APPENDIX 3.4-A, APPENDIX C: VIBRATION PROPAGATION MEASUREMENT DATA

Table C-1 Line Source Response Coefficients for Borehole Impact Site VP1—86 ft Depth

Frequency (Hz)	A	B	C
3.15	14.1	-10.3	-4.1
4	-160.2	153.8	-41.8
5	15.9	-4.7	-4.3
6.3	105.1	-45.6	-2.4
8	88.5	-36.1	-2.8
10	-205.5	232.7	-63.3
12.5	22.8	10.4	-9.4
16	41.2	-9.1	-4.1
20	-58.5	89.7	-29.2
25	-62.7	100.6	-33.3
31.5	110.0	-44.9	-2.4
40	85.2	-35.9	-2.8
50	116.8	-51.5	-2.1
63	71.7	-30.0	-3.1
80	62.1	-25.0	-3.4
100	62.0	-25.6	-3.3
125	83.5	-38.9	-2.7

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

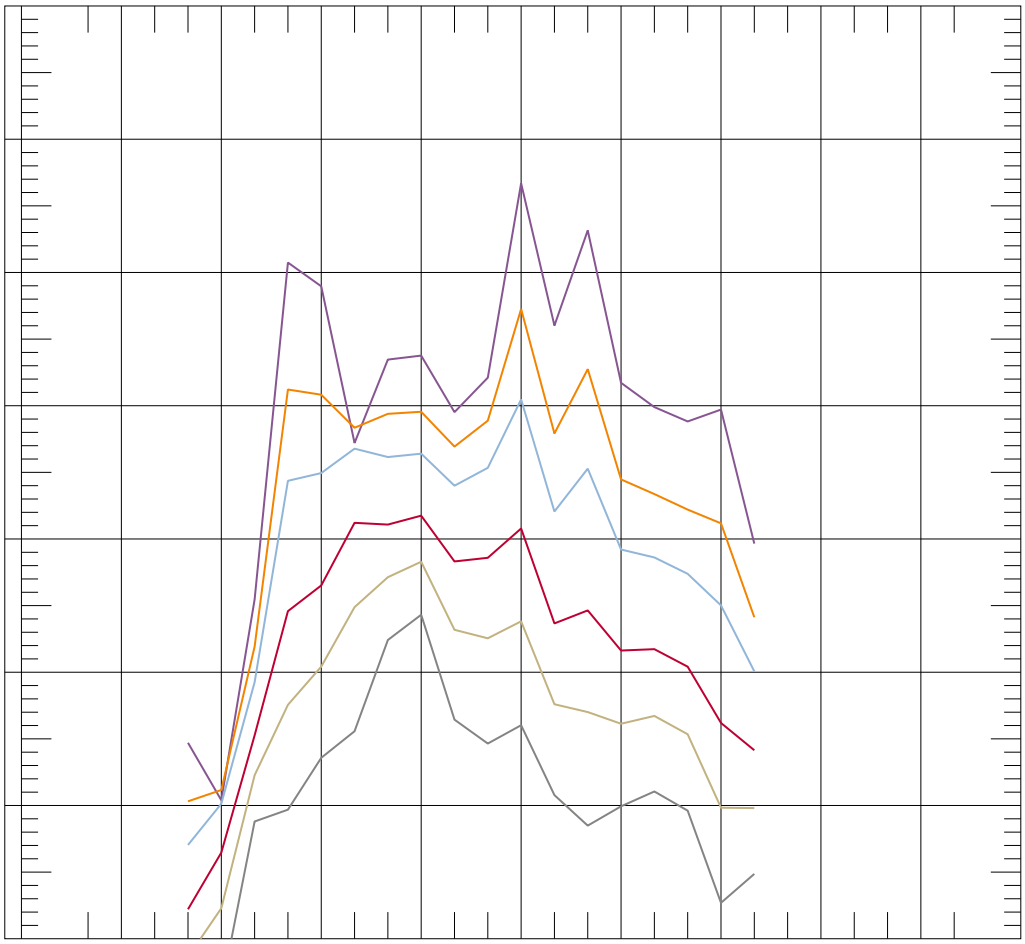

Figure C-1 Line Source Response for Borehole Impact Site VP1—86 ft Depth

Table C-2 Line Source Response Coefficients for Surface Impact Site VP2

Frequency (Hz)	A	B	C
3.15	10.3	0.3	0
4	14.8	-1.4	0
5	21.6	-3.8	0
6.3	24.5	-4.9	0
8	23.6	-3.7	0
10	26.4	-3.9	0
12.5	30.3	-4.8	0
16	40.3	-9.3	0
20	43.6	-12.6	0
25	51.4	-17.4	0
31.5	65.6	-25.6	0
40	82.0	-35.5	0
50	79.4	-36.3	0
63	68.2	-33.5	0
80	52.2	-27.6	0
100	45.3	-24.7	0
125	53.2	-28.4	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

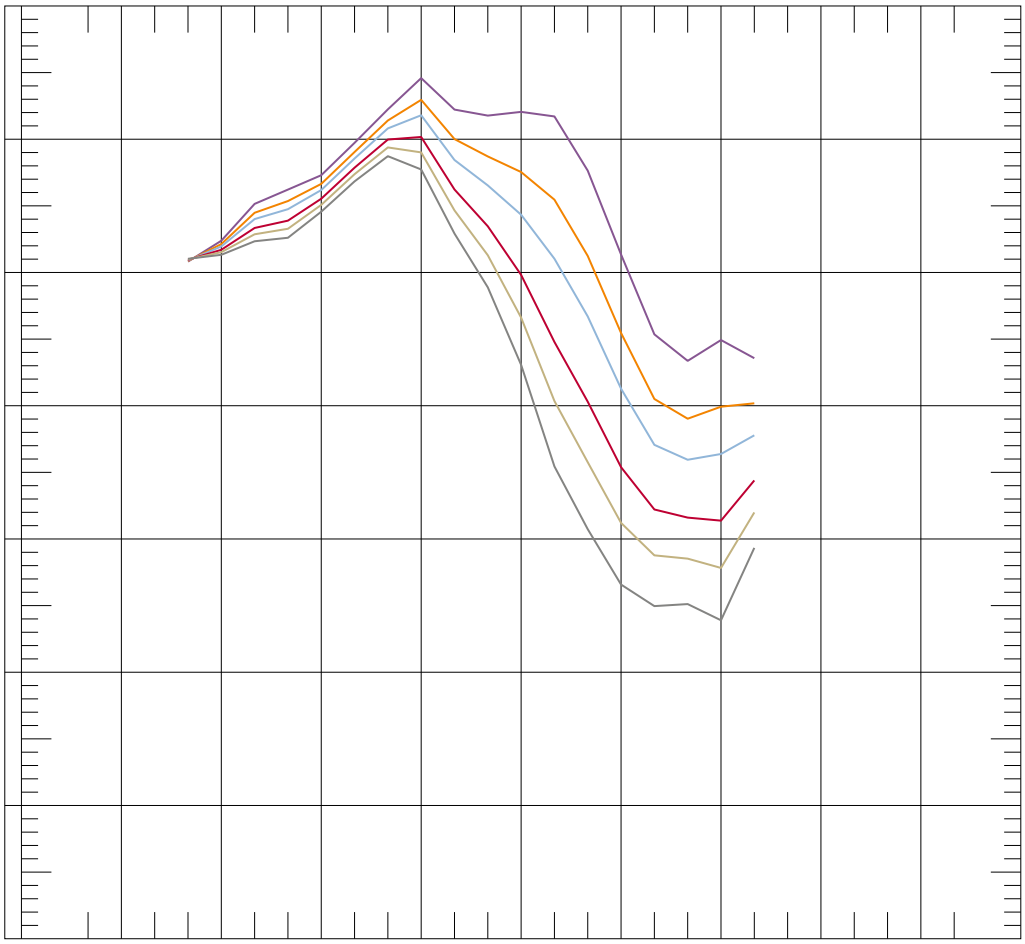

Figure C-2 Line Source Response for Surface Impact Site VP2

Table C-3 Line Source Response Coefficients for Borehole Impact Site VP3—0 ft Depth

Frequency (Hz)	A	B	C
3.15	8.6	0.8	-0.3
4	-17.8	41.5	-13.4
5	19.6	3.1	-2.5
6.3	11.6	12.6	-4.6
8	25.7	2.8	-2.6
10	-37.5	79.3	-24.5
12.5	-0.1	39.3	-13.7
16	44.4	-4.6	-2.6
20	64.4	-16.7	-2.0
25	-57.1	126.4	-41.7
31.5	96.0	-31.8	-1.4
40	-137.1	220.2	-68.8
50	54.8	18.4	-18.8
63	127.7	-58.2	-0.7
80	77.2	-34.6	-1.3
100	51.3	-24.5	-1.6
125	39.1	-18.8	-1.9

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

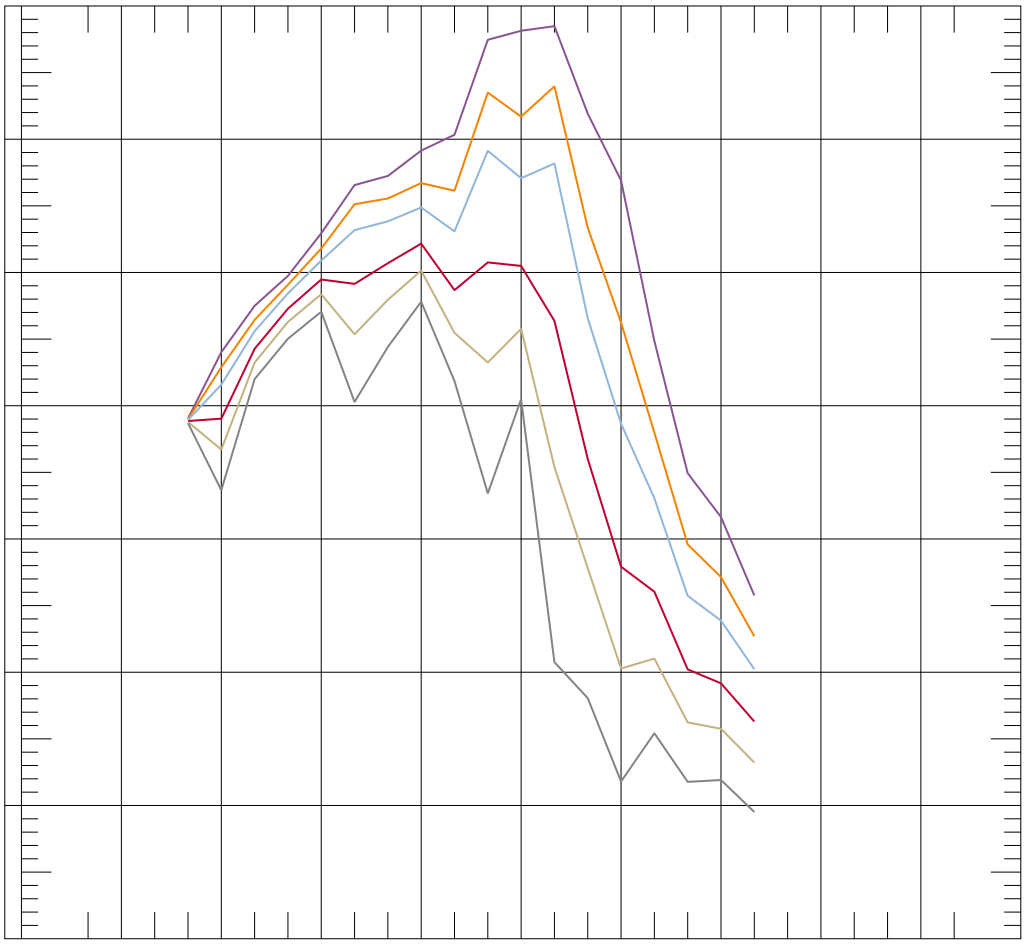

Figure C-3 Line Source Response for Borehole Impact Site VP3—0 ft Depth

Table C-4 Line Source Response Coefficients for Borehole Impact Site VP3—20 ft Depth

Frequency (Hz)	A	B	C
3.15	5.0	-1.8	0.6
4	-47.4	70.4	-21.1
5	-36.8	62.7	-18.2
6.3	13.0	12.6	-5.3
8	22.7	4.2	-2.8
10	-77.4	116.7	-33.7
12.5	-35.0	74.7	-23.4
16	-4.1	47.9	-18.3
20	55.2	-15.4	-2.4
25	-44.9	93.8	-30.9
31.5	80.6	-27.6	-1.8
40	-4.3	59.3	-24.4
50	22.6	31.0	-18.4
63	46.5	-14.9	-2.4
80	61.2	-28.0	-1.8
100	22.1	-11.4	-2.6
125	4.1	-2.7	-3.0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

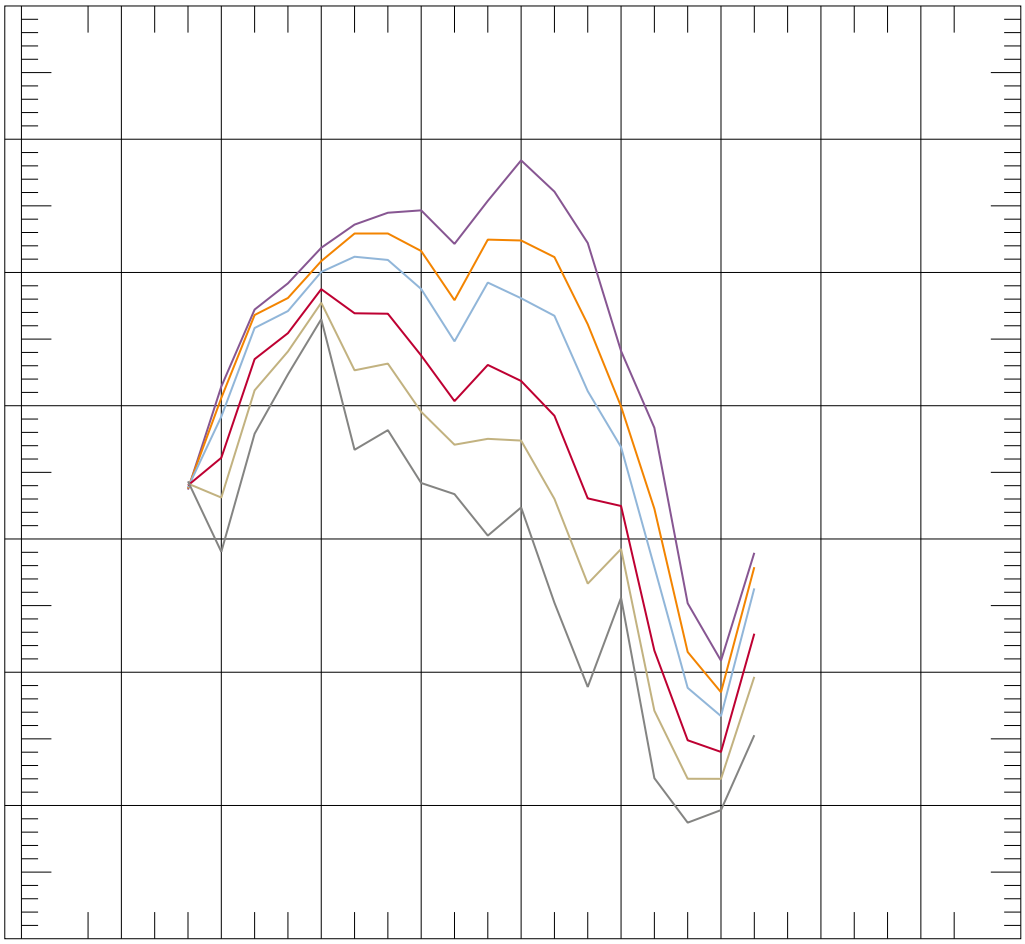

Figure C-4 Line Source Response for Borehole Impact Site VP3—20 ft Depth

Table C-5 Line Source Response Coefficients for Borehole Impact Site VP3—40 ft Depth

Frequency (Hz)	A	B	C
3.15	-27.3	36.2	-9.8
4	6.0	5.4	-2.6
5	14.4	5.3	-2.5
6.3	-69.0	96.3	-26.4
8	-66.8	95.8	-26.2
10	-5.7	36.0	-11.9
12.5	25.9	3.3	-3.4
16	32.2	-0.6	-3.4
20	-6.1	40.5	-14.2
25	-145.8	193.3	-54.5
31.5	-181.4	233.6	-65.7
40	-177.3	227.4	-64.0
50	88.4	-36.2	-1.8
63	23.0	-2.3	-3.4
80	20.0	-7.7	-3.2
100	34.8	-14.7	-2.8
125	36.3	-14.4	-2.8

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

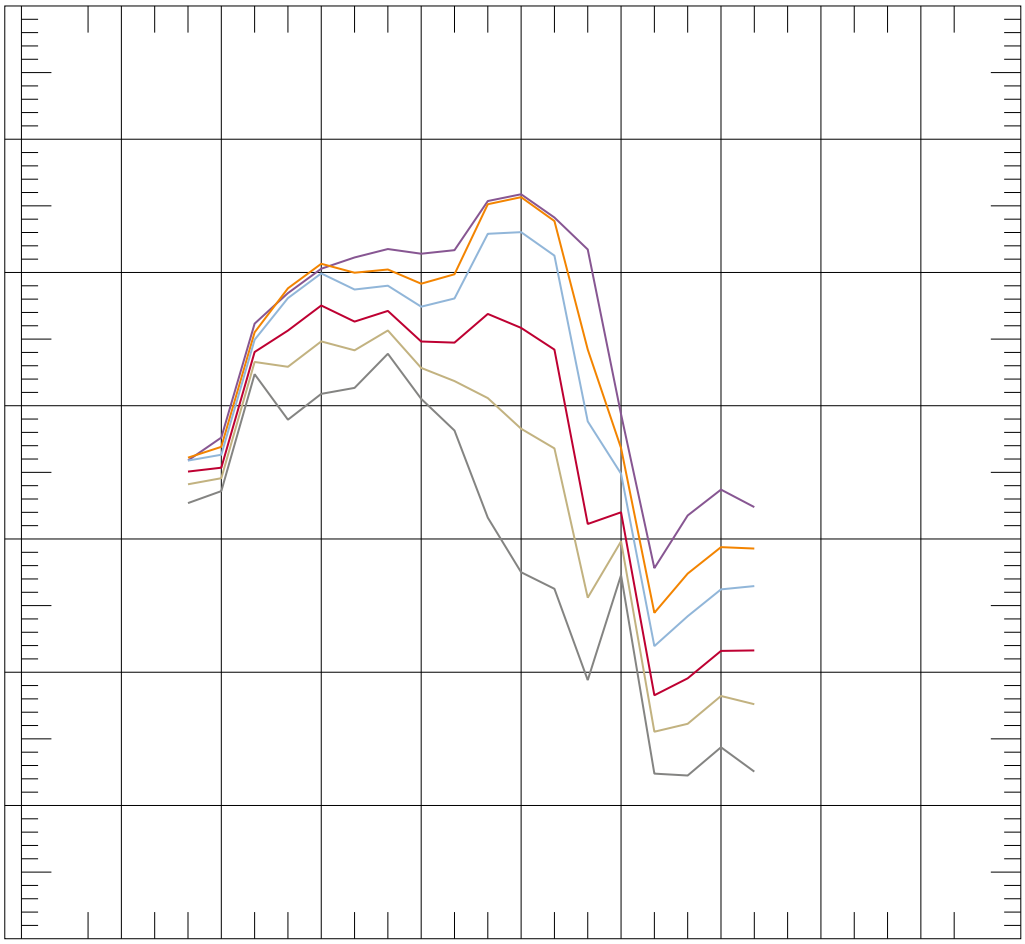

Figure C-5 Line Source Response for Borehole Impact Site VP3—40 ft Depth

Table C-6 Line Source Response Coefficients for Borehole Impact Site VP3—60 ft Depth

Frequency (Hz)	A	B	C
3.15	-32.7	37.5	-9.6
4	7.6	6.1	-3.3
5	-97.4	113.7	-29.2
6.3	-199.5	218.2	-55.9
8	17.0	5.2	-3.6
10	-70.8	92.2	-24.3
12.5	-9.5	31.1	-9.3
16	25.3	2.2	-3.9
20	-236.4	262.1	-67.8
25	50.3	-10.8	-3.5
31.5	49.6	-11.2	-3.5
40	-141.4	168.1	-45.6
50	-5.4	43.9	-18.6
63	47.8	-14.7	-3.3
80	64.0	-25.9	-2.7
100	61.0	-25.9	-2.7
125	50.2	-20.7	-3.0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

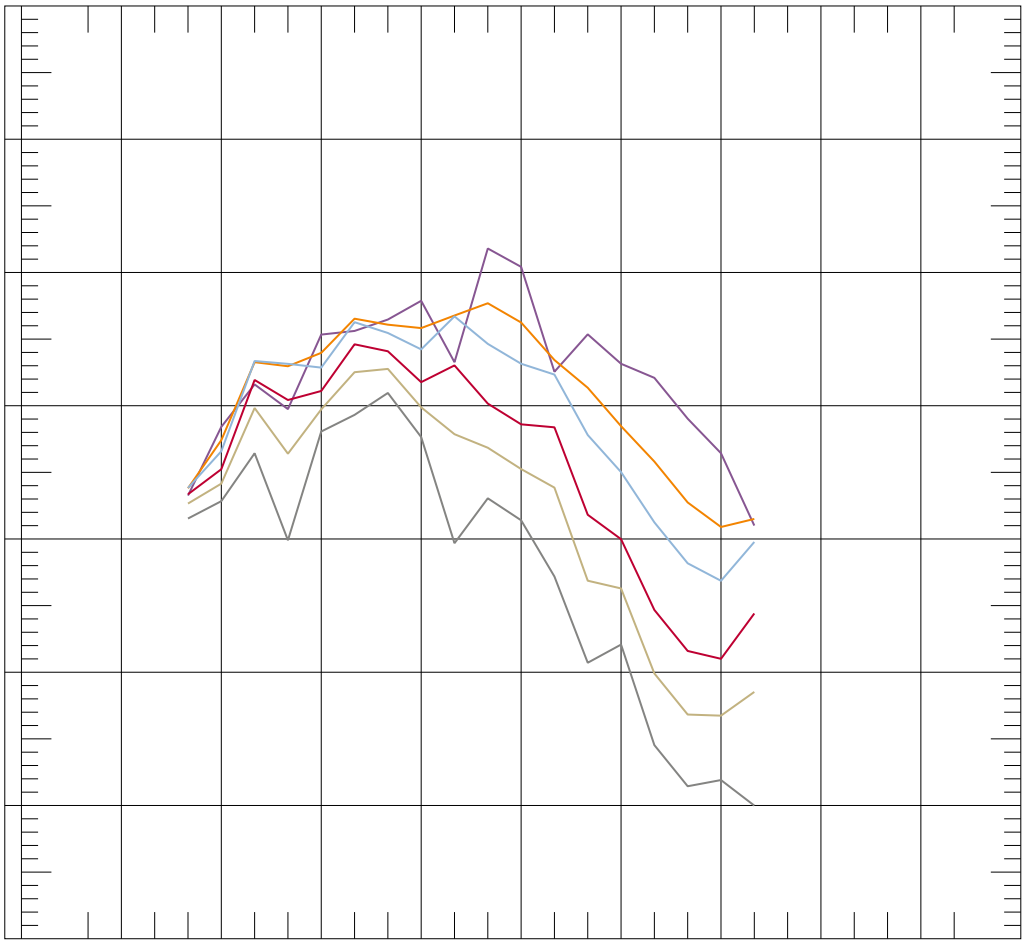

Figure C-6 Line Source Response for Borehole Impact Site VP3—60 ft Depth

Table C-7 Line Source Response Coefficients for Surface Impact Site VP4

Frequency (Hz)	A	B	C
3.15	11.3	-5.7	0
4	13.7	-4.4	0
5	20.4	-6.6	0
6.3	27.8	-7.3	0
8	38.0	-6.5	0
10	44.7	-7.4	0
12.5	49.1	-9.7	0
16	53.4	-12.2	0
20	58.7	-15.6	0
25	65.8	-19.7	0
31.5	77.9	-26.8	0
40	87.7	-35.0	0
50	92.0	-41.0	0
63	82.7	-39.3	0
80	63.6	-33.0	0
100	52.4	-29.0	0
125	28.8	-14.6	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

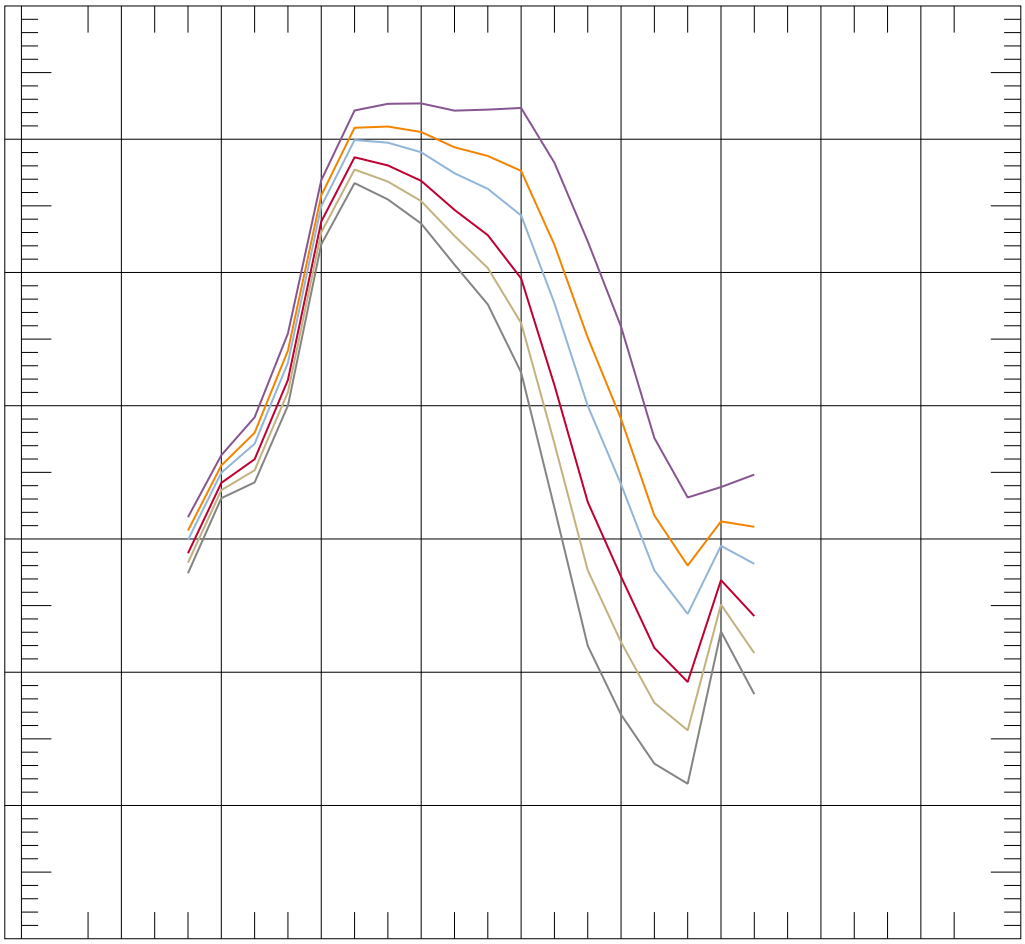

Figure C-7 Line Source Response for Surface Impact Site VP4

Table C-8 Line Source Response Coefficients for Borehole Impact Site VP5—0 ft Depth

Frequency (Hz)	A	B	C
3.15	5.4	2.3	-2.7
4	10.9	1.9	-2.7
5	16.3	3.8	-2.3
6.3	22.7	2.5	-2.6
8	22.8	3.5	-2.5
10	23.5	3.8	-1.9
12.5	19.5	8.2	-2.8
16	6.4	23.9	-7.5
20	22.1	3.3	-1.5
25	47.8	-8.7	-2.4
31.5	49.2	7.9	-11.6
40	87.2	-33.5	-1.3
50	80.3	-31.8	-1.3
63	89.0	-40.6	-1.1
80	84.2	-38.2	-1.1
100	69.0	-32.7	-1.3
125	63.4	-33.3	-1.3

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

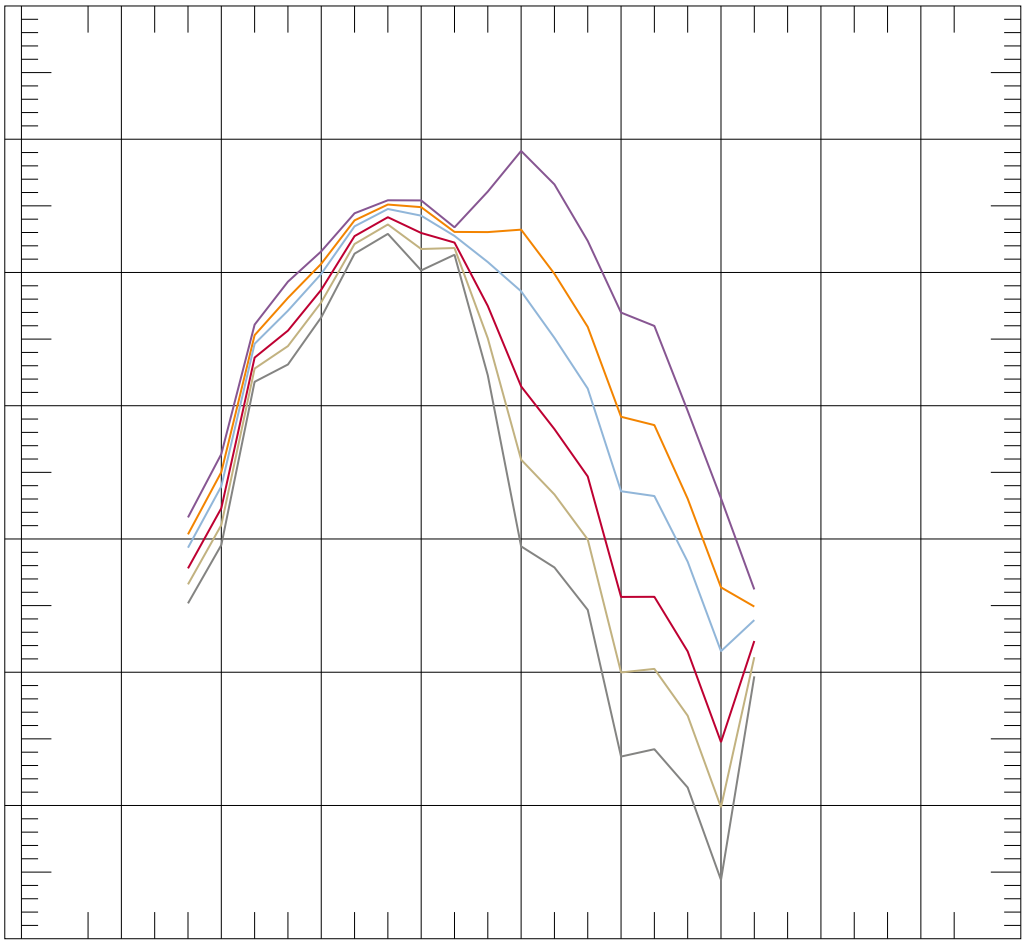

Figure C-8 Line Source Response for Borehole Impact Site VP5—0 ft Depth

Table C-9 Line Source Response Coefficients for Borehole Impact Site VP5—30 ft Depth

Frequency (Hz)	A	B	C
3.15	2.4	0.6	-0.2
4	6.3	4.7	-2.2
5	-25.1	50.9	-15.1
6.3	-17.2	46.9	-14.4
8	-9.7	43.4	-13.9
10	27.5	4.0	-3.0
12.5	27.5	3.7	-3.0
16	29.4	1.3	-3.2
20	38.1	-4.3	-3.0
25	53.3	-12.2	-2.7
31.5	52.4	-11.0	-2.7
40	64.2	-17.0	-2.4
50	47.3	5.4	-11.1
63	-125.9	173.9	-53.2
80	-42.8	77.6	-26.9
100	-129.8	179.0	-55.6
125	-175.5	216.7	-63.4

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

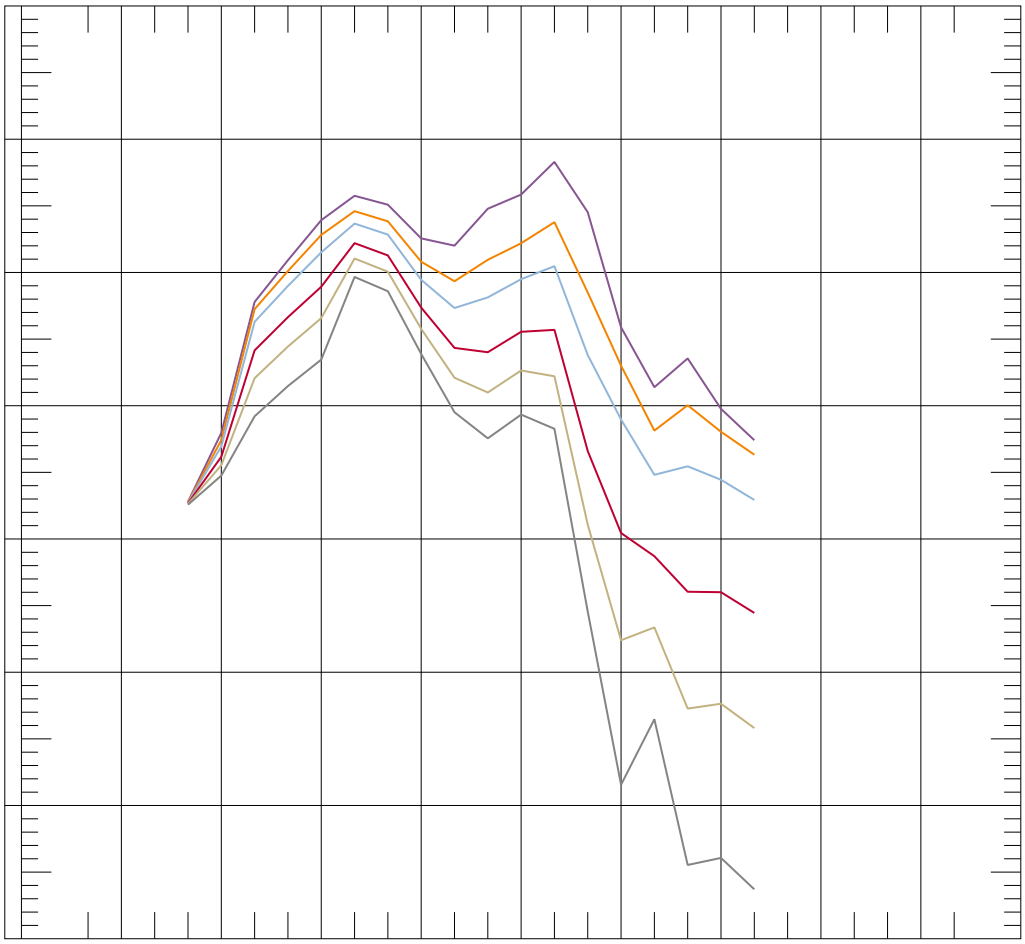

Figure C-9 Line Source Response for Borehole Impact Site VP5—30 ft Depth

Table C-10 Line Source Response Coefficients for Borehole Impact Site VP5—40 ft Depth

Frequency (Hz)	A	B	C
3.15	0.3	5.2	-2.4
4	16.9	0.3	-3.4
5	14.8	5.4	-2.8
6.3	12.6	12.5	-5.2
8	14.1	14.1	-5.8
10	1.1	30.9	-10.8
12.5	33.1	-0.4	-3.4
16	37.5	-3.8	-3.3
20	45.0	-9.8	-3.1
25	42.0	-7.3	-3.2
31.5	-22.8	60.4	-19.6
40	-198.5	250.5	-70.1
50	-278.8	335.9	-94.0
63	-228.4	274.5	-77.4
80	75.9	-31.3	-2.0
100	74.7	-18.0	-8.3
125	104.4	-46.6	-1.4

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

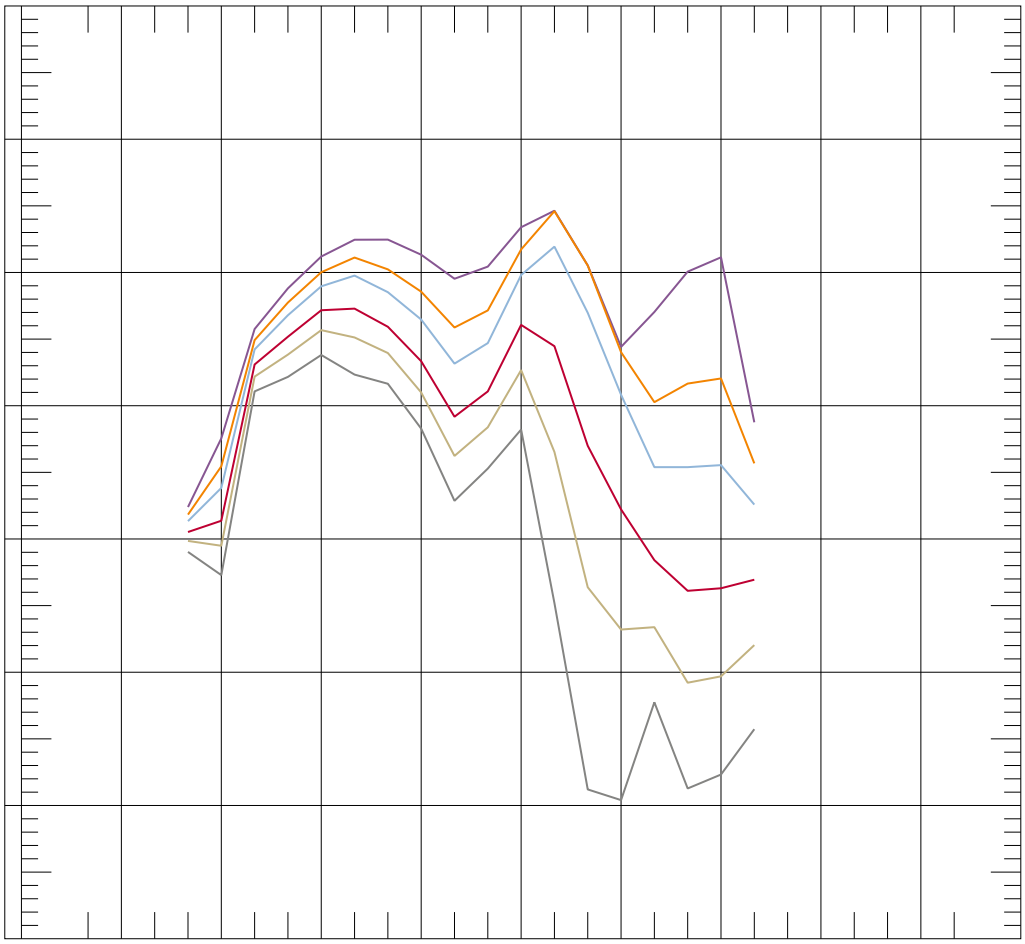

Figure C-10 Line Source Response for Borehole Impact Site VP5—40 ft Depth

Table C-11 Line Source Response Coefficients for Borehole Impact Site VP5—50 ft Depth

Frequency (Hz)	A	B	C
3.15	2.7	-3.0	1.0
4	4.5	0.7	-0.3
5	13.3	5.8	-2.8
6.3	-52.4	74.5	-20.4
8	-103.6	134.4	-37.1
10	-22.4	54.4	-17.1
12.5	36.9	-2.8	-3.6
16	44.2	-7.4	-3.4
20	58.9	-17.3	-2.9
25	-105.4	147.8	-43.5
31.5	-202.3	240.5	-64.4
40	-301.9	344.0	-91.3
50	-12.4	54.1	-20.3
63	-337.5	375.4	-101.5
80	-81.3	121.2	-39.6
100	39.0	8.1	-13.6
125	106.3	-50.5	-1.5

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

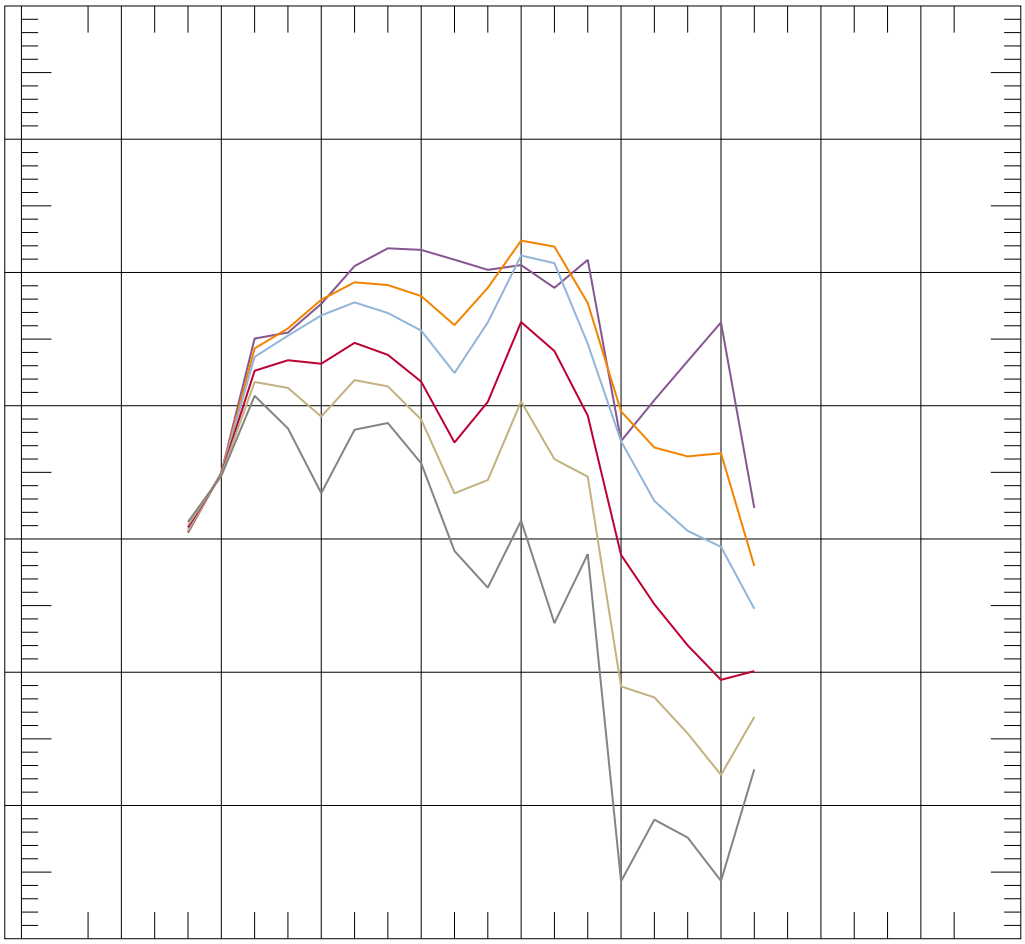

Figure C-11 Line Source Response for Borehole Impact Site VP5—50 ft Depth

Table C-12 Line Source Response Coefficients for Borehole Impact Site VP5—60 ft Depth

Frequency (Hz)	A	B	C
3.15	-17.3	32.3	-12.0
4	2.5	5.3	-2.2
5	8.8	6.2	-2.9
6.3	14.3	5.8	-3.4
8	12.6	6.1	-3.3
10	25.4	1.8	-3.9
12.5	18.9	5.2	-3.6
16	20.8	3.8	-3.8
20	43.1	-9.7	-3.6
25	38.0	-6.1	-3.7
31.5	37.2	-3.8	-3.8
40	31.5	-0.9	-3.9
50	-87.3	112.0	-31.1
63	-14.5	46.6	-18.3
80	37.3	-10.8	-3.5
100	46.3	-16.7	-3.2
125	45.3	-16.5	-3.2

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

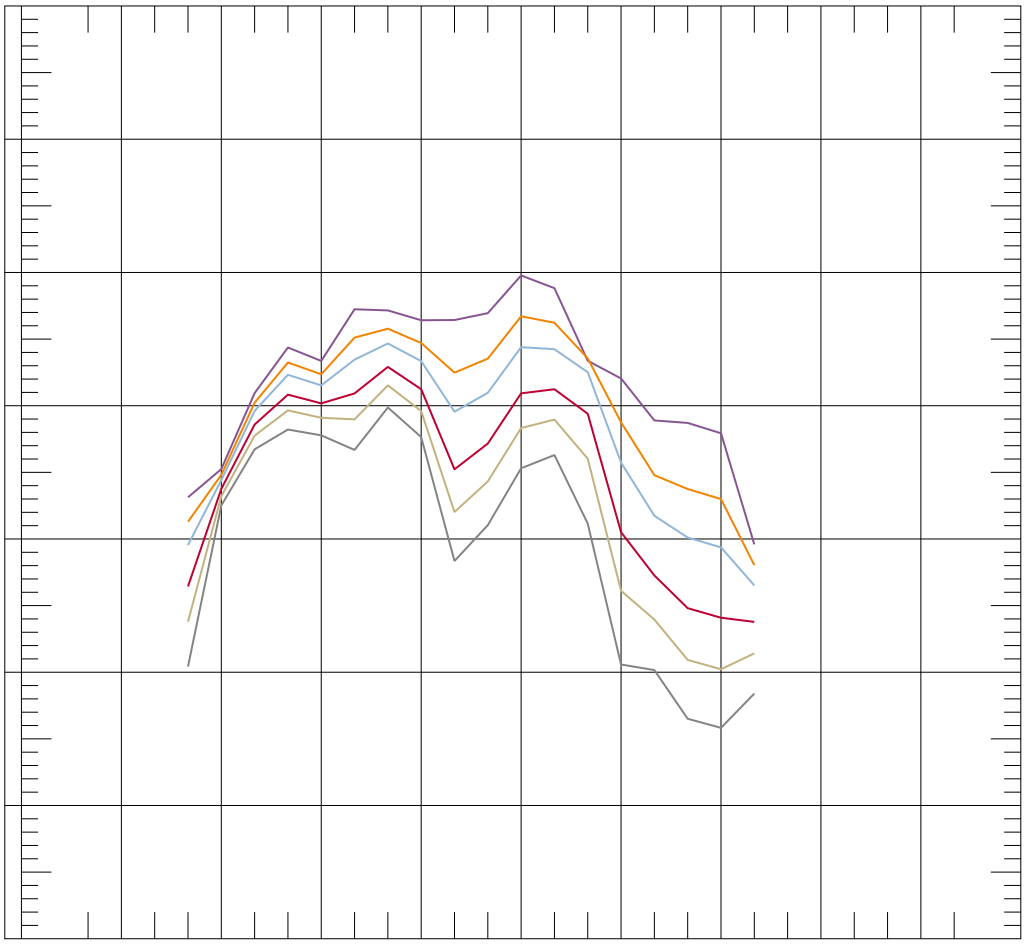

Figure C-12 Line Source Response for Borehole Impact Site VP5—60 ft Depth

Table C-13 Line Source Response Coefficients for Surface Impact Site VP6

Frequency (Hz)	A	B	C
3.15	-6.1	-0.4	0
4	-0.8	-0.2	0
5	13.3	-3.1	0
6.3	26.6	-6.4	0
8	42.2	-12.2	0
10	46.9	-13.7	0
12.5	48.3	-13.6	0
16	45.8	-12.5	0
20	57.9	-18.3	0
25	79.8	-28.7	0
31.5	111.0	-44.5	0
40	91.8	-37.7	0
50	88.9	-41.6	0
63	64.7	-34.4	0
80	27.6	-17.2	0
100	27.3	-16.2	0
125	25.9	-15.4	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

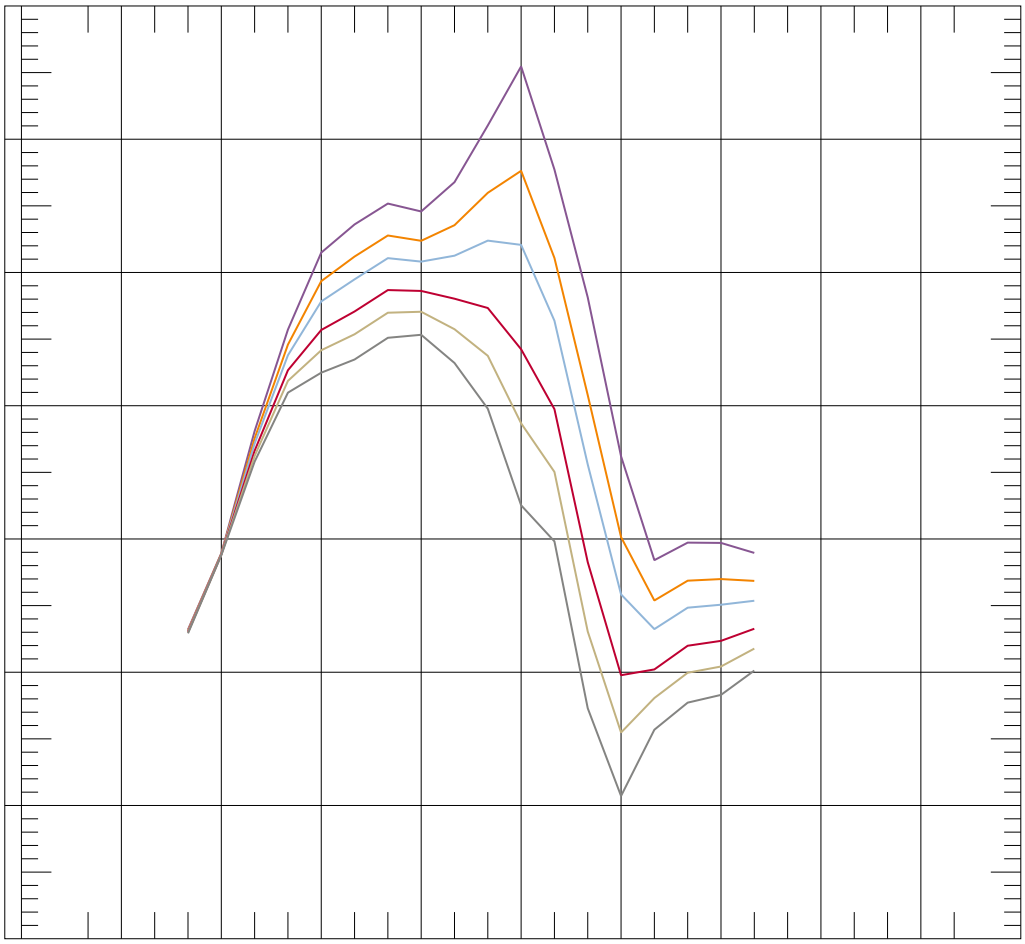

Figure C-13 Line Source Response for Surface Impact Site VP6

Table C-14 Line Source Response Coefficients for Surface Impact Site VP7

Frequency (Hz)	A	B	C
3.15	7.0	-18.2	0
4	-7.0	-9.5	0
5	9.5	-15.0	0
6.3	18.2	-16.1	0
8	33.7	-21.9	0
10	42.3	-21.3	0
12.5	56.6	-25.2	0
16	82.7	-35.8	0
20	73.7	-30.4	0
25	83.3	-33.2	0
31.5	103.8	-44.9	0
40	112.3	-49.5	0
50	110.5	-51.4	0
63	120.3	-60.8	0
80	103.8	-54.5	0
100	88.3	-48.6	0
125	75.8	-44.8	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

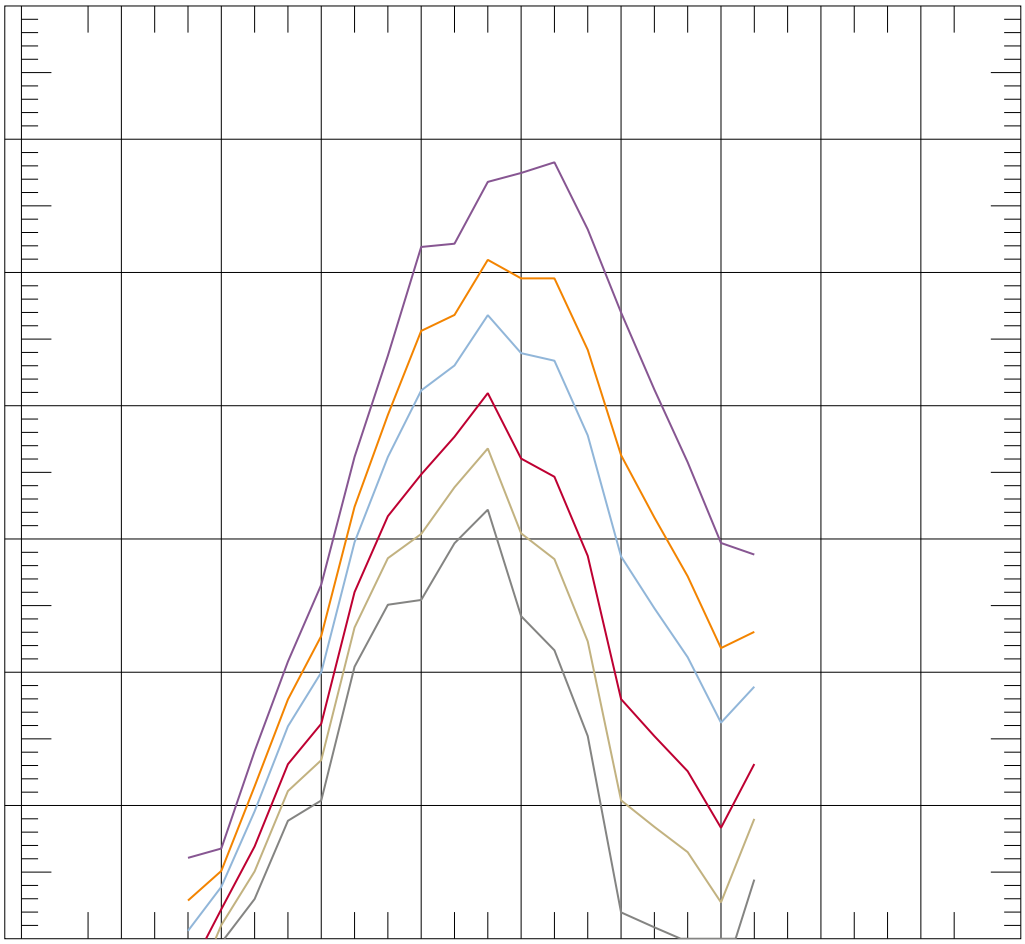

Figure C-14 Line Source Response for Surface Impact Site VP7

Table C-15 Line Source Response Coefficients for Surface Impact Site VP8

Frequency (Hz)	A	B	C
3.15	42.7	-13.9	0
4	44.8	-14.4	0
5	43.6	-13.2	0
6.3	39.3	-10.3	0
8	35.2	-6.7	0
10	39.5	-8.2	0
12.5	52.0	-13.7	0
16	67.0	-20.5	0
20	83.6	-27.6	0
25	103.4	-37.4	0
31.5	121.2	-48.6	0
40	134.8	-58.0	0
50	124.2	-55.9	0
63	93.4	-44.0	0
80	62.8	-29.6	0
100	56.6	-27.1	0
125	46.9	-21.9	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

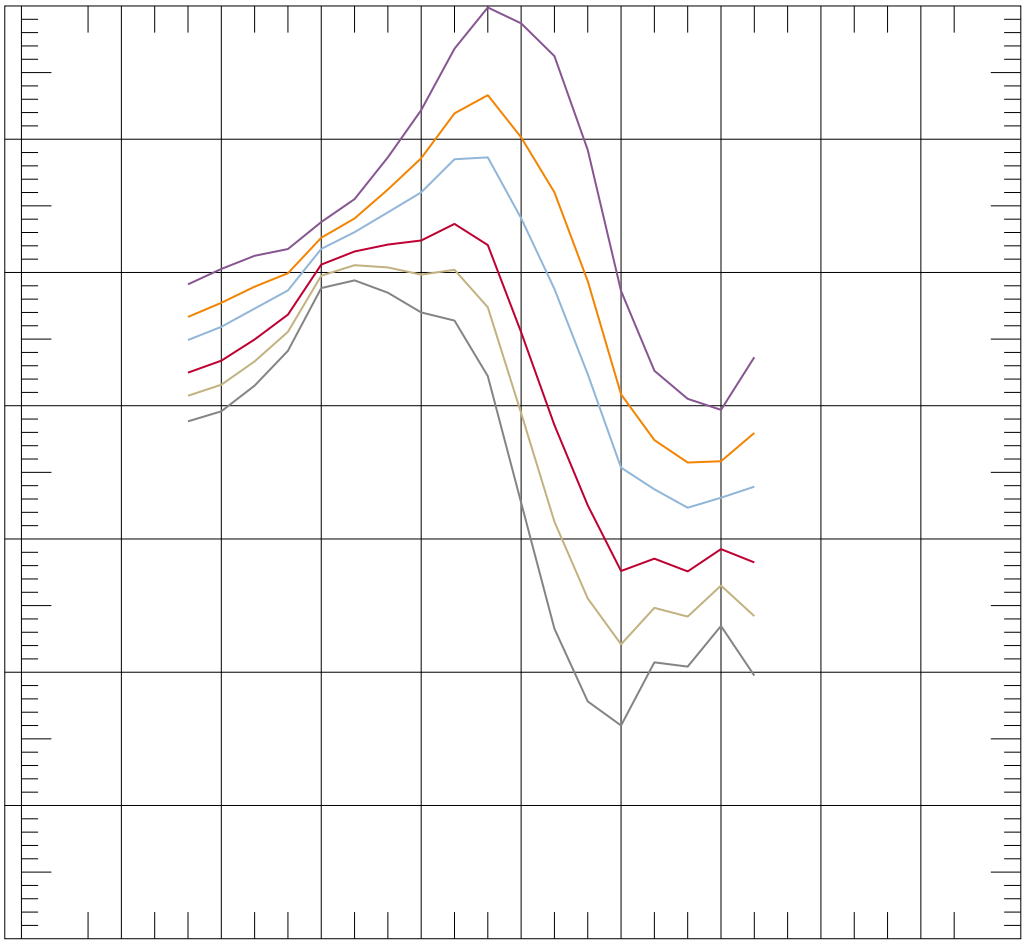

Figure C-15 Line Source Response for Surface Impact Site VP8

Table C-16 Line Source Response Coefficients for Surface Impact Site VP9

Frequency (Hz)	A	B	C
3.15	14.1	-4.7	0
4	23.6	-7.6	0
5	29.4	-9.3	0
6.3	31.3	-8.8	0
8	29.3	-5.9	0
10	32.1	-4.9	0
12.5	42.7	-8.1	0
16	59.7	-16.0	0
20	71.7	-21.8	0
25	78.6	-26.0	0
31.5	88.6	-32.2	0
40	94.9	-37.8	0
50	100.3	-43.1	0
63	112.0	-53.0	0
80	107.5	-54.9	0
100	58.0	-33.8	0
125	24.6	-18.4	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

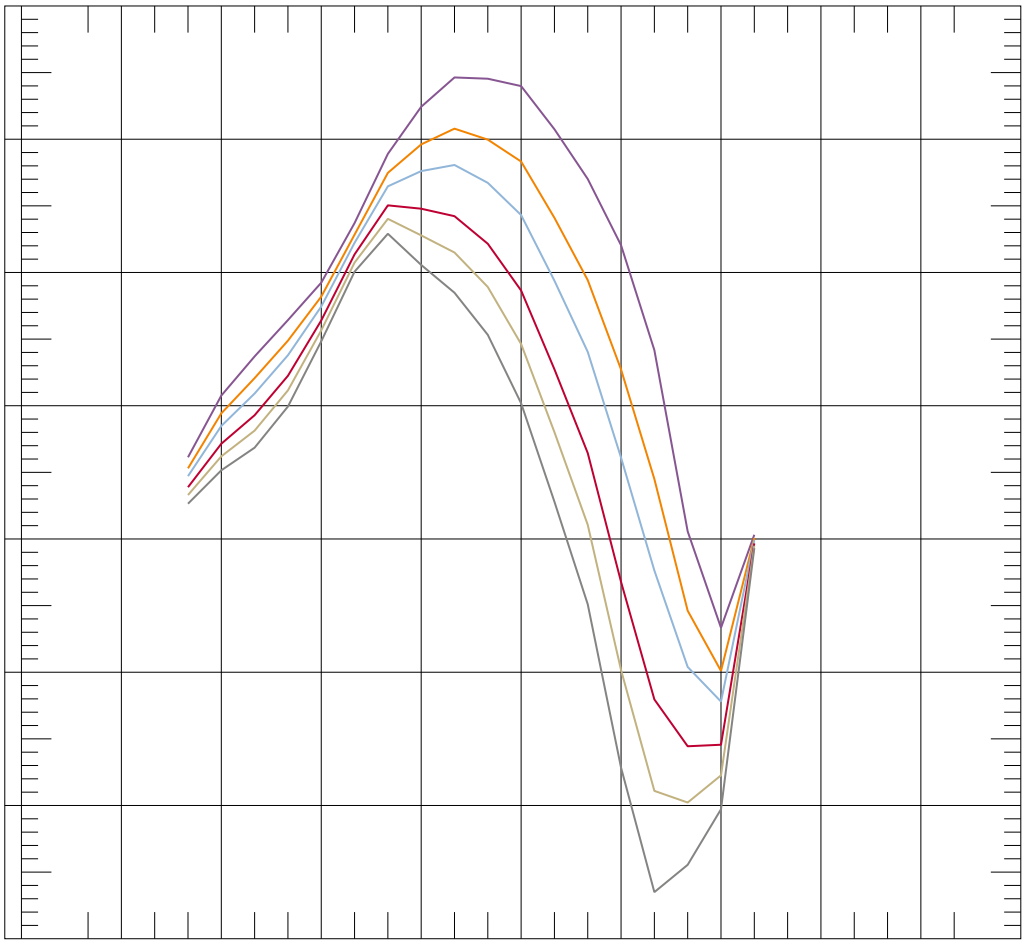

Figure C-16 Line Source Response for Surface Impact Site VP9

Table C-17 Line Source Response Coefficients for Borehole Impact Site VP10—50 ft Depth

Frequency (Hz)	A	B	C
3.15	11.4	0.3	-0.1
4	15.7	1.5	-0.5
5	14.1	5.5	-2.4
6.3	19.9	5.3	-3.3
8	22.5	5.0	-3.4
10	27.9	3.7	-3.6
12.5	29.3	2.8	-3.6
16	27.2	3.7	-3.6
20	27.2	2.6	-3.6
25	37.3	-4.9	-3.5
31.5	53.0	-13.8	-3.1
40	45.3	-9.2	-3.4
50	62.6	-20.3	-2.8
63	55.2	-18.6	-2.9
80	66.9	-25.9	-2.5
100	79.3	-34.6	-2.1
125	105.3	-52.8	-1.4

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

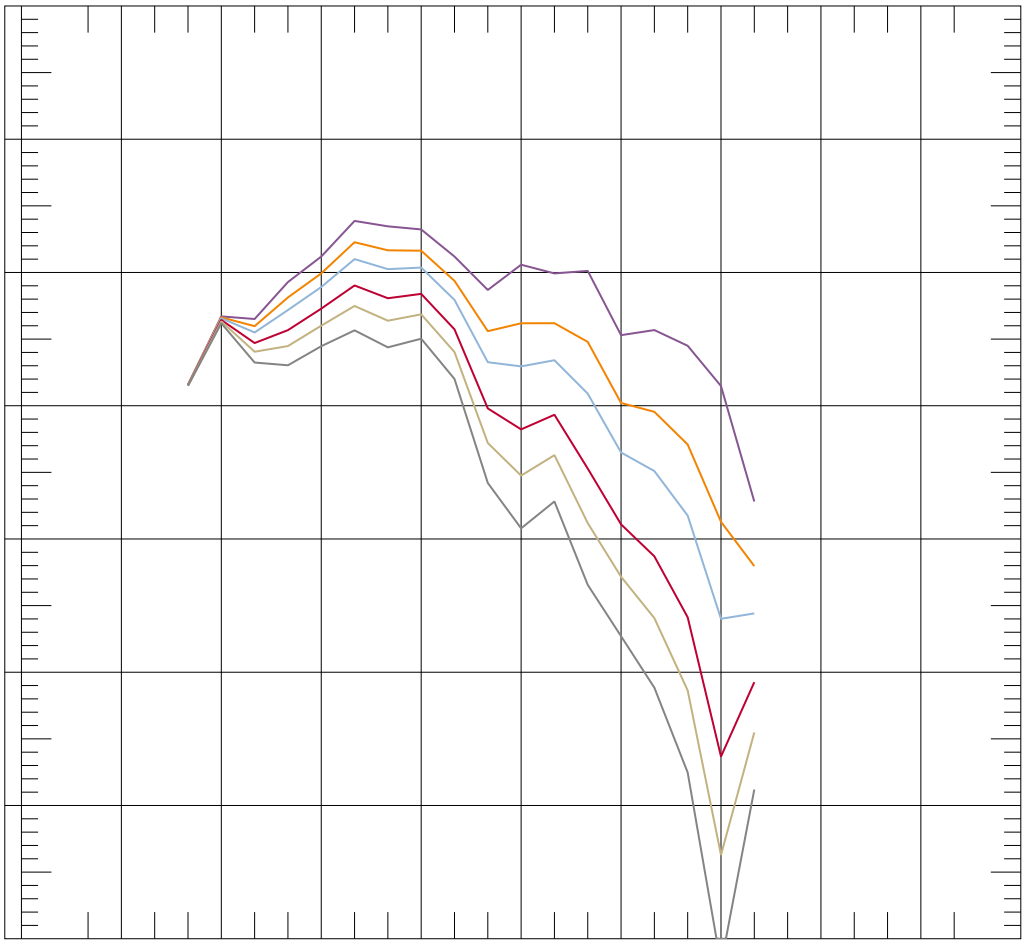

Figure C-17 Line Source Response for Borehole Impact Site VP10—50 ft Depth

Table C-18 Line Source Response Coefficients for Borehole Impact Site VP10—60 ft Depth

Frequency (Hz)	A	B	C
3.15	2.6	5.5	-2.3
4	-65.1	80.9	-21.2
5	13.9	6.1	-2.9
6.3	14.1	5.9	-2.6
8	19.1	5.9	-3.4
10	27.0	3.5	-3.8
12.5	-10.1	37.3	-11.3
16	41.6	-3.4	-3.8
20	35.2	-1.8	-3.9
25	48.4	-11.2	-3.5
31.5	63.5	-20.2	-3.0
40	67.2	-22.0	-2.9
50	48.6	-11.9	-3.5
63	47.0	-13.5	-3.4
80	67.2	-27.1	-2.7
100	80.4	-35.5	-2.3
125	79.2	-38.0	-2.2

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

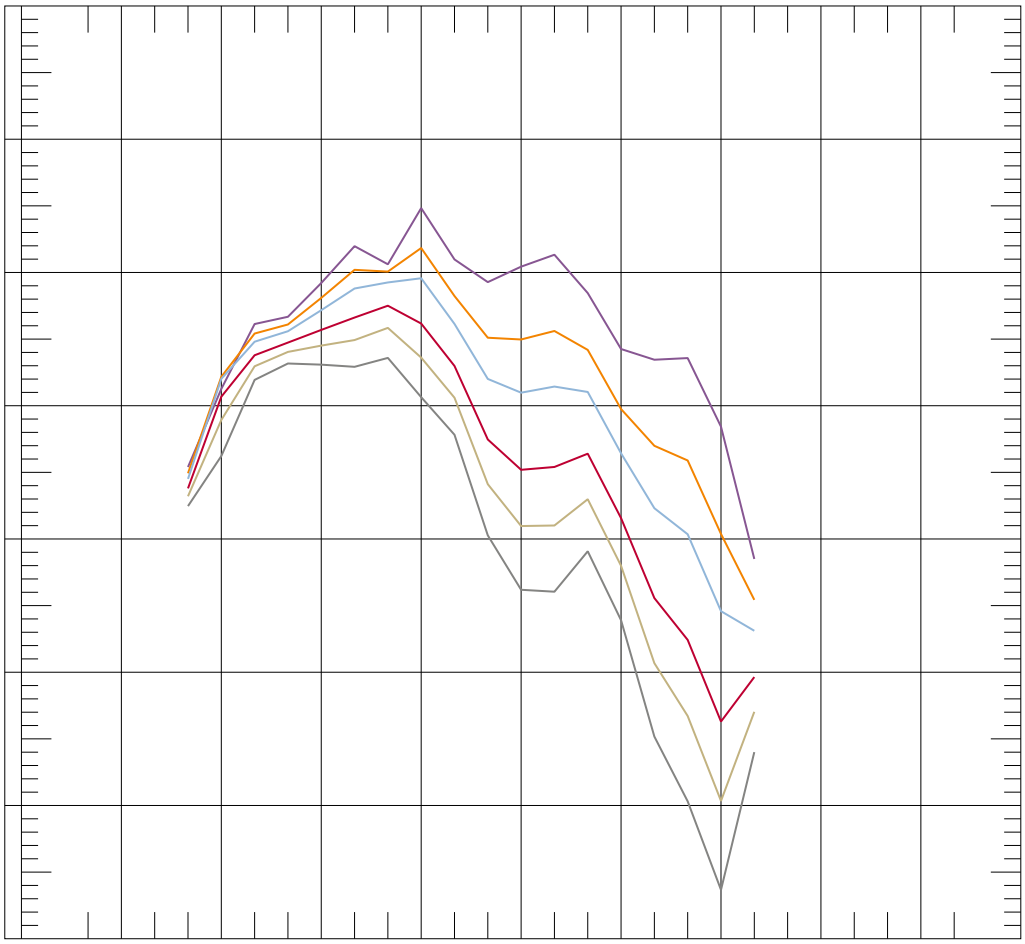

Figure C-18 Line Source Response for Borehole Impact Site VP10—60 ft Depth

Table C-19 Line Source Response Coefficients for Borehole Impact Site VP10—70 ft Depth

Frequency (Hz)	A	B	C
3.15	18.2	1.4	-4.1
4	-115.9	132.1	-35.2
5	12.5	6.5	-3.0
6.3	25.8	2.9	-4.0
8	23.8	4.2	-4.0
10	26.4	4.5	-3.9
12.5	45.3	-1.2	-4.1
16	34.0	1.3	-4.1
20	42.6	-5.4	-4.0
25	49.4	-11.3	-3.7
31.5	51.0	-13.1	-3.6
40	76.1	-26.7	-2.9
50	81.8	-30.8	-2.7
63	-134.3	159.5	-44.2
80	78.5	-31.2	-2.7
100	76.0	-30.9	-2.7
125	106.3	-48.5	-1.9

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

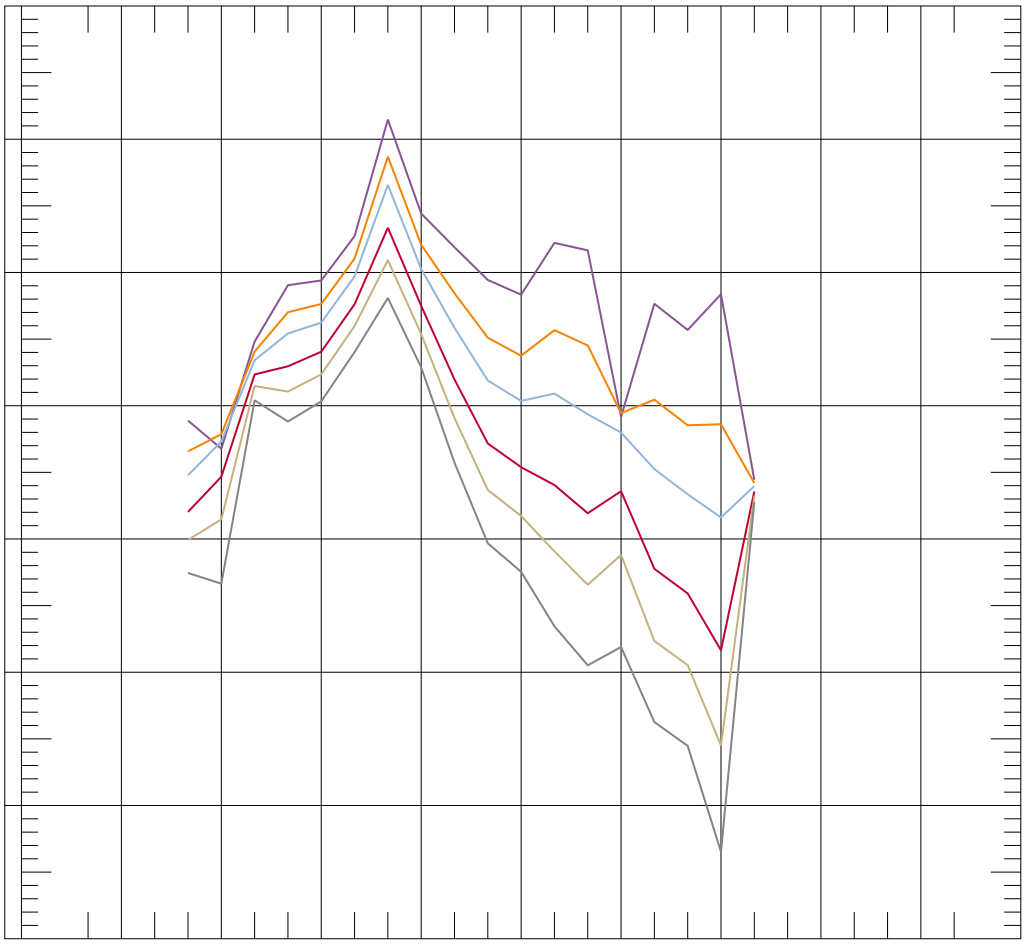

Figure C-19 Line Source Response for Borehole Impact Site VP10—70 ft Depth

Table C-20 Line Source Response Coefficients for Surface Impact Site VP11

Frequency (Hz)	A	B	C
3.15	18.6	-5.7	0
4	25.6	-7.1	0
5	32.0	-8.5	0
6.3	30.7	-6.9	0
8	32.5	-7.2	0
10	37.8	-9.2	0
12.5	45.0	-11.7	0
16	56.3	-16.2	0
20	69.5	-21.9	0
25	90.4	-31.4	0
31.5	104.6	-38.7	0
40	110.9	-44.1	0
50	96.2	-40.4	0
63	84.9	-39.4	0
80	84.1	-42.2	0
100	53.3	-29.7	0
125	36.9	-22.9	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

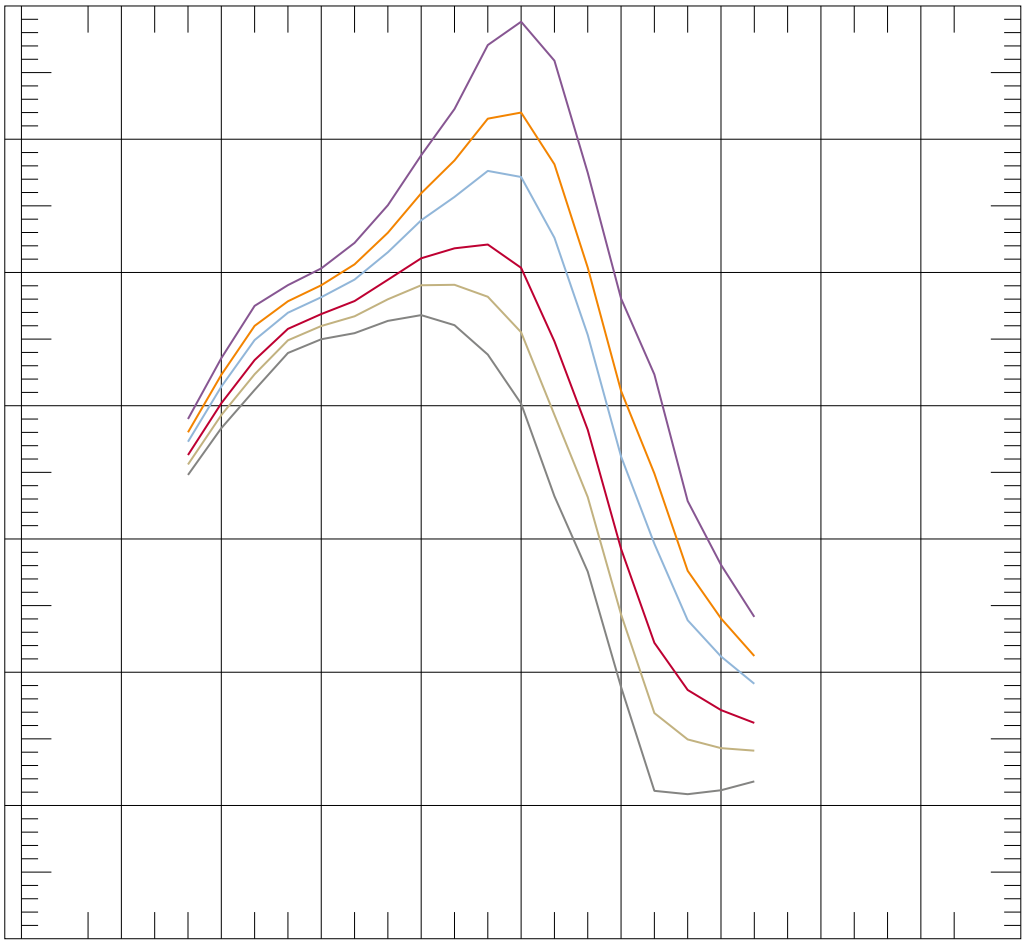

Figure C-20 Line Source Response for Surface Impact Site VP11

Table C-21 Line Source Response Coefficients for Borehole Impact Site VP12—50 ft Depth

Frequency (Hz)	A	B	C
3.15	8.9	3.6	-1.4
4	9.7	5.8	-2.9
5	15.4	5.8	-2.8
6.3	13.8	5.4	-2.3
8	16.3	5.8	-2.8
10	-15.6	43.1	-13.8
12.5	16.4	5.7	-2.6
16	-66.2	95.8	-26.6
20	4.3	24.3	-8.5
25	7.1	27.2	-10.8
31.5	58.4	-15.4	-3.0
40	-22.0	66.9	-25.0
50	59.4	-21.1	-2.8
63	48.4	-16.5	-3.0
80	62.6	-26.5	-2.5
100	66.8	-31.1	-2.3
125	77.8	-39.6	-1.9

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

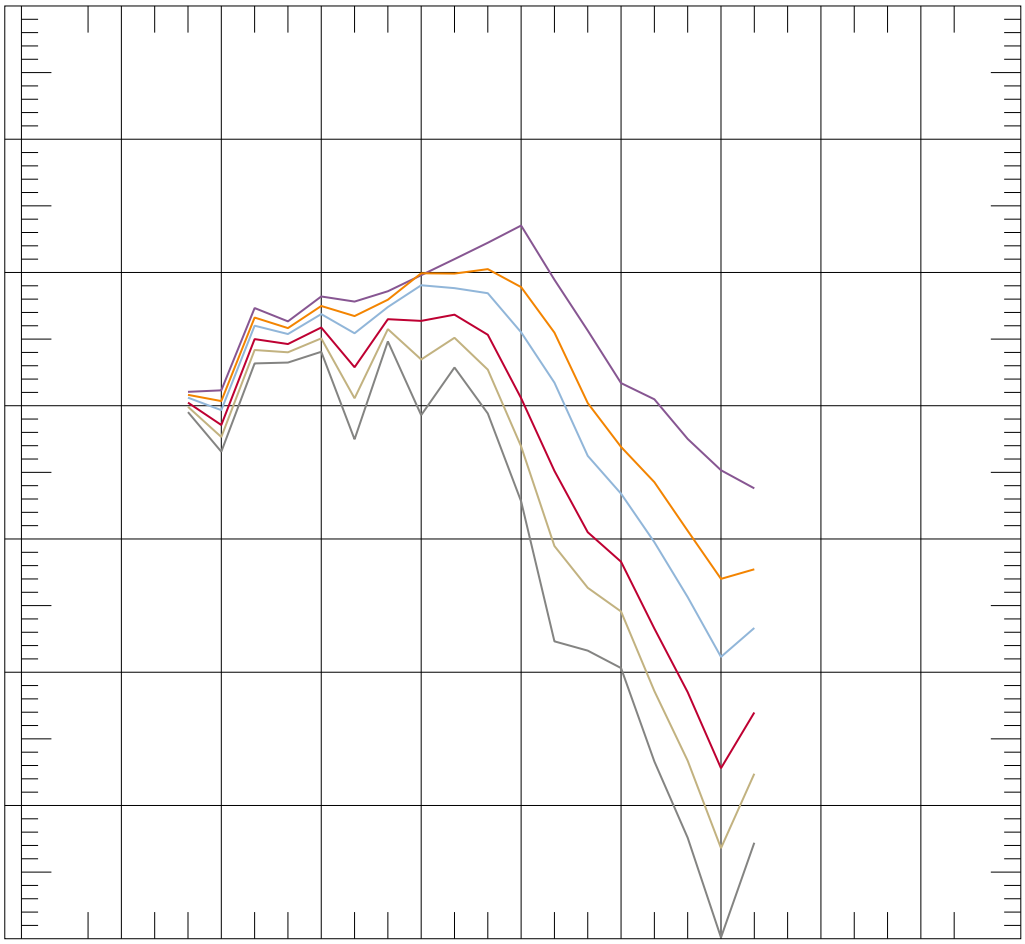

Figure C-21 Line Source Response for Borehole Impact Site VP12—50 ft Depth

Table C-22 Line Source Response Coefficients for Borehole Impact Site VP12—60 ft Depth

Frequency (Hz)	A	B	C
3.15	-37.0	51.7	-14.7
4	15.4	4.3	-3.7
5	23.7	2.1	-3.9
6.3	-3.9	23.3	-7.1
8	4.7	19.2	-7.3
10	21.9	4.3	-3.7
12.5	22.9	4.3	-3.7
16	22.9	4.3	-3.7
20	21.8	5.1	-3.6
25	29.9	1.9	-3.9
31.5	49.8	-9.0	-3.6
40	54.7	-13.2	-3.4
50	58.3	-17.4	-3.2
63	28.0	-3.5	-3.8
80	53.6	-19.9	-3.1
100	80.5	-37.2	-2.2
125	89.3	-41.9	-2.0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

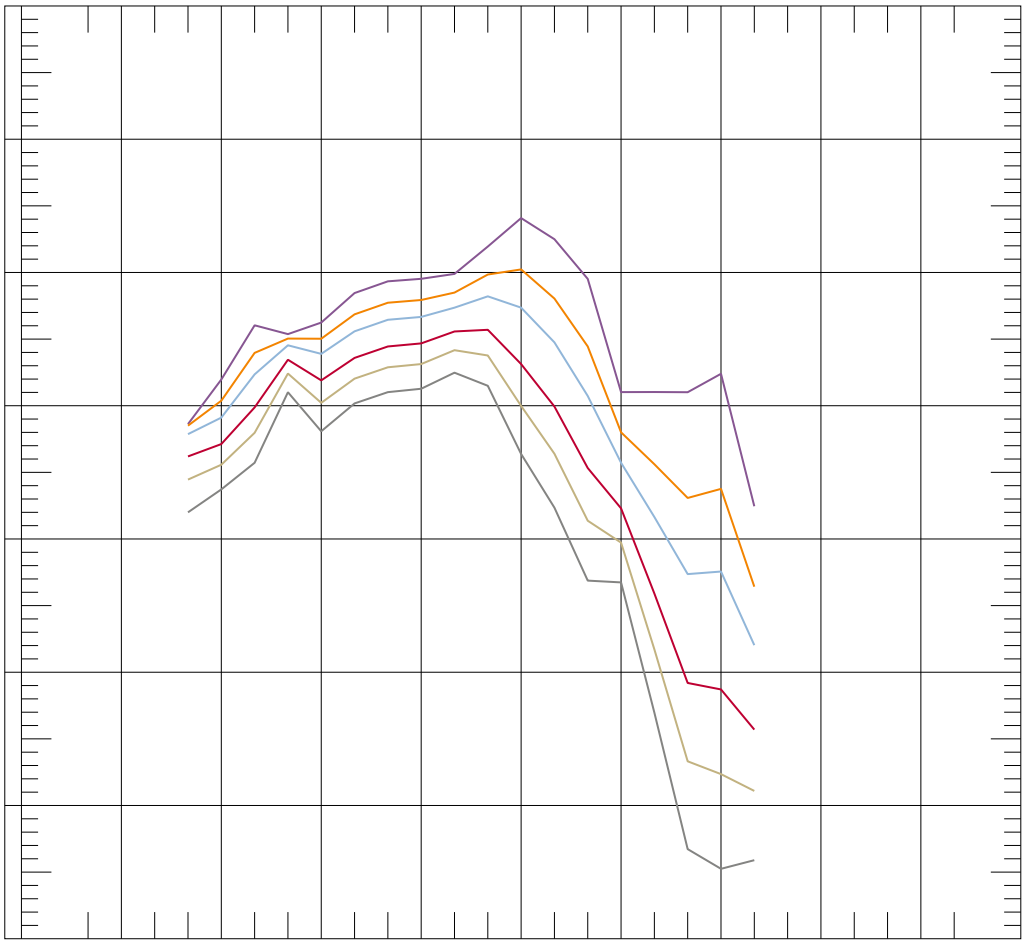

Figure C-22 Line Source Response for Borehole Impact Site VP12—60 ft Depth

Table C-23 Line Source Response Coefficients for Borehole Impact Site VP12—70 ft Depth

Frequency (Hz)	A	B	C
3.15	4.2	4.8	-1.8
4	8.5	6.4	-2.9
5	14.6	6.4	-3.4
6.3	12.8	6.5	-3.1
8	11.7	6.2	-2.7
10	14.5	6.4	-3.4
12.5	17.1	6.4	-3.4
16	16.0	6.5	-3.3
20	18.2	6.5	-3.0
25	18.2	6.3	-2.8
31.5	26.0	3.6	-4.0
40	37.4	-4.0	-4.0
50	60.7	-18.6	-3.3
63	-0.1	46.0	-21.2
80	77.8	-31.8	-2.7
100	114.2	-53.2	-1.8
125	108.7	-51.3	-1.8

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

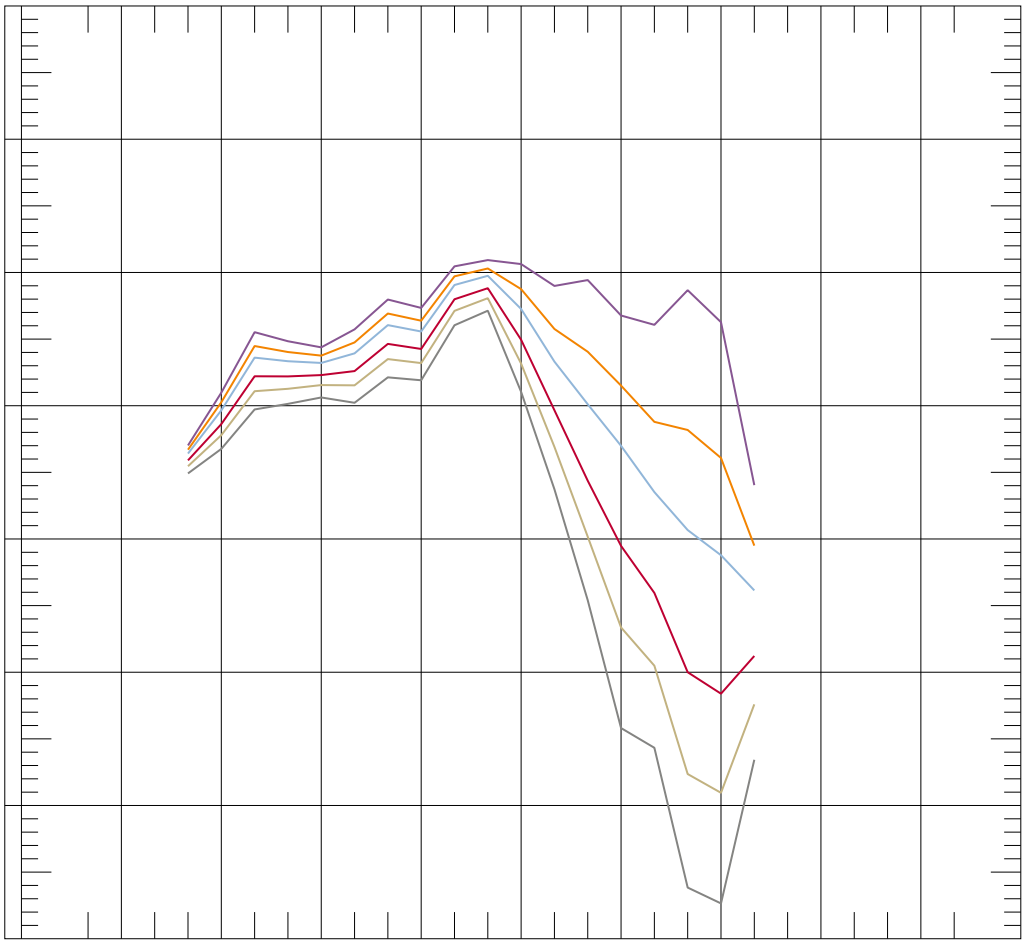

Figure C-23 Line Source Response for Borehole Impact Site VP12—70 ft Depth

Table C-24 Line Source Response Coefficients for Borehole Impact Site VP12—80 ft Depth

Frequency (Hz)	A	B	C
3.15	5.2	6.8	-3.3
4	7.1	5.0	-2.0
5	-11.3	31.9	-10.1
6.3	12.6	6.7	-3.3
8	10.6	5.7	-2.3
10	14.4	6.6	-3.6
12.5	13.7	6.5	-2.9
16	15.5	6.7	-3.4
20	21.0	6.0	-3.9
25	27.9	4.5	-4.1
31.5	30.1	2.8	-4.2
40	28.4	2.8	-4.2
50	-210.6	231.8	-60.2
63	75.2	-27.7	-3.1
80	101.1	-43.4	-2.4
100	109.8	-49.9	-2.1
125	64.9	-28.4	-3.1

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

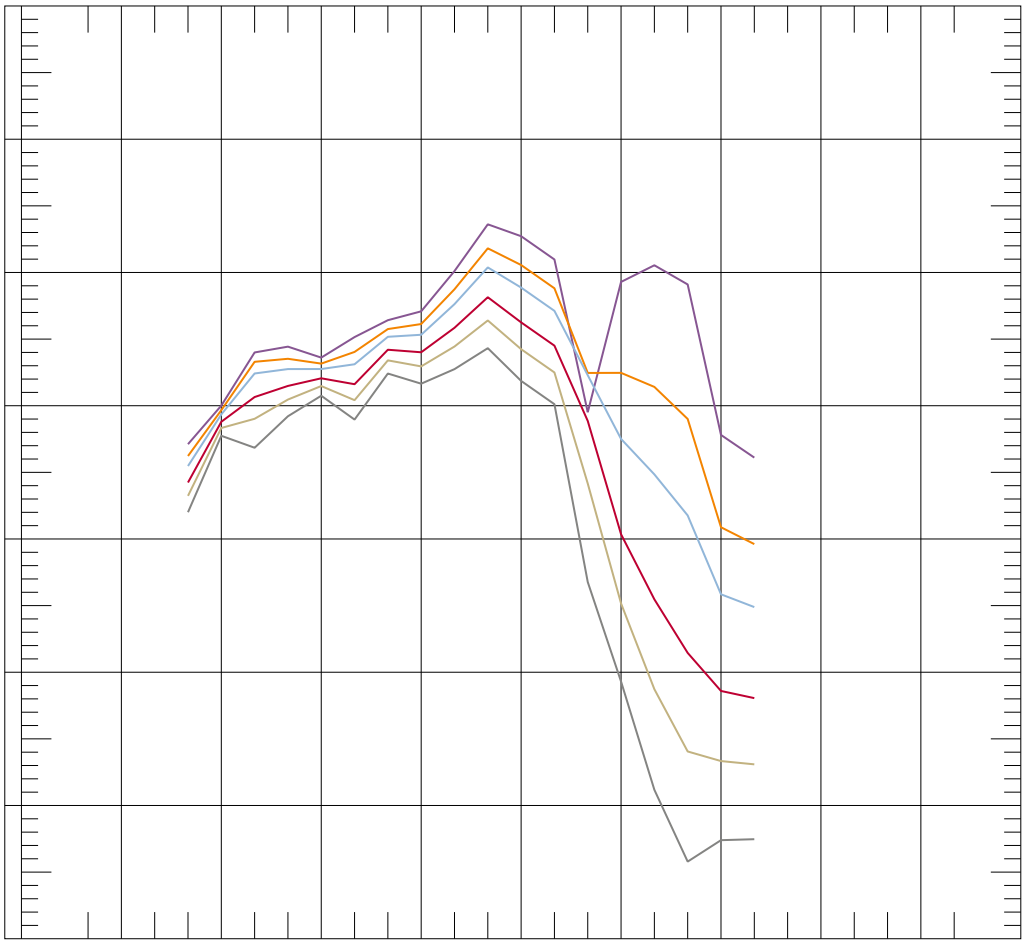

Figure C-24 Line Source Response for Borehole Impact Site VP12—80 ft Depth

Table C-25 Line Source Response Coefficients for Borehole Impact Site VP12—90 ft Depth

Frequency (Hz)	A	B	C
3.15	7.2	6.9	-3.6
4	6.5	5.0	-1.9
5	11.5	6.9	-3.6
6.3	10.1	6.8	-3.1
8	10.1	6.8	-3.1
10	12.0	6.7	-3.0
12.5	12.4	5.0	-1.9
16	15.6	6.6	-3.8
20	13.5	5.6	-2.2
25	18.5	6.9	-3.7
31.5	43.5	-4.3	-4.4
40	42.8	-4.3	-4.4
50	48.5	-8.8	-4.2
63	26.6	0.0	-4.5
80	62.4	-21.2	-3.7
100	109.5	-49.4	-2.3
125	94.0	-42.8	-2.6

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

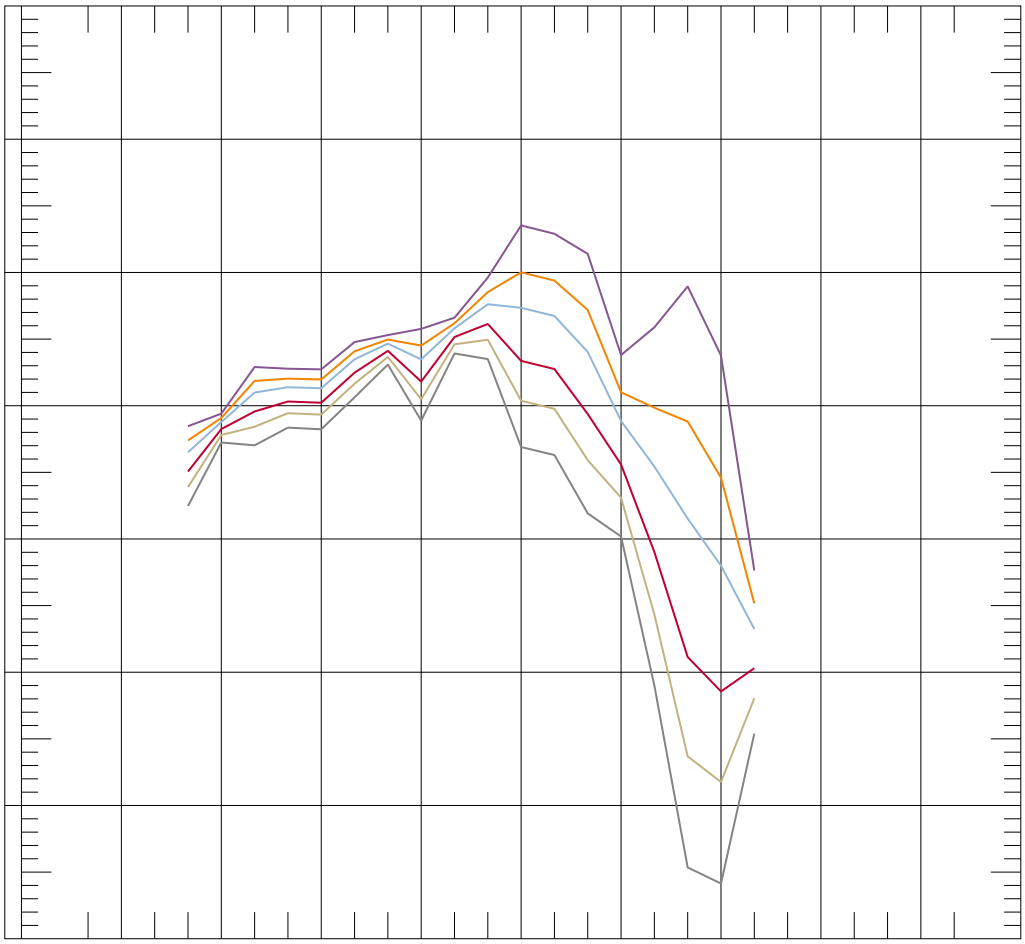

Figure C-25 Line Source Response for Borehole Impact Site VP12—90 ft Depth

Table C-26 Line Source Response Coefficients for Surface Impact Site VP13

Frequency (Hz)	A	B	C
3.15	17.8	-2.8	0
4	20.4	-3.3	0
5	22.5	-3.1	0
6.3	22.6	-2.7	0
8	26.5	-4.6	0
10	26.6	-3.6	0
12.5	29.0	-4.9	0
16	35.2	-8.6	0
20	44.1	-13.4	0
25	57.0	-19.5	0
31.5	70.4	-26.6	0
40	70.3	-28.1	0
50	65.0	-26.4	0
63	63.1	-27.3	0
80	65.0	-30.1	0
100	67.3	-32.7	0
125	61.8	-30.1	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

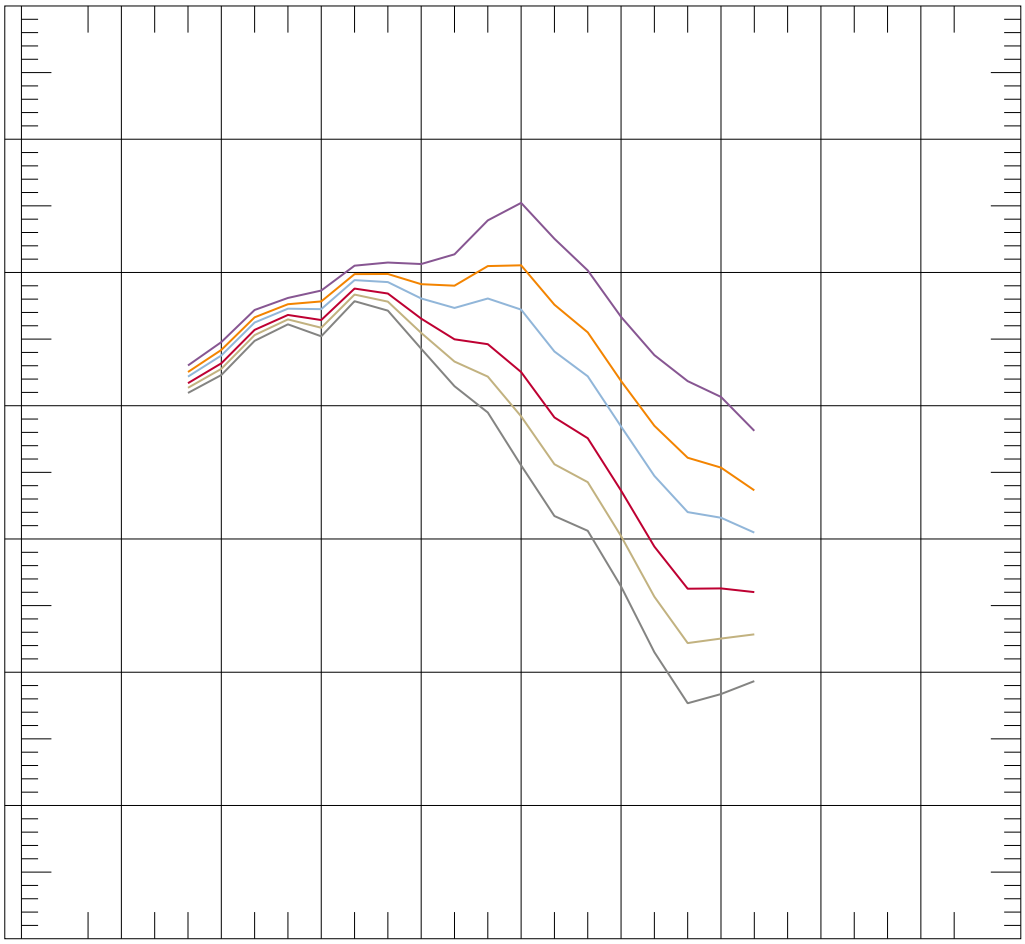

Figure C-26 Line Source Response for Surface Impact Site VP13

Table C-27 Line Source Response Coefficients for Surface Impact Site VP14

Frequency (Hz)	A	B	C
3.15	10.8	-1.0	0
4	19.4	-4.6	0
5	25.2	-6.9	0
6.3	24.6	-5.4	0
8	27.8	-4.0	0
10	38.4	-6.4	0
12.5	56.5	-14.6	0
16	75.2	-24.0	0
20	79.6	-26.7	0
25	90.3	-33.5	0
31.5	105.9	-43.6	0
40	109.4	-49.6	0
50	104.0	-50.0	0
63	101.2	-50.6	0
80	82.6	-43.9	0
100	47.3	-28.6	0
125	26.1	-19.3	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

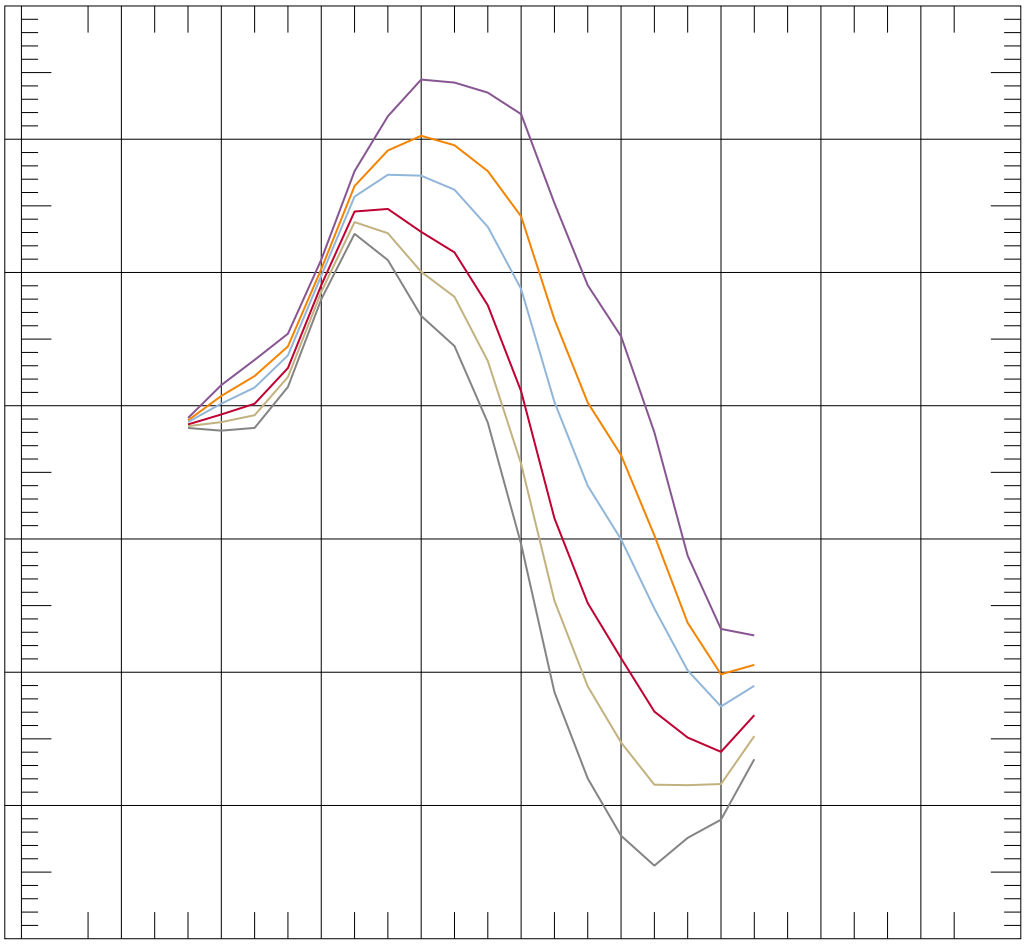

Figure C-27 Line Source Response for Surface Impact Site VP14

Table C-28 Line Source Response Coefficients for Borehole Impact Site VP15—80 ft Depth

Frequency (Hz)	A	B	C
3.15	11.6	3.1	-4.2
4	18.8	1.8	-4.3
5	21.2	2.5	-4.2
6.3	40.9	-7.7	-4.1
8	42.0	-7.2	-4.1
10	36.9	1.7	-7.1
12.5	69.0	-19.0	-3.5
16	102.3	-37.6	-2.6
20	107.9	-42.4	-2.4
25	195.5	-114.7	11.9
31.5	97.3	-37.5	-2.6
40	75.2	-27.9	-3.1
50	64.5	-18.8	-5.2
63	65.1	-25.0	-3.2
80	7.7	34.4	-19.1
100	115.9	-54.5	-1.9
125	129.4	-65.7	-1.5

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

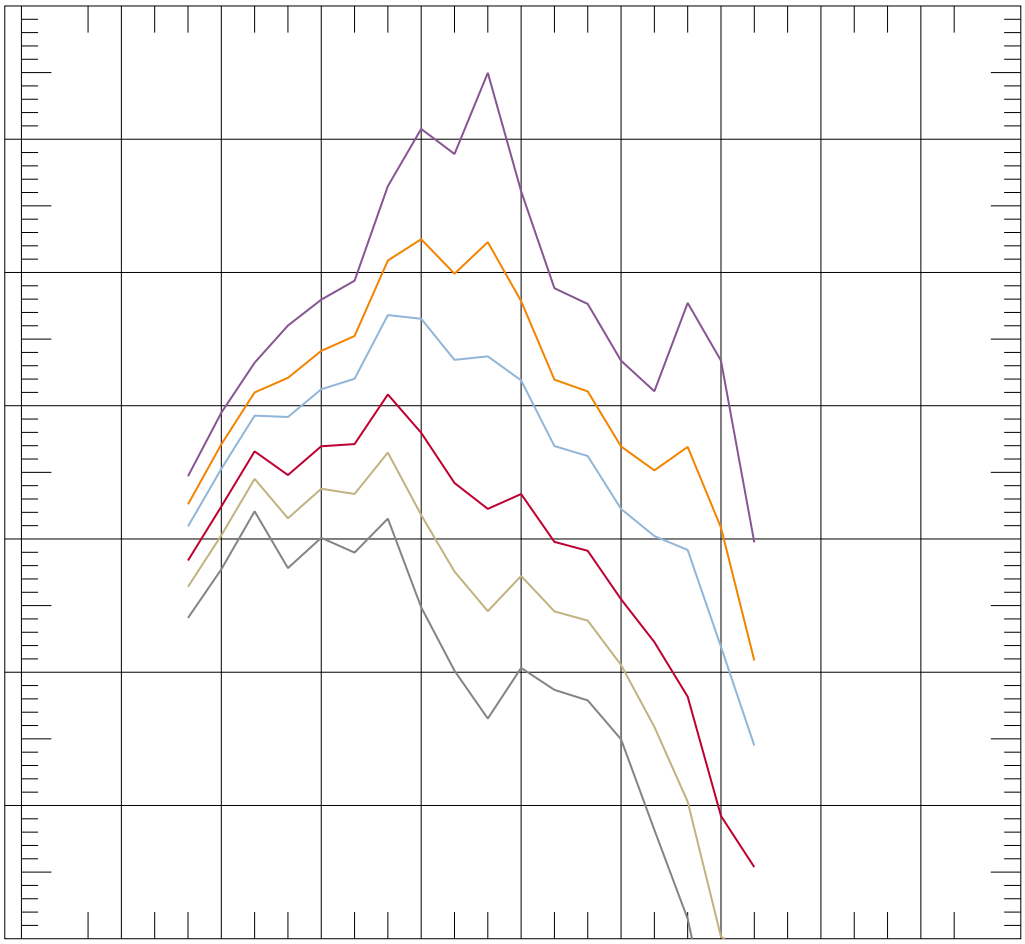

Figure C-28 Line Source Response for Borehole Impact Site VP15—80 ft Depth

Table C-29 Line Source Response Coefficients for Borehole Impact Site VP15—90 ft Depth

Frequency (Hz)	A	B	C
3.15	0.1	6.5	-2.8
4	24.5	-0.4	-4.5
5	22.9	0.9	-4.4
6.3	-21.4	39.6	-12.0
8	52.8	-11.8	-4.1
10	64.4	-17.0	-3.9
12.5	82.0	-23.7	-3.5
16	126.9	-46.0	-2.4
20	135.1	-55.5	-2.1
25	136.4	-56.6	-2.0
31.5	176.5	-76.0	-1.4
40	132.2	-56.4	-2.0
50	131.2	-54.4	-2.1
63	135.0	-57.0	-2.0
80	183.9	-84.5	-1.2
100	181.5	-83.6	-1.2
125	146.6	-70.4	-1.5

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

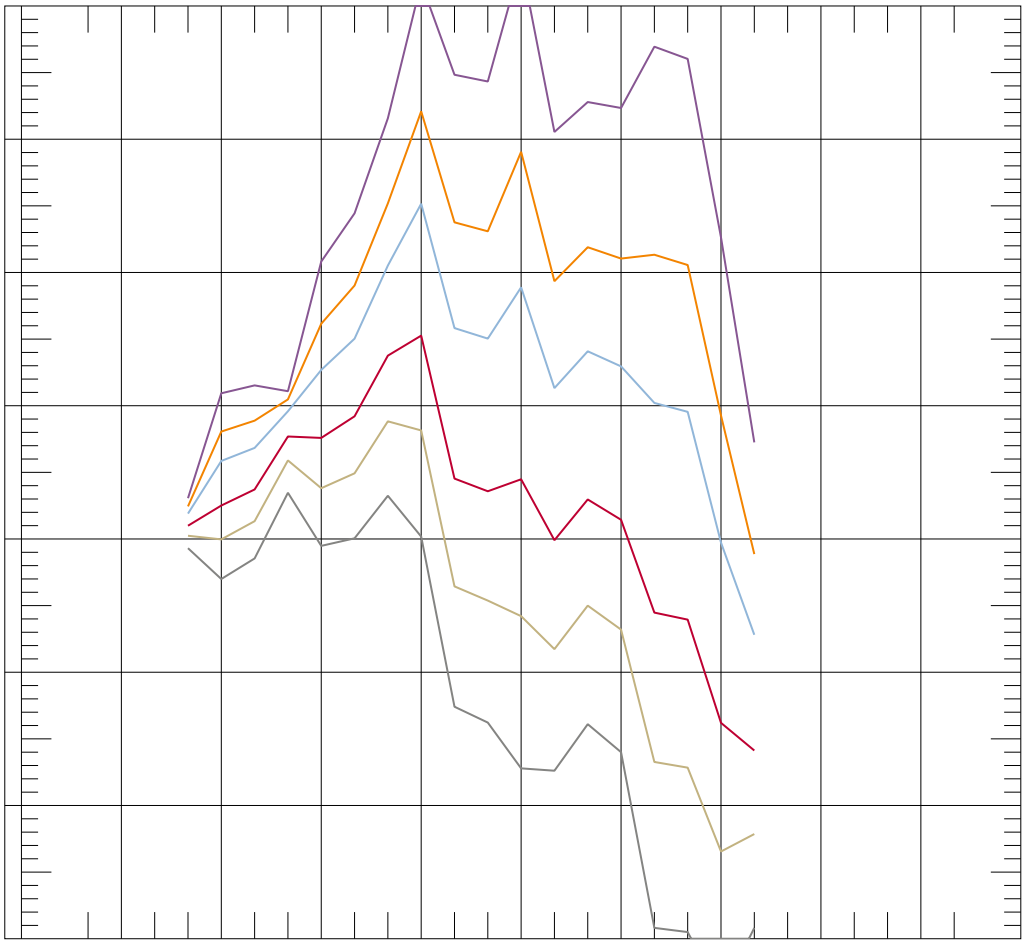

Figure C-29 Line Source Response for Borehole Impact Site VP15—90 ft Depth

Table C-30 Line Source Response Coefficients for Borehole Impact Site VP15—100 ft Depth

Frequency (Hz)	A	B	C
3.15	13.1	2.2	-4.6
4	34.9	-5.2	-4.5
5	6.0	16.0	-7.5
6.3	14.6	6.2	-4.2
8	15.9	5.9	-4.2
10	64.9	-17.1	-4.1
12.5	90.8	-28.0	-3.5
16	24.4	50.0	-25.4
20	120.2	-47.6	-2.6
25	141.3	-57.4	-2.2
31.5	181.0	-79.3	-1.4
40	159.9	-71.2	-1.7
50	116.2	-49.0	-2.5
63	106.3	-44.2	-2.7
80	139.9	-63.3	-2.0
100	147.9	-68.9	-1.8
125	117.2	-55.8	-2.2

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

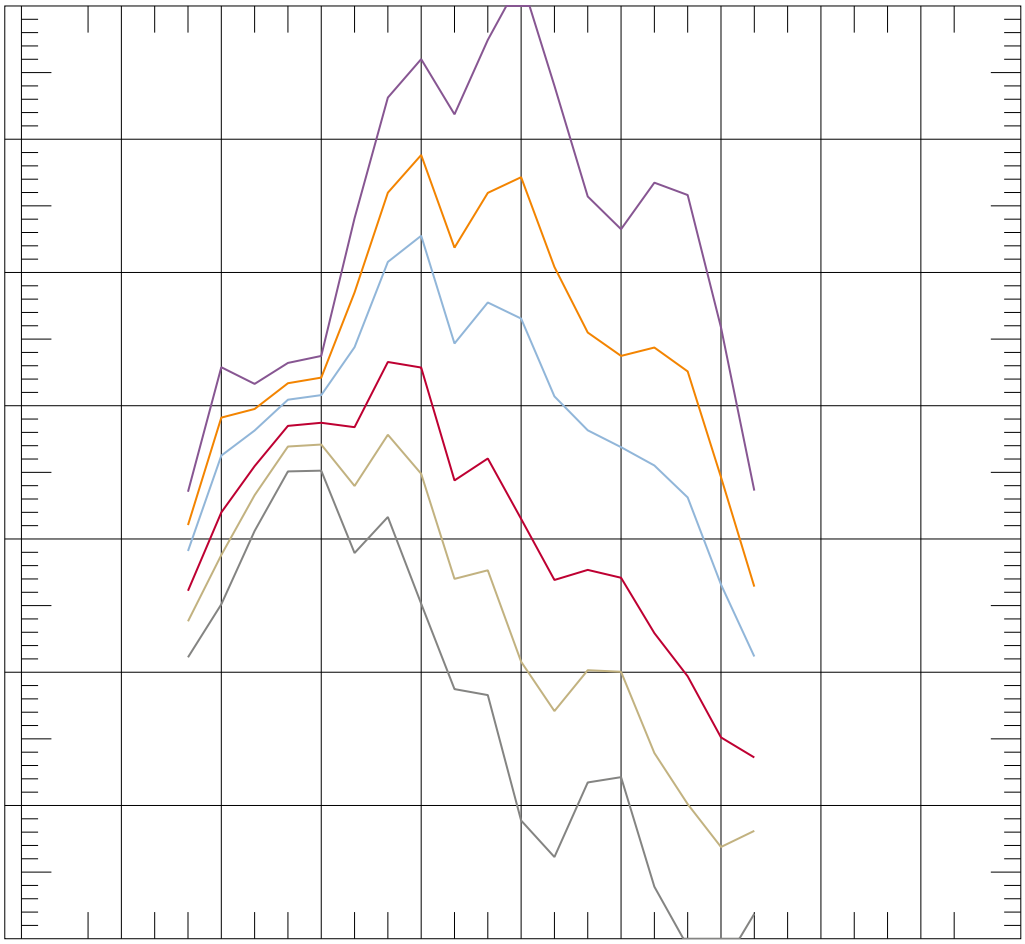

Figure C-30 Line Source Response for Borehole Impact Site VP15—100 ft Depth

Table C-31 Line Source Response Coefficients for Borehole Impact Site VP15—110 ft Depth

Frequency (Hz)	A	B	C
3.15	5.8	6.6	-4.2
4	26.1	-0.5	-4.8
5	-275.6	282.5	-70.0
6.3	33.1	-1.2	-4.8
8	53.7	-10.9	-4.5
10	-190.2	214.5	-56.1
12.5	86.2	-25.8	-3.8
16	110.6	-38.8	-3.2
20	127.7	-49.5	-2.7
25	133.4	-52.1	-2.6
31.5	163.5	-69.7	-1.9
40	167.0	-73.0	-1.8
50	-289.8	323.5	-87.1
63	51.5	1.2	-11.6
80	147.6	-66.1	-2.0
100	182.8	-85.4	-1.4
125	201.3	-97.4	-1.1

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

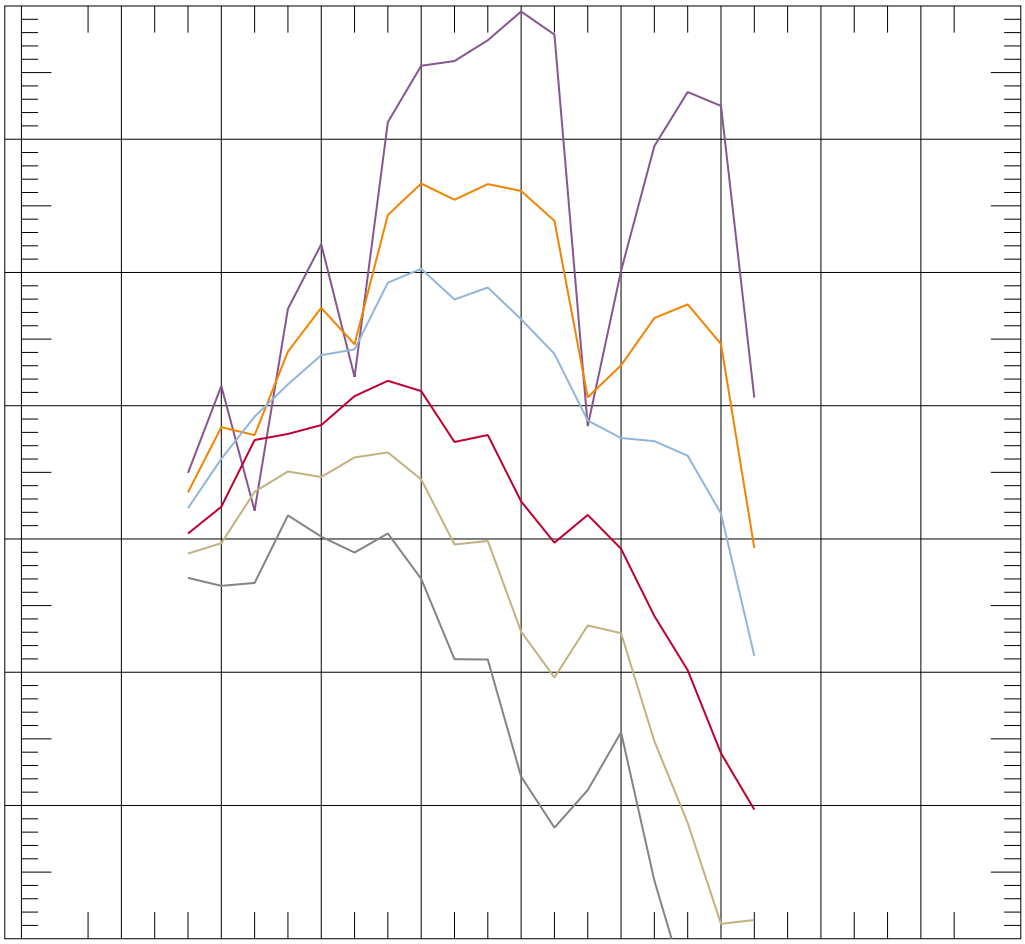

Figure C-31 Line Source Response for Borehole Impact Site VP15—110 ft Depth

Table C-32 Line Source Response Coefficients for Surface Impact Site VP16

Frequency (Hz)	A	B	C
3.15	12.5	-3.2	0
4	20.2	-5.3	0
5	33.1	-10.1	0
6.3	38.5	-11.1	0
8	40.5	-10.1	0
10	42.3	-9.3	0
12.5	49.4	-12.5	0
16	56.5	-16.2	0
20	65.2	-20.8	0
25	69.0	-22.6	0
31.5	86.3	-32.7	0
40	101.8	-43.4	0
50	101.4	-47.2	0
63	99.4	-50.4	0
80	89.1	-47.7	0
100	65.0	-36.9	0
125	35.8	-21.9	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

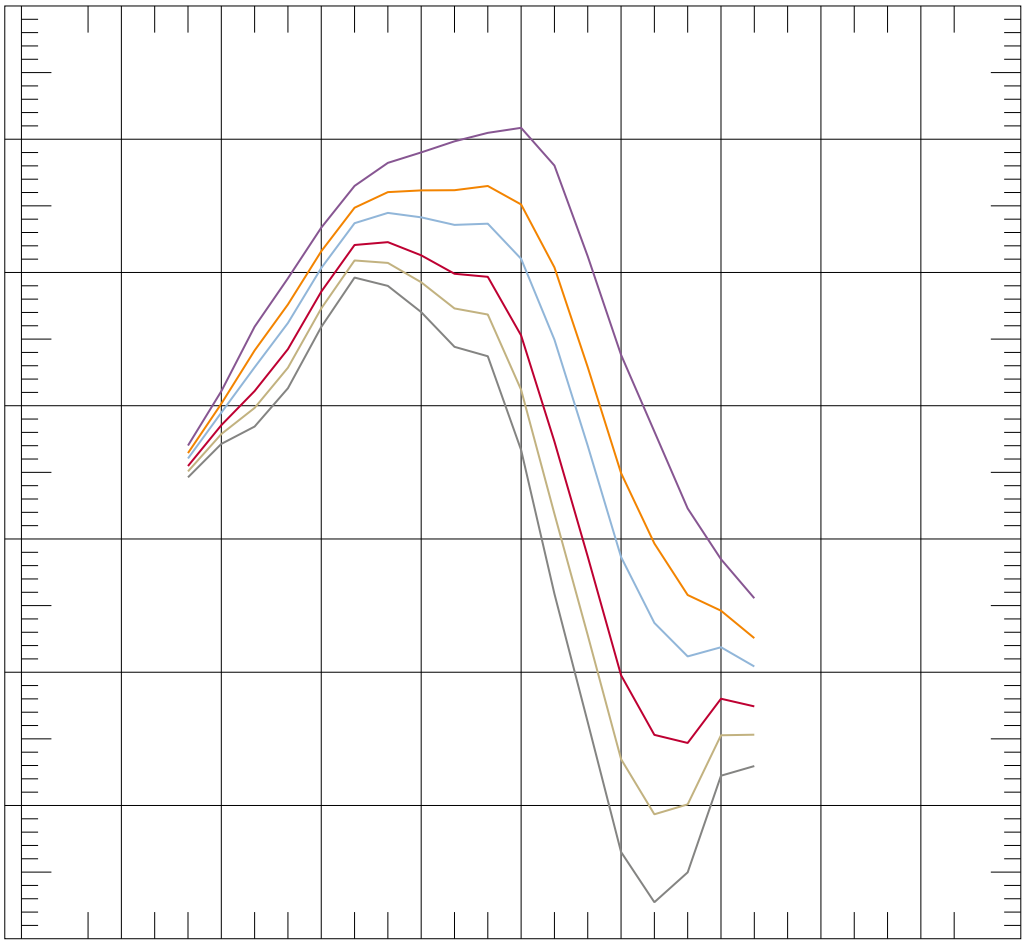

Figure C-32 Line Source Response for Surface Impact Site VP16

Table C-33 Line Source Response Coefficients for Surface Impact Site VP17

Frequency (Hz)	A	B	C
3.15	25.8	-11.3	0
4	24.9	-8.7	0
5	26.2	-7.4	0
6.3	26.8	-6.1	0
8	27.3	-4.8	0
10	30.4	-4.6	0
12.5	33.6	-5.2	0
16	37.9	-7.0	0
20	46.4	-11.5	0
25	57.7	-17.7	0
31.5	64.7	-21.7	0
40	74.0	-29.3	0
50	78.5	-33.9	0
63	77.0	-35.8	0
80	78.4	-39.8	0
100	66.3	-36.1	0
125	48.3	-27.1	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

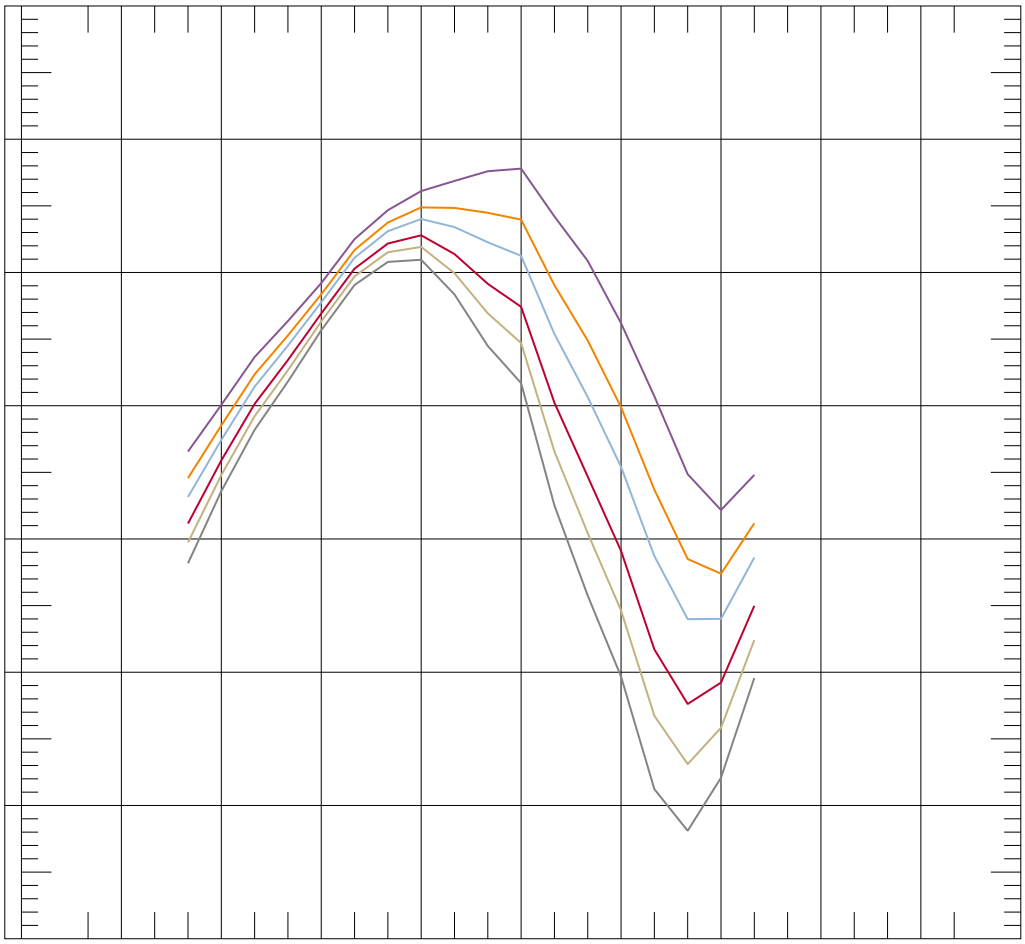

Figure C-33 Line Source Response for Surface Impact Site VP17

Table C-34 Line Source Response Coefficients for Surface Impact Site VP18

Frequency (Hz)	A	B	C
3.15	9.7	-1.5	0.0
4	15.6	-0.3	-1.0
5	38.7	-17.2	2.3
6.3	31.0	-7.4	0.0
8	33.3	-6.5	0.0
10	42.5	-9.1	0.0
12.5	22.6	19.7	-8.7
16	68.3	-20.4	0.0
20	42.4	13.0	-10.3
25	71.7	-13.6	-5.0
31.5	47.1	13.7	-13.2
40	83.4	-27.5	-3.2
50	119.3	-72.3	8.7
63	140.4	-100.3	15.5
80	134.7	-101.5	16.2
100	95.2	-75.9	11.9
125	23.5	-13.8	-0.9

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

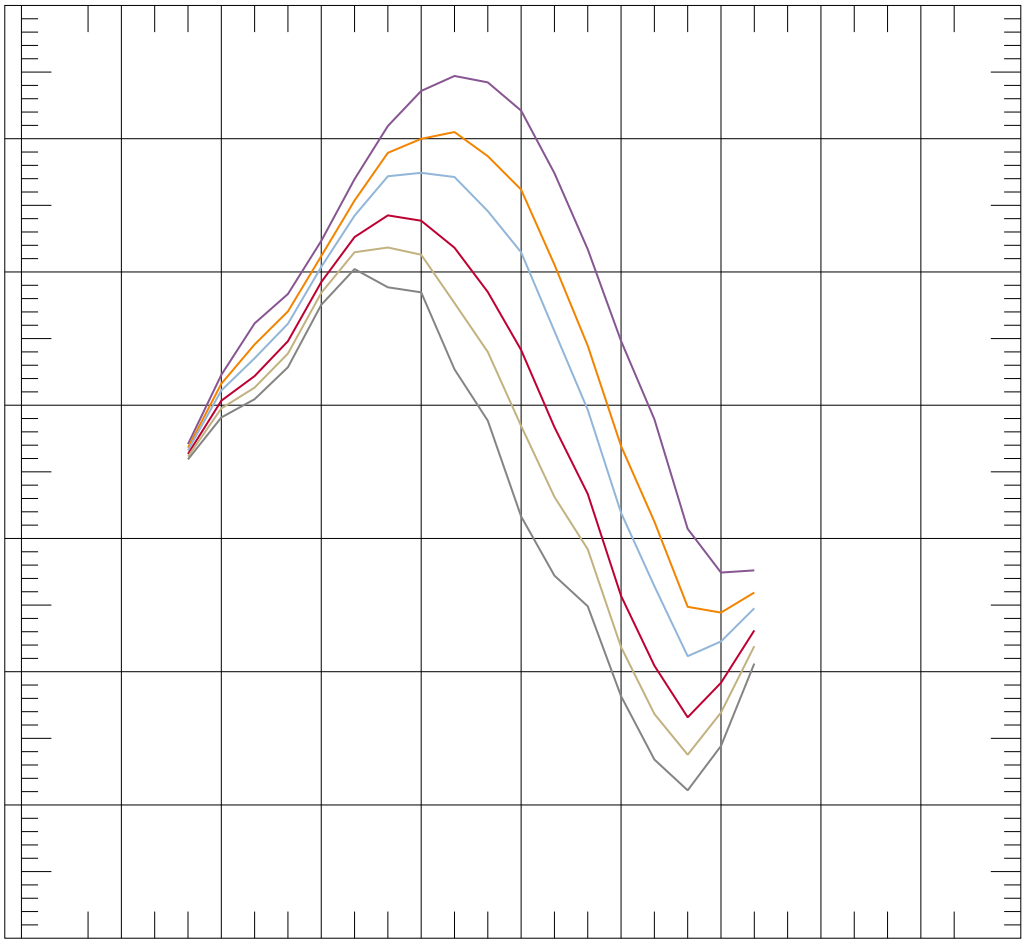

Figure C-34 Line Source Response for Surface Impact Site VP18

Table C-35 Line Source Response Coefficients for Borehole Impact Site VP19—50 ft Depth

Frequency (Hz)	A	B	C
3.15	45.6	-19.5	0
4	38.7	-13.8	0
5	32.4	-7.3	0
6.3	38.7	-9.8	0
8	58.3	-20.2	0
10	51.8	-17.0	0
12.5	51.6	-16.0	0
16	41.1	-8.4	0
20	64.1	-20.9	0
25	107.4	-44.0	0
31.5	143.6	-62.7	0
40	127.3	-55.5	0
50	108.3	-45.5	0
63	99.9	-43.7	0
80	123.1	-57.4	0
100	121.9	-57.0	0
125	115.1	-55.1	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

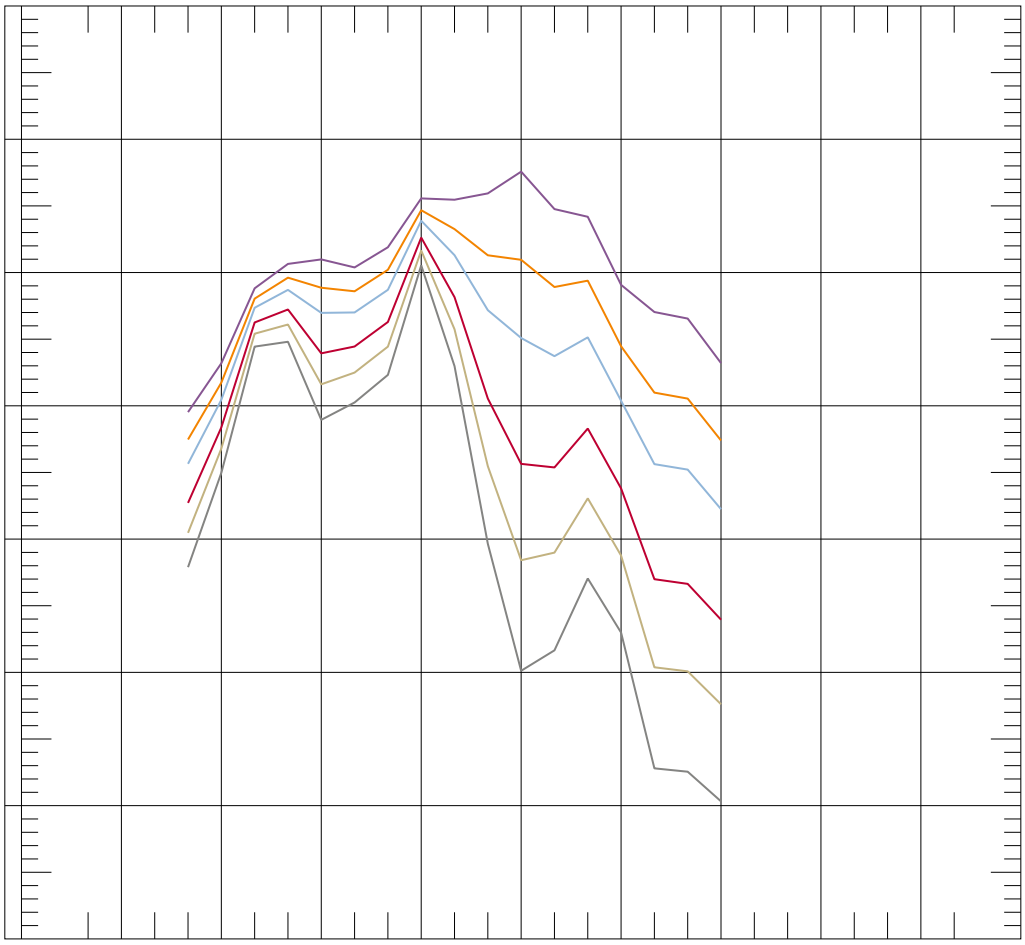

Figure C-35 Line Source Response for Borehole Impact Site VP19—50 ft Depth

Table C-36 Line Source Response Coefficients for Borehole Impact Site VP19—60 ft Depth

Frequency (Hz)	A	B	C
3.15	81.9	-39.8	0
4	42.1	-16.1	0
5	23.3	-1.0	0
6.3	57.0	-18.2	0
8	71.8	-27.3	0
10	55.1	-16.6	0
12.5	70.8	-22.9	0
16	65.7	-21.1	0
20	84.6	-30.5	0
25	111.4	-46.6	0
31.5	117.5	-51.3	0
40	137.6	-60.9	0
50	140.6	-63.2	0
63	56.8	-21.6	0
80	125.4	-58.0	0
100	127.1	-60.7	0
125	141.2	-70.0	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

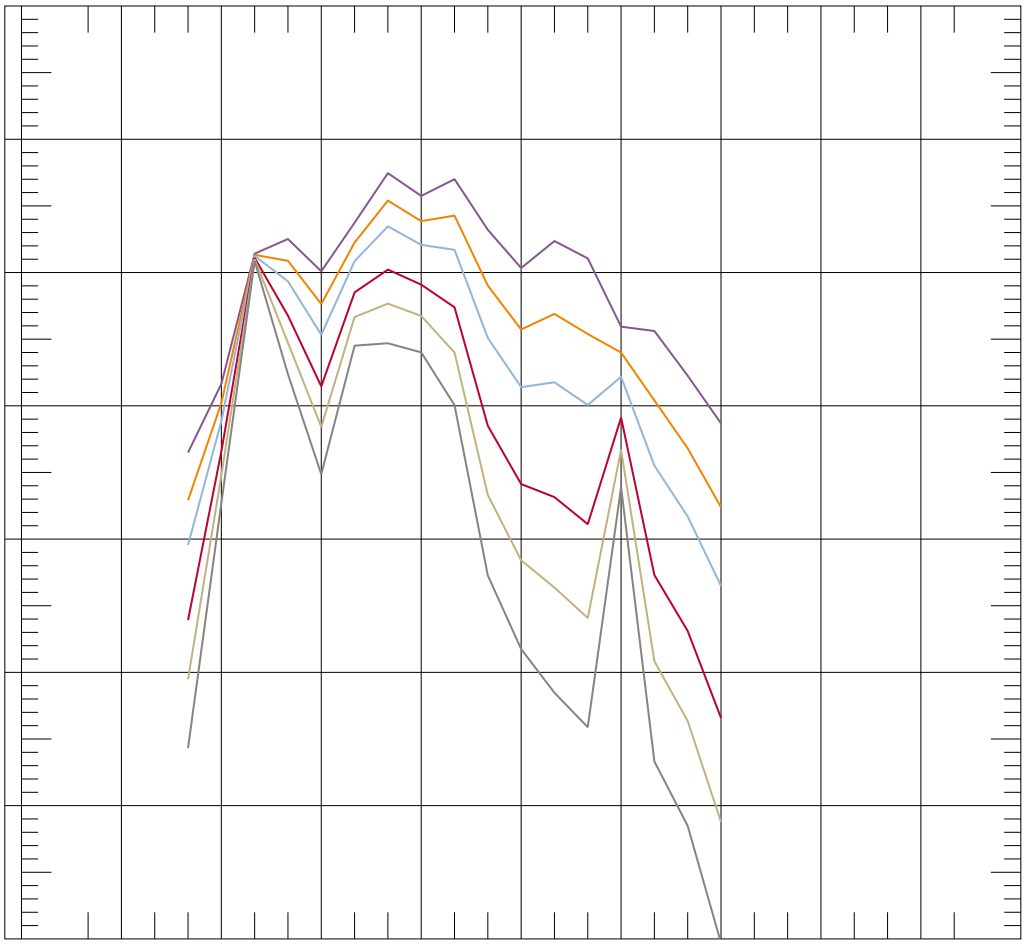

Figure C-36 Line Source Response for Borehole Impact Site VP19—60 ft Depth

Table C-37 Line Source Response Coefficients for Borehole Impact Site VP19—71 ft Depth

Frequency (Hz)	A	B	C
3.15	15.3	-4.2	0
4	12.6	-0.9	0
5	14.5	-0.1	0
6.3	17.6	-0.4	0
8	85.0	-35.8	0
10	51.1	-17.8	0
12.5	37.3	-10.2	0
16	50.3	-14.7	0
20	104.9	-41.4	0
25	134.3	-56.4	0
31.5	151.3	-65.9	0
40	125.6	-54.5	0
50	135.2	-59.9	0
63	157.5	-72.4	0
80	157.5	-75.1	0
100	127.1	-64.6	0
125	123.7	-64.5	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

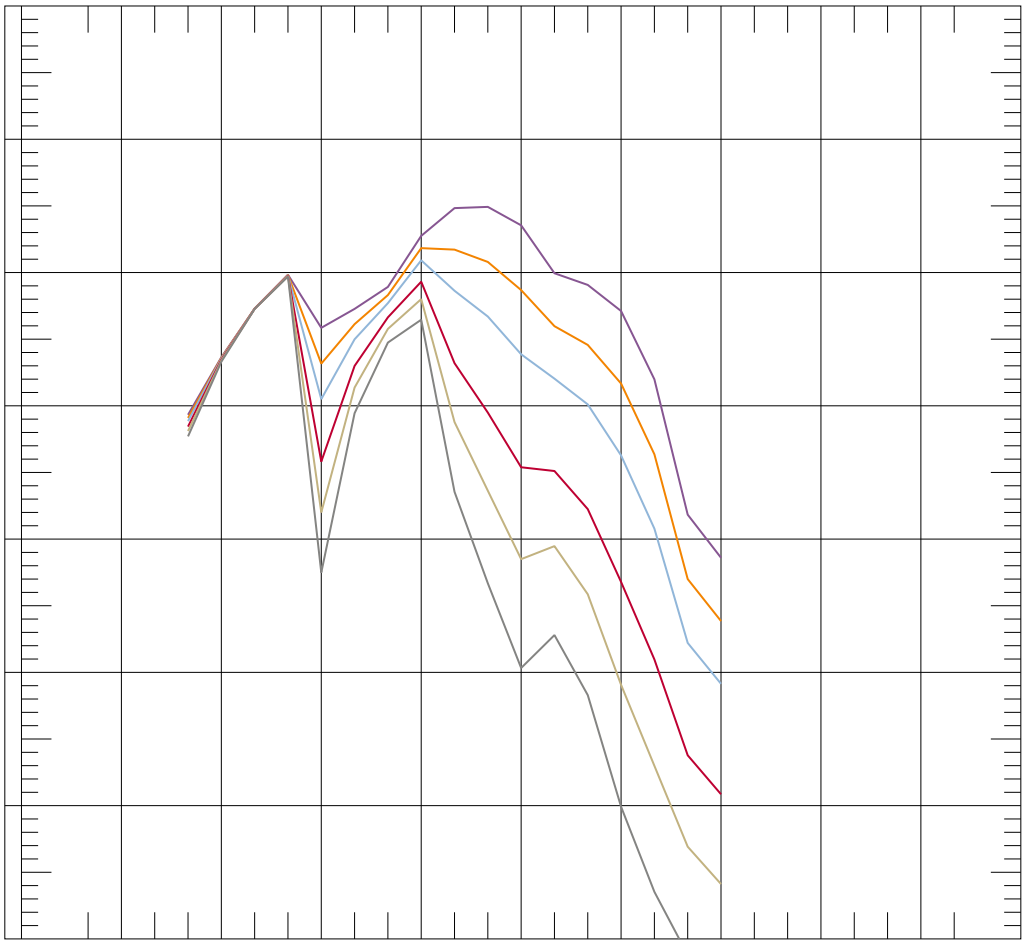

Figure C-37 Line Source Response for Borehole Impact Site VP19—71 ft Depth

Table C-38 Line Source Response Coefficients for Surface Impact Site VP20

Frequency (Hz)	A	B	C
3.15	24.0	-3.1	0
4	29.6	-4.7	0
5	44.2	-10.2	0
6.3	48.2	-10.3	0
8	49.2	-9.7	0
10	53.6	-11.3	0
12.5	58.2	-13.7	0
16	63.5	-16.8	0
20	69.3	-19.6	0
25	76.0	-22.9	0
31.5	82.8	-26.9	0
40	78.8	-28.2	0
50	79.9	-33.3	0
63	67.3	-30.5	0
80	64.4	-32.8	0
100	60.4	-34.2	0
125	46.9	-28.1	0

Hz = hertz

$LSR(d) = A + B * Log(d) + C * Log^2(d)$

Where: A, B, C = Polynomial coefficients

d = Perpendicular and horizontal distance from track centerline (feet)

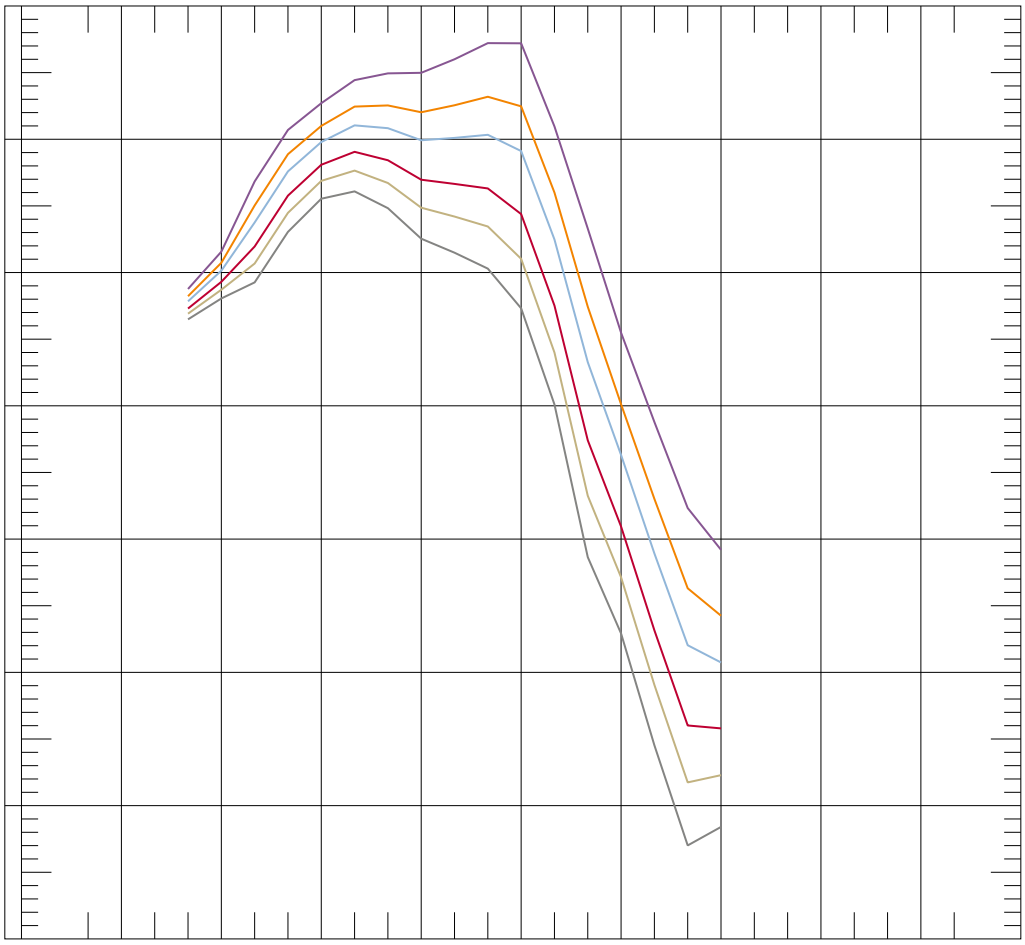

Figure C-38 Line Source Response for Surface Impact Site VP20