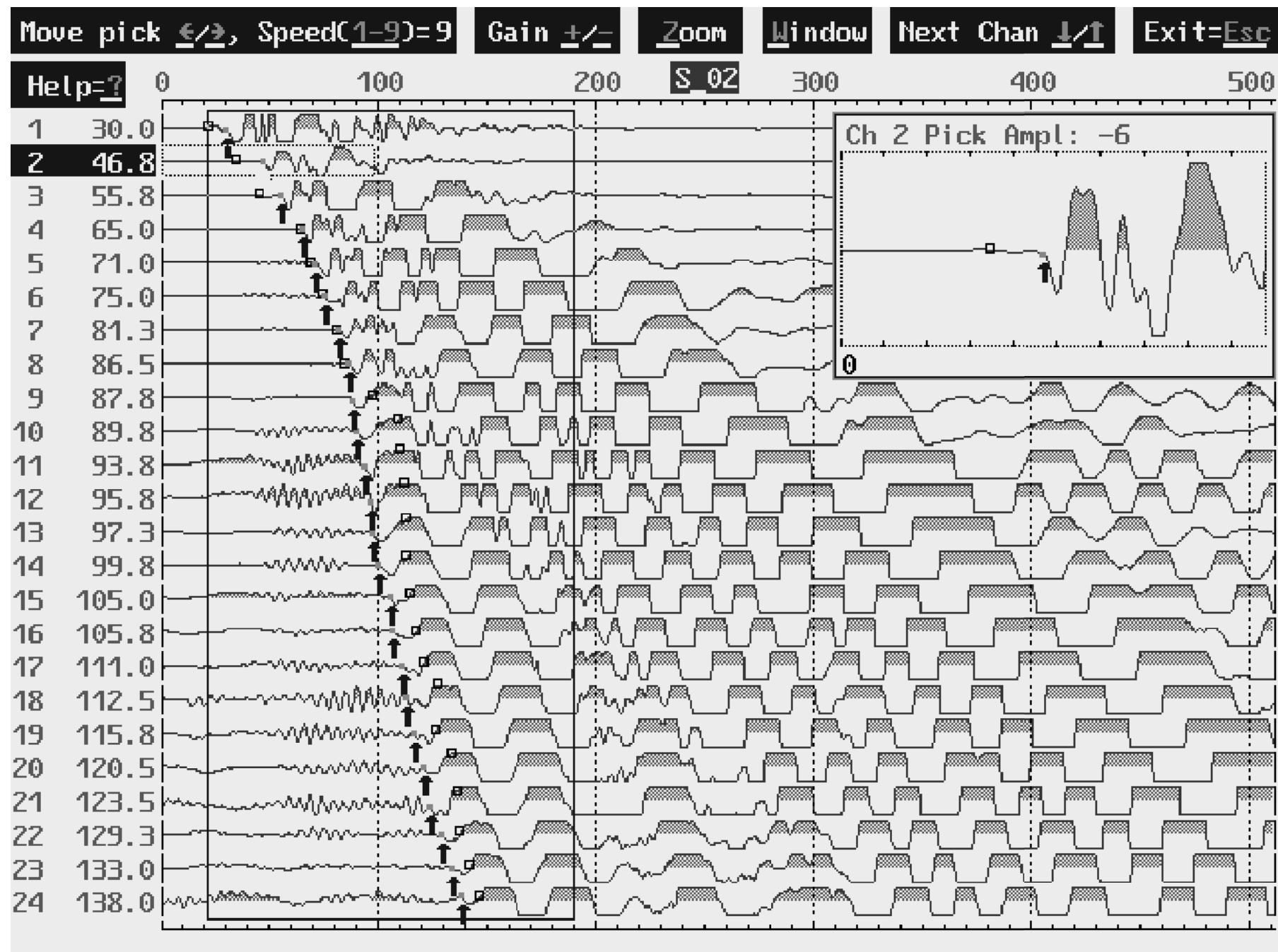
Spread A



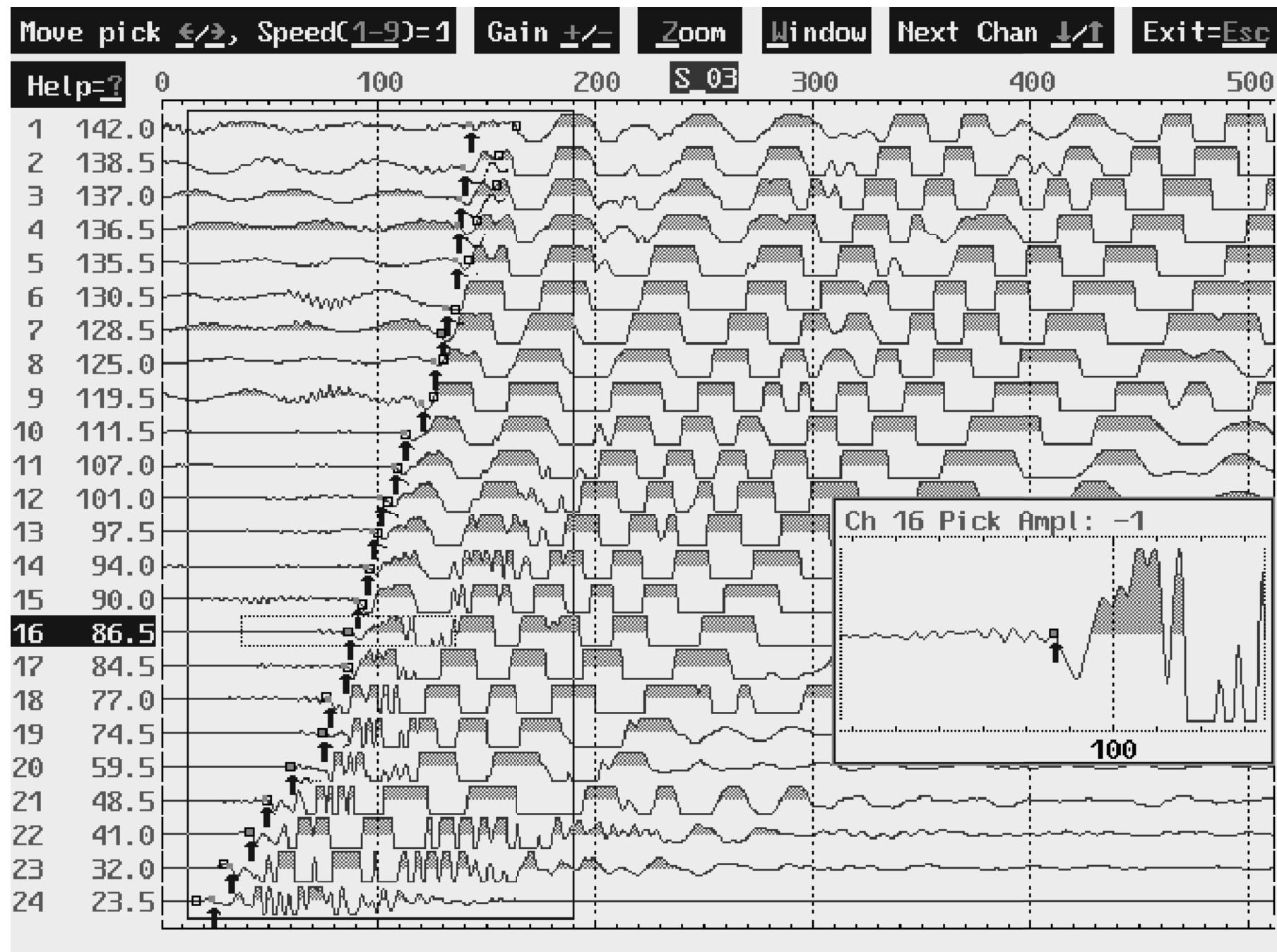
Mount Baker Middle School S-wave



Mount Baker Middle School S-wave

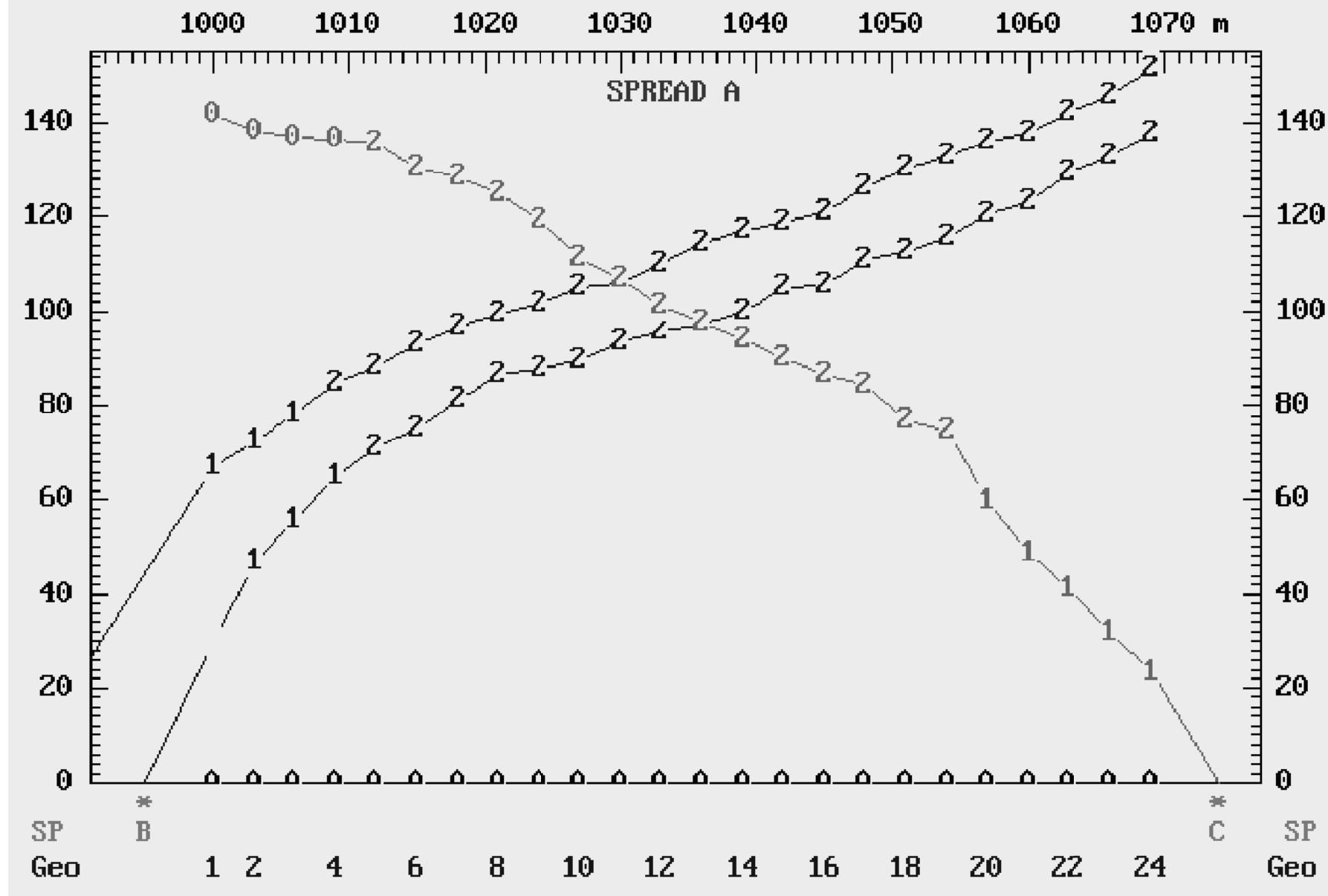


Mount Baker Middle School S-wave



Mount Baker Middle School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

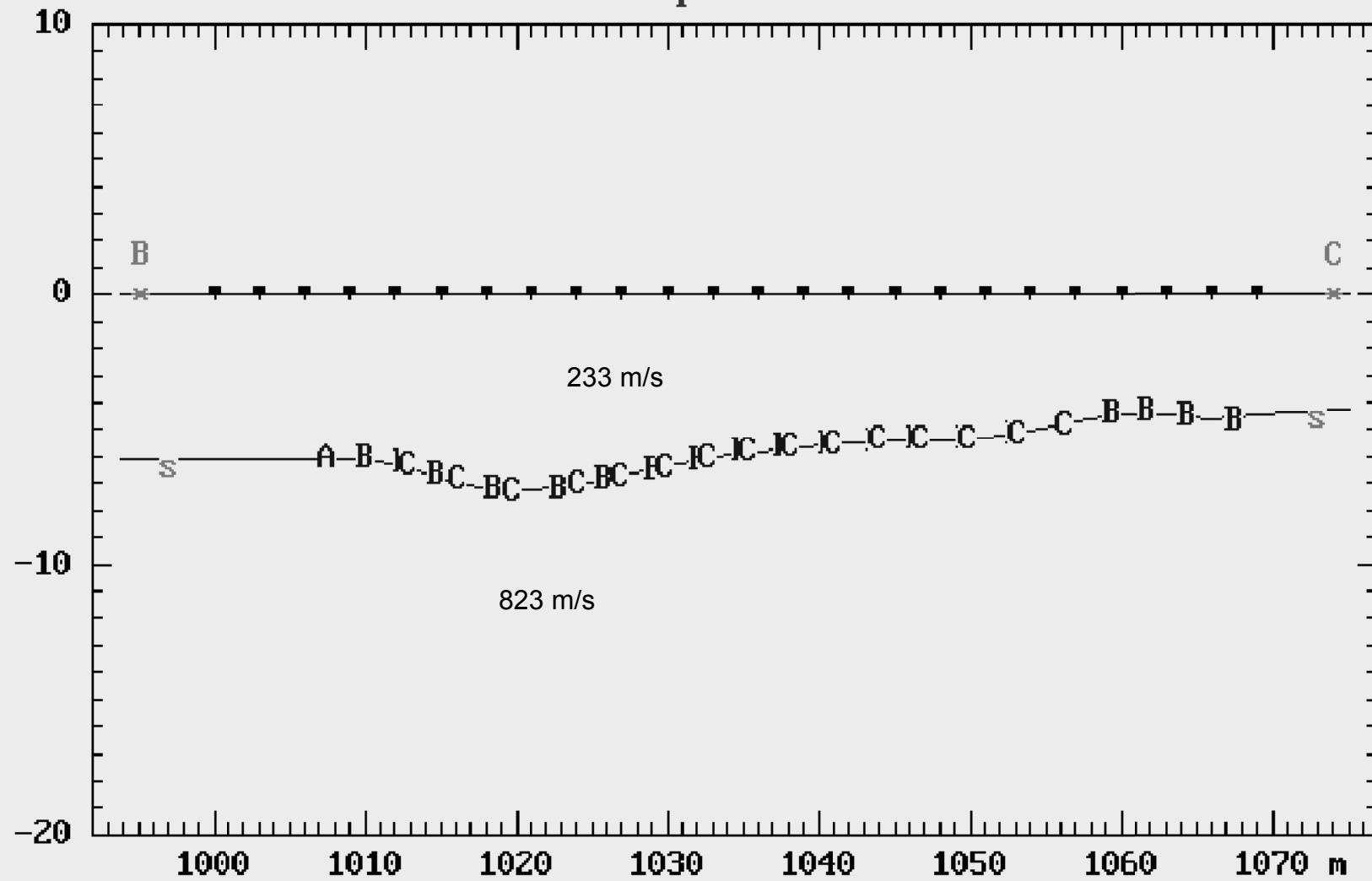


Mount Baker Middle School S-wave

Press Esc to EXIT

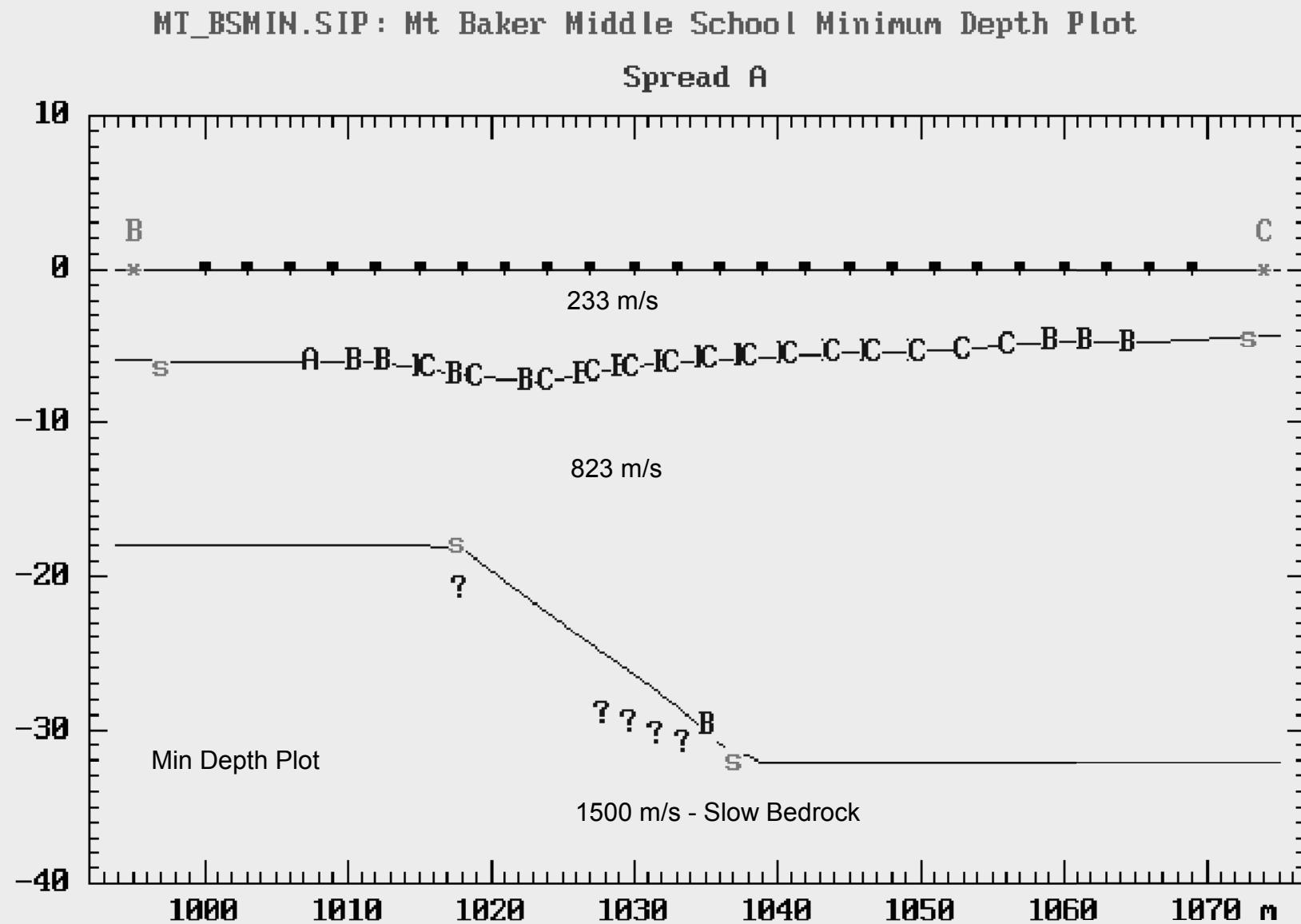
MT_BSWAV.SIP: Mt Baker Middle School S-Waves

Spread A

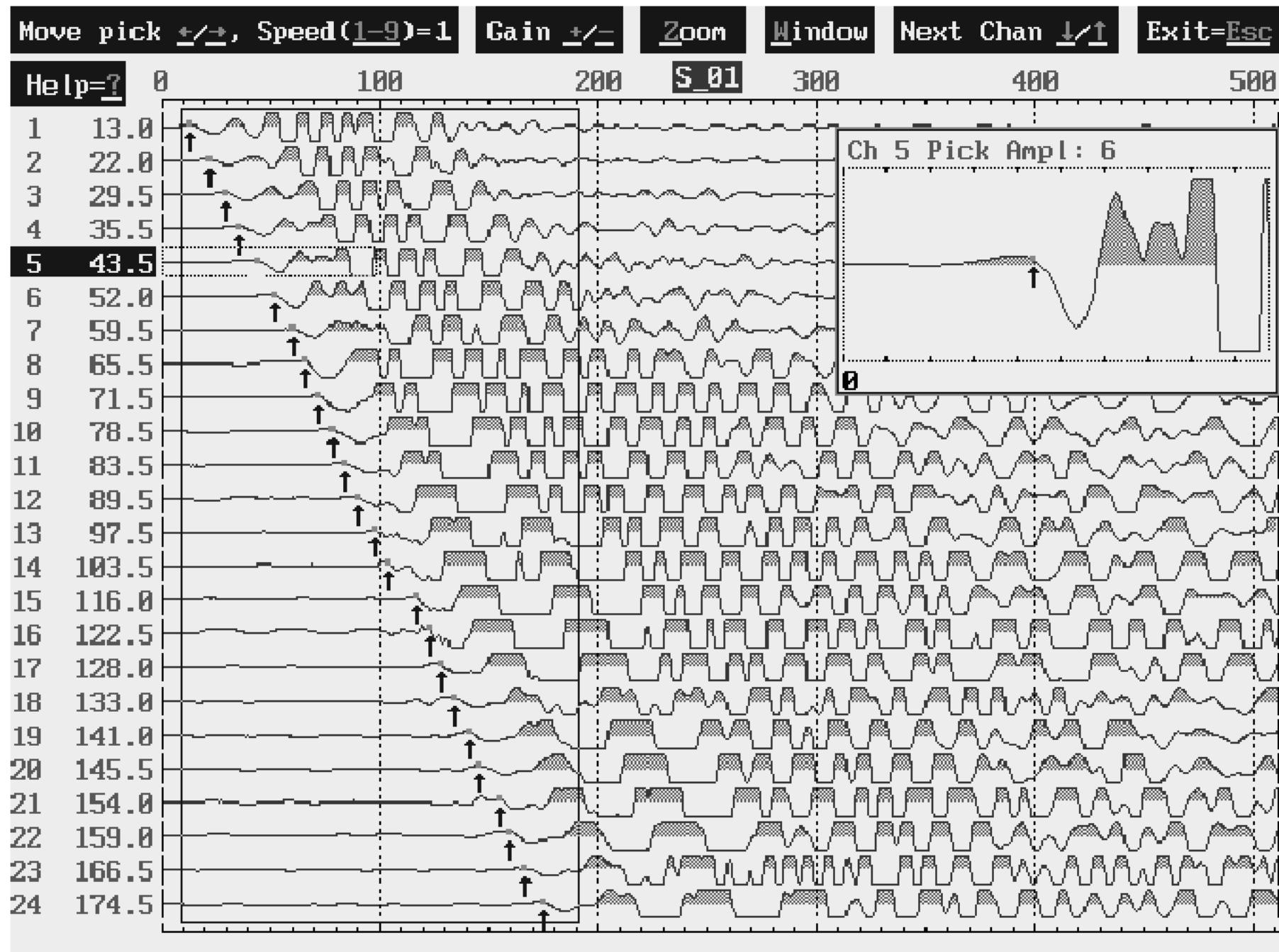


Mount Baker Middle School S-wave

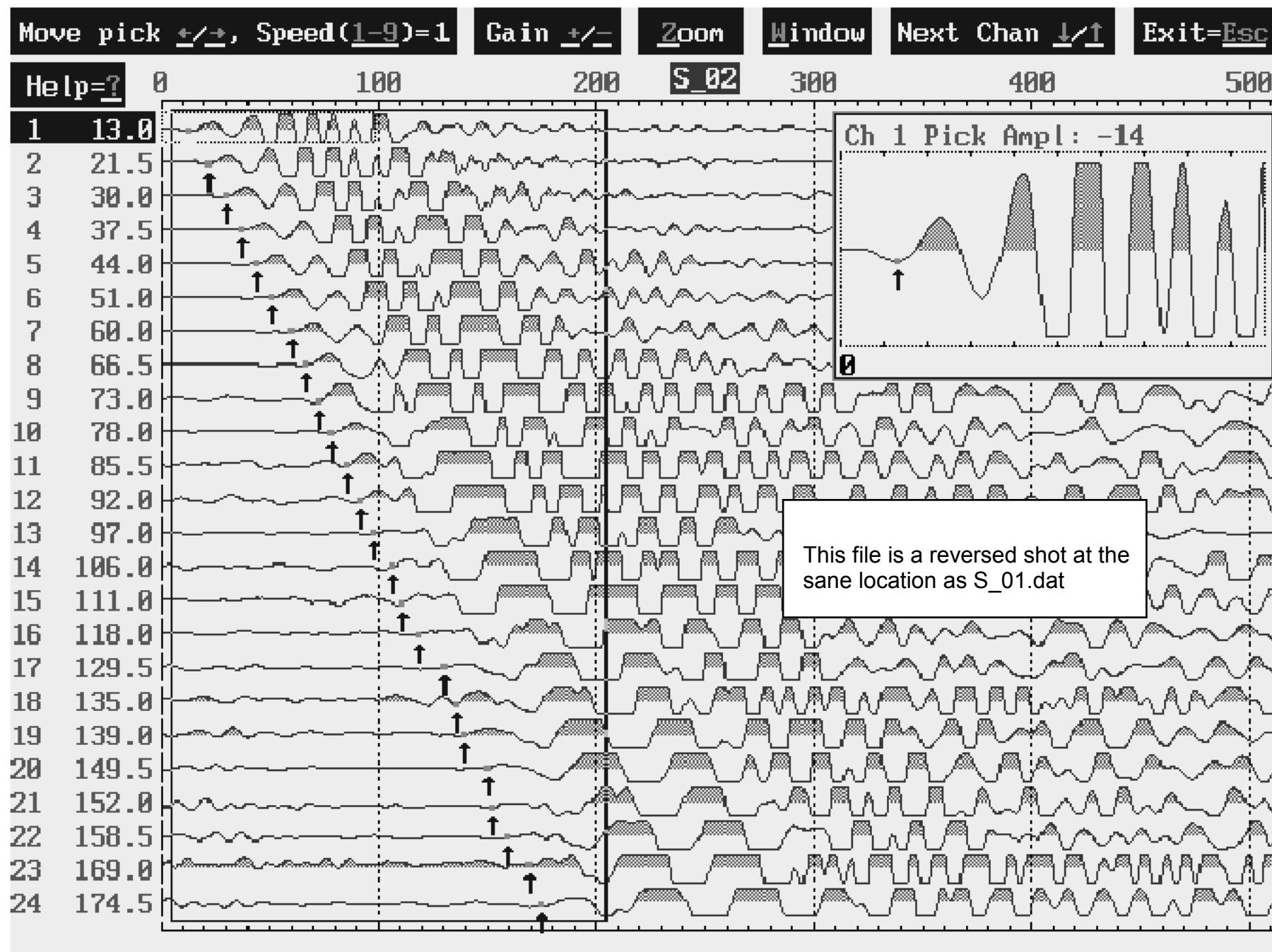
Press Esc to EXIT



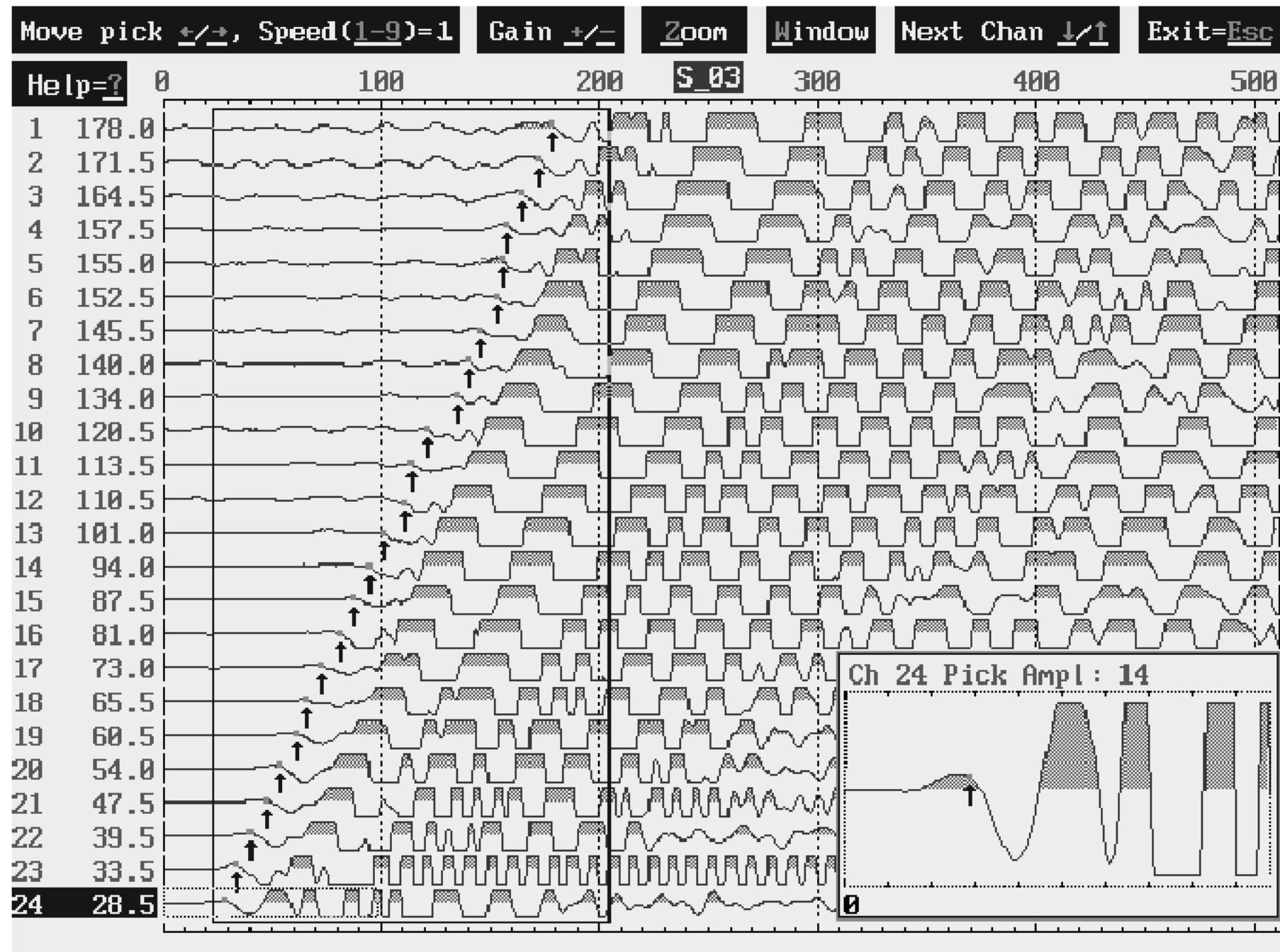
Old Woodway Elementary School S-wave



Old Woodway Elementary School S-wave

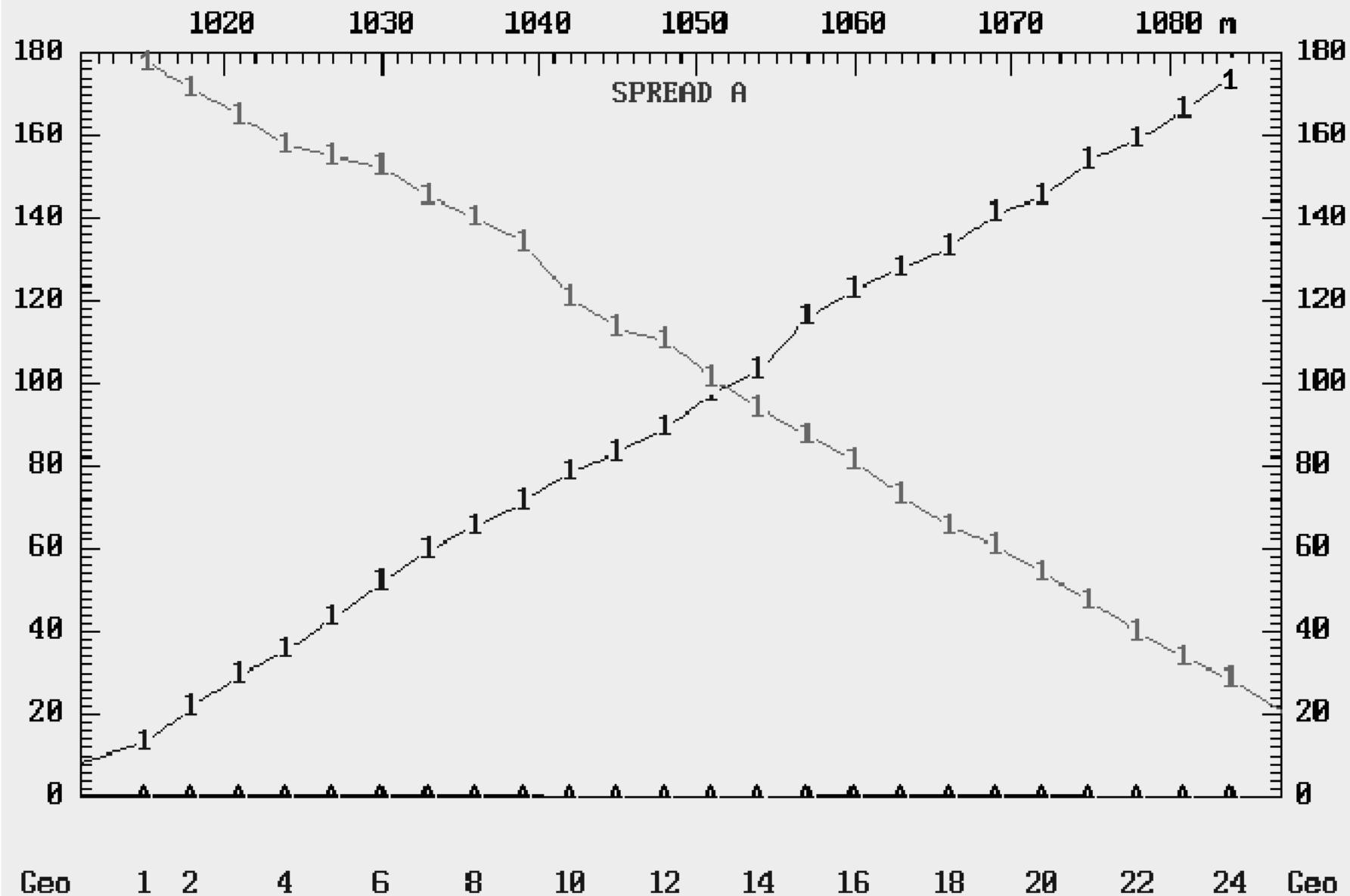


Old Woodway Elementary School S-wave



Old Woodway Elementary School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

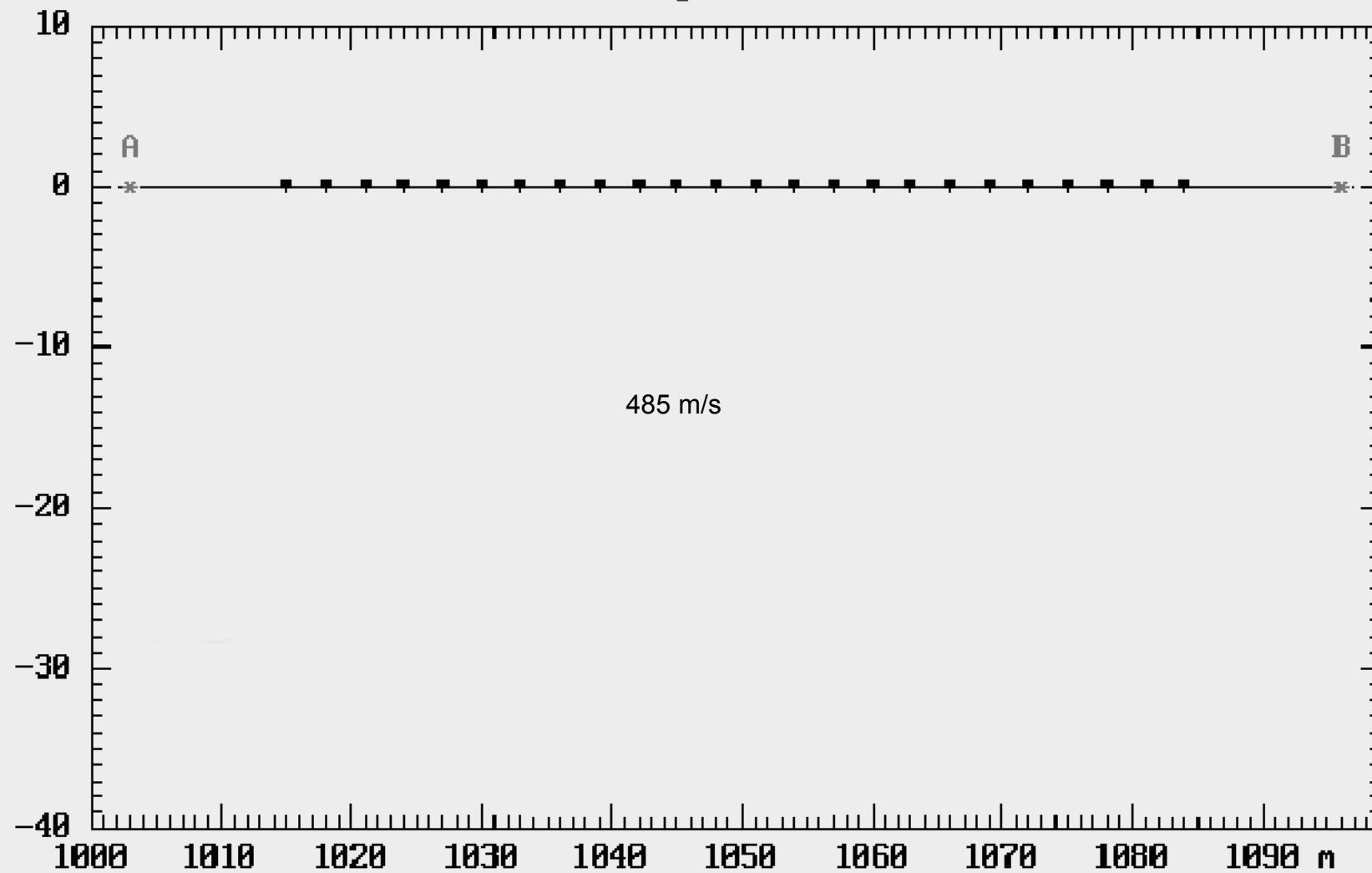


Old Woodway Elementary School S-wave

Press Esc to EXIT

OLWOSWAV.SIP : Old Woodway Elementary S-Waves

Spread A

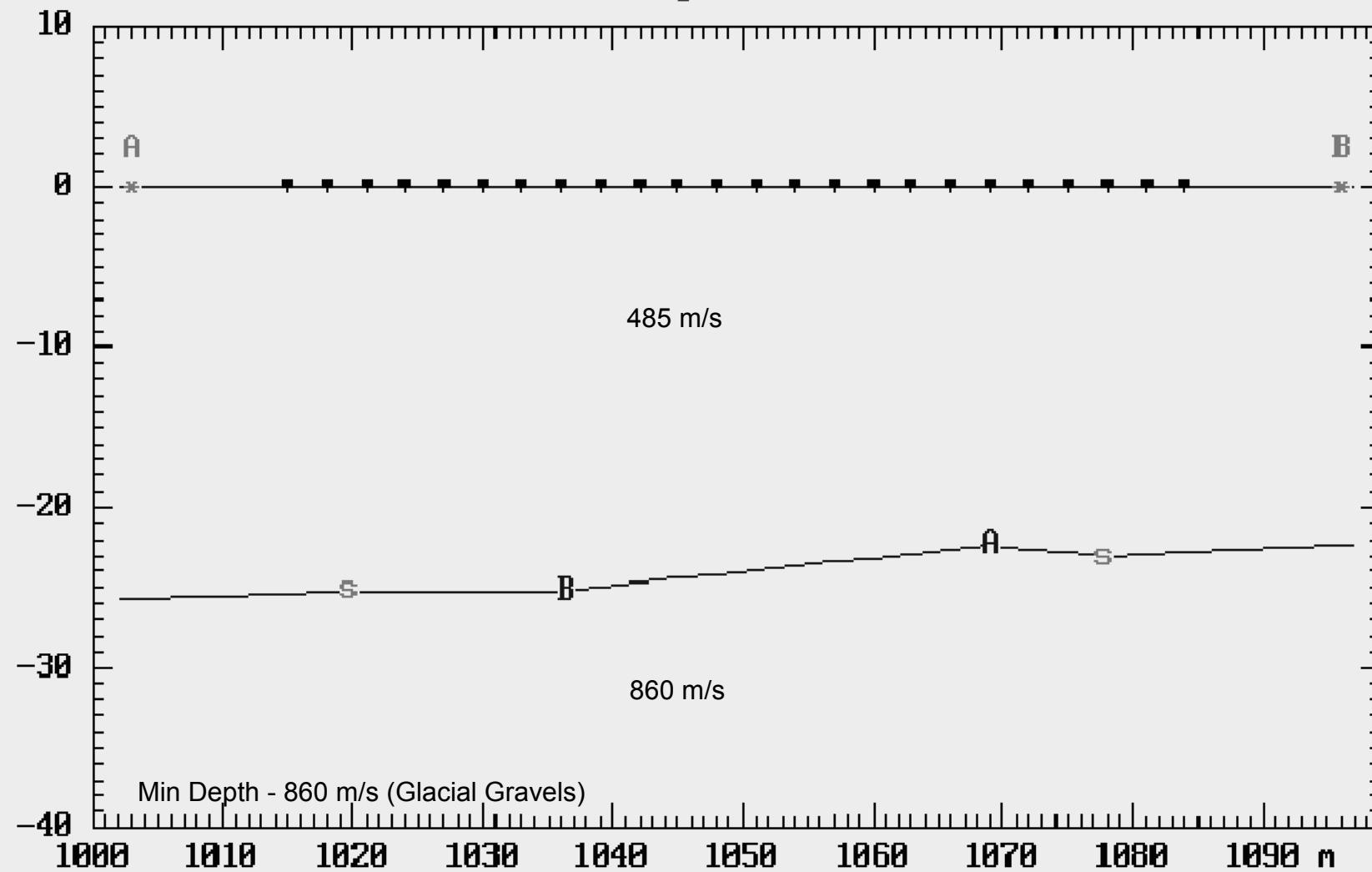


Old Woodway Elementary School S-wave

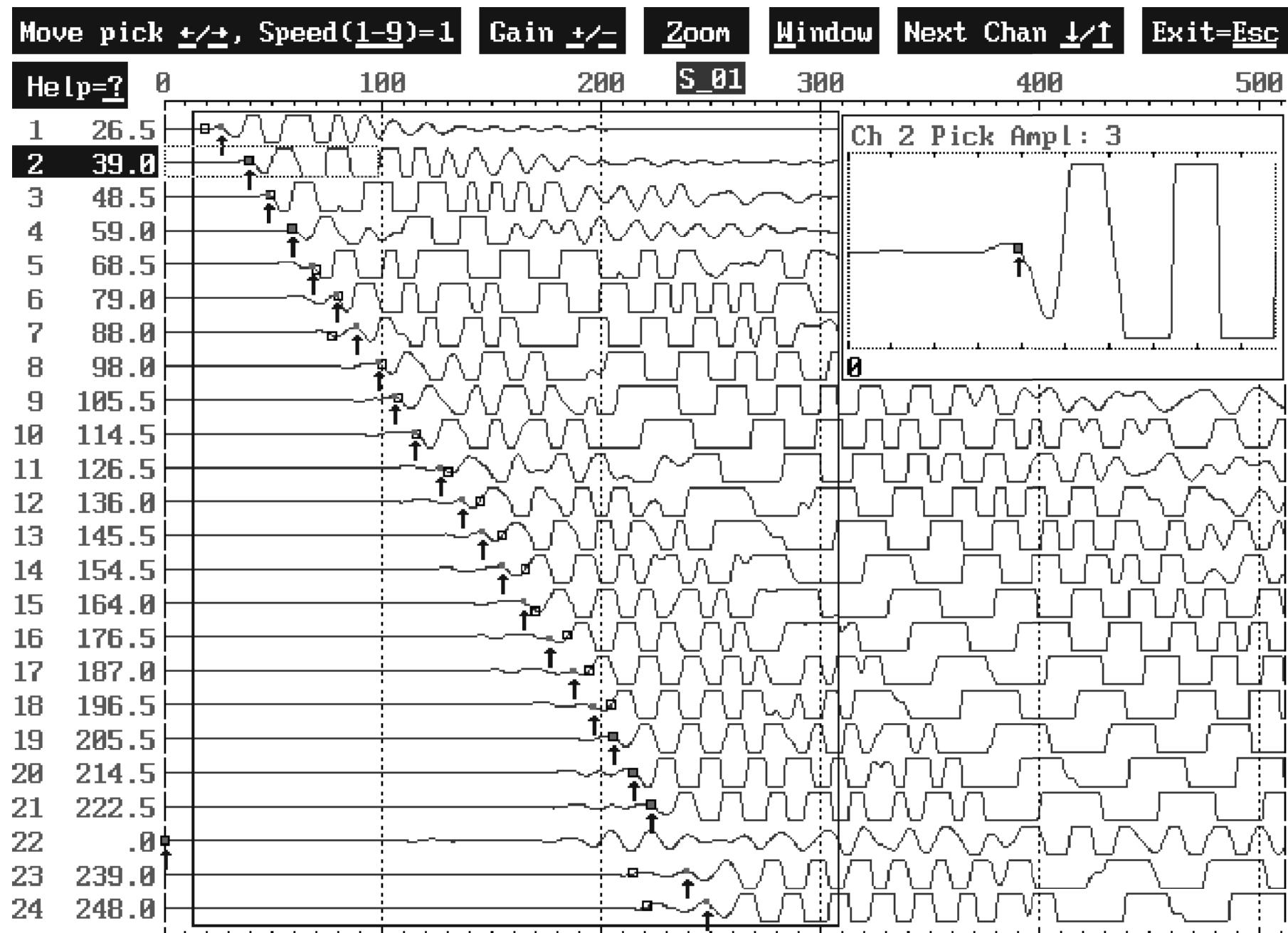
Press Esc to EXIT

OLWOSWAV.SIP: Old Woodway Elementary S-Waves

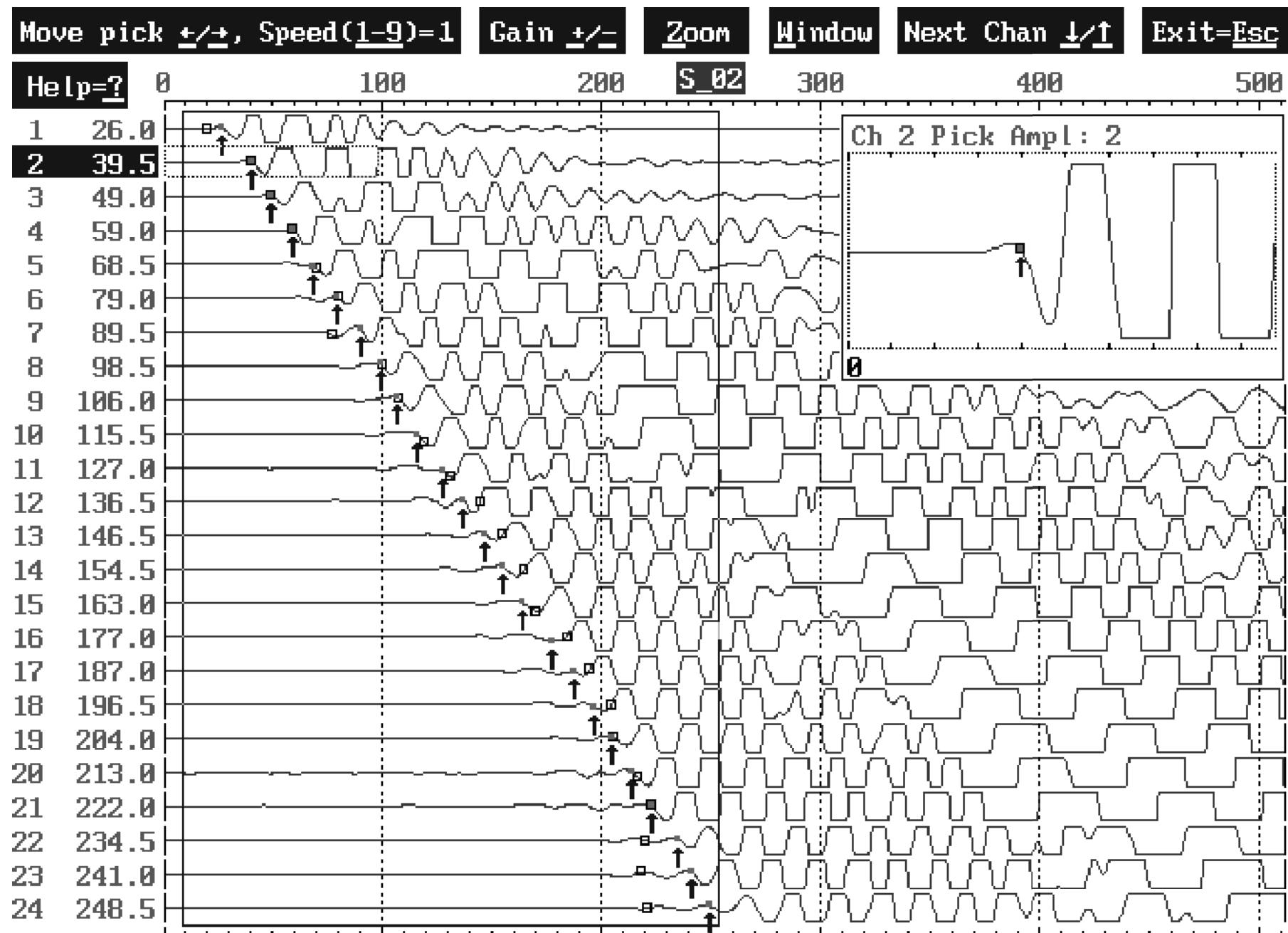
Spread A



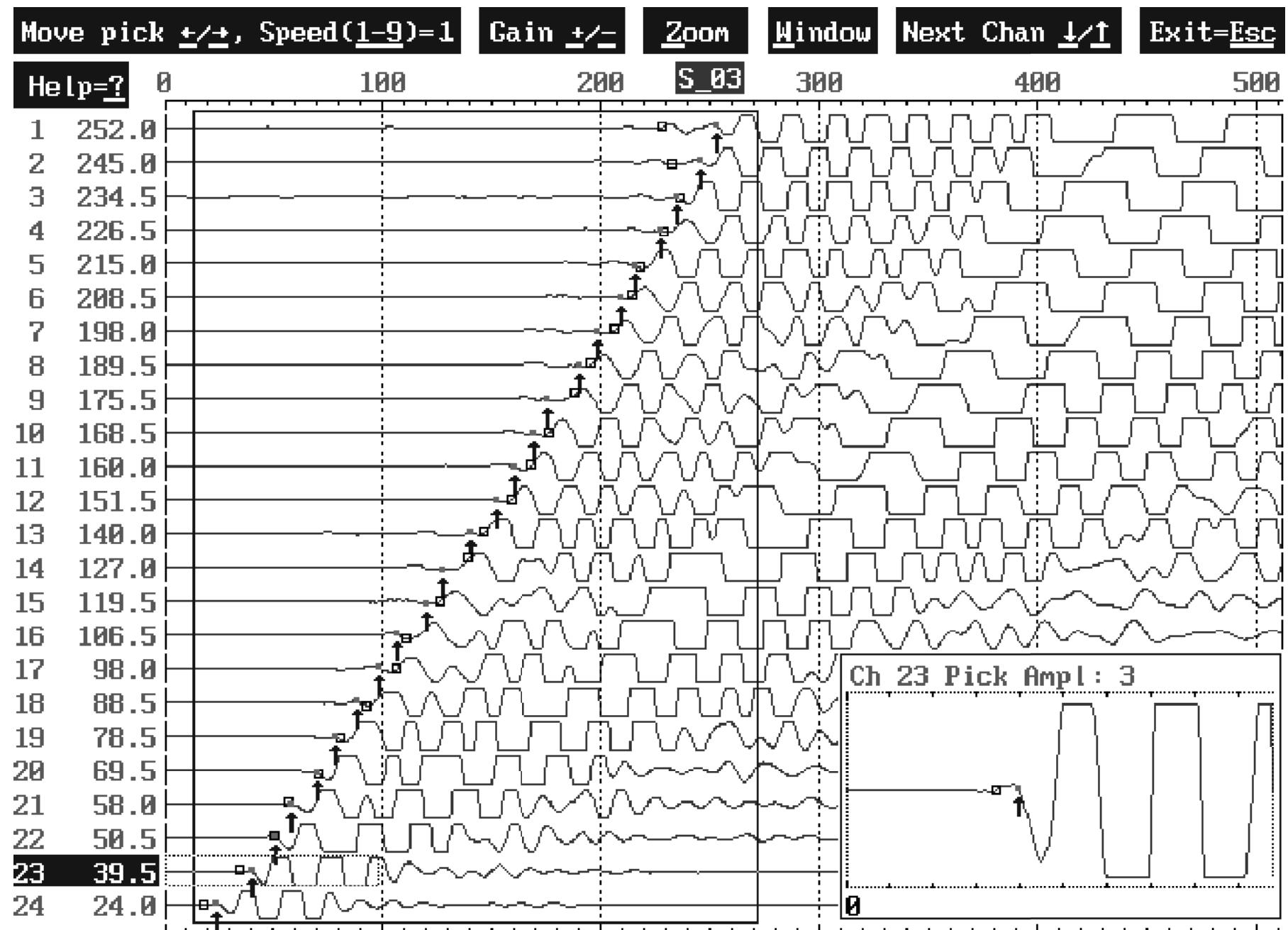
Peone Prairie S-wave



Peone Prairie S-wave

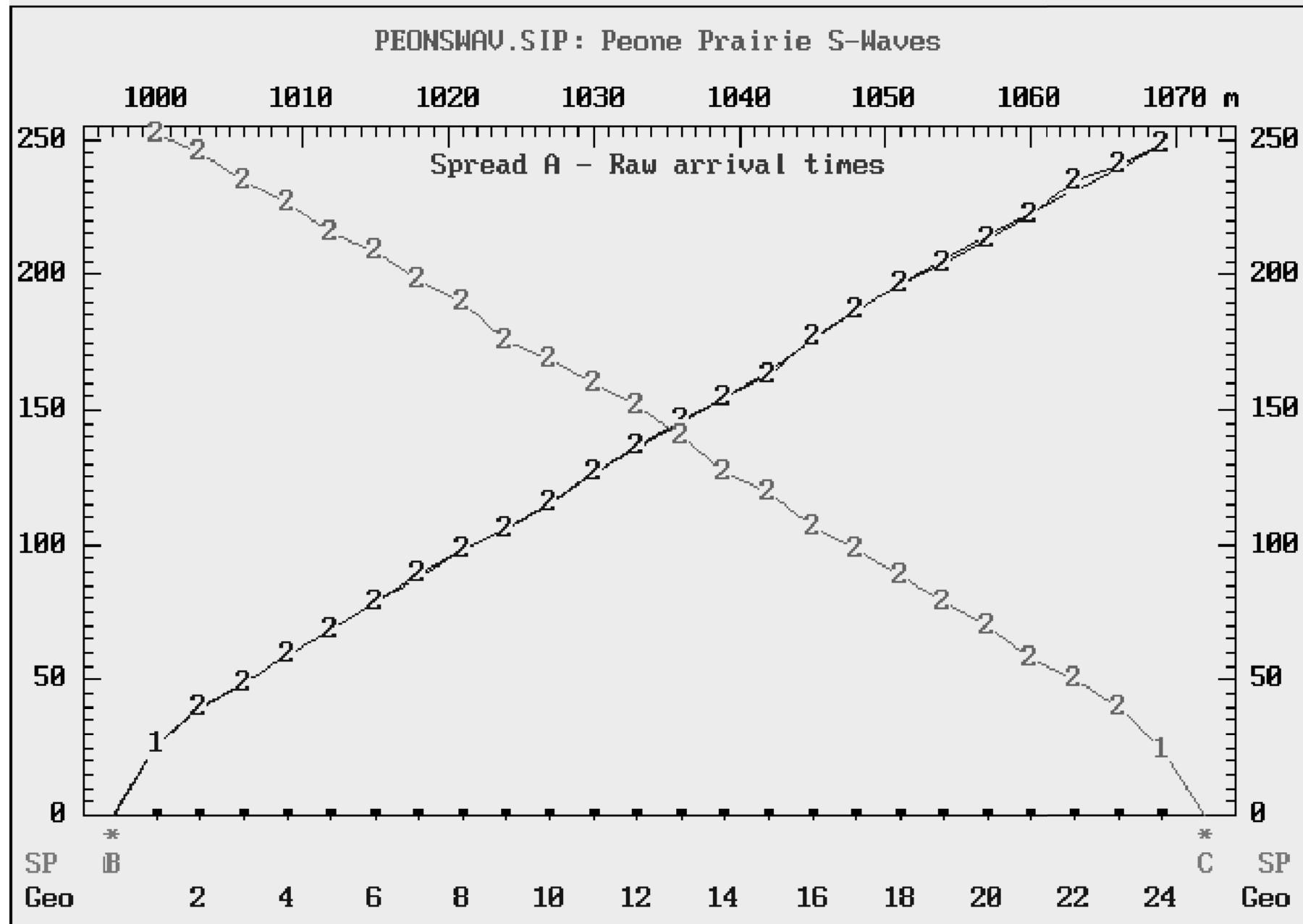


Peone Prairie S-wave



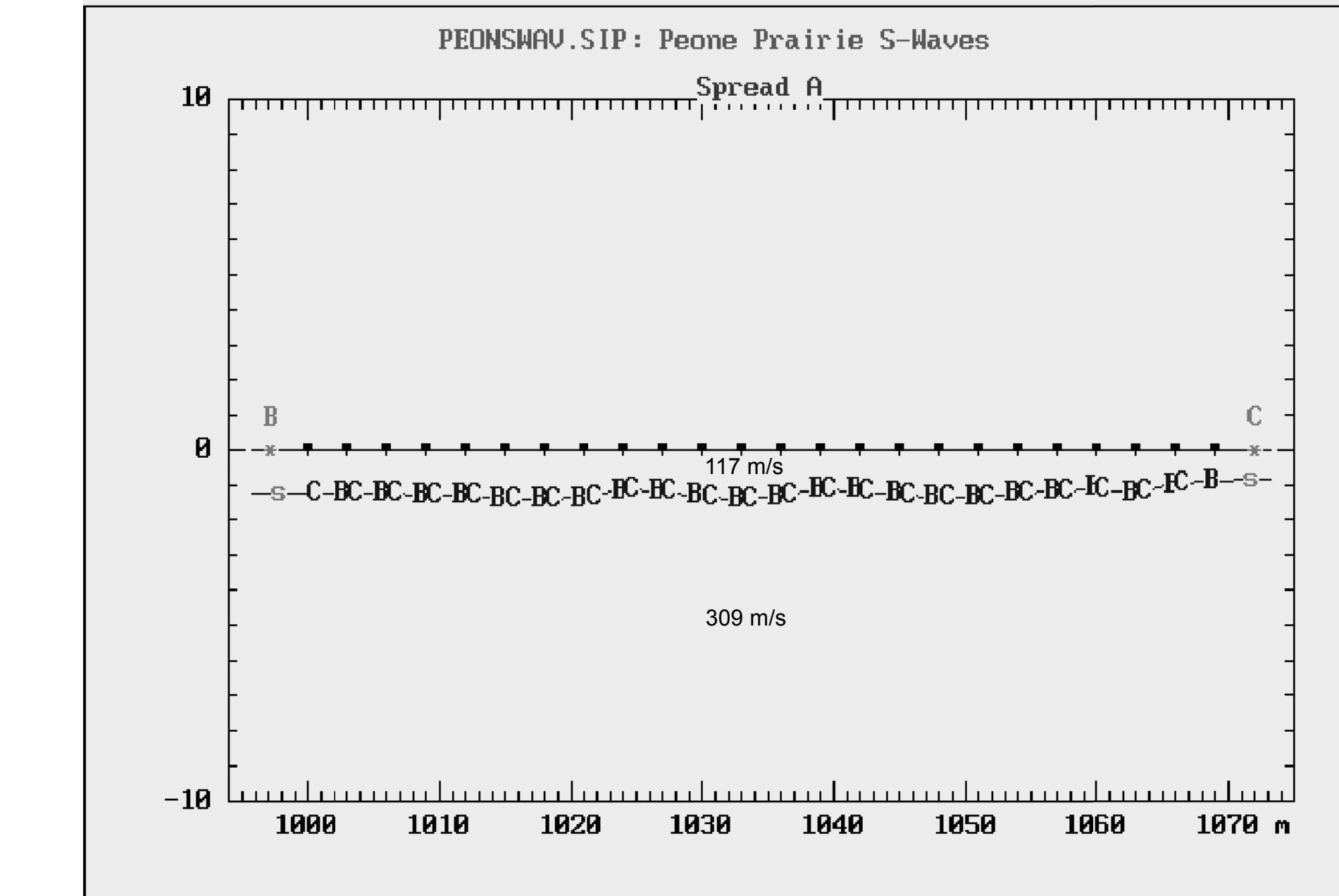
Peone Prairie S-wave

Press Esc to EXIT



Peone Prairie S-wave

Press Esc to EXIT

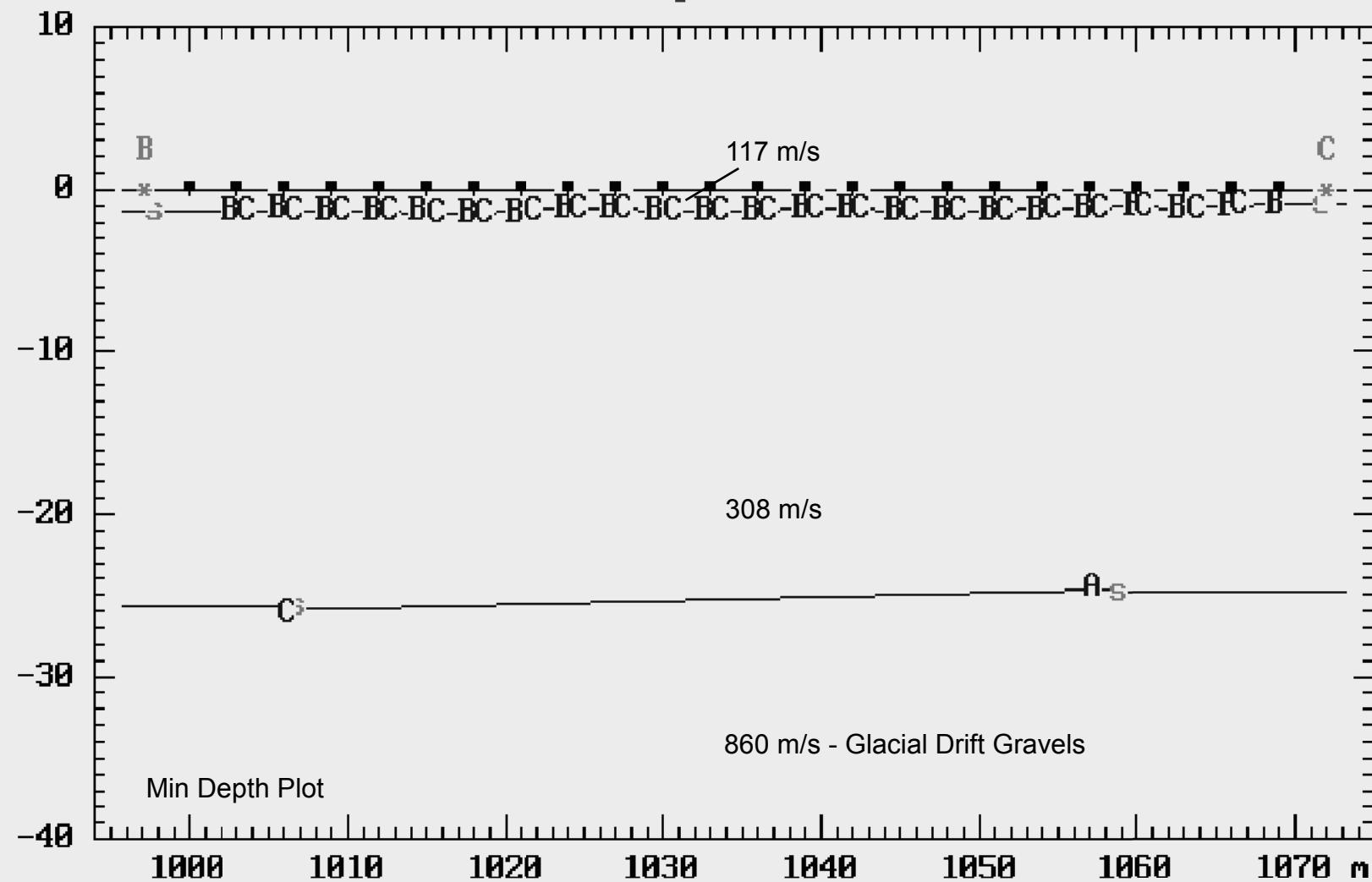


Peone Prairie S-wave

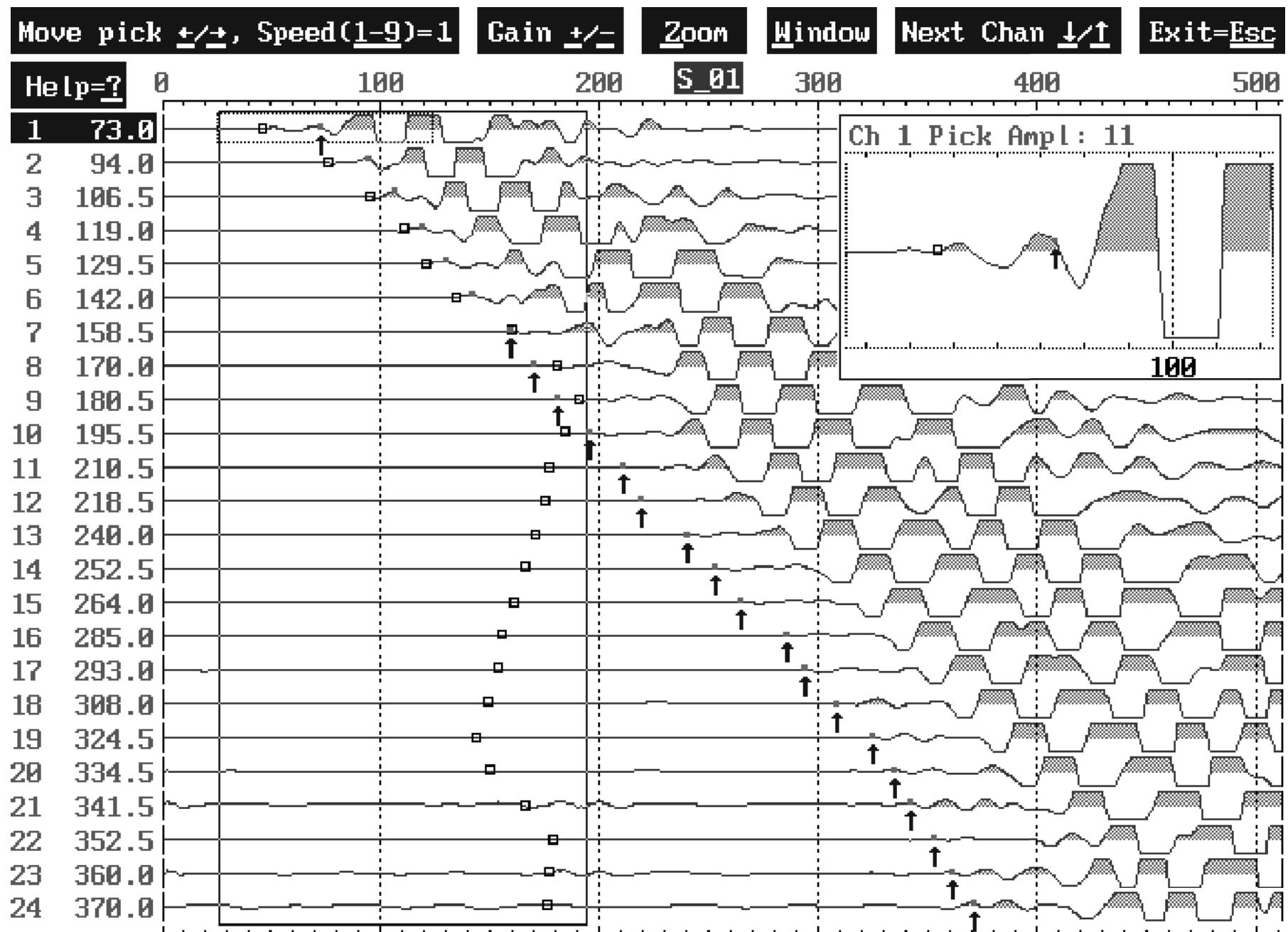
Press Esc to EXIT

PEONSMIN.SIP : Peone Prairie Minimum Depth Plot

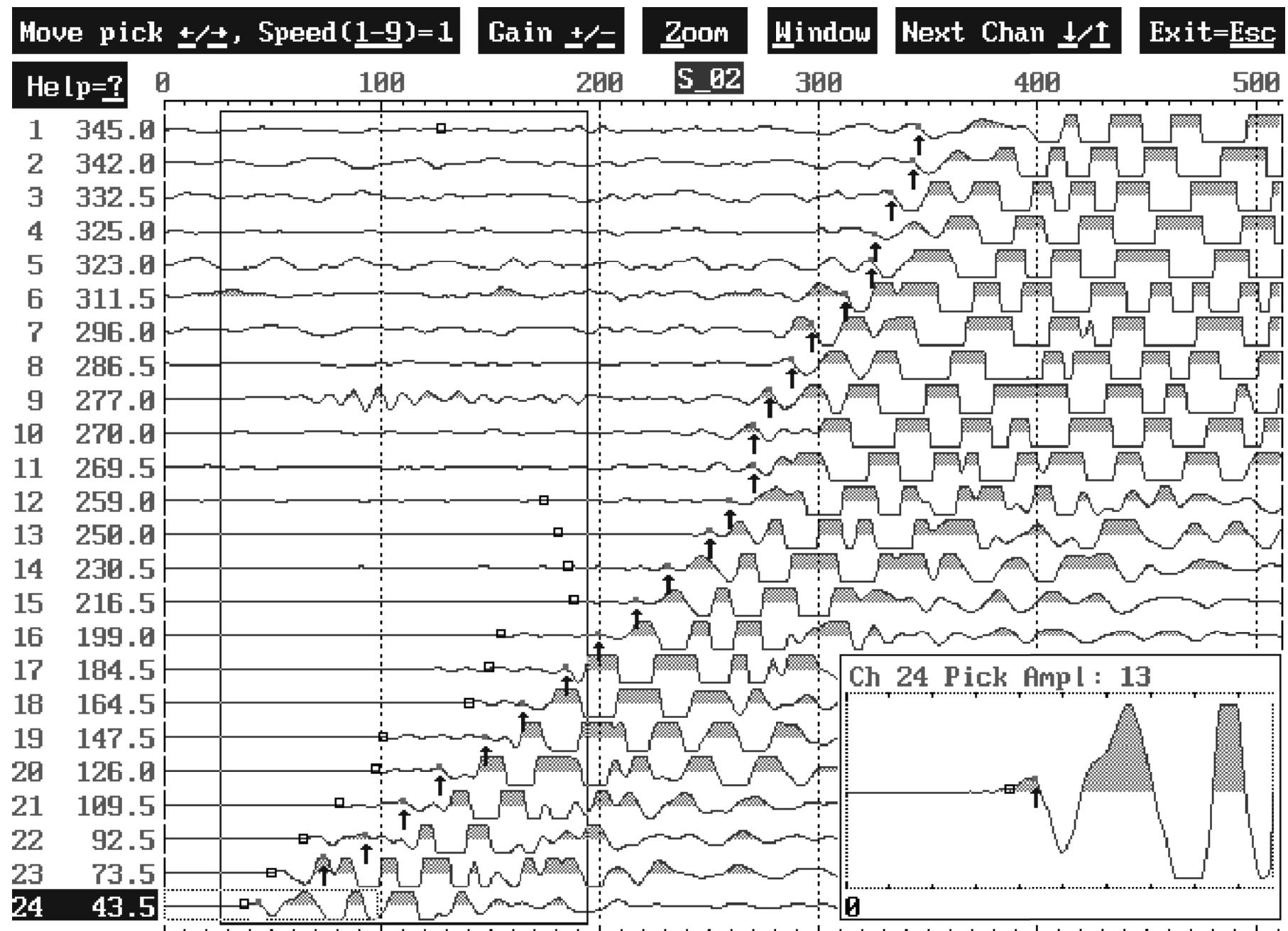
Spread A



Pigman Farm S-wave

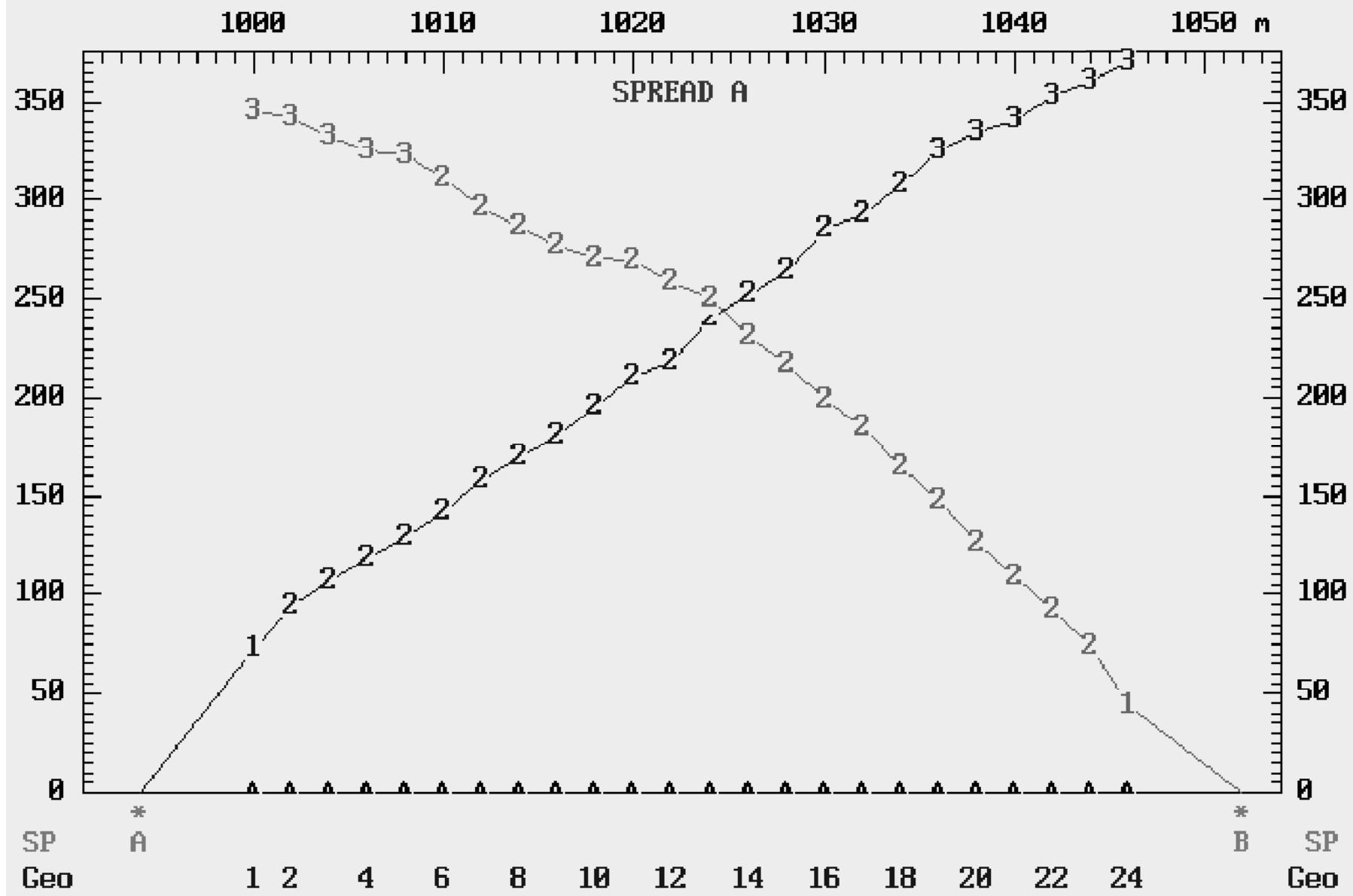


Pigman Farm S-wave



Pigman Farm S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

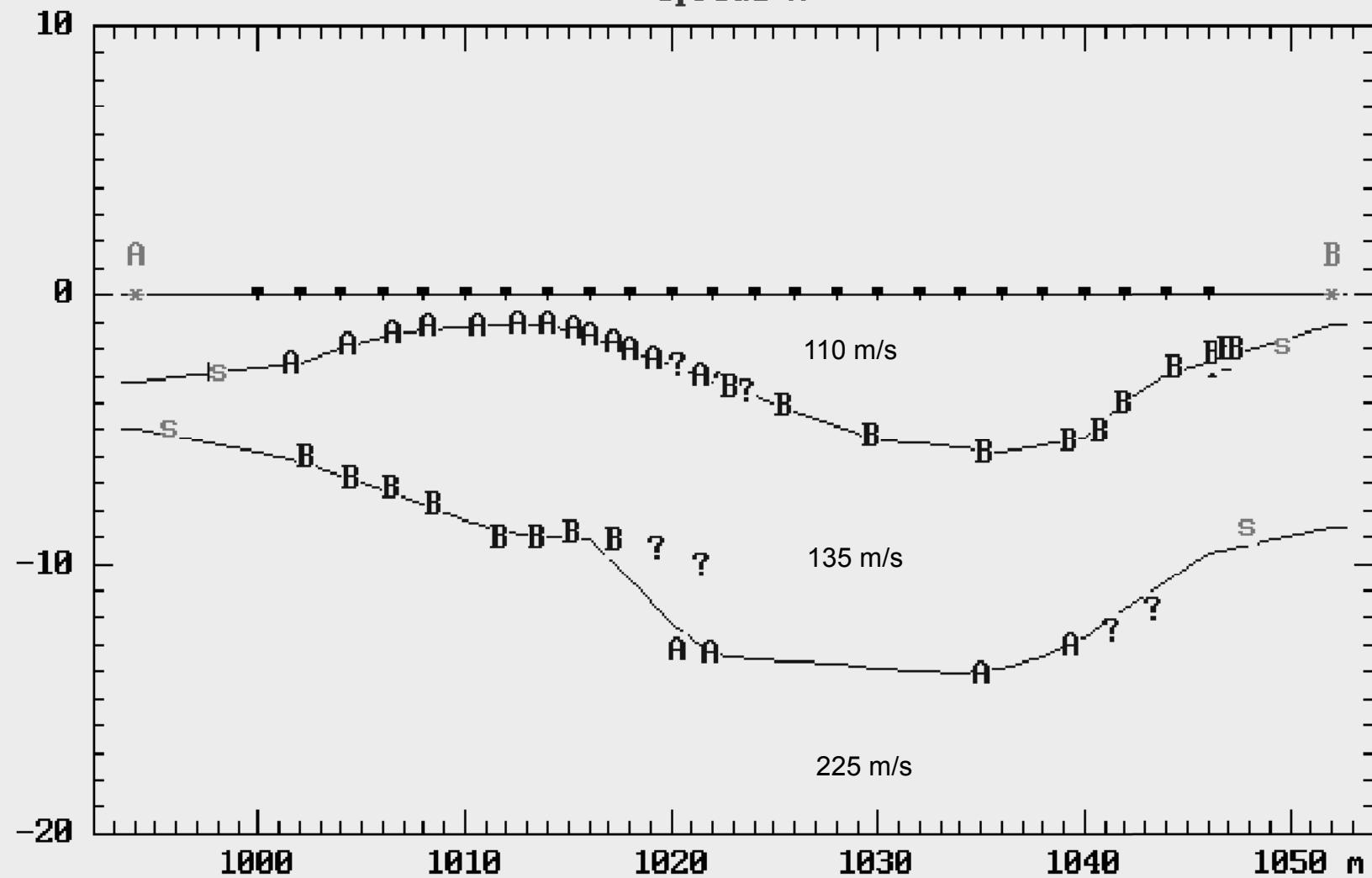


Pigman Farm S-wave

Press Esc to EXIT

PIGMSWAU.SIP: Pigman Farm S-Waves■

Spread A

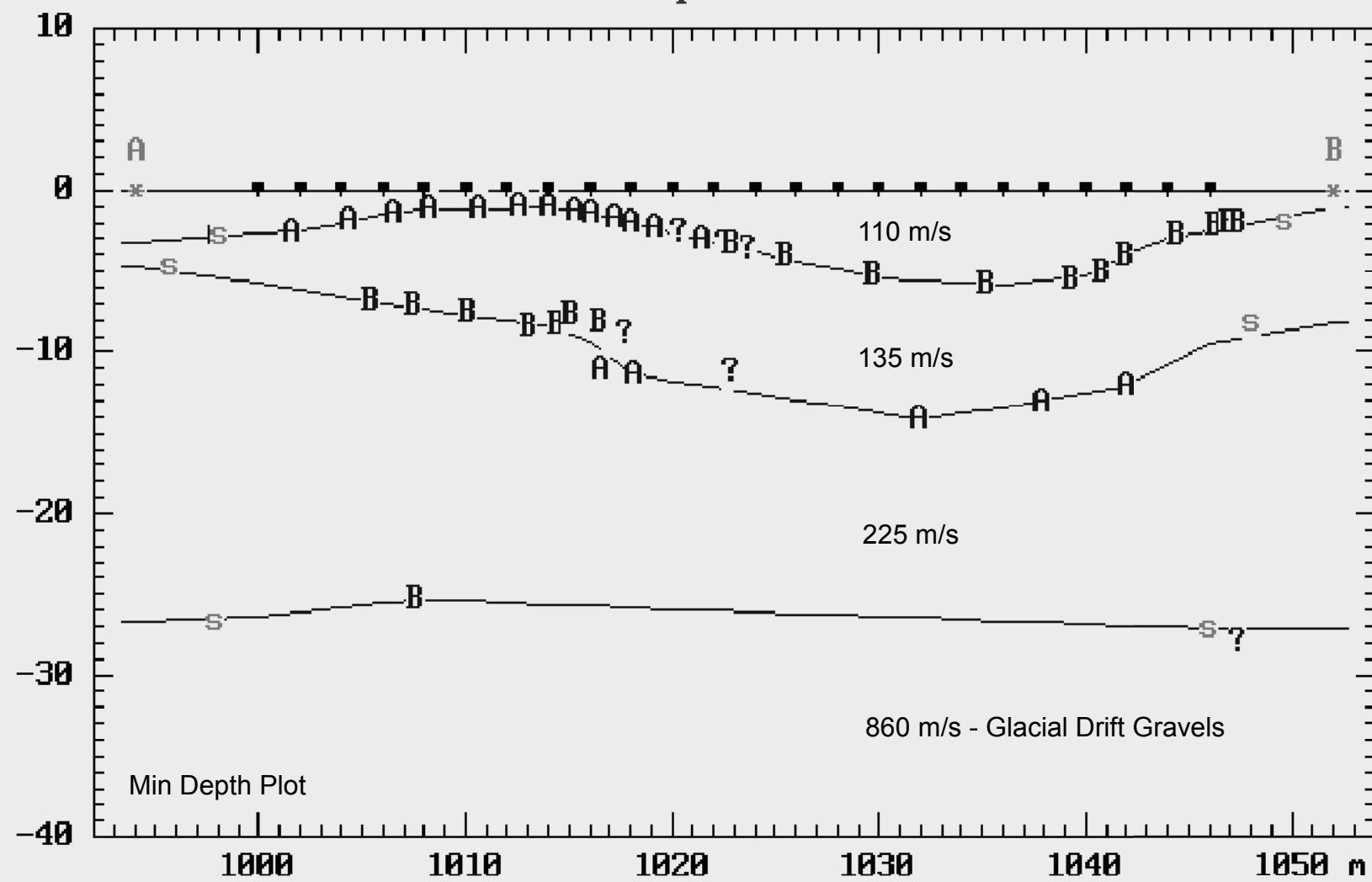


Pigman Farm S-wave

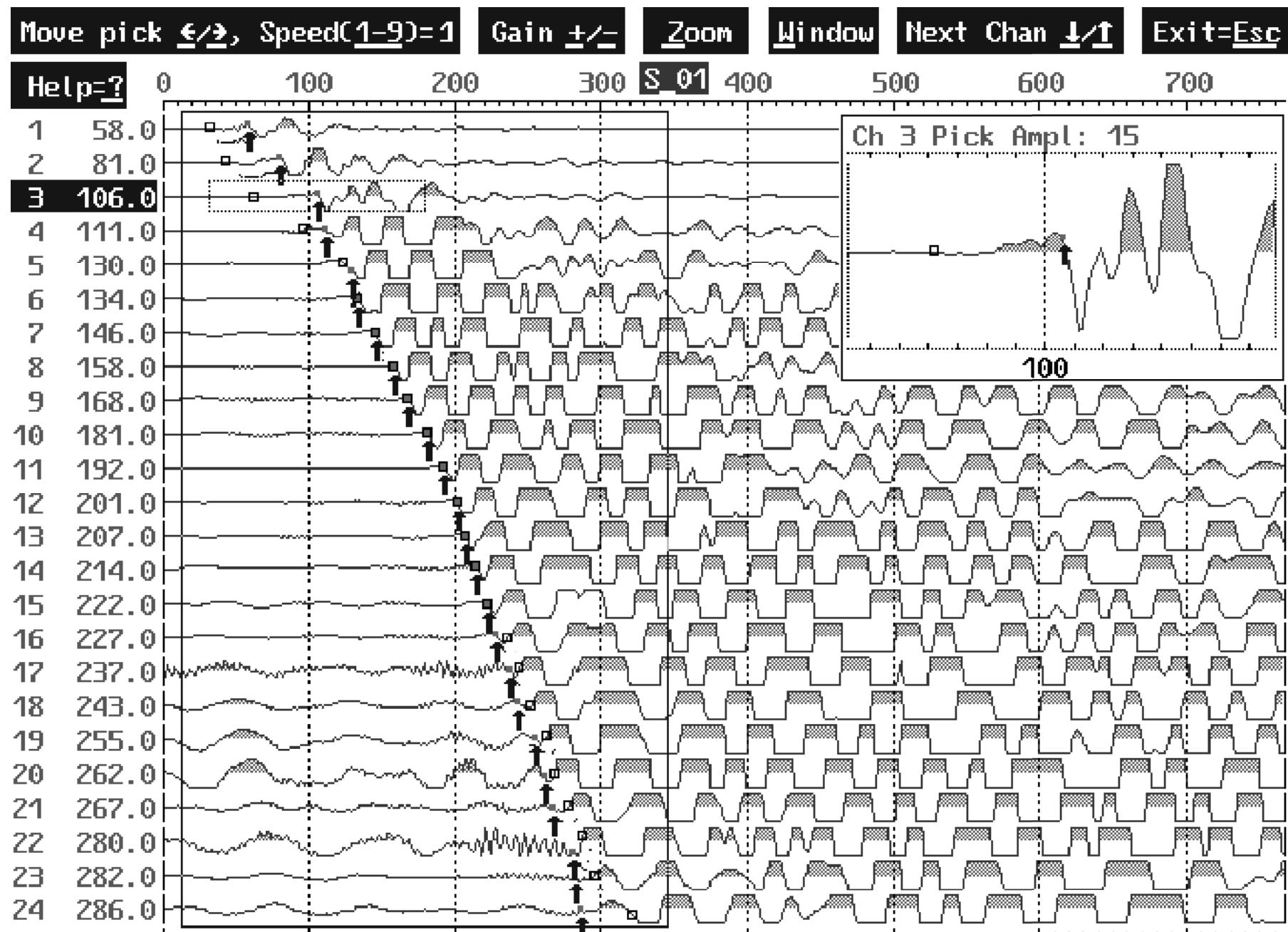
Press Esc to EXIT

PIGMSMIN.SIP: Pigman Farm Minimum Depth Model

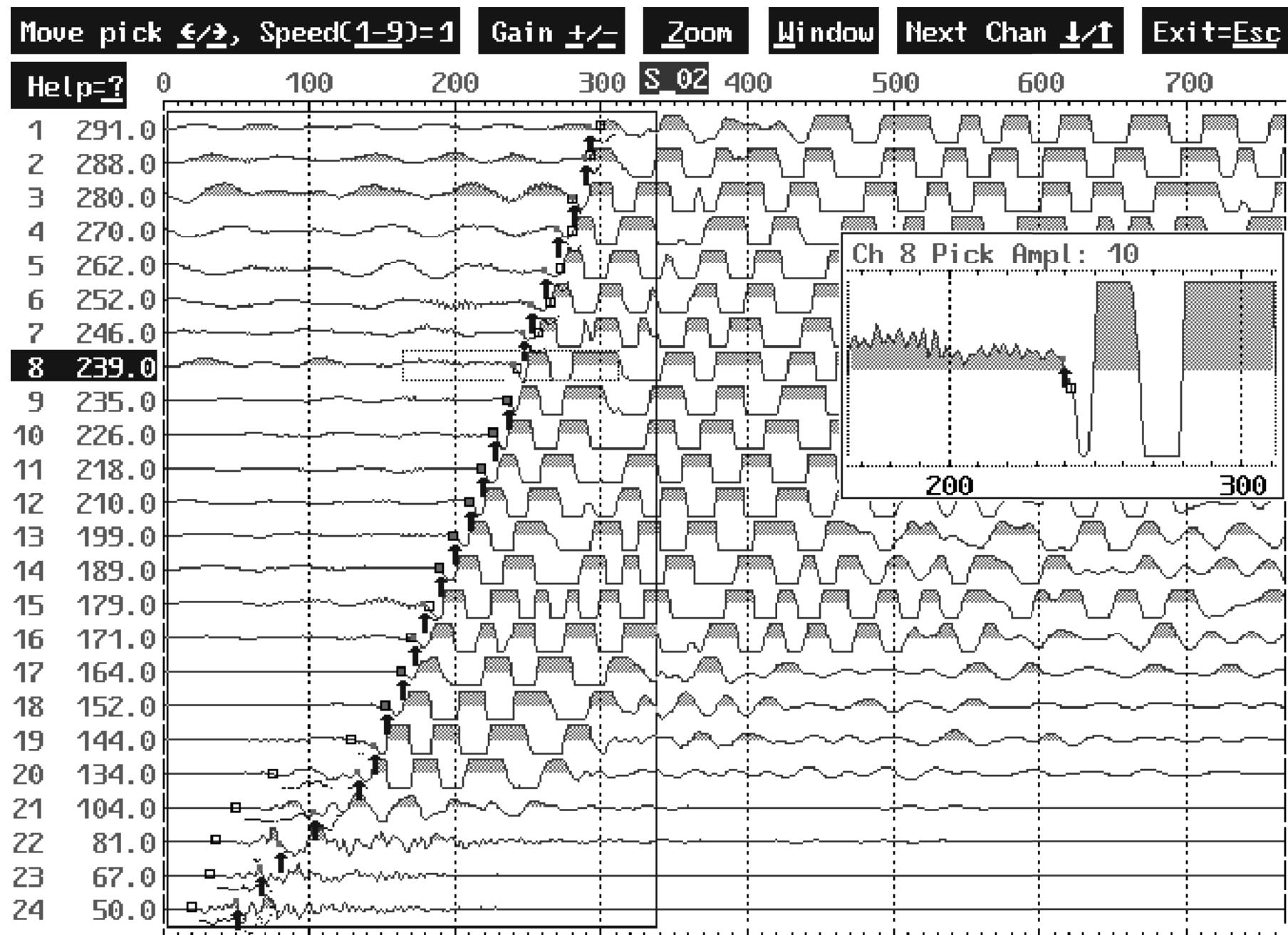
Spread A



Pilchuck Park S-wave

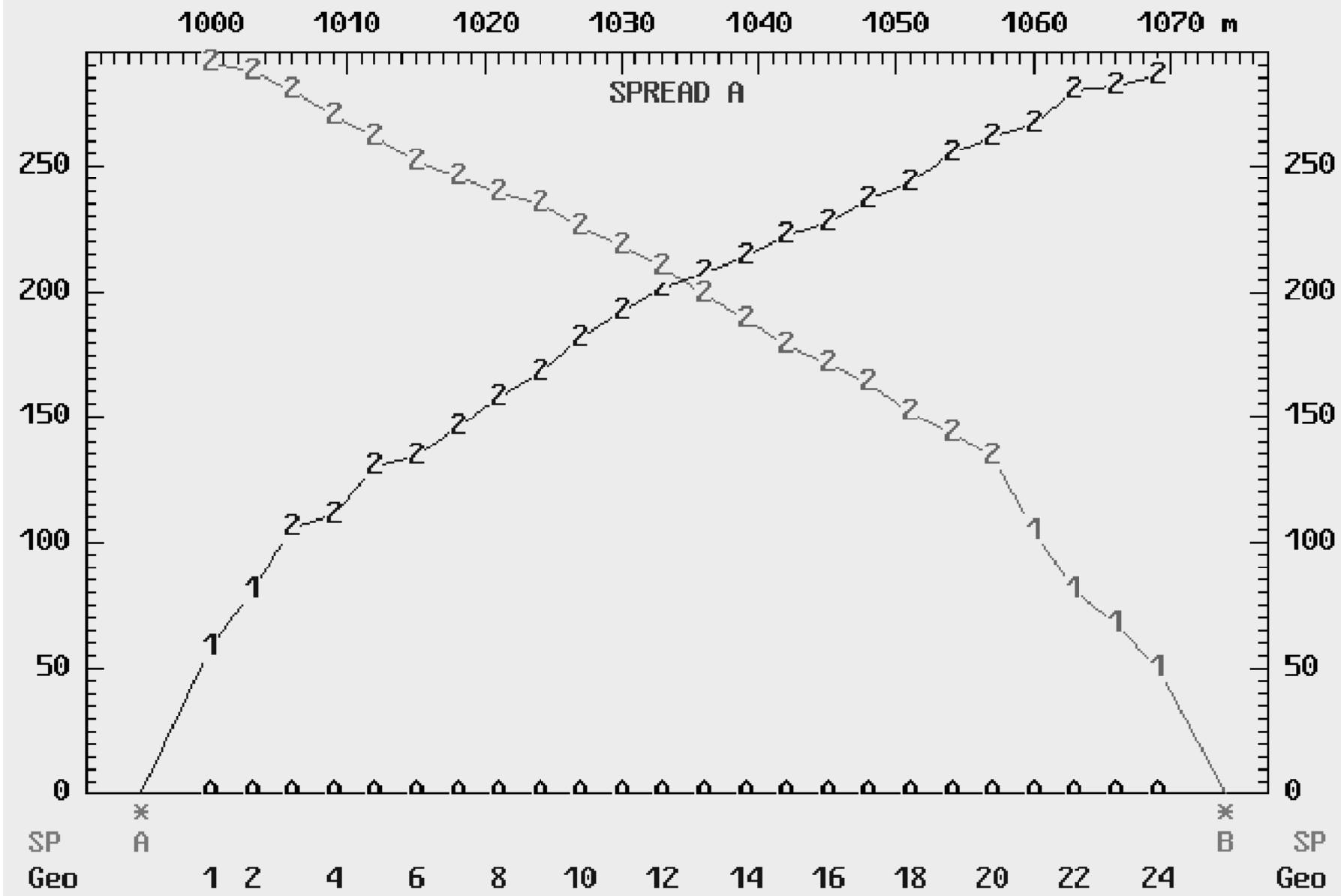


Pilchuck Park S-wave



Pilchuck Park S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

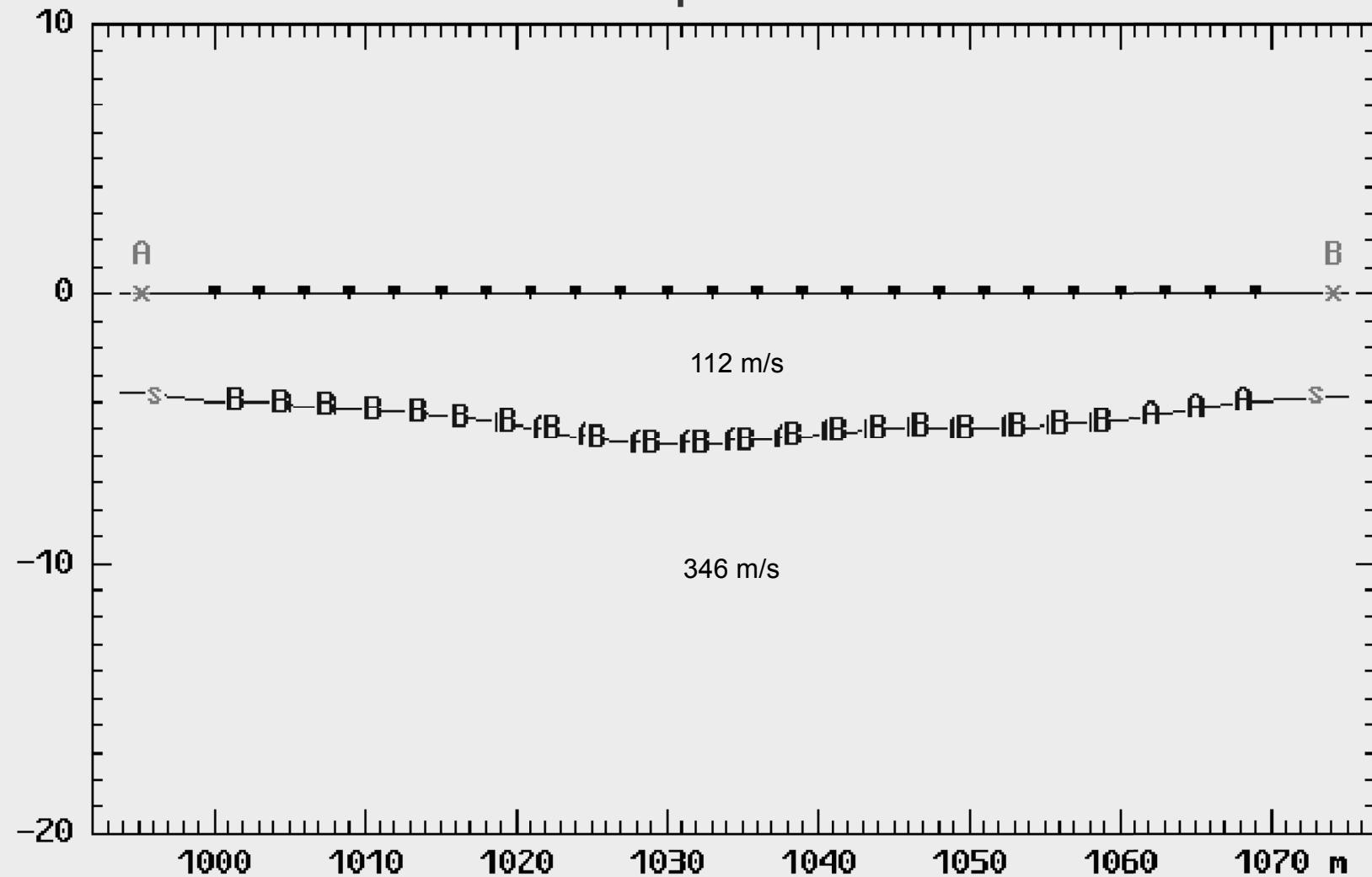


Pilchuck Park S-wave

Press Esc to EXIT

PILSWAV.SIP: Pilchuck Park S-Waves

Spread A

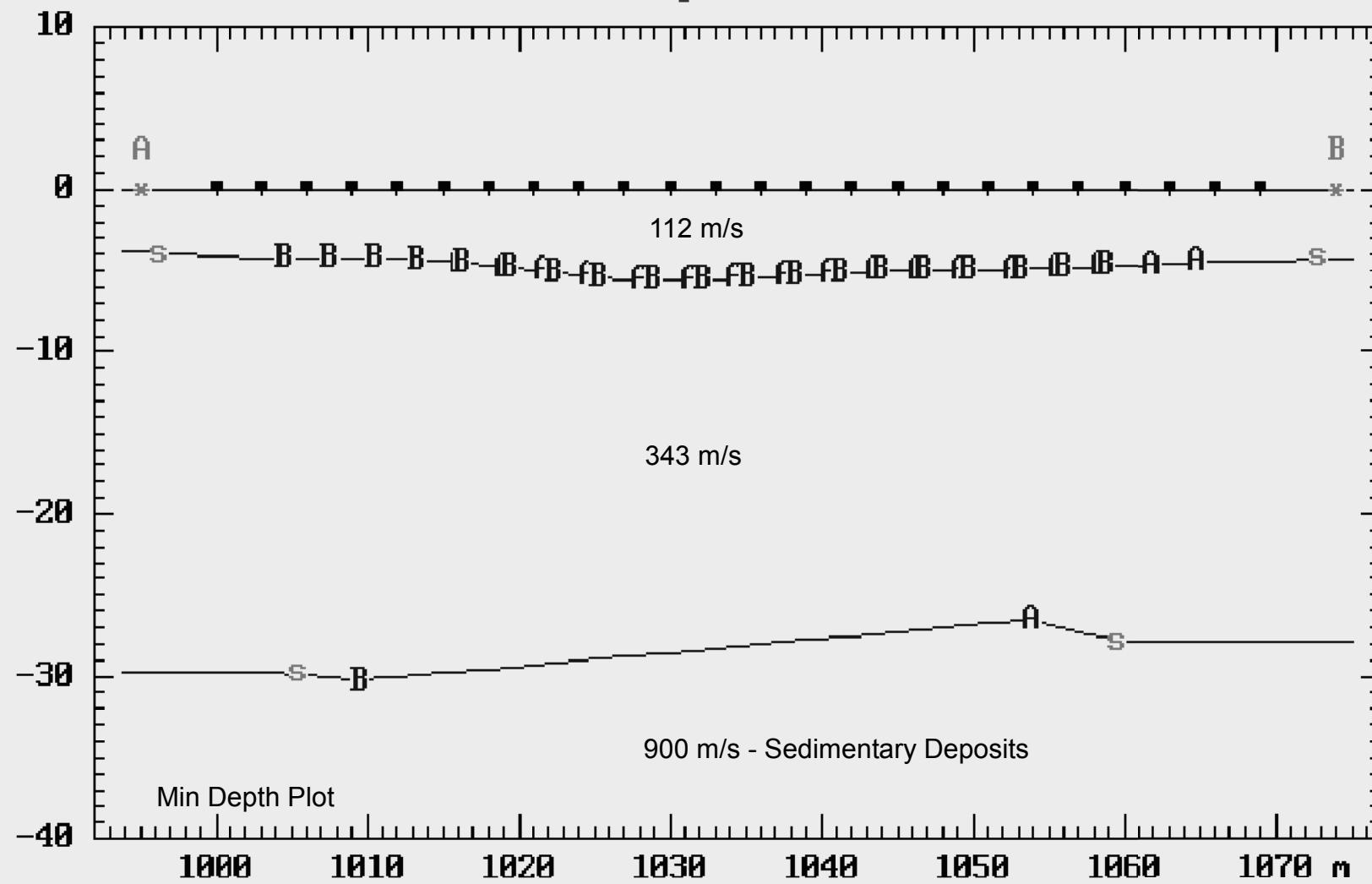


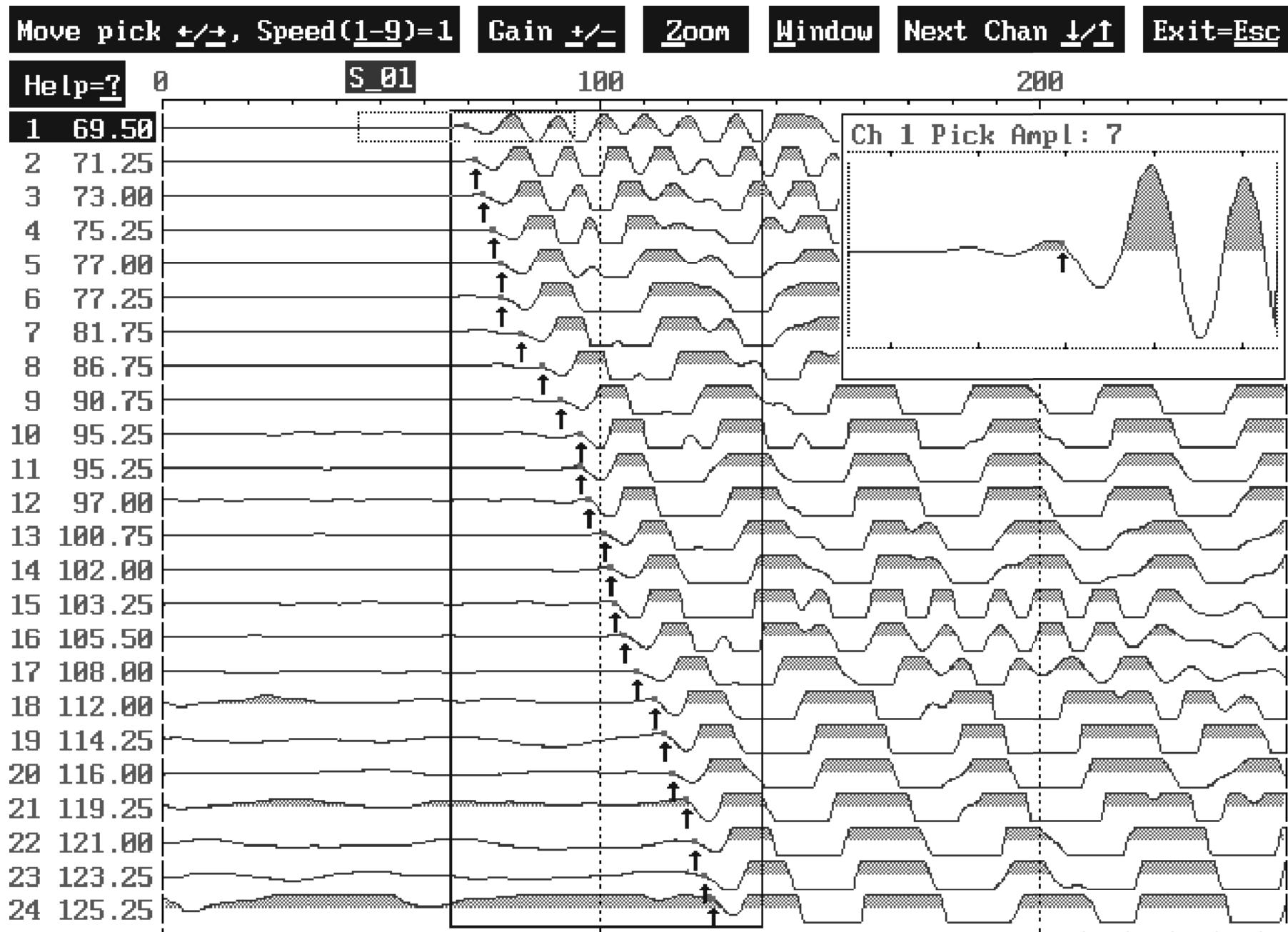
Pilchuck Park S-wave

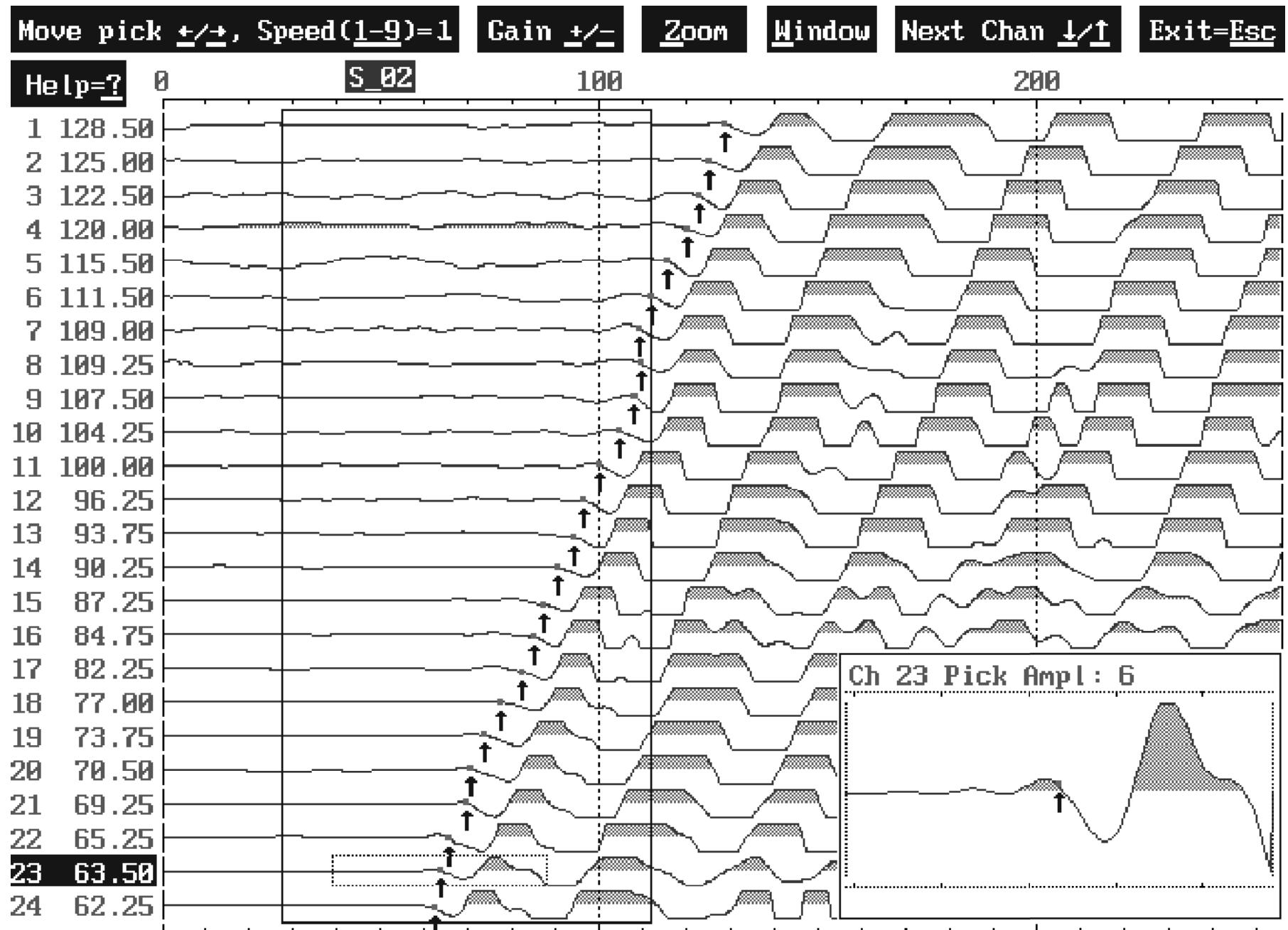
Press Esc to EXIT

PILSMIN.SIP: Pilchuck Park Minimum Depth Plot

Spread A

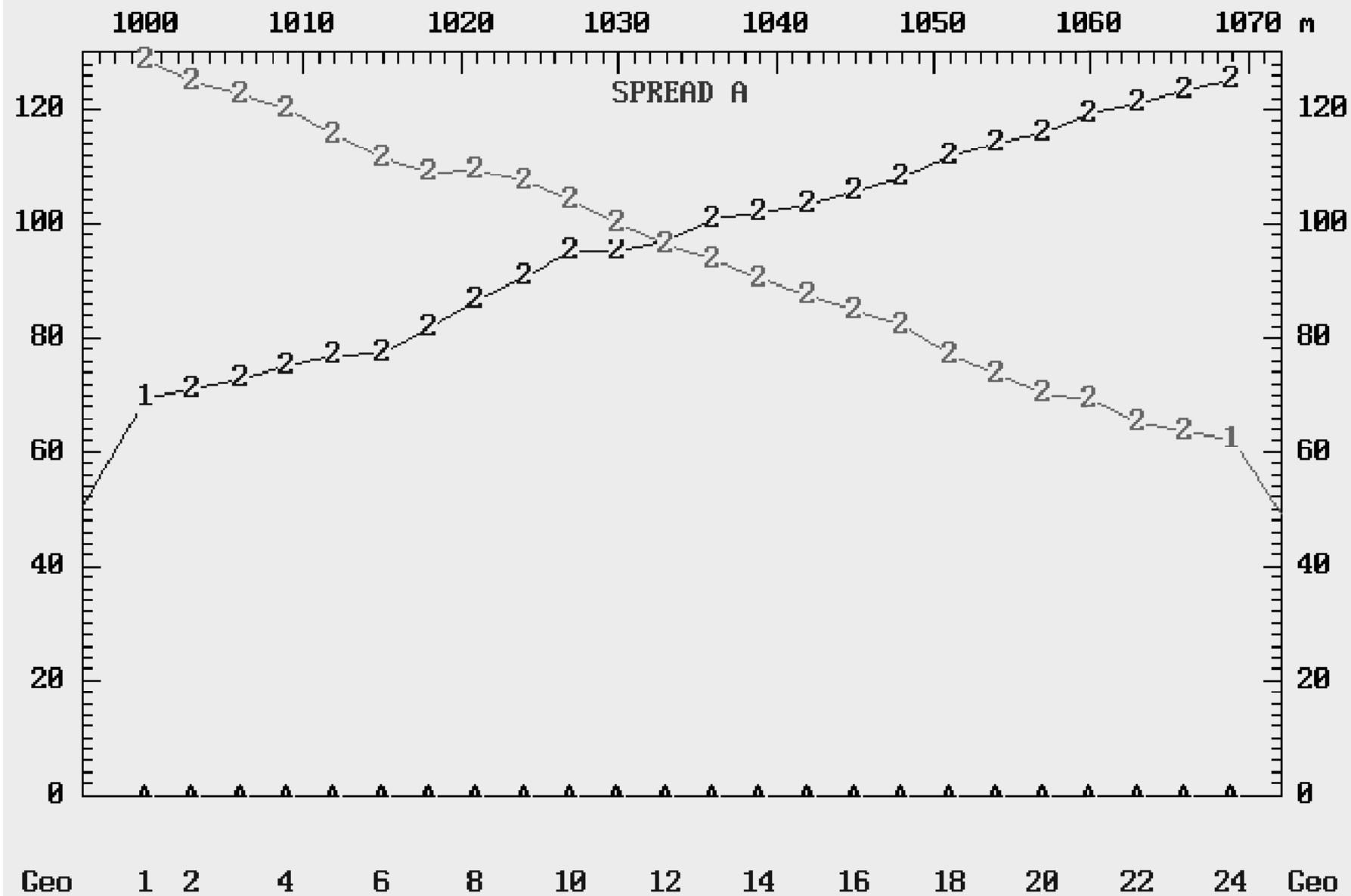


Pioneer Middle School S-wave

Pioneer Middle School S-wave

Pioneer Middle School S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

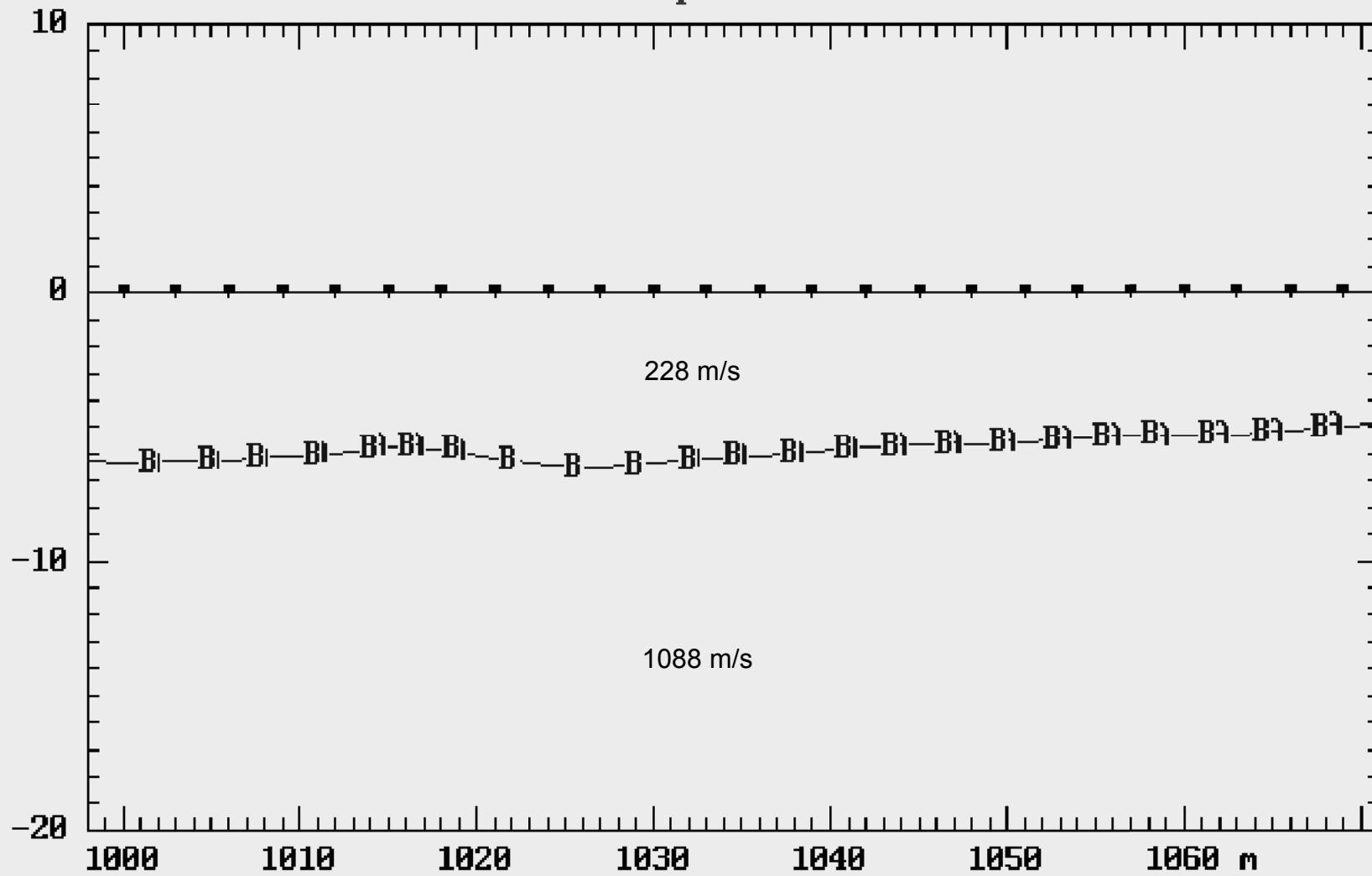


Pioneer Middle School S-wave

Press Esc to EXIT

PIONSWAV.SIP: Pioneer Middle School S-Waves

Spread A

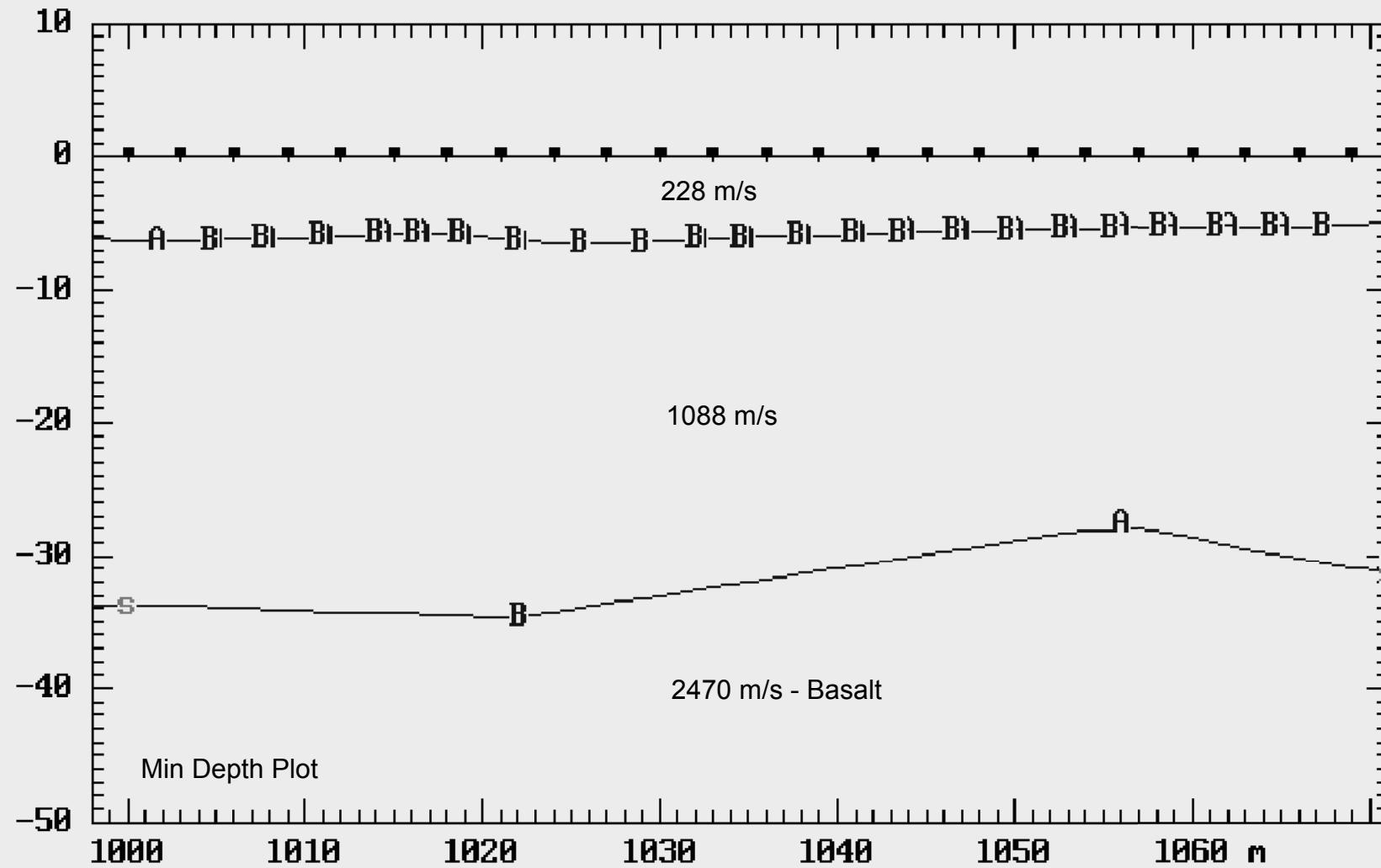


Pioneer Middle School S-wave

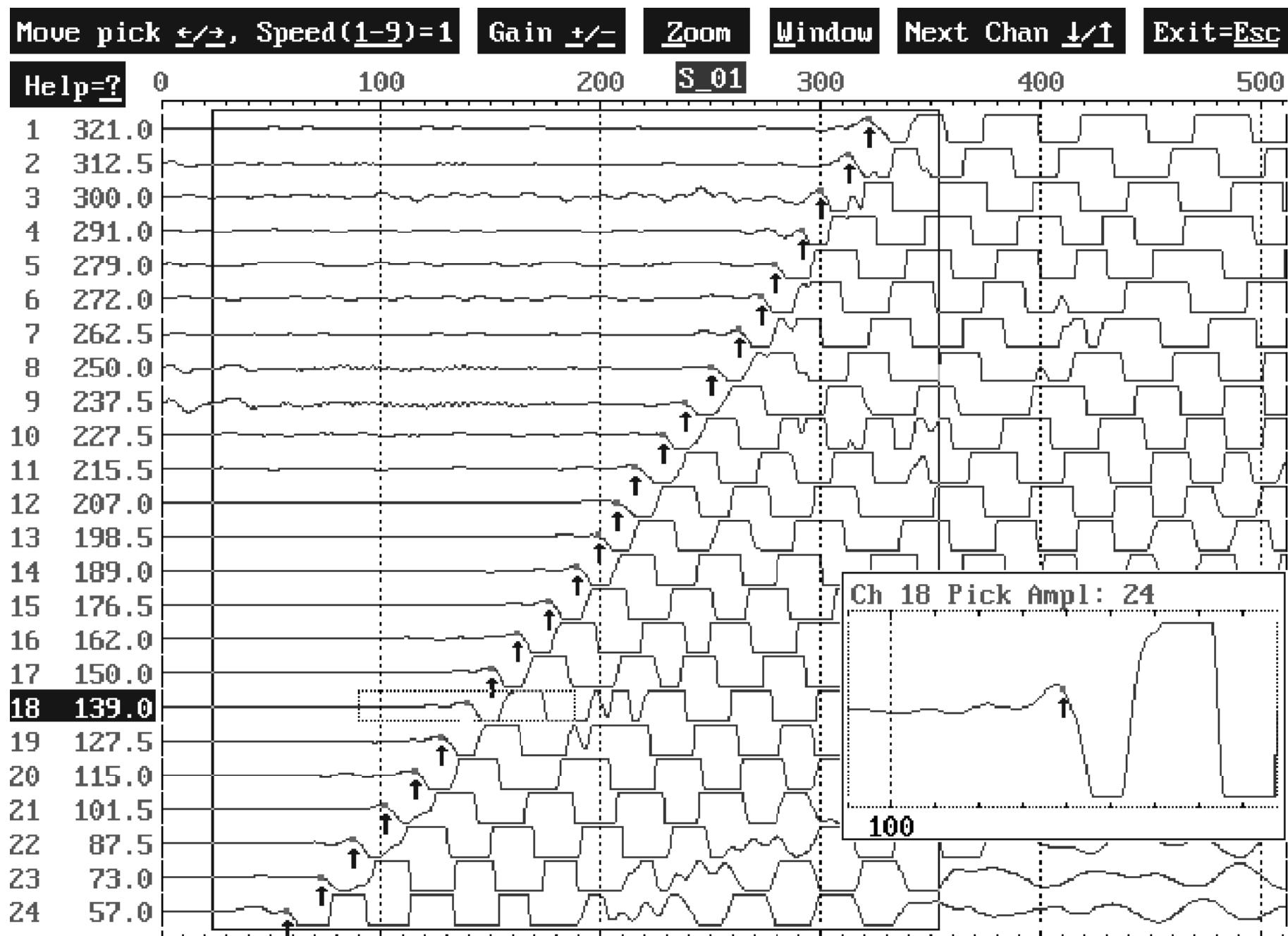
Press Esc to EXIT

PIONSMIN.SIP: Pioneer Middle School Minimum Depth Plot

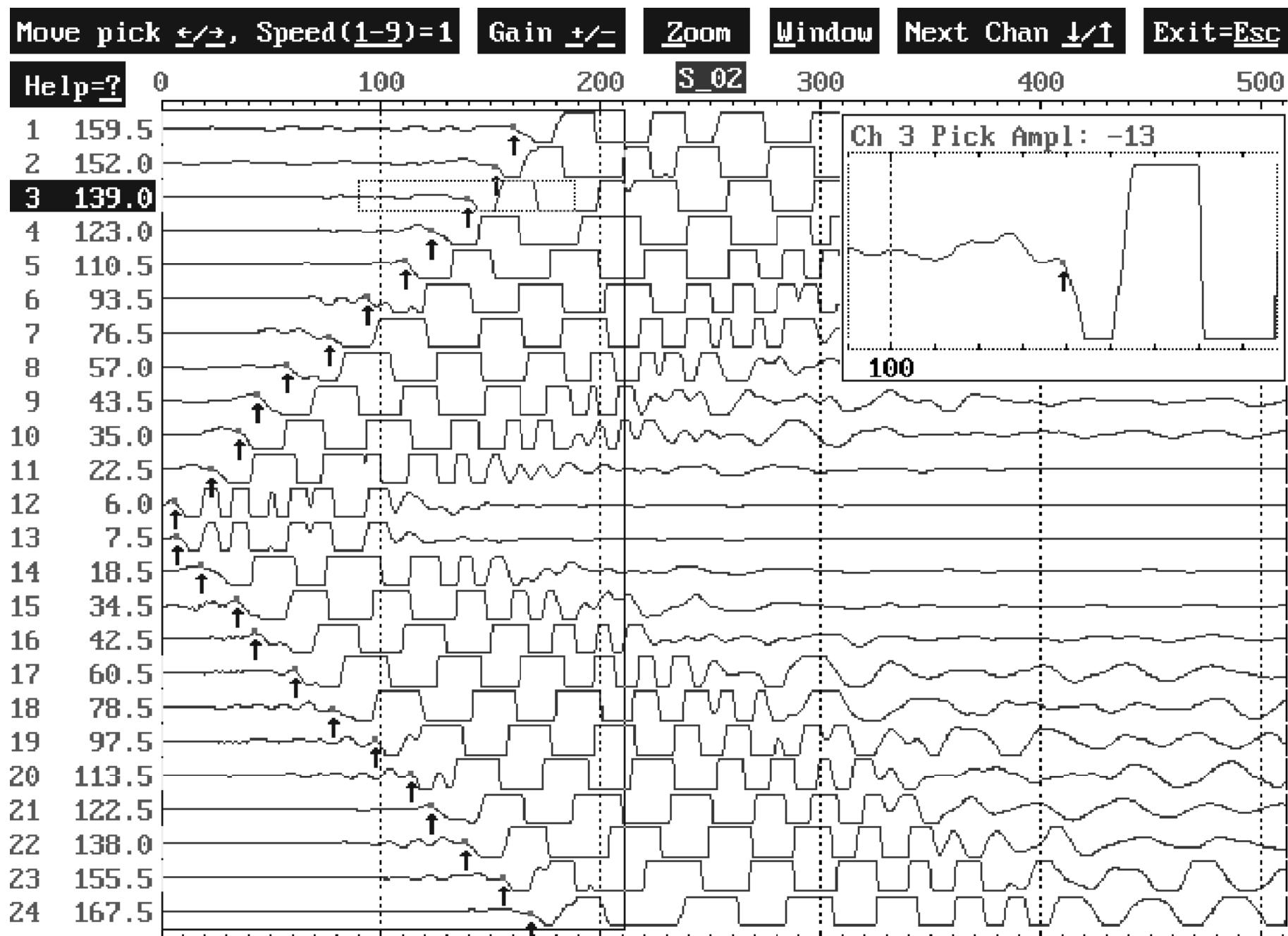
Spread A



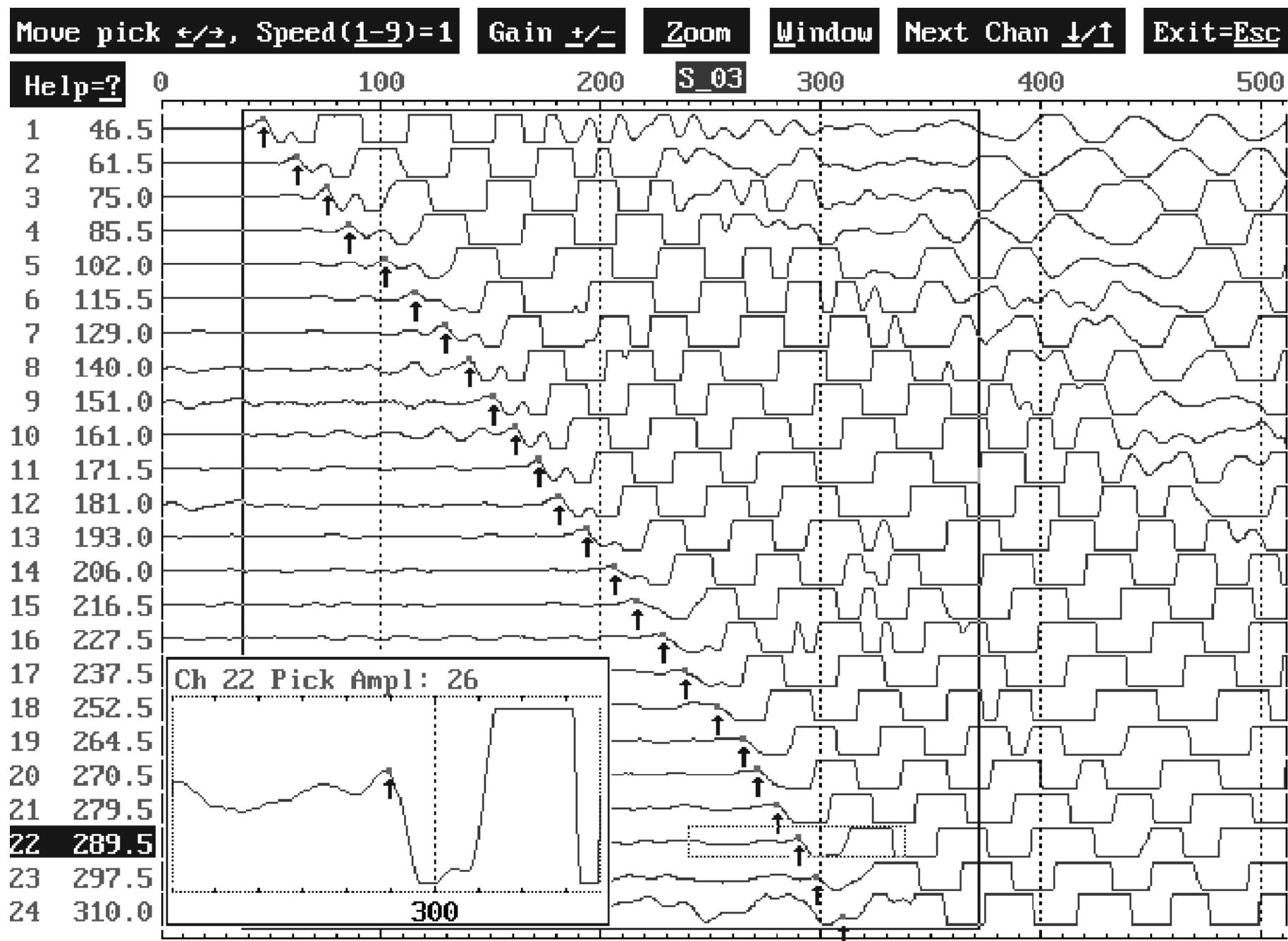
Port Susan Middle School S-wave



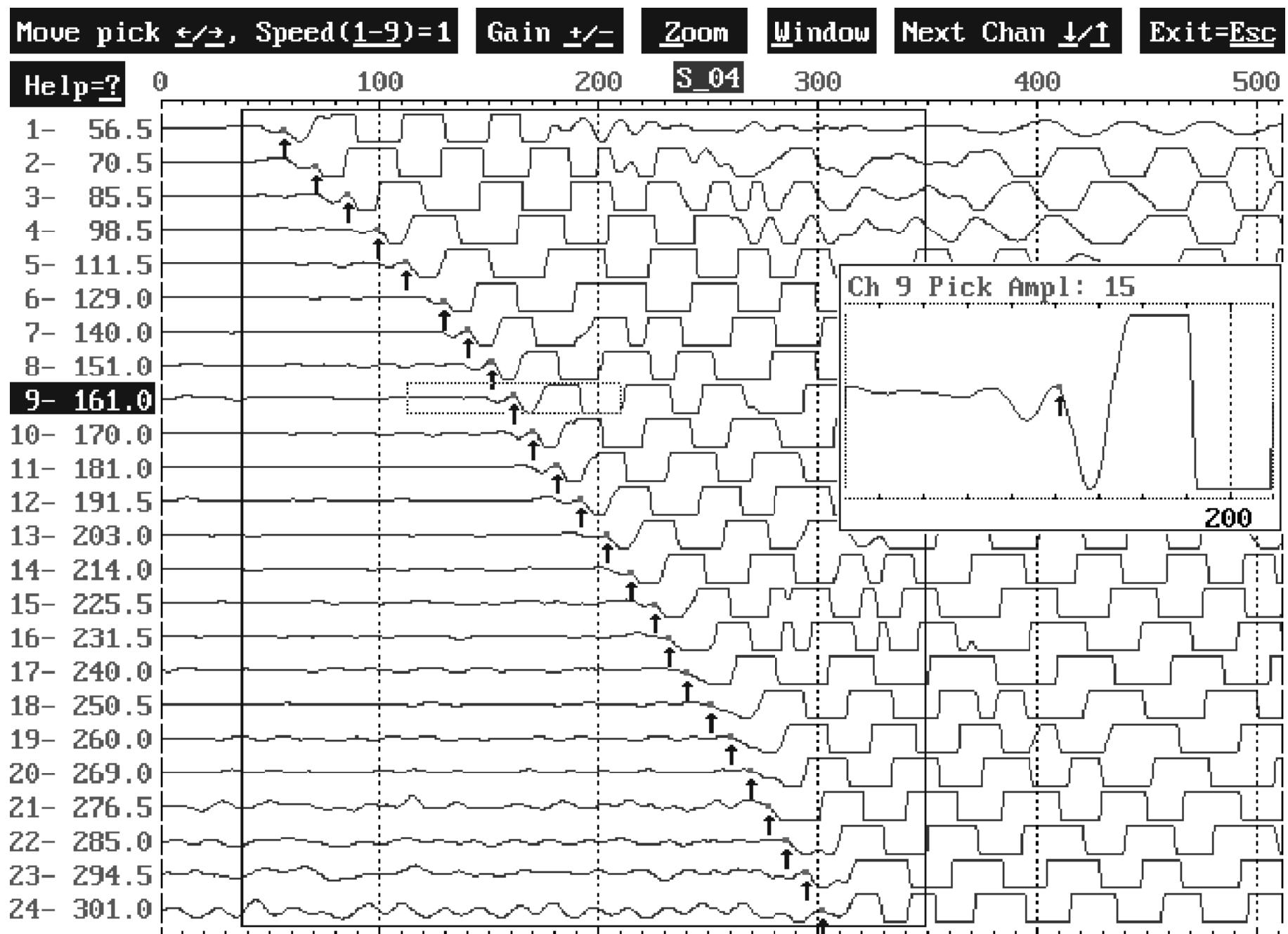
Port Susan Middle School S-wave



Port Susan Middle School S-wave

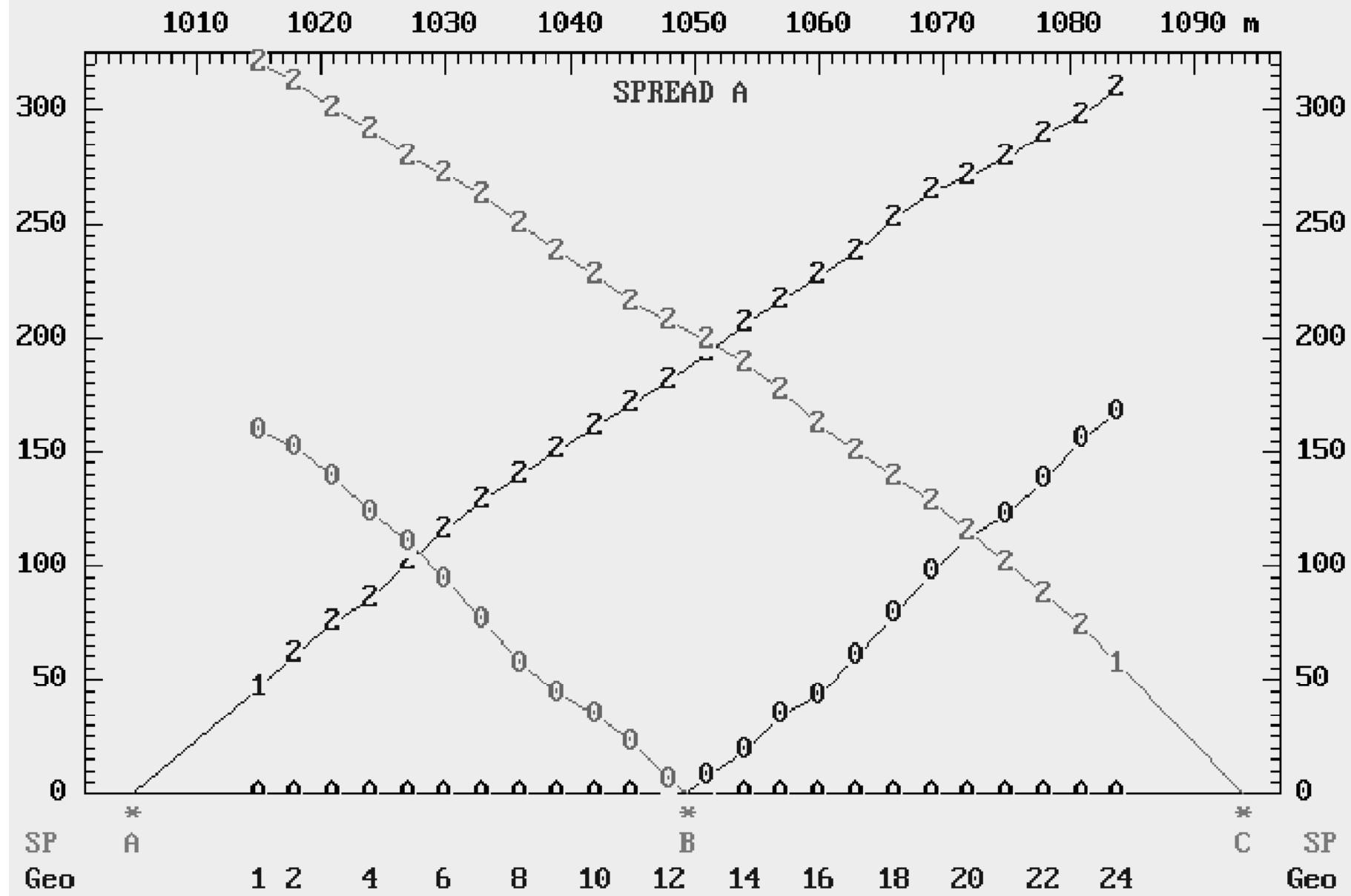


Port Susan Middle School S-wave



Port Susan Middle School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

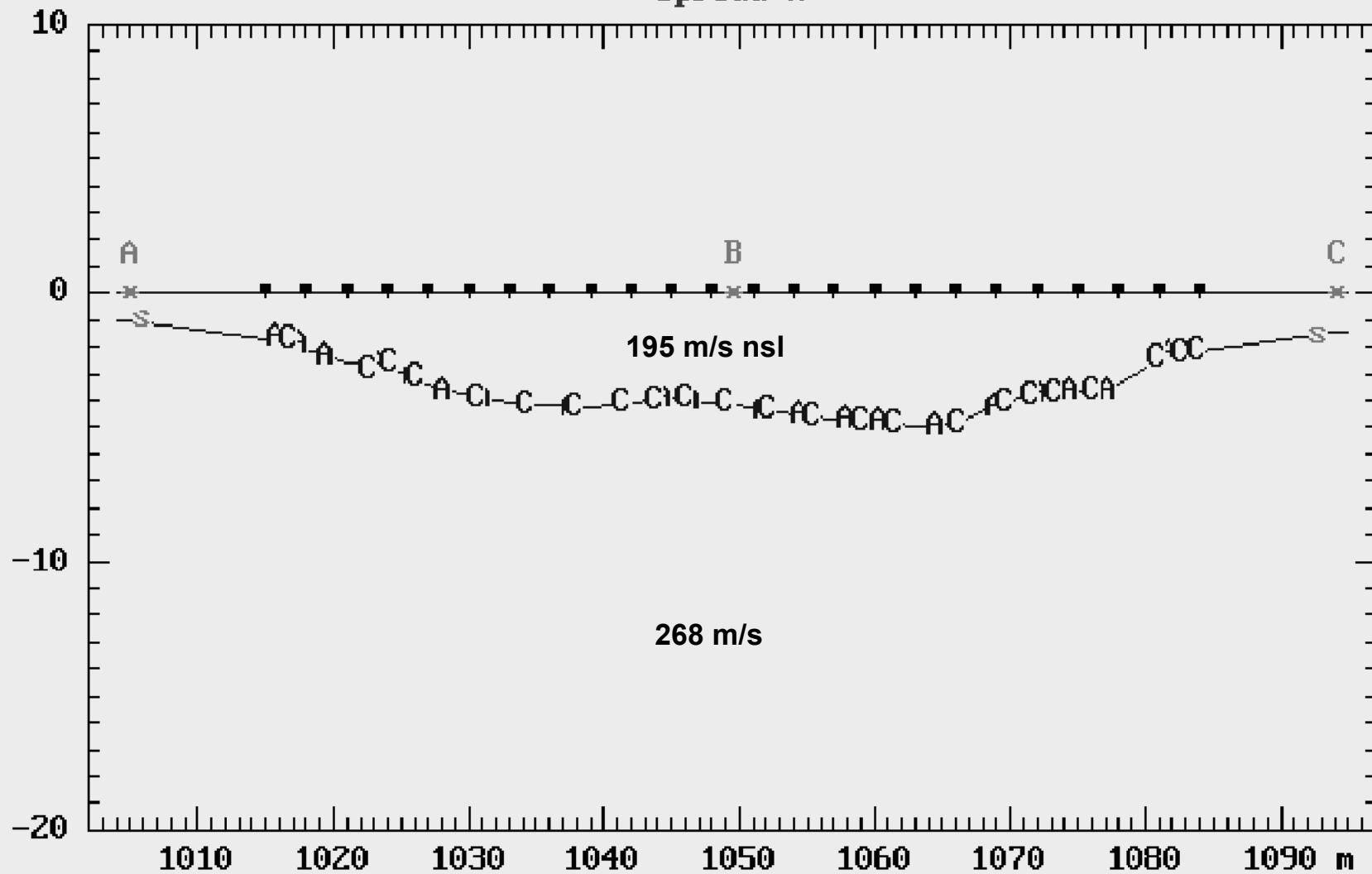


Port Susan Middle School S-wave

Press Esc to EXIT

PORTSWAV.SIP: Port Susan Middle School Shear Wave

Spread A

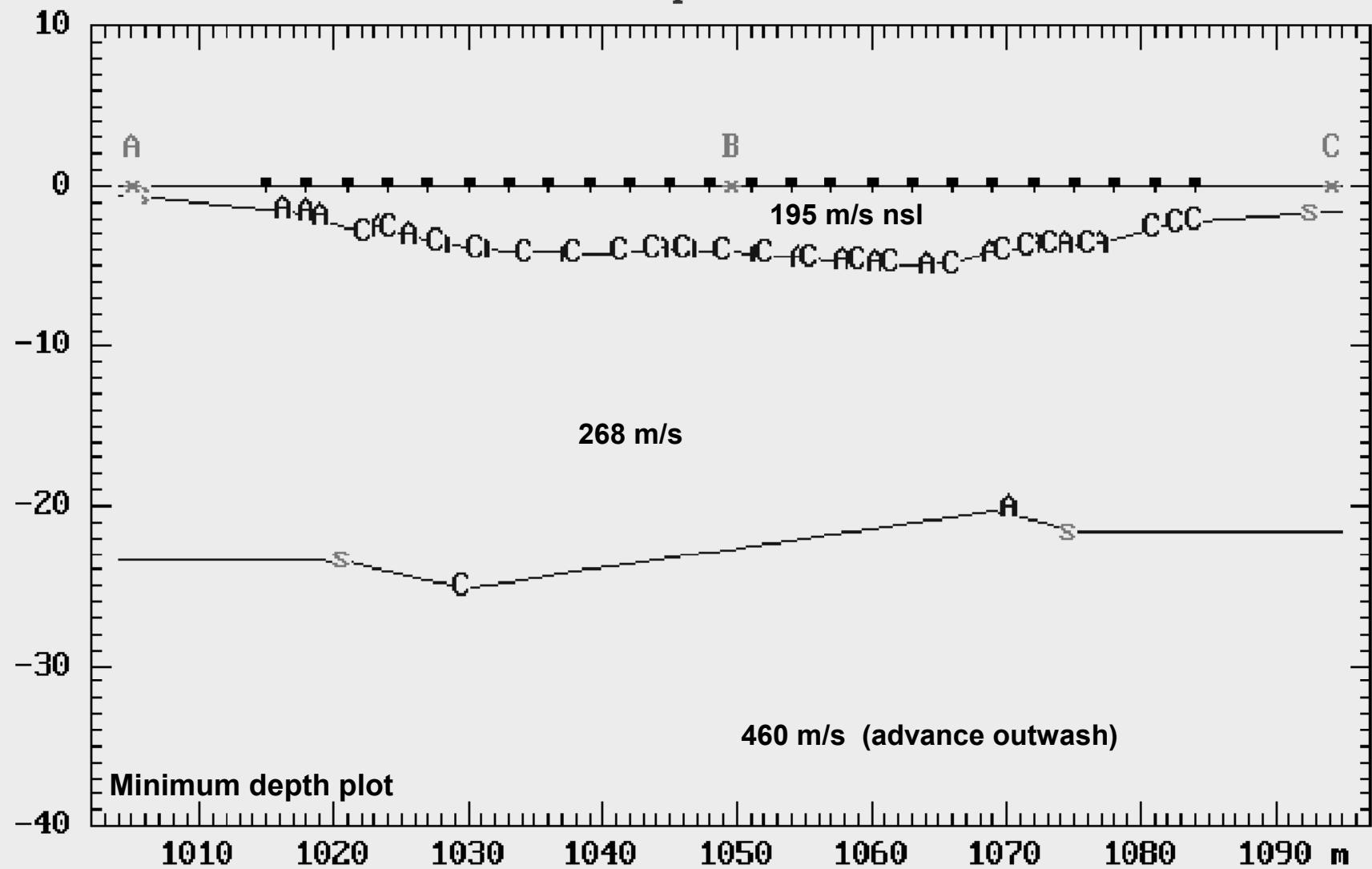


Port Susan Middle School S-wave

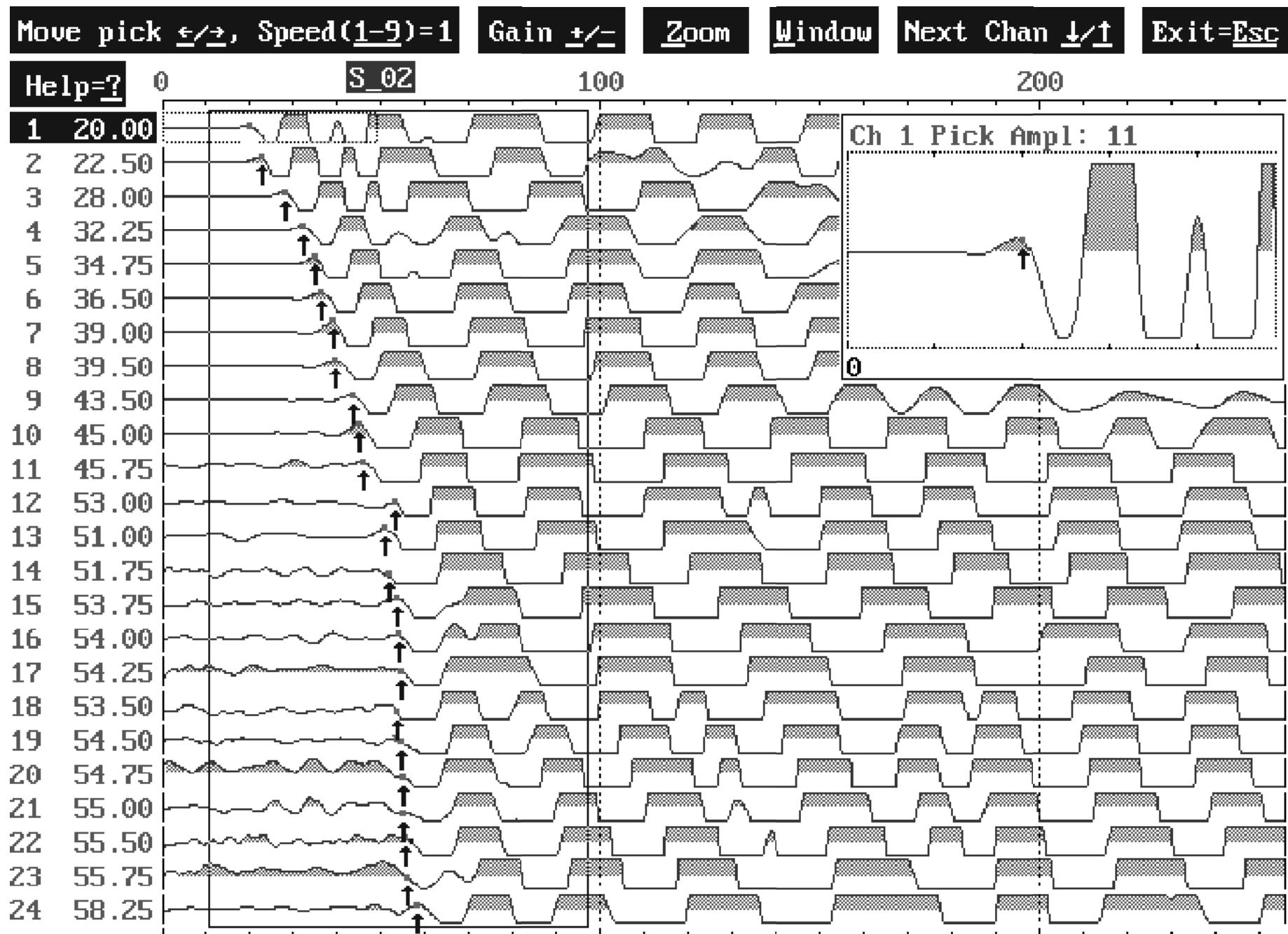
Press Esc to EXIT

PORISM2.SIP: Port Susan Middle School Shear Wave

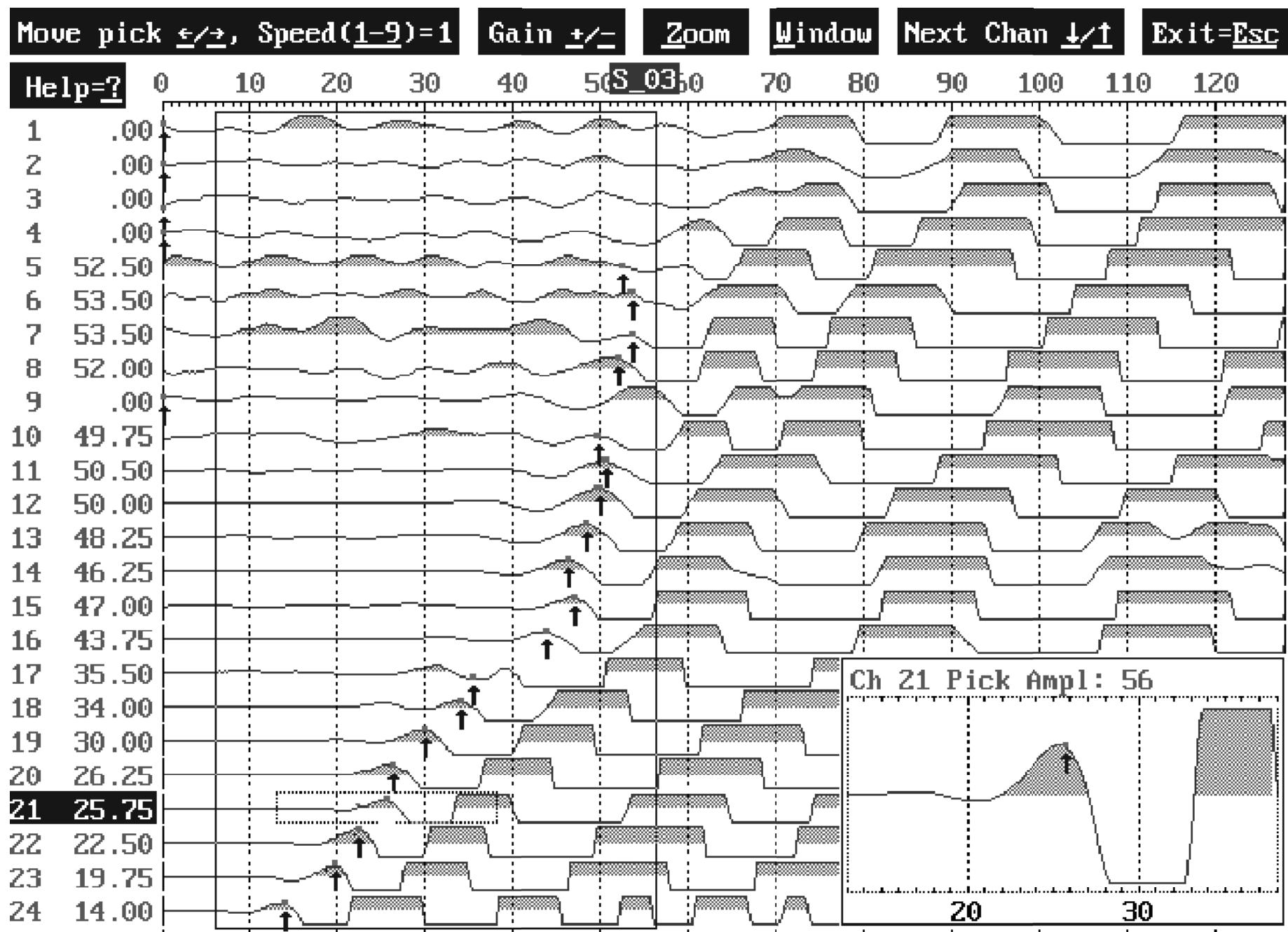
Spread A



Rambo Road S-wave

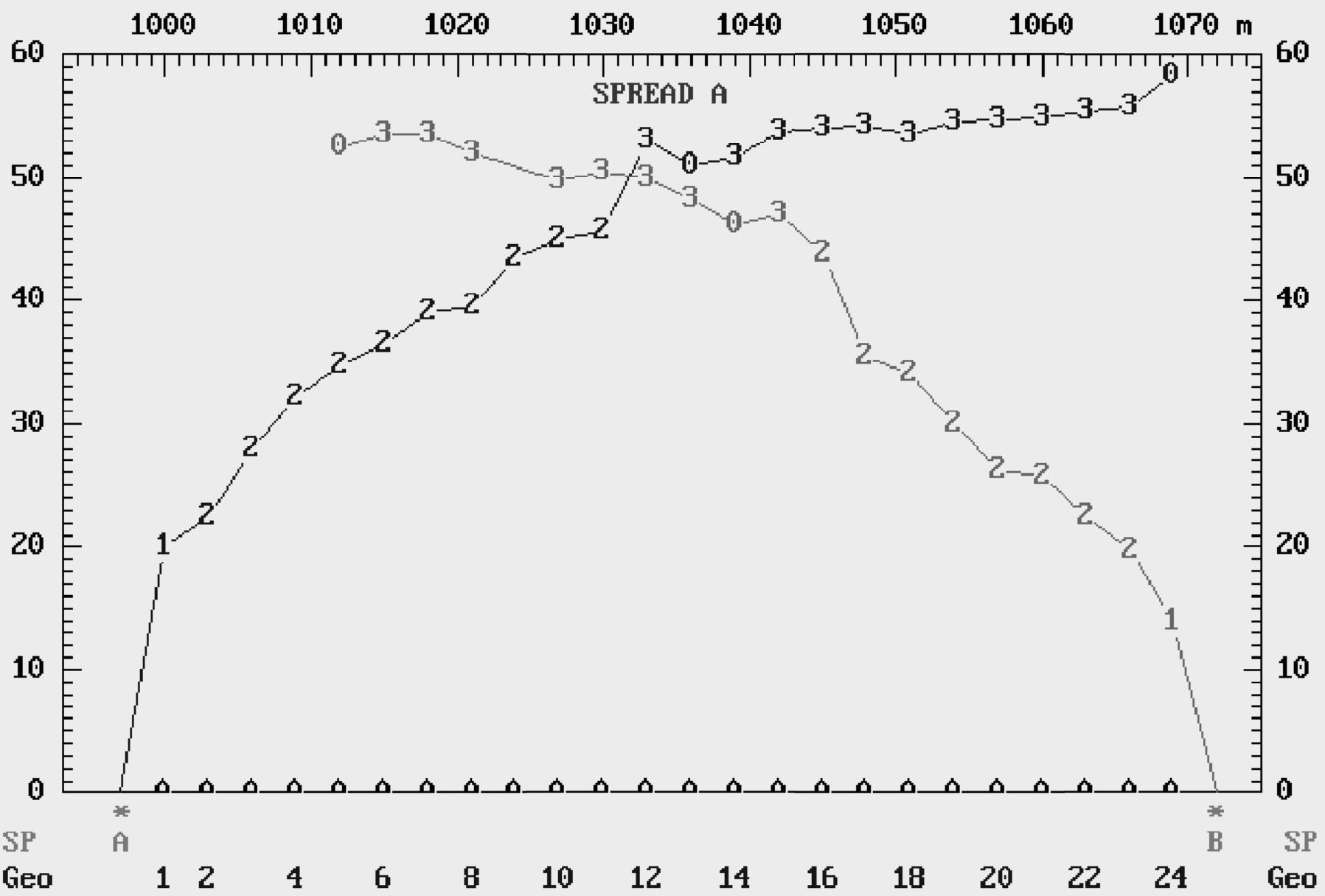


Rambo Road S-wave



Rambo Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

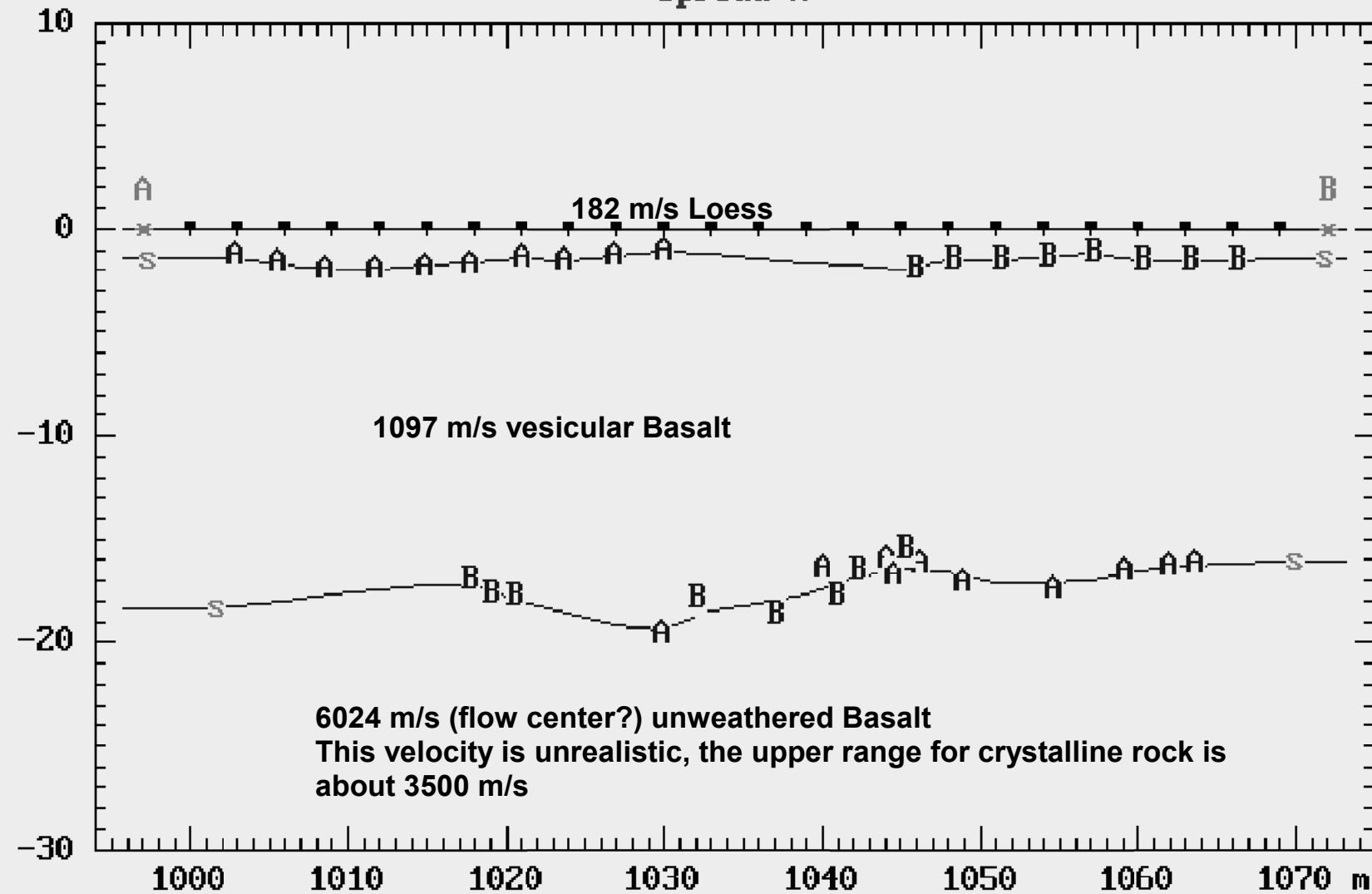


Rambo Road S-wave

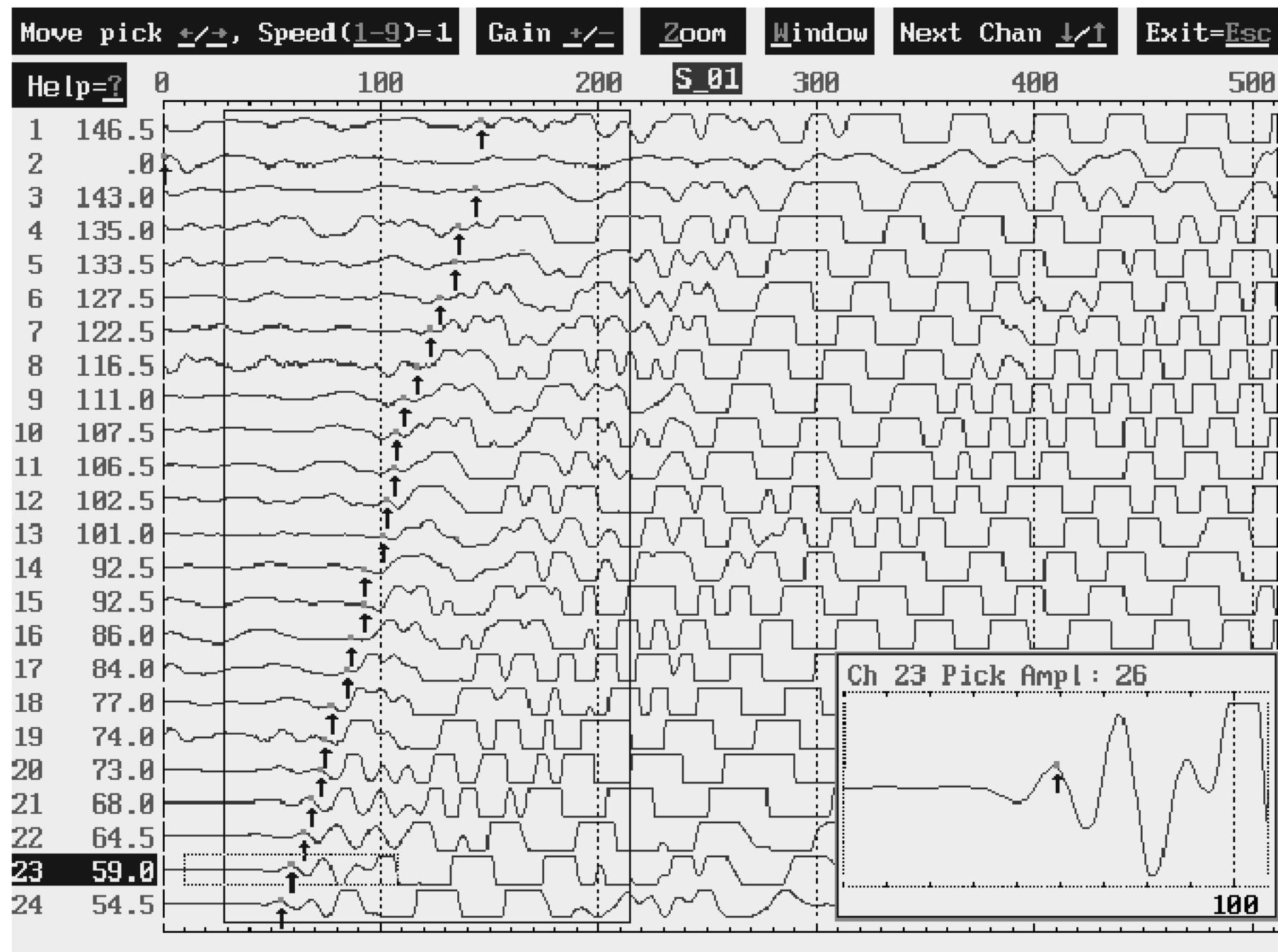
Press Esc to EXIT

RAMB_SW1.SIP: Rambo Road Shear Wave Survey

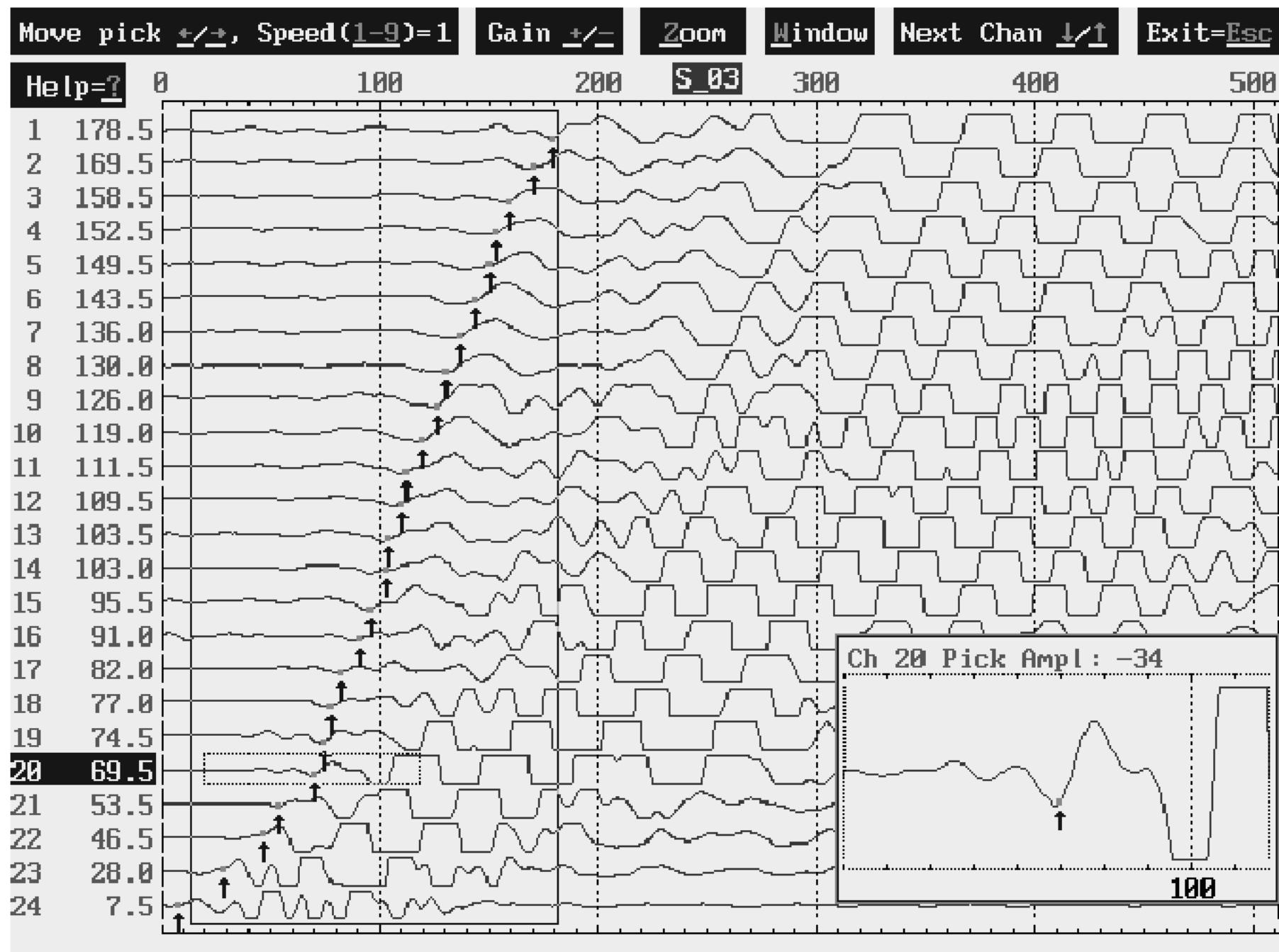
Spread A



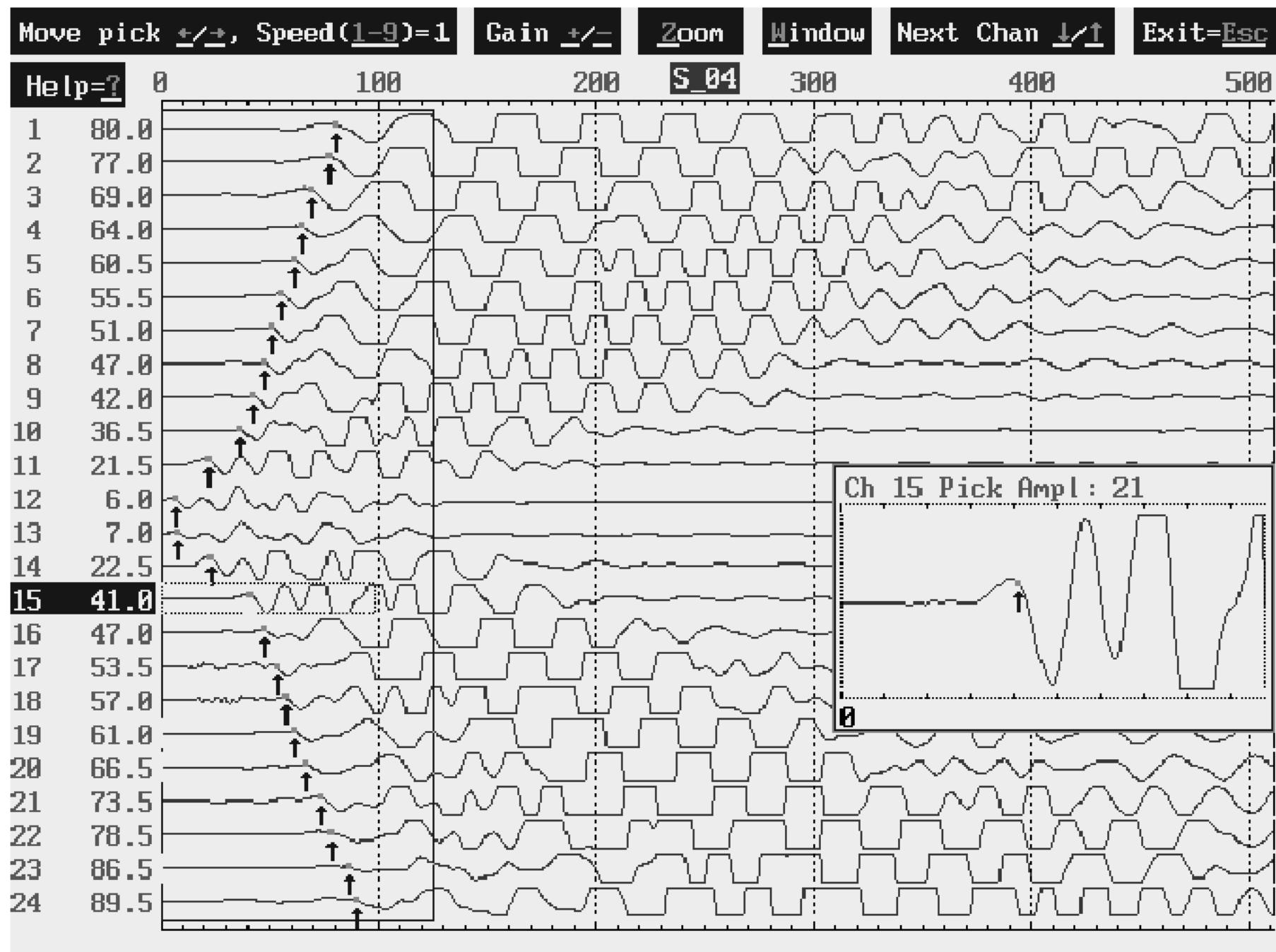
Ridgecrest Elementary S-wave



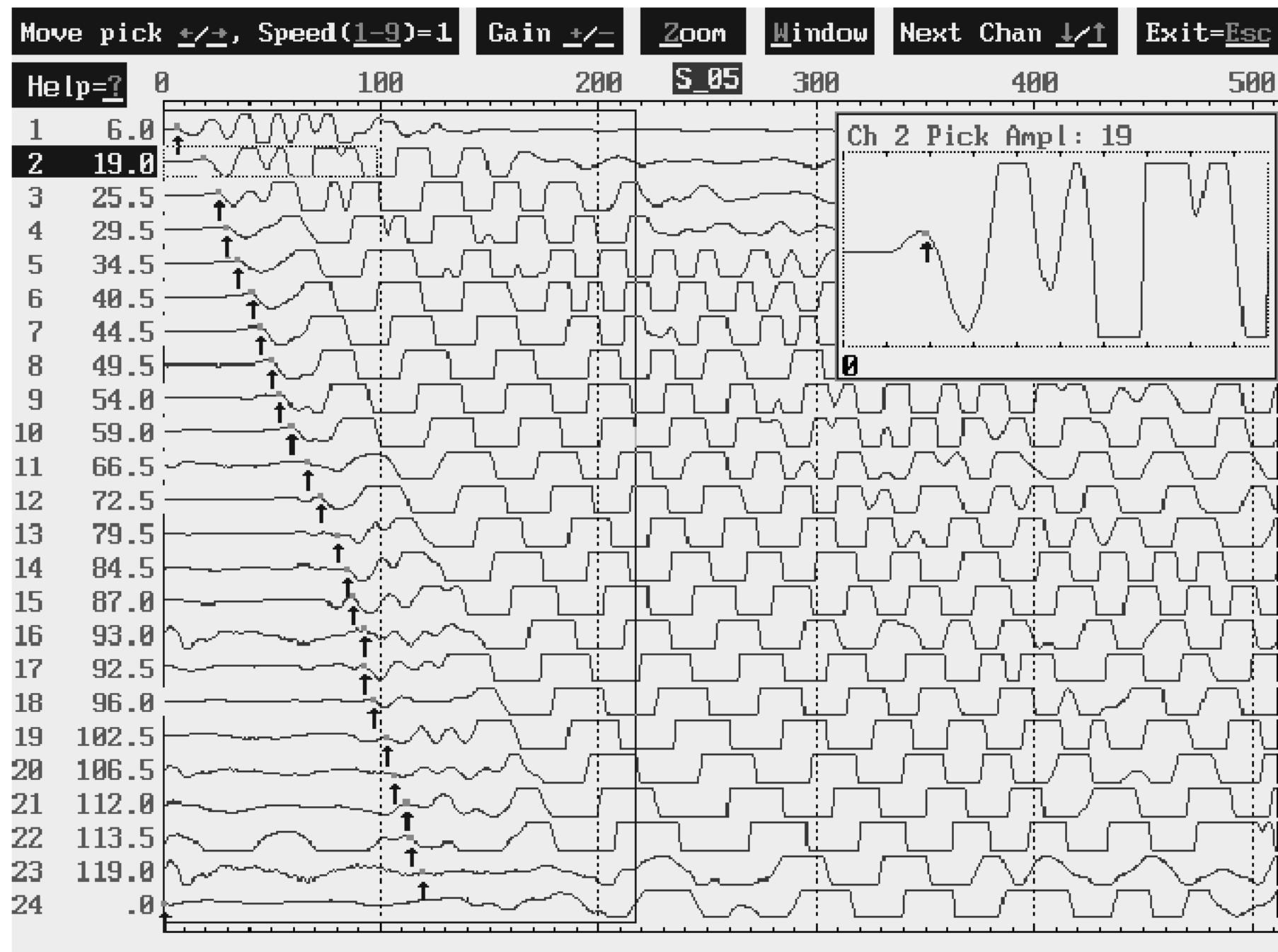
Ridgecrest Elementary S-wave



Ridgecrest Elementary S-wave

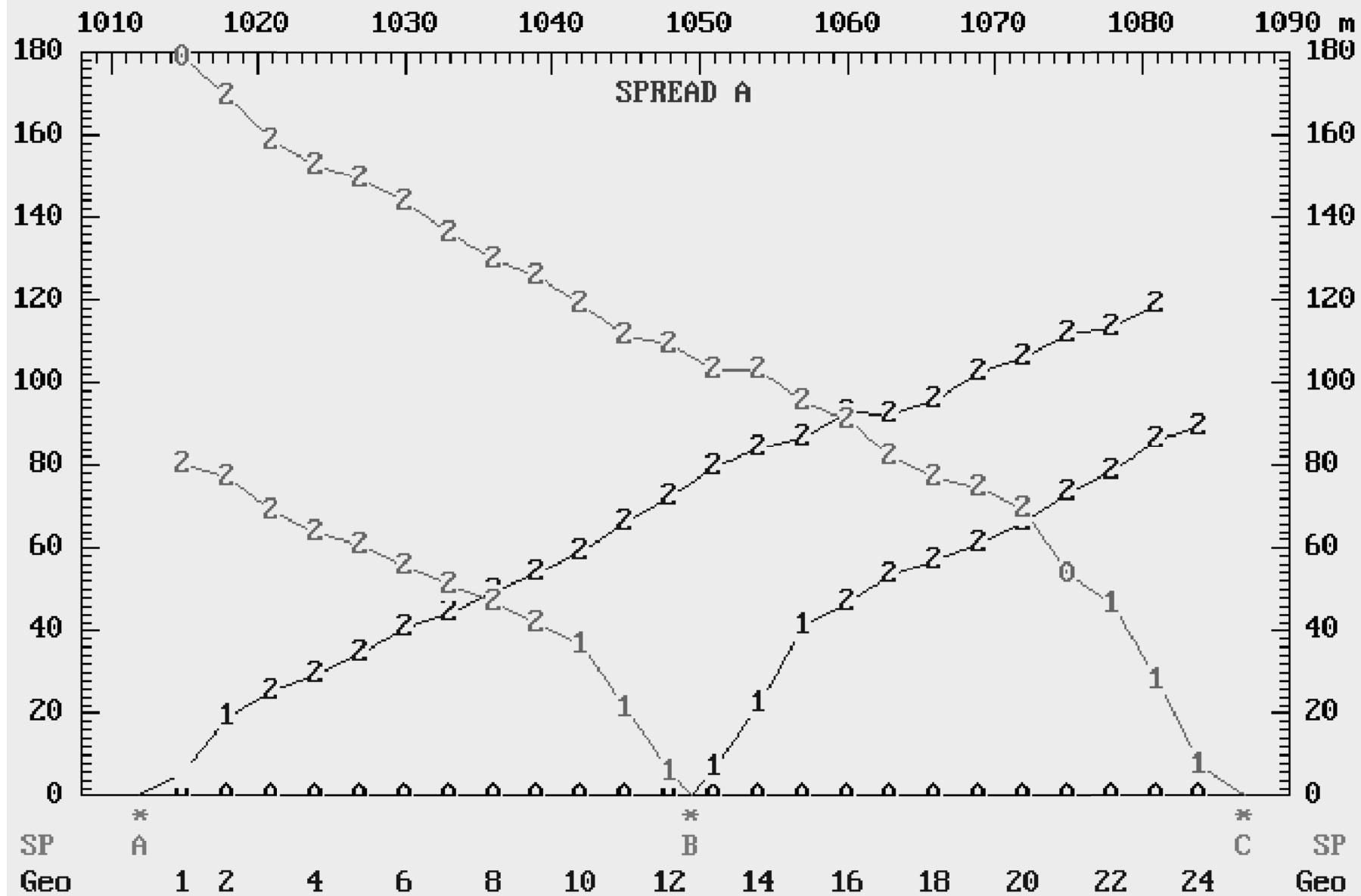


Ridgecrest Elementary S-wave



Ridgecrest Elementary S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

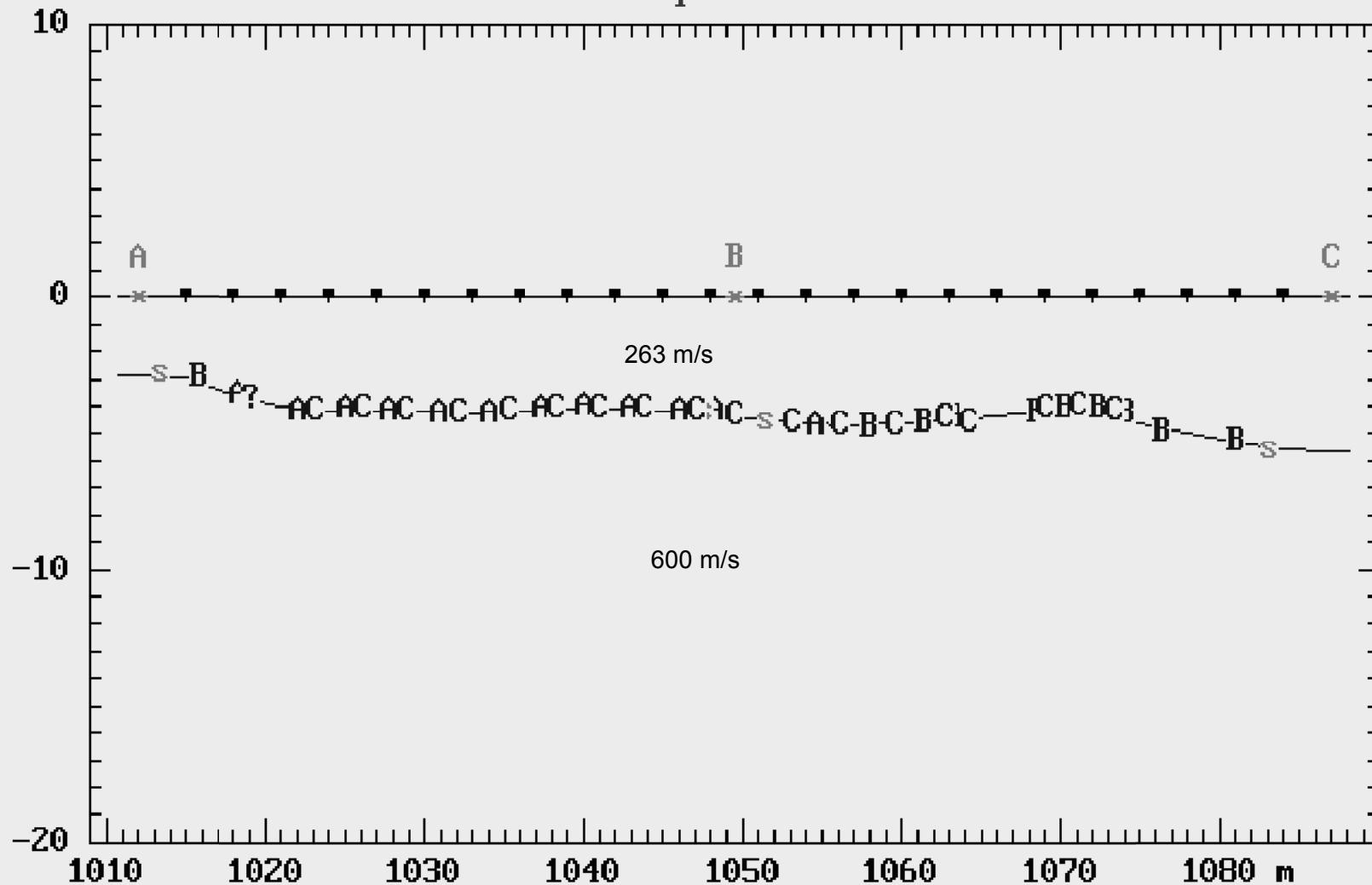


Ridgecrest Elementary S-wave

Press Esc to EXIT

RIDGSWAU.SIP: Ridgecrest Elementary S-Waves

Spread A

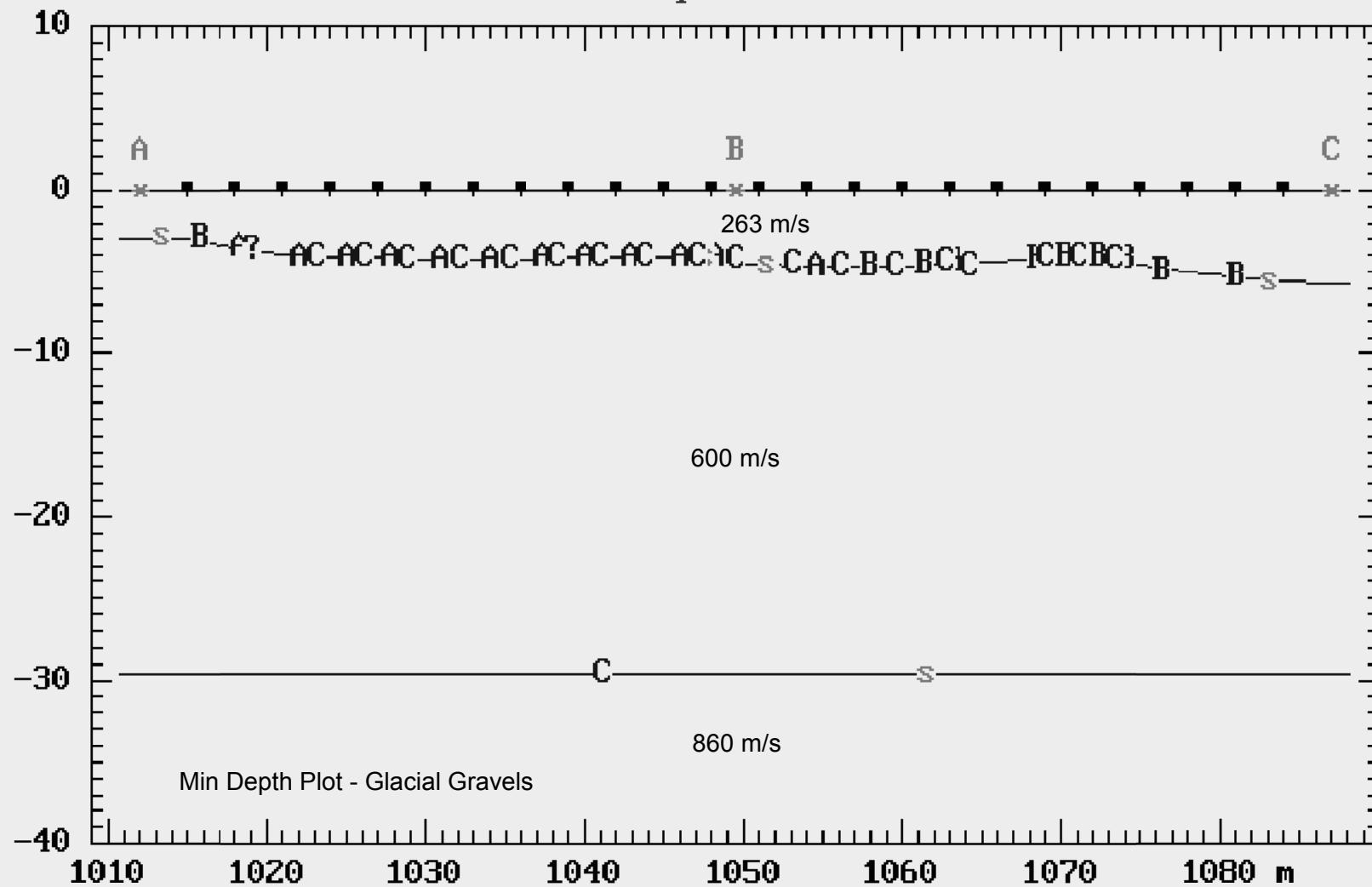


Ridgecrest Elementary S-wave

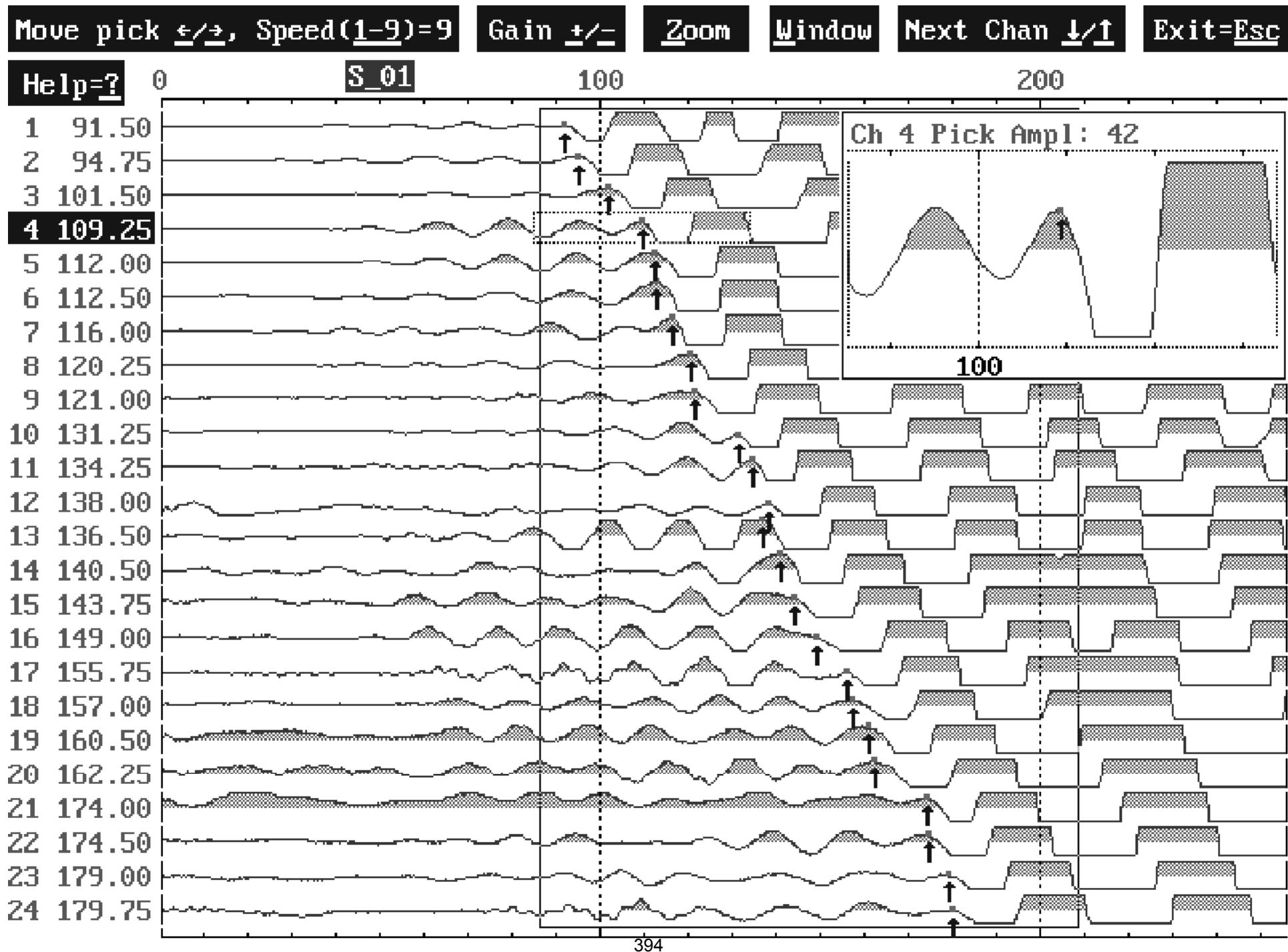
Press Esc to EXIT

RIDGSMIN.SIP: Ridgecrest Elementary S-Waves Minimum Depth Plot

Spread A

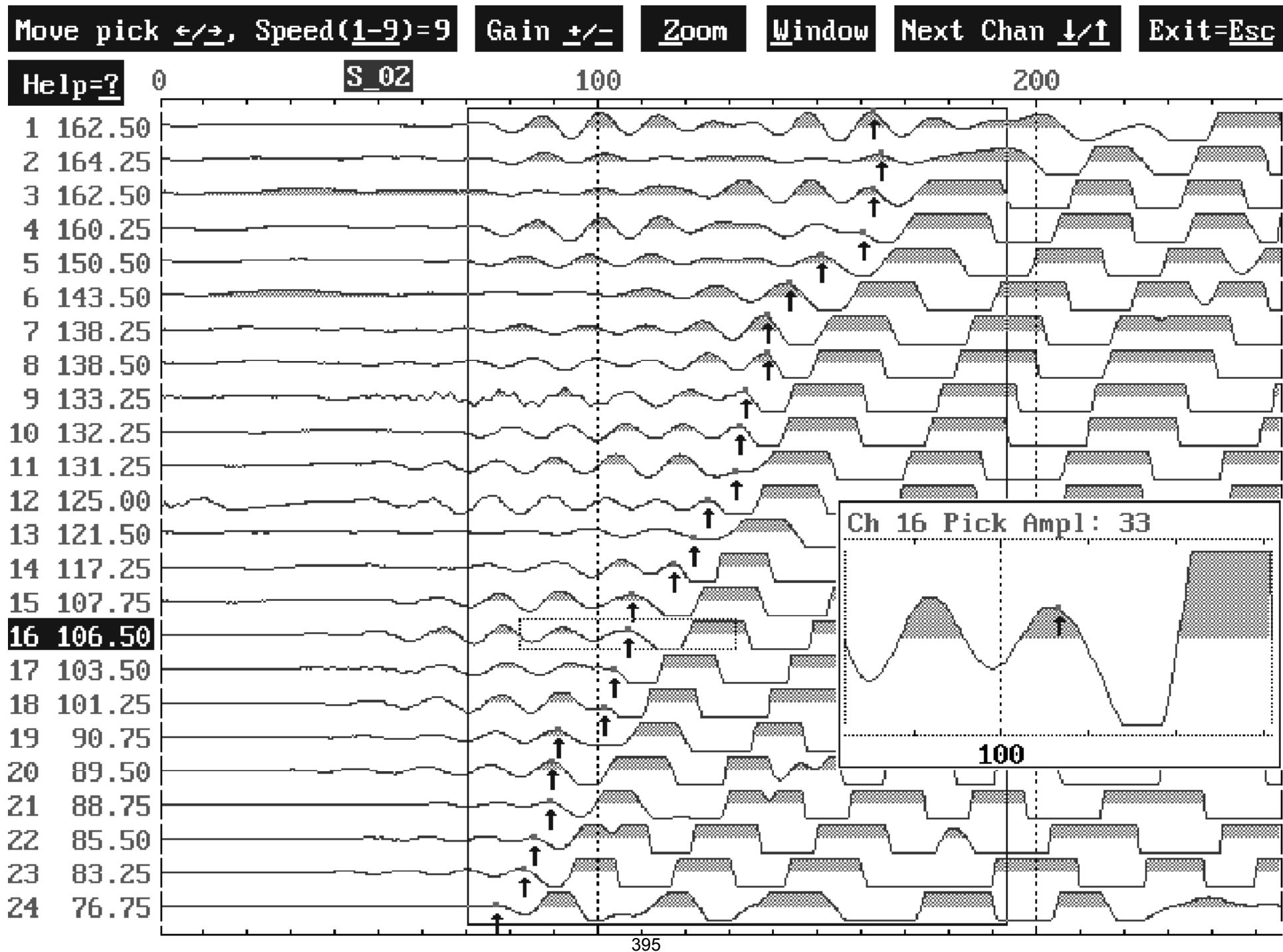


Rock Creek RD S-wave



Appendix C

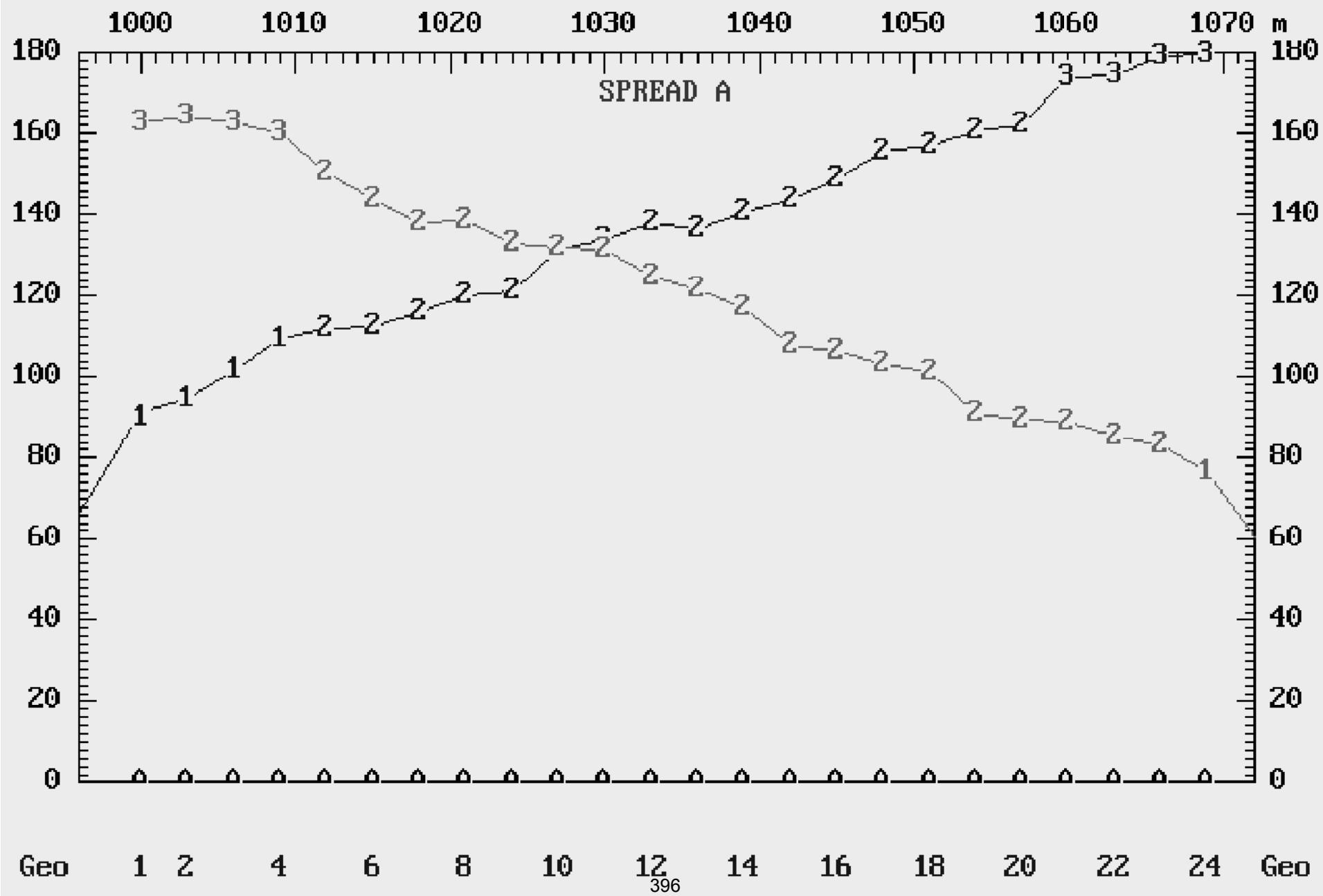
Rock Creek RD S-wave



Appendix C

Rock Creek RD S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

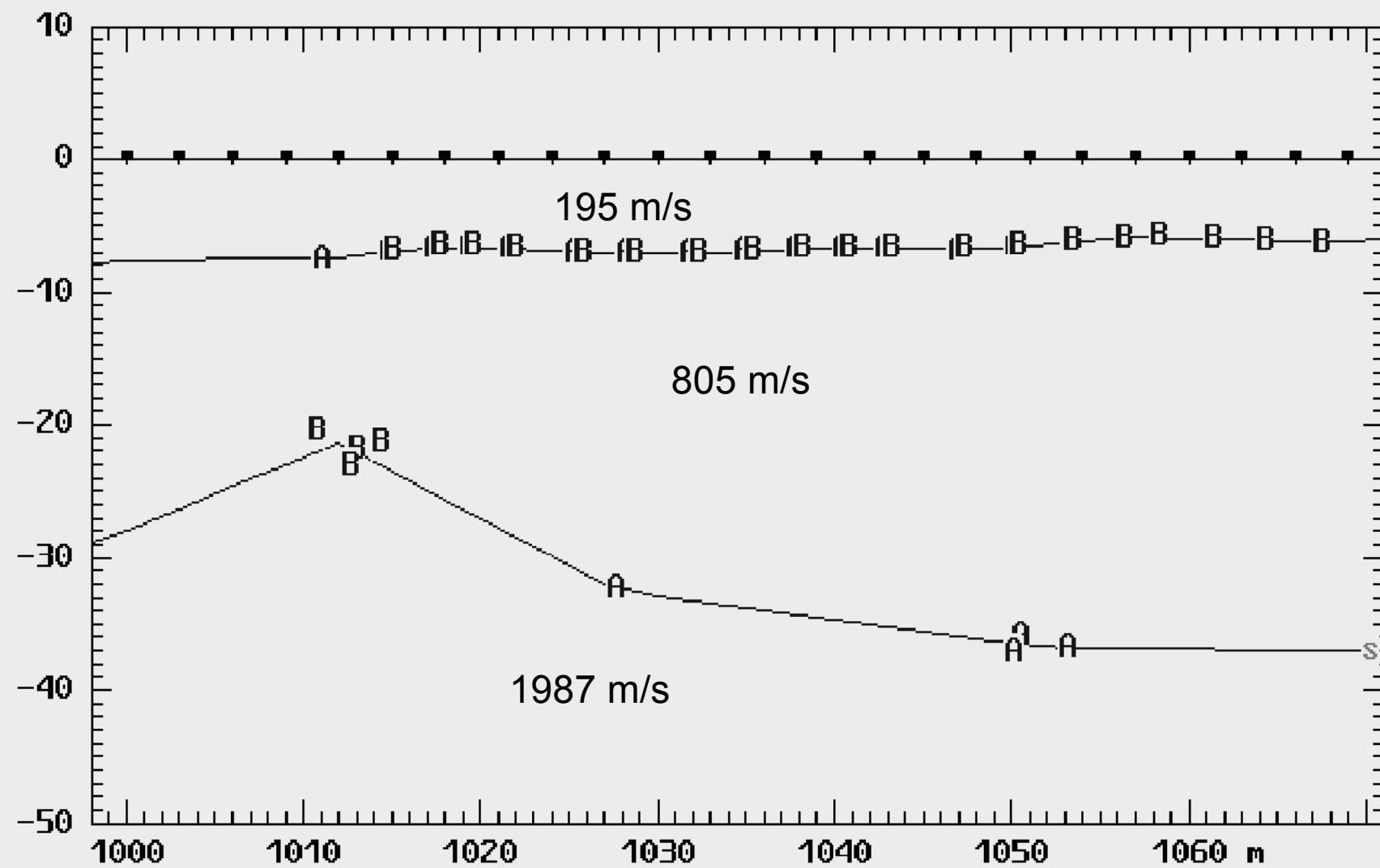


Rock Creek RD S-wave

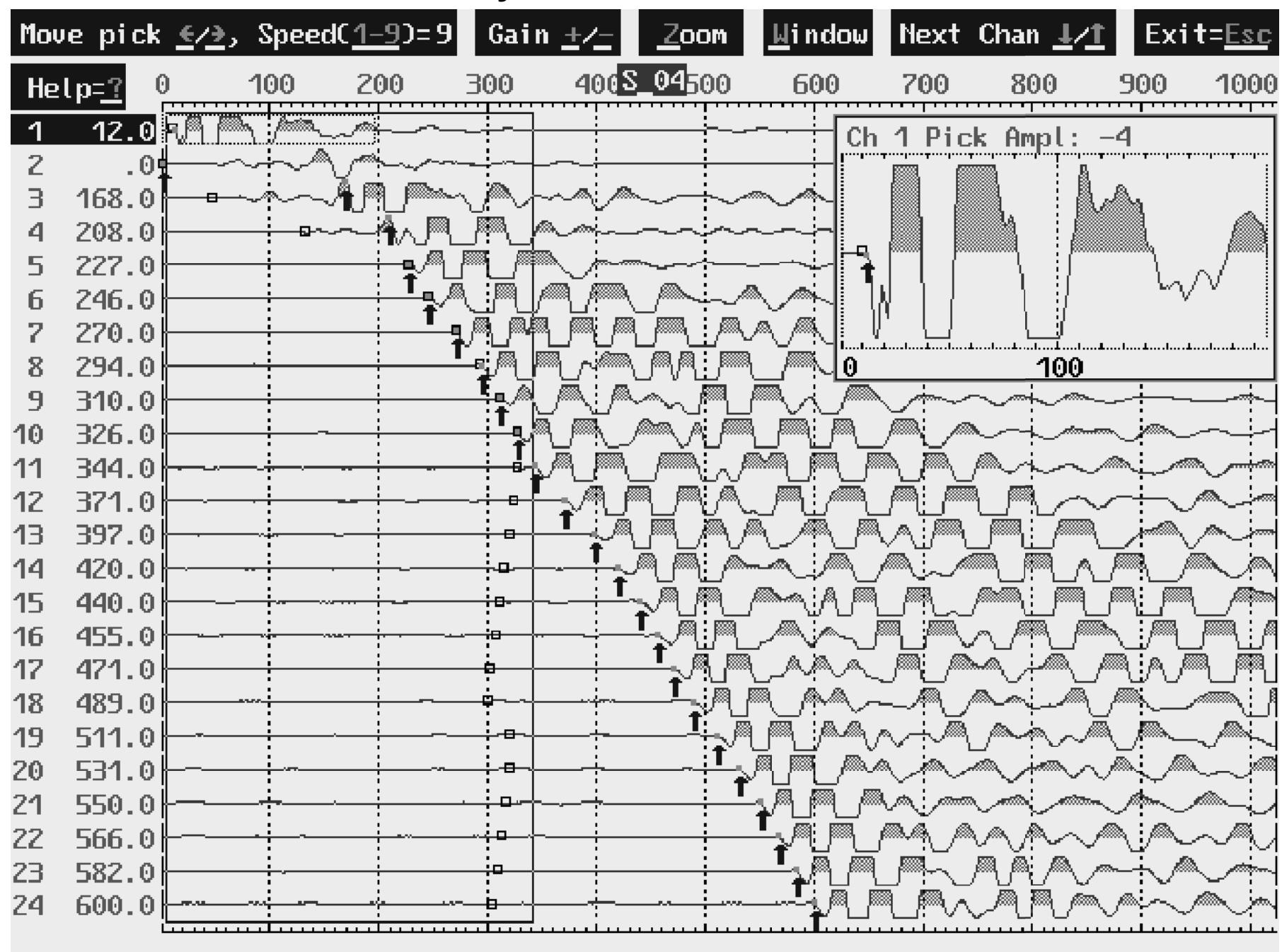
Press Esc to EXIT

ROCCR_SW.SIP: Rock Creek S-wave

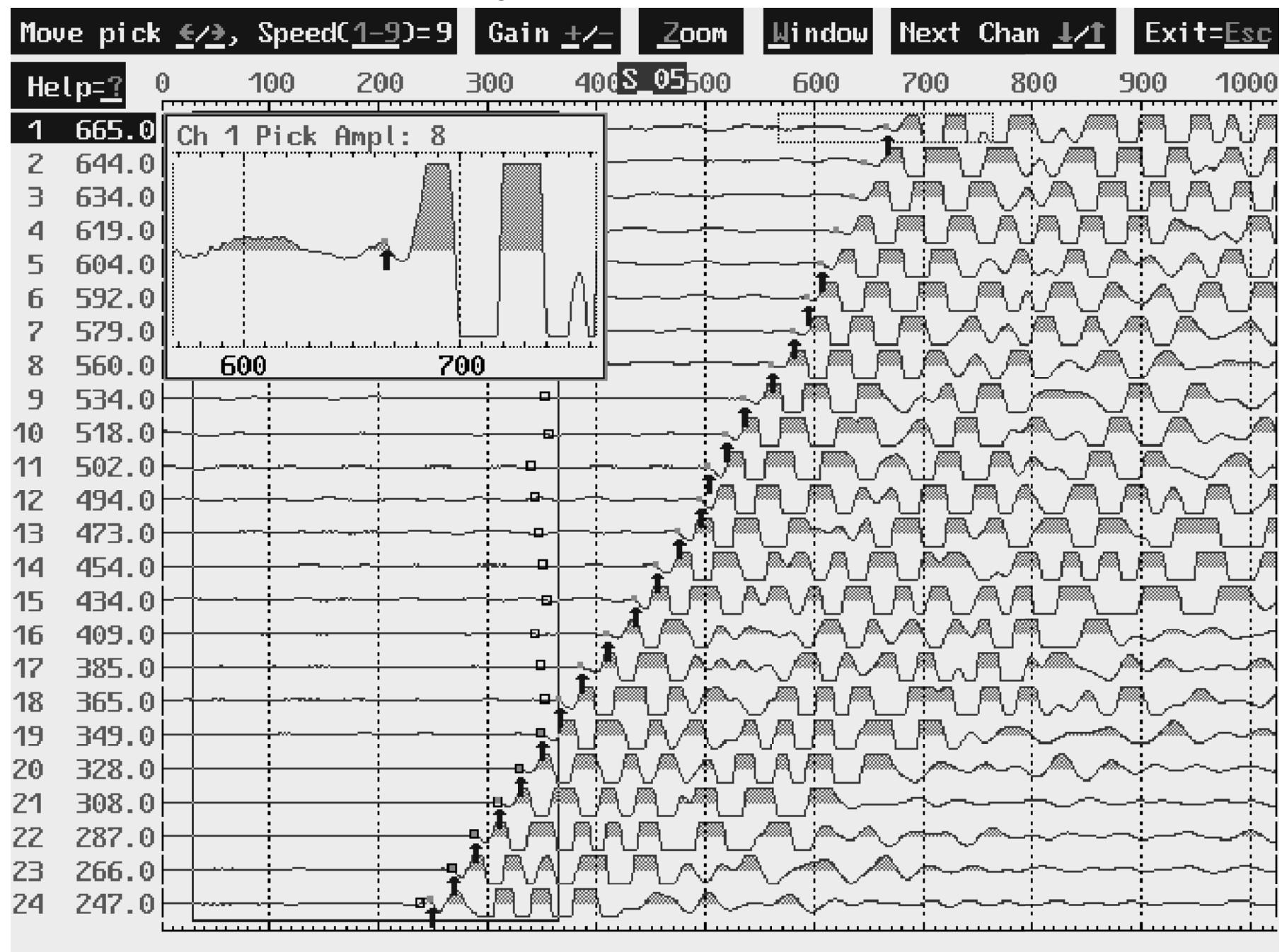
Spread A



Roy Morse Park S-wave

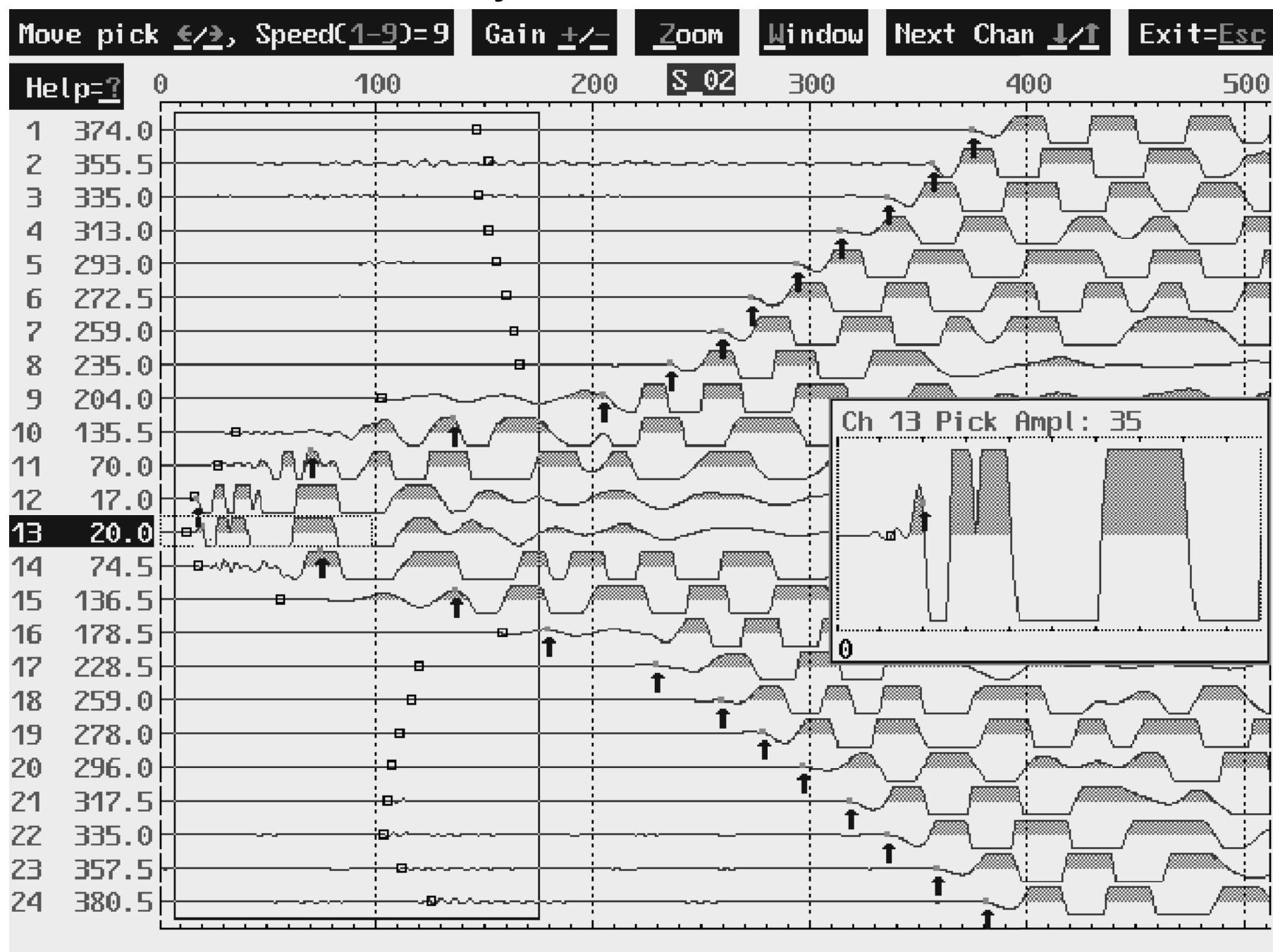


Roy Morse Park S-wave

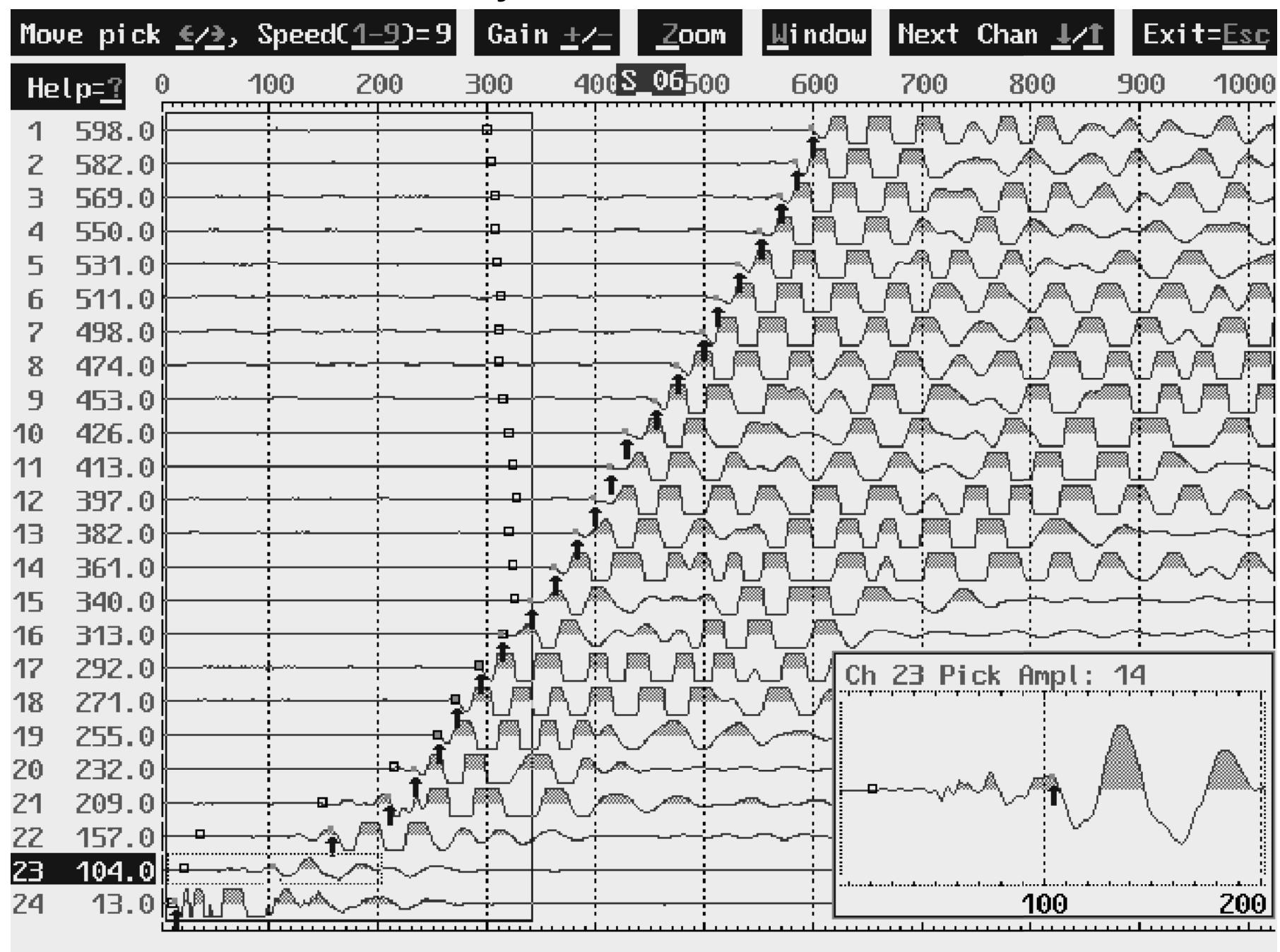


Appendix C

Roy Morse Park S-wave

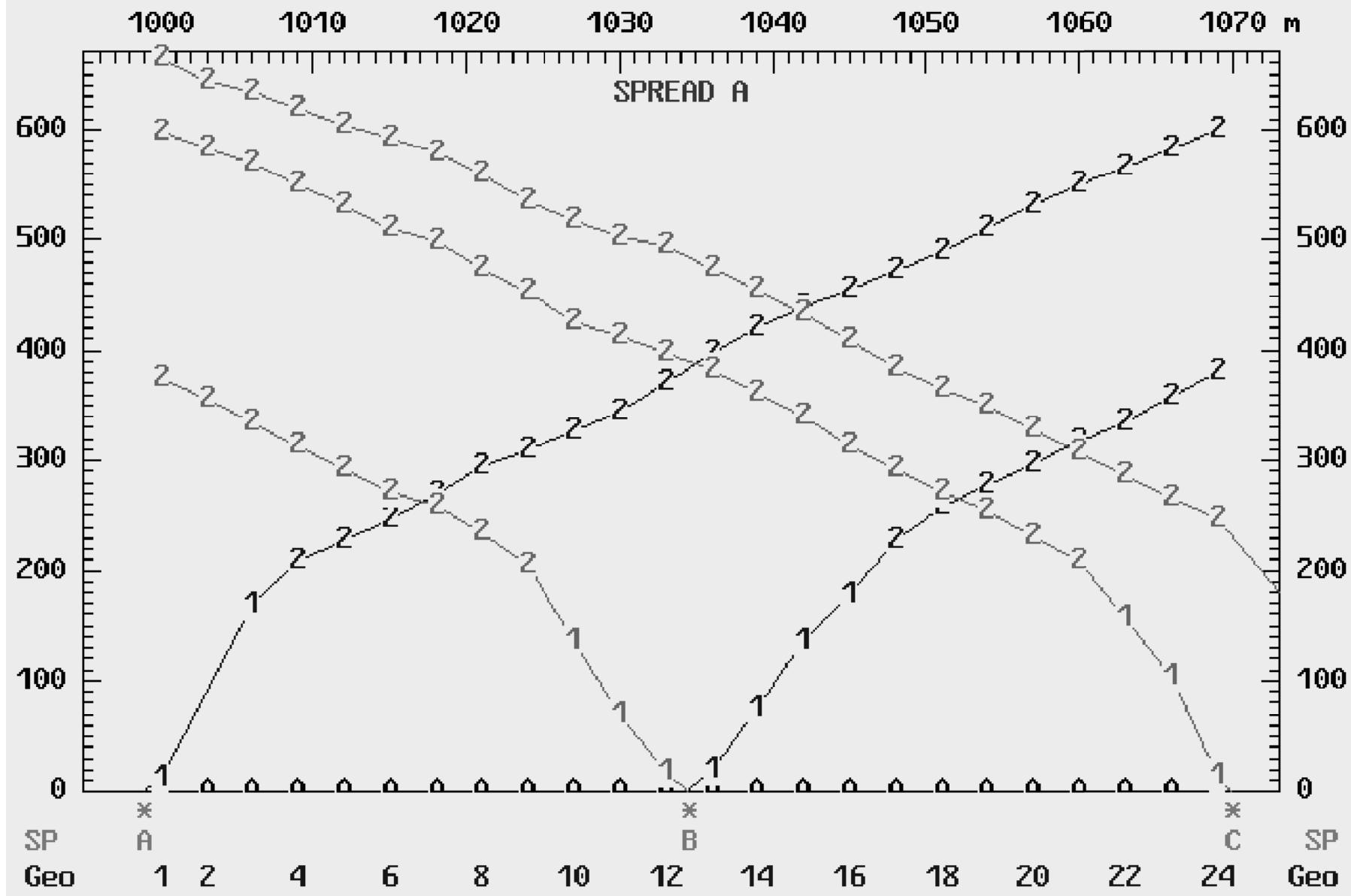


Roy Morse Park S-wave



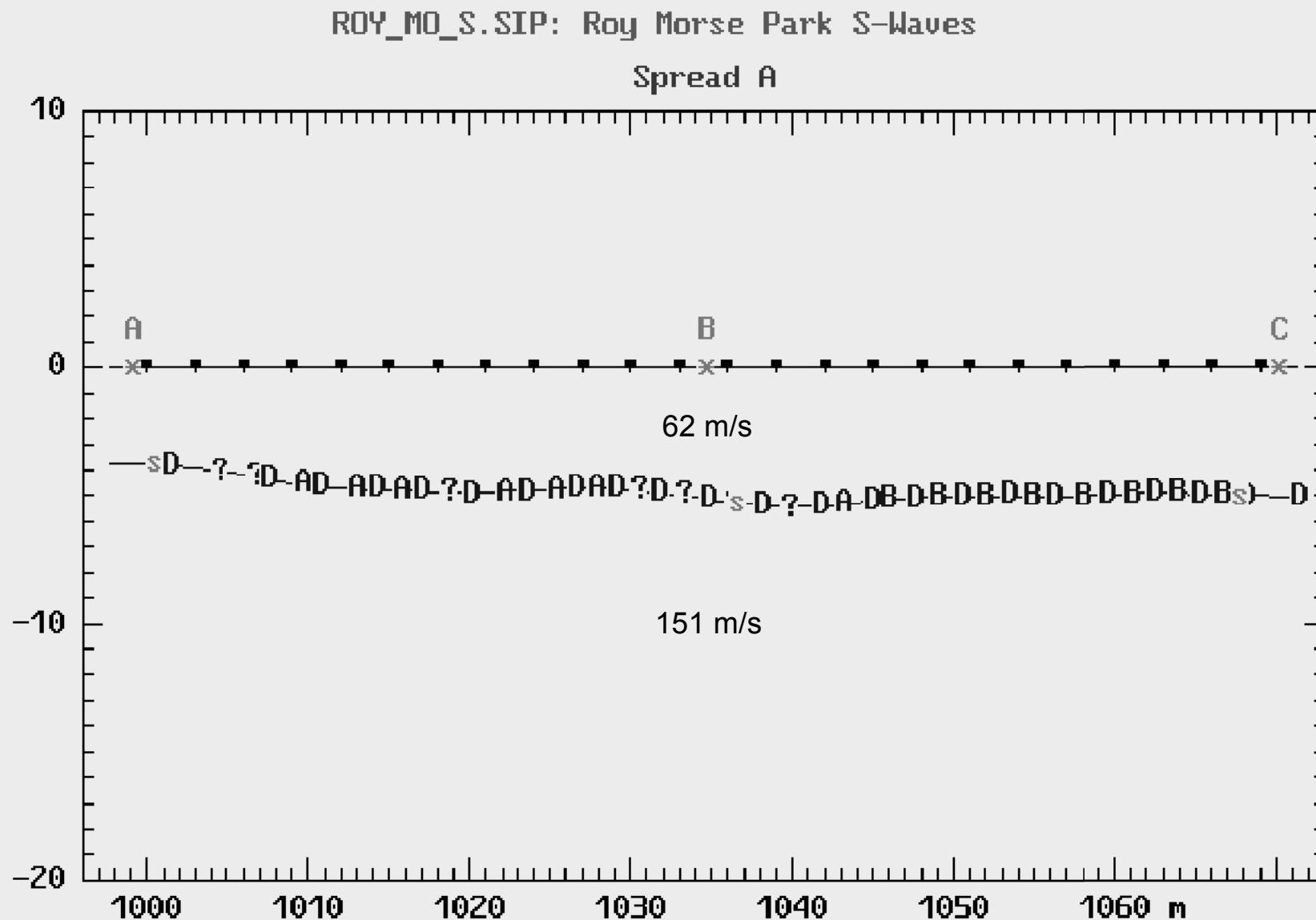
Roy Morse Park S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Roy Morse Park S-wave

Press Esc to EXIT

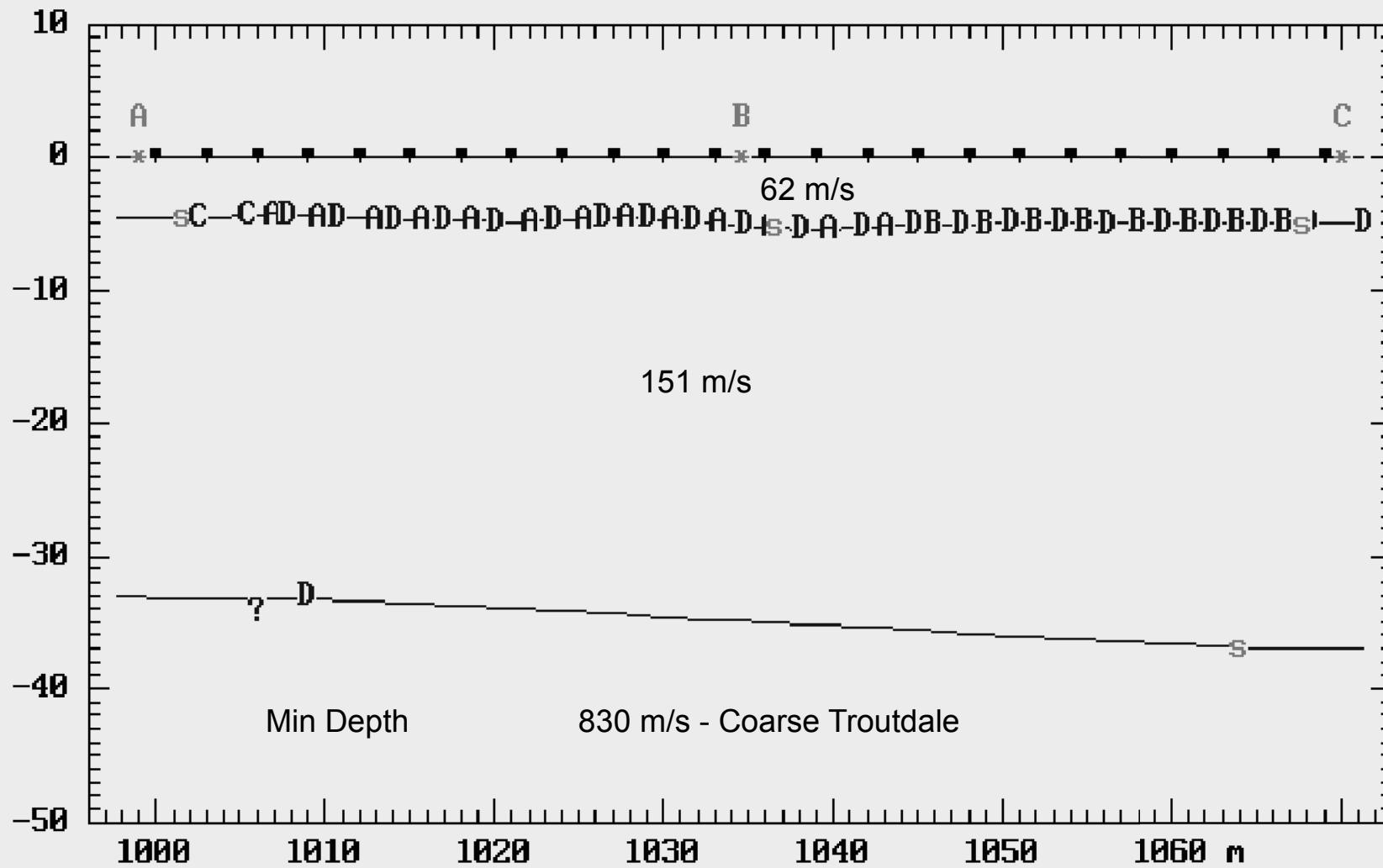


Roy Morse Park S-wave

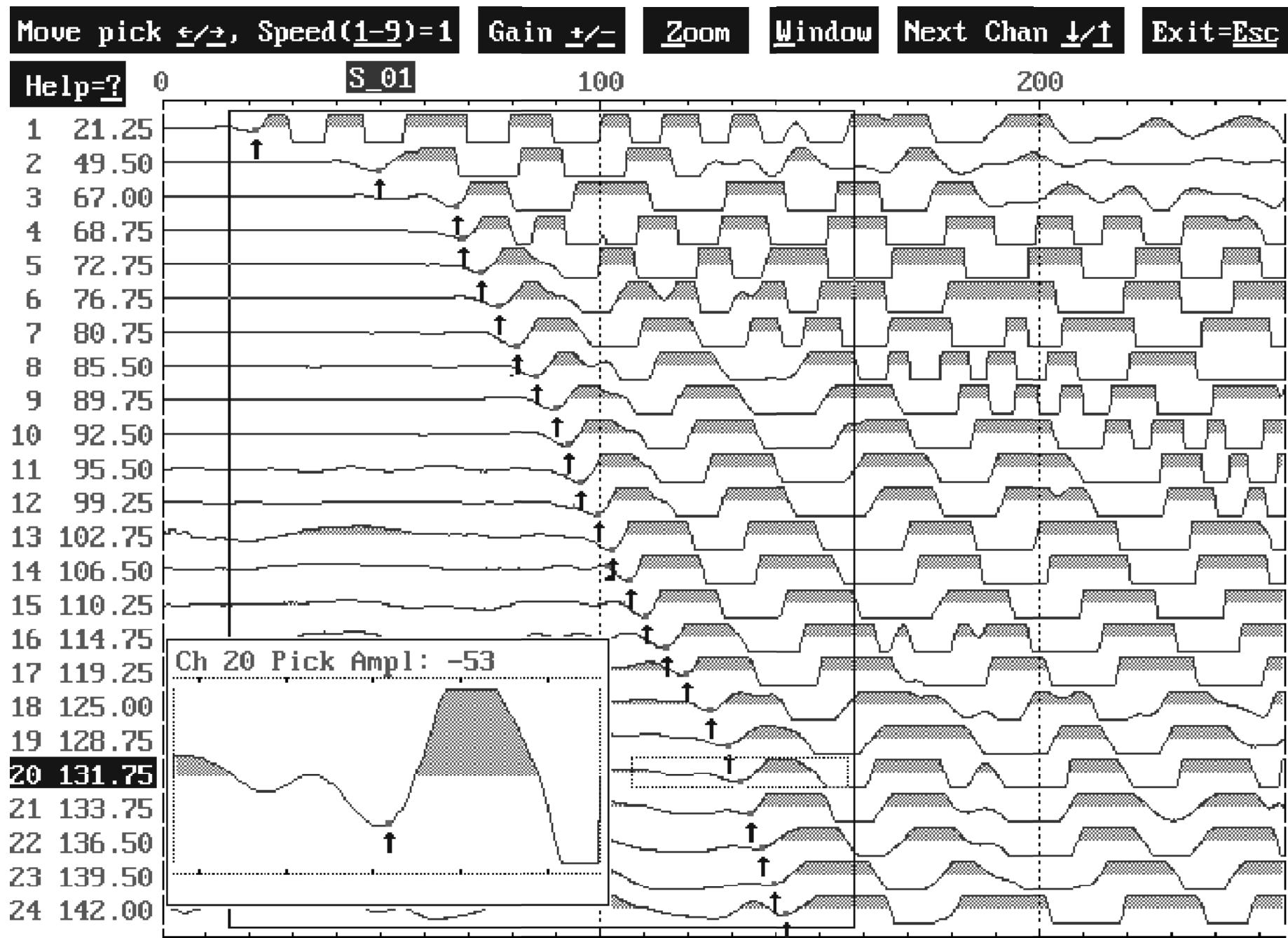
Press Esc to EXIT

ROY_MIN.SIP : Roy Morse Park S-Waves Min Depth

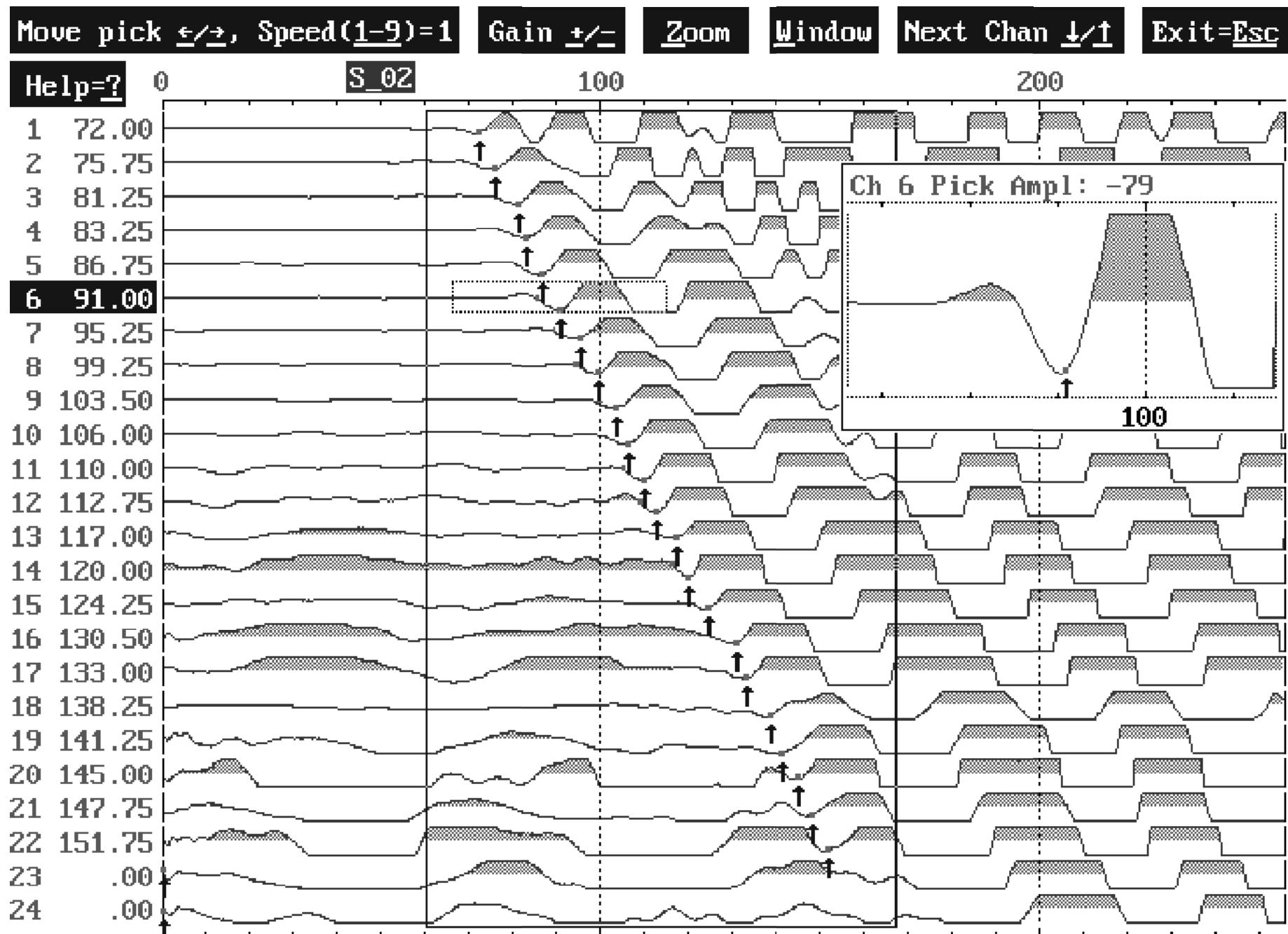
Spread A



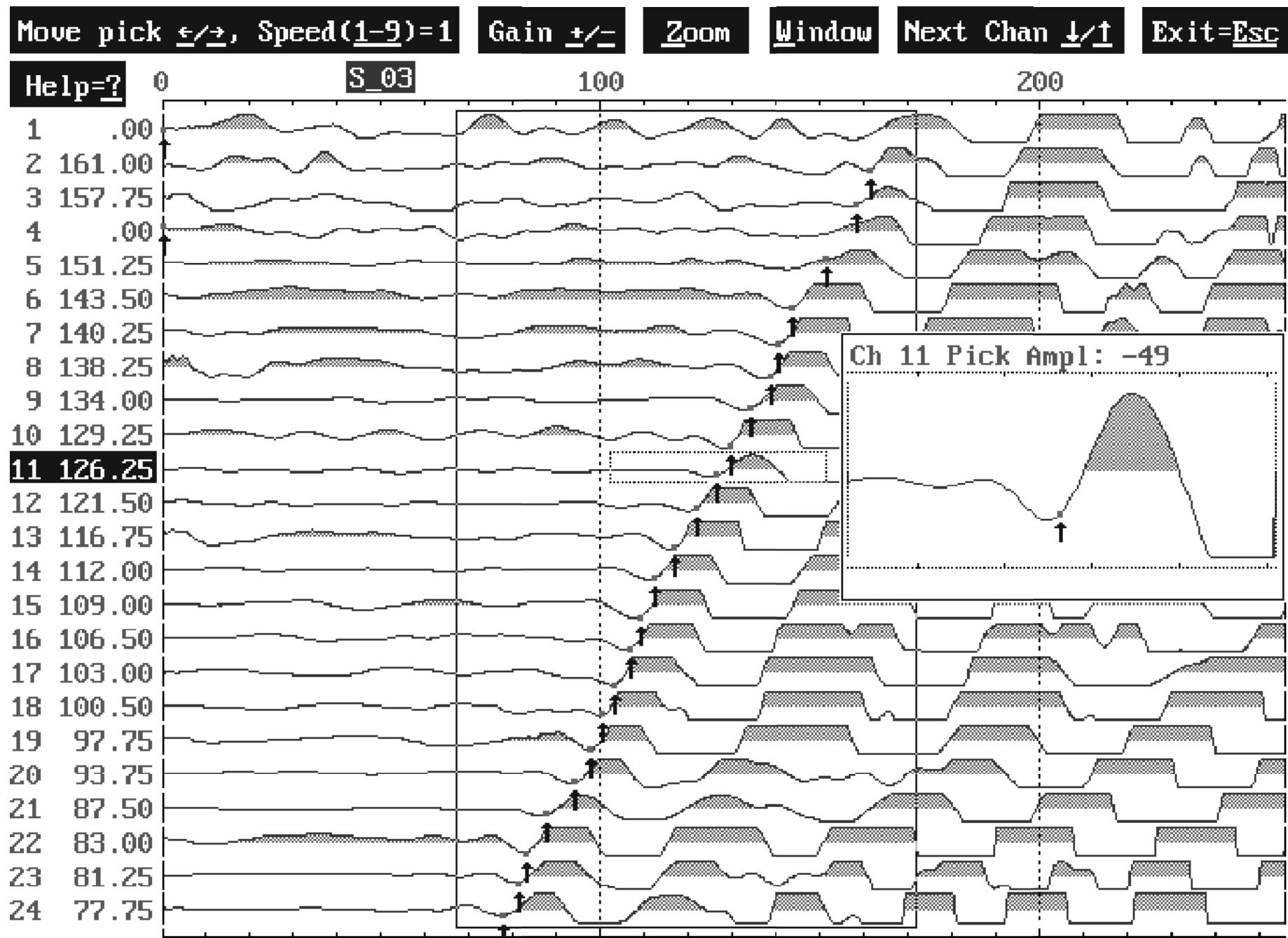
Sands Farm S-wave



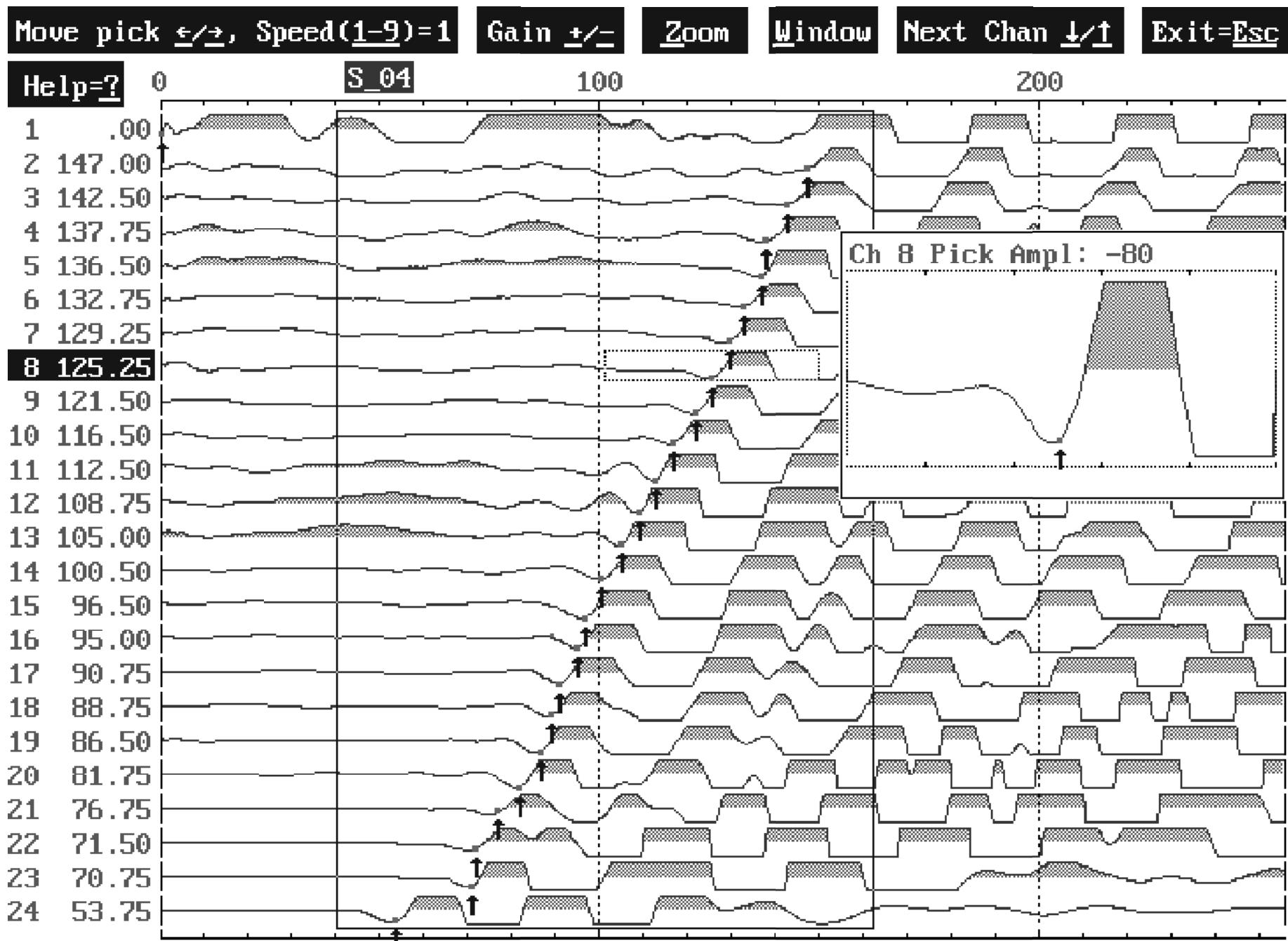
Sands Farm S-wave



Sands Farm S-wave

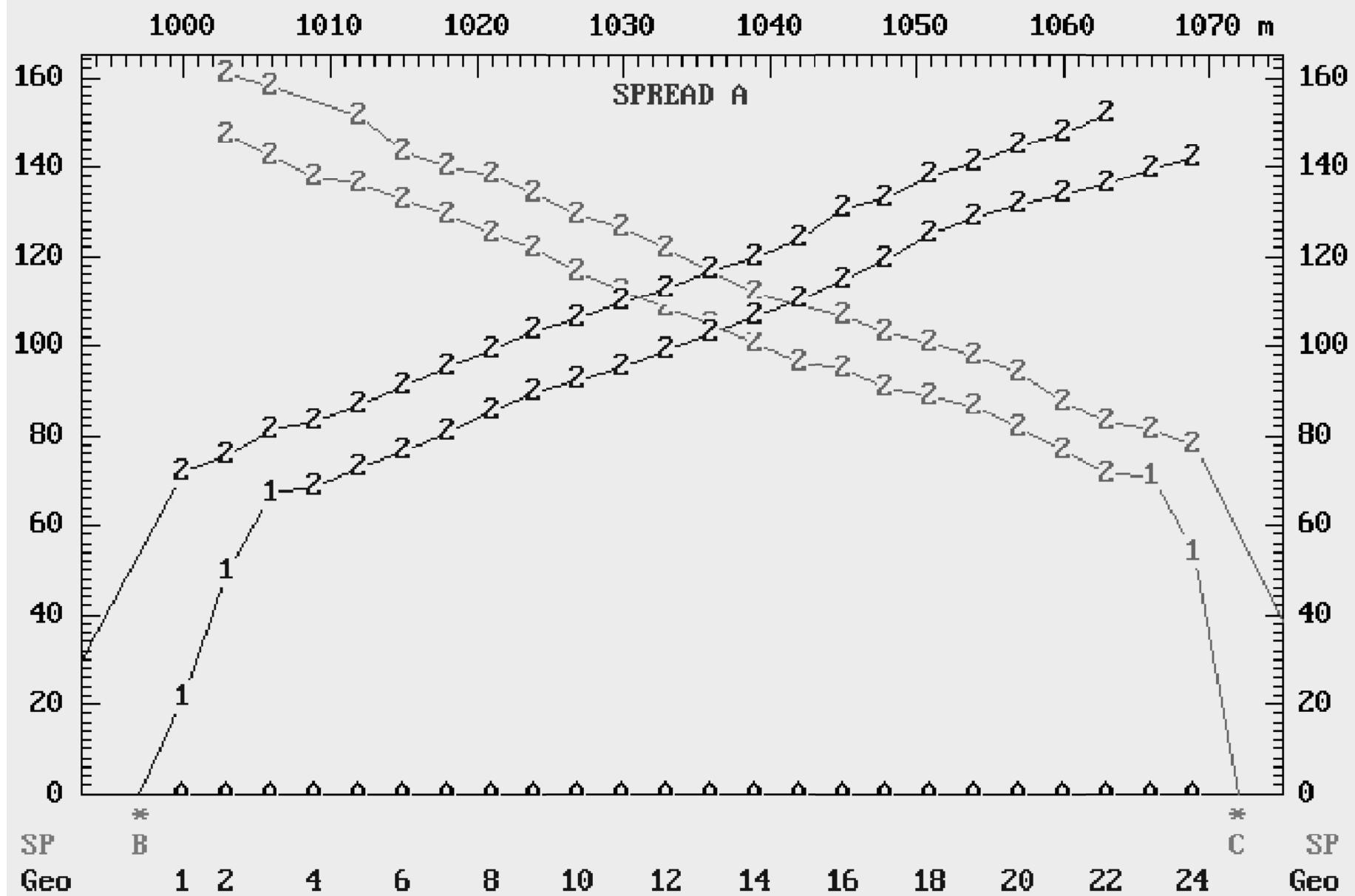


Sands Farm S-wave



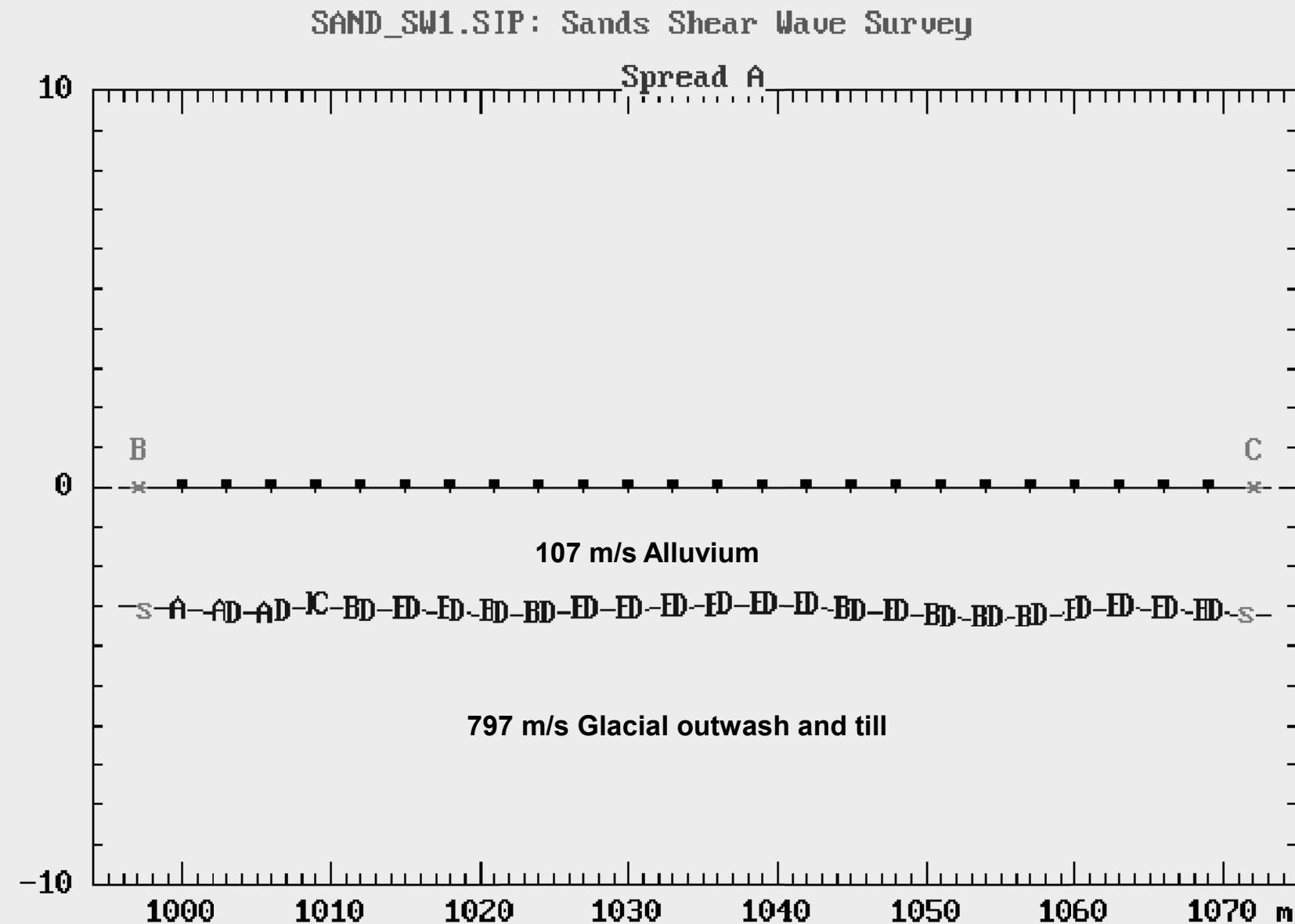
Sands Farm S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Sands Farm S-wave

Press Esc to EXIT

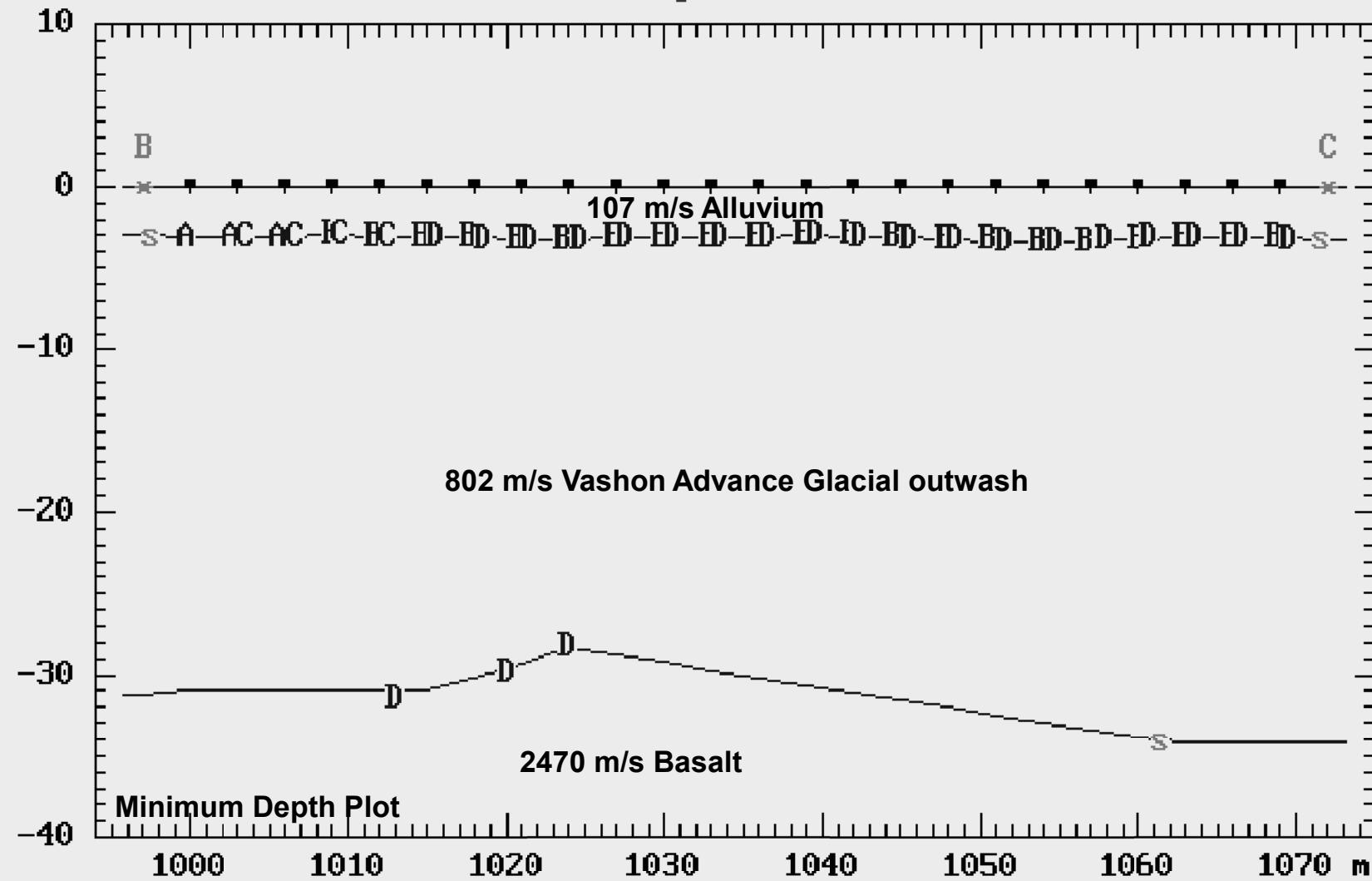


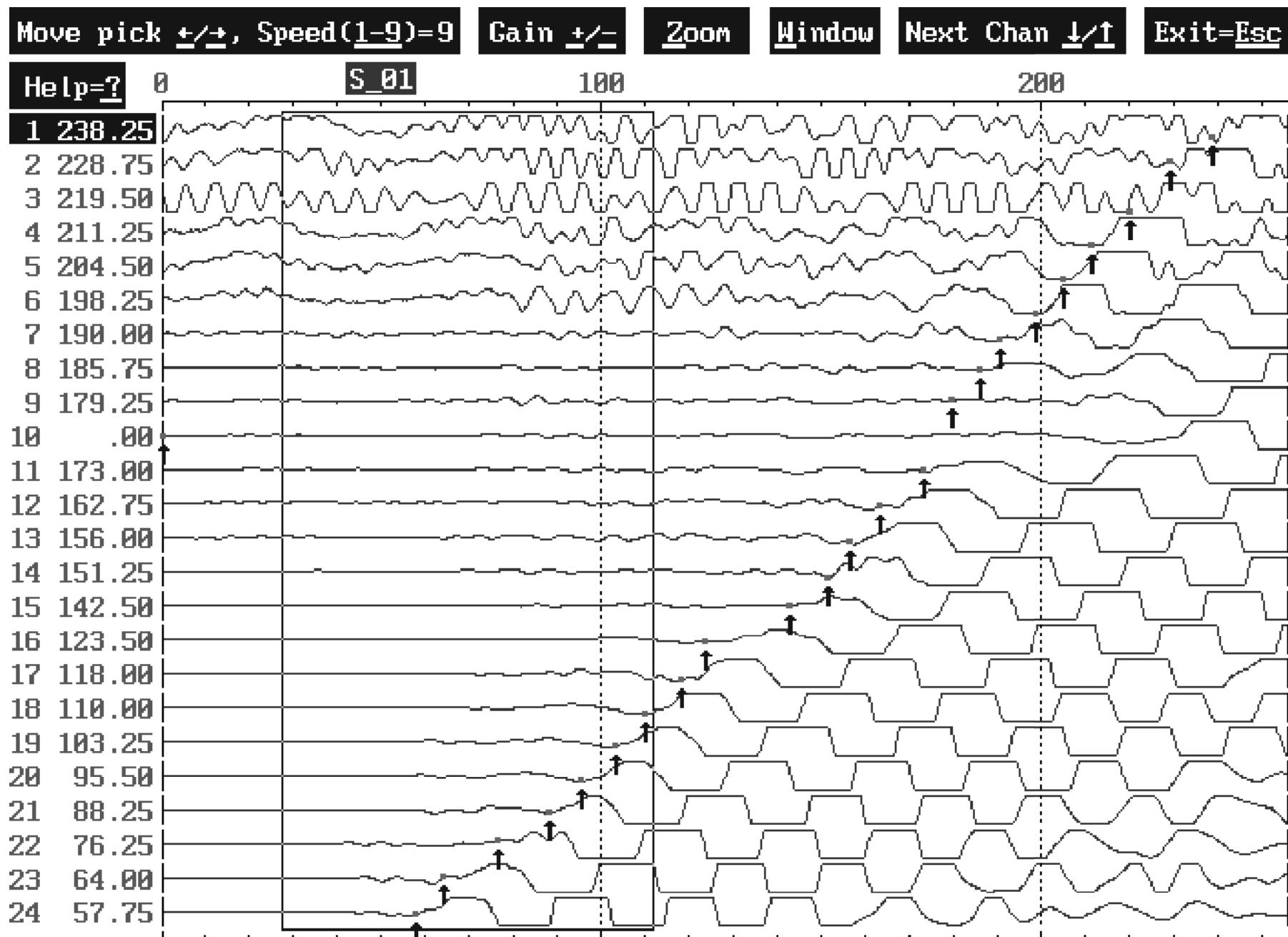
Sands Farm S-wave

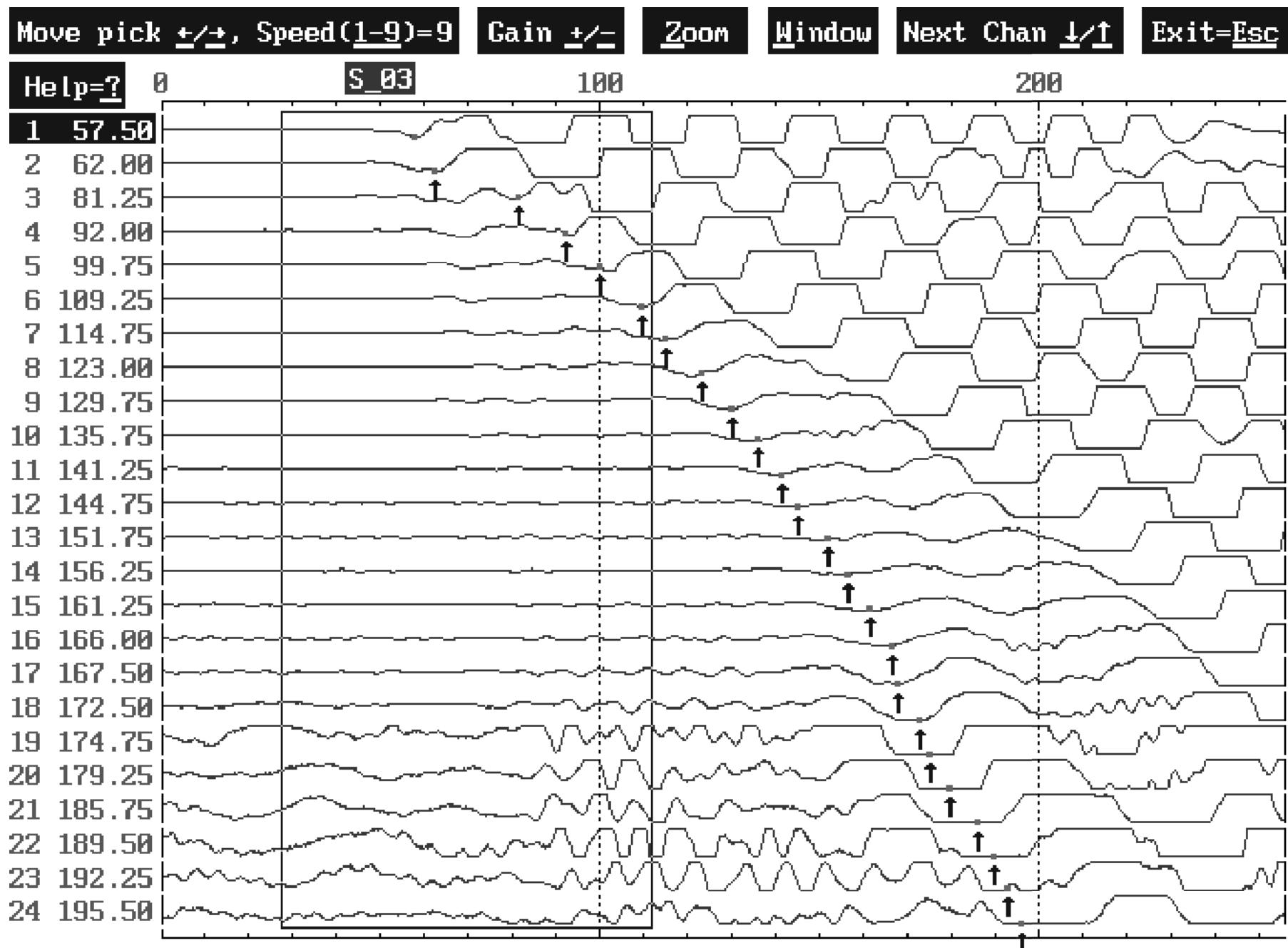
Press Esc to EXIT

SAND_SW2.SIP: Sands Shear Wave Survey

Spread A

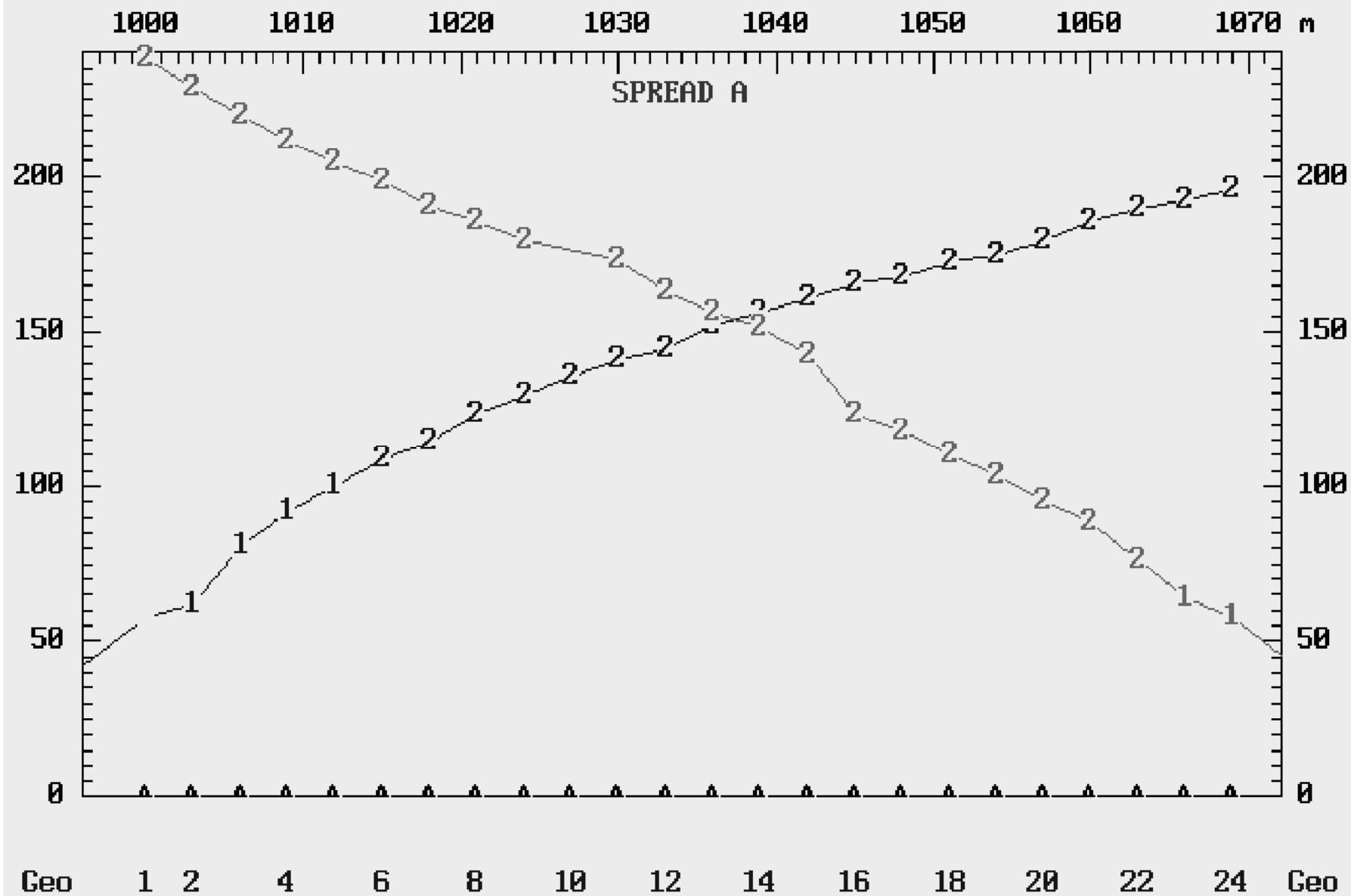


Schultz RD S-wave

Schultz RD S-wave

Schultz RD S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

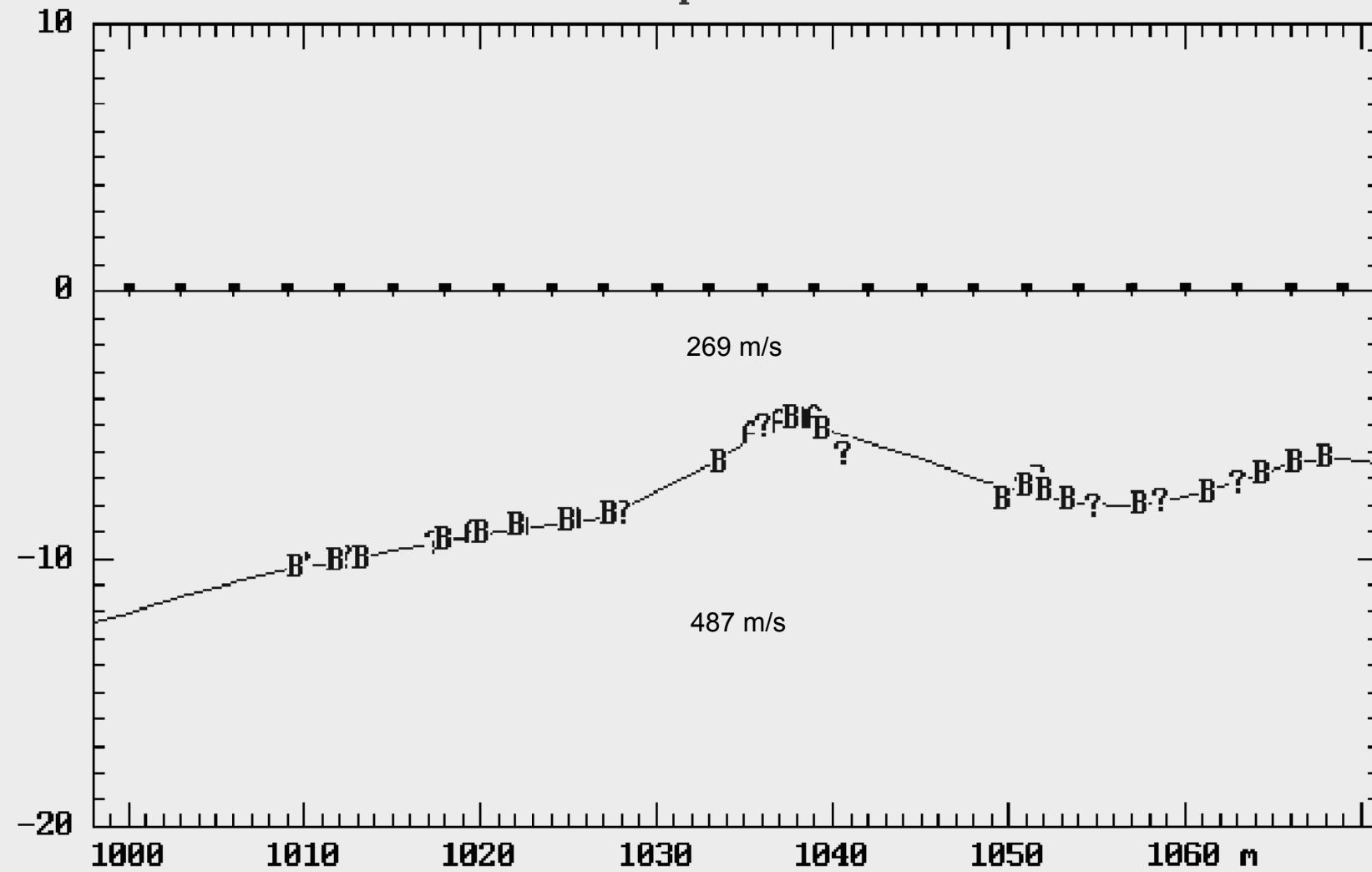


Schultz RD S-wave

Press Esc to EXIT

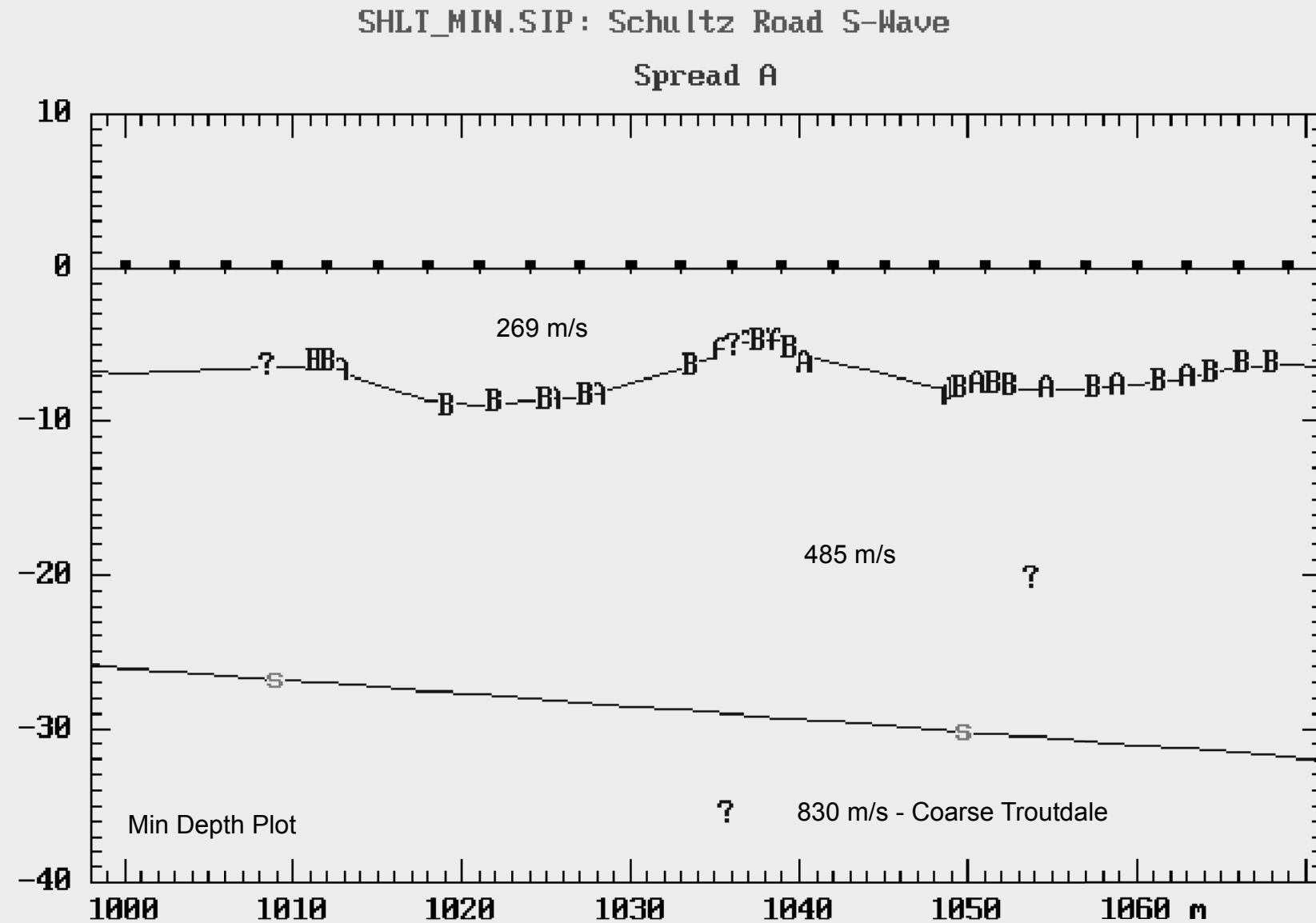
SHLT2_S1.SIP: Schultz Road S-Wave

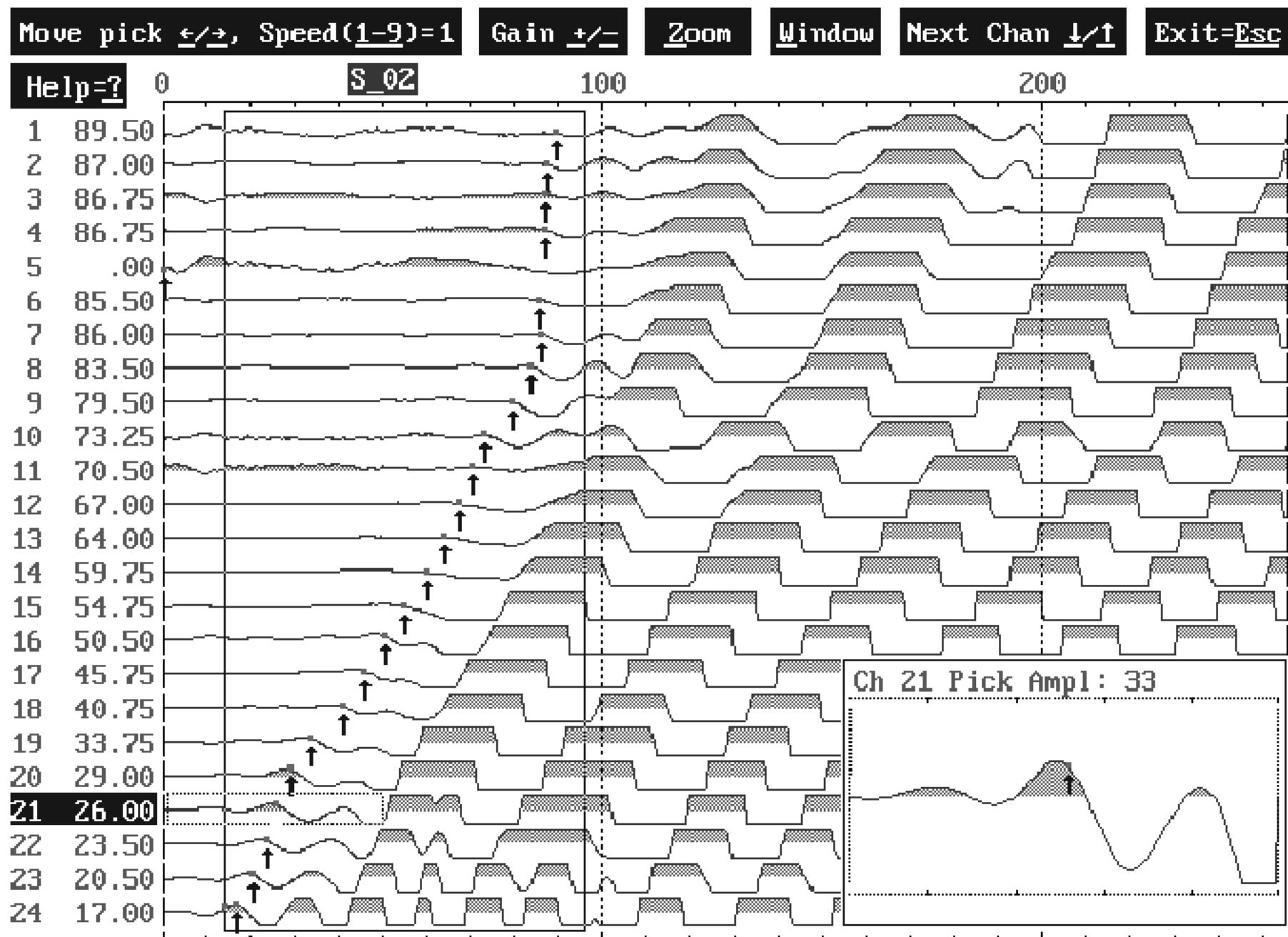
Spread A

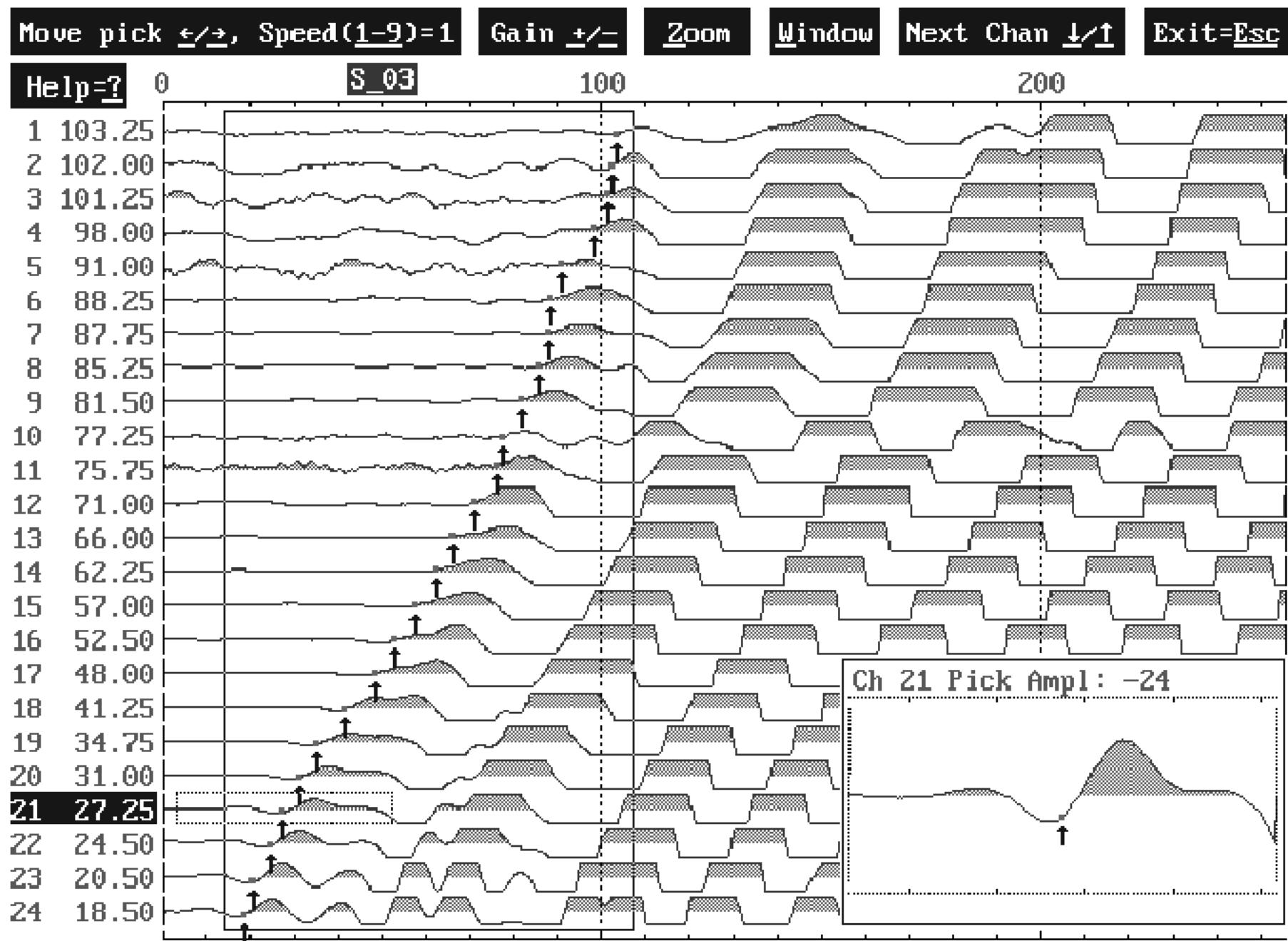


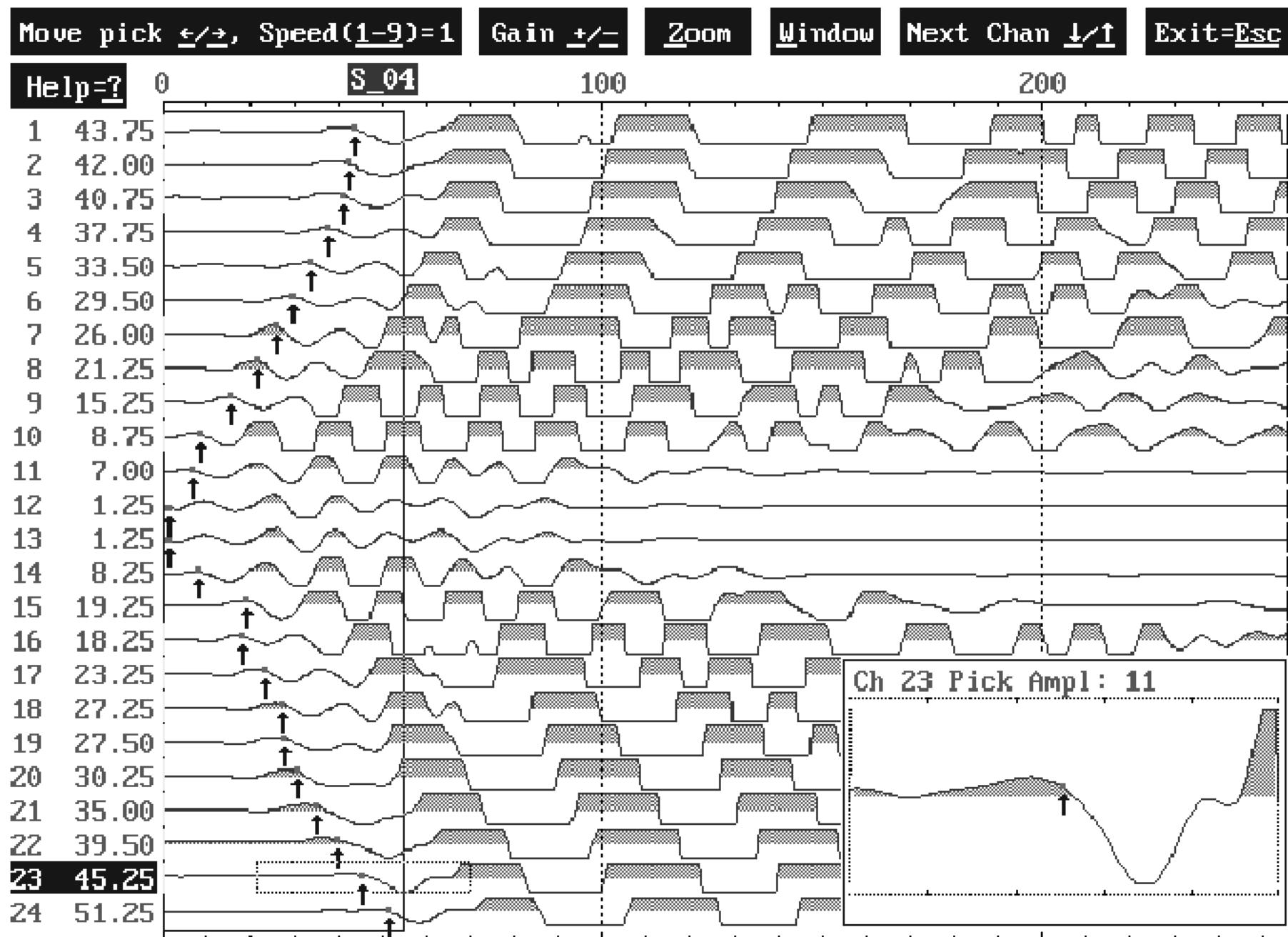
Schultz RD S-wave

Press Esc to EXIT

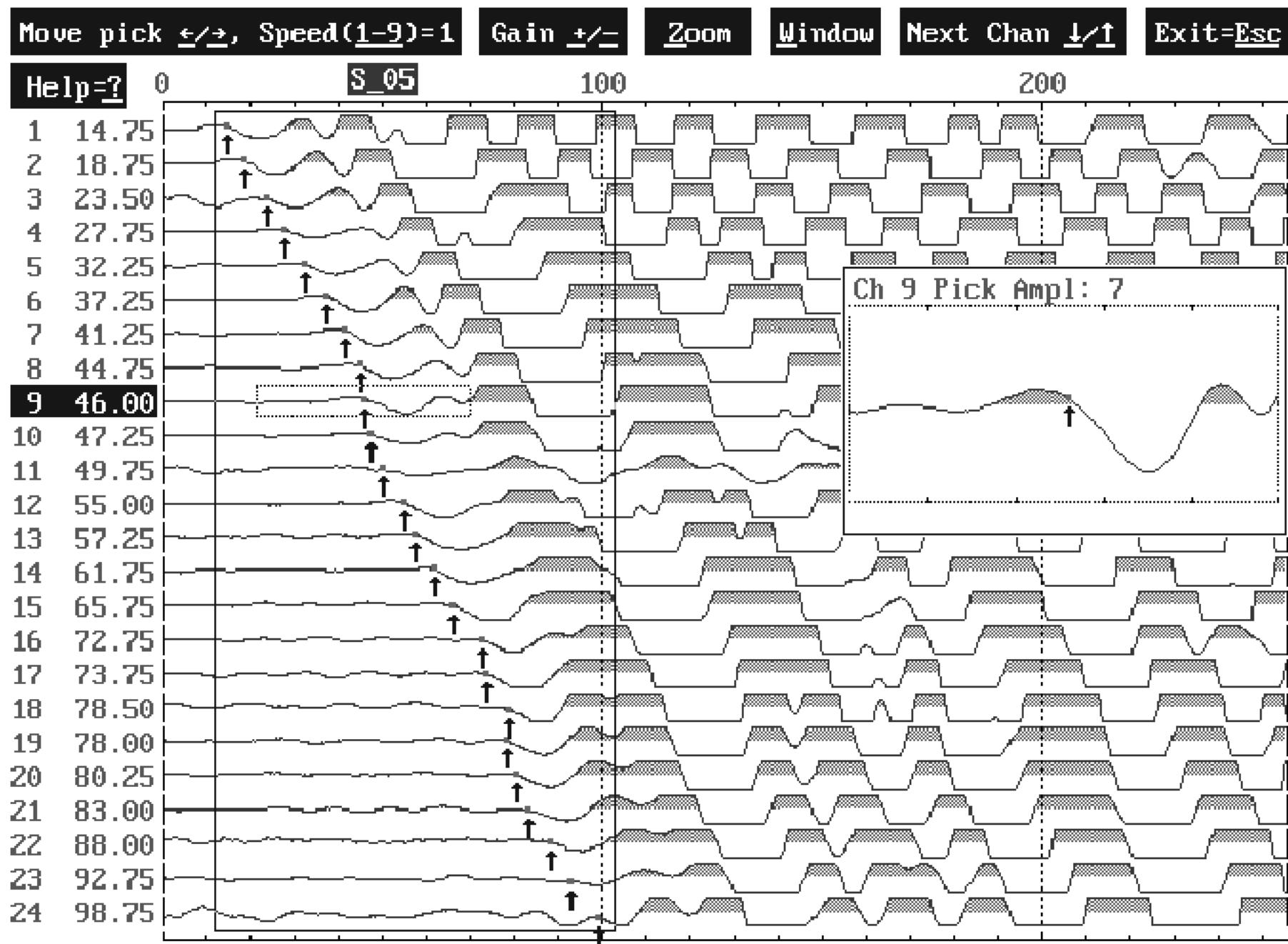


Selah Intermediate School S-wave

Selah Intermediate School S-wave

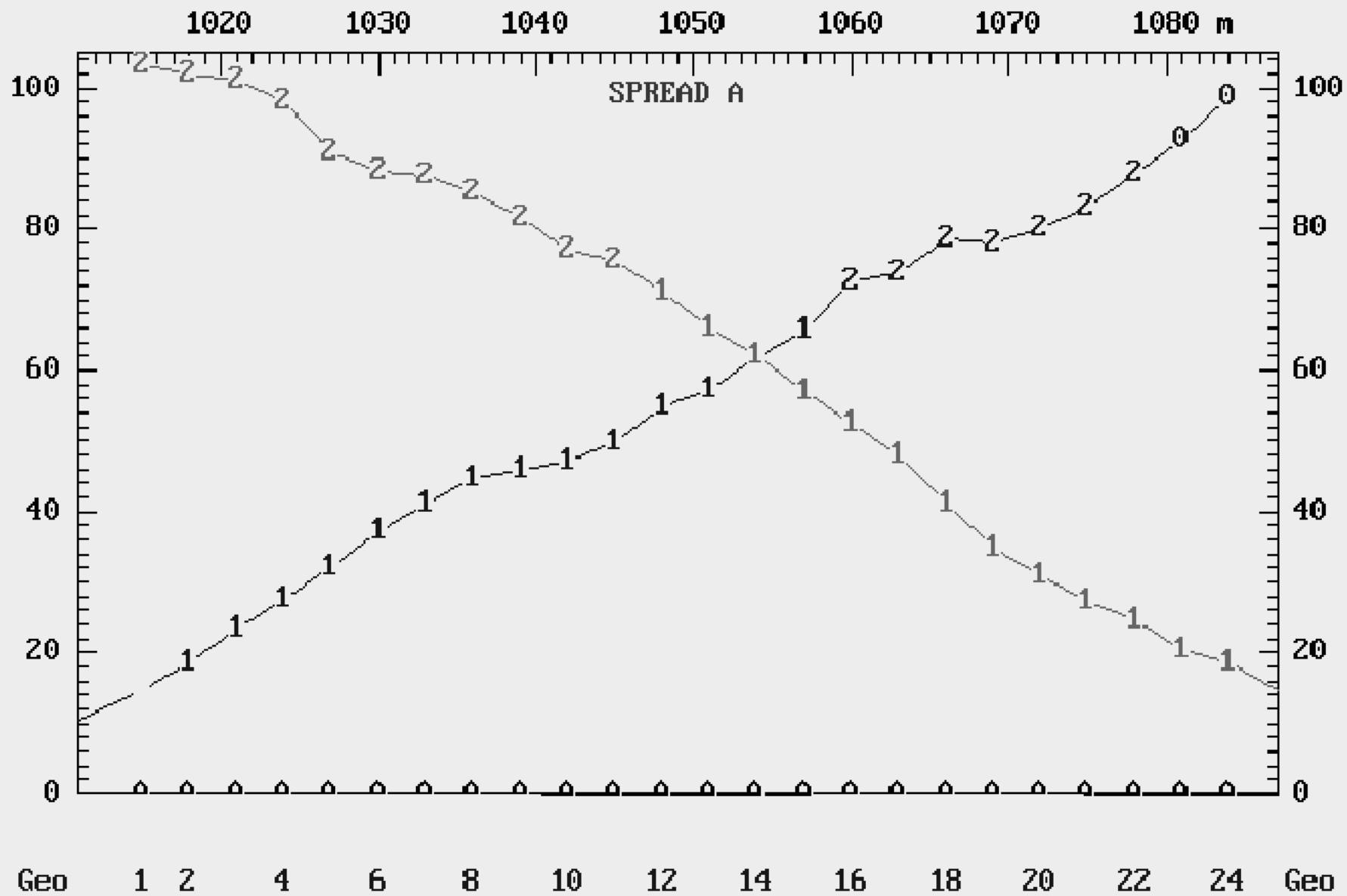
Selah Intermediate School S-wave

Selah Intermediate School S-wave



Selah Intermediate School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

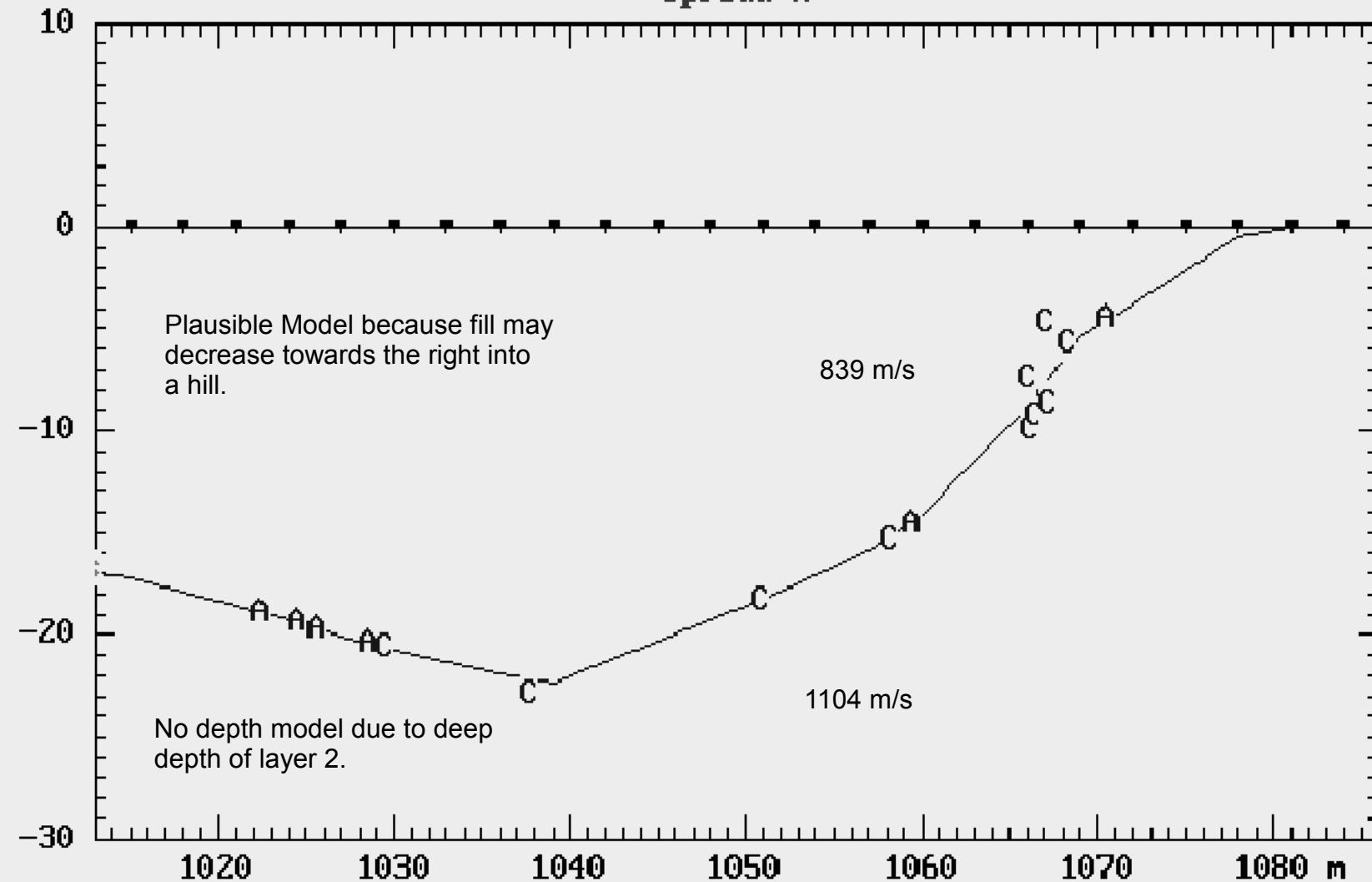


Selah Intermediate School S-wave

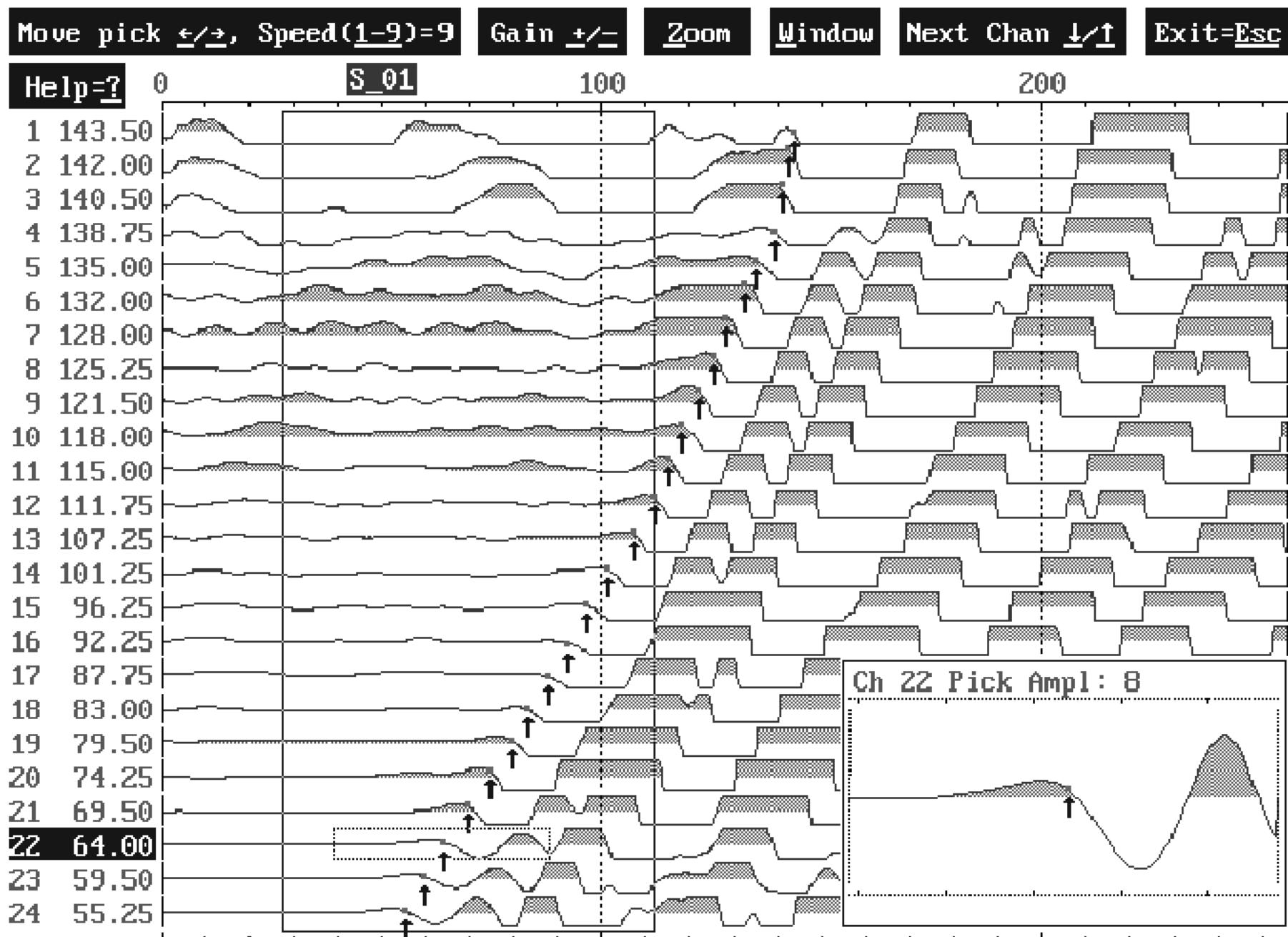
Press Esc to EXIT

SINTSWA2.SIP: Selah Intermediate S-Waves

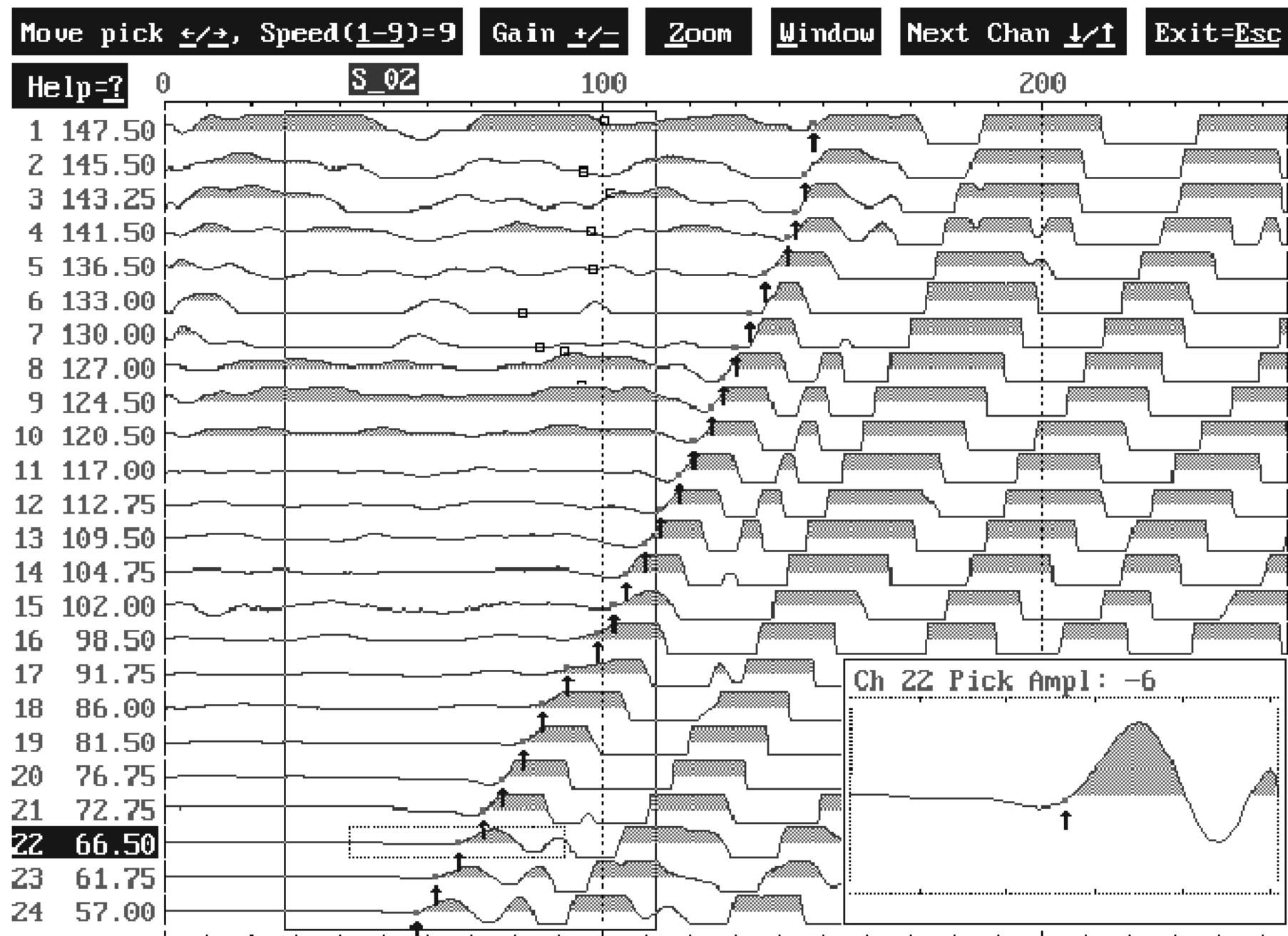
Spread A



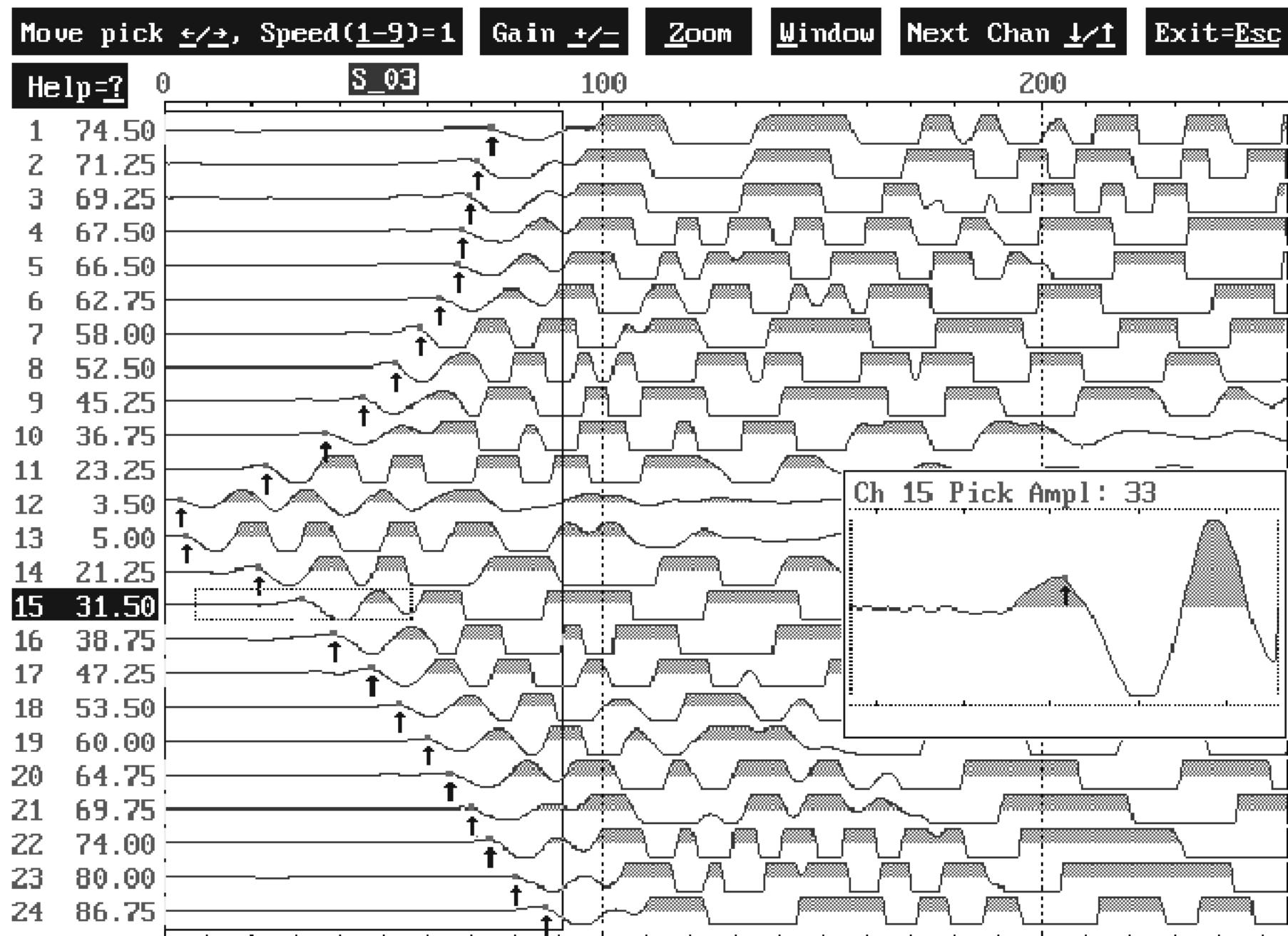
Selah Junior High S-wave



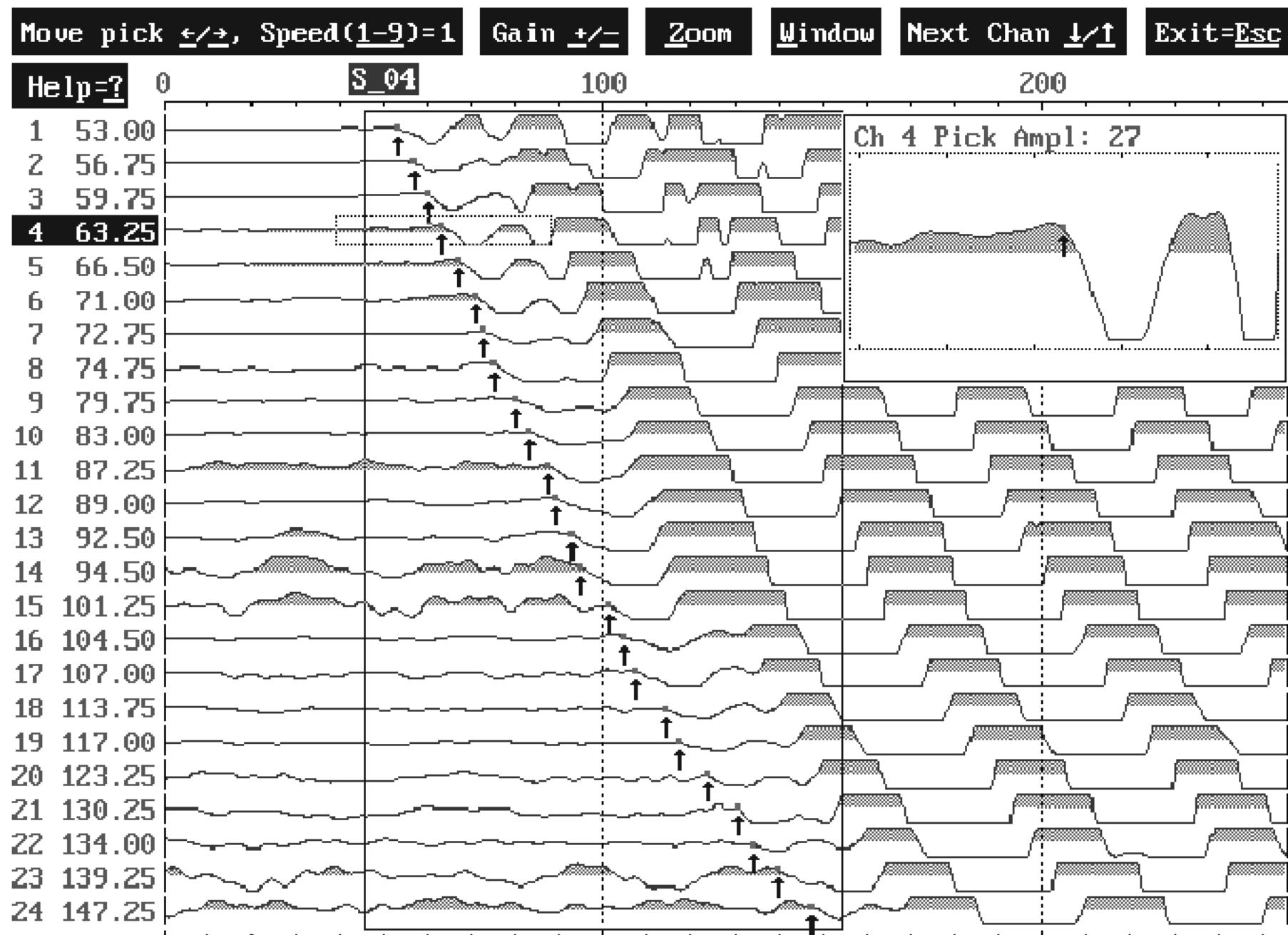
Selah Junior High S-wave



Selah Junior High S-wave

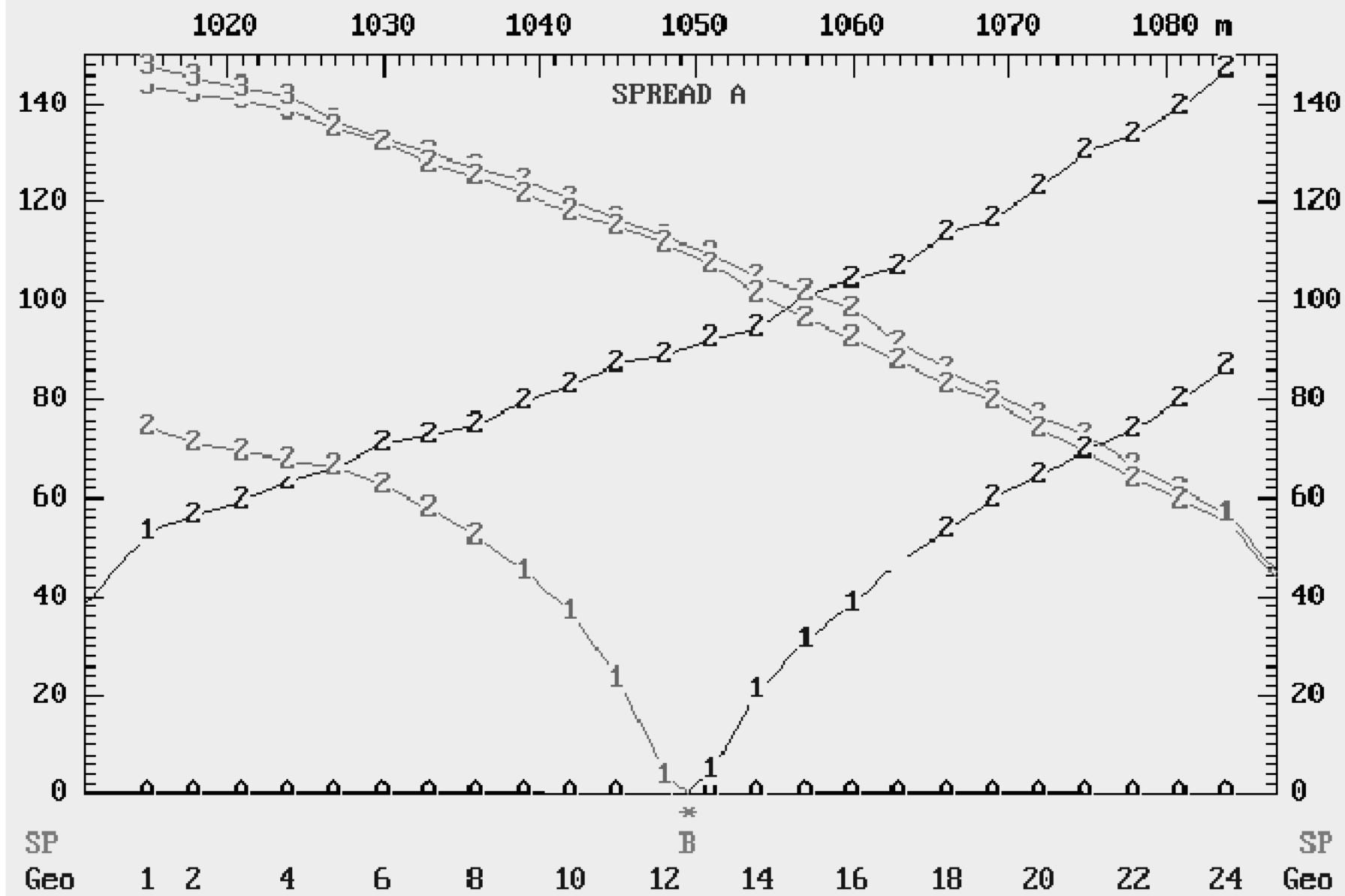


Selah Junior High S-wave



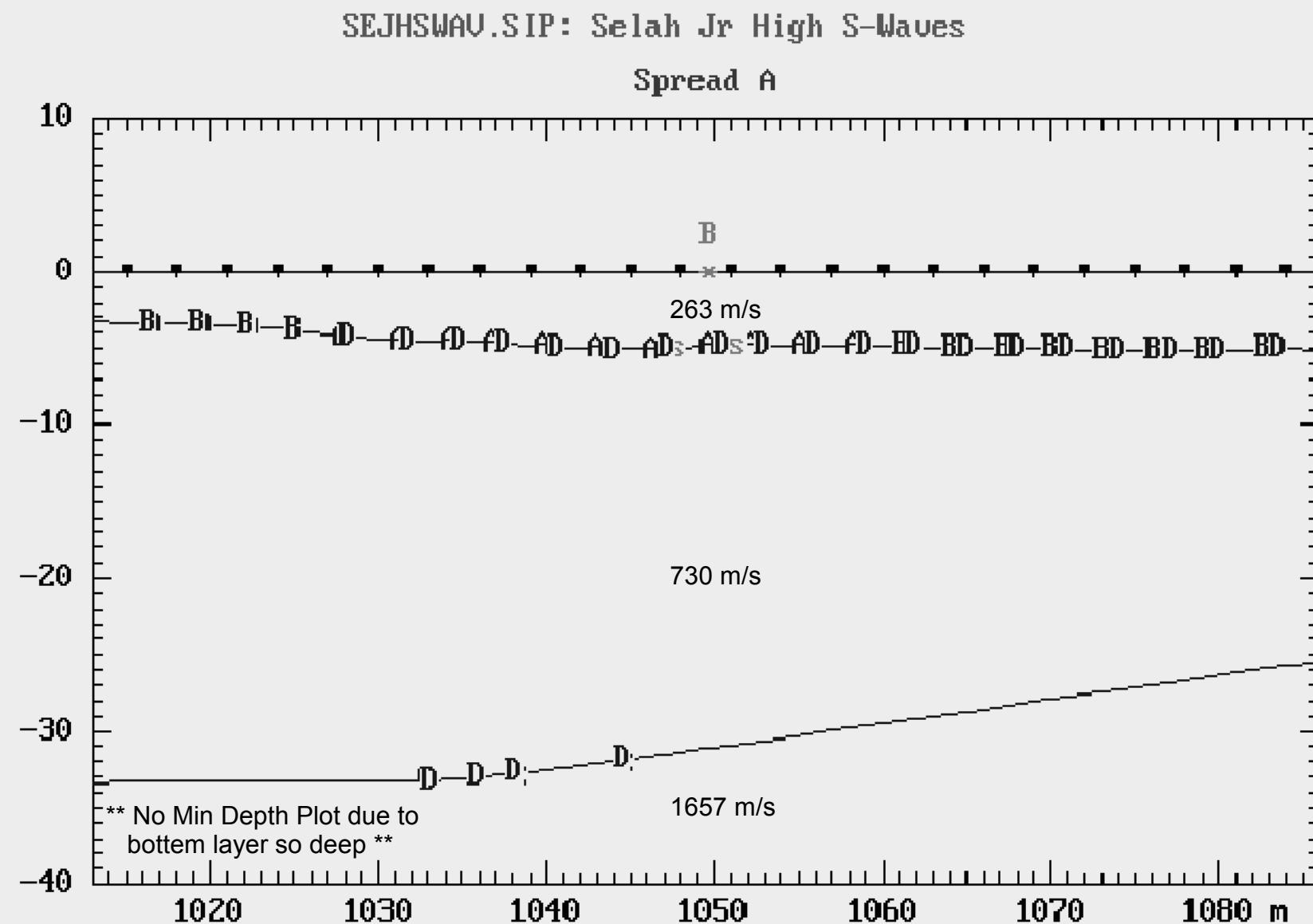
Selah Junior High S-wave

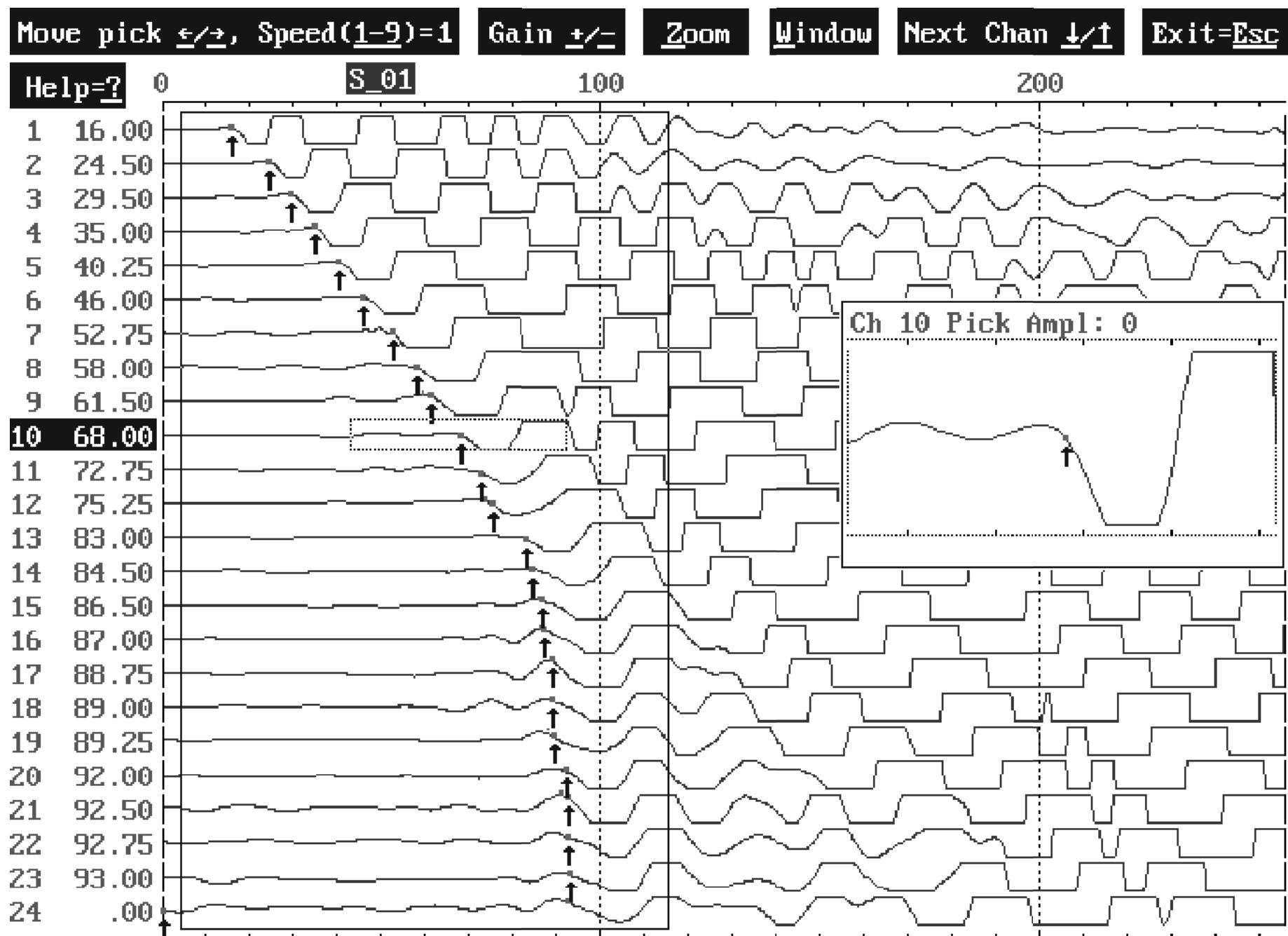
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

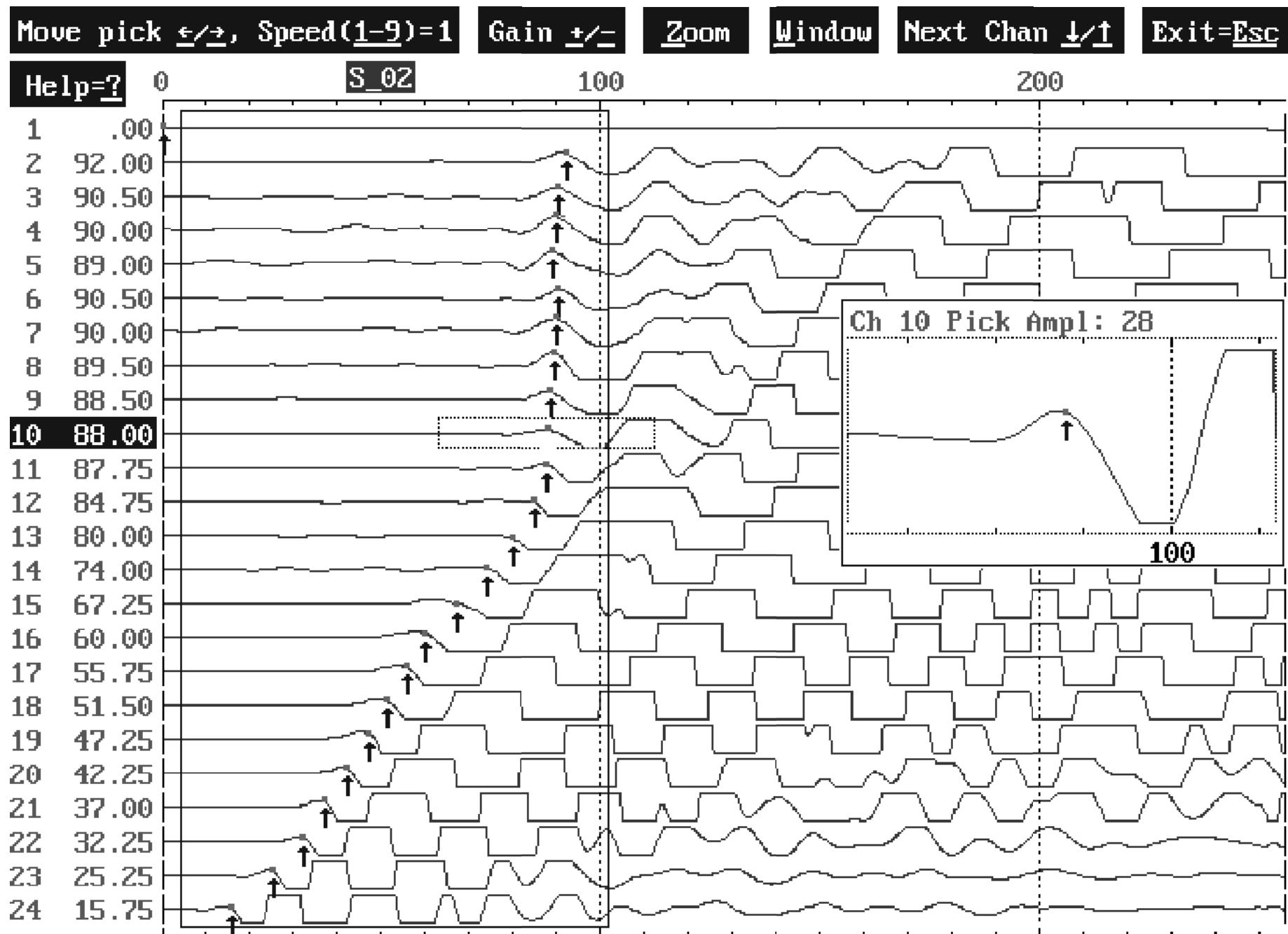


Selah Junior High S-wave

Press Esc to EXIT

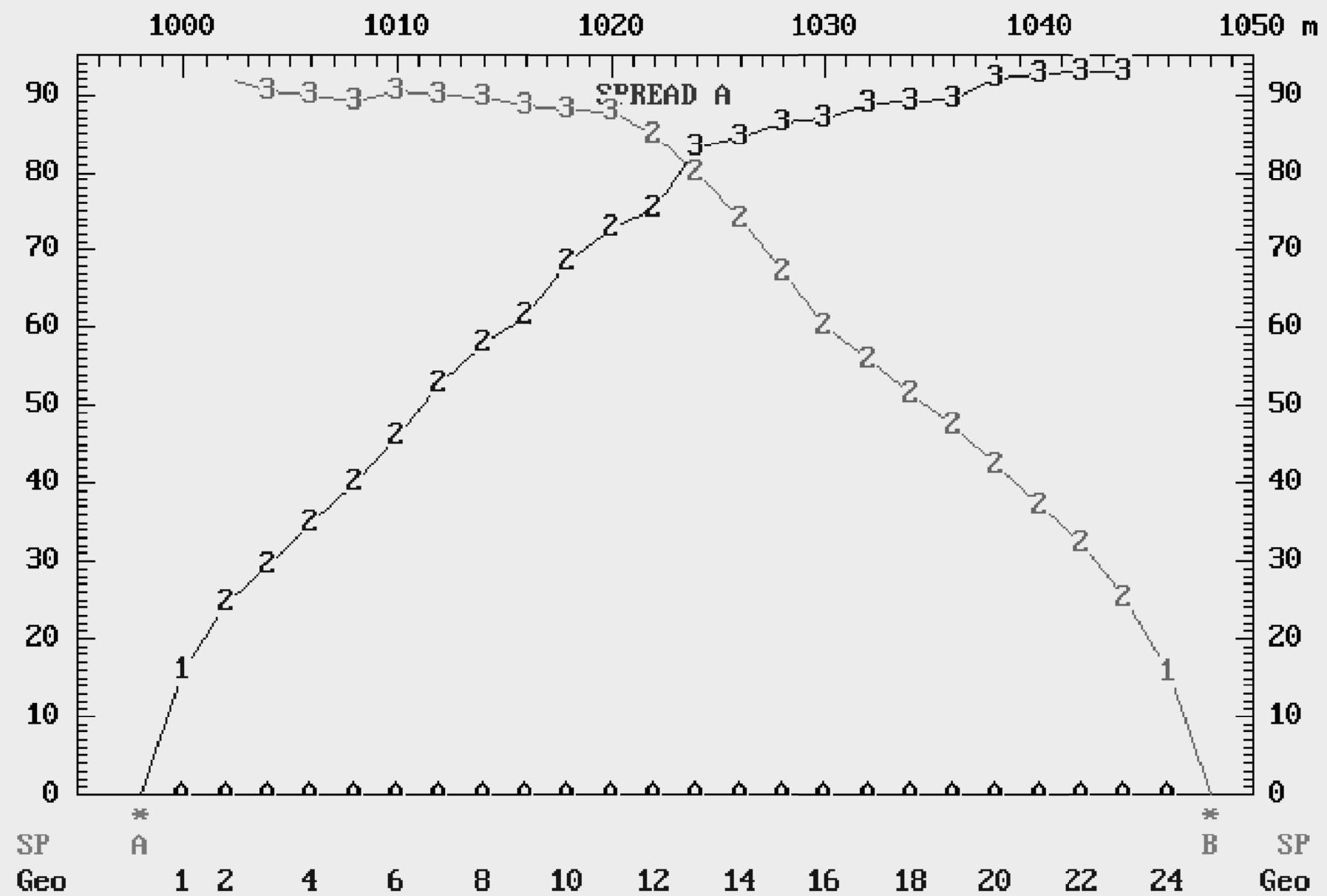


Sheffler Road S-wave

Sheffler Road S-wave

Sheffler Road S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

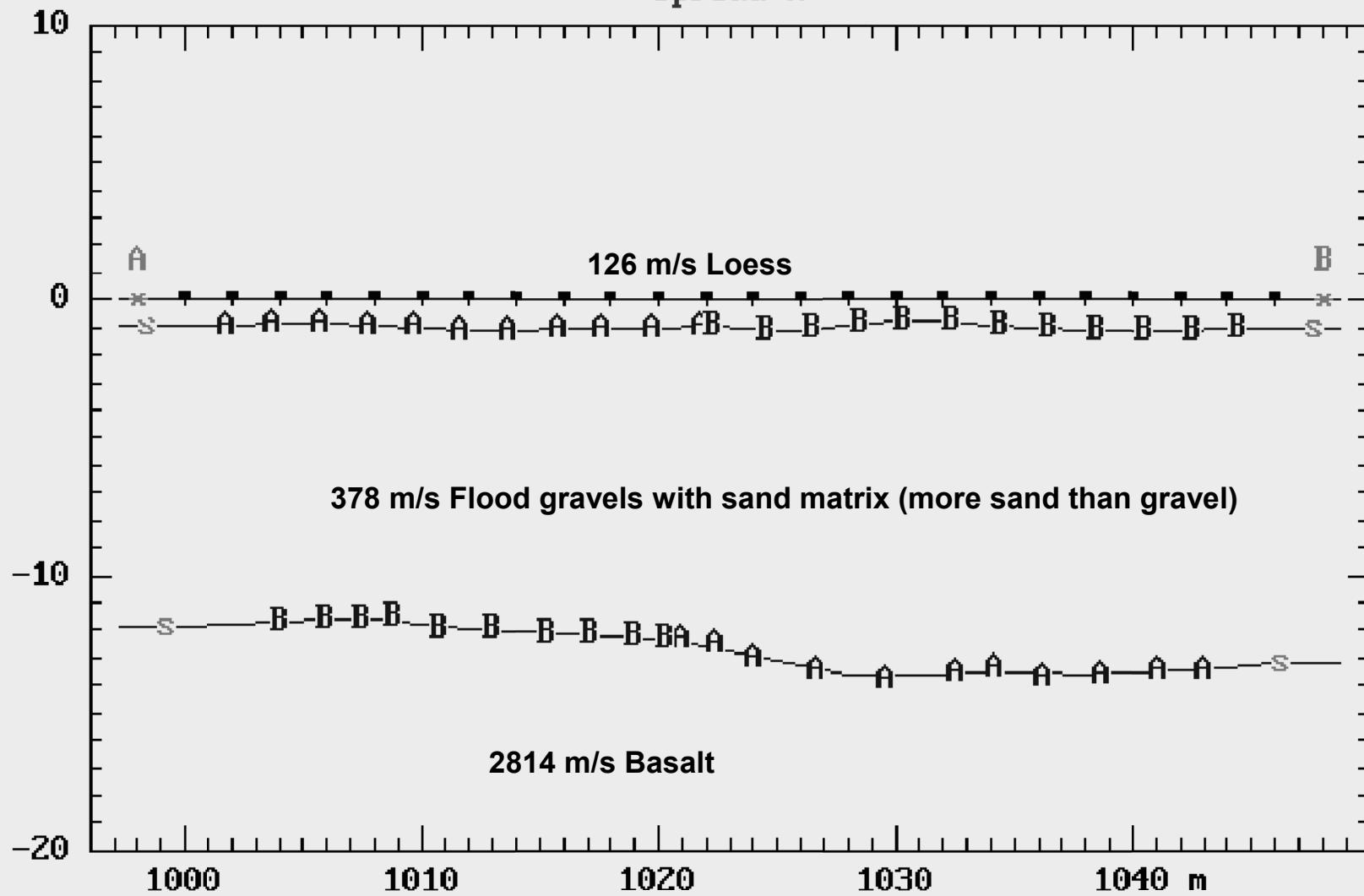


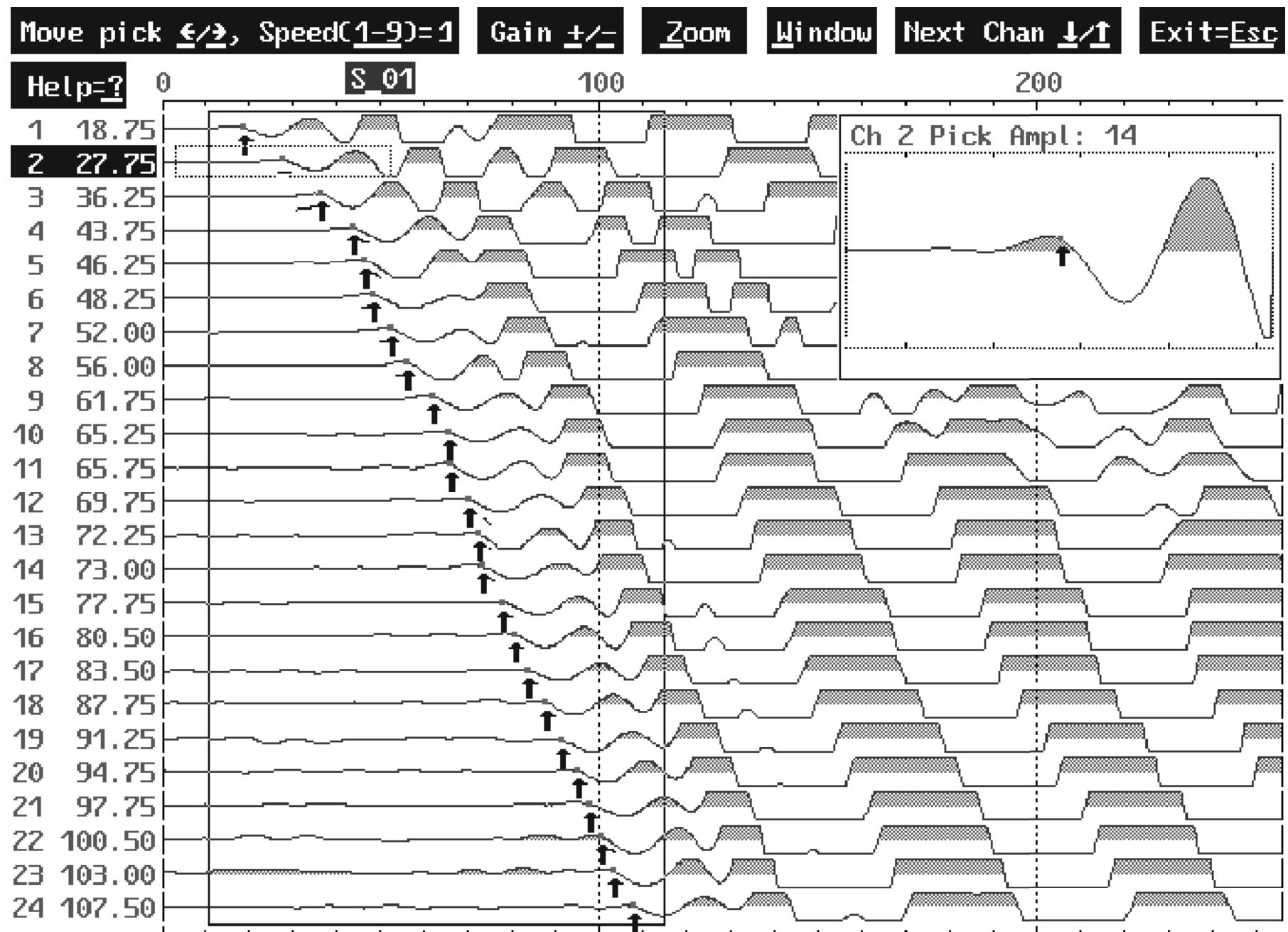
Sheffler Road S-wave

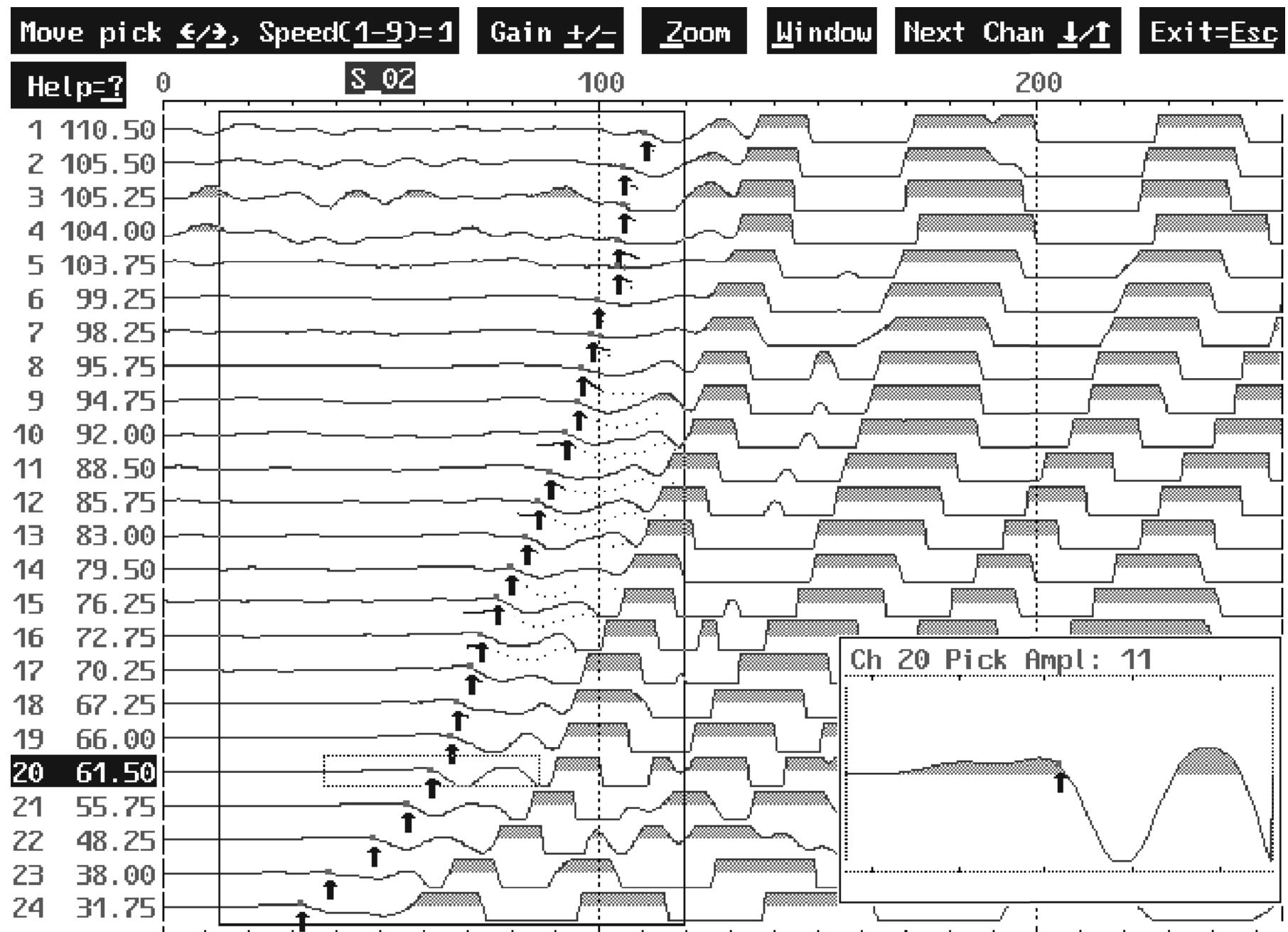
Press Esc to EXIT

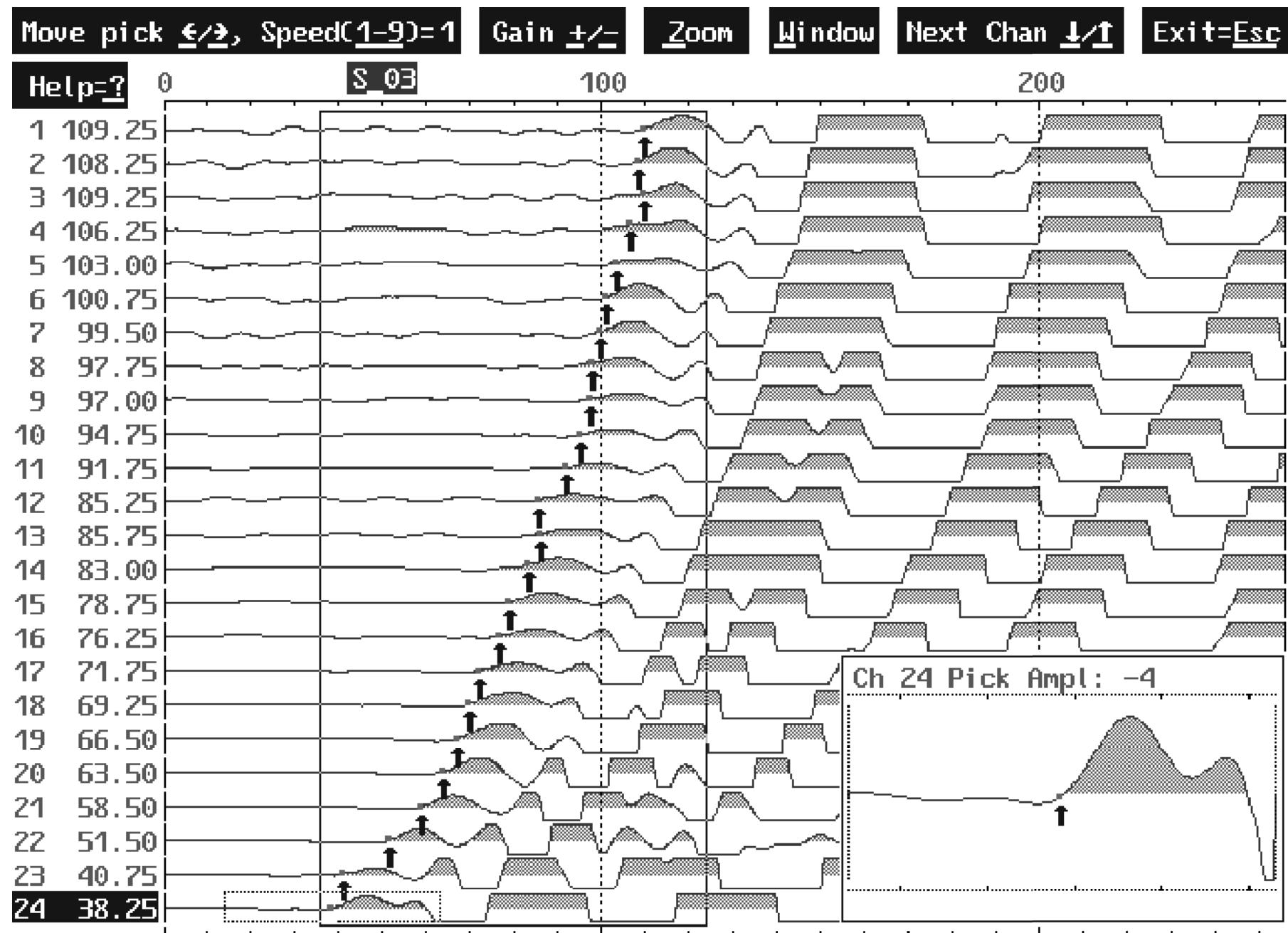
SHEFF_SW.SIP: Sheffler Road S wave survey

Spread A



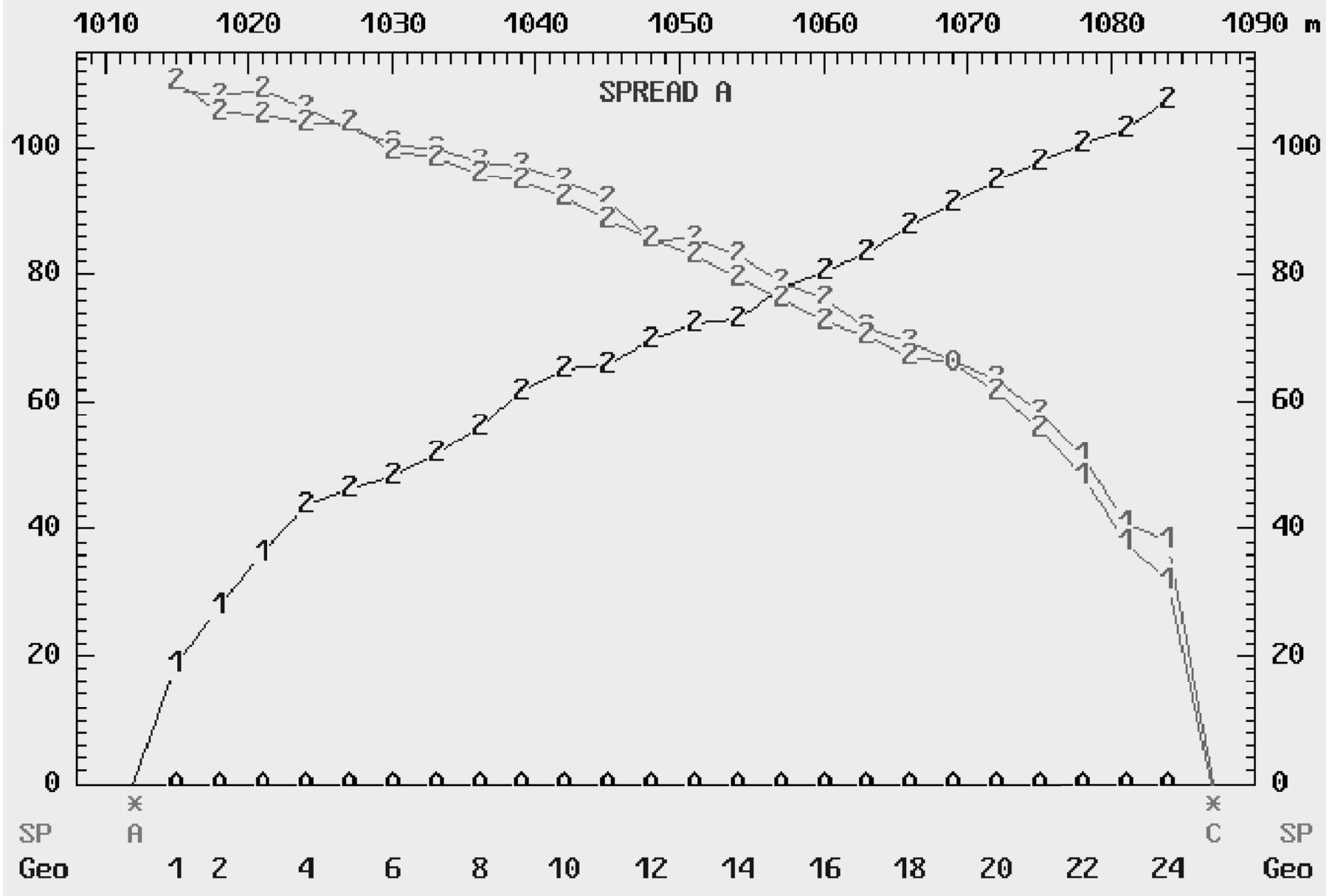
Sherman Park S-wave

Sherman Park S-wave

Sherman Park S-wave

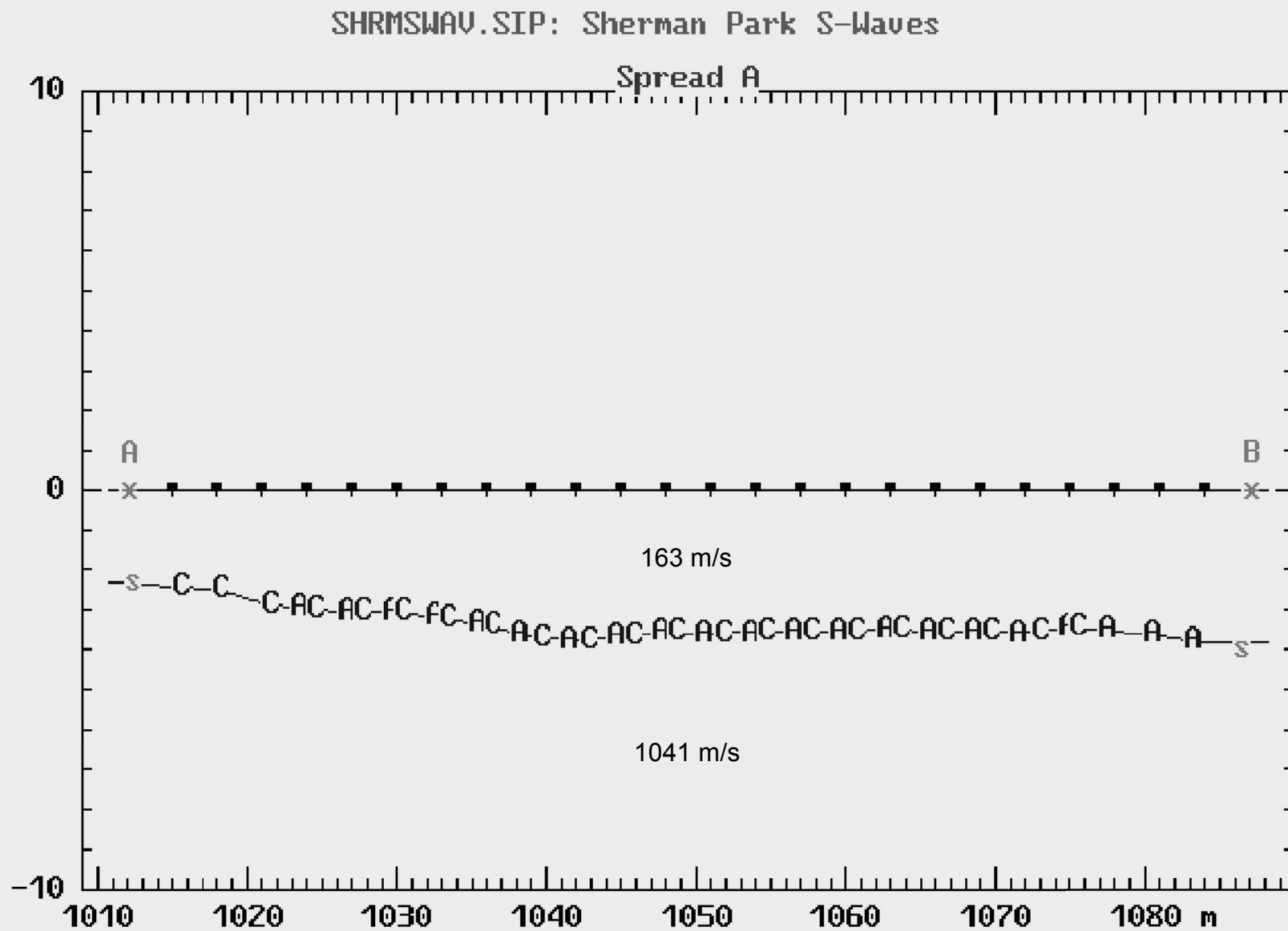
Sherman Park S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.



Sherman Park S-wave

Press Esc to EXIT

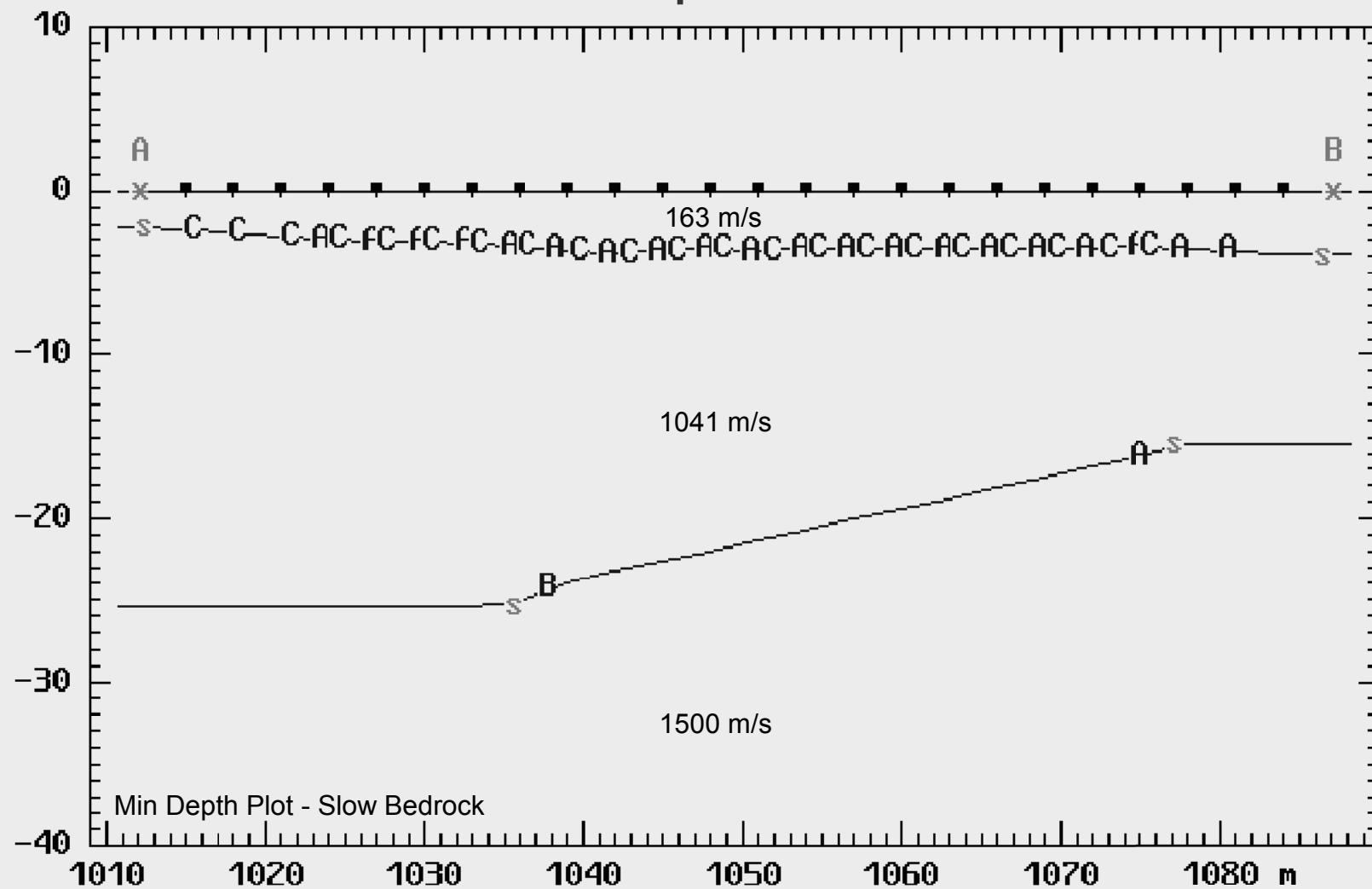


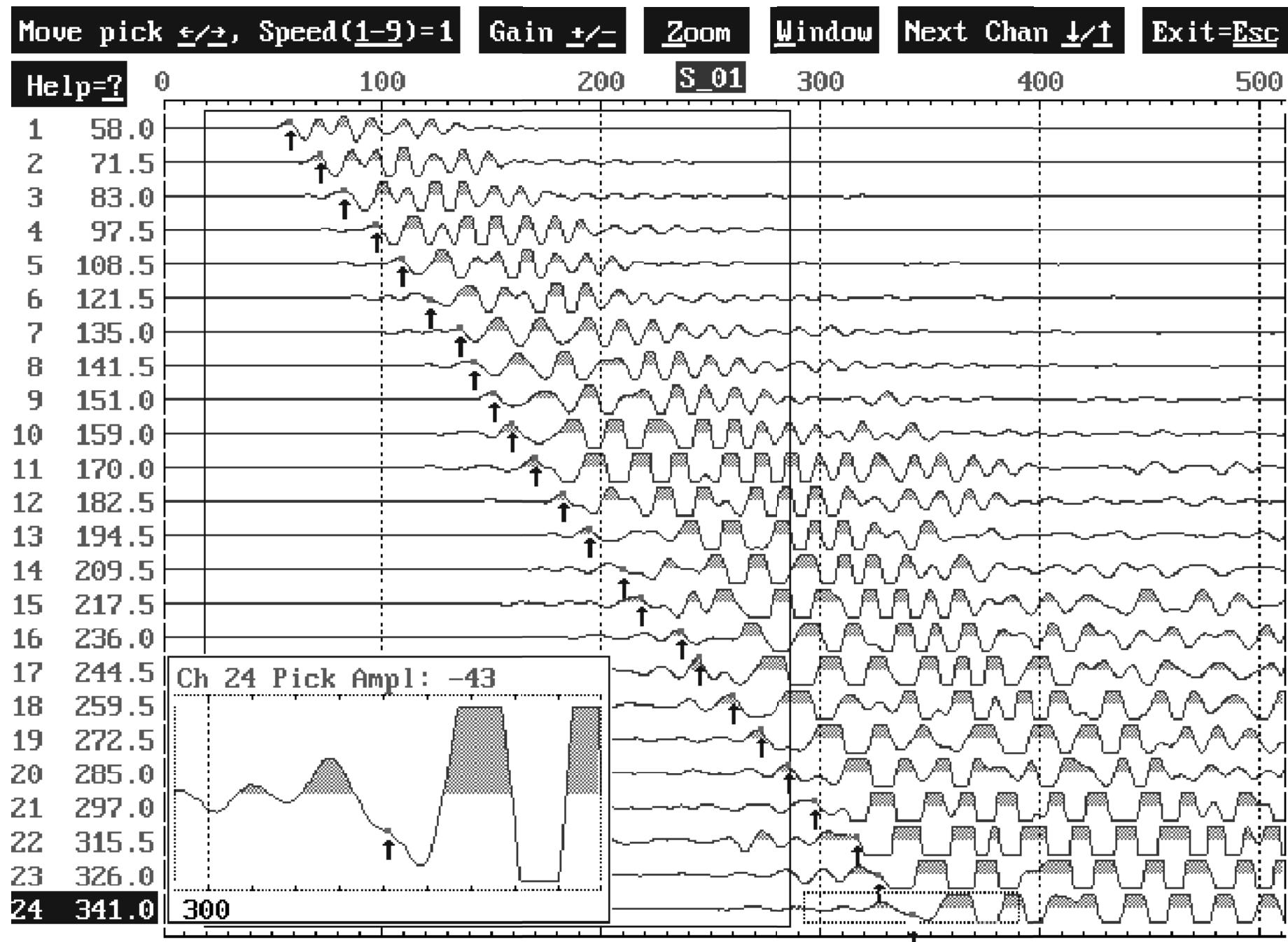
Sherman Park S-wave

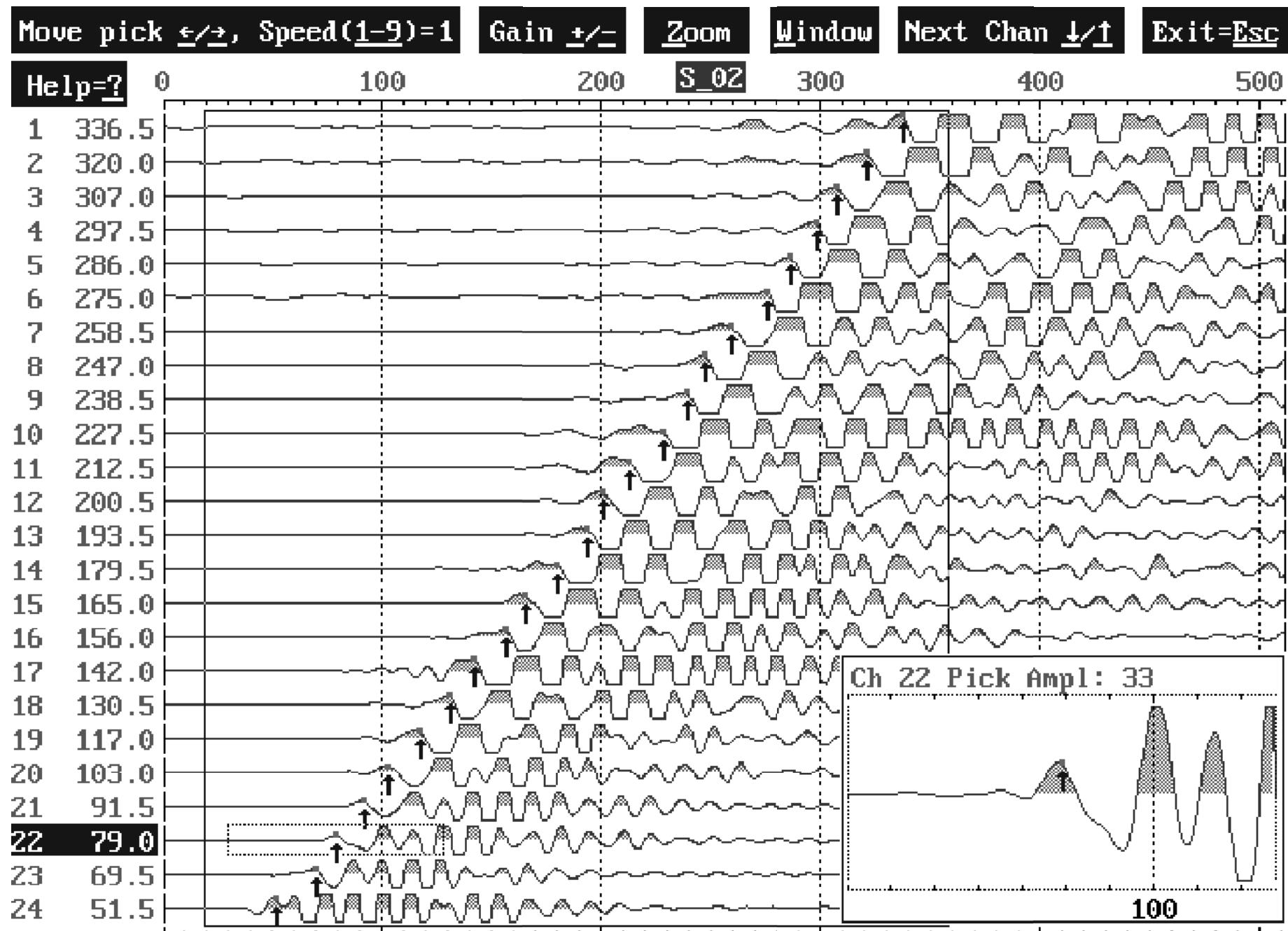
Press Esc to EXIT

SHRMSMIN.SIP: Sherman Park S-Waves Minimum Depth Plot

Spread A

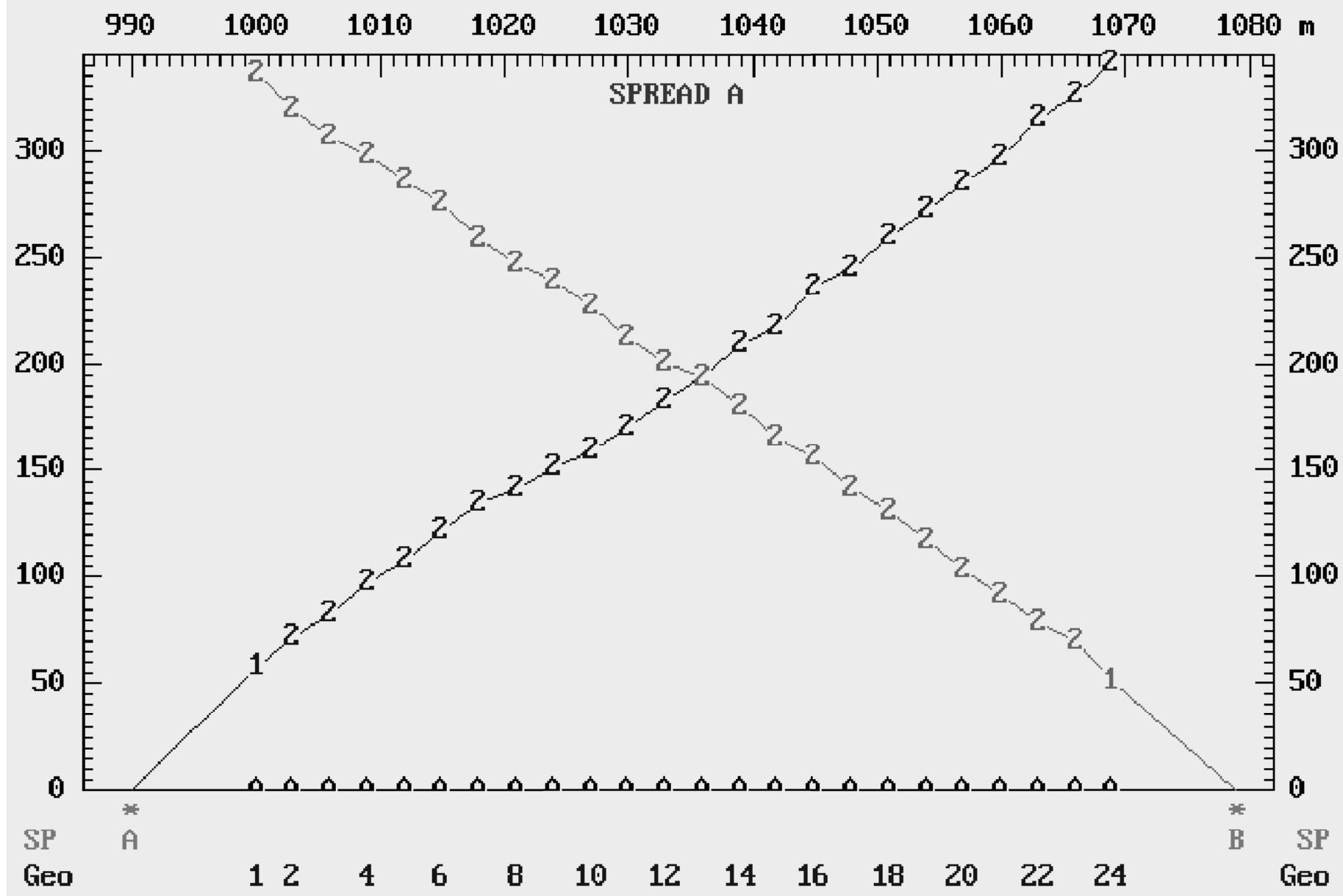


Shoultes Elementary School S-wave

Shoultes Elementary School S-wave

Shoultes Elementary School S-wave

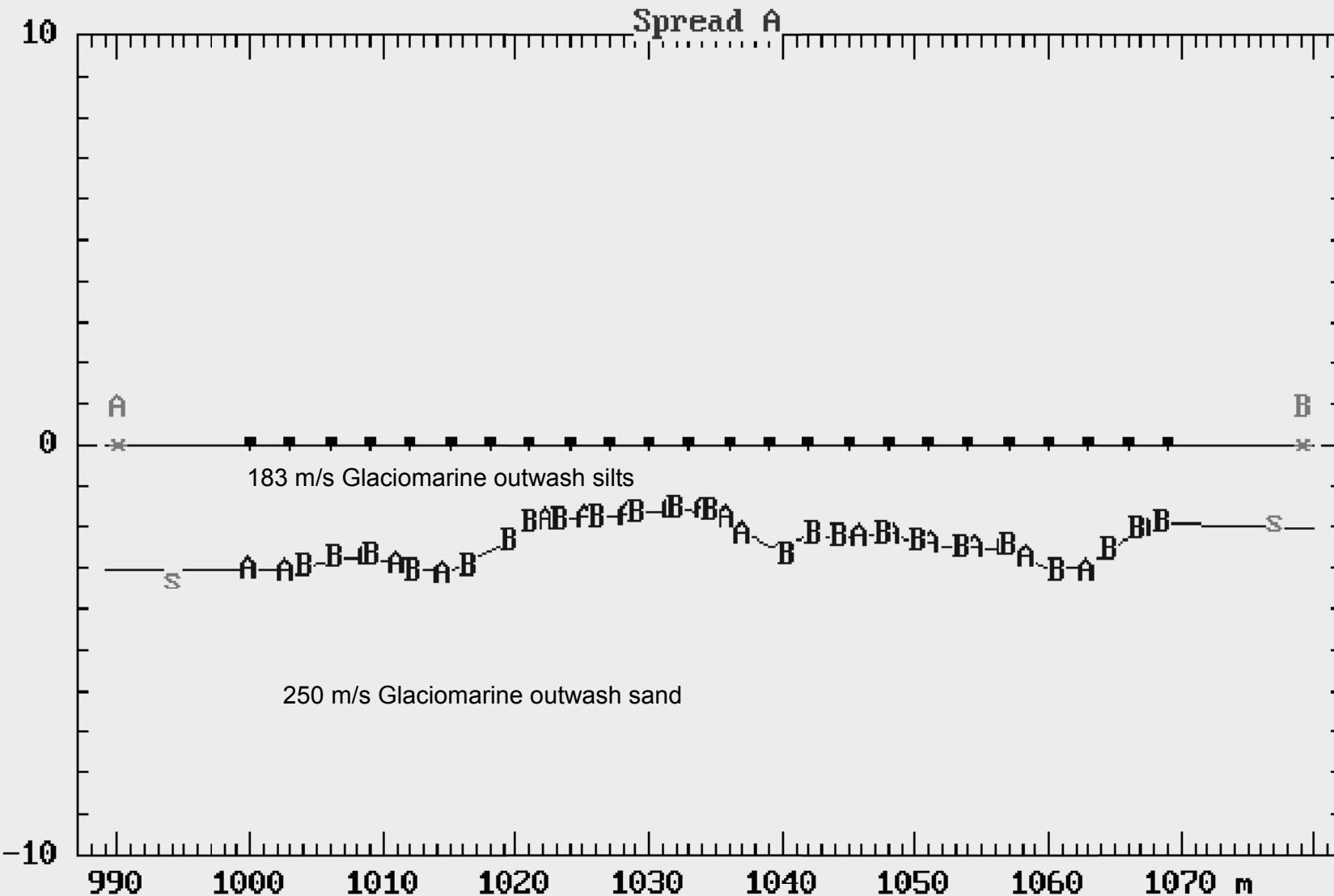
Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Shoultes Elementary School S-wave

Press Esc to EXIT

SHOLSWAV.SIP: Shoultes EL S wave survey

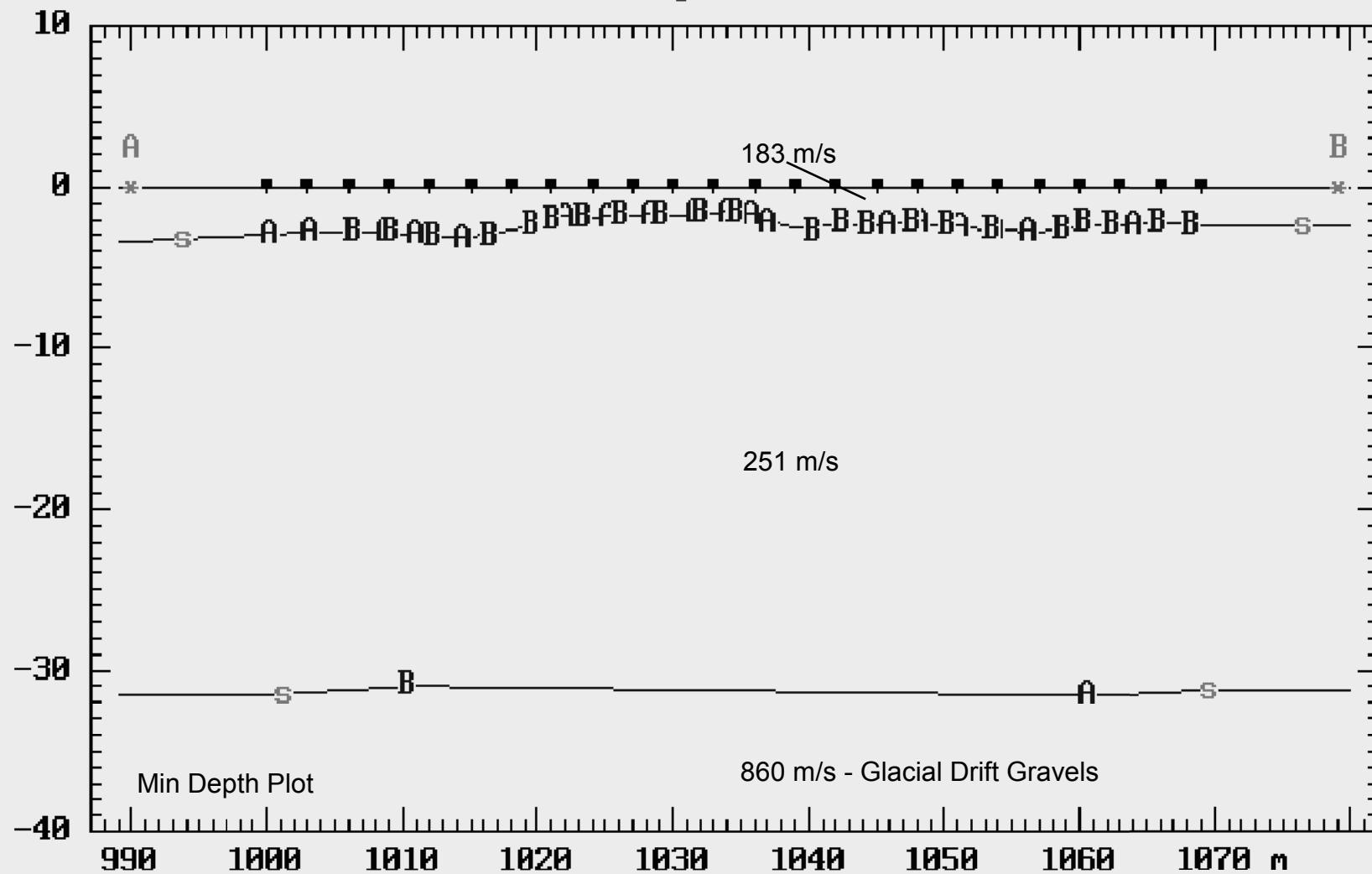


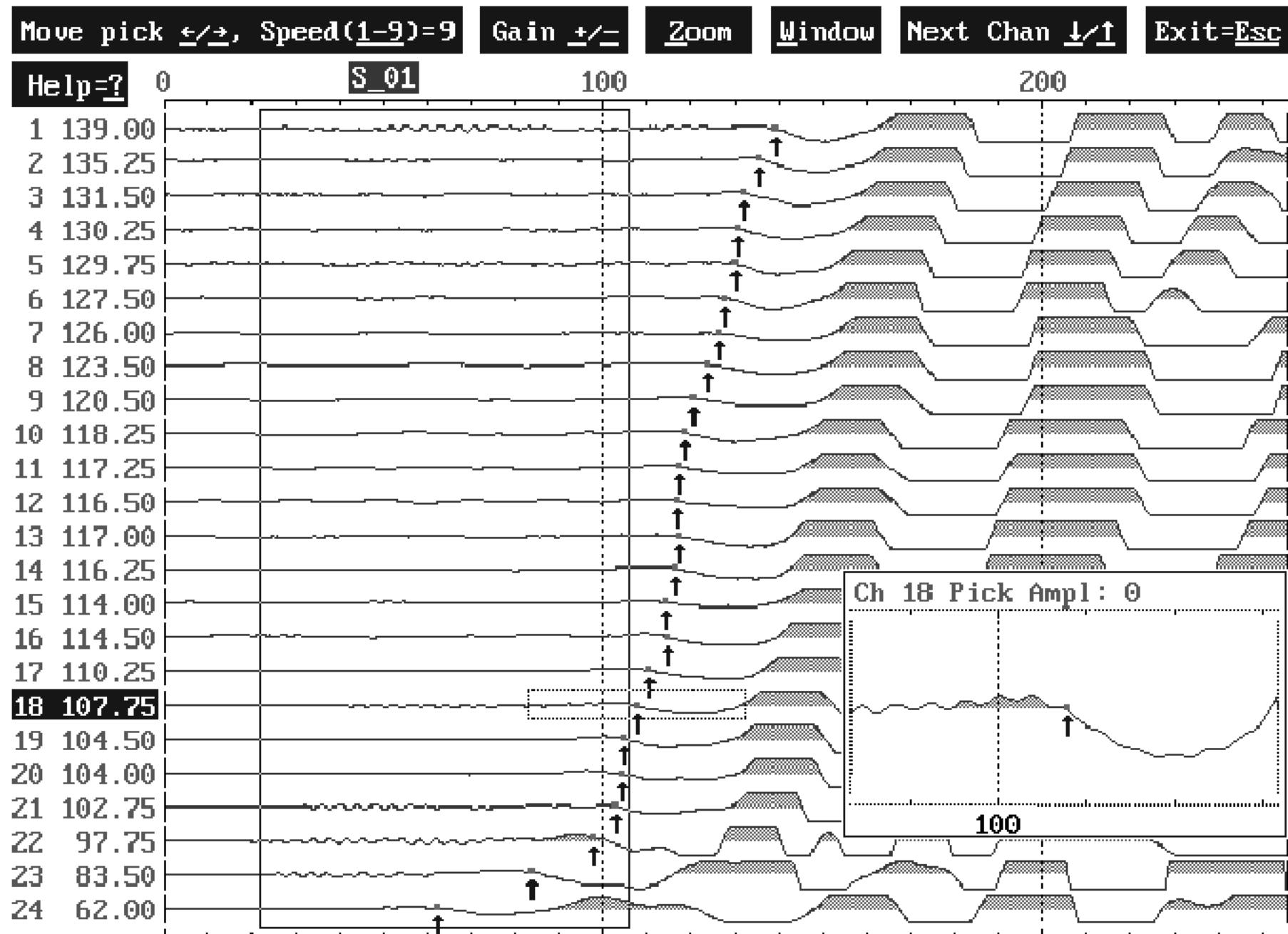
Shoultes Elementary School S-wave

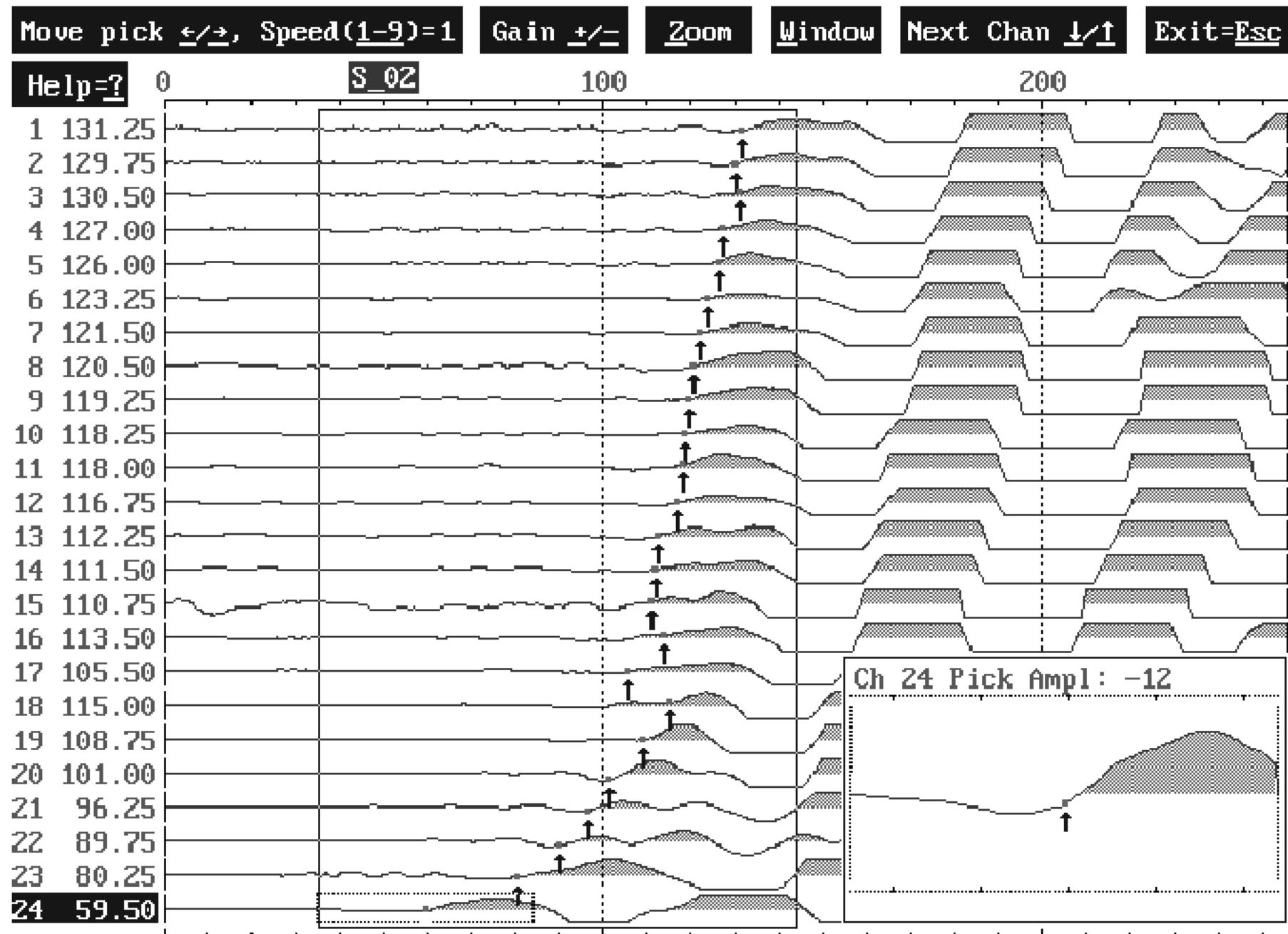
Press Esc to EXIT

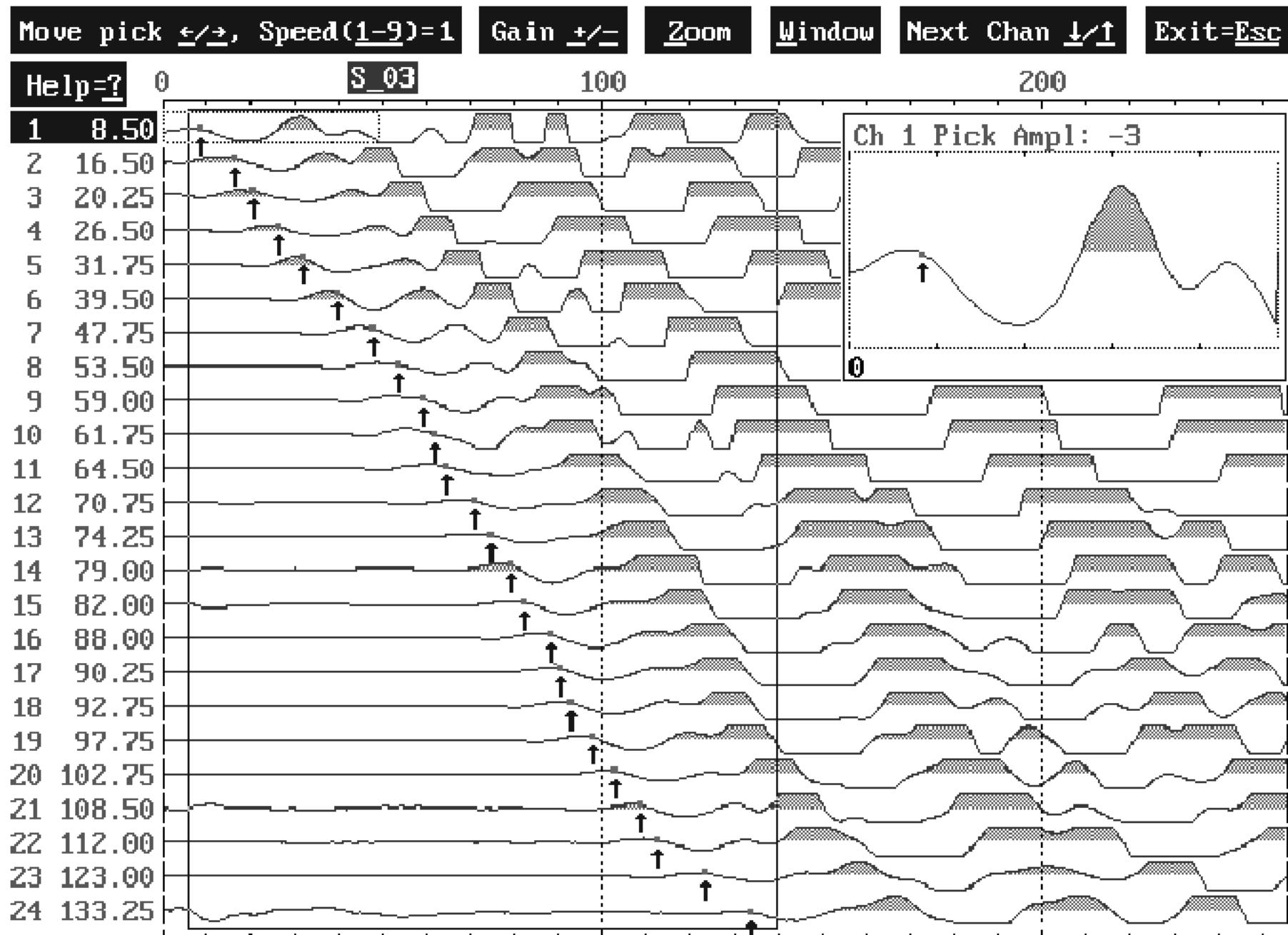
SHOLSMIN.SIP : Shoultes Elementary Minimum Depth Plot

Spread A



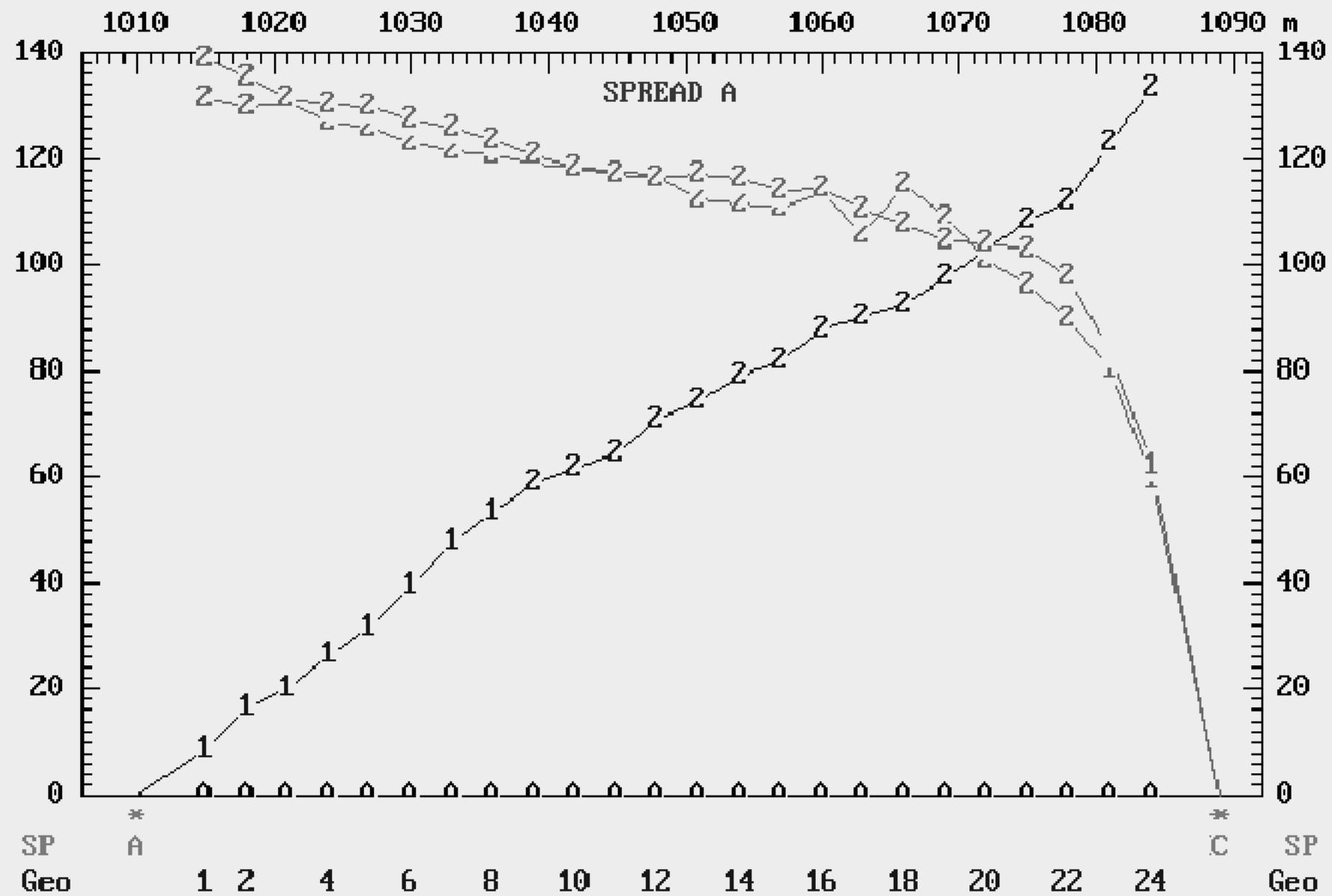
Smith Farm S-wave

Smith Farm S-wave

Smith Farm S-wave

Smith Farm S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

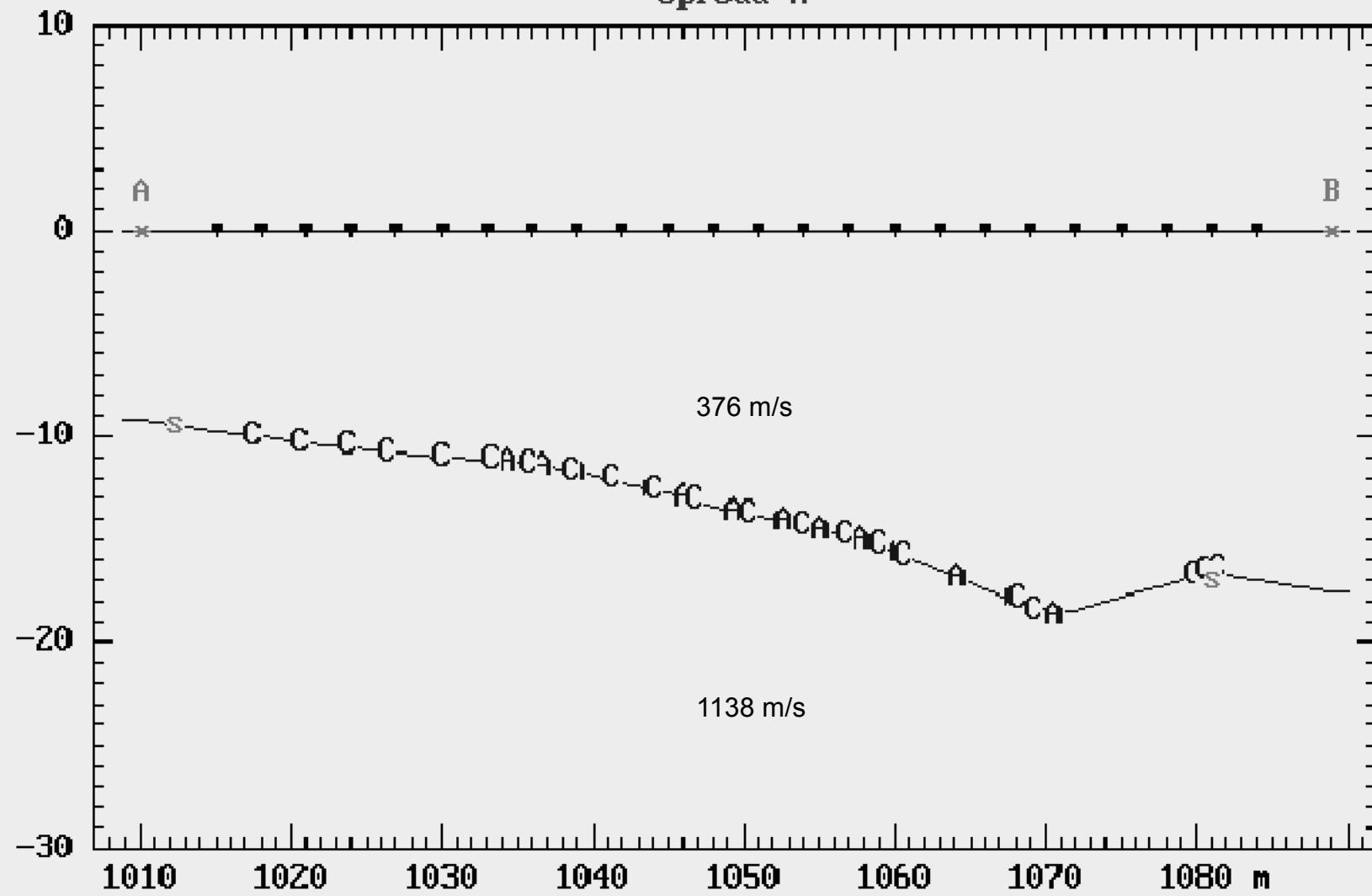


Smith Farm S-wave

Press Esc to EXIT

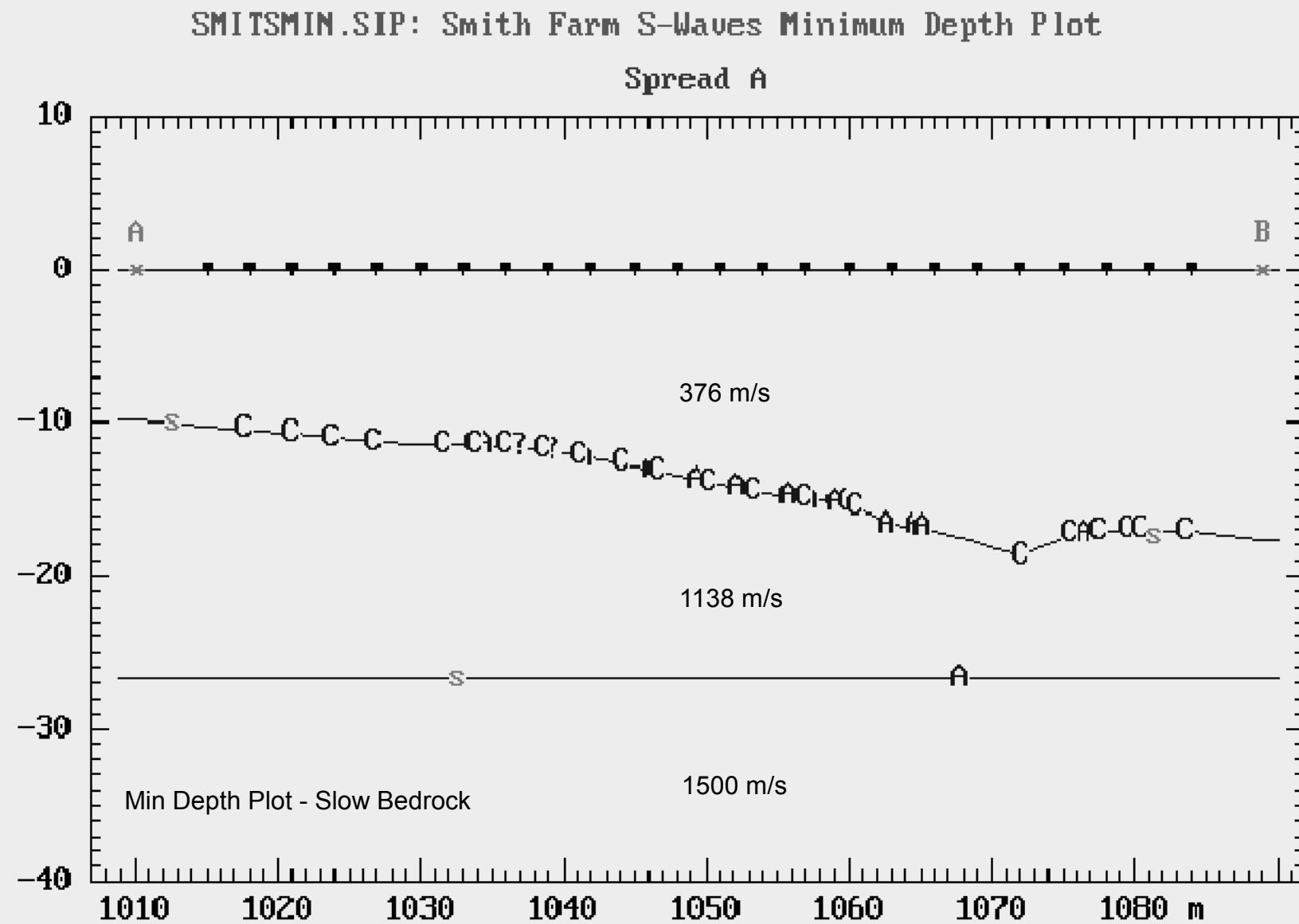
SMITSWAU.SIP: Smith Farm S-Waves

Spread A

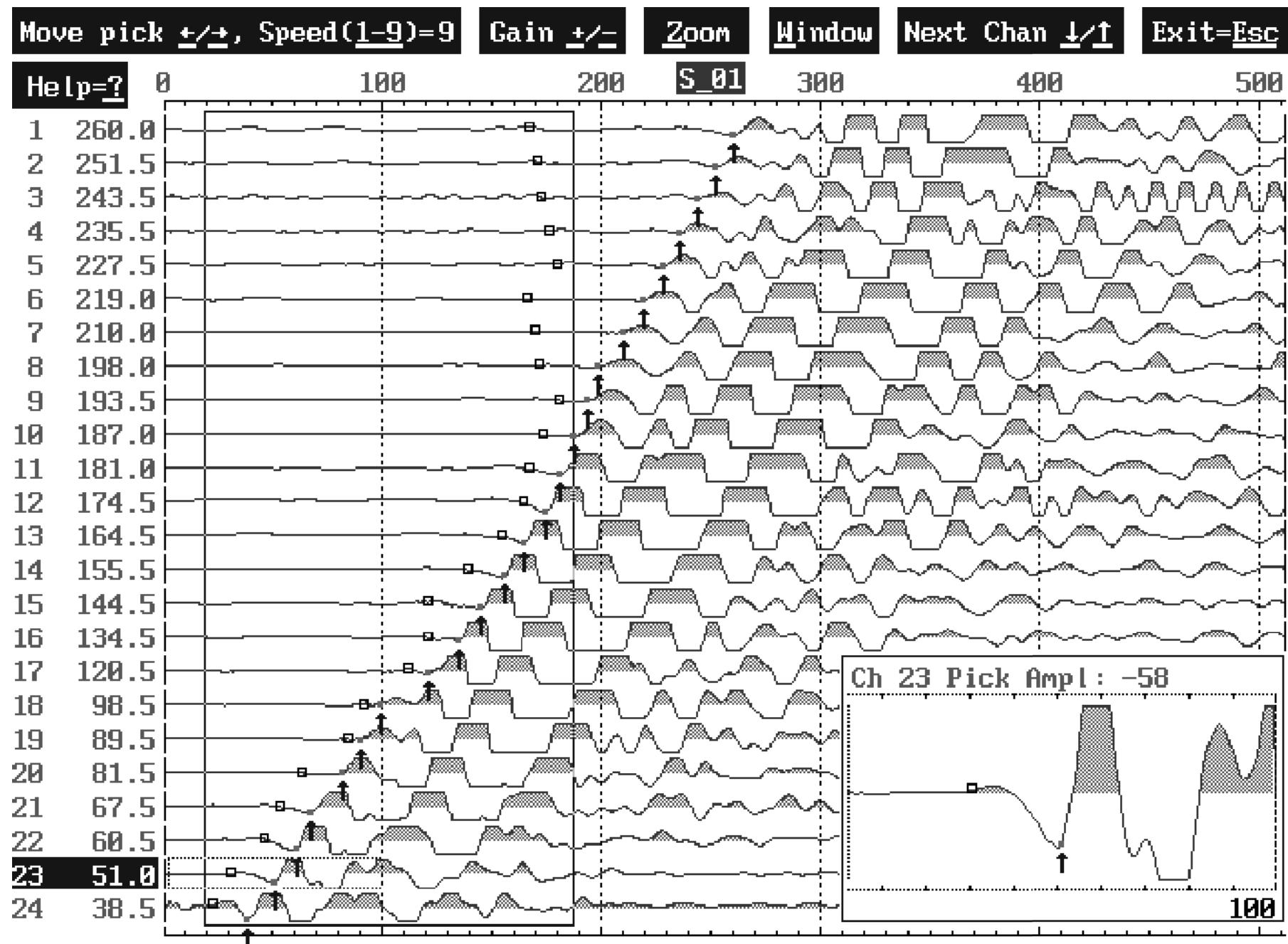


Smith Farm S-wave

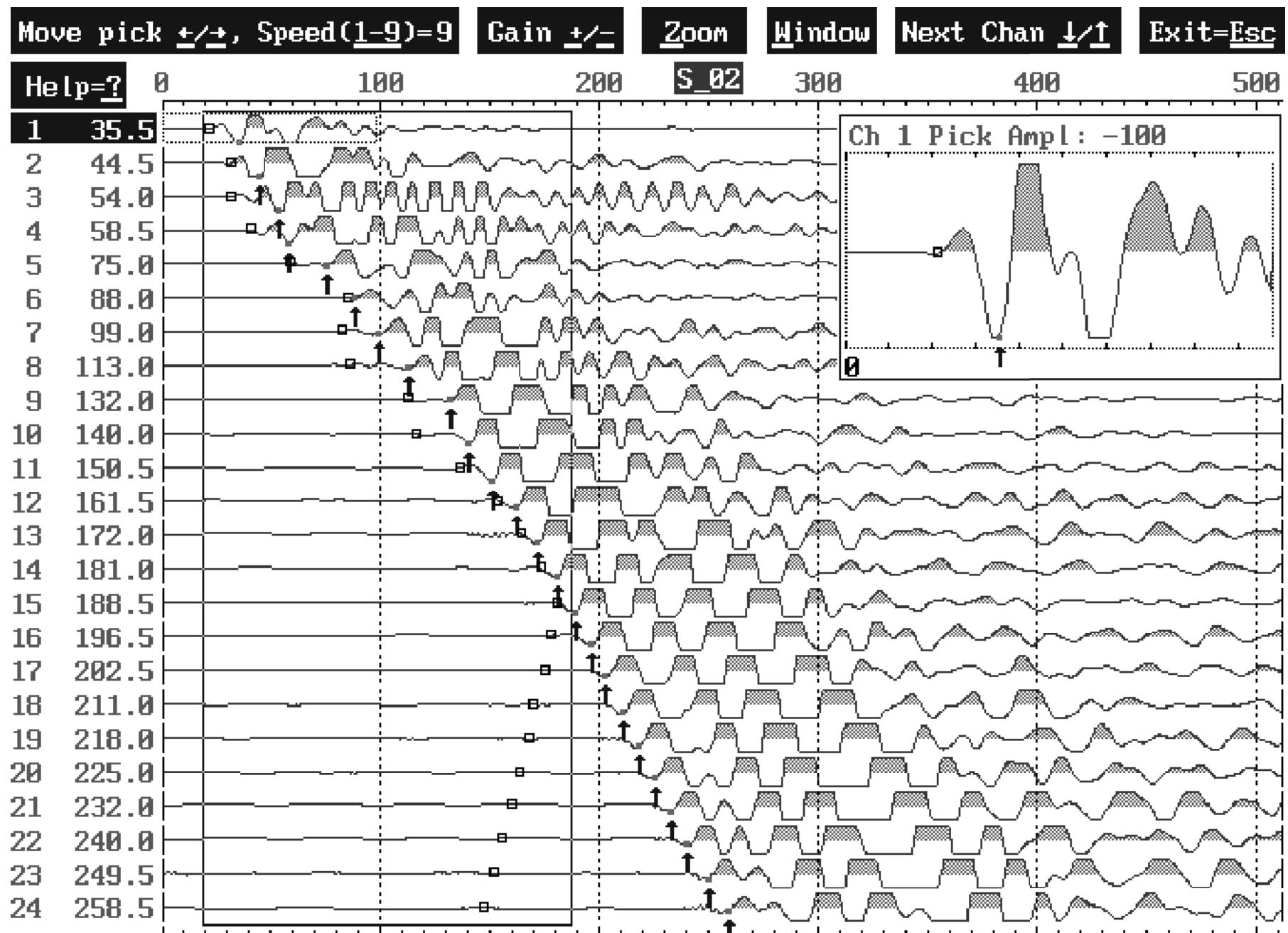
Press Esc to EXIT



St. Elizabeth Ann Seton Church S-wave

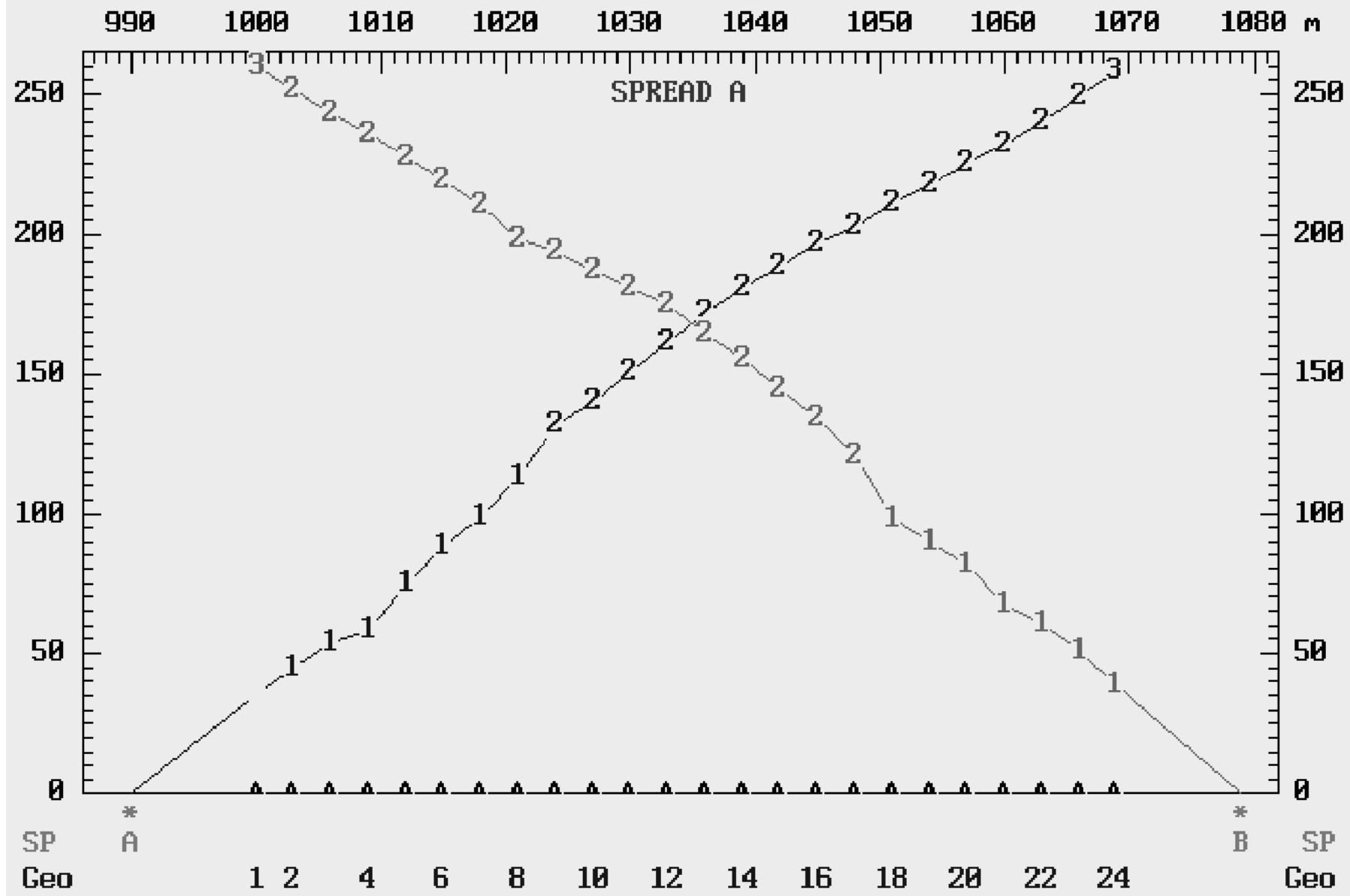


St. Elizabeth Ann Seton Church S-wave



St. Elizabeth Ann Seton Church S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

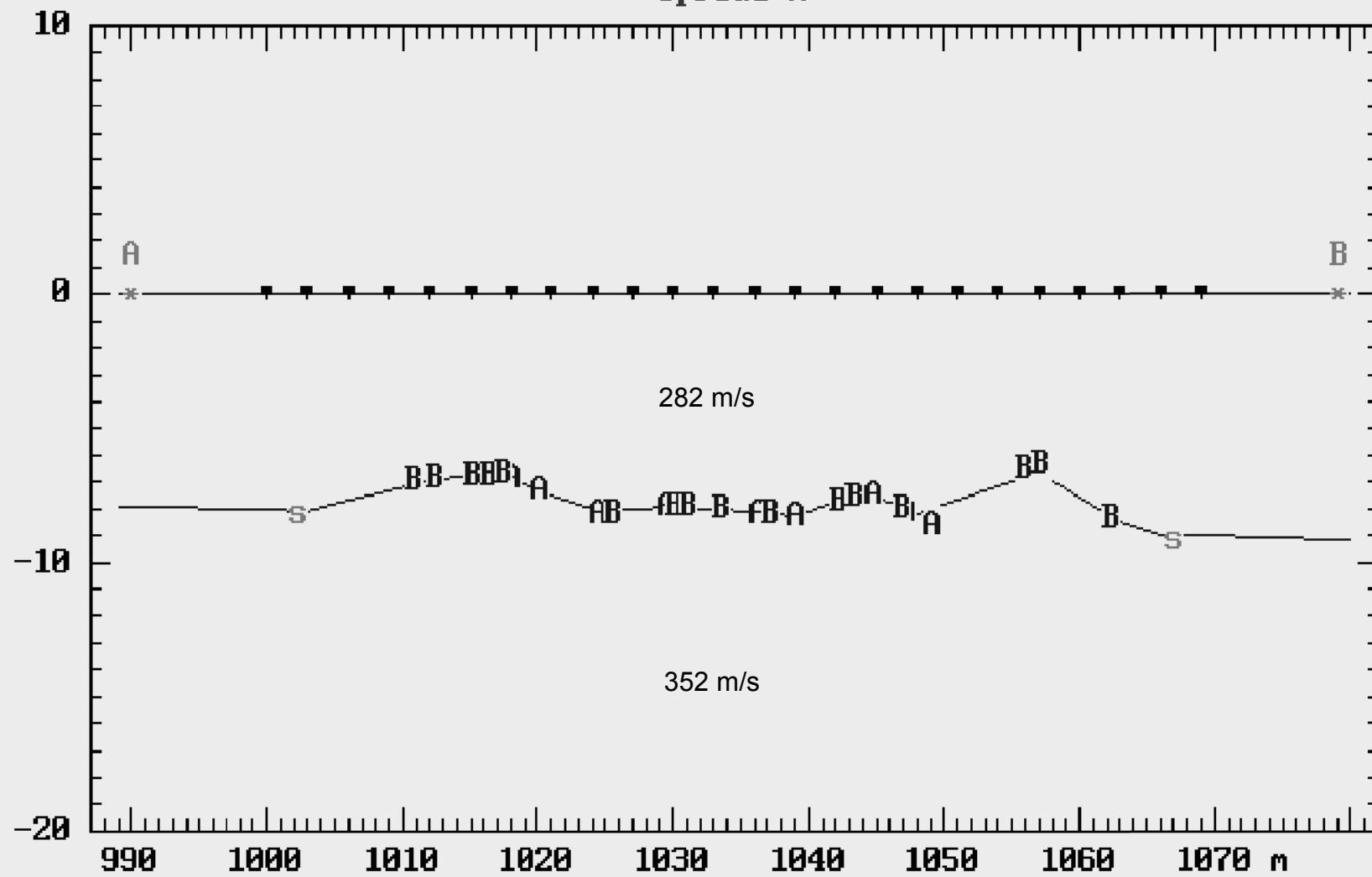


St. Elizabeth Ann Seton Church S-wave

Press Esc to EXIT

STLASWAV.SIP: St. Elizabeth Ann Seton S-Waves

Spread A

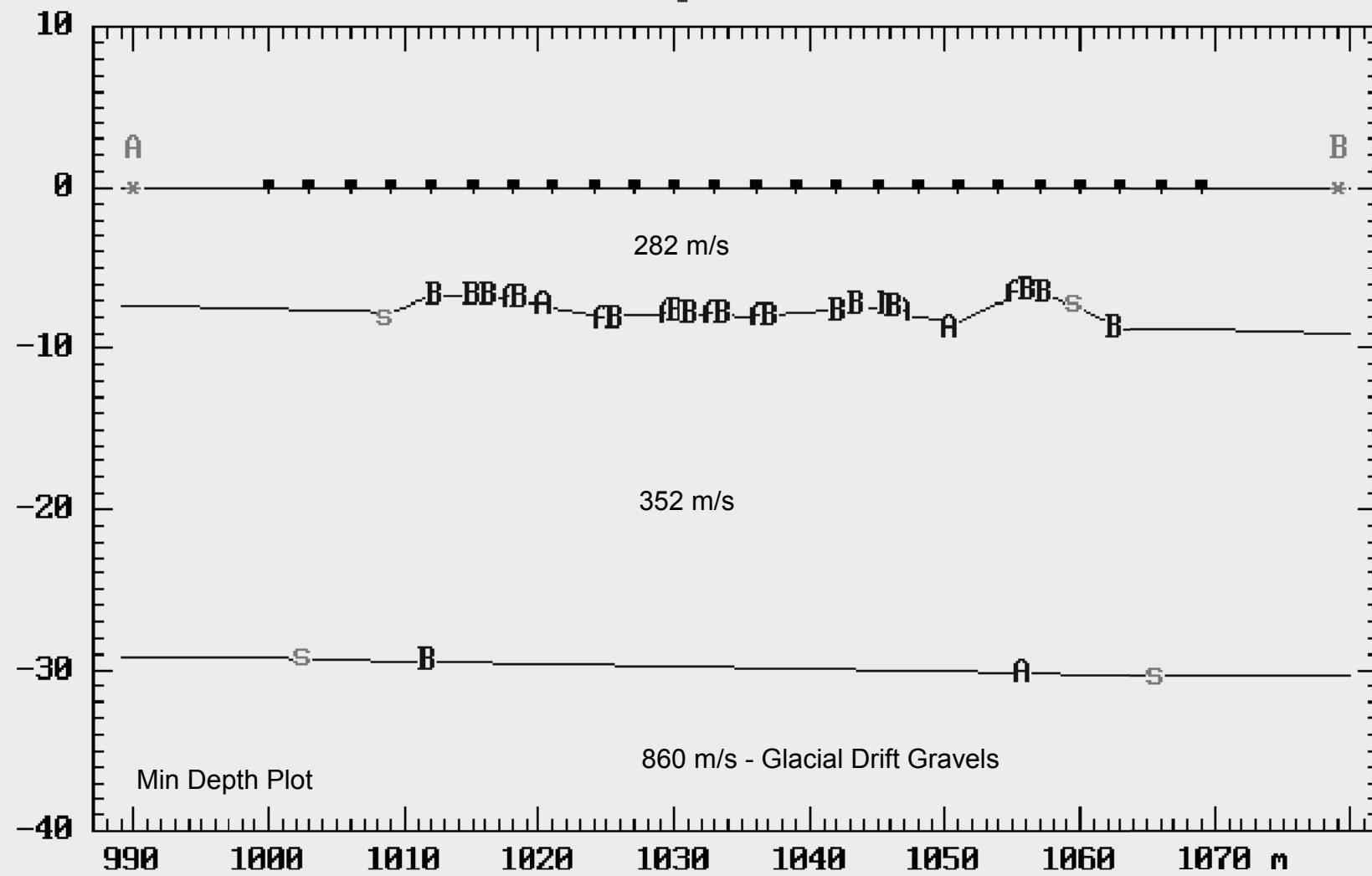


St. Elizabeth Ann Seton Church S-wave

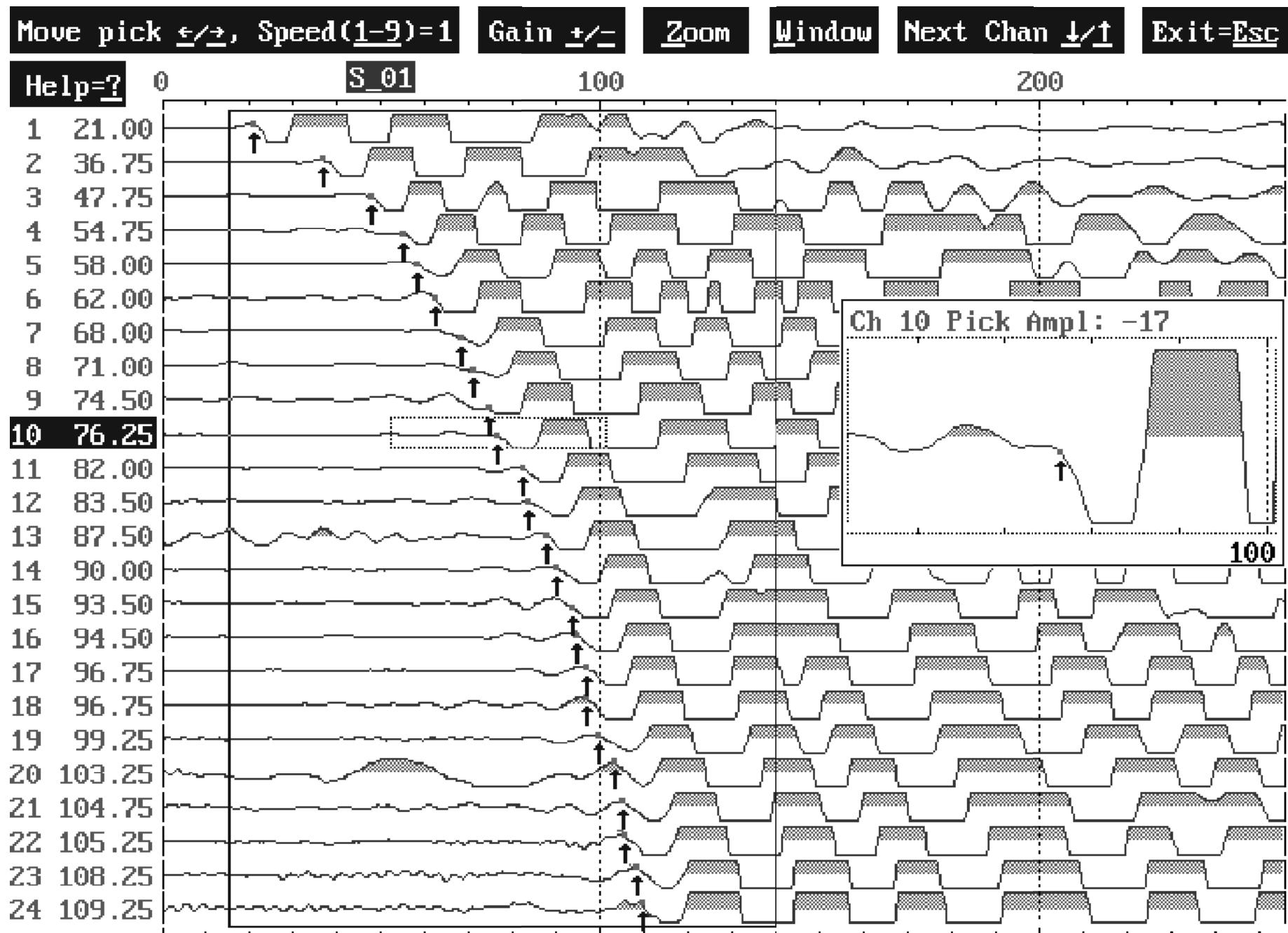
Press Esc to EXIT

STLASMIN.SIP: St. Elizabeth Ann Seton Minimum Depth Model

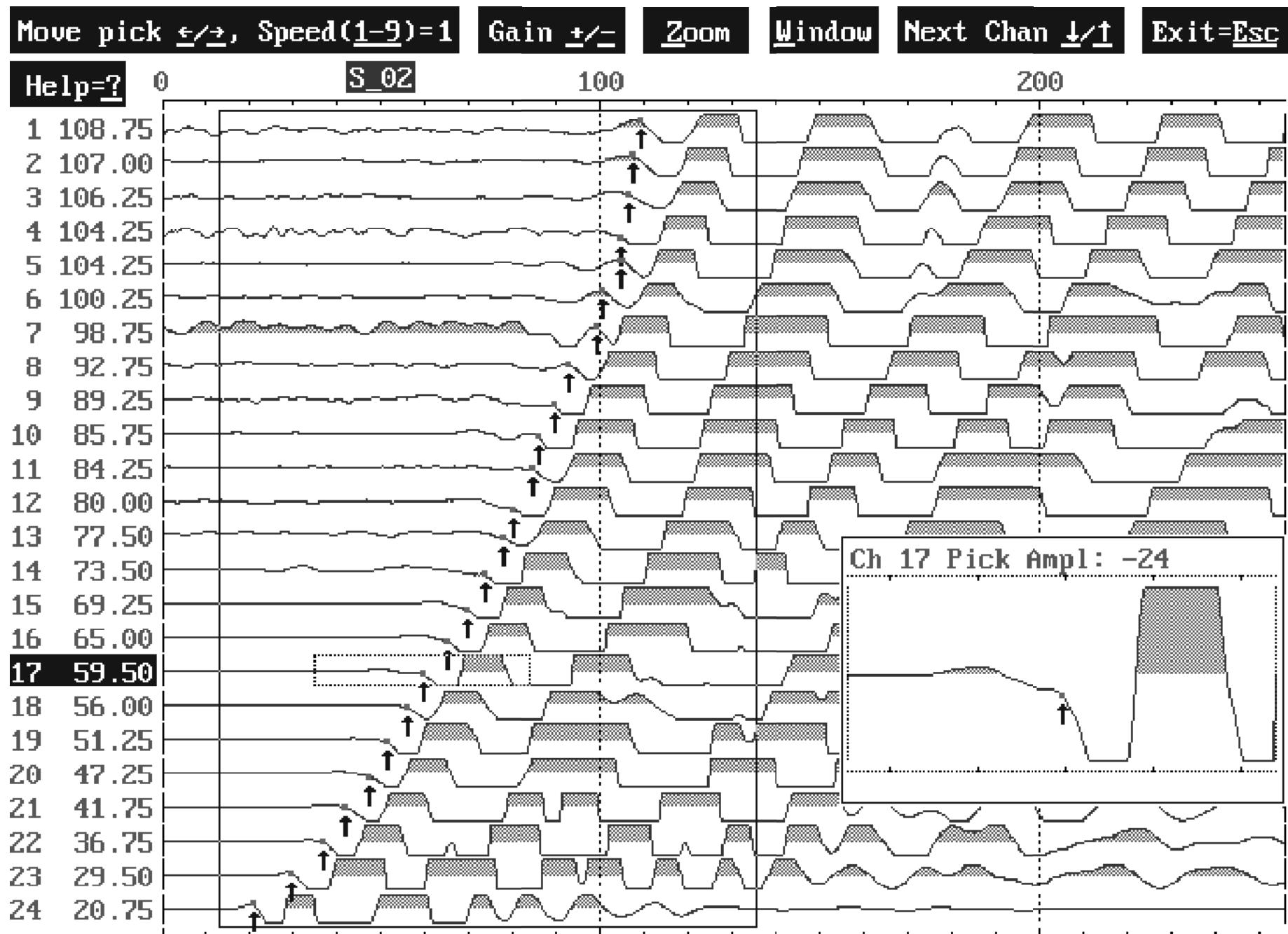
Spread A



Stacey S-wave

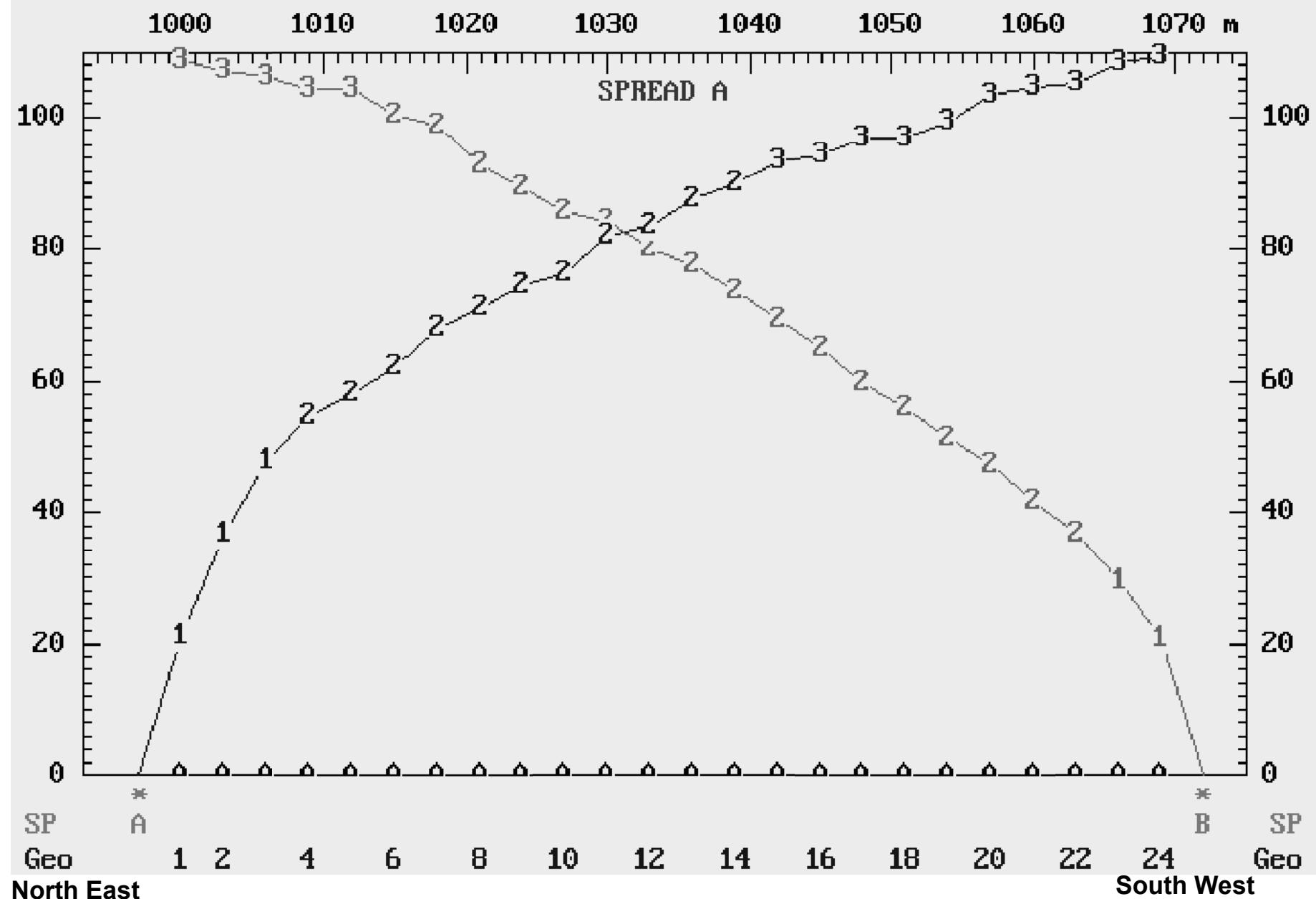


Stacey S-wave



Stacey S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

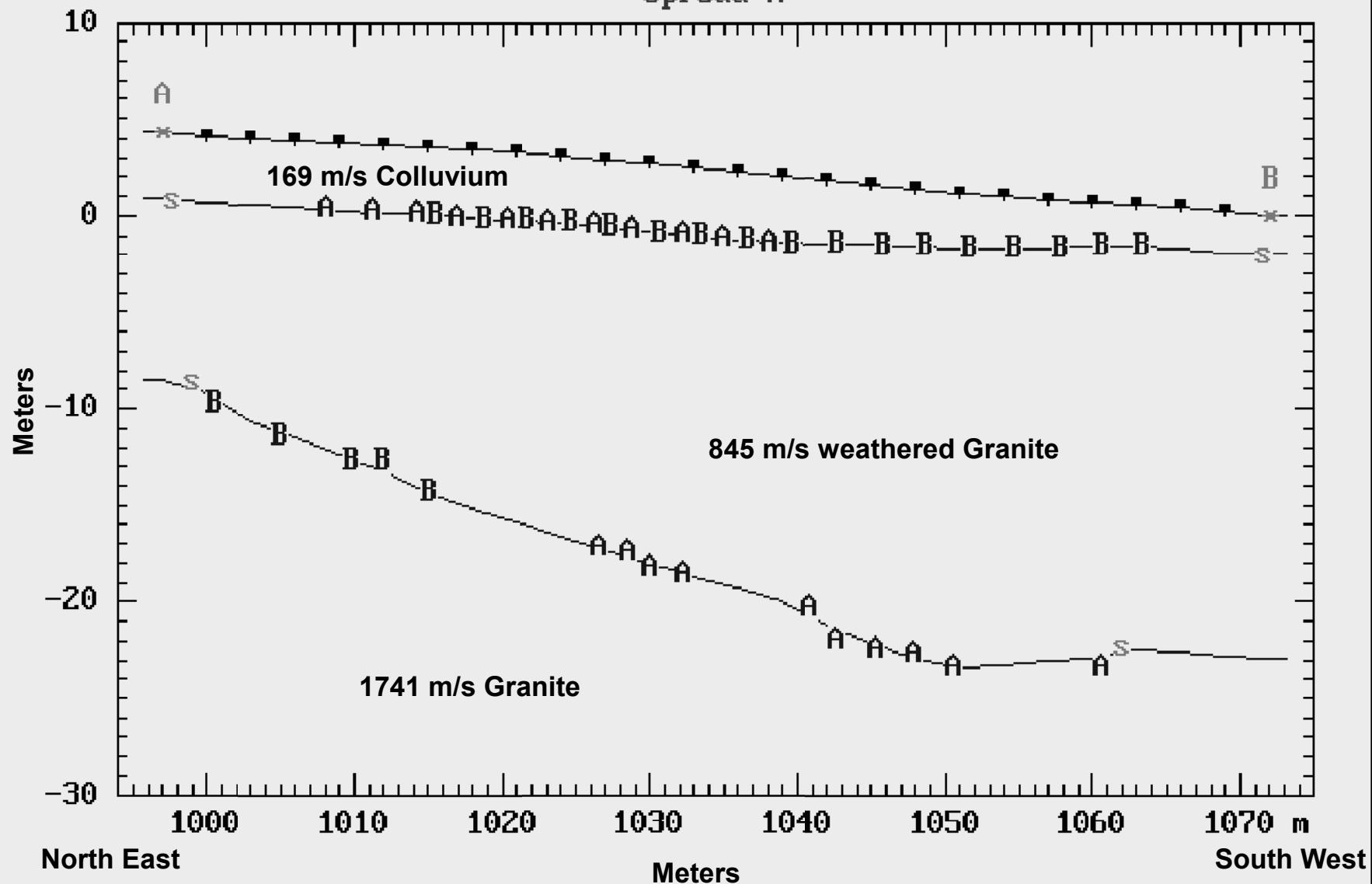


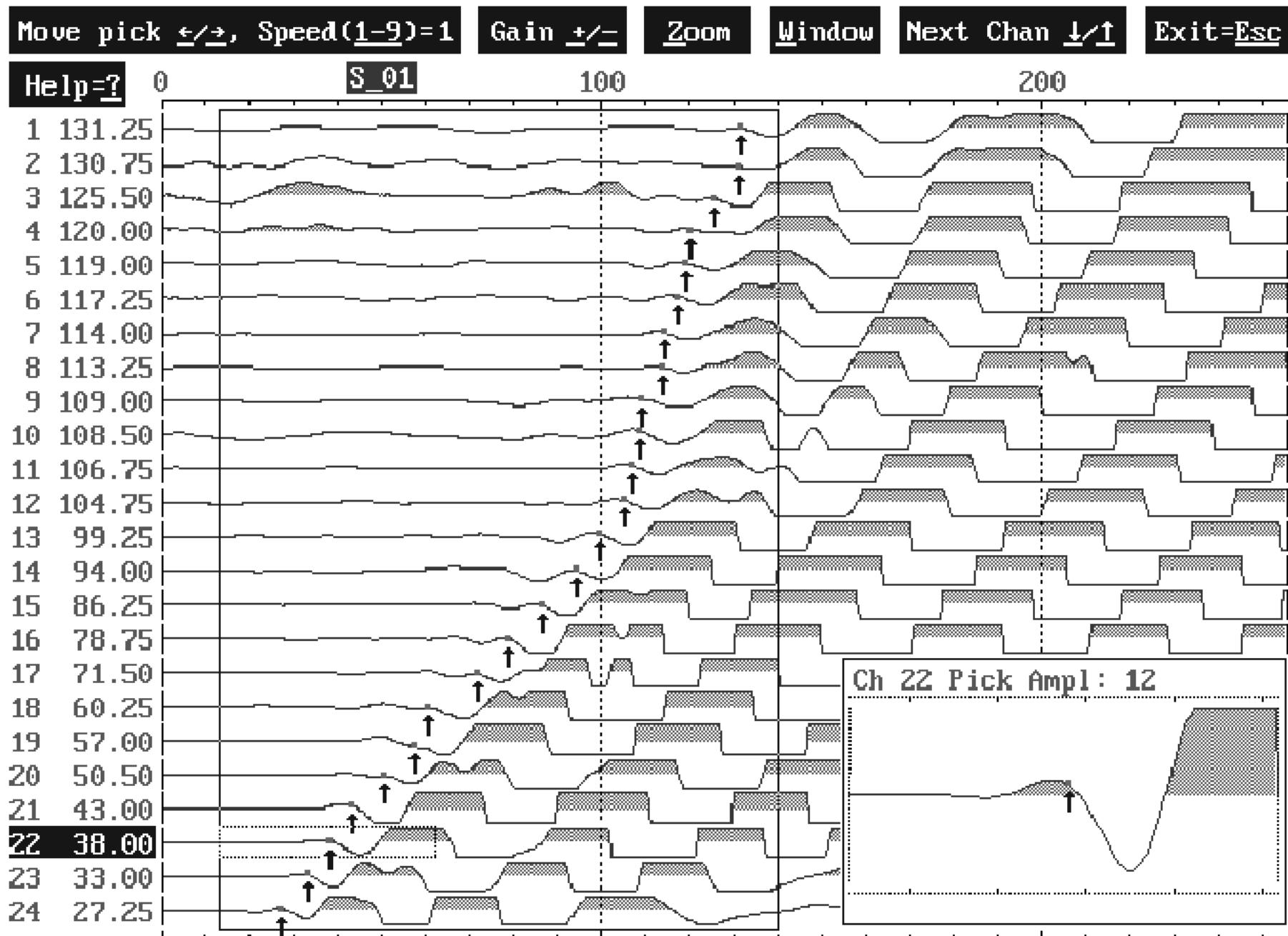
Stacey S-wave

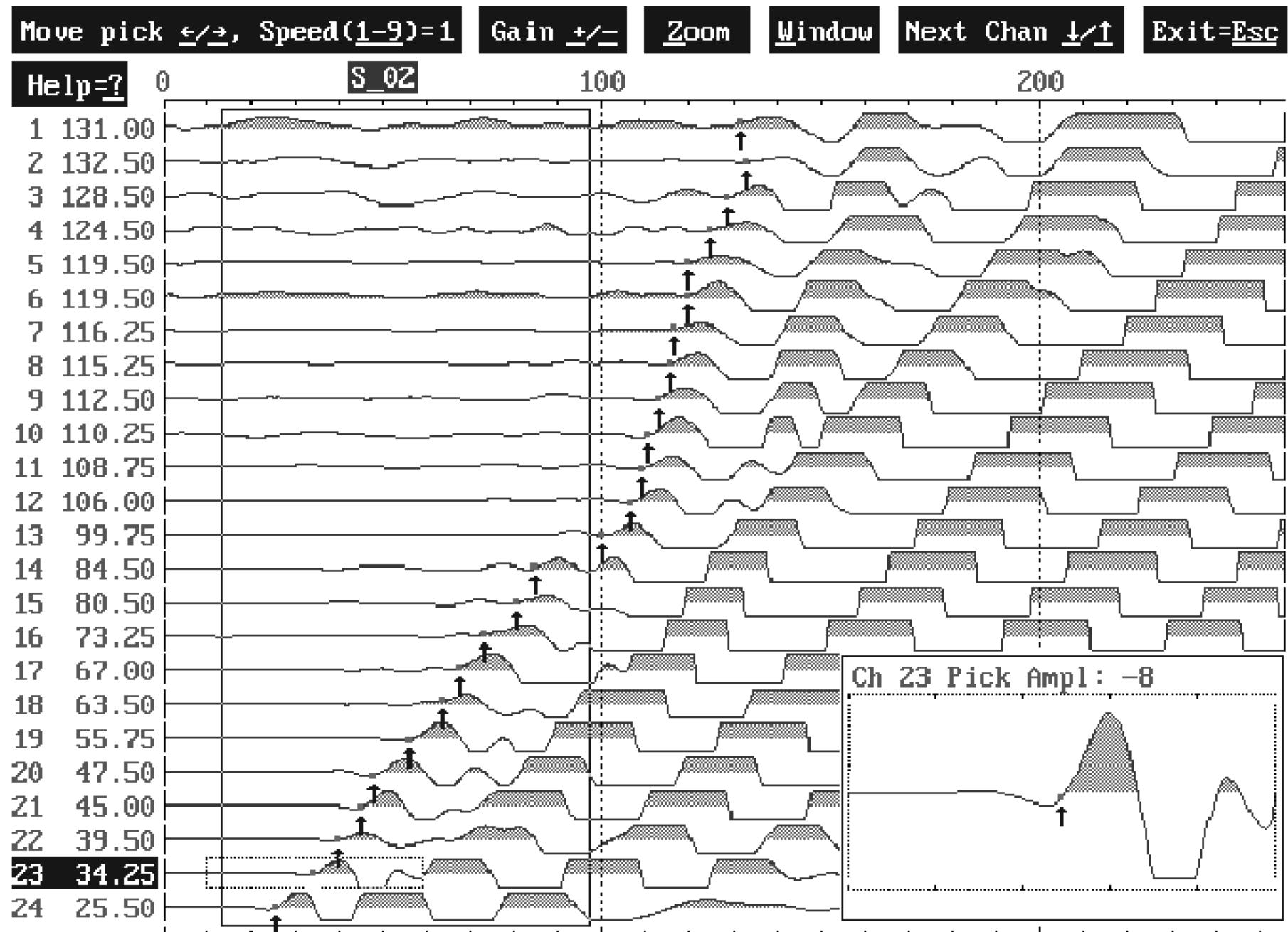
Press Esc to EXIT

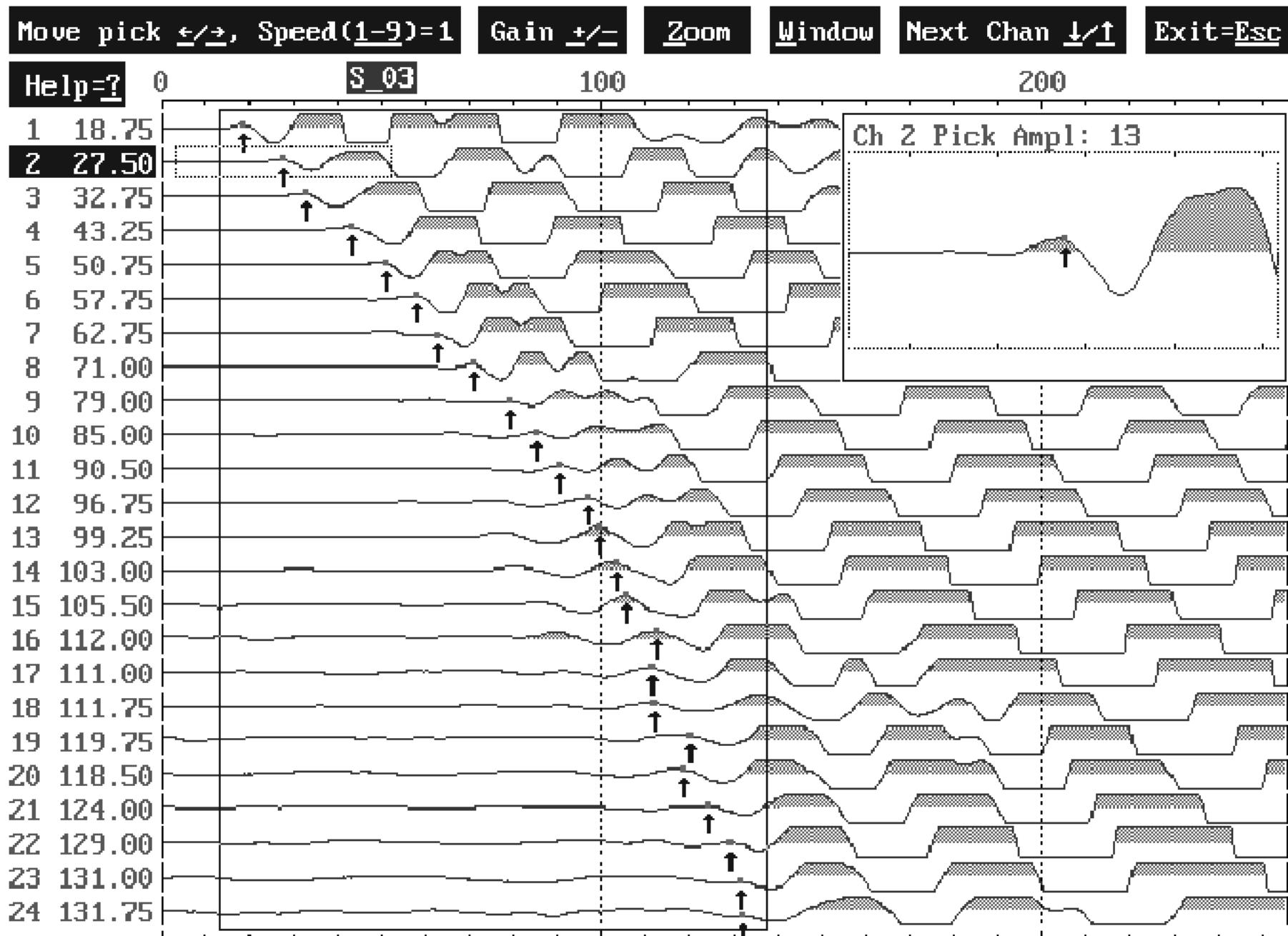
STACE_SW.SIP: Stacey Swave survey

Spread A



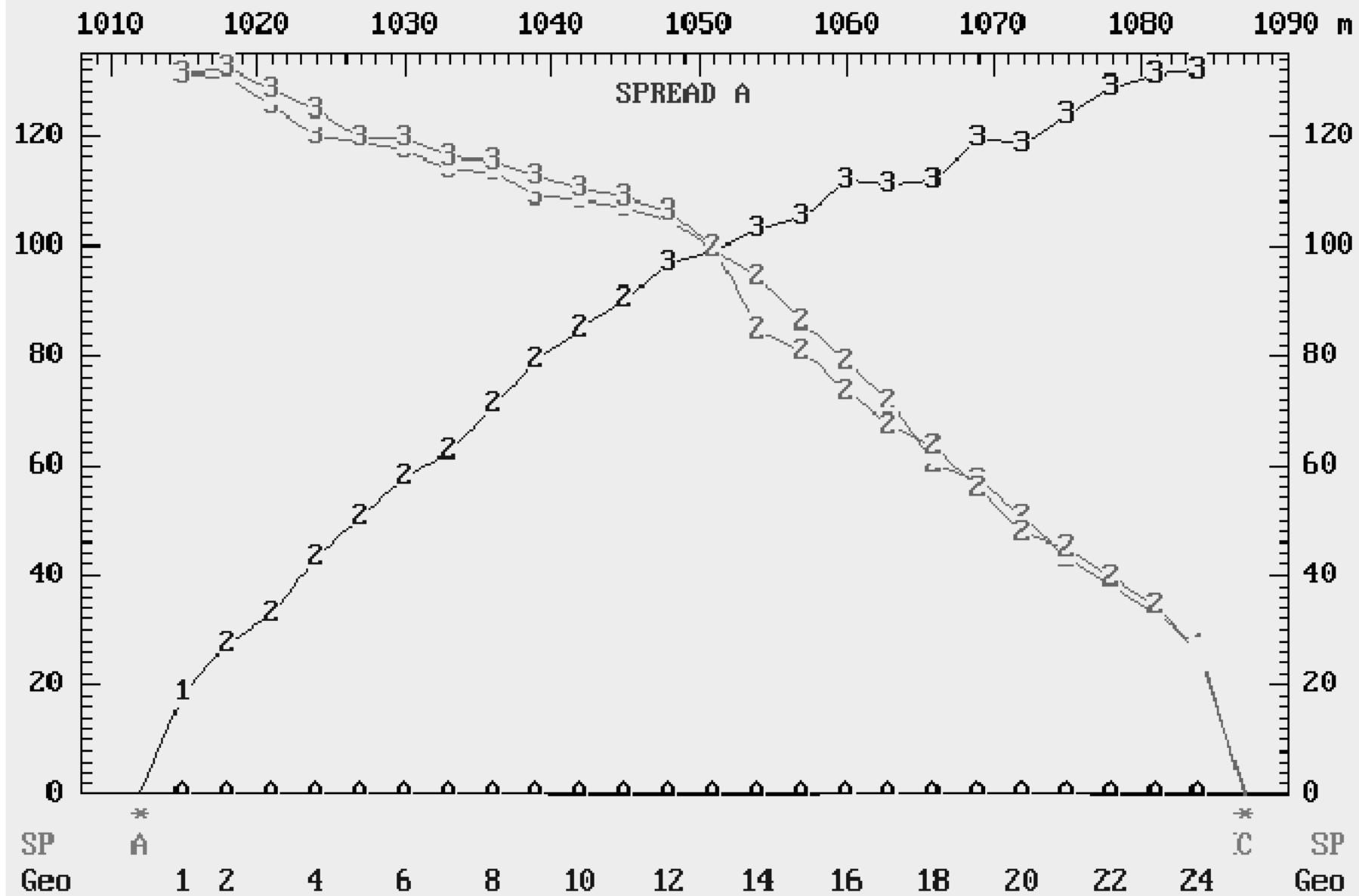
Summitview Baptist Church S-wave

Summitview Baptist Church S-wave

Summitview Baptist Church S-wave

Summitview Baptist Church S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

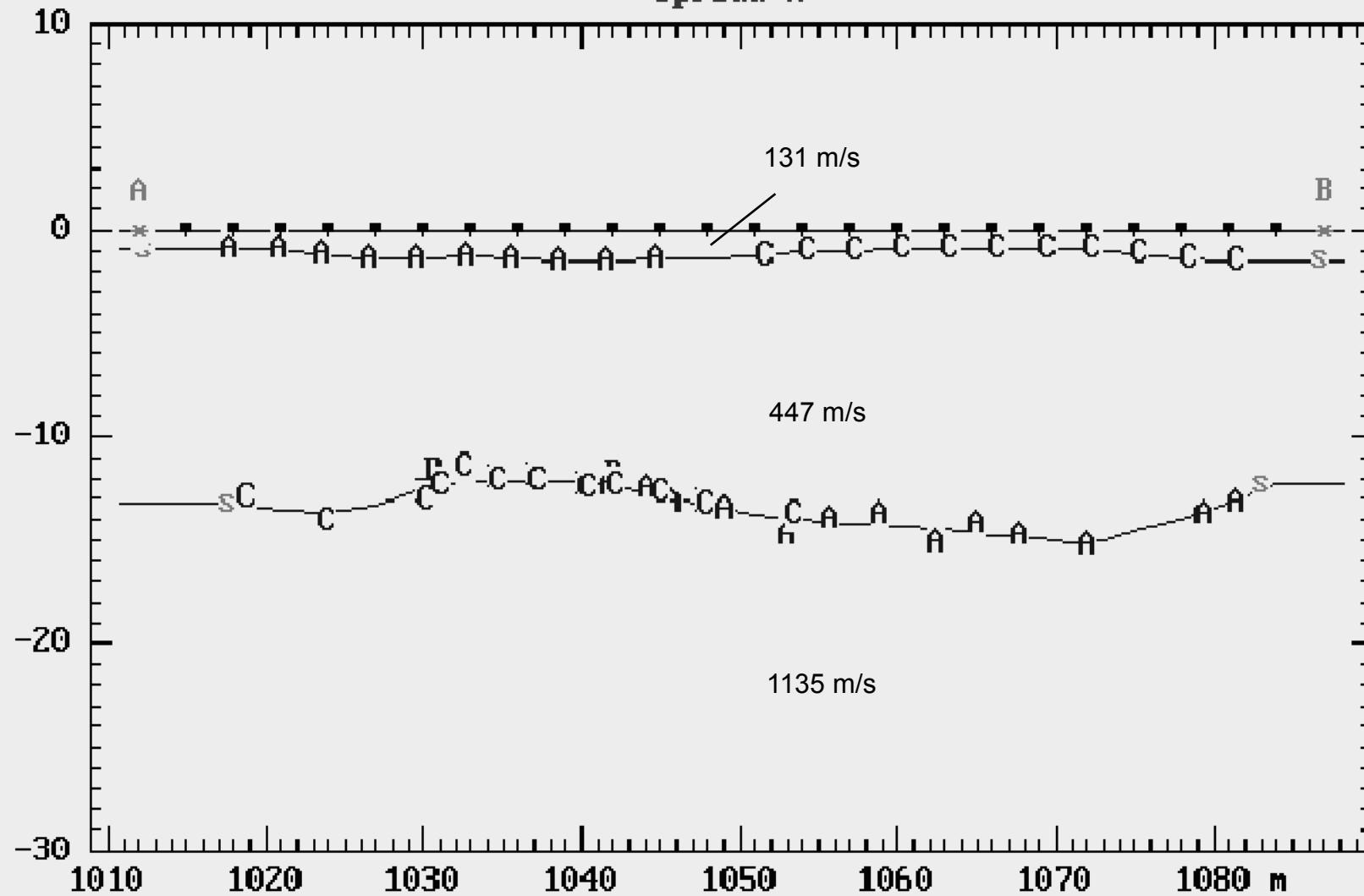


Summitview Baptist Church S-wave

Press Esc to EXIT

SUMMSWAU.SIP: Summitview Baptist Church S-Waves

Spread A

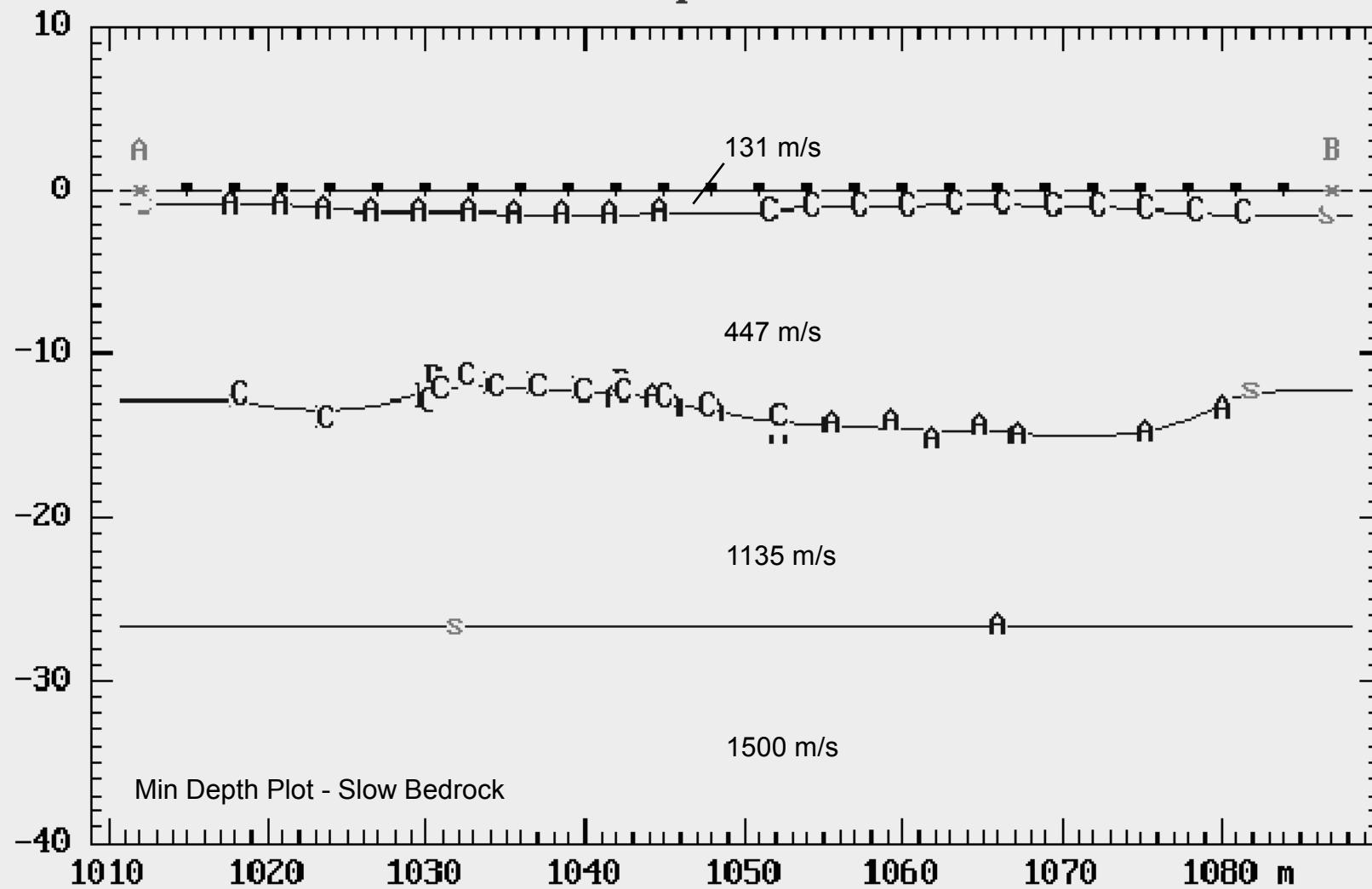


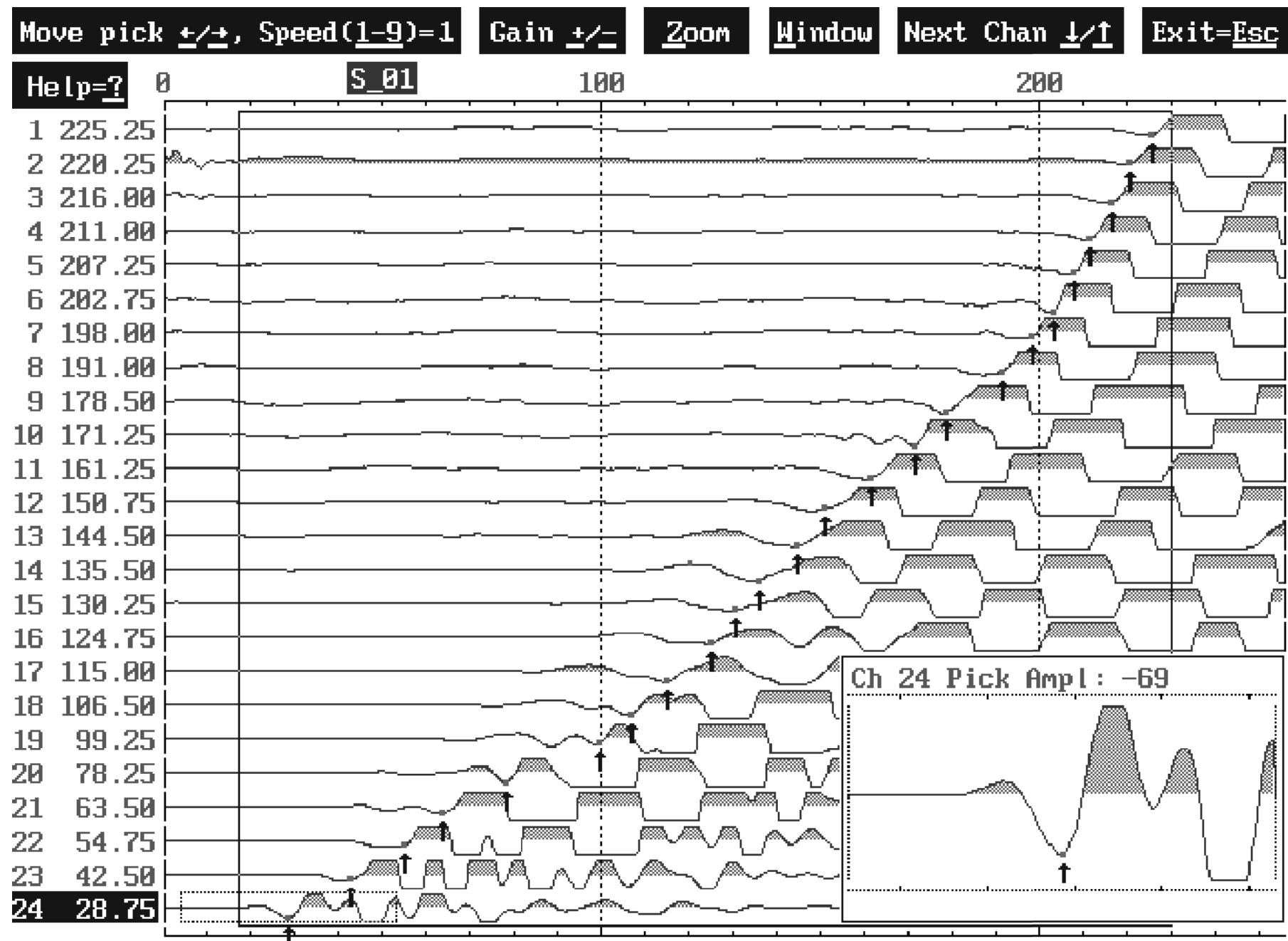
Summitview Baptist Church S-wave

Press Esc to EXIT

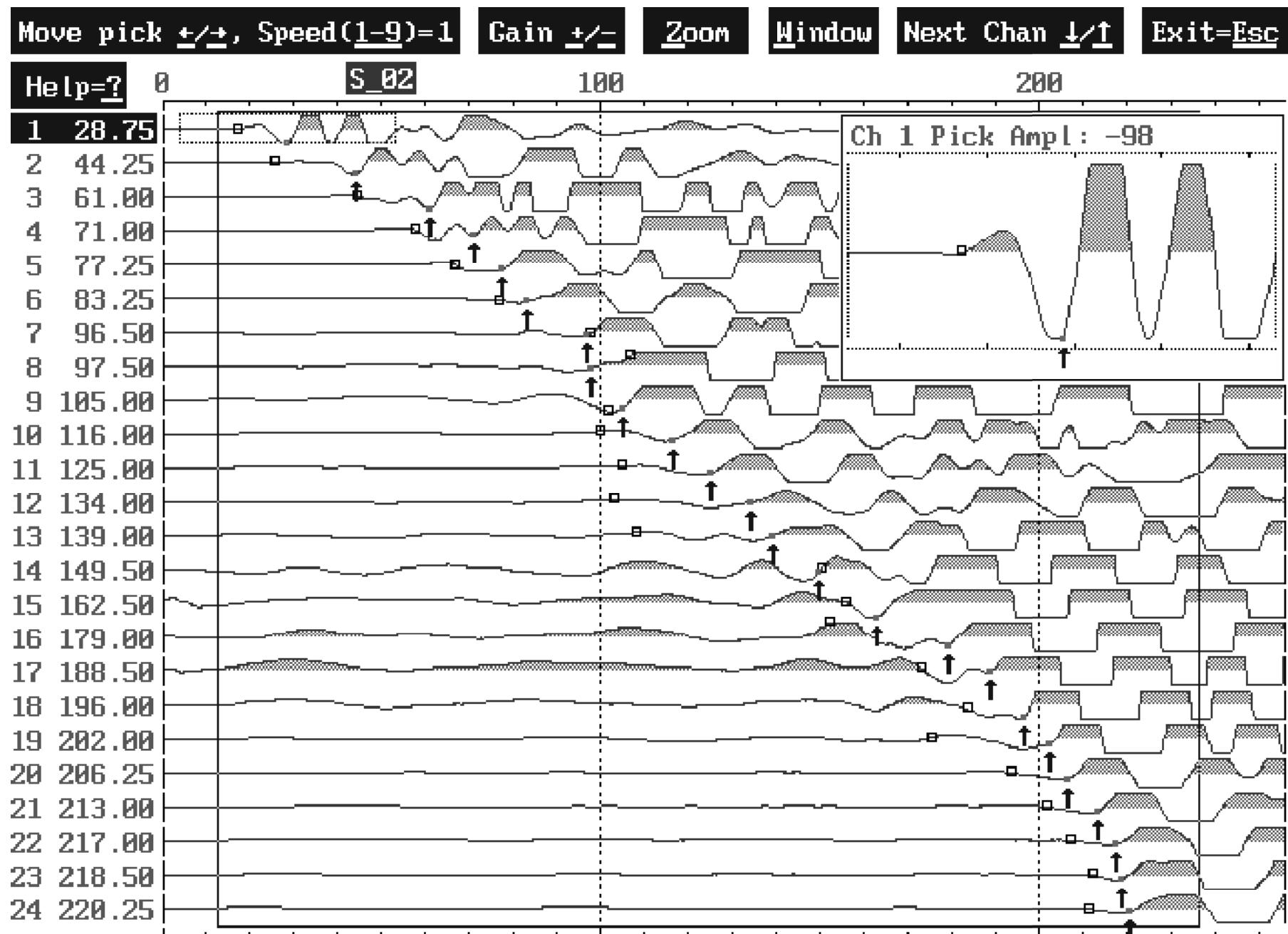
SUMMSMIN.SIP: Summitview Baptist Church S-Waves Minimum Depth Plot

Spread A



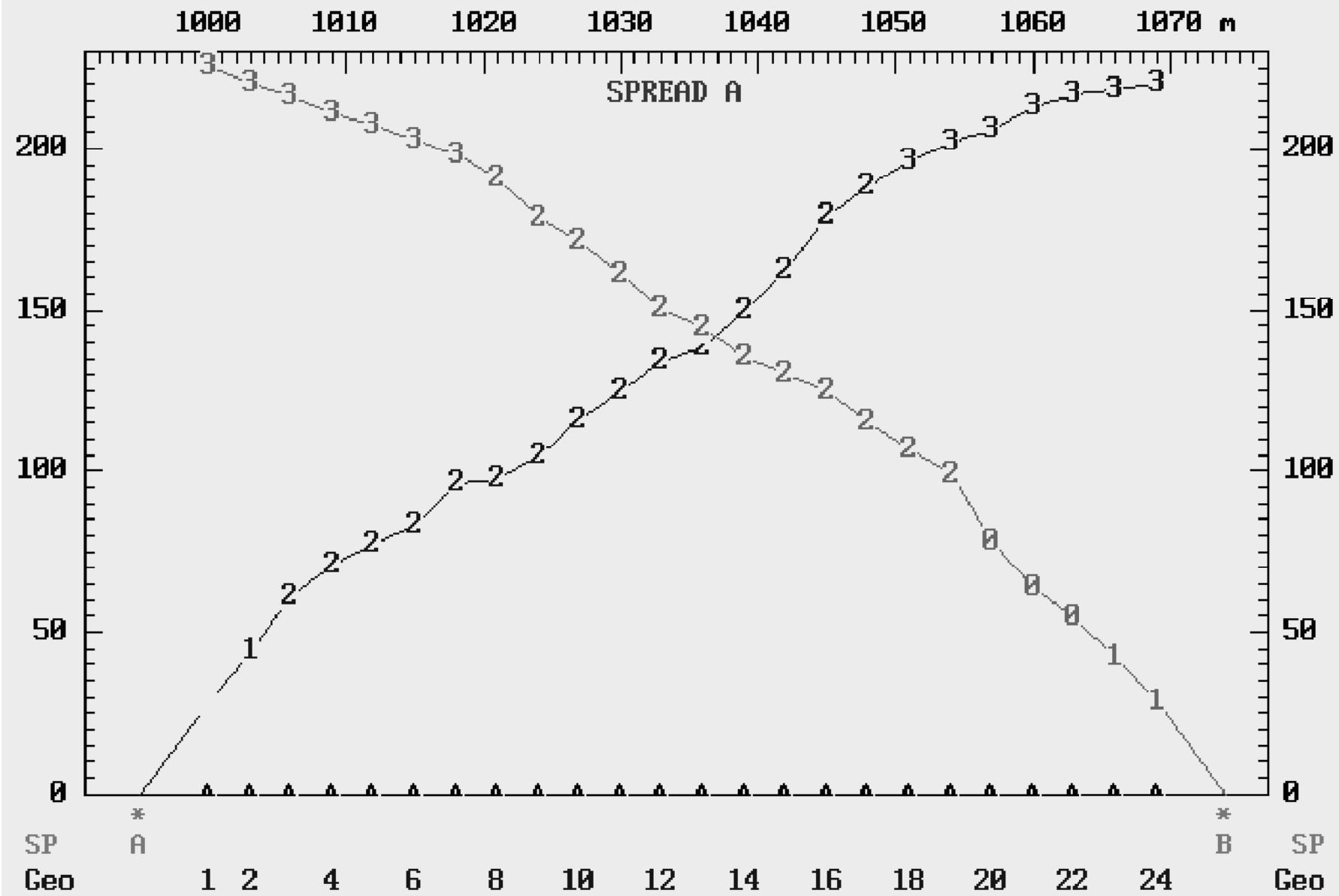
Sunnyside Elementary School S-wave

Sunnyside Elementary School S-wave



Sunnyside Elementary School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

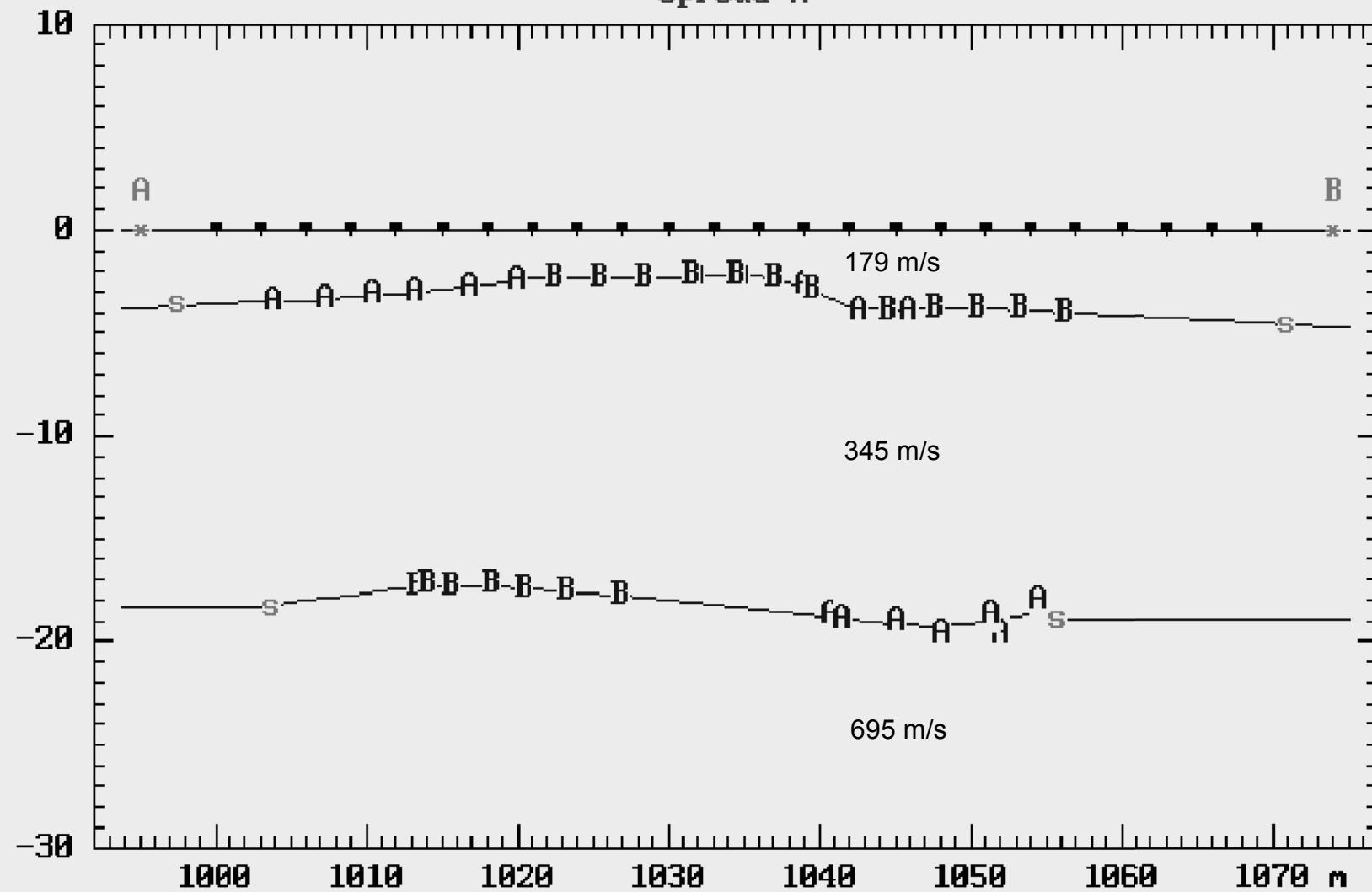


Sunnyside Elementary School S-wave

Press Esc to EXIT

SUNYSWA2.SIP : Sunnyside Elementary S-Waves

Spread A

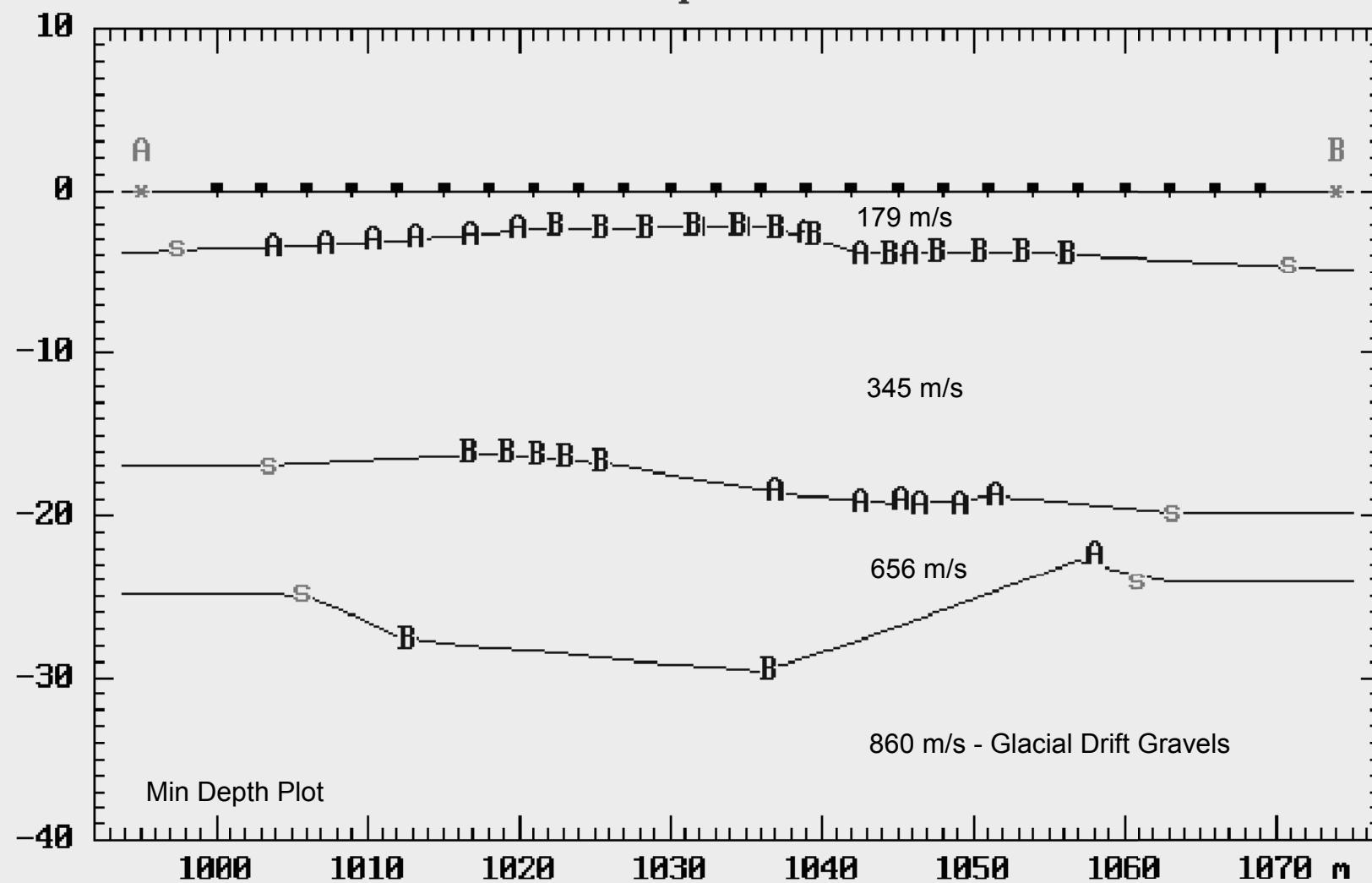


Sunnyside Elementary School S-wave

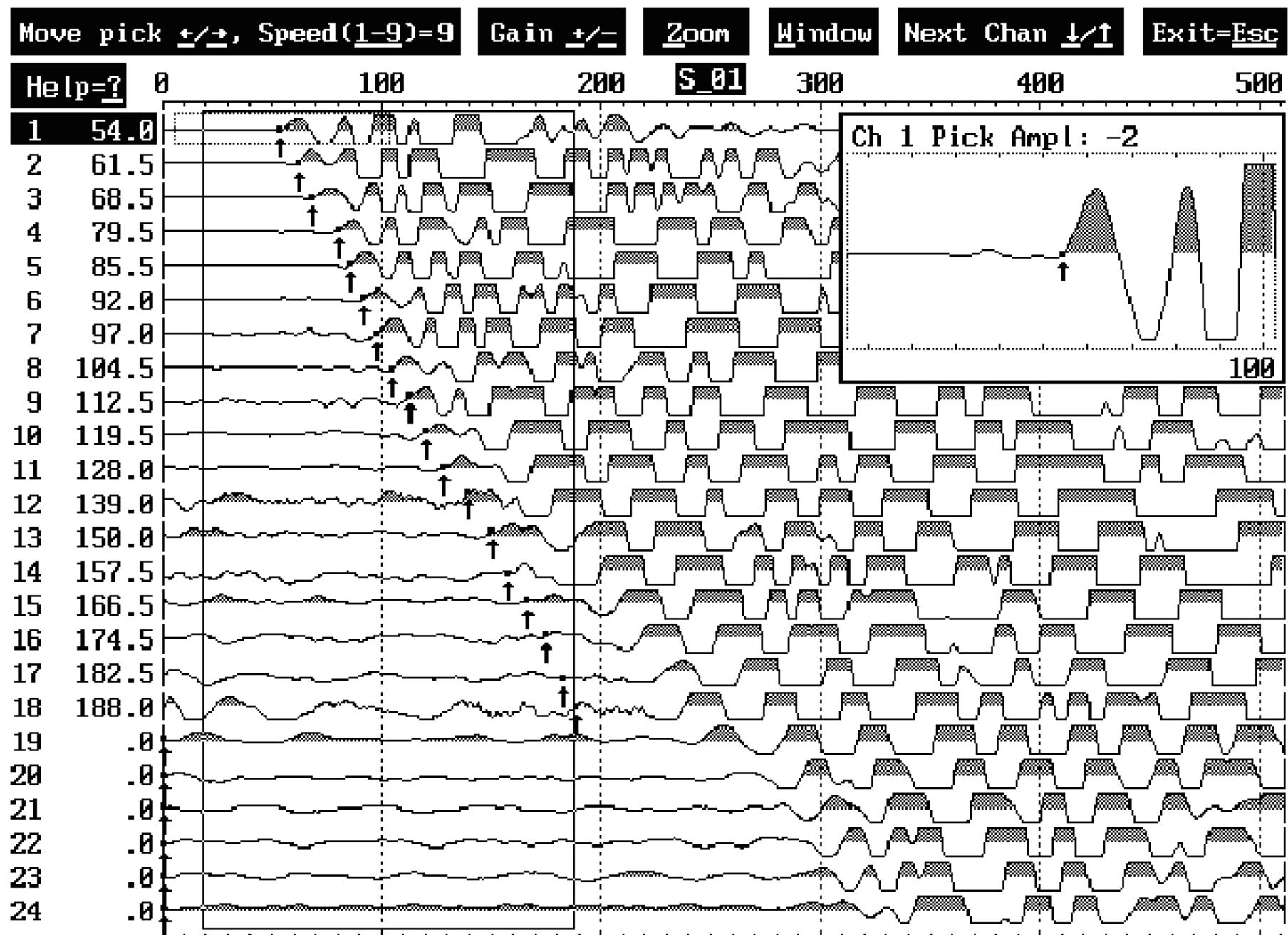
Press Esc to EXIT

SUNYSMIN.SIP: Sunnyside Elementary Minimum Depth

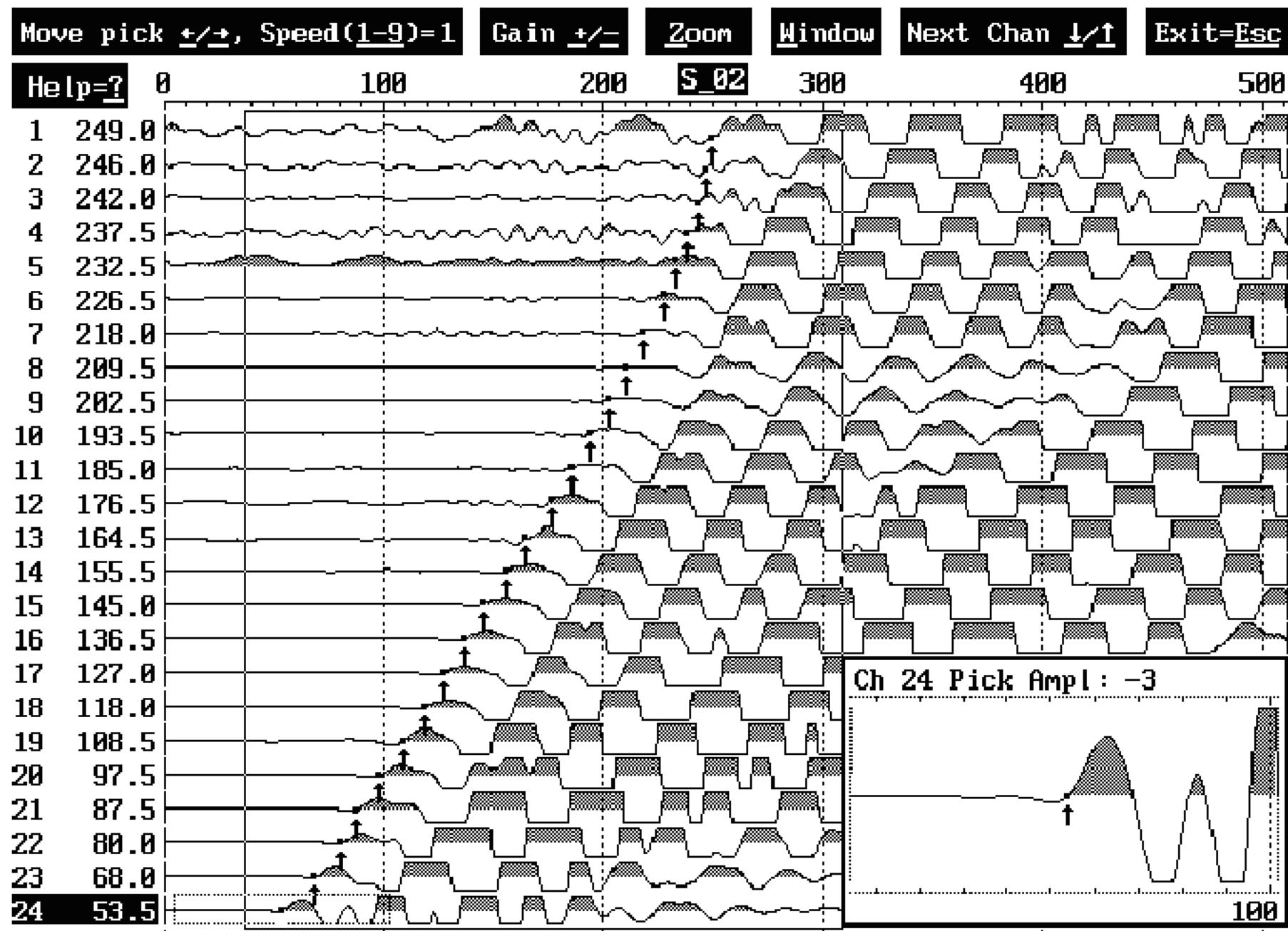
Spread A

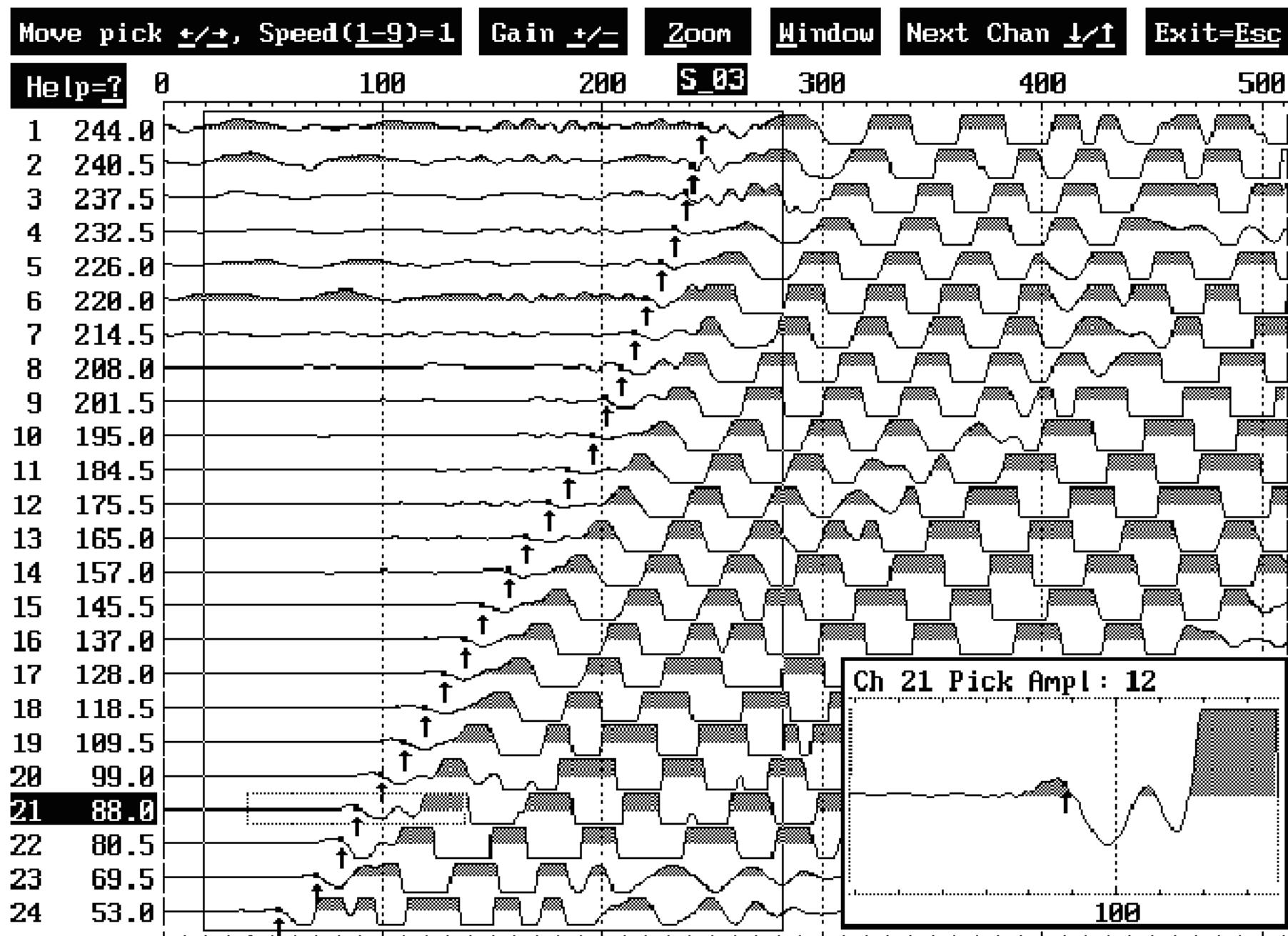


Syre Elementary S-wave



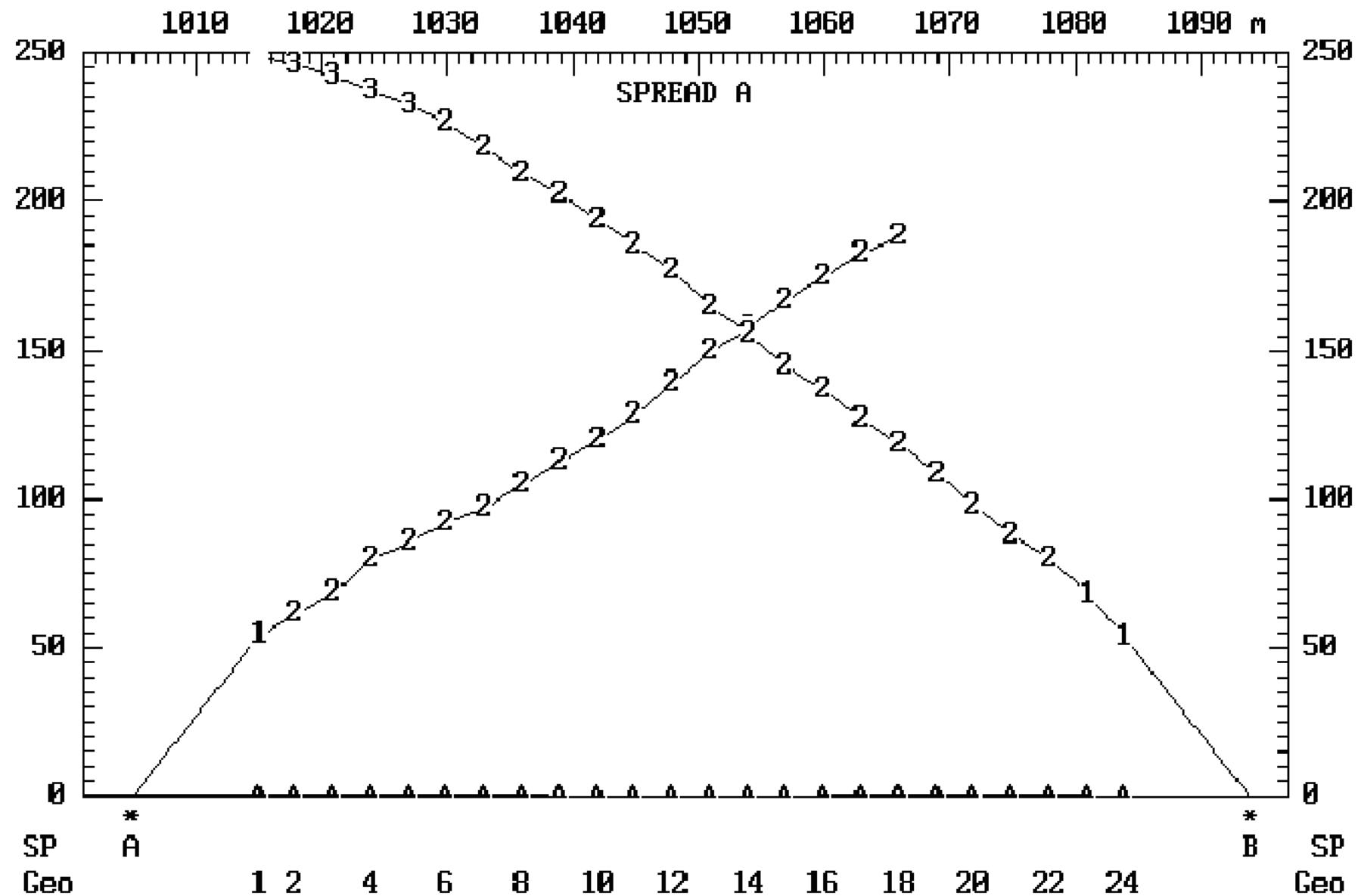
Syre Elementary S-wave



Syre Elementary S-wave

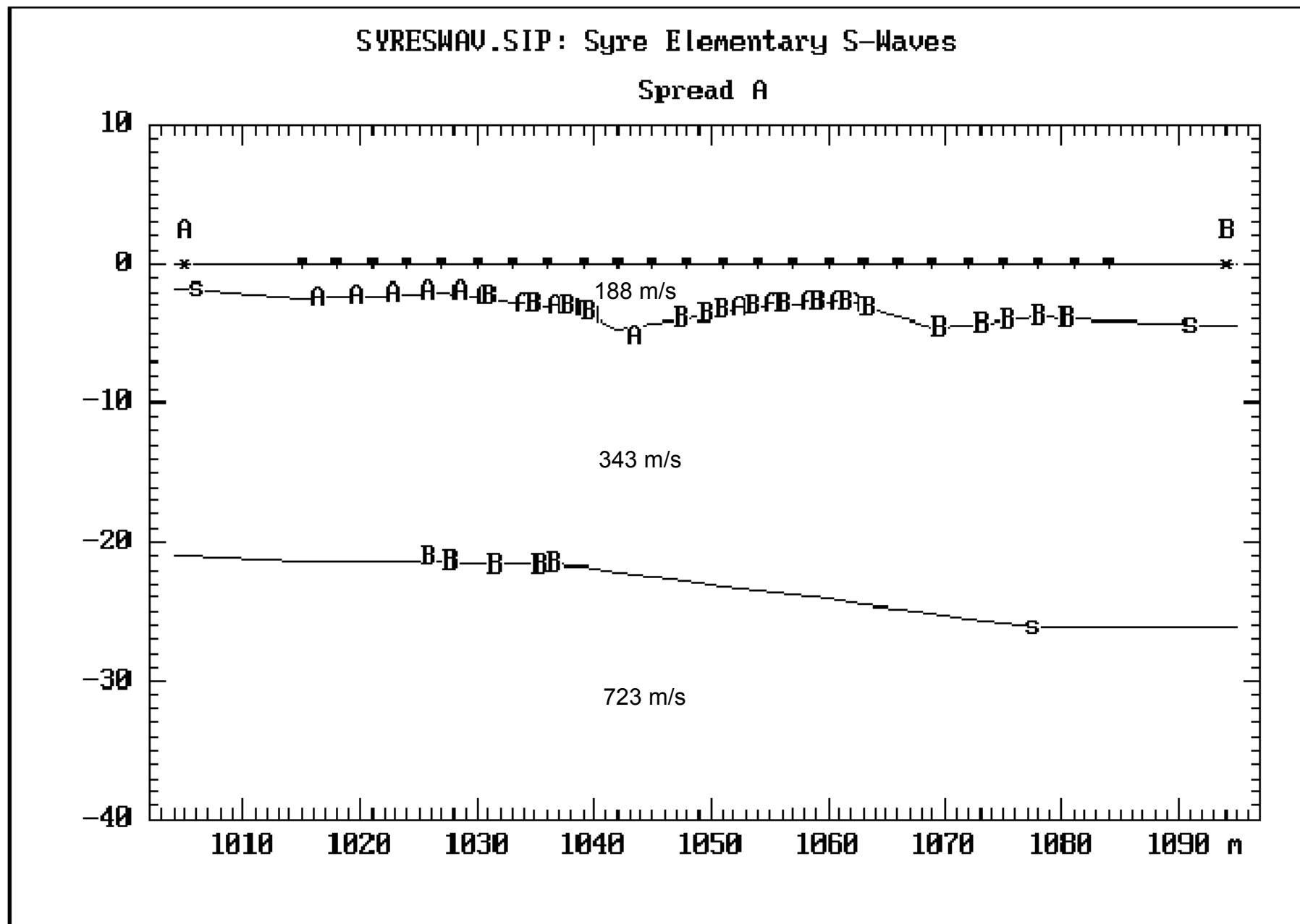
Syre Elementary S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Syre Elementary S-wave

Press Esc to EXIT

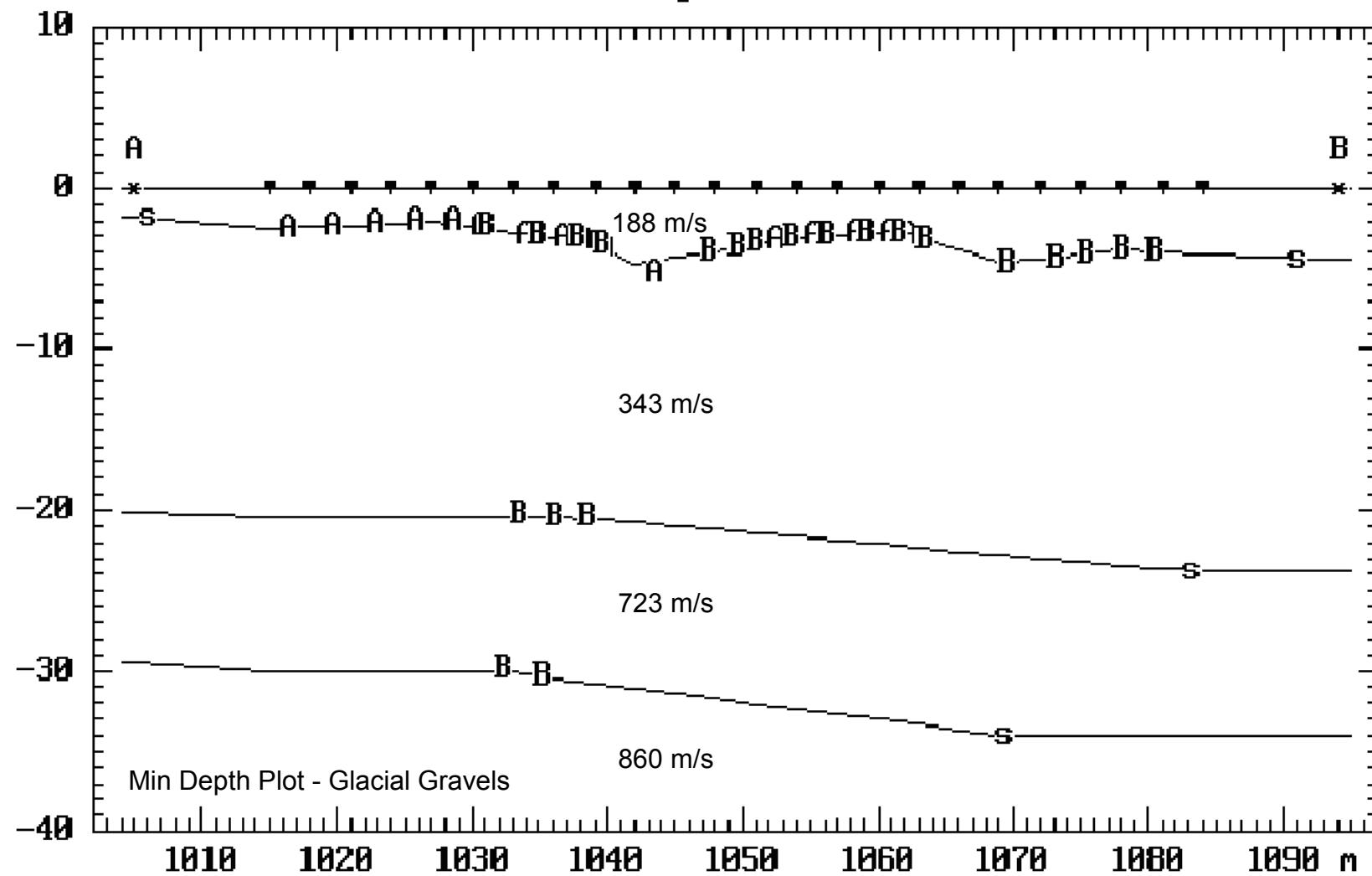


Syre Elementary S-wave

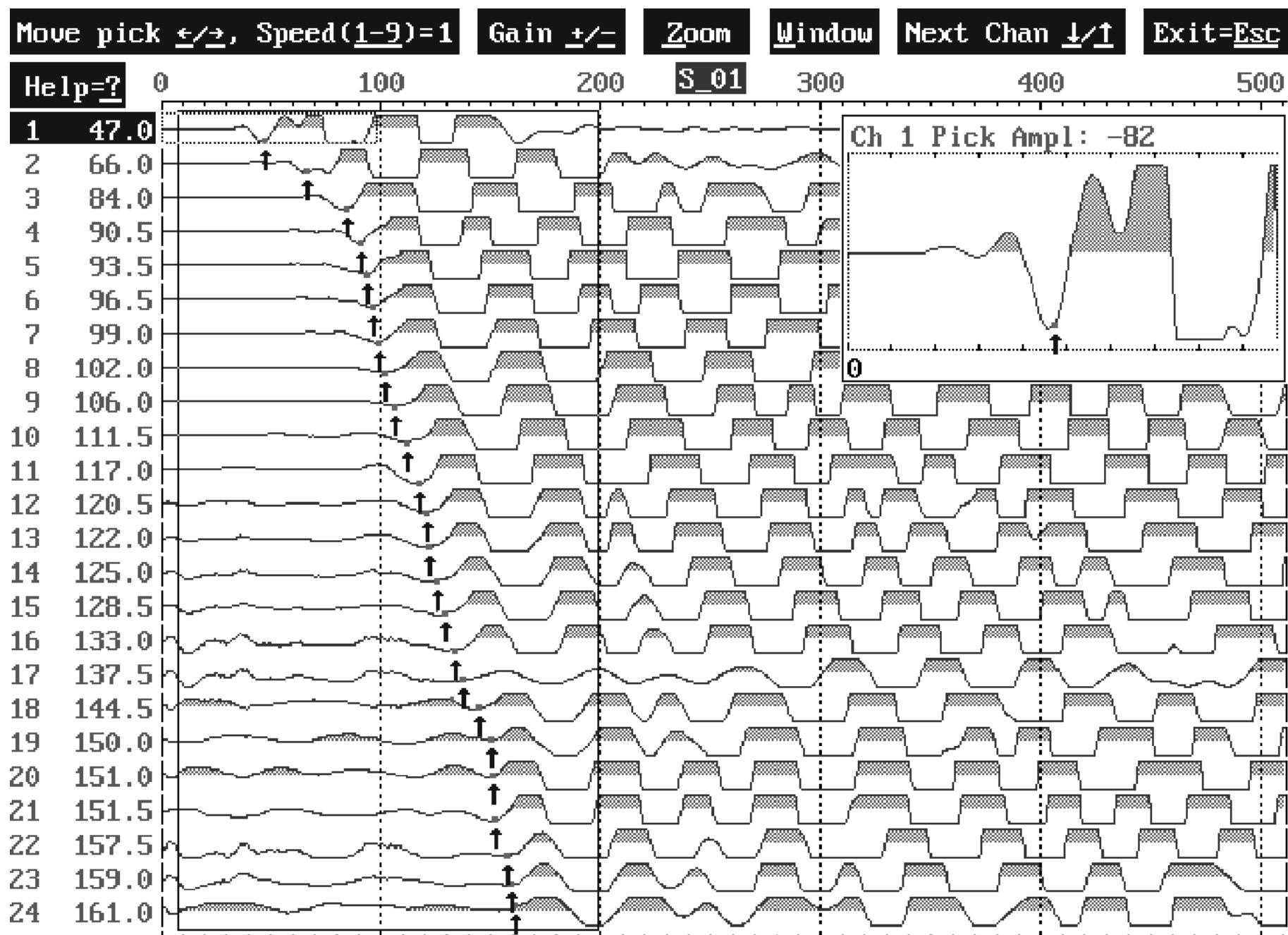
Press Esc to EXIT

SYRESMIN.SIP: Syre Elementary S-Waves Minimum Depth Plot

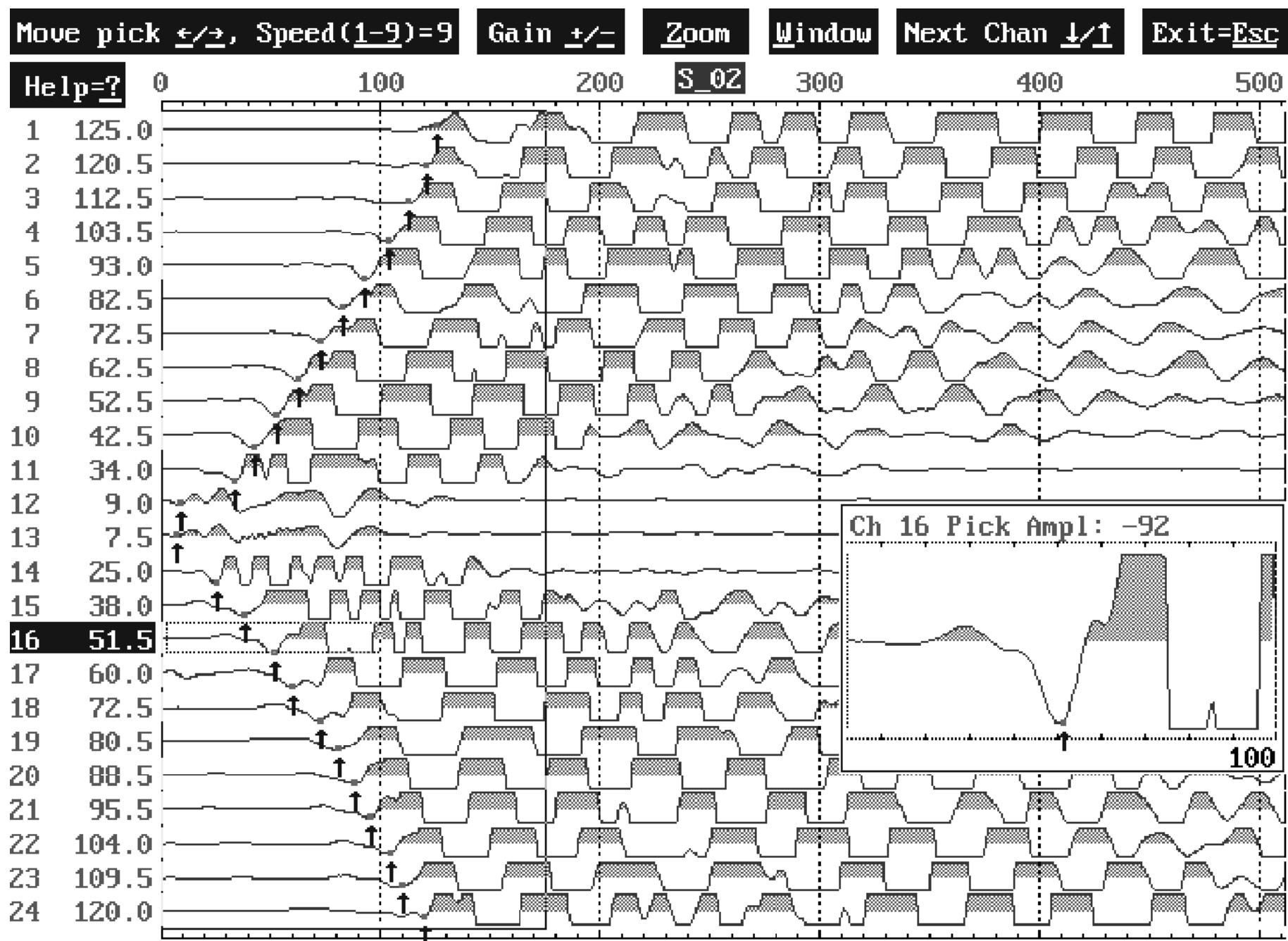
Spread A



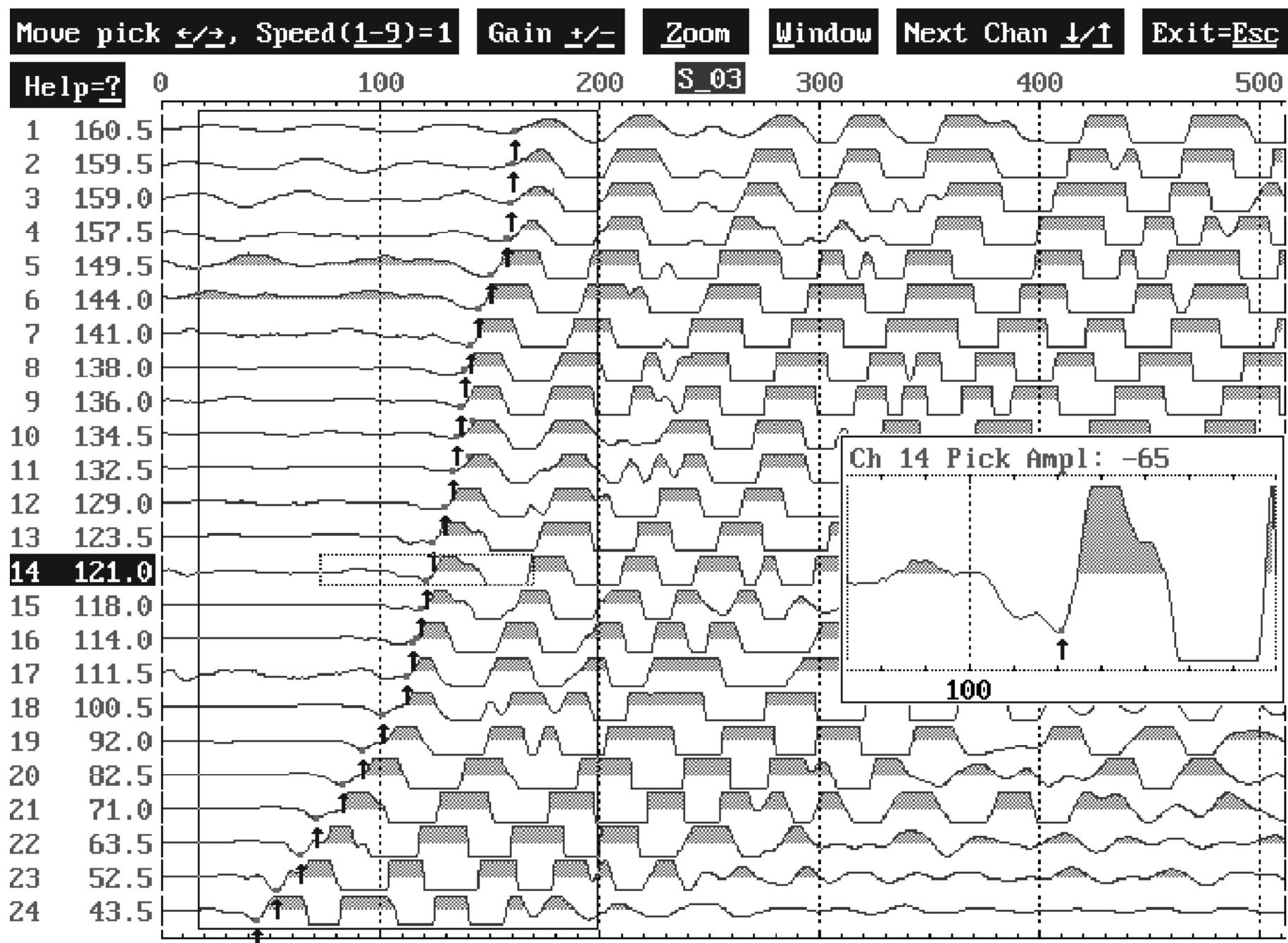
Twin Rivers Park S-wave



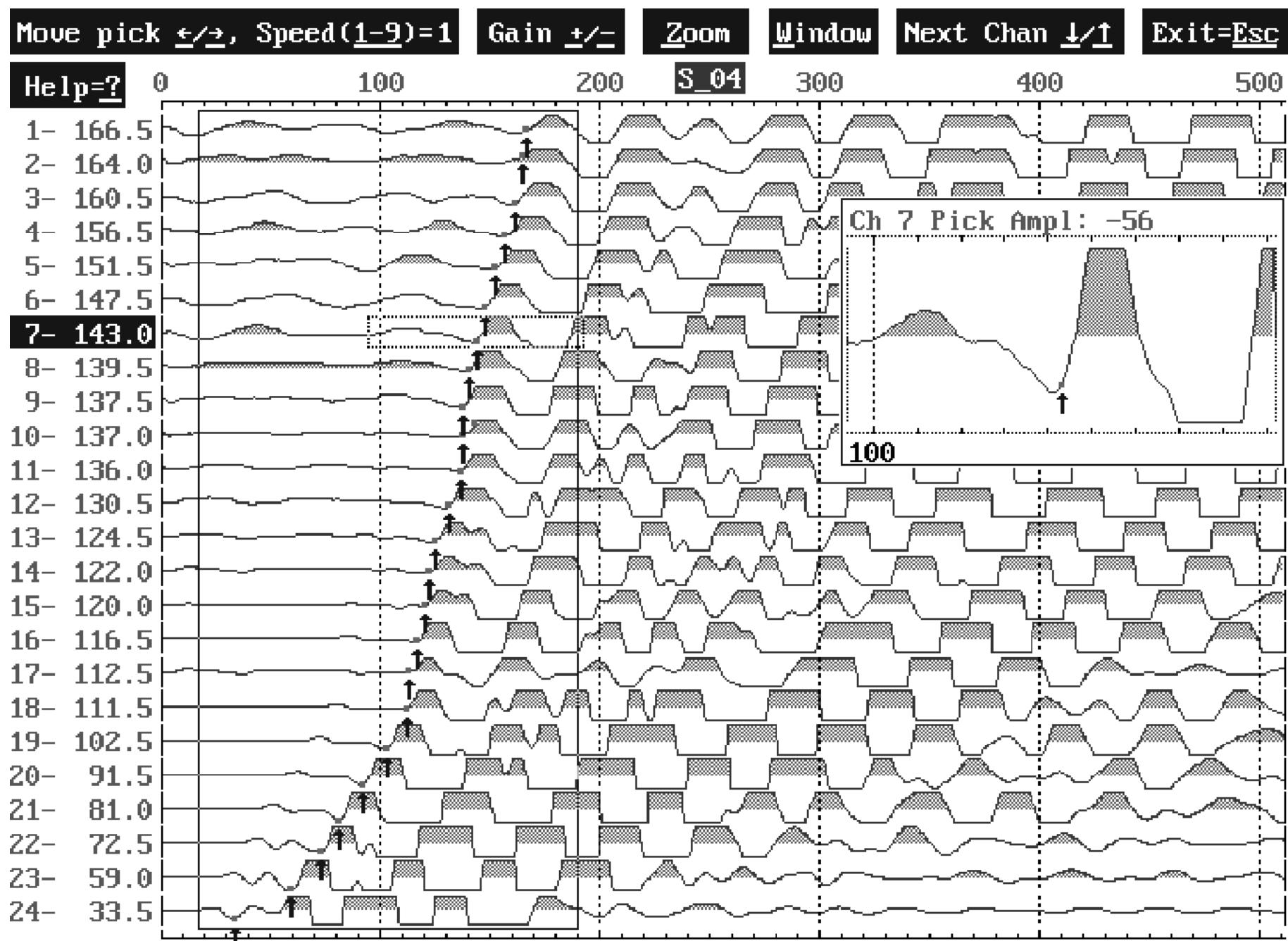
Twin Rivers Park S-wave



Twin Rivers Park S-wave

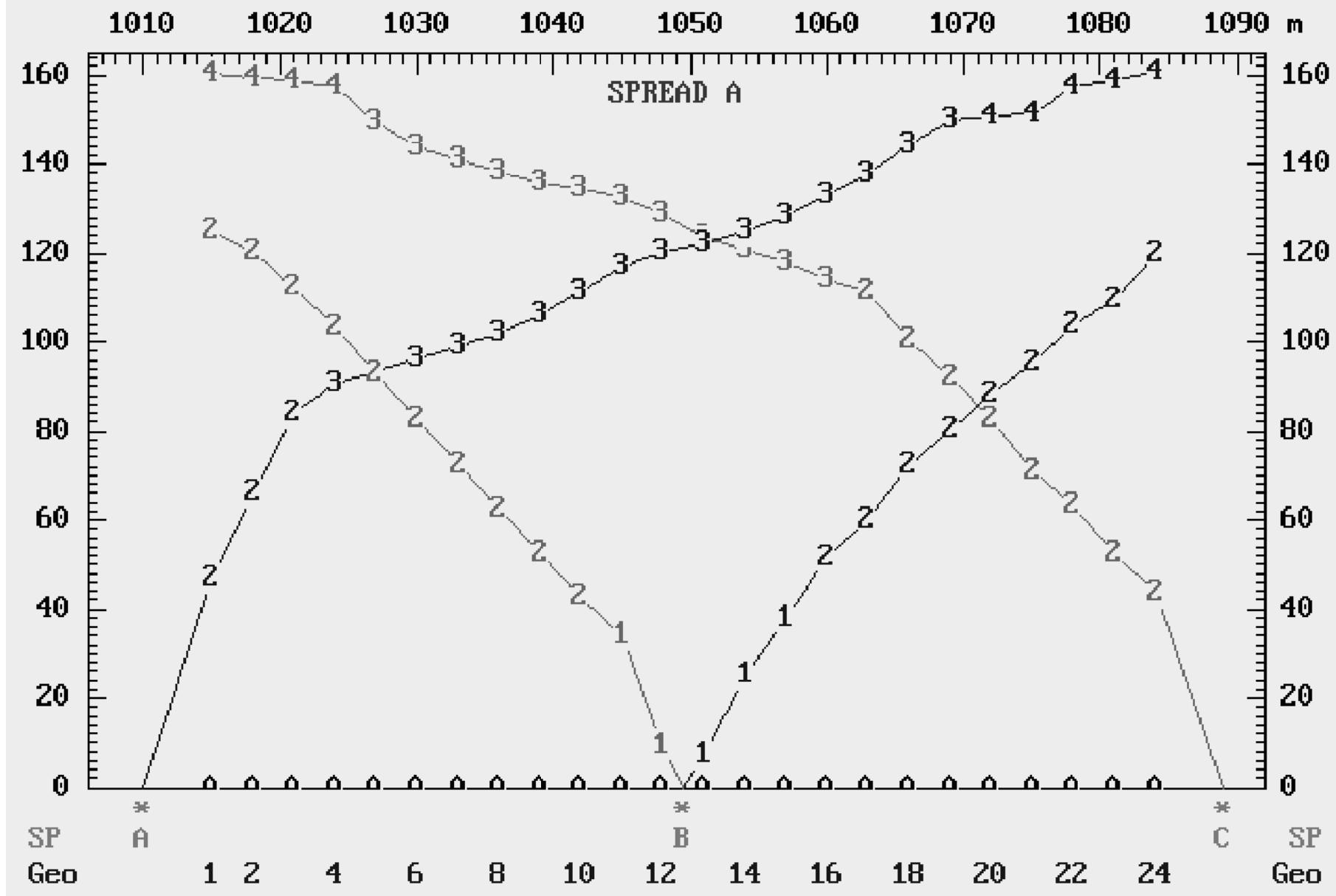


Twin Rivers Park S-wave



Twin Rivers Park S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

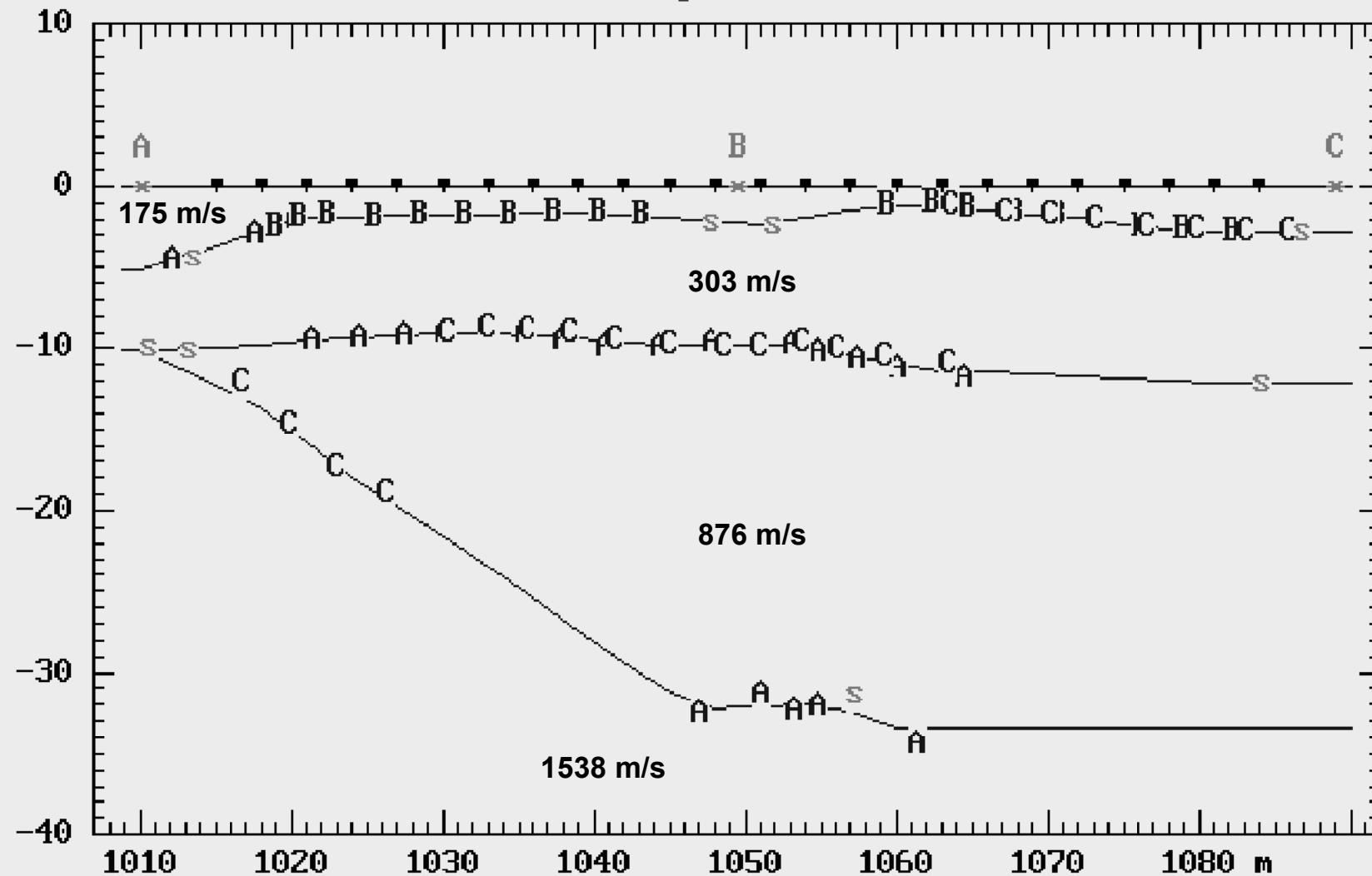


Twin Rivers Park S-wave

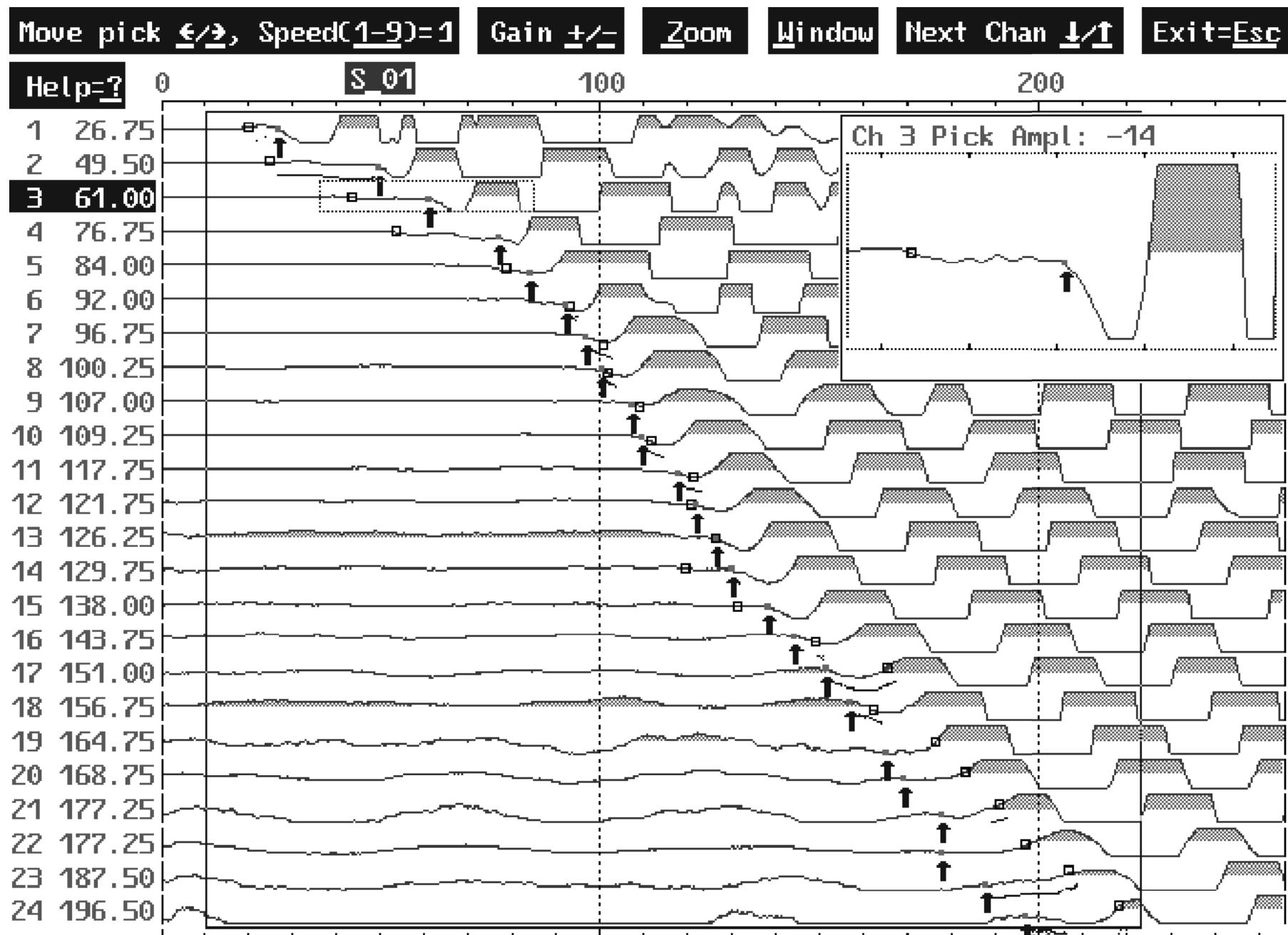
Press Esc to EXIT

TWINSWAU.SIP: Twin Rivers Park Shear Wave

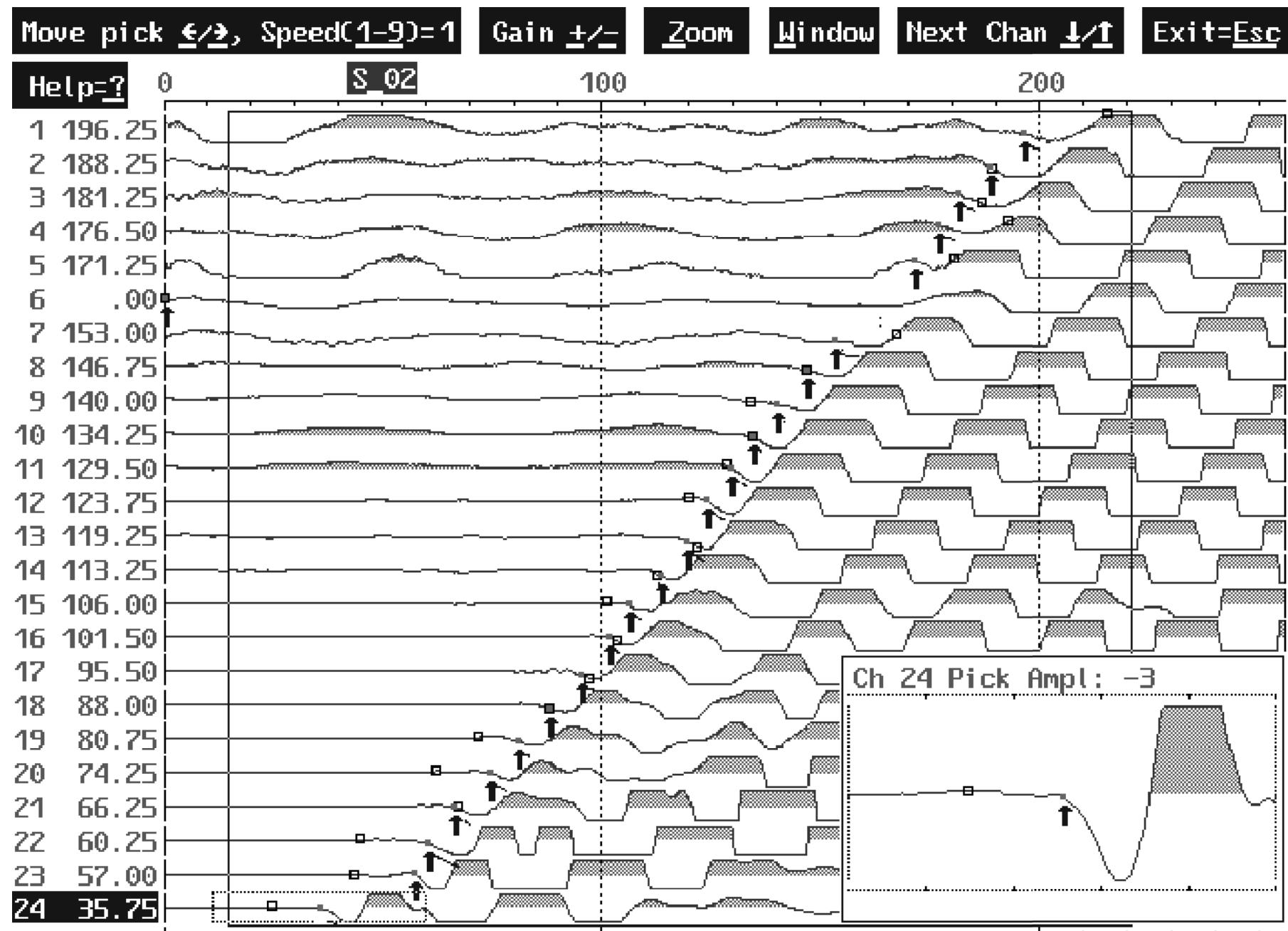
Spread A



Van Wyck RD S-wave

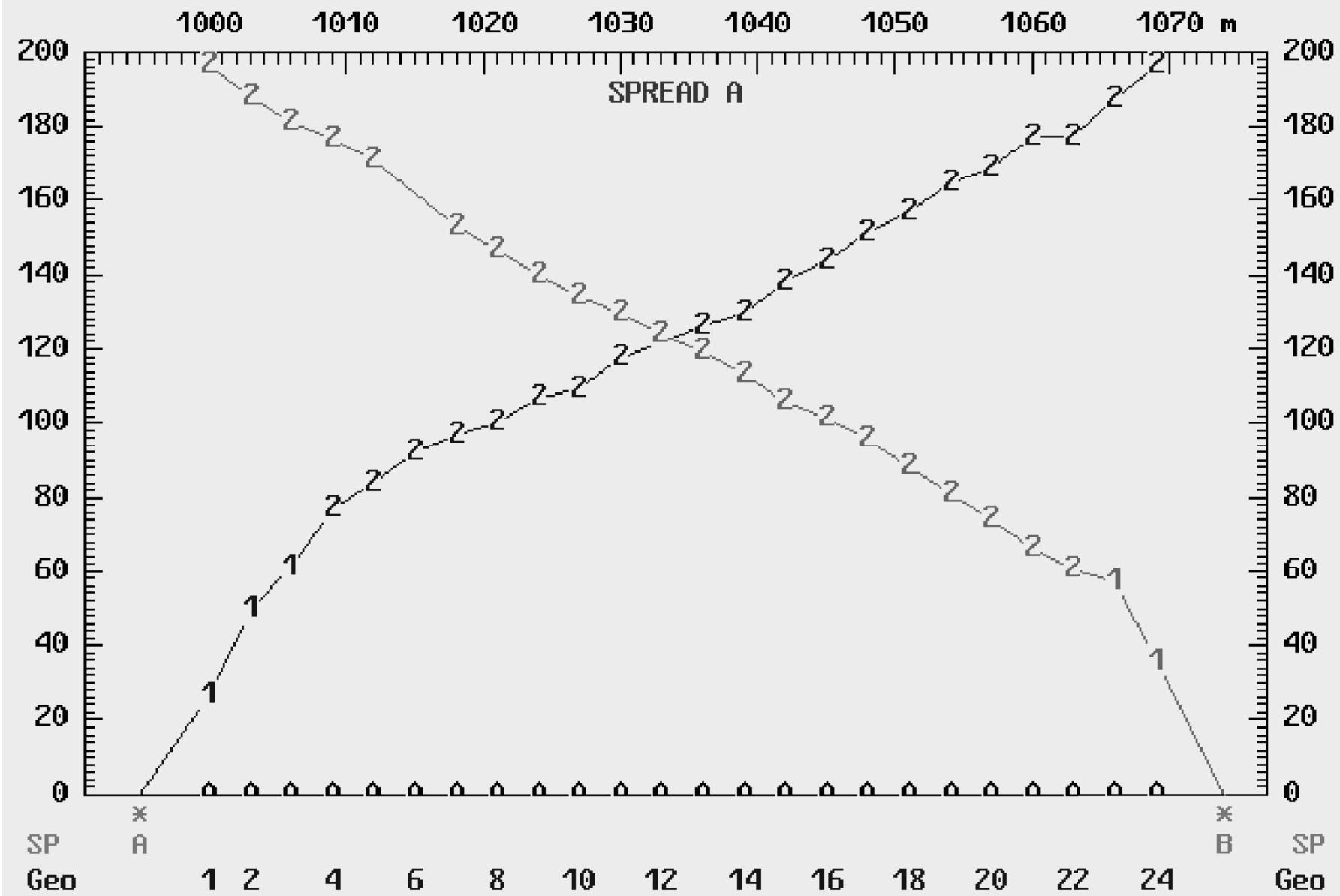


Van Wyck RD S-wave



Van Wyck RD S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.

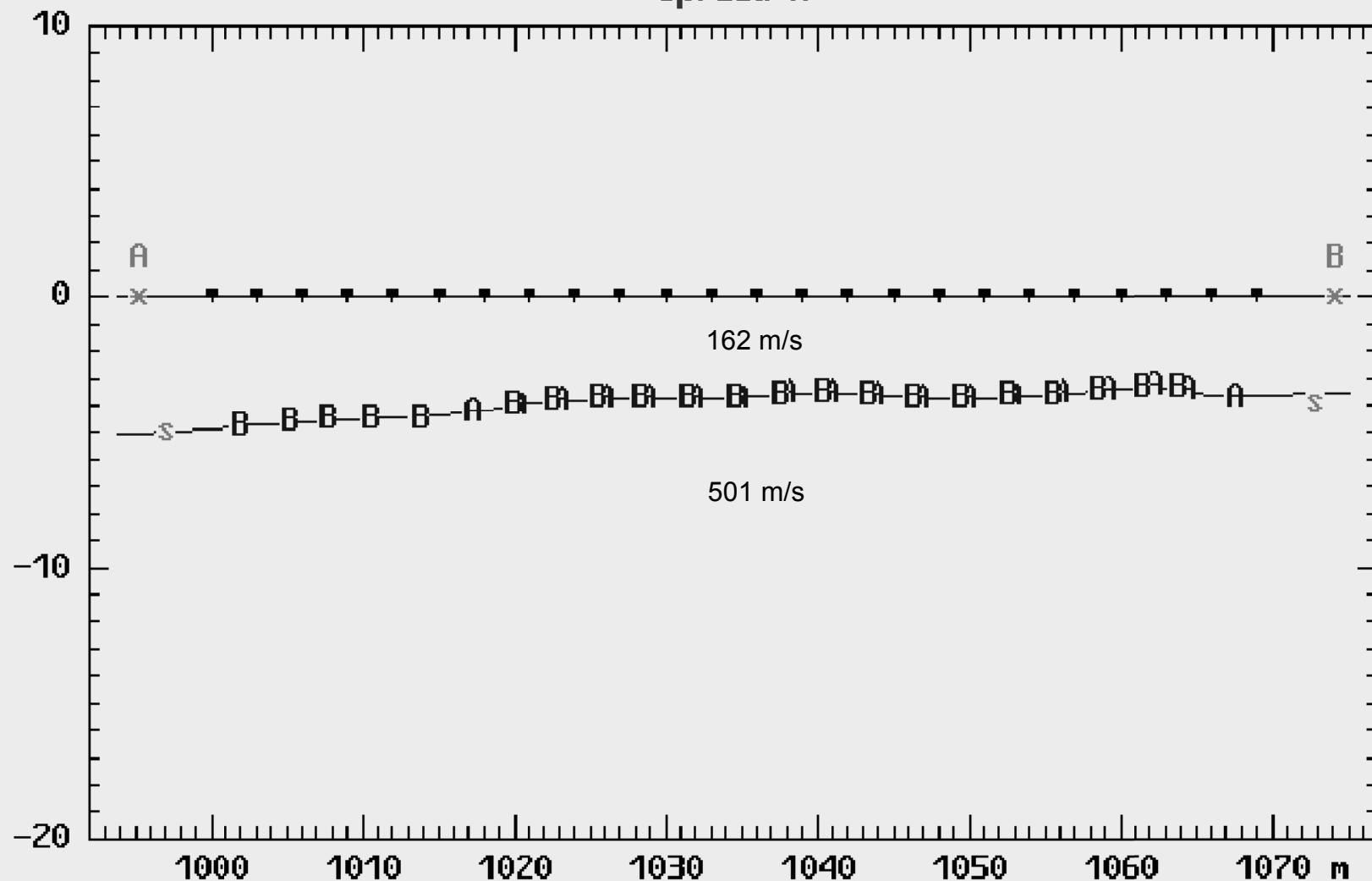


Van Wyck RD S-wave

Press Esc to EXIT

WYCKSWAV.SIP: Van Wyck Rd S-Waves

Spread A

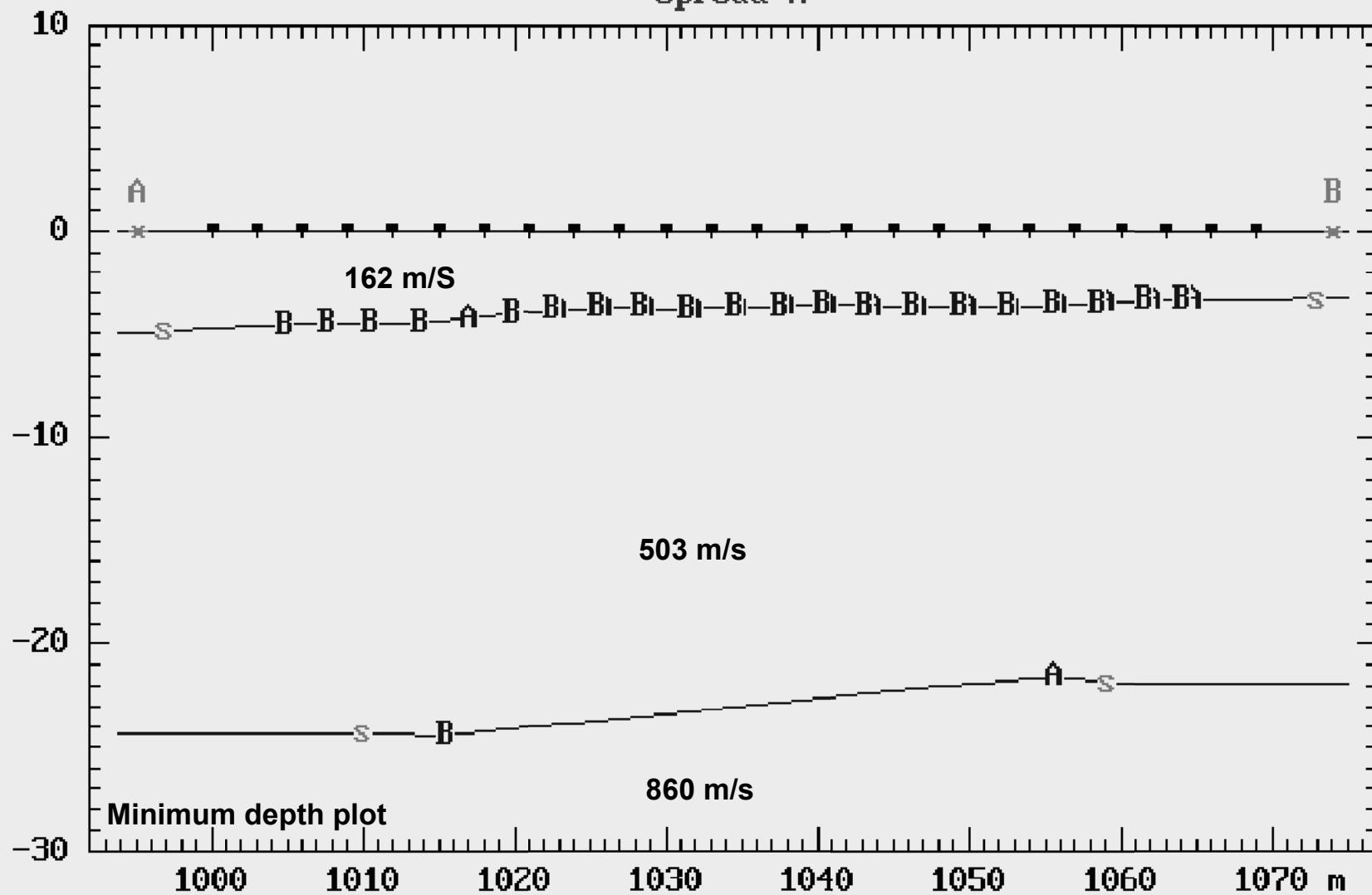


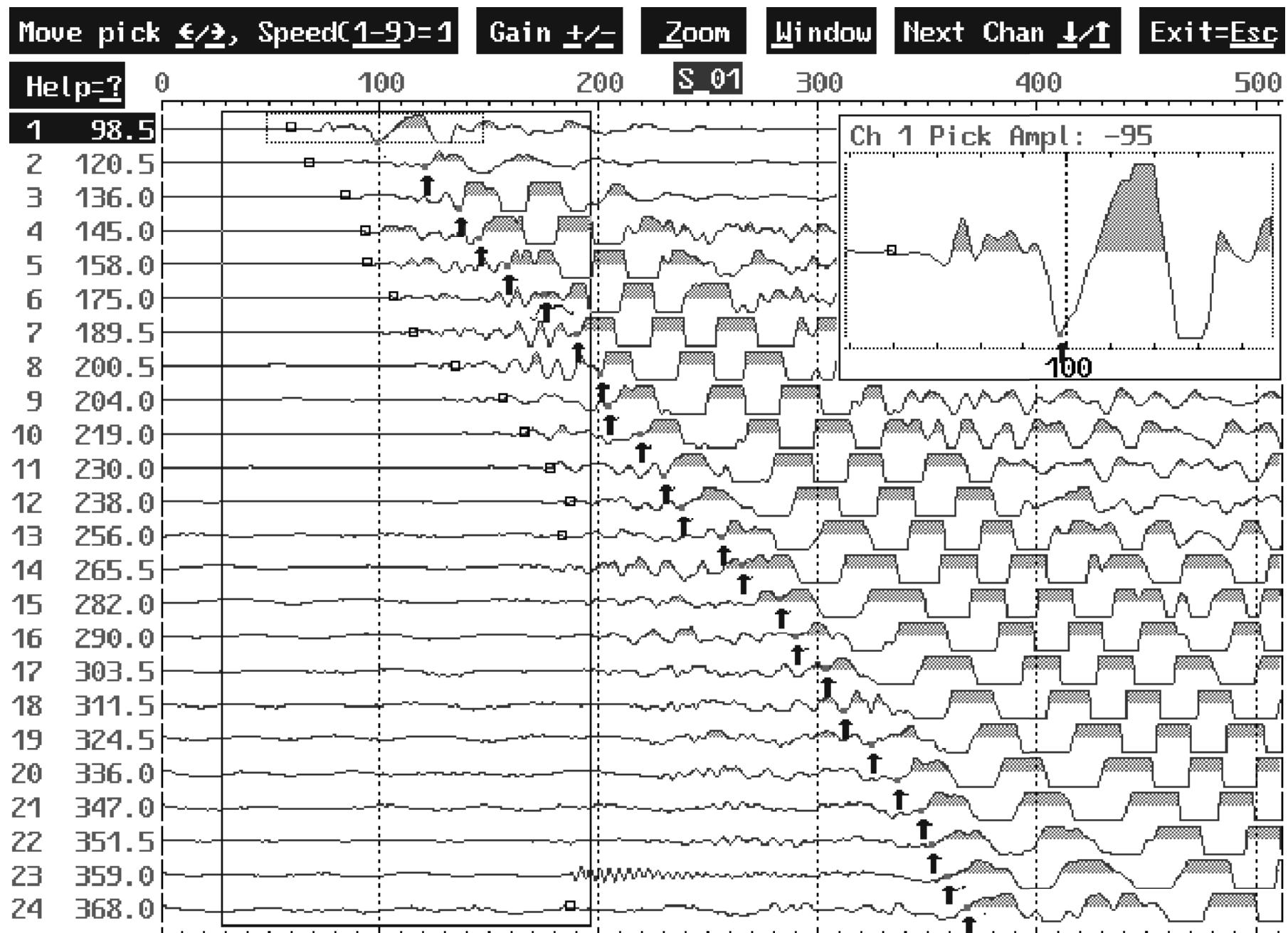
Van Wyck RD S-wave

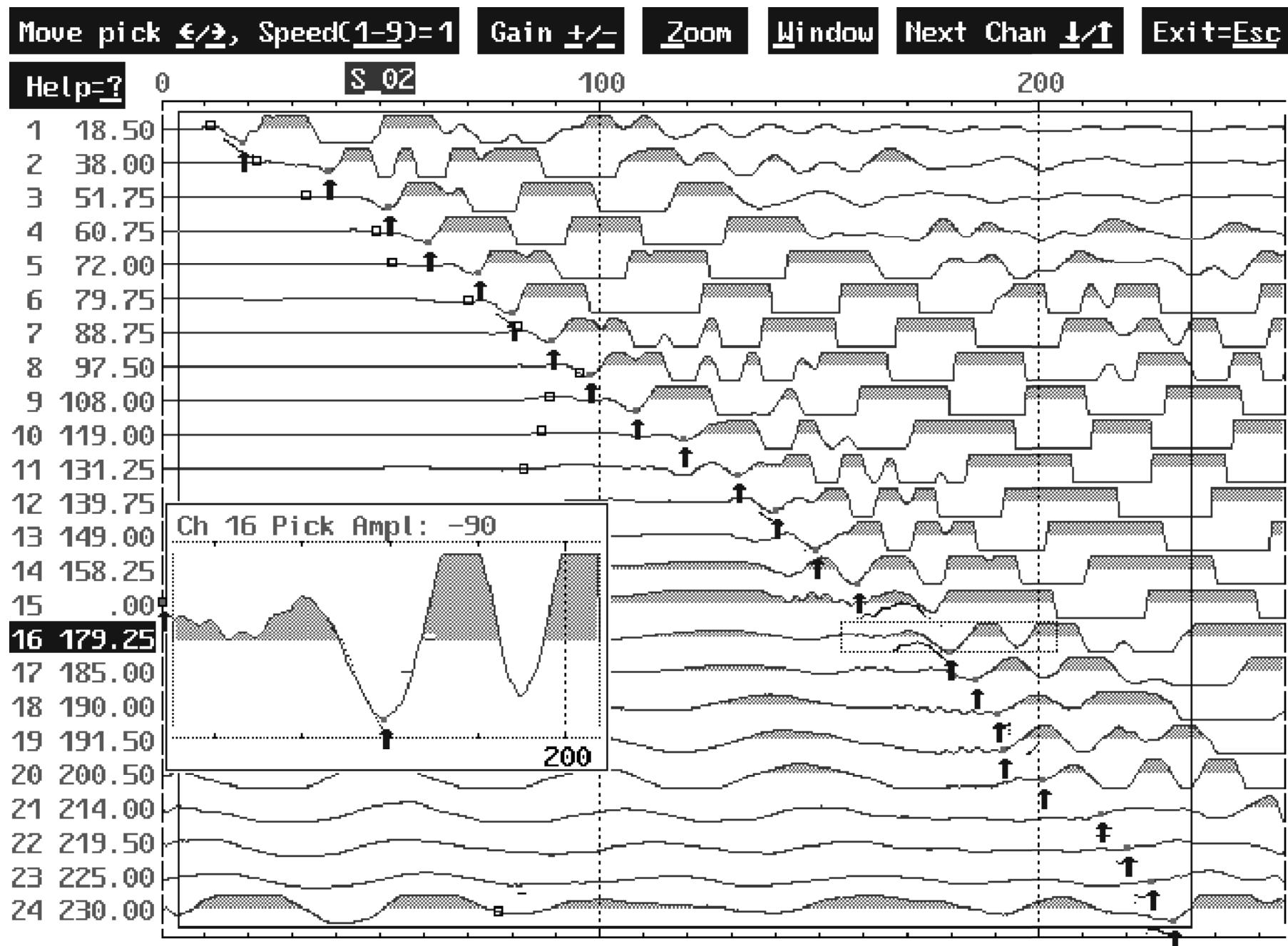
Press Esc to EXIT

WYCK_SW2.SIP: Van Wyck Rd S-Waves

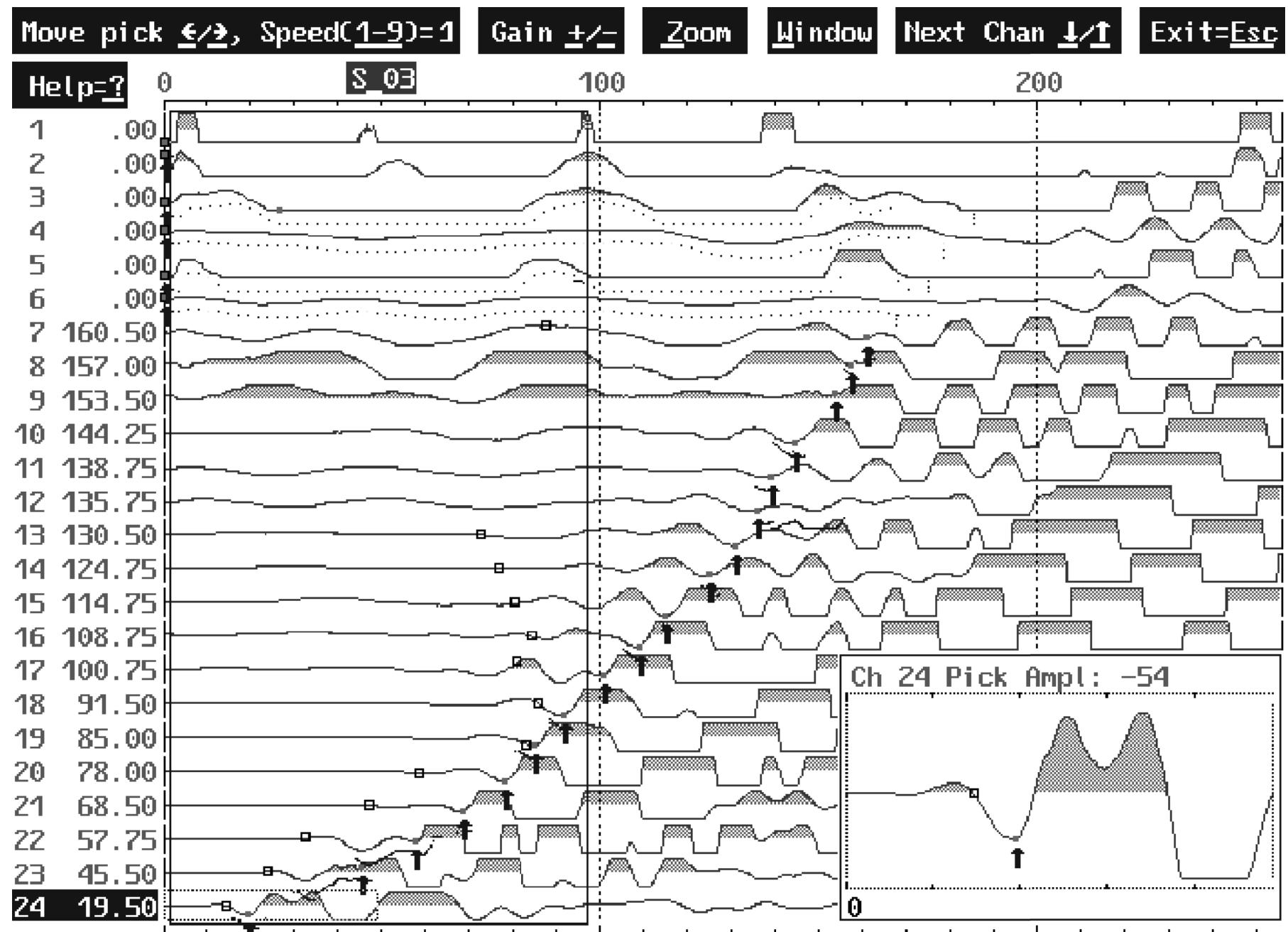
Spread A



Vossbeck Elementary S-wave

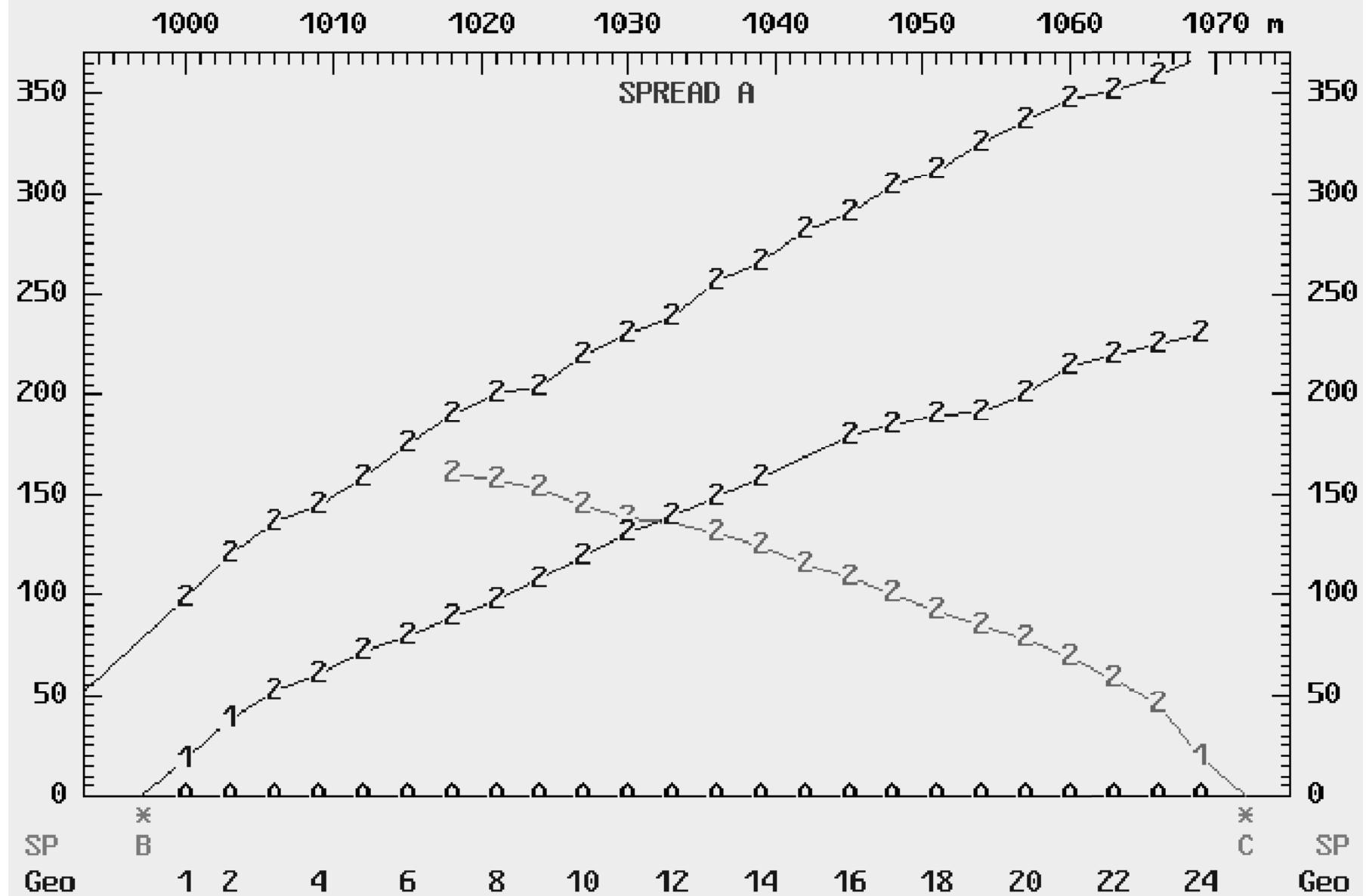
Vossbeck Elementary S-wave

Vossbeck Elementary S-wave



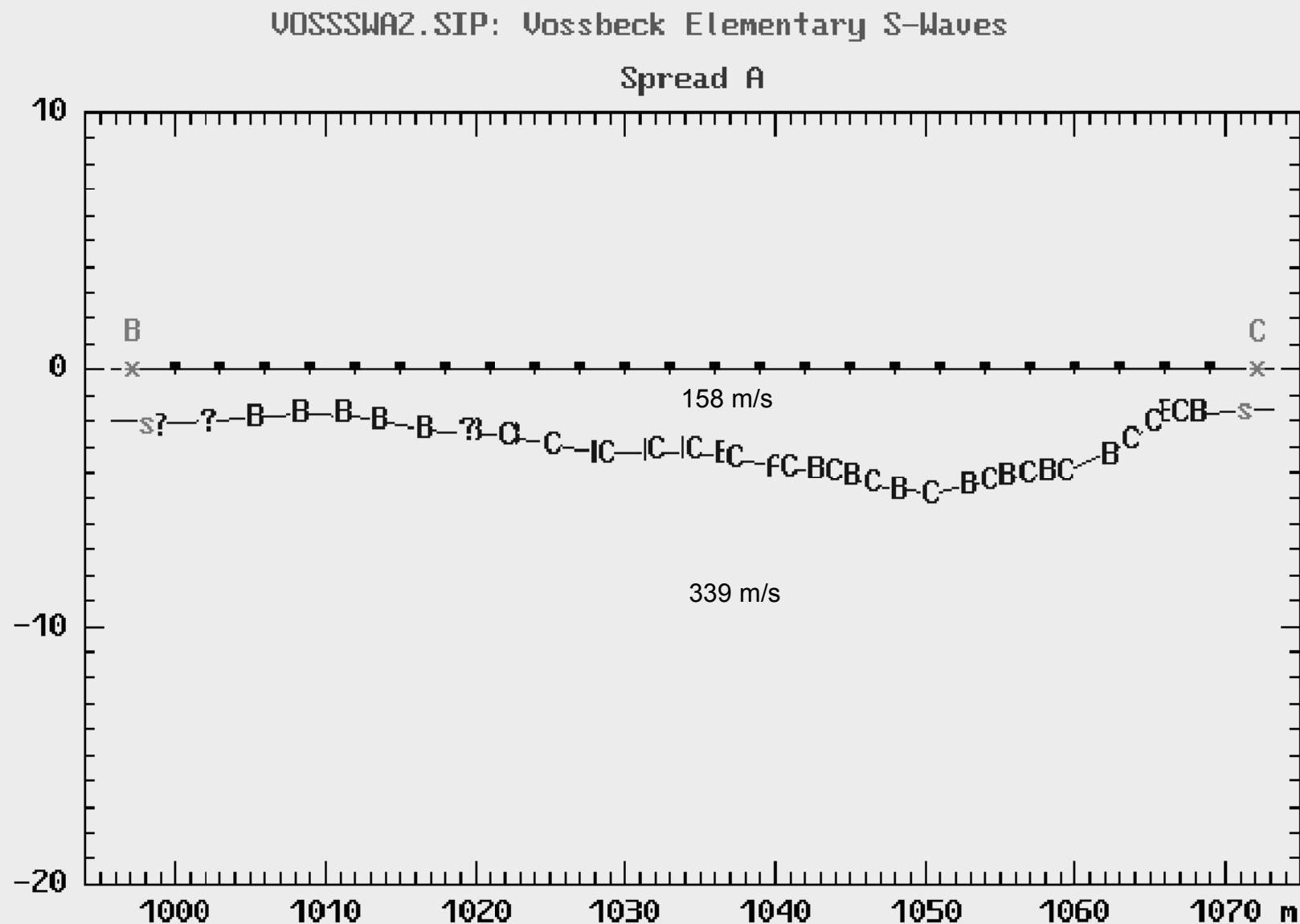
Vossbeck Elementary S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Vossbeck Elementary S-wave

Press Esc to EXIT

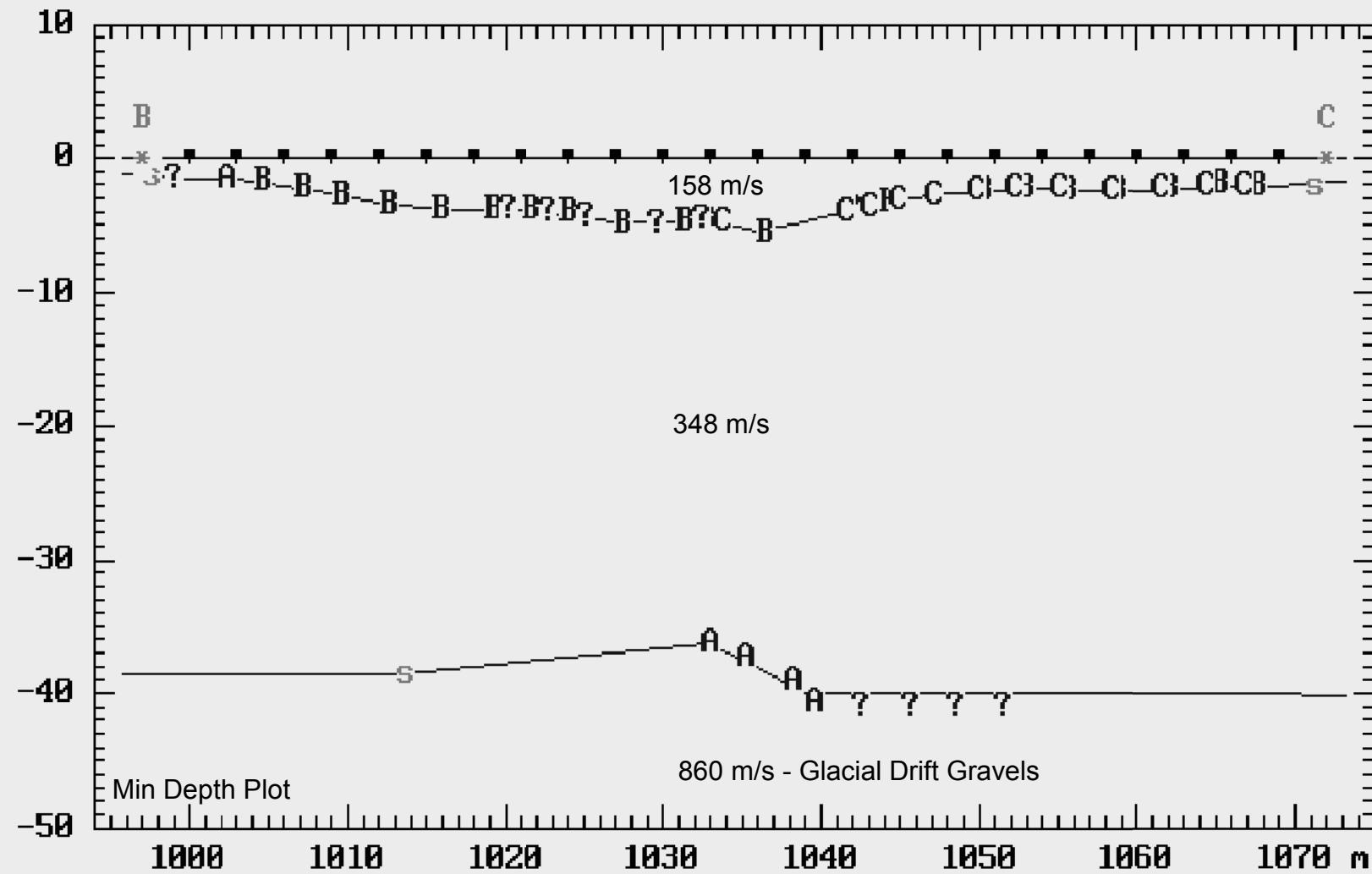


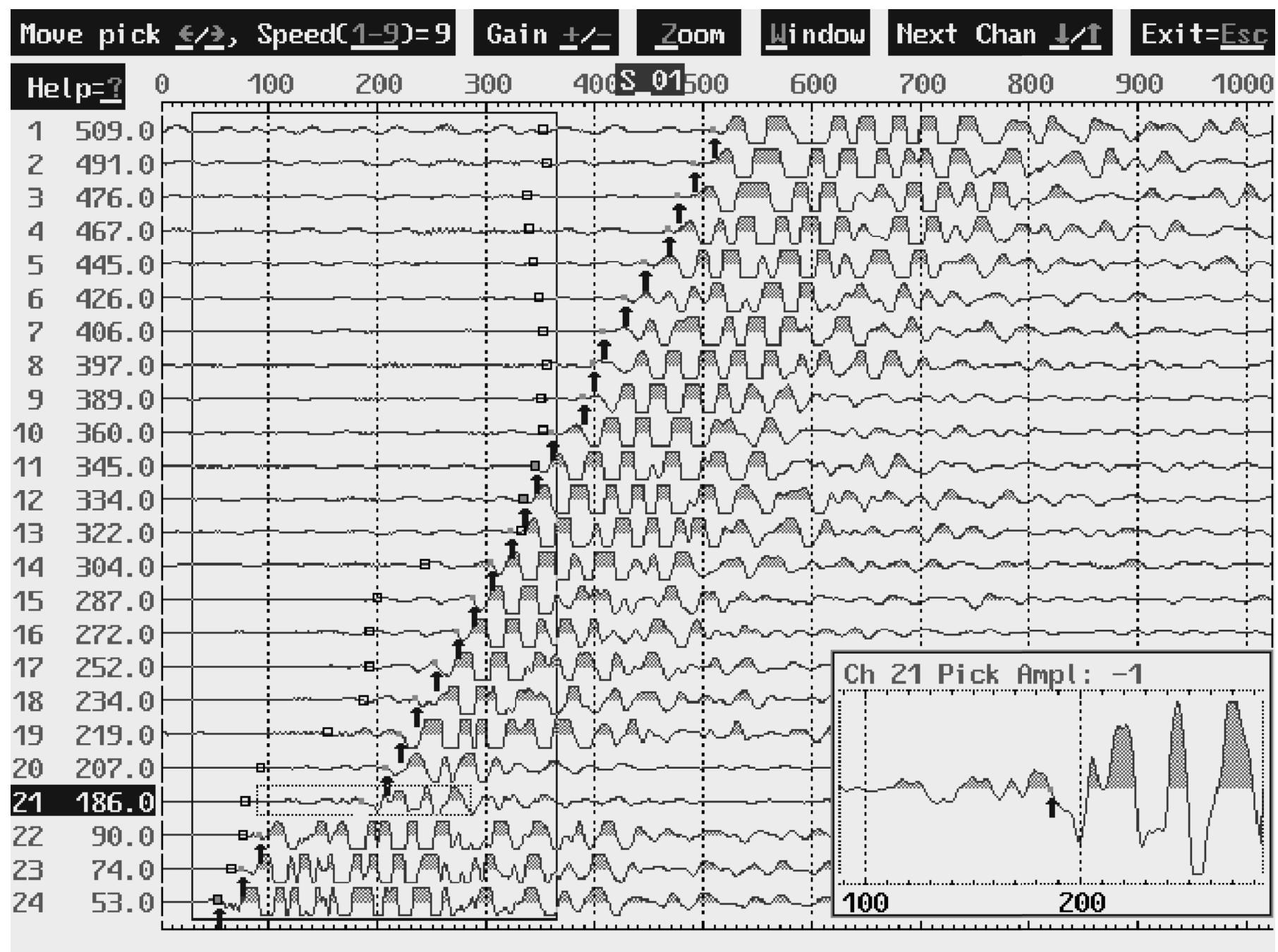
Vossbeck Elementary S-wave

Press Esc to EXIT

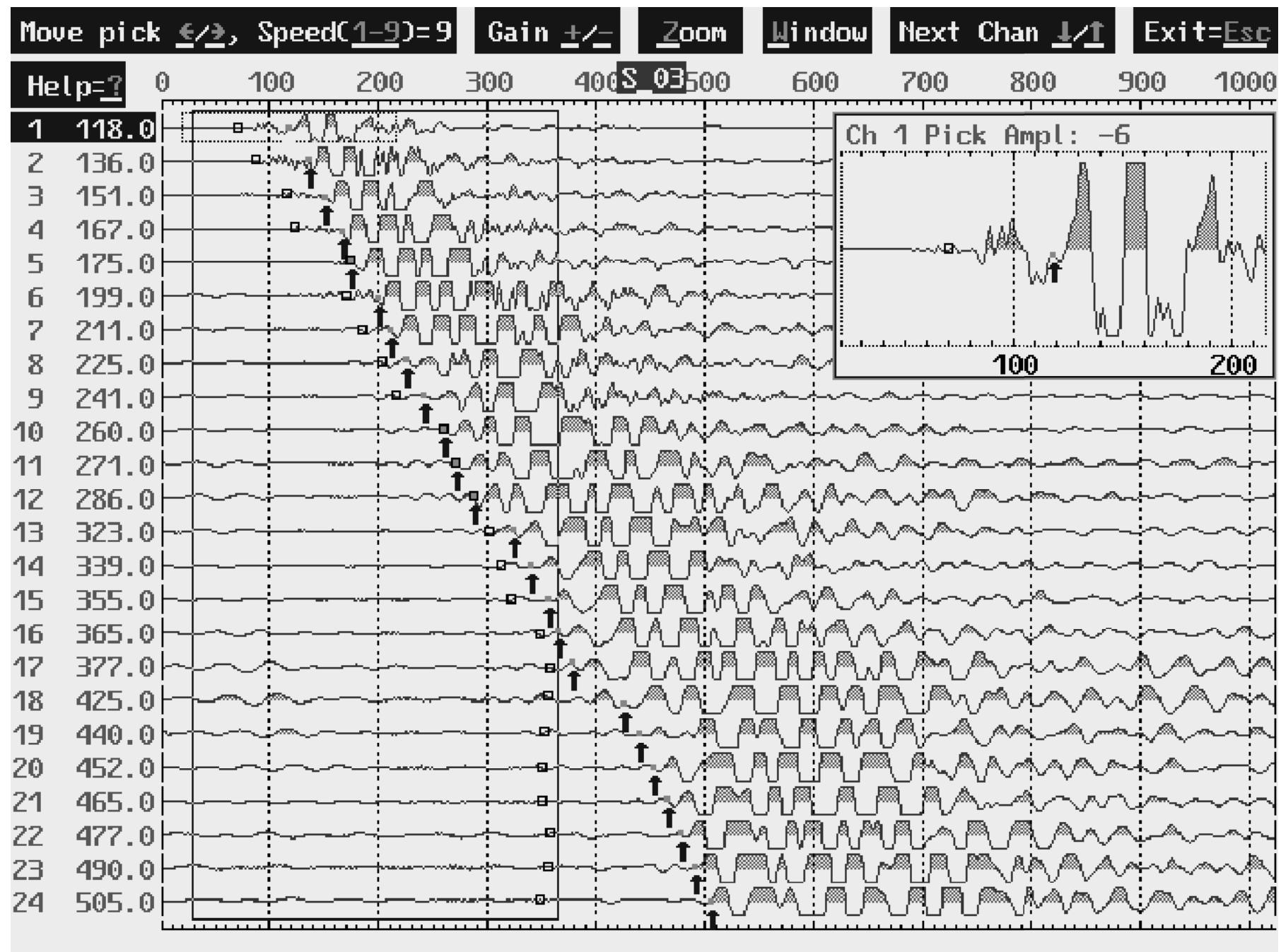
VOSSMIN.SIP: Vossbeck Elementary Minimum Depth Plot

Spread A



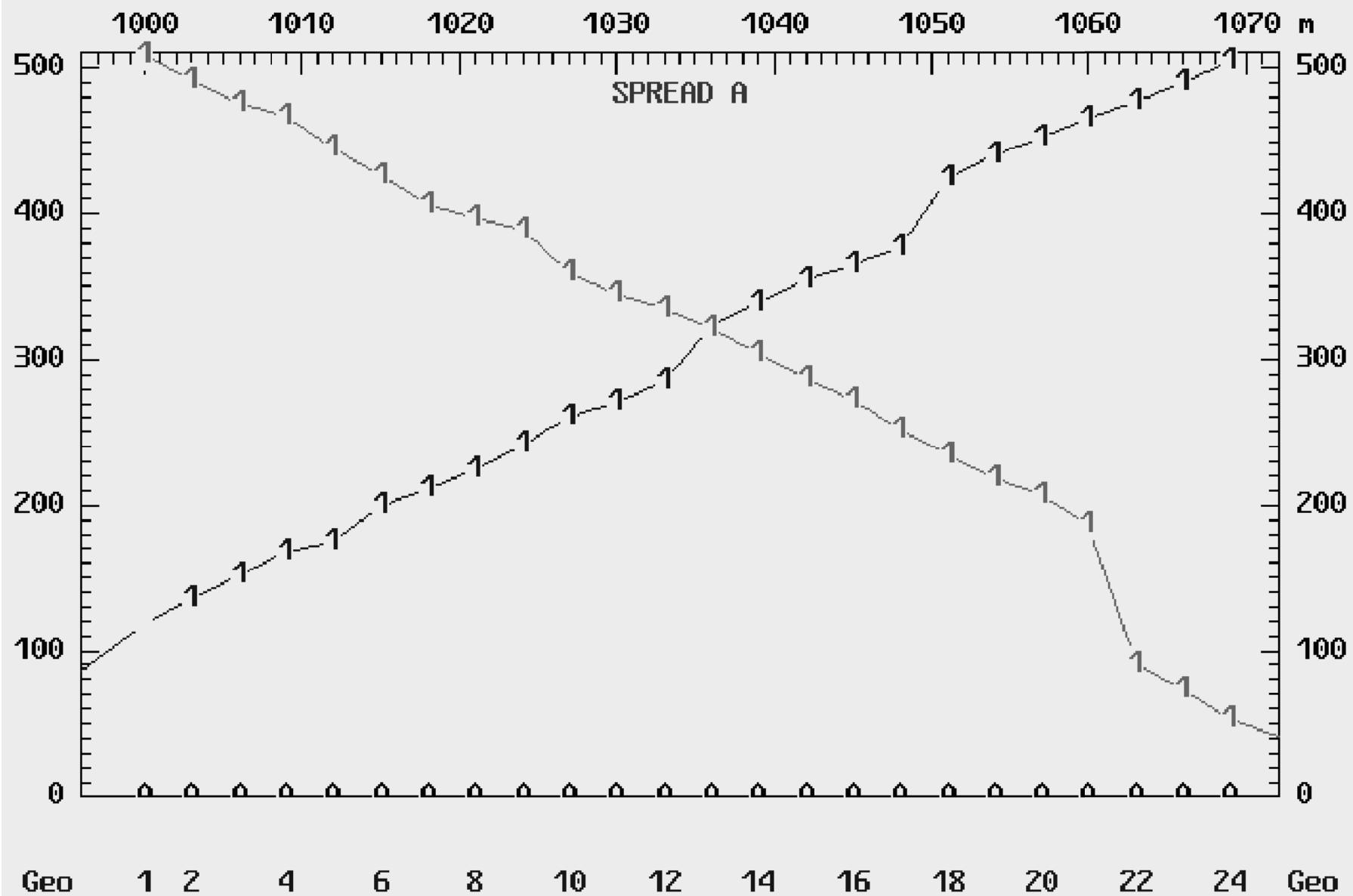
Washington Elementary S-wave

Washington Elementary S-wave



Washington Elementary S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

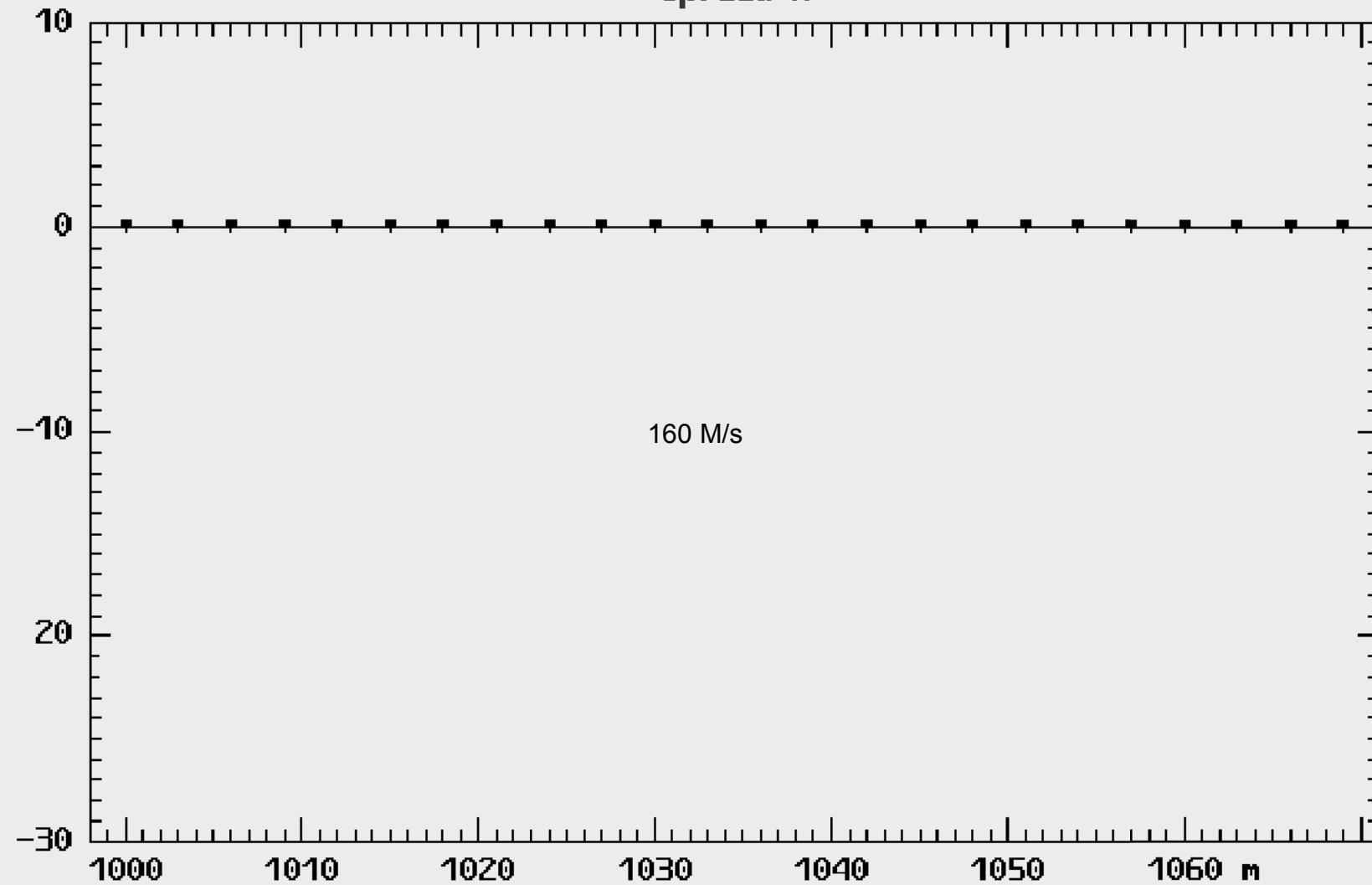


Washington Elementary S-wave

Press Esc to EXIT

WASHSMIN.SIP: Washington Elementary S-Waves

Spread A

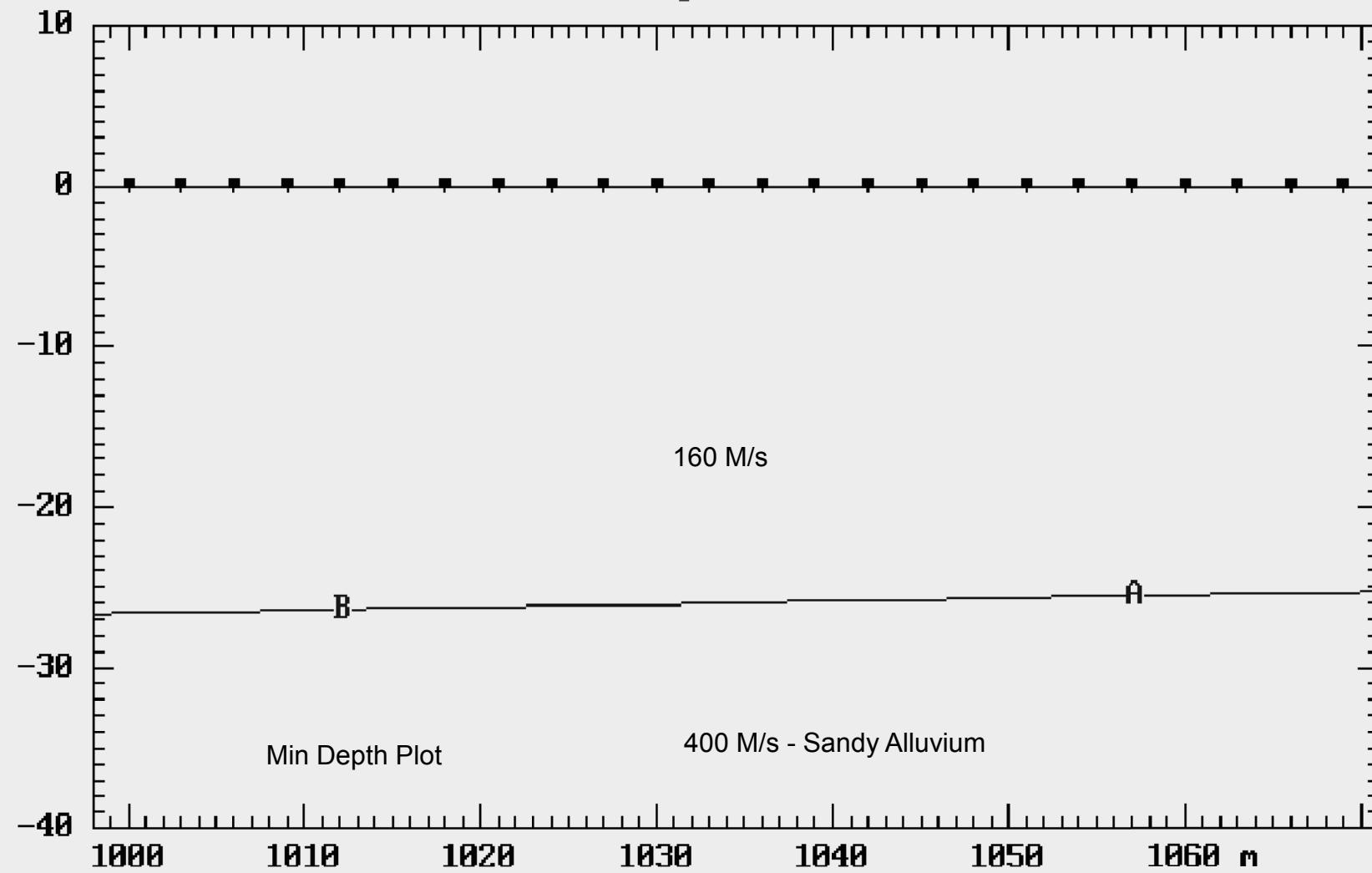


Washington Elementary S-wave

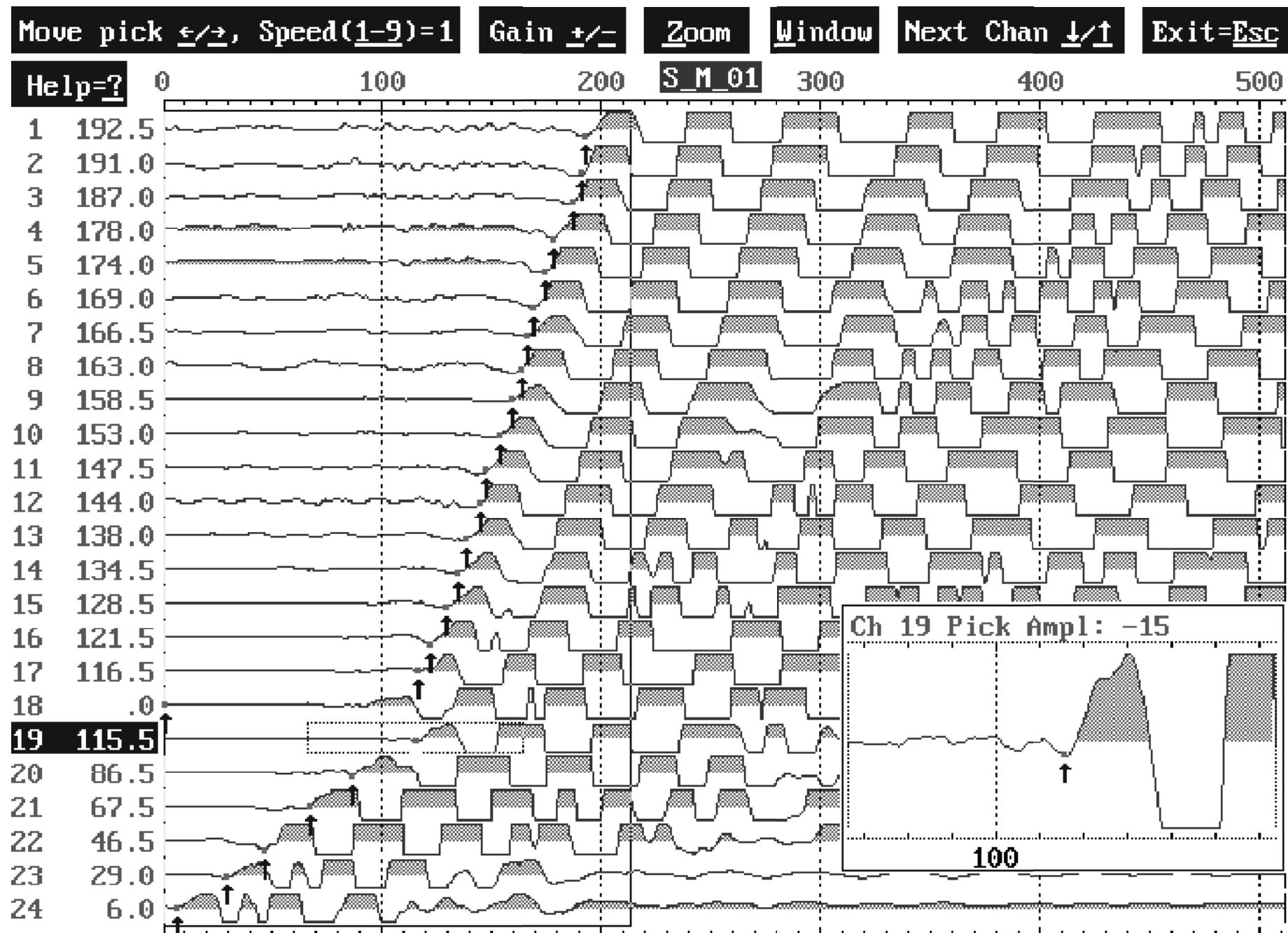
Press Esc to EXIT

WASHSMIN.SIP: Washington Elementary S-Waves Minimum Depth Plot

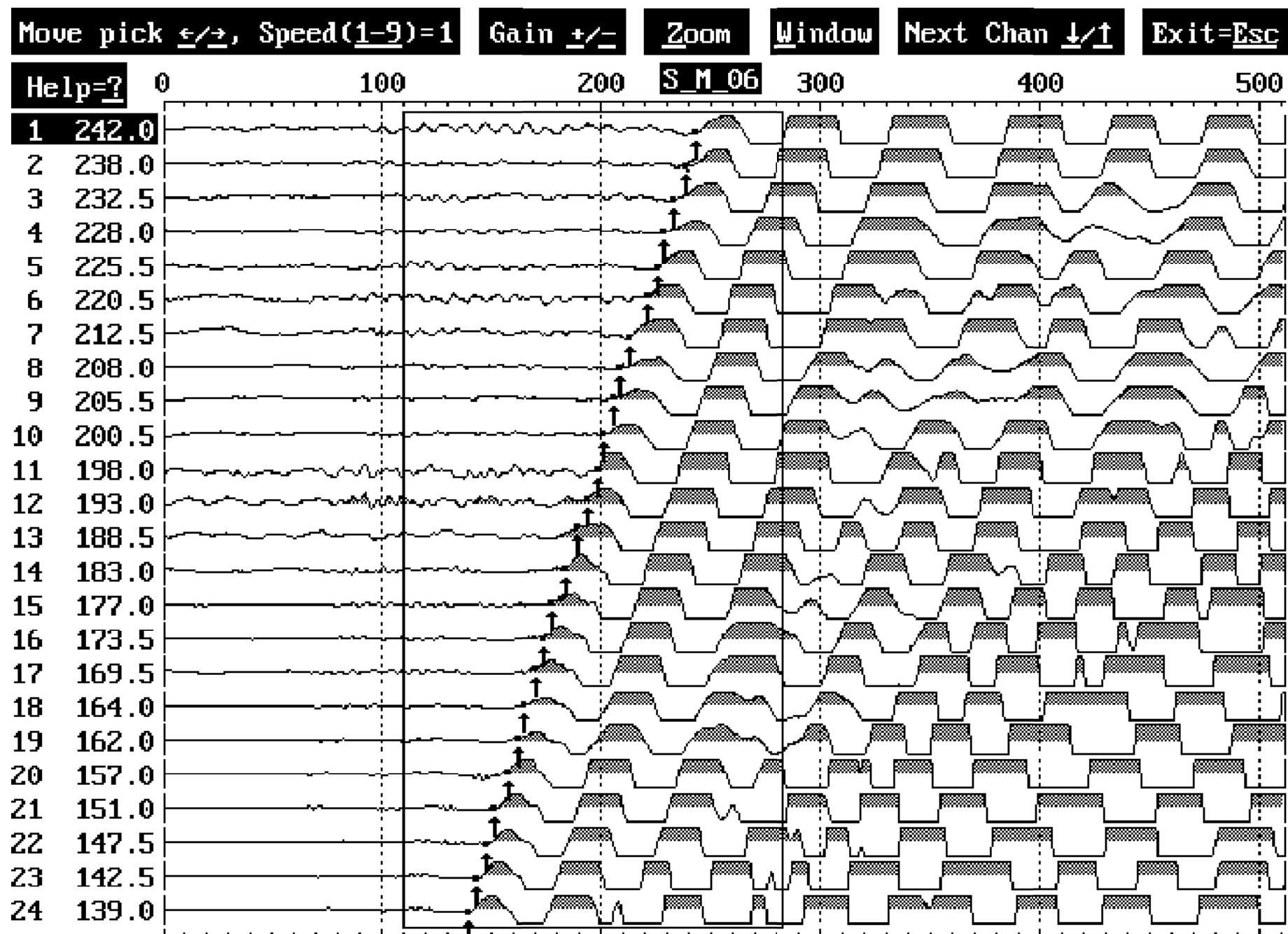
Spread A



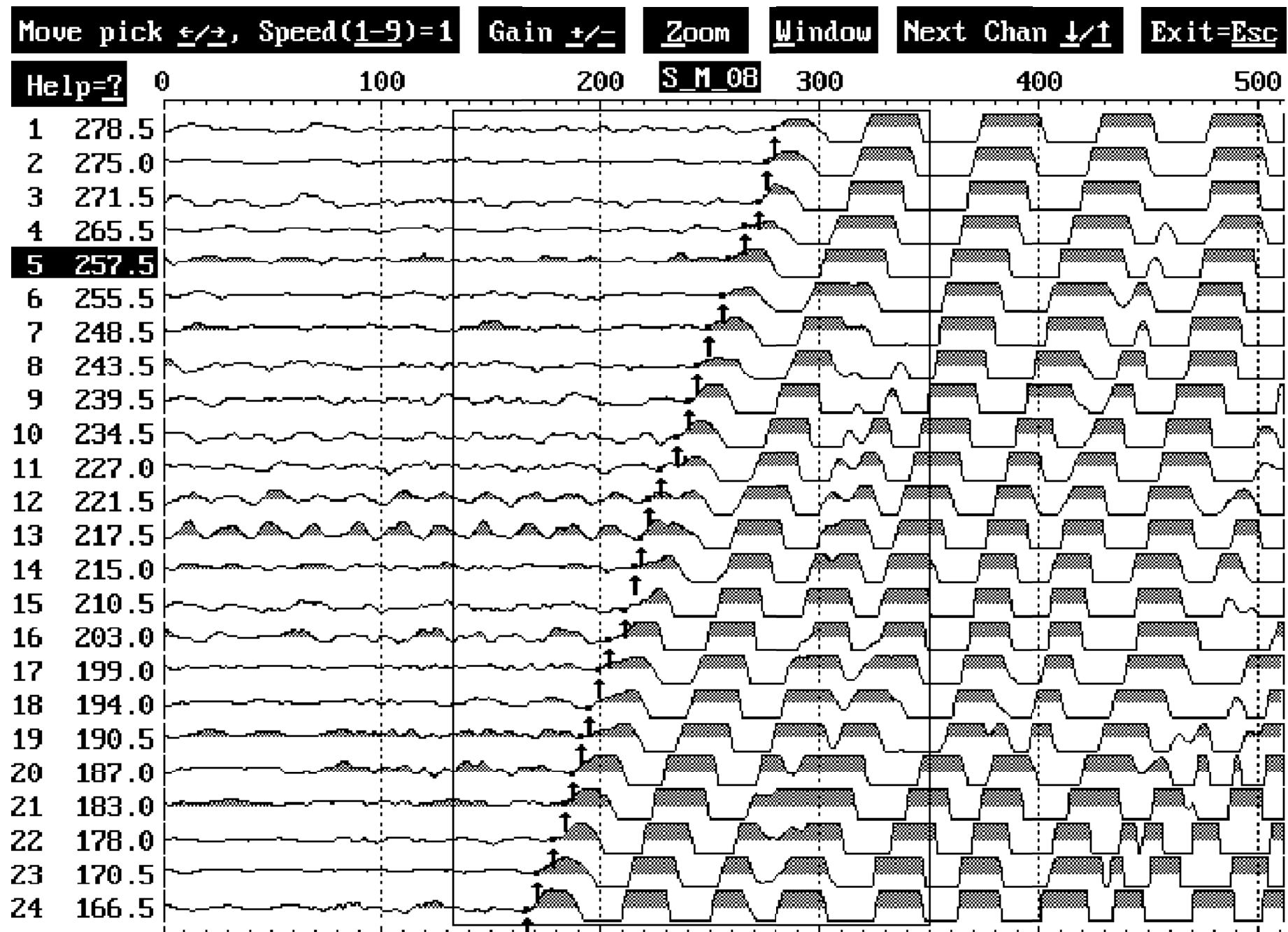
Webster IV S-wave



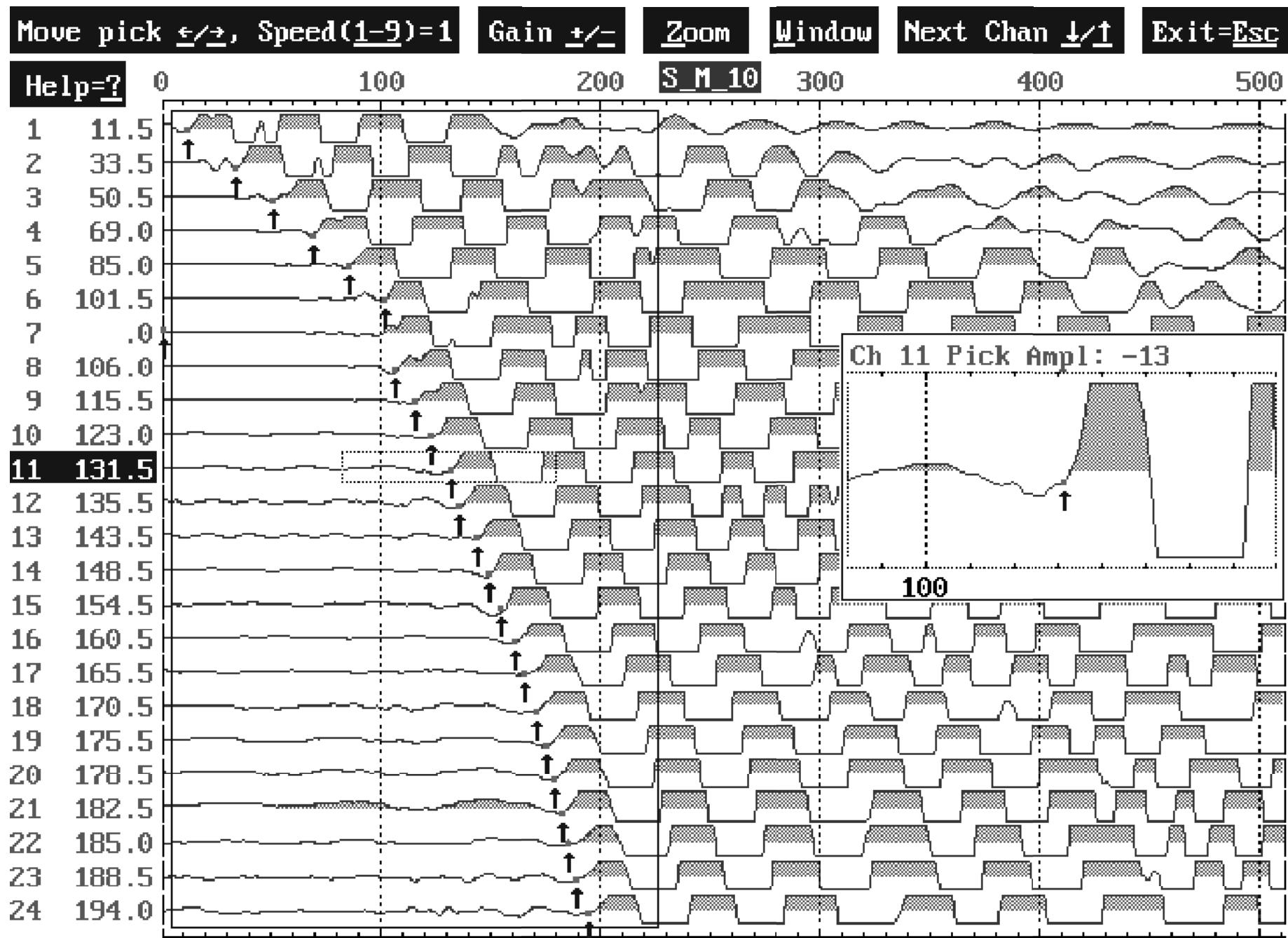
Webster IV S-wave



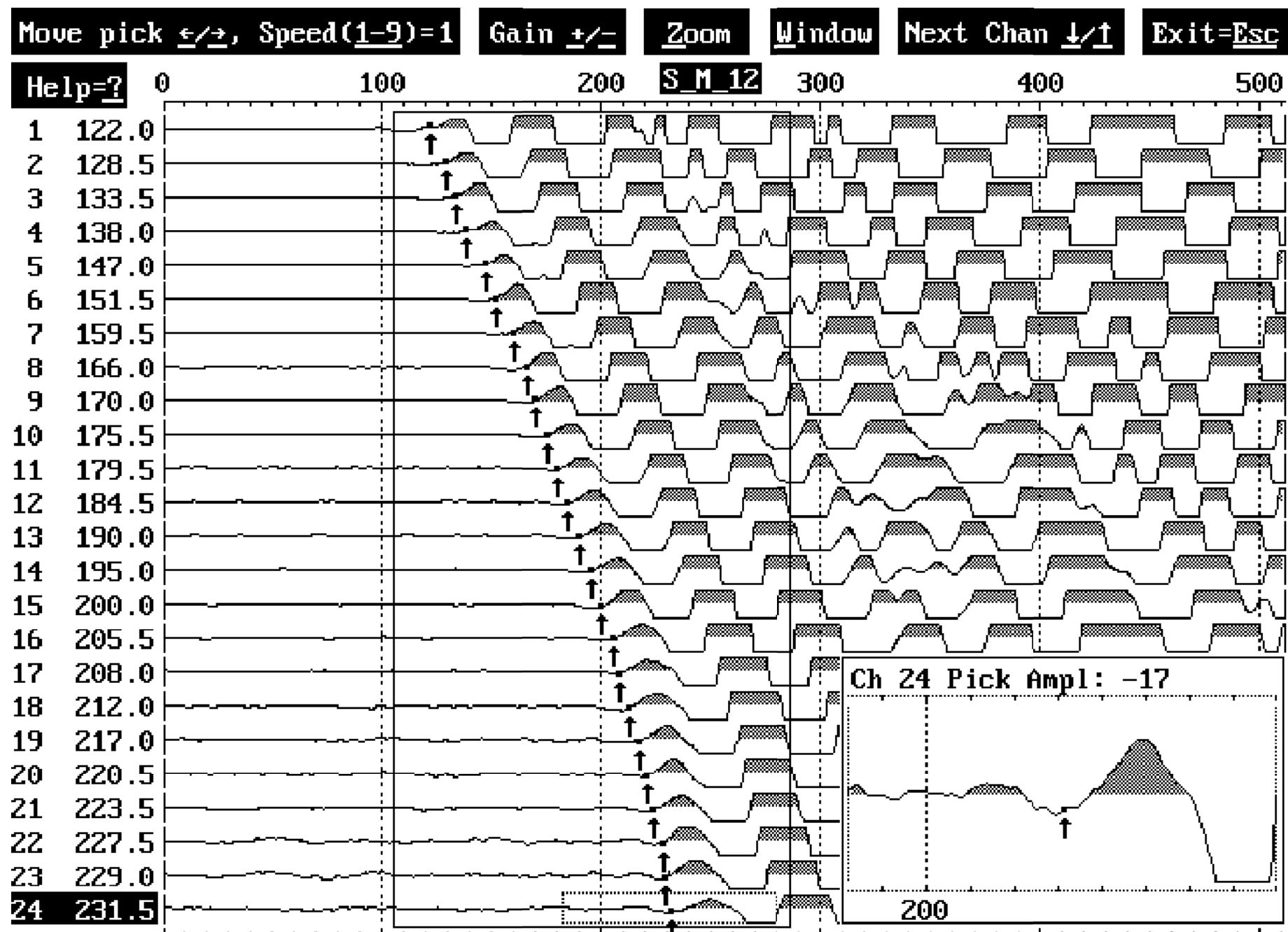
Webster IV S-wave



Webster IV S-wave

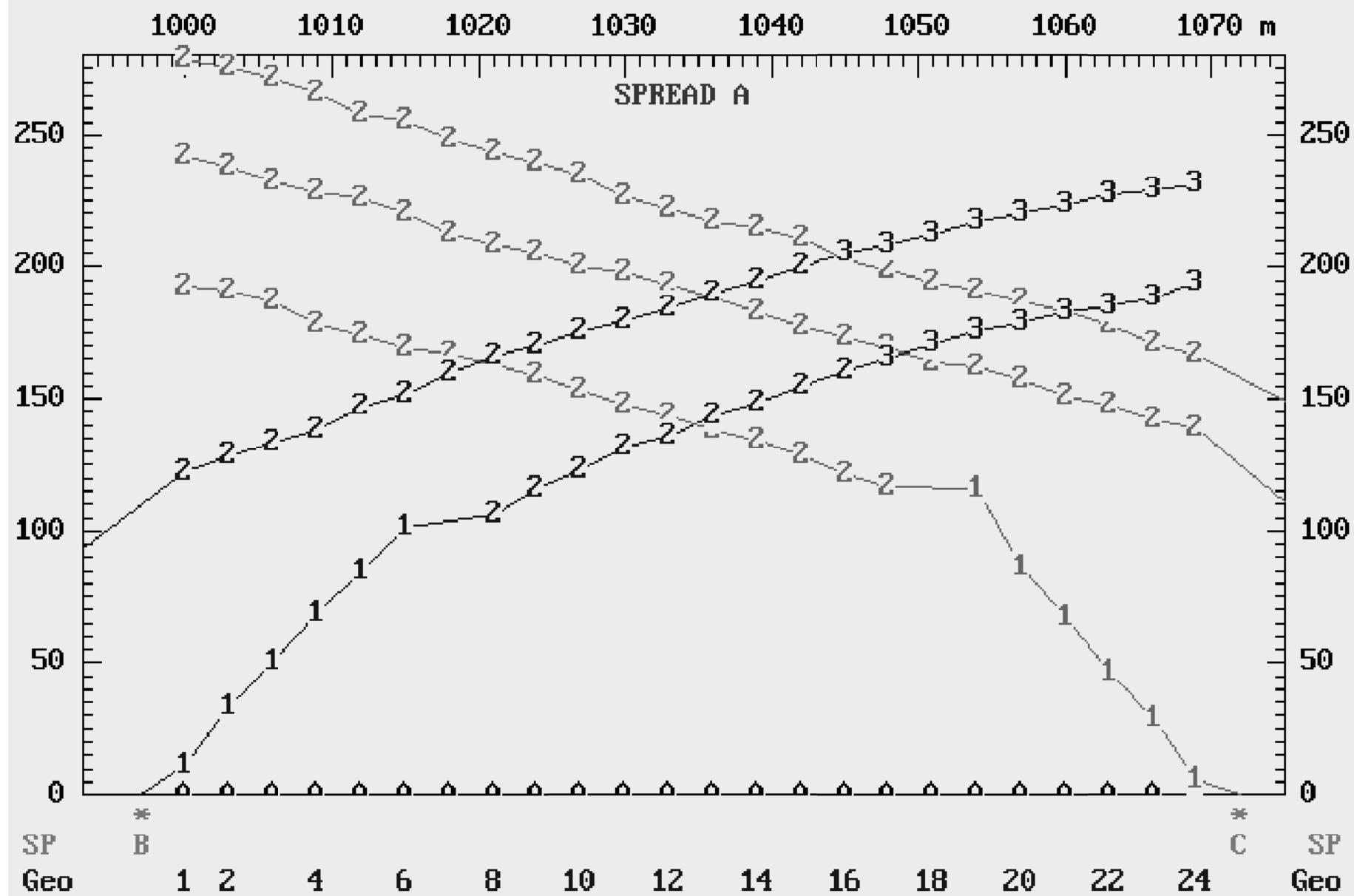


Webster IV S-wave



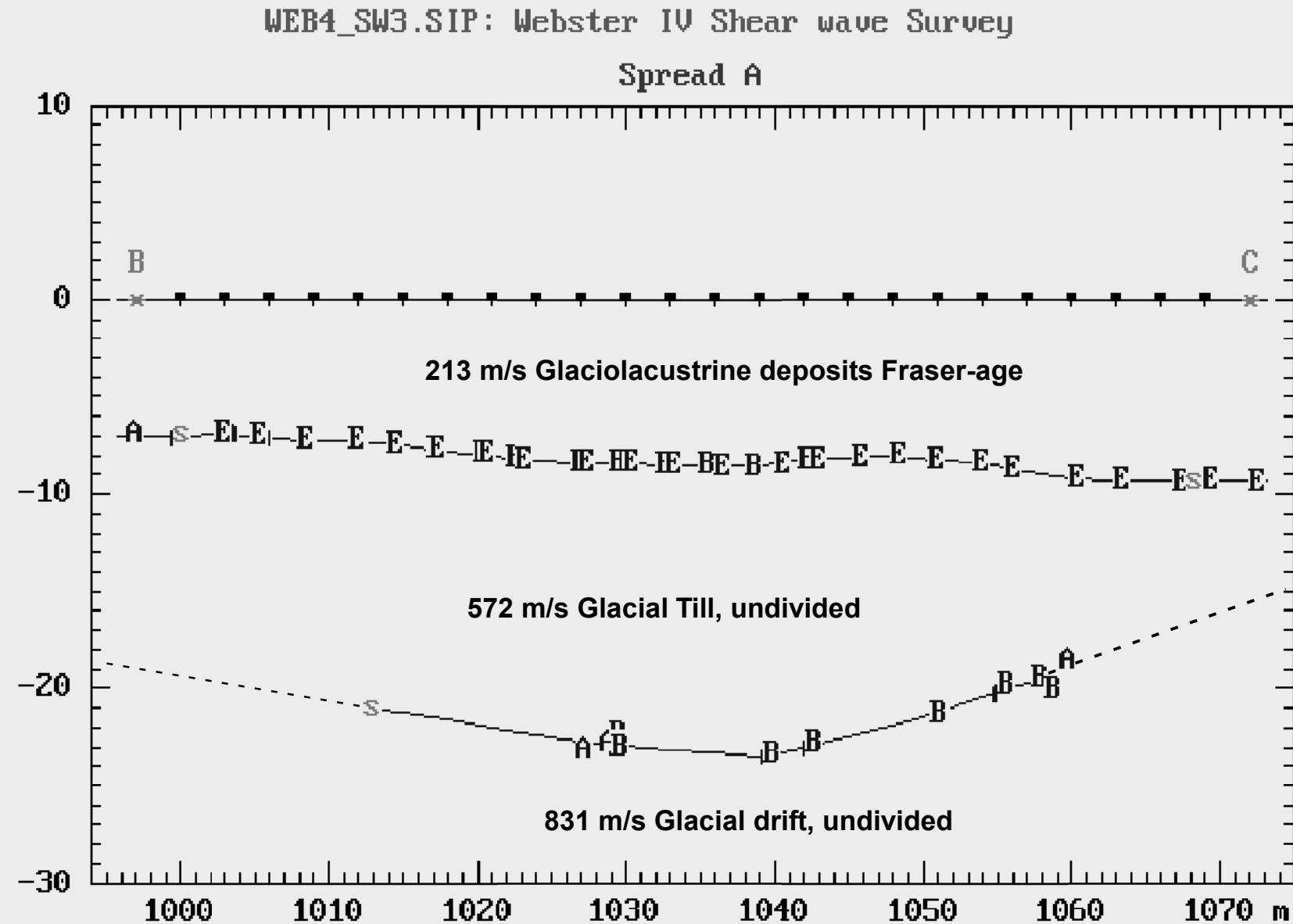
Webster IV S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for **MAIN MENU**.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

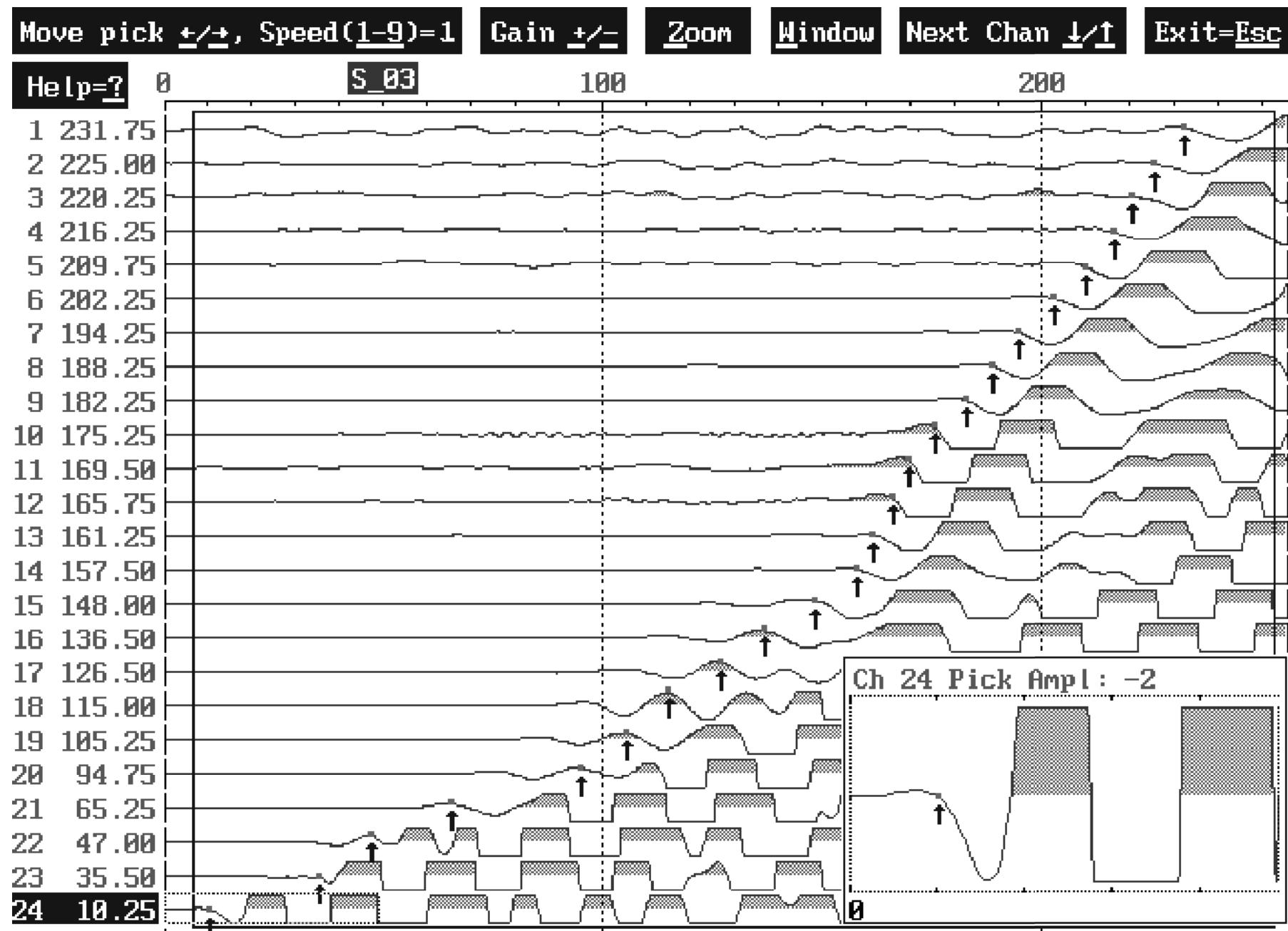


Webster IV S-wave

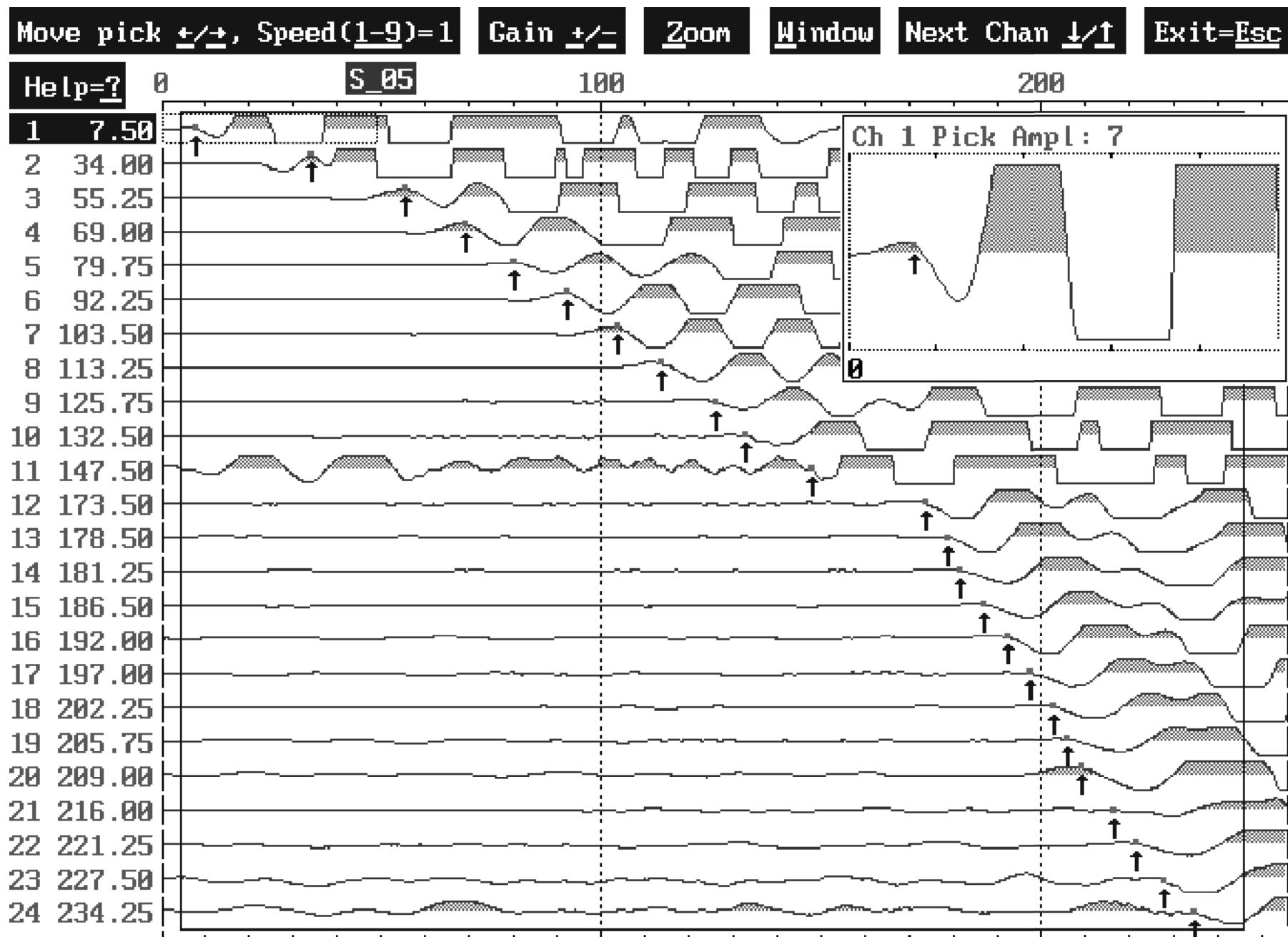
Press Esc to EXIT



Websters 01 (try 3) S-wave

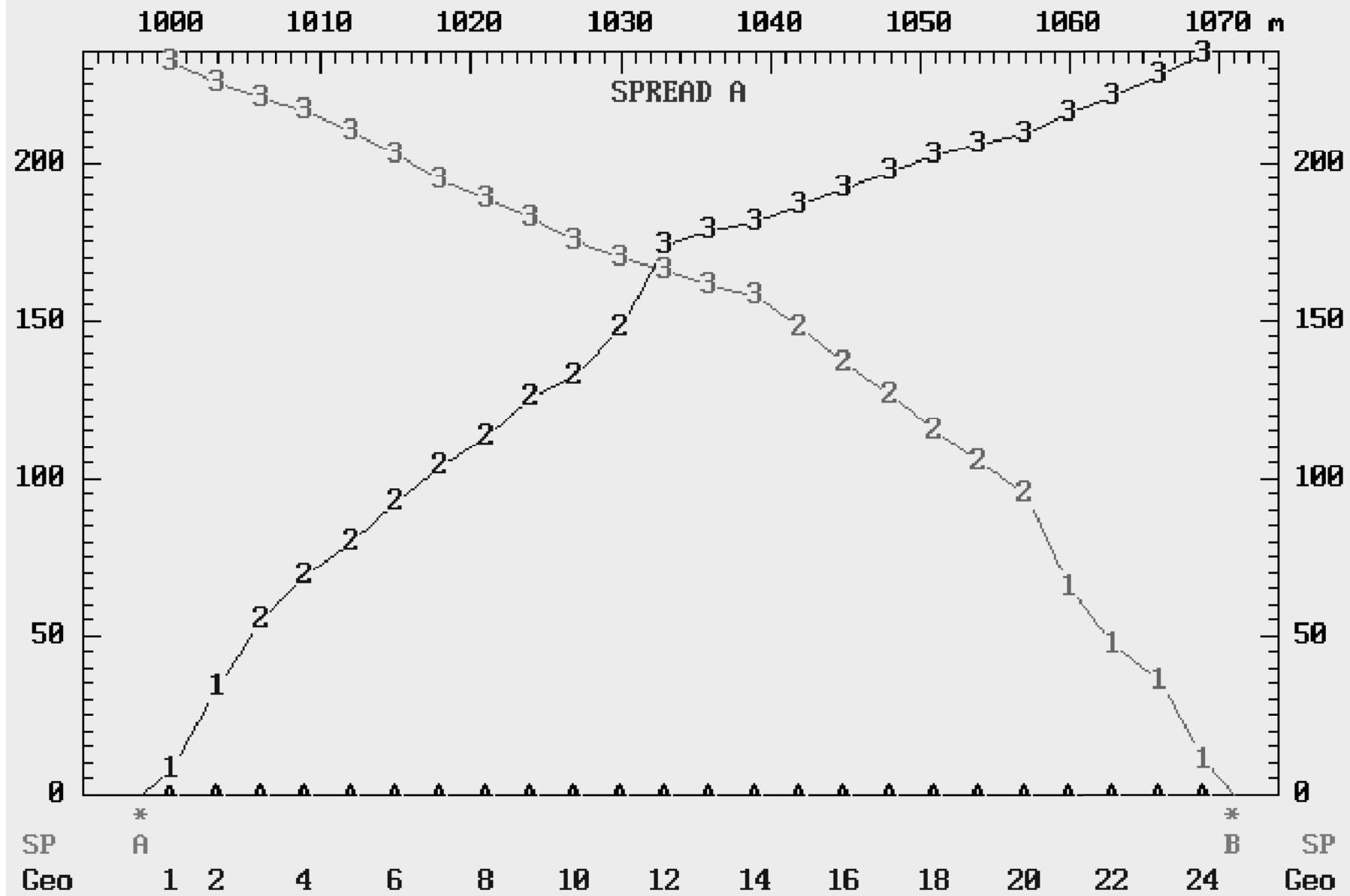


Websters 01 (try 3) S-wave



Websters 01 (try 3) S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

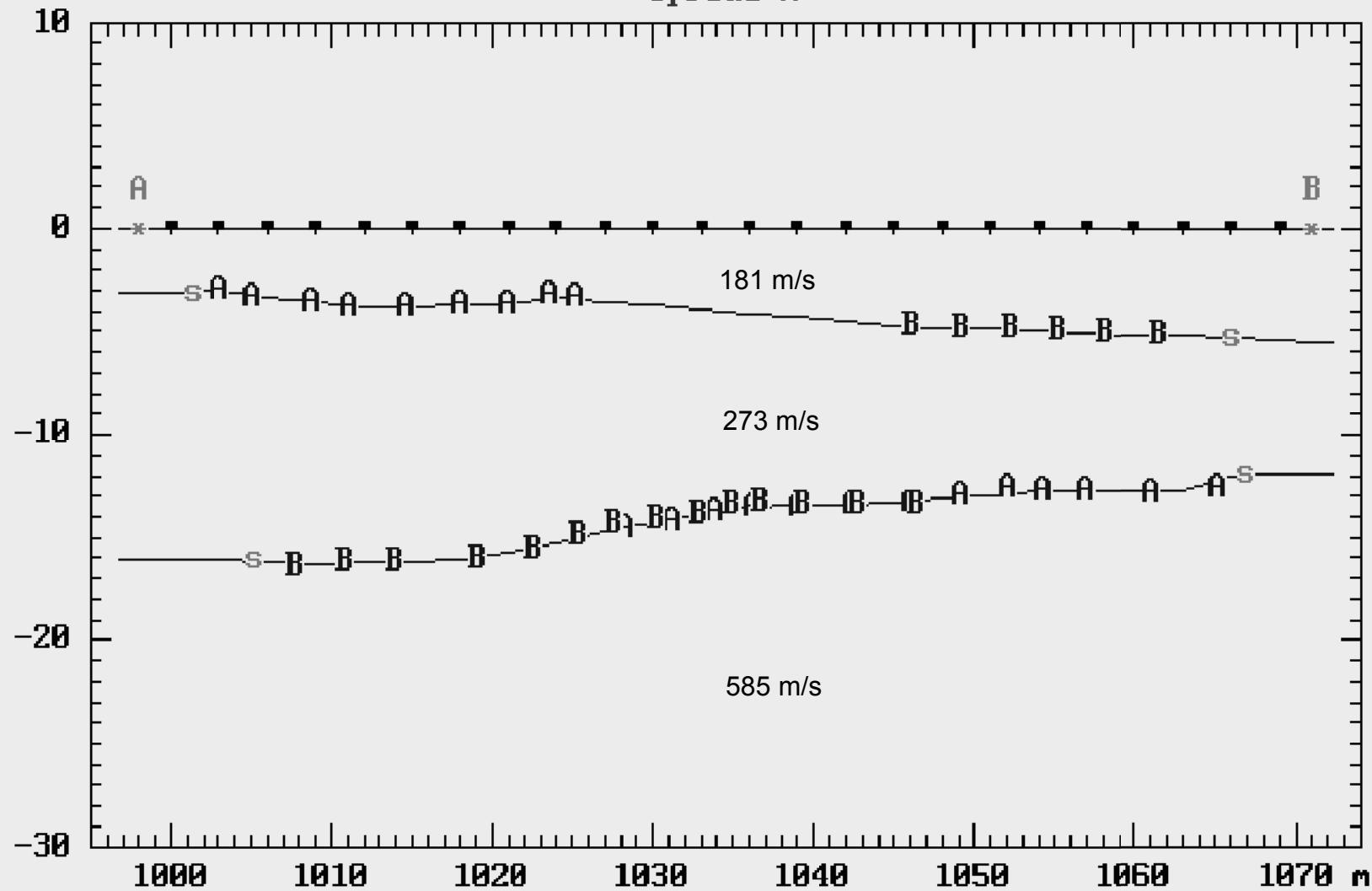


Websters 01 (try 3) S-wave

Press Esc to EXIT

WEB1SWAV.SIP: Websters 01 S-Waves

Spread A

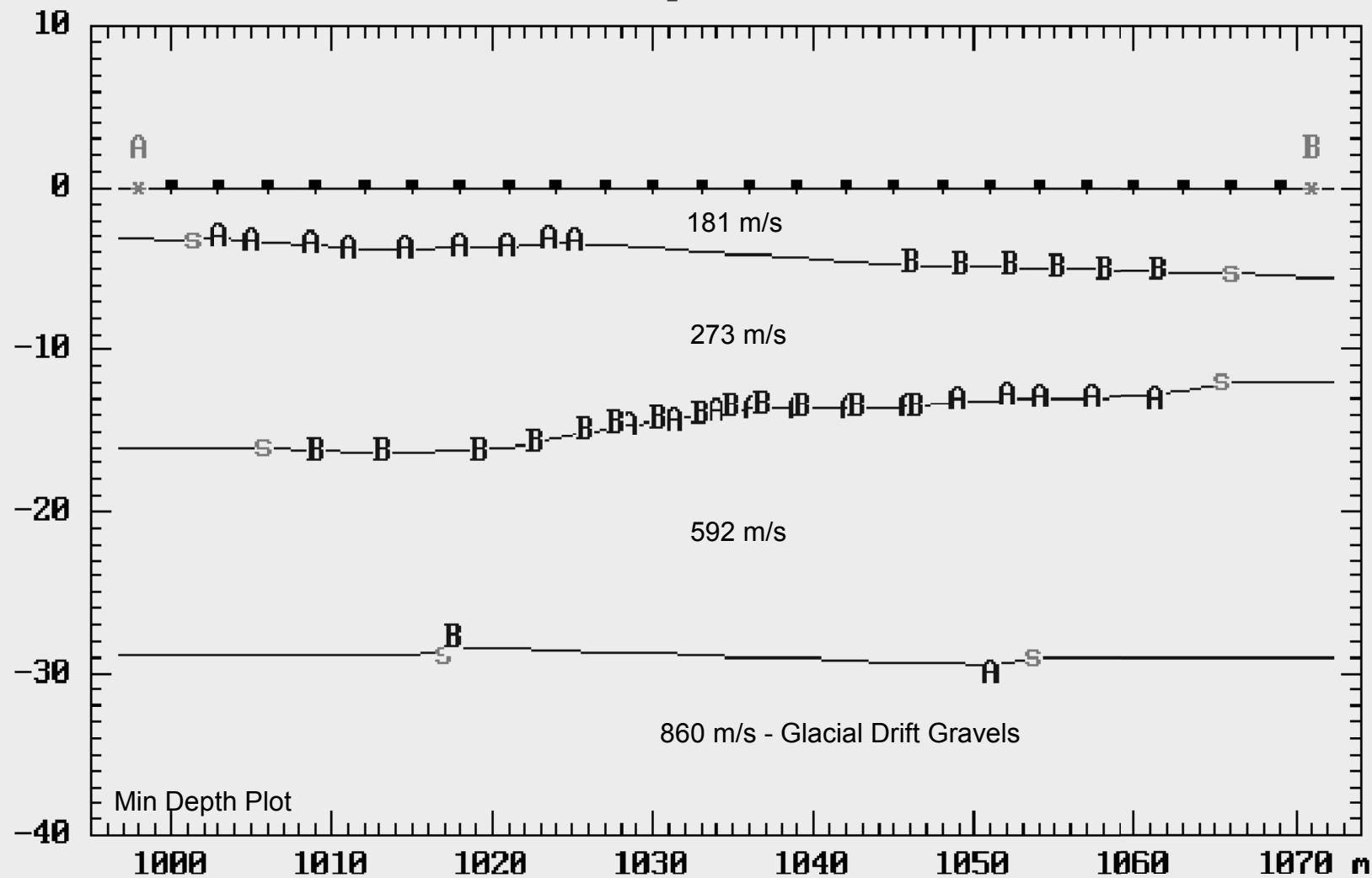


Websters 01 (try 3) S-wave

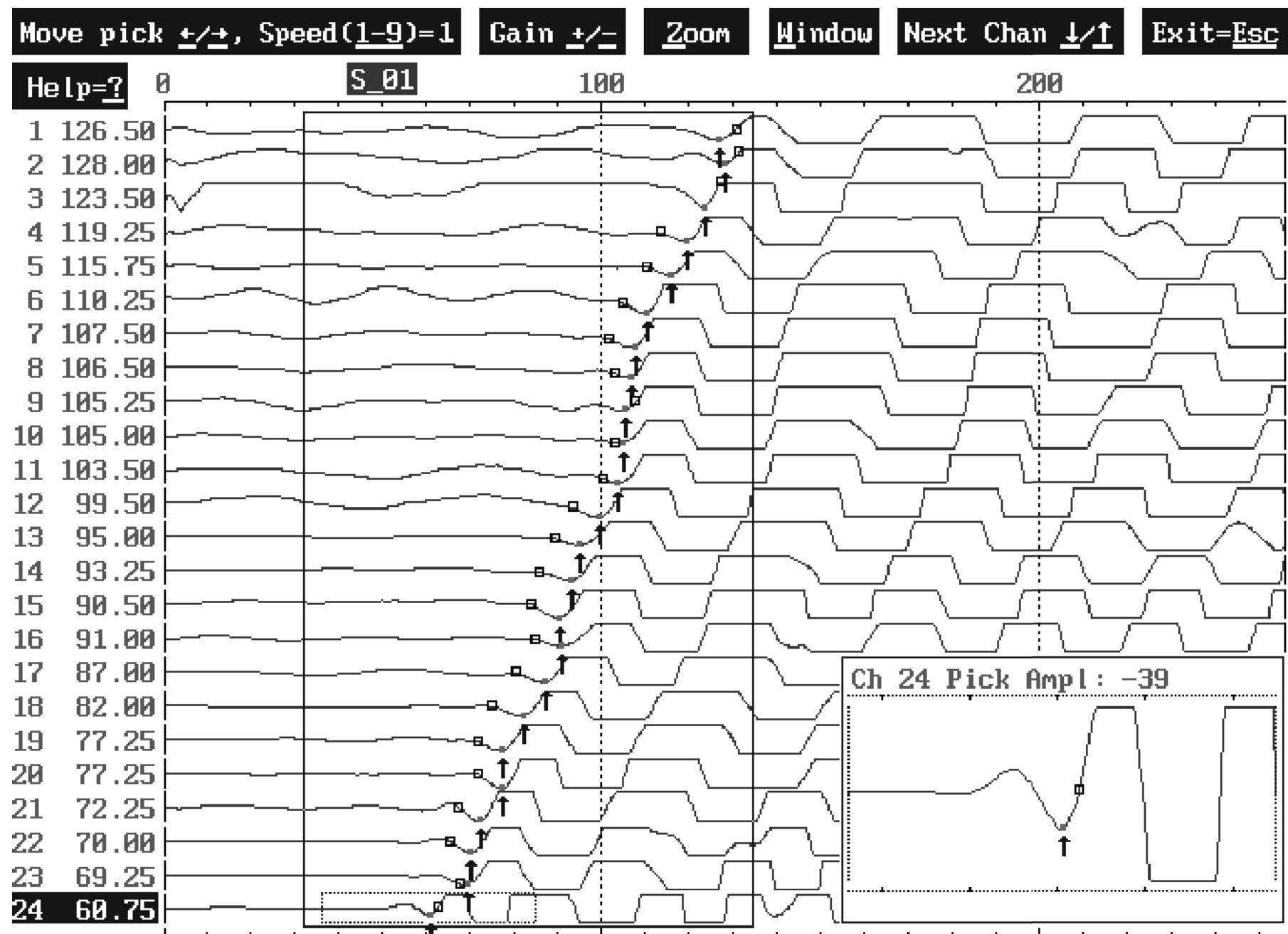
Press Esc to EXIT

WEB1SMIN.SIP: Websters 01 S-Waves Minimum Depth Model

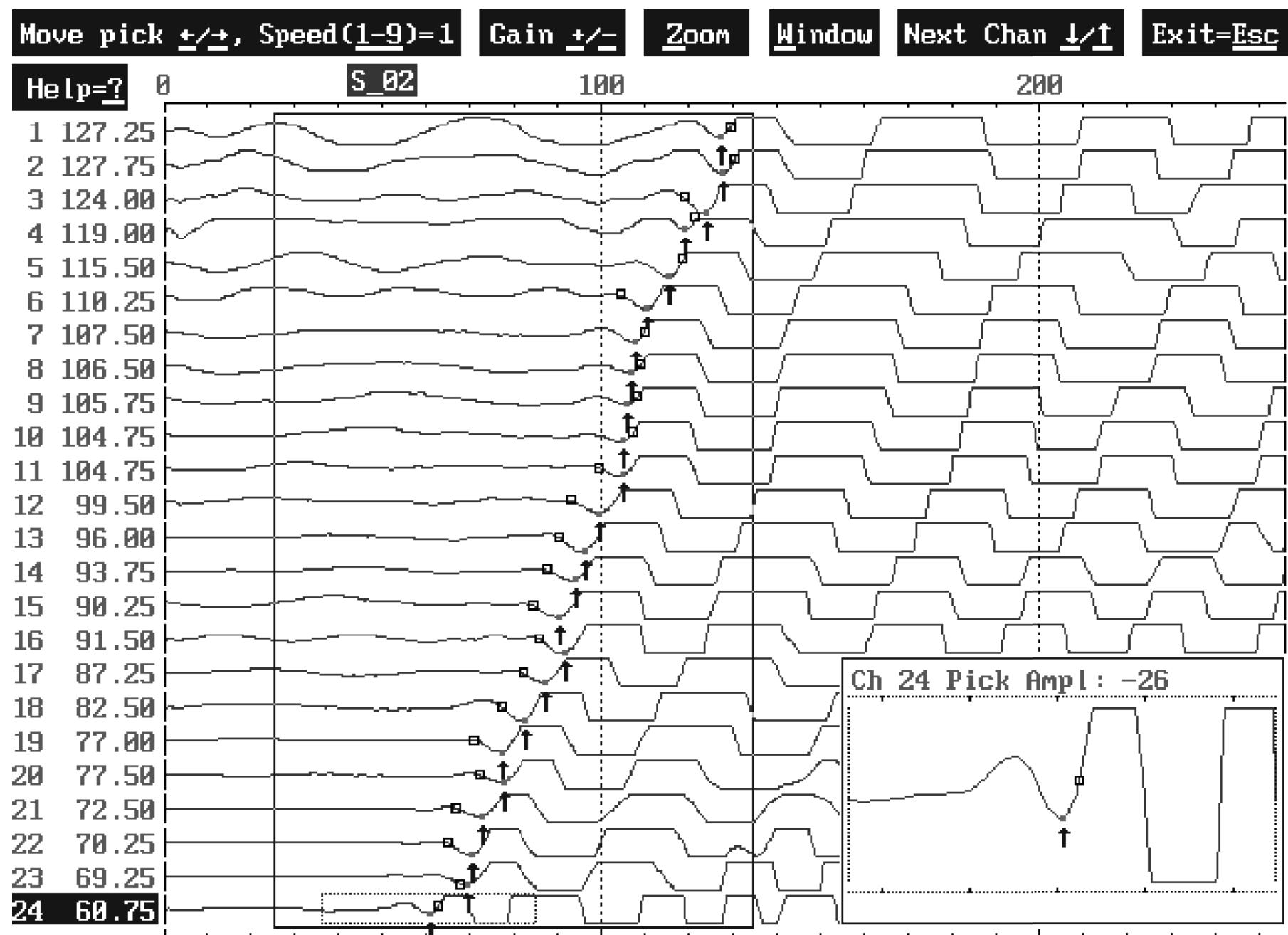
Spread A



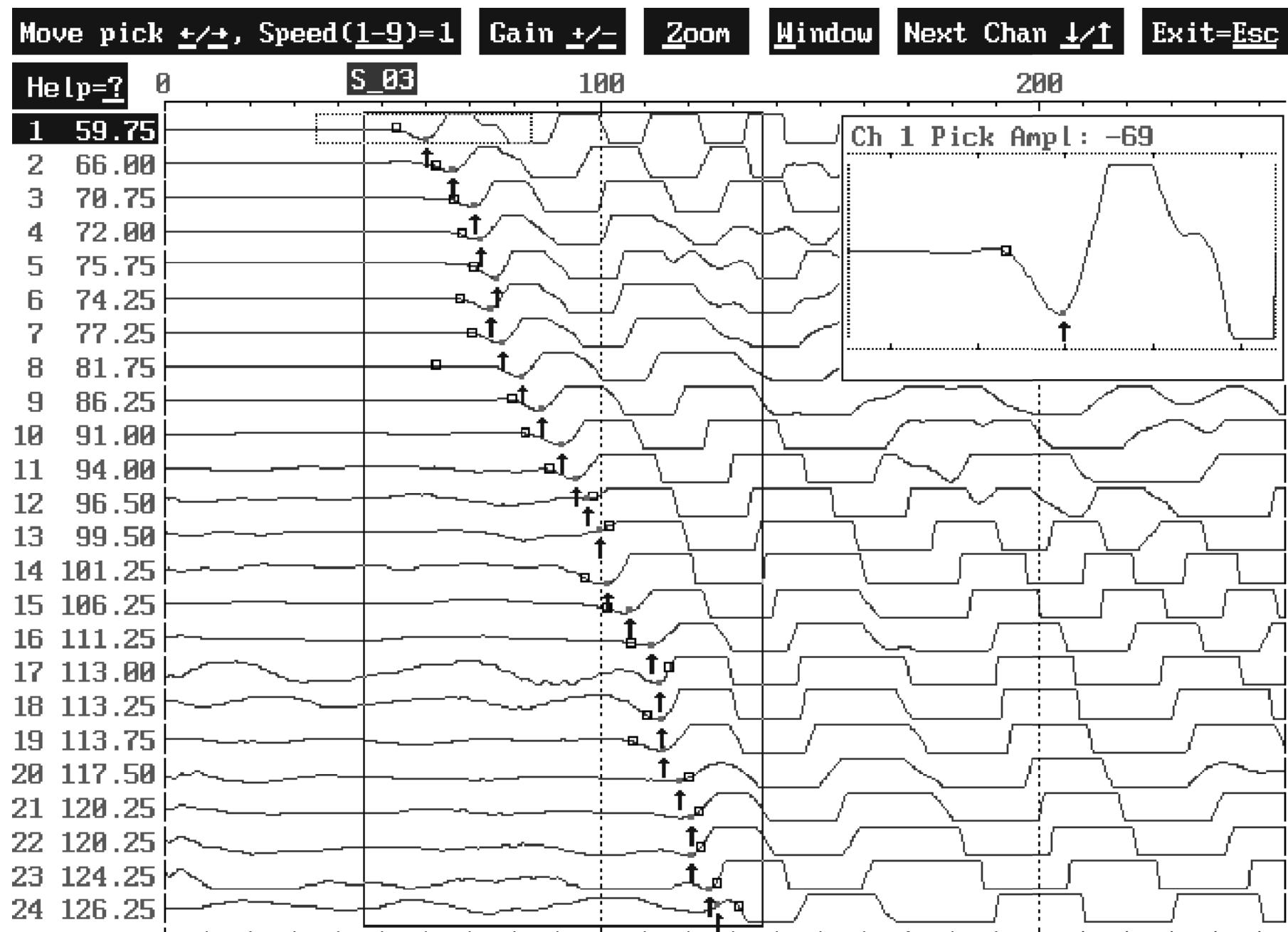
Whitman S-wave



Whitman S-wave

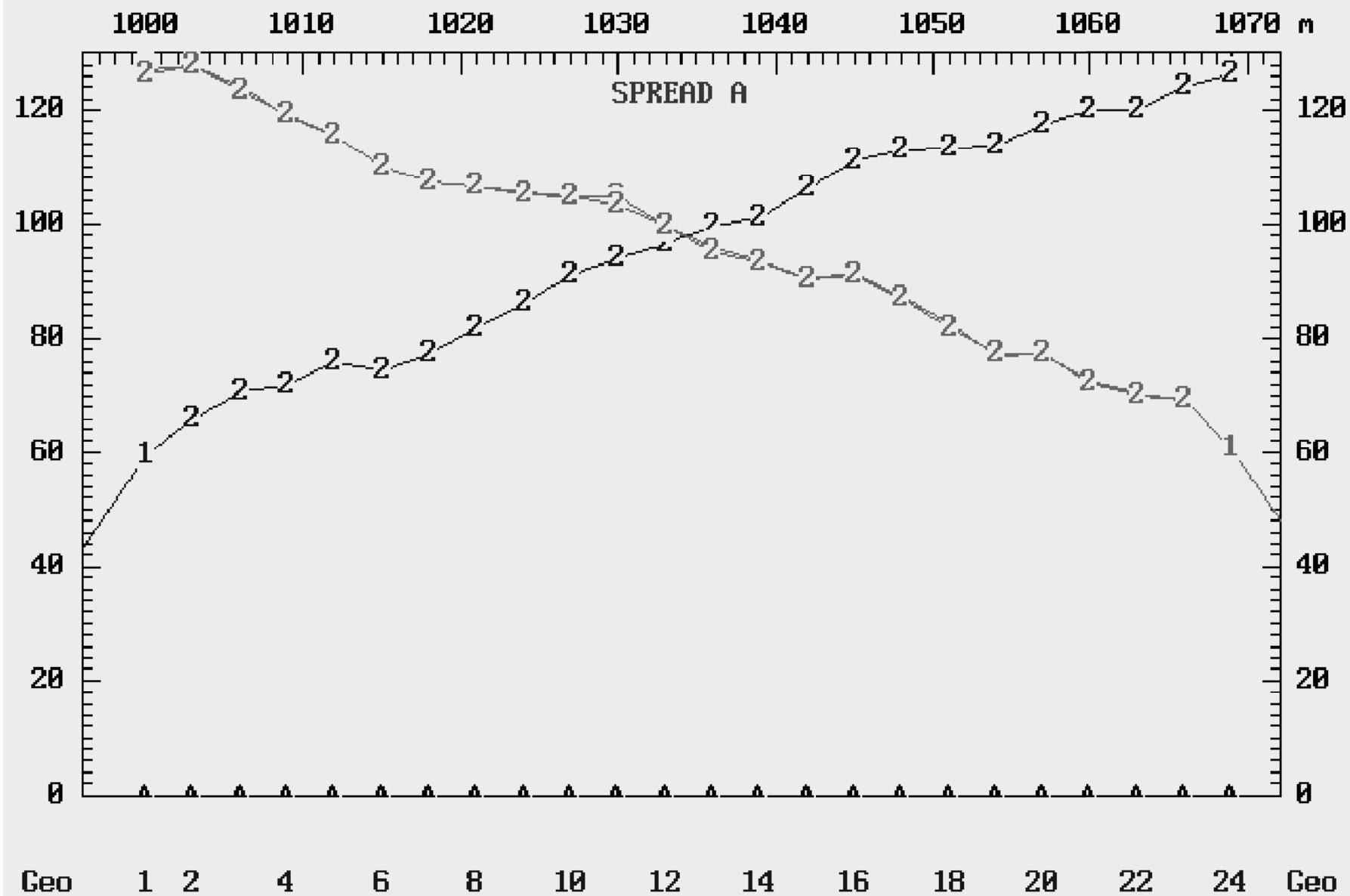


Whitman S-wave



Whitman S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

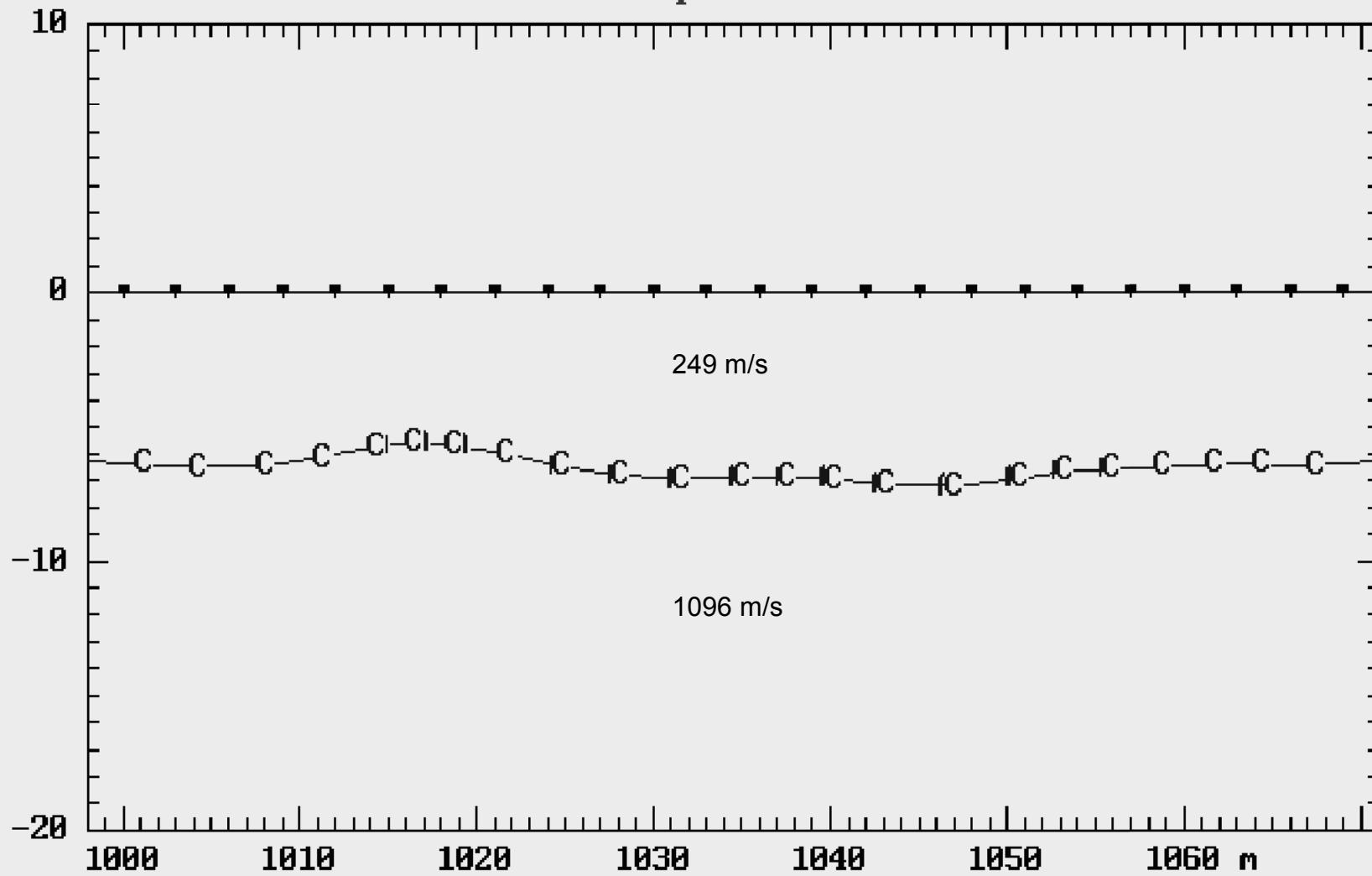


Whitman S-wave

Press Esc to EXIT

WHITSWAV.SIP: Whitman S-Waves

Spread A

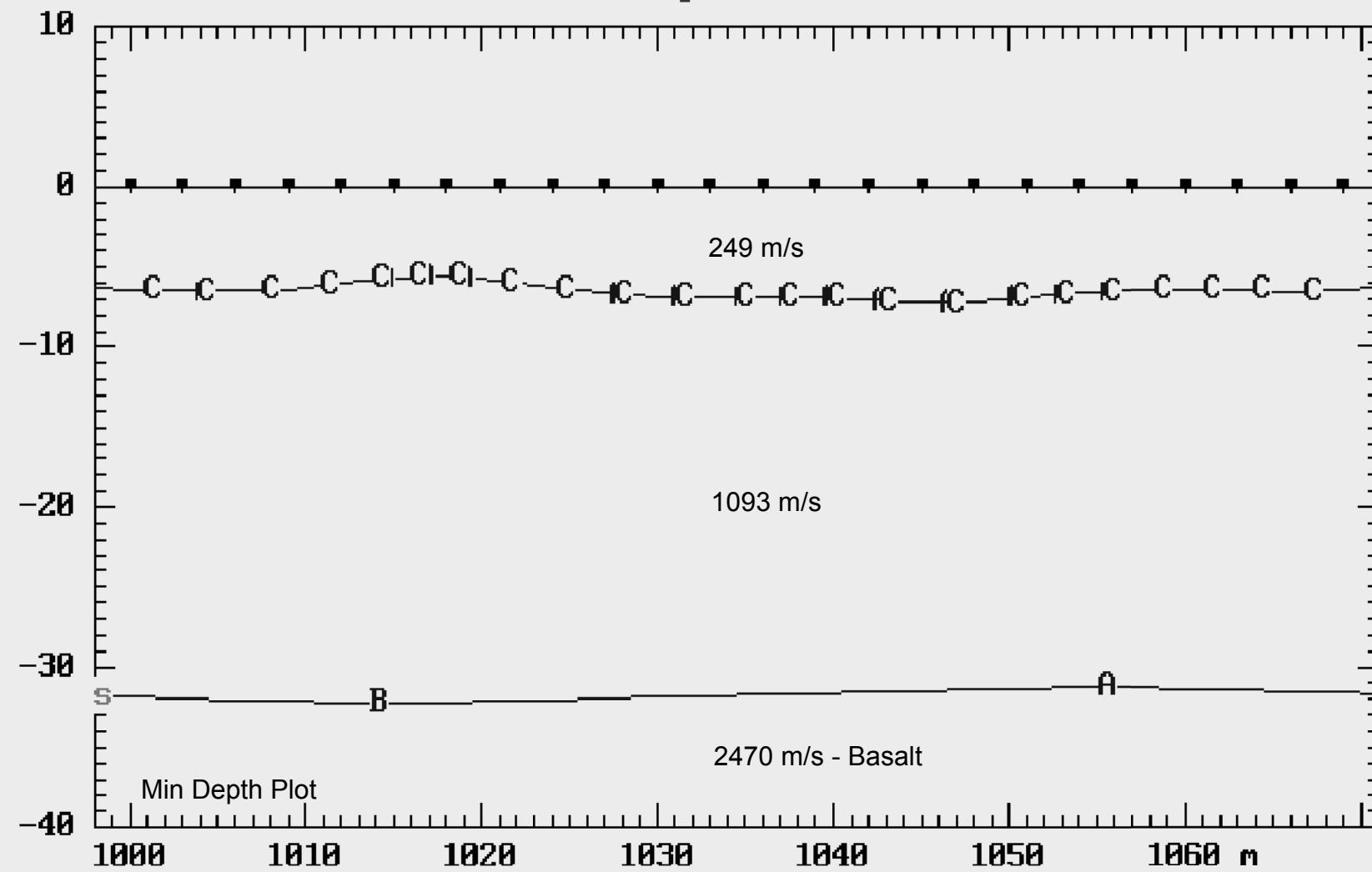


Whitman S-wave

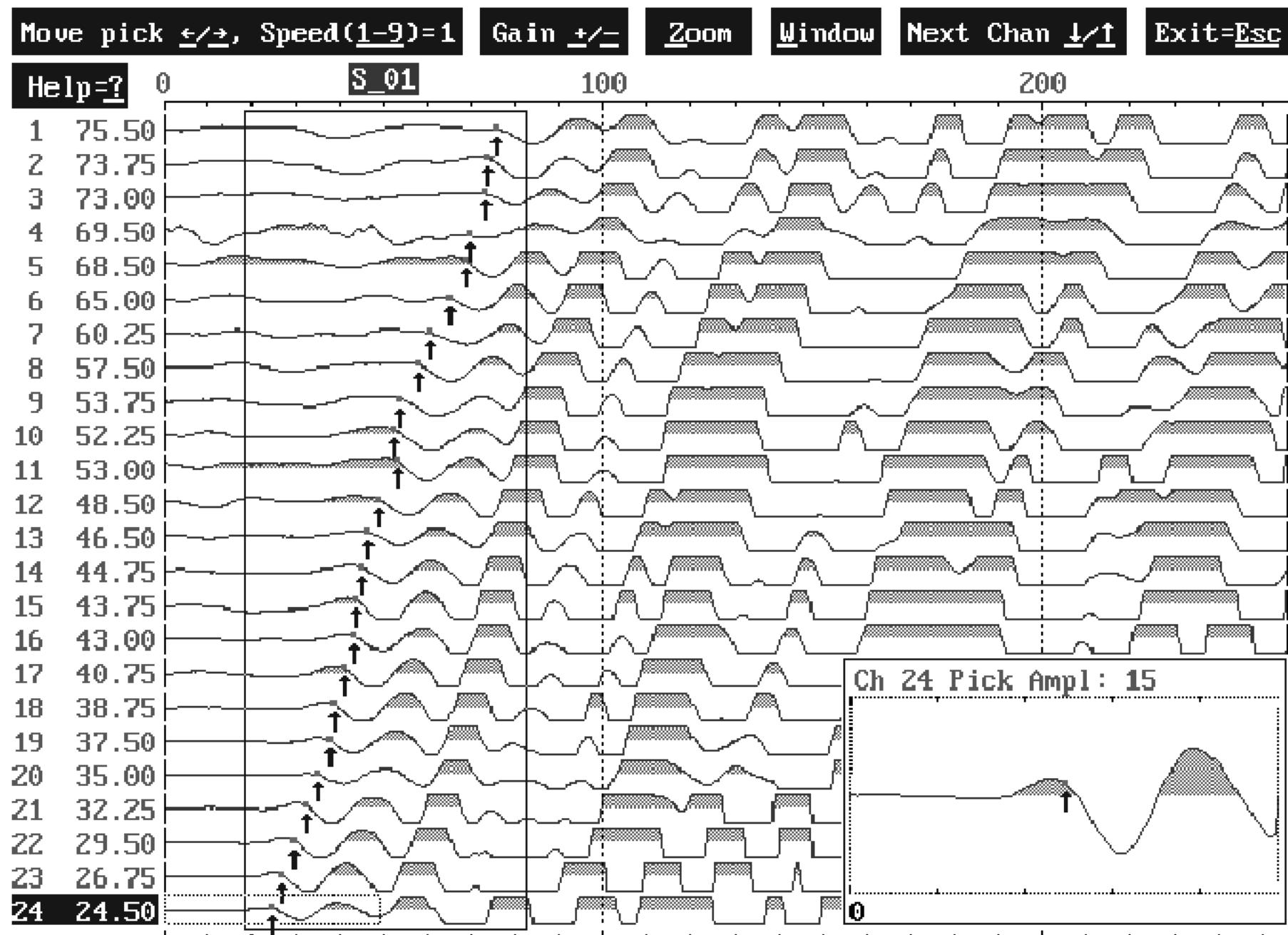
Press Esc to EXIT

WHITSMIN.SIP: Whitman Minimum Depth Plot

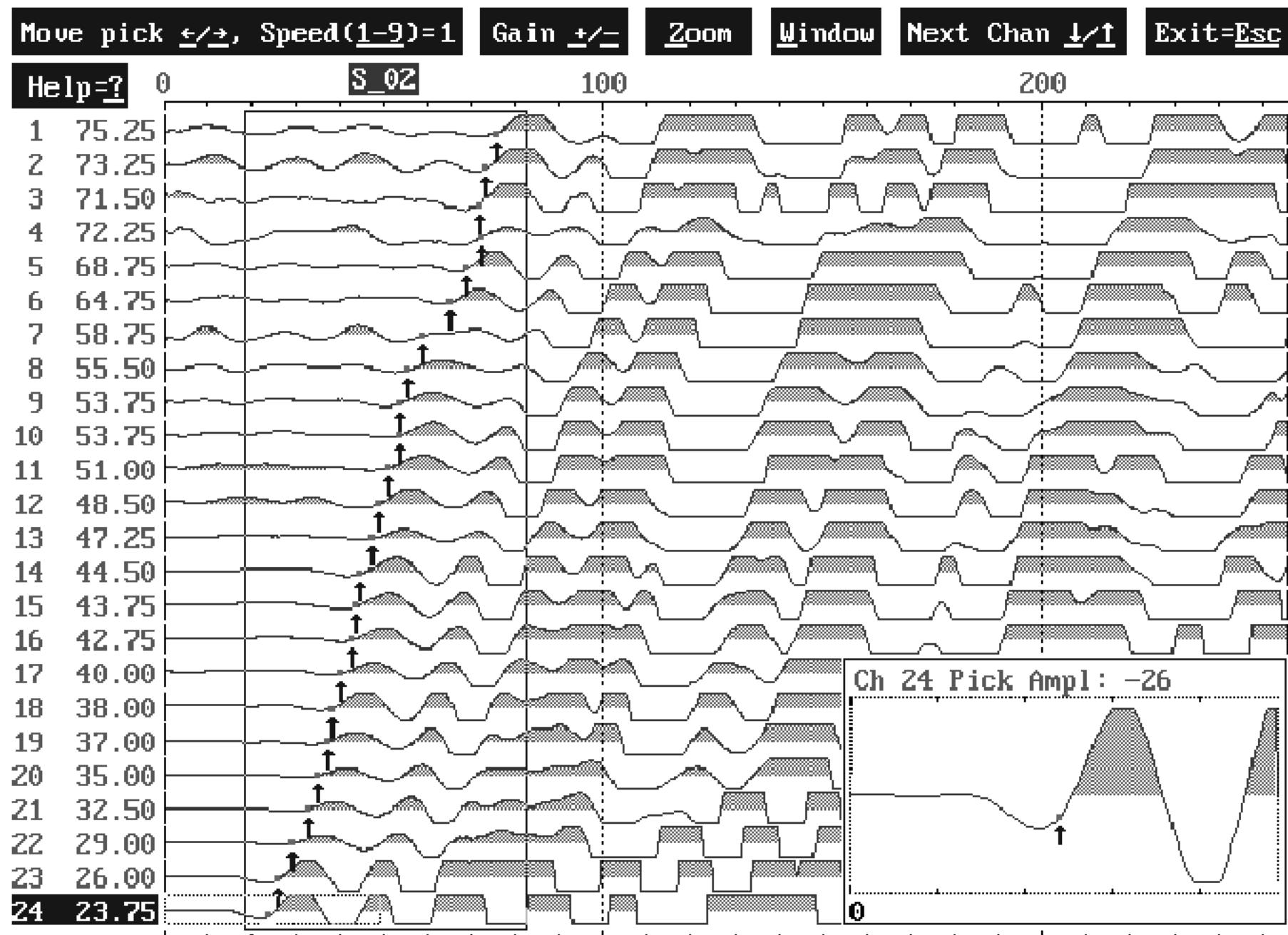
Spread A



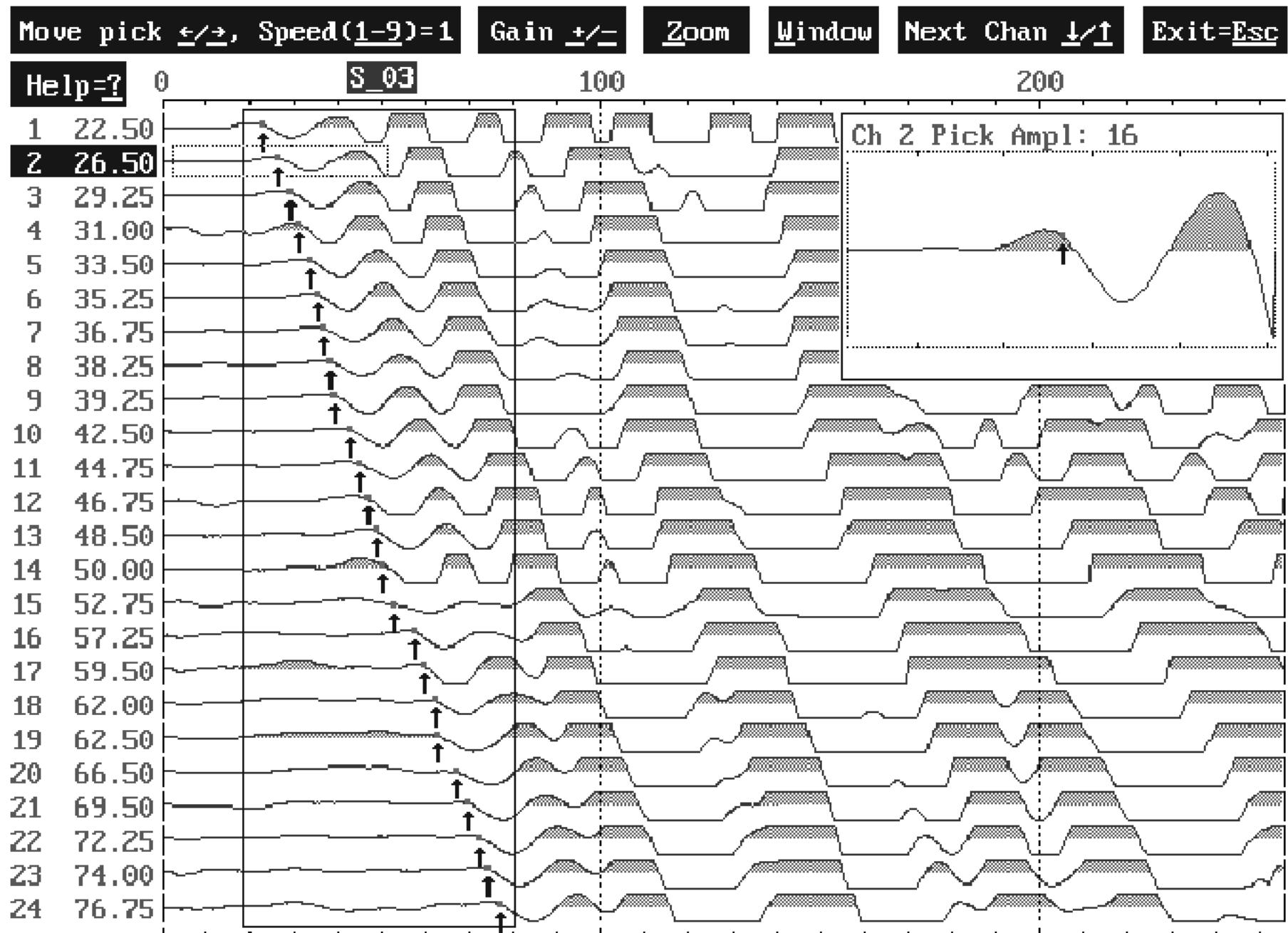
Whitney Elementary S-wave



Whitney Elementary S-wave

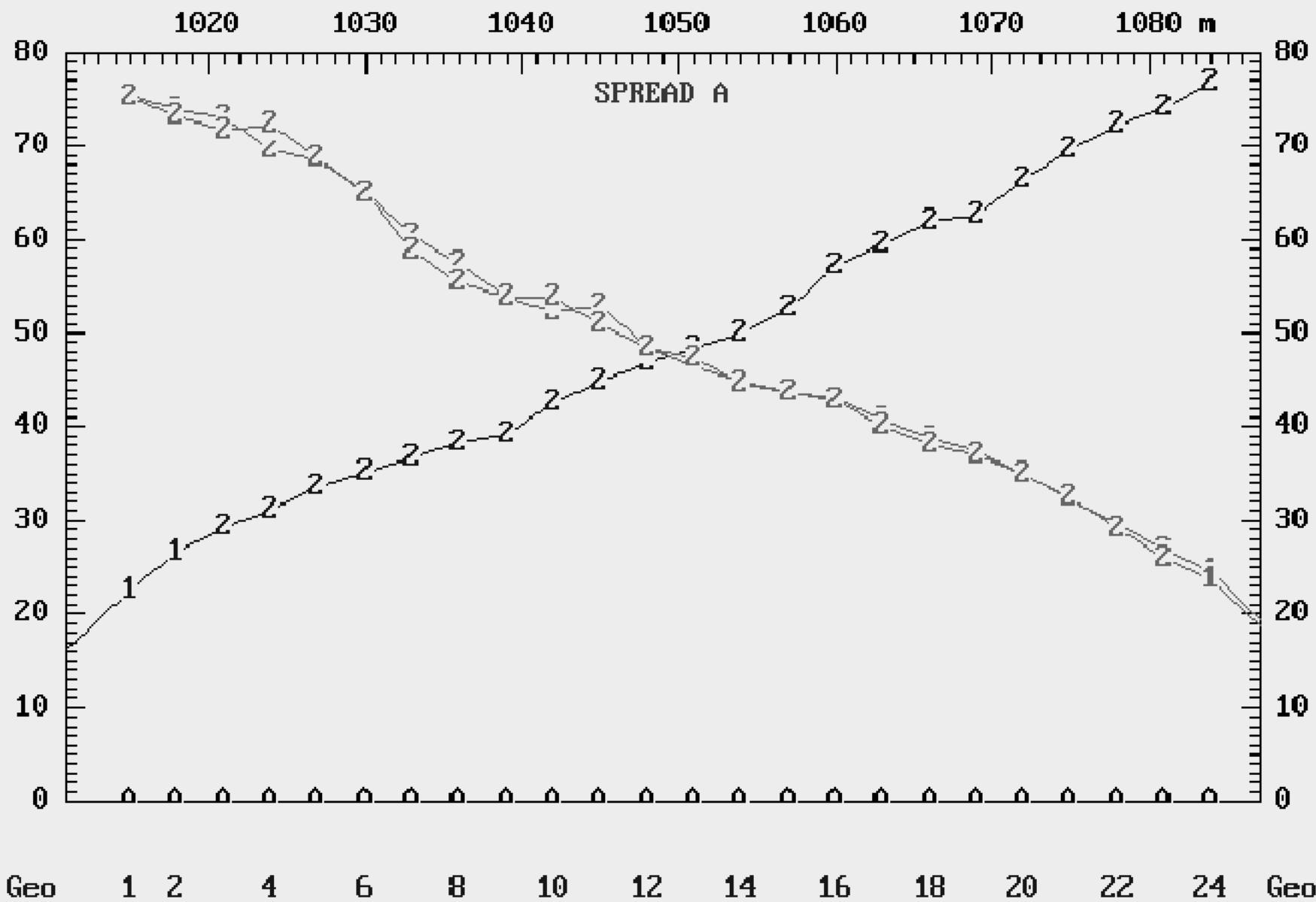


Whitney Elementary S-wave



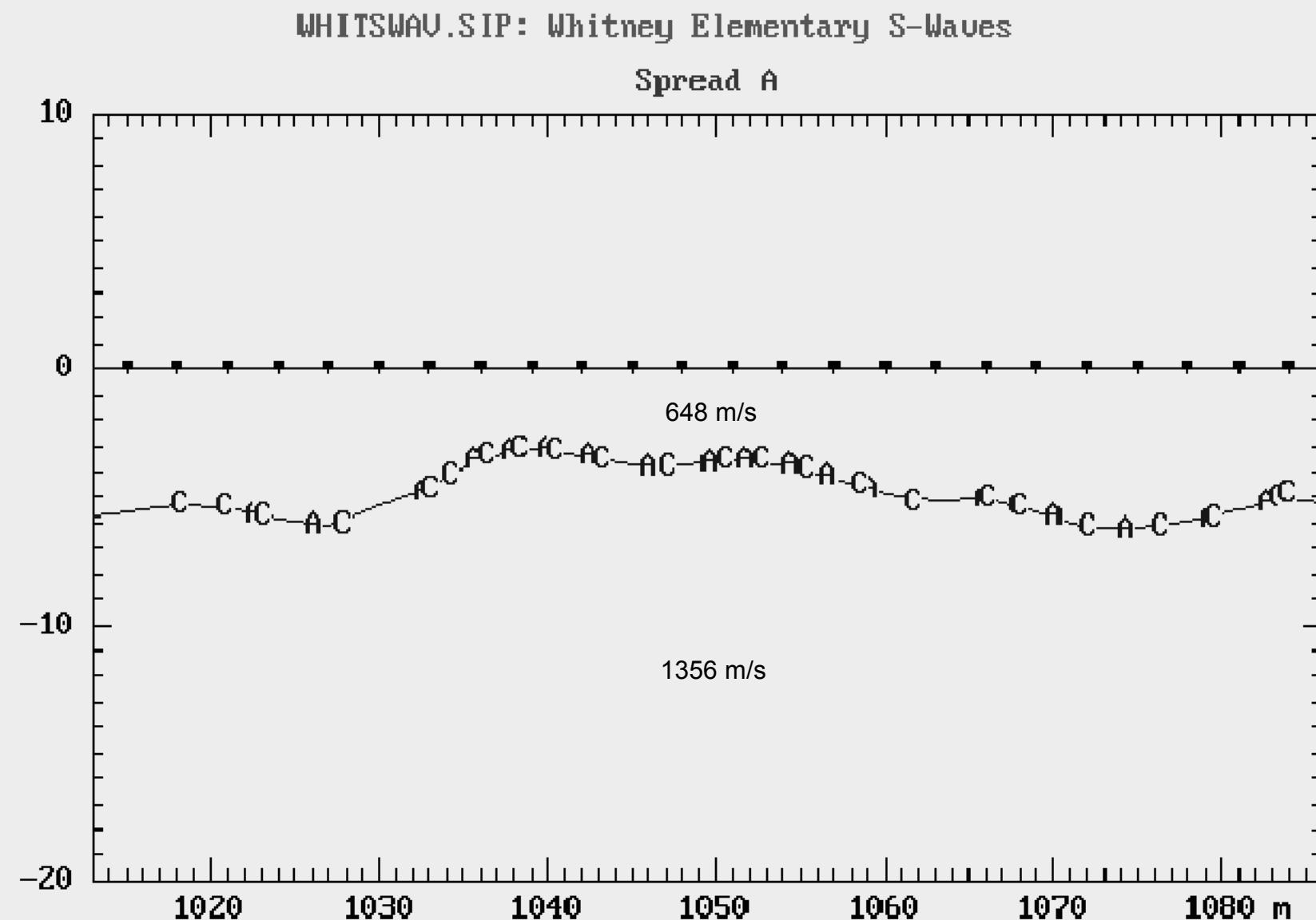
Whitney Elementary S-wave

Use arrow keys, PgUp, PgDn, Home & End to select point; type in Layer Number.
Press Esc when finished.



Whitney Elementary S-wave

Press Esc to EXIT

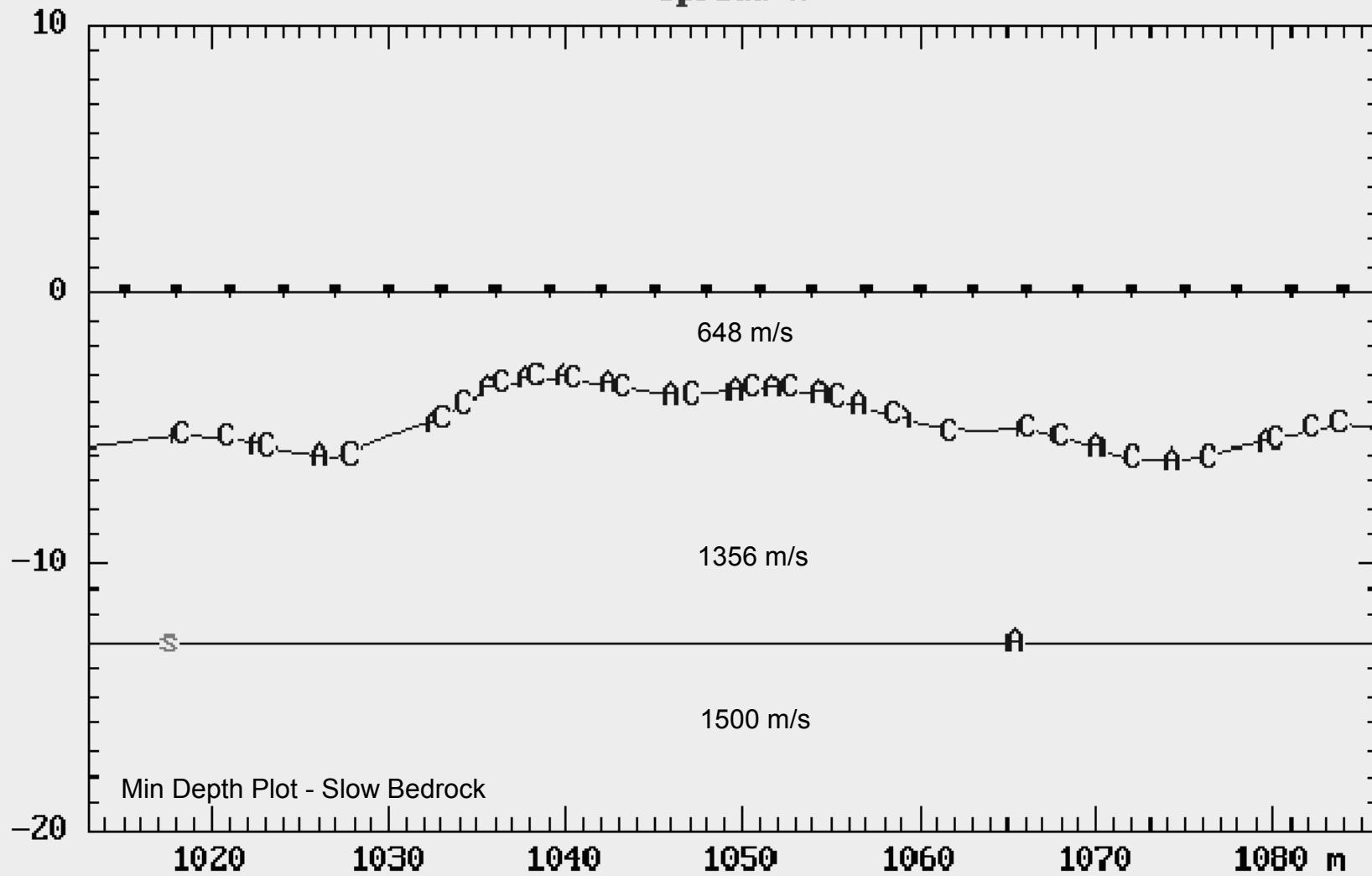


Whitney Elementary S-wave

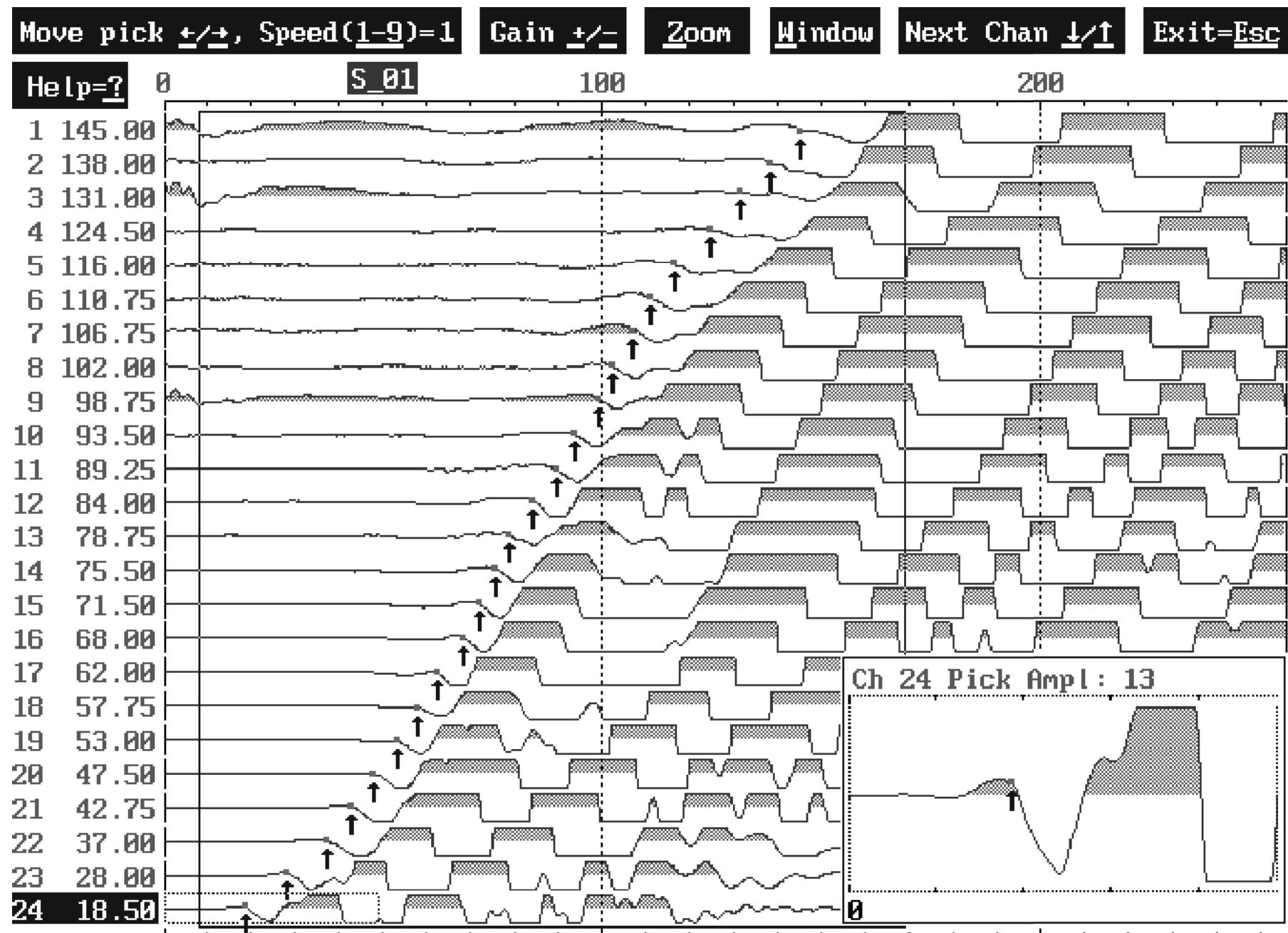
Press Esc to EXIT

WHITSMIN.SIP: Whitney Elementary S-Waves Minimum Depth Plot

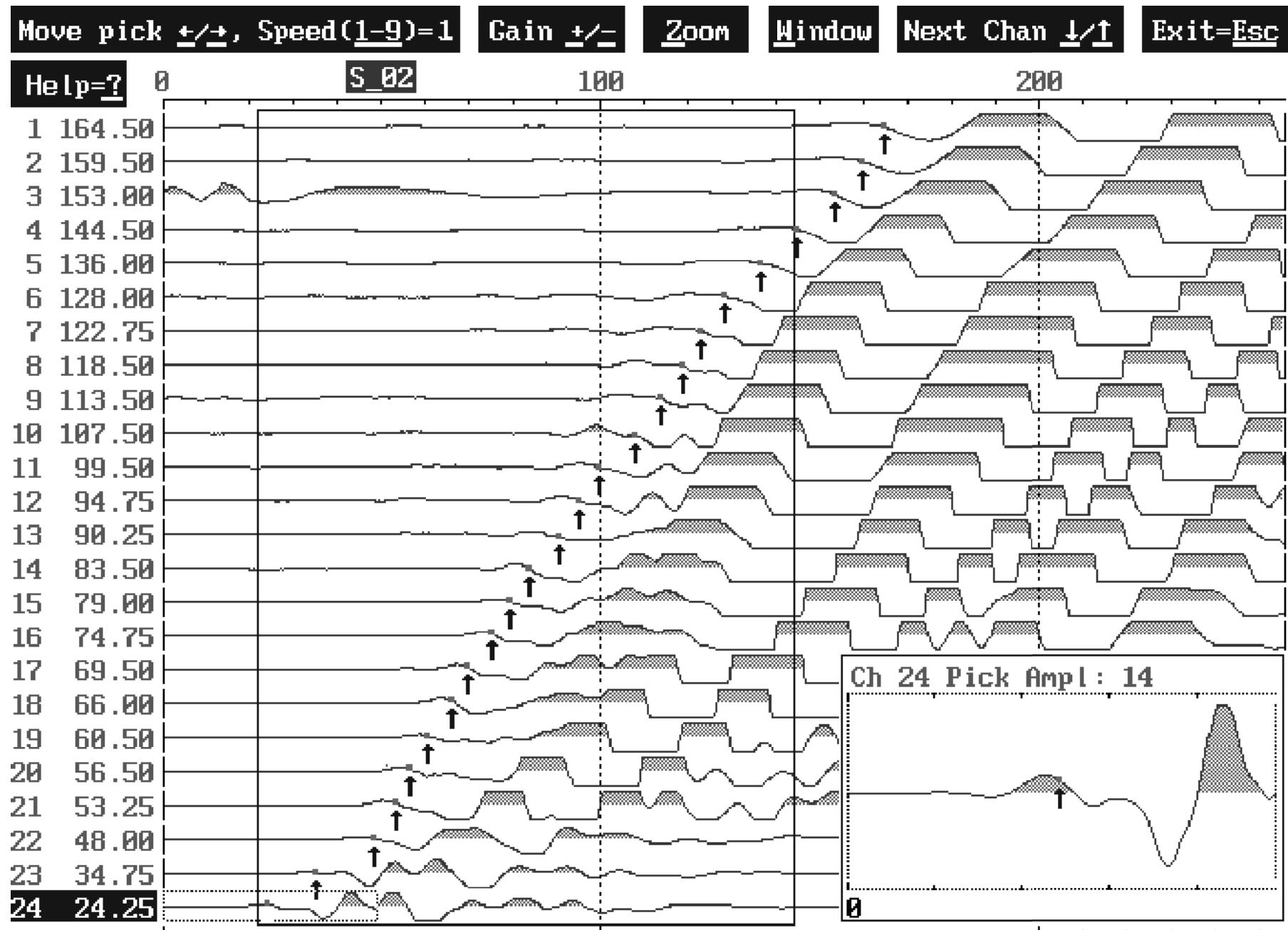
Spread A



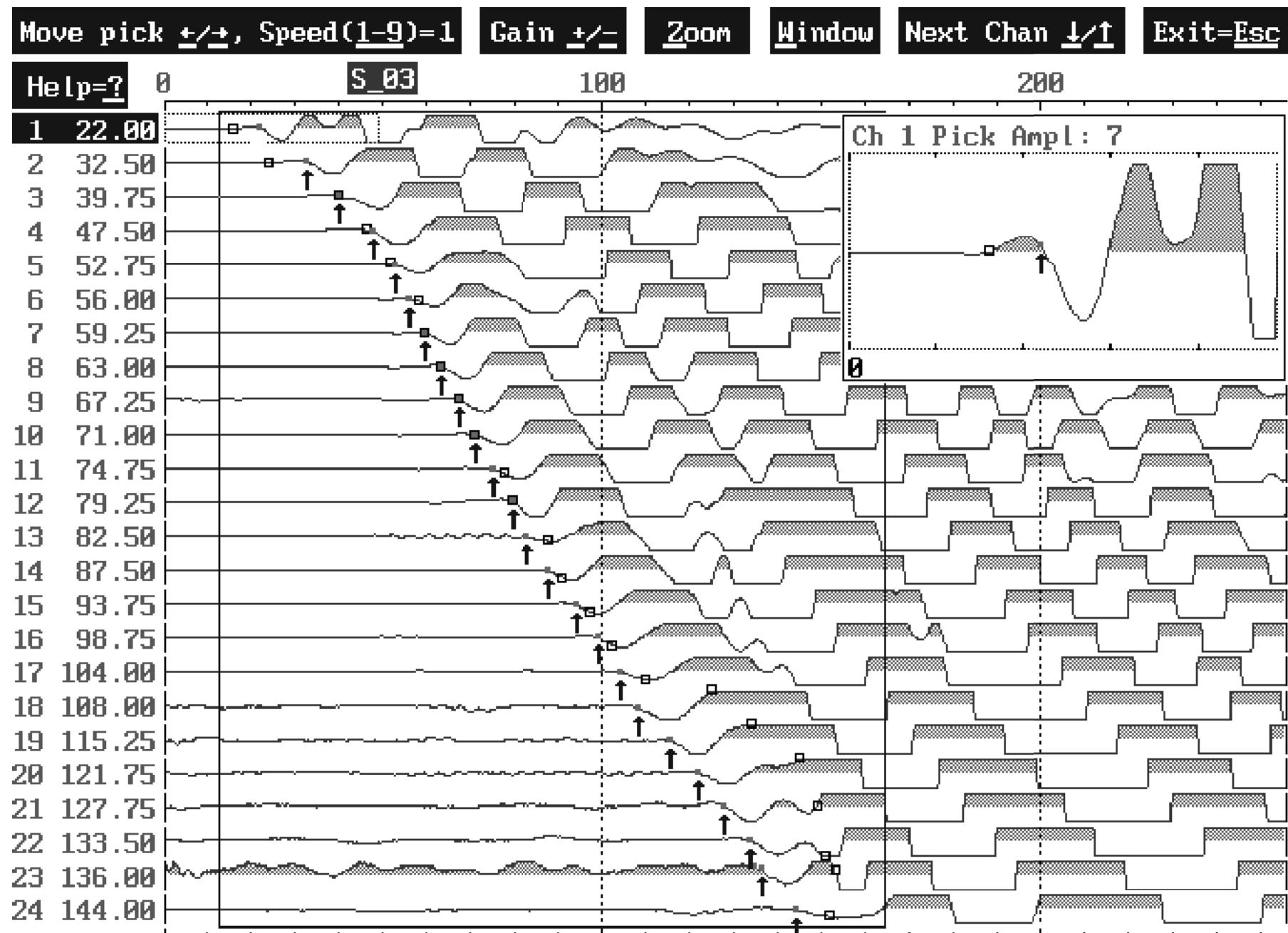
Zion Lutheran School S-wave



Zion Lutheran School S-wave

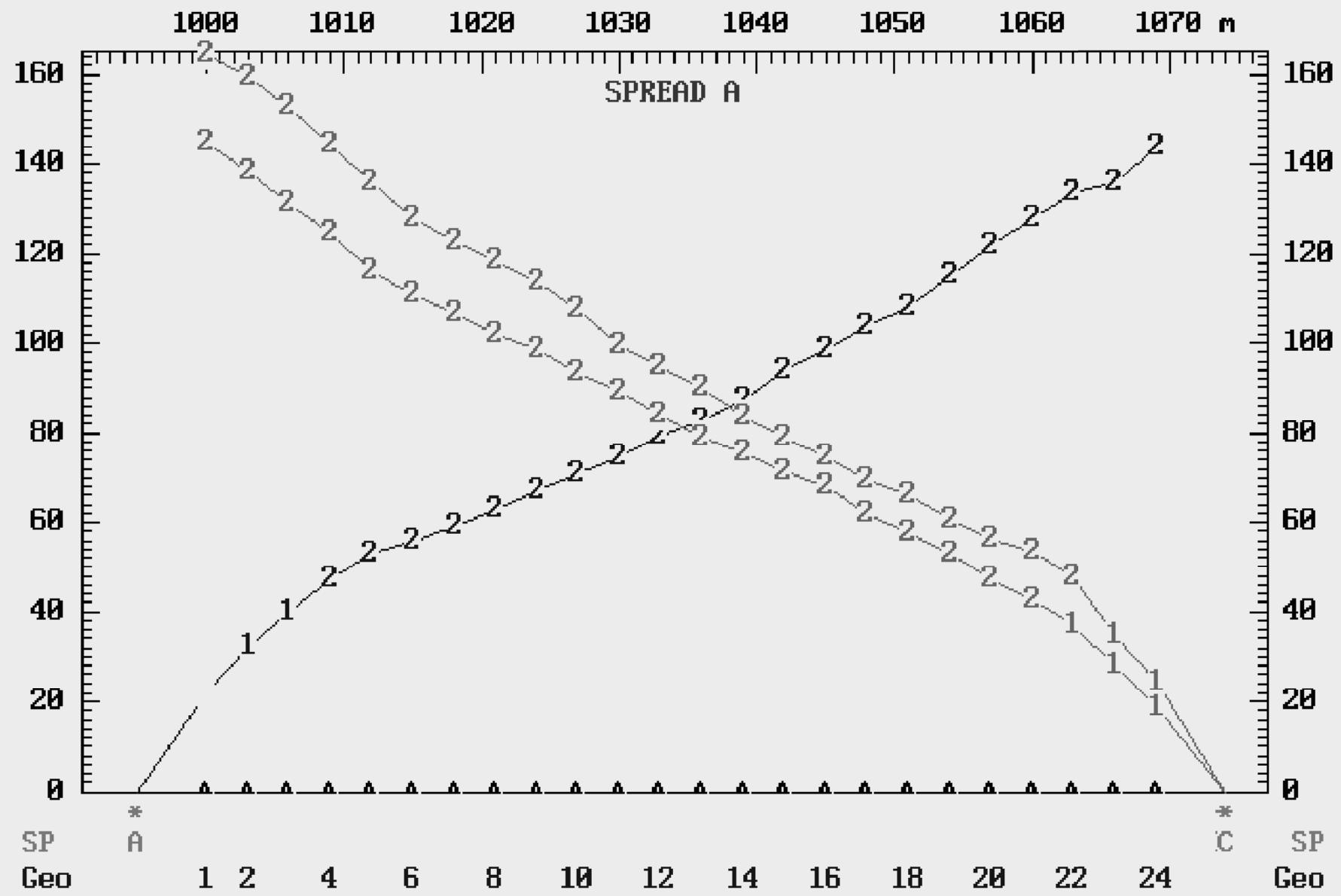


Zion Lutheran School S-wave



Zion Lutheran School S-wave

Use arrow keys to select point, type in Layer Number. Press Esc for MAIN MENU.
Use PgUp/PgDn to move to top/bottom, Home/End to move to left/right end.

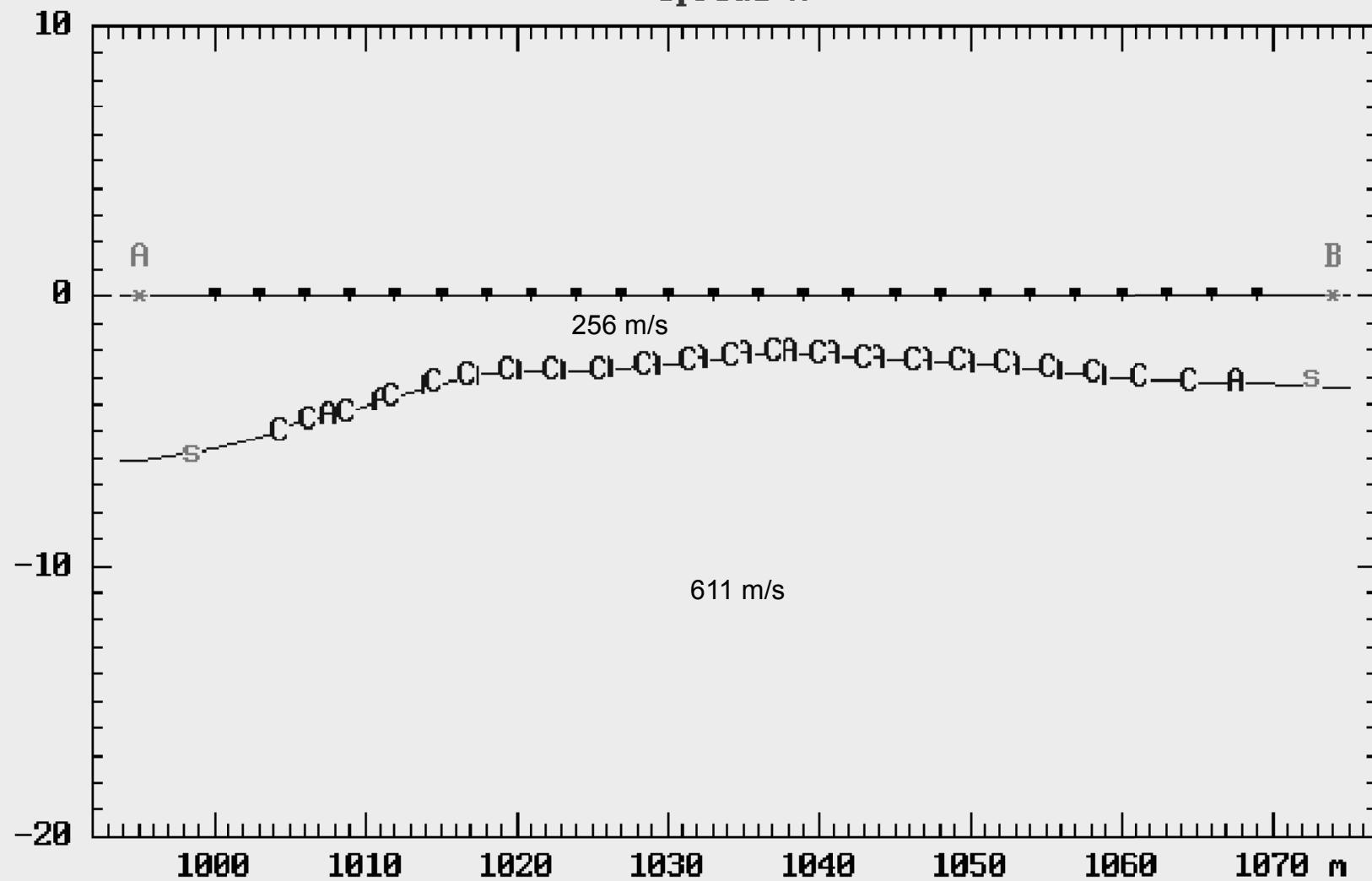


Zion Lutheran School S-wave

Press Esc to EXIT

ZIONSWAV.SIP: Zion S-Waves

Spread A

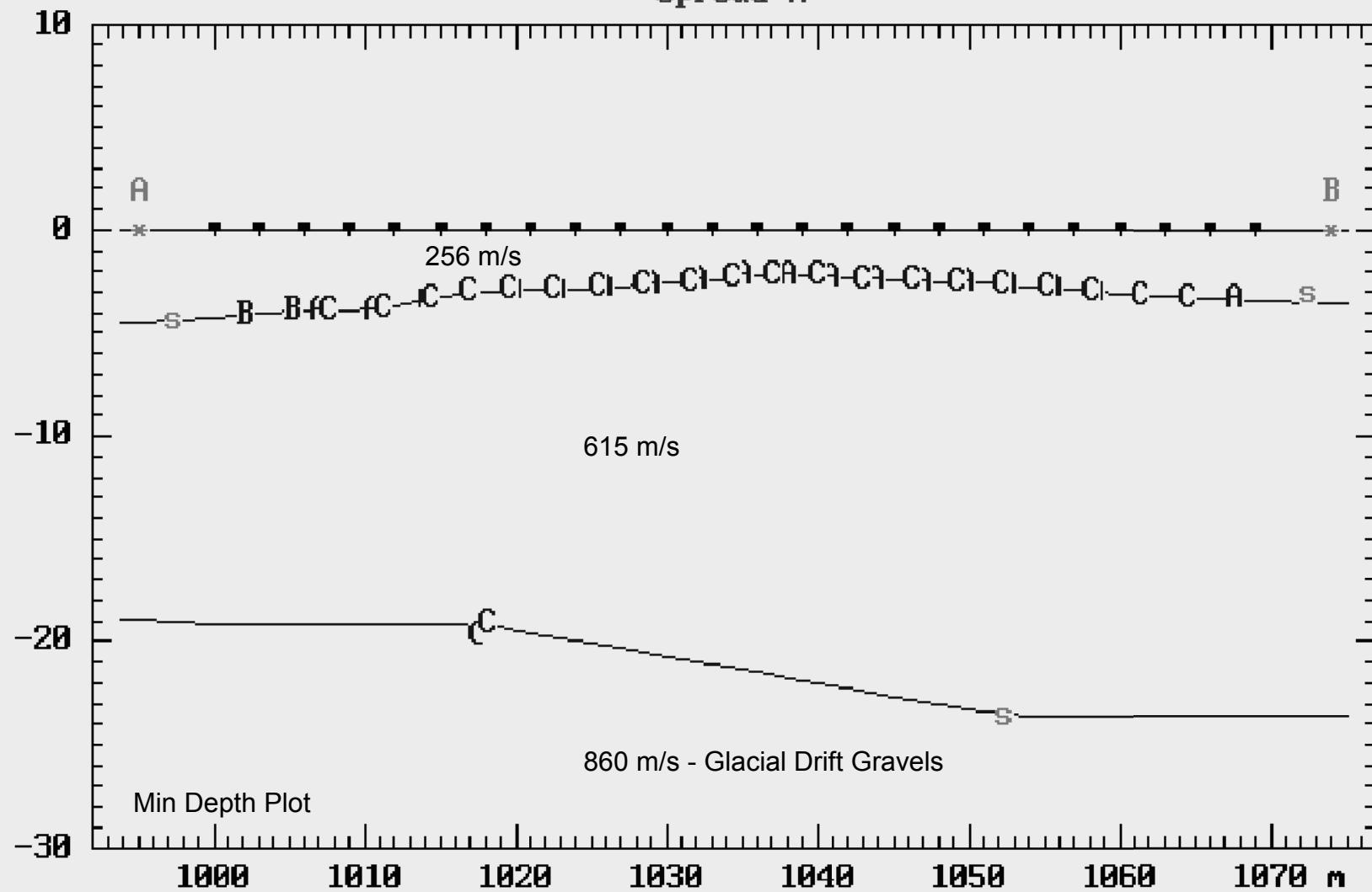


Zion Lutheran School S-wave

Press Esc to EXIT

ZIONSMIN.SIP: Zion Minimum Depth Plot

Spread A



Appendix D

Table: UnitDescription

Record Count: 48

Field Name	Type	Description
GeoUnit	Text	Geologic Unit Code
Description	Text	Description of Geologic Unit
Count	Number	Number of measurements per unit

Table: Locations

Record Count: 243

Field Name	Type	Description
Site_ID	Number	Unique site number used to link the Location and Velocity tables together
Source	Text	Original Source for Data
Site_Name	Text	Site Name (as reported in original data source if possible)
Survey_Date	Date/Time	Date of the survey, if reported
Depth_of_Survey_m	Number	Depth of survey (m) if reported
Depth_of_Survey_ft	Number	Depth of survey (ft) if reported
Number_of_Measurements	Number	Number of velocity measurements associated with this site
x	Number	Easting - NAD 1983 HARN StatePlane Washington South FIPS 4602 (Feet)
y	Number	Northing - NAD 1983 HARN StatePlane Washington South FIPS 4602 (Feet)

Table: Velocity

Record Count: 712

Field Name	Type	Description
Site_ID	Number	Unique site number used to link the Location and Velocity tables together
DepthStart_m	Number	Top depth of unit (m)
DepthEnd_m	Number	Bottom depth of unit (m)
UnitThickness_m	Number	Unit Thickness (m)
DepthStart_ft	Number	Top depth of unit (ft)
DepthEnd_ft	Number	Bottom depth of unit (ft)
UnitThickness_ft	Number	Unit Thickness (ft)
Vs-ms	Number	Shear wave velocity (m/s)
Vs-ft/s	Number	Shear wave velocity (ft/s)
GeoUnit	Text	Geologic Unit Code