Appendix 2

To: **CRIPPLE CREEK & VICTOR GOLD MINING COMPANY**
P. O. Box 191
2755 State Highway 67
Victor, Colorado 80112

Date: **June 13, 1997**

Subject: **GROUND MOTION ATTENUATION STUDIES**
AJAX AND RIDGE ROAD TEST SITES
May 28 & 29, 1997

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CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY
GROUND VIBRATION ATTENUATION STUDIES
AJAX AND RIDGE ROAD MINING AREAS

May 28 & 29, 1997

Executive Summary

Matheson Mining Consultants (MMC) monitored eight test blasts at each of the two test sites, Ajax and Ridge Road, with six seismographs. All data and analyses are attached to this report. The Ajax test site showed the lesser ground motion attenuation of the two sites.

The recommended scaled distance to not exceed the regulatory limit of 0.50 inches per second peak particle velocity for the Ajax site is 47.7. The Ajax analysis is comprised of forty-four data points and has a correlation coefficient of 0.889.

The Ridge Road test site has a recommended scaled distance of 34.0 to not exceed the 0.50 inches per second regulatory limit. These recommendations are based on a forty data points with a correlation coefficient of 0.921.

Scaled distance is a relationship used in explosives engineering to interrelate blasts with different maximum charge weights per delay.

$$SD = \frac{D}{\sqrt{W}}$$

Where: SD is Scaled Distance
D is distance in feet
W is maximum charge weight per 8 millisecond delay period.

Below are tables based on the regulatory limit of 0.50 inches per second.

Ajax Test Site (SD = 47.6)	
Distance (FT)	Charge Weight/Delay (Lbs/Delay)
500	110
750	248
1000	441
1250	689
1500	993

Ridge Road (SD = 34.0)	
Distance (FT)	Charge Weight/Delay (Lbs/Delay)
500	216
750	487
1000	865
1250	1352
1500	1946

Introduction

Matheson Mining Consultants was retained by Cripple Creek and Victor Gold Mining Company to perform a ground motion attenuation study of ground vibrations created by blasting at the Ajax and Ridge Road test areas. Six blasting seismographs monitored each blast at the Ajax test site and five seismographs monitored the Ridge Road test blasts. Seismographs were positioned at varying distances from each test blast. The resulting data sets were analyzed and used to determine distance and charge weight relationships required for ground vibration regulatory compliance. The distance studies predict statistically safe distances for any given charge weight per delay period and peak particle velocity.

The procedure for the analyses performed on the test blasts is outlined in "Blasting Guidance Manual", March 1987, published by United States Department of the Interior Office of Surface Mining Reclamation and Enforcement.

The tests performed at the two sites were designed to be conservative in nature. The intent of these studies was to maximize ground motion. Typically in mine production blasting, explosive energy is consumed by fragmentation and displacement of the rock mass. The confined test blasts minimized fragmentation and displacement while maximizing ground motion.

Instrumentation

Vibration records were collected with two Blastmate III and three MiniMate Plus digital blasting seismographs. These seismographs measure three orthogonal planes of ground motion, transverse, longitudinal and vertical, and one channel of air overpressure. The frequency response is 1.5 to 250 Hertz. All instruments have a valid annual calibration. Copies of the calibration certificates are attached as Appendix I. Each vibration recording is printed on a single sheet of paper with: Date/Time, Trigger Source, Range, Record Time, instrument Serial Number, Battery Level, Calibration date and File Name in the title block. The instruments are seismically triggered and record each channel digitally at 1024 samples per second.

Fourier transforms of each of the three waveform components are calculated to determine frequency response. Frequency versus particle velocity plots of each wave trace are plotted on each record. The United States Bureau of Mines (USBM) and the Office of Surface Mining, Reclamation and Enforcement (OSMRE) regulatory criteria are plotted on each vibration record.

Attached as Appendix II is an excerpt from the Blastmate III User's Manual describing the specifications and function of the instrumentation and record processing.

Procedure

Eight 6-7/8 inch diameter drill holes were drilled to a depth of 30 feet on 25 foot centers at each of the two test areas, Ajax and Ridge Road. Attached as Appendix III is a map of the test areas. Each drill hole was loaded with 100 pounds of ANFO, primed with one cast booster, and detonated individually. The charge weight was selected to maximize the ground motion created by the explosive detonation while eliminating flyrock and permanent ground displacement. Seismographs were located at varying distances between the blast site and the closest non-mine owned residence. Distances, ground motion amplitudes, statistical analysis, particle velocity versus distance tables, charge weight versus distance tables and the complete set of vibration records for the Ajax test site are attached as Appendix IV. Distances, ground motion amplitudes, statistical analysis, particle velocity versus distance tables, charge weight versus distance tables and the complete set of vibration records for the Ridge Road test site are attached as Appendix V.

Ground vibrations were measured at distances varying from 100 to 1800 feet from the test blasts. Scaled distances varied from 10 to 180. Least squares regression analysis was performed on each data set to determine the +95% confidence intervals as recommended by OSM and USBM regulatory guidelines. The statistical validity of the data is evaluated using the correlation coefficients calculated in the analyses. The equations for the +95% confidence interval are then used to calculate maximum charge weight per delay interval for any given particle velocity and distance. Recommendations are made based on regulatory criteria, accepted citizen tolerance levels and historic vibration monitoring from the existing mine production.

Results

Two separate least squares regression analyses were performed. Appendix IV contains the regression analysis, tables and seismograph recordings for the Ajax test site. Appendix V contains the least squares regression analysis, tables and seismograph recordings for the Ridge Road test site.

Individual seismograph records are attached in Appendices IV and V for Ajax and Ridge Road test sites respectively. Two separate least squares regression analyses were performed. The first is the Ajax and is comprised of forty-four data points; the second is the Ridge Road and is comprised of forty data points.

The +95% confidence equations and correlation coefficients calculated with the collected data are:

Ajax: $PPV = 261.0 * (SD)^{-1.62}$ $r^2 = 0.889$

Ridge Road: $PPV = 286.0 * (SD)^{-1.80}$ $r^2 = 0.921$

Given a not to exceed peak particle velocity and a known distance a maximum charge weight per delay may be calculated using the above equations. Tables are attached to the regression analyses in Appendices IV and V using the above equations to calculate maximum allowable charge weight per delay at given distances given a not to exceed peak particle velocity. Additional tables show peak particle velocities at given distances given a charge weight.

The equations are in the expected range for this site. Both data sets show excellent correlation coefficients. A high degree of reliability may be placed on these results.

Conclusions

Colorado Mined Land Reclamation imposes a 0.50 inches per second peak particle velocity limit on ground motion created by Cripple Creek and Victor Gold Mining Company blasting operations. The Ajax analysis recommends a scaled distance of 47.6 in order to not exceed 0.50 inches per second. The Ridge Road analysis recommends a scaled distance of 34.0 in order to not exceed 0.50 inches per second. Below is a table of particle velocities and their corresponding scaled distances.

Peak Particle Velocity (inches per second)	Ajax Scaled Distance	Ridge Road Scaled Distance
0.10	128.5	79.3
0.20	83.8	54.2
0.30	65.2	43.3
0.40	54.6	37.0
0.50	47.6	34.0

Attached in Appendices IV and V are tables listing maximum particle velocities at varying distances for given charge weights. Corresponding tables list maximum allowable charge weights per delay at varying distances given a peak particle velocity.

Sincerely,

Colin Matheson
Mining Engineer

Photo Index

Photo # 1 - Ajax test blast site, hole 1 closest to the camera through hole 8 distant.

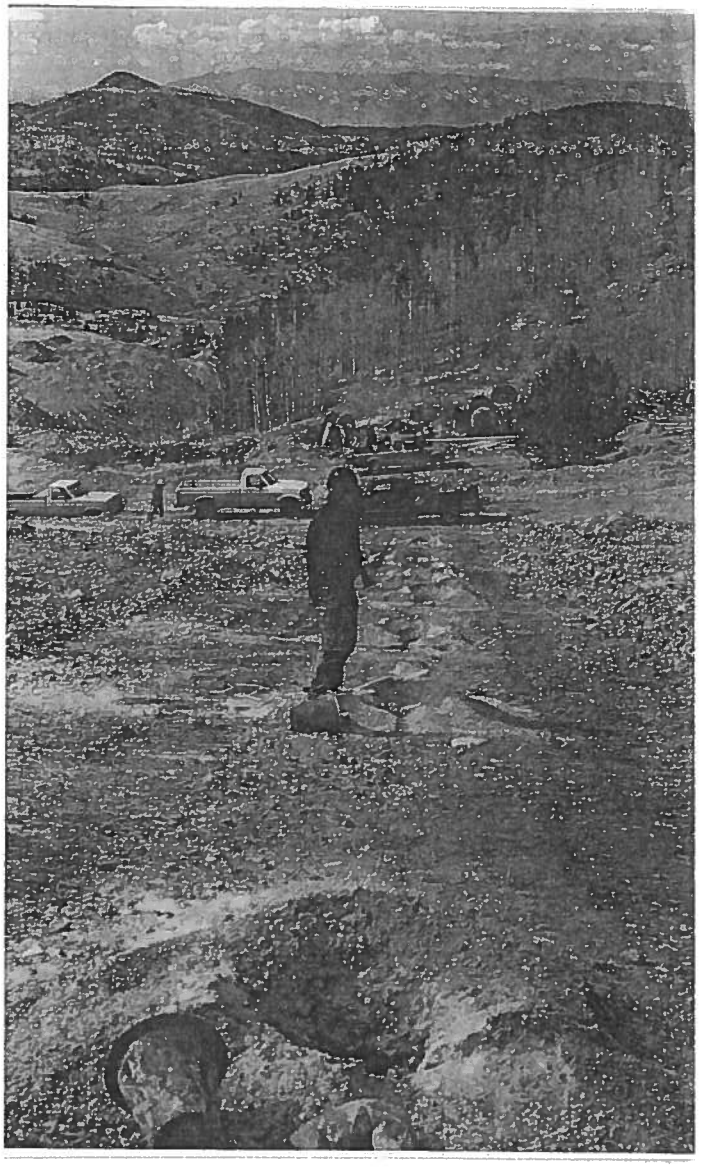
Photo # 2 - Blackwing measuring hole depth at Ajax test site.

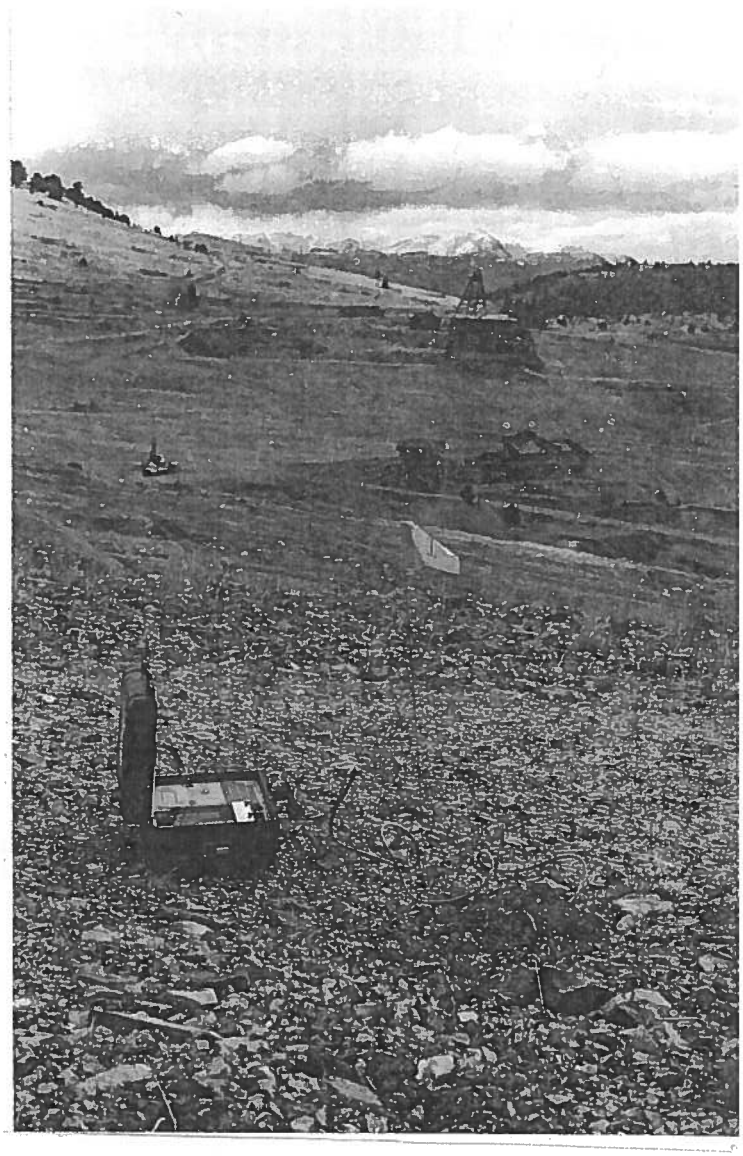
Photo # 3 - Loading holes at the Ridge Road test site.

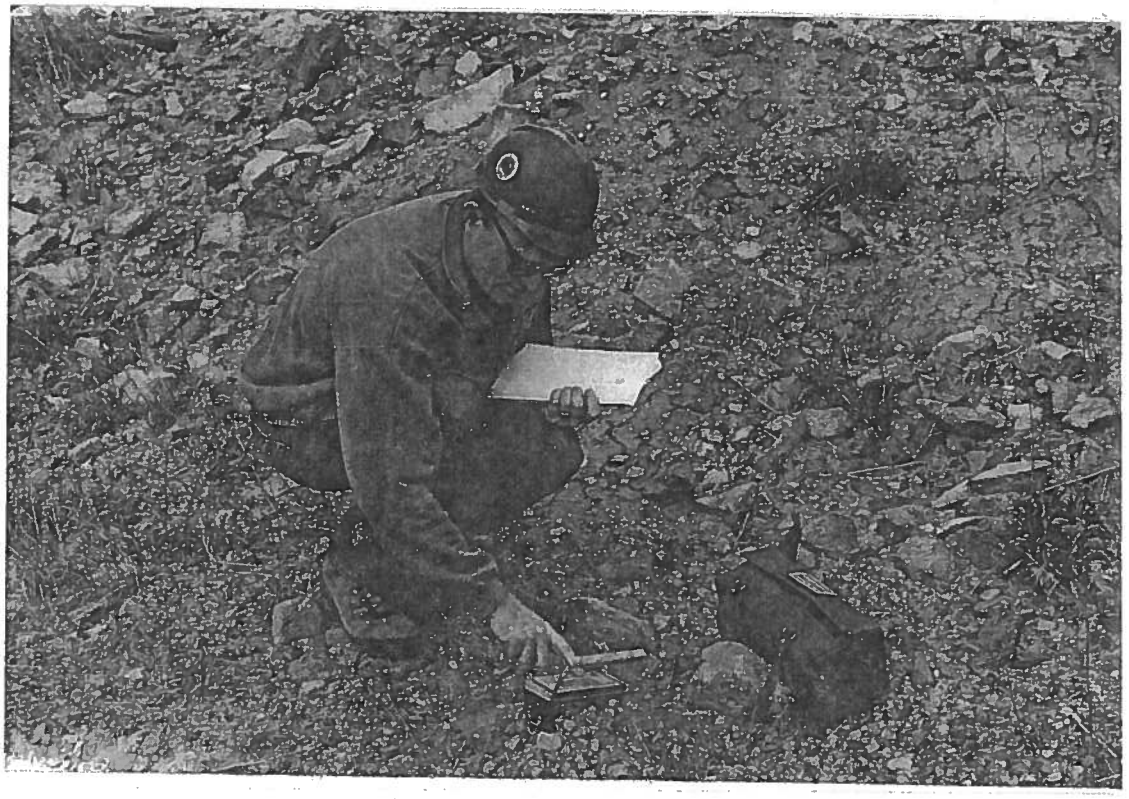
Photo # 4 - Ridge Road instrument array with Goldfield in the distance.

Photo # 5 - Example of instrument placement, Ridge Road array.

Photo # 6 - Collecting data off of seismograph, Ridge Road array.







Appendix I

Calibration Certificates

Calibration Certificate

Model: MiniMate Plus

Date: January 17, 1997

Unit S/N: BC5571

TEST REFERENCES*	Model	Serial No.
Bruel & Kjaer Accelerometer	4381	1160721
Bruel & Kjaer Charge Amplifier	2635	1423229
Hewlett Packard Spectrum Analyzer	3582A	1809A03540
Good Will Inst. Frequency Counter	GUC-2010G	5110825
Bruel & Kjaer HPMC	4221	745522
Bruel & Kjaer Mic Carrier System	2804	1904864
Bruel & Kjaer Microphone	4193	1863904

INSTANTEL INC. hereby certifies that this unit has been calibrated and that the results are consistent with the specifications published regarding this instrument. The SENSORCHECK™ feature of the unit is sufficiently reliable to indicate proper operation, although it is recommended that this unit be sent to INSTANTEL or an authorized service centre for regular calibration.

AUTHORIZED BY: W.B. Shaver

*References are traceable to NRC, NIST or equivalent

LITHO IN U.S.A.

GOES 462-1/2

Calibration Certificate

Model: MiniMate Plus

Date: January 17, 1997

Unit S/N: BC5570

TEST REFERENCES*	Model	Serial No.
Bruel & Kjaer Accelerometer	4381	1160721
Bruel & Kjaer Charge Amplifier	2635	1423229
Hewlett Packard Spectrum Analyzer	3582A	1809A03540
Good Will Inst. Frequency Counter	GUC-2010G	5110825
Bruel & Kjaer HPMC	4221	745522
Bruel & Kjaer Mic Carrier System	2804	1904864
Bruel & Kjaer Microphone	4193	1863904

INSTANTEL INC. hereby certifies that this unit has been calibrated and that the results are consistent with the specifications published regarding this instrument. The SENSORCHECK™ feature of the unit is sufficiently reliable to indicate proper operation, although it is recommended that this unit be sent to INSTANTEL or an authorized service centre for regular calibration.

AUTHORIZED BY: W.B. Shaver

*References are traceable to NRC, NIST or equivalent

LITHO IN U.S.A.

GOES 462-1/2

Calibration Certificate

Model: MiniMate Plus

Date: January 10, 1997

Unit S/N: BC5536

TEST REFERENCES*	Model	Serial No.
Bruel & Kjaer Accelerometer	4381	1160721
Bruel & Kjaer Charge Amplifier	2635	1423229
Hewlett Packard Spectrum Analyzer	3582A	1809A03540
Good Will Inst. Frequency Counter	GUC-2010G	5110825
Bruel & Kjaer HPMC	4221	745522
Bruel & Kjaer Mic Carrier System	2804	1904864
Bruel & Kjaer Microphone	4193	1863904

INSTANTEL INC. hereby certifies that this unit has been calibrated and that the results are consistent with the specifications published regarding this instrument. The SENSORCHECK™ feature of the unit is sufficiently reliable to indicate proper operation, although it is recommended that this unit be sent to INSTANTEL or an authorized service centre for regular calibration.

AUTHORIZED BY: _____

*References are traceable to NRC, NIST or equivalent

Calibration Certificate

Model: BlastMate III

Date: January 10, 1997

Unit S/N: BA5552

TEST REFERENCES*	Model	Serial No.
Bruel & Kjaer Accelerometer	4381	1160721
Bruel & Kjaer Charge Amplifier	2635	1423229
Hewlett Packard Spectrum Analyzer	3582A	1809A03540
Good Will Inst. Frequency Counter	GUC-2010G	5110825
Bruel & Kjaer HPMC	4221	745522
Bruel & Kjaer Mic Carrier System	2804	1904864
Bruel & Kjaer Microphone	4193	1863904

INSTANTEL INC. hereby certifies that this unit has been calibrated and that the results are consistent with the specifications published regarding this instrument. The SENSORCHECK™ feature of the unit is sufficiently reliable to indicate proper operation, although it is recommended that this unit be sent to INSTANTEL or an authorized service centre for regular calibration.

AUTHORIZED BY: BTRAN

*References are traceable to NRC, NIST or equivalent

Calibration Certificate

Model: BlastMate III

Date: February 14, 1997

Unit S/N: BA5546

TEST REFERENCES*	Model	Serial No.
Bruel & Kjaer Accelerometer	4381	1160721
Bruel & Kjaer Charge Amplifier	2635	1423229
Hewlett Packard Spectrum Analyzer	3582A	1809A03540
Good Will Inst. Frequency Counter	GUC-2010G	5110825
Bruel & Kjaer HPMC	4221	745522
Bruel & Kjaer Mic Carrier System	2804	1904864
Bruel & Kjaer Microphone	4193	1863904

INSTANTEL INC. hereby certifies that this unit has been calibrated and that the results are consistent with the specifications published regarding this instrument. The SENSORCHECK™ feature of the unit is sufficiently reliable to indicate proper operation, although it is recommended that this unit be sent to INSTANTEL or an authorized service centre for regular calibration.

AUTHORIZED BY: BTRAN

*References are traceable to NRC, NIST or equivalent

Appendix II

Instrument Specifications

3. COMPLIANCE MODULE

This chapter provides instructions to install and setup the BlastMate III.

3.1 What is Event Monitoring?

Event monitoring measures both ground vibrations and air pressure. The monitor measures transverse, vertical, and longitudinal ground vibrations. Transverse ground vibrations agitate particles in a side to side motion. Vertical ground vibrations agitate particles in an up and down motion. Longitudinal ground vibrations agitate particles in a forward and back motion progressing outward from the event site. Events also affect air pressure by creating what is commonly referred to as "air blast". By measuring air pressures, we can determine the effect of air blast energy on structures, measured on the Linear "L" scale, or as perceived by the human ear, measured on the "A" Weight scale.

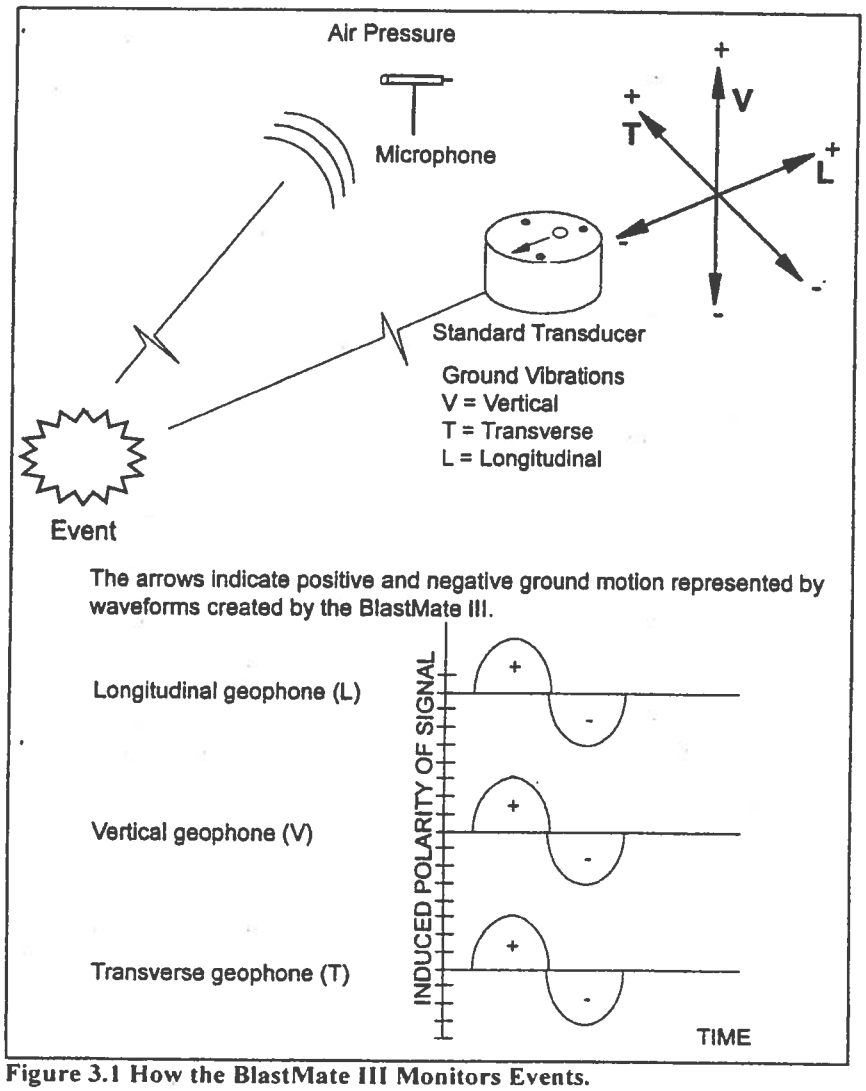


Figure 3.1 How the BlastMate III Monitors Events.

a. Geophone Operation

Functionally a geophone sensor is a coil of wire suspended around a magnet. The magnet is free to move in a field of magnetic flux lines. By Lenzs' Law, induced voltage is proportional to the speed at which flux lines are traversed. Induced coil voltage is therefore proportional to the relative velocity of the coil to the magnet. In practice, it does not matter whether the coil or the magnet moves. Only the motion and speed relative to each other are important.

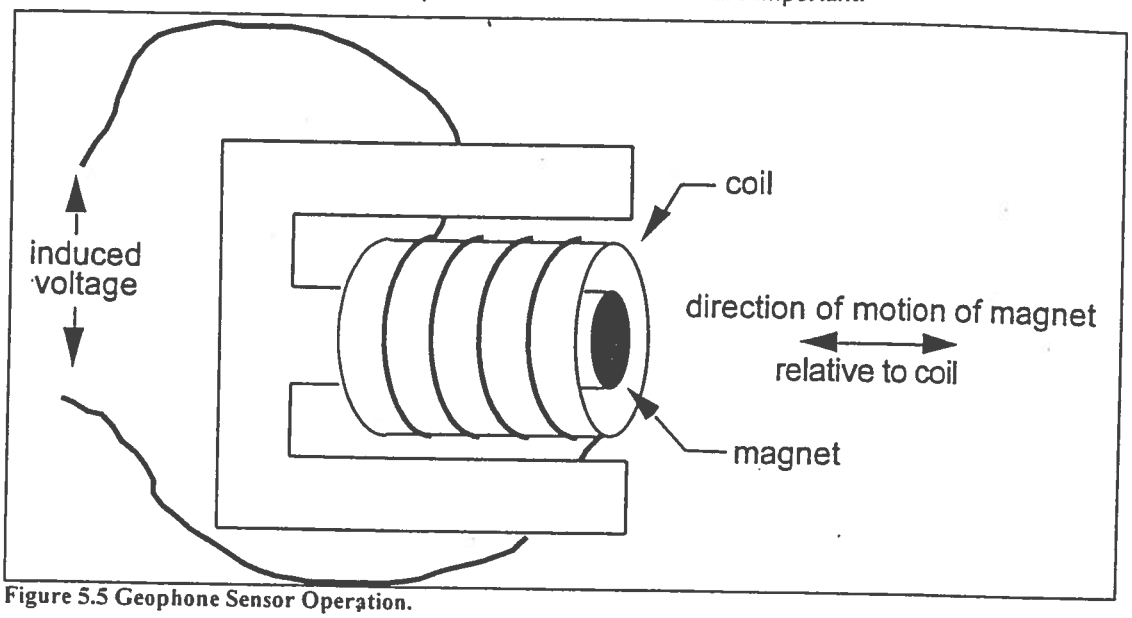


Figure 5.5 Geophone Sensor Operation.

Geophone sensor specifications give a number known as the Intrinsic Voltage Sensitivity. It is the coil voltage induced for a given coil versus magnet speed with units of V/in/s. In seismic applications, the magnet is moved by the blast energy because it is coupled to the particles of the surrounding terrain. The coil, because of its inertia, does not move and the resulting magnet versus coil motion induces a voltage which is proportional to particle velocity.

b. Instantel Standard Transducer

Instantel offers a 2 to 300 Hz standard transducer in a round package. The transducer may be installed on a floor, wall, or ceiling using a variety of installation procedures including ground spikes, burying, mounting rod, or optional levelling plate with levelling feet and integrated bubble level. The figure below includes an Instantel Standard Transducer (a) and a Standard Transducer with levelling plate (b).

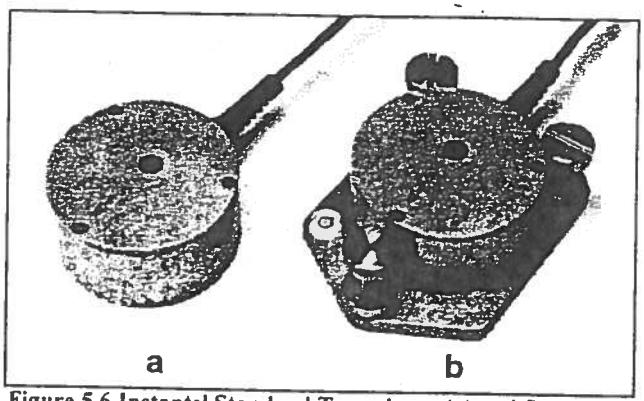


Figure 5.6 Instantel Standard Transducer (a) and Standard Transducer with Optional Levelling Plate (b).

c. Transducer Calibration Requirements

The geophone sensors inside Instantel's transducers must be calibrated annually by Instantel or an authorized Instantel service facility. Contact your dealer for further information.

5.2.2 Microphone

The microphone measures air pressure. Instantel offers two types, Linear "L" (standard) and "A" Weight (optional). Both come with a three foot (one meter) microphone mounting stand.

a. Measurement Scales

The BlastMate III supports two sound pressure measurement scales: Linear "L" and "A" Weight.

(1) Linear "L"

Linear measurement is generally used to measure the effect of low frequency air pressure on buildings. The linear scale records sound pressure without modification in the 2 to 300 Hz range. Measurement units may be in absolute, Pascal, or relative dB scales.

(2) "A" Weight

"A" Weight measures noise levels people may consider an annoyance. The incoming signal is filtered over a 20 Hz to 20,000 Hz range reflecting the hearing range of the human ear. The signal is then converted to root mean square (RMS). Units are measured using the decibel scale, dB(A).

b. Microphone Calibration Requirements

Instantel's microphone must be calibrated annually by Instantel or an authorized Instantel service facility. Contact your dealer for further information.

5.3 Sensorcheck®

Sensorcheck performs a two stage test on the BlastMate III and its sensors. In the first stage, the program displays the BlastMate III serial number, software version, the total amount of memory installed in the BlastMate III, the total amount of memory available to store events, and the number of events presently stored in memory. The second stage tests each geophone within Instantel's transducer and the microphone operation. The program also tests the operation of the BlastMate III itself and the sensor connecting cables. Pass or fail results appear on the display. See the Basic Reference chapter of this manual to choose when Sensorcheck operates automatically.

5.3.1 Checking the Transducer's Geophones

Sensorcheck measures a geophone's natural frequency and damping indicated by an Overswing Ratio (OR). Sensorcheck sends an electric pulse to the geophones and measures the response. If the geophone's response falls within a specified calibration range, the geophone is in calibration and monitoring operations can continue. If the geophone's response does not fall within a specified calibration range, the geophone is not calibrated. You cannot record events until you fix or replace the geophones. See the troubleshooting section of this manual for the appropriate procedures to follow.

a. Natural Frequency

Waveform measurements check the natural period (t) of a geophone's sensor coil assembly. Referring to the figure below, the distance from P_1 to P_2 represents 0.125 seconds. Since Frequency is the reciprocal of the period, F=1/t, the frequency is approximately 8 Hz. A calibrated sensor has a natural frequency between 6.5 and 9.5 Hertz. Calculations for all geophones appears with each recorded event.

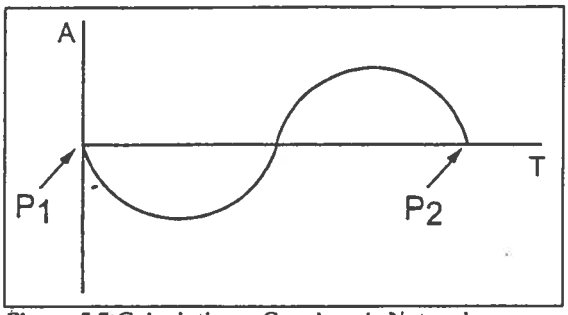


Figure 5.7 Calculating a Geophone's Natural Frequency.

b. Damping – Overswing Ratio (OR)

The overswing ratio (OR) measures damping and is calculated by computing the ratio of the magnitude of adjacent waveform peaks according to the following formula:

$$OR = \frac{A_1}{A_2}$$

Acceptable overswing ratios range from 2.8 to 4.8. The figure below displays a graph of a geophone coil's "free fall" response. A_1 and A_2 are used for overswing calculations.

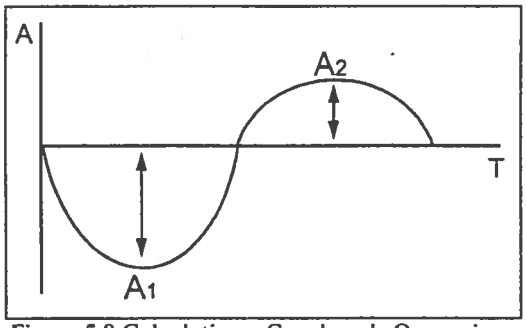


Figure 5.8 Calculating a Geophone's Overswing Ratio.

5.3.2 Checking the Microphone

Sensorcheck tests the microphone's operation by sending a signal to the microphone and measuring its frequency and amplitude response. If the results of the test fall within specified ranges, the microphone is within calibration.

5.3.3 Sensorcheck Report

The Sensorcheck report appears on the BlastMate III display. The message "All Channels Working, Press Print to Print" indicates the BlastMate III sensors have passed the Sensorcheck.

5.4 Antialias Filters

Aliasing occurs when a high–frequency signal appears as an erroneous low frequency because the waveform was sampled at too low a sampling rate. An antialiasing filter solves this problem by removing the high–frequencies.

5.5 Data Analysis Techniques

The following sections define the BlastMate III data analysis techniques. The first section, ground vibrations, discusses calculations applied to event data recorded by a transducer. The second section, sound pressure, describes the microphone event data calculations.

5.5.1 Ground Vibrations

The BlastMate III calculates the Peak Particle Velocity, Zero Crossing Frequency, Peak Acceleration, and Peak Displacement for each of the transverse, vertical, and longitudinal axes. The BlastMate III calculates Peak Vector Sum using data from all three axes.

a. Peak Particle Velocity (PPV)

Peak Particle Velocity indicates the maximum speed particles travel resulting from an event's ground vibrations. The BlastMate III calculates the PPV for each geophone.

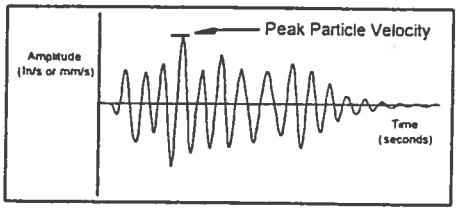


Figure 5.9 Calculating Peak Particle Velocity.

b. Zero Crossing Frequency (ZC Freq)

The Zero Crossing Frequency calculates the event waveform's frequency at the largest peak.

(1) Calculating Zero Crossing Frequency

To calculate the Zero Crossing Frequency, we need to determine the period of oscillation of the waveform. Convenient waveform positions for measuring period, the time for one complete cycle, occur between two successive peaks, troughs, or zero crossings. The BlastMate III measures between zero crossings. Frequency is the number of periods that occur in one second calculated by the formula: Frequency = 1/period.

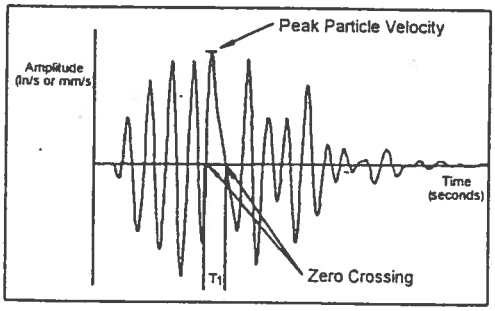


Figure 5.10 Calculating the Zero Crossing Frequency.

(2) Zero Crossing Frequency Limitation

The Zero Crossing Frequency calculation is limited because it assumes a single predominant frequency at the peak, typically represented by sinusoidal waveforms. In practice, the peak may be the result of two or more major frequency components representing compound waveforms as

illustrated in the figure below. It is therefore only an approximation of the frequency of the Peak Particle Velocity.

Waveforms may have the same Peak Particle Velocities but different Zero Crossing Frequencies depending on the shape of the waveforms involved. With reference to the figures above and below; both waveforms have the same Peak Particle Velocities however their Zero Crossing Frequencies differ. In the figure above, the zero crossing frequency uses the 1/2 period indicated by T_1. In the figure below, the zero crossing frequency uses the 1/2 period indicated by T_2. Notice that T_1 is less than T_2 because of the different waveform shapes, therefore the Zero Crossing Frequency in figure above is greater than the Zero Crossing Frequency in the figure below. It is for this reason, the Zero Crossing Frequency may differ for peaks having the same Peak Particle Velocity.

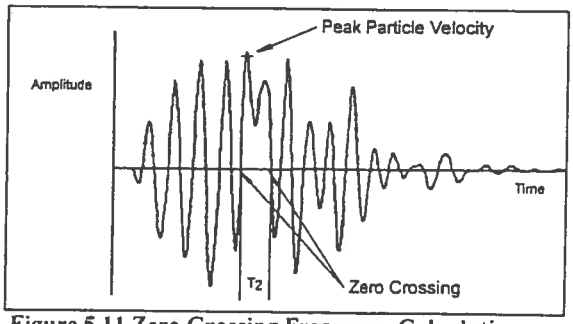


Figure 5.11 Zero Crossing Frequency Calculation Limitation.

(3) Sample Rate Error

The Zero Crossing Frequency requires the period of a wavelength before it can calculate the wavelength's frequency using the formula 1/period. A sampling error occurs for higher frequencies when wavelength periods become relatively small and the sampling rate begins to miss zero crossing points. In other words, the wavelength periods occur much faster than a BlastMate III can sample and use in the calculation.

At higher frequencies there are fewer sample points per cycle and therefore greater error. The following table illustrates how error increases with frequency.

Zero Crossing Frequency Sample Rate Error

Frequency Range	Recording Rate	
	Standard (1024 Hz)	Fast (2048 Hz)
0 – 30 Hz	negligible error	negligible error
31 – 50 Hz	up to 5 Hz error	up to 2.5 Hz error
51 – 70 Hz	up to 8 Hz error	up to 4 Hz error
71 – 90 Hz	up to 18 Hz error	up to 9 Hz error
91 – 150 Hz	up to 50 Hz error	up to 25 Hz error

The BlastMate III does not calculate frequencies above 100 Hz because of the high error level at 1024 samples per second. The message ">100 Hz" displays. Furthermore if a waveform is very complex, or if it contains a large offset value, the zero crossings may lie outside an acceptable window. Whenever a frequency cannot be calculated the message "<1 Hz" displays. The message

N/A indicates an entire waveform was not captured and therefore no frequency could be calculated. More accurate analysis is available using the BlastWare III software.

c. Peak Acceleration

The BlastMate III calculates peak acceleration, the rate of change of velocity, by dividing the difference in velocity by the difference in time. To obtain the peak acceleration, the BlastMate III subtracts two velocity readings and divides the result by the elapsed time between them.

$$a = \frac{dV}{dT} \approx \frac{\Delta V}{\Delta T}$$

where:

Δt = a small interval

The BlastMate III calculates the peak acceleration at each point along the entire waveform and reports the peak value. Note that this is not necessarily at the peak velocity for an individual waveform.

d. Peak Displacement

The BlastMate III calculates peak displacement, or particle distance travelled, by multiplying speed by time. In the BlastMate III the interval velocity is multiplied by the time interval and the resulting displacement segments are summed.

$$s = \int V dt \approx \sum (V \Delta t)$$

where:

V = the velocity in each interval

To obtain the peak displacement, the BlastMate III integrates each wave segment of the entire waveform between zero crossings, selects the largest, then divides the value by half. Note that this is not necessarily at the peak velocity of the waveform.

e. Peak Vector Sum (PVS)

The figure below displays three event waveforms. The figure illustrates the procedure of graphically calculating peak vector sums. Measured magnitudes are tabulated for six different times and represent velocities in each of the three axes. The vector sum represents the resultant particle velocity magnitude and is calculated by squaring and adding the magnitudes and taking the square root.

$$PVS = \sqrt{T^2 + V^2 + L^2}$$

where:

T = particle velocity along the transverse plane

V = particle velocity along the vertical plane

L = particle velocity along the longitudinal plane

The BlastMate III calculates the peak vector sum for each point of the sampled waveforms and displays the largest value. Note that this is not necessarily at the peak velocity for an individual waveform.

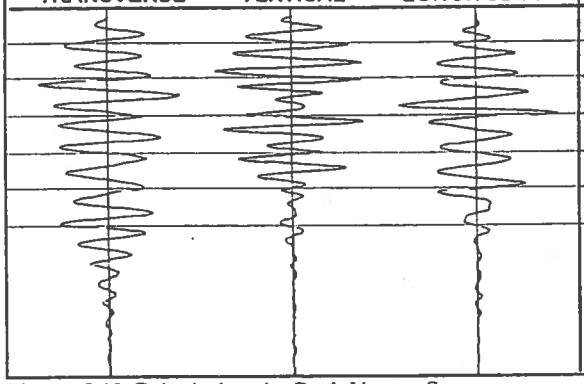
EVENT WAVEFORMS	MAGNITUDE			PEAK VECTOR
TRANSVERSE VERTICAL LONGITUDINAL	T	V	L	
	-0.34	-0.33	0.14	0.494
	0.38	-0.47	0.38	0.714
	0.29	-0.31	0.51	0.663
	-0.53	0.23	-0.31	0.655
	0.24	0.07	0.36	0.44
	-0.23	-0.16	-0.15	0.318

Figure 5.12 Calculating the Peak Vector Sum.

5.5.2 Sound Pressure

The BlastMate III calculates two sound pressure indicators, peak sound pressure and zero crossing frequency.

a. Peak Sound Pressure (PSP)

The BlastMate III checks the entire event waveform and displays the largest sound pressure called the Peak Sound Pressure (PSP), also referred to as the Peak Air Over–Pressure. Results appear on the BlastMate III display and in the Event Summary Report.

b. Zero Crossing Frequency (ZC Freq)

The Zero Crossing Frequency calculation for sound pressure is the same calculation used for ground vibrations. Please see above for a complete discussion.

Note: The Zero Crossing Frequency calculation is performed for Linear microphones only. This calculation does not appear on the BlastMate III display or on Event Summary Reports when using an "A" Weight microphone.

5.6 Alternate Manual Waveform Calculations

The following sections discuss manual waveform analysis techniques. These have been included for reference purposes only. They do not represent the calculation techniques employed by the BlastMate III.

Graphical methods for calculating area and slope depend on the shape of the waveform being analyzed. A complete discussion of the procedures is beyond the scope of this manual. Two useful reference texts are G. A. BOLLIGER, *BLAST VIBRATION ANALYSIS*, Southern Illinois University Press and CHARLES H. DOWDING, *BLAST VIBRATION MONITORING AND CONTROL*, Prentice-Hall Inc.

In each of the subsequent examples some formulae appear with no attempt at derivation. The following definitions apply:

A = amplitude in inches/second measured from the zero line

A_m = amplitude measured in millimetres/second

T = period in seconds

Y = absolute change in amplitude over time measured in inches/second

Y_m = absolute change in amplitude over time measured in millimetres/second

5.6.1 Sinusoidal Waveforms

The motion is essentially sinusoidal with gradual amplitude and frequency changes.

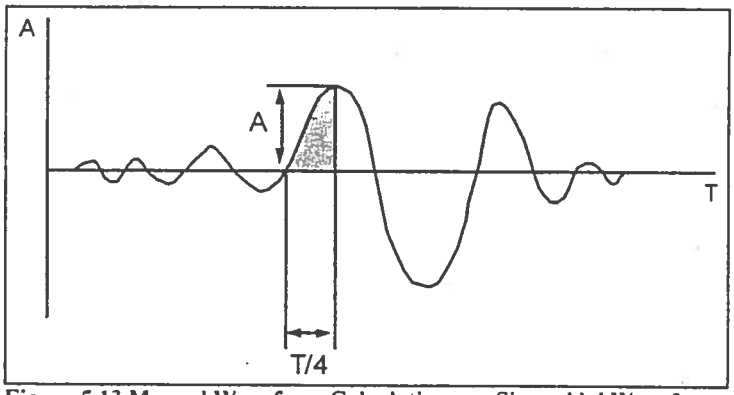


Figure 5.13 Manual Waveform Calculations on Sinusoidal Waveforms.

a. Calculating Displacement:

$$\text{Maximum Displacement (in.)} = \frac{T}{2\pi} \times A$$

$$\text{Maximum Displacement (mm)} = \frac{T}{2\pi} \times A_m$$

b. Calculating Acceleration:

$$\text{Maximum Acceleration (in./s}^2\text{)} = \frac{2\pi}{T} \times A$$

$$\text{Maximum Acceleration (mm/s}^2\text{)} = \frac{2\pi}{T} \times A_m$$

5.6.2 Nearly Triangular Waveforms

Motion is irregular and has large amplitude.

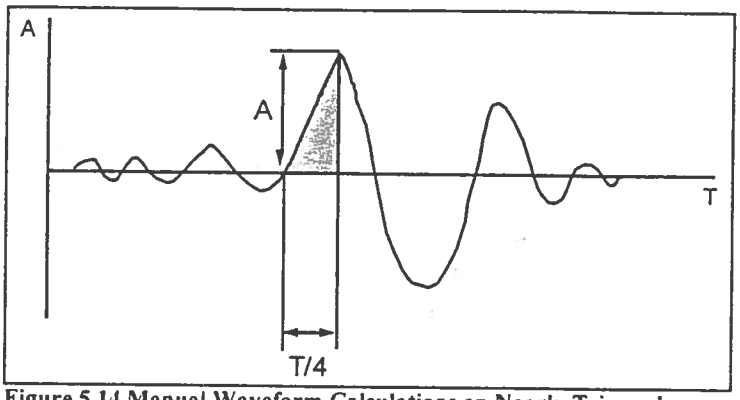


Figure 5.14 Manual Waveform Calculations on Nearly Triangular Waveforms.

a. Calculating Displacement:

Maximum Displacement (in.) $= \frac{T}{8} \times A$

Maximum Displacement (mm) $= \frac{T}{8} \times A_m$

b. Calculating Acceleration:

Maximum Acceleration (in./s^2) $= \frac{1}{T} \times Y$

Maximum Acceleration (mm/s^2) $= \frac{1}{T} \times Y_m$

5.6.3 Compound Waveforms

If the record exhibits interference by two or more predominant frequencies then the maximum displacement will be the sum of the maximum of each individual frequency component.

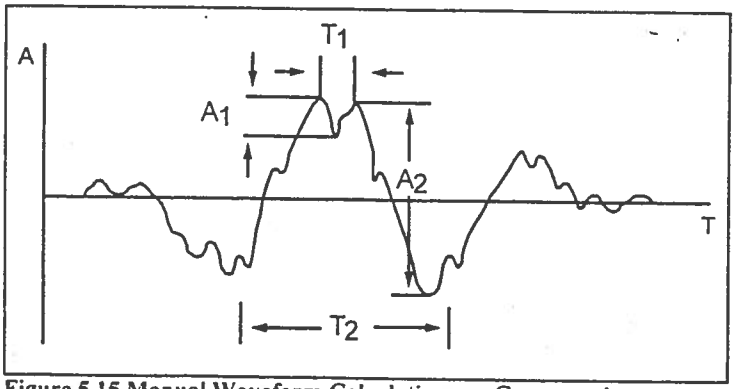


Figure 5.15 Manual Waveform Calculations on Compound Waveforms.

a. Calculating Displacement:

Maximum Displacement (in.) = $\frac{T_1}{2\pi} \times A_1 + \frac{T_2}{2\pi} \times A_2$

Maximum Displacement (mm) = $\frac{T_1}{2\pi} \times A_{1m} + \frac{T_2}{2\pi} \times A_{2m}$

b. Calculating Acceleration:

Maximum Acceleration (in./s^2) = $\frac{2\pi}{T_1} \times A_1 + \frac{2\pi}{T_2} \times A_2$

Maximum Acceleration (mm/s^2) = $\frac{2\pi}{T_1} \times A_{1m} + \frac{2\pi}{T_2} \times A_{2m}$

5.6.4 Irregular Waveforms

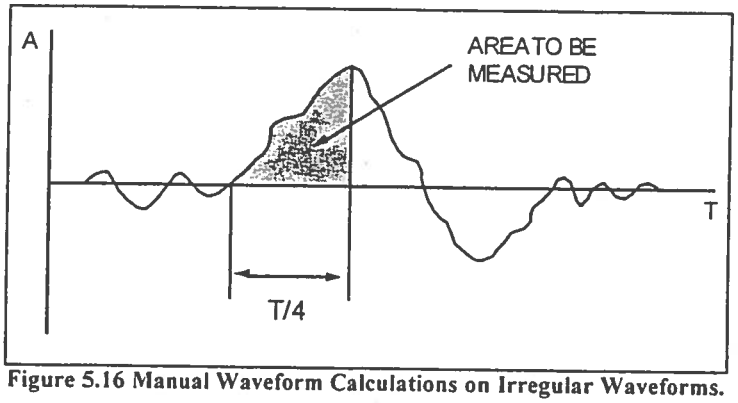


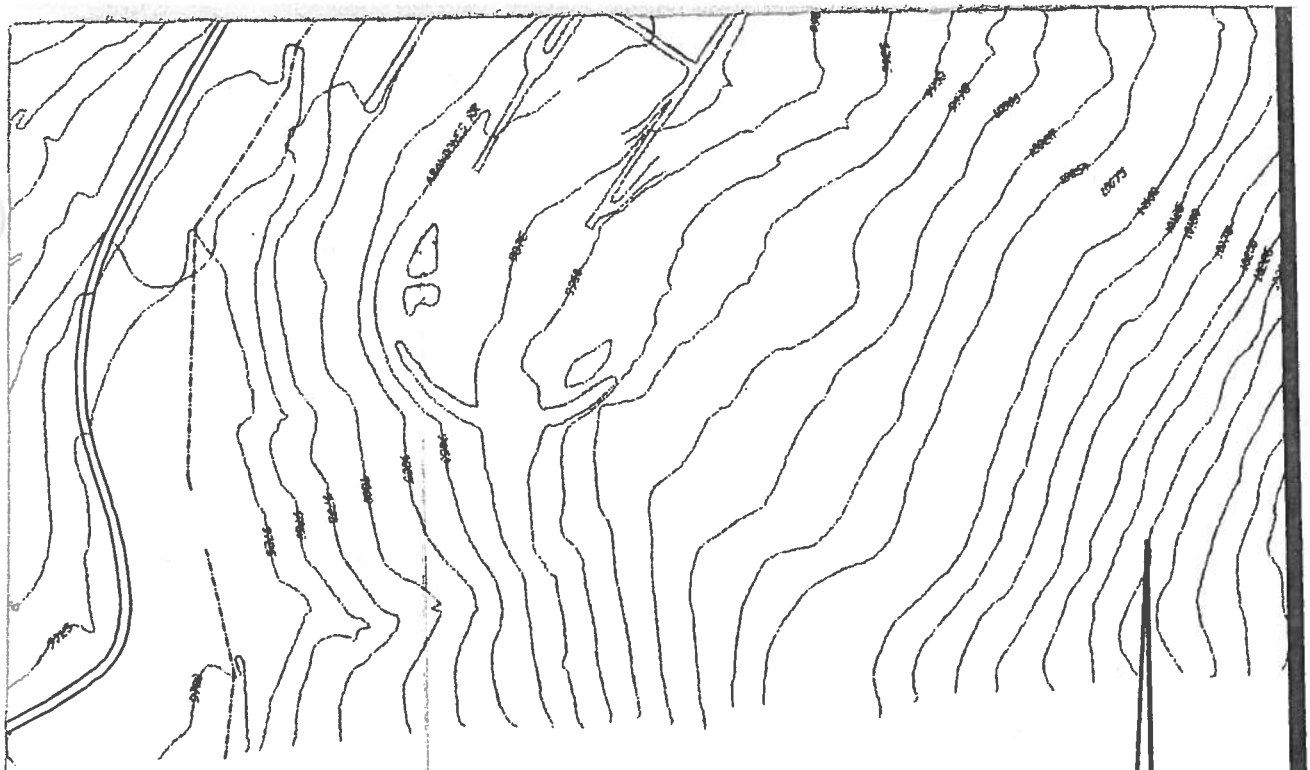
Figure 5.16 Manual Waveform Calculations on Irregular Waveforms.

a. Calculating Displacement:

Maximum Displacement = area under curve measured by a planimeter.

Appendix III

Map



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SCALE IN FEET

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e Creek & Victor Gold Mining Company

A Joint Venture – Pikes Peak Mining Company, Manager

d Motion Attenuation Study

May 1997

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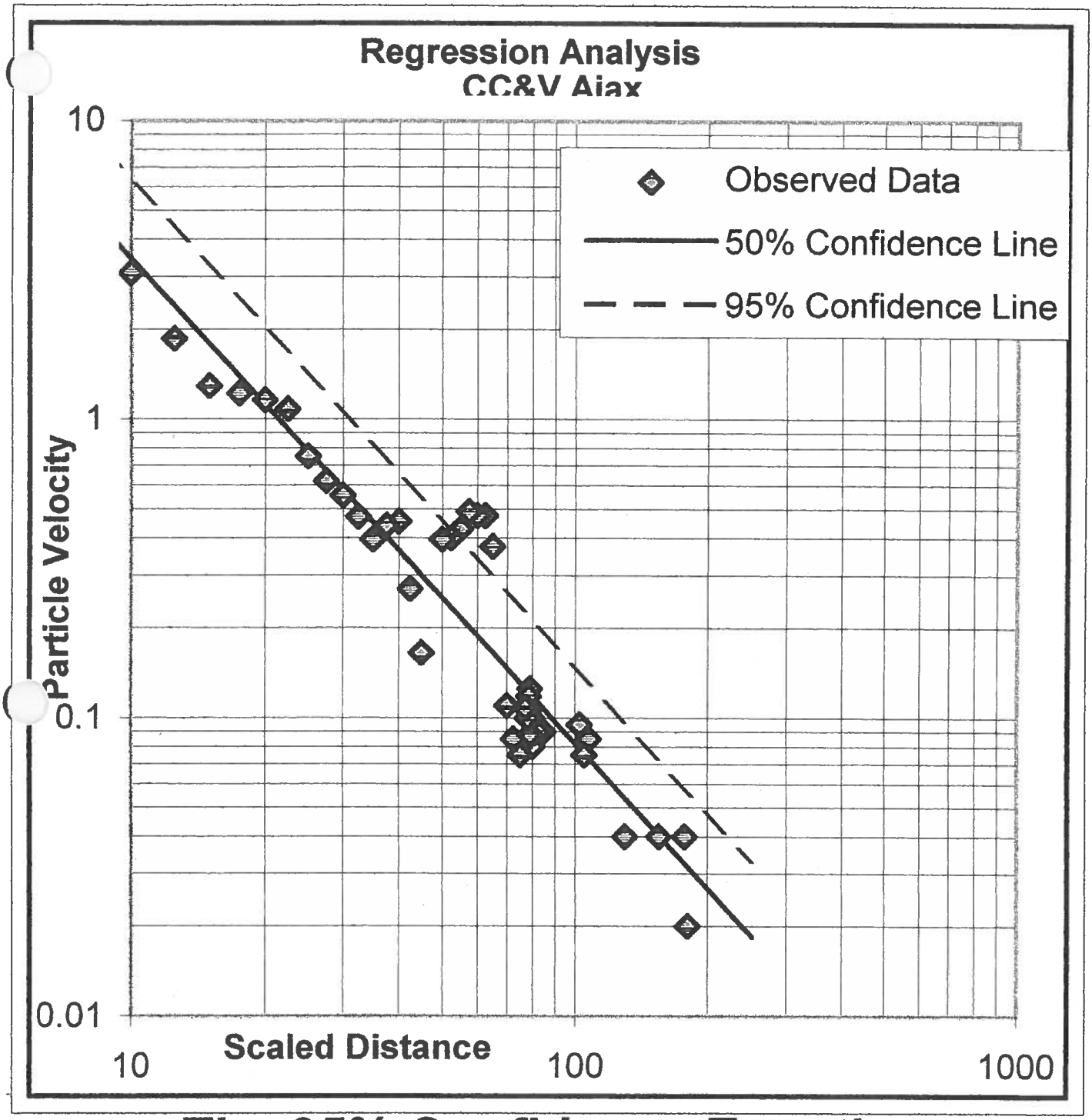
Appendix IV

Ajax



The 95% Confidence Equation

PPV= 261.0 X (SD)^ -1.62

The Correlation Coeficient r^2 is: 0.889

Prepared by MMC 6/17/97

REGRESSION ANALYSIS

CC&V Ajax CC&V Ajax

Data Statisics

N	Max_PPV	Min_PPV	Max_SD	Min_SD
44.0	3.08	0.02	180	10

Calculated Sums

Sum_X	Sum_Y	Sum_X2	Sum_Y2	Sum_XY
176.3	-67.182	726.210	161.810	-301.6

Sums Of Squares

SS_X	SS_Y	SS_XY	SumXSumY	$(SumX)^2$
20.00	59.23	-32.45	-11842.579	31073.226

Calculated Means & Calulated Coefficients

X_Bar	Y_Bar	a	K_{50}	K_{95}	K_{99}	K_{-99}	B_{50}
4.006	-1.527	4.97	144.3	261.0	333.5	62.5	-1.62

Sample Standard Deviation & Coefficient of Correlation

S	S_{e2}	r	r^2
0.396	6.598	-0.943	0.889

The 95% Confidence Level Equation

PPV= 261.0 X (SD)^ $^{-1.62}$

Ajax Test Site

	Distance (feet)	Charge Weight (pounds)	Particle Velocity (inches/second)	Hole #	Instrument #	Time
1	275	100	0.620	AJ-8	BA5546	10:58:53
2	1075	100	0.085	AJ-8	BA5552	10:59
3	250	100	0.750	AJ-7	BA5546	11:38:11
4	450	100	0.165	AJ-7	BC5571	11:39:08
5	650	100	0.375	AJ-7	BC5570	11:39:08
6	850	100	0.090	AJ-7	BC5536	11:39:08
7	1050	100	0.075	AJ-7	BA5552	11:39:09
8	225	100	1.080	AJ-6	BA5546	12:00:37
9	425	100	0.270	AJ-6	BC5571	12:00:11
10	625	100	0.475	AJ-6	BC5570	11:59:01
11	825	100	0.090	AJ-6	BC5536	11:59:01
12	1025	100	0.095	AJ-6	BA5552	11:59:02
13	200	100	1.160	AJ-5	BA5546	12:12:38
14	400	100	0.455	AJ-5	BC5571	12:13:34
15	600	100	0.475	AJ-5	BC5570	12:13:34
16	800	100	0.080	AJ-5	BC5536	12:13:34
17	1800	100	0.020	AJ-5	BA5552	12:14:31
18	175	100	1.220	AJ-4	BA5546	12:31:54
19	375	100	0.440	AJ-4	BC5571	12:32:51
20	575	100	0.490	AJ-4	BC5570	12:32:51
21	775	100	0.075	AJ-4	BC5536	12:32:51
22	1775	100	0.040	AJ-4	BA5552	12:32:52
23	150	100	1.290	AJ-3	BA5546	12:42:38
24	350	100	0.395	AJ-3	BC5571	12:43:35
25	550	100	0.430	AJ-3	BC5570	12:43:35
26	750	100	0.075	AJ-3	BC5536	12:43:35
27	1550	100	0.040	AJ-3	BA5552	12:43:36
28	125	100	1.860	AJ-2	BA5546	12:46:08
29	325	100	0.470	AJ-2	BC5571	12:47:04
30	525	100	0.400	AJ-2	BC5570	12:47:05
31	725	100	0.085	AJ-2	BC5536	12:47:04
32	100	100	3.080	AJ-1	BA5546	12:54:16
33	300	100	0.555	AJ-1	BC5571	12:55:13
34	500	100	0.395	AJ-1	BC5570	12:55:13
35	700	100	0.110	AJ-1	BC5536	12:55:13
36	1300	100	0.040	AJ-1	BA5552	12:55:14
37	800	100	0.100	AJ-8	VT3375	10:59:21
38	795	100	0.088	AJ-7	VT3375	11:38:40
39	790	100	0.108	AJ-6	VT3375	11:58:33
40	785	100	0.125	AJ-5	VT3375	12:13:06
41	780	100	0.118	AJ-4	VT3375	12:32:03
42	775	100	0.100	AJ-3	VT3375	12:43:07
43	770	100	0.108	AJ-2	VT3375	12:46:36
44	765	100	0.108	AJ-1	VT3375	12:54:45

Charge Weight per Delay
calculated from given distance and particle velocity
PV=261*(SD)6-1.62
PV=0.1 ips

Distance (feet)	Charge Weight (pounds)	Distance (feet)	Charge Weight (pounds)
100	0.6	4,000	968.4
200	2.4	4,100	1,017.4
300	5.4	4,200	1,067.6
400	9.7	4,300	1,119.1
500	15.1	4,400	1,171.7
600	21.8	4,500	1,225.6
700	29.7	4,600	1,280.7
800	38.7	4,700	1,337.0
900	49.0	4,800	1,394.5
1,000	60.5	4,900	1,453.2
1,100	73.2	5,000	1,513.1
1,200	87.2	5,100	1,574.2
1,300	102.3	5,200	1,636.6
1,400	118.6	5,300	1,700.1
1,500	136.2	5,400	1,764.9
1,600	154.9	5,500	1,830.8
1,700	174.9	5,600	1,898.0
1,800	196.1	5,700	1,966.4
1,900	218.5	5,800	2,036.0
2,000	242.1	5,900	2,106.8
2,100	266.9	6,000	2,178.9
2,200	292.9	6,100	2,252.1
2,300	320.2	6,200	2,326.5
2,400	348.6	6,300	2,402.2
2,500	378.3	6,400	2,479.0
2,600	409.1	6,500	2,557.1
2,700	441.2	6,600	2,636.4
2,800	474.5	6,700	2,716.9
2,900	509.0	6,800	2,798.6
3,000	544.7	6,900	2,881.5
3,100	581.6	7,000	2,965.7
3,200	619.8	7,100	3,051.0
3,300	659.1	7,200	3,137.5
3,400	699.7	7,300	3,225.3
3,500	741.4	7,400	3,314.3
3,600	784.4	7,500	3,404.5
3,700	828.6	7,600	3,495.8
3,800	874.0	7,700	3,588.4
3,900	920.6	7,800	3,682.3

Charge Weight per Delay
calculated from given distance and particle velocity
PV=261*(SD)6-1.62
PV=0.2 ips

Distance (feet)	Charge Weight (pounds)	Distance (feet)	Charge Weight (pounds)
100	1.4	4,000	2,278.7
200	5.7	4,100	2,394.1
300	12.8	4,200	2,512.3
400	22.8	4,300	2,633.3
500	35.6	4,400	2,757.2
600	51.3	4,500	2,884.0
700	69.8	4,600	3,013.6
800	91.1	4,700	3,146.0
900	115.4	4,800	3,281.3
1,000	142.4	4,900	3,419.5
1,100	172.3	5,000	3,560.5
1,200	205.1	5,100	3,704.3
1,300	240.7	5,200	3,851.0
1,400	279.1	5,300	4,000.5
1,500	320.4	5,400	4,152.9
1,600	364.6	5,500	4,308.2
1,700	411.6	5,600	4,466.3
1,800	461.4	5,700	4,627.2
1,900	514.1	5,800	4,791.0
2,000	569.7	5,900	4,957.6
2,100	628.1	6,000	5,127.1
2,200	689.3	6,100	5,299.4
2,300	753.4	6,200	5,474.6
2,400	820.3	6,300	5,652.6
2,500	890.1	6,400	5,833.5
2,600	962.8	6,500	6,017.2
2,700	1,038.2	6,600	6,203.8
2,800	1,116.6	6,700	6,393.2
2,900	1,197.7	6,800	6,585.4
3,000	1,281.8	6,900	6,780.6
3,100	1,368.6	7,000	6,978.5
3,200	1,458.4	7,100	7,179.3
3,300	1,550.9	7,200	7,383.0
3,400	1,646.4	7,300	7,589.5
3,500	1,744.6	7,400	7,798.9
3,600	1,845.7	7,500	8,011.1
3,700	1,949.7	7,600	8,226.1
3,800	2,056.5	7,700	8,444.0
3,900	2,166.2	7,800	8,664.8

Charge Weight per Delay
calculated from given distance and particle velocity
PV=261*(SD)6-1.62
PV=0.3 ips

Distance (feet)	Charge Weight (pounds)	Distance (feet)	Charge Weight (pounds)
100	2.3	4,000	3,759.1
200	9.4	4,100	3,949.4
300	21.1	4,200	4,144.4
400	37.6	4,300	4,344.1
500	58.7	4,400	4,548.5
600	84.6	4,500	4,757.6
700	115.1	4,600	4,971.4
800	150.4	4,700	5,189.9
900	190.3	4,800	5,413.1
1,000	234.9	4,900	5,641.0
1,100	284.3	5,000	5,873.6
1,200	338.3	5,100	6,110.9
1,300	397.1	5,200	6,352.9
1,400	460.5	5,300	6,599.6
1,500	528.6	5,400	6,851.0
1,600	601.5	5,500	7,107.0
1,700	679.0	5,600	7,367.8
1,800	761.2	5,700	7,633.3
1,900	848.1	5,800	7,903.5
2,000	939.8	5,900	8,178.4
2,100	1,036.1	6,000	8,458.0
2,200	1,137.1	6,100	8,742.3
2,300	1,242.9	6,200	9,031.2
2,400	1,353.3	6,300	9,324.9
2,500	1,468.4	6,400	9,623.3
2,600	1,588.2	6,500	9,926.4
2,700	1,712.7	6,600	10,234.1
2,800	1,842.0	6,700	10,546.6
2,900	1,975.9	6,800	10,863.8
3,000	2,114.5	6,900	11,185.7
3,100	2,257.8	7,000	11,512.2
3,200	2,405.8	7,100	11,843.5
3,300	2,558.5	7,200	12,179.5
3,400	2,715.9	7,300	12,520.2
3,500	2,878.1	7,400	12,865.5
3,600	3,044.9	7,500	13,215.6
3,700	3,216.4	7,600	13,570.4
3,800	3,392.6	7,700	13,929.8
3,900	3,573.5	7,800	14,294.0

Charge Weight per Delay
calculated from given distance and particle velocity
PV=261*(SD)6-1.62
PV=0.4 ips

Distance (feet)	Charge Weight (pounds)	Distance (feet)	Charge Weight (pounds)
100	3.4	4,000	5,362.0
200	13.4	4,100	5,633.5
300	30.2	4,200	5,911.6
400	53.6	4,300	6,196.5
500	83.8	4,400	6,488.1
600	120.6	4,500	6,786.3
700	164.2	4,600	7,091.3
800	214.5	4,700	7,403.0
900	271.5	4,800	7,721.3
1,000	335.1	4,900	8,046.4
1,100	405.5	5,000	8,378.2
1,200	482.6	5,100	8,716.6
1,300	566.4	5,200	9,061.8
1,400	656.8	5,300	9,413.7
1,500	754.0	5,400	9,772.3
1,600	857.9	5,500	10,137.6
1,700	968.5	5,600	10,509.6
1,800	1,085.8	5,700	10,888.3
1,900	1,209.8	5,800	11,273.7
2,000	1,340.5	5,900	11,665.8
2,100	1,477.9	6,000	12,064.6
2,200	1,622.0	6,100	12,470.1
2,300	1,772.8	6,200	12,882.3
2,400	1,930.3	6,300	13,301.2
2,500	2,094.5	6,400	13,726.8
2,600	2,265.5	6,500	14,159.1
2,700	2,443.1	6,600	14,598.1
2,800	2,627.4	6,700	15,043.8
2,900	2,818.4	6,800	15,496.3
3,000	3,016.1	6,900	15,955.4
3,100	3,220.6	7,000	16,421.2
3,200	3,431.7	7,100	16,893.7
3,300	3,649.5	7,200	17,373.0
3,400	3,874.1	7,300	17,858.9
3,500	4,105.3	7,400	18,351.5
3,600	4,343.2	7,500	18,850.9
3,700	4,587.9	7,600	19,356.9
3,800	4,839.2	7,700	19,869.7
3,900	5,097.3	7,800	20,389.1

Charge Weight per Delay
calculated from given distance and particle velocity
PV=261*(SD)6-1.62
PV=0.5 ips

Distance (feet)	Charge Weight (pounds)	Distance (feet)	Charge Weight (pounds)
100	4.4	4,000	7,062.7
200	17.7	4,100	7,420.3
300	39.7	4,200	7,786.6
400	70.6	4,300	8,161.8
500	110.4	4,400	8,545.9
600	158.9	4,500	8,938.7
700	216.3	4,600	9,340.4
800	282.5	4,700	9,751.0
900	357.5	4,800	10,170.3
1,000	441.4	4,900	10,598.5
1,100	534.1	5,000	11,035.5
1,200	635.6	5,100	11,481.3
1,300	746.0	5,200	11,936.0
1,400	865.2	5,300	12,399.5
1,500	993.2	5,400	12,871.8
1,600	1,130.0	5,500	13,352.9
1,700	1,275.7	5,600	13,842.9
1,800	1,430.2	5,700	14,341.7
1,900	1,593.5	5,800	14,849.3
2,000	1,765.7	5,900	15,365.8
2,100	1,946.7	6,000	15,891.1
2,200	2,136.5	6,100	16,425.2
2,300	2,335.1	6,200	16,968.2
2,400	2,542.6	6,300	17,519.9
2,500	2,758.9	6,400	18,080.5
2,600	2,984.0	6,500	18,650.0
2,700	3,217.9	6,600	19,228.2
2,800	3,460.7	6,700	19,815.3
2,900	3,712.3	6,800	20,411.2
3,000	3,972.8	6,900	21,016.0
3,100	4,242.0	7,000	21,629.5
3,200	4,520.1	7,100	22,251.9
3,300	4,807.1	7,200	22,883.2
3,400	5,102.8	7,300	23,523.2
3,500	5,407.4	7,400	24,172.1
3,600	5,720.8	7,500	24,829.8
3,700	6,043.0	7,600	25,496.4
3,800	6,374.1	7,700	26,171.7
3,900	6,714.0	7,800	26,855.9

Particle Velocity (+95%)
calculated from given distance and charge weight
PV =261*(SD)^-1.62
Charge Weight = 100 pounds

Distance (feet)	PV (inches/second)	Distance (feet)	PV Inches/second)
100	6.261	4000	0.016
200	2.037	4100	0.015
300	1.056	4200	0.015
400	0.663	4300	0.014
500	0.462	4400	0.014
600	0.344	4500	0.013
700	0.268	4600	0.013
800	0.216	4700	0.012
900	0.178	4800	0.012
1000	0.150	4900	0.011
1100	0.129	5000	0.011
1200	0.112	5100	0.011
1300	0.098	5200	0.010
1400	0.087	5300	0.010
1500	0.078	5400	0.010
1600	0.070	5500	0.009
1700	0.064	5600	0.009
1800	0.058	5700	0.009
1900	0.053	5800	0.009
2000	0.049	5900	0.008
2100	0.045	6000	0.008
2200	0.042	6100	0.008
2300	0.039	6200	0.008
2400	0.036	6300	0.008
2500	0.034	6400	0.007
2600	0.032	6500	0.007
2700	0.030	6600	0.007
2800	0.028	6700	0.007
2900	0.027	6800	0.007
3000	0.025	6900	0.007
3100	0.024	7000	0.006
3200	0.023	7100	0.006
3300	0.022	7200	0.006
3400	0.021	7300	0.006
3500	0.020	7400	0.006
3600	0.019	7500	0.006
3700	0.018	7600	0.006
3800	0.017	7700	0.006
3900	0.017	7800	0.005

Particle Velocity (+95%)
calculated from given distance and charge weight
PV =261*(SD)^-1.62
Charge Weight = 200 pounds

Distance (feet)	PV (inches/second)	Distance (feet)	PV Inches/second)
100	10.977	4000	0.028
200	3.571	4100	0.027
300	1.852	4200	0.026
400	1.162	4300	0.025
500	0.809	4400	0.024
600	0.602	4500	0.023
700	0.469	4600	0.022
800	0.378	4700	0.021
900	0.312	4800	0.021
1000	0.263	4900	0.020
1100	0.226	5000	0.019
1200	0.196	5100	0.019
1300	0.172	5200	0.018
1400	0.153	5300	0.018
1500	0.137	5400	0.017
1600	0.123	5500	0.017
1700	0.111	5600	0.016
1800	0.102	5700	0.016
1900	0.093	5800	0.015
2000	0.086	5900	0.015
2100	0.079	6000	0.014
2200	0.073	6100	0.014
2300	0.068	6200	0.014
2400	0.064	6300	0.013
2500	0.060	6400	0.013
2600	0.056	6500	0.013
2700	0.053	6600	0.012
2800	0.050	6700	0.012
2900	0.047	6800	0.012
3000	0.044	6900	0.012
3100	0.042	7000	0.011
3200	0.040	7100	0.011
3300	0.038	7200	0.011
3400	0.036	7300	0.011
3500	0.035	7400	0.010
3600	0.033	7500	0.010
3700	0.032	7600	0.010
3800	0.030	7700	0.010
3900	0.029	7800	0.009

Particle Velocity (+95%)
calculated from given distance and charge weight
PV =261*(SD)^-1.62
Charge Weight = 300 pounds

Distance (feet)	PV (inches/second)	Distance (feet)	PV Inches/second)
100	15.244	4000	0.039
200	4.960	4100	0.037
300	2.571	4200	0.036
400	1.614	4300	0.034
500	1.124	4400	0.033
600	0.837	4500	0.032
700	0.652	4600	0.031
800	0.525	4700	0.030
900	0.434	4800	0.029
1000	0.366	4900	0.028
1100	0.313	5000	0.027
1200	0.272	5100	0.026
1300	0.239	5200	0.025
1400	0.212	5300	0.025
1500	0.190	5400	0.024
1600	0.171	5500	0.023
1700	0.155	5600	0.022
1800	0.141	5700	0.022
1900	0.129	5800	0.021
2000	0.119	5900	0.021
2100	0.110	6000	0.020
2200	0.102	6100	0.020
2300	0.095	6200	0.019
2400	0.089	6300	0.019
2500	0.083	6400	0.018
2600	0.078	6500	0.018
2700	0.073	6600	0.017
2800	0.069	6700	0.017
2900	0.065	6800	0.016
3000	0.062	6900	0.016
3100	0.058	7000	0.016
3200	0.056	7100	0.015
3300	0.053	7200	0.015
3400	0.050	7300	0.015
3500	0.048	7400	0.014
3600	0.046	7500	0.014
3700	0.044	7600	0.014
3800	0.042	7700	0.013
3900	0.040	7800	0.013

Particle Velocity (+95%)
calculated from given distance and charge weight
PV =261*(SD)^-1.62
Charge Weight = 400 pounds

Distance (feet)	PV (inches/second)	Distance (feet)	PV Inches/second)
100	19.245	4000	0.049
200	6.261	4100	0.047
300	3.246	4200	0.045
400	2.037	4300	0.043
500	1.419	4400	0.042
600	1.056	4500	0.040
700	0.823	4600	0.039
800	0.663	4700	0.038
900	0.548	4800	0.036
1000	0.462	4900	0.035
1100	0.396	5000	0.034
1200	0.344	5100	0.033
1300	0.302	5200	0.032
1400	0.268	5300	0.031
1500	0.239	5400	0.030
1600	0.216	5500	0.029
1700	0.195	5600	0.028
1800	0.178	5700	0.028
1900	0.163	5800	0.027
2000	0.150	5900	0.026
2100	0.139	6000	0.025
2200	0.129	6100	0.025
2300	0.120	6200	0.024
2400	0.112	6300	0.023
2500	0.105	6400	0.023
2600	0.098	6500	0.022
2700	0.092	6600	0.022
2800	0.087	6700	0.021
2900	0.082	6800	0.021
3000	0.078	6900	0.020
3100	0.074	7000	0.020
3200	0.070	7100	0.019
3300	0.067	7200	0.019
3400	0.064	7300	0.018
3500	0.061	7400	0.018
3600	0.058	7500	0.018
3700	0.055	7600	0.017
3800	0.053	7700	0.017
3900	0.051	7800	0.017

Particle Velocity (+95%)
calculated from given distance and charge weight
PV =261*(SD)^-1.62
Charge Weight = 500 pounds

Distance (feet)	PV (inches/second)	Distance (feet)	PV Inches/second)
100	23.057	4000	0.059
200	7.501	4100	0.056
300	3.889	4200	0.054
400	2.440	4300	0.052
500	1.700	4400	0.050
600	1.265	4500	0.048
700	0.986	4600	0.047
800	0.794	4700	0.045
900	0.656	4800	0.044
1000	0.553	4900	0.042
1100	0.474	5000	0.041
1200	0.412	5100	0.039
1300	0.362	5200	0.038
1400	0.321	5300	0.037
1500	0.287	5400	0.036
1600	0.258	5500	0.035
1700	0.234	5600	0.034
1800	0.213	5700	0.033
1900	0.196	5800	0.032
2000	0.180	5900	0.031
2100	0.166	6000	0.030
2200	0.154	6100	0.030
2300	0.143	6200	0.029
2400	0.134	6300	0.028
2500	0.125	6400	0.027
2600	0.118	6500	0.027
2700	0.111	6600	0.026
2800	0.104	6700	0.025
2900	0.099	6800	0.025
3000	0.093	6900	0.024
3100	0.088	7000	0.024
3200	0.084	7100	0.023
3300	0.080	7200	0.023
3400	0.076	7300	0.022
3500	0.073	7400	0.022
3600	0.069	7500	0.021
3700	0.066	7600	0.021
3800	0.064	7700	0.020
3900	0.061	7800	0.020

Ajax Test Site

	Distance (feet)	Charge Weight (pounds)	Particle Velocity (inches/second)	Hole #	Instrument #	Time
1	275	100	0.620	AJ-8	BA5546	10:58:53
2	1075	100	0.085	AJ-8	BA5552	10:59
3	250	100	0.750	AJ-7	BA5546	11:38:11
4	450	100	0.165	AJ-7	BC5571	11:39:08
5	650	100	0.375	AJ-7	BC5570	11:39:08
6	850	100	0.090	AJ-7	BC5536	11:39:08
7	1050	100	0.075	AJ-7	BA5552	11:39:09
8	225	100	1.080	AJ-6	BA5546	12:00:37
9	425	100	0.270	AJ-6	BC5571	12:00:11
10	625	100	0.475	AJ-6	BC5570	11:59:01
11	825	100	0.090	AJ-6	BC5536	11:59:01
12	1025	100	0.095	AJ-6	BA5552	11:59:02
13	200	100	1.160	AJ-5	BA5546	12:12:38
14	400	100	0.455	AJ-5	BC5571	12:13:34
15	600	100	0.475	AJ-5	BC5570	12:13:34
16	800	100	0.080	AJ-5	BC5536	12:13:34
17	1800	100	0.020	AJ-5	BA5552	12:14:31
18	175	100	1.220	AJ-4	BA5546	12:31:54
19	375	100	0.440	AJ-4	BC5571	12:32:51
20	575	100	0.490	AJ-4	BC5570	12:32:51
21	775	100	0.075	AJ-4	BC5536	12:32:51
22	1775	100	0.040	AJ-4	BA5552	12:32:52
23	150	100	1.290	AJ-3	BA5546	12:42:38
24	350	100	0.395	AJ-3	BC5571	12:43:35
25	550	100	0.430	AJ-3	BC5570	12:43:35
26	750	100	0.075	AJ-3	BC5536	12:43:35
27	1550	100	0.040	AJ-3	BA5552	12:43:36
28	125	100	1.860	AJ-2	BA5546	12:46:08
29	325	100	0.470	AJ-2	BC5571	12:47:04
30	525	100	0.400	AJ-2	BC5570	12:47:05
31	725	100	0.085	AJ-2	BC5536	12:47:04
32	100	100	3.080	AJ-1	BA5546	12:54:16
33	300	100	0.555	AJ-1	BC5571	12:55:13
34	500	100	0.395	AJ-1	BC5570	12:55:13
35	700	100	0.110	AJ-1	BC5536	12:55:13
36	1300	100	0.040	AJ-1	BA5552	12:55:14
37	800	100	0.100	AJ-8	VT3375	10:59:21
38	795	100	0.088	AJ-7	VT3375	11:38:40
39	790	100	0.108	AJ-6	VT3375	11:58:33
40	785	100	0.125	AJ-5	VT3375	12:13:06
41	780	100	0.118	AJ-4	VT3375	12:32:03
42	775	100	0.100	AJ-3	VT3375	12:43:07
43	770	100	0.108	AJ-2	VT3375	12:46:36
44	765	100	0.108	AJ-1	VT3375	12:54:45

Date/Time	Vert at 10:58:53 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	2.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1Q.I50

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

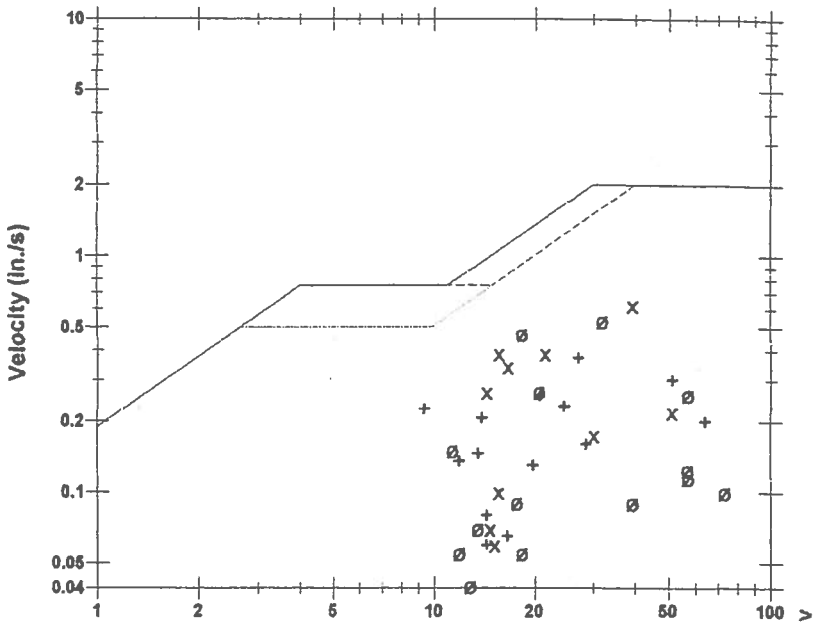
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

	Tran	Vert	Long	
PPV	0.370	0.620	0.530	in./s
ZC Freq	27	39	32	Hz
Time (Rel. to Trig)	0.038	0.015	0.032	sec
Peak Acceleration	0.292	0.371	0.371	g
Peak Displacement	0.00219	0.00359	0.00311	in.
Sensorcheck ™	Passed	Passed	Passed	

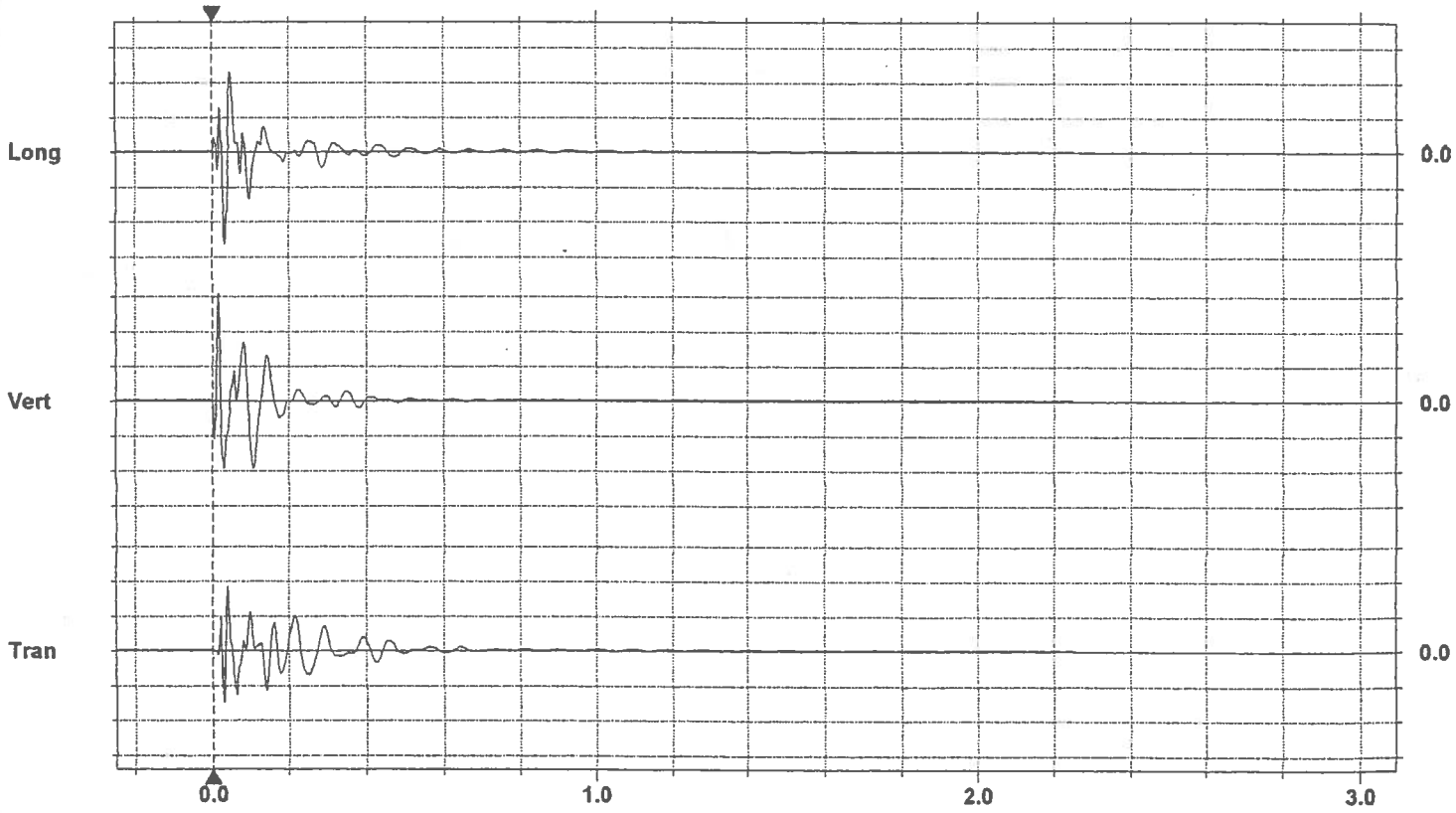
Peak Vector Sum 0.667 in./s at 0.030 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Instantel

Event Report

Date/Time	Vert at 10:59:50 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.4 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1Q.JQ0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

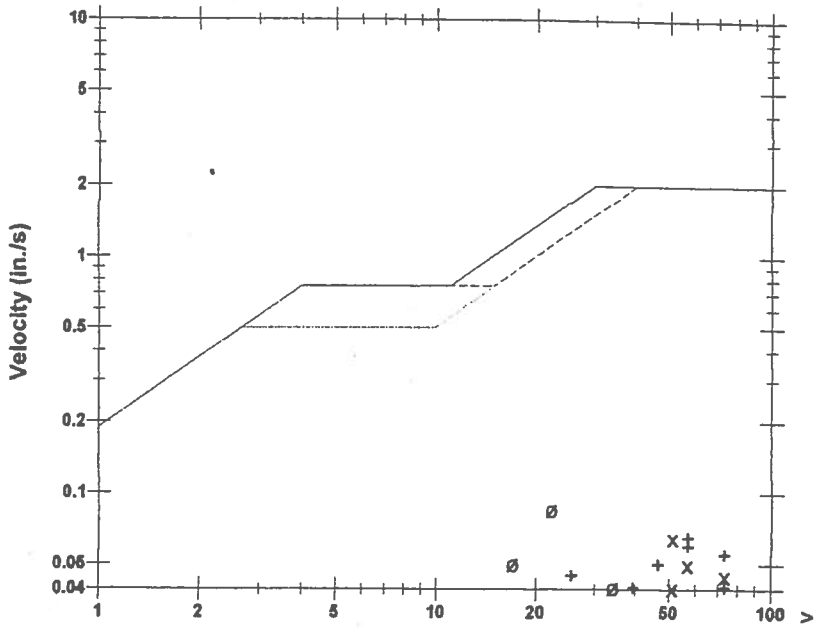
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

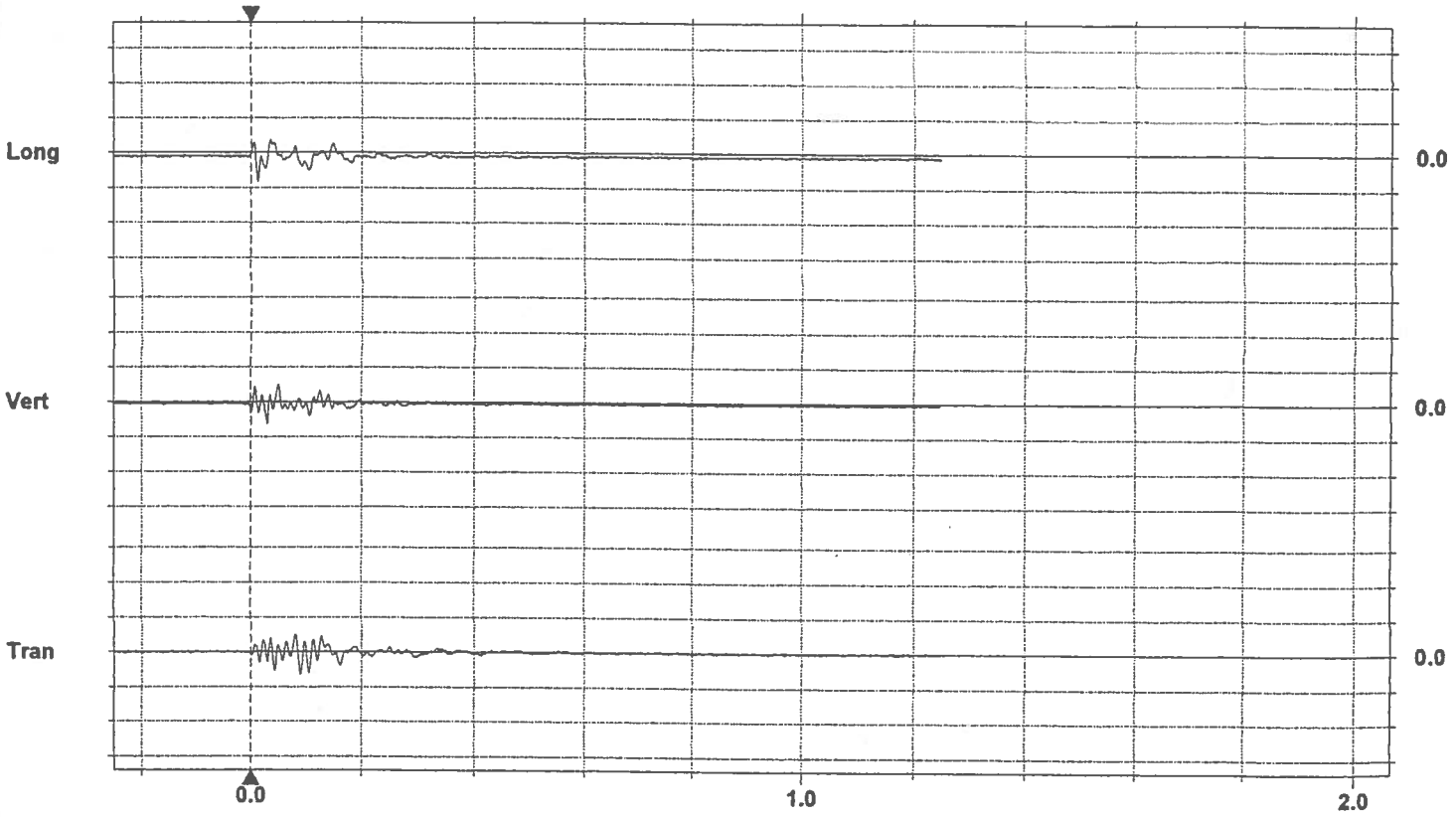
	Tran	Vert	Long	
PPV	0.0650	0.0650	0.0850	in./s
ZC Freq	57	51	22	Hz
Time (Rel. to Trig)	0.090	0.029	0.013	sec
Peak Acceleration	0.0663	0.0663	0.0663	g
Peak Displacement	0.00023	0.00018	0.00155	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0877 in./s at 0.106 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:38:11 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1S.BN0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

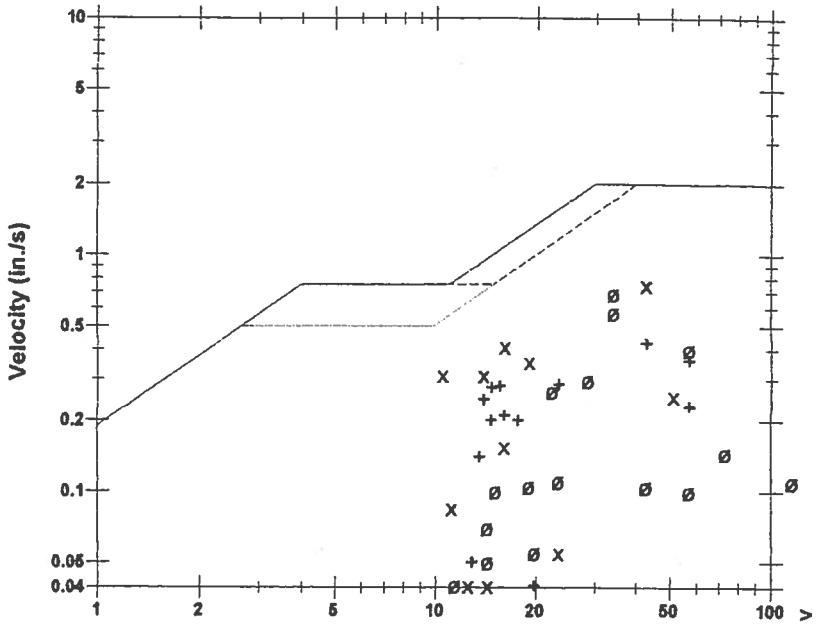
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

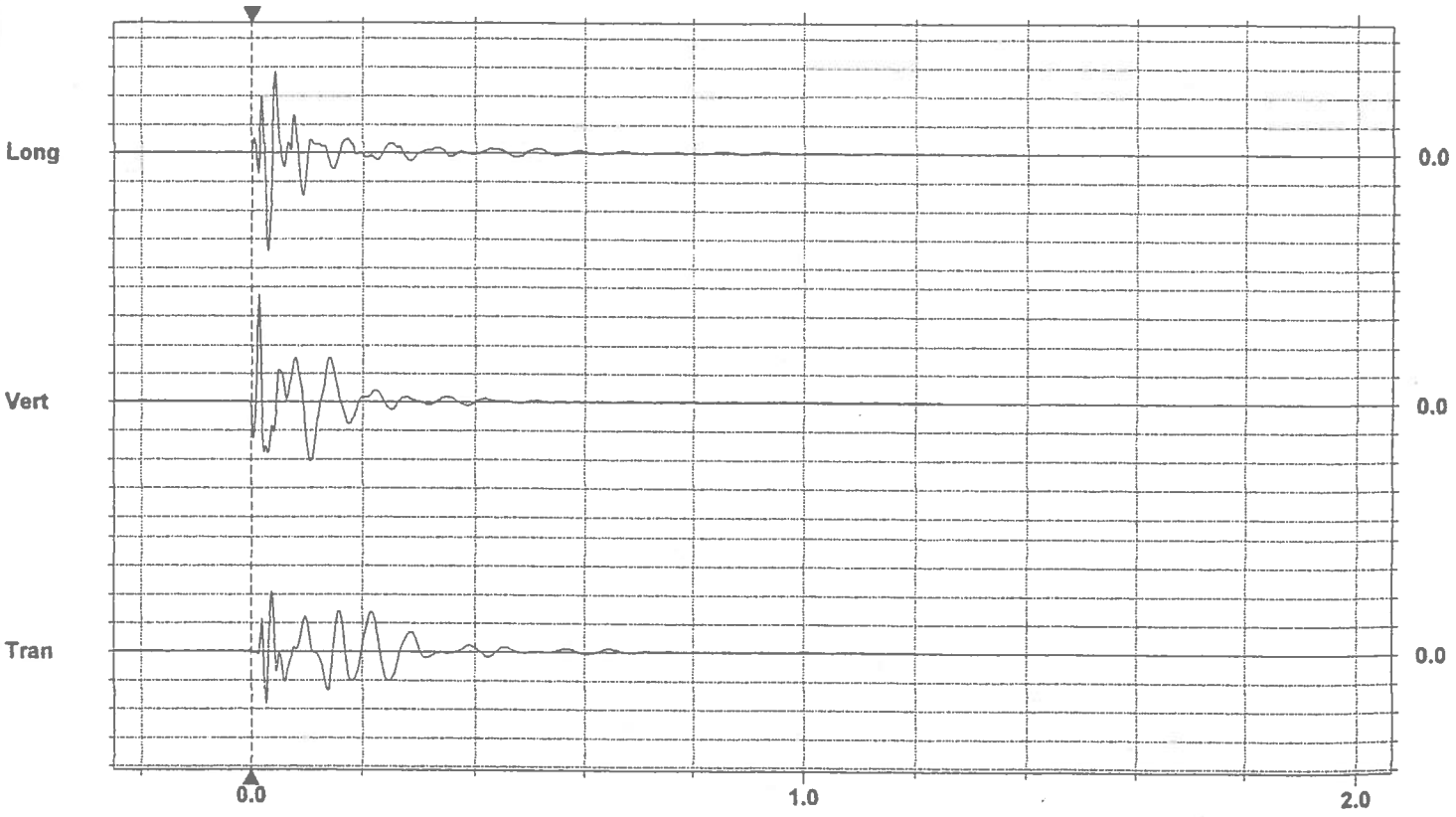
	Tran	Vert	Long	
PPV	0.425	0.750	0.685	in./s
ZC Freq	43	43	34	Hz
Time (Rel. to Trig)	0.038	0.014	0.031	sec
Peak Acceleration	0.358	0.477	0.424	g
Peak Displacement	0.00279	0.00398	0.00308	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.778 in./s at 0.030 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:39:08 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1S.D80

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

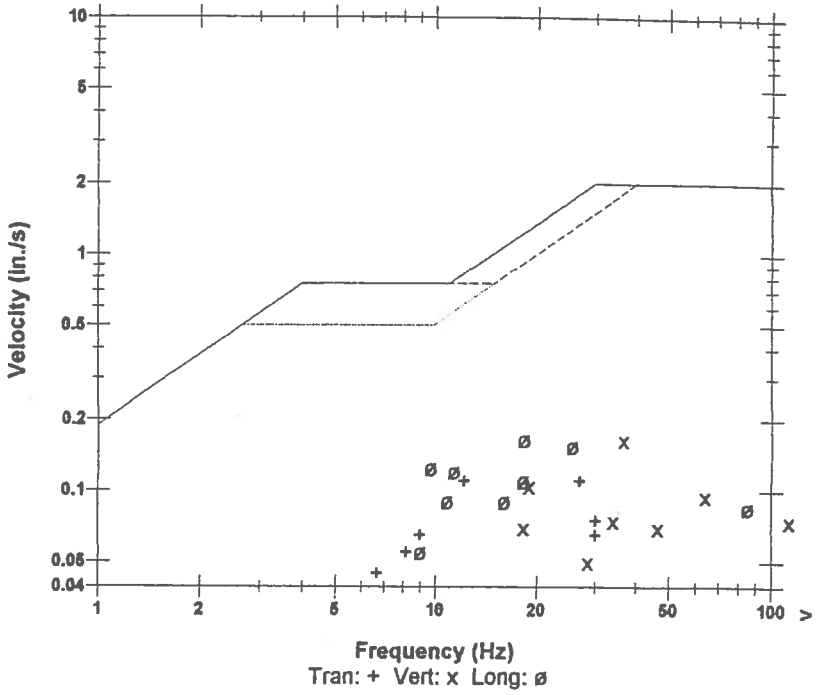
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

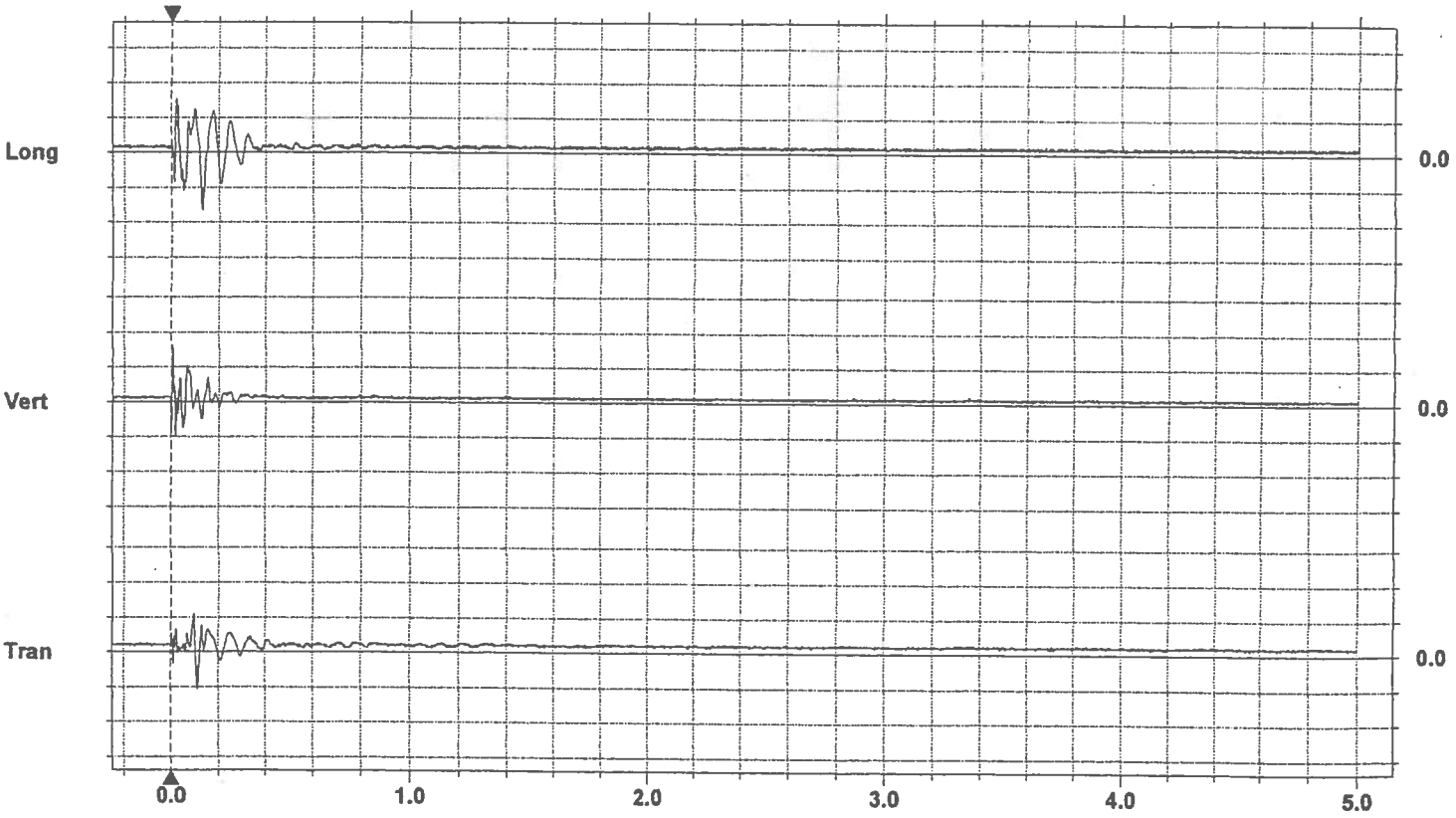
	Tran	Vert	Long	
PPV	0.110	0.165	0.165	in./s
ZC Freq	12	37	18	Hz
Time (Rel. to Trig)	0.093	0.006	0.128	sec
Peak Acceleration	0.0795	0.186	0.133	g
Peak Displacement	0.00266	0.00176	0.00199	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.188 in./s at 0.129 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:39:08 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1S.D80

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

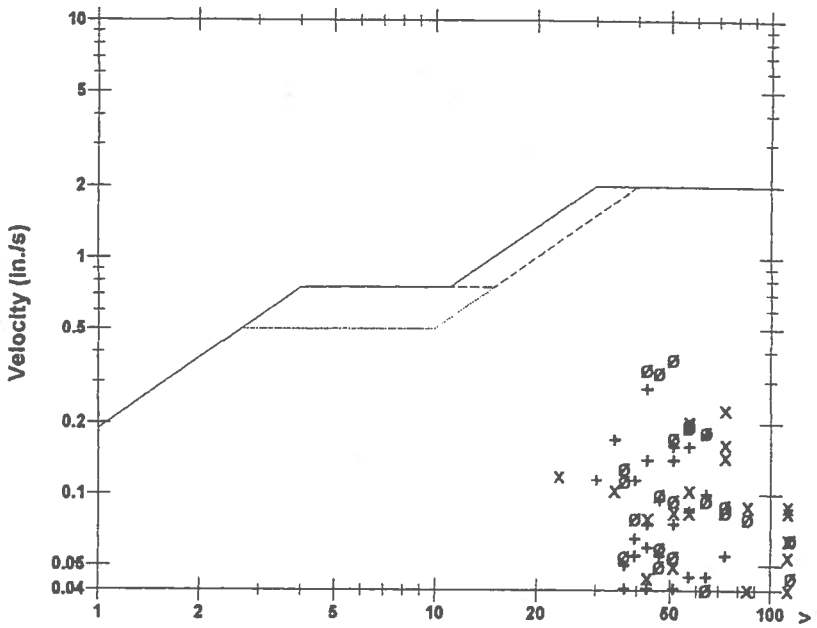
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

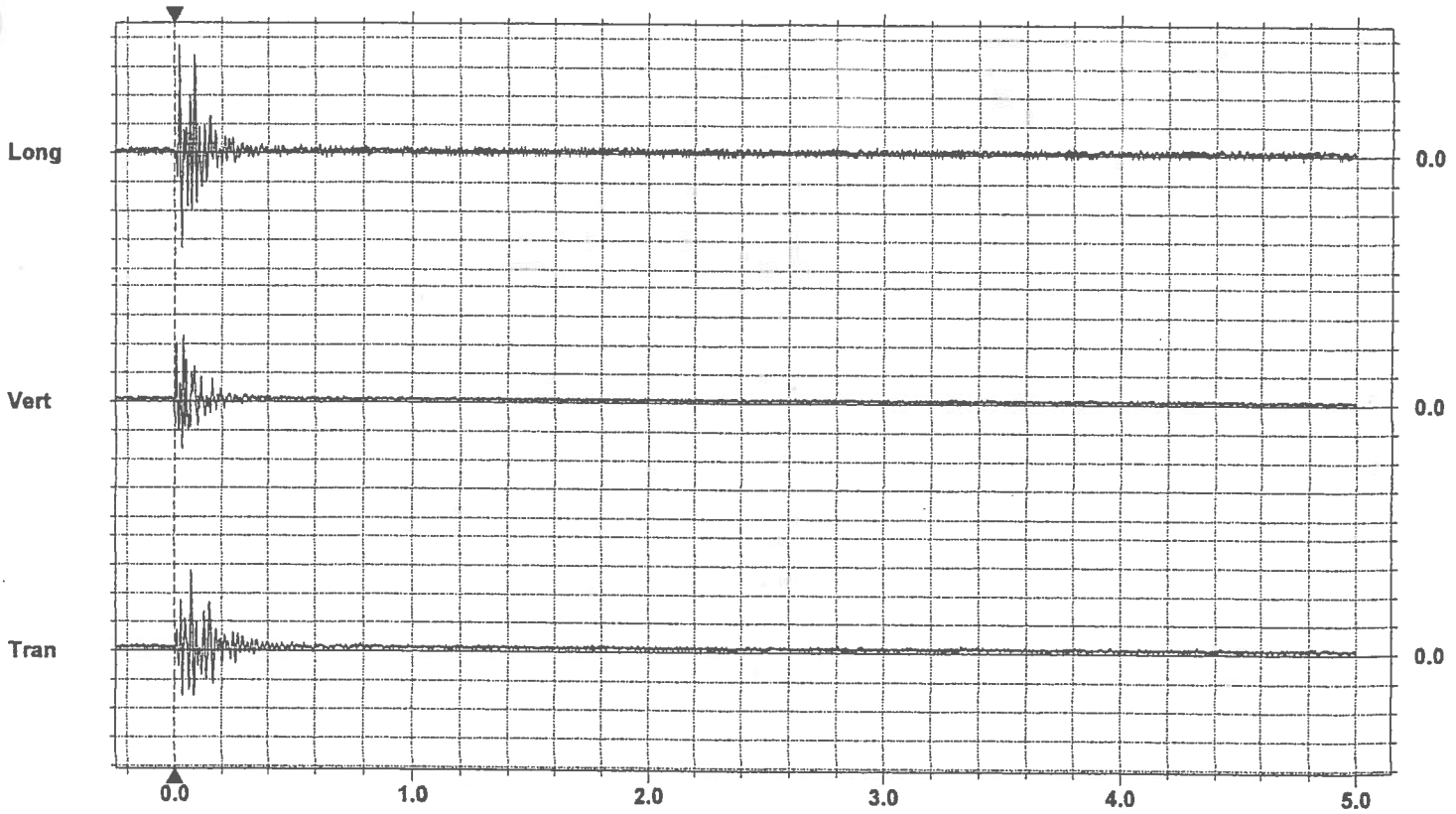
	Tran	Vert	Long	
PPV	0.280	0.230	0.375	in./s
ZC Freq	43	73	51	Hz
Time (Rel. to Trig)	0.072	0.038	0.021	sec
Peak Acceleration	0.212	0.239	0.345	g
Peak Displacement	0.00104	0.00076	0.00127	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.390 in./s at 0.084 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:39:08 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1S.D80

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

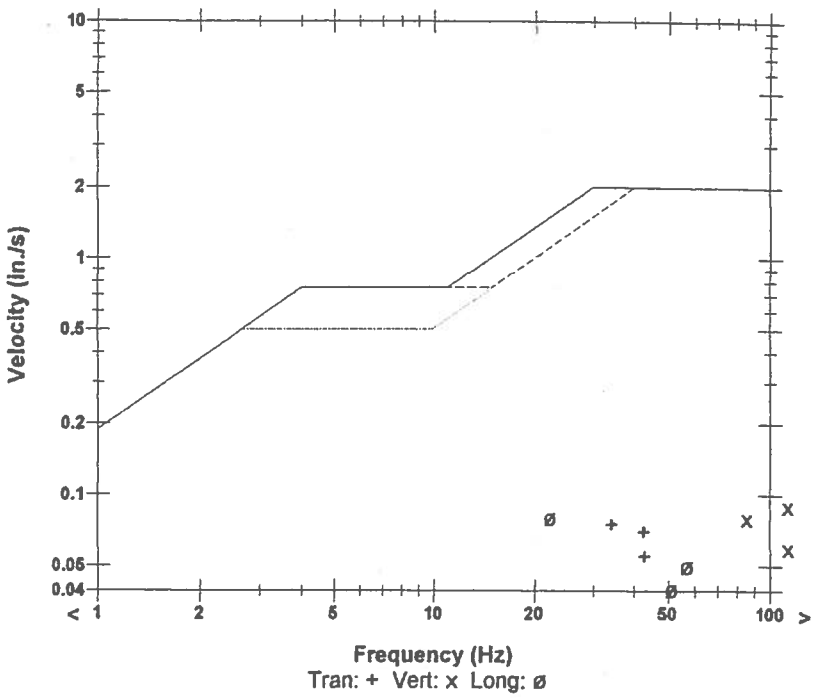
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

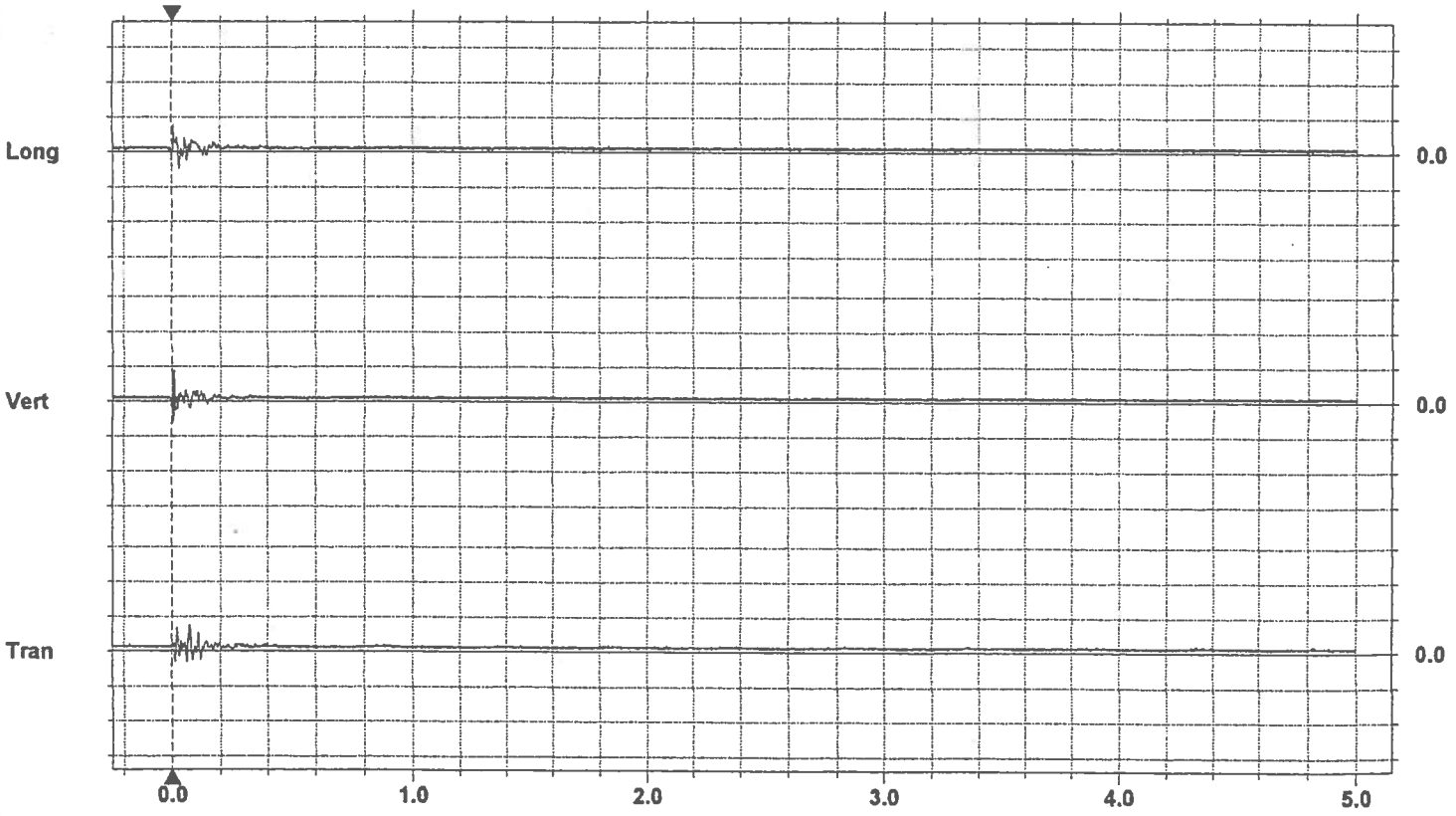
	Tran	Vert	Long	
PPV	0.0750	0.0900	0.0800	in./s
ZC Freq	34	>100	22	Hz
Time (Rel. to Trig)	0.072	0.009	0.009	sec
Peak Acceleration	0.0663	0.172	0.0530	g
Peak Displacement	0.00191	0.00799	0.00206	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.123 in./s at 0.009 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:39:09 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.4 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1S.D90

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

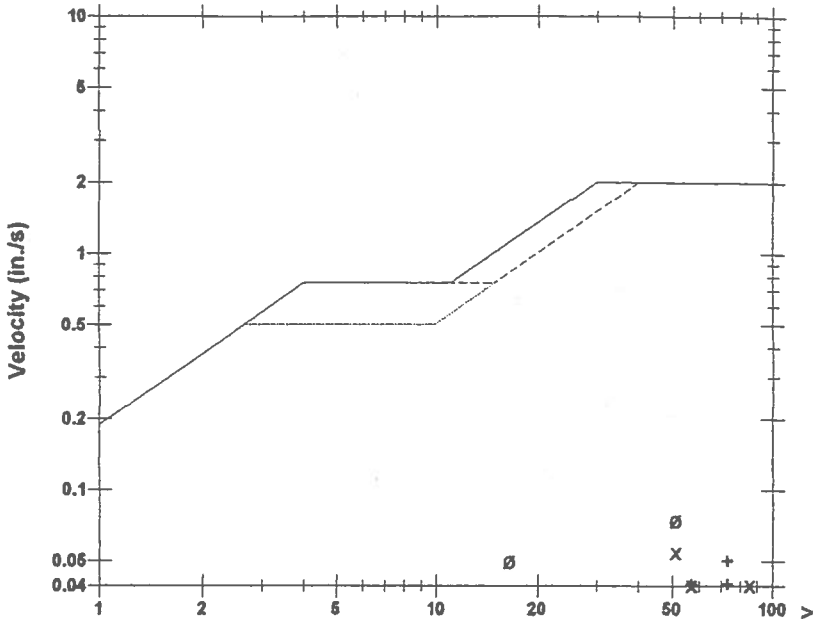
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

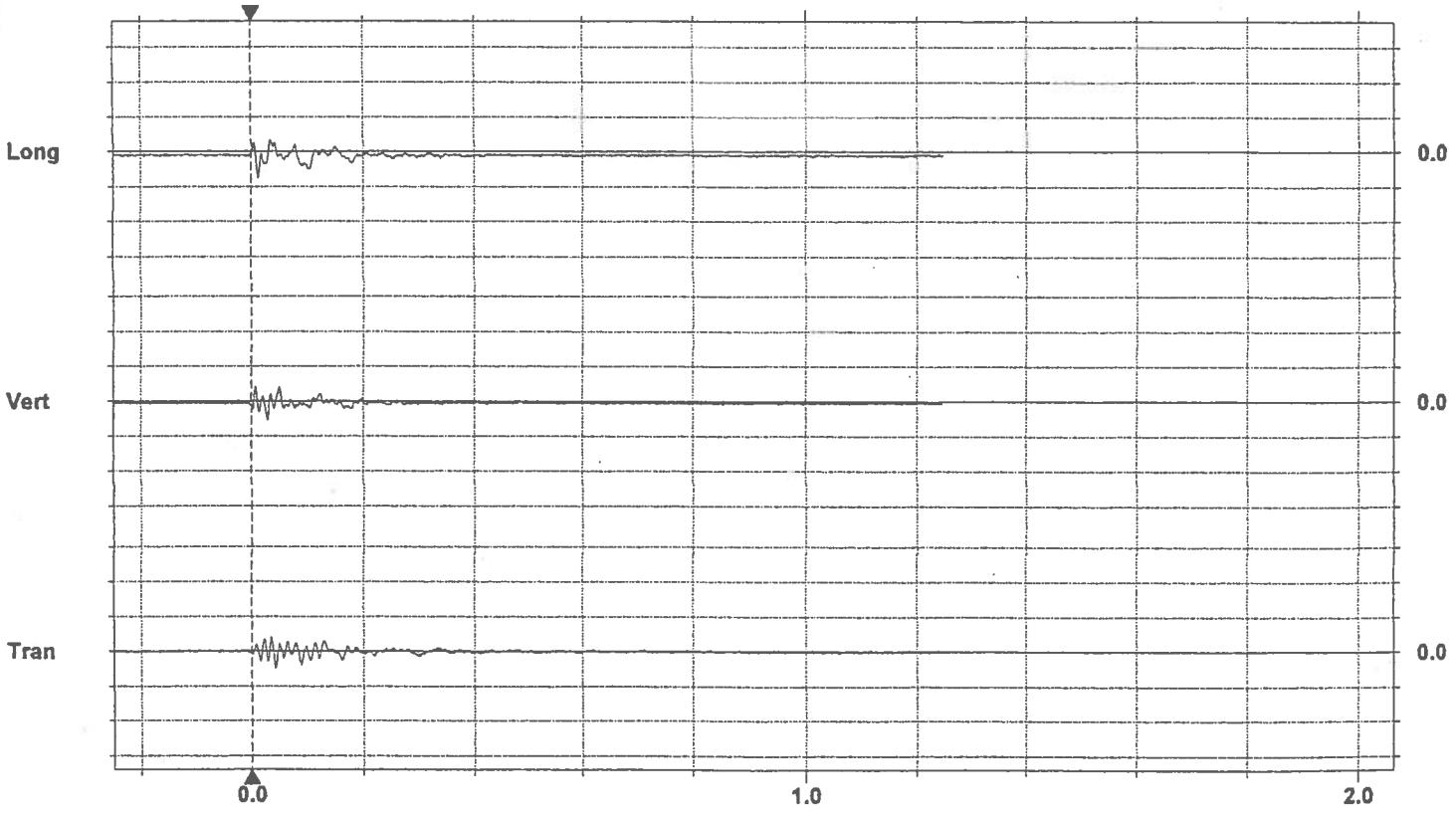
	Tran	Vert	Long	
PPV	0.0500	0.0550	0.0750	in./s
ZC Freq	73	51	51	Hz
Time (Rel. to Trig)	0.044	0.029	0.012	sec
Peak Acceleration	0.0530	0.0663	0.0663	g
Peak Displacement	0.00011	0.00017	0.00125	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0792 in./s at 0.013 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:58:04 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1T.8S0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

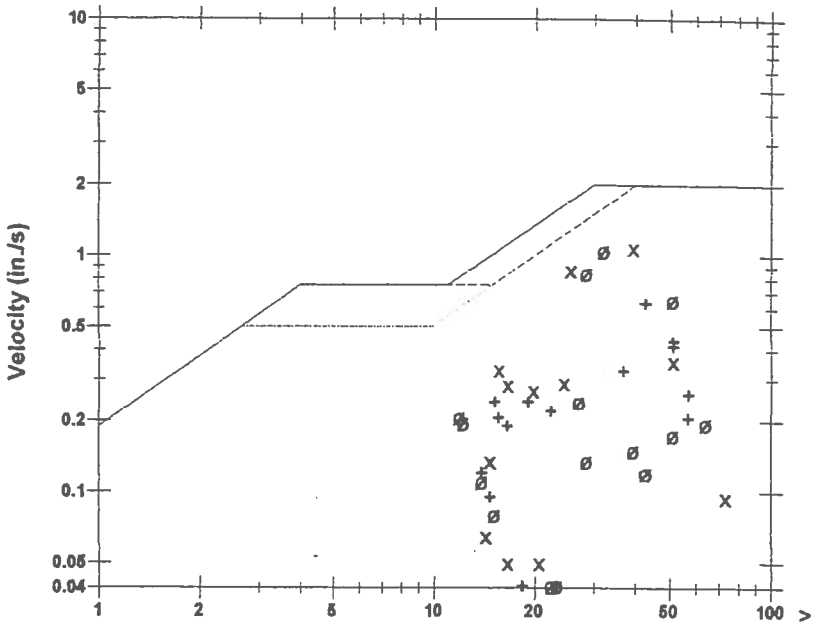
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

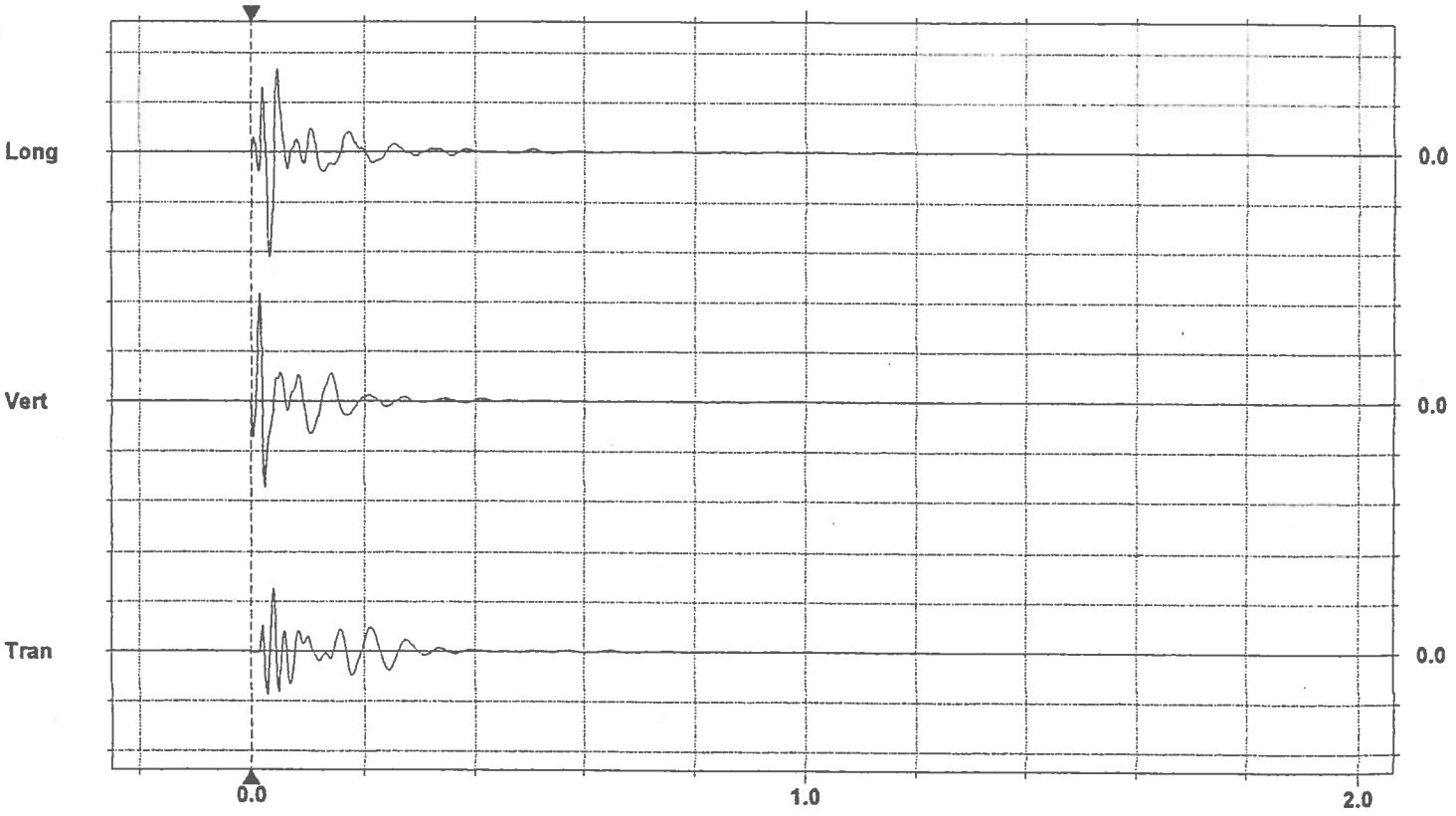
	Tran	Vert	Long	
PPV	0.630	1.08	1.05	in./s
ZC Freq	43	39	32	Hz
Time (Rel. to Trig)	0.040	0.015	0.033	sec
Peak Acceleration	0.464	0.875	0.583	g
Peak Displacement	0.00242	0.00443	0.00519	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 1.11 in./s at 0.033 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





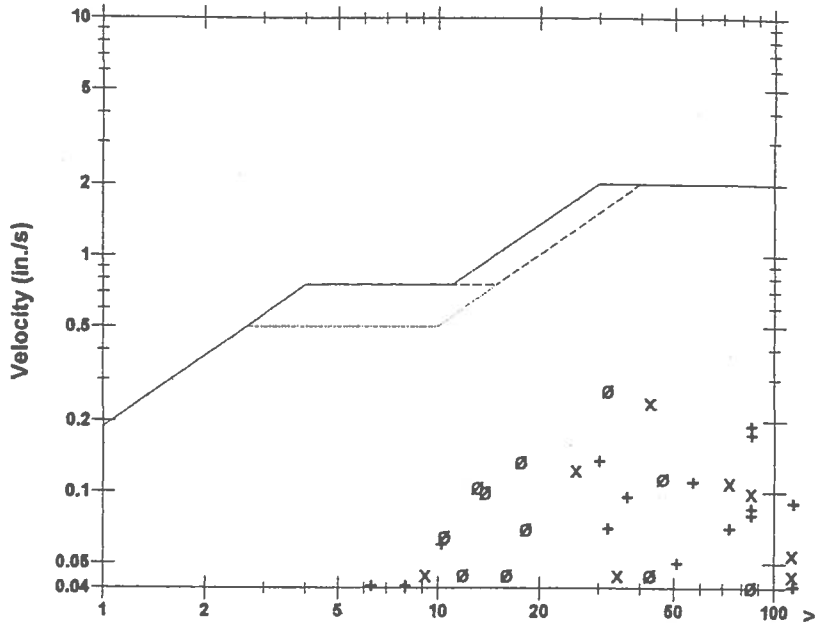
Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 in./s/div
Trigger = ▶--------◀

Date/Time	Vert at 11:59:01 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1T.AD0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

USBM RI8507 And OSMRE

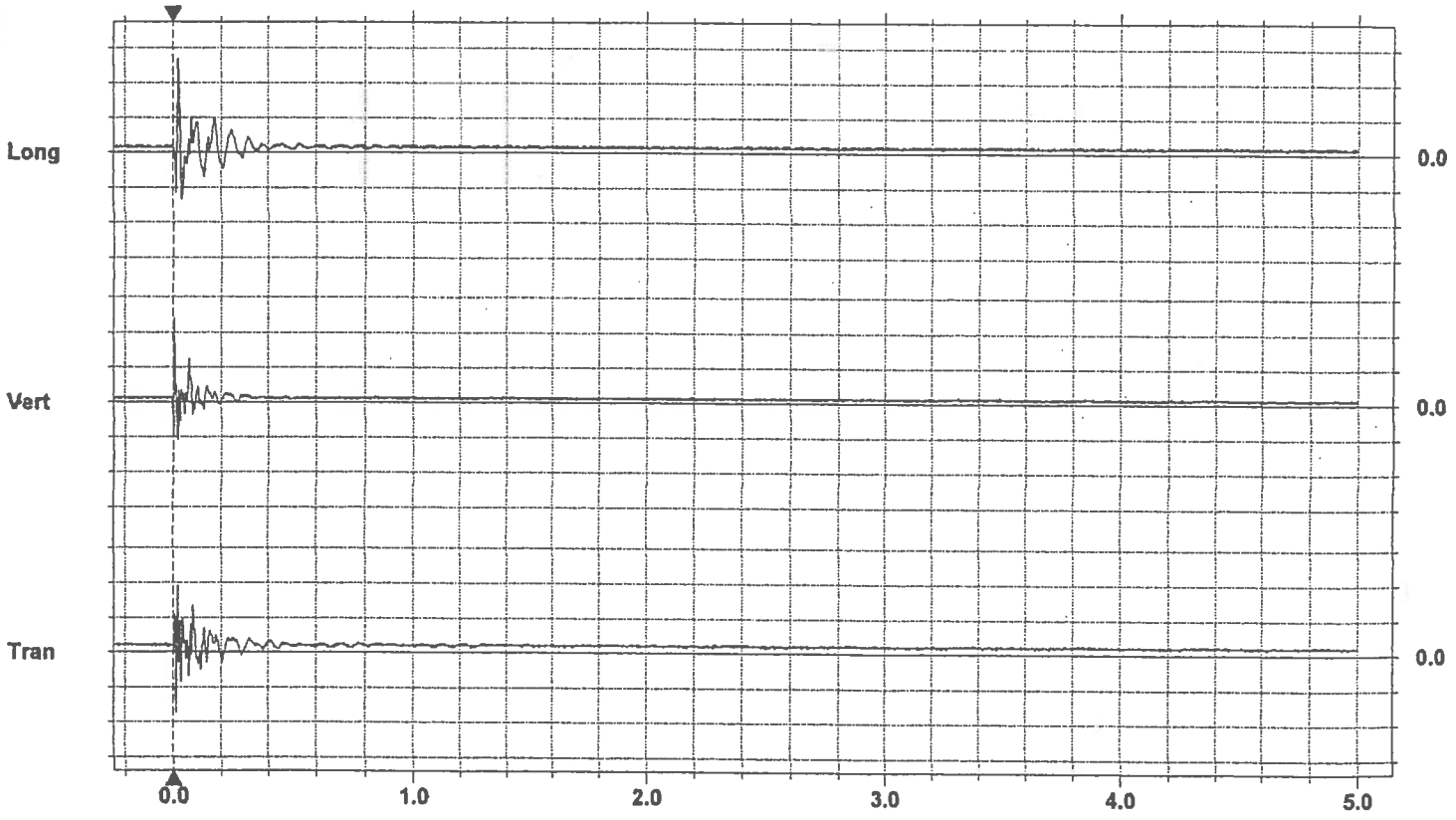


	Tran	Vert	Long	
PPV	0.190	0.240	0.270	in./s
ZC Freq	85	43	32	Hz
Time (Rel. to Trig)	0.019	0.007	0.022	sec
Peak Acceleration	0.265	0.252	0.199	g
Peak Displacement	0.00253	0.00171	0.00200	in.
Sensorcheck ™	Passed	Passed	Passed	

Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

Peak Vector Sum 0.288 in./s at 0.021 sec

N/A: Not Applicable



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:59:01 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1T.AD0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

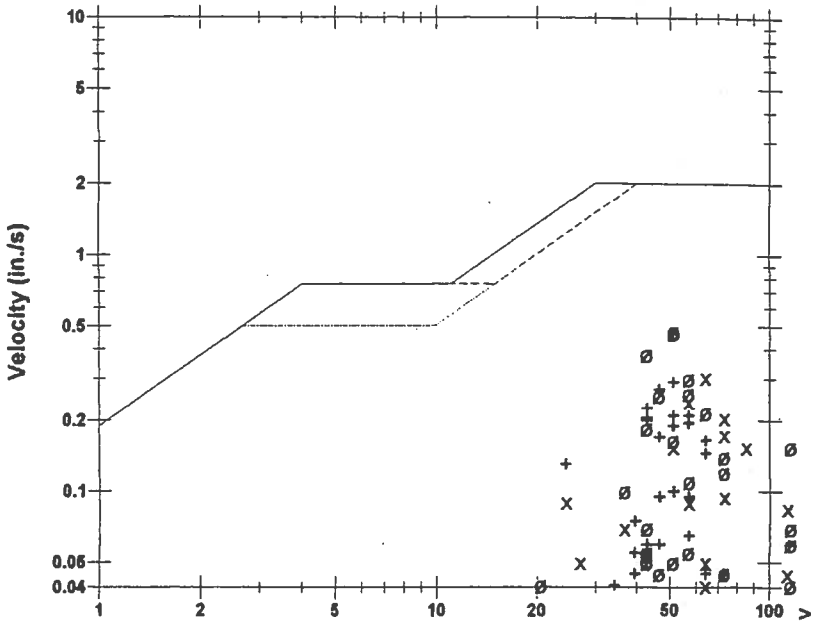
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

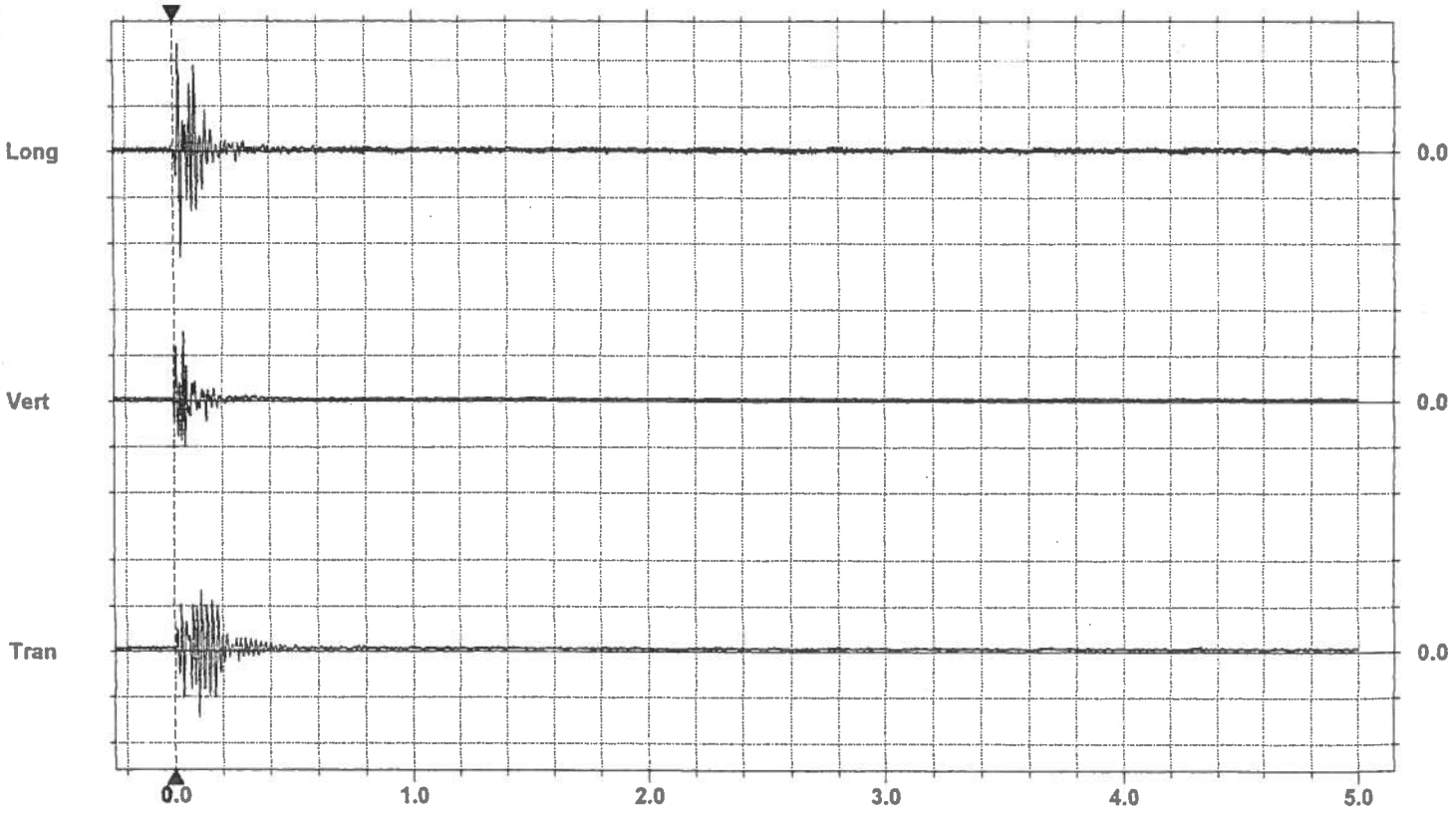
	Tran	Vert	Long	
PPV	0.290	0.305	0.475	in./s
ZC Freq	51	64	51	Hz
Time (Rel. to Trig)	0.101	0.039	0.021	sec
Peak Acceleration	0.239	0.318	0.424	g
Peak Displacement	0.00151	0.00078	0.00148	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.504 in./s at 0.031 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Instantel

Event Report

Date/Time	Vert at 11:59:01 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1T.ADO

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

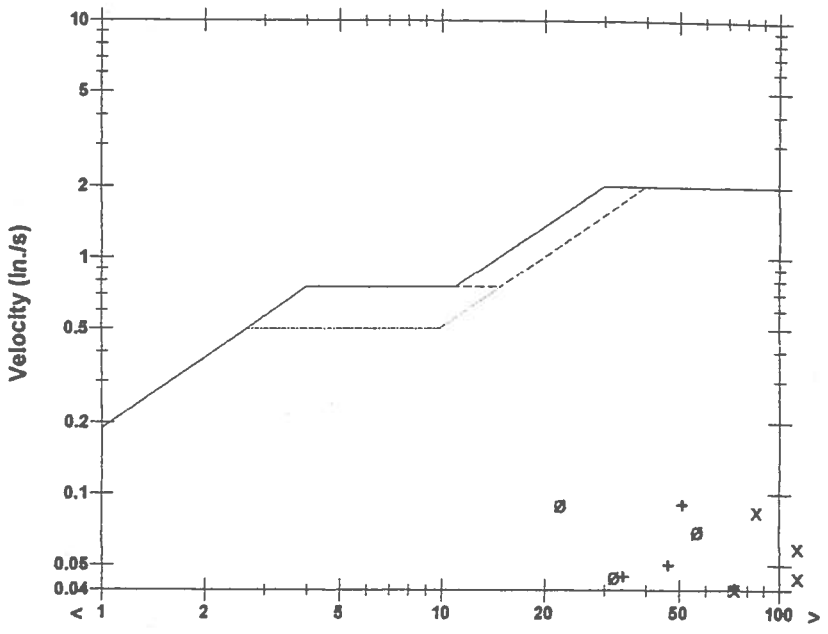
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

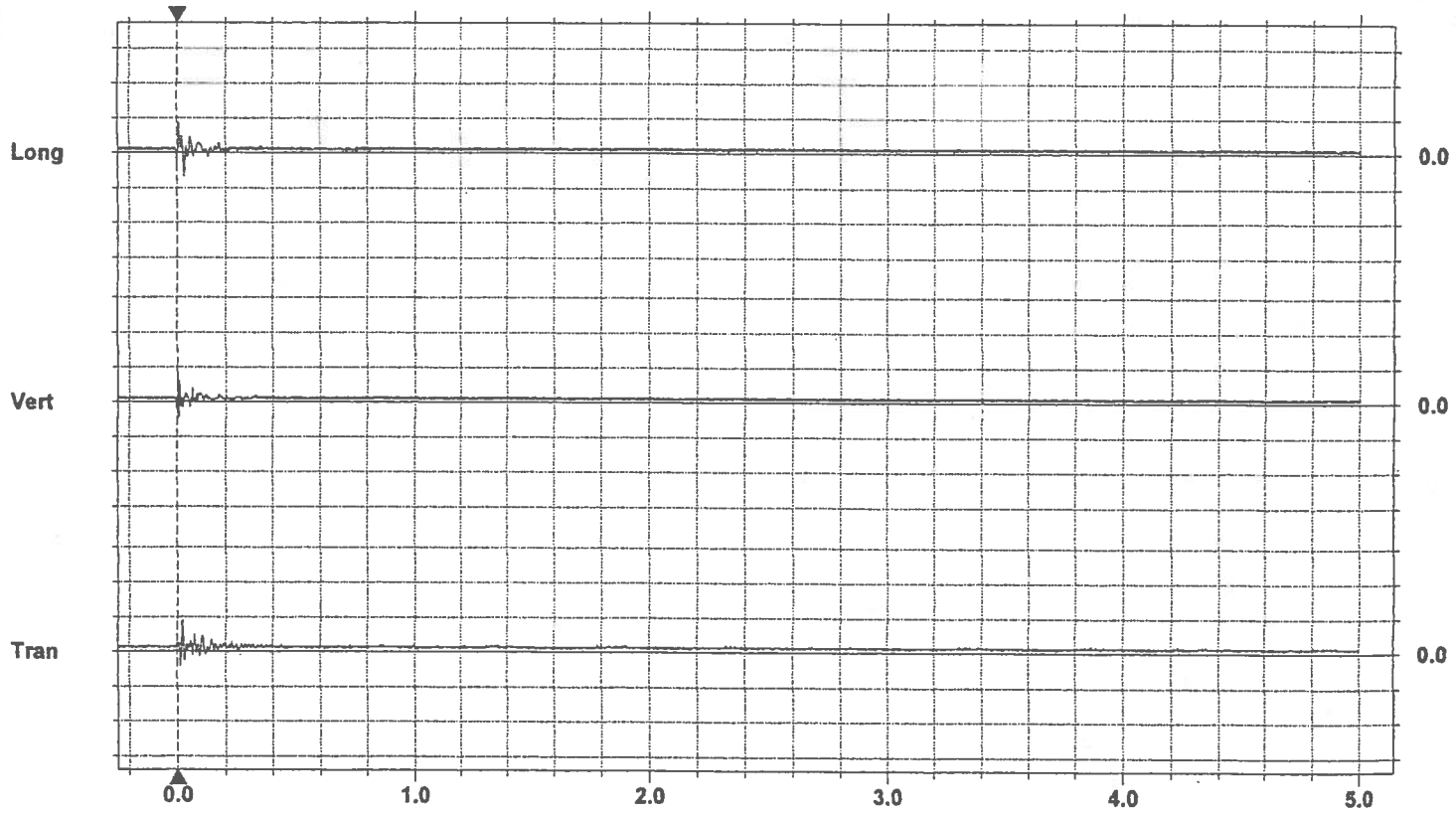
	Tran	Vert	Long	
PPV	0.0900	0.0850	0.0900	in./s
ZC Freq	51	85	22	Hz
Time (Rel. to Trig)	0.021	0.001	0.008	sec
Peak Acceleration	0.0795	0.133	0.0530	g
Peak Displacement	0.00192	0.0242	0.00214	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.107 in./s at 0.009 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 11:59:02 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1T.AE0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

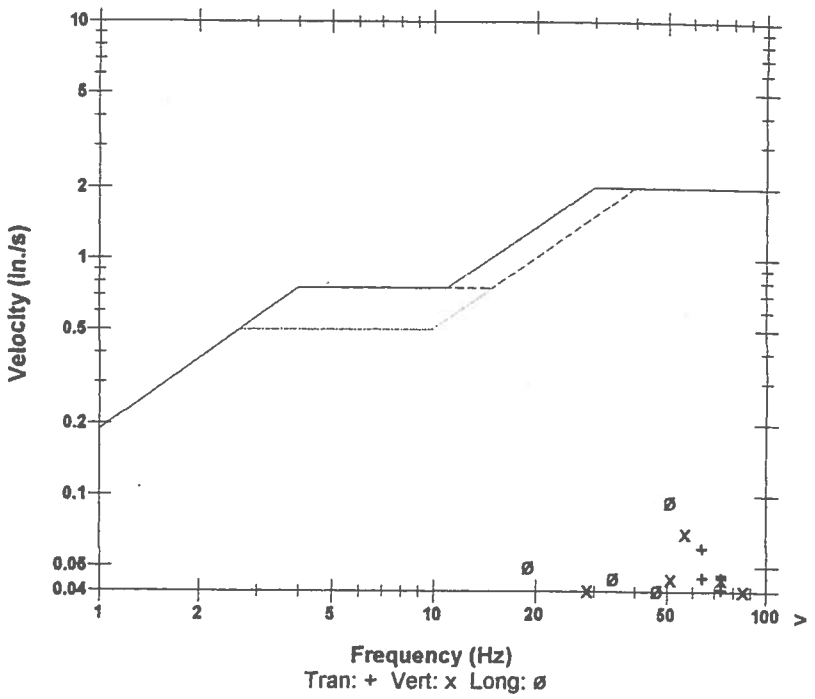
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

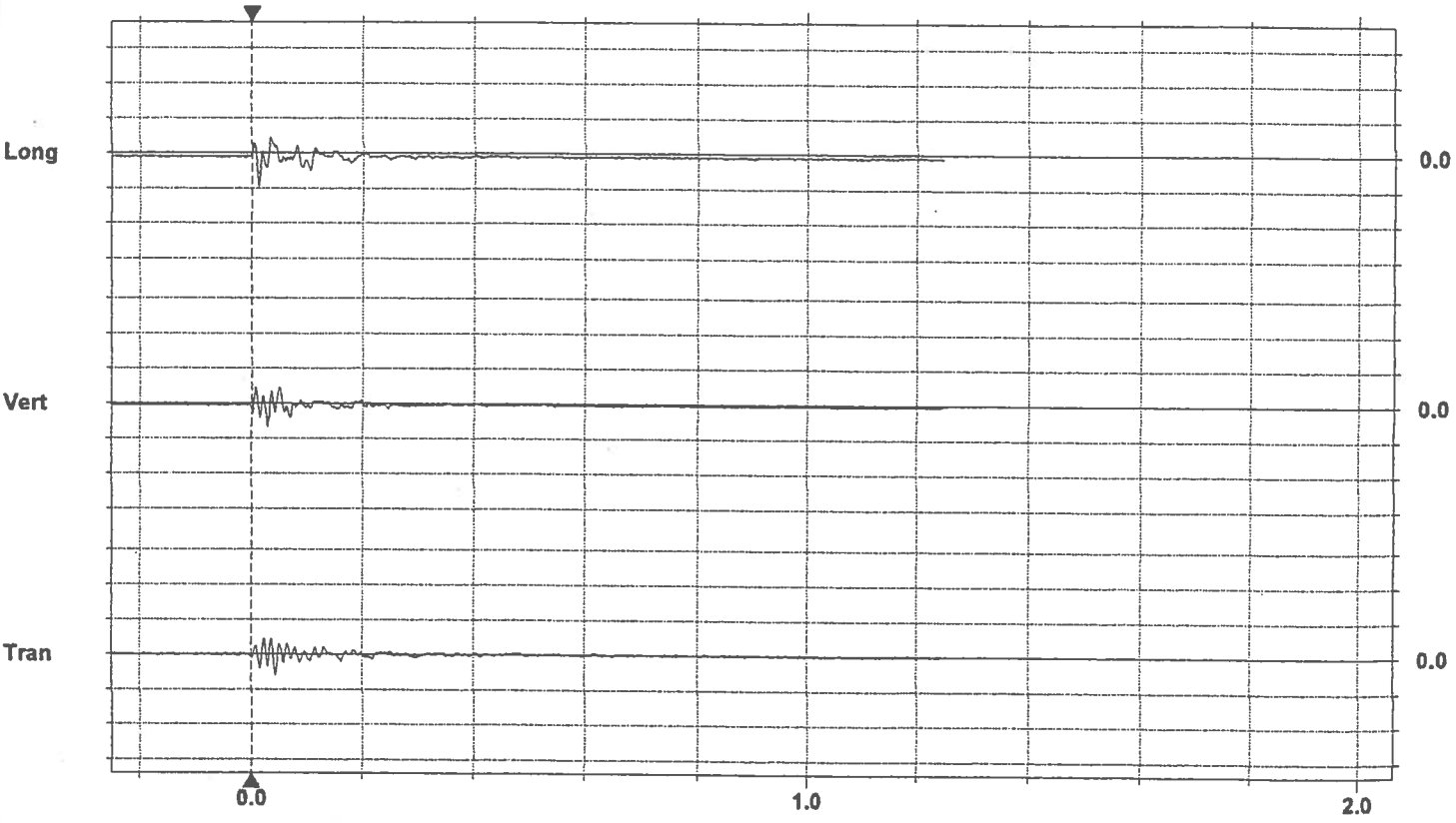
	Tran	Vert	Long	
PPV	0.0600	0.0700	0.0950	in./s
ZC Freq	64	57	51	Hz
Time (Rel. to Trig)	0.044	0.029	0.012	sec
Peak Acceleration	0.0663	0.0663	0.0795	g
Peak Displacement	0.00015	0.00020	0.00081	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0963 in./s at 0.012 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:12:38 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1T.X20

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

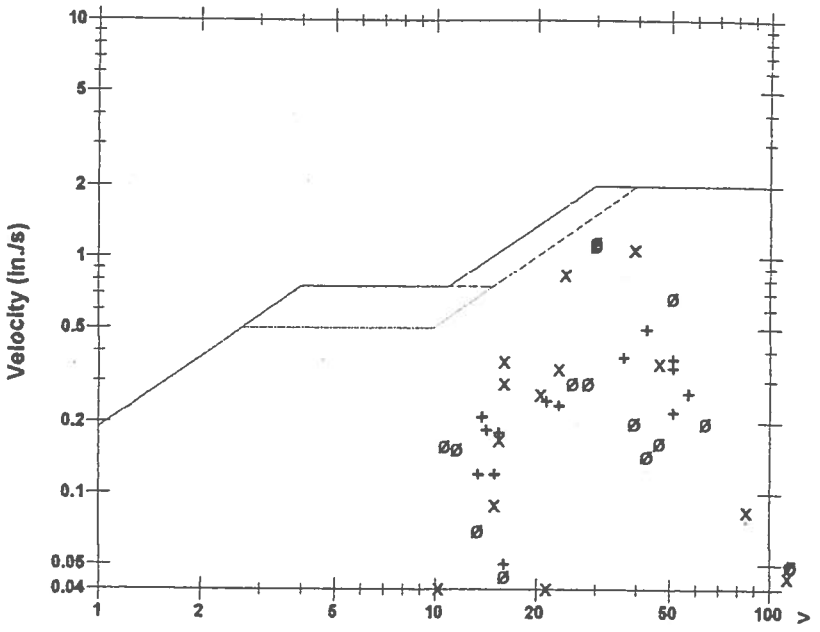
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.495	1.09	1.16	in./s
ZC Freq	43	39	30	Hz
Time (Rel. to Trig)	0.041	0.016	0.050	sec
Peak Acceleration	0.384	0.835	0.716	g
Peak Displacement	0.00234	0.00485	0.00594	in.
Sensorcheck ™	Passed	Passed	Passed	

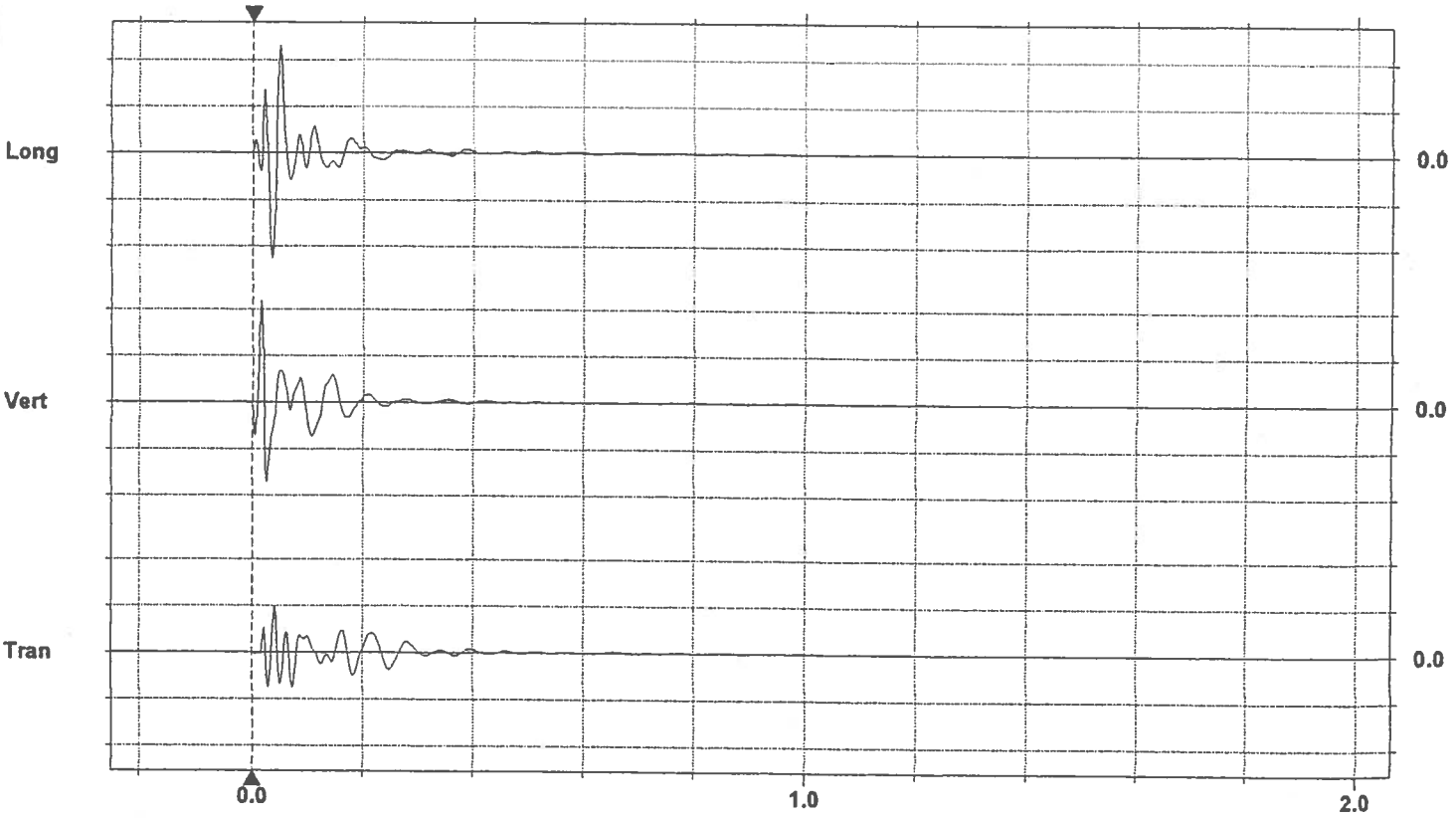
Peak Vector Sum 1.25 in./s at 0.050 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Frequency (Hz)
Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:13:34 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	8.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1T.YM0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

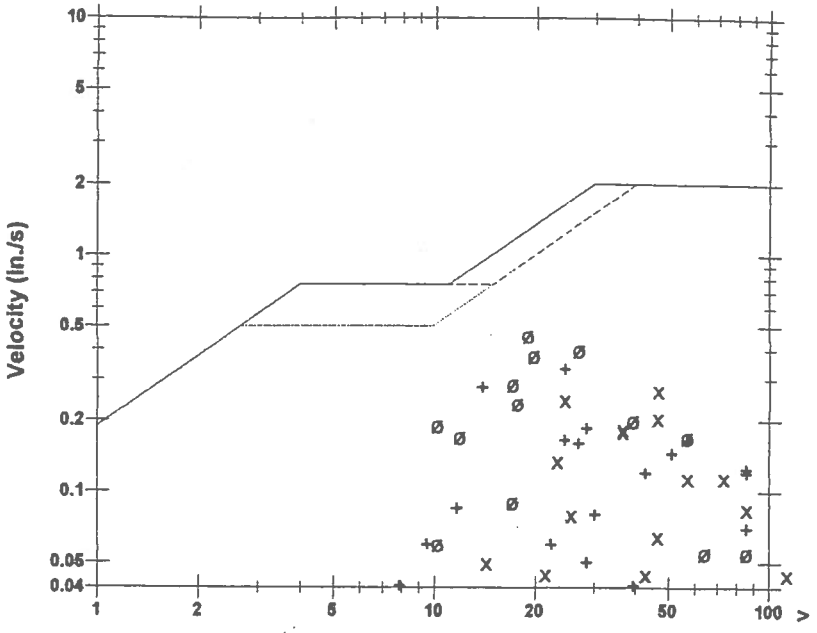
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.330	0.270	0.455	in./s
ZC Freq	24	47	19	Hz
Time (Rel. to Trig)	0.063	0.009	0.049	sec
Peak Acceleration	0.212	0.212	0.212	g
Peak Displacement	0.00255	0.00169	0.00260	in.
Sensorcheck ™	Passed	Passed	Passed	

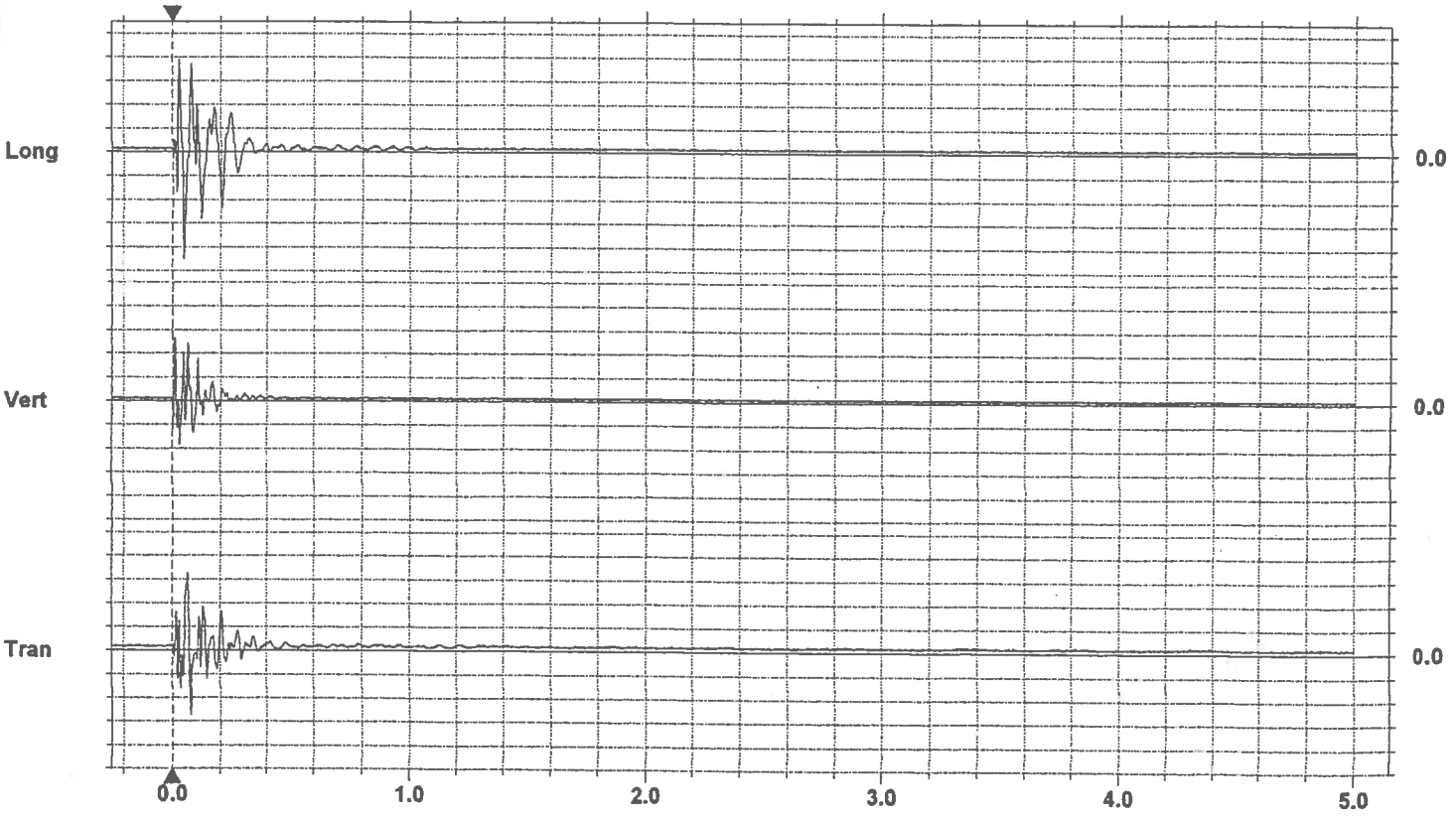
Peak Vector Sum 0.468 in./s at 0.048 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:13:34 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1T.YM0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

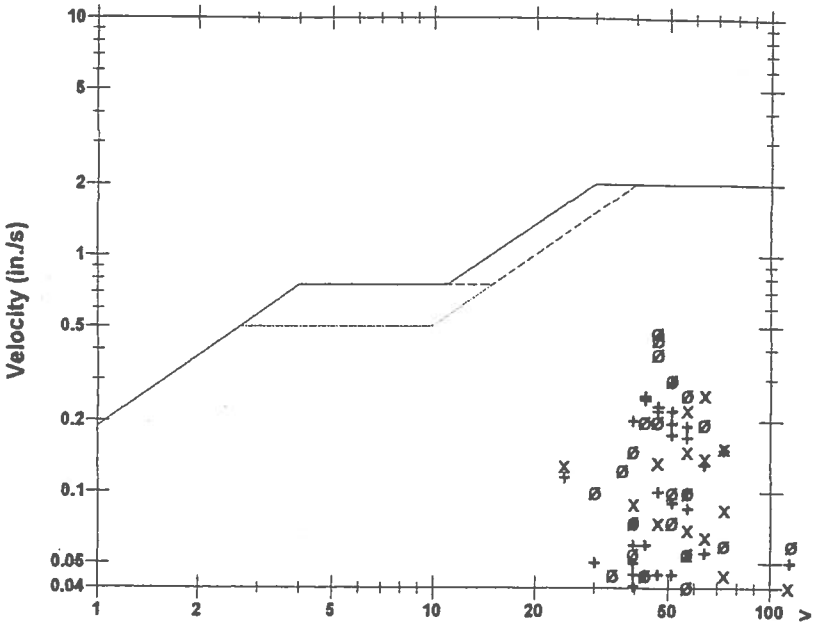
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

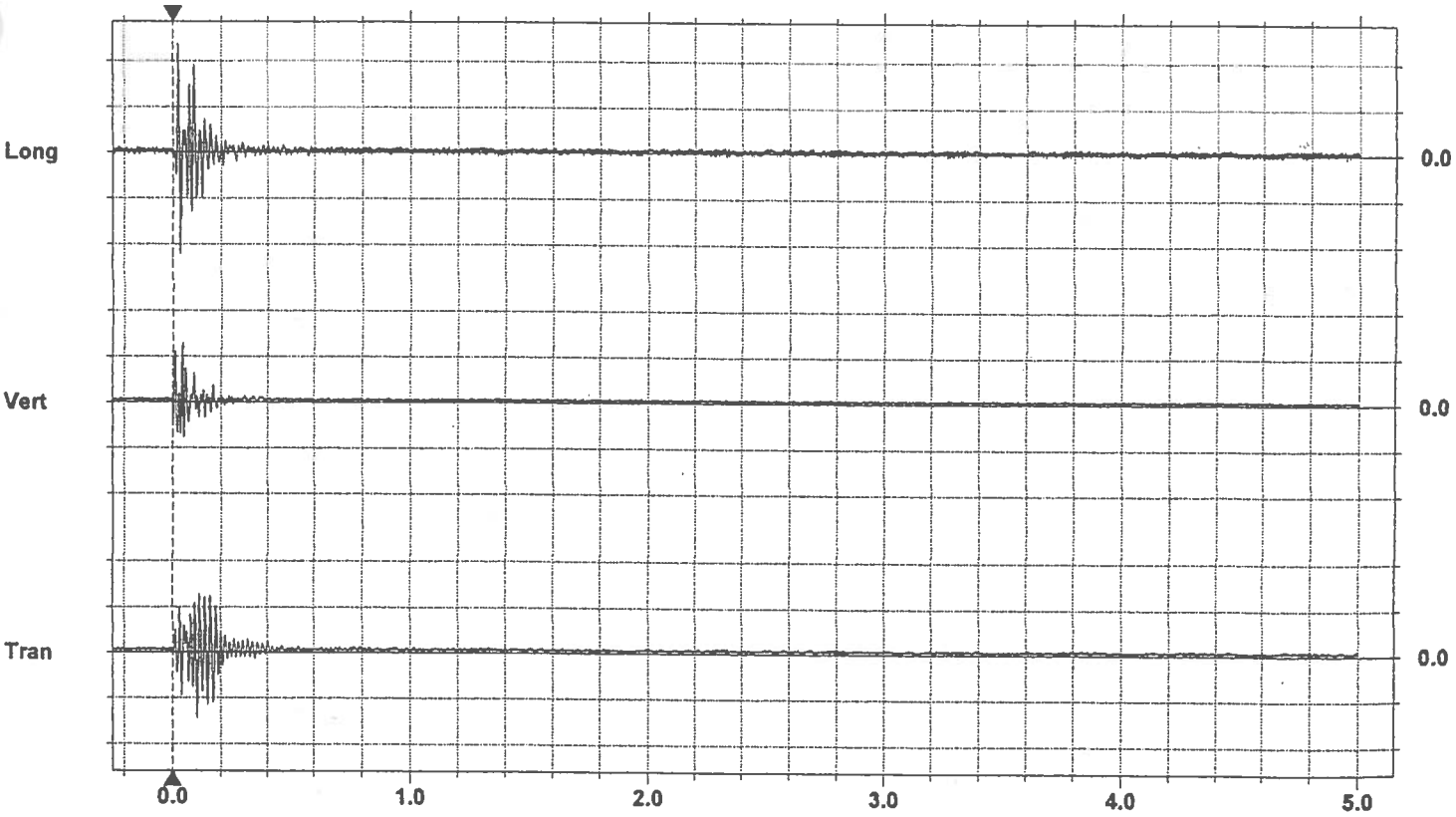
	Tran	Vert	Long	
PPV	0.290	0.260	0.475	in./s
ZC Freq	51	64	47	Hz
Time (Rel. to Trig)	0.101	0.040	0.021	sec
Peak Acceleration	0.225	0.252	0.398	g
Peak Displacement	0.00096	0.00124	0.00152	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.488 in./s at 0.021 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Instantel

Event Report

Date/Time	Vert at 12:13:34 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1T.YM0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

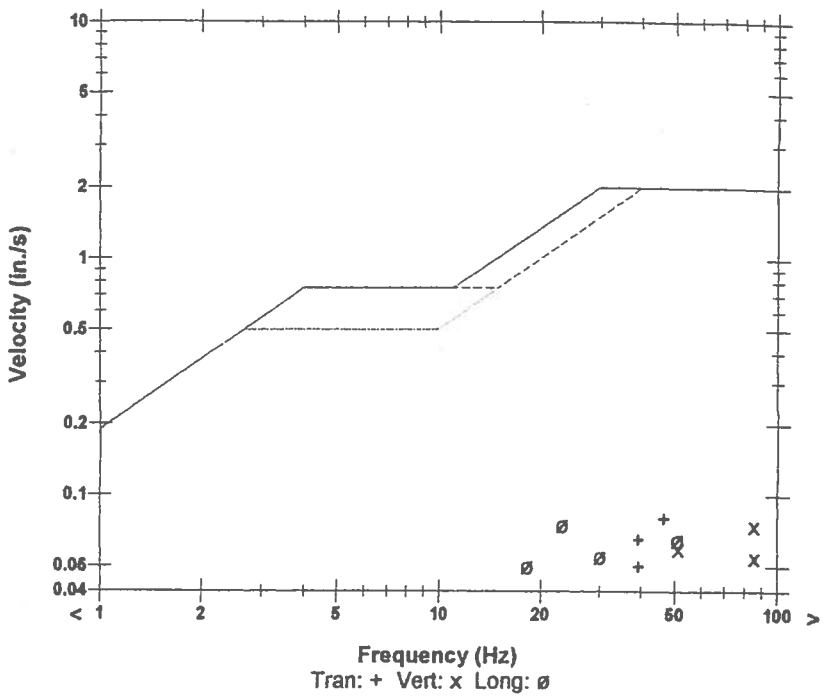
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

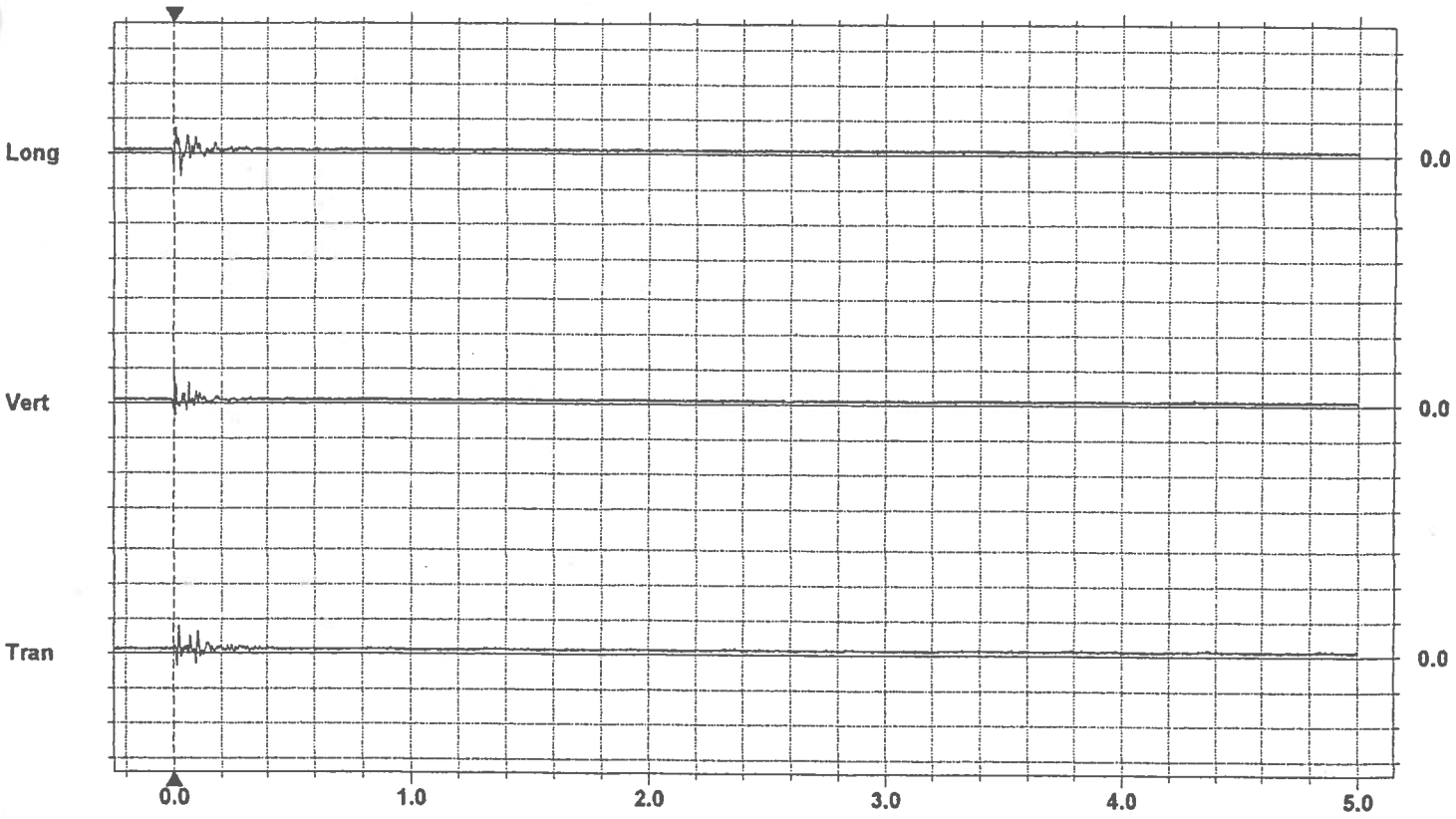
	Tran	Vert	Long	
PPV	0.0800	0.0750	0.0750	in./s
ZC Freq	47	85	23	Hz
Time (Rel. to Trig)	0.022	0.001	0.009	sec
Peak Acceleration	0.0663	0.106	0.0530	g
Peak Displacement	0.00191	0.0131	0.00177	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0931 in./s at 0.010 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Instantel

Event Report

Date/Time	Long at 12:13:35 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.4 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.75 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1T.YN0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

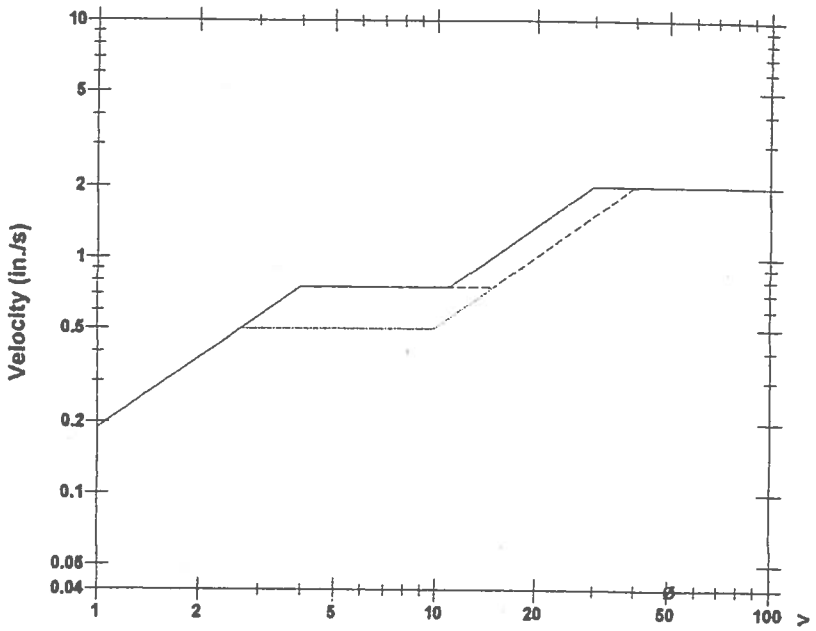
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

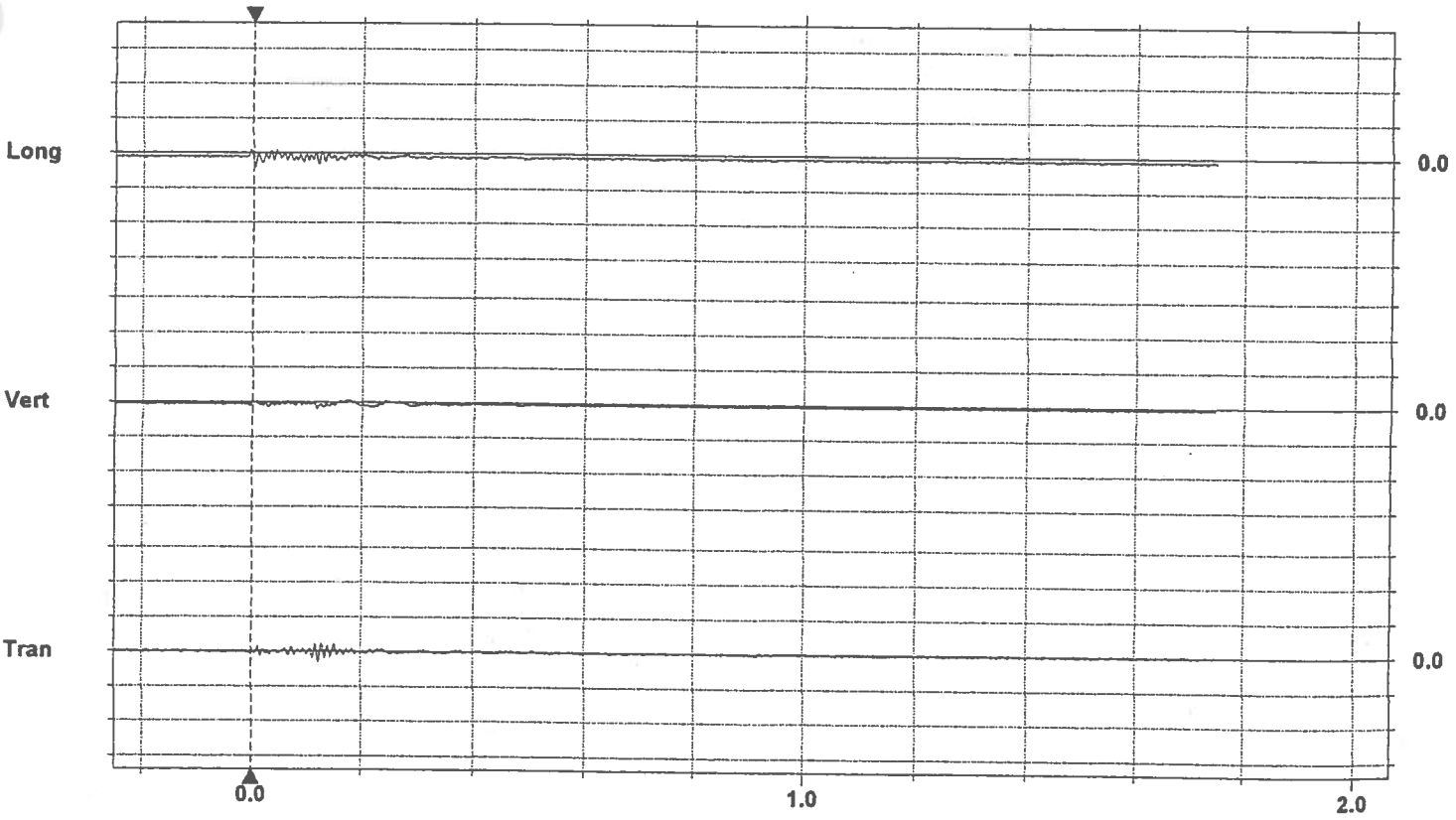
	Tran	Vert	Long	
PPV	0.0300	0.0200	0.0400	in./s
ZC Freq	85	57	51	Hz
Time (Rel. to Trig)	0.124	0.119	0.002	sec
Peak Acceleration	0.0530	0.0265	0.0398	g
Peak Displacement	0.00008	0.00013	0.00122	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0412 in./s at 0.119 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:31:54 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1U.T60

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

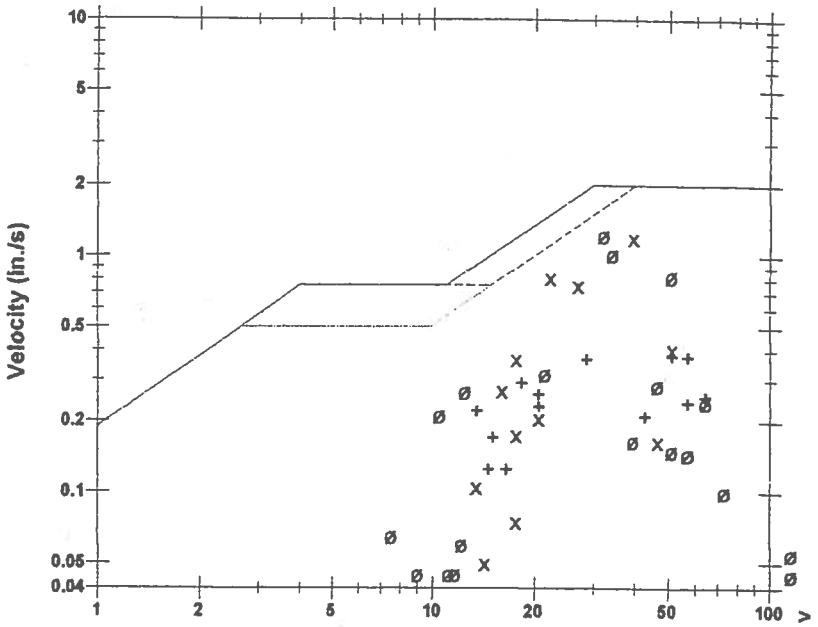
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

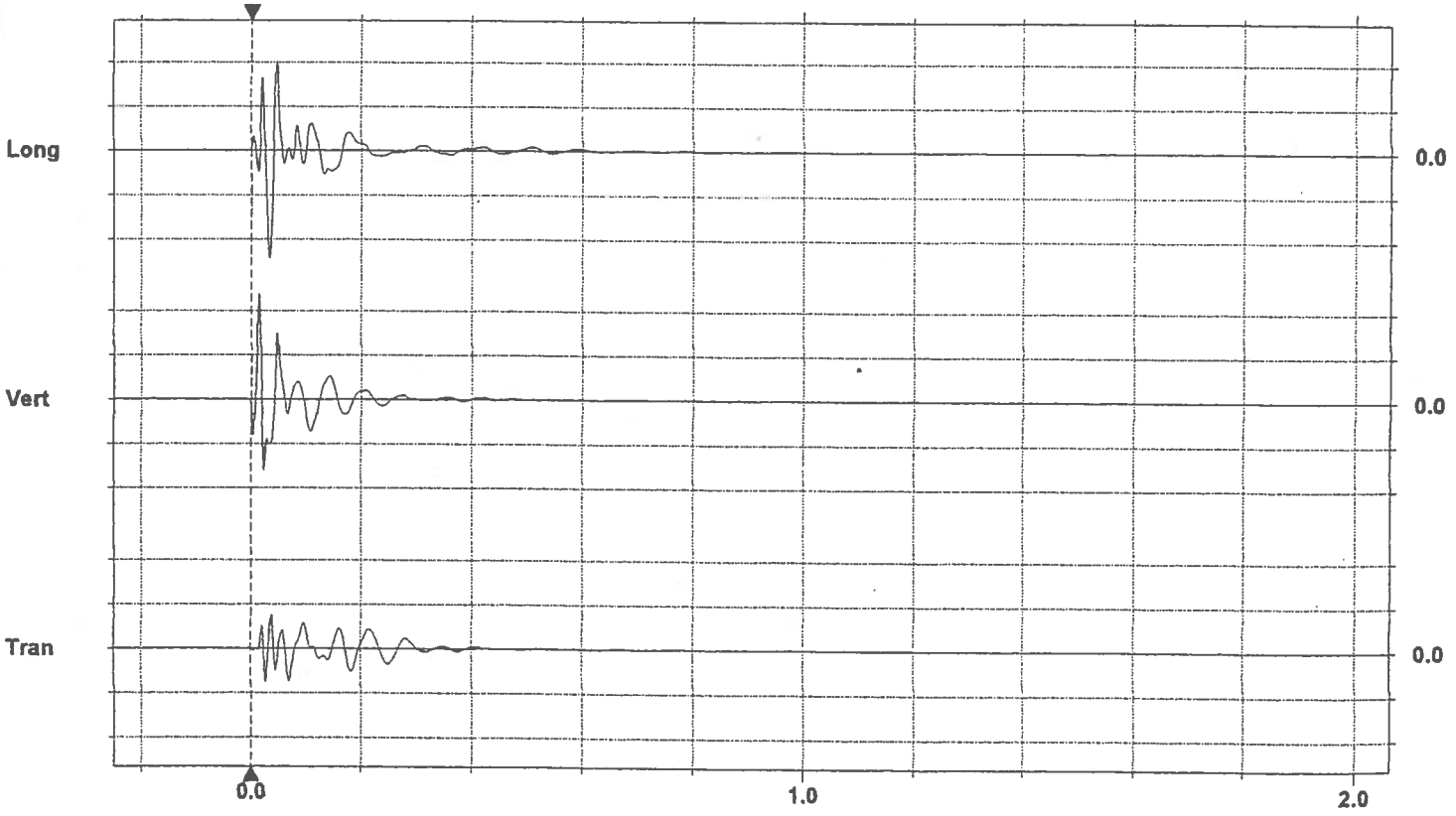
	Tran	Vert	Long	
PPV	0.380	1.19	1.22	in./s
ZC Freq	51	39	32	Hz
Time (Rel. to Trig)	0.038	0.015	0.034	sec
Peak Acceleration	0.411	0.928	0.769	g
Peak Displacement	0.00243	0.00555	0.00599	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 1.33 in./s at 0.035 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:32:51 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1U.UR0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

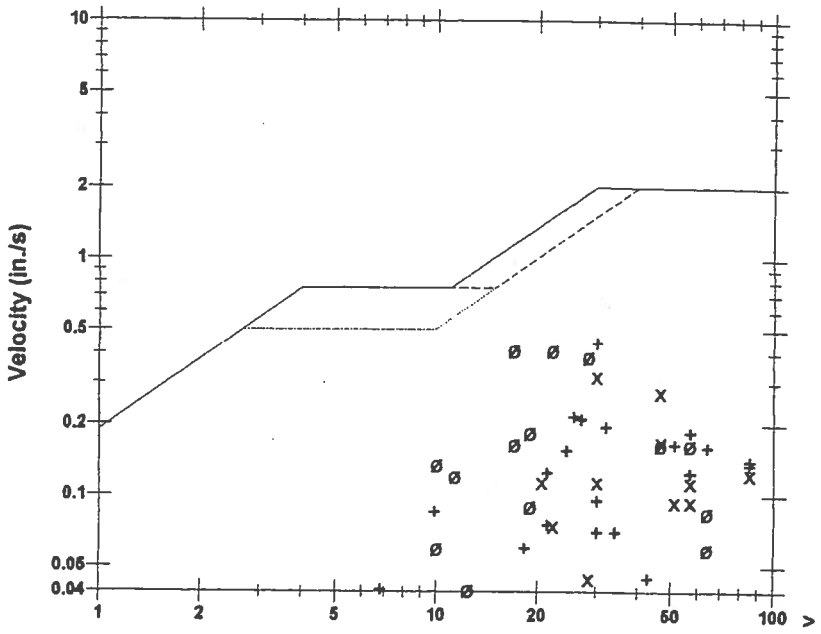
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.440	0.320	0.410	in./s
ZC Freq	30	30	22	Hz
Time (Rel. to Trig)	0.057	0.063	0.048	sec
Peak Acceleration	0.265	0.225	0.199	g
Peak Displacement	0.00258	0.00165	0.00286	in.
Sensorcheck ™	Passed	Passed	Passed	

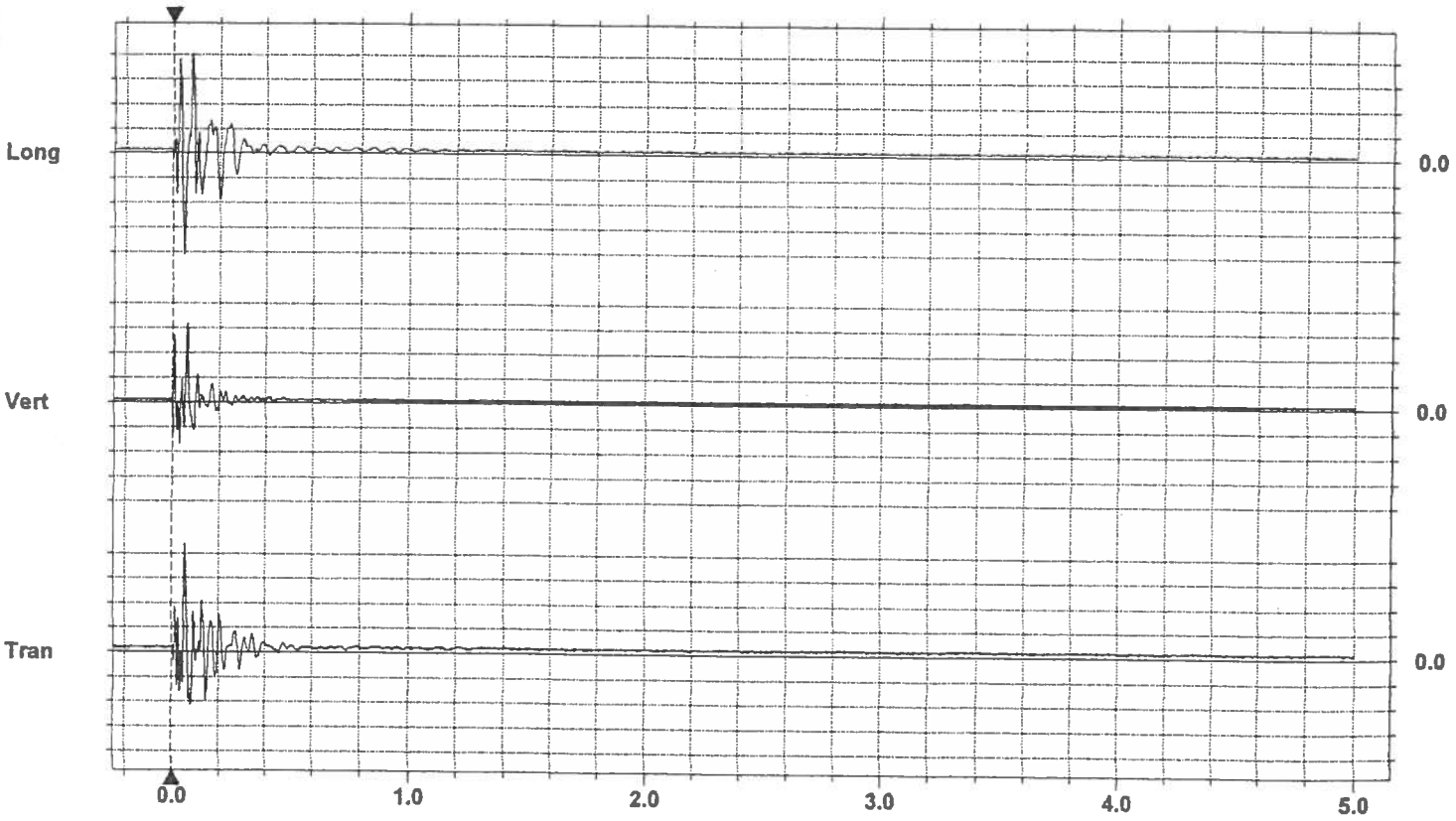
Peak Vector Sum 0.475 in./s at 0.057 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Frequency (Hz)
Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Event Report

Date/Time	Vert at 12:32:51 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1U.UR0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

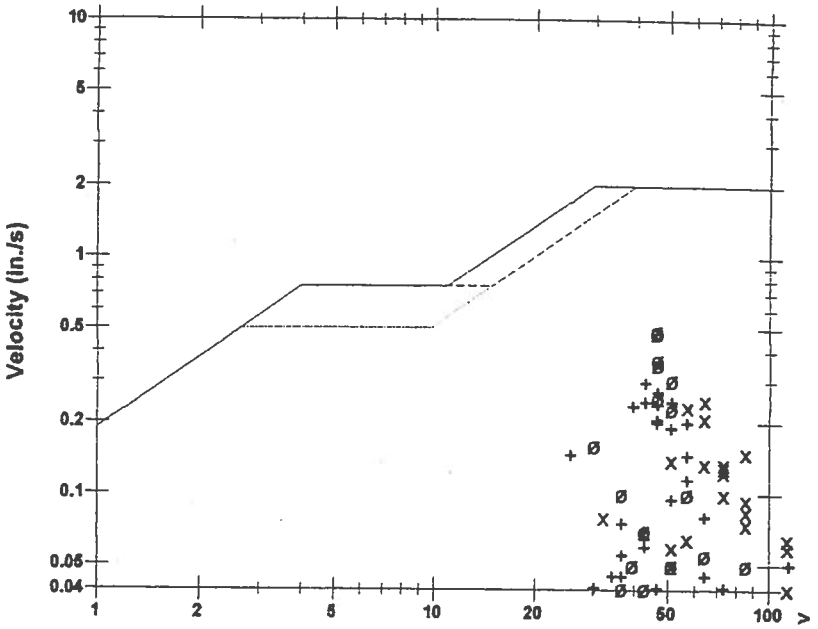
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

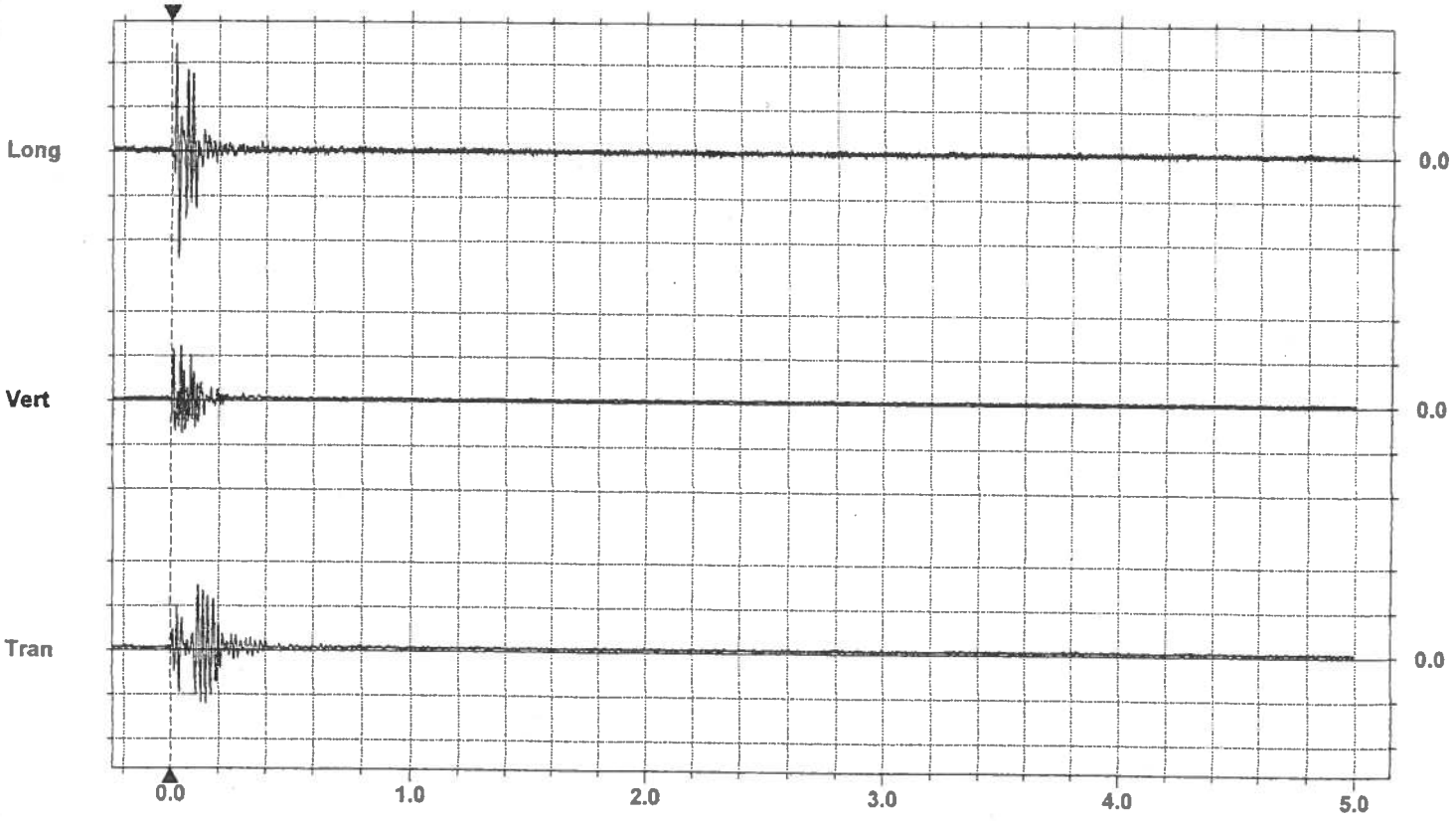
	Tran	Vert	Long	
PPV	0.295	0.250	0.490	in./s
ZC Freq	43	64	47	Hz
Time (Rel. to Trig)	0.114	0.039	0.022	sec
Peak Acceleration	0.239	0.239	0.411	g
Peak Displacement	0.00110	0.00066	0.00162	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.501 in./s at 0.031 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:32:51 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1U.UR0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

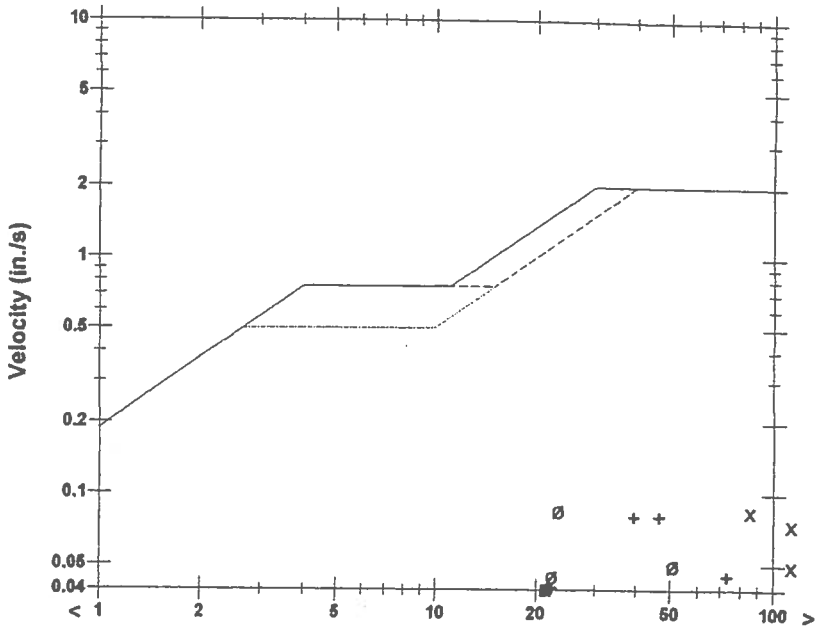
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

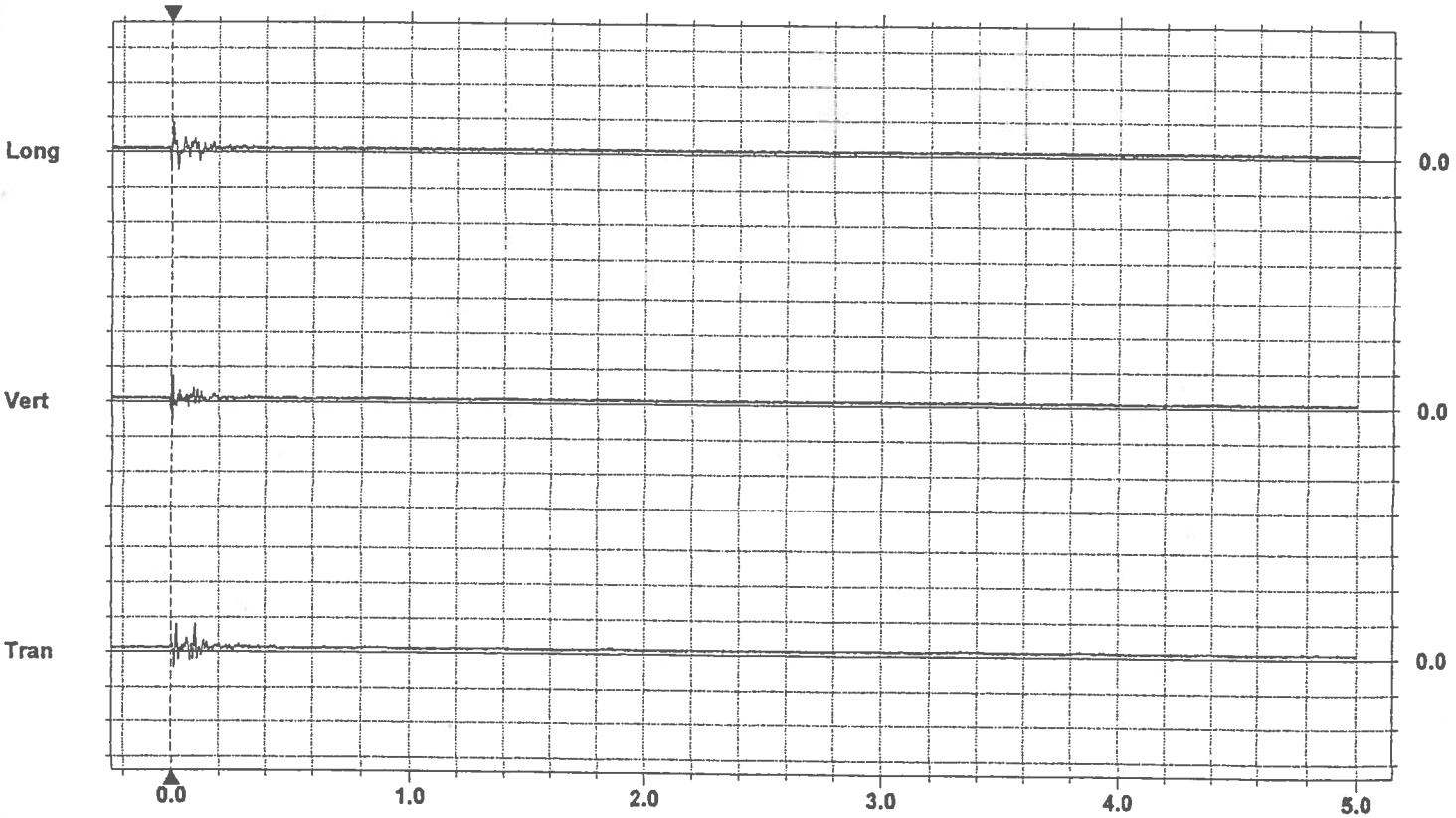
	Tran	Vert	Long	
PPV	0.0800	0.0850	0.0850	in./s
ZC Freq	47	85	23	Hz
Time (Rel. to Trig)	0.022	0.001	0.008	sec
Peak Acceleration	0.0663	0.133	0.0530	g
Peak Displacement	0.00187	0.00796	0.00123	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.114 in./s at 0.009 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Instantel Event Report

Date/Time	Long at 12:32:52 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.4 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1U.US0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

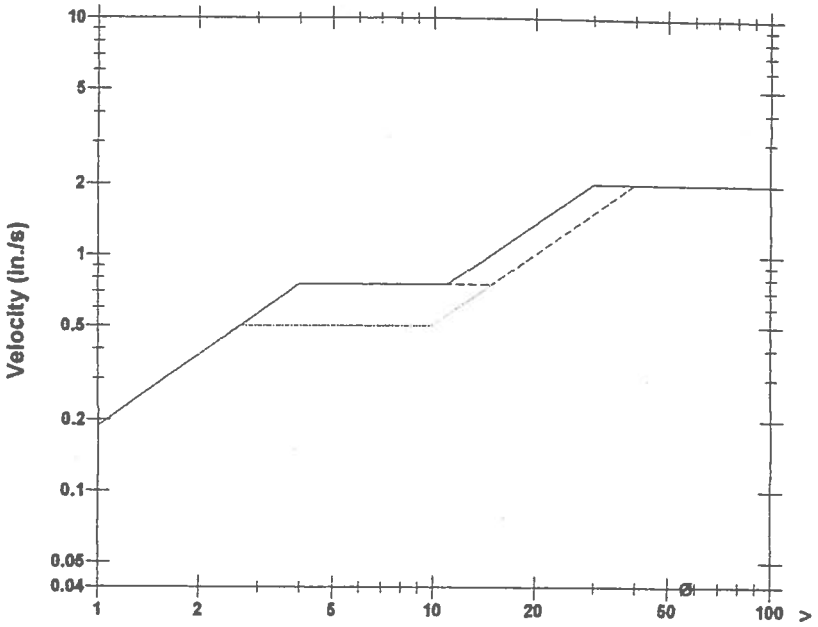
Microphone	Disabled
PSPL	N/A
ZC Freq	N/A
Channel Test	N/A

	Tran	Vert	Long	
PPV	0.0250	0.0150	0.0400	in./s
ZC Freq	>100	>100	57	Hz
Time (Rel. to Trig)	0.116	-0.006	0.002	sec
Peak Acceleration	0.0265	0.0265	0.0398	g
Peak Displacement	0.00004	0.00017	0.00197	in.
Sensorcheck ™	Passed	Passed	Passed	

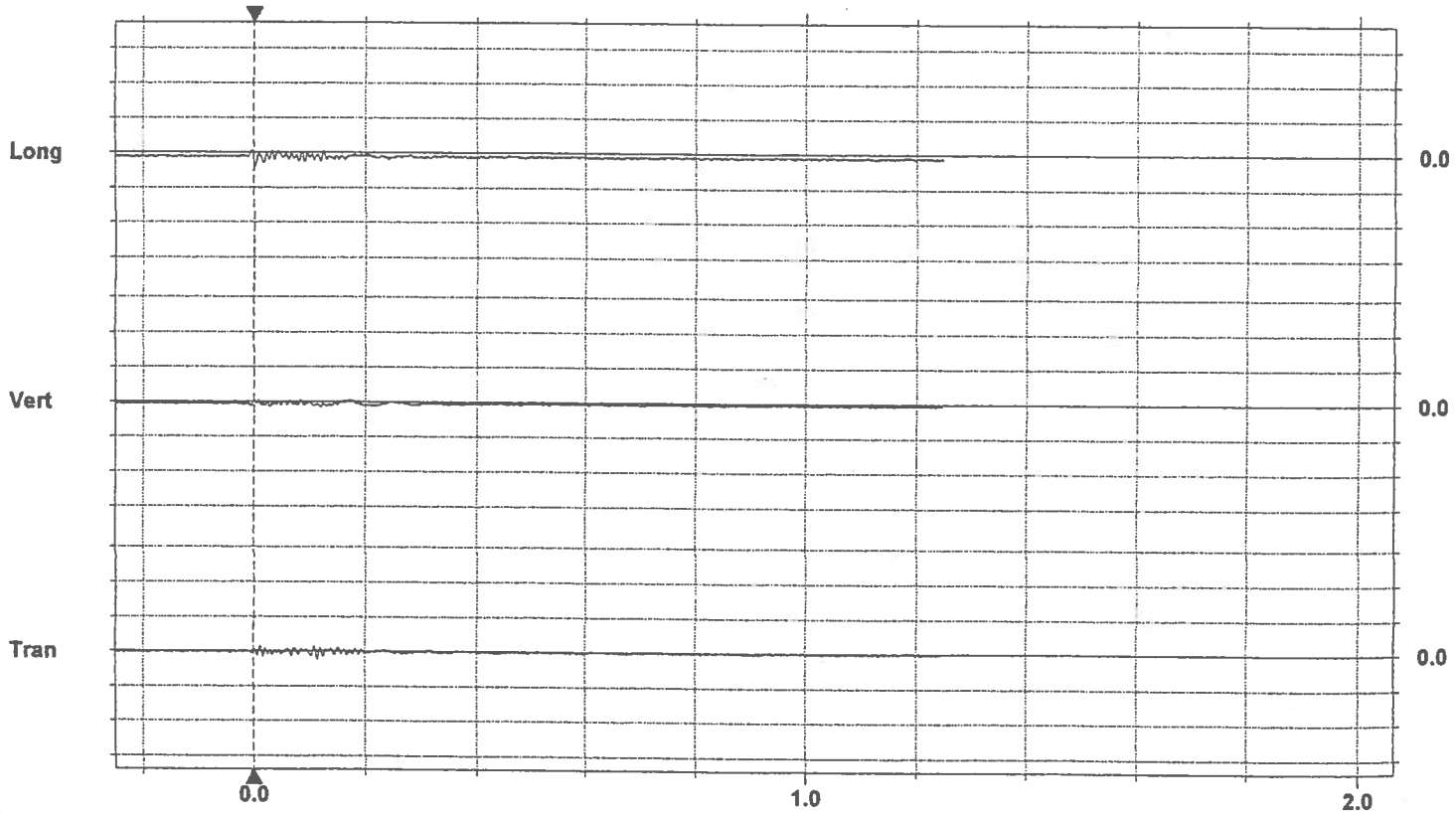
Peak Vector Sum 0.0403 in./s at 0.002 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:42:38 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1V.B20

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

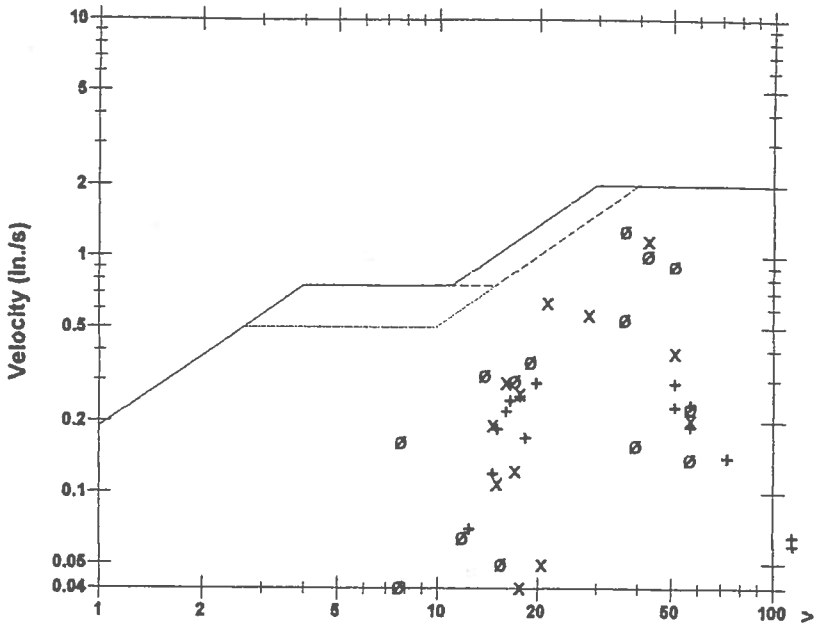
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

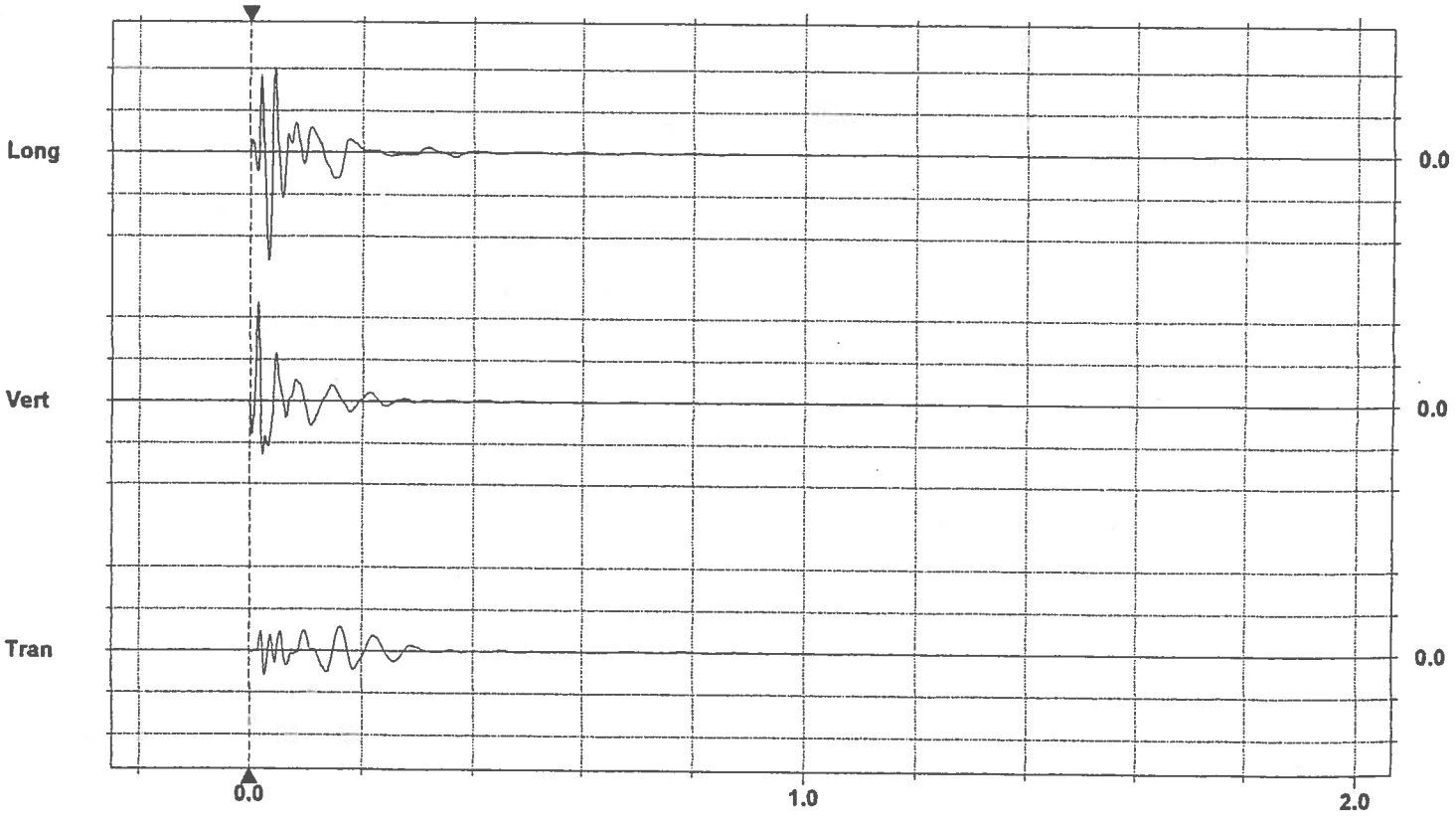
	Tran	Vert	Long	
PPV	0.290	1.18	1.29	in./s
ZC Freq	51	43	37	Hz
Time (Rel. to Trig)	0.028	0.015	0.034	sec
Peak Acceleration	0.371	1.07	0.888	g
Peak Displacement	0.00239	0.00511	0.00581	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 1.40 in./s at 0.034 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:43:35 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1V.CN0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

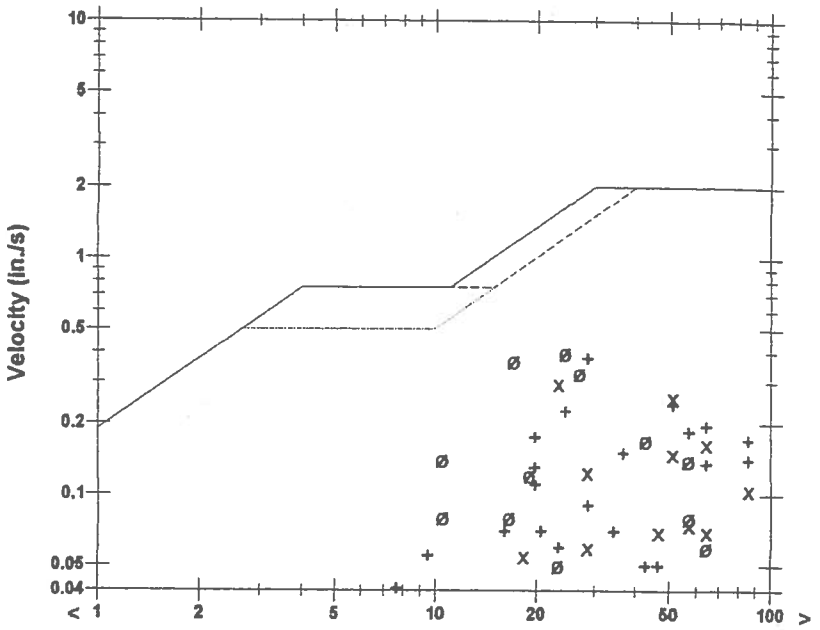
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.375	0.295	0.395	in./s
ZC Freq	28	23	24	Hz
Time (Rel. to Trig)	0.055	0.062	0.047	sec
Peak Acceleration	0.239	0.239	0.186	g
Peak Displacement	0.00255	0.00496	0.00249	in.
Sensorcheck ™	Passed	Passed	Passed	

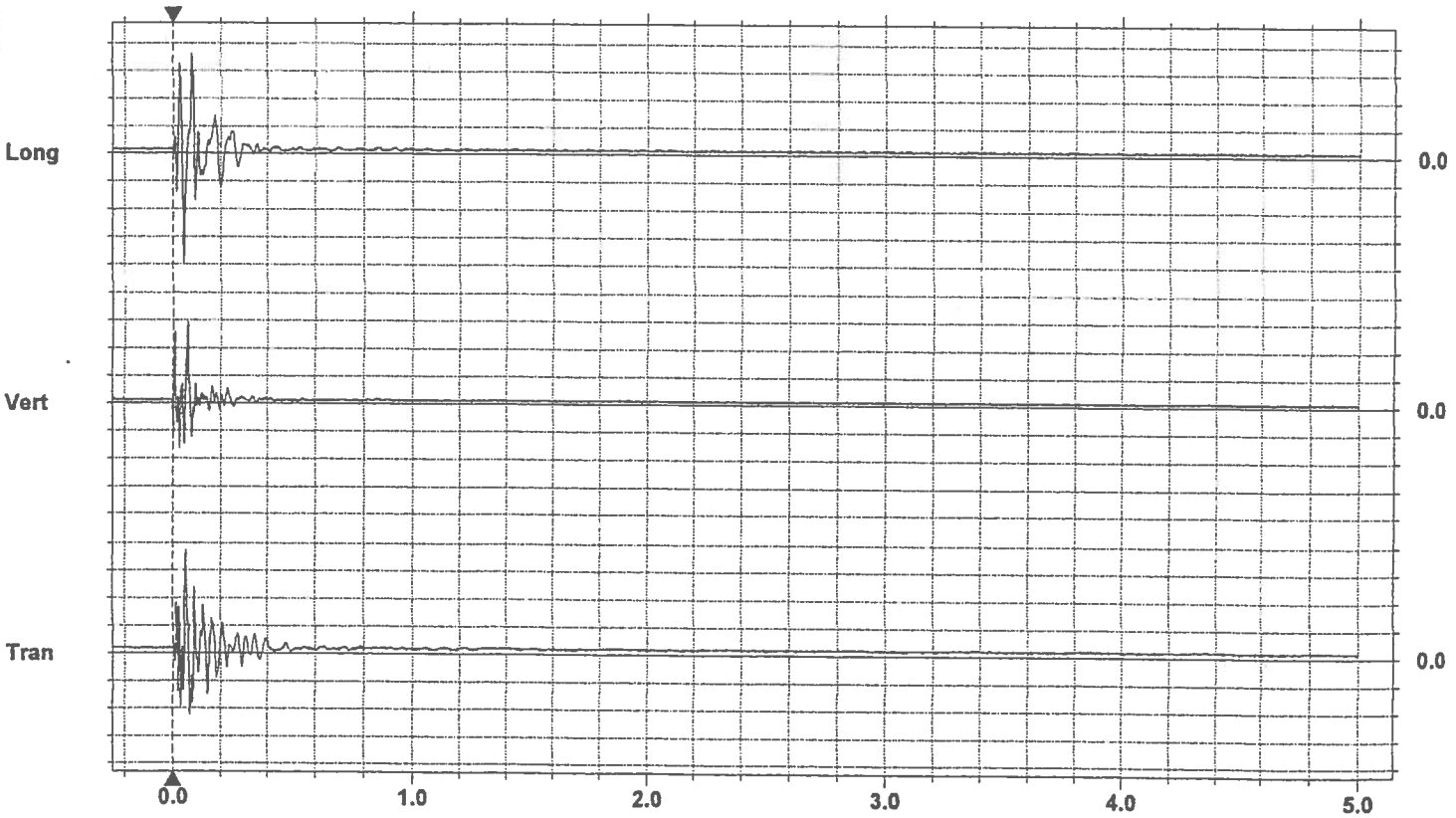
Peak Vector Sum 0.423 in./s at 0.047 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:43:35 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1V.CN0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

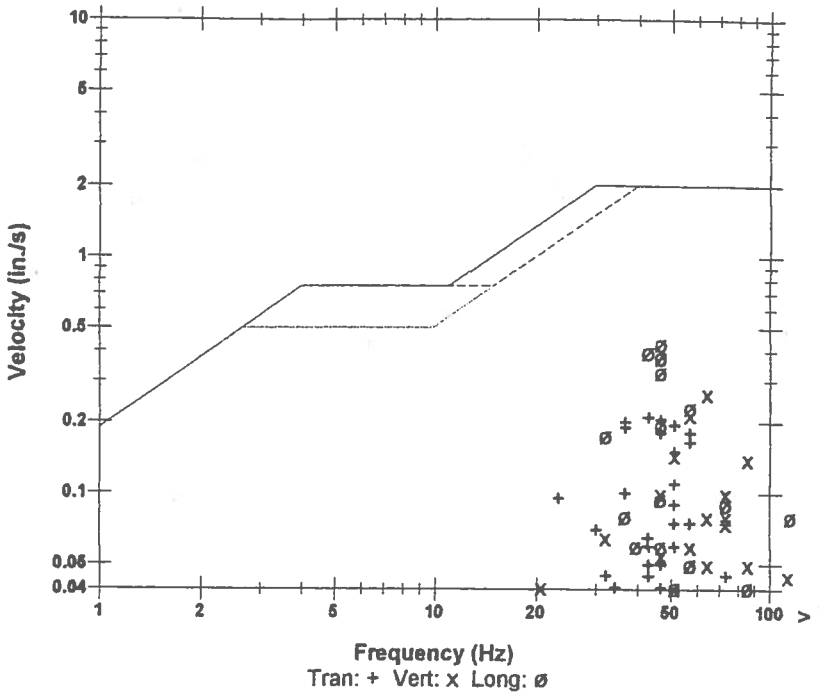
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

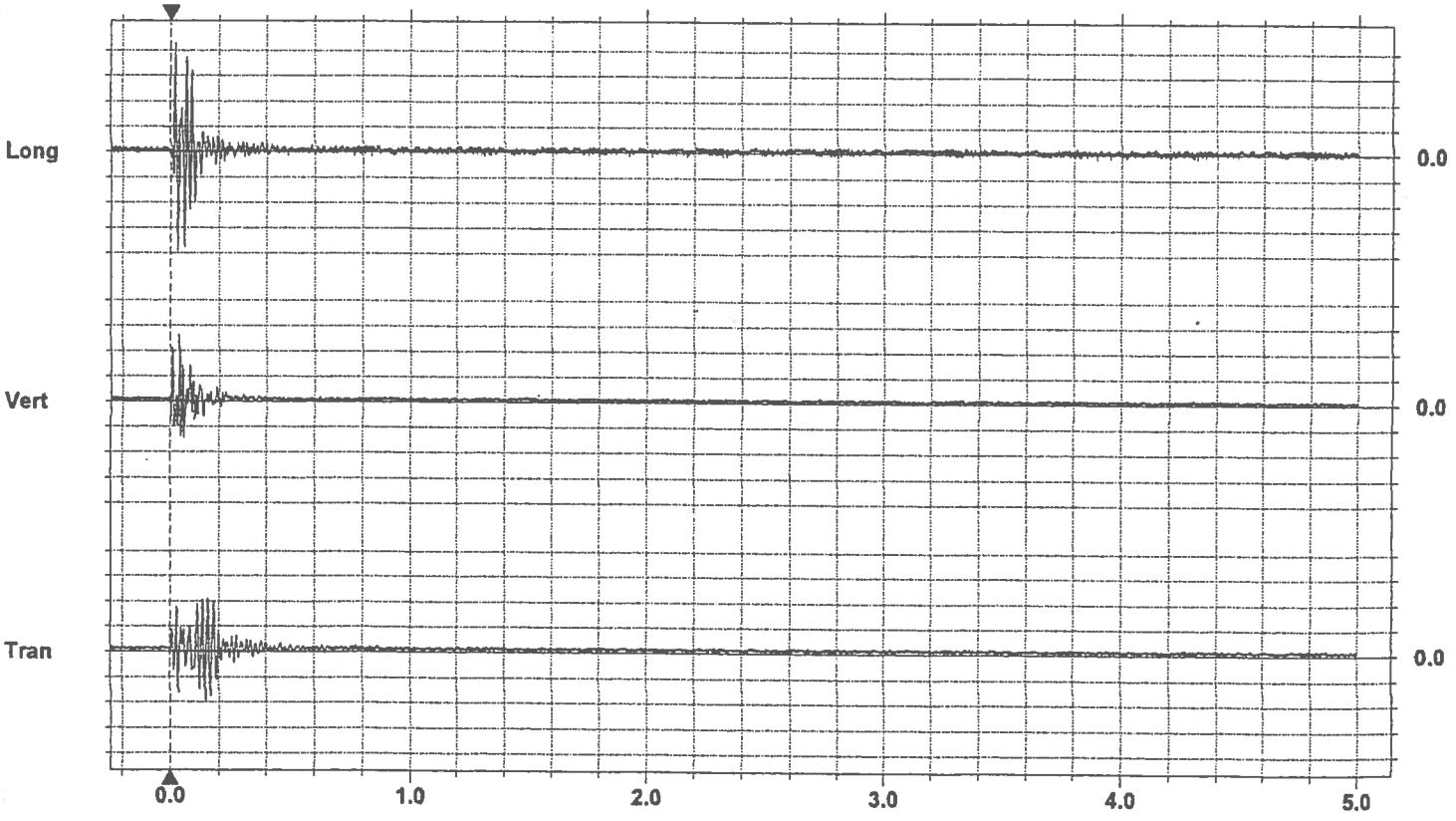
	Tran	Vert	Long	
PPV	0.210	0.265	0.430	in./s
ZC Freq	43	64	47	Hz
Time (Rel. to Trig)	0.154	0.037	0.021	sec
Peak Acceleration	0.186	0.252	0.384	g
Peak Displacement	0.00084	0.00062	0.00139	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.437 in./s at 0.021 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶--------◀

Date/Time	Vert at 12:43:35 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1V.CN0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

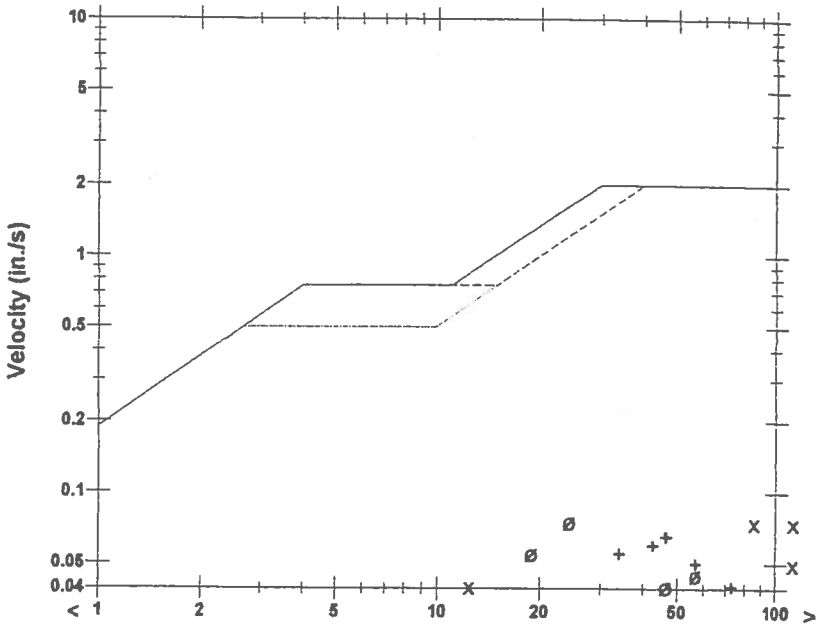
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

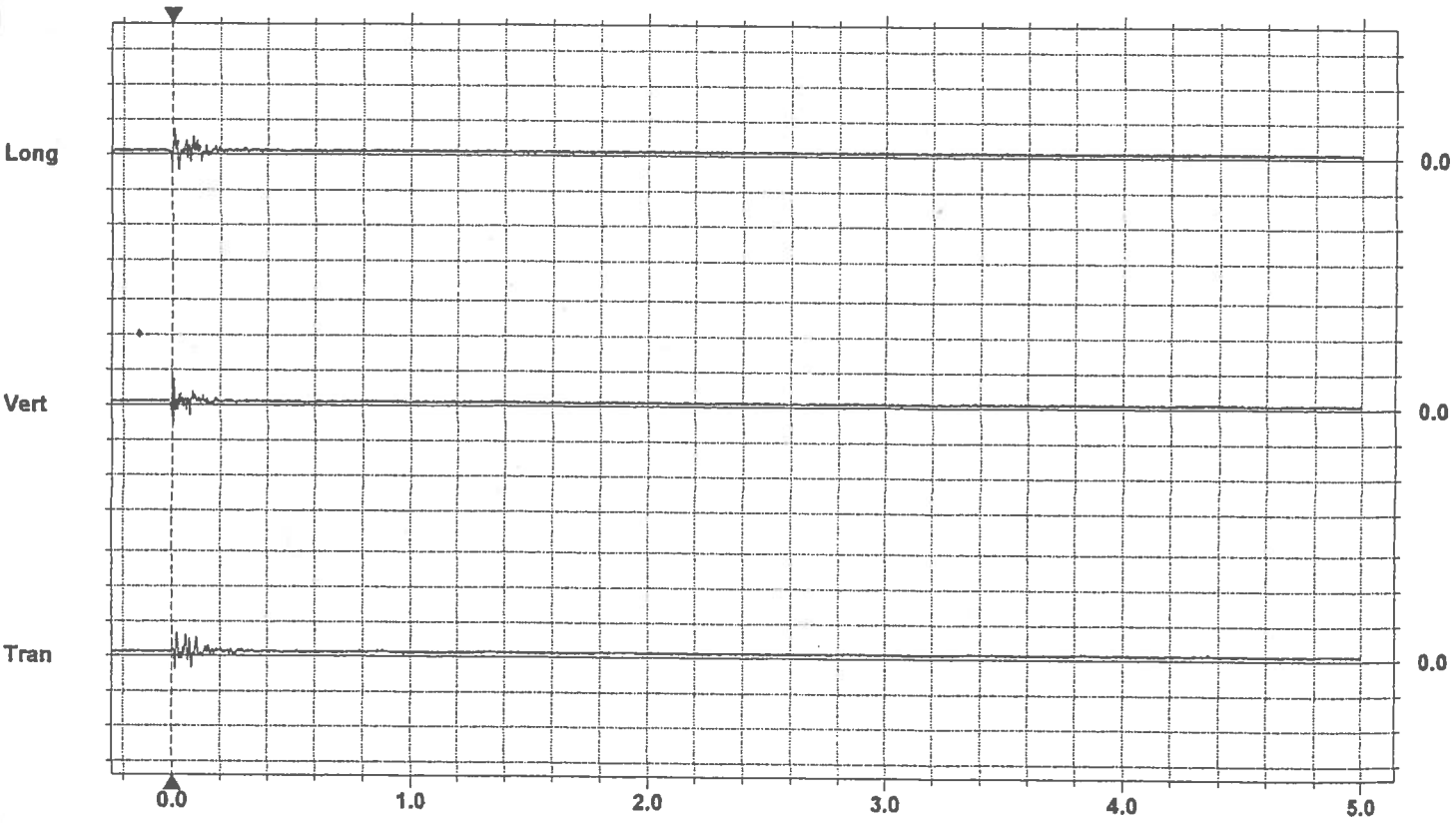
	Tran	Vert	Long	
PPV	0.0650	0.0750	0.0750	in./s
ZC Freq	47	85	24	Hz
Time (Rel. to Trig)	0.021	0.001	0.008	sec
Peak Acceleration	0.0663	0.133	0.0398	g
Peak Displacement	0.00186	0.0104	0.00122	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.103 in./s at 0.009 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Long at 12:43:36 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0200 in./s	**Battery Level**	6.4 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.75 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1V.CO0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

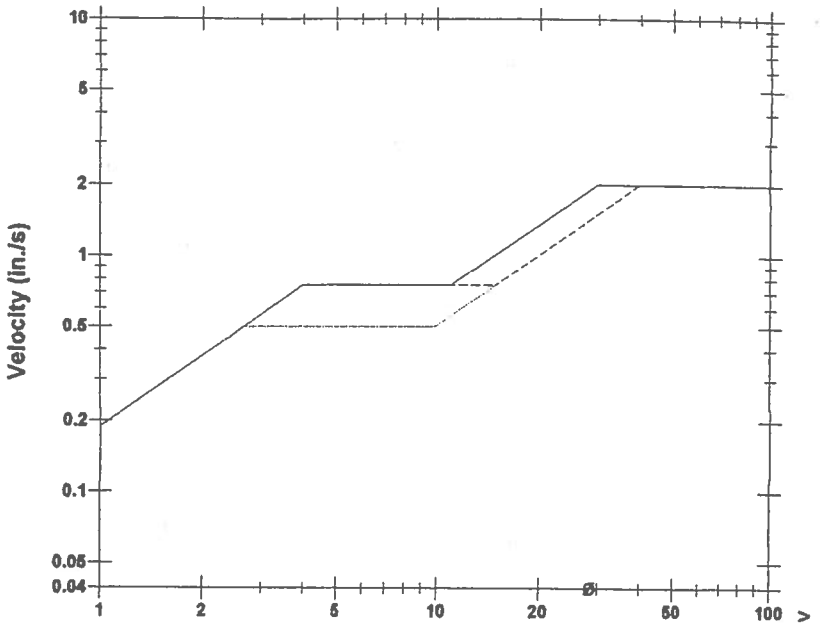
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.0150	0.0200	0.0400	in./s
ZC Freq	73	37	28	Hz
Time (Rel. to Trig)	0.056	0.018	0.003	sec
Peak Acceleration	0.0265	0.0265	0.0398	g
Peak Displacement	0.00006	0.00019	0.00224	in.
Sensorcheck ™	Passed	Passed	Passed	

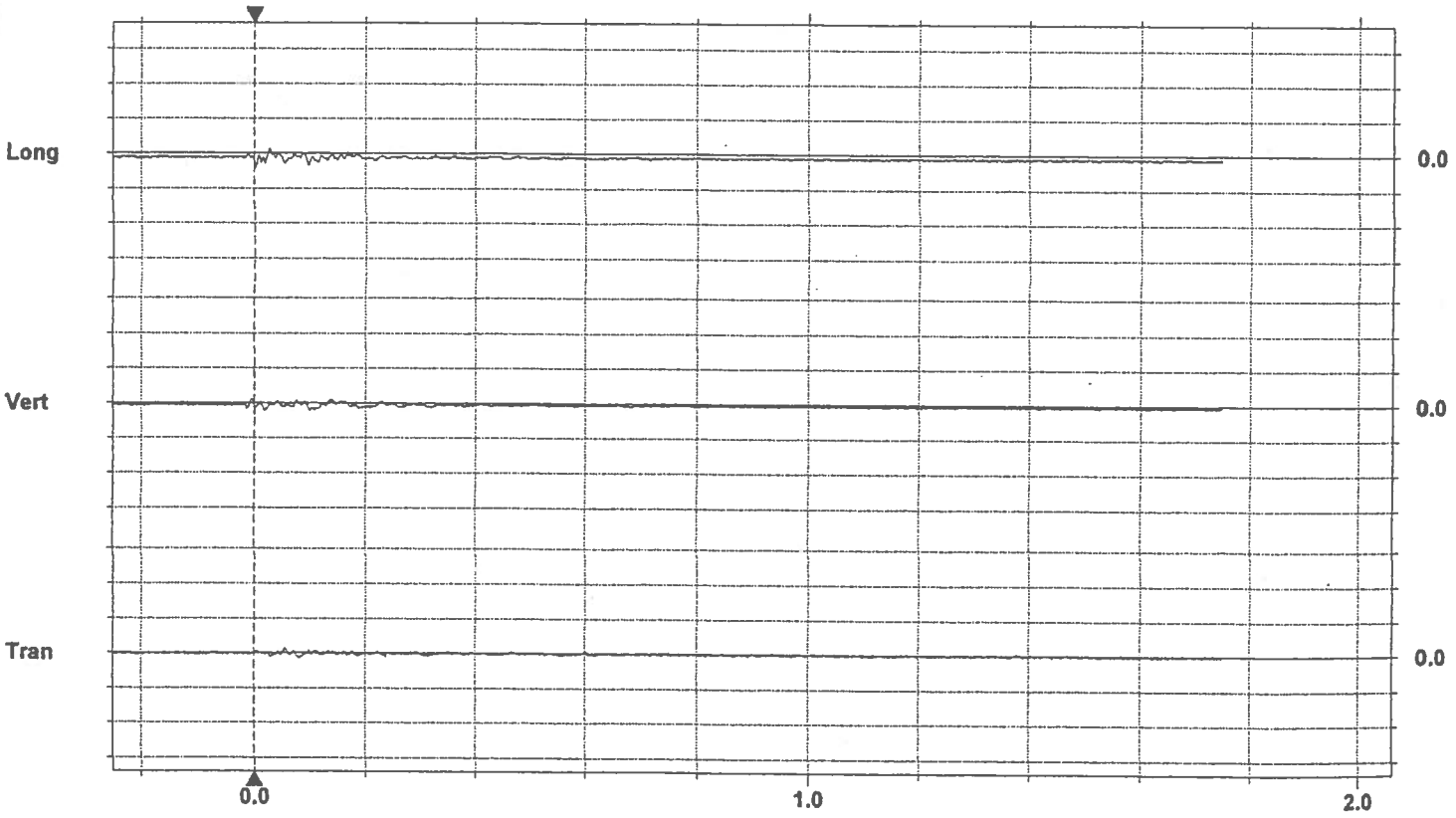
Peak Vector Sum 0.0415 in./s at 0.003 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:46:08 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.1 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.75 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1V.GW0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

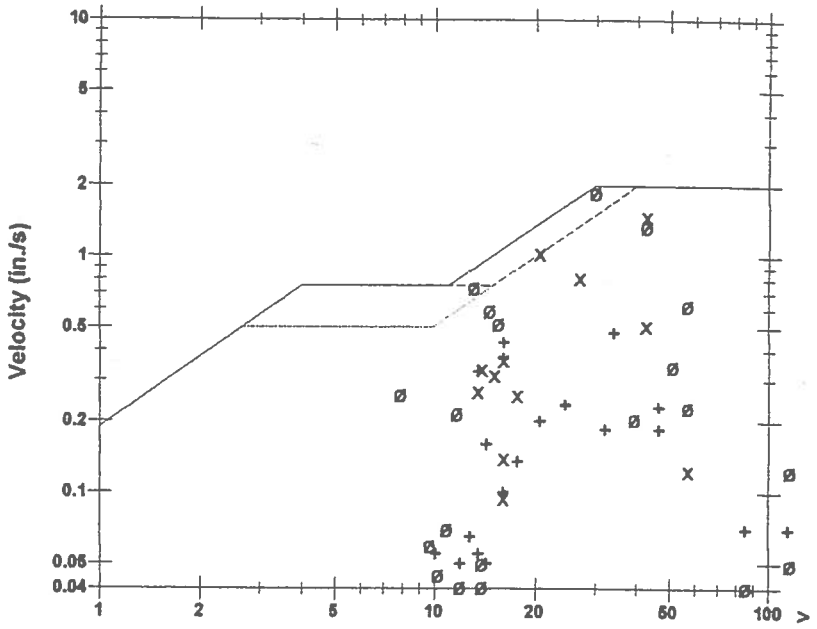
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

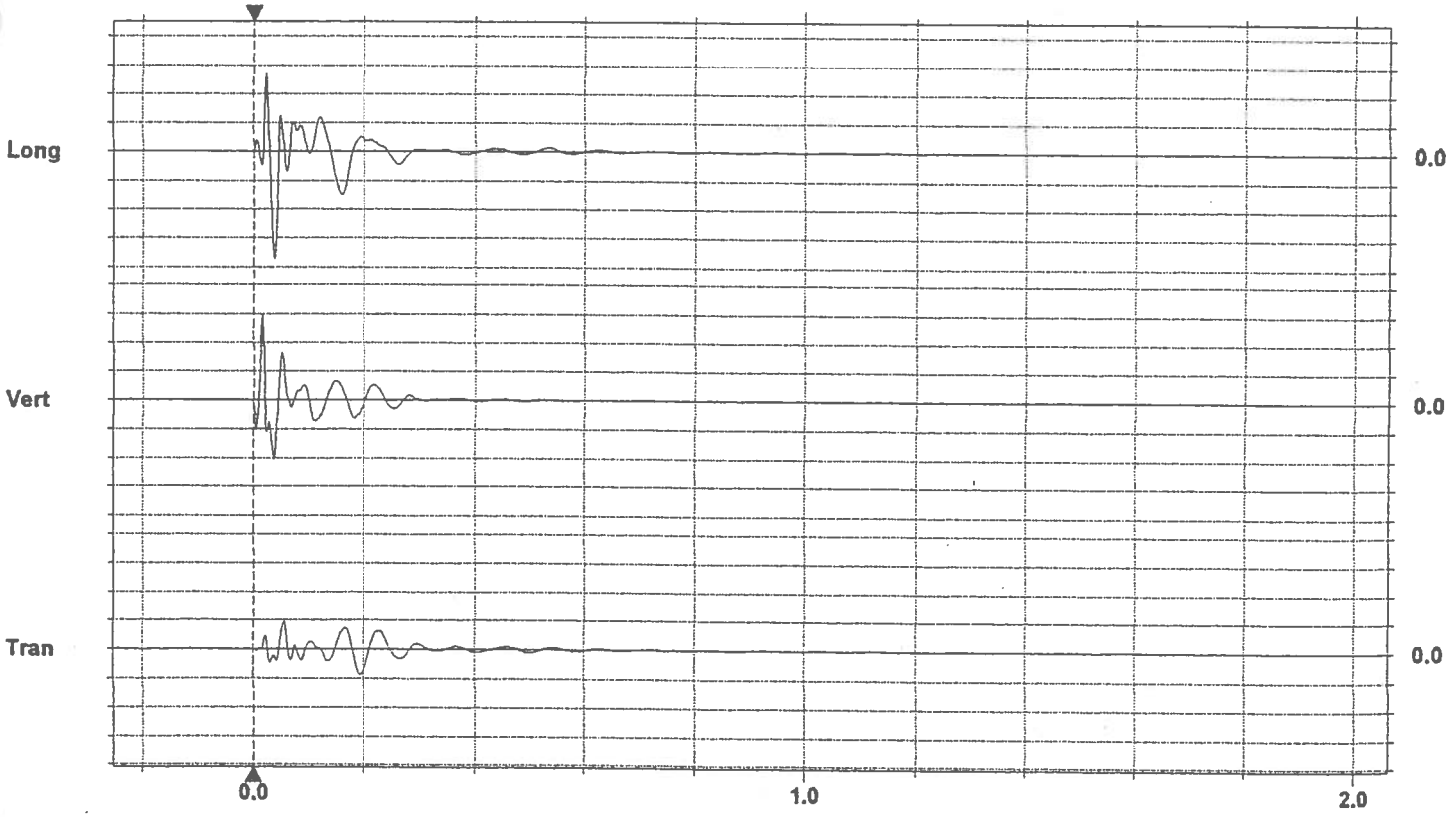
	Tran	Vert	Long	
PPV	0.475	1.48	1.86	in./s
ZC Freq	34	43	30	Hz
Time (Rel. to Trig)	0.057	0.017	0.039	sec
Peak Acceleration	0.305	1.27	0.981	g
Peak Displacement	0.00437	0.00714	0.00988	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 2.13 in./s at 0.038 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:47:04 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1V.IG0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

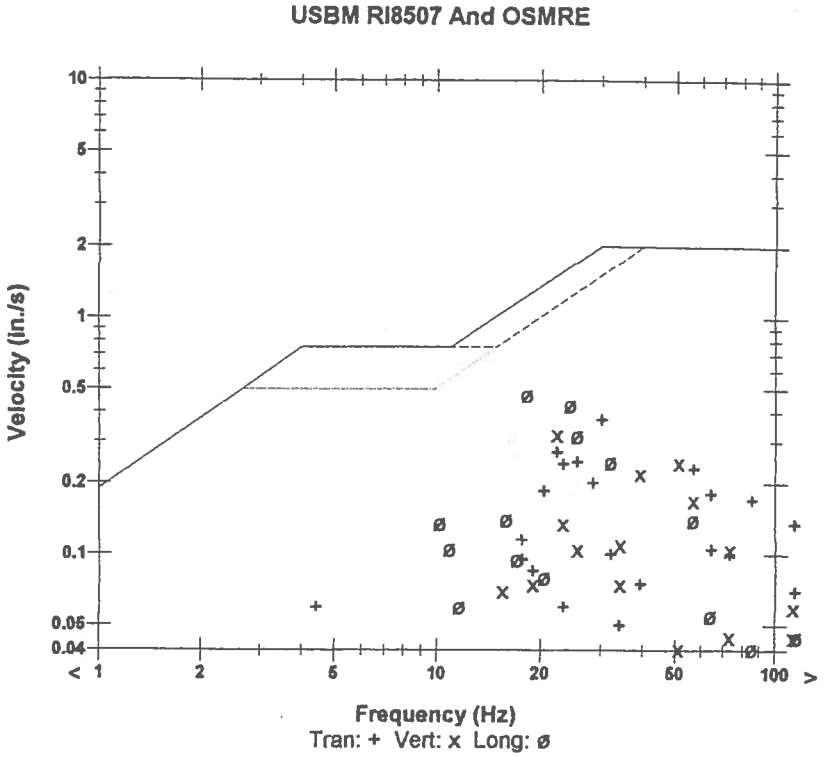
Post Event Notes

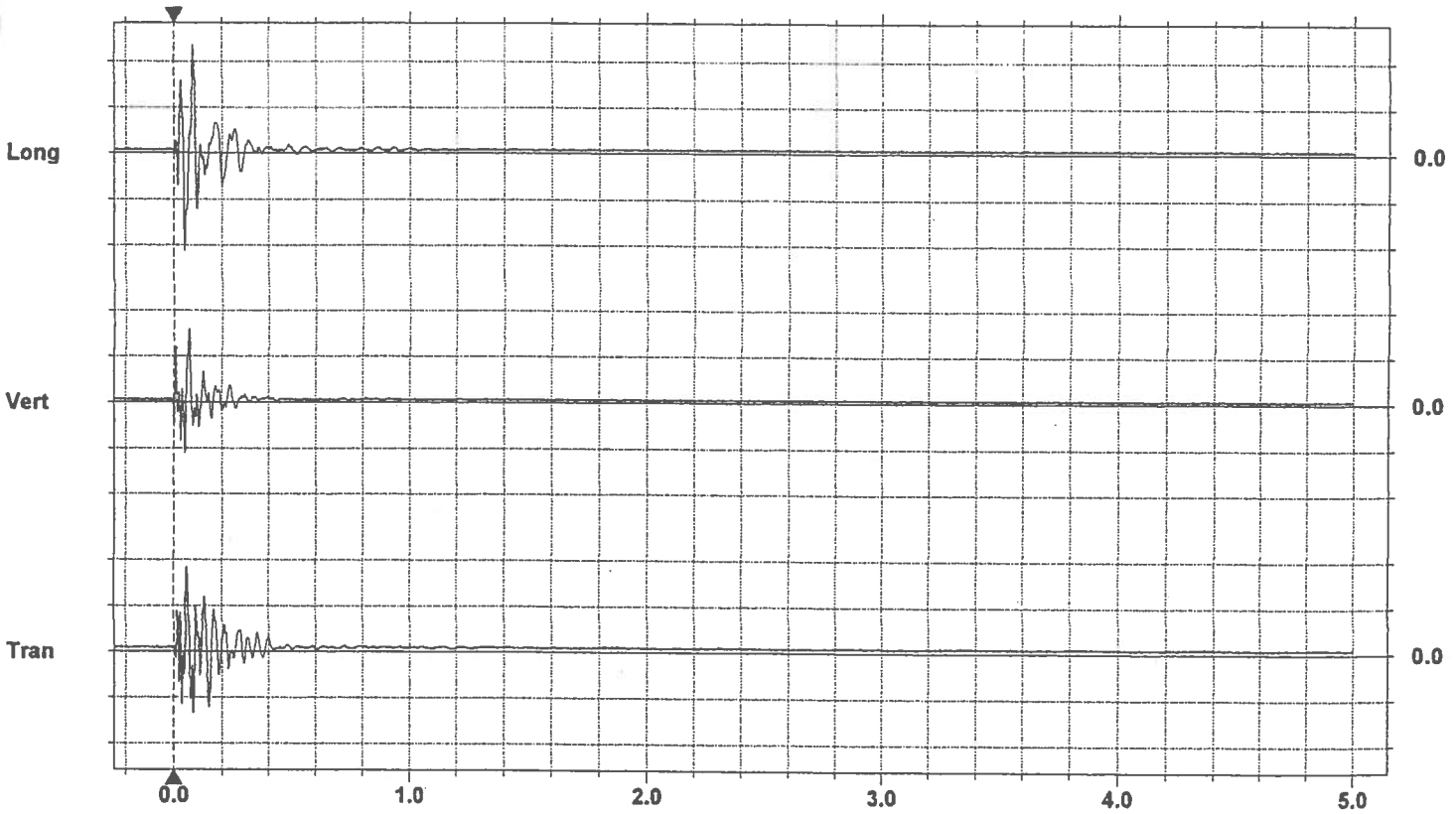
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.370	0.320	0.470	in./s
ZC Freq	30	22	18	Hz
Time (Rel. to Trig)	0.055	0.063	0.079	sec
Peak Acceleration	0.239	0.212	0.252	g
Peak Displacement	0.00257	0.0110	0.00326	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.519 in./s at 0.080 sec

N/A: Not Applicable





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:47:05 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1V.IH0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

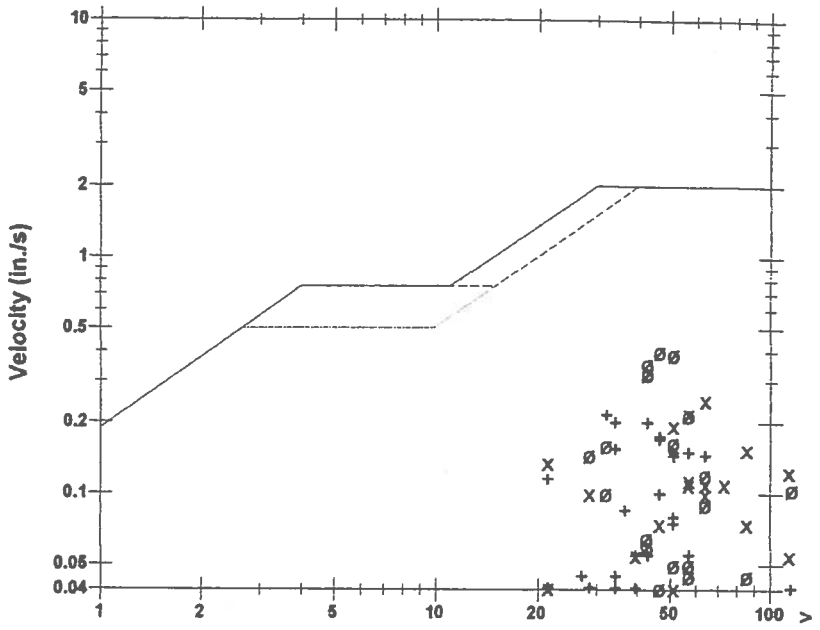
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

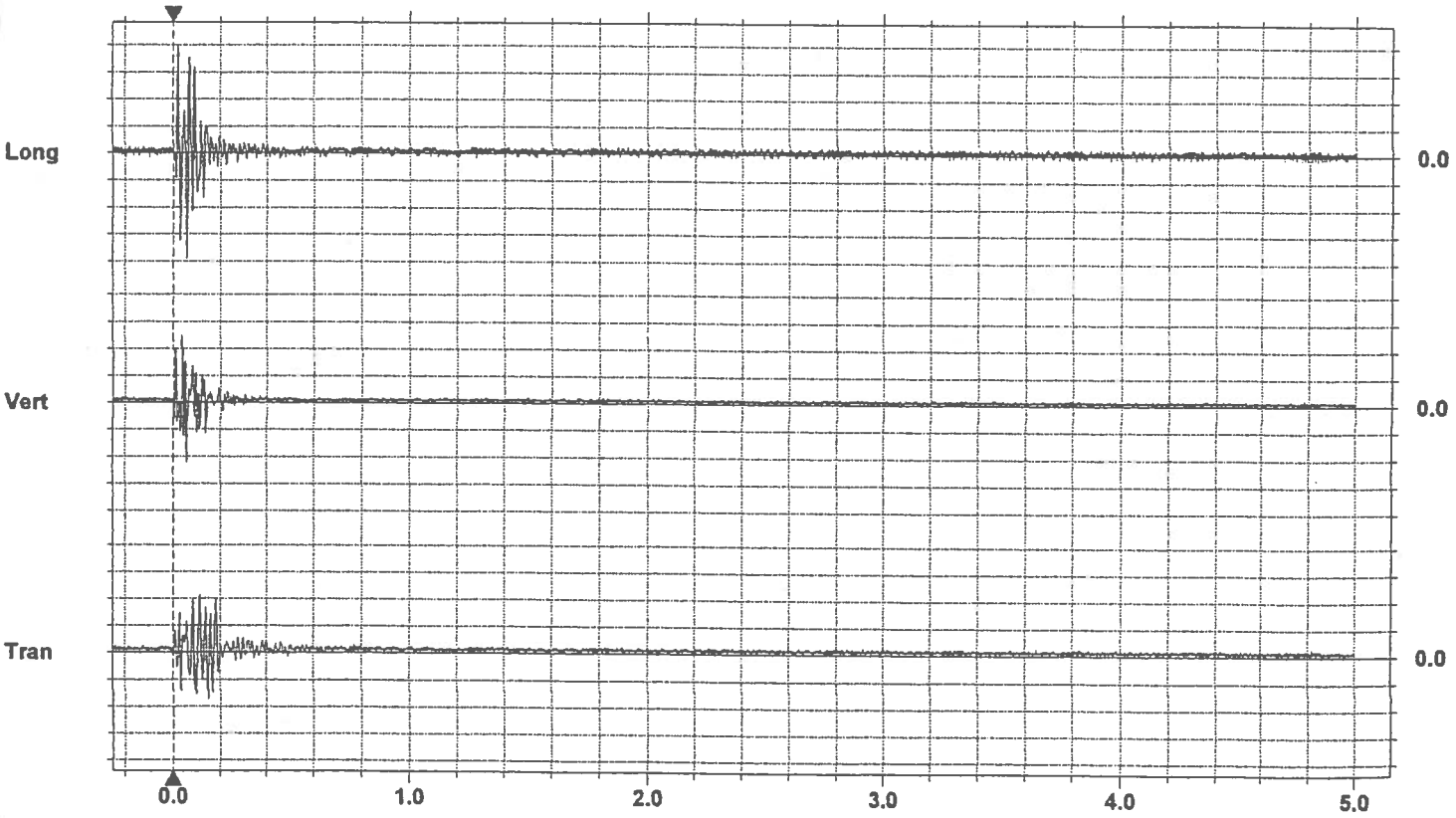
	Tran	Vert	Long	
PPV	0.215	0.250	0.400	in./s
ZC Freq	32	64	47	Hz
Time (Rel. to Trig)	0.111	0.038	0.021	sec
Peak Acceleration	0.172	0.239	0.358	g
Peak Displacement	0.00102	0.00073	0.00139	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.453 in./s at 0.059 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:47:04 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1V.IG0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

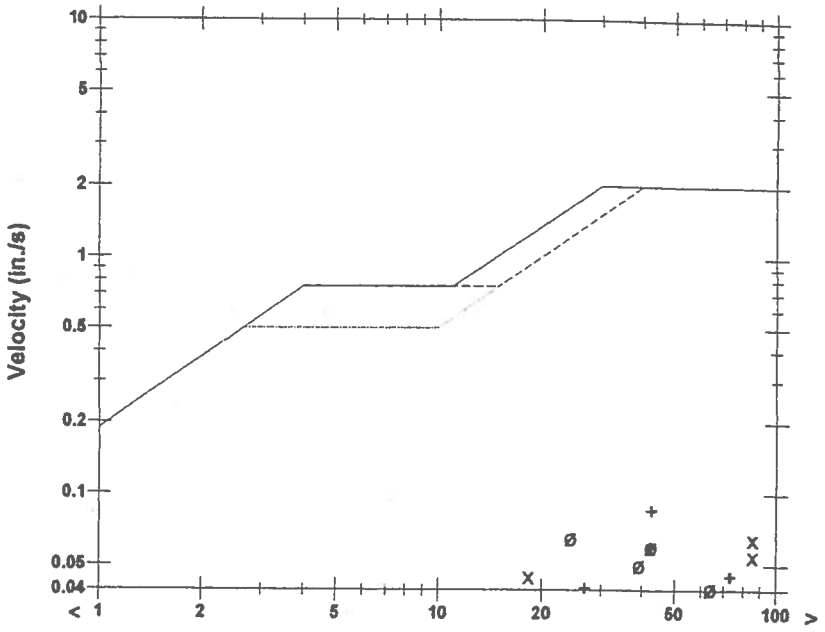
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

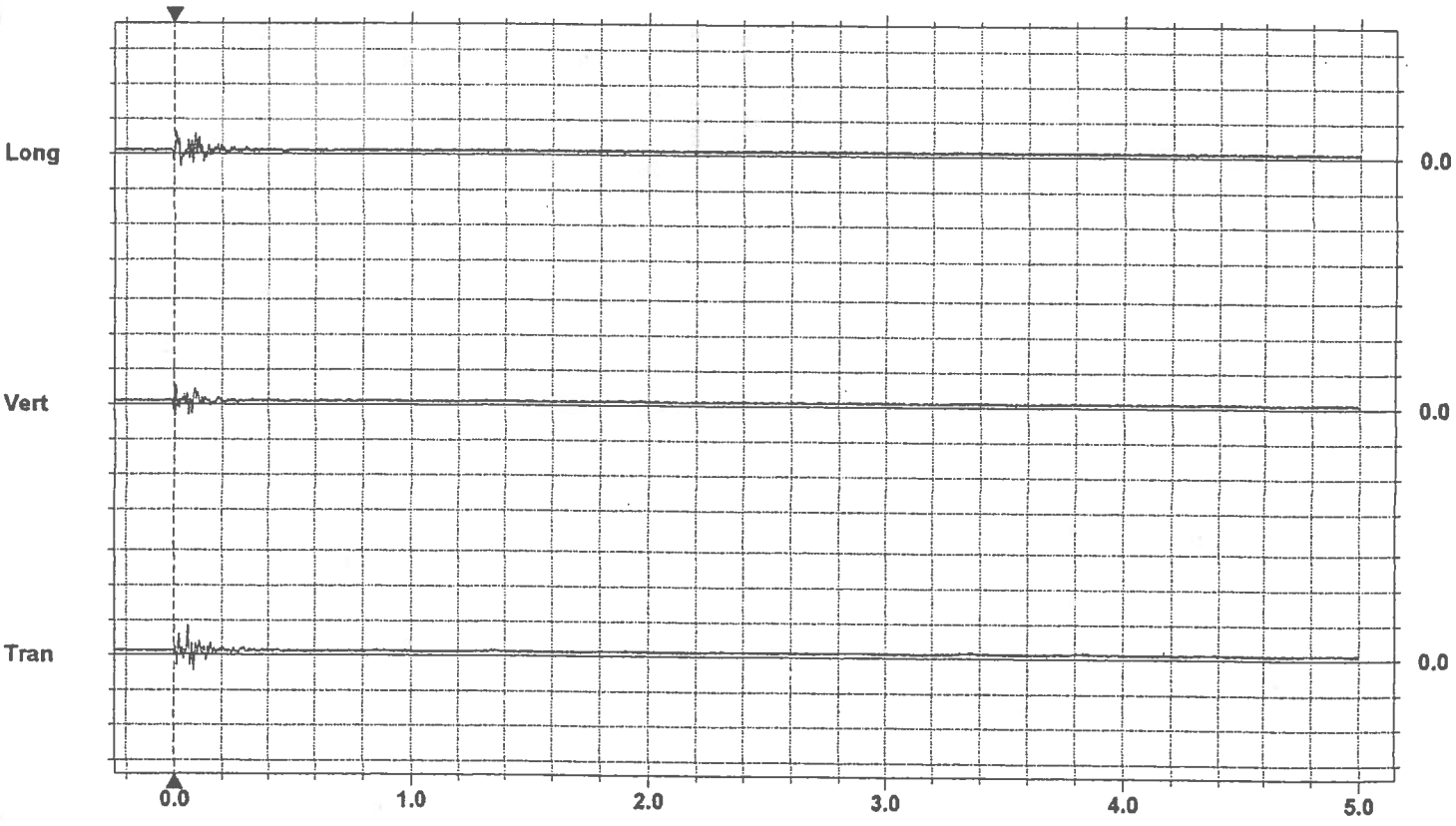
	Tran	Vert	Long	
PPV	0.0850	0.0650	0.0650	in./s
ZC Freq	43	85	24	Hz
Time (Rel. to Trig)	0.057	0.001	0.008	sec
Peak Acceleration	0.0530	0.0928	0.0530	g
Peak Displacement	0.00185	0.0106	0.00143	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0907 in./s at 0.057 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶--------◀

Date/Time	Vert at 12:54:16 May 28, 1997	**Serial Number**	BA5546 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0700 in./s	**Battery Level**	6.0 Volts
Range	Geo: 10.00 in./s	**Calibration**	February 14, 1997 by Instantel Inc.
Record Time	1.75 sec (Auto=1 sec) at 1024 sps	**File Name**	G5466H1V.UG0

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

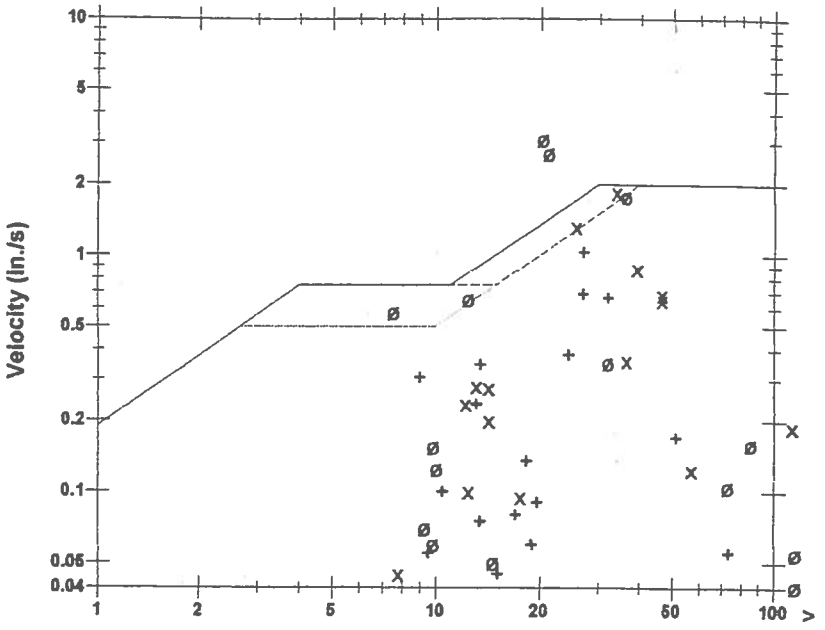
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

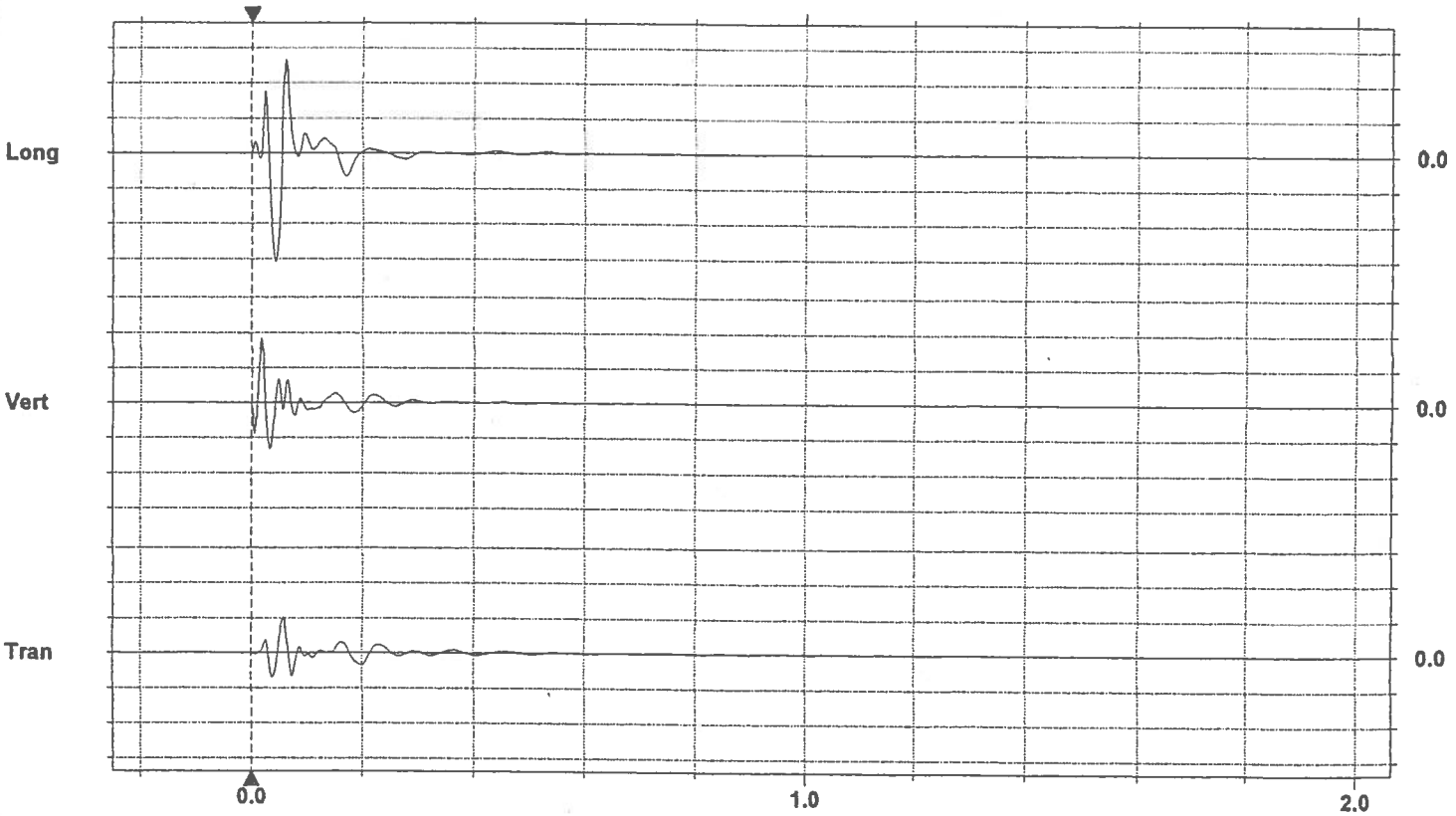
	Tran	Vert	Long	
PPV	1.03	1.85	3.08	in./s
ZC Freq	27	34	20	Hz
Time (Rel. to Trig)	0.059	0.019	0.045	sec
Peak Acceleration	0.464	1.05	1.78	g
Peak Displacement	0.00557	0.00801	0.0249	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 3.13 in./s at 0.045 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 1.000 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:55:13 May 28, 1997	**Serial Number**	BC5571 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.6 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5716H1V.W10

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

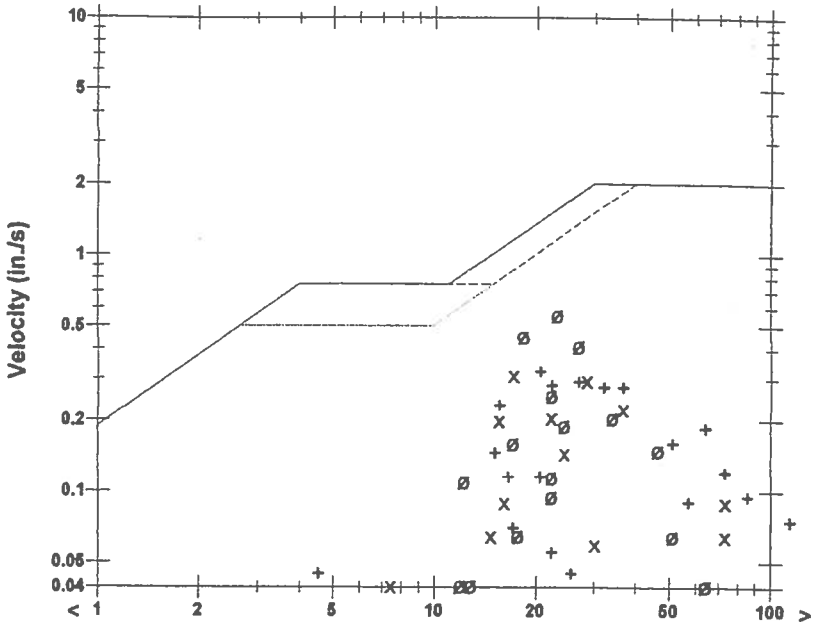
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

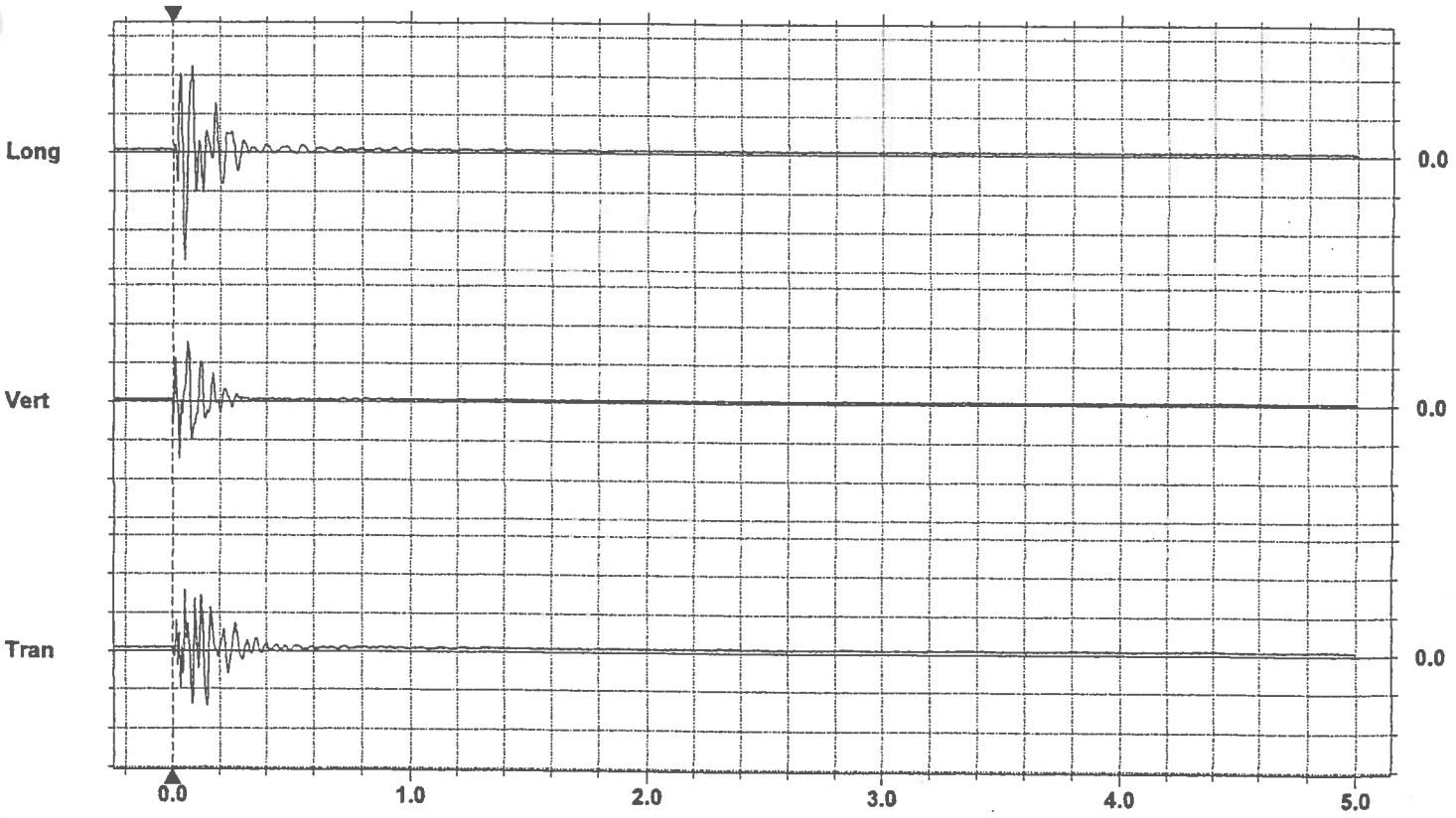
	Tran	Vert	Long	
PPV	0.320	0.310	0.555	in./s
ZC Freq	20	17	23	Hz
Time (Rel. to Trig)	0.053	0.062	0.052	sec
Peak Acceleration	0.239	0.172	0.252	g
Peak Displacement	0.00259	0.00954	0.00377	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.641 in./s at 0.053 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.200 in./s/div
Trigger = ▶---------◀

Date/Time	Vert at 12:55:13 May 28, 1997	**Serial Number**	BC5570 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 17, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5706H1V.W10

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

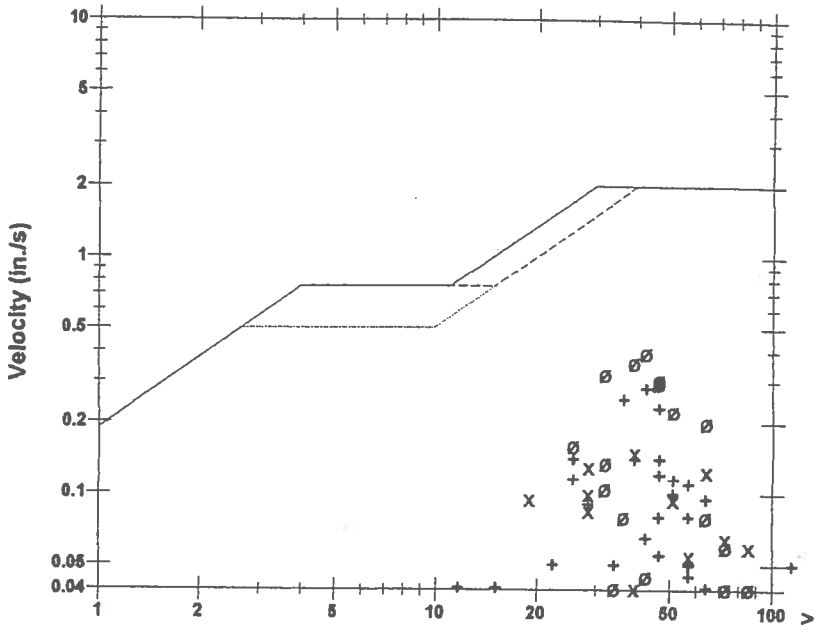
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

	Tran	Vert	Long	
PPV	0.280	0.150	0.395	in./s
ZC Freq	43	39	43	Hz
Time (Rel. to Trig)	0.080	0.009	0.021	sec
Peak Acceleration	0.212	0.159	0.278	g
Peak Displacement	0.00108	0.00068	0.00153	in.
Sensorcheck ™	Passed	Passed	Passed	

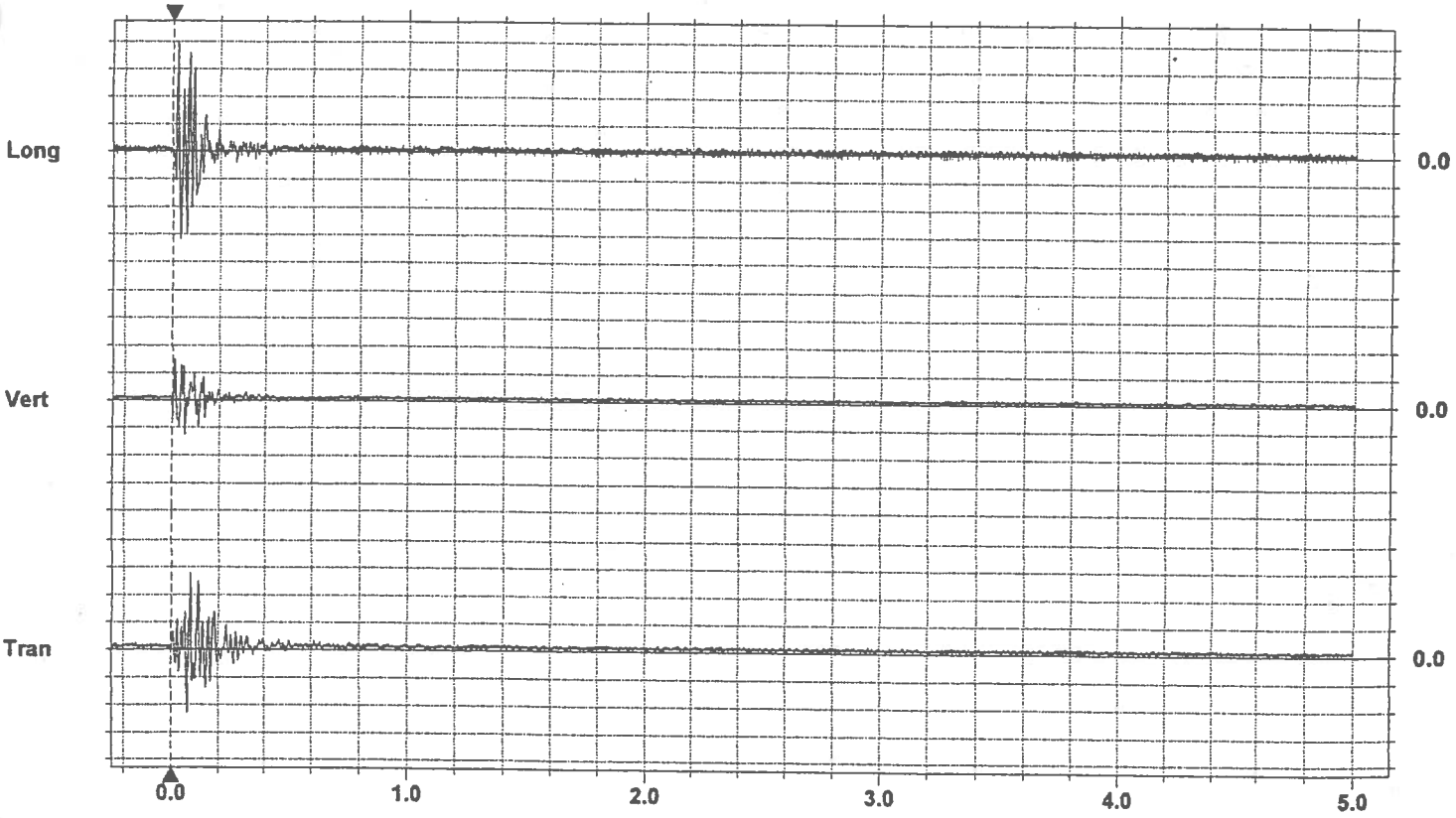
Peak Vector Sum 0.427 in./s at 0.069 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



Tran: + Vert: x Long: ø



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

Date/Time	Long at 12:55:13 May 28, 1997	**Serial Number**	BC5536 V 3.11-3.11 MiniMate Plus
Trigger Source	Geo: 0.0500 in./s	**Battery Level**	6.5 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	5.0 sec at 1024 sps	**File Name**	G5366H1V.W10

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

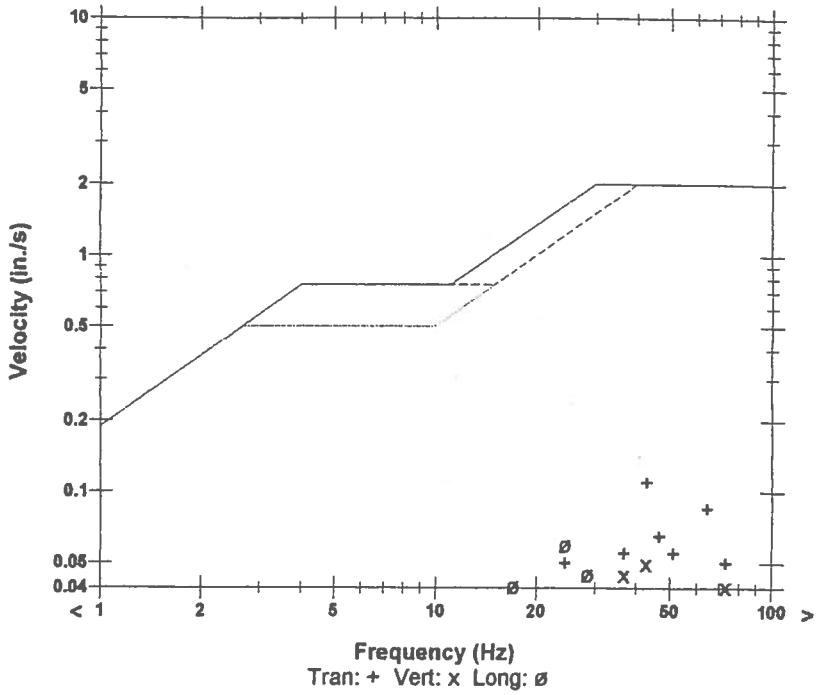
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

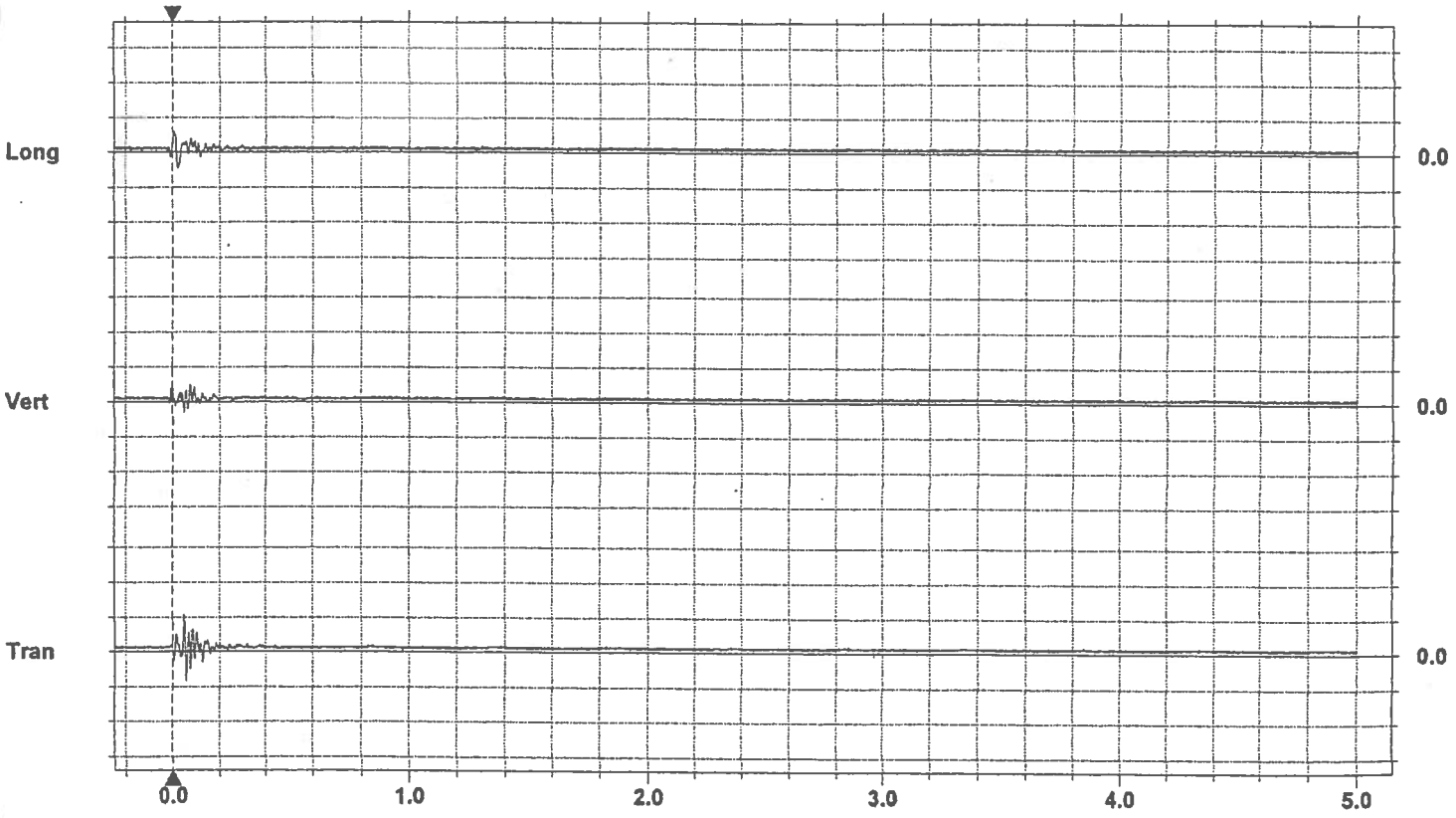
	Tran	Vert	Long	
PPV	0.110	0.0500	0.0600	in./s
ZC Freq	43	43	24	Hz
Time (Rel. to Trig)	0.049	0.075	0.002	sec
Peak Acceleration	0.106	0.0398	0.0398	g
Peak Displacement	0.00175	0.00546	0.00091	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.116 in./s at 0.049 sec

N/A: Not Applicable

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶--------◀

Date/Time	Long at 12:55:14 May 28, 1997	**Serial Number**	BA5552 V 3.11-3.11 BlastMate III
Trigger Source	Geo: 0.0400 in./s	**Battery Level**	6.4 Volts
Range	Geo: 10.00 in./s	**Calibration**	January 10, 1997 by Instantel Inc.
Record Time	1.25 sec (Auto=1 sec) at 1024 sps	**File Name**	G5526H1V.W20

Notes
Location:
Client: CC&V
User Name: M.M.C.
General: Attenuation Study

Post Event Notes

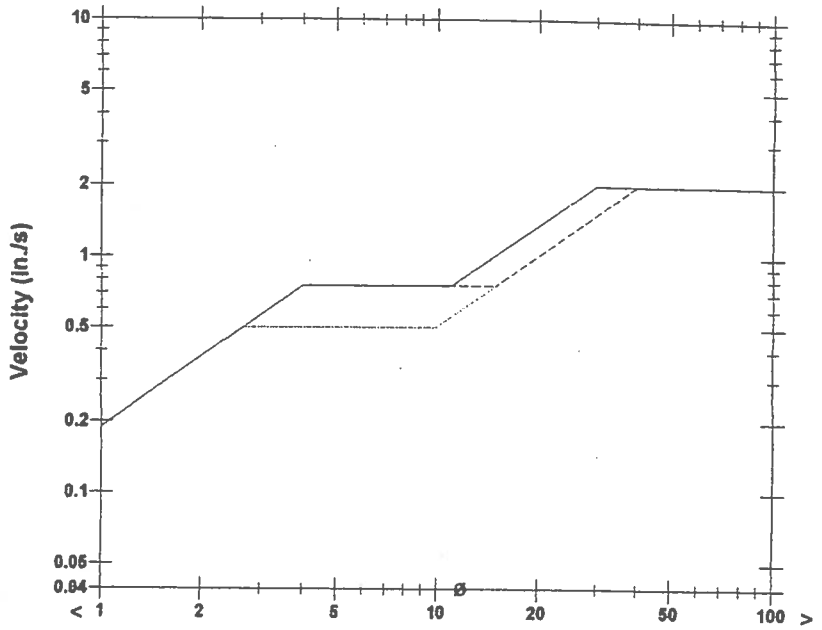
Microphone Disabled
PSPL N/A
ZC Freq N/A
Channel Test N/A

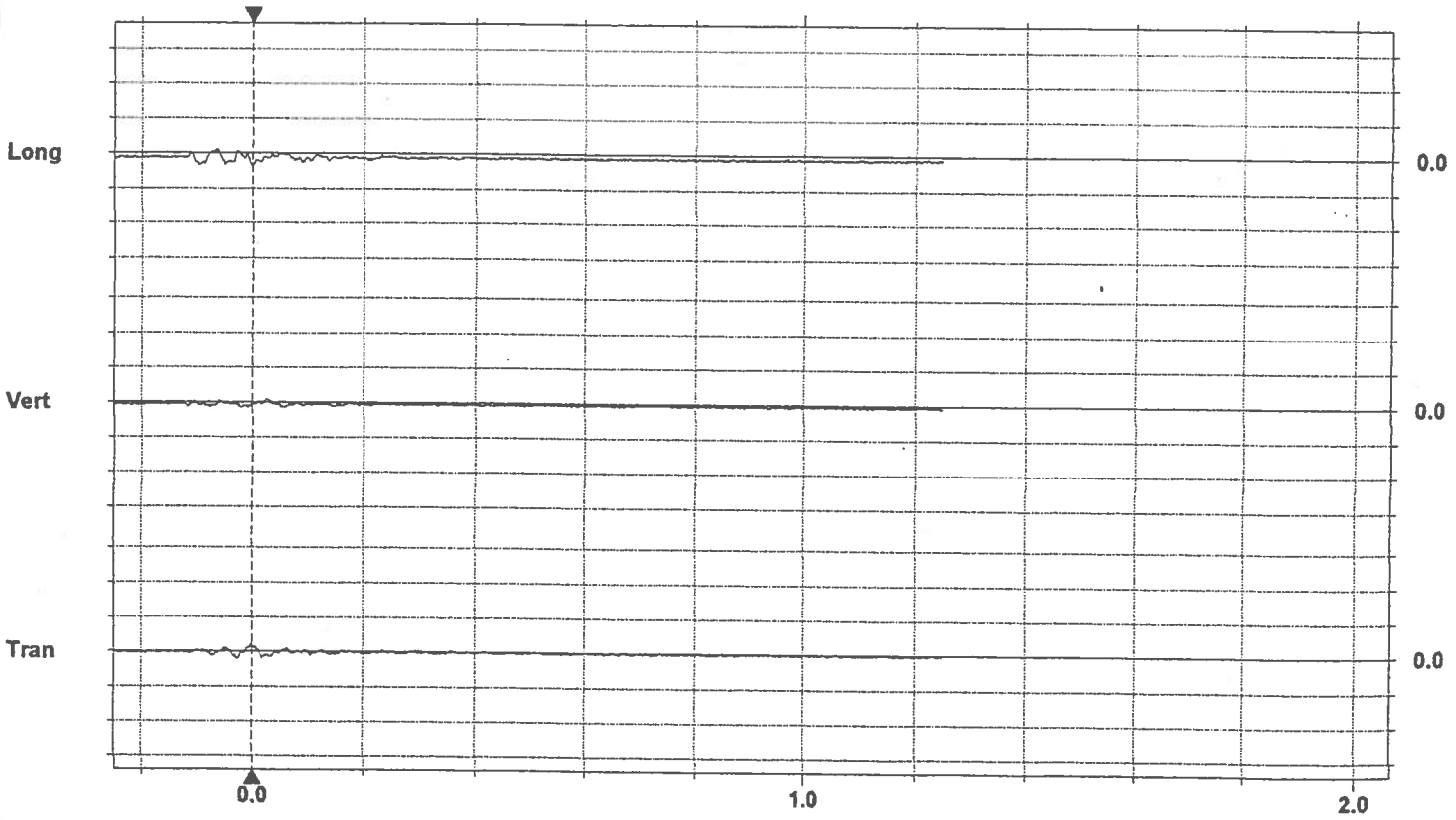
	Tran	Vert	Long	
PPV	0.0200	0.0150	0.0400	in./s
ZC Freq	34	85	12	Hz
Time (Rel. to Trig)	-0.028	-0.117	0.000	sec
Peak Acceleration	0.0265	0.0265	0.0265	g
Peak Displacement	0.00015	0.00013	0.00327	in.
Sensorcheck ™	Passed	Passed	Passed	

Peak Vector Sum 0.0430 in./s at 0.000 sec

N/A: Not Applicable

USBM RI8507 And OSMRE



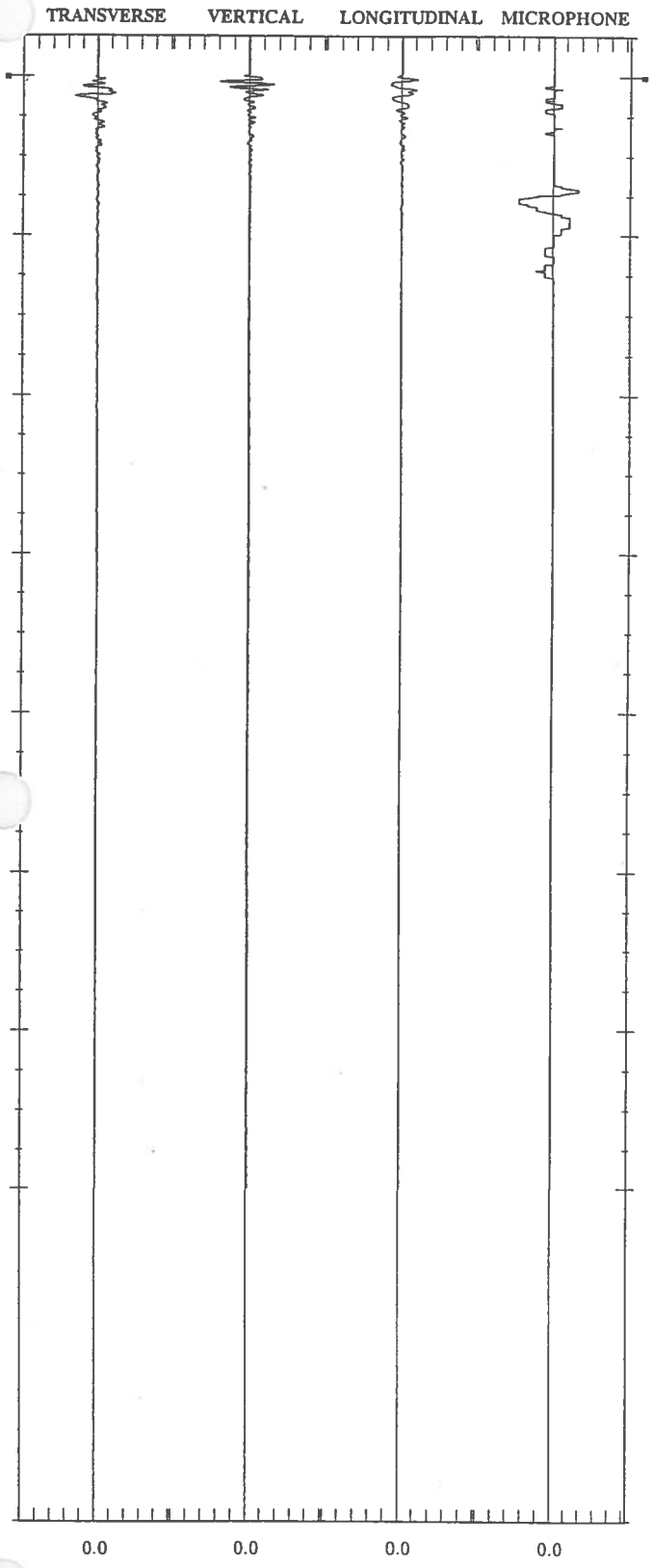


Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.100 in./s/div
Trigger = ▶---------◀

SEISMOGRAPH ANALYSIS REPORT

Ap.4

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER = ▪——▪

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3L.6XV
TIME & DATE	Vert. at 10:59:21 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.105 in/sec at 36 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	112.1 dB(L) at 767 ms
ZC FREQ	5 Hz

	TRAN	VERT	LONG	
PPV	0.080	0.100	0.053	in/sec
ZC FREQ	12	30	23	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	130	35	21	ms
ACCEL	0.03	0.05	0.02	g
1/4 WAVE DISP	0.0008	0.0006	0.0007	in

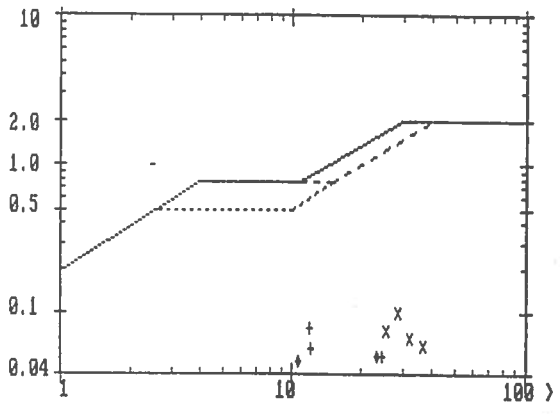
DYNAMIC GEO CAL Passed Passed Passed
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 462

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



FREQUENCY (Hz)
+ TRAN X VERT - LONG

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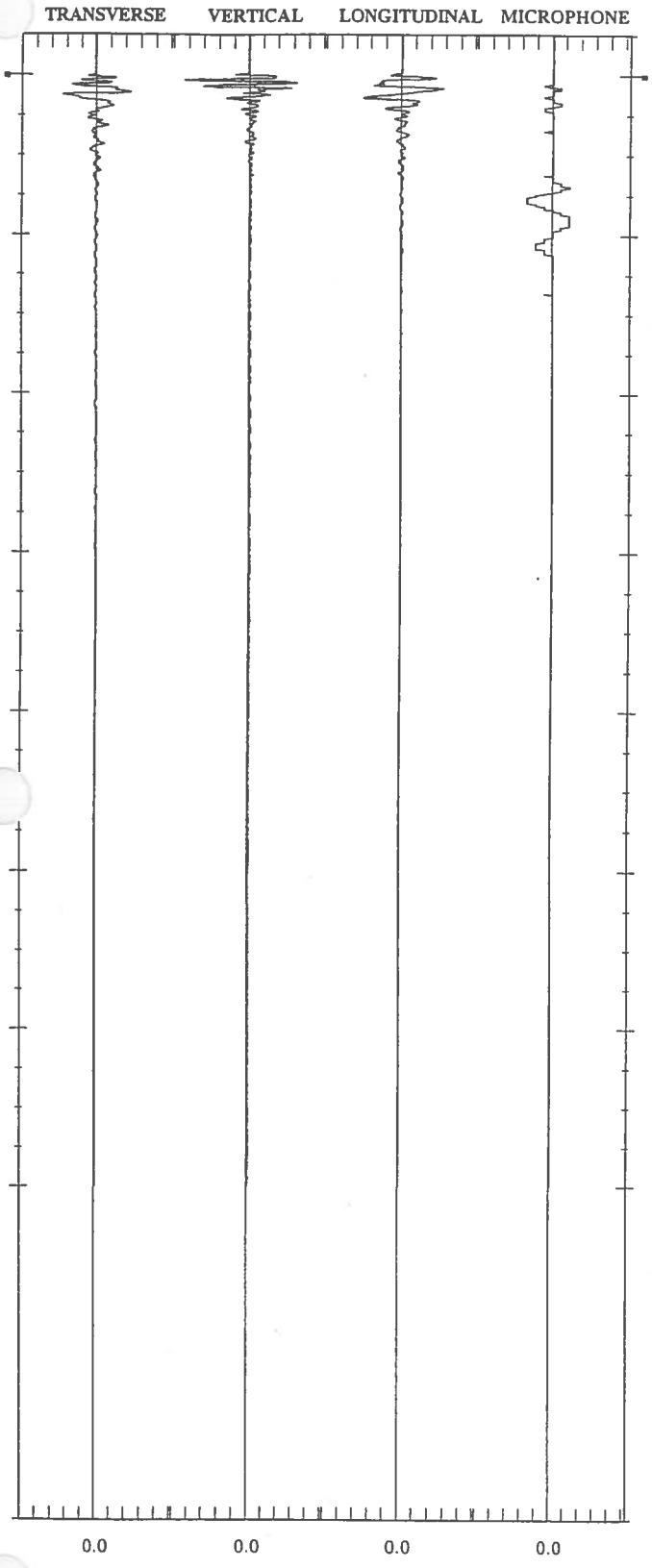
SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.020 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER =

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3N.0GV
TIME & DATE	Vert. at 11:38:40 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.091 in/sec at 35 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	109.6 dB(L) at 762 ms
ZC FREQ	5 Hz

	TRAN	VERT	LONG	
PPV	0.048	0.088	0.055	in/sec
ZC FREQ	13	30	12	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	127	34	84	ms
ACCEL	0.03	0.05	0.03	g
1/4 WAVE DISP	0.0005	0.0005	0.0006	in

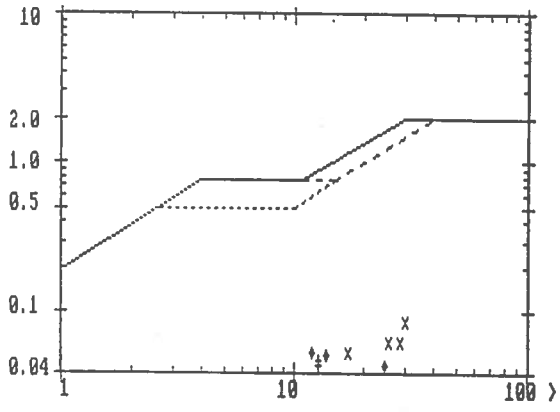
DYNAMIC GEO CAL Passed Passed Passed
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 469

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



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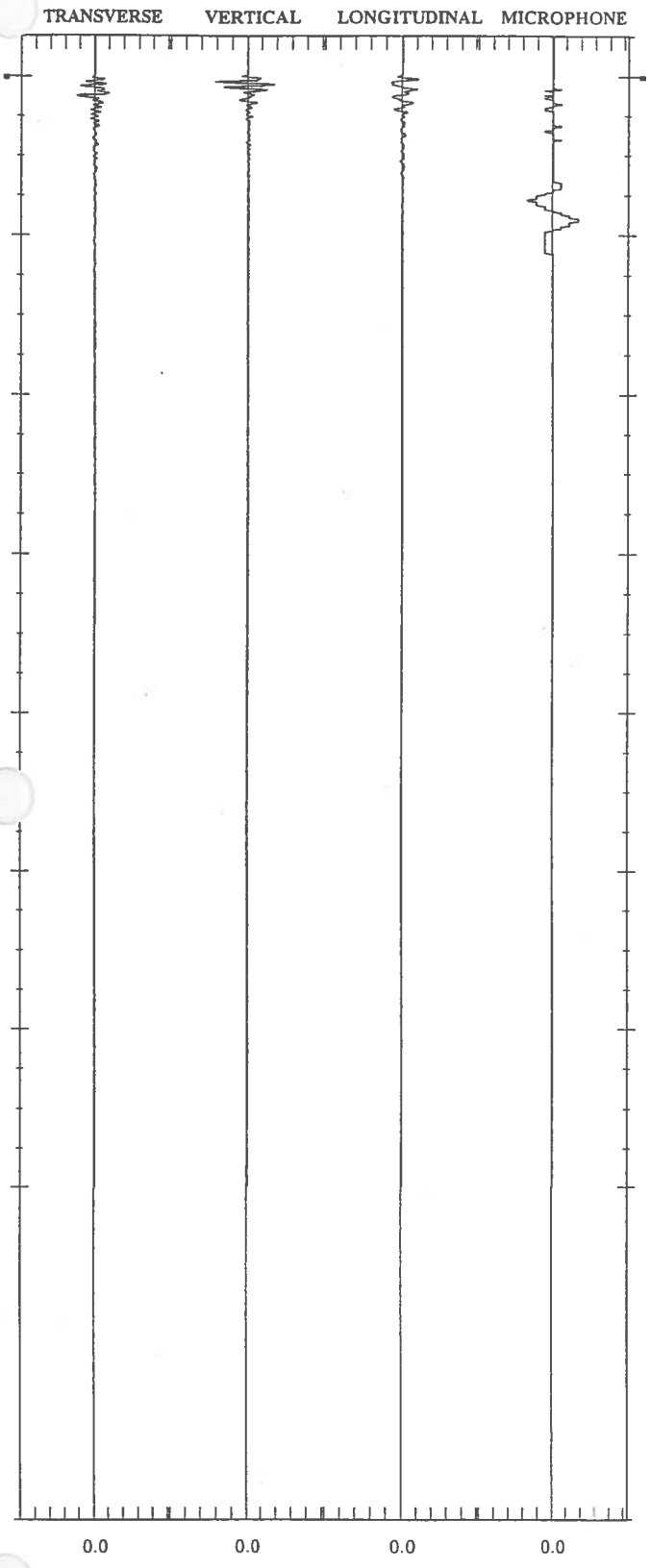
SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER =

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3N.XLV
TIME & DATE	Vert. at 11:58:33 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.114 in/sec at 35 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	109.6 dB(L) at 776 ms
ZC FREQ	5 Hz

	TRAN	VERT	LONG	
PPV	0.063	0.108	0.050	in/sec
ZC FREQ	24	30	26	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	125	35	19	ms
ACCEL	0.03	0.05	0.03	g
1/4 WAVE DISP	0.0005	0.0005	0.0004	in
DYNAMIC GEO CAL	Passed	Passed	Passed	

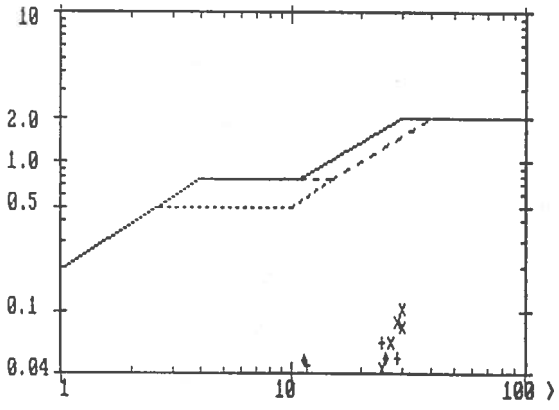
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 468

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



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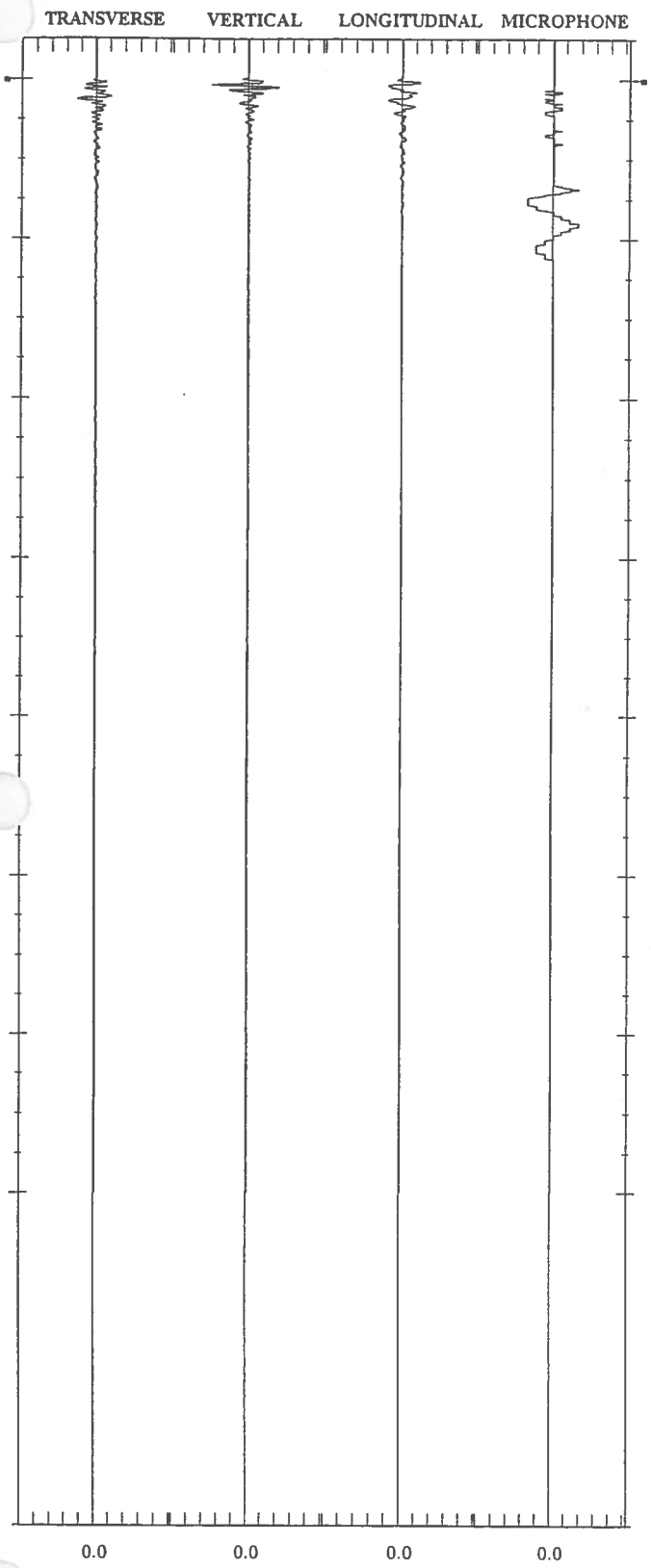
SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER =

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3O.LUV
TIME & DATE	Vert. at 12:13:06 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.133 in/sec at 36 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	109.6 dB(L) at 687 ms
ZC FREQ	11 Hz

	TRAN	VERT	LONG	
PPV	0.068	0.125	0.058	in/sec
ZC FREQ	24	30	24	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	127	35	20	ms
ACCEL	0.03	0.06	0.03	g
1/4 WAVE DISP	0.0005	0.0006	0.0005	in

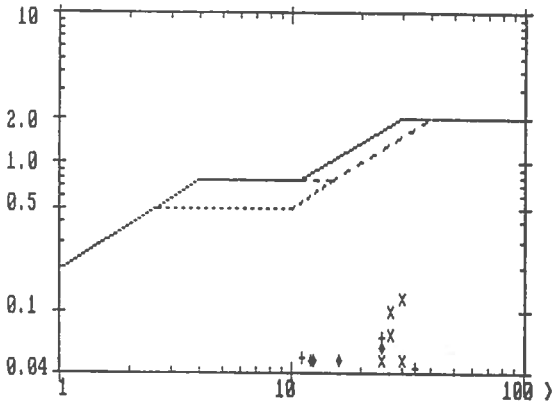
DYNAMIC GEO CAL Passed Passed Passed
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 468

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



FREQUENCY (Hz)
+ TRAN X VERT • LONG

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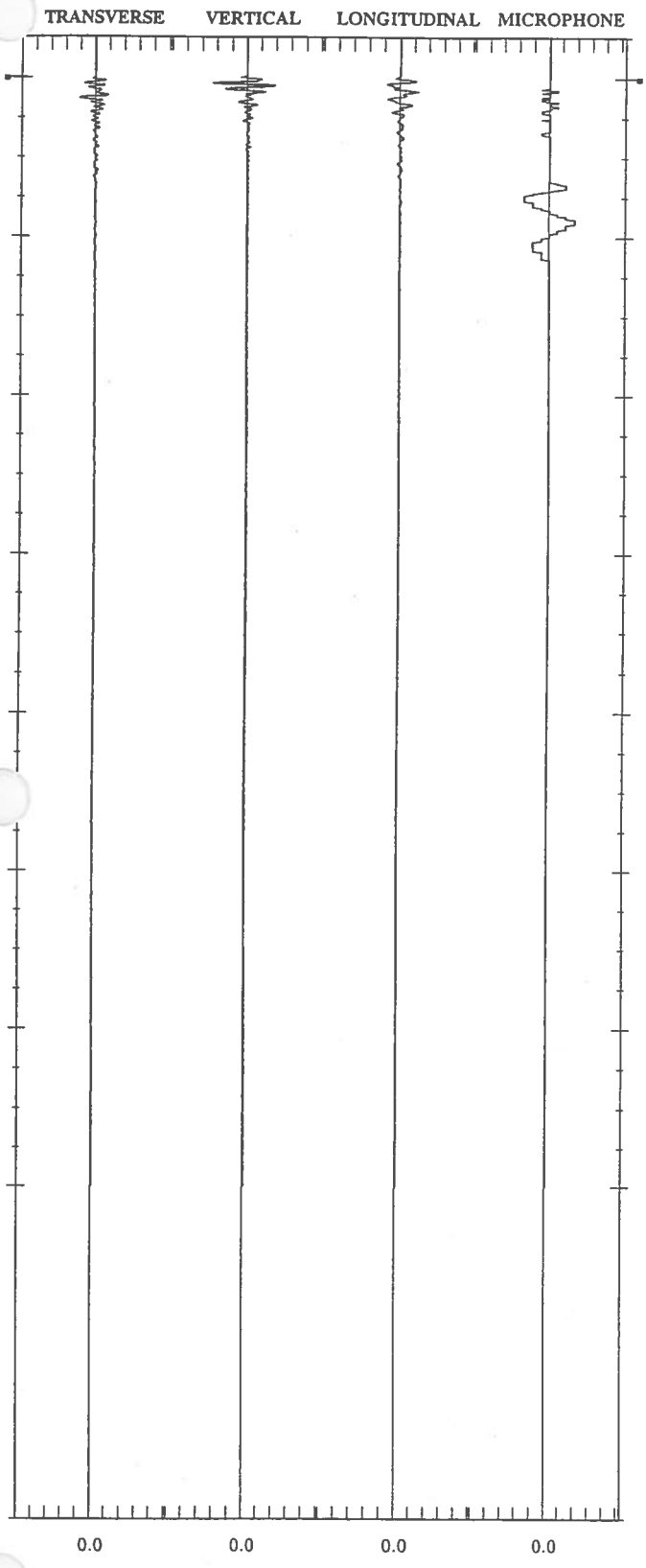
SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER =

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3P.HZV
TIME & DATE	Vert. at 12:32:23 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.124 in/sec at 36 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	109.6 dB(L) at 737 ms
ZC FREQ	4 Hz

	TRAN	VERT	LONG	
PPV	0.055	0.118	0.060	in/sec
ZC FREQ	26	32	12	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	128	35	85	ms
ACCEL	0.03	0.05	0.03	g
1/4 WAVE DISP	0.0003	0.0006	0.0005	in
DYNAMIC GEO CAL	Passed	Passed	Passed	

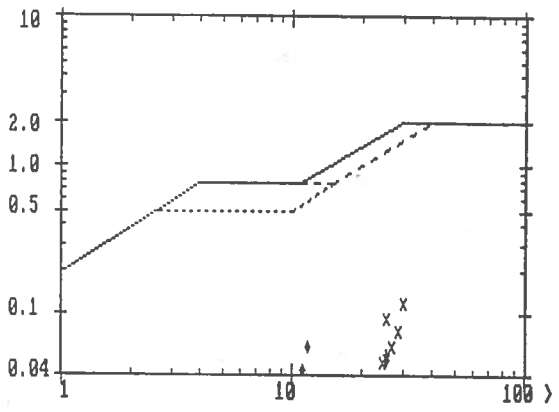
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 468

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

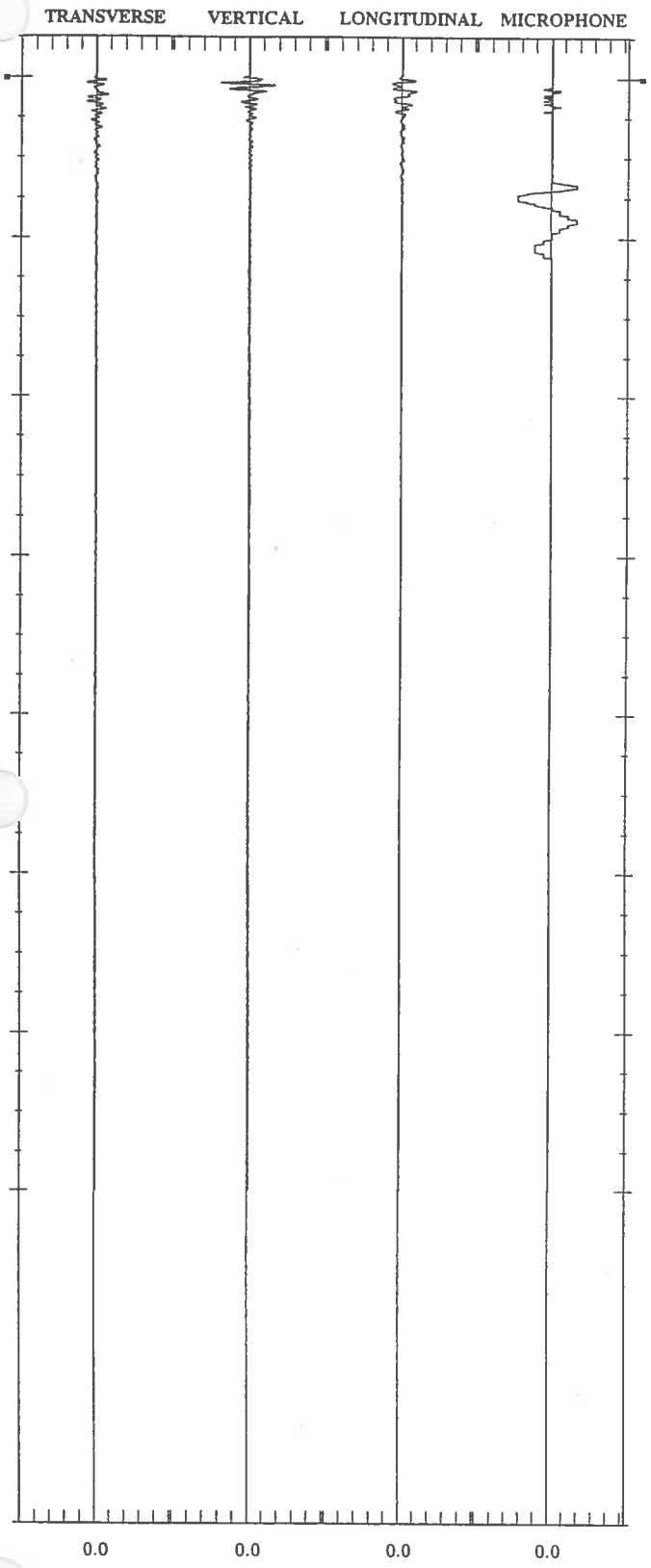
USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



Vibra-Tech
THE VIBRATION MONITORING EXPERTS

SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER =

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3P.ZVV
TIME & DATE	Vert. at 12:43:07 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.107 in/sec at 34 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	112.1 dB(L) at 731 ms
ZC FREQ	5 Hz

	TRAN	VERT	LONG	
PPV	0.038	0.100	0.048	in/sec
ZC FREQ	26	32	12	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	111	34	86	ms
ACCEL	0.02	0.05	0.03	g
1/4 WAVE DISP	0.0002	0.0005	0.0005	in

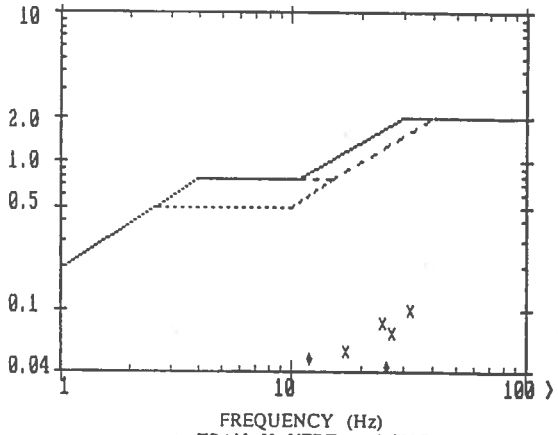
DYNAMIC GEO CAL Passed Passed Passed
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 468

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

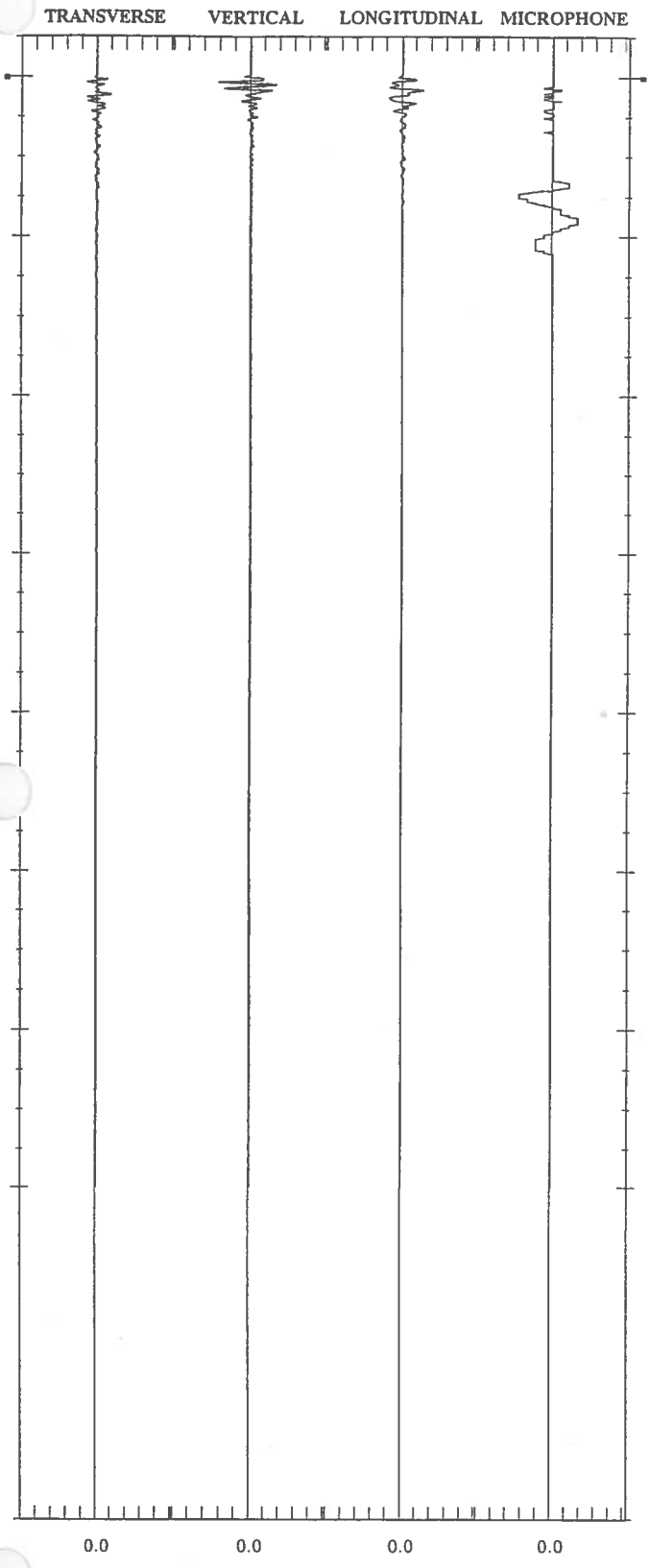
USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



Vibra-Tech
THE VIBRATION MONITORING EXPERTS

SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER = •——•

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3Q.5OV
TIME & DATE	Vert. at 12:46:36 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.114 in/sec at 35 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	112.1 dB(L) at 733 ms
ZC FREQ	5 Hz

	TRAN	VERT	LONG	
PPV	0.043	0.108	0.070	in/sec
ZC FREQ	26	32	12	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	112	33	86	ms
ACCEL	0.03	0.05	0.03	g
1/4 WAVE DISP	0.0003	0.0005	0.0007	in

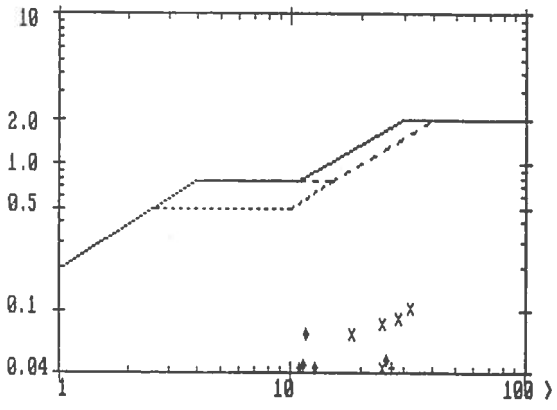
DYNAMIC GEO CAL Passed Passed Passed
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 468

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



FREQUENCY (Hz)
+ TRAN X VERT • LONG

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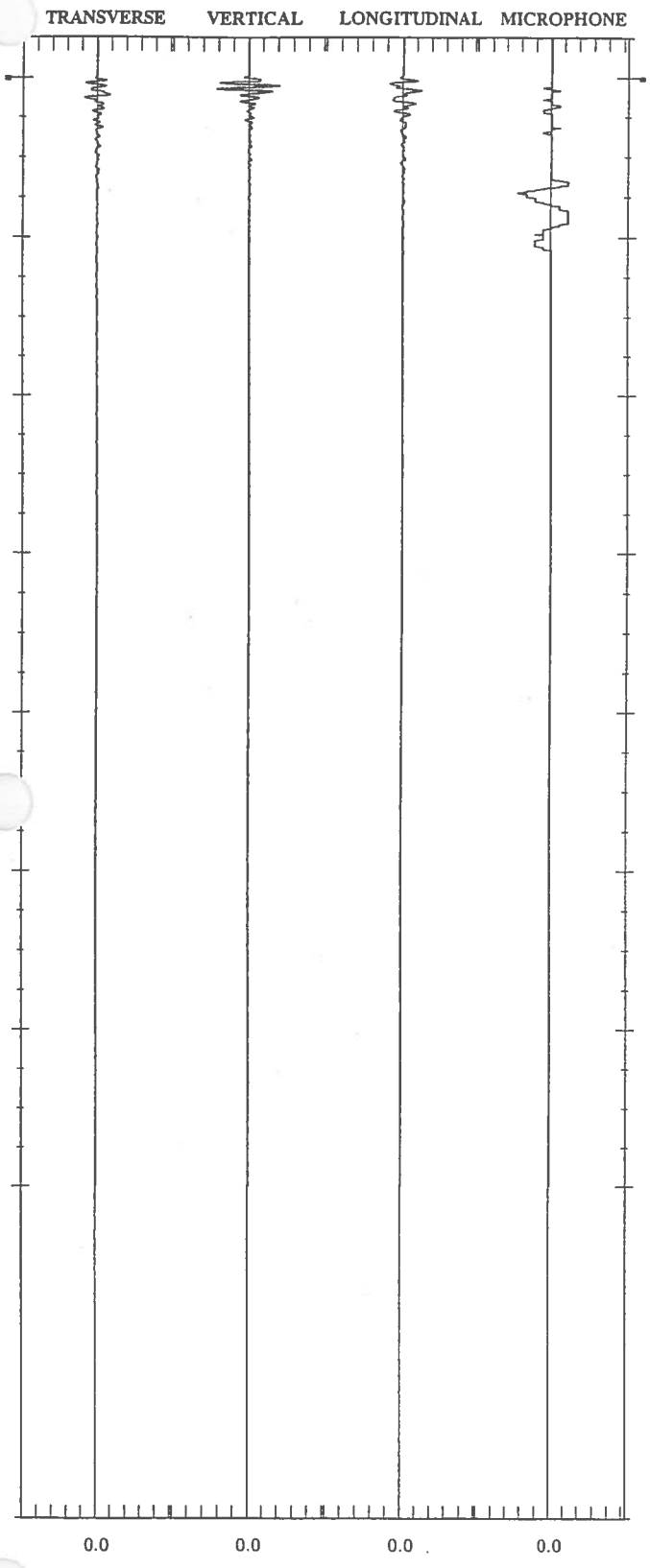
SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



AMPLITUDE SCALE:GEO: 0.050 in/sec/div MIC: 0.0005 psi(L)/div
TIME SCALE: 250 msec/div 9.375 sec/page TRIGGER =

SERIAL NO.	3375 V2.4-MSV
CODE	E3756H3Q.J9V
TIME & DATE	Vert. at 12:54:45 May 28, 1997
TRIGGER SOURCE	Geo or Mic 0.020 in/sec 119.6 dB(L)
RECORD TIME	7 sec
LOCATION	loaner @ Ajax
CLIENT	CC&V
USER	CC&V
NOTES	

SCALED DISTANCE	N/A
PEAK VECTOR SUM	0.113 in/sec at 35 ms
MICROPHONE	LINEAR WEIGHTING
PK AIR	112.1 dB(L) at 725 ms
ZC FREQ	5 Hz

	TRAN	VERT	LONG	
PPV	0.045	0.108	0.063	in/sec
ZC FREQ	22	28	11	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	131	74	85	ms
ACCEL	0.02	0.05	0.03	g
L4 WAVE DISP	0.0004	0.0007	0.0005	in

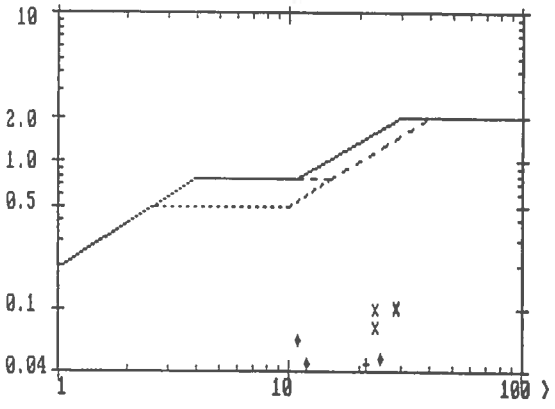
DYNAMIC GEO CAL Passed Passed Passed
INTERNAL MIC CHANNEL TEST: Passed Freq = 20 Amp = 468

BATTERY LEVEL 6.9 volts

CALIBRATED ON Jun 28, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



FREQUENCY (Hz)
+ TRAN X VERT ◆ LONG

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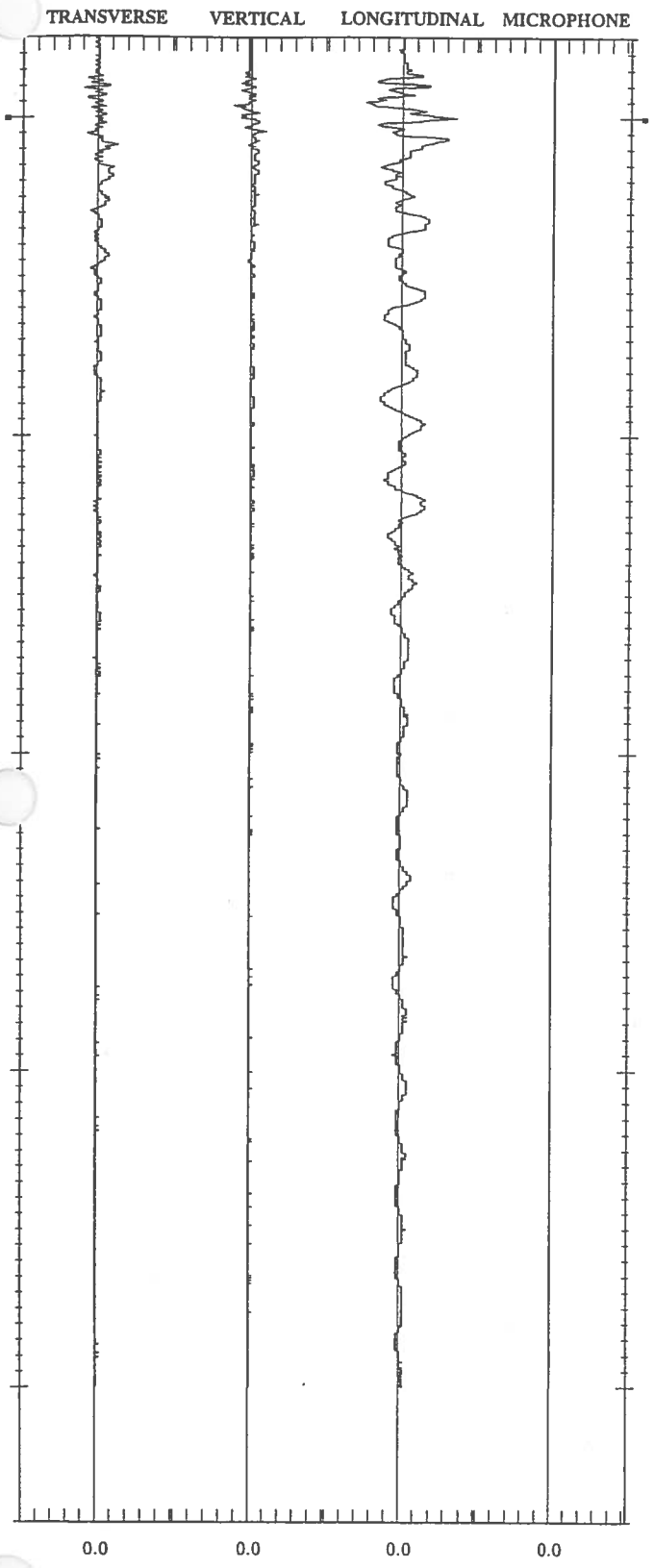
SEISMOGRAPH ANALYSIS REPORT

EVENT WAVEFORMS



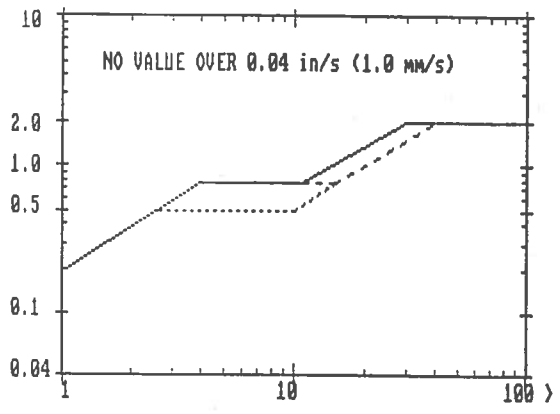
AMPLITUDE SCALE:GEO: 0.010 in/sec/div MIC: 1.0000 psi(L)/div
TIME SCALE: 50 msec/div 4.688 sec/page TRIGGER =

SERIAL NO.	3191 V2.4-MSV			
CODE	E1916H3S.4KV			
TIME & DATE	Long. at 13:29:08 May 28, 1997			
TRIGGER SOURCE	Geo 0.030 in/sec			
RECORD TIME	4 sec			
LOCATION	Upstairs City hall			
CLIENT				
USER				
NOTES				
SCALED DISTANCE	N/A			
PEAK VECTOR SUM	0.036 in/sec at 2 ms			
MICROPHONE	LINEAR WEIGHTING			
PK AIR	<100 dB(L) at 2 ms			
ZC FREQ	N/A			
	TRAN	VERT	LONG	
PPV	0.013	0.013	0.035	in/sec
ZC FREQ	20	28	12	Hz
FFT FREQ	N/A	N/A	N/A	Hz
TIME(REL.TO TRIG)	85	-37	2	ms
ACCEL	0.01	0.01	0.02	g
1/4 WAVE DISP	0.0001	0.0000	0.0004	in
DYNAMIC GEO CAL	Passed	Passed	Passed	
INTERNAL MIC CHANNEL TEST:	Failed	Freq = 0	Amp = 1	
BATTERY LEVEL	6.3 volts			

CALIBRATED ON Sep 11, 1996 by VIBRA-TECH

(N/A) - not applicable

USBM RI8507 AND OSMRE ANALYSIS
(in/sec)



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