



CONSUMERS ENERGY

WELL: P-201
FIELD: WILDCAT
LOCATION: SAINT CLAIRE COUNTY, MI, USA
ZERO OFFSET VSP

ENCLOSURE 3B: NEW CORRELATION

ACQUISITION BY BAKER HUGHES GE JUNE 2019
PROCESSED BY BAKER HUGHES GE JUNE 2019

ACQUISITION INFORMATION

KB ELEVATION 656 FT AMSL
MINIMUM DEPTH 125 FT (MD KB)
MAXIMUM DEPTH 2375 FT (MD KB)
CASING 7 IN 0 - 2490
ENERGY SOURCE VIBRATOR
SOURCE ELEVATION 643 FT AMSL
SOURCE EASTING FROM WELLHEAD -175 FT
SOURCE NORTHING FROM WELLHEAD -40 FT
RECORD LENGTH 6 SECONDS
SAMPLE INTERVAL 1 MS

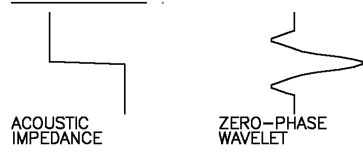
PROCESSING

Edit, stack and pick first arrival times
Correction for geometric spreading using $t^{*2.2}$
Estimation of downgoing P-waves: first breaks aligned at 200ms
7-point median filter
Zero phase bandpass filter: 10(18)- 135(36) Hz(dB/Oct)
Subtraction of downgoing P-waves using 9-point median
Zero phase bandpass filter: 10(18)- 135(36) Hz(dB/Oct)
Enhancement: 3-point median filter
Zero phase bandpass filter: 10(18)- 135(36) Hz(dB/Oct)
VSP deconvolution of upgoing waves:
1007 msec operator derived from downgoing P-waves, 5% WN
Zero phase bandpass filter: 10(18)- 135(36) Hz(dB/Oct)
Enhancement: 5-point median filter
Zero phase bandpass filter: 10(18)- 135(36) Hz(dB/Oct)
Datum correction
Shift to two-way time
Corridor window of enhanced deconvolved upgoing waves
Stack of corridor window
8 traces repeat.
Zero phase, Normal polarity, bandpass filter:
10(18)-470(36) Hz(dB/oct)

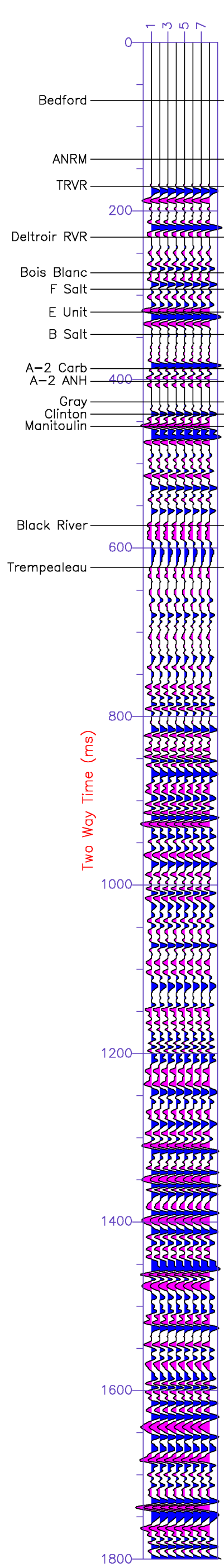
Vertical scale: 20 cm/sec
Seismic Datum: Ground Level = 643 ft AMSL
Replacement velocity: 6,000 ft/sec
Note: Surface Seismic Datum=1,000 ft AMSL & Vrep=10,000 ft/s.
Required two way time shift to bring Surface Seismic
to VSP = -71 ms. So actual time shift is 71ms-15ms=56ms

NORMAL POLARITY

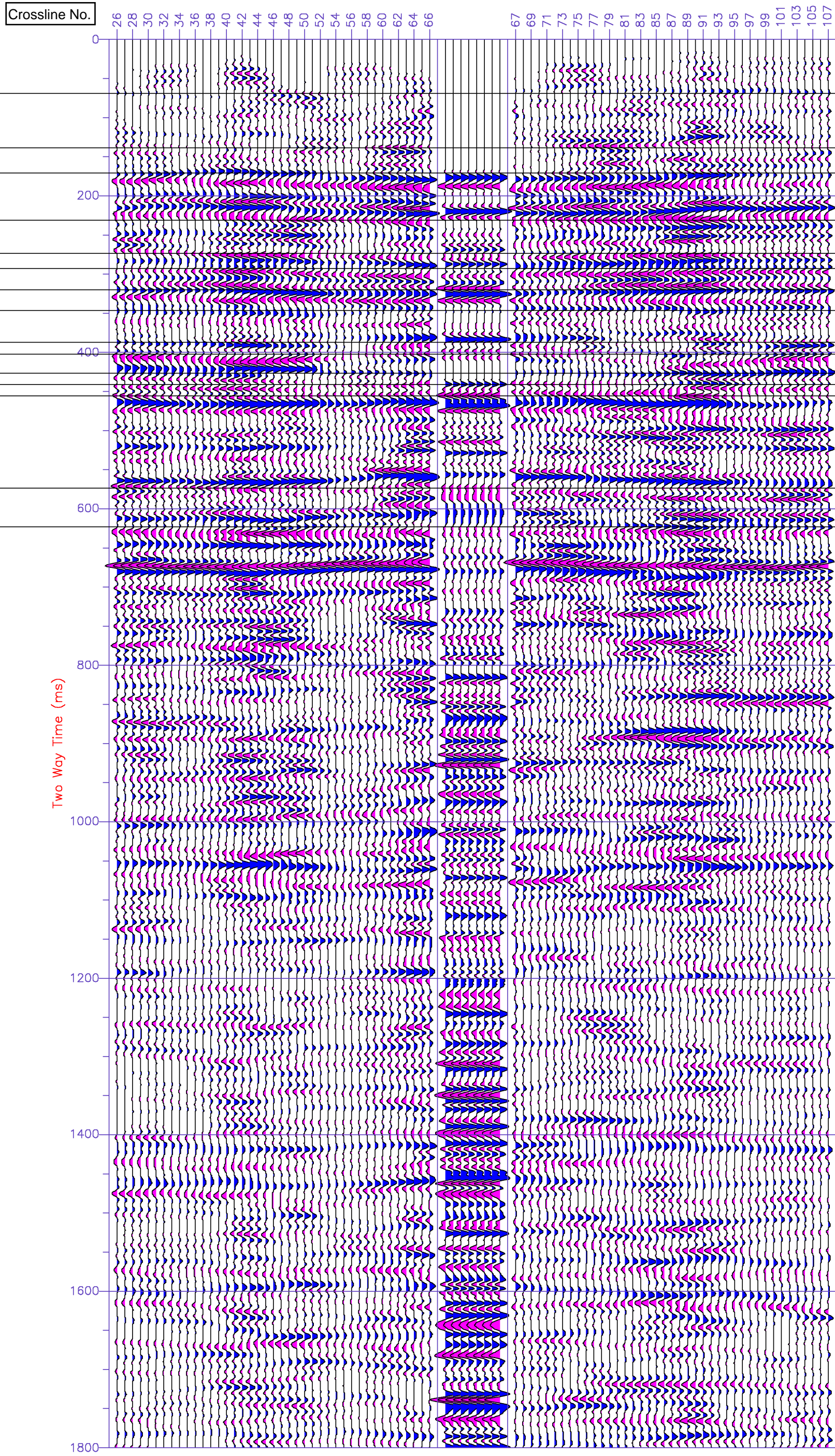
AN INCREASE IN ACOUSTIC IMPEDANCE
IS DISPLAYED AS A PEAK



Corridor Stack
10-135 Hz



Inline 91 VS Corridor Stack 8-110 Hz
Surface Seismic has a -15 ms time shift



Crossline 66 VS Corridor Stack 8-110 Hz
Surface Seismic has a -15 ms time shift

