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# DELINEATING PIERRE FORMATION FRACTURE RESERVOIRS USING COMPRESSIONAL AND HORIZONTAL SHEAR WAVE SEISMIC DATA NEAR FLORENCE, FREMONT COUNTY, COLORADO

by

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## ABSTRACT

The Florence field in the Cañon City graben, Colorado, is the second oldest oil field in the United States (Mallory, 1977). Oil is found in fractured zones within the Pierre Formation. A seven mile compressional (P)- and horizontal shear (SH)-wave seismic survey was analyzed to investigate the possibility of detecting fractured zones in the Pierre Formation.

The SH-wave reprocessed preserved amplitude section shows an amplitude increase throughout the Pierre and along the Niobrara horizon within the Florence field's limits. Zones which show an amplitude increase result from SH-wave velocities being lower in fractured intervals. Section above Niobrara Formation may be fractured throughout, not just in specific production intervals. Specific production intervals are evidence of open fractures.

$V_s/V_p$ ratios decrease within areas of preferential fracturing. Both P- and SH-wave amplitudes increase in fractured zones, causing the $A_s/A_p$ ratio to show a slight increase in zones with fracturing. SH-wave velocity information is more definitive than P-wave velocity information of fractured areas. Northeastern end of both seismic lines indicates an area of fractures and a structural flexure which warrants this area for future exploration.

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