CONTENTS

REGIONAL ANALYSES: ROCKY MOUNTAINS AND COLORADO PLATEAU

Multi-Directional Laramide Compression in the Durango Area - Why?..........................Eric Erslev 1
The Post-Laramide Joint Network of the Colorado Plateau ............................................. Earl R. Verbeek and Marilyn A. Grout 7

THEORETICAL & APPLIED CASE STUDIES

Fracture Prediction in Triple-Bed Strata........................................................................Ron W. Pritchett 23
Beware of Gravity Fractures and Non-Structural Lineations ................................................. John F. Harris and Alan P. Emmendorfer 37
Heterogeneous Joint and Fault Systems in the Navajo Sandstone, Southwestern Utah, and Their Influence on Permeability................................................................. Hugh A. Hurlow 41
Directions and Frequency of Natural Jointing in the Royal Gorge Arch, Fremont County, Colorado............................................................ Timothy L. Clarey and Ronald B. Chase 53
Fracture Patterns and Fault Architecture in the East Kaibab Monocline ........................................ Pauline N. Mollena and Atilla Aydin 63
Preliminary Results of Coal Cleat Studies, Upper Cretaceous Ferron Sandstone
Member of the Mancos Shale, Emery and Sevier Counties, Utah .................................. Steven M. Condon 77
Fracture Studies on the Upper Cretaceous Pictured Cliffs Sandstone and Fruitland Formation, Northern San Juan Basin, La Plata County, Colorado .................................................. Steven M. Condon 85
Conjugate Fracture Pairs in the Molina Member of the Wasatch Formation,
Piceance Basin, Colorado: Implications for Fracture Origins and Hydrocarbon Production/Exploration ................................................................. John C. Lorenz 97
Tonal Indicators of Fractured Reservoirs: A Remote Sensing Case Study in the
San Juan Basin, Northwestern New Mexico ................................................................... Arthur J. Pyron 105

NATURALLY FRACUTURED SHALES

Boulder Mancos Field: Development Analogy for Naturally Fractured Reservoirs ..................George M. Caristrom 117
The Productive Potential From Fractured Reservoirs in the Carlile Shale of the San Juan Basin .......................................................................................... Alan P. Emmendorfer 129
Natural Gas Resource Potential of the Lewis Shale, San Juan Basin,
New Mexico and Colorado.................................................................... G. L. Jennings, K. H. Greaves and S. R. Bereskin 131

HORIZONTAL DRILLING APPLICATIONS

Horizontal Exploitation of Oil and Gas-Bearing Natural Fracture Systems in the Cane Creek Clastic Interval of the Pennsylvanian Paradox Formation, Grand and San Juan Counties, Utah........................................ Kenneth W. Grove and David M. Rawlins 133
Fracture Characterization Based on Oriented Horizontal Core from the Spraberry Trend
................................................................. David S. Schechter, John C. Lorenz, Paul McDonald,
Tom Sheffield and Charlie Sizemore 135
GEOMECHANICAL & SEISMIC INTERPRETATIONS

Geomechanics Approach to Management of Naturally Fractured Reservoirs:
Interrelationship Between Natural Fractures, In-Situ Stress, and
Reservoir Permeability Anisotropy ........................................... Lawrence W. Teufel 137

Case History: Rulison Field, Colorado, Fracture Detection, Mapping, and
Analysis of a Naturally Fractured Gas Reservoir
Using P-wave Reflection Seismic
........................................ Heloise B. Lynn, K. Michele Simon, Vello Kuuskraa and Dave Decker 139

Detection of Naturally Fractured Tight Gas Reservoirs: Case Histories from the
Uinta and Wind River Basins Using 2-D and 3-D Seismic Data
........................................ Dave Phillips, Heloise Lynn, Michele Simon and Richard Van Dok 145

SAN JUAN BASIN MESASUREDE RESERVOIRS

Open Apertures, Fracture Orientations, and Their Correlation to Production
in the Mesaverde Group in the San Juan Basin .................................. Harry TerBest, Jr 147

Mapping Mesaverde Fractures with 3-D Seismic Data ................................ Gary S. Forrest 149

Use of Microscopic Information for Macrofracture Characterization
in Mesaverde Group Sandstones from the Surface and Subsurface
of the San Juan Basin ............................................................... Orlando J. Ortega and Randall Marrett 151

THREE DIMENSIONAL MODELS

Three-dimensional Discrete Fracture Models, Nevada and Utah ...................... Lawrence O. Anna 153

New Technology to Identify and Characterize Natural Fractures
.................................................................................................................. W. W. Weiss and Abdel Zellou 155

Drainage Patterns in Naturally Fractured Tight Gas Reservoirs
........................................ Hugo Harstad, Lawrence W. Teufel, John C. Lorenz and William H. Babcock 165

GROUND WATER & ENVIRONMENTAL ISSUES / FAULTING

Structural Geology Applied To The Evaluation Of Fractured Sedimentary
Bedrock Aquifers In The Pinebrook Subdivision, Summit County, Utah
.................................................................................................................. Kelly F. Keighley and James P. Evans 173

Hydrocarbon Contamination and Transport in Fractured Bedrock Aquifers
Along the Zuzax Fault, Tijeras Canyon, New Mexico ...................... P. Drakos and J. Lazarus 191

Correlation of Fractured Surface Exposures to Aberrant Oil Production
Along the Duchesne Fault Zone, Northeastern Utah
.................................................................................................................. S. R. Bereskin, R. L. Bruhn, A. Groeger and B.A. Marin 203