



**Aggregate Resource Drilling, LLC**  
**4080 Commercial Ave**  
**Springfield, OR 97478**

# BLAST REPORT

<b>Blast No.:</b> 7021.01	<b>Blast Type:</b>	<b>Permittee:</b> 7021.01
Raging River Quarry	<b>Pit/Permit:</b> RAGING RIVER (EASTSIDE ROCK)	<b>Customer:</b> Eastside Rock Products, Inc.
<b>Date:</b> 01/27/2017	<b>Weather:</b> Overcast	<b>Location:</b> Fall City, WA
<b>Time:</b> 1547	<b>Temperature:</b> 32 °F	<b>Material Type:</b> Rock and Stone
	<b>Wind From:</b> ESE	<b>Site Lat/Long:</b> 47.548100 / -121.905300
	<b>Wind Velocity:</b> 4 mph	<b>Blast Lat/Long:</b> 47.547200 / -121.905000

## SUMMARY

Bit Diameter (in)	Pattern	No Holes (ea)	Total Bore Footage (ft)	Min Depth (ft)	Max Depth (ft)	Material Produced	Max Wt. of Explosives Per Hole (lb)
3.50	08x08	68	1,826	11	46	8,656.59 TON	123
<b>TOTALS:</b>		68	1,826	11	46	8,656.59	123

<b>No. of Rows:</b> 14	<b>Subdrilling:</b> 0.00 ft	<b>Back Fill Depth:</b> 0.00 ft	<b>Stem Length Min.:</b> 10.00 ft
<b>Holes per Row Min.:</b> 2	<b>Face Height Min.:</b> 100.00 ft	<b>Water Depth Min.:</b> 0.00 ft	<b>Stem Length Max.:</b> 22.00 ft
<b>Holes per Row Max.:</b> 12	<b>Face Height Max.:</b> 100.00 ft	<b>Water Depth Max.:</b> 4.00 ft	<b>Stemming Type:</b> Cuttings
	<b>Product Density:</b> 0.82 g/cc		

## WEIGHTS

<b>Max. No. of Holes Per 8 ms Interval:</b> 3.00	<b>Powder Factor:</b> 0.36 lb/TON
<b>Max. Wt. of Explosives Per Hole:</b> 123.13 lb	<b>Rock Density:</b> 2.00 t/yd <sup>3</sup>
<b>Max. Wt. of Explosives Per 8 ms Interval:</b> 369.39 lb	



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## PRODUCTS AND SERVICES

	Units	UM	Weight Per Unit	Total Weight of Explosives
<b>Blasting Agent</b>				
Austinite 15 50# Per Bag	38.00	BG	50.00	1,900.00
Aust.15 WR300 50# Per Bag	22.00	BG	50.00	1,100.00
Hydromite 880 2 1/2 X 16 V -Stk	5.00	ST	3.33	16.67
<b>High Explosives</b>				
Brown Cap 1/2# Booster	17.00	EA	0.50	8.50
Black Cap 3/4# Booster	67.00	EA	0.75	50.25
<b>Non Electric Detonators</b>				
Lead In Line, 2500 Ft SHOCK*STAR	1.00	SP	0.03	0.03
20 Ft SHOCK*STAR In-Hole	17.00	EA	0.00	0.03
30 Ft SHOCK*STAR Dual-Delay	29.00	EA	0.00	0.09
40 Ft SHOCK*STAR Dual-Delay	11.00	EA	0.00	0.03
60 Ft SHOCK*STAR Dual-Delay	27.00	EA	0.00	0.08
20 Ft SHOCK*STAR Quick Relay 17ms	8.00	EA	0.00	0.01
<b>Services</b>				
Mileage Charge	1.00	EA	0.00	
<b>Taxes</b>				
State Tax	1.00	EA	0.00	
<b>TOTAL WEIGHT OF EXPLOSIVES (INCLUDING PRIMERS)</b>				<b>3,075.69</b>

## CREW

**Blaster In Charge:** Eric Jennings. WA Blasting Lic#: EXUS00021447  
**Blaster Helper:** Jim Christianson  
**Blaster Helper:** Benjamin Cartledge  
**Blaster Helper:** Devin Costa  
**Blaster Helper:** Remington Moore  
**Blaster Helper:** Wyatt Brown

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**SEISMOGRAPH(S)**

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<b>Seismograph</b>	<b>Location</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Distance from Blast (ft)</b>
410-06-615	placed at Quarry Entrance	47.546789	-121.901628	843.76
410-06-616	5610 SE 324 PL (placed at gate)	47.550636	-121.906873	1,335.65
410-06-617	32415 SE 58 St (placed at driveway entrance)	47.548772	-121.908342	1,003.04
410-06-618	Placed in Culdisac	47.548407	-121.902666	724.01
410-14-075	John's cantilevered house (3rd house from culdisac)	47.551226	-121.902369	1,560.67

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**GENERAL COMMENTS**

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Firing method: Nonelectric shock tube.

/s/ Eric Jennings

# ARII Drill Log

**Job Name:** 7021.01 Raging River Quarry  
**Driller Name:** Jim Christianson

**Location:** Fall City, WA  
**Drill #:** 003-98-014

**Start Date:** 01/23/17  
**Finish Date:** 01/25/17

																								Burden	Spacing
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Notes	
1	/	/	/	/	/	/	/	/	/	/	2	1	/	/	/	/	/	/	/	/	/	/	/	08	08
2	/	/	/	/	/	/	/	/	/	2	2	2	/	/	/	/	/	/	/	/	/	/	/	08	08
3	/	/	/	/	/	/	/	/	/	2	2	2	/	/	/	/	/	/	/	/	/	/	/	08	08
4	/	/	/	/	/	/	/	/	/	2	2	2	/	/	/	/	/	/	/	/	/	/	/	08	08
5	/	/	/	/	/	/	/	/	/	2	2	/	/	/	/	/	/	/	/	/	/	/	/	08	08
6	/	/	/	/	/	/	/	2	2	4	4	/	/	/	/	/	/	/	/	/	/	/	/	08	08
7	/	/	/	/	/	/	/	2	1	2	4	/	/	/	/	/	/	/	/	/	/	/	/	08	08
8	/	/	/	/	/	/	/	1	4	2	4	/	/	/	/	/	/	/	/	/	/	/	/	08	08
9	/	/	/	/	/	/	/	4	6	3	6	/	/	/	/	/	/	/	/	/	/	/	/	08	08
10	/	/	/	/	/	/	20	20	12	4	10	/	/	/	/	/	/	/	/	/	/	/	/	08	08
11	/	/	/	/	/	/	20	/	/	1	10	/	/	/	/	/	/	/	/	/	/	/	/	08	08
12	/	2	2	2	2	/	4	/	3	1	8	/	/	/	/	/	/	/	/	/	/	/	/	08	08
13	3	2	2	2	2	2	4	3	3	6	6	8	/	/	/	/	/	/	/	/	/	/	/	08	08
14	46	46	46	44	42	40	40	39	38	36	34	32	/	/	/	/	/	/	/	/	/	/	/	08	08
			2	2	2	2	2	6	6	4	6	4	/	/	/	/	/	/	/	/	/	/	/		
			46	44	42	40	40	39	36	36	34	32													

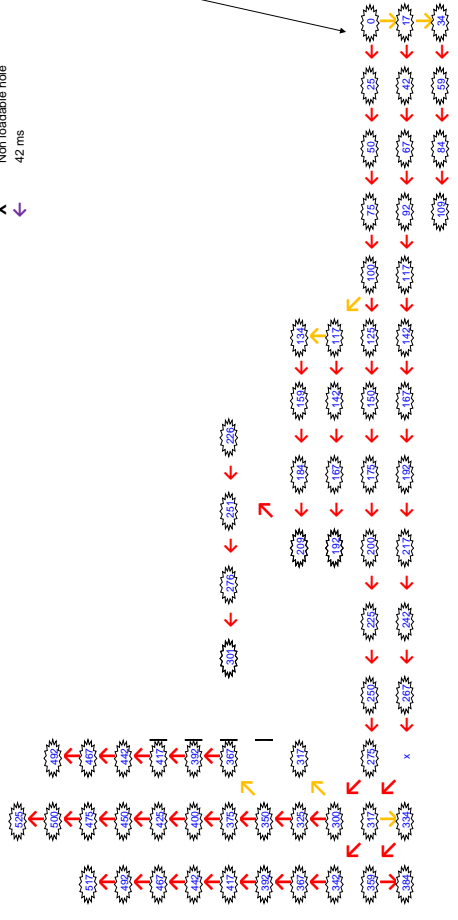
**SUMMARY:**

	<b>08x08</b>	<b>Total</b>
<b>Bit Diameter</b>	3.50	3.50
<b>Burden</b>	08	08
<b>Spacing</b>	08	08
<b>Hole Count</b>	68	68
<b>No. Rows</b>	14	14
<b>Holes Per Row Min (ea)</b>	2	2-2
<b>Holes Per Row Max (ea)</b>	12	12-12
<b>Min Depth (ft)</b>	11	11
<b>Max Depth (ft)</b>	46	46
<b>Footage (lf)</b>	1826	1826
<b>Overburden (LF)</b>	204	204
<b>Overburden (SCY)</b>	483	483
<b>Volume (SCY)</b>	4328	4328
<b>Material Produced</b>	8657 TON	8657 TON

# BLAST HOLE TIMING DIAGRAM

CUSTOMER NAME: Eastside Rock      LOCATION STATE: WA      Date 1/27/17  
 LOCATION CITY: Fall City      JOB #: 702101  
 MAX HOLES PER ROW: 3      DURATION OF BLAST: 0.5 seconds  
 HOLE TO HOLE TIME: 25  
 ROW TO ROW TIME: 17

Looking hole  
 25 ms  
 17 ms  
 Non loadable hole  
 42 ms



- ROW 1:
- ROW 2:
- ROW 3:
- ROW 4:
- ROW 5:
- ROW 6:
- ROW 7:
- ROW 8:
- ROW 9:
- ROW 10:
- ROW 11:
- ROW 12:
- ROW 13:
- ROW 14:
- ROW 15:
- ROW 16:
- ROW 17:



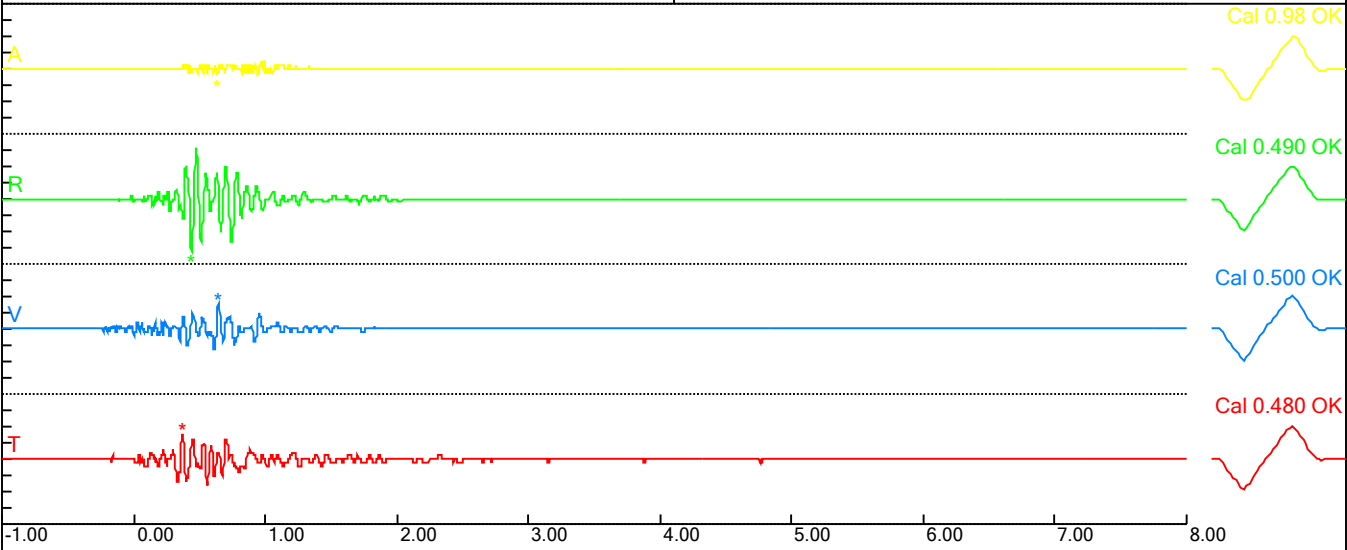
AGGREGATE RESOURCE DRILLING, LLC

Job: 7021.01 Raging River Quarry  
 placed at Quarry Entrance  
 GPS of Seismograph: N47.546789, W-121.901628  
 GPS of Shot: N47.547200, W-121.905000  
 Hole Diameter: 3.5 in. / Hole Depth: 11 - 46 ft  
 Hole Count: 68 @ Spacing 08x08 ft.  
 Stemming: 22 ft. / Water Depth: 4 ft.  
 Weather: 32, wind 4 mph ESE, Overcast  
 BIC: Eric Jennings  
 Seismograph Set Up: Benjamin Cartledge

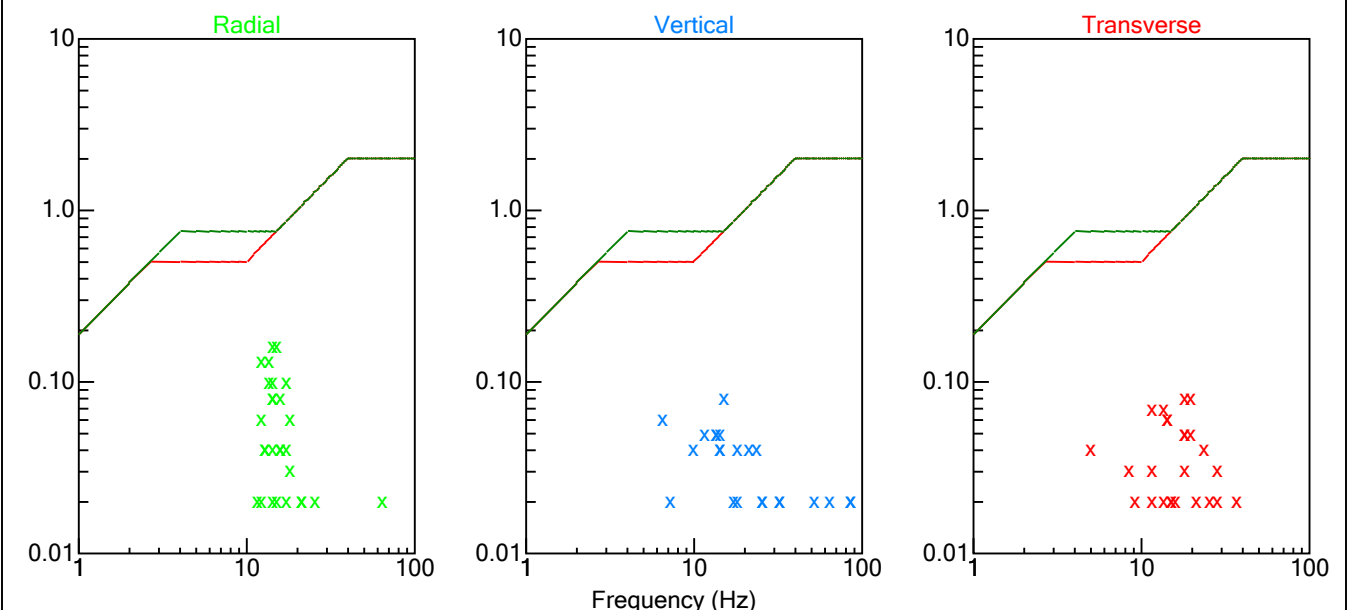
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 SN: 3615  
 Seismic Trigger: 0.0200 in/sec  
 Air Trigger: 124 dBL  
 Sample Rate: 512  
 Duration: 8 Seconds  
 Pre-Trigger: 1.0 Second  
 Seismic Range: 5.00 in/s  
 Acoustic Range: 142 dBL  
 Gain: 2.0x  
 Voltage: 5.80

**Peaks and Frequencies**  
 PPV Maximum: 0.160 in/sec (0.4375 sec)  
 Acoustic: 106 dBL @ 0.0 Hz (0.6348 sec)  
 Radial: 0.160 in/sec @ 14.2 Hz (0.4375 sec)  
 Vertical: 0.0800 in/sec @ 15.0 Hz (0.6426 sec)  
 Transverse: 0.0800 in/sec @ 18.2 Hz (0.3711 sec)  
 Last Calibration Date: 4/26/2016

**Graph Information**  
 Duration: -1.000 s To: 8.000 s  
 Acoustic Scale: 126 dBL  
 Seismic Scale: 0.200 in/sec (0.0500 in/sec/div)  
 Time Intervals: 1.00 sec



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)





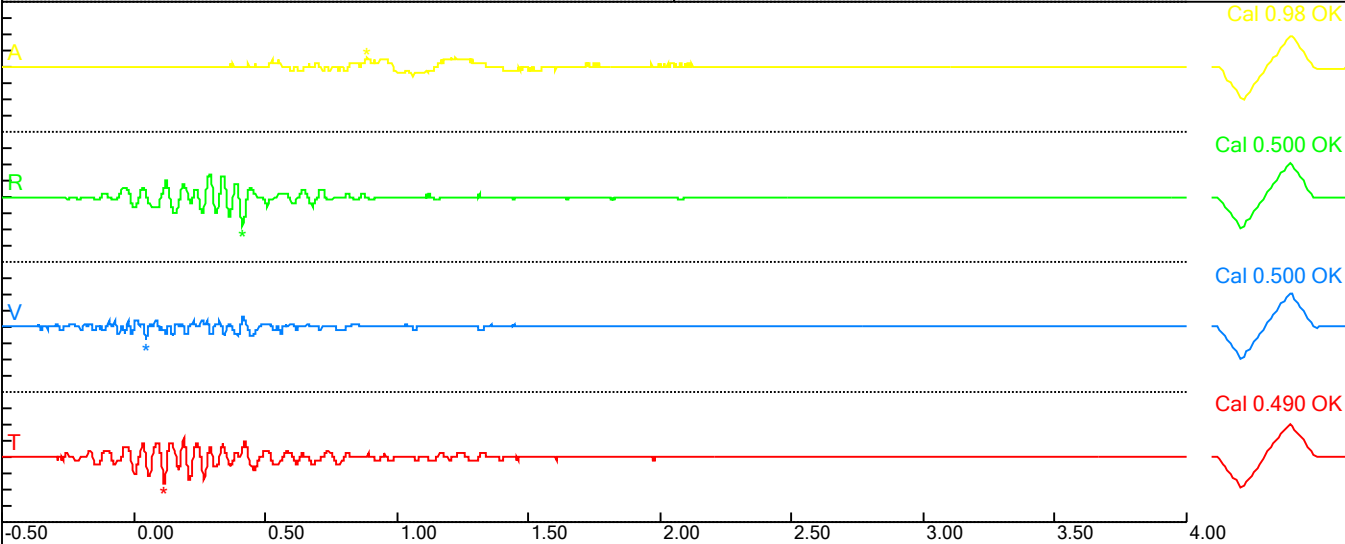
AGGREGATE RESOURCE DRILLING, LLC

Job: 7021.01 Raging River Quarry  
 5610 SE 324 PL (placed at gate)  
 GPS of Seismograph: N47.550636, W-121.906873  
 GPS of Shot: N47.547200, W-121.905000  
 Hole Diameter: 3.5 in. / Hole Depth: 11 - 46 ft  
 Hole Count: 68 @ Spacing 08x08 ft.  
 Stemming: 22 ft. / Water Depth: 4 ft.  
 Weather: 32, wind 4 mph ESE, Overcast  
 BIC: Eric Jennings  
 Seismograph Set Up: Benjamin Cartledge

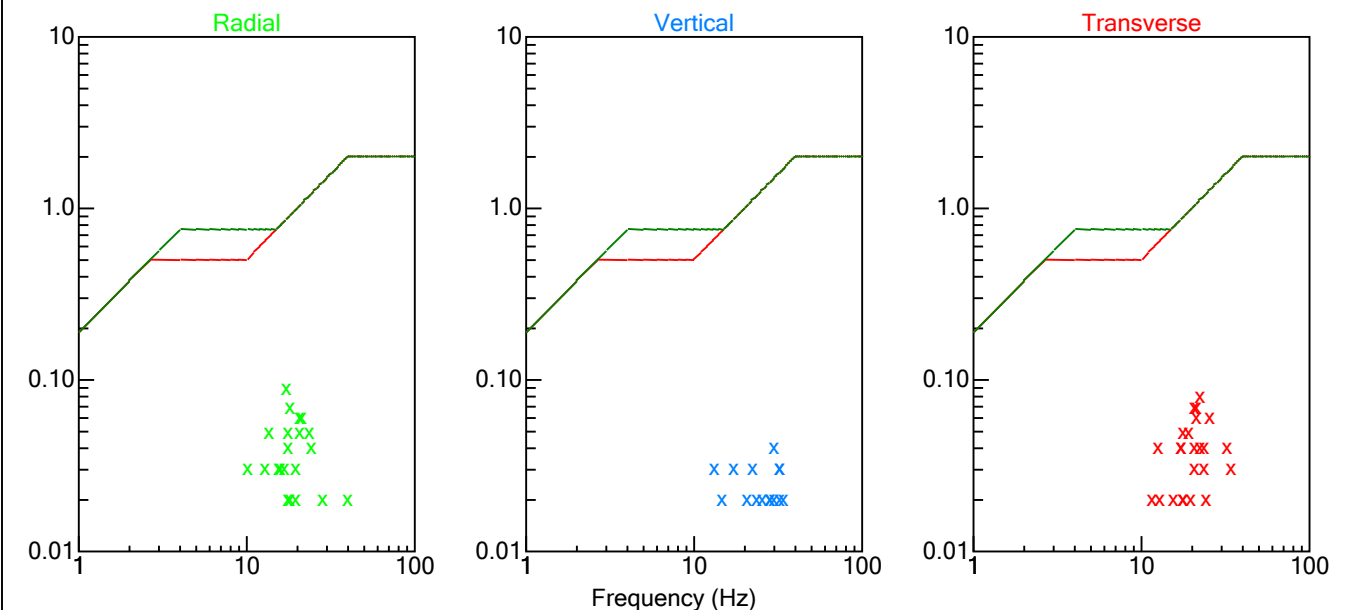
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 SN: 3616  
 Seismic Trigger: 0.0500 in/sec  
 Air Trigger: 124 dBL  
 Sample Rate: 1024  
 Duration: 4 Seconds  
 Pre-Trigger: 0.5 Second  
 Seismic Range: 5.00 in/s  
 Acoustic Range: 142 dBL  
 Gain: 2.0x  
 Voltage: 6.30

**Peaks and Frequencies**  
 PPV Maximum: 0.0900 in/sec (0.4131 sec)  
 Acoustic: 110 dBL @ 4.6 Hz (0.8857 sec)  
 Radial: 0.0900 in/sec @ 17.0 Hz (0.4131 sec)  
 Vertical: 0.0400 in/sec @ 30.1 Hz (0.0479 sec)  
 Transverse: 0.0800 in/sec @ 22.2 Hz (0.1152 sec)  
 Last Calibration Date: 9/21/2016

**Graph Information**  
 Duration: -0.500 s To: 4.000 s  
 Acoustic Scale: 126 dBL  
 Seismic Scale: 0.200 in/sec (0.0500 in/sec/div)  
 Time Intervals: 0.50 sec



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)





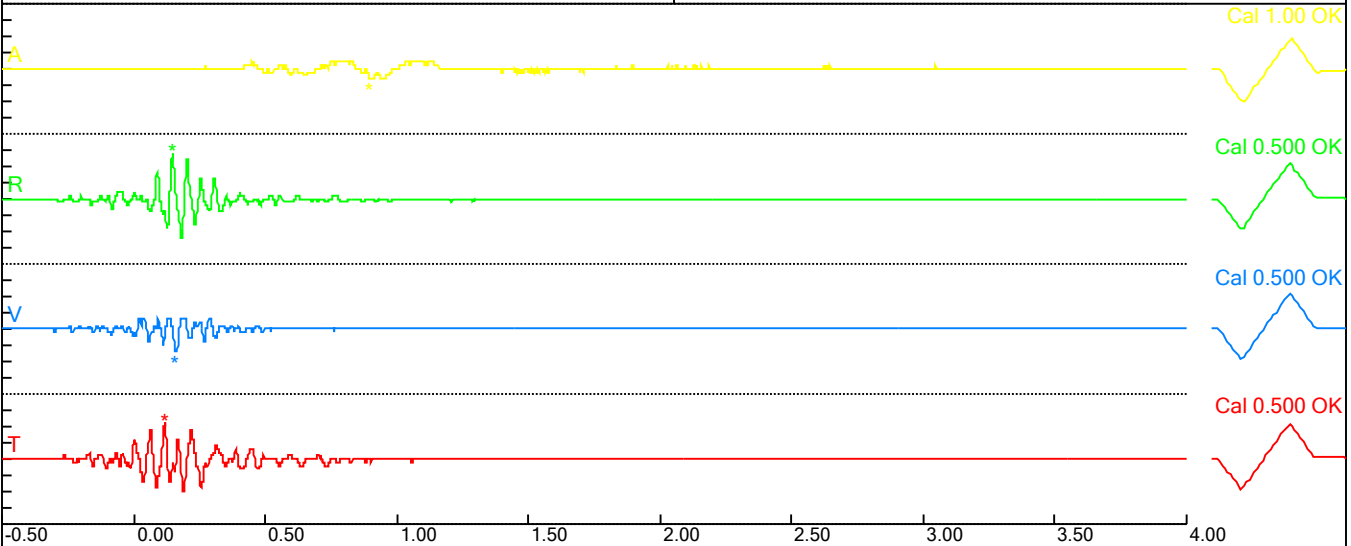


AGGREGATE RESOURCE DRILLING, LLC

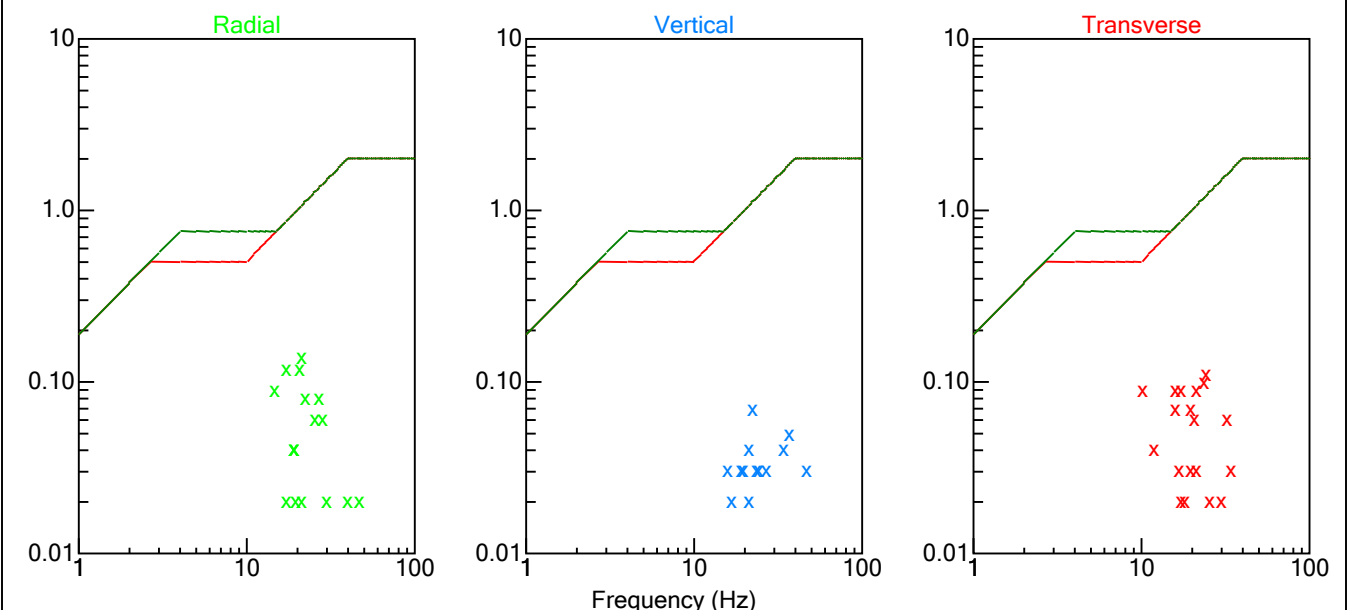
Job: 7021.01 Raging River Quarry  
 32415 SE 58 St (placed at driveway entrance)  
 GPS of Seismograph: N47.548772, W-121.908342  
 GPS of Shot: N47.547200, W-121.905000  
 Hole Diameter: 3.5 in. / Hole Depth: 11 - 46 ft  
 Hole Count: 68 @ Spacing 08x08 ft.  
 Stemming: 22 ft. / Water Depth: 4 ft.  
 Weather: 32, wind 4 mph ESE, Overcast  
 BIC: Eric Jennings  
 Seismograph Set Up: Benjamin Cartledge

File: 3617201701271546010.dtb  
 Number: 010  
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 SN: 3617  
 Seismic Trigger: 0.0500 in/sec  
 Air Trigger: 124 dBL  
 Sample Rate: 1024  
 Duration: 4 Seconds  
 Pre-Trigger: 0.5 Second  
 Seismic Range: 5.00 in/s  
 Acoustic Range: 142 dBL  
 Gain: 2.0x  
 Voltage: 6.20

Peaks and Frequencies	Graph Information
PPV Maximum: 0.140 in/sec (0.1475 sec)	Duration: -0.500 s To: 4.000 s
Acoustic: 110 dBL @ 5.4 Hz (0.8945 sec)	Acoustic Scale: 126 dBL
Radial: 0.140 in/sec @ 21.3 Hz (0.1475 sec)	Seismic Scale: 0.200 in/sec (0.0500 in/sec/div)
Vertical: 0.0700 in/sec @ 22.2 Hz (0.1572 sec)	Time Intervals: 0.50 sec
Transverse: 0.110 in/sec @ 24.3 Hz (0.1182 sec)	
Last Calibration Date: 6/14/2016	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)





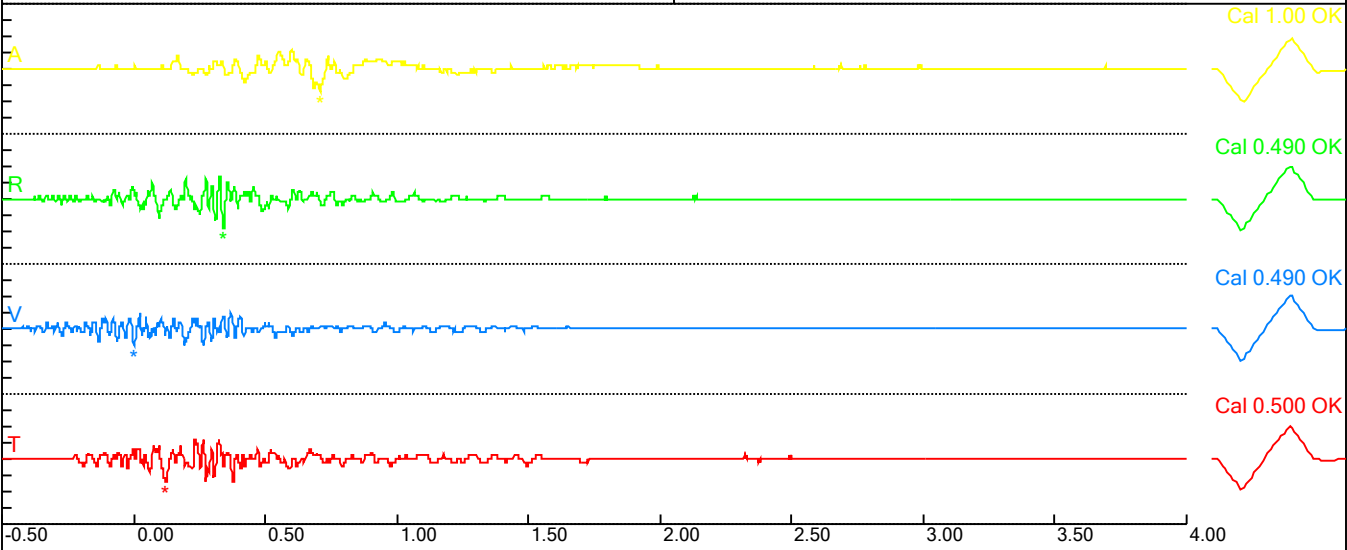
AGGREGATE RESOURCE DRILLING, LLC

Job: 7021.01 Raging River Quarry  
 Placed in Culdisac  
 GPS of Seismograph: N47.548407, W-121.902666  
 GPS of Shot: N47.547200, W-121.905000  
 Hole Diameter: 3.5 in. / Hole Depth: 11 - 46 ft  
 Hole Count: 68 @ Spacing 08x08 ft.  
 Stemming: 22 ft. / Water Depth: 4 ft.  
 Weather: 32, wind 4 mph ESE, Overcast  
 BIC: Eric Jennings  
 Seismograph Set Up: Benjamin Cartledge

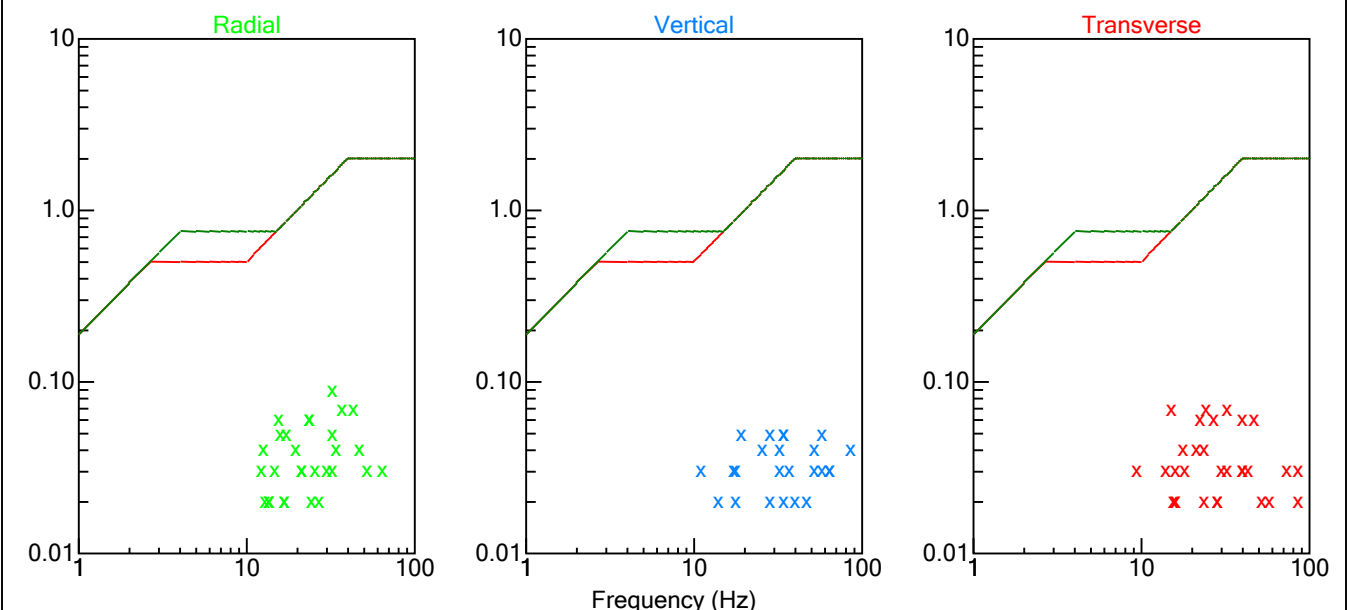
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 Air Trigger: 124 dBL  
 Sample Rate: 1024  
 Duration: 4 Seconds  
 Pre-Trigger: 0.5 Second  
 Seismic Range: 5.00 in/s  
 Acoustic Range: 142 dBL  
 Gain: 2.0x  
 Voltage: 6.20

**Peaks and Frequencies**  
 PPV Maximum: 0.0900 in/sec (0.3398 sec)  
 Acoustic: 117 dBL @ 9.4 Hz (0.7080 sec)  
 Radial: 0.0900 in/sec @ 32.0 Hz (0.3398 sec)  
 Vertical: 0.0500 in/sec @ 56.8 Hz (0.0000 sec)  
 Transverse: 0.0700 in/sec @ 15.0 Hz (0.1201 sec)  
 Last Calibration Date: 7/26/2016

**Graph Information**  
 Duration: -0.500 s To: 4.000 s  
 Acoustic Scale: 126 dBL  
 Seismic Scale: 0.200 in/sec (0.0500 in/sec/div)  
 Time Intervals: 0.50 sec



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



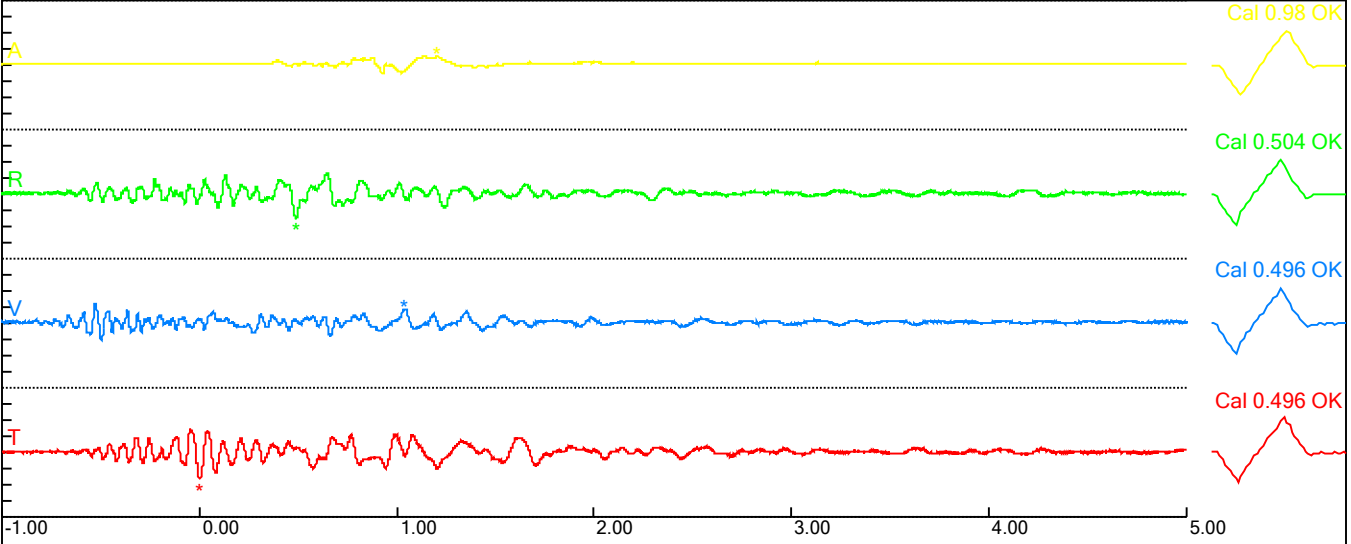


AGGREGATE RESOURCE DRILLING, LLC

Job: 7021.01 Raging River Quarry  
 John's cantilevered house (3rd house from culdisac)  
 GPS of Seismograph: N47.551226, W-121.902369  
 GPS of Shot: N47.547200, W-121.905000  
 Hole Diameter: 3.5 in. / Hole Depth: 11 - 46 ft  
 Hole Count: 68 @ Spacing 08x08 ft.  
 Stemming: 22 ft. / Water Depth: 4 ft.  
 Weather: 32, wind 4 mph ESE, Overcast  
 BIC: Eric Jennings  
 Seismograph Set Up: Benjamin Cartledge

File: 7075201701271546350026.evt  
 Number: 0026  
 Date and Time: 1/27/2017 3:46:35 PM  
 SN: 7075  
 Seismic Trigger: 0.0200 in/sec  
 Air Trigger: 124.0 dBL  
 Sample Rate: 1024  
 Duration: 5 Seconds  
 Pre-Trigger: 1.0 Second  
 Seismic Gain: 10.2in/sec  
 Acoustic Gain: 148.2 dBL  
 Voltage: 6.06

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0209 in/sec (0.0010 sec)	Duration: -1.000 s To: 5.000 s
Acoustic: 108.9 dBL @ 2.2 Hz (1.2021 sec)	Acoustic Scale: 126.0 dBL
Radial: 0.0191 in/sec @ 6.0 Hz (0.4902 sec)	Seismic Scale: 0.0500 in/sec (0.0125 in/sec/div)
Vertical: 0.0109 in/sec @ 5.2 Hz (1.0361 sec)	Time Intervals: 1.00 sec
Transverse: 0.0209 in/sec @ 12.2 Hz (0.0010 sec)	
Seis Calibration Date (SN): 9/21/2016 (7075)	
Air Calibration Date (SN): 9/21/2016 (7075)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)

