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Application of 3-D Seismic on Morrow Channel Sandstones, Second Wind and Jace Fields, Cheyenne and Kiowa Counties, Colorado

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Two 3-D seismic surveys have been shot by Union Pacific Resources (UPRC) to extend fields producing from Pennsylvanian Morrow channel sands. The target fields were Jace and Second Wind, both located near the Colorado-Kansas border in a Morrow channels consisting of fluvial valley-fill sandstone and shales which have incised into the underlying lower Morrow carbonates. This shale-sand and carbonate interface provides sufficient acoustic contrast to make the incisions interpretable on 2-D seismic data. The sinuous nature of the valleys, the erratic Morrow structure and the distribution of the 2-D data are interpretive challenges that are significantly reduced by the 3-D seismic data.

The Jace and Second Wind surveys had full-fold coverage of 5 square miles and 2.8 square miles, respectively. The surveys had similar acquisition parameters resulting in 20-fold subsurface

data using 75 by 75-foot bin size. At Jace, the 3-D survey indicated an absence of channel where 2-D data had shown potential valley incision, thus saving UPRC from drilling several dry holes. At Second Wind, the 3-D interpretation clearly defined the limits and geometry of the valley and uncovered a complex series of fault blocks cutting the valley. The subsequent drilling encountered a thick channel sandstone at the predicted structural elevation.

In the Morrow Stateline trend, 3-D seismic data has proven its ability to provide a more accurate "picture" of the Morrow valley geometry, therefore, reducing the risk of near-miss non-sand valley wells. Many of the Morrow structural complications, particularly the tracking of faults and their influence on the valley system, are more clearly understood on a 3-D data set.

Biographical Sketch – Mark P. Germinario

Mark received both his BS and MS degrees in Geology from San Diego State University in 1980 and 1982, respectively. From 1982 to the present, he has been employed by Union Pacific Resources (formerly Champlin Petroleum) at their offices in Denver, Colorado and Fort Worth, Texas. He has conducted exploration in the Wyoming-Utah Overthrust region, the Powder River Basin and the Green River Basin. For the last six years, Mark has done both exploration and development geology in the Morrow channel play on Southeastern Colorado. In the course of this work, he has been involved in the drilling of over 150 Morrow exploration and development wells.