

Collected Studies

**COAL**

**SEAM**

**NATURAL**

**GAS**

Also Known as "Coalbed Methane"

The IOGCC logo consists of the letters "IOGCC" in white, serif font, centered within a blue oval. This oval is positioned on top of a thick red horizontal bar that spans the width of the page.

**IOGCC**

A Publication of the Interstate Oil and Gas Compact Commission



The Interstate Oil and Gas Compact Commission gratefully acknowledges the dedication and efforts of IOGCC Research Assistant Keith Thomas in compiling this collection of studies.

The IOGCC also would like to thank the U.S. Environmental Protection Agency for the financial support that made this publication possible.

The IOGCC also would like to thank the U.S. Department of Energy for its ongoing support.

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Summer 2002

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**Interstate Oil and Gas Compact Commission**



## Foreword

The energy value of natural gas has been known since ancient times. Capturing it for beneficial use has been the tough part. The world has lost untold quantities of natural gas. In countries other than the United States and Canada, it continues to be vented and flared in wasteful volumes. Colorless, odorless natural gas dissipates quickly into the atmosphere when freed from the rock in which it is trapped. Thirty years ago, the United States made a national policy decision to capture natural gas from what were then considered “more difficult” rocks, including coal.

Since the underground mining of coal began, humans have been aware that gas trapped in coal is freed when the coal is broken open. In traditional underground mining operations, a prime safety consideration for miners is venting gas from the mine.

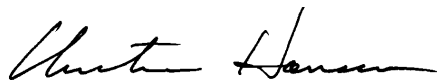
Though the resource was identified, developing it as commercial natural gas was considered so difficult at the time that a federal tax credit to develop “coalbed methane” was put in place. Many believed the credit was a hollow incentive to the industry. However, this federal policy decision proved to be important for the development of this natural gas. (Identified in the tax law as “coalbed methane” the industry and government have commonly used this shorthand to identify natural gas from coal.)

Extensive research has shown that gas from coal is our nation’s most abundant new source of natural gas. It remained a novel concept to those accustomed to natural gas coming from more traditional rocks such as sandstone and limestone.

Natural gas whose source is coal now accounts for 7 per cent of total production in the United States. Twenty years ago the figure was virtually zero.

Because public policy supports development of natural gas from coal, extensive research has been conducted to learn how to harness this resource for beneficial human use. These studies have never before been published in a single volume. The most significant early work comes from the Gas Research Institute, which paved the way for current production practices. States, universities, companies and other research institutions have added to this volume of work. Even today more research is being conducted across the nation as natural gas is sought in different kinds of coal.

Because this is now an important part of the total U.S. energy mix, the industry needs to move away from using its confusing catchword “coalbed methane.” The general public understands the term “natural gas” because they use it every day. That is why we are calling this resource “natural gas” and identifying its source rock as coal seams.



Christine Hansen  
Executive Director



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# Introduction

One of our country's most valuable caches of natural gas comes from a source once seen as a nuisance to the coal mining industry. Coal seam natural gas (CSNG) must now be seen as having great potential as a fossil fuel resource. There is a voluminous amount of information on this issue. Valuable studies dating back 50 years or more have been produced. The many sides of this issue have been considered for years. What is not disputed is that the United States has very large coalbeds that cover vast areas of the country. See Figure 1. The question is what to do with the natural gas present in those coalbeds.

**Figure 1**



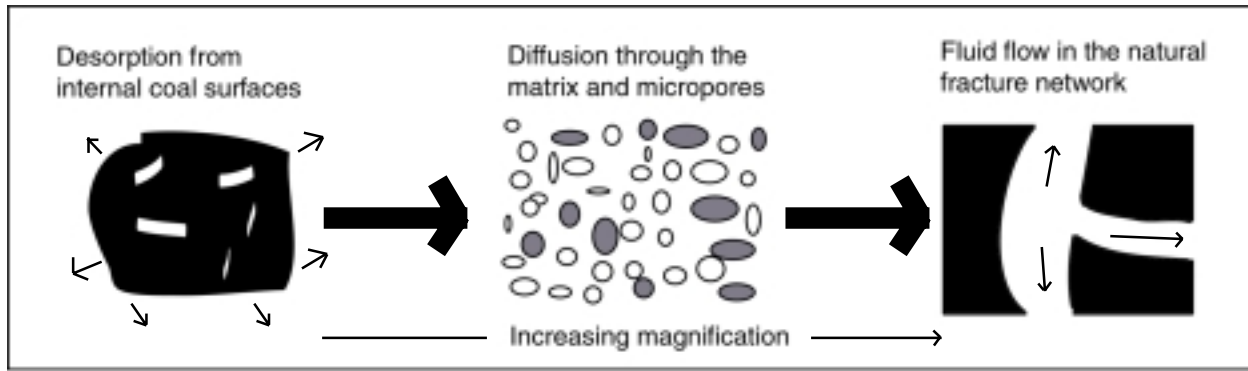
Source: U.S. Geological Survey  
Energy Resource Surveys Program

The coal industry has long recognized the removal of the methane-rich gas in the coalbeds as a dangerous part of the mining process. To safely mine the coal, the gas must be removed. In the past, CSNG had to be vented to allow for coal development. Such degasification wasted this valuable resource because economical methods for utilization had not been developed.

A great amount of research has been conducted on these coalbeds and the natural gas they contain. The CSNG occurs within the coal in two ways. CSNG is usually stored on the internal surfaces of the coal (sorbed gas), but can also exist in the cleats (natural fractures) as free gas in the coalbeds. To produce the more commonly found sorbed gas, it must be “desorbed” from the internal surfaces of the coal and allowed to migrate out of the matrix into natural fractures where it can be extracted.<sup>1</sup> See Figure 2.

<sup>1</sup> U. S. Geological Survey, *Coalbed Methane – An Untapped Energy Resource and an Environmental Concern*, 1997, USGS Fact Sheet FS-019-97.

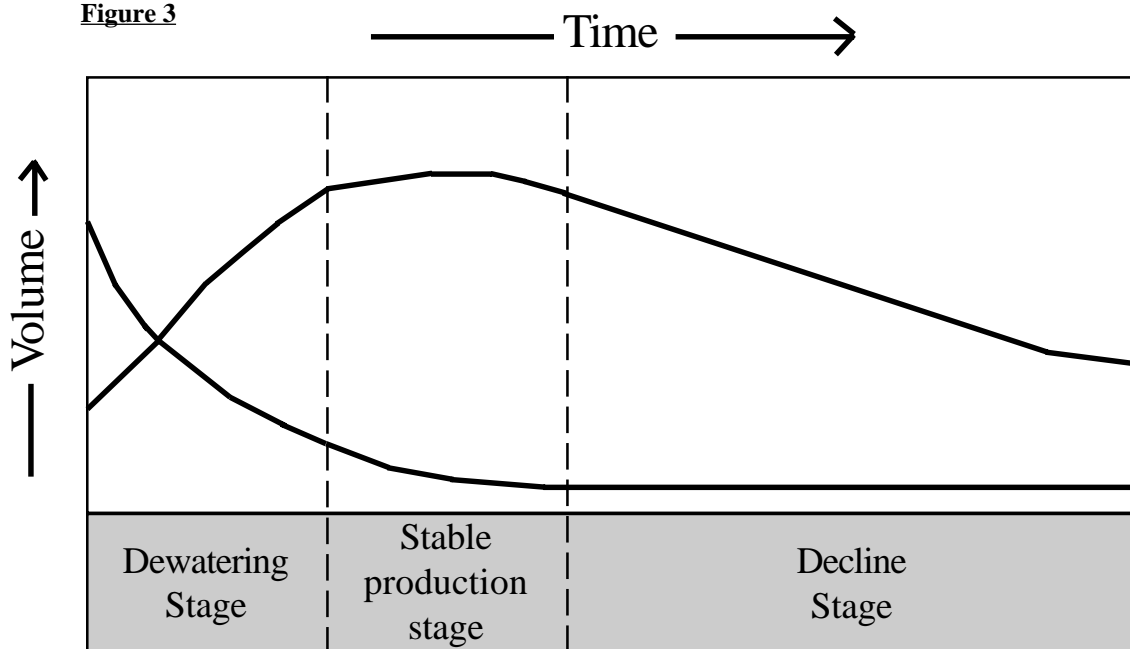
**Figure 2**



Source: U.S. Geological Survey Energy Resource Surveys Program

The cleats found in coalbeds are usually filled with water. This water can be saline. To produce CSNG from a coalbed, the water must be removed. Removal of the water allows the gas to enter these fractures and then be extracted through a wellbore. In the early stages of CSNG production the volume of water can be great, which creates a problem for the operator, the landowner and the state. Following the completion of a CSNG well, the amount of water produced decreases with time and the volume of CSNG increases. In the later stages of production from a CSNG well, the volume of gas decreases while the amount of water produced will usually stay at the decreased level.<sup>2</sup> See Figure 3. The water discharge must be done in an economical and environmentally responsible manner.

**Figure 3**



Source: U.S. Geological Survey Energy Resource Surveys Program

<sup>2</sup> Id.

Much has been written on CSNG. A wealth of information exists about the potential for exploration and production of this resource. Studies on CSNG are not confined to the coalbeds in a limited area, but rather have been conducted in many of the coal basins throughout the country. These studies have been conducted by the federal government, the geological surveys of many of the states, and by private industry. There have been in-depth studies into such issues as the environmental impact of production of natural gas from coal seams, the most economical ways to produce CSNG, and the relationship between CSNG production and coal mining interests.

In keeping with its long history of helping states to stay informed on issues pertaining to the efficient production of oil and gas, the Interstate Oil and Gas Compact Commission (IOGCC) will maintain a list of documents discussing development of CSNG. This bibliography of scientific papers, reports, articles and studies addresses pertinent issues many IOGCC member states face. The sources of these documents are the states, the United States Geological Survey, the Gas Technology Institute and other organizations. It is the desire of the IOGCC that by sharing the information available, the burden of addressing issues related to the production of natural gas from coal seams will be lessened. States have a wealth of information on this topic and must now use it to their benefit.

This compilation of CSNG information does not include all relevant documents on this issue, but rather illustrates the quality and quantity of information on the topic. This bibliography represents only a small amount of the information. These documents contain information that will help the states understand many aspects of CSNG development. The IOGCC will collect as many of the pertinent documents as possible. Papers, reports, articles and studies dealing with issues important only to those engaged in the exploration of CSNG are not included. Many of the documents can be reproduced and supplied upon request by the IOGCC or retrieved online. However, many of the documents listed in this publication can be obtained only from the organizations listed with that document.

The IOGCC gratefully acknowledges the cooperation of many of the state oil and gas regulatory agencies and the state geological surveys. With the help of its member states, the IOGCC will continue to update and expand this list.



# Acronyms

The following is a list of acronyms used in this publication.

|               |       |   |
|---------------|-------|---|
| <b>AAPG</b>   | ..... | American Association of Petroleum Geologists                                      |
| <b>ACS</b>    | ..... | American Chemical Society   |
| <b>AGS</b>    | ..... | Alaska Geological Survey  |
| <b>AGU</b>    | ..... | American Geophysical Union  |
| <b>BIA</b>    | ..... | Bureau of Indian Affairs, U.S. Department of the Interior                         |
| <b>BLM</b>    | ..... | Bureau of Land Management, U.S. Department of the Interior                        |
| <b>BRI</b>    | ..... | Basin Research Institute, Louisiana State University                              |
| <b>CBM</b>    | ..... | Coalbed Methane   |
| <b>CGS</b>    | ..... | Colorado Geological Survey  |
| <b>COGCC</b>  | ..... | Colorado Oil & Gas Conservation Commission  |
| <b>COMPAS</b> | ...   | Coalbed Methane Production and Stimulation Database                               |
| <b>CSM</b>    | ..... | Colorado School of Mines  |
| <b>CSNG</b>   | ..... | Coal Seam Natural Gas   |
| <b>DGGS</b>   | ..... | Division of Geological and Geophysical Surveys, Alaska Dept. of Natural Resources |
| <b>DOE</b>    | ..... | U.S. Department of Energy   |
| <b>EPA</b>    | ..... | U.S. Environmental Protection Agency  |
| <b>FTE</b>    | ..... | Freeze-thaw/evaporation   |
| <b>GIS</b>    | ..... | Global Information System   |
| <b>GRI</b>    | ..... | Gas Research Institute  |
| <b>GSA</b>    | ..... | Geological Society of America   |
| <b>GSC</b>    | ..... | Geological Survey of Canada   |
| <b>GTI</b>    | ..... | Gas Technology Institute  |
| <b>IOGCC</b>  | ..... | Interstate Oil and Gas Compact Commission   |
| <b>KGS</b>    | ..... | Kansas Geological Survey  |
| <b>LLL</b>    | ..... | Lawrence Livermore Laboratory   |
| <b>MBMG</b>   | ..... | Montana Bureau of Mines & Geology   |
| <b>MGS</b>    | ..... | Montana Geological Society  |
| <b>MRCPP</b>  | ..... | Methane Recovery From Coalbeds Project, U.S. Department of Energy                 |
| <b>NDGS</b>   | ..... | North Dakota Geological Survey  |
| <b>NETL</b>   | ..... | National Energy Technology Laboratory, U.S. Department of Energy                  |
| <b>NMGS</b>   | ..... | New Mexico Geological Society   |
| <b>NPDES</b>  | ..... | National Pollutant Discharge Elimination System                                   |
| <b>OGS</b>    | ..... | Oklahoma Geological Survey  |
| <b>PGS</b>    | ..... | Pennsylvania Geological Survey  |
| <b>RMAG</b>   | ..... | Rocky Mountain Association of Geologists  |
| <b>SEPM</b>   | ..... | Society of Economic Paleontologists and Mineralogists                             |
| <b>SNG</b>    | ..... | Substitute Natural Gas  |
| <b>SPE</b>    | ..... | Society of Petroleum Engineers  |
| <b>STR</b>    | ..... | Salinity / Toxicity Relationship  |
| <b>TSOP</b>   | ..... | The Society of Organic Petrology  |
| <b>UGMS</b>   | ..... | Utah Geological and Mineralogical Survey  |
| <b>USBM</b>   | ..... | United States Bureau of Mines   |
| <b>USGS</b>   | ..... | United States Geological Survey   |
| <b>WGA</b>    | ..... | Wyoming Geological Association  |
| <b>WOGCC</b>  | ..... | Wyoming Oil & Gas Conservation Commission   |
| <b>WSGS</b>   | ..... | Wyoming State Geological Survey   |



# The Bibliography

The citations in this bibliography are listed alphabetically by author. Works by the same author are organized with the older of the citations listed first. The indexes at the end of the bibliography are provided to help locate works on a specific topic or on a specific area.

1. Adams, M. A.; and Kirr, J. N., 1980, *Uinta Basin Report, A Study of Cretaceous Geology, Coal and the Potential Coalbed Methane Resource of the Uinta Basin in Utah and Colorado*, from a report of the Methane Recovery from Coalbeds Project of the U. S. Department of Energy, available from the Department of Energy.

**Summary:** MRCP Report.

2. Adams, M. A., 1982, *Central Appalachian Basin Report: A Study of Carboniferous Geology, Coal and the Potential Coalbed Methane Resource of the Central Appalachian Basin in Maryland, West Virginia, Kentucky, and Tennessee*, from a report of the Methane Recovery from Coalbeds Project of the U. S. Department of Energy, available from the Department of Energy.

**Summary:** MRCP Report.

3. Adams, M. A.; Eddy, G. E.; Hewitt, J. L.; Kirr, J. N.; and Rightmire, C. T., 1982, *Northern Appalachian Coal Basin Report; A Study of Carboniferous Geology, Coal, and the Potential Coalbed Methane Resources of the Northern Appalachian Coal Basin in Pennsylvania, Ohio, Maryland, West Virginia, and Kentucky*, from a report of the Methane Recovery from Coalbeds Project of the U. S. Department of Energy, available from the Department of Energy.

**Summary:** MRCP Report.

4. Affolter, R. H.; Hatch, J. R.; Matson, R. E.; and Sauer, L. A., III, 1979, *Chemical Analyses of Coal from the Tongue River Member, Fort Union Formation, Decker Coal Deposit, Big Horn County, Montana*, available from the United States Geological Survey as OF 79-772.

**Summary:** USGS Open File Report.

5. Affolter, R. H.; Hatch, J. R.; and Culbertson, W. C., 1979, *Chemical Analyses of Coal from the Tongue River Member, Fort Union Formation, Moorhead and Southeastern Part of the Northward Extension of the Sheridan Coal Fields, Powder River and Big Horn Counties, Montana*, available from the United States Geological Survey as OF 79-538.

**Summary:** USGS Open File Report.

6. Affolter, R. H.; Simon, F. O.; and Stricker, G. D., 1981, *Chemical Analyses of Coal from the Healy, Kenai, Seldovia, and Utokok River 1:250,000 Quadrangles, Alaska*, available from the United States Geological Survey as OF 81-0654.

**Summary:** USGS Open File Report.

7. Affolter, R. H.; Stricker, G. D.; Roberts, S. B.; and Brownfield, M. E., 1992, *Geochemical Variation of Arctic Margin Low-Sulfur Cretaceous and Tertiary Coals, North Slope, Alaska*, available from the publisher, ICAM.

**Summary:** Non-USGS publication with USGS authors.

8. Ahmed, U.; Bowman, K. C.; Bush, D.; Hanson, J.; Holland, M.; Kelkar, S.; Owen, L. B.; Rakop, K.; and Tibbits, G., 1985, *Methane Production Characteristics of Deeply Buried Coalbed Reservoirs*, available from the Gas Technology Institute as GRI-85/0033.

**Summary:** This report discusses the data collected on a well drilled into the Fruitland formation coal in the San Juan Basin of southeast Colorado. The data was analyzed to determine the potential of the coal seam natural gas reservoir.

9. Alain, A. K.; and Denes, G. M., 1992, *Cavity Stress Relief Method to Stimulate Demethanation Boreholes*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Paper

10. State of Alaska, Division of Oil and Gas, Department of Natural Resources, 1999, *Coalbed Methane Study*, available online.

**Summary:** Brief synopsis of the status and potential of the development and impact of coalbed methane in Alaska. For more information, contact Jim Clough, Alaska Division of Geological & Geophysical Surveys, 907/451-5030.

11. Ammosov, I. I.; and Eremin, I. V., 1963, *Fracturing in Coal*, (translated from Russian), available from IZDAT Publishers.

**Summary:** Paper

12. Ancell, K. L.; Lambert, S.; and Johnson, F. S., 1980, *Analysis of the Coalbed Degasification Process at the Seventeen Well Pattern in the Warrior Basin of Alabama*, from the proceedings of the SPE/DOE First Annual Symposium on Unconventional Gas Recovery, available from the Society



of Petroleum Engineers.

**Summary:** SPE Convention Document.

13. Anderson, O.J.; Lucas, S.G.; Love, D.W.; and Cather, S.M., eds., 1989, *Southeastern Colorado Plateau*, found in the New Mexico Geological Survey 40th Annual Field-trip Guidebook, available from the New Mexico Geological Society, as Guidebook 40.

**Summary:** NMGS Guidebook.

14. Andrews, R. D.; Cardott, B. J.; and Storm, T., 1998, *The Hartshorne Play in Southeastern Oklahoma: Regional and Detailed Sandstone Reservoir Analysis and Coalbed Methane Resources*, available from the Oklahoma Geological Survey as Special Publication 98-7.

**Summary:** OGS Report.

15. Anna, L. O.; Faunt, C. C.; D'Agnesse, F. A.; and Henry, M. E., 1998, *Three Dimensional Groundwater Flow Modeling of the Ferron Sandstone, Central Utah*, available from the American Association of Petroleum Geologists.

**Summary:** Conference paper, which discusses how modeling can address the interaction between regional groundwater flow, the flow system in fractured coalbeds within the Ferron Sandstone, and faults. Discusses how use of a 3-D discrete fracture network model can be used to describe a groundwater flow system in a coalbed. Presented at the 1998 annual meeting of the American Association of Petroleum Geologists.

16. Anna, Lawrence O., 1999, *Numerical Simulation of Water Flow in Ferron Sandstone Coalbeds, Central Utah*, available from the Geological Society of America.

**Summary:** Conference paper, which discusses how modeling can address the interaction between regional groundwater flow, the flow system in fractured coalbeds within the Ferron Sandstone, and faults. Discusses how use of a 3-D discrete fracture network model can be used to describe a groundwater flow system in a coalbed. Presented at the 1999 annual meeting of the Geological Society of America.

17. Anna, L. O., 2001, *Groundwater Flow Associated With Coalbed Gas Production, Ferron Sandstone, East-Central Utah*, from International Journal of Coal Geology, available on CD from the United States Geological Survey.

**Summary:** Article.

18. Applied Hydrology Associates, Inc., 2000, *3M Project San Juan Basin, Colorado and New Mexico; Hydrology Modeling Report*, available online from the Colorado Oil and Gas Conservation Commission.

**Summary:** Regional groundwater model for the San Juan Basin. This model was developed as part of the comprehensive 3M Project (the three Ms stand for mapping, modeling and monitoring).

19. Archer, P. L., 1979, *Illinois Basin Report; A Study of Pennsylvanian Geology, Coal, and Coalbed Methane Resources in Illinois, Indiana, and Western Kentucky*, from a report of the Methane Recovery from Coalbeds Project of the U. S. Department of Energy, available from the Department of Energy.

**Summary:** MRCP Report.

20. Arri, L. E.; Yee, D.; Morgan, W. D.; and Jeansonne, M. W., 1992, *Modeling Coalbed Methane Production with Binary Gas Sorption*, available from the Society of Petroleum Engineers as SPE Paper 24363.

**Summary:** SPE Paper presented at the Rocky Mountain Regional Meeting of the Society of Petroleum Engineers.

21. Attanasi, E. D.; and Rice, D. D., 1995, *Economics and Coalbed Gas in the 1995 National Assessment of U.S. Oil and Gas Resources*, available from the United States Geological Survey as OF 95-0075.

**Summary:** USGS Open File Report.

22. Attanasi, E. D., 1997, *Relative Importance of Physical and Economic Factors in Appalachian Coalbed Gas Assessment*, from International Journal of Coal Geology, 38 (1-2), available from the publisher, Elsevier.

**Summary:** This article in a Non-USGS publication by USGS authors discusses the findings of the 1995 National Assessment of Oil and Gas Resources, which was conducted by the USGS. This conference document examines physical and economic variables to explain the disparity between economic and technically recoverable coal seam natural gas.

23. Aven, P., 1998, *Congress, Courts Deciding Who Has Rights to Coalbed Methane*, from The Denver Business Journal, available from the publisher.

**Summary:** Article.

24. Ayers, W. B., Jr., 1986, *Coal Resources of the Tongue River Member of the Fort Union Formation (Palaeocene), Powder River Basin, Wyoming and Montana*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

25. Ayers, W. B., Jr.; Kaiser, W. R.; Scanlon, A. H.; Swartz, T. E.; and Zellers, S. D., 1988, *Geologic Evaluation of Critical Methane Resources: Part I - San Juan Basin*, available from the Gas Technology Institute as GRI-88/0332.1.

**Summary:** This report discusses research conducted to identify sedimentologic controls on the occurrence of coalbed methane in the Fruitland Formation in the San Juan Basin.

26. Ayers, W. B., Jr.; and Kelso, B. S., 1989, *Knowledge of Methane Potential for Coalbed Resources Grows, But Needs More Study*, from *Oil and Gas Journal*, v. 87, no. 43, available from the publisher.

**Summary:** Article.

27. Ayers, W. B., Jr.; and Zellers, S. D., 1989, *Geologic Controls on Occurrence and Producibility of Coalbed Methane, Fruitland Formation, North-Central San Juan Basin, New Mexico*, from the proceedings of the 1989 Coalbed Methane Symposium, available as Paper 8925.

**Summary:** Symposium Document.

28. Ayers, W. B., Jr.; Kaiser, W. R.; Ambrose, W. A.; Swartz, T. E.; Laubach, S. E.; Tremain, C. M.; and Whitehead, N. H., III, 1990, *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part I, San Juan Basin*, available from the Gas Technology Institute as GRI-90/0014.1.

**Summary:** Annual report, which describes the geologic framework and hydrologic regime of coal seam natural gas produced from the Fruitland Formation of the San Juan Basin.

29. Ayers, W. B., Jr.; Kaiser, William R.; Laubach, S. E. ; Ambrose, W. A.; Baumgardner, R. W., Jr.; Scott, Andrew R.; Tyler, Roger; Yeh, Joseph; Hawkins, G. J.; Swartz, T. E.; Schultz-Ela, D. D.; Zellers, S. D.; Tremain, Carol M.; and Whitehead, N. H., III, 1991, *Geologic and Hydrologic Controls on the Occurrences and Producibility of Coalbed Methane, Fruitland Formation, San Juan Basin*, available from the Gas Technology Institute as GRI-91/0072.

**Summary:** Report containing an evaluation of coalbed methane in the Fruitland Formation. Describes coal seam natural gas occurrences and resources, regional hydrodynamics, coal rank,

composition of the coal gas, and fracture patterns.

30. Ayers, W.B., Jr.; Kaiser, W.R.; and Levine, J.R., 1993, *Coal as Source Rock and Gas Reservoir*, material from Coalbed Methane Symposium, Short Course 1, Birmingham, Alabama.

**Summary:** Symposium Document.

31. Ayers, W. B., Jr., 1993, *Geologic Characterization of Coalbed Methane Occurrence and Producibility*, from 1993 Coalbed Methane Symposium, Short Course 1, Birmingham, Alabama.

**Summary:** Symposium Document .

32. Ayers, W.B., Jr.; and Kaiser, W.R., 1994, *Coalbed Methane in the Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado*, available from the New Mexico Bureau of Geology and Mineral Resources as Bulletin 1461.

**Summary:** Report from the New Mexico Bureau of Geology and Mineral Resources.

33. Ayoub, J.; Colson, L.; Hinkel, J.; Johnston, D.; and Levine, J., 1991, *Learning to Produce Coalbed Methane*, from Oil Review, v. 3, available from the publisher.

**Summary:** Article.

34. Baker, E. C.; Oyler, D. C.; Perry, J. H.; and Finfinger, G. L., 1983, *Economic Evaluation of Directional Drilling for Methane Drainage from Coalbeds*, U. S. Bureau of Mines Report of Investigations 8842, available from the National Technical Information Service.

**Summary:** USBM Report.

35. Banerjee, B. D., 1987, *A New Approach to the Determination of Methane Content in Coal Seams*, from International Journal of Mining and Geological Engineering, v. 5, available from the publisher.

**Summary:** Article.

36. Barker, Charles E., 1989, *Rock-Eval Analysis of Sediments and Ultimate Analysis of Coal, Mesaverde Group, Multiwell Experiment Site, Piceance Basin, Colorado*, available from the United States Geological Survey as B 1886.

**Summary:** USGS Report prepared in cooperation with the U.S. Department of Energy.

37. Barker, Charles E.; Johnson, Ronald C.; Pawlewicz, Mark J.; Crysdale, Bonnie L.; and Clark, Arthur C., 1991, *Coal-bed Methane Show Within the Wind River Indian Reservation Enhances Gas Prospects in Deeper Portions of the Wind River Basin, Wyoming*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 75 (6).

**Summary:** AAPG Bulletin.

38. Barker, C. E.; Johnson, R. C.; Crysdale, B. L.; and Clark, A. C., 1991, *A Field and Laboratory Procedure for Desorbing Coal Gases*, available from the United States Geological Survey as OF 91-0563

**Summary:** USGS Open File Report.

39. Barker, C. E.; Bartke, T. C.; Hatcher, P. G.; and Daws, T. A., 1993, *An Empirical Correlation Between Coal Bed Gas With Rock-Eval Pyrolysis and (Super 13) C NMR Results, Cretaceous Mesaverde and Meeteetse Formations, Wind River Basin, Wyoming*, available from the Wyoming Geological Association.

**Summary:** Conference Document.

40. Barker, C. E., 1995, *The Geologic Controls on Coalbed Gas - A Major Source in the U.S.*, from the 1995 12th Annual International Pittsburgh Coal Conference, available as Abstract no. 33-g.

**Summary:** Conference Document.

41. Barker, C. E., 1996, *A Field and Laboratory Procedure to Desorb Coal Bed Gasses from Drill Core and Cuttings*, available from the United States Geological Survey as OF 96-658.

**Summary:** USGS Open File Report.

42. Barker, C. E.; and Pierce, B. S., 1997, *Burial History and Coal Petrography of the Ferron Coals, Utah as Factors in Their Variable Coal Bed Gas Content*, from the Fourteenth Annual Meeting of the Society of Organic Petrology, Twenty-sixth Annual Meeting of the Eastern Section, American Association of Petroleum Geologists, Lexington, Kentucky, available as Abstracts with Program, v. 14.

**Summary:** AAPG Conference Document.

43. Barker, C. E.; Scott, A. R.; and Tyler, R., 1997, *The Geology of Coalbed Methane - The Perspective from Basin and Thermal History Studies*, from Geological Society of America Short

Course.

**Summary:** GSA Short Course.

44. Barker, Charles E.; Pierce, Brenda S.; Garrison, James R., Jr.; and van den Bergh, T. C. V., 1997, *The Influence of Burial History on the Coalbed Gas Content of Ferron Coals, San Rafael Swell, Utah*, available from the Geological Society of America as Abstract with Programs - Geological Society of America, 29 (6).

**Summary:** GSA Conference Document.

45. Barker, Charles E.; Biewick, Laura R. H.; Warwick, Peter D.; and San Filippo, John R., 2000, *Preliminary Gulf Coast Coalbed Methane Exploration Maps; Depth to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance*, available from the United States Geological Survey as OF 00-0113.

**Summary:** USGS Open File Report.

46. Barker, C. E.; Dallegge, T. A.; and Seamount, D. C., 2001, *Ongoing Coalbed Desorption Studies, Cook Inlet Basin, Alaska*, available from the Miscellaneous Publication series of the Division of Geological and Geophysical Surveys of the Alaska Department of Natural Resources.

**Summary:** Alaska DGGs Report.

47. Barker, C. E.; Clough, J. G.; Roberts, S. B.; and Fisk, R., 2002, *Coalbed Methane in Northern Alaska: Potential Resources for Rural Use and Added Supply for the Proposed Trans-Alaska Gas Pipeline*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 86.

**Summary:** AAPG Bulletin.

48. Barker, C. E.; Gose, M.; Scott, R. J.; Warwick, P. D.; San Filippo, J. R.; Klein, J. M.; and Hook, R. W., 2002, *The Sacatosa Coalbed Methane Field: A First for Texas*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Conference Document.

49. Barker, J. F.; and Fritz, P., 1981, *The Occurrence and Origin of Methane in Some Groundwater Flow Systems*, from Canadian Journal of Earth Sciences, v. 18, available from the publisher.

**Summary:** Article.

50. Barr, David T.; Cleary, Michael P.; and Wright, Timothy B., 1993, *Effective Design, Real-Data Analysis and Post-Job Evaluation*, available from the Gas Technology Institute as GRI-93/0362.

**Summary:** This is a final report on the implementation of previously developed physical models of hydraulic fracturing on wells with coalbed methane and tight gas sands.

51. Bartholomew, C. H.; Butala, S.J.; Medina, J. C.; Lee, M. L.; Taylor, T. Q.; and Andrus, D. B., 1999, *Mineral-Catalyzed Formation of Natural Gas During Coal Maturation*, available from Kluwer Academic Publishers, Boston.

**Summary:** Paper.

52. Beamish, B. B.; and Crosdale, P. J., 1998, *Instantaneous Outbursts in Underground Coal Mines: An Overview and Association with Coal Type*, from International Journal of Coal Geology, V. 35, available from the publisher.

**Summary:** Article.

53. Beavers, C. D.; Boyer, C. M.; Dobscha, F. X.; Green, C. D.; Lambert, S. W.; Lanier, J. B.; Sheehy, L. D.; Spafford, S. D.; and Stubbs, P. B., 1998, *Rock Creek Methane from Multiple Coal Seams Completion Project*, available from the Gas Technology Institute as GRI-88/0127.

**Summary:** This is a report on the Rock Creek Methane from Multiple Coal Seams Completion Project. This project focused on well drilling and completion, with emphasis on wellbore access and hydraulic stimulation.

54. Beavers, W. M.; Graves, Stanley L.; and Hollingsworth, F. C., 1986, *Field Evaluations of Gas Lift and Progressive Cavity Pumps as Effective Dewatering Methods for Coalbed Methane Wells*, available from the Gas Technology Institute as GRI-86/0025.

**Summary:** Final report discusses the effectiveness of dewatering techniques for coalbed methane wells in the Warrior Coal Field. Contains field evaluations of gas lift and progressive cavity pumps.

55. Beckstrom, J. A.; and Boyer, D. G., 1991, *Aquifer Protection Considerations of Coalbed Methane Development in the San Juan Basin*, paper presented at the 1991 SPE Rocky Mountain Regional Meeting and Low-Permeability Symposium, available from the Society of Petroleum Engineers as SPE paper 21841.

**Summary:** This SPE paper places the environmental issues surrounding coal seam natural gas development in the San Juan Basin into historical perspective. The findings of sampling and testing programs conducted near the New Mexico community of Cedar Hill are discussed.

56. Bell, G. J.; Jones, Arfon H.; and Morales, R. H., 1987, *Hydraulic Fracture Design Rationale for the Recovery of Methane from Coal Seams*, available from the Gas Technology Institute as GRI-87/0016.

**Summary:** This report discusses the differences in treatment pressure behavior during the hydraulic fracturing operations on coal seams and conventional formations.

57. Bell, Gregory J.; and Jones, Arfon H.; 1988, *Coalbed Methane Production and Stimulation (COMPAS) Database Documentation and User's Manual*, available from the Gas Technology Institute as GRI-88/0028.

**Summary:** This report discusses the COMPAS database, which contains information on 172 hydraulic fracture treatments for 122 wells.

58. Bell, G. J.; Jones, A. H.; Morales, R. H.; and Schraufnagel, Richard A., 1989, *Coal Seam Hydraulic Fracture Propagation on a Laboratory Scale*, available from the publisher, the University of Alabama, School of Mines and Energy Development.

**Summary:** This conference paper reports on the varied pressure responses of coal seams to hydraulic fracture stimulation.

59. Bennion, D. B.; Thomas, G. B.; Imer, D.; Ma, T.; and Schulmeister, B., 2001, *Water Quality Considerations that Result in Impaired Well Injectivity of Water Injection and Disposal Wells*, available from the Colorado School of Mines.

**Summary:** CSM Publication.

60. Berggren, L. W.; and Sanderson, G. A., 2001, *Recent Developments in the Application of the § 29 Tax Credit to Coal Seam Gas*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 104.

**Summary:** Symposium Paper.

61. Bertard, C.; Bruyet, B.; and Gunther, J., 1970, *Determination of Desorbable Gas Concentration of Coal (Direct Method)*, from *International Journal of Rock Mechanics and Mining Science*, v. 7, available from the publisher.

**Summary:** Article.

62. Bibler, C.; and Carothers, P., 2000, *Overview of Coal Mine Gas Use Technologies*, from the June 2000 Second International Methane Mitigation Conference, Novosibirsk, Russia, available online at



Raven Ridge website, [www.ravenridge.com](http://www.ravenridge.com).

**Summary:** Conference Paper.

63. Boardman, E. L.; and Rippon, J. H., 1997, *Coalbed Methane Migration in and Around Fault Zones*, available from the Geological Society, London, as Special Publication 125.

**Summary:** Geological Society Report.

64. Bodden, W. R., III; and Ehrlich, R., 1998, *Permeability of Coals and Characteristics of Desorption Tests: Implications for Coalbed Methane Production*, from International Journal of Coal Geology, v. 35, available from the publisher.

**Summary:** Article.

65. Bojan, M. J.; Danner, R. P.; Menon, V. C.; Mitchell, G.; Radovic, L. R.; and Steele, W. A., 1992, *Adsorption and Transport in Coalbed Reservoirs*, available from the Gas Technology Institute as GRI-92/0502.

**Summary:** This report discusses the ability to evaluate the production and reserve potential of coal seam wells.

66. Boreck, D. L.; and Strever, M. T., 1980, *Conservation of Methane from Colorado Mined/Minable Coal Beds: A Feasibility Study*, available from the Colorado Geological Survey as Open-File Report 80-5.

**Summary:** Details factors affecting methane development, drilling and completion methods for degasifying coalbeds. It also contains a detailed case study of a Piceance Basin mine.

67. Boreck, Donna L.; and Weaver, Jean N., 1984, *Coalbed Methane Study of the "Anderson" Coal Deposit, Johnson County, Wyoming; A Preliminary Report*, available from the United States Geological Survey as OF 84-0831.

**Summary:** USGS Open File Report.

68. Bostic, Joy; Brady, Lawrence; Howes, Mary; Burchett, Raymond R.; and Pierce, Brenda S., 1993, *Investigations of the Coal Properties and the Potential for Coal-bed Methane in the Forest City Basin*, available from the United States Geological Survey as OF 93-0576.

**Summary:** USGS Open File Report.

69. Boyer, C. M., II; and Hirko, N. M., 1985, *Rock Creek Methane from Multiple Coal Seams Completion Project. Phase I Test Plan*, available from the Gas Technology Institute as GRI-86/0155.

**Summary:** This report discusses the Rock Creek Methane from Multiple Coal Seams Completion Project.

70. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; Malone, P. G.; Schwerer, F. C.; and Stubbs, P. B., 1986, *Measurement of Static Coalbed Reservoir Conditions for Hydraulic Fracture Design: Volume I*, available from the Gas Technology Institute as GRI-87/0082.1.

**Summary:** Final report on a well that was completed into the Mary Lee and Blue Creek coal seams in the Black Warrior Basin of Alabama. This well completion was used to evaluate the geologic and reservoir parameters which affect the stimulation and production of coal seam natural gas.

71. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; Malone, P. G.; Schwerer, F. C.; and Stubbs, P. B., 1986, *Measurement of Static Coalbed Reservoir Conditions for Hydraulic Fracture Design: Volume II*, available from the Gas Technology Institute as GRI-87/0082.2.

**Summary:** Final report of findings from a coal seam natural gas well completed into the Mary Lee and Blue Creek coal seams in the Warrior Basin of Alabama. Evaluates the geologic and reservoir parameters that affect the stimulation and production of coalbed methane. Appendixes address such issues as gas and water production, hydraulic fracturing, and a mini-frac analysis.

72. Boyer, C. M., II; Militzer, M. R.; and Schwerer, F. C., 1986, *Preliminary Economic Assessment Potential for Producing Methane for the Multiple Coal Seams Completion Project at Rock Creek*, available from the Gas Technology Institute as GRI-86/0046.

**Summary:** This report discusses the evaluation of the economic potential for commercial production of natural gas from the coal seams at Rock Creek in the Warrior Basin of Alabama.

73. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; and Malone, P. G., 1986, *Rock Creek Methane from Multiple Coal Seams Completion Project. Demonstrated Drilling and Completion Technology for the Multiple Coal Seams Completion Project*, available from the Gas Technology Institute as GRI-87/0084.

**Summary:** This report discusses details of drilling, casing and cementing.

74. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Diamond, W. P.; Malone, P. G.; and Militzer, P. G., 1986, *Rock Creek Methane from Multiple Coal Seams Completion Project. Final Geologic Report. Big Indian Creek Site, Volume I*, available from the Gas Technology Institute as GRI-85/0285.

**Summary:** This report gives the data on the methane contents of the natural gas from coal seam wells drilled at the Big Indian Creek site in the Warrior coal basin in Alabama.

75. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Diamond, W. P.; Malone, P. G.; and Militzer, P. G., 1986, *Rock Creek Methane from Multiple Coal Seams Completion Project. Final Geologic Report. Big Indian Creek Site, Volume I*, available from the Gas Technology Institute as GRI-85/0285.1.

**Summary:** This report contains the appendixes to the data in Volume I (GRI-85/0285).

76. Boyer, C. M.; and Kelafant, J. R., 1988, *Geologic Assessment of Natural Gas from Coal Seams in the Central Appalachian Basin*, available from the Gas Technology Institute as GRI-88/0302.

**Summary:** This report gives an analysis of the subsurface geology of six Pennsylvanian age coal seams. This was done to estimate the coal volumes present in the Central Appalachian Basin.

77. Boyer, C. M., II, 1989, *Coalbed Methane Development Faces Technology Gaps*, available from the Gas Technology Institute.

**Summary:** GRI Report.

78. Boyer, C. M., II, 1989, *Coalbed Methane Resources and the Mechanisms of Gas Production*, available from the Gas Technology Institute as GRI-89/0266.

**Summary:** This report explores the potential of the natural gas from coal seams resource and the key mechanisms controlling its production.

79. Boyer, C. M., II; and Reeves, S. R., 1989, *A Strategy for Coalbed Methane Production Development Part III: Production Operations*, from the proceedings of the 1989 Coalbed Methane Symposium, available as Paper 8913.

**Summary:** Symposium Paper.

80. Boyer, C. M., II; Kelefant, J. R.; Kuuskraa, V. A.; and Manger, K. C., 1990, *Methane Emissions from Coal Mining: Issues and Opportunities for Reduction*, from the U.S. Environmental Protection Agency, Air and Radiation as ANR-445, EPA/400/9-90/008, available from the EPA.

**Summary:** EPA Report.

81. Boyer, Charles M., II; Paul, George S.; and Kuuskraa, Vello A., 1993, *Methane from Coal*

*Deposits: Technical Evaluation and Database*, available from the Gas Technology Institute as GRI-92/0473.

**Summary:** This report on GRI-sponsored research discusses the advancements made in the low cost recovery of natural gas from coal seams.

82. Boyer, Charles M., II; Paul, George S.; and Kuuskraa, Vello A., 1994, *Methane from Coal Deposits: Technical Evaluation and Database*, available from the Gas Technology Institute as GRI-94/0182.

**Summary:** This report focuses on three vehicles of GRI's technology transfer.

83. Boyer, C. M., II; and Quingshao, B., 1998, *Methodology of Coalbed Methane Resource Assessment*, from International Journal of Coal Geology, v. 35, available from the publisher.

**Summary:** Article.

84. Brownfield, M. E.; Affolter, Ronald H.; and Stricker, G. D., 1991, *High Chromium Content in Tertiary Coals, Northwestern Washington; A Key to Their Depositional History*, available from the United States Geological Survey as OF 91-0582.

**Summary:** USGS Open File Report.

85. Brownfield, Michael E.; Hettinger, Robert D.; and Johnson, Edward A., 2000, *A Summary of the Stratigraphy, Coal Resources, and Coal-bed Methane Potential of Northwest Colorado*, available from the United States Geological Survey as P 1625-B

**Summary:** USGS Paper.

86. Bruner, K. R.; Oldham, A. V.; Repine, T. E., Jr.; Markowski, A. K.; and Harper, J. A., 1995, *Geological Aspects of Coalbed Methane in the Northern Appalachian Coal Basin, Southwestern Pennsylvania and North-Central West Virginia*, available from the Pennsylvania Geological Survey as Open-File Report 98-13.

**Summary:** PGS Open-File Report.

87. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; Santoro, D.J.; Ward, W.P.; and Way, S. C., 1985, *Hydrologic Characterization of Coal Seams for Methane Recovery. Activity 2 Topical Report: Hydrologic Constraints and Single-Phase Test Procedures, Volume I*, available from the Gas Technology Institute as GRI-83/0065.1.

**Summary:** This is the final report on a literature search that resulted in a computerized retrieval system for well testing methods and data analysis procedures.

88. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; and Way, S. C., 1985, *Hydrologic Characterization of Coal Seams for Methane Recovery. Activities 5 and 7 Progress Report: Review of Single-Phase Hydrologic Testing in Coalbeds and Development of Unsaturated-Flow Well Test Procedures*, available from the Gas Technology Institute as GRI-85/0046.

**Summary:** Report discusses the results discovered from data gathered from five coal seam natural gas projects located in the Piceance, San Juan and Warrior basins. The data was used to evaluate single-phase tests for determining hydrological properties.

89. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; and Way, S. C., 1987, *Review of Hydrologic Testing in Coalbeds*, available from the Gas Technology Institute as GRI-87/0017.

**Summary:** This is a report on the evaluation of hydrologic testing of coalbeds.

90. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Murphy, C.L.; Ramesh, M.S.; Reverand, J. M.; and Way, S. C., 1989, *Application of Hydrology to Evaluation of Coalbed Methane Reservoirs*, available from the Gas Technology Institute as GRI-89/0031.

**Summary:** This is a report on the development of hydrologic concepts and well testing techniques. Discusses a test devised to determine permeability and static reservoir pressure of a coal seam as well as the condition of the wellbore.

91. Bureau of Land Management, 1975, *Trace Elements, in Hanna Basin Study Site (Carbon County, Wyoming) Resource and Potential Reclamation*, available from the BLM.

**Summary:** BLM Report.

92. Bureau of Land Management, 1994, *Oil and Gas Resource Management Plan / EIS Amendment Record of Decision*, available from the BLM.

**Summary:** BLM Report.

93. Bureau of Land Management, Solid Minerals Group, 1995, *Geologic and Hydrologic Assessment of Natural Gas from Coal: Greater Green River, Piceance, Powder River, and Raton Basins, Western United States*, available from the BLM.

**Summary:** BLM Report.

94. Bureau of Land Management, 1996, *BLM Evaluates Coalbed Methane, Coal & Synfuels Technology*, available from the BLM.
- Summary:** BLM Report.
95. Bureau of Land Management, Buffalo Resource Area, 1997, *Gillette South Coal Bed Methane Project (Microform): Final Environmental Impact Statement*, available from the BLM.
- Summary:** BLM Report.
96. Bureau of Land Management, 1999, *Coalbed Methane Development in the Northern San Juan Basin of Colorado*, available from the BLM.
- Summary:** BLM Report.
97. Bureau of Land Management, 1999, *Lower Prairie Dog Creek Coal Bed Methane Project Environmental Assessment*, available from the BLM.
- Summary:** BLM Report.
98. Bureau of Land Management, 1999, *Pennaco Energy Deer Creek Exploratory Coalbed Methane Project Environmental Assessment*, available from the BLM.
- Summary:** BLM Report.
99. Bureau of Land Management, 1999, *Wyodak Coal Bed Methane Project Draft Environmental Impact Statement*, available from the BLM.
- Summary:** BLM Report.
100. Bureau of Land Management, 1999, *Wyodak Coal Bed Methane Project Final Environmental Impact Statement*, available from the BLM.
- Summary:** BLM Report.
101. Bureau of Land Management, Buffalo Field Office, 2000, *Wyodak Drainage Coal Bed Methane Environmental Assessment*, available from the BLM.
- Summary:** BLM Report.

102. Bureau of Land Management, Buffalo Field Office, 2000, *Decision Record Wyodak Coal Bed Methane Environmental Assessment*, available from the BLM.
- Summary:** BLM Report.
103. Bureau of Land Management; Holsan, Gary, *Draft Environmental Assessment, Pannaco Energy Deer Creek Exploratory Coalbed Methane Project*, available from the BLM.
- Summary:** BLM Report.
104. Bustin, R. M.; and Clarkson, C. R., 1997, *Generation and Expulsion of Petroleum and Gas from Almond Formation Coal, Greater Green River Basin, Wyoming*, available from the American Association of Petroleum Geologists.
- Summary:** AAPG Report.
105. Bustin, R. M.; and Clarkson, C. R., 1998, *Geological Controls on Coalbed Methane Reservoir Capacity and Gas Content*, from International Journal of Coal Geology, v. 38, available from the publisher.
- Summary:** Article.
106. Bustin, R. M., 2000, *Hydrogen Sulphide Sorption on Coal With Comparisons to Methane, Carbon Dioxide, Nitrogen and Hydrogen Sorption: Implications for Acid Gas Sequestering and Co-production of Methane*, available from TSOP as Abstracts and Program, v. 17.
- Summary:** Report.
107. Bustin, R. M., 2001, *Hydrogen Sulphide Sorption on Coal With Comparisons to Methane, Carbon Dioxide, Nitrogen and Hydrogen Sorption: Implications for Acid Gas Sequestering and Co-production of Methane*, from proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 112.
- Summary:** Symposium Paper.
108. Butala, Steven J. M.; Medina, Juan Carlos; Bowerbank, Christopher R.; Lee, Milton L.; Felt, Scott A.; Taylor, Terrence Q.; Andrus, Dallan B.; Bartholomew, Calvin H.; Yin, Pequi; and Surdam, Ronald C., 1997, *Catalytic Effects of Mineral Matter on Natural Gas Formation During Coal Maturation*, available from the Gas Technology Institute as GRI-97/0213.

**Summary:** This report discusses a study conducted to determine if mineral catalysts affect gas

formation during coal maturation.

109. Byrer, C. W.; Mroz, T. H.; and Covatch, G. L., 1987, *Coalbed Methane Production Potential in U.S. Basins*, from Journal of Petroleum Technology, v. 39, available from the publisher.

**Summary:** Article.

110. Camp, Bret S.; Kidd, Jack T.; Lottman-Craig, Linda K.; Osborne, Terry E.; Saulsberry, Jerrald L.; Smith, Jeffrey L.; Steidl, Peter F.; and Stubbs, Paul B., 1992, *1.1.4 Coalbed Methane Multiple Coal Seam Project 305. Geologic Manual for the Evaluation and Development of Coalbed Methane*, available from the Gas Technology Institute as GRI-91/0110.

**Summary:** This report discusses the geologic parameters and the methodology used in the identification, confirmation, and development of coalbed methane resources.

111. Campbell, F. W.; Hoffman, G. K.; Kottowski, F. E.; and Arkell, B. W., 1991, *Geology and Coal Resources of New Mexico's Small Coalfields*, available from the United States Geological Survey as B 1972.

**Summary:** USGS Bulletin.

112. Campen, Betsy; and Campen, Ted, 1989, *Coalbed Methane in Montana*, available from the Montana Geological Society.

**Summary:** MGS Report.

113. Campen, Elizabeth B., 1991, *Coal-bed Methane Potential in Montana*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

114. Campen, E. B.; and Campen, E. B., 2002, *Basic Log Analysis in Coalbed Methane Exploration*, available from the Rocky Mountain Association of Geologists, in Coalbed Methane of North America, II.

**Summary:** RMAG Report.

115. Cao, Y. D.; and Glick, D. C., 2001, *Coal and Gas Outbursts in Footwalls of Reverse Faults*, from International Journal of Coal Geology, v. 48, available from the publisher.



**Summary:** Article.

116. Cardott, B. J., 1999, *Coalbed Methane Activity in Oklahoma*, available from the Oklahoma Geological Survey as OF 6-99.

**Summary:** OGS Open File Report.

117. Cardott, B. J., 2000, *Coalbed Methane Activity in Oklahoma*, available from the Oklahoma Geological Survey as OF 2-2000.

**Summary:** OGS Open File Report.

118. Cardott, B. J., 2001, *Coalbed Methane Activity in Oklahoma*, available from the Oklahoma Geological Survey as Open File Report 2-2001.

**Summary:** OGS Open File Report.

119. Cardott, B. J., 2001, *Introduction to Coal as Gas Resource Rock and Reservoir*, available from the Oklahoma Geological Survey as Open File Report 2-2001.

**Summary:** OGS Open File Report.

120. Cardott, B. J., 2001, *Oklahoma Coalbed-Methane Completions, 1988 to 1996*, available from the Oklahoma Geological Survey as Circular 104.

**Summary:** OGS Circular.

121. Cardott, B. J., 2002, *Coalbed Methane Development in Oklahoma*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of North America, II.

**Summary:** RMAG Report.

122. Carey, M. A.; Roberts, S. B.; and Clark, A. C., 1988, *Chemical Analyses for Nine Coal Samples from the Sagwon Member (Tertiary) of the Sagavanirktok Formation, North Slope, Alaska*, available from the United States Geological Survey as OF 88-0678.

**Summary:** USGS Open File Report.

123. Carroll, C. J., 1999, *Correlation of Producing Fruitland Formation Coals and Coalbed*

*Methane Leakage on the Southern Ute Reservation*, available from the Colorado Geological Survey as Open-File Report 99-10.

**Summary:** Contains production database, seven cross sections, five structure and production isopach maps, production bubble map, cross sections index map and two new surface maps of the Fruitland Formation coal zones located on the Southern Ute Reservation. This 1999 report contains descriptions of suspected seep locations, fracture data, and coal correlation with the western outcrop region.

124. Carter, L.M.H., ed., 1995, *Energy and the Environment; Application of Geosciences to Decision Making*, from Tenth V.E. McKelvey Forum on Mineral and Energy Resources, available from the United States Geological Survey as Circular 1108.

**Summary:** USGS Circular.

125. Carter, R. H.; Holditch, S. A.; Hinkel, J.; and Jeffrey, R., 1989, *Enhanced Gas Production Through Hydraulic Fracturing of Coal Seams*, available from the Gas Technology Institute as GRI-90/0061.

**Summary:** This is a final report on research conducted to identify mechanisms that influence the propagation of hydraulic fractures in coal seams and the surrounding strata, correlate the production of methane with identifiable fracture characteristics, and to specify the most effective fracture treatment designs.

126. Carter, R. H.; Holditch, S. A.; Ely, J. W.; Hinkel, J.; and Jeffrey, R., 1989, *Physical and Chemical Fluid Interaction Associated with Hydraulic Fracturing of Coal Seams*, available from the Gas Technology Institute as GRI-90/0060.

**Summary:** This report discusses laboratory tests and computer simulations conducted to investigate the mechanical, physical and chemical phenomena associated with the hydraulic fracturing of coal seams.

127. Case, James C.; Edgar, Thomas V.; and De Bruin, Rodney H., 2000, *Subsidence Potential Related to Water Withdrawal in the Powder River Basin*, available from the Wyoming State Geological Survey.

**Summary:** Discusses the differences between the Powder River Basin and various other documented cases where subsurface fluids have been withdrawn. The authors of this report also compare coal seam natural gas production and water production from sandstones in the same area.

128. Cervik, J., 1969, *Behavior of Coal-Gas Reservoirs*, U. S. Bureau of Mines Technical Progress Report, available from the National Technical Information Service.

**Summary:** USBM Report.

129. Cervik, J.; Fields, H. H.; and Aul, G. N., 1975, *Rotary Drilling Holes in Coalbeds for Degasification*, U. S. Bureau of Mines Report of Investigations 8097, available from the National Technical Information Service.

**Summary:** USBM Report.

130. Chandler, R. V.; Epsman, M. L.; Hamilton, R. P.; Pashin, J. C.; Rheams, L. J.; Richter, K. E.; Tolson, J. S.; Ward, W. E., II; Wilson, G. V.; and Winston, R. B., 1988, *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part II – Black Warrior Basin*, available from the Gas Technology Institute as GRI-88/0332.2.

**Summary:** This is an annual report on data used to evaluate the geologic and production parameters for coal seam natural gas in the Brookwood and Oak Grove coal degasification fields in the Black Warrior Basin of Alabama.

131. Charpentier, Ronald R.; and Law, Ben E., 1993, *Estimation of Coalbed Methane Contents from Geologic Data*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

132. Chesnut, D. R., Jr.; Nuttall, B. C.; Hower, J. C.; Greb, S. F.; Eble, C. F.; Hiatt, J. K.; and Williams, D. A., 1997, *Coalbed Methane in Kentucky*, from a paper presented to the 1997 International Coalbed Methane Symposium, Tuscaloosa, Alabama, available online at <http://www.uky.edu/KGS/coal/webcoal/pages/cbm.html>.

**Summary:** This symposium paper details the coalbeds in Kentucky and the potential for natural gas from coal seams as a resource.

133. Choate, R.; and Johnson, C. A., 1979, *Geologic Overview, Coalbed Description and Potential for Methane Recovery from Coalbeds, Powder River Basin, Wyoming-Montana*, by the TRW Energy Systems Group for the U. S. Department of Energy.

**Summary:** Report prepared for DOE.

134. Choate, R.; and Johnson, C. A., 1980, *Powder River Basin Report: A Study of Early Tertiary Geology, Coal and the Potential for Methane Recovery from Coalbeds in Montana and Wyoming*, from a report of the Methane Recovery from Coalbeds Project of the U. S. Department of Energy, available from the Department of Energy.

**Summary:** MRCP Report.

135. Choate, R.; Jurich, D.; and Saulnier, G. L., Jr., 1981, *Geologic Overview, Coal Deposits, and the Potential for Methane Recovery from Coalbeds, Piceance Basin, Colorado*, from a TRW Energy Engineering Division Report, available from the U. S. Department of Energy.

**Summary:** Report prepared for DOE.

136. Choate, R.; and Rightmire, C. T., 1982, *Influence of the San Juan Mountain Geothermal Anomaly and other Tertiary Igneous Events on the Coalbed Methane Potential in the Piceance, San Juan, and Raton Basins, Colorado and New Mexico*, from the proceedings of the 1982 SPE/DOE Unconventional Gas Recovery Symposium, available from the Society of Petroleum Engineers.

**Summary:** SPE Symposium Document.

137. Choate, R.; Lent, J.; and Rightmire, C. T., 1982, *San Juan Basin Report – Upper Cretaceous Geology, Coal and the Potential for Methane Recovery from Coalbeds in Colorado and New Mexico*, from a TRW Energy Engineering Division Report, available from the U. S. Department of Energy.

**Summary:** Report prepared for DOE.

138. Choate, Raoul, 1984, *Evaluation of Coalbed Methane Resource in Western United States*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

139. Choate, R.; McCord, J. P.; and Rightmire, C. T., 1986, *Assessment of Natural Gas from Coalbeds by Geologic Characterization and Production Evaluation*, available from the American Association of Petroleum Geologists in *AAPG Studies in Geology*, 21.

**Summary:** AAPG Report.

140. Choi, S. K.; and Wold, M. B., 2001, *Advances in Simulation of Gas Outburst Conditions in Underground Coal Mines*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 126.

**Summary:** Symposium Paper.

141. Clark, W. F.; and Helmer, T., 1988, *Completing, Equipping, and Operating Fruitland Formation*

*Coal-bed Methane Wells in the San Juan Basin, New Mexico and Colorado*, available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

142. Clarkson, C. R.; Lamberson, M. N.; and Bustin, R. M., 1993, *Variation in Surface Area and Micropore Size Distribution with Composition of Medium Volatile Bituminous Coal of the Gates Formation, Northeastern British Columbia: Implications for Coalbed Methane Potential*, available from the Geological Survey of Canada as Paper 93-1.

**Summary:** GSC Paper.

143. Clarkson, C. R.; and Bustin, R. M., 1996, *Variation in Micropore Capacity and Size Distribution with Composition in Bituminous Coal of the Western Canadian Sedimentary Basin*, from Fuel, v. 75, available from the publisher.

**Summary:** Article.

144. Clarkson, C. R.; and Bustin, R. M., 1997, *Variation in Permeability with Lithotype and Maceral Composition of Cretaceous Coals of the Canadian Cordillera*, from International Journal of Coal Geology, v. 33, available from the publisher.

**Summary:** Article.

145. Clarkson, C. R.; and Bustin, R. M., 1999, *The Effect of Pore Structure and Gas Pressure Upon the Transport Properties of Coal: A Laboratory and Modelling Study*, from Fuel, v. 78, available from the publisher.

**Summary:** Article.

146. Clayton, J. L.; Rice, D. D.; and Stanton, R. W., 1992, *Geochemical and Geological Controls on Generation and Accumulation of Oil and Gas from Coalbeds, Western United States*, available from the American Association of Petroleum Geologists.

**Summary:** Conference Document.

147. Clayton, J. L.; Leventhal, J. S.; and Rice, D. D., 1995, *Atmospheric Methane Flux from Coals*, available from the United States Geological Survey as C 1108.

**Summary:** USGS Circular.

148. Clayton, J.; Rice, D. D.; Leventhal, J. S.; and Kotarba, M., 1998, *Atmospheric Methane Flux from Coals Related to Mining and Natural Geologic Processes*, from the 1998 annual meeting of the Geological Society of America, available from the GSA in Abstracts with Programs - Geological Society of America, 30 970.

**Summary:** GSA Conference Document.

149. Clayton, Jerry L., 1998, *Geochemistry of Coalbed Gas; a Review*, from International Journal of Coal Geology, available from the publisher, Elsevier.

**Summary:** Presents a review of the main aspects of coalbed gas geochemistry and advances in research.

150. Cleary, Michael P.; Barr, David T.; Wright, Timothy B., 1997, *Technology Transfer for Hydraulic Fracturing*, available from the Gas Technology Institute as GRI-98/0216.

**Summary:** This final report presents a listing of a technology transfer effort to implement stimulation concepts developed for the Gas Research Institute. Discusses the improvement of hydraulic fracturing operations, the development of computer-based monitoring systems and provides a detailed account of data from a large number of wells.

151. Close, J. C.; and Erwin, T. M., 1989, *Significance and Determination of Gas Content Data as Related to Coalbed Methane Reservoir Evaluation and Production Implications*, from the proceedings of the 1989 Coalbed Methane Symposium.

**Summary:** Symposium Document.

152. Close, J. C.; Mavor, M. J.; and McBane, R. A., 1990, *Importance, Genesis and Recognition of Fracture Permeability in Fruitland Coalbed Methane Reservoirs of the Northern San Juan Basin, Colorado and New Mexico*, paper presented at the 1990 SPE/CIM International Technical Meeting, available from the Society of Petroleum Engineers as SPE paper 21593.

**Summary:** This SPE paper discusses the fracture permeability of the Fruitland Formation coalbed methane reservoirs in the San Juan Basin.

153. Close, J. C.; and Dutcher, R. R., 1990, *Prediction of Permeability Trends and Origins of Coalbed Methane Reservoirs of the Raton Basin, Colorado and New Mexico*, from the 41st Annual Field Conference of the New Mexico Geological Society, available from the New Mexico Geological Society.

**Summary:** NMGS Guidebook.

154. Close, J. C.; and Dutcher, R. R., 1990, *Update on Coalbed Methane Potential of Raton Basin, Colorado and New Mexico*, paper presented at the 1990 SPE Annual Technical Conference and Exhibition, available from the Society of Petroleum Engineers as SPE paper 20667.

**Summary:** This SPE paper provides an updated overview on coal seam natural gas potential in the Raton Basin.

155. Close, J. C.; and Mavor, M. J., 1991, *Influence of Coal and Rank on Fracture Development in Fruitland Coal Gas Reservoirs of San Juan Basin*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

156. Close, J. C., 1992, *Western Cretaceous Coal Seam Project*, Quarterly Review of Methane from Coal Seams Technology, v. 10, no. 1, available from the publisher.

**Summary:** Report.

157. Close, J. C., 1993, *Natural Fractures in Coal*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

158. Close, J. C.; and Dutcher, R. R., 2002, *Geomorphology of Drainage Patterns: Clues to Coal Gas Natural Fracture Timing, Orientation and Location, Raton Basin, Colorado - New Mexico*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of North America, II.

**Summary:** RMAG Report.

159. Clough, J. G., 2001, *Coalbed Methane - Potential Energy Source for Rural Alaska*, available from State of Alaska Division of Geological and Geophysical Surveys in Alaska GeoSurvey News, v. 5, no. 2.

**Summary:** Alaska DGGGS Publication.

160. Clough, J. G.; Barker, Charles E.; and Scott, A. R., 2001, *Opportunities for Coalbed Gas Exploration in Alaska*, available from the American Association of Petroleum Geologists.

**Summary:** This AAPG conference document presents facts and figures on the potential for production of Alaskan coal seam natural gas.

161. Coates, D. A., 1980, *Formation of Clinker by Natural Burning of Coal Beds in the Powder River Basin, Wyoming and Montana*, available from the Colorado Geological Survey.

**Summary:** CGS Report.

162. Coates, D. A.; Stricker, G. D.; and Landis, E. R., 1990, *Coal Geology, Coal Quality, and Coal Resources in Permian Rocks of the Beacon Supergroup, Transantarctic Mountains, Antarctica*, available from the publisher, American Geophysical Union, in Antarctic Research Series, 51.

**Summary:** AGU Report.

163. Cole, G. A.; Daniel, J. A.; Heald, B. P.; et al, 1981, *Oil and Gas Drilling and Coal Production Summary for Montana*, available from the Montana Bureau of Mines and Geology.

**Summary:** MBMG Publication.

164. Collett, Timothy S., 1999, *Composition and Source of the Gas Associated with Coalbed Gas Production from Coals in Eastern Utah*, available from the Geological Society of America.

**Summary:** Conference paper, which reports the findings of a USGS study of the geologic and engineering controls on gas production from coalbeds. These coalbeds are found in the Ferron Sandstone member of the Mancos Shale of eastern Utah. Presented at the 1999 annual meeting of the Geological Society of America.

165. Collins, Lesley, 1999, *Sheridan Area Coal Bed Methane Decision Record Available*, available from the Bureau of Land Management.

**Summary:** BLM Report.

166. Collins, Lesley, 1999, *Wyodak Area Coal Bed Methane Record of Decision Available*, available from the Bureau of Land Management.

**Summary:** BLM Report.

167. Colorado Geological Survey, 1980, *Evaluation of the Methane Potential of Unmined-Unminable Coalbeds in Colorado, Review of Coal Methane Resource for Western Basins*, from the U. S. Department of Energy.

**Summary:** DOE Report.



168. Colorado Oil and Gas Conservation Commission, 2000, *Summary Report of Bradenhead Testing, Gas Well Remediation, and Ground Water Investigations; San Juan Basin, La Plata County, Colorado*, available online from the Colorado Oil and Gas Conservation Commission.

**Summary:** This report, prepared by the COGCC staff, summarizes the findings of an investigation into changes in the levels of methane in water from water wells in La Plata County, Colorado. The report compares methane levels in ground water prior to coalbed methane development with those after the beginning of development.

169. Cooper, J. D.; Decker, A. D.; Logan, T. L.; and Schwoebel, Jeffrey J., 1996, *Development and Evaluation of Technology for Methane Production from a Deep Coal Seam in the Piceance Basin*, available from the Gas Technology Institute as GRI-86/0242.

**Summary:** Reports on the findings of a study on the effects of hydraulic fracturing on deep coal seams in the Piceance Basin.

170. Counsil, J.; Decker, A. D.; Jeu, S. J.; and Logan, T. L., 1988, *Development and Evaluation of Technology for Methane Production from a Deep Coal Seam in the Piceance Basin*, available from the Gas Technology Institute as GRI-88/00235.

**Summary:** Reports on the findings of the GRI Deep Coal Seam Project. Data given on drilling, reservoir testing, core analysis, logging and stimulation of low permeability coal reservoirs in the Piceance Basin.

171. Cox, D. O.; Decker, A. D.; and Stevens, S. H., 1993, *Analysis of Fruitland Water Production, Treatment and Disposal, San Juan Basin*, available from the Gas Technology Institute as GRI-93/0288.

**Summary:** Report on study that investigated future water production in the San Juan Basin. The study identified alternative water treatment technologies, which might be competitive with underground disposal.

172. Cox, D. O.; Stevens, S. H.; Hill, D. G.; and McBane, R. A., 1993, *Water Disposal from Coalbed Methane Wells in the San Juan Basin*, paper presented at the 1993 SPE Annual Technical Conference and Exhibition, available from the Society of Petroleum Engineers as SPE Paper 26384.

**Summary:** This SPE paper discusses the use of alternate treatment technologies for coal seam natural gas produced water in the San Juan Basin to make the water suitable for surface discharge.

173. Cox, D. O.; and Young, G. B. C., 1995, *Well Testing in Coalbed Methane (CBM) Wells: An Environmental Remediation Case History*, paper presented at the 1995 SPE Annual Technical Conference and Exhibition, available from the Society of Petroleum Engineers as SPE Paper 30578.

**Summary:** This SPE paper discusses water contamination caused by methane seepage from coal seam natural gas wells in the San Juan Basin.

174. Crist, T. E.; Kelso, B. S.; and Boyer, C. M., 1990, *Geologic Assessment of Natural Gas from Coal Seams in the Menefee Formation, San Juan Basin*, available from the Gas Technology Institute as GRI-88/0303.

**Summary:** This report presents the results of a regional geologic assessment of the Menefee formation in the San Juan basin.

175. Crosdale, P. J.; Beamish, B. B.; and Valix, M., 1998, *Coalbed Methane Sorption Related to Coal Composition*, from *International Journal of Coal Geology*, v. 35, available from the publisher.

**Summary:** Article.

176. Crovelli, Robert A.; Schmoker, James W.; and Balay, Richard H., 1995, *Fractal Lognormal Percentage Assessment of Technically Recoverable Natural Gas Resources in Continuous-type and Coalbed (Unconventional) Plays, Onshore and State Waters of the United States*, available from the United States Geological Survey as OF 95-0647.

**Summary:** USGS Open File Report.

177. Crovelli, Robert A.; Nuccio, Vito F., 1997, *Estimates of Technically Recoverable Natural Gas Resources for Continuous Type (Unconventional) Plays in Coal Beds on Federal Lands of the Conterminous United States*, available from the United States Geological Survey as OF 97-0491.

**Summary:** USGS Open File Report.

178. Crovelli, Robert A.; Schmoker, James A.; and Balay, Richard H., 1997, *U. S. Department of the Interior U.S. Geological Survey; Fractal Lognormal Percentage Analysis of the U.S. Geological Survey's 1995 National Assessment of Conventional Oil and Gas Reservoirs*, from *Nonrenewable Resources*, 6 (1), available from the publisher, Oxford University Press for the International Association for Mathematical Geology, New York.

**Summary:** Article.

179. Crovelli, Robert A.; Nuccio, Vito F., 1999, *USGS Resource Assessment Methodology for Technically Recoverable Coalbed Methane Applied to the Ferron Sandstone Trend*, from the GSA 1999 annual meeting, available from the Geological Society of America.

**Summary:** This conference report gives a description and application of a new method for resource

assessment of recoverable coal seam natural gas.

180. Crowley, S. S.; Stanton, R. W.; Triplehorn, D. M.; and Ruppert, Leslie F., 1990, *Origin and Distribution of Inorganic Elements in the Wyoak-Anderson Coal Bed, Powder River Basin, Wyoming*, available from the United States Geological Survey as C 1060.

**Summary:** USGS Circular.

181. Crowley, S. S.; and Stanton, R. W., 1994, *Distribution of Environmentally Sensitive Trace Elements in the Coal Beds of the Powder River Basin, Wyoming and Montana*, available from the Society of Organic Petrology.

**Summary:** Society of Organic Petrology Report.

182. Culbertson, W. C.; Hatch, J. R.; and Affolter, R. H., 1978, *Geology and Coal Resources of the Hanging Woman Creek EMRIA Site, Big Horn and Powder River Counties, Montana*, available from the United States Geological Survey as OF 78-506.

**Summary:** USGS Open File Report.

183. Culbertson, W. C.; and Robinson, L. N., 1978, *Coal Resource Occurrence and Coal Development Potential Maps of the Quietus Quadrangle, Big Horn and Powder River Counties, Montana*, available from the United States Geological Survey as OF 78-654.

**Summary:** USGS Open File Report.

184. Curl, S. J., 1978, *Methane Prediction in Coal Mines*, available from IEA Coal Research as Report no. ICTIS/TR 4.

**Summary:** IEA Coal Research Report.

185. Dabbous, M. K.; Reznik, A. A.; Taber, J. J.; and Fulton, P. F., 1992, *The Permeability of Coal to Gas and Water*, available from the Society of Petroleum Engineers in Reprint Series 35.

**Summary:** SPE Report.

186. Dallegge, Todd A.; and Barker, Charles E., 2000, *Coal-bed Methane Gas-In-Place Resource Estimates Using Sorption Isotherms and Burial History Reconstruction; An Example from Ferron Sandstone Member of the Mancos Shale*, available from the United States Geological Survey as P 1625-B.

**Summary:** USGS Professional Paper.

187. Dallegge, T. A.; and Barker, C. E., 2002, *Implications to Conventional Gas Reserve Growth of Coalbed Methane Desorption Analysis from the Beaver Creek and Kenai Gas Fields, Kenai Peninsula, Alaska*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 86.

**Summary:** AAPG Bulletin.

188. Daly, D. J.; and Mesing, G., 1993, *Gas Industry-Related Produced-Water Demographics*, from Quarterly Review of Methane from Coal Seams Technology, v. 11, no. 2, available from the publisher.

**Summary:** Report.

189. Daly, Daniel J.; Stoa, Rodney S.; Bassingthwaite, Scott A.; Sorenson, James A.; Charlton, David S.; Mesing, George; and Evans, James M., 1995, *Gas Industry-Related Exploration and Production Waste "Demographics" Utilizing GIS*, available from the Society of Petroleum Engineers as Reprint 95-0007; SPE 29720.

**Summary:** This conference paper is an assessment of how natural gas produced waters were handled in the U. S. in 1990.

190. D'Amico, J. S., 2000, *Processing Key to CBM Economics*, from American Oil & Gas Reporter, v. 43, no. 8, available from the publisher.

**Summary:** Article.

191. Danell, R. E.; Kallstrand, A.; Nunn, J.; and Heed, B., 2001, *Reduction of Methane Emissions from Underground Coal Mining: Demonstration of Abatement and Utilization in Mine Ventilation Exhaust Air*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama.

**Summary:** Symposium Document.

192. Das, B. M.; Nikols, D. J.; Das, Z. U.; and Hucka, V. J., 1991, *Factors Affecting Rate and Total Volume of Methane Desorption from Coalbeds*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

193. David, C., 1999, *This Land is Your Land, This Land is My Land: But Who Owns The Coal Gas?*

**Summary:** Paper.

194. Davidson, R. M.; Sloss, L. L.; and Clark, L. B., 1995, *Coalbed Methane Extraction*, from IEA Coal Research, available from the publisher as document IEACR/76.

**Summary:** Report.

195. Davis, Hal A., 1993, *Coalbed Methane Produced Water Management Guide. Treatment and Discharge to Surface Water: Black Warrior Basin, Alabama*, available from the Gas Technology Institute as GRI-93/0116.

**Summary:** Report on a guidance manual for the management of water produced from wells in the Black Warrior Basin of Alabama.

196. Dawson, F. M., 1995, *Coalbed Methane: A Comparison Between Canada and the United States*, available from the Geological Survey of Canada as Bulletin 489.

**Summary:** GSC Bulletin.

197. Dawson, F. M., 1999, *Coalbed Methane Exploration in Structurally Complex Terrain*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

198. Dawson, F. M.; Marchioni, D. L.; Anderson, T. C.; and McDougall, W. J., 2000, *An Assessment of Coalbed Methane Exploration in Canada*, available from the Geological Survey of Canada as Bulletin 549.

**Summary:** GSC Bulletin.

199. Dawson, M.; and Kalkreuth, W., 1994, *Coal Rank and Coalbed Methane Potential of Cretaceous/Tertiary Coals in the Canadian Rocky Mountain Foothills and Adjacent Foreland*, from Bulletin of Canadian Petroleum Geology, v. 42, available from the publisher.

**Summary:** Report.

200. DeBruin, Rodney H.; and Boyd, C. S., 1990, *Oil and Gas Fields of the Powder River Basin*,

Wyoming, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

201. DeBruin, R. H.; Lyman, R. M.; and Hallberg, L. L., 1999, *Coalbed Methane Activity in the Eastern Powder River Basin, Campbell and Converse Counties, Wyoming*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

202. DeBruin, R. H., 1999, *Oil and Gas Field Map of the Powder River Basin*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

203. DeBruin, R. H.; Lyman, R. M.; and Hallberg, L. L., 2000, *Coalbed Methane Activity in the Eastern Powder River Basin, Campbell and Converse Counties, Wyoming*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

204. DeBruin, R. H.; Lyman, R. M.; Hallberg, L. L.; and Harrison, M. M., 2000, *Coalbed Methane Activity in the Western Powder River Basin, Campbell, Converse, Johnson, Natrona, and Sheridan Counties, Wyoming*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

205. DeBruin, R. H., 2000, *Oil and Gas Field Maps of Southeastern Wyoming Basins*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

206. DeBruin, R. H.; Lyman, R. M.; Jones, R. W.; and Cook, L. W., 2001, *Coalbed Methane in Wyoming*, available from the Wyoming State Geological Survey as Information Pamphlet 7.

**Summary:** WSGS pamphlet that details the development of coal seam natural gas in the state of Wyoming.

207. Decker, A. D.; and Seccombe, J. C., 1986, *Geologic and Reservoir Characteristics of the Red Mountain Coalbed Methane Test Site in the Piceance Basin*, available from the Gas Technology

Institute as GRI-86/0109.

**Summary:** This GRI topical report discusses the data from a six year multi-well project that focuses on the technology required to produce gas from deeply buried coal in the Piceance Basin.

208. Decker, David, 1987, *Coal Bed Methane; Dynamic New Segment of Petroleum Industry*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

209. Decker, A. D.; and Horner, D. M., 1987, *Origin and Production Implications of Abnormal Coal Reservoir Pressure*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 8714.

**Summary:** Symposium Paper.

210. Decker, A. David; Kelso, B.S.; Kuuskraa, V.A.; and Wicks, D.E., 1988, *Geologic Assessment of Natural Gas from Coal Seams in the Fruitland Formation, San Juan Basin*, available from the Gas Technology Institute as GRI-87/0341.

**Summary:** This report discusses the gas-in-place in the Fruitland Formation coals in the San Juan Basin. Discusses the geology of the coal formation to provide a foundation for evaluating the coal seam natural gas in place.

211. Decker, D.; Jeu, S. J.; Cooper, J. D.; and Wicks, D. E., 1988, *Geology, Geochemistry, Reservoir Engineering, and Completion Methods at the Cedar Hill Field, San Juan County, New Mexico: A Field Study of Classic Coal Degasification Behavior*, available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

212. Decker, A. D.; Close, J.; and McBane, Richard A., 1989, *Use of Remote Sensing, Curvature Analysis, and Coal Petrology as Indicators of Higher Coal Reservoir Permeability*, available from the publisher, University of Alabama, School of Mines and Energy Development.

**Summary:** This conference paper evaluates techniques that can be used to predict the orientation and the location of areas with a greater natural gas from coal seams reservoir permeability prior to drilling. From data collected from the Fruitland formation in the Cedar Hill Field, northern San Juan Basin, New Mexico.

213. Deeley, G. M.; and Canter, L. W., 1986, *Distribution of Heavy Metals in Waste Drilling Fluids*

*Under Conditions of Changing pH*, from Journal of Environmental Quality, available from the publisher.

**Summary:** Article.

214. Deul, M.; and Kim, A. G., 1975, *Degasification of Coalbeds - A Commercial Source of Pipeline Gas*, presented at the Institute of Gas Technology Symposium on Clean Fuels from Coal II, available from the publisher.

**Summary:** Symposium Paper.

215. Deul, M.; and Kim, A. G., 1988, *Methane Control Research: Summary of Results, 1964-80*, U. S. Bureau of Mines Bulletin 687, available from the National Technical Information Service.

**Summary:** USBM Bulletin.

216. Diamond, W. P.; McCulloch, C. M.; and Bench, B. M., 1976, *Use of Surface Joint and Photolinear Data for Predicting Subsurface Coal Cleat Orientation*, U.S. Bureau of Mines Report of Investigations 8120, available from the National Technical Information Service.

**Summary:** USBM Report.

217. Diamond, W. P., 1979, *Evaluation of the Methane Gas Content of Coalbeds: Part of a Complete Coal Exploration Program for Health and Safety and Resource Evaluation*, from the proceedings of the Second International Coal Exploration Symposium.

**Summary:** Symposium Paper.

218. Diamond, W. P.; and Levine, J. R., 1981, *Direct Method Determinations of the Gas Content of Coal, Procedures and Results*, U. S. Bureau of Mines Report of Investigations 8515, available from the National Technical Information Service.

**Summary:** USBM Report.

219. Diamond, W. P., 1982, *Site-Specific and Regional Geologic Considerations for Coalbed Gas Drainage*, U.S. Bureau of Mines Information Circular 8898, available from the National Technical Information Service.

**Summary:** USBM Circular.



220. Diamond, W. P.; and Oyler, D. C., 1986, *Effects of Stimulation Treatments on Coalbeds and Surrounding Strata*, U. S. Bureau of Mines Report of Investigations 9083, available from the National Technical Information Service.

**Summary:** USBM Report.

221. Diamond, W. P.; LaScola, J. C.; and Hyman, D. M., 1986, *Results of Direct-Method Determination of the Gas Content of U.S. Coalbeds*, U.S. Bureau of Mines Information Circular 9067, available from the National Technical Information Service.

**Summary:** USBM Circular.

222. Diamond, W. P., 1987, *Underground Observations of Mined-Through Stimulation Treatments of Coalbeds*, from the Quarterly Review of Methane from Coal Seams Technology, v. 4, no. 4, available from the publisher.

**Summary:** Article.

223. Diamond, W. P.; Elder, C. H.; and Jeran, P. W., 1988, *Influence of Geology on Methane Emission from Coal*, U.S. Bureau of Mines Bulletin 687, available from the National Technical Information Service.

**Summary:** USBM Bulletin.

224. Diamond, W. P.; Iannacchione, A. T.; Puglio, D. G.; and Steidl, P. F., 1988, *Geologic Studies of Gassy Coalbeds*, U.S. Bureau of Mines Bulletin 687, available from the National Technical Information Service.

**Summary:** USBM Bulletin.

225. Diamond, W. P., 1993, *Methane Control for Underground Coal Mines*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

226. Diamond, W. P., 1994, *Methane Control for Underground Coal Mines*, U.S. Bureau of Mines Information Circular 9395, available from the National Technical Information Service.

**Summary:** USBM Circular.

227. Diamond, W. P.; and Schatzel, S. J., 1998, *Measuring the Gas Content of Coal: A Review*, from International Journal of Coal Geology, v. 35, available from the publisher.

**Summary:** Article.

228. Diamond, W. P.; Schatzel, S. J.; Garcia, F.; and Ulery, J. P., 2001, *The Modified Direct Method: A Solution for Obtaining Accurate Coal Desorption Measurements*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 128.

**Summary:** Symposium Paper.

229. Diessel, Claus, 1998, *Sequence Stratigraphy Applied to Coal Seams; Two Case Histories*, available from the Society of Sedimentary Geology.

**Summary:** Society of Sedimentary Geology Report.

230. Doelling, H. H.; Smith, A. D.; and Davis, F. D., 1979, *Methane Content of Utah Coals*, available from the Utah Geological and Mineralogical Survey as Special Studies 49.

**Summary:** UGMS Study.

231. Donovan, W. S., 2000, *Mudlogging Method Calculates Coalbed Gas Content*, from Oil & Gas Journal, v. 98, no. 7, available from the publisher.

**Summary:** Article.

232. Doscher, T. M.; Kuuskraa, V. A.; and Hammerschaib, E., 1981, *The Controlling Production Mechanism of Methane Gas from Coalbeds*, from Energy Sources, v. 5, available from the publisher.

**Summary:** Article.

233. Draffin, C. W.; et al, 1979, *Underground Coal Conversion - Program Description*, available from the U.S. Department of Energy as ET-0100.

**Summary:** DOE Paper.

234. Drottar, K. R.; Mount, D. R.; and Patti, S. J., 1989, *Biomonitoring of Coalbed Methane Produced Water from the Cedar Cove Degasification Field, Alabama*, available from the publisher, University of Alabama, School of Mines and Energy Development.

**Summary:** Conference paper from the 1989 Coalbed Methane Symposium.

235. Echols, J. B., 2000, *Coalbed Methane: Louisiana's Unexplored Energy Resource*, available from Louisiana State University as Basin Research Institute Bulletin, v. 9.

**Summary:** BRI Bulletin.

236. Eddy, G.; Gillies, Alex; Lewis, K.; Lindeman, R. A.; and Snygg, Arnold, 1983, *Testing Requirements for Field Based Coalbed Methane Projects*, available from the Gas Technology Institute as GRI-83/0015.

**Summary:** This report discusses the planning materials relevant to defining the natural gas from coal seams.

237. Edgar, Thomas V.; and Case, James C., 2000, *Preliminary Hazards Report PHR 00-1; Pumping Induced Settlement of Aquifers*, available online from the Wyoming State Geological Survey.

**Summary:** Sets the theoretical and mathematical basis for the conclusions reached in *Subsidence Potential Related to Water Withdrawal in the Powder River Basin*, by Case, James C.; Edgar, Thomas V.; and De Bruin, Rodney H. (Listed above).

238. Elder, C. H.; and Duel, M., 1974, *Degasification of the Mary Lee Coalbed Near Oak Grove, Jefferson County, Alabama, By Vertical Borehole in Advance of Mining*, U. S. Bureau of Mines Report of Investigations 7968, available from the National Technical Information Service.

**Summary:** USBM Report.

239. Elder, C. H., 1977, *Effects of Hydraulic Stimulation on Coalbeds and Associated Strata*, U. S. Bureau of Mines Report of Investigations 8260, available from the National Technical Information Service.

**Summary:** USBM Report.

240. Ellis, M. S., 1989, *Geologic Map of the Powder River Basin and Surrounding Area, Wyoming, Montana, South Dakota*, available from the United States Geological Survey as MF-2095.

**Summary:** USGS Map.

241. Ellis, M. S.; and Colton, R. B., 1994, *Geologic Map of the Powder River Basin and Surrounding Area, Wyoming, Montana, South Dakota, North Dakota, and Nebraska*, available from the United

States Geological Survey as I-2298.

**Summary:** USGS Map.

242. Ellis, M. S.; Keighin, C. W.; Gunther, G. L.; Flores, R. M.; Stricker, G. D.; Roberts, S. B.; Ochs, A. M.; and Bader, L. R., 1997, *Constraints on Coal Resource Estimation; A Depositional Perspective*, available from the publisher, Geological Society of America.

**Summary:** Conference document from the 1997 Annual Meeting of the GSA.

243. Ellis, Margaret. S.; Gunther, Gregory L.; Flores, Romeo. M.; Stricker, Gary D.; Ochs, Allan M.; and Schuenemeyer, John H., 1998, *Preliminary Report on Methodology for Calculating Coal Resources of the Wyodak-Anderson Coal Zone, Powder River Basin, Wyoming and Montana*, available from the United States Geological Survey as OF 98-0789-B.

**Summary:** USGS Open File Report.

244. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, 1999, *Coal Resources, Greater Green River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

245. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Cararoc, V. V.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, 1999, *Coal Resources of the Hanna and Carbon Basins, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

246. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Roberts, S. B.; Wilde, Edith M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, 1999, *Coal Resources, Powder River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

247. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Keighin, C. W.; Goven, G. E.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, 1999, *Coal Resources, Williston Basin, 1999 Resource*

*Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

248. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., 1999, *Gillette Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

249. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., 1999, *Sheridan Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

250. Ely, J.; Holditch, S. A.; and Carter, R. H., 1988, *Improved Hydraulic Fracturing Strategy for Fruitland Formation Coal-bed Methane Recovery, San Juan Basin, New Mexico and Colorado*, available from the publisher, Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Publication.

251. Ely, J. W.; and Holditch, S. A., 1990, *Fracturing Techniques Depend on Coal Seam Characteristics*, from Oil & Gas Journal, v. 88, no. 30, available from the publisher.

**Summary:** Article.

252. Emerson, D. O.; Ganow, H. C.; Qualheim, B. J.; Snoeberger, D. F.; Stone, R., 1976, *Underground Coal Gasification in the Powder River Basin*, available from the publisher, the Wyoming Geological Association.

**Summary:** WGA Publication.

253. Enever, J.; Casey, D.; and Bocking, M., 1999, *The Role of In-Situ Stress in Coalbed Methane Exploration*, available from the publisher, Kluwer Academic Publishers, Boston.

**Summary:** Report.

254. The Environmental Protection Agency, 1995, *Economic Assessment of the Potential for Profitable Use of Coal Mine Methane: Case Studies of Three Hypothetical U.S. Mines*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

255. The Environmental Protection Agency, 1996, *A Guide for Methane Mitigation Projects: Gas-to-Energy at Coal Mines*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

256. The Environmental Protection Agency, 1997, *A Guide to Financing Coalbed Methane Projects*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

257. The Environmental Protection Agency, 1997, *Identifying Opportunities for Coal Mine Methane Recovery at U.S. Coal Mines: Draft Profiles of Selected Gassy Underground Coal Mines*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

258. The Environmental Protection Agency, 1998, *Legal Issues Related to Coalbed Methane Storage in Abandoned Coal Mines in Virginia, West Virginia, Pennsylvania, Utah, Colorado, and Alabama*, available from the Coalbed Methane Outreach Program of the U.S. Environmental Protection Agency as Document No. 60933.

**Summary:** EPA Report.

259. The Environmental Protection Agency, 1998, *Preliminary Report on Coal Resources of the Wyo-dak-Anderson Coal Zone, Powder River Basin, Wyoming and Montana*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

260. The Environmental Protection Agency, 1999, *Environmental Protection with a Profit*, available from the Coalbed Methane Outreach Program of the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

261. The Environmental Protection Agency, 1999, *Opportunities for Coal Mine Gas Projects Created by Electric Industry Restructuring*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

262. The Environmental Protection Agency, 1996, *Technical and Economic Assessment: Mitigation of Methane Emissions from Coal Mine Ventilation Air*, available from the Coalbed Methane Outreach Program of the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

263. Ertekin, T.; Hoysan, P. M.; Pavone, A. M.; and Schwerer, F. C., 1983, *Development of Coal Gas Production Simulators and Mathematical Models for Well Test Strategies. (Literature Survey and Computer Models for Unstimulated Vertical Wells and for Stimulated Vertical Wells Connected to an Infinite-Conductivity-Constant Pressure-Vertical Fracture)*, available from the Gas Technology Institute as GRI-81/0160.

**Summary:** This GRI report discusses the WELL 1D computer program that is designed to simulate the nonsteady, one dimensional, simultaneous, two-phase flow of water and methane gas through a coal seam to an unstimulated vertical well or to a hydraulically stimulated vertical well connected to a high conductivity vertical fracture.

264. Ertekin, Turgay.; and King, G. R., 1983, *Development of Coal-Gas Production Simulators and Mathematical Models for Well Test Strategies. Computer Models for Single- or Two-Phase Flow of Methane and Water in Heterogeneous Coal Seams to a Single, Vertical Production Well Connected to a Finite Conductivity Vertical Fracture*, available from the Gas Technology Institute as GRI-81/0173.

**Summary:** This GRI report discusses a series of computer based models for production of methane from coal seams by vertical wells.

265. Ertekin, Turgay, 1984, *Flow Dynamics of Coal-bed Methane in the Vicinity of Degasification Wells*, available from Pennsylvania State University.

**Summary:** Pennsylvania State University Publication.

266. Ertekin, T.; Sung, W.; and Bilgesu, H. I., 1991, *Structural Properties of Coal that Control Coalbed Methane Production*, from Geology in Coal Resource Utilization, available from the publisher, Techbooks, Fairfax, Virginia.

**Summary:** Report.

267. Fassett, J. E.; and Hinds, J. S., 1971, *Geology and Fuel Resources of the Fruitland Formation and Kirtland Shale of the San Juan Basin, New Mexico and Colorado*, available from the United States Geological Survey as Professional Paper 676.

**Summary:** USGS Paper.

268. Fassett, J. E., 1987, *Geometry and Depositional Environments of Fruitland Formation Coalbeds, San Juan Basin, New Mexico and Colorado*, from the proceedings of the 1987 International Coalbed Methane Symposium, Tuscaloosa, Alabama.

**Summary:** Symposium Paper.

269. Fassett, J. E. ed., 1988, *Geology and Coal-Bed Methane Resources of the Northern San Juan Basin, Colorado and New Mexico*, available from the Rocky Mountain Association of Geologists.

**Summary:** RMAG Guidebook.

270. Fassett, James E., 1989, *Coal-bed Methane; A Contumacious, Free-spirited Bride; The Geologic Handmaiden of Coal Beds*, from Energy Frontiers in the Rockies, available from the publisher, Sandia National Laboratories, Albuquerque.

**Summary:** Report.

271. Fassett, J. E., 1989, *Coal-Bed Methane Resources and Fruitland Formation Coal-Bed Geology, San Juan Basin, New Mexico and Colorado*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 73, no. 9.

**Summary:** AAPG Bulletin.

272. Fassett, James E., 1990, *Once a Menace, Now a Burgeoning Source of Energy; Coalbed Methane in the Warrior and San Juan Basins*, from the Sixth V.E. McKelvey Forum on Mineral and Energy Resources, available from the United States Geological Survey as C 1060.

**Summary:** USGS Conference Paper included in a USGS Circular.

273. Fassett, James E., 1997, *The Mystery of the Escaping Gas; Forensic Geology in the Northern San Juan Basin, La Plata County, Colorado*, available from the publisher, the American Association of Petroleum Geologists in the AAPG Bulletin.



**Summary:** Conference paper that discusses the role production of coalbed methane from wells close to and down dip from seep areas plays in the mobilization of the gas that is migrating up dip, thus increasing the rate of gas seepage from old seeps or creating new seeps.

274. Fassett, James E., 1997, *Subsurface Correlation of Late Cretaceous Fruitland Formation Coal Beds in the Pine River, Florida River, Carbon Junction, and Basin Creek Gas-Seep Areas, La Plata County, Colorado*, available from the United States Geological Survey as OF 97-0059.

**Summary:** USGS Open File Report.

275. Fassett, James E., 2001, *Competing Models for the Fruitland Formation Coal and Coal-bed Methane System of the San Juan Basin, New Mexico and Colorado*, from the 2001 Annual Meeting of the Geological Society of America, available from the GSA in Abstracts with Programs - Geological Society of America, 33 (6).

**Summary:** This GSA conference document discusses the differing models for the Fruitland Formation coal in the San Juan Basin.

276. Fender, H. B.; and Murray, D. K., 1978, *Data Accumulation on the Methane Potential of the Coal Beds of Colorado*, available from the Colorado Geological Survey as Open-File Report 78-2.

**Summary:** CGS Open-File Report.

277. Fields, H. H.; et al, 1973, *Degasification of Virgin Pittsburgh Coalbed Through a Large Borehole*, U. S. Bureau of Mines Report of Investigations 7800, available from the National Technical Information Service.

**Summary:** USBM Report.

278. Fields, H. H.; Cervik, J.; and Goodman, T. W., 1976, *Degasification and Production of Natural Gas from an Air Shaft in the Pittsburgh Coalbed*, U. S. Bureau of Mines Report of Investigations 8173, available from the National Technical Information Service.

**Summary:** USBM Report.

279. Fillo, John P.; Hamaker, T.; and O'Neil, Patrick E., 1987, *Coalbed Methane Development in Alabama: Biototoxicity of Produced Water Originating from Coalbed Degasification Wells in the Cedar Cove Field. A Proposed Study Plan*, available from the Gas Technology Institute as GRI-87/0102.

**Summary:** Proposed study plan, which outlines work elements and methodology for conducting field

experiments at the Cedar Cove degasification field in Alabama. The proposed study would also include aquatic toxicity testing using a natural gas produced water, which was disposed of in the form of stream discharge.

280. Finch, Steven T., Jr., 1994, *Fracture and Methane-Contamination Study: Animas River Valley from Bondad, Colorado to Cedar Hill, New Mexico*, available from the Gas Technology Institute as GRI-93/0303.

**Summary:** Report on a study that investigated the potential causes of contamination found in the shallow groundwater of the Animas River Valley.

281. Finkelman, R. B., 1992, *Characteristics of Acid-Forming Materials in Coal*, from Montana Reclamation Research Publication.

**Summary:** Report.

282. Fischer, Dennis D., 1985, *Estimated Groundwater Restoration Costs Associated with Commercial Underground Coal Gasification Operations*, available from the Gas Technology Institute as GRI-85/0256.

**Summary:** This GRI report discusses the costs associated with groundwater restoration.

283. Fish and Wildlife Service, 2000, *Endangered and Threatened Wildlife and Plants; 12 Month Finding for a Petition to List the Black-tailed Prairie Dog as Threatened*, available from the U.S. Fish and Wildlife Service of the U.S. Department of the Interior.

**Summary:** U.S. Fish and Wildlife Service Report.

284. Flores, R. M.; Rice, D. D.; and Gruber, J., 1991, *Coalbed Gas Potential and Reservoir Heterogeneity, Tertiary Fort Union Formation, Powder River Basin, Montana*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

285. Flores, R. M.; Roberts, S. B.; Perry, W. J., Jr.; and Nichols, D. J., 1991, *Evolution of Paleocene Depositional Systems and Coal Basins in a Tectonic Continuum, Rocky Mountain Region*, from the 1991 meeting of the Geological Society of America, available from the GSA in Abstracts with Programs - Geological Society of America, 23 (4).

**Summary:** GSA Conference Document.

286. Flores, Romeo M., 1993, *Coalbed and Related Depositional Environments in Methane Gas-Producing Sequences*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

287. Flores, Romeo M., editor, 1998, *Coalbed Methane: From Coal-Mine Outbursts to a Gas Resource*, from International Journal of Coal Geology, available from the publisher, Elsevier.

**Summary:** Non-USGS publication by USGS authors.

288. Flores, Romeo M., 1998, *Coalbed Methane: From Hazard to Resource*, from International Journal of Coal Geology, available from the publisher, Elsevier.

**Summary:** Discusses how coalbed gas has gone from being a mining hazard to a conventional gas resource.

289. Flores, R. M.; Ochs, A. M.; Bader, L. R.; Johnson, R. C.; and Vogler, D., 1999, *Framework Geology of the Fort Union Coal in the Powder River Basin, 1999 Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

290. Flores, R. M., 2000, *Creation of Digital Databases and Derivative Products for Coal and Coalbed Methane Resource Assessment; A Short Course*, available from the United States Geological Survey as OF 00-0223.

**Summary:** USGS Open File Report.

291. Flores, R. M., 2001, *The Emerging New Coalbed Methane Resource in the Powder River Basin, Wyoming and Montana*, from the proceedings of the May 18, 2000 meeting of the Alaska Geological Society, Anchorage, available from the Alaska Geological Society.

**Summary:** AGS Conference Document.

292. Flores, Romeo M.; Stricker, Gary D.; Meyer, Joseph F.; Doll, Thomas E.; Norton, Pierce H., Jr.; Livingston, Robert J.; and Jennings, M. Craig, 2001, *A Field Conference on Impacts of Coalbed Methane Development in the Powder River Basin, Wyoming*, available online from the United States Geological Survey as Open File Report 01-126.

**Summary:** Report of some of the findings of a BLM-USGS cooperative CBM project. This joint project sought to collect technical data on CBM resources and reservoirs in the Powder River Basin.

293. Flores, Romeo M.; Moore, Timothy A.; Stanton, Ronald W.; and Stricker, Gary D., 2001, *Textural Controls on Coalbed Methane Content in the Subbituminous Coal of the Powder River Basin*, from the 2001 Annual Meeting of the Geological Society of America, Boston, available from the GSA in Abstracts with Programs - Geological Society of America, 33 (6).

**Summary:** This GSA conference document discusses the methane gas content in Powder River basin coals.

294. Forgotson, J. M.; and Friedman, S. A., 1993, *Arkoma Basin (Oklahoma) Coal-bed Methane Resource Base and Development*, from the Official Program of the American Association of Petroleum Geologists Annual Convention, available from the AAPG.

**Summary:** AAPG Conference Document.

295. Friedman, S. A., 1982, *Determination of Reserves of Methane from Coal Beds for Use in Rural Communities in Eastern Oklahoma*, available from the Oklahoma Geological Survey as OGS Special Publication 82-3.

**Summary:** OGS Publication.

296. Friedman, S. A., 1989, *Coal-bed Methane Resources in Arkoma Basin, Southeastern Oklahoma*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 73.

**Summary:** AAPG Bulletin.

297. Friedman, S. A., 1991, *Fracture and Structure of Principal Coal Beds Related To Coal Mining and Coalbed Methane, Arkoma Basin, Eastern Oklahoma*, from the Annual Convention of the American Association of Petroleum Geologists, Dallas, available from the AAPG.

**Summary:** AAPG Convention Document.

298. Friedman, S. A., 1997, *Coal-bed Methane Resources and Reserves of Osage County, Oklahoma*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 81.

**Summary:** AAPG Bulletin.

299. FrontBurner, 1991, *Reservoir Modeling / A Bright Light for Coalbed Methane Production*,

available from the publisher.

**Summary:** This journal article discusses the COMETPC-3 Reservoir Simulator developed for the Gas Research Institute by ICF Resources.

300. Fulton, P. F.; Parente, C. A.; Rogers, B. A.; Shah, N.; and Reznik, A. A., 1980, *A Laboratory Investigation of Enhanced Recovery of Methane from Coal by Carbon Dioxide Injection*, paper presented at the 1980 SPE/DOE Symposium on Unconventional Gas Recovery, available from the Society of Petroleum Engineers as SPE Paper 8930.

**Summary:** SPE Paper.

301. Gaddy, D. E., 1999, *Coalbed Methane Production Shows Wide Range of Variability*, from Oil & Gas Journal, v. 97, no. 17, available from the publisher.

**Summary:** Article.

302. Gamson, P. D.; Beamish, B. B.; and Johnson, D. P., 1993, *Coal Microstructure and Micropermeability and Their Effects on Natural Gas Recovery*, from Fuel, v. 72, available from the publisher.

**Summary:** Article.

303. Gamson, P. D.; Beamish, B. B.; and Johnson, D. P., 1996, *Coal Microstructure and Secondary Mineralization: Their Effect on Methane Recovery*, available from the Geological Society, London, as Special Publication 109.

**Summary:** Geological Society Report.

304. Gan, H. S.; Nandi, S. P.; and Walker, P. L., Jr., 1972, *Nature of Porosity in American Coals*, from Fuel, v. 51, available from the publisher.

**Summary:** Article.

305. Ganow, H. C., 1979, *In Situ Coal Gasification at the Hoe Creek, Wyoming Field Site - An Overview*, available from the Wyoming Geological Association.

**Summary:** WGA Publication.

306. Garcia-Gonzalez, Mario; MacGowan, Donald B.; and Surdam, Ronald C., 1993, *Coal as a Source Rock of Petroleum and Gas; A Comparison Between Natural and Artificial Maturation of the*

*Almond Formation Coals, Greater Green River Basin in Wyoming*, available from the United States Geological Survey as P 1570.

**Summary:** USGS Conference Document.

307. Garrison, James R., Jr.; van den Bergh, T. C. V.; Barker, Charles E.; and Tabet, David E., 1997, *Depositional Sequences Stratigraphy and Architecture of the Cretaceous Ferron Sandstone; Implications for Coal and Coalbed Methane Resources; A Field Excursion*, from Geology Studies, 42, Part 2, available from the publisher, Brigham Young University, Department of Geology, Provo, Utah.

**Summary:** Report.

308. Gas Research Institute, 1991, *Coalbed Methane Reservoir Simulators*, available from the Gas Technology Institute as GRI-91/0476.

**Summary:** This is a GRI brochure on the COMETPC 3-D Reservoir Simulator.

309. Gas Research Institute, 1991, *Selected Bibliography of Coalbed Methane Technology*, available from the Gas Technology Institute as GRI-91/0430.

**Summary:** List of publications that discuss coal seam natural gas and its technology.

310. Gas Research Institute, 1992, *Arkoma Basin, Oklahoma and Arkansas*, from Quarterly Review of Methane from Coal Seams Technology, v. 9, nos. 3-4, available from the publisher.

**Summary:** GRI Report.

311. Gas Research Institute, 1992, *Cherokee Basin, Kansas and Oklahoma*, from Quarterly Review of Methane from Coal Seams Technology, v. 9, nos. 3-4, available from the publisher.

**Summary:** GRI Report.

312. Gas Research Institute, 1993, *Western Interior Coal Region (Arkoma, Cherokee, and Forest City Basins)*, from Quarterly Review of Methane from Coal Seams Technology, v. 11, no. 1, available from the publisher.

**Summary:** GRI Report.

313. Gas Research Institute, 1994, *Coalbed Methane: GRI Changes the Way Industry Does Business*

*in Alabama*, available from the Gas Technology Institute as GRI-94/0475.

**Summary:** This brochure discusses GRI's role in transforming natural gas from coal seam production in Alabama.

314. Gas Research Institute, 1994, *Open-hole Cavity Completions, Fracturing, and Restimulation*, from Quarterly Review of Methane from Coal Seams Technology, v. 11, nos. 3-4, available from the publisher.

**Summary:** GRI Report.

315. Gas Research Institute, 1995, *Disposal Technology for Water Produced from Coalbed Methane Wells*, available from the Gas Technology Institute as GRI-95/0480.

**Summary:** Brochure that discusses cost effective handling and the environmentally responsible disposal of the water produced in association with the production of coal seam natural gas.

316. Gas Research Institute, 1996, *Geosciences: Accurately Estimating Coal Seam Reservoir Gas-In-Place*, from GRID, v. 19, no. 2, available from the Gas Technology Institute as GRI-96/0257-0013.

**Summary:** This article from GRID discusses the GRI program to evaluate the accuracy of analyzing and estimating gas-in-place.

317. Gas Research Institute, 1996, *Improved Coal Seam Reservoir Gas-In-Place Analysis Protocol*, available from the Gas Technology Institute as GRI-96/0481.

**Summary:** This GRI Bulletin discusses the development of a gas-in-place analysis protocol.

318. Gas Research Institute, *Treating Produced Waters in the San Juan Basin With the Freeze-Thaw/Evaporation Process*, available online from the Gas Technology Institute.

**Summary:** This is a report on the development of a freeze-thaw/evaporation (FTE) purification process to treat produced water.

319. Gash, B. W., 1991, *Measurement of "Rock Properties" in Coal for Coalbed Methane Production*, available from the Society of Petroleum Engineers as SPE Paper 22909.

**Summary:** SPE Paper.

320. Gayer, R.; and Harris, I., 1996, *Coalbed Methane and Coal Geology*, available from the Geological

Society, London, as Special Publication 109.

**Summary:** Geological Society Report.

321. Gentzis, T., 2000, *Subsurface Sequestration of Carbon Dioxide - An Overview from an Alberta (Canada) Perspective*, from International Journal of Coal Geology, v. 43, available from the publisher.

**Summary:** Article.

322. George, J. D. St.; and Barakat, M. A., 2001, *The Change in Effective Stress Associated with Shrinkage from Gas Desorption in Coal*, from International Journal of Coal Geology, v. 45, available from the publisher.

**Summary:** Article.

323. Gilles, Alex; and Snygg, Arnold, 1981, *Development of Technology for Coal Bed Methane Recovery Program Planning*, available from the Gas Technology Institute as GRI-81/0008.1.

**Summary:** This is a final report on an assessment of the suitability of production methods in the recovery of natural gas from coal seams. Discusses the fact that the most limiting technology is the stimulation of water and gas flow from deeper gassy coal formations.

324. Gilles, Alex; and Snygg, Arnold, 1981, *Development of Technology for Coalbed Methane Recovery Program Planning, Appendix A, Technology Options*, available from the Gas Technology Institute as GRI-81/0008.2.

**Summary:** Report that discusses the technology available for recovering coal seam natural gas. This report also includes: water quality data for mine drainage in the Appalachian Basin and information on methods for the treatment of coal seam water.

325. Glikson, M.; Boreham, C. J.; and Thiede, D. S., 1999, *Coal Composition and Mode of Maturation, a Determining Factor in Quantifying Hydrocarbon Species Generated*, available from the publisher, Kluwer Academic Publishers, Boston.

**Summary:** Report.

326. Goldhaber, M. B.; Hatch, J. R.; Pashin, J. C.; Offield, T. W.; and Finkelman, R. B., 1997, *Anomalous Arsenic and Fluorine Concentrations in Carboniferous Coal, Black Warrior Basin, Alabama; Evidence for Fluid Expulsion During Alleghanian Thrusting?*, from the 1997 Annual Meeting of the Geological Society of America, available from the Geological Society of America.



**Summary:** Report on the arsenic and fluorine content of Pennsylvanian age coals from the Warrior Basin of northwestern Alabama.

327. Gorody, Anthony, 1998, *Mineral-catalyzed Formation of Natural Gas During Coal Maturation*, published by the American Association of Petroleum Geologists and the Society of Economic Paleontologists and Mineralogists, available from AAPG.

**Summary:** AAPG / SEPM Report.

328. Gorody, Anthony, 1998, *Using Temporal Changes in Produced Water Geochemistry as a Guide to Assess Reservoir Compartmentation in Coal Bed Methane Reservoirs*, published by the American Association of Petroleum Geologists and the Society of Economic Paleontologists and Mineralogists, available from the AAPG.

**Summary:** AAPG / SEPM Report.

329. Gossling, J. M., 1994, *Coalbed Methane Potential of the Hartshorne Coals in Parts of Haskell, Latimer, LeFlore, McIntosh, and Pittsburg Counties, Oklahoma*, unpublished M.S. Thesis, University of Oklahoma.

**Summary:** Master' s Thesis.

330. Grau, R. H., III; and LaScola, J. C., 1984, *Methane Emissions from U. S. Coal Mines in 1980*, U. S. Bureau of Mines Information Circular 8987, available from the National Technical Information Service.

**Summary:** USBM Circular.

331. Grau, R. H., III, 1986, *Results of an Eight Year Methane Drainage Project from Horizontal Holes in the Pittsburgh Coalbed*, from presentation at Pittsburgh Coalbed Methane Forum.

**Summary:** Convention Presentation.

332. Gray, I., 1987, *Reservoir Engineering in Coal Seams: Part I - The Physical Process of Gas Storage and Movement in Coal Seams*, available from the Society of Petroleum Engineers in SPE Reservoir Engineering, v. 2.

**Summary:** SPE Report.

333. GRID, 1990, *Gas Supply: Coalbed Methane Research Extends to Appalachian Basin*, from Grid,

v. 13, no. 1, available from the publisher, the Gas Technology Institute.

**Summary:** This journal article discusses GRI sponsored research into the development of technology for use in the Appalachian Basin.

334. Griebbling, Richard T., 2001, *The Orderly Development of Coalbed Methane Resources from Public Lands - Experience from Coalbed Methane Development in Colorado*, testimony before the Subcommittee on Energy and Mineral Resources of the Committee on Resources of the House of Representatives on September 6, 2001, available online from the Resources Committee of the U. S. House of Representatives.

**Summary:** Mr. Griebbling is Director of the Colorado Oil & Gas Conservation Commission. His testimony included: the history and status of CBM development in Colorado; a discussion of methane gas found in the groundwater in the Colorado portion of the San Juan Basin; an explanation of the difference between biogenic and thermogenic methane gas; and discussion of the “3M” Project.

335. Grossman, E. L.; Coffman, B. K.; Fritz, S. J.; and Wada, H., 1989, *Bacterial Production of Methane and Its Influence on Ground-Water Chemistry in East Central Texas Aquifers*, from Geology, v. 17, available from the publisher.

**Summary:** Article.

336. Grout, M. A., 1991, *Cleats in Coalbeds of Southern Piceance Basin, Colorado-Correlation with Regional and Local Fracture Sets in Associated Clastic Rocks*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

337. Gulley, David D.; Mount, David R.; Hockett, James R.; and Bergman, Harold L., 1992, *Statistical Model to Predict Toxicity of Saline Produced Waters to Freshwater Organisms*, available from the publisher, Plenum Press, New York, N.Y.

**Summary:** This conference paper discusses research conducted on the concentration of salinity in produced water discharged to surface waters, and how these inorganic ions can be toxic to the freshwater organisms traditionally used for biomonitoring.

338. Hallinger, Donald E., 1991, *Coal-bed Methane; An Unconventional But Viable Source of Natural Gas*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

339. Hanshaw, P. M., ed., 1989, *Coal and Hydrocarbon Resources of North America; Volume 1: Coal, Uranium, and Oil and Gas in Mesozoic Rocks of the San Juan Basin; Anatomy of a Giant Energy-Rich Basin, Field Trips for the 28th International Geological Congress*, available from the American Geophysical Union.

**Summary:** Conference Presentation.

340. Hanson, M.E.; Mavko, B.B.; and Thorson, L.D., 1985, *Development of Hydraulic Fracturing Models for Application to Coal Seam Methane Drainage*, available from the Gas Technology Institute as GRI-85/0073.

**Summary:** This is the final report on the development of a three-dimensional hydraulic fracturing model for stimulating methane production from coal seams.

341. Hanson, M.E.; Mavko, B.B.; and Nielsen, P.E., 1989, *Three-Dimensional Hydraulic Fracture Model Development for Application to and Understanding of Coal Bed Methane Stimulation Treatments*, available from the Gas Technology Institute as GRI-89/0039.

**Summary:** This is the final report on development of a three-dimensional model that simulates hydraulically driven fracturing as applied to the drainage of methane from coal seams.

342. Harpalani, S.; and Zhao, X., 1989, *An Investigation of the Effect of Gas Desorption on Coal Permeability*, from the proceedings of the 1989 International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 8923.

**Summary:** Symposium Paper.

343. Harpalani, Satya, 1989, *Permeability Changes Resulting from Gas Desorption*, available from the Gas Technology Institute as GRI-89/0219.

**Summary:** This GRI report discusses coal permeability and gas desorption.

344. Harpalani, S.; and Schraufnagel, R., 1990, *Shrinkage of Coal Matrix with Release of Gas and Its Impact on Permeability of Coal*, from Fuel, v. 69, available from the publisher.

**Summary:** Article.

345. Harpalani, S.; and Zhao, X., 1991, *Microstructure of Coal and Its Influence on Flow of Gas*, from Energy Sources, v. 13, available from the publisher.

**Summary:** Article.

346. Harpalani, S.; and Chen, G., 1992, *Effect of Gas Production on Porosity and Permeability of Coal*, from the proceedings of the Symposium on Coalbed Methane, Townsville, Australia.

**Summary:** Symposium Paper.

347. Harpalani, S.; Chen, G., 1993, *Gas Slippage and Matrix Shrinkage Effects on Coal Permeability*, from the proceedings of the 1993 International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 9325.

**Summary:** Symposium Paper.

348. Harpalani, S.; and Chen, G., 1997, *Influence of Gas Production Induced Volumetric Strain on Permeability of Coal*, from Geotechnical Geological Engineering, v. 15, available from the publisher.

**Summary:** Article.

349. Harpalani, S., 1999, *Compressibility of Coal and Its Impact on Gas Production from Coalbed Reservoirs*.

**Summary:** Report.

350. Harper, D., 1991, *Coalbed Methane in Indiana*, available from the Indiana Geological Survey as Occasional Paper 56.

**Summary:** Indiana Geological Survey Paper.

351. Harris, Ray E.; DeBruin, Rodney H.; and Jones, Richard W., 1992, *Resources in Sedimentary Rocks of the Powder River Basin and Adjacent Uplifts, Northeastern Wyoming*, available from the United States Geological Survey as B 1917-N.

**Summary:** This USGS report discusses the minerals deposits of the Powder River Basin.

352. Harrison, M. M., 1999, *Coalbed Methane Activity in the Western Powder River Basin, Campbell, Johnson, and Sheridan Counties, Wyoming*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Publication.

353. Harrison, S. M.; Molson, J. W.; Abercrombie, H. J.; Barker, J. F.; Rudolph, D.; and Aravena, R., 2000, *Hydrogeology of a Coal-Seam Gas Exploration Area, Southeastern British Columbia: Part I. Groundwater Flow Systems*, available from the publisher.

**Summary:** Report.

354. Hatch, J. R., 1992, *Hydrocarbon Source-rock Evaluation of Desmoinesian (Middle Pennsylvanian) Coals from Part of the Western Region of the Interior Coal Province, U.S.A.*, from the 1992 Annual Convention Official Program of the American Association of Petroleum Geologists, available from AAPG.

**Summary:** AAPG Convention Document.

355. Heffern, Edward L.; and Coates, Donald A., 1996, *Burning Coal Beds and Clinker in the Powder River Basin*, from The Contact, 43, (1), Casper, Wyoming, available from the publisher, Wyoming Geological Association.

**Summary:** WGA Report.

356. Hemborg, H. T., 1998, *Spanish Peak Field, Las Animas County, Colorado: Geologic Setting and Early Development of a Coalbed Methane Reservoir in the Central Raton Basin*, available from the Colorado Geological Survey in Resource Series 33.

**Summary:** CGS Report.

357. Henry, Mitchell E.; and Finn, Thomas M., 1999, *Digital Framework Geologic Data for a Study of Coal-Bed Methane, Wasatch Plateau, Utah*, from the 1999 Annual Meeting of the Geological Society of America, available from the GSA in Abstracts with Programs - Geological Society of America, 31 (7).

**Summary:** This GSA conference document discusses the database used in support of the United States Geological Survey led study of natural gas from coal seams resources of the Wasatch Plateau in Utah.

358. Herring, J. R.; and Dean, W. E., 1987, *Methane Fluxes from Coal Rank Increase and Natural Coal Fires*, from the Spring 1987 National Meeting of the American Chemical Society, available from the ACS.

**Summary:** ACS Conference Document.

359. Hettinger, R. D.; Biewick, R. R. H.; Bryant, Karen; Ellis, M. S.; Ferderer, D. A.; Kirschbaum, M. A.; Molnia, C. L.; Roberts, L. N. R.; Stricker, G. D.; and Watson, W. D., 1995, *Coal Resource Assessment in the Western United States; Factors for Consideration in the Management of Federal Lands*, available from the United States Geological Survey as C 1108.

**Summary:** USGS Report.

360. Higgs, M. D., 1986, *Laboratory Studies into the Generation of Natural Gas from Coal*, from Habitat of Paleozoic Gas in N.W. Europe, available from the Geological Society, London, as Special Publication 23.

**Summary:** Geological Society Report.

361. Higley, Debra K., 1992, *A Method to Estimate the Uncertainty of Coal Resources*, available from the publisher, the United States Geological Survey.

**Summary:** USGS Report.

362. Hildebrand, Ricky T., 1986, *Ground-water Composition as an Indicator of Sodium Content in Coal in the Powder River Basin, Southeastern Montana and Northeastern Wyoming*, available from the United States Geological Survey as C 0974.

**Summary:** USGS Report.

363. Hildebrand, Ricky T., 1995, *Geochemical Studies of the Anderson-Dietz 1 Coal Bed, Powder River Basin; Origin of Inorganic Elements and Environmental Implications*, available from the publisher, the Wyoming State Geological Survey.

**Summary:** WSGS Report.

364. Hill, D. G.; Nelson, C. R.; and Brandenburg, C. F., 2000, *Coalbed Methane "Frontier" Expanding*, from American Oil & Gas Reporter, v. 43, no. 5, available from the publisher.

**Summary:** Article.

365. Hill, David G., 2001, *North American Coalbed Methane Resource Map*, available from the Gas Technology Institute as GTI-01/0165.

**Summary:** GTI Map.

366. Hobbs, R. G., 1978, *Methane Occurrences, Hazards, and Potential Resources; Recluse Geologic Analysis Area, Northern Campbell County, Wyoming*, available from the United States Geological Survey as OF 78-401.

**Summary:** USGS Open File Report.

367. Holditch, S. A.; Ely, J. W.; Carter, R. H.; and Semmelbeck, M. E., 1990, *Coal Seam Stimulation Manual*, available from the Gas Technology Institute as GRI-90/0140.

**Summary:** This GRI publication provides guidelines to design well completions and hydraulic fracturing treatments in coal seams.

368. Holditch, S. A., 1992, *Completion Methods in Coal Seam Reservoirs*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

369. Holditch, S. A.; Ely, J. W.; Semmelbeck, M. E.; Carter, R. H.; Hinkel, J.; and Jeffrey, R. G., Jr., 1992, *Enhanced Recovery of Coalbed Methane Through Hydraulic Fracturing*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

370. Hollub, V.A.; and Schafer, P.S., 1992, *A Guide to Coalbed Methane Operations*, Gas Research Institute report no. GRI-92/0234, available from the Society of Petroleum Engineers.

**Summary:** This guide provides information on siting, drilling, completion and production of natural gas from coal seams. Discusses key field operations and guidelines for performing those operations.

371. Hotchkiss, W. R., 1975, *Sulfur and Trace Elements in the Rosebud and McKay Coal Seams, Colstrip Field, Montana*, available from the publisher, the Montana Geological Society.

**Summary:** MGS Report.

372. Howard, Jeanne G.; and Irvin, Marcia S., 1992, *Coalbed Methane: Hazard of the Past, Energy for the Future*, available from Sage Publications, Inc.

**Summary:** Report.

373. Hower, James C.; et al, 1998, *Generation and Expulsion of Petroleum and Gas from Almond Formation Coal, Greater Green River Basin, Wyoming; Discussions and Reply*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

374. Huffman, Claude, Jr.; and Swanson, Vernon E., 1994, *Geologic and Hydrologic Controls on Coalbed*

*Methane: Sand Wash Basin, Colorado and Wyoming.*

**Summary:** Report.

375. Humphrey, H. B., 1959, *Historical Summary of Coal-mine Explosions in the United States*, from U.S. Bureau of Mines Information Circular 7900, available from the National Technical Information Service.

**Summary:** USBM Circular.

376. Hunt, A.M.; and Steele, Derek J., 1992, *Coalbed Methane Technology Development in the Appalachian Basin*, available from the Gas Technology Institute as GRI-92/0138.

**Summary:** This final report discusses research conducted to determine the applicability of current technology to development of coal seam natural gas reservoirs in Appalachia.

377. Hyman, Laura A.; Brugler, Mercer; Deneshjou, Dane; and Henry, A., 1991, *Improved Evaluation of Coal Reservoirs Through Specialized Core Analysis*, available from the Gas Technology Institute as GRI-91/0201.

**Summary:** This GRI report discusses the methodologies employed to determine the relative permeability characteristics on several coal samples.

378. Hyman, L. A.; Ohen, H. A.; Amaefule, J. O.; and Daneshjou, D., 1991, *Simultaneous Determination of Capillary Pressure and Relative Permeability in Coalbed Methane Reservoirs*, from the proceedings of the 3rd Coalbed Methane Symposium, available from the publisher, the University of Alabama, College of Continuing Studies.

**Summary:** This conference paper discusses the development of a modified porous plate experiment and mathematical model used to improve the measurement and evaluation of gas and water relative permeability, capillary pressure, and pore volume in coal samples.

379. Hyman, L. A.; Brugler, M. L.; Daneshjou, D. H.; and Ohen, H. A., 1992, *Advances in Laboratory Measurement Techniques of Relative Permeability and Capillary Pressure for Coal Seams*, from Quarterly Review of Methane from Coal Seams Technology, v. 9, no. 2, available from the publisher.

**Summary:** Report.

380. ICF Resources, Inc., 1990, *The United States Coalbed Methane Resource*, from Quarterly Review of Methane from Coal Seams Technology, v. 7, no. 3, available from the publisher.



**Summary:** Report.

381. Iannacchione, A. T.; and Puglio, D. G., 1979, *Geological Association of Coalbed Gas and Natural Gas from the Hartshorne Formation in Haskell and LeFlore Counties, Oklahoma*, from the IX International Congress of Carbon Stratigraphy and Geology.

**Summary:** Convention Report.

382. Iannacchione, A. T.; and Puglio, D. G., 1979, *Geology of the Lower Kittanning Coalbed and Related Mining and Methane Emission Problems in Cambria County, Pennsylvania*, from U.S. Bureau of Mines Report of Investigations 8354, available from the National Technical Information Service.

**Summary:** USBM Report.

383. Iannacchione, A. T.; and Puglio, D. G., 1979, *Methane Content and Geology of the Hartshorne Coalbed in Haskell and Le Flore Counties, Oklahoma*, from U.S. Bureau of Mines Report of Investigations 8407, available from the National Technical Information Service.

**Summary:** USBM Report.

384. Iannacchione, A. T.; Kertis, C. A.; Houseknecht, D. W.; and Perry, J. H., 1983, *Problems Facing Coal Mining and Gas Production in the Hartshorne Coalbeds of the Western Arkoma Basin, OK*, from U.S. Bureau of Mines Report of Investigations 8795, available from the National Technical Information Service.

**Summary:** USBM Report.

385. Irani, M. C.; et al, 1972, *Methane Emissions from U. S. Coal Mines, A Survey*, U. S. Bureau of Mines Information Circular 8558, available from the National Technical Information Service.

**Summary:** USBM Circular.

386. Irani, M. C.; Jeran, P. W.; and Deul, M., 1974, *Methane Emissions from U. S. Coal Mines in 1973, A Survey – Supplement to Information Circular 8558*, U. S. Bureau of Mines Information Circular 8659, available from the National Technical Information Service.

**Summary:** USBM Circular.

387. Irani, M. C.; et al, 1977, *Methane Emissions from U. S. Coal Mines in 1975, A Survey*, U. S.

Bureau of Mines Information Circular 8733, available from the National Technical Information Service.

**Summary:** USBM Circular.

388. Jansen, G. J., 1987, *Petrography Studies Can Aid in Coal Mine Planning and in Estimating Methane Yields in Coal Beds*, from Mining Engineering, v. 39, no. 9, available from the publisher.

**Summary:** Article.

389. Jeran, P. W.; Lawhead, D. H.; and Irani, M. C., 1976, *Methane Emissions from an Advancing Coal Mine Section in the Pittsburgh Coalbed*, U. S. Bureau of Mines Report of Investigations 8132, available from the National Technical Information Service.

**Summary:** USBM Report.

390. Johnson, D. J.; and Scholes, P. L., 1991, *Predicting Cleat in Coal Seams from Mineral and Maceral Composition with Wireline Logs*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

391. Johnson, Ronald C.; Barker, Charles E.; Pawlewicz, Mark J.; Crysdale, Bonnie L.; Clark, Arthur C.; and Rice, Dudley D., 1991, *Preliminary Results of a Coalbed Methane Assessment of the Wind River Indian Reservation, Wyoming*, available from the Rocky Mountain Association of Geologists.

**Summary:** Report presented at a 1991 meeting of the Rocky Mountain Association of Geologists.

392. Johnson, R. C.; and Szmajter, R. J., 1992, *Description of Upper Cretaceous Mesaverde Formation from the 1991 U.S. Geological Survey Coalbed Methane Coring Program, Wind River Reservation, Wyoming*, available from the United State Geological Survey.

**Summary:** USGS Report.

393. Johnson, R. C.; and Flores, R. M., 1993, *Coalbed Methane Potential of the Upper Cretaceous Lance and Paleocene Fort Union Formation, Wind River Reservation, Wyoming*, available from the publisher, the Wyoming Geological Association.

**Summary:** WGA Report.

394. Johnson, Ronald C.; Clark, Arthur C.; Barker, Charles E.; Crysdale, Bonnie L.; Higley, Debra K.; Szmajter, Richard J.; and Finn, Thomas M., 1993, *Coalbed Methane Potential of the Upper Cretaceous Mesaverde and Meeteetse Formations, Wind River Reservation, Wyoming*, available from the publisher, the Wyoming Geological Association.

**Summary:** WGA Conference Document.

395. Johnson, R. C.; and Rice, D. D., 1993, *Composition and Origins of Shallow (<1,000 ft) Coalbed Gasses, Wind River Reservation, Wyoming*.

**Summary:** Report.

396. Johnson, R. C.; and Flores, R. M., 1993, *Stratigraphy, Areal Distribution, and Paleodepositional Environments of Fort Union Formation Coal Beds, Wind River Reservation, Wyoming; Implications for Coalbed Methane Development*, available from the publisher, the Wyoming Geological Association.

**Summary:** WGA Conference Document.

397. Johnson, Ronald C.; and Rice, Dudley D., 1993, *Variations in Composition and Origins of Gases from Coal Bed and Conventional Reservoirs, Wind River Basin, Wyoming*, available from the Wyoming Geological Association.

**Summary:** Report presented at a 1993 meeting of the Wyoming Geological Association.

398. Johnson, Ronald C.; and Flores, Romeo M., 1998, *Developmental Geology of Coalbed Methane from Shallow to Deep in Rocky Mountain Basins and in Cook Inlet-Matanuska Basins, Alaska, USA and Canada*, from International Journal of Coal Geology, available from the publisher, Elsevier.

**Summary:** Report on natural gas from coal seams in the different basins of the Rocky Mountains. Discusses the geology of the basins and problems associated with production.

399. Johnson, V. L.; Graham, D. L.; and Reidel, S. P., 1993, *Methane in Columbia River Basalt Aquifers: Isotopic and Geohydrologic Evidence for a Deep Coal-bed Gas Source in the Columbia Basin, Washington*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 77.

**Summary:** AAPG Bulletin.

400. Jones, A. H.; Bell, G. J.; and Schraufnagel, R. A., 1988, *A Review of the Physical and Mechanical Properties of Coal with Implications for Coal-bed Methane Well Completion and Production*,

available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

401. Jones, Allison L., 1988, *Geologic Setting and Water Quality of Selected Basins in the Active Coal-mining Areas of Ohio, June 1985 Through December 1986*, available from the United States Geological Survey as WRI 88-4084.

**Summary:** USGS Report / Map.

402. Jones, R. W.; and DeBruin, R. H., 1989, *Coalbed Methane in Wyoming*, from the 1989 Wyoming Geological Society 40th Field Conference, available from the Wyoming Geological Society.

**Summary:** WGS Guidebook.

403. Jordan, G., 1990, *Desorption, Diffusion and Coal Testing for Coalbed Methane*, available from the publisher, the Alberta Research Council in Coal-bed Methane Information Series 111.

**Summary:** Alberta Research Council Report.

404. Joubert, J. I.; Grein, C. T.; and Bienstock, D., 1973, *Sorption of Methane in Moist Coal*, from Fuel, v. 52, available from the publisher.

**Summary:** Article.

405. Joubert, J. I.; Grein, C. T.; and Bienstock, D., 1974, *Effect of Moisture on the Methane Capacity of American Coals*, from Fuels, v. 53, available from the publisher.

**Summary:** Article.

406. Junkin, P. D.; and Tipton, L. M., 1981, *Environmental Research Plan for Gas Supply Technologies. Volume II: Environmental Research Plan*, available from the Gas Technology Institute as GRI-80/0013.2.

**Summary:** This report discusses a five-year research plan that was developed for the environmental impacts and constraints associated with gas supply technologies used to produce various types of non-conventional natural gas. Among those types studied was coalbed methane. Contains discussion of the prioritization methodology used to rank research activities, based on environmental and technical criteria.

407. Junkin, P. D.; and Tipton, L. M., 1983, *Safety Research Plan for Gas Supply Technologies*, available from the Gas Technology Institute as GRI-81/0180.

**Summary:** This final report discusses the development of a research plan for safety issues related to gas supply technologies.

408. Kaiser, W. R.; Tyler, R.; Ambrose, W. A.; Scott, A. R.; and Patchen, D. G., 1992, *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources*, from Quarterly Review of Methane from Coal Seams Technology, v. 9, nos. 3-4, available from the publisher.

**Summary:** Report.

409. Kaiser, W. R.; and Ambrose, W. A., 1992, *Hydrology and Production of Coalbed Methane in Western United States Intermountain Basins*, published by the American Association of Petroleum Geologists and the Society of Economic Paleontologists and Mineralogists, available from the AAPG.

**Summary:** AAPG / SEPM Report.

410. Kaiser, W. R.; Hamilton, D. S.; and Patchen, D. G., 1993, *Geologic and Hydrologic Controls on Coalbed Methane Production in Western United States Intermountain Basins*, from Quarterly Review of Methane from Coal Seams Technology, v. 10, no. 3, available from the publisher.

**Summary:** Report.

411. Kaiser, W. R., 1993, *Hydrology of Coalbed Reservoirs*, from 1993 Coalbed Methane Symposium, Short Course 1, Birmingham, Alabama.

**Summary:** Symposium Document.

412. Kaiser, W. R.; Scott, A. R.; Hamilton, D. S.; Tyler, Roger; McMurry, R. G.; Zhou, Naijiang; and Tremain, C. M., 1994, *Geologic and Hydrologic Controls on Coalbed Methane: Sand Wash Basin, Colorado and Wyoming*, available from the Colorado Geological Survey.

**Summary:** Includes structural stratigraphic and hydrologic setting of Mesaverde and Fort Union coals, coal seam natural gas resources, production and possible traps.

413. Kaiser, W. R.; Hamilton, D. S.; Scott, A. R.; Tyler, R.; and Finley, R. J., 1994, *Geological and Hydrological Controls on the Producibility of Coalbed Methane*, from Journal of the Geological Society, London, v. 151, Part 3, available from the publisher.

**Summary:** Article.

414. Kaiser, W. R.; Scott, A. R.; and Tyler, R., 1995, *Geology and Hydrology of Coalbed Methane Producibility in the United States: Analogs for the World*, from Intergas '95 Short Course, Tuscaloosa, Alabama, available from the publisher.

**Summary:** Report.

415. Kalkreuth, W.; Abercrombie, H.; and Burchard, K., 1994, *The Coalbed Methane Potential of Jurassic/Cretaceous Coals from the Fernie Basin, British Columbia, Canada*, from Erdol und Kohle - Erdgas - Petrochemie, v. 47, no. 4, available from the publisher.

**Summary:** Article.

416. Kalkreuth, W. D.; Dawson, M.; and Hughes, J. D., 1994, *Geological Survey of Canada Coalbed Methane Research - CBM Potential of Coals from the Western Canada Sedimentary Basin*, from the Twenty-Eights Newcastle Symposium on Advances in the Study of the Sydney Basin, Newcastle, NSW, Australia.

**Summary:** Symposium Document.

417. Kalkreuth, W. D.; Dawson, M.; and Hughes, J. D., 1995, *Geological Survey of Canada Coalbed Methane Research*, from Coal Science and Technology 24, v. 1, available from the publisher, Elsevier, New York.

**Summary:** Report.

418. Karacan, C. O.; and Okandan, E., 2000, *Assessment of Energetic Heterogeneity of Coals for Gas Adsorption and Its Effect on Mixture Predictions for Coalbed Methane Studies*, from Fuel, v. 79, available from the publisher.

**Summary:** Article.

419. Kaszuba, J. P.; and Buys, M. W., 1993, *Reclamation Procedures for Produced Water Spills from Coalbed Methane Wells, San Juan Basin, Colorado and New Mexico*, paper presented at the 1993 SPE/EPA Exploration and Production Environmental Conference, available from the Society of Petroleum Engineers as SPE paper 25970.

**Summary:** This SPE paper defines the quality of water produced from coal seam natural gas wells producing from the Fruitland Formation, characterizes affected soils, evaluates the environmental effects the water has on soil, and discusses specific reclamation procedures for a portion of the San Juan Basin.

420. Kelafant, J. R.; Wicks, D. E.; and Kuuskraa, V. A., 1988, *A Geologic Assessment of Natural Gas from Coal Seams in the Northern Appalachian Basin, Alabama*, available from the Gas Technology Institute as GRI-88/0039.

**Summary:** This report discusses the geologic assessment of Northern Appalachian Coal Basin gas-in-place estimates.

421. Kelso, B. S.; Goolsby, S. M.; and Tremain, C. M., 1980, *Deep Coal Bed Methane Potential of the San Juan River Coal Region, Southwestern Colorado*, available from the Colorado Geological Survey as Open-File Report 80-2.

**Summary:** CGS Open-File Report.

422. Kelso, B. S.; and Kelafant, J. A., 1989, *A Strategy for Coalbed Methane Production Development Part I: Geologic Characterization*, from the proceedings of the 1989 Coalbed Methane Symposium, available as Paper 8911.

**Summary:** Symposium Document.

423. Kelso, B. S., 1994, *Geologic Controls on Open-hole Cavity Completions in the San Juan Basin*, from Quarterly Review of Methane from Coal Seams Technology, v. 11, nos. 3-4, available from the publisher.

**Summary:** Report.

424. Kelso, B. S.; Lombardi, T. E.; and Kuuskraa, J. A., 1995, *Drilling and Production Statistics for Major U.S. Coalbed Methane and Gas Shale Reservoirs*, available from the Gas Technology Institute as GRI-96/0052.

**Summary:** This GRI-sponsored report gives a summary of the drilling and production statistics from the major coal seam gas and gas shale reservoirs in the U.S.

425. Kemp, J. H.; and Peterson, K. M., 1988, *Coal-bed Gas Development in the San Juan Basin: A Primer for the Lawyer and Landman*, from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Publication.

426. Khavari-Khorasani, G.; and Michelsen, J. K., 1999, *Coal Bed Gas Content and Gas Undersaturation*, from Coalbed Methane: Scientific, Environmental and Economic Evaluation, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

427. Khodaverdian, M.; and McLennan, J. D., 1993, *Hydraulic Fracturing Coalbed Methane Reservoirs: Obstacles and Solutions*, available from Government Institutes, Inc.

**Summary:** Conference paper that reports on a program working to identify the mechanisms responsible for high treatment pressures as they relate to lower production of gas produced from wells treated at high pressures. These abnormally high pressures are encountered during hydraulic fracturing. Presented at the 1992 International Gas Research Conference.

428. Khodaverdian, Mohamad F., 1994, *Coalbed Methane Stimulation Techniques: Mechanisms and Applicability*, available from the Gas Technology Institute as GRI-95/0003.

**Summary:** This GRI sponsored topical report examines the mechanisms responsible for the high fracturing pressures observed in coal in order to specify stimulation procedures required to achieve fracture characteristics that optimize gas production.

429. Khodaverdian, Mohamad F.; McLennan, John D.; and Jones Arfon H., 1994, *Hydraulic Fracture Stimulation for Enhanced Recovery of Coalbed Methane*, from the 8th International Conference on Computer Methods and Advances in Geomechanics.

**Summary:** Conference Paper.

430. Khodaverdian, Mohamad F.; McLennan, John D.; Palmer, Ian D.; Vaziri, Hans H.; and Wang, X., 1996, *Cavity Completions for Enhanced Coalbed Methane Recovery*, available from the Gas Technology Institute as GRI-95/0432.

**Summary:** This report discusses an investigation of the cavity completion mechanisms causing formation stimulation.

431. Khodaverdian, Mohamad F.; McLennan, John D.; Palmer, Ian D.; and Vaziri, Hans H., 1996, *Coalbed Cavity Completion Analysis Suggests Improvements*, from *Gas Tips*, v. 2, no. 1, available from the publisher, the Gas Technology Institute.

**Summary:** Report.

432. Kidd, J. T.; Camp, B. S.; Lottman-Craig, L. K.; Osborne, T. E.; Smith, J. L.; Saulsberry, J. L.; Steidl, P. F.; and Stubbs, P. B., 1992, *Geologic Manual for the Evaluation and Development of Coalbed Methane*, available from the Gas Technology Institute as GRI-91/0110.

**Summary:** GRI Topical Report.



433. Kim, A. G.; and Douglas, L. J., 1972, *Hydrocarbon Gases Produced in a Simulated Swamp Environment*, from U.S. Bureau of Mines Report of Investigations 7690, available from the National Technical Information Service.

**Summary:** USBM Report.

434. Kim, A. G., 1973, *The Composition of Coalbed Gas*, from U.S. Bureau of Mines Report of Investigations 7762, available from the National Technical Information Service.

**Summary:** USBM Report.

435. Kim, A. G.; and Douglas, L. J., 1973, *Gases Desorbed from Five Coals of Low Gas Content*, from U.S. Bureau of Mines Report of Investigations 7768, available from the National Technical Information Service.

**Summary:** USBM Report.

436. Kim, A. G., 1974, *Low-temperature Evolution of Hydrocarbon Gases from Coal*, from U.S. Bureau of Mines Report of Investigations 7965, available from the National Technical Information Service.

**Summary:** USBM Report.

437. Kim, A. G., 1974, *Methane in the Pittsburgh Coalbed, Washington County, Pa.*, from U.S. Bureau of Mines Report of Investigations 7969, available from the National Technical Information Service.

**Summary:** USBM Report.

438. Kim, A. G., 1975, *Methane in the Pittsburgh Coalbed, Greene County, Pa.*, from U.S. Bureau of Mines Report of Investigations 8026, available from the National Technical Information Service.

**Summary:** USBM Report.

439. Kim, A. G., 1977, *Estimating Methane Content of Bituminous Coalbeds from Adsorption Data*, from U.S. Bureau of Mines Report of Investigations 8245, available from the National Technical Information Service.

**Summary:** USBM Report.

440. Kim, A. G., 1978, *Experimental Studies on the Origin and Accumulation of Coalbed Gas*, from U.S. Bureau of Mines Report of Investigations 8317, available from the National Technical Information Service.

**Summary:** USBM Report.

441. Kim, A. G.; and Kissell, F. N., 1988, *Methane Formation and Migration in Coalbeds*, from U.S. Bureau of Mines Bulletin 687, available from the National Technical Information Service.

**Summary:** USBM Report.

442. Kindley, Mark, 1982, *Coal Bed Methane Offers Energy Options*, available from the publisher, the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

443. Kindley, Mark, 1982, *Interest Grows in Coal Bed Methane, Technological, Legal Problems Persist*, available from the publisher, the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

444. Kirschbaum, M. A.; Correia, G. A.; and McPhillips, M., 1982, *Coal Exploratory Drilling During 1979 in Western Powder River County, Montana*, available from the United States Geological Survey as OF 82-0748.

**Summary:** USGS Open File Report.

445. Kirschbaum, Mark A.; Roberts, Laura N. R.; and Biewick, Laura R. H., 2000, *Geologic Assessment of Coal in the Colorado Plateau; Arizona, Colorado, New Mexico, and Utah*, available from the United State Geological Survey as P 1625-B.

**Summary:** This USGS Professional Paper presents a geologic assessment of coal deposits of the Colorado Plateau and gives new resource estimates for selected assessment units.

446. Kissel, F. N., 1972, *The Methane Migration and Storage Characteristics of the Pittsburgh, Pocahontas No. 3, and Oklahoma Hartshorne Coalbeds*, U. S. Bureau of Mines Report of Investigations 7677, available from the National Technical Information Service.

**Summary:** USBM Report.

447. Kissel, F. N.; McCulloch, C. M.; and Elder, C. H., 1973, *The Direct Method of Determining Methane Content of Coalbeds for Ventilation Design*, U. S. Bureau of Mines Report of Investigations 7767, available from the National Technical Information Service.

**Summary:** USBM Report.

448. Kizil-sshtein, L. Ya, 1998, *Heavy-metal Geochemistry of Coal; An Ecological Aspect*, available from MAIK Nauka/Interperiodica Publishing.

**Summary:** Report.

449. Kizil-sshtein, L. Ya, 1999, *Vanadium Geochemistry of Coal; An Ecological Aspect*, available from MAIK Nauka/Interperiodica Publishing.

**Summary:** Report.

450. Knox, L. M.; and Hadro, J., 2001, *Canister Desorption Techniques: Variation and Reliability*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, as Paper 123.

**Summary:** Symposium Paper.

451. Koenig, R. A.; McKee, C. R.; Reverand, J. M.; Ward, W. P.; and Way, S. C., 1985, *Hydrologic Characterization of Coal Seams for Methane Recovery. Activity 2 Topical Report: Hydrologic Constraints and Single-Phase Test Procedures*, available from the Gas Technology Institute as GRI-83/0065.2.

**Summary:** Final report on 15 methods for analysis of single-phase well tests as they apply to low permeability coal seam natural gas reservoirs.

452. Koenig, R. A.; Bumb, A. C.; Kunkel, J. R.; McKee, C. R.; Murphy, C. L.; Ramesh, M. S.; and Reverand, J. M., 1989, *Hydrologic Characterizations of Coal Seams for Methane Recovery*, available from the Gas Technology Institute as GRI-89/0220.

**Summary:** Final report on methods developed to characterize the hydrologic properties of coal seam natural gas reservoirs.

453. Koenig, R. A.; and Schraufnagel, R. A., 1992, *Application of the Slug Test in Coalbed Methane Testing*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

454. Kopp, O. C.; Bennett, M. E., III; and Clark, C. E., 2000, *Volatiles Lost During Coalification*, from International Journal of Coal Geology, v. 44, available from the publisher.

**Summary:** Article.

455. Kuuskraa, V.A.; McFall, K.S.; and Wicks, D.E., 1986, *Geologic Assessment of Natural Gas from Coal Seams in the Warrior Basin, Alabama*, available from the Gas Technology Institute as GRI-86/0272.

**Summary:** This report discusses the geologic assessment of Black Warrior Basin, Alabama, gas-in-place estimates.

456. Kuuskraa, V.A.; McFall, K.S.; Sedwick, K.B.; and Wicks, D.E., 1986, *Geologic Assessment of Natural Gas from Coal Seams in the Piceance Basin, Colorado*, available from the Gas Technology Institute as GRI-87/0060.

**Summary:** This report discusses the geologic assessment of the three major coal groups in the Piceance Basin and gives gas-in-place estimates.

457. Kuuskraa, V. A.; and Boyer, C. M., 1993, *Economic and Parametric Analysis of Coalbed Methane*, available from the American Association of Petroleum Geologists, in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

458. Kvenvolden, Keith A.; and Lorenson, Thomas D., 2000, *Methane and Other Hydrocarbon Gases in Sediment from the Southeastern North American Continental Margin*, from Proceedings of the Ocean Drilling Program, Scientific Results, available from Texas A & M University.

**Summary:** Discussion of residual concentrations and distributions of hydrocarbon gases from methane to n-heptane. Measurements were taken from sediments recovered from seven sites.

459. Lamarre, Robert, 2000, *Coalbed Methane Stratigraphic Traps in Ferron Coals of East-Central Utah*, from Texaco Exploration and Production.

**Summary:** Texaco Report.

460. Lamarre, R. A., 2002, *Hydrodynamic and Stratigraphic Controls for a Large Coalbed Methane Accumulation in Ferron Coals of East-Central Utah*, available from the Rocky Mountain Association of Geologists in Coalbed Methane in North America, II.

**Summary:** RMAG Report.

461. Lamberson, M. N.; and Bustin, R. M., 1993, *Coalbed Methane Characteristics of Gates Formation Coals, Northeastern British Columbia: Effect of Maceral Composition*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 77.

**Summary:** AAPG Bulletin.

462. Lambert, S. W.; and Trevits, M. A., 1980, *The Feasibility of No-Propant Stimulation to Enhance Removal of Methane from the Mary Lee Coalbed*, available from the United States Department of Energy as Report of Investigations CMTC-TR80-1.

**Summary:** DOE Contracted Study.

463. Lambert, S. W.; Trevits, M. A.; and Steidl, P. F., 1980, *Vertical Borehole Design and Completion Practices to Remove Methane Gas from Minable Coalbeds*, available from the U. S. Department of Energy as DOE/CMTC/TR-80/2.

**Summary:** DOE Report.

464. Lambert, S. W.; Saulsberry, J. L.; and Reeves, S. R., 1995, *Coalbed Methane Production Improvement/Recompletion Project in the Warrior Basin*, available from the Gas Technology Institute as GRI-95/0034.

**Summary:** This GRI report discusses research into reasons why Warrior Basin wells producing natural gas from coal seams are not producing satisfactorily.

465. Lambert, S. W.; Saulsberry, J. L.; Steidl, P. F.; Conway, M. W.; and Spafford, S. D., 1995, *Fracturing Experience at the Rock Creek Multiple Coal Seams Project*, available from the Gas Technology Institute as GRI-95/0035.

**Summary:** This topical report reviews well stimulation design considerations, diagnostic results, and production results for a number of production wells stimulated at the Rock Creek Project.

466. Landis, E. R., 1977, *Coal Resources of Colorado and Wyoming*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

467. Langenberg, W.; Kalkreuth, W.; Levine, J.; Strobl, R.; Demchuk, T.; Hoffman, G.; and Jerzykiewicz,

T., 1990, *Coal Geology and Its Application to Coal-bed Methane Reservoirs*, from lecture notes for a short course, available from the Alberta Resource Council in Information Series 109.

**Summary:** Alberta Resource Council Short Course.

468. Langenberg, W., 1991, *Coalification Patterns and Coalbed Methane Potential in the Cadomin Area, Alberta, Canada*, from Journal of Coal Quality, v. 10, available from the publisher.

**Summary:** Report.

469. Larson, L. R.; and Daddow, Richard L., 1984, *Ground-Water-Quality Data from the Powder River Basin, Northeastern Wyoming*, available from the United States Geological Survey as Open File Report OF 83-0939.

**Summary:** USGS Open File Report.

470. Larson, L. R., 1984, *Ground-Water Quality in Wyoming*, available from the United States Geological Survey as Report WRI 84-4034.

**Summary:** USGS Report.

471. Larson, L. R., 1988, *Coal-Spoil and Ground-Water Chemical Data from Two Coal Mines; Hanna Basin and Powder River Basin, Wyoming*, available from the United States Geological Survey as Open File Report OF 88-0481.

**Summary:** USGS Open File Report.

472. Laubach, S. E.; Tremain, C. M.; and Ayers, W. B., 1991, *Coal Fracture Studies: Guides for Coalbed Methane Exploration and Development*, from Journal of Coal Quality, v. 10, available from the publisher.

**Summary:** Article.

473. Laubach, Stephen E.; and Tremain, Carol M., 1991, *Distribution and Origin of Regional Coal Fracture (Cleat) Domains in Upper Cretaceous Fruitland Formation Coal; Possible Effects on Coalbed Stimulation and Methane Production*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

474. Laubach, S. E.; Tyler, Roger; Tremain, C. M.; Grout, M. A.; and Ambrose, W. A., 1991, *Fracture Patterns in Coal in the Western United States; Observations and Implications for Development of Coalbed Methane Resources*, available from the Geological Society of America.

**Summary:** GSA paper.

475. Laubach, S. E.; Tyler, Roger; Ambrose, W. A.; Tremain, C. M.; and Grout, M. A., 1992, *Preliminary Map of Fracture Patterns in Coal in the Western United States*, available from the Wyoming Geological Association.

**Summary:** WGA Map.

476. Laubach, S. E.; and Tremain, C. M., 1994, *Fracture Swarms: Potential Targets for Methane Exploration in Upper Cretaceous Sandstone and Coal, Northern San Juan Basin*, available from the New Mexico Bureau of Mines and Mineral Resources as Bulletin 146.

**Summary:** New Mexico Bureau of Mines and Mineral Resources Bulletin.

477. Laubach, S. E.; Marrett, R. A.; Olson, J. E.; and Scott, A. R., 1998, *Characteristics and Origins of Coal Cleat: A Review*, from *International Journal of Coal Geology*, v. 35, available from the publisher.

**Summary:** Article.

478. Law, B. E.; and Grazia, S. L., 1972, *Preliminary Geologic Map and Coal Resources of the Decker Quadrangle, Big Horn County, Montana*, available from the United States Geological Survey as OF 72-0220.

**Summary:** USGS Open File Report / Map.

479. Law, B. E., 1977, *Geophysical Logs of Test Holes from the Henry Mountains Coal Field, Garfield and Wayne Counties, Southeastern Utah*, available from the United States Geological Survey as OF 77-0041.

**Summary:** USGS Open File Report / Map.

480. Law, B. E., 1978, *Geologic Map and Coal Deposits of the Gillette West Quadrangle, Campbell County, Wyoming*, available from the United States Geological Survey as MF-974.

**Summary:** USGS Map.

481. Law, B. E.; Barnum, B. E.; and Wollenzien, T. P., 1979, *Coal Bed Correlations in the Tongue River Member of the Fort Union Formation, Monarch, Wyoming and Decker, Montana*, available from the United States Geological Survey as I-1128.

**Summary:** USGS Report.

482. Law, B. E., 1979, *Coal Deposits of the Emery Coal Zone, Henry Mountains Coal Field, Garfield and Wayne Counties, Utah*, available from the United States Geological Survey as MF-1082-A.

**Summary:** USGS Report / Map.

483. Law, B. E., 1979, *Surface Coal Sections in the Emery Coal Zone, Henry Mountains Coal Field, Garfield and Wayne Counties, Utah*, available from the United States Geological Survey as MF-1082-B.

**Summary:** USGS Report.

484. Law, B. E.; Hatch, J. R.; Kukal, G. C.; and Keighin, C. W., 1983, *Geologic Implications of Coal Dewatering*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 67.

**Summary:** This AAPG paper discusses the coal-derived water and how it compares to other formation fluids.

485. Law, B. E.; Hatch, J. R.; Kukal, G. C.; and Keighin, C. William, 1983, *Geologic Implications of Dewatering of Coal and Other Carbonaceous Lithologies; A Hypothesis*, AAPG Annual Convention with Divisions SEPM/EMD/DPA, from AAPG annual convention, available from the American Association of Petroleum Geologists in AAPG Bulletin, 67.

**Summary:** AAPG Conference Document.

486. Law, B. E., 1988, *Coal-bed Methane*, available from the United States Geological Survey as B 1870.

**Summary:** USGS Report.

487. Law, B. E.; Anders, D. E.; and Michael, G. E., 1990, *Use of Rock-Eval Pyrolysis and Vitrinite Reflectance Data in Characterizing Type and Maturity of Organic Matter in Coal, Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado*, from AAPG Rocky Mountain Section Meeting, available from the American Association of Petroleum Geologists in AAPG Bulletin, 74.



**Summary:** AAPG Bulletin.

488. Law, B. E.; Rice, D. D.; and Flores, R. M., 1991, *Coalbed Gas Accumulations in the Paleocene Fort Union Formation, Powder River Basin, Wyoming*, available from the Rocky Mountain Association of Geologists.

**Summary:** Paper.

489. Law, B. E., 1992, *Coalbed Methane*, available from the United States Geological Survey as B 2007.

**Summary:** USGS Report.

490. Law, B. E.; and Rice, D. D., 1993, *Coalbed Methane - New Perspectives on an Old Source of Energy*, from the proceedings of the Tenth Annual International Pittsburgh Coal Conference.

**Summary:** Conference Document.

491. Law, B. E.; and Rice, D. D., 1993, *Hydrocarbons from Coal*, available from the American Association of Petroleum Geologists, in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

492. Law, B. E., 1993, *The Relationship Between Coal Rank and Cleat Spacing; Implications for the Prediction of Permeability in Coal*, from the proceedings of the 1993 International Coal Symposium, Birmingham, Alabama.

**Summary:** Symposium Document.

493. Law, B. E.; Spencer, C. W.; Crovelli, R. A.; Schmoker, J. W.; Ryder, R. T.; Sutherland, W. M.; and Frohne, K. H., 1995, *Low Permeability (Tight) Gas Reservoirs; an Environmentally Acceptable Major Source of Energy for the 21st Century?*, from the 10th V.E. McKelvey Forum on Mineral and Energy Resources, available from the United States Geological Survey as C 1108.

**Summary:** USGS Conference Paper.

494. Law, B. E., 1998, *Geologic Attributes of Coalbed Methane Accumulations in the United States*, from the proceedings of the International Symposium of the All-Russian Petroleum Scientific-Research Geological-Exploration Institute (VNIGRI).

**Summary:** Symposium Document.

495. Lawrence, A. W., 1993, *Coalbed Methane Produced-water Treatment and Disposal Options*, from Quarterly Review of Methane from Coal Seams Technology, v. 11, no. 2, available from the publisher.

**Summary:** Report.

496. Laxminarayana, C.; and Crosdale, P. J., 2001, *Heat of Methane Adsorption of Coal: Implications for Pore Structure Development*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 114.

**Summary:** Symposium Paper.

497. Lee-Ryan, P. B.; Fillo, John P.; Tallon, James T.; and Evans, James M., 1991, *Evaluation of Management Options for Coalbed Methane Produced Water*, available from Dan A. Thompson, University of Alabama, College of Continuing Studies.

**Summary:** This is a conference paper presented at the Coalbed Methane Symposium, 3rd, in 1991. This paper reports on an investigation into the feasibility and costs associated with treatment and disposal of waters produced with coal seam natural gas. Waters from the Black Warrior Basin in Alabama and the Lance-Fox Hills aquifer in Wyoming were used for the evaluation.

498. Leel, Woodruff; and Wickstrom, Charles, 1987, *Methane Emissions Along a Salt Marsh Salinity Gradient*.

**Summary:** Report.

499. Leel, Woodruff; and Wickstrom, Charles, 1990, *Coalbed Methane Resource of the Rock Springs Formation on the Rock Springs Uplift, Sweetwater County, Wyoming*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

500. Lemons, B. N.; and Nemirow, L., 1989, *Maximizing the Section 29 Credit in Coal Seam Methane Transactions*, from Journal of Taxation, v. 70, available from the publisher.

**Summary:** Article

501. Levine, J. R., 1987, *Influence of Coal Composition on the Generation and Retention of Coalbed Natural Gas*, from the proceedings of the 1987 Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 8711.

**Summary:** Symposium Paper.

502. Levine, J. R., 1990, *Generation, Storage and Migration of Natural Gas in Coal Bed Reservoirs*, from the Alberta Research Council, available in Information Series 109.

**Summary:** Alberta Research Council Report.

503. Levine, J. R., 1991, *The Impact of Oil Formed During Coalification on Generation and Storage of Natural Gas in Coalbed Reservoir Systems*, from the proceedings of the 1991 Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 9126.

**Summary:** Symposium Paper.

504. Levine, J. R., 1991, *New Methods for Assessing Gas Resources in Thin-bedded, High-ash Coals*, from the proceedings of the 1991 Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 9125.

**Summary:** Symposium Paper.

505. Levine, J. R., 1992, *Five Common Misconceptions Regarding Coalbed Gas Reservoir Systems*, from Quarterly Review of Methane from Coal Seams Technology, v. 9, nos. 3-4, available from the publisher.

**Summary:** Report.

506. Levine, J. R., 1992, *Oversimplifications Can Lead to Faulty Coalbed Gas Reservoir Analysis Five*, from Oil & Gas Journal, v. 90, no. 47, available from the publisher.

**Summary:** Article.

507. Levine, J. R., 1993, *Coalification: The Evolution of Coal as Source Rock and Reservoir Rock for Oil and Gas*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

508. Levine, J. R., 1996, *Model Study of the Influence of Matrix Shrinkage on Absolute Permeability of Coal Bed Reservoirs*, available from the publisher, the Geological Society, London, as Special Publication 109.

**Summary:** Geological Society Report.

509. Lewis, R. T., 1999, *Coalbed Methane Production of the Buck Knob Anticline Field, Wise County, Virginia*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 83.

**Summary:** AAPG Bulletin.

510. Lico, M. S.; Kharaka, Y. K.; Carothers, W. W.; and Wright, V. A., 1982, *Methods for Collection and Analysis of Geopressed Geothermal and Oil Field Waters*, available from the United States Geological Survey as Report W 2194.

**Summary:** USGS Report.

511. Linz, David G.; Simpson, T. E.; Lawrence, Alonzo W.; Miller, Jeffrey A.; and Davis, Hal A., 1993, *Coalbed Methane Produced Water Management Strategies in the Black Warrior Basin of Alabama*, available from the University of Alabama.

**Summary:** Paper contains a summary of data gathered for the development of a guidance manual that presents the methodology for managing produced water in the Black Warrior Basin of Alabama. The method presented manages the water through the use of treatment ponds and National Pollutant Discharge Elimination System (NPDES) permits.

512. Littke, R.; and Leythaeuser, D., 1993, *Migration of Oil and Gas in Coals*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

513. Logan, Terry L.; and Marshall, Richard B., 1985, *Drilling and Configuration Methods for Deep Coalbed Methane Wells Used at the Red Mountain Site, Piceance Basin, Colorado*, available from the Gas Technology Institute as GRI-85/0137.

**Summary:** This GRI topical report discusses the findings from engineering analyses and field experiences of the Deep Coal Seam Project in the Piceance Basin of Colorado.

514. Logan, T. L., 1988, *Horizontal Drainhole Drilling Techniques Used in Rocky Mountain Coal Seams*, available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

515. Logan, T. L., 1989, *Coalbed Methane; 6, Western Basins Dictate Varied Operations*, from Oil & Gas Journal, available from the publisher.

**Summary:** Article.

516. Logan, T. L.; Clark W. F.; and McBane Richard A., 1989, *Comparing Different Coalbed Methane Completion Techniques, Hydraulic Fracture and Openhole Cavity, at the Northeast Blanco Unit, San Juan Basin*, available from the publisher, the University of Alabama, School of Mines and Energy Development.

**Summary:** This conference paper discusses the different completion techniques used on wells in the San Juan Basin.

517. Logan, T. L.; Clark W. F.; and McBane R. A., 1992, *Comparing Openhole Cavity and Cased Hole Hydraulic Fracture Completion Techniques, San Juan Basin, New Mexico*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

518. Logan, T. L., 1993, *Drilling Techniques for Coalbed Methane*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

519. Logan, Terry L; McLennan, John D.; and Wyman, Richard E., 1995, *Cavity Completion Technique for Coal Gas Reservoirs: Procedures*, available from the Gas Technology Institute as GRI-95/0452.

**Summary:** This GRI topical report outlines the various techniques, costs, and potential hazards associated with openhole cavity completion of natural gas from coal seams.

520. Logan, T. L.; and Mavor, M. J., 1995, *Western Cretaceous Coal Seam Project Final Report*, available from the Gas Technology Institute as GRI-94/0089.

**Summary:** This final report presents the 11-year history of the Deep Coal Seam and Western Cretaceous Coal Seam Projects.

521. Logan, T. L.; and Robinson, J. R., 1995, *Western Cretaceous Coal Seam Project: Summary of the Evergreen Operating Corporation Rosa #283 Well, Cooperative Research Project, San Juan Basin*, available from the Gas Technology Institute as GRI-95/0110.

**Summary:** This GRI report discusses a remedial stimulation treatment done to enhance gas

production from a previously hydraulically fractured well.

522. Lorenson, T. D.; Kvenvolden, K. A.; Barnes, P. W.; Poppe, B. N.; Sansone, F. J.; Rust, T. M.; Lilley, M. D.; and Olson, E. J., 1995, *Isotopic Composition of Methane in Seawater of the Alaska Beaufort Sea*, from International Union of Geodesy and Geophysics, available from the University of Hawaii.

**Summary:** Conference paper. Non-USGS publication by USGS and Non-USGS authors.

523. Lyman, Robert M.; and Volkmer, John E., 2001, *Pyrophoricity (spontaneous combustion) of Powder River Basin Coals - Considerations for Coalbed Methane Development*, available online from the Wyoming State Geological Survey as Coal Report CR 01-1.

**Summary:** Discussion of potential for self-ignition of coal in the immediate vicinity of coal seam natural gas wells of the Powder River Basin. This report details the conditions that favor spontaneous combustion in subbituminous coals of the Powder River Basin.

524. Lyons, Paul C.; and Ryder, Robert T., 1995, *Selected Bibliography of Appalachian Coalbed Methane*, available from the United States Geological Survey as OF 95-0572.

**Summary:** USGS Report.

525. Lyons, Paul C., 1996, *Coalbed Methane Potential in the Appalachian States of Pennsylvania, West Virginia, Maryland, Ohio, Virginia, Kentucky, and Tennessee; An Overview*, available from the United States Geological Survey as OF 96-0735.

**Summary:** USGS Report.

526. Lyons, Paul C., 1997, *Appalachian Coalbed Methane*, from International Journal of Coal Geology, 38, available from the publisher, Elsevier.

**Summary:** Article.

527. Lyons, Paul C., 1997, *Central-Northern Appalachian Coalbed Methane Flow Grows*, from Oil & Gas Journal, July 7, 1997, available from the publisher.

**Summary:** Article.

528. Lyons, Paul C., 1998, *The Central and Northern Appalachian Basin; A Frontier Region for Coalbed Methane Development*, from International Journal of Coal Geology, 38 (1-2), available

from the publisher, Elsevier.

**Summary:** Conference Document.

529. Lyons, W. S., 2001, *Seismic Maps Ferron Coalbed Sweetspots*, available from the American Association of Petroleum Geologists in AAPG Explorer, v. 22, no. 12.

**Summary:** AAPG Report.

530. Magee, R.A.; Faist, M.B.; and Barrs, T.W., 1983, *Characterization and Disposal of Coal Gasification Waste Products: Phase 1 - Program Design*, available from the Gas Technology Institute as GRI-81/0119.

**Summary:** This is a final report on a five-year research plan that was developed to support design and permitting for disposal of solid wastes from a coal gasification facility. Discusses the regulatory and legal liabilities associated with the disposal.

531. Malone, P. G.; Briscoe, F. H.; Camp, B. S.; and Boyer, C. M., 1987, *Methods of Calculating Coalbed Methane Reserves With Insight into the Advantages and Disadvantages of Each Method*, from the proceedings of the 1987 Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 8716.

**Summary:** Symposium Paper.

532. Malone, P. G.; Camp, B. S.; and Smith, J. L., 1989, *An Investigation of Parameters Affecting Desorption Rates of Warrior Basin Coals*, from the proceedings of the 1989 Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 8921.

**Summary:** Symposium Paper.

533. Malone, R. D.; and Byrer, C. W., 1981, *Methane Recovery from Coalbeds Well Description and Field Activities Log Procedures Manual*, available from the U.S. Department of Energy Morgantown Energy Technology Center as Technical Report 82-3.

**Summary:** DOE Report.

534. Manydeeds, Stephen A., 1991, *CBM Potential of the Wind River Indian Reservation*, available from the U.S. Department of the Interior, Bureau of Indian Affairs.

**Summary:** BIA Report.

535. Markochick, Dennis J.; and Law, Ben E., 1981, *Estimates of Gas Content in Coal and Carbonaceous Rocks from Deep Drilling in Pacific Creek Area, Northeastern Green River Basin, Sweetwater County, Wyoming*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 65 (3).

**Summary:** AAPG Bulletin.

536. Markowski, A. K., 1993, *Coalbed Methane: New Energy from an Old Scourge?*, from Pennsylvania Geology, v. 24, no. 2, available from the Pennsylvania Geological Survey.

**Summary:** PGS Article.

537. Markowski, A. K., 1998, *Coalbed Methane Resource Potential and Current Prospects in Pennsylvania*, from International Journal of Coal Geology, v. 38, nos. 1-2, available from the Pennsylvania Geological Survey.

**Summary:** PGS Article.

538. Mason, Richard Z.; Siegel, Martin M.; Barone, Saverio Peter; and Gash, Bruce W., 1987, *Economic Evaluation of Underground Coal Gasification of Western Subbituminous Coal*, available from the U.S. Department of Energy Morgantown Energy Technology Center.

**Summary:** DOE Conference Paper.

539. Masszi, D., 1991, *Cavity Stress-relief Method for Recovering Methane from Coal Seams*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

540. Mastalerz, M.; and Kvale, E. P., 1998, *Coal-bed Gas Potential in Daviess County, Indiana*, available from the Indiana Geological Survey as Open-File Study 98-7.

**Summary:** Indiana Geological Survey Open-File Study.

541. Mastalerz, M.; Glikson, M.; and Golding, S. D., eds., 1999, *Coalbed Methane: Scientific, Environmental and Economic Evaluation*, available from Kluwer Academic Publishers, Boston.

**Summary:** Paper.



542. Mastalerz, M.; and Kvale, E. P., 2000, *Coal Quality Variation and Coalbed Gas Content in Boreholes SDH-383 and SDH-384 in Posey County, Indiana*, available from the Indiana Geological Survey as Open-File Study 00-5.

**Summary:** Indiana Geological Survey Open-File Study.

543. Matson, R. E., 1991, *Coal-bed Methane Discoveries in Powder River Basin*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report.

544. Mavor, M. J.; Dhir, R.; McLennan, J. D.; and Close, J. C., 1991, *Evaluation of Hydraulic Fracture Stimulation of the Colorado 32-7 Well, San Juan Basin*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

545. Mavor, M. J., 1991, *Western Cretaceous Coal Seam Project: Evaluation of Coalbed Natural Gas Openhole Cavity Completion Productivity*, available from the Gas Technology Institute as GRI-91/0374.

**Summary:** This GRI topical report discusses two openhole cavity wells evaluated to determine the reasons for the greater productivity of cavity well completions relative to cased, fractured well completions.

546. Mavor, M. J.; and Close, J. C., 1992, *Formation Evaluation of Coalbed Methane Wells*, available from the Gas Technology Institute as GRI-91/0334.

**Summary:** GRI Topical Report.

547. Mavor, M. J.; Close, J. C.; and McBane, R. A., 1992, *Formation Evaluation of Exploration Coalbed Methane Wells*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

548. Mavor, M. J.; Owen, L. B.; and Pratt, T. J., 1992, *Measurement and Analysis of Sorption Isotherm Data*, available from the Gas Technology Institute as GRI-91/0335.

**Summary:** GRI Topical Report.

549. Mavor, Mathew J., 1993, *Coal Gas Reservoir Cavity Completion Well Performance*, from the 1992 International Gas Research Conference, available from the publisher, Government Institutes, Inc.

**Summary:** This conference paper discusses San Juan Basin, Fruitland Formation coal seam natural gas wells completed with openhole cavities using a controlled injection-blowout technique.

550. Mavor, M.J.; Logan, T. L.; Close, J. C.; Pratt, T. J.; and Robinson, J. R., 1993, *Western Cretaceous Coal Seam Project: 1992 Annual Report*, available from the Gas Technology Institute as GRI-93/0245.

**Summary:** This GRI annual report discusses the Western Cretaceous Coal Seam Project's concentration on dynamic open hole completions in natural gas wells.

551. Mavor, M. J.; and Logan, T. L., 1994, *Recent Advances in Coal Gas-well Openhole Well Completion Technology*, from Journal of Petroleum Technology, v. 46, available from the publisher.

**Summary:** Article.

552. Mavor, Matt, 1995, *Coal Natural Gas Reservoir Properties and Formation Evaluation Techniques*, available from the Gas Technology Institute as GRI-95/0168.

**Summary:** This GRI topical report summarizes coal seam natural gas reservoir and fluid properties as well as the techniques necessary to obtain quantitative estimates of the properties.

553. Mavor, M. J.; Pratt, T. J.; and Nelson, C. R., 1995, *Quantify the Accuracy of Coal Seam Gas Content*, from Petroleum Engineer International, v. 68, no. 10, available from the publisher.

**Summary:** Article.

554. Mavor, M.; and Nelson, C. R., 1997, *Coalbed Reservoir Gas-in-Place Analysis*, available from the American Association of Petroleum Geologists Catalog #196 and from the Gas Technology Institute as GRI-97/0263.

**Summary:** This report prepared by the Gas Research Institute is a "How-To" manual that helps producers accurately determine the gas-in-place volume of coal seam natural gas reservoirs.

555. Mavor, M.; Pratt, T.; and DeBruin, R., 1999, *Study Quantifies Powder River Coal Seam Properties*, from Oil & Gas Journal, v. 97, no. 17, available from the publisher.

**Summary:** Article.

556. McCabe, M. A.; Robert, L. M.; Blauch, M. E.; Terracina, J. M.; Lehman, L. V.; and Bowles, B., 1999, *Investigations of a New Fracturing Fluid and Conductivity Enhancement Technology on Coalbed Methane Production*, paper presented at the 1999 SPE Mid-Continent Operations Symposium, available from the Society of Petroleum Engineers as SPE paper 52193.

**Summary:** This SPE paper presents the results of field trials of a new fracturing-fluid system and liquid surface-modification additive for coating propan in the Fruitland Coal reservoir in the San Juan Basin.

557. McCabe, Peter J.; Gautier, Donald L.; Lewan, Michael D.; and Turner, Christine, 1993, *The Future of Energy Gasses*, available from the United States Geological Survey as C 1115.

**Summary:** This USGS report discusses ways to mitigate the impact of energy gasses on the environment.

558. McCallister, T., 2000, *Impact of Unconventional Gas Technology in the Annual Energy Outlook 2000*, available online from the U.S. Department of Energy, Energy Information Administration at [http://www.eia.gov/oiaf/analysispaper/unconventional\\_gas.html](http://www.eia.gov/oiaf/analysispaper/unconventional_gas.html).

**Summary:** This section of the Department of Energy's *Annual Energy Outlook 2000* discusses unconventional gas sources such as coal seam natural gas, tight sands and gas shales.

559. McClanahan, Elizabeth A., 1995, *Coalbed Methane: Myths, Facts, and Legends of Its History and the Legislative and Regulatory Climate into the 21st Century*, available from Oklahoma Law Review, cited as 48 Okla. L. Rev. 471.

**Summary:** Law review article.

560. McCord, J. P., 1980, *Geologic Overview, Coal and Coalbed Methane Resources of the Greater Green River Coal Region, Wyoming and Colorado*, from TRW, Inc.

**Summary:** TRW Report.

561. McCulloch, C. M.; and Deul, M., 1973, *Geologic Factors Causing Roof Instability and Methane Emission Problems: The Lower Kittanning Coalbed, Cambria County, Pa.*, U. S. Bureau of Mines Report of Investigations 7769, available from the National Technical Information Service.

**Summary:** USBM Report.

562. McCulloch, C. M.; Deul, M.; and Jeran, P. W., 1974, *Cleat in Bituminous Coalbeds*, U. S. Bureau of Mines Report of Investigations 7910, available from the National Technical Information Service.

**Summary:** USBM Report.

563. McCulloch, C. M.; Levine, J. R.; Kissel, F. N.; and Deul, M, 1975, *Measuring the Methane Content of Bituminous Coal Beds*, U. S. Bureau of Mines Report of Investigations 8043, available from the National Technical Information Service.

**Summary:** USBM Report.

564. McCulloch, C. M.; Lambert, S. W.; and White, J. R., 1976, *Determining Cleat Orientation of Deeper Coalbeds from Overlying Coals*, U. S. Bureau of Mines Report of Investigations 8116, available from the National Technical Information Service.

**Summary:** USBM Report.

565. McCulloch, C. M.; and Deul, M, 1977, *Methane from Coal*, from 1976 Symposium, available from the Colorado Geological Survey in Resources Series 1.

**Summary:** CGS Symposium Paper.

566. McCulloch, C. M.; and Diamond, W. P., 1979, *Inexpensive Method Helps Predict Methane Content of Coal Beds*, from Planbook of Coal Mining, available from the publisher, McGraw-Hill, Inc., New York.

**Summary:** Report.

567. McCune, D., 2002, *Fundamentals of Coalbed Methane Production*, available from the publisher, The University of Kansas, Tertiary Oil Recovery Project, Lawrence, Kansas.

**Summary:** TORP Report.

568. McElhiney, J. E.; Paul, G. W.; Young, G. B. C.; and McCartney, J. A., 1993, *Reservoir Engineering Aspects of Coalbed Methane*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

569. McGarry, D. E., 2000, *Challenges in Assessment, Management and Development of Coalbed Methane Resources in the Powder River Basin, Wyoming*, from the proceedings of the 25th International Technical Conference on Coal Utilization and Fuel Systems.

**Summary:** Conference Document.

570. McGinnis, Norman F., 1983, *Dewatering Systems and Techniques for Coalbed Methane Wells: Volume I*, available from the Gas Technology Institute as GRI-81/0159.1.

**Summary:** Final report on study of oil and gas pumping systems evaluated for coal seam natural gas dewatering operations. Ten well systems are evaluated. First of two volumes.

571. McGinnis, Norman F., 1983, *Dewatering Systems and Techniques for Coalbed Methane Wells: Volume II*, available from the Gas Technology Institute as GRI-81/0159.2.

**Summary:** Final report on study of dewatering operations. Supplies dewatering system designs for six pump types. Includes tables and graphs that illustrate the associated costs.

572. McKay, E. J.; Butler, B. A.; and Robinson, L. N., 1979, *Coal Resource Occurrence and Coal Development Potential Maps of the Bear Creek Quadrangle, Powder River County, Montana*, available from the United States Geological Survey as OF 79-106.

**Summary:** USGS Maps / Report.

573. McKay, E. J.; and Robinson, L. N., 1979, *Coal Resource Occurrence and Coal Development Potential Maps of the Fort Howes Quadrangle, Rosebud and Powder River County, Montana*, available from the United States Geological Survey as OF 79-104.

**Summary:** USGS Maps / Report.

574. McKay, E. J.; and Robinson, L. N., 1979, *Coal Resource Occurrence and Coal Development Potential Maps of the Otter Quadrangle, Powder River County, Montana*, available from the United States Geological Survey as OF 79-105.

**Summary:** USGS Maps / Report.

575. McKee, C. R.; Bumb, A. C.; Way, S. C.; Koenig, R. A.; Reverand, J. M.; and Brandenburg, D. F., 1986, *Using Permeability-vs-Depth Correlations to Assess the Potential for Producing Gas from Coal Seams*, from *Quarterly Review of Methane from Coal Seams Technology*, v. 4, no. 1, available from the publisher.

**Summary:** Report.

576. McKee, C. R.; Bumb, A. C.; and Koenig, R. A., 1988, *Stress-dependent Permeability and*

*Porosity of Coal*, available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

577. McKinnon, I., 2002, *Canadian Coalbed Methane*, from Oil and Gas Investor, v. 22, no. 3, available from the publisher.

**Summary:** Article.

578. McLellan, M. W.; and Biewick, L. H., 1989, *Geologic Map of the Bloom Creek Quadrangle, Powder River County, Montana*, available from the United States Geological Survey as I-1968.

**Summary:** USGS Map / Report.

579. McLennan, J.D.; Schafer, P.S.; and Pratt, T.J., 1995, *A Guide to Determining Coalbed Gas Content*, Gas Research Institute report no. GRI-94/0396, available from the American Association of Petroleum Geologists.

**Summary:** This guide discusses methods for quantifying the amount and type of gas present in coalbeds through the use of recovered coal samples.

580. McPherson, Malcomb J.; and Harpalani, Satya, 1985, *Permeability and Sorption Tests on Coal*, available from the Gas Technology Institute as GRI-85/0309.

**Summary:** This GRI topical report discusses an investigation which describes the release and migration of methane through coal. Emphasis is on samples taken from the Blue Creek Seam in Alabama.

581. Mead, S. W.; Wang, F. T.; and Ganow, H. C., 1978, *Control Aspects of Underground Coal Gasification*, from the 1978 DOE Environmental Control Symposium, Washington, available from the U.S. Department of Energy as Lawrence Livermore Laboratory document UCRL-81887.

**Summary:** DOE Symposium Document.

582. Mead, S. W.; Wang, F. T.; Ganow, H. C.; and Stuermer, D. H., 1979, *Environmental Studies of LLL's Hoe Creek II Underground Coal Gasification Experiment*, from the 1979 5th Annual Underground Coal Conversion Symposium, Arlington, VA, available from the U.S. Department of Energy as Lawrence Livermore Laboratory document UCRL-82409.

**Summary:** DOE Symposium Document.

583. Mead, S. W.; Wang, F. T.; Ganow, H. C.; Stuermer, D. H., and Stone, R., 1979, *Ground-water Effects of Underground Coal Gasification Experiments in Northeastern Wyoming*, from the proceedings of the 54th Annual Fall Technical Conference of the Society of Petroleum Engineers, Las Vegas, NV, available from the Society of Petroleum Engineers.

**Summary:** SPE Conference Document.

584. Mead, S. W.; Wang, F. T.; Stuermer, D. H.; Raber, E.; Ganow, H. C.; and Stone, R., 1980, *Implications of Ground-water Measurements at the Hoe Creek UCG Site in Northeastern Wyoming*, from the 6th Annual Underground Coal Conversion Symposium, Afton, OK, available from the U.S. Department of Energy as Lawrence Livermore Laboratory document UCRL-82428.

**Summary:** Symposium Document.

585. Mead, S. W.; and Ganow, H. C., 1982, *Environmental Studies of Underground Coal Gasification Experiment in Northeastern Wyoming, Subsidence Investigations*, available from the U.S. Department of Energy as a Lawrence Livermore Laboratory Technical Report.

**Summary:** DOE Report.

586. Medina, J. C.; Butala, S. J.; Bartholomew, C. H.; and Lee, M. L., 2000, *Iron Catalyzed CO<sub>2</sub> Hydrogenation as a Mechanism for Coalbed Gas Formation*, from Fuel, v. 79, available from the publisher.

**Summary:** Article.

587. Medina, J. C.; Butala, S. J.; Bartholomew, C. H.; and Lee, M. L., 2000, *Low Temperature Iron- and Nickel-catalyzed Reactions Leading to Coalbed Gas Formation*, from Geochemica et Cosmochimica Acta, v. 64, available from the publisher.

**Summary:** Article.

588. Medlin, J. H.; Swanson, Vernon E.; and Coleman, S. L., 1976, *Major, Minor, and Trace Elements in U.S. Coal*, available from the United States Geological Survey as C 0757.

**Summary:** USGS Conference Document.

589. Meissner, C. R., Jr.; Cecil, C. B.; and Stricker, G. D., eds. 1976, *Coal Geology and the Future; Symposium Abstracts and Selected References*, available from the United States Geological Survey as C 0757.

**Summary:** USGS Publication.

590. Meissner, F. F., 1984, *Cretaceous and Lower Tertiary Coals as Source for Gas Accumulations in the Rocky Mountain Area*, available from the Rocky Mountain Association of Geologists in Hydrocarbon Source Rocks of the Greater Rocky Mountain Region.

**Summary:** RMAG Report.

591. Meissner, F. F., 1987, *Mechanisms and Patterns of Gas Generation, Storage Expulsion-migration and Accumulation Associated with Coal Measures, Green River and San Juan Basins, Rocky Mountain Region, USA*, from Collection Colloques et Seminaires, v. 45, available from the publisher.

**Summary:** Article.

592. Meyer, J., 2000, *Coal Bed Methane Produced Water-Infiltration/Evapotranspiration, Belle Fourche River Basin, 1993-1999*, available from the Bureau of Land Management.

**Summary:** BLM Report.

593. M'Gonigle, John W.; and Robinson Roberts, Laura N., 1997, *Mineral Resource Potential; Leasable Minerals (Energy Resources); Coal Geology and Resources*, available from the United States Geological Survey as B 2127.

**Summary:** USGS Report.

594. Michael, G. Eric; Law, Ben E.; and Anders, D. E., 1990, *Geochemical Evaluation of Gas-Bearing Coals With Respect to Maturity, Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado*, available from the United States Geological Survey in C 1060.

**Summary:** USGS Conference Paper.

595. Michelsen, J. K.; and Khaavari-Khorasani, G., 1999, *The Physics and Efficiency of Petroleum Expulsion from Coal*, available from the publisher, Kluwer Academic Publishers, Boston.

**Summary:** Report.

596. Mitcham, S. A.; and Wobeser, G., 1993, *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama*, available from the Geological Survey of Alabama.



**Summary:** GSA Report.

597. Mitchell, T. E.; and Pappajohn, S. P., 1991, *Coalbed Methane Production Potential in Complex Geologic Settings*, available from the publisher Techbooks, Fairfax, VA, in Geology in Coal Resource Utilization.

**Summary:** Report.

598. Moffat, D. H.; and Weale, K. E., 1955, *Sorption by Coal of Methane at High Pressure*, from Fuel, v. 34, available from the publisher.

**Summary:** Article.

599. Molnia, C. L.; Kottowski, F. E.; Jobin, D. A.; and O'Connor, J. T., 1985, *Coal in New Mexico: Issues in Quality and Resources*, available from the United States Geological Survey.

**Summary:** USGS Report.

600. Montgomery, S. L., 1986, *Coalbed Methane: An Old Hazard Becomes a New Resource*, from Petroleum Frontiers, v. 3, no. 4, available from the publisher.

**Summary:** Article.

601. Montgomery, S. L., 1999, *Powder River Basin, Wyoming: An Expanding Coalbed Methane (CBM) Play*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 83.

**Summary:** AAPG Bulletin.

602. Montgomery, Scott L.; Tabet, David E.; and Barker, Charles E., 2001, *Upper Cretaceous Ferron Sandstone; Major Coalbed Methane Play in Central Utah*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 85 (2).

**Summary:** This AAPG bulletin discusses drilling for coal seam natural gas in the Upper Cretaceous Ferron Sandstone of central Utah.

603. Mount, David R.; and Gulley, David D., 1992, *Development of a Salinity/Toxicity Relationship to Predict Acute Toxicity of Saline Waters to Fresh Water Organisms*, available from the Gas Technology Institute as GRI-92/0301.

**Summary:** Report on work to develop a Salinity / Toxicity Relationship (STR) that can be used to

predict the toxicity of saline waters to freshwater organisms. Reports on the application of STR to field data.

604. Mount, David R.; Drottar, Kurt R.; Gulley, David D.; Frillo, John P.; and O’Neil, Patrick E., 1992, *Use of Laboratory Toxicity Data for Evaluating the Environmental Acceptability of Produced Water Discharge to Surface Waters*, available from the publisher, Plenum Press, New York, N.Y.

**Summary:** This conference paper summarizes the findings of studies as they apply to the surface discharge of produced waters. Discusses how aquatic organisms respond to the discharge.

605. Mount, David R.; O’Neil, Patrick E.; and Evans, James M., 1993, *Discharge of Coalbed Produced Water to Surface Waters – Assessing, Predicting, and Preventing Ecological Effects*, available from the Gas Technology Institute as GRI-93/0486-0001.

**Summary:** This journal article discusses a GRI study into the environmental acceptability of discharging coalbed produced waters in the Black Warrior Basin. Discusses the safety of discharging such waters.

606. Mount, David R.; Gulley, David D.; and Evans, James M., 1993, *Salinity/Toxicity Relationships to Predict the Acute Toxicity of Produced Waters to Freshwater Organisms*, available from the Society of Petroleum Engineers as SPE paper 26007.

**Summary:** This conference paper discusses the Salinity/Toxicity Relationships equations used to provide accurate predictions of the toxicity of produced waters.

607. Mountain Fuel Resources, Inc., 1978, *Demonstration Project for Methane Recovery from Unminable Coalbeds*, from a technical proposal submitted to the U. S. Department of Energy.

**Summary:** Mountain Fuel Resources technical proposal.

608. Mountain Fuel Supply Company, 1980, *Demonstration Project for Methane Recovery from Unminable Coalbeds, Progress Report No. 11*, prepared for the U. S. Department of Energy.

**Summary:** DOE Contracted Report.

609. Mowers, T.; and Wade, L., 1994, *Greater Green River Basin Bibliography: Selected References*, available from the Gas Technology Institute as GRI-95/0018.

**Summary:** Bibliography containing more than 260 items in two sections: Coalbed Methane and Tight Gas Sands.

610. Mroz, T. H.; Ryan, J. G.; and Byrer, C. W., 1983, *Methane Recovery from Coalbeds: A Potential Energy Source*, available from the U. S. Department of Energy.

**Summary:** DOE Report.

611. Mullen, M. J., 1988, *Log Evaluation in Wells Drilled for Coal-bed Methane*, available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

612. Mullen, M. J., 1991, *Cleat Detection in Coalbeds Using the Microlog*, available from the Rocky Mountain Association of Geologists.

**Summary:** RMAG Report.

613. Murphy, Edward C.; and Goven, Gerald E., 1998, *The Coalbed Methane Potential of North Dakota Lignites*, available from the North Dakota Geological Survey.

**Summary:** NDGS Report.

614. Murray, D. K., 1991, *Coalbed Methane: Natural Gas Resources from Coal Seams*, available from the publisher, Techbooks, Fairfax, VA, in Geology in Coal Resource Utilization.

**Summary:** Report.

615. Murray, D. K., 1996, *Coalbed Methane in the USA: Analogues for Worldwide Development*, available from the Geological Society, London, as Special Publication 109.

**Summary:** Geological Society Report.

616. Murray, D. K., 2000, *CBM in the United States*, from World Coal, March 2000, available from the publisher.

**Summary:** Article.

617. Murray, D. K., 2002, *Deep Coals Hold Big Part of Resource*, from American Oil & Gas Reporter, v. 45, no. 5, available from the publisher.

**Summary:** Article.

618. Murrie, G. W., 1977, *Coal and Gas Resources of the Lower Hartshorne Coalbed in LeFlore and Haskell Counties, Oklahoma*, available from the Geological Society of America in GSA Abstracts with Programs, v. 9, no. 1.

**Summary:** GSA Report.

619. Mutmanský, J. M., 1999, *Guidebook on Coalbed Methane Drainage for Underground Coal Mines*, available from the Coalbed Methane Outreach Program of the U.S. Environmental Protection Agency as Document No. 60938.

**Summary:** EPA Report.

620. Nelson, Charles R., 1993, *GRI Basic Research Group Coalbed Methane Research*, available from the Gas Technology Institute as GRI-93/0486-0003.

**Summary:** This journal article discusses the evaluation of the accuracy of measurements on coal seam reservoirs by the GRI's Basic Research Group.

621. Nelson, Charles R., 1997, *Advances in Coalbed Reservoir Gas-In-Place Analysis*, from Gas Tips, v. 4, no. 1, available online from the Gas Technology Institute at <http://www.gti-ticora.com/Publications.html>.

**Summary:** This GRI report discusses new log and core analysis methods used to determine the gas-in-place volume of coalbed reservoirs.

622. Nelson, C. R.; Mavor, M. J.; Pratt, T. J.; and Casey, T. A., 1997, *Protocol Ups Coal Seam Gas Analysis*, from American Oil & Gas Reporter, v. 40, available from the publisher.

**Summary:** Article.

623. Nelson, C. R., 1999, *Common Sources of Error in Coalbed Gas Resource and Reservoir Gas-In-Place Values*, available from the publisher, the American Association of Petroleum Geologists as AAPG Bulletin, v. 83.

**Summary:** AAPG Bulletin.

624. Nelson, Charles R., 1999, *Changing Perceptions Regarding the Size and Production Potential of Coalbed Methane Resources*, from Gas Tips, v. 5, no. 2, available from the Gas Technology Institute.

**Summary:** GRI Report.

625. Nelson, C. R., 1999, *Gem in the Rough; Technology, Economics Putting New Shine on Coalbed Methane*, from American Oil & Gas Reporter, v. 42, no. 3, available from the publisher.

**Summary:** Article.

626. Nelson, Charles R., 2000, *Coalbed Methane Potential of the U.S. Rocky Mountain Region*, from Gas Tips, available online from the Gas Technology Institute at <http://www.gti-ticora.com/Publications.html>.

**Summary:** This GRI report discusses the potential for production of natural gas from Rocky Mountain region coal seams.

627. Nelson, Charles R., 2000, *New Methods for Coalbed Reservoir Gas-In-Place Analysis: Results from Case Studies in the San Juan, Powder River, Black Warrior and Central Appalachian Basins*, available online from the Gas Technology Institute at <http://www.gti-ticora.com/Publications.html>.

**Summary:** This GRI report discusses new methods used to determine the gas-in-place volume of coalbed reservoirs.

628. Nelson, C. R., 2001, *Geologic Controls on Effective Cleat Porosity Variation in San Juan Basin Fruitland Formation Coalbed Reservoirs*, from the proceedings of the International Coalbed Methane Symposium. Tuscaloosa, Alabama, available as Paper 108.

**Summary:** Symposium Paper.

629. Nelson, C. R.; and Pratt, T. J., 2001, *In Coalbed Gas Plays, Reservoir Variables Key to Success*, from American Oil & Gas Reporter, v. 44, no. 3, available from the publisher.

**Summary:** Article.

630. Nichols, D. J., 1999, *Stratigraphic Palynology of the Fort Union Formation (Paleocene) in the Powder River Basin, Montana and Wyoming; A Guide to Correlations of Methane-producing Coal Zones*, available from the Wyoming Geological Association in Guidebook - Wyoming Geological Association, 50.

**Summary:** WGA Publication.

631. Nikols, D. J.; and Rottenfusser, B. A., 1991, *Coalbed Methane - A Canadian Resource for the 1990's*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

632. Noack, K., 1998, *Control of Gas Emissions in Underground Coal Mines*, from International Journal of Coal Geology, v. 35, nos. 1-4, available from the publisher.

**Summary:** Article.

633. Nolde, J. E.; and Spears, D., 1998, *A Preliminary Assessment of In-place Coalbed Methane Resources in the Virginia Portion of the Central Appalachian Basin*, from International Journal of Coal Geology, v. 38, available from the publisher.

**Summary:** Article.

634. Nuccio, Vito, 2000, *Coal-bed Methane: Potential and Concerns*, available online from the United States Geological Survey as Fact Sheet FS-123-00.

**Summary:** This USGS Fact Sheet describes the coal seam natural gas industry in the United States and broadly discusses some of the concerns associated with its production.

635. Nuccio, V. F., 2002, *What is it? And Why All the Fuss?*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of North America, II.

**Summary:** RMAG Report.

636. Nuttall, Brandon C.; Chesnut, Donald R.; and Drahovzal, James A., 1999, *Western Kentucky Coalbed Methane Consortium: A Proposed Joint Geologic Study of Coal-Bearing Strata of the Western Kentucky Coal Field Emphasizing Coalbed Methane Resource Characterization*, available online from the Kentucky Geological Survey.

**Summary:** This is a proposal for a study designed to provide stratigraphic and structural framework, and coal thickness models for use by industry for exploration.

637. Ogbe, D. O.; Packer, J. B.; and Clough, J. G., 2002, *Risk-weighted Volumetric Analysis to Estimate Gas Reserves and Evaluate Coalbed Methane Potential of the Lower Matanuska Valley, Cook Inlet Basin, Alaska*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 86.

**Summary:** AAPG Bulletin.

638. Olague, N. E.; and Smith, D. M., 1989, *Diffusion of Gases in American Coals*, from Fuel, v. 68,

available from the publisher.

**Summary:** Article.

639. Oldaker, P. R., 1991, *Hydrogeology of the Fruitland Formation, San Juan Basin, Colorado and New Mexico*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

640. Oldaker, Paul, 2000, *San Juan Basin Gas Seeps*, from the 2000 Coalbed Methane Symposium.

**Summary:** Symposium Document.

641. Olszewski, A. J.; Luffel, D. L.; Hawkins, J.; Zuber, M. D.; McLennan, J. D.; Schatz, J. F.; and Truman, R. B., 1993, *Development of Formation Evaluation Technology for Coalbed Methane*, available from the Gas Technology Institute as GRI-93/0178.

**Summary:** This GRI report discusses the identification and development of methodologies for estimating zone thickness, coal quality, gas content, isotherm, permeability, and cleat orientation from log data.

642. Oman, Charles L.; Finkelman, R. B.; Coleman, S. L.; and Bragg, L. J., 1988, *Selenium in Coal from the Powder River Basin, Wyoming and Montana*, available from the United States Geological Survey as C 1025.

**Summary:** USGS Conference Document.

643. O'Neil, Patrick E.; Mettee, Maurice F.; and Harris, Steven C., 1987, *Coalbed Methane Development in Alabama: Biological and Hydrological Conditions of Streams Draining the Cedar Cove Degasification Field*, available from the Geological Survey of Alabama as Circular 133.

**Summary:** Findings of a study into the biological and water quality impacts of coal seam natural gas production water disposal into surface water streams in the Cedar Cove degasification field within Alabama's Warrior Coal Basin.

644. O'Neil, P. E.; Harris, S. C.; Drottar, K. R.; Mount, D. R.; Fillo, J. P.; and Mettee, M. F., 1989, *Biomonitoring of a Produced Water Discharge from the Cedar Cove Degasification Field, Alabama*, available from the Geological Survey of Alabama as Bulletin 135.

**Summary:** Examines the environmental fate and effect of a natural gas produced water effluent. This

study provides information and methodologies for defining acceptable conditions under which produced waters from coal seam natural gas wells can be discharged into surface waters.

645. O'Neil, P. E.; Harris, S. C.; and Mettee, M. F., 1989, *Stream Monitoring of Coalbed Methane Produced Water from the Cedar Cove Degasification Field, Alabama*, available from the University of Alabama.

**Summary:** Conference paper that discusses the instream effects of an NPDES-permitted discharge of produced waters on biological communities in a stream environment. Data from this study was used to develop concentration response models.

646. O'Neil, Patrick E.; Harris, Steven C.; Mettee, Maurice F.; McGregor, Stuart W.; and Shepard, Thomas E., 1991, *Long-Term Biomonitoring of a Produced Water Discharge from the Cedar Cove Degasification Field, Alabama*, available from the Gas Technology Institute as GRI-90/0233.

**Summary:** Final report on samples of coal seam natural gas produced water that was discharged to a receiving stream in the Warrior Coal Basin of Alabama. The study was conducted to determine the long-term environmental effects.

647. O'Neil, P. E.; and Harris, S. C., 1992, *Development of an Instream Bioassessment Methodology for the Surface Disposal of Coalbed Methane Produced Waters*, available from the Geological Survey of Alabama as Bulletin 149.

**Summary:** Reports on the development and testing of an instream bioassessment technique for assessing the effects of stream discharged production water. This bioassessment technique was developed in the coal seam natural gas fields of Alabama's Warrior Basin.

648. O'Neil, Patrick E.; Harris, Steven C.; Mettee, Maurice F.; Isaacson, H. Ronald; and Evans, James M., 1992, *Biological Fate and Effect of Coalbed Methane Produced Waters Discharged into Streams of the Warrior Basin, Alabama*, available from the publisher, Plenum Press, New York, NY.

**Summary:** This is a conference paper that reviews studies containing relevant information to the biological fate and effect of saline waters discharged to stream environments. Presents data relative to studies relating to producing natural gas from coal seams.

649. O'Neil, Patrick E.; Isaacson, H. Ronald; and Evans, James M., 1992, *Surface Discharge of Coalbed Methane Produced Waters in the Warrior Basin of Alabama, The Cedar Cove Model*, available from the publisher, Plenum Press, New York, NY.

**Summary:** This conference paper asserts that recent implementation of water quality-based control of effluents with toxicity testing and possible biocriteria requirements is proof that in the future there will



be a more comprehensive regulation of the discharge of waste water. Discusses the Cedar Cove Model within the framework of existing discharge permit requirements, future regulation, and coal seam natural gas studies completed in the state of Alabama.

650. O'Neil, Patrick E., 1994, *A Review of Water-Quality, Biological Risk, and Discharge Monitoring Studies Relative to the Surface Disposal of Produced Waters from the Development of Coal-Seam Methane in Alabama*, available from the Geological Survey of Alabama as Circular 177.

**Summary:** Presents results of water-quality, aquatic toxicity, and biomonitoring studies in the Warrior Coal Basin of Alabama. Presents the Cedar Cove Model, which is a systematic approach for monitoring the discharge of produced-water effluents to surface waters.

651. Ortiz, Isais; Weller, T. F.; Anthony, R. V.; Frank, James; Linz, David G.; and Nakles, David V., 1993, *Disposal of Produced Waters: Underground Injection Option in the Black Warrior Basin*, available from the University of Alabama.

**Summary:** Conference paper discusses study that summarizes underground injection activity as an alternative to stream discharge of coal seam natural gas produced waters.

652. Osborne, T. E.; Moore, D. K.; Kidd, J. T.; and Pescatore, F. T., 1991, *Coalbed Methane Potential of the Northern Coosa Basin in Alabama*, from *Journal of Coal Quality*, v. 10, available from the publisher.

**Summary:** Article.

653. Owsiacki, G.; and Payie G., 2000, *Coalbed Methane Potential in British Columbia*, available from the British Columbia Ministry of Energy and Mines as GeoFile 2000-7.

**Summary:** British Columbia Ministry of Energy and Mines Report.

654. Oyler, D. C.; Diamond, W. P.; and Jeran, P. W., 1979, *Directional Drilling for Coalbed Degasification*, U. S. Bureau of Mines Report of Investigations 8380, available from the National Technical Information Service.

**Summary:** USBM Report.

655. Oyler, D. C.; and Diamond, W. P., 1982, *Drilling a Horizontal Coalbed Methane Drainage System from a Directional Surface Borehole*, U. S. Bureau of Mines Report of Investigations 8640, available from the National Technical Information Service.

**Summary:** USBM Report.

656. Oyler, D. C.; and Stubbs, R. B., 1985, *Measuring Formation Pressures and the Degree of Gas Drainage in a Large Coalbed Gas Drainage Field*, U. S. Bureau of Mines Report of Investigations 8986, available from the National Technical Information Service.

**Summary:** USBM Report.

657. Palmer, I. D.; Davids, M. W.; and Leu, S. J., 1992, *Analysis of Unconventional Behavior Observed During Coalbed Fracturing Treatments*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

658. Palmer, I. D.; and Sparks, D. P., 1992, *Measurement of Induced Fractures by Downhole TV Camera in Black Warrior Basin Coalbeds*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

659. Palmer, I. D.; Lambert, S. W.; and Spitler, J. L., 1993, *Coalbed Methane Well Completions and Stimulations*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

660. Palmer, I. D., 1993, *Induced Stresses Due to Propped Hydraulic Fracture in Coalbed Methane Wells*, paper presented at the 1993 SPE Rocky Mountain Regional Low Permeability Reservoirs Symposium, available from the Society of Petroleum Engineers as SPE Paper 25861.

**Summary:** This SPE paper discusses applications of the concept of altered-stress fracturing as they apply to the San Juan Basin.

661. Pashin, J.C.; Ward, W.E., II; Winston, R.B.; Chandler, R.V.; Bolin, D.E.; Hamilton, R.P.; and Mink, R.M., 1990, *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part II, Black Warrior Basin*, available from the Gas Technology Institute as GRI-90/0014.2.

**Summary:** This is an annual report that discusses the geologic evaluation of coal seam natural gas production parameters for the Black Warrior Basin in Alabama.

662. Pashin, J. C., 1991, *Regional Analysis of the Black Creek-Cobb Coalbed-Methane Target Interval, Black Warrior Basin, Alabama*, available from the Geological Survey of Alabama as

Bulletin 145.

**Summary:** Geological Survey of Alabama Bulletin.

663. Pashin, J.C.; Ward, W.E., II; Winston, R.B.; Chandler, R.V.; Bolin, D.E.; Richter, K. E.; Osborne, W. E.; and Sarnecki, J. C., 1991, *Structure, Sedimentology, Coal Quality and Hydrology of the Black Warrior Basin in Alabama: Controls on the Occurrence and Producibility of Coalbed Methane*, available from the Gas Technology Institute as GRI-91/0034.

**Summary:** This GRI topical report discusses the geologic evaluation of coal seam natural gas production parameters for the Black Warrior Basin in Alabama.

664. Pashin, J. C., 1994, *Coal-body Geometry and Synsedimentary Detachment Folding in Oak Grove Coalbed Methane Field, Black Warrior Basin, Alabama*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 78.

**Summary:** AAPG Bulletin.

665. Pashin, J. C., 1997, *Productivity of Coalbed Methane Wells in Alabama*, proceedings from the 1997 International Coalbed Methane Symposium, available from the University of Alabama.

**Summary:** Conference paper that discusses productivity parameters in coal seam natural gas wells and the geologic controls on natural gas production from those wells.

666. Pashin, Jack C.; and Hinkle, Frank, 1997, (Reprinted 2001), *Coalbed Methane in Alabama*, available from the Geological Survey of Alabama as Circular 192.

**Summary:** Documents the rapid growth of the coal seam natural gas industry since 1984. Summarizes the current state of the industry in Alabama. This report also discusses the numerous scientific and technological advances made since 1984.

667. Pashin, J. C., 1998, *Stratigraphy and Structure of Coalbed Methane Reservoirs in the United States: An Overview*, from the International Journal of Coal Geology v. 35, available from the publisher, Elsevier.

**Summary:** A review paper that discusses stratigraphic and structural controls on coal seam natural gas production in the United States with emphasis on the Black Warrior and San Juan basins.

668. Pashin, J. C.; and Groshong, R. H., Jr., 1998, *Structural Control of Coalbed Methane Production in Alabama*, from the International Journal of Coal Geology v. 38, available from the publisher, Elsevier.

**Summary:** This research paper discusses the influence of extensional and compressional folds and faults on the performance of coal seam natural gas wells.

669. Pashin, J. C.; Carroll, R. E.; Hatch, J. R.; and Goldhaber, M. B., 1999, *Interplay Among Cleating, Maturation, and Mineralization in Coalbed Methane Reservoirs of the Black Warrior Basin*, proceedings from the 1999 International Coalbed Methane Symposium, available from the University of Alabama.

**Summary:** This paper discusses fracturing, faulting, and mineralization in coal seam natural gas reservoirs.

670. Pashin, Jack C.; Carroll, Richard E.; Hatch, Joseph R.; and Goldhaber, Martin B., 1999, *Mechanical and Thermal Control of Cleating and Shearing in Coal; Examples from the Alabama Coalbed Methane Fields*, from the proceedings of the 1998 International Conference on Coal Seam Gas and Oil, available from Kluwer Academic Publishers, Dordrecht, Netherlands.

**Summary:** Conference Paper.

671. Pashin, J. C.; Groshong, R. H., Jr.; and Carroll, R. E., 2001, *Carbon Sequestration Potential of Coalbed Methane Reservoirs in the Black Warrior Basin: A Preliminary Look*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 143.

**Summary:** Symposium Paper.

672. Pashin, J. C.; Groshong, R. H., Jr.; and Carroll, R. E., 2001, *Enhanced Coalbed Methane Recovery Through Sequestration of Carbon Dioxide: Potential for a Market-Based Environmental Solution in the Black Warrior Basin of Alabama*, proceedings from the U.S. Department of Energy, National Energy Technology Laboratory, First National Conference on Carbon Sequestration, available from the National Energy Technology Laboratory as DOE/NETL-2001/1144.

**Summary:** This paper discusses the potential for enhanced coal seam natural gas recovery through injection of carbon dioxide and the basic considerations of geology, technology, and infrastructure required to formulate an enhanced recovery strategy.

673. Pashin, J. C.; Carroll, R. E.; Groshong, R. H., Jr.; Raymond, D. E.; McIntyre, Marcella; and Payton, W. J., 2002, *Geologic Screening Criteria for Sequestration of CO<sub>2</sub> in Coal: Quantifying Potential of the Black Warrior Coalbed Methane Fairway, Alabama*, from the U.S. Department of Energy, National Technology Laboratory, Annual Technical Progress Report, available online from the Geological Survey of Alabama at <http://www.gsa.state.al.us/gsa/CO2PAGE/CO2page.htm>.

**Summary:** This report discusses geologic factors affecting the potential for carbon sequestration and enhanced coal seam natural gas recovery. Includes important stratigraphic, structural, geothermic,

hydrologic, and coal quality data.

674. Patching, T. C., 1970, *The Retention and Release of Gas in Coal - A Review*, available from the Canadian Institute of Mining and Metallurgy in CIM Transactions, v. 63.

**Summary:** Canadian Institute of Mining and Metallurgy Report.

675. Penny, Glenn S.; and Conway, Michael W., 1994, *Coordinated Studies in Support of Hydraulic Fracturing of Coalbed Methane*, available from the Gas Technology Institute as GRI-94/0398.

**Summary:** Report on laboratory research into hydraulic fracturing procedures and products used on coal seam natural gas wells. Contains appendix with additional research papers.

676. Penny, Glenn S.; and Conway, Michael W., 1995, *Coordinated Studies in Support of Hydraulic Fracturing of Coalbed Methane*, available from the Gas Technology Institute as GRI-95/0283.

**Summary:** Findings of a project that coordinates laboratory data with field operations to ensure the application of current technology in stimulating coalbed methane wells. Data used in designing fracturing and remedial treatments in the Black Warrior Basin.

677. Penny, Glenn S.; Conway, Michael W.; Almond, Stephen W.; Himes, Ron; and Nick, Kevin E., 1996, *Mechanisms and Impact of Damage Resulting from Hydraulic Fracturing*, available from the Gas Technology Institute as GRI-96/0183.

**Summary:** This GRI topical report discusses research into the mechanisms of formation damage following hydraulic fracturing and its impact upon gas well productivity.

678. Perry, J. H.; Aul, G. N.; and Cervik, J., 1978, *Methane Drainage Study in the Sunnyside Coalbed, Utah*, U. S. Bureau of Mines Report of Investigations 8323, available from the National Technical Information Service.

**Summary:** USBM Report.

679. Perry, J. H.; Prosser, L. J., Jr.; and Cervik, J., 1980, *Methane Drainage from the Mary Lee Coalbed, Alabama, Using Horizontal Drilling Techniques*, from the proceedings of the SPE/DOE First Annual Symposium on Unconventional Gas Recovery, available from the Society of Petroleum Engineers.

**Summary:** SPE Symposium Document.

680. Petroleum Frontiers, 1986, *Coalbed Methane - An Old Hazard Becomes a New Resource*, from Petroleum Frontiers, v. 3, no. 4, available from the publisher.

**Summary:** Article.

681. Petroleum Information / Dwights, 1998, *\$110 Million Gas Gathering System Proposed for Powder River*, available from the publisher, Petroleum Information / Dwights.

**Summary:** Article.

682. Petroleum Technology Transfer Council, 2002, *Coalbed Methane Workshop On-line (Rockies Newsletter)*, Colorado School of Mines.

**Summary:** PTTC Workshop.

683. Picciano, Laura, 1994, *Gas Research Institute's Coalbed Methane Research: Selected Bibliography. (Preliminary Issue)*, available from the Gas Technology Institute as GRI-94/0473.

**Summary:** Bibliography lists reports, papers and workshop citations on the topic of coal seam natural gas. This bibliography contains only works funded by the GRI, or which extensively used GRI data.

684. Picciano, Laura, 1995, *Gas Research Institute's Appalachian Basin Research: Selected Bibliography*, available from the Gas Technology Institute as GRI-95/0297.

**Summary:** Bibliography of research and development reports. Contains reports on coal seam natural gas in the Appalachian Basin.

685. Picciano, Laura; and Sole, Linda S., 1995, *San Juan Basin Bibliography: Selected References*, available from the Gas Technology Institute as GRI-95/0120.

**Summary:** Bibliography of publications on natural gas exploration in the San Juan Basin. Contains citations of works on the topic of coal seam natural gas.

686. Pierce, Brenda, 1993, *Coalbed Methane in the Forest City Basin*, available online from the United States Geological Survey at <http://www.energy.usgs.gov/factsheets/Forest/forest.html>.

**Summary:** This USGS Fact Sheet discusses the potential for natural gas production from the coal seams in the Forest City Basin.

687. Pilcher, R. C.; Collings, R. C.; and Marshall, J. S., 2000, *An Overview of Emerging Practices and Models Used in Coal Mine Methane Resource Estimation and Reserve Evaluation*, from the proceedings of the Second International Methane Mitigation Conference, Novosibirsk, Russia.

**Summary:** Conference Document.

688. Pillard, David, *Predicting the Toxicity of Common Ions Found in Produced Waters*, available online from the Gas Technology Institute or from ENSR Consulting, Engineering, and Remediation.

**Summary:** This article discusses a software application developed to help producers determine the cause of toxicity in produced waters.

689. Popp, J. T.; and McCulloch, C. M., 1976, *Geological Factors Affecting Methane in the Beckley Coalbed*, U.S. Bureau of Mines Report of Investigations 8137, available from the National Technical Information Service.

**Summary:** USBM Report.

690. Popp, J. T.; Coleman, D. D.; and Deogh, R. A., 1979, *Investigations of the Gas Content of Coal Seams in the Vicinity of Charleston, Illinois*, available from the Illinois Institute of Natural Resources as Document 79-38.

**Summary:** IINR Document.

691. Powder River Coalbed Methane Information Council, *Coalbed Methane Development Information*, available from the Powder River Coalbed Methane Information Council.

**Summary:** This publication discusses many aspects of development of coal seam natural gas in the Powder River Basin.

692. Puglio, D. G., 1981, *Evaluating Geologic Conditions and Methane Contents of Coalbeds Through Exploration Programs in the Northern Appalachian Coalfield*, from the proceedings of the Third International Coal Exploration Symposium.

**Summary:** From Conference Proceedings.

693. Puri, R.; Evanoff, J. C.; and Brugler, M. L., 1992, *Measurement of Coal Cleat Porosity and Relative Permeability Characteristics*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

694. Puri, R.; and Seidle, J. P., 1992, *Measurement of Stress-dependent Permeability in Coal and its Influence on Coalbed Methane Production*, from *In Situ*, v. 16, available from the publisher.

**Summary:** Article.

695. Pyrak-Nolte, Laura J., 1991, *Multiphase Flow in a Structure*, available from the University of Alabama.

**Summary:** This conference paper discusses fracture void simulations that exhibit the spatial correlations observed in natural fractures.

696. Pyrak-Nolte, Laura J., 1992, *Multiphase Flow Through Cleats in Coal*, available from the Gas Technology Institute as GRI-91/0386.

**Summary:** Discusses the production potential of natural gas from coal seams. This annual report examines the work that has been done to determine how multiphase flow is controlled by the geometry of the voids in the coal cleats and the amount of saturation of each phase.

697. Pyrak-Nolte, Laura J., 1993, *Multiphase Flow Through Cleats in Coal*, available from the Gas Technology Institute as GRI-92/0503.

**Summary:** This final report discusses data on the gas-water relative permeability characteristics of coal cleats. Discusses data on the effective cleat porosity, aperture, and interconnectedness properties of five coal drill core samples.

698. Pyrak-Nolte, Laura J., 1994, *Multiphase Flow Through Cleats in Coal*, available from the Gas Technology Institute as GRI-94/0076.

**Summary:** This is an annual report that discusses data on the effective cleat porosity, aperture, and interconnectedness properties of coal core samples taken from the Fruitland Formation in the San Juan Basin of Colorado and New Mexico.

699. Pyrak-Nolte, Laura J., 1997, *Simulation of Three-Dimensional Fracture Network Geometry in Coal*, available from the Gas Technology Institute as GRI-96/0411.

**Summary:** This report describes a method for simulating three-dimensional fracture networks used in the development of a simulator that realistically models macroscopic and meso-scale geometrical properties of coal cleats.

700. Questa Engineering Corporation, 2000, *The 3M CBM Final Report; Volume I: Analysis and Results and Volume II: The 3M CBM Model Users Guide*, available online from the Colorado Oil and



Gas Conservation Commission.

**Summary:** Describes the 3M Model, which was developed to conduct a large scale, two-dimensional simulation of the Colorado portion of the Fruitland Coal in the San Juan Basin. Provides a tool that can be used to evaluate the impact of various factors on gas seepage. This coal seam natural gas model can also be used to evaluate potential infill drilling, alternative production or operation scenarios, or other coal seam natural gas issues.

701. Radlinski, A. P.; and Radlinska, E. Z, 1999, *The Microstructure of Pore Space in Coals of Different Rank*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

702. Ramaswamy, G., 2001, *Advances Key for Coalbed Methane*, from American Oil & Gas Reporter, v. 44, no. 10, available from the publisher.

**Summary:** Article.

703. Ray, James P.; and Engelhardt, F. Rainer, 1992, *Produced Water Technology*, from Environmental Issues and Solutions, available from the publisher, Plenum Press.

**Summary:** Report.

704. Reeves, S., 2001, *Geologic Sequestration of CO<sub>2</sub> in Deep, Unminable Coalbeds: An Integrated Research and Commercial-scale Demonstration Project*, from the proceedings of the National Energy Technology Laboratory First National Conference on Carbon Sequestration, available from the U.S. Department of Energy, National Energy Technology Laboratory.

**Summary:** NETL Conference Document.

705. Reinecke, Kurt M.; Rice, Dudley D.; and Johnson, Ronald C., 1991, *Characteristics and Development of Fluvial Sandstone and Coalbed Reservoirs of Upper Cretaceous Mesaverde Group, Grand Valley Field, Garfield County, Colorado*, from the proceedings of the 1991 Field Conference of the Rocky Mountain Association of Geologists, available from the RMAG.

**Summary:** RMAG Conference Document.

706. Rice, C.A., 1999, *Waters Co-Produced with Coalbed Methane from the Ferron Sandstone in East-Central Utah*, from the 1999 annual meeting of the GSA, available from the Geological Society of America.

**Summary:** GSA Conference Paper.

707. Rice, C. A.; Ellis, M. S.; and Bullock, J. H., Jr., 2000, *Water Co-Produced with Coalbed Methane in the Powder River Basin, Wyoming: Preliminary Compositional Data*, available online from the United States Geological Survey as Open File Report 00-372.

**Summary:** Report provides preliminary data on water samples taken from 47 coal seam natural gas wells drilled in the Powder River Basin, Wyoming. The samples were taken between June 1999 and May 2000. Includes data on major, minor and trace elements.

708. Rice, Cynthia A.; and Nuccio, Vito, 2000, *Water Produced with Coalbed Methane*, available online from the United States Geological Survey as FS-0156-00.

**Summary:** USGS Fact Sheet.

709. Rice, C. A.; Bartos, T. T.; and Ellis, M. S., 2002, *Chemical and Isotopic Composition of Water in the Fort Union and Wasatch Formations of the Powder River Basin, Wyoming and Montana: Implications for Coalbed Methane Development*, available from the Rocky Mountain Association of Geologists.

**Summary:** RMAG Report.

710. Rice, D. D.; and Threlkeld, C. N., 1982, *Occurrences and Origin of Natural Gas in Ground Water, Southern Weld County, Colorado*, available from the United States Geological Survey as Open-File Report 82-496.

**Summary:** USGS Open-File Report.

711. Rice, Dudley D.; and Threlkeld, Charles N., 1986, *Comparison of Natural Gases Produced from Upper Cretaceous Fruitland Formation Coal Beds and Adjacent Reservoirs, San Juan Basin, New Mexico and Colorado*, available from the American Association of Petroleum Geologists in *AAPG Bulletin*, v. 70 (5).

**Summary:** AAPG Conference Document.

712. Rice, D. D.; Clayton, J. L.; and Pawlewicz, M. J., 1989, *Characterization of Coal-Derived Hydrocarbons and Source Rock Potential of Coal Beds, San Juan Basin, New Mexico and Colorado, USA*, from *International Journal of Coal Geology*, v. 13, available from the publisher.

**Summary:** Article.

713. Rice, D. D., 1989, *Coal-bed Methane as a Source of Hydrocarbon Gas*, from the proceedings of the 1989 International Seminar of the United Nations; Petroleum Geology and Geochemistry, Kiev, USSR, available from the publisher, Akademiya Nauk URSR, Kiev.

**Summary:** United Nations Conference Document.

714. Rice, Dudley D.; and Flores, Romeo M., 1989, *Nature of Natural Gas in Anomalously Thick Coal Beds, Powder River Basin, Wyoming*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 73 (9).

**Summary:** AAPG Conference Document.

715. Rice, D. D.; Flores, R. M.; and Law, B. E., 1989, *Nature and Origin of Lower Tertiary Coalbed Gases, Powder River Basin, Wyoming*, from the proceedings of the Coalbed Methane Symposium.

**Summary:** Symposium Paper.

716. Rice, D. D.; Epsman, M. L.; and Mancini, E. A., 1989, *Origin of Conventional and Coalbed Gases in the Black Warrior Region, Alabama*, from the proceedings of the 1989 Coalbed Methane Symposium.

**Summary:** Symposium Document.

717. Rice, D. D.; and Flores, R. M., 1990, *Coalbed Methane Potential of Tertiary Coal Beds and Adjacent Sandstone Deposits, Powder River Basin, Wyoming and Montana*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 74.

**Summary:** AAPG Bulletin.

718. Rice, Dudley D.; and Flores, Romeo M., 1991, *Controls on Bacterial Gas Accumulations in Thick Tertiary Coal Beds and Adjacent Channel Sandstones, Powder River Basin, Wyoming and Montana*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 75 (3).

**Summary:** AAPG Conference Document.

719. Rice, D. D.; Clayton, J. L.; Flores, R. M.; Law, B. E.; and Stanton, R. W., 1992, *Some Geologic Controls of Coalbed Gas Generation, Accumulation, and Production, Western United States*, available from the United States Geological Survey as Circular 1074.

**Summary:** USGS Circular.

720. Rice, Dudley D., 1993, *Composition and Origins of Coalbed Gas*, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Report. Non-USGS publication with USGS authors.

721. Rice, Dudley D.; Law, Ben E.; and Clayton, Jerry L., 1993, *Coalbed Gas; An Undeveloped Resource*, available from the United States Geological Survey as P 1570.

**Summary:** USGS Conference Document.

722. Rice, D. D., 1993, *Controls of Coalbed Gas Composition*, from the proceedings of the 1993 International Coalbed Methane Symposium, Birmingham, Alabama.

**Summary:** Symposium Document.

723. Rice, Dudley D.; Wanty, Richard B.; Byrer, Charles W.; and Kruger, Dina W., 1995, *Coalbed Methane; From Hazard to Environmental Concern and Untapped Energy Resource*, available from the United States Geological Survey as C-1108.

**Summary:** USGS Circular.

724. Rice, Dudley D.; Charpentier, Ronald R.; Fouch, Thomas D.; Schmoker, James W.; and Attanasi, Emil D., 1995, *Is "Unconventional" Gas a Sustainable Energy Source?*, available from the United States Geological Survey as C 1108.

**Summary:** USGS Conference Document.

725. Rice, D. D., 1996, *Geologic Framework and Description of Coalbed Gas Plays*, available from the United States Geological Survey as Digital Data Series DDS-30, Release 2, on CD-ROM.

**Summary:** USGS Report.

726. Rice, D. D.; Young, G. B. C.; and Paul, G. W., 1996, *Methodology for Assessment of Technically Recoverable Resources of Coalbed Gas*, available from the United States Geological Survey as Digital Data Series DDS-30, Release 2, on CD-ROM.

**Summary:** USGS Report.

727. Rice, Dudley, 1997, *Coalbed Methane — An Untapped Energy Resource and an Environmental Concern*, available from the United States Geological Survey as FS-019-97.

**Summary:** USGS Fact Sheet.

728. Rice, Dudley D., 1997, *Mineral Resources Potential; Leasable Minerals (Energy Sources); Coal-bed Resources*, available from the United States Geological Survey as B 2127.

**Summary:** USGS Report.

729. Rieke, H. H., 1980, *Arkoma Basin Report; A Study of Pennsylvanian Geology, Coal and Coalbed Methane Resources in Arkansas and Oklahoma*, from a report of the Methane Recovery from Coalbeds Project of the U. S. Department of Energy, available from the Department of Energy.

**Summary:** MRCP Report.

730. Rieke, H. H.; and Kirr, J. N., 1984, *Geologic Overview, Coal, and Coalbed Methane Resources of the Arkoma Basin - Arkansas and Oklahoma*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 17.

**Summary:** AAPG Report.

731. Rightmire, Craig T.; and Byrer, C. W., 1983, *Coal Bed Methane Exploration and Development*, from Coal Age Min. Inf. Service, available from the publisher, McGraw-Hill.

**Summary:** Report.

732. Rightmire, C. T.; Eddy, G. E.; and Kirr, J. N., 1984, *Coalbed Methane Resources of the United States*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology 17.

**Summary:** AAPG Report.

733. Rightmire, C. T.; and Choat, R., 1986, *Coal-bed Methane and Tight Gas Sands Interrelationships*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology 24.

**Summary:** AAPG Report.

734. Roberts, R. D., 2001, *Coalbed Methane Development: A Land Owner's Prospective*, paper presented at the SPE/EPA/DOE Exploration and Production Environmental Conference, available from the Society of Petroleum Engineers as SPE Paper 66572.

**Summary:** This SPE paper discusses several aspects of the Mineral Extraction Agreement between

the current owner of a large tract of property in Colorado and New Mexico and the previous owner, who retained the mineral rights that include the Raton Basin coal seam natural gas.

735. Roberts, S. B.; Clark, A. C.; and Carey, M. A., 1988, *Analyses of Seven Core Samples from Two Tertiary Coal Beds in the Sagwon Member of the Sagavanirktok Formation, North Slope, Alaska*, available from the United States Geological Survey as OF 88-0021.

**Summary:** USGS Report.

736. Roberts, S. B.; and Stanton, R. W., 1994, *Stratigraphy and Depositional Setting of Thick Coal Beds in the Grass Creek Coal Mine, Southeastern Bighorn Basin, Wyoming*, available from the publisher, the Wyoming State Geological Survey.

**Summary:** WSGS Report.

737. Roberts, S. B.; and Bossiroy, Dominique, 1995, *Stratigraphy and Coal Geology of the Lower Part of the Fort Union Formation in the Grass Creek Coal Mine Area, Southeastern Bighorn Basin, Wyoming*, available from the United States Geological Survey as C-0146.

**Summary:** USGS Map/ Report.

738. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Ochs, A. M.; Gunther, G. L.; Schuenemeyer, J. H.; and Power, H. C., 1999, *Ashland Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

739. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Bader, L. R.; Ellis, M. S.; Stricker, G. D.; Gunther, G. L.; Ochs, A. M.; Kinney, S. A.; Schuenemeyer, J. H.; and Power, H. C., 1999, *Colstrip Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

740. Roberts, S. B.; Gunther, G. L.; Taber, T. T.; Ochs, A. M.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Wilde, Edith M.; Schuenemeyer, J. H.; and Power, H. C., 1999, *Decker Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment*

*of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

741. Roberts, S. B.; and Rossi, G. S., 1999, *A Summary of Coal in the Coalmont Formation (Tertiary), North Park Basin, Colorado, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

742. Roberts, S. B.; and Rossi, G. S., 1999, *A Summary of Coal in the Fort Union Formation (Tertiary), Bighorn Basin, Wyoming and Montana, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, available from the United States Geological Survey as P 1625-A.

**Summary:** USGS Paper.

743. Roberts, Stephen B.; and Fishman, Neil S., 2000, *Coal-bed Methane Potential in the Laramie Formation, Greater Wattenberg Area, Denver Basin, Colorado; Just Wishful Thinking?*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 84 (8).

**Summary:** This AAPG conference document discusses the potential for natural gas production from coal seams in the Denver Basin of Colorado.

744. Roberts, S. B., (Submitted), *Coal in the Front Range Urban Corridor - An Overview of Coal Geology, Coal Production, and Coal-bed Methane Potential in Selected Areas of the Denver Basin, Colorado, and the Potential Impact of Historic Coal Mining and Development and Land Use Planning*, available from the United States Geological Survey as a Professional Paper.

**Summary:** USGS Paper.

745. Robinson, B. M; and Holditch, S. A., 1999, *Coal Gas Requires Stimulation*, from American Oil & Gas Reporter, v. 42, no. 12, available from the publisher.

**Summary:** Article.

746. Robinson, L. N.; Culbertson, W. C.; and Affolter, R. H., 1981, *Geology, Coal Resources, and Coal Quality of the Prairie Dog Creek EMRIA Study Area, Rosebud County, Montana*, available from the United States Geological Survey as OF 81-1136.

**Summary:** USGS Report.

747. Rodrigues, C. F.; and Lemos de Sousa, M. J., 2002, *The Measurement of Coal Porosity With Different Gases*, from International Journal of Coal Geology, v. 48, available from the publisher.

**Summary:** Article.

748. Rodvelt, G.; Willis, S.; Mullins, D.; and Toothman, R., 2002, *CT Fracturing: Multiple Coals, One Trip*, from American Oil & Gas Reporter, v. 45, no. 5, available from the publisher.

**Summary:** Article.

749. Rogers, R. E., 1994, *Coalbed Methane: Principles and Practice*, available from the publisher, Prentice Hall.

**Summary:** Report.

750. Roybal, G. H.; Anderson, O. J.; and Beaumont, E. C., eds., 1987, *Coal Deposits and Facies Changes Along the Southwestern Margin of the Late Cretaceous Seaway, West-Central New Mexico*, available from the New Mexico Bureau of Mines and Mineral Resources as Bulletin 121.

**Summary:** New Mexico Bureau of Mines and Mineral Resources Report.

751. Rozak, A. T.; and Bustin, R. M., 2001, *Measuring Permeability in Coals Utilizing Well Log Data and Log FAC Analysis*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 111.

**Summary:** Symposium Paper.

752. Ruppel, T. C.; Grein, C. T.; and Bienstock, D., 1972, *Adsorption of Methane/Ethane Mixtures on Dry Coal at Elevated Pressures*, from Fuel, v. 51, available from the publisher.

**Summary:** Article.

753. Saltsman, R.D.; Uhrin, David C.; and du Breuil, F., 1980, *Survey of Coal Industry Programs for Utilization of Methane from Coal Seams*, available from the Gas Technology Institute as GRI-79/0044.

**Summary:** This is a final report on a survey used to explore the potential for utilization of coal seam natural gas. Discusses the premise that if certain methods of drainage and degasification used by coal



mining companies to capture methane become routine, then the investment necessary to make methane collection profitable will be justified.

754. Sanderson, G. A.; and Berggren, L. W., 1998, *White Paper: Update on Application of § 29 Tax Credit to Coal Seam Gas*, available from the U.S. Environmental Protection Agency.

**Summary:** EPA Report.

755. Sanfilipo, John R.; Barker, Charles E.; Stanton, Ron W.; Warwick, Peter D.; and Morris, Loyd E., 2000, *A Shallow Coal-bed Methane Show in the Gulf Coast of Texas, Indication of Down-dip Commercial Potential?*, from the proceedings of 2000 Annual Meeting of the American Association of Petroleum Geologists, available from the AAPG.

**Summary:** This AAPG conference document discusses the potential for production of natural gas from coal seams along the Gulf Coast of Texas.

756. Sato, T., 1981, *Methane Recovery from Coalbeds: Surface and Physical Properties of Western United States Coals*, from an unpublished M.S. Thesis, University of New Mexico, Albuquerque.

**Summary:** Master's Thesis.

757. Saulsberry, J. L.; Schraufnagel, R. A.; and Jones, A. H., 1992, *Fracture Height Growth and Production from Multiple Reservoirs*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

758. Saulsberry, J. L.; Spafford, S. D.; Steidl, P. F.; Litzinger, L. A.; Durden, A. H.; Rochester, C. L.; Kuuskraa, V. A.; and Young, G. B. C., 1994, *Effective Completions for Shallow Coal Seams*, available from the Gas Technology Institute as GRI-93/0366.

**Summary:** This GRI topical report discusses research designed to facilitate development of shallow coalbed methane reserves that were bypassed while the deeper seams were explored and developed.

759. Saulsberry, J. L.; Schafer, P. S.; and Schraufnager, R. A., eds., 1996, *A Guide to Coalbed Methane Reservoir Engineering*, available from the Society of Petroleum Engineers, also available from the Gas Technology Institute as GRI-94/0397.

**Summary:** This SPE document provides practical methods for the evaluation and development of coal seam natural gas reservoirs.

760. Sawyer, W. K.; Saulsberry, J. L.; Schraufnagel, Richard A.; and Paul, G. W., 1991, *History Match of a Multi-Seam Coalbed Well in the Black Warrior Basin*, available from the publisher, the University of Alabama, College of Continuing Studies.

**Summary:** This conference paper discusses a three-dimensional reservoir simulation study used to history match the first 400 days of gas and water production from a multi-completion well in the Black Warrior Basin.

761. Saxby, J. D.; and Shibaoka, M., 1986, *Coal and Coal Macerals as Source Rocks for Oil and Gas*, from Applied Chemistry, v. 1., available from the publisher.

**Summary:** Article.

762. Schenk, C. J.; Nuccio, V. F.; Flores, R. M.; Johnson, R. C.; Roberts, S. B.; and Collet, T. S., 2001, *Coal-bed Gas Resources of the Rocky Mountain Region*, available from the United States Geological Survey as FS 0110-01.

**Summary:** USGS Fact Sheet.

763. Schenker, Jeffrey H., 1997, *A Molecular Dynamic Investigation into the Competitive Adsorption of Gas Species on Coal*, available from the University of Wyoming.

**Summary:** Report.

764. Scholes, P. L.; and Johnston, D., 1993, *Coalbed Methane Applications of Wireline Logs*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

765. Schraufnagel, Richard A.; McBane, Richard A.; and Kuuskraa, Vello A., 1989, *Coalbed Methane Development Faces Technology Gaps*, from Oil & Gas Journal, v. 88, no. 6, available from the publisher.

**Summary:** This journal article examines the major technology, research needs, and problem areas faced by the coal seam natural gas industry.

766. Schraufnagel, Richard A.; Saulsberry, J. L.; and Lambert, S. W., 1989, *Gas Production from Multiple Wells at Rock Creek*, available from the publisher, the University of Alabama, School of Mines and Energy Development.

**Summary:** This conference paper discusses the Methane from Multiple Coal Seams Project at Rock

Creek and its evaluation of the technology required for cost effective production of methane from multiple coal seams through single wellbores.

767. Schraufnagel, R. A., 1992, *Multiple Seam Completion and Production Experience at Rock Creek*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

768. Schraufnagel, R. A., 1993, *Coalbed Methane Production*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

769. Schroeder, K.; and Ozdemir, E., 2001, *Sequestration of Carbon Dioxide in Coal Seams*, from the proceedings of the National Energy Technology Laboratory First National Conference on Carbon Sequestration, available online at [http://www.netl.doe.gov/publications/proceedings/01/carbon\\_seq/3a4.pdf](http://www.netl.doe.gov/publications/proceedings/01/carbon_seq/3a4.pdf).

**Summary:** This NETL conference document discusses the sequestration of CO<sub>2</sub> in coal seams as a way to mitigate rising levels of CO<sub>2</sub> in the atmosphere.

770. Schuenemeyer, J. H.; Flores, R. M.; Stricker, G. D.; Ellis, M. S.; Gunther, G. L.; Taber, T. Y.; and Ochs, A. M., 1997, *A Method to Estimate the Uncertainty of Coal Resources*, available from the publisher, the Geological Society of America in Abstracts with Programs - Geological Society of America, 29 (6).

**Summary:** GSA Conference Document.

771. Schwochow, Stephen D., 1990, *Cumulative Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volumes 1 (1983) Through 7 (1989)*, from Quarterly Review of Methane from Coal Seams Technology, v. 8, no. 1., available from the Gas Technology Institute as GRI-90/0381-0001.

**Summary:** Bibliography of information on natural gas from coal seams.

772. Schwochow, Stephen D., 1991, *Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volume 8 (1990)*, available from the Gas Technology Institute as GRI-91/0486.

**Summary:** Bibliography of information on coal seam natural gas.

773. Schwochow, S. D.; Murray, D. K.; and Fahy, M. F., 1991, *Coalbed Methane of Western North America*, available from the Rocky Mountain Association of Geologists.

**Summary:** RMAG Publication.

774. Schwochow, Stephen D., 1992, *Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volume 9 (1991)*, available from the Gas Technology Institute as GRI-92/0613.

**Summary:** Bibliography of information on natural gas from coal seams.

775. Schwochow, Stephen D., 1993, *Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volume 10 (1992)*, available from the Gas Technology Institute as GRI-93/0508.

**Summary:** Bibliography of information on natural gas from coal seams.

776. Schwochow, S. D.; and Stevens, S. H., 1993, *Coalbed Methane - State of the Industry*, from Quarterly Review of Coal Seams Technology, available from the publisher.

**Summary:** Article.

777. Schwochow, S. D.; and Stevens, S. H., 1993, *Coal-seam Water: Production, Treatment, and Disposal*, from Quarterly Review of Methane from Coal Seams Technology, v. 11, no. 2, available from the publisher.

**Summary:** Article.

778. Schwochow, S. D.; and Nuccio, V. F., 2002, *Coalbed Methane of North America, II*, available from the Rocky Mountain Association of Geologists.

**Summary:** RMAG Publication.

779. Scott, A. R.; Kaiser, W. R.; and Ayers, W. B., Jr., 1991, *Composition, Distribution, and Origin of Fruitland Formation and Pictured Cliffs Sandstone Gases, San Juan Basin, Colorado and New Mexico*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

780. Scott, Andrew R.; Ambrose, William A., 1992, *Thermal Maturity and Coalbed Methane Potential of the Greater Green River, Piceance, Powder River, and Raton Basins*, published by the American Association of Petroleum Geologists and the Society of Economic Paleontologists and Mineralogists, available from the AAPG.

**Summary:** AAPG / SEPM Report.

781. Scott, A. R., 1994, *Composition of Coalbed Gases*, from *In Situ*, v. 18, available from the publisher.

**Summary:** Article.

782. Scott, A. R., 1994, *Thermogenic and Secondary Biogenic Gases, San Juan Basin, Colorado and New Mexico - Implications for Coalbed Gas Producibility*, available from the American Association of Petroleum Geologists in *AAPG Bulletin*, v. 78, no. 8.

**Summary:** AAPG Bulletin.

783. Scott, A. R.; Zhou, N.; and Levine, J. R., 1995, *A Modified Approach to Estimating Coal and Coal Gas Resources: Examples from the Sand Wash Basin, Colorado*, available from the American Association of Petroleum Geologists in *AAPG Bulletin*, v. 79.

**Summary:** AAPG Report.

784. Scott, A. R.; and Kaiser, W. R., 1996, *Factors Affecting Gas-content Distribution in Coal Beds: A Review*, from proceedings of the 1996 AAPG Rocky Mountain Section Meeting, available from the American Association of Petroleum Geologists.

**Summary:** AAPG Conference Document.

785. Scott, Andrew R., 1997, *Bacterially Mediated Reactions in Coal Beds*, available from the publisher, the Geological Society of America.

**Summary:** GSA Report.

786. Scott, A. R.; Nance, H. S.; and Beltran, M. Z., 1997, *Heterogeneity of Water and Coal Gas Production in the Northern San Juan Basin, Colorado and New Mexico*, from the International Coalbed Symposium, available as Paper 9739.

**Summary:** Symposium Document.

787. Scott, A. R., 1997, *Timing of Cleat Development in Coal Beds*, available from the American Association of Petroleum Geologists in AAPG Annual Convention Official Program, v. 6.

**Summary:** AAPG Convention Document.

788. Scott, Andrew R.; Tyler, Roger; and Clough, James G., 1998, *Exploration for Coalbed Methane in Frontier Regions Using Limited Data*, published by the American Association of Petroleum Geologists and the Society of Economic Paleontologists and Mineralogists, available from the AAPG.

**Summary:** AAPG / SEPM Report.

789. Scott, A. R., 1999, *Improving Coal Gas Recovery with Microbially Enhanced Coalbed Methane*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

790. Scott, A. R.; and Tyler, R., 2000, *Evaluating Coalbed Methane Potential in Texas*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 84, no. 10.

**Summary:** AAPG Bulletin.

791. Scott, A. R., 2001, *Coal and Coalbed Methane Resources of Texas*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 85.

**Summary:** AAPG Bulletin

792. Seidle, J. R.; and McAnear, J. F., 1995, *Pressure Falloff Testing of Enhanced Coalbed Methane Pilot Injection Wells*, paper presented at the 1995 SPE Annual Technical Conference and Exhibition, available from the Society of Petroleum Engineers as SPE Paper 30578.

**Summary:** This SPE paper discusses pressure falloff tests performed on enhanced coal seam natural gas recovery pilot in the San Juan Basin. The tests were performed to determine effective permeability to gas, wellbore skin and the average reservoir pressure.

793. Seidle, J. P., 2002, *Lessons Learned, Lessons Lost - Review of Selected Coalbed Methane Pilots*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of North America, II.

**Summary:** RMAG Report.

794. Selden, R. F., 1934, *The Occurrence of Gases in Coals*, U.S. Bureau of Mines Report of Investigations 3233, available from the National Technical Information Service.

**Summary:** USBM Report.

795. Semmelbeck, M. E.; and Lee, W. J., 1992, *Well Test Requirements for Evaluation of Coalbed Methane Development Potential*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

796. Shepard, Thomas E.; O'Neil, Patrick E.; Harris, Steven C.; and McGregor Stuart W., 1993, *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama*, available from the Geological Survey of Alabama as Circular 171.

**Summary:** Evaluates the quality and effects of coal seam natural gas produced water discharged into the Big Sandy Creek of Alabama. Compares these waters with those from other coal seam natural gas fields in Alabama.

797. Shi, J. Q.; and Durucan, S., 2001, *Application of Conventional Oil Reservoir Productivity Equations to Horizontal Coalbed Methane Wells*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 134.

**Summary:** Symposium Document.

798. Shi, J. Q.; and Durucan, S., 2001, *Identifying the Key Factors Controlling Openhole Cavity Completions at the San Juan Basin - A Numerical Study*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 135.

**Summary:** Symposium Document.

799. Shi, J. Q.; Durucan, S.; and Sinka, I. C., 2002, *Key Parameters Controlling Coalbed Methane Cavity Well Performance*, from International Journal of Coal Geology, v. 49, available from the publisher.

**Summary:** Article.

800. Shirley, K., 1999, *Exceptional Economics, Potential Drive Coalbed Methane Plays*, from American Oil & Gas Reporter, v. 42, no. 7, available from the publisher.

**Summary:** Article.

801. Shirley, K., 2002, *Operators Continue to Expand Coalbed Methane's Geographic Diversity*, from American Oil & Gas Reporter, v. 45, no. 3, available from the publisher.

**Summary:** Article.

802. Siegel, M. M.; James, W. M.; Mason, R. Z.; Gash, B. W.; and Barone, Saverio Peter, 1985, *Economic Evaluation of SNG and Methanol Using Underground Coal Gasification*, available from the publisher, Government Institutes, Inc., Rockville, Maryland.

**Summary:** This conference paper discusses an economic analysis that was conducted for substitute natural gas (SNG) production from deep coal in the Powder River Basin of Wyoming. Results are presented in tables.

803. Simmons, B. F., 1992, *Treatment and Disposal of Wastewaters Produced with Coalbed Methane by Reverse Osmosis*, available from the publisher, Plenum Press.

**Summary:** Report.

804. Simmons, B. F., 2000, *Coalbed Methane in Wyoming*, available from the publisher, the Wyoming State Geological Survey.

**Summary:** WSGS Report.

805. Sinha, K.P.; Bell, G. J.; Odette, B. B.; McLennan, J. D.; and Jones, A. H., 1990, *Coalbed Methane Production and Stimulation Database - COMPAS II: Documentation and User's Manual*, available from the Gas Technology Institute as GRI-90/0119.

**Summary:** This GRI topical report discusses the COMPAS II, a microcomputer program that provides information on oil and gas wells.

806. Smith, D. M.; and Williams, F. L., 1984, *Diffusion Models for Gas Production from Coals - Application to Methane Content Determination*, from Fuel, v. 63, available from the publisher.

**Summary:** Article.

807. Smith, D. M.; and Williams, F. L., 1984, *Diffusion Models for Gas Production from Coals - Determination of Diffusion Parameters*, from Fuel, v. 63, available from the publisher.



**Summary:** Article.

808. Smith, D. M.; and Williams, F. L., 1984, *Direct Method of Determining the Ethane Content of Coal: A Modification*, from Fuel, v. 63, available from the publisher.

**Summary:** Article.

809. Society of Petroleum Engineers, 1992, *Coalbed Methane*, available from the Society of Petroleum Engineers in Reprint Series, 35

**Summary:** SPE Report.

810. Soeder, D. J., 1991, *The Effects of Overburden Stress on Coalbed Methane Production*, available from the publisher, Techbooks, Fairfax, VA, in Geology in Coal Resource Utilization.

**Summary:** Report.

811. Sööt, P. M., 1988, *Non-conventional Fuel Tax Credit*, available from the Rocky Mountain Association of Geologists in Rocky Mountain Association of Geologists Guidebook.

**Summary:** RMAG Report.

812. Sööt, P. M., 1991, *Western United States Coalbed Methane Gas Content Correlations*, available from the Rocky Mountain Association of Geologists, in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

813. Spafford, S. D.; Dobscha, F. X.; Durden, A. H.; Hollub, V. A.; McKinnon, C. L.; Saulsberry, J. L.; Steidl, P. F.; and Stubbs, P. B., 1992, *1.1.4 Coalbed Methane Multiple Coal Seam Project 305. Rock Creek Methane from Multiple Coal Seams Completion Project*, available from the Gas Technology Institute as GRI-92/0257.

**Summary:** This report discusses the 1991 results of the Coalbed Methane Multiple Coal Seam Project.

814. Stanton, Ronald C., 1989, *Sampling of Coal Beds for Analysis*, available from the United States Geological Survey in B 1823.

**Summary:** USGS Report.

815. Stanton, R.; Flores, R.; Warwick, P. D.; Gluskoter, H.; and Stricker, G. D., 2001, *Coal Bed Sequestration of Carbon Dioxide*, from the National Energy Technology Laboratory First National Conference on Carbon Sequestration, available online from the National Energy Technology Laboratory at [http://www.netl.doe.gov/publications/proceedings/01/carbon\\_seq/3a3.pdf](http://www.netl.doe.gov/publications/proceedings/01/carbon_seq/3a3.pdf).

**Summary:** Discusses the USGS project, "Assessment of Geologic Reservoirs for Carbon Dioxide Sequestration".

816. Steidl, P. F., 1991, *Inspections of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama*, available from the University of Alabama.

**Summary:** Conference paper discusses a study of hydraulic fractures in coalbeds. Project focused on 13 wells where induced fractures were intercepted by mining in the Warrior Basin.

817. Steidl, P. F., 1991, *Observations of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama. Rock Creek Methane from Multiple Coal Seams Completion Project*, available from the Gas Technology Institute as GRI-91/0327.

**Summary:** This report presents data on the inspection of fractures from 13 wells that were intercepted by mining in the Warrior Basin in Alabama.

818. Stevens, S.H.; Lombardi, T.E.; Kelso, B.S.; and Coates, J.M., 1992, *Geologic Assessment of Natural Gas from Coal Seams in the Raton and Vermejo Formation, Raton Basin*, available from the Gas Technology Institute as GRI-92/0345.

**Summary:** This report assesses the coal seam natural gas resources of the Raton Basin.

819. Stevens, S. H.; Kelso, B. S.; Lombardi, T. E.; and Coates, J. M., 1993, *Raton Basin Assessment of Coalbed Methane Resources*, from *Quarterly Review of Methane from Coal Seams Technology*, v. 10, no. 3, available from the publisher.

**Summary:** Report.

820. Stevens, S. H.; Spector, D.; and Reimer, P., 1998, *Enhanced Coalbed Methane Recovery Using CO<sub>2</sub> Injection: Worldwide Resource and CO<sub>2</sub> Sequestration Potential*, paper presented at the 1998 International Oil and Gas Conference and Exhibition, available from the Society of Petroleum Engineers as Paper 48881.

**Summary:** This paper discusses the analysis of production operations from the first carbon dioxide enhanced coal seam natural gas pilot. The paper asserts that the San Juan Basin test well shows that injection of carbon dioxide into deep coal seams for enhancement of coal seam natural gas recovery and the sequestration of greenhouse gas is technically and economically feasible.

821. Stoeckinger, W. T., 1989, *Coal-bed Methane Production in Eastern Kansas: Its Potential and Restraints*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 73.

**Summary:** AAPG Bulletin.

822. Stoeckinger, W. T., 1989, *Methane from Coal in Southeastern Kansas: The Rebirth of an Old Industry*, from the proceedings of the 1989 Coalbed Methane Symposium, available as Paper 8964.

**Summary:** Symposium Paper.

823. Stoeckinger, W. T., 1990, *Kansas Coalbed Methane Comes on Stream*, from Oil & Gas Journal, v. 88, no. 23, available from the publisher.

**Summary:** Article.

824. Stoeckinger, W. T., 1991, *Methods to Measure Directly the Gas Content of Coals*, available from the publisher, the Kansas Geological Survey in Open-File Report 91-52.

**Summary:** KGS Open-File Report.

825. Stoeckinger, W. T., 1992, *Coalbed Methane Production Base Established in Southeast Kansas*, from Oil & Gas Journal, v. 90, no. 15, available from the publisher.

**Summary:** Article.

826. Stott, J., 2001, *Canadian Coalbed Methane Activity Intensifies*, from Oil & Gas Journal, v. 99, no. 47, available from the publisher.

**Summary:** Article.

827. Strever, M. T., 1979, *Methane Drainage Plan Using Horizontal Holes at the Hawk's Nest East Mine, Paonia, Colorado*, available from the Colorado Geological Survey as Open-File Report 80-7.

**Summary:** Examines drilling, completion, pipe size, spacing, and recovery of methane at the Hawk's Nest East Mine in Colorado.

828. Stricker, G. D., 1983, *Coal Occurrences, Quality, and Resource Assessment, National Petroleum Reserve in Alaska, U.S. Geological Survey Polar Research Symposium; Abstracts with Program*, available from the United States Geological Survey as C 0911

**Summary:** USGS Conference Document.

829. Stricker, Gary D.; and Ellis, Margaret S., 1994, *Laramide Tectonism and Paleogeography; Their Effects on Quality and Hazardous Air Pollutant Trace Element Trends in Rocky Mountain Province Paleocene Coals*, from Annual Meeting of the Society of Organic Petrology. Abstracts and Program, 11, available from the publisher, the Society of Organic Petrology.

**Summary:** Society of Organic Petrology Conference Document.

830. Stricker, G. D.; and Ellis, M. S., 1999, *Coal Quality and Geochemistry, Greater Green River Basin, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, from the United States Geological Survey in P 1625-A.

**Summary:** USGS Professional Paper.

831. Stricker, G. D.; and Ellis, M. S., 1999, *Coal Quality and Geochemistry, Hanna and Carbon Basins, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*, from the United States Geological Survey in P 1625-A.

**Summary:** USGS Professional Paper.

832. Stricker, G. D.; and Flores, R. M., 2000, *Powder River Basin and Williston Basin Coal Resource Assessment and Their Relationship to Coalbed Methane Potential*, from the proceedings of a 1999 meeting of the Society of Mining, Metallurgy, and Exploration, Inc., Salt Lake City.

**Summary:** Society of Mining, Metallurgy, and Exploration Conference Document.

833. Stricker, G. D.; Flores, R. M.; and Ochs, A. M., 2000, *Powder River Basin Coalbed Methane; The USGS Role in Investigating This Ultimate Clean Coal By-production*, from the proceedings of the 25th International Technical Conference on Coal Utilization and Fuel Systems, Clearwater, Florida.

**Summary:** Conference Document.

834. Stricker, G. D.; Flores, R. M.; and McGarry, D. E., 2001, *Coalbed Methane Studies on Federal Lands in the Powder River Basin and Other Areas in Wyoming*, from the proceedings of the 2001 Meeting of the Geological Society of America, Boston.

**Summary:** GSA Conference Document.

835. Stuhec, S., 1990, *Introduction to Coal Sampling Techniques for the Petroleum Industry*, available from the Alberta Research Council, Coalbed Methane Seminar Series in Information Series 11.

**Summary:** Alberta Research Council Report.

836. Su, X; Feng, Y.; Chen, J.; and Pan, J., 2001, *The Annealing Mechanisms of Cleats in Coal*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 130.

**Summary:** Symposium Paper.

837. Svenster, P. G., 1959, *Diffusion of Gases Through Coal*, from Fuel, v. 38, available from the publisher.

**Summary:** Article.

838. Swinchatt, J. P., 1994, *The Future of Energy Gases*, from the United States Geological Survey as OF 94-0642.

**Summary:** USGS Report.

839. TRW, 1977, *Methane Produced from Coalbeds, Systems Studies of Energy Conservation*, available from the United States Department of Energy.

**Summary:** DOE Contracted Study.

840. Takahashi, K. I., 2001, *U. S. Geological Survey Coalbed Methane Field Conference*, from the United States Geological Survey as OF 01-0235.

**Summary:** USGS Open File Report.

841. Tang, Y.; Jenden, P. D.; Nigrini, A.; and Teerman, S. C., 1996, *Modeling Early Methane Generation in Coal*, from Energy and Fuels, v. 10, available from the publisher.

**Summary:** Article.

842. Telle, W. R.; Thompson, D. A.; Lottman, L. K.; and Malone, P. G., 1987, *Preliminary Burial - Thermal History Investigations of the Black Warrior Basin: Implications for Coalbed Methane and Conventional Hydrocarbon Development*, from the proceedings of the 1987 Coalbed

Methane Symposium, Tuscaloosa, Alabama, available as Paper 8713.

**Summary:** Symposium Paper.

843. Tewalt, S. J.; Bauer, M. A.; Mathew, D.; Roberts, M. P.; Ayers, W. B., Jr.; Barnes, J. W.; and Kaiser, W. R., 1983, *Estimation of Coal Resources in Texas Gulf Coast, Ohio Northern Appalachian, and Wyoming Powder River Basins: A Comparison of Statistical Approaches*, available from the publisher, the University of Texas.

**Summary:** University of Texas Report.

844. Tewalt, S. J.; and Halili, N. E., 1994, *Arsenic in the Coal Beds and Surface Waters of the Warrior Basin, Western Alabama*, from the proceedings of the Eleventh Annual International Pittsburgh Coal Conference, available as v. 2.

**Summary:** Conference Document.

845. Thielemann, T.; Krooss, B. M.; Littke, R.; and Welte, D. H., 2001, *Does Coal Mining Induce Methane Emissions Through the Lithosphere/Atmosphere Boundary in the Ruhr Basin, Germany?*, from Journal of Geochemical Exploration, v. 74, available from the publisher.

**Summary:** Article.

846. Thimons, B.; and Kissell, F. N., 1973, *Diffusion of Methane Through Coal*, from Fuel, v. 52, available from the publisher.

**Summary:** Article.

847. Tietge, Joseph E.; Mount, David R.; and Gulley, David D., 1994, *GRI Freshwater STR Model and Computer Program: Overview, Validation, and Application*, available from the Gas Technology Institute as GRI-94/0369.

**Summary:** Report on the development of a toxicity database from which predictive ion toxicity models could be created. These models would be used in the evaluation of options for meeting permit toxicity limits regulated by the National Pollutant Discharge Elimination System (NPDES).

848. Ting, F. T. C.; and Wang, P. B., 1984, *Coal Anisotropism and Its Relationship to Methane Concentration in Coal*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 68.

**Summary:** AAPG Bulletin.

849. Ting, F. T. C., 1987, *Original Anisotropism and Its Relationship with Some Physical and Chemical Properties of Coal*, from Organic Chemistry, v. 11, available from the publisher.

**Summary:** Article.

850. Tremain, C. M., 1980, *The Coalbed Methane Potential of the Raton Basin, Colorado*, available from the Colorado Geological Survey as Open-File Report 80-4.

**Summary:** CGS Open-File Report.

851. Tremain, Carol M.; and Toomey, James, 1983, *Coal Bed Methane Desorption Data*, available from the Colorado Geological Survey.

**Summary:** CGS Report.

852. Tremain, C. M.; et al, 1983, *The Coal Bed Methane Resources of Colorado*, available from the Colorado Geological Survey in Map Series 19.

**Summary:** CGS Maps.

853. Tremain, C. M., 1990, *Coalbed Methane Development in Colorado, September 1990*, available from the Colorado Geological Survey in Information Series 32.

**Summary:** CGS Report.

854. Tremain, C. M.; Laubach, S. E.; and Whitehead, N. H., III, 1991, *Coal Fracture (Cleat) Patterns in Upper Cretaceous Fruitland Formation, San Juan Basin, Colorado and New Mexico - Implications for Coalbed Methane Exploration and Development*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of Western North America.

**Summary:** RMAG Report.

855. Tremain, C. M.; Laubach, S. E.; and Whitehead, N. H., III, 1994, *Coal Fracture (Cleat) Patterns in Upper Cretaceous Fruitland Formation Coal Seams, San Juan Basin*, available from the publisher, the New Mexico Bureau of Mines and Mineral Resources in Bulletin 146.

**Summary:** New Mexico Bureau of Mines and Mineral Resources Report.

856. Trent, Virgil, A., 1985, *Summary of Results of the Coal Resource Occurrence and Coal Development Potential Mapping Program in Part of the Powder River Basin, Montana and Wyoming*,

from the United States Geological Survey as OF 85-0621.

**Summary:** USGS Report / Map.

857. Tyler, Noel, director, *Development and Evaluation of a Basin-Scale Coalbed Methane Producibility Model*, available on line from the Gas Technology Institute.

**Summary:** Report on the development of a model for evaluating coal seam natural gas potential in frontier basins, or for finding “sweet spots” in basins with established production.

858. Tyler, Roger; Ambrose, W.A.; Scott, A.R.; and Kaiser, W.R., 1991, *Coalbed Methane Potential of the Greater Green River, Piceance, Powder River, and Raton Basins*, available from the Gas Technology Institute as GRI-91/0315.

**Summary:** This report discusses an evaluation of coal seam natural gas potential of four basins in the western United States. The evaluation was done in the context of characteristics identified in the San Juan Basin.

859. Tyler, Roger; Laubach, S. E.; Ambrose, W. A.; Grout, M. A.; and Tremain, C. M., 1992, *Face-Cleat Patterns in Rocky Mountain Foreland Basins, Western United States; Permeability Indicators for Coalbed Methane*, available from the American Association of Petroleum Geologists in AAPG Bulletin, 76(8).

**Summary:** AAPG Conference Document.

860. Tyler, R. N.; Zhou, N.; McMurray, R. G.; Jackson, M. L. W.; and Tremain, C. M., 1992, *Selected References Related to Coalbed Methane in the Greater Green River, Piceance, Powder River, Raton, and San Juan Basins*, available from the Colorado Geological Survey in Information Series 35.

**Summary:** CGS Publication.

861. Tyler, Roger; Kaiser, William R.; Scott, Andrew R.; Hamilton, Douglas S.; McMurry, Ronald G.; and Zhou, Naijiang, 1994, *Geologic and Hydrologic Assessment of Natural Gas from Coal Seams in the Mesaverde Group and Fort Union Formation, Greater Green River Basin, Wyoming and Colorado*, available from the Gas Technology Institute as GRI-93/0320.

**Summary:** Review of coal seam natural gas potential in the Greater Green River Basin in Wyoming and Colorado. Reports on recent production that has resulted in little gas and large volumes of water.

862. Tyler, R.; Kaiser, W. R.; Scott, A. R.; Hamilton, D. S.; and Ambrose, W. A., 1995, *Geologic and*



*Hydrologic Assessment of Natural Gas from Coal: Greater Green River, Piceance, Powder River, and Raton Basins, Western United States*, available online from the Texas Bureau of Economic Geology as Report of Investigations No. 228 at <http://www.beg.utexas.edu/mainweb/publications/abstracts/pubs-1995.html>.

**Summary:** Texas Bureau of Economic Geology Report.

863. Tyler, Roger; Kaiser, William R.; McMurry, Ronald G.; Nance, H. Seay; Scott, Andrew R.; and Zhou, Naijiang, 1995, *Geologic Characterization and Coalbed Methane Occurrence: Williams Fork Formation, Piceance Basin, Northwest Colorado*, available from the Gas Technology Institute as GRI-94/0456.

**Summary:** This report focuses on the refinement and validation aspects of a coal seam natural gas producibility model.

864. Tyler, Roger; Scott, Andrew R.; Kaiser, William R.; Nance, H. Seay; McMurry, Ronald G.; Tremain Carol M.; and Mavor, Matt J., 1996, *Geologic and Hydrologic Controls Critical to Coalbed Methane Producibility and Resource Assessment: Williams Fork Formation, Piceance Basin, Colorado*, available from the Gas Technology Institute as GRI-95/0532.

**Summary:** Report on the development of the third portion of a Gas Research Institute coal seam natural gas producibility model. Compares the geologic and hydrologic settings of the Piceance, San Juan and Sand Wash basins. This report also reviews the key geologic and hydrologic controls on producibility.

865. Tyler, R.; Scott, A. R.; Kaiser, W. R.; and McMurray, R. G., 1997, *The Application of a Coalbed Methane Producibility Model in Defining Coalbed Methane Exploration Fairways and Sweet Spots: Examples from the San Juan, Sand Wash, and Piceance Basins*, available from the publisher, the Bureau of Economic Geology, Austin, Texas, as Report of Investigations 244.

**Summary:** Bureau of Economic Geology Report.

866. Tyler, R.; Scott, A. R., 1997, *Defining Coalbed Gas Exploration Fairways in Low Permeability, Hydrocarbon Overpressured Basins: An Example from the Piceance Basin, Northwest Colorado*, from the proceedings of the International Coalbed Methane Symposium, available as Paper 9717.

**Summary:** Symposium Paper.

867. Tyler, R.; Kaiser, W. R.; Scott, A. R.; and Hamilton, D. S., 1997, *The Potential for Coalbed Gas Exploration and Production in the Greater Green River Basin, Southwest Wyoming and Northwest Colorado*, from *The Mountain Geologist*, v. 34, no. 1, available from the publisher.

**Summary:** Article.

868. Tyler, R.; Scott, A. R.; and Kaiser, W. R., 1999, *Defining Coalbed Methane Exploration Fairways: An Example from the Piceance Basin, Rocky Mountain Foreland, Western United States*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

869. United States Geological Survey, 1995, *1995 National Assessment of United States Oil and Gas Resources*, available from the United States Geological Survey as C 1118.

**Summary:** USGS Report.

870. United States Geological Survey, Central Region Energy Resources Team, 1999, *Coalbed Methane Project*, available from the United States Geological Survey.

**Summary:** USGS, Central Region Energy Resources Team Report.

871. United States Geological Survey, Central Region Energy Resources Team, 2000, *Preliminary Gulf Coast Coalbed Methane Exploration Maps: Depths to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance*, available from the United States Geological Survey.

**Summary:** USGS, Central Region Energy Resources Team Report / Maps.

872. Van Bergen, F.; Pagnier, H. J. M.; Schreurs, H. C. E.; Paaij, A. P. C.; Hamelinck, C. N.; Wolf, H. A. A.; Barzandji, O. H.; Jansen, D.; and Ruijg, G. J., 2001, *Inventory of the Potential for Enhanced Coalbed Methane Production With Carbon Dioxide Disposal in the Netherlands*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 117.

**Summary:** Symposium Paper.

873. Van Loenen, Richard E.; and Gibbons, Anthony B., 1991, *Assessment of Undiscovered Resources of Coalbed Methane in Nine Wyoming BLM Wilderness Study Areas*, available from the United States Geological Survey as OF 91-0590.

**Summary:** USGS Report.

874. Van Voast, Wayne A., 1991, *Fracture Patterns in Coal in the Western United States; Observations and Implications for Development of Coalbed Methane Resources*, available from the

Geological Society of America.

**Summary:** GSA Report.

875. Van Voast, W. A., 1991, *Hydrogeologic Aspects of Coal-bed Methane Occurrence, Powder River Basin*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 75.

**Summary:** AAPG Bulletin.

876. Vessey, S. J.; and Bustin, R. M., 1999, *Coalbed Methane Characteristics of the Mist Mountain Formation, Southern Canadian Cordillera: Effect of Shearing and Oxidation*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

877. Viel, John A., 2002, *Regulatory Issues Affecting Management of Produced Water from Coal Bed Methane Wells*, prepared by the Argonne National Laboratory for the DOE Office of Fossil Energy. For availability of paper, contact John A. Viel at the Argonne National Laboratory.

**Summary:** Describes existing national discharge regulations, current methods for managing coal seam natural gas produced water, current discharge permitting process, and how the increasing volume of discharged water due to increased coal seam natural gas development will affect the process.

878. Von Schonfeldt, H., 1981, *Methane Drainage in Advance of Mining Through Horizontal Boreholes*, for TRW Energy Systems Group by Occidental Research Corporation.

**Summary:** Contracted Report.

879. Vorkink, William P.; and Lee, Milton L., 1993, *Appraisal of Heavy Hydrocarbons in Coal Seam Gas Reservoirs*, available from the Gas Technology Institute as GRI-92/0501.

**Summary:** This report discusses a study that examined the content and composition of heavy hydrocarbon constituents in coal seam reservoirs.

880. Wandry, Craig J.; Law, Ben E.; Spencer, Charles W.; and Barker, Charles E., 2000, *Oil, Gas, and Coal-bed Methane Resources*, available from the United States Geological Survey in P 1610.

**Summary:** USGS Professional Paper.

881. Wanty, Richard B.; Folger, Peter F.; and Briggs, Paul H., 1993, *Ground-water Chemistry of the*

*Coal-Bearing Upper Cretaceous Mesaverde Formation, Wind River Reservation, Wyoming*, from 1993 meeting of the Wyoming Geological Association, available from the Wyoming Geological Association.

**Summary:** WGA Symposium Document.

882. Wanty, Richard B., *USGS Research on Saline Waters Co-Produced With Energy Resources*, available online from the United States Geological Survey as Fact Sheet FS-003-97.

**Summary:** USGS Fact Sheet that discusses the water co-produced with oil and gas in the oilfields of the United States.

883. Warwick, P. D.; SanFilipo, J. R.; Barker, Charles E.; and Morris, L. E., 2000, *Coal-bed Methane in the Gulf Coastal Plain; A New Frontier?*, available from the Geological Society of America in Abstracts with Programs - Geological Society of America, 31 (7).

**Summary:** This GSA conference document discusses the potential for production of natural gas from coal seams along the Gulf Coastal Plain.

884. Warwick, P. D.; Barker, C. E.; SanFilipo, J. R.; and Biewick, L. R. H., 2000, *Preliminary Evaluation of the Coalbed Methane Resources of the Gulf Coastal Plain*, available online from the United States Geological Survey as Open File Report 00-143.

**Summary:** USGS Open File Report that illustrates the location and geology of coalbeds in the Gulf Coastal Plain and their potential for coal seam natural gas production.

885. Warwick, Peter D.; Barker, C. E.; SanFilipo, John R.; and Morris, L. E., 2000, *Preliminary Results from Coal-bed Methane Drilling in Panola County, Texas*, available the United States Geological Survey as OF 00-0048.

**Summary:** USGS Open File Report.

886. Warwick, P. D.; Barker, C. E.; SanFilipo, J. R., 2002, *Preliminary Evaluation of the Coalbed Methane Potential of the Gulf Coastal Plain, USA and Mexico*, available from the Rocky Mountain Association of Geologists in Coalbed Methane of North America, II.

**Summary:** RMAG Report.

887. Weaver, J. N.; Gruber, J. R., Jr., 1993, *Coal and Coal Bed Methane Resources of the Absaroka - Beartooth Study Area*, available from the United States Geological Survey as OF 93-0207.

**Summary:** USGS Report.

888. Weishauptove, Z.; Medek, J.; and Nmec, J, 1999, *Decrease of Desorption Intensity of Coalbed Methane Due to Hydraulic Fracturing*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

889. Westinghouse Electric Company, 1978, *Coalbed Methane Extraction and Utilization*, from 7th Monthly Progress Report to the United States Department of Energy.

**Summary:** DOE Contracted Study.

890. Westman, Glenn H.; and Parish, Lovell M., 1981, *The Coal Bed Methane Potential of the Sand Wash Basin, Green River Coal Region, Colorado*, available from the publisher, the Colorado Geological Survey.

**Summary:** CGS Report.

891. Wheat, R. W., 1999, *Coalbed Methane Potential, Core and Pilot Program, Illinois Basin*, available from the American Association of Petroleum Geologists in AAPG Bulletin, v. 83.

**Summary:** AAPG Bulletin.

892. Wheaton, J. R.; and Lovelace, B. K., *Hydrologic Issues Associated with Coal-Bed Methane Development in Montana*, Reclamation Research Unit.

**Summary:** Report.

893. Wicks, D. E.; and Zuber, M. D., 1989, *A Strategy for Coalbed Methane Production Development, Part II*, from the proceedings of the 1989 Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 8912.

**Summary:** Symposium Document.

894. Wieczner, Bilha; and Irvin, Marcia, 1989, *Coalbed Methane Development in Alabama: A Bibliography*, available from the Gas Technology Institute as GRI-89/0343.

**Summary:** Bibliography that contains listings of reports on coal seam natural gas development in Alabama. Publication dates range from 1890 through 1989.

895. Williams, Peggy, 1998, *Coalbed Methane*, from The Oil & Gas Investor, available from the publisher.

**Summary:** Article.

896. Willis, C., 1978, *Rocky Mountain Coal Seams Call for Special Drilling Techniques*, from The Oil & Gas Journal, July 10, 1978, available from the publisher.

**Summary:** Article.

897. Winston, R. B., 1990, *Preliminary Report on Coal Quality Trends in Upper Pottsville Formation Coal Groups and Their Relationships to Coal Resource Development, Coalbed Methane Occurrence, and Geologic History in the Warrior Coal Basin, Alabama*, available from the Geological Survey of Alabama as Circular 152.

**Summary:** GSA Circular.

898. Wolf, K.; Ephraim, R.; Bertheux, W.; and Bruining, J., 2001, *Coal Cleat Classification and Permeability Estimation by Image Analysis on Cores and Drilling Cuttings*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 102.

**Summary:** Symposium Paper.

899. Wong, S.; MacLeod, K.; Wold, M.; Gunter, W. D.; Mavor, M. J.; and Gale, J., 2001, *CO<sub>2</sub> - Enhanced Coalbed Methane Recovery Demonstrations Pilot - A Case for Australia*, from the proceedings of the International Coalbed Methane Symposium, Tuscaloosa, Alabama, available as Paper 148.

**Summary:** Symposium Paper.

900. Wray, L. L.; and Koenig, N. V., 2001, *The Coalbed Methane Potential in the Upper Cretaceous to Early Tertiary Laramie and Denver Formations, Denver Basin, Colorado*, available from the Colorado Geological Survey on CD-ROM.

**Summary:** This CGS report provides geologic information on the coal seam natural gas resources of the Denver Basin.

901. Wray, Laura L., *Geologic Mapping and Subsurface Well Log Correlations of the Late Cretaceous Fruitland Formation Coal Beds and Carbonaceous Shales – the Stratigraphic Mapping Component of the 3M Project, San Juan Basin, La Plata County, Colorado*, available online from the Colorado Oil and Gas Conservation Commission.

**Summary:** Documents the distribution of mappable Cretaceous Fruitland Formation Coals of the San Juan Basin and provides a grid of correlated subsurface cross sections in La Plata County, Colorado.

902. Wyman, R. E., 1984, *Gas Resources in Elsworth Coal Seams*, available from the publisher, the Canadian Society of Petroleum Geologists in Canadian Society of Petroleum Geologists Memoirs, 38.

**Summary:** Canadian Society of Petroleum Geologists Report.

903. Wyoming Department of Environmental Quality, Water Quality Division, 2000, *Antidegradation Review, Analysis and Findings: Concentrations of Barium in the Surface Waters in Northeastern Wyoming Related to Discharges of Coal Bed Methane Produced Water*, available from the Water Quality Division, Wyoming Department of Environmental Quality.

**Summary:** Wyoming DEQ Report.

904. Wyoming Geological Association, 1981, *Powder River Basin Oil and Gas Fields*, available from the Wyoming Geological Association.

**Summary:** WGA Report.

905. Wyoming Oil & Gas Conservation Commission, 2000, *Coal Bed Methane Wells*, available from the Wyoming Oil & Gas Conservation Commission.

**Summary:** WOGCC Report.

906. Wyoming State Geological Survey, 1998, *Coalbed Methane Map*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Map.

907. Wyoming State Geological Survey, 1999, *Coalbed Methane Map*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Map.

908. Wyoming State Geological Survey, 2000, *Coalbed Methane Map*, available from the Wyoming State Geological Survey.

**Summary:** WSGS Map.

909. Wyoming State Geological Survey, 2000, *Stream Classification and Drainage Systems Map of the Northeast Wyoming Coal Bed Methane Development*, available from the Wyoming State Geological Survey.

**Summary:** WSGS / DEQ Report / Map.

910. Wyoming Water Resources Center, University of Wyoming, 1997, *A Study of Techniques to Assess Surface and Groundwater Impacts Associated with Coal Bed Methane and Surface Coal Mining: Little Thunder Creek Drainage, Wyoming*, available from the Wyoming Water Resources Center, University of Wyoming.

**Summary:** Wyoming Water Resources Center Report.

911. Yee, D.; and Hanson, W. B., 1993, *Gas Sorption on Coal and Measurement of Gas Content*, available from the American Association of Petroleum Geologists in AAPG Studies in Geology, 38.

**Summary:** AAPG Report.

912. Young, G. B. C., 1998, *Computer Modeling and Simulation of Coalbed Methane Resources*, from International Journal of Coal Geology, v. 35, available from the publisher.

**Summary:** Article.

913. Zabetakis, M. G.; et al, 1972, *Methane Emission in Coal Mines: Effects of Oil and Gas Wells*, U. S. Bureau of Mines Report of Investigations 7658, available from the National Technical Information Service.

**Summary:** USBM Report.

914. Zabetakis, M. G.; Deul, M.; and Skow, M. L., 1973, *Methane Control in the United States Coal Mines - 1972*, U. S. Bureau of Mines Information Circular 8600, available from the National Technical Information Service.

**Summary:** USBM Report.

915. Zebrowitz, M. J.; Kelafant, J. R.; and Boyer, C. M., 1991, *Reservoir Characteristics and Production of the Coal Seams in Northern and Central Appalachian Basins*, from the proceedings of the 1991 3rd Coalbed Methane Symposium, available from the University of Alabama, College of Continuing Studies.

**Summary:** This conference paper discusses methods used to estimate reservoir characteristics and



to predict the natural gas potential of coal seam wells in the Northern and Central Appalachian basins.

916. Zuber, M. D.; Boyer, C. M.; Schraufnagel, Richard A.; and Saulsberry, J., 1989, *Insights and Analysis from the Rock Creek Project: A Reservoir Engineering Approach*, available from the Society of Petroleum Engineers as SPE-19057.

**Summary:** This SPE conference document discusses GRI conducted field evaluations of coal seam natural gas technology at the Rock Creek Project site in Alabama.

917. Zuber, M. D.; Kuuskraa, V. A.; and Sawyer, S. K., 1992, *Optimizing Well Spacing and Hydraulic-Fracture Design for Economic Recovery of Coalbed Methane*, available from the Society of Petroleum Engineers in Reprint Series, 35.

**Summary:** SPE Report.

918. Zuber, M. D.; and Hopkins, C., 1996, *Coalbed Methane Engineering Methods*, from SPE Short Course Manual, available from S. A. Holditch & Associates, Inc.

**Summary:** SPE Short Course.

919. Zuber, M. D., 1998, *Production Characteristics and Reservoir Analysis of Coalbed Methane Reservoirs*, from International Journal of Coal Geology, v. 38, available from the publisher.

**Summary:** Article.

920. Zuber, M. D., 1999, *The Use of Monte Carlo Analysis to Evaluate Prospective Coalbed Methane Properties*, available from Kluwer Academic Publishers, Boston.

**Summary:** Report.

921. Zuber, M. D.; and Boyer, C. M., 2001, *Comparative Analysis of Coalbed Methane Production Trends and Variability - Impact on Exploration and Production*, from the proceedings of the *International Coalbed Methane Symposium*, Tuscaloosa, Alabama, available as Paper 136.

**Summary:** Symposium Document.

922. Zuber, M. D.; and Boyer, C. M., 2002, *Coalbed-Methane Evaluation Techniques - The Current State of the Art*, from Journal of Petroleum Technology, v. 54, no. 2, available from the publisher.

**Summary:** Article.



# Index

The following indexes place the listings from the bibliography into easily recognizable categories. Most of the listings appear in more than one of the indexes.

## I LOCATION

*Contains listings that are basin or state specific, or are specific to federal lands (including Indian reservations). Citations appear alphabetically by author/editor and include the title of the work. Refer to the bibliography for more information on the publication.*

1. Adams, M. A., *Central Appalachian Basin Report: A Study of Carboniferous Geology, Coal and the Potential Coalbed Methane Resource of the Central Appalachian Basin in Maryland, West Virginia, Kentucky, and Tennessee.*
2. Adams, M. A.; Eddy, G. E.; Hewitt, J. L.; Kirr, J. N.; and Rightmire, C. T., *Northern Appalachian Coal Basin Report: A Study of Carboniferous Geology, Coal, and the Potential Coalbed Methane Resources of the Northern Appalachian Coal Basin in Pennsylvania, Ohio, Maryland, West Virginia, and Kentucky.*
3. Adams, M. A.; and Kirr, J. N., *Uinta Basin Report, A Study of Cretaceous Geology, Coal and the Potential Coalbed Methane Resource of the Uinta Basin in Utah and Colorado.*
4. Affolter, R. H.; Simon, F. O.; and Stricker, G. D., *Chemical Analyses of Coal from the Healy, Kenai, Seldovia, and Utokok River 1:250,000 Quadrangles, Alaska.*
5. Affolter, R. H.; Hatch, J. R.; Matson, R. E.; and Sauer, L. A., III, *Chemical Analyses of Coal from the Tongue River Member, Fort Union Formation, Decker Coal Deposit, Big Horn County, Montana.*
6. Affolter, R. H.; Hatch, J. R.; and Culbertson, W. C., *Chemical Analyses of Coal from the Tongue River Member, Fort Union Formation, Moorhead and Southeastern Part of the Northward Extension of the Sheridan Coal Fields, Powder River and Big Horn Counties, Montana.*
7. Affolter, R. H.; Stricker, G. D.; Roberts, S. B.; and Brownfield, M. E., *Geochemical Variation of Arctic Margin Low-Sulfur Cretaceous and Tertiary Coals, North Slope, Alaska.*
8. Ahmed, U.; Bowman, K. C.; Bush, D.; Hanson, J.; Holland, M.; Kelkar, S.; Owen, L. B.; Rakop, K.; and Tibbits, G., *Methane Production Characteristics of Deeply Buried Coalbed Reservoirs.*
9. State of Alaska, Division of Oil and Gas, Department of Natural Resources, *Coalbed Methane Study.*

10. Ancell, K. L.; Lambert, S.; and Johnson, F. S., *Analysis of the Coalbed Degasification Process at the Seventeen Well Pattern in the Warrior Basin of Alabama.*
11. Anderson, O.J.; Lucas, S.G.; Love, D.W.; and Cather, S.M., eds., *Southeastern Colorado Plateau.*
12. Andrews, R. D.; Cardott, B. J.; and Storm, T., *The Hartshorne Play in Southeastern Oklahoma: Regional and Detailed Sandstone Reservoir Analysis and Coalbed Methane Resources.*
13. Anna, L. O., *Groundwater Flow Associated With Coalbed Gas Production, Ferron Sandstone, East-Central Utah.*
14. Anna, Lawrence O., *Numerical Simulation of Water Flow in Ferron Sandstone Coalbeds, Central Utah.*
15. Anna, L. O.; Faunt, C. C.; D'Agnesse, F. A.; and Henry, M. E., *Three Dimensional Groundwater Flow Modeling of the Ferron Sandstone, Central Utah.*
16. Applied Hydrology Associates, Inc., *3M Project San Juan Basin, Colorado and New Mexico; Hydrology Modeling Report.*
17. Archer, P. L., *Illinois Basin Report; A Study of Pennsylvanian Geology, Coal, and Coalbed Methane Resources in Illinois, Indiana, and Western Kentucky.*
18. Attanasi, E. D.; and Rice, D. D., *Economics and Coalbed Gas in the 1995 National Assessment of U.S. Oil and Gas Resources.*
19. Attanasi, E. D., *Relative Importance of Physical and Economic Factors in Appalachian Coalbed Gas Assessment.*
20. Ayers, W. B., Jr., *Coal Resources of the Tongue River Member of the Fort Union Formation (Palaeocene), Powder River Basin.*
21. Ayers, W.B., Jr.; and Kaiser, W.R., *Coalbed Methane in the Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado.*
22. Ayers, W. B., Jr.; and Zellers, S. D., *Geologic Controls on Occurrence and Producibility of Coalbed Methane, Fruitland Formation, North-Central San Juan Basin, New Mexico.*
23. Ayers, W. B., Jr.; Kaiser, W. R.; Scanlon, A. H.; Swartz, T. E.; and Zellers, S. D., *Geologic Evaluation of Critical Methane Resources: Part I - San Juan Basin.*
24. Ayers, W. B., Jr.; Kaiser, W. R.; Ambrose, W. A.; Swartz, T. E.; Laubach, S. E.; Tremain, C. M.; and Whitehead, N. H., III, *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part I, San Juan Basin.*

25. Ayers, W. B., Jr.; Kaiser, William R.; Laubach, S. E. ; Ambrose, W. A.; Baumgardner, R. W., Jr.; Scott, Andrew R.; Tyler, Roger; Yeh, Joseph; Hawkins, G. J.; Swartz, T. E.; Schultz-Ela, D. D.; Zellers, S. D.; Tremain, Carol M.; and Whitehead, N. H., III, *Geologic and Hydrologic Controls on the Occurrences and Producibility of Coalbed Methane, Fruitland Formation, San Juan Basin.*
26. Barker, C. E.; and Pierce, B. S., *Burial History and Coal Petrography of the Ferron Coals, Utah as Factors in Their Variable Coal Bed Gas Content.*
27. Barker, Charles E.; Johnson, Ronald C.; Pawlewicz, Mark J.; Crysdale, Bonnie L.; and Clark, Arthur C., *Coal-bed Methane Show Within the Wind River Indian Reservation Enhances Gas Prospects in Deeper Portions of the Wind River Basin, Wyoming.*
28. Barker, C. E.; Clough, J. G.; Roberts, S. B.; and Fisk, R., *Coalbed Methane in Northern Alaska: Potential Resources for Rural Use and Added Supply for the Proposed Trans-Alaska Gas Pipeline.*
29. Barker, C. E.; Bartke, T. C.; Hatcher, P. G.; and Daws, T. A., *An Empirical Correlation Between Coal Bed Gas With Rock-Eval Pyrolysis and (Super 13) C NMR Results, Cretaceous Mesaverde and Meeteetse Formations, Wind River Basin, Wyoming.*
30. Barker, C. E., *The Geologic Controls on Coalbed Gas - A Major Source in the U.S.*
31. Barker, C. E.; Scott, A. R.; and Tyler, R., *The Geology of Coalbed Methane - The Perspective from Basin and Thermal History Studies.*
32. Barker, Charles E.; Pierce, Brenda S.; Garrison, James R., Jr.; and van den Bergh, T. C. V., *The Influence of Burial History on the Coalbed Gas Content of Ferron Coals, San Rafael Swell, Utah.*
33. Barker, C. E.; Dallegge, T. A.; and Seamount, D. C., *Ongoing Coalbed Desorption Studies, Cook Inlet Basin, Alaska.*
34. Barker, Charles E.; Biewick, Laura R. H.; Warwick, Peter D.; and San Filippo, John R., *Preliminary Gulf Coast Coalbed Methane Exploration Maps; Depth to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance.*
35. Barker, Charles E., *Rock-Eval Analysis of Sediments and Ultimate Analysis of Coal, Mesaverde Group, Multiwell Experiment Site, Piceance Basin, Colorado.*
36. Barker, C. E.; Gose, M.; Scott, R. J.; Warwick, P. D.; San Filippo, J. R.; Klein, J. M.; and Hook, R. W., *The Sacatosa Coalbed Methane Field: A First for Texas,*
37. Beavers, C. D.; Boyer, C. M.; Dobscha, F. X.; Green, C. D.; Lambert, S. W.; Lanier, J. B.; Sheehy, L. D.; Spafford, S. D.; and Stubbs, P. B., *Rock Creek Methane from Multiple Coal Seams Completion Project.*

38. Beavers, W. M.; Graves, Stanley L.; and Hollingsworth, F. C., *Field Evaluations of Gas Lift and Progressive Cavity Pumps as Effective Dewatering Methods for Coalbed Methane Wells.*
39. Beckstrom, J. A.; and Boyer, D. G., *Aquifer Protection Considerations of Coalbed Methane Development in the San Juan Basin.*
40. Boreck, Donna L.; and Weaver, Jean N., *Coalbed Methane Study of the "Anderson" Coal Deposit, Johnson County, Wyoming; A Preliminary Report.*
41. Boreck, D. L.; and Strever, M. T., *Conservation of Methane from Colorado Mined/Minable Coal Beds: A Feasibility Study.*
42. Bostic, Joy; Brady, Lawrence; Howes, Mary; Burchett, Raymond R.; and Pierce, Brenda S., *Investigations of the Coal Properties and the Potential for Coal-bed Methane in the Forest City Basin.*
43. Boyer, C. M.; and Kelafant, J. R., *Geologic Assessment of Natural Gas from Coal Seams in the Central Appalachian Basin.*
44. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; Malone, P. G.; Schwerer, F. C.; and Stubbs, P. B., *Measurement of Static Coalbed Reservoir Conditions for Hydraulic Fracture Design: Volume I.*
45. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; Malone, P. G.; Schwerer, F. C.; and Stubbs, P. B., *Measurement of Static Coalbed Reservoir Conditions for Hydraulic Fracture Design: Volume II.*
46. Boyer, Charles M., II; Paul, George S.; and Kuuskraa, Vello A., *Methane from Coal Deposits: Technical Evaluation and Database.*
47. Boyer, C. M., II; Militzer, M. R.; and Schwerer, F. C., *Preliminary Economic Assessment Potential for Producing Methane for the Multiple Coal Seams Completion Project at Rock Creek.*
48. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; and Malone, P. G., *Rock Creek Methane from Multiple Coal Seams Completion Project. Demonstrated Drilling and Completion Technology for the Multiple Coal Seams Completion Project.*
49. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Diamond, W. P.; Malone, P. G.; and Militzer, P. G., *Rock Creek Methane from Multiple Coal Seams Completion Project. Final Geologic Report. Big Indian Creek Site, Volume I.*
50. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Diamond, W. P.; Malone, P. G.; and Militzer, P. G., *Rock Creek Methane from Multiple Coal Seams Completion Project. Final Geologic Report. Big Indian Creek Site, Volume II.*
51. Boyer, C. M., II; and Hirko, N. M., *Rock Creek Methane from Multiple Coal Seams Completion Project. Phase I Test Plan.*

52. Brownfield, M. E.; Affolter, Ronald H.; and Stricker, G. D., *High Chromium Content in Tertiary Coals, Northwestern Washington; A Key to Their Depositional History.*
53. Brownfield, Michael E.; Hettinger, Robert D.; and Johnson, Edward A., *A Summary of the Stratigraphy, Coal Resources, and Coal-bed Methane Potential of Northwest Colorado.*
54. Bruner, K. R.; Oldham, A. V.; Repine, T. E., Jr.; Markowski, A. K.; and Harper, J. A., *Geological Aspects of Coalbed Methane in the Northern Appalachian Coal Basin, Southwestern Pennsylvania and North-Central West Virginia.*
55. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; and Way, S. C., *Hydrologic Characterization of Coal Seams for Methane Recovery. Activities 5 and 7 Progress Report: Review of Single-Phase Hydrologic Testing in Coalbeds and Development of Unsaturated-Flow Well Test Procedures.*
56. Bureau of Land Management, *Coalbed Methane Development in the Northern San Juan Basin of Colorado.*
57. Bureau of Land Management, Buffalo Field Office, *Decision Record Wyodak Coal Bed Methane Environmental Assessment.*
58. Bureau of Land Management; Holsan, Gary, *Draft Environmental Assessment, Pannaco Energy Deer Creek Exploratory Coalbed Methane Project.*
59. Bureau of Land Management, Solid Minerals Group, *Geologic and Hydrologic Assessment of Natural Gas from Coal: Greater Green River, Piceance, Powder River, and Raton Basins, Western United States.*
60. Bureau of Land Management, Buffalo Resource Area, *Gillette South Coal Bed Methane Project (Microform): Final Environmental Impact Statement.*
61. Bureau of Land Management, *Lower Prairie Dog Creek Coal Bed Methane Project Environmental Assessment.*
62. Bureau of Land Management, *Pennaco Energy Deer Creek Exploratory Coalbed Methane Project Environmental Assessment.*
63. Bureau of Land Management, *Trace Elements, in Hanna Basin Study Site (Carbon County, Wyoming) Resource and Potential Reclamation.*
64. Bureau of Land Management, *Wyodak Coal Bed Methane Project Draft Environmental Impact Statement.*
65. Bureau of Land Management, *Wyodak Coal Bed Methane Project Final Environmental Impact Statement.*

66. Bureau of Land Management, Buffalo Field Office, *Wyodak Drainage Coal Bed Methane Environmental Assessment*.
67. Bustin, R. M.; and Clarkson, C. R., *Generation and Expulsion of Petroleum and Gas from Almond Formation Coal, Greater Green River Basin, Wyoming*.
68. Byrer, C. W.; Mroz, T. H.; and Covatch, G. L., *Coalbed Methane Production Potential in U.S. Basins*.
69. Campbell, F. W.; Hoffman, G. K.; Kottowski, F. E.; and Arkell, B. W., *Geology and Coal Resources of New Mexico's Small Coalfields*.
70. Campen, Betsy; and Campen, Ted, *Coalbed Methane in Montana*.
71. Campen, Elizabeth B., *Coal-bed Methane Potential in Montana*.
72. Cardott, B. J., 1999, *Coalbed Methane Activity in Oklahoma*.
73. Cardott, B. J., 2000, *Coalbed Methane Activity in Oklahoma*.
74. Cardott, B. J., 2001, *Coalbed Methane Activity in Oklahoma*.
75. Cardott, B. J., *Coalbed Methane Development in Oklahoma*.
76. Cardott, B. J., *Oklahoma Coalbed-Methane Completions, 1988 to 1996*.
77. Carey, M. A.; Roberts, S. B.; and Clark, A. C., *Chemical Analyses for Nine Coal Samples from the Sagwon Member (Tertiary) of the Sagavanirktok Formation, North Slope, Alaska*.
78. Carroll, C. J., *Correlation of Producing Fruitland Formation Coals and Coalbed Methane Leakage on the Southern Ute Reservation*.
79. Case, James C.; Edgar, Thomas V.; and De Bruin, Rodney H., *Subsidence Potential Related to Water Withdrawal in the Powder River Basin*.
80. Chandler, R.V.; Epsman, M.L.; Hamilton, R.P.; Pashin, J.C.; Rheams, L.J.; Richter, K.E.; Tolson, J.S.; Ward, W.E., II; Wilson, G.V.; and Winston, R.B., *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part II – Black Warrior Basin*.
81. Chesnut, D. R., Jr.; Nuttall, B. C.; Hower, J. C.; Greb, S. F.; Eble, C. F.; Hiatt, J. K.; and Williams, D. A., *Coalbed Methane in Kentucky*.
82. Choate, Raoul, *Evaluation of Coalbed Methane Resource in Western United States*.
83. Choate, R.; Jurich, D.; and Saulnier, G. L., Jr., *Geologic Overview, Coal Deposits, and the Potential for Methane Recovery from Coalbeds, Piceance Basin, Colorado*.



84. Choate, R.; and Johnson, C. A., *Geologic Overview, Coalbed Description and Potential for Methane Recovery From Coalbeds, Powder River Basin, Wyoming-Montana.*
85. Choate, R.; and Rightmire, C. T., *Influence of the San Juan Mountain Geothermal Anomaly and other Tertiary Igneous Events on the Coalbed Methane Potential in the Piceance, San Juan, and Raton Basins, Colorado and New Mexico.*
86. Choate, R.; and Johnson, C. A., *Powder River Basin Report: A Study of Early Tertiary Geology, Coal and the Potential for Methane Recovery From Coalbeds in Montana and Wyoming.*
87. Choate, R.; Lent, J.; and Rightmire, C. T., *San Juan Basin Report – Upper Cretaceous Geology, Coal and the Potential for Methane Recovery From Coalbeds in Colorado and New Mexico.*
88. Clark, W. F.; and Helmer, T., *Completing, Equipping, and Operating Fruitland Formation Coalbed Methane Wells in the San Juan Basin, New Mexico and Colorado.*
89. Clarkson, C. R.; and Bustin, R. M., *Variation in Micropore Capacity and Size Distribution with Composition in Bituminous Coal of the Western Canadian Sedimentary Basin.*
90. Clarkson, C. R.; and Bustin, R. M., *Variation in Permeability with Lithotype and Maceral Composition of Cretaceous Coals of the Canadian Cordillera.*
91. Clarkson, C. R.; Lamberson, M. N.; and Bustin, R. M., *Variation in Surface Area and Micropore Size Distribution with Composition of Medium Volatile Bituminous Coal of the Gates Formation, Northeastern British Columbia: Implications for Coalbed Methane Potential.*
92. Clayton, J. L.; Rice, D. D.; and Stanton, R. W., *Geochemical and Geological Controls on Generation and Accumulation of Oil and Gas from Coalbeds, Western United States.*
93. Close, J. C.; and Dutcher, R. R., *Geomorphology of Drainage Patterns: Clues to Coal Gas Natural Fracture Timing, Orientation and Location, Raton Basin, Colorado - New Mexico.*
94. Close, J. C.; Mavor, M. J.; and McBane, R. A., *Importance, Genesis and Recognition of Fracture Permeability in Fruitland Coalbed Methane Reservoirs of the Northern San Juan Basin, Colorado and New Mexico.*
95. Close, J. C.; and Mavor, M. J., *Influence of Coal and Rank on Fracture Development in Fruitland Coal Gas Reservoirs of San Juan Basin.*
96. Close, J. C.; and Dutcher, R. R., *Prediction of Permeability Trends and Origins of Coalbed Methane Reservoirs of the Raton Basin, Colorado and New Mexico.*
97. Close, J. C.; and Dutcher, R. R., *Update on Coalbed Methane Potential of Raton Basin, Colorado and New Mexico.*
98. Clough, J. G., *Coalbed Methane - Potential Energy Source for Rural Alaska.*

99. Clough, J. G.; Barker, Charles E.; and Scott, A. R., *Opportunities for Coalbed Gas Exploration in Alaska*.
100. Coates, D. A.; Stricker, G. D.; and Landis, E. R., *Coal Geology, Coal Quality, and Coal Resources in Permian Rocks of the Beacon Supergroup, Transantarctic Mountains, Antarctica*.
101. Coates, D. A., *Formation of Clinker by Natural Burning of Coal Beds in the Powder River Basin, Wyoming and Montana*.
102. Cole, G. A.; Daniel, J. A.; Heald, B. P.; et al, *Oil and Gas Drilling and Coal Production Summary for Montana*.
103. Collett, Timothy S., *Composition and Source of the Gas Associated with Coalbed Gas Production from Coals in Eastern Utah*.
104. Collins, Lesley, *Seridan Area Coal Bed Methane Decision Record Available*.
105. Collins, Lesley, *Wyodak Area Coal Bed Methane Record of Decision Available*.
106. Colorado Geological Survey, *Evaluation of the Methane Potential of Unmined-Unminable Coalbeds in Colorado, Review of Coal Methane Resource for Western Basins*.
107. Colorado Oil and Gas Conservation Commission, *Summary Report of Bradenhead Testing, Gas Well Remediation, and Ground Water Investigations; San Juan Basin, La Plata County, Colorado*.
108. Cooper, J. D.; Decker, A. D.; Logan, T. L.; and Schwoebel, Jeffrey J., *Development and Evaluation of Technology for Methane Production from a Deep Coal Seam in the Piceance Basin*.
109. Council, J.; Decker, A. D.; Jeu, S. J.; and Logan, T. L., *Development and Evaluation of Technology for Methane Production from a Deep Coal Seam in the Piceance Basin*.
110. Cox, D. O.; Decker, A. D.; and Stevens, S. H., *Analysis of Fruitland Water Production, Treatment and Disposal, San Juan Basin*.
111. Cox, D. O.; Stevens, S. H.; Hill, D. G.; and McBane, R. A., *Water Disposal From Coalbed Methane Wells in the San Juan Basin*.
112. Cox, D. O.; and Young, G. B. C., *Well Testing in Coalbed Methane (CBM) Wells: An Environmental Remediation Case History*.
113. Crist, T. E.; Kelso, B. S.; and Boyer, C. M., *Geologic Assessment of Natural Gas from Coal Seams in the Menefee Formation, San Juan Basin*.
114. Crovelli, Robert A.; Nuccio, Vito F., *Estimates of Technically Recoverable Natural Gas Resources for Continuous Type (Unconventional) Plays in Coal Beds on Federal Lands of the Conterminous United States*.

115. Crovelli, Robert A.; Schmoker, James W.; and Balay, Richard H., *Fractal Lognormal Percentage Assessment of Technically Recoverable Natural Gas Resources in Continuous-type and Coalbed (Unconventional) Plays, Onshore and State Waters of the United States.*
116. Crovelli, Robert A.; Schmoker, James A.; and Balay, Richard H., *U. S. Department of the Interior U.S. Geological Survey; Fractal Lognormal Percentage Analysis of the U.S. Geological Survey's 1995 National Assessment of Conventional Oil and Gas Reservoirs.*
117. Crovelli, Robert A.; Nuccio, Vito F., *USGS Resource Assessment Methodology for Technically Recoverable Coalbed Methane Applied to the Ferron Sandstone Trend.*
118. Crowley, S. S.; and Stanton, R. W., *Distribution of Environmentally Sensitive Trace Elements in the Coal Beds of the Powder River Basin, Wyoming and Montana.*
119. Crowley, S. S.; Stanton, R. W.; Triplehorn, D. M.; and Ruppert, Leslie F., *Origin and Distribution of Inorganic Elements in the Wyodak-Anderson Coal Bed, Powder River Basin, Wyoming.*
120. Culbertson, W. C.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Quietus Quadrangle, Big Horn and Powder River Counties, Montana.*
121. Culbertson, W. C.; Hatch, J. R.; and Affloter, R. H., *Geology and Coal Resources of the Hanging Woman Creek EMRIA Site, Big Horn and Powder River Counties, Montana.*
122. Dallegge, Todd A.; and Barker, Charles E., *Coal-bed Methane Gas-In-Place Resource Estimates Using Sorption Isotherms and Burial History Reconstruction; An Example from Ferron Sandstone Member of the Mancos Shale.*
123. Dallegge, T. A.; and Barker, C. E., *Implications to Conventional Gas Reserve Growth of Coalbed Methane Desorption Analysis from the Beaver Creek and Kenai Gas Fields, Kenai Peninsula, Alaska.*
124. Davis, Hal A., *Coalbed Methane Produced Water Management Guide. Treatment and Discharge to Surface Water: Black Warrior Basin, Alabama.*
125. Dawson, F. M.; Marchioni, D. L.; Anderson, T. C.; and McDougall, W. J., *An Assessment of Coalbed Methane Exploration in Canada.*
126. Dawson, F. M., *Coalbed Methane: A Comparison Between Canada and the United States.*
127. Dawson, M.; and Kalkreuth, W., *Coal Rank and Coalbed Methane Potential of Cretaceous/Tertiary Coals in the Canadian Rocky Mountain Foothills and Adjacent Foreland.*
128. DeBruin, R. H.; Lyman, R. M.; and Hallberg, L. L., 1999, *Coalbed Methane Activity in the Eastern Powder River Basin, Campbell and Converse Counties, Wyoming.*
129. DeBruin, R. H.; Lyman, R. M.; and Hallberg, L. L., 2000, *Coalbed Methane Activity in the Eastern Powder River Basin, Campbell and Converse Counties, Wyoming.*

130. DeBruin, R. H.; Lyman, R. M.; Hallberg, L. L.; and Harrison, M. M., *Coalbed Methane Activity in the Western Powder River Basin, Campbell, Converse, Johnson, Natrona, and Sheridan Counties, Wyoming.*
131. DeBruin, R. H.; Lyman, R. M.; Jones, R. W.; and Cook, L. W., *Coalbed Methane in Wyoming.*
132. DeBruin, R. H., *Oil and Gas Field Map of the Powder River Basin.*
133. DeBruin, R. H., *Oil and Gas Field Maps of Southeastern Wyoming Basins.*
134. DeBruin, Rodney H.; and Boyd, C. S., *Oil and Gas Fields of the Powder River Basin, Wyoming.*
135. Decker, David, 1987, *Coal Bed Methane; Dynamic New Segment of Petroleum Industry.*
136. Decker, A. David; Kelso, B.S.; Kuuskraa, V.A.; and Wicks, D.E., *Geologic Assessment of Natural Gas from Coal Seams in the Fruitland Formation, San Juan Basin.*
137. Decker, A. D.; and Seccombe, J. C., *Geologic and Reservoir Characteristics of the Red Mountain Coalbed Methane Test Site in the Piceance Basin.*
138. Decker, D.; Jeu, S. J.; Cooper, J. D.; and Wicks, D. E., *Geology, Geochemistry, Reservoir Engineering, and Completion Methods at the Cedar Hill Field, San Juan County, New Mexico: A Field Study of Classic Coal Degasification Behavior.*
139. Decker, A. D.; and Horner, D. M., *Origin and Production Implications of Abnormal Coal Reservoir Pressure.*
140. Decker, A. D.; Close, J.; and McBane, Richard A., *Use of Remote Sensing, Curvature Analysis, and Coal Petrology as Indicators of Higher Coal Reservoir Permeability.*
141. Diamond, W. P., *Site-Specific and Regional Geologic Considerations for Coalbed Gas Drainage.*
142. Doelling, H. H.; Smith, A. D.; and Davis, F. D., *Methane Content of Utah Coals.*
143. Drottar, K. R.; Mount, D. R.; and Patti, S. J., *Biomonitoring of Coalbed Methane Produced Water from the Cedar Cove Degasification Field, Alabama.*
144. Echols, J. B., *Coalbed Methane: Louisiana's Unexplored Energy Resource.*
145. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Greater Green River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*

146. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Cararoc, V. V.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources of the Hanna and Carbon Basins, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
147. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Roberts, S. B.; Wilde, Edith M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Powder River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
148. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Keighin, C. W.; Goven, G. E.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Williston Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
149. Ellis, M. S.; Keighin, C. W.; Gunther, G. L.; Flores, R. M.; Stricker, G. D.; Roberts, S. B.; Ochs, A. M.; and Bader, L. R., *Constraints on Coal Resource Estimation; A Depositional Perspective.*
150. Ellis, M. S., *Geologic Map of the Powder River Basin and Surrounding Area, Wyoming, Montana, South Dakota.*
151. Ellis, M. S.; and Colton, R. B., *Geologic Map of the Powder River Basin and Surrounding Area, Wyoming, Montana, South Dakota, North Dakota, and Nebraska.*
152. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., *Gillette Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
153. Ellis, Margaret. S.; Gunther, Gregory L.; Flores, Romeo. M.; Stricker, Gary D.; Ochs, Allan M.; and Schuenemeyer, John H., *Preliminary Report on Methodology for Calculating Coal Resources of the Wyodak-Anderson Coal Zone, Powder River Basin, Wyoming and Montana.*
154. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., *Sheridan Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
155. Ely, J. W.; and Holditch, S. A., 1990, *Fracturing Techniques Depend on Coal Seam Characteristics.*
156. Ely, J.; Holditch, S. A.; and Carter, R. H., *Improved Hydraulic Fracturing Strategy for Fruitland Formation Coal-bed Methane Recovery, San Juan Basin, New Mexico and Colorado.*
157. Emerson, D. O.; Ganow, H. C.; Qualheim, B. J.; Snoeberger, D. F.; Stone, R., *Underground Coal Gasification in the Powder River Basin.*

158. The Environmental Protection Agency, *Legal Issues Related to Coalbed Methane Storage in Abandoned Coal Mines in Virginia, West Virginia, Pennsylvania, Utah, Colorado, and Alabama.*
159. The Environmental Protection Agency, *Preliminary Report on Coal Resources of the Wyodak-Anderson Coal Zone, Powder River Basin, Wyoming and Montana.*
160. Fassett, J. E., *Coal-Bed Methane Resources and Fruitland Formation Coal-Bed Geology, San Juan Basin, New Mexico and Colorado.*
161. Fassett, James E., *Competing Models for the Fruitland Formation Coal and Coal-bed Methane System of the San Juan Basin, New Mexico and Colorado.*
162. Fassett, J. E. ed., *Geology and Coal-Bed Methane Resources of the Northern San Juan Basin, Colorado and New Mexico.*
163. Fassett, J. E.; and Hinds, J. S., *Geology and Fuel Resources of the Fruitland Formation and Kirtland Shale of the San Juan Basin, New Mexico and Colorado.*
164. Fassett, J. E., *Geometry and Depositional Environments of Fruitland Formation Coalbeds, San Juan Basin, New Mexico and Colorado.*
165. Fassett, James E., *The Mystery of the Escaping Gas; Forensic Geology in the Northern San Juan Basin, La Plata County, Colorado.*
166. Fassett, James E., *Once a Menace, Now a Burgeoning Source of Energy; Coalbed Methane in the Warrior and San Juan Basins.*
167. Fassett, James E., *Subsurface Correlation of Late Cretaceous Fruitland Formation Coal Beds in the Pine River, Florida River, Carbon Junction, and Basin Creek Gas-Seep Areas, La Plata County, Colorado.*
168. Fender, H. B.; and Murray, D. K., *Data Accumulation on the Methane Potential of the Coal Beds of Colorado.*
169. Fields, H. H.; Cervik, J.; and Goodman, T. W., *Degasification and Production of Natural Gas from an Air Shaft in the Pittsburgh Coalbed.*
170. Fields, H. H.; et al, *Degasification of Virgin Pittsburgh Coalbed Through a Large Borehole.*
171. Fillo, John P.; Hamaker, T.; and O'Neil, Patrick E., *Coalbed Methane Development in Alabama: Biototoxicity of Produced Water Originating from Coalbed Degasification Wells in the Cedar Cove Field. A Proposed Study Plan.*
172. Finch, Steven T., Jr., *Fracture and Methane-Contamination Study: Animas River Valley from Bondad, Colorado to Cedar Hill, New Mexico.*

173. Flores, R. M.; Rice, D. D.; and Gruber, J., *Coalbed Gas Potential and Reservoir Heterogeneity, Tertiary Fort Union Formation, Powder River Basin, Montana.*
174. Flores, R. M., *The Emerging New Coalbed Methane Resource in the Powder River Basin, Wyoming and Montana.*
175. Flores, Romeo M.; Stricker, Gary D.; Meyer, Joseph F.; Doll, Thomas E.; Norton, Pierce H., Jr.; Livingston, Robert J.; and Jennings, M. Craig, *A Field Conference on Impacts of Coalbed Methane Development in the Powder River Basin, Wyoming.*
176. Flores, R. M.; Ochs, A. M.; Bader, L. R.; Johnson, R. C.; and Vogler, D., *Framework Geology of the Fort Union Coal in the Powder River Basin, 1999 Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
177. Flores, Romeo M.; Moore, Timothy A.; Stanton, Ronald W.; and Stricker, Gary D., *Textural Controls on Coalbed Methane Content in the Subbituminous Coal of the Powder River Basin.*
178. Forgotson, J. M.; and Friedman, S. A., *Arkoma Basin (Oklahoma) Coal-bed Methane Resource Base and Development.*
179. Friedman, S. A., *Coal-bed Methane Resources in Arkoma Basin, Southeastern Oklahoma.*
180. Friedman, S. A., *Coal-bed Methane Resources and Reserves of Osage County, Oklahoma.*
181. Friedman, S. A., *Determination of Reserves of Methane from Coal Beds for Use in Rural Communities in Eastern Oklahoma.*
182. Friedman, S. A., *Fracture and Structure of Principal Coal Beds Related To Coal Mining and Coalbed Methane, Arkoma Basin, Eastern Oklahoma.*
183. Ganow, H. C., *In Situ Coal Gasification at the Hoe Creek, Wyoming Field Site - An Overview.*
184. Garcia-Gonzalez, Mario; MacGowan, Donald B.; and Surdam, Ronald C., *Coal as a Source Rock of Petroleum and Gas; A Comparison Between Natural and Artificial Maturation of the Almond Formation Coals, Greater Green River Basin in Wyoming.*
185. Garrison, James R., Jr.; van den Bergh, T. C. V.; Barker, Charles E.; and Tabet, David E., *Depositional Sequences Stratigraphy and Architecture of the Cretaceous Ferron Sandstone; Implications for Coal and Coalbed Methane Resources; A Field Excursion.*
186. Gas Research Institute, *Arkoma Basin, Oklahoma and Arkansas.*
187. Gas Research Institute, *Cherokee Basin, Kansas and Oklahoma.*
188. Gas Research Institute, *Coalbed Methane: GRI Changes the Way Industry Does Business in Alabama.*

189. Gas Research Institute, *Treating Produced Waters in the San Juan Basin With the Freeze-Thaw/Evaporation Process*.
190. Gas Research Institute, *Western Interior Coal Region (Arkoma, Cherokee, and Forest City Basins)*.
191. Gilles, Alex; and Snygg, Arnold, *Development of Technology for Coalbed Methane Recovery Program Planning. Appendix A, Technology Options*.
192. Goldhaber, M. B.; Hatch, J. R.; Pashin, J. C.; Offield, T. W.; and Finkelman, R. B., *Anomalous Arsenic and Fluorine Concentrations in Carboniferous Coal, Black Warrior Basin, Alabama; Evidence for Fluid Expulsion During Alleghanian Thrusting?*
193. Gossling, J. M., *Coalbed Methane Potential of the Hartshorne Coals in Parts of Haskell, Latimer, LeFlore, McIntosh, and Pittsburg Counties, Oklahoma*.
194. Grau, R. H., III, *Results of an Eight Year Methane Drainage Project from Horizontal Holes in the Pittsburgh Coalbed*.
195. GRID, *Gas Supply: Coalbed Methane Research Extends to Appalachian Basin*.
196. Griebeling, Richard T., *The Orderly Development of Coalbed Methane Resources from Public Lands - Experience from Coalbed Methane Development in Colorado*.
197. Grossman, E. L.; Coffman, B. K.; Fritz, S. J.; and Wada, H., *Bacterial Production of Methane and Its Influence on Ground-Water Chemistry in East Central Texas Aquifers*.
198. Grout, M. A., *Cleats in Coalbeds of Southern Piceance Basin, Colorado-Correlation with Regional and Local Fracture Sets in Associated Clastic Rocks*.
199. Hanshaw, P. M., ed., *Coal and Hydrocarbon Resources of North America; Volume 1: Coal, Uranium, and Oil and Gas in Mesozoic Rocks of the San Juan Basin; Anatomy of a Giant Energy-Rich Basin, Field Trips for the 28th International Geological Congress*.
200. Harper, D., *Coalbed Methane in Indiana*.
201. Harris, Ray E.; DeBruin, Rodney H.; and Jones, Richard W., *Resources in Sedimentary Rocks of the Powder River Basin and Adjacent Uplifts, Northeastern Wyoming*.
202. Harrison, M. M., *Coalbed Methane Activity in the Western Powder River Basin, Campbell, Johnson, and Sheridan Counties, Wyoming*.
203. Harrison, S. M.; Molson, J. W.; Abercrombie, H. J.; Barker, J. F.; Rudolph, D.; and Aravena, R., *Hydrogeology of a Coal-Seam Gas Exploration Area, Southeastern British Columbia: Part I. Groundwater Flow Systems*.



204. Hatch, J. R., *Hydrocarbon Source-rock Evaluation of Desmoinesian (Middle Pennsylvanian) Coals from Part of the Western Region of the Interior Coal Province.*
205. Heffern, Edward L.; and Coates, Donald A., 1996, *Burning Coal Beds and Clinker in the Powder River Basin.*
206. Hemborg, H. T., *Spanish Peak Field, Las Animas County, Colorado: Geologic Setting and Early Development of a Coalbed Methane Reservoir in the Central Raton Basin.*
207. Henry, Mitchell E.; and Finn, Thomas M., *Digital Framework Geologic Data for a Study of Coal-Bed Methane, Wasatch Plateau, Utah.*
208. Hettinger, R. D.; Biewick, R. R. H.; Bryant, Karen; Ellis, M. S.; Ferderer, D. A.; Kirschbaum, M. A.; Molnia, C. L.; Roberts, L. N. R.; Stricker, G. D.; and Watson, W. D., *Coal Resource Assessment in the Western United States; Factors for Consideration in the Management of Federal Lands.*
209. Hildebrand, Ricky T., *Geochemical Studies of the Anderson-Dietz 1 Coal Bed, Powder River Basin; Origin of Inorganic Elements and Environmental Implications.*
210. Hildebrand, Ricky T., *Ground-water Composition as an Indicator of Sodium Content in Coal in the Powder River Basin, Southeastern Montana and Northeastern Wyoming.*
211. Hill, David G., *North American Coalbed Methane Resource Map.*
212. Hobbs, R. G., *Methane Occurrences, Hazards, and Potential Resources; Recluse Geologic Analysis Area, Northern Campbell County, Wyoming.*
213. Hollub, V.A.; and Schafer, P.S., *A Guide to Coalbed Methane Operations.*
214. Hotchkiss, W. R., *Sulfur and Trace Elements in the Rosebud and McKay Coal Seams, Colstrip Field, Montana.*
215. Hower, James C.; et al, *Generation and Expulsion of Petroleum and Gas from Almond Formation Coal, Greater Green River Basin, Wyoming; Discussions and Reply.*
216. Huffman, Claude, Jr.; and Swanson, Vernon E., *Geologic and Hydrologic Controls on Coalbed Methane: Sand Wash Basin, Colorado and Wyoming.*
217. Hunt, A.M.; and Steele, Derek J., *Coalbed Methane Technology Development in the Appalachian Basin.*
218. ICF Resources, Inc., *The United States Coalbed Methane Resource.*
219. Iannacchione, A. T.; and Puglio, D. G., *Geological Association of Coalbed Gas and Natural Gas from the Hartshorne Formation in Haskell and LeFlore Counties, Oklahoma.*

220. Iannacchione, A. T.; and Puglio, D. G., *Geology of the Lower Kittanning Coalbed and Related Mining and Methane Emission Problems in Cambria County, Pennsylvania.*
221. Iannacchione, A. T.; and Puglio, D. G., *Methane Content and Geology of the Hartshorne Coalbed in Haskell and Le Flore Counties, Oklahoma.*
222. Iannacchione, A. T.; Kertis, C. A.; Houseknecht, D. W.; and Perry, J. H., *Problems Facing Coal Mining and Gas Production in the Hartshorne Coalbeds of the Western Arkoma Basin, OK.*
223. Jeran, P. W.; Lawhead, D. H.; and Irani, M. C., *Methane Emissions From an Advancing Coal Mine Section in the Pittsburgh Coalbed.*
224. Johnson, R. C.; and Flores, R. M., *Coalbed Methane Potential of the Upper Cretaceous Lance and Paleocene Fort Union Formation, Wind River Reservation, Wyoming.*
225. Johnson, Ronald C.; Clark, Arthur C.; Barker, Charles E.; Crysdale, Bonnie L.; Higley, Debra K.; Szmajter, Richard J.; and Finn, Thomas M., *Coalbed Methane Potential of the Upper Cretaceous Mesaverde and Meeteetse Formations, Wind River Reservation, Wyoming.*
226. Johnson, R. C.; and Rice, D. D., *Composition and Origins of Shallow (<1,000 ft) Coalbed Gases, Wind River Reservation, Wyoming.*
227. Johnson, R. C.; and Szmajter, R. J., *Description of Upper Cretaceous Mesaverde Formation from the 1991 U.S. Geological Survey Coalbed Methane Coring Program, Wind River Reservation, Wyoming.*
228. Johnson, Ronald C.; and Flores, Romeo M., *Developmental Geology of Coalbed Methane from Shallow to Deep in Rocky Mountain Basins and in Cook Inlet-Matanuska Basins, Alaska, USA and Canada.*
229. Johnson, Ronald C.; Barker, Charles E.; Pawlewicz, Mark J.; Crysdale, Bonnie L.; Clark, Arthur C.; and Rice, Dudley D., *Preliminary Results of a Coalbed Methane Assessment of the Wind River Indian Reservation, Wyoming.*
230. Johnson, R. C.; and Flores, R. M., *Stratigraphy, Areal Distribution, and Paleodepositional Environments of Fort Union Formation Coal Beds, Wind River Reservation, Wyoming; Implications for Coalbed Methane Development.*
231. Johnson, Ronald C.; and Rice, Dudley D., *Variations in Composition and Origins of Gases from Coal Bed and Conventional Reservoirs, Wind River Basin, Wyoming.*
232. Johnson, V. L.; Graham, D. L.; and Reidel, S. P., *Methane in Columbia River Basalt Aquifers: Isotopic and Geohydrologic Evidence for a Deep Coal-bed Gas Source in the Columbia Basin, Washington.*
233. Jones, Allison L., *Geologic Setting and Water Quality of Selected Basins in the Active Coal-mining Areas of Ohio, June 1985 Through December 1986.*

234. Jones, R. W.; and DeBruin, R. H., 1989, *Coalbed Methane in Wyoming*.
235. Kaiser, W. R.; Scott, A. R.; Hamilton, D. S.; Tyler, Roger; McMurry, R. G.; Zhou, Naijiang; and Tremain, C. M., *Geologic and Hydrologic Controls on Coalbed Methane: Sand Wash Basin, Colorado and Wyoming*.
236. Kaiser, W. R.; and Ambrose, W. A., *Hydrology and Production of Coalbed Methane in Western United States Intermountain Basins*.
237. Kalkreuth, W.; Abercrombie, H.; and Burchard, K., *The Coalbed Methane Potential of Jurassic/Cretaceous Coals from the Fernie Basin, British Columbia, Canada*.
238. Kalkreuth, W. D.; Dawson, M.; and Hughes, J. D., *Geological Survey of Canada Coalbed Methane Research - CBM Potential of Coals from the Western Canada Sedimentary Basin*.
239. Kaszuba, J. P.; and Buys, M. W., *Reclamation Procedures for Produced Water Spills from Coalbed Methane Wells, San Juan Basin, Colorado and New Mexico*.
240. Kelafant, J. R.; Wicks, D. E.; and Kuuskraa, V. A., *A Geologic Assessment of Natural Gas from Coal Seams in the Northern Appalachian Basin, Alabama*.
241. Kelso, B. S.; Goolsby, S. M.; and Tremain, C. M., *Deep Coal Bed Methane Potential of the San Juan River Coal Region, Southwestern Colorado*.
242. Kelso, B. S.; Lombardi, T. E.; and Kuuskraa, J. A., *Drilling and Production Statistics for Major U.S. Coalbed Methane and Gas Shale Reservoirs*.
243. Kelso, B. S., *Geologic Controls on Open-hole Cavity Completions in the San Juan Basin*.
244. Kemp, J. H.; and Peterson, K. M., *Coal-bed Gas Development in the San Juan Basin: A Primer for the Lawyer and Landman*.
245. Kim, A. G., *Methane in the Pittsburgh Coalbed, Greene County, Pa.*
246. Kim, A. G., *Methane in the Pittsburgh Coalbed, Washington County, Pa.*
247. Kirschbaum, Mark A.; Roberts, Laura N. R.; and Biewick, Laura R. H., *Geologic Assessment of Coal in the Colorado Plateau; Arizona, Colorado, New Mexico, and Utah*.
248. Kissel, F. N., *The Methane Migration and Storage Characteristics of the Pittsburgh, Pocahontas No. 3, and Oklahoma Hartshorne Coalbeds*.
249. Kuuskraa, V.A.; McFall, K.S.; Sedwick, K.B.; and Wicks, D.E., *Geologic Assessment of Natural Gas from Coal Seams in the Piceance Basin, Colorado*.
250. Kuuskraa, V.A.; McFall, K.S.; and Wicks, D.E., *Geologic Assessment of Natural Gas from Coal Seams in the Warrior Basin, Alabama*.

251. Kvenvolden, Keith A.; and Lorenson, Thomas D., *Methane and Other Hydrocarbon Gases in Sediment from the Southeastern North American Continental Margin*.
252. Lamarre, Robert, *Coalbed Methane Stratigraphic Traps in Ferron Coals of East-Central Utah*.
253. Lamarre, R. A., *Hydrodynamic and Stratigraphic Controls for a Large Coalbed Methane Accumulation in Ferron Coals of East-Central Utah*.
254. Lamberson, M. N.; and Bustin, R. M., *Coalbed Methane Characteristics of Gates Formation Coals, Northeastern British Columbia: Effect of Maceral Composition*.
255. Lambert, S. W.; Saulsberry, J. L.; and Reeves, S. R., *Coalbed Methane Production Improvement/Recompletion Project in the Warrior Basin*.
256. Lambert, S. W.; and Trevits, M. A., *The Feasibility of No-Propant Stimulation to Enhance Removal of Methane from the Mary Lee Coalbed*.
257. Lambert, S. W.; Saulsberry, J. L.; Steidl, P. F.; Conway, M. W.; and Spafford, S. D., *Fracturing Experience at the Rock Creek Multiple Coal Seams Project*.
258. Landis, E. R., *Coal Resources of Colorado and Wyoming*.
259. Langenberg, W., *Coalification Patterns and Coalbed Methane Potential in the Cadomin Area, Alberta, Canada*.
260. Larson, L. R., *Coal-Spoil and Ground-Water Chemical Data from Two Coal Mines; Hanna Basin and Powder River Basin, Wyoming*.
261. Larson, L. R.; and Daddow, Richard L., *Ground-Water-Quality Data from the Powder River Basin, Northeastern Wyoming*.
262. Larson, L. R., *Ground-Water Quality in Wyoming*.
263. Laubach, S. E.; Tyler, Roger; Tremain, C. M.; Grout, M. A.; and Ambrose, W. A., *Fracture Patterns in Coal in the Western United States; Observations and Implications for Development of Coalbed Methane Resources*.
264. Laubach, S. E.; and Tremain, C. M., *Fracture Swarms: Potential Targets for Methane Exploration in Upper Cretaceous Sandstone and Coal, Northern San Juan Basin*.
265. Laubach, S. E.; Tyler, Roger; Ambrose, W. A.; Tremain, C. M.; and Grout, M. A., *Preliminary Map of Fracture Patterns in Coal in the Western United States*.
266. Law, B. E.; Barnum, B. E.; and Wollenzien, T. P., *Coal Bed Correlations in the Tongue River Member of the Fort Union Formation, Monarch, Wyoming and Decker, Montana*.

267. Law, B. E., *Coal Deposits of the Emery Coal Zone, Henry Mountains Coal Field, Garfield and Wayne Counties, Utah.*
268. Law, B. E.; Rice, D. D.; and Flores, R. M., *Coalbed Gas Accumulations in the Paleocene Fort Union Formation, Powder River Basin, Wyoming.*
269. Law, B. E., *Geologic Map and Coal Deposits of the Gillette West Quadrangle, Campbell County, Wyoming.*
270. Law, B. E., *Geophysical Logs of Test Holes from the Henry Mountains Coal Field, Garfield and Wayne Counties, Southeastern Utah.*
271. Law, B. E.; and Grazia, S. L., *Preliminary Geologic Map and Coal Resources of the Decker Quadrangle, Big Horn County, Montana.*
272. Law, B. E., *Surface Coal Sections in the Emery Coal Zone, Henry Mountains Coal Field, Garfield and Wayne Counties, Utah.*
273. Law, B. E.; Anders, D. E.; and Michael, G. E., *Use of Rock-Eval Pyrolysis and Vitrinite Reflectance Data in Characterizing Type and Maturity of Organic Matter in Coal, Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado.*
274. Leel, Woodruff; and Wickstrom, Charles, *Coalbed Methane Resource of the Rock Springs Formation on the Rock Springs Uplift, Sweetwater County, Wyoming.*
275. Lewis, R. T., *Coalbed Methane Production of the Buck Knob Anticline Field, Wise County, Virginia.*
276. Linz, David G.; Simpson, T. E.; Lawrence, Alonzo W.; Miller, Jeffrey A.; and Davis, Hal A., *Coalbed Methane Produced Water Management Strategies in the Black Warrior Basin of Alabama.*
277. Logan, T. L., *Coalbed Methane; 6, Western Basins Dictate Varied Operations.*
278. Logan, T. L.; Clark W. F.; and McBane Richard A., *Comparing Different Coalbed Methane Completion Techniques, Hydraulic Fracture and Openhole Cavity, at the Northeast Blanco Unit, San Juan Basin.*
279. Logan, T. L.; Clark W. F.; and McBane R. A., *Comparing Openhole Cavity and Cased Hole Hydraulic Fracture Completion Techniques, San Juan Basin, New Mexico.*
280. Logan, Terry L; and Marshall, Richard B., *Drilling and Configuration Methods for Deep Coalbed Methane Wells Used at the Red Mountain Site, Piceance Basin, Colorado.*
281. Logan, T. L., *Horizontal Drainhole Drilling Techniques Used in Rocky Mountain Coal Seams.*
282. Logan, T. L.; and Mavor, M. J., *Western Cretaceous Coal Seam Project Final Report.*

283. Logan, T. L.; and Robinson, J. R., *Western Cretaceous Coal Seam Project: Summary of the Evergreen Operating Corporation Rosa #283 Well, Cooperative Research Project, San Juan Basin.*
284. Lorensen, T. D.; Kvenvolden, K. A.; Barnes, P. W.; Poppe, B. N.; Sansone, F. J.; Rust, T. M.; Lilley, M. D.; and Olson, E. J., *Isotopic Composition of Methane in Seawater of the Alaska Beaufort Sea.*
285. Lyman, Robert M.; and Volkmer, John E., *Pyrophoricity (spontaneous combustion) of Powder River Basin Coals – Considerations for Coalbed Methane Development.*
286. Lyons, Paul C., *Appalachian Coalbed Methane.*
287. Lyons, Paul C., *The Central and Northern Appalachian Basin; A Frontier Region for Coalbed Methane Development.*
288. Lyons, Paul C., *Central-Northern Appalachian Coalbed Methane Flow Grows.*
289. Lyons, Paul C., *Coalbed Methane Potential in the Appalachian States of Pennsylvania, West Virginia, Maryland, Ohio, Virginia, Kentucky, and Tennessee; An Overview.*
290. Lyons, Paul C.; and Ryder, Robert T., *Selected Bibliography of Appalachian Coalbed Methane.*
291. Malone, P. G.; Camp, B. S.; and Smith, J. L., *An Investigation of Parameters Affecting Desorption Rates of Warrior Basin Coals.*
292. Manydeeds, Stephen A., *CBM Potential of the Wind River Indian Reservation.*
293. Markochick, Dennis J.; and Law, Ben E., *Estimates of Gas Content in Coal and Carbonaceous Rocks from Deep Drilling in Pacific Creek Area, Northeastern Green River Basin, Sweetwater County, Wyoming.*
294. Markowski, A. K., *Coalbed Methane Resource Potential and Current Prospects in Pennsylvania.*
295. Mastalerz, M.; and Kvale, E. P., *Coal Quality Variation and Coalbed Gas Content in Boreholes SDH-383 and SDH-384 in Posey County, Indiana.*
296. Mastalerz, M.; and Kvale, E. P., *Coal-bed Gas Potential in Daviess County, Indiana.*
297. Matson, R. E., *Coal-bed Methane Discoveries in Powder River Basin.*
298. Mavor, Mathew J., *Coal Gas Reservoir Cavity Completion Well Performance.*
299. Mavor, M. J.; Dhir, R.; McLennan, J. D.; and Close, J. C., *Evaluation of Hydraulic Fracture Stimulation of the Colorado 32-7 Well, San Juan Basin.*

300. Mavor, M.; Pratt, T.; and DeBruin, R., *Study Quantifies Powder River Coal Seam Properties.*
301. Mavor, M. J., *Western Cretaceous Coal Seam Project: Evaluation of Coalbed Natural Gas Openhole Cavity Completion Productivity.*
302. Mavor, M.J.; Logan, T. L.; Close, J. C.; Pratt, T. J.; and Robinson, J. R., *Western Cretaceous Coal Seam Project: 1992 Annual Report.*
303. McCord, J. P., *Geologic Overview, Coal and Coalbed Methane Resources of the Greater Green River Coal Region, Wyoming and Colorado.*
304. McCulloch, C. M.; and Deul, M., *Geologic Factors Causing Roof Instability and Methane Emission Problems: The Lower Kittanning Coalbed, Cambria County, Pa.*
305. McGarry, D. E., *Challenges in Assessment, Management and Development of Coalbed Methane Resources in the Powder River Basin, Wyoming.*
306. McKay, E. J.; Butler, B. A.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Bear Creek Quadrangle, Powder River County, Montana.*
307. McKay, E. J.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Fort Howes Quadrangle, Rosebud and Powder River County, Montana*
308. McKay, E. J.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Otter Quadrangle, Powder River County, Montana.*
309. McKinnon, I., *Canadian Coalbed Methane.*
310. McLellan, M. W.; and Biewick, L. H., *Geologic Map of the Bloom Creek Quadrangle, Powder River County, Montana.*
311. McPherson, Malcomb J.; and Harpalani, Satya, *Permeability and Sorption Tests on Coal.*
312. Mead, S. W.; Wang, F. T.; Ganow, H. C.; and Stuermer, D. H., *Environmental Studies of LLL's Hoe Creek II Underground Coal Gasification Experiment.*
313. Mead, S. W.; and Ganow, H. C., *Environmental Studies of Underground Coal Gasification Experiment in Northeastern Wyoming, Subsidence Investigations.*
314. Mead, S. W.; Wang, F. T.; Ganow, H. C.; Stuermer, D. H., and Stone, R., *Ground-water Effects of Underground Coal Gasification Experiments in Northeastern Wyoming.*
315. Mead, S. W.; Wang, F. T.; Stuermer, D. H.; Raber, E.; Ganow, H. C.; and Stone, R., *Implications of Ground-water Measurements at the Hoe Creek UCG Site in Northeastern Wyoming.*
316. Meissner, F. F., *Cretaceous and Lower Tertiary Coals as Source for Gas Accumulations in the Rocky Mountain Area.*

317. Meissner, F. F., *Mechanisms and Patterns of Gas Generation, Storage Expulsion-migration and Accumulation Associated with Coal Measures, Green River and San Juan Basins, Rocky Mountain Region, USA.*
318. Meyer, J., *Coal Bed Methane Produced Water-Infiltration/Evapotranspiration, Belle Fourche River Basin, 1993-1999.*
319. Michael, G. Eric; Law, Ben E.; and Anders, D. E., *Geochemical Evaluation of Gas-Bearing Coals With Respect to Maturity, Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado.*
320. Mitcham, S. A.; and Wobeser, G., *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama.*
321. Molnia, C. L.; Kottlowski, F. E.; Jobin, D. A.; and O'Connor, J. T., *Coal in New Mexico: Issues in Quality and Resources.*
322. Montgomery, S. L., *Powder River Basin, Wyoming: An Expanding Coalbed Methane (CBM) Play.*
323. Montgomery, Scott L.; Tabet, David E.; and Barker, Charles E., *Upper Cretaceous Ferron Sandstone; Major Coalbed Methane Play in Central Utah.*
324. Mowers, T.; and Wade, L., *Greater Green River Basin Bibliography: Selected References.*
325. Murphy, Edward C.; and Goven, Gerald E., *The Coalbed Methane Potential of North Dakota Lignites.*
326. Murray, D. K., *CBM in the United States.*
327. Murray, D. K., *Coalbed Methane in the USA: Analogues for Worldwide Development.*
328. Murrie, G. W., *Coal and Gas Resources of the Lower Hartshorne Coalbed in LeFlore and Haskell Counties, Oklahoma.*
329. Nelson, Charles R., *Coalbed Methane Potential of the U.S. Rocky Mountain Region.*
330. Nelson, C. R., *Geologic Controls on Effective Cleat Porosity Variation in San Juan Basin Fruitland Formation Coalbed Reservoirs.*
331. Nelson, Charles R., *New Methods for Coalbed Reservoir Gas-In-Place Analysis: Results from Case Studies in the San Juan, Powder River, Black Warrior and Central Appalachian Basins.*
332. Nichols, D. J., *Stratigraphic Palynology of the Fort Union Formation (Paleocene) in the Powder River Basin, Montana and Wyoming; A Guide to Correlations of Methane-producing Coal Zones.*



333. Nolde, J. E.; and Spears, D., *A Preliminary Assessment of In-place Coalbed Methane Resources in the Virginia Portion of the Central Appalachian Basin.*
334. Nuttall, Brandon C.; Chesnut, Donald R.; and Drahovzal, James A., *Western Kentucky Coalbed Methane Consortium: A Proposed Joint Geologic Study of Coal-Bearing Strata of the Western Kentucky Coal Field Emphasizing Coalbed Methane Resource Characterization.*
335. Ogbe, D. O.; Packer, J. B.; and Clough, J. G., *Risk-weighted Volumetric Analysis to Estimate Gas Reserves and Evaluate Coalbed Methane Potential of the Lower Matanuska Valley, Cook Inlet Basin, Alaska.*
336. Oldaker, P. R., 1991, *Hydrogeology of the Fruitland Formation, San Juan Basin, Colorado and New Mexico.*
337. Oldaker, Paul, 2000, *San Juan Basin Gas Seeps.*
338. Oman, Charles L.; Finkelman, R. B.; Coleman, S. L.; and Bragg, L. J., *Selenium in Coal from the Powder River Basin, Wyoming and Montana.*
339. O'Neil, Patrick E.; Harris, Steven C.; Mettee, Maurice F.; Isaacson, H. Ronald; and Evans, James M., *Biological Fate and Effect of Coalbed Methane Produced Waters Discharged into Streams of the Warrior Basin, Alabama.*
340. O'Neil, P. E.; Harris, S. C.; Drottar, K. R.; Mount, D. R.; Fillo, J. P.; and Mettee, M. F., *Biomonitoring of a Produced Water Discharge from the Cedar Cove Degasification Field, Alabama.*
341. O'Neil, Patrick E.; Mettee, Maurice F.; and Harris, Steven C., *Coalbed Methane Development in Alabama: Biological and Hydrological Conditions of Streams Draining the Cedar Cove Degasification Field.*
342. O'Neil, P. E.; and Harris, S. C., *Development of an Instream Bioassessment Methodology for the Surface Disposal of Coalbed Methane Produced Waters.*
343. O'Neil, Patrick E.; Harris, Steven C.; Mettee, Maurice F.; McGregor, Stuart W.; and Shepard, Thomas E., *Long-Term Biomonitoring of a Produced Water Discharge from the Cedar Cove Degasification Field, Alabama.*
344. O'Neil, Patrick E., *A Review of Water-Quality, Biological Risk, and Discharge Monitoring Studies Relative to the Surface Disposal of Produced Waters from the Development of Coal-Seam Methane in Alabama.*
345. O'Neil, P. E.; Harris, S. C.; and Mettee, M. F., *Stream Monitoring of Coalbed Methane Produced Water from the Cedar Cove Degasification Field, Alabama.*
346. O'Neil, Patrick E.; Isaacson, H. Ronald; and Evans, James M., *Surface Discharge of Coalbed Methane Produced Waters in the Warrior Basin of Alabama, The Cedar Cove Model.*

347. Ortiz, Isais; Weller, T. F.; Anthony, R. V.; Frank, James; Linz, David G.; and Nakles, David V., *Disposal of Produced Waters: Underground Injection Option in the Black Warrior Basin.*
348. Osborne, T. E.; Moore, D. K.; Kidd, J. T.; and Pescatore, F. T., *Coalbed Methane Potential of the Northern Coosa Basin in Alabama.*
349. Owsiacski, G.; and Payie G., *Coalbed Methane Potential in British Columbia.*
350. Palmer, I. D., *Induced Stresses Due to Propped Hydraulic Fracture in Coalbed Methane Wells.*
351. Palmer, I. D.; and Sparks, D. P., *Measurement of Induced Fractures by Downhole TV Camera in Black Warrior Basin Coalbeds.*
352. Pashin, J. C.; Groshong, R. H., Jr.; and Carroll, R. E., *Carbon Sequestration Potential of Coalbed Methane Reservoirs in the Black Warrior Basin: A Preliminary Look.*
353. Pashin, J. C., *Coal-body Geometry and Synsedimentary Detachment Folding in Oak Grove Coalbed Methane Field, Black Warrior Basin, Alabama.*
354. Pashin, Jack C.; and Hinkle, Frank, *Coalbed Methane in Alabama.*
355. Pashin, J. C.; Groshong, R. H., Jr.; and Carroll, R. E., *Enhanced Coalbed Methane Recovery Through Sequestration of Carbon Dioxide: Potential for a Market-Based Environmental Solution in the Black Warrior Basin of Alabama.*
356. Pashin, J.C.; Ward, W.E., II; Winston, R.B.; Chandler, R.V.; Bolin, D.E.; Hamilton, R.P.; and Mink, R.M., *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part II, Black Warrior Basin.*
357. Pashin, J. C.; Carroll, R. E.; Groshong, R. H., Jr.; Raymond, D. E.; McIntyre, Marcella; and Payton, W. J., *Geologic Screening Criteria for Sequestration of CO<sub>2</sub> in Coal: Quantifying Potential of the Black Warrior Coalbed Methane Fairway, Alabama.*
358. Pashin, J. C.; Carroll, R. E.; Hatch, J. R.; and Goldhaber, M. B., *Interplay Among Cleating, Maturation, and Mineralization in Coalbed Methane Reservoirs of the Black Warrior Basin.*
359. Pashin, Jack C.; Carroll, Richard E.; Hatch, Joseph R.; and Goldhaber, Martin B., *Mechanical and Thermal Control of Cleating and Shearing in Coal; Examples from the Alabama Coalbed Methane Fields.*
360. Pashin, J. C., *Productivity of Coalbed Methane Wells in Alabama.*
361. Pashin, J. C., *Regional Analysis of the Black Creek-Cobb Coalbed-Methane Target Interval, Black Warrior Basin, Alabama.*
362. Pashin, J. C., *Stratigraphy and Structure of Coalbed Methane Reservoirs in the United States: An Overview.*

363. Pashin, J. C.; and Groshong, R. H., Jr., *Structural Control of Coalbed Methane Production in Alabama.*
364. Pashin, J.C.; Ward, W.E., II; Winston, R.B.; Chandler, R.V.; Bolin, D.E.; Richter, K. E.; Osborne, W. E.; and Sarnecki, J. C., *Structure, Sedimentology, Coal Quality and Hydrology of the Black Warrior Basin in Alabama: Controls on the Occurrence and Producibility of Coalbed Methane.*
365. Penny, Glenn S.; and Conway, Michael W., *Coordinated Studies in Support of Hydraulic Fracturing of Coalbed Methane.*
366. Perry, J. H.; Prosser, L. J., Jr.; and Cervik, J., *Methane Drainage from the Mary Lee Coalbed, Alabama, Using Horizontal Drilling Techniques.*
367. Perry, J. H.; Aul, G. N.; and Cervik, J., *Methane Drainage Study in the Sunnyside Coalbed, Utah.*
368. Petroleum Information / Dwights, *\$110 Million Gas Gathering System Proposed for Powder River.*
369. Picciano, Laura, *Gas Research Institute's Appalachian Basin Research: Selected Bibliography.*
370. Picciano, Laura; and Sole, Linda S., *San Juan Basin Bibliography: Selected References.*
371. Pierce, Brenda, *Coalbed Methane in the Forest City Basin.*
372. Popp, J. T.; and McCulloch, C. M., *Geological Factors Affecting Methane in the Beckley Coalbed.*
373. Popp, J. T.; Coleman, D. D.; and Deogh, R. A., *Investigations of the Gas Content of Coal Seams in the Vicinity of Charleston, Illinois.*
374. Powder River Coalbed Methane Information Council, *Coalbed Methane Development Information.*
375. Puglio, D. G., *Evaluating Geologic Conditions and Methane Contents of Coalbeds Through Exploration Programs in the Northern Appalachian Coalfield.*
376. Pyrak-Nolte, Laura J., *Multiphase Flow Through Cleats in Coal.*
377. Questa Engineering Corporation, *The 3M CBM Final Report; Volume I: Analysis and Results and Volume II: The 3M CBM Model Users Guide.*
378. Reinecke, Kurt M.; Rice, Dudley D.; and Johnson, Ronald C., *Characteristics and Development of Fluvial Sandstone and Coalbed Reservoirs of Upper Cretaceous Mesaverde Group, Grand Valley Field, Garfield County, Colorado.*
379. Rice, C. A.; Bartos, T. T.; and Ellis, M. S., *Chemical and Isotopic Composition of Water in the Fort Union and Wasatch Formations of the Powder River Basin, Wyoming and Montana: Implications for Coalbed Methane Development.*

380. Rice, C. A.; Ellis, M. S.; and Bullock, J. H., Jr., *Water Co-Produced with Coalbed Methane in the Powder River Basin, Wyoming: Preliminary Compositional Data.*
381. Rice, Cynthia A.; and Nuccio, Vito, *Water Produced with Coalbed Methane.*
382. Rice, C.A., *Waters Co-Produced with Coalbed Methane from the Ferron Sandstone in East-Central Utah.*
383. Rice, D. D.; Clayton, J. L.; and Pawlewicz, M. J., *Characterization of Coal-Derived Hydrocarbons and Source Rock Potential of Coal Beds, San Juan Basin, New Mexico and Colorado, USA.*
384. Rice, D. D.; and Flores, R. M., *Coalbed Methane Potential of Tertiary Coal Beds and Adjacent Sandstone Deposits, Powder River Basin, Wyoming and Montana.*
385. Rice, Dudley D.; and Threlkeld, Charles N., *Comparison of Natural Gases Produced from Upper Cretaceous Fruitland Formation Coal Beds and Adjacent Reservoirs, San Juan Basin, New Mexico and Colorado.*
386. Rice, Dudley D.; and Flores, Romeo M., *Controls on Bacterial Gas Accumulations in Thick Tertiary Coal Beds and Adjacent Channel Sandstones, Powder River Basin, Wyoming and Montana.*
387. Rice, Dudley D.; and Flores, Romeo M., *Nature of Natural Gas in Anomalously Thick Coal Beds, Powder River Basin, Wyoming.*
388. Rice, D. D.; Flores, R. M.; and Law, B. E., *Nature and Origin of Lower Tertiary Coalbed Gases, Powder River Basin, Wyoming.*
389. Rice, D. D.; and Threlkeld, C. N., *Occurrences and Origin of Natural Gas in Ground Water, Southern Weld County, Colorado.*
390. Rice, D. D.; Epsman, M. L.; and Mancini, E. A., *Origin of Conventional and Coalbed Gases in the Black Warrior Region, Alabama.*
391. Rice, D. D.; Clayton, J. L.; Flores, R. M.; Law, B. E.; and Stanton, R. W., *Some Geologic Controls of Coalbed Gas Generation, Accumulation, and Production, Western United States.*
392. Rieke, H. H., *Arkoma Basin Report; A Study of Pennsylvanian Geology, Coal and Coalbed Methane Resources in Arkansas and Oklahoma.*
393. Rieke, H. H.; and Kirr, J. N., *Geologic Overview, Coal, and Coalbed Methane Resources of the Arkoma Basin - Arkansas and Oklahoma.*
394. Rightmire, C. T.; Eddy, G. E.; and Kirr, J. N., *Coalbed Methane Resources of the United States.*
395. Roberts, R. D., *Coalbed Methane Development: A Land Owner's Prospective.*

396. Roberts, S. B.; Clark, A. C.; and Carey, M. A., *Analyses of Seven Core Samples from Two Tertiary Coal Beds in the Sagwon Member of the Sagavanirktok Formation, North Slope, Alaska.*
397. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Ochs, A. M.; Gunther, G. L.; Schuenemeyer, J. H.; and Power, H. C., *Ashland Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
398. Roberts, S. B., (Submitted), *Coal in the Front Range Urban Corridor - An Overview of Coal Geology, Coal Production, and Coal-bed Methane Potential in Selected Areas of the Denver Basin, Colorado, and the Potential Impact of Historic Coal Mining and Development and Land Use Planning.*
399. Roberts, Stephen B.; and Fishman, Neil S., 2000, *Coal-bed Methane Potential in the Laramie Formation, Greater Wattenberg Area, Denver Basin, Colorado; Just Wishful Thinking?.*
400. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Bader, L. R.; Ellis, M. S.; Stricker, G. D.; Gunther, G. L.; Ochs, A. M.; Kinney, S. A.; Schuenemeyer, J. H.; and Power, H. C., *Colstrip Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
401. Roberts, S. B.; Gunther, G. L.; Taber, T. T.; Ochs, A. M.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Wilde, Edith M.; Schuenemeyer, J. H.; and Power, H. C., *Decker Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
402. Roberts, S. B.; and Bossiroy, Dominique, *Stratigraphy and Coal Geology of the Lower Part of the Fort Union Formation in the Grass Creek Coal Mine Area, Southeastern Bighorn Basin, Wyoming.*
403. Roberts, S. B.; and Stanton, R. W., *Stratigraphy and Depositional Setting of Thick Coal Beds in the Grass Creek Coal Mine, Southeastern Bighorn Basin, Wyoming.*
404. Roberts, S. B.; and Rossi, G. S., *A Summary of Coal in the Coalmont Formation (Tertiary), North Park Basin, Colorado, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
405. Roberts, S. B.; and Rossi, G. S., *A Summary of Coal in the Fort Union Formation (Tertiary), Bighorn Basin, Wyoming and Montana, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
406. Robinson, L. N.; Culbertson, W. C.; and Affolter, R. H., *Geology, Coal Resources, and Coal Quality of the Prairie Dog Creek EMRIA Study Area, Rosebud County, Montana.*

407. Roybal, G. H.; Anderson, O. J.; and Beaumont, E. C., eds., *Coal Deposits and Facies Changes Along the Southwestern Margin of the Late Cretaceous Seaway, West-Central New Mexico.*
408. Sanfilipo, John R.; Barker, Charles E.; Stanton, Ron W.; Warwick, Peter D.; and Morris, Loyd E., *A Shallow Coal-bed Methane Show in the Gulf Coast of Texas, Indication of Down-dip Commercial Potential?.*
409. Sato, T., *Methane Recovery from Coalbeds: Surface and Physical Properties of Western United States Coals.*
410. Sawyer, W. K.; Saulsberry, J. L.; Schraufnagel, Richard A.; and Paul, G. W., *History Match of a Multi-Seam Coalbed Well in the Black Warrior Basin.*
411. Schenk, C. J.; Nuccio, V. F.; Flores, R. M.; Johnson, R. C.; Roberts, S. B.; and Collet, T. S., *Coalbed Gas Resources of the Rocky Mountain Region.*
412. Schraufnagel, Richard A.; Saulsberry, J. L.; and Lambert, S. W., *Gas Production from Multiple Wells at Rock Creek.*
413. Schraufnagel, R. A., *Multiple Seam Completion and Production Experience at Rock Creek.*
414. Schwochow, S. D.; and Nuccio, V. F., *Coalbed Methane of North America, II.*
415. Schwochow, S. D.; Murray, D. K.; and Fahy, M. F., *Coalbed Methane of Western North America.*
416. Scott, A. R., *Coal and Coalbed Methane Resources of Texas.*
417. Scott, A. R.; Kaiser, W. R.; and Ayers, W. B., Jr., *Composition, Distribution, and Origin of Fruitland Formation and Pictured Cliffs Sandstone Gases, San Juan Basin, Colorado and New Mexico.*
418. Scott, A. R.; and Tyler, R., *Evaluating Coalbed Methane Potential in Texas.*
419. Scott, A. R.; Nance, H. S.; and Beltran, M. Z., *Heterogeneity of Water and Coal Gas Production in the Northern San Juan Basin, Colorado and New Mexico.*
420. Scott, A. R.; Zhou, N.; and Levine, J. R., *A Modified Approach to Estimating Coal and Coal Gas Resources: Examples from the Sand Wash Basin, Colorado.*
421. Scott, Andrew R.; Ambrose, William A., *Thermal Maturity and Coalbed Methane Potential of the Greater Green River, Piceance, Powder River, and Raton Basins.*
422. Scott, A. R., *Thermogenic and Secondary Biogenic Gases, San Juan Basin, Colorado and New Mexico - Implications for Coalbed Gas Producibility.*
423. Seidle, J. R.; and McAnear, J. F., *Pressure Falloff Testing of Enhanced Coalbed Methane Pilot Injection Wells.*

424. Shepard, Thomas E.; O'Neil, Patrick E.; Harris, Steven C.; and McGregor Stuart W., *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama.*
425. Shi, J. Q.; and Durucan, S., *Identifying the Key Factors Controlling Openhole Cavity Completions at the San Juan Basin - A Numerical Study.*
426. Steidl, P. F., *Inspections of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama.*
427. Steidl, P. F., *Observations of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama. Rock Creek Methane From Multiple Coal Seams Completion Project.*
428. Stevens, S.H.; Lombardi, T.E.; Kelso, B.S.; and Coates, J.M., *Geologic Assessment of Natural Gas from Coal Seams in the Raton and Vermejo Formation, Raton Basin.*
429. Stevens, S. H.; Kelso, B. S.; Lombardi, T. E.; and Coates, J. M., *Raton Basin Assessment of Coalbed Methane Resources.*
430. Stoeckinger, W. T., *Coalbed Methane Production Base Established in Southeast Kansas.*
431. Stoeckinger, W. T., *Coal-bed Methane Production in Eastern Kansas: Its Potential and Restraints.*
432. Stoeckinger, W. T., *Kansas Coalbed Methane Comes on Stream.*
433. Stoeckinger, W. T., *Methane from Coal in Southeastern Kansas: The Rebirth of an Old Industry.*
434. Stott, J., 2001, *Canadian Coalbed Methane Activity Intensifies.*
435. Strever, M. T., *Methane Drainage Plan Using Horizontal Holes at the Hawk's Nest East Mine, Paonia, Colorado.*
436. Stricker, G. D., *Coal Occurrences, Quality, and Resource Assessment, National Petroleum Reserve in Alaska, U.S. Geological Survey Polar Research Symposium; Abstracts with Program.*
437. Stricker, G. D.; and Ellis, M. S., *Coal Quality and Geochemistry, Greater Green River Basin, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
438. Stricker, G. D.; and Ellis, M. S., *Coal Quality and Geochemistry, Hanna and Carbon Basins, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
439. Stricker, G. D.; Flores, R. M.; and McGarry, D. E., *Coalbed Methane Studies on Federal Lands in the Powder River Basin and Other Areas in Wyoming.*

440. Stricker, Gary D.; and Ellis, Margaret S., *Laramide Tectonism and Paleogeography; Their Effects on Quality and Hazardous Air Pollutant Trace Element Trends in Rocky Mountain Province Paleocene Coals*.
441. Stricker, G. D.; Flores, R. M.; and Ochs, A. M., *Powder River Basin Coalbed Methane; The USGS Role in Investigating This Ultimate Clean Coal By-production*.
442. Stricker, G. D.; and Flores, R. M., *Powder River Basin and Williston Basin Coal Resource Assessment and Their Relationship to Coalbed Methane Potential*.
443. Telle, W. R.; Thompson, D. A.; Lottman, L. K.; and Malone, P. G., *Preliminary Burial - Thermal History Investigations of the Black Warrior Basin: Implications for Coalbed Methane and Conventional Hydrocarbon Development*.
444. Tewalt, S. J.; and Halili, N. E., *Arsenic in the Coal Beds and Surface Waters of the Warrior Basin, Western Alabama*.
445. Tewalt, S. J.; Bauer, M. A.; Mathew, D.; Roberts, M. P.; Ayers, W. B., Jr.; Barnes, J. W.; and Kaiser, W. R., *Estimation of Coal Resources in Texas Gulf Coast, Ohio Northern Appalachian, and Wyoming Powder River Basins: A Comparison of Statistical Approaches*.
446. Tremain, C. M.; et al, *The Coal Bed Methane Resources of Colorado*.
447. Tremain, C. M.; Laubach, S. E.; and Whitehead, N. H., III, *Coal Fracture (Cleat) Patterns in Upper Cretaceous Fruitland Formation Coal Seams, San Juan Basin*.
448. Tremain, C. M.; Laubach, S. E.; and Whitehead, N. H., III, *Coal Fracture (Cleat) Patterns in Upper Cretaceous Fruitland Formation, San Juan Basin, Colorado and New Mexico - Implications for Coalbed Methane Exploration and Development*.
449. Tremain, C. M., *The Coalbed Methane Potential of the Raton Basin, Colorado*.
450. Trent, Virgil, A., *Summary of Results of the Coal Resource Occurrence and Coal Development Potential Mapping Program in Part of the Powder River Basin, Montana and Wyoming*.
451. Tyler, R.; Scott, A. R.; Kaiser, W. R.; and McMurray, R. G., *The Application of a Coalbed Methane Producibility Model in Defining Coalbed Methane Exploration Fairways and Sweet Spots: Examples from the San Juan, Sand Wash, and Piceance Basins*.
452. Tyler, Roger; Ambrose, W.A.; Scott, A.R.; and Kaiser, W.R., *Coalbed Methane Potential of the Greater Green River, Piceance, Powder River*.
453. Tyler, R.; Scott, A. R., *Defining Coalbed Gas Exploration Fairways in Low Permeability, Hydrocarbon Overpressured Basins: An Example from the Piceance Basin, Northwest Colorado*.
454. Tyler, R.; Scott, A. R.; and Kaiser, W. R., *Defining Coalbed Methane Exploration Fairways: An Example from the Piceance Basin, Rocky Mountain Foreland, Western United States*.



455. Tyler, Roger; Laubach, S. E.; Ambrose, W. A.; Grout, M. A.; and Tremain, C. M., *Face-Cleat Patterns in Rocky Mountain Foreland Basins, Western United States; Permeability Indicators for Coalbed Methane*.
456. Tyler, Roger; Kaiser, William R.; McMurry, Ronald G.; Nance, H. Seay; Scott, Andrew R.; and Zhou, Naijiang, *Geologic Characterization and Coalbed Methane Occurrence: Williams Fork Formation, Piceance Basin, Northwest Colorado*.
457. Tyler, R.; Kaiser, W. R.; Scott, A. R.; Hamilton, D. S.; and Ambrose, W. A., *Geologic and Hydrologic Assessment of Natural Gas from Coal: Greater Green River, Piceance, Powder River, and Raton Basins, Western United States*.
458. Tyler, Roger; Kaiser, William R.; Scott, Andrew R.; Hamilton, Douglas S.; McMurry, Ronald G.; and Zhou, Naijiang, *Geologic and Hydrologic Assessment of Natural Gas from Coal Seams in the Mesaverde Group and Fort Union Formation, Greater Green River Basin, Wyoming and Colorado*.
459. Tyler, Roger; Scott, Andrew R.; Kaiser, William R.; Nance, H. Seay; McMurry, Ronald G.; Tremain Carol M.; and Mavor, Matt J., *Geologic and Hydrologic Controls Critical to Coalbed Methane Producibility and Resource Assessment: Williams Fork Formation, Piceance Basin, Colorado*.
460. Tyler, R.; Kaiser, W. R.; Scott, A. R.; and Hamilton, D. S., *The Potential for Coalbed Gas Exploration and Production in the Greater Green River Basin, Southwest Wyoming and Northwest Colorado*.
461. Tyler, R. N.; Zhou, N.; McMurray, R. G.; Jackson, M. L. W.; and Tremain, C. M., *Selected References Related to Coalbed Methane in the Greater Green River, Piceance, Powder River, Raton, and San Juan Basins*.
462. United States Geological Survey, Central Region Energy Resources Team, *Coalbed Methane Project*.
463. United States Geological Survey, *1995 National Assessment of United States Oil and Gas Resources*.
464. United States Geological Survey, Central Region Energy Resources Team, *Preliminary Gulf Coast Coalbed Methane Exploration Maps: Depths to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance*.
465. Van Loenen, Richard E.; and Gibbons, Anthony B., *Assessment of Undiscovered Resources of Coalbed Methane in Nine Wyoming BLM Wilderness Study Areas*.
466. Van Voast, Wayne A., *Fracture Patterns in Coal in the Western United States; Observations and Implications for Development of Coalbed Methane Resources*.
467. Van Voast, W. A., *Hydrogeologic Aspects of Coal-bed Methane Occurrence, Powder River Basin*.

468. Vessey, S. J.; and Bustin, R. M., *Coalbed Methane Characteristics of the Mist Mountain Formation, Southern Canadian Cordillera: Effect of Shearing and Oxidation.*
469. Wanty, Richard B.; Folger, Peter F.; and Briggs, Paul H., *Ground-water Chemistry of the Coal-Bearing Upper Cretaceous Mesaverde Formation, Wind River Reservation, Wyoming.*
470. Warwick, P. D.; SanFilipo, J. R.; Barker, Charles E.; and Morris, L. E., *Coal-bed Methane in the Gulf Coastal Plain; A New Frontier?*
471. Warwick, P. D.; Barker, C. E.; SanFilipo, J. R., *Preliminary Evaluation of the Coalbed Methane Potential of the Gulf Coastal Plain, USA and Mexico.*
472. Warwick, P. D.; Barker, C. E.; SanFilipo, J. R.; and Biewick, L. R. H., *Preliminary Evaluation of the Coalbed Methane Resources of the Gulf Coastal Plain.*
473. Warwick, Peter D.; Barker, C. E.; SanFilipo, John R.; and Morris, L. E., *Preliminary Results from Coal-bed Methane Drilling in Panola County, Texas.*
474. Weaver, J. N.; Gruber, J. R., Jr., *Coal and Coal Bed Methane Resources of the Absaroka - Beartooth Study Area.*
475. Westman, Glenn H.; and Parish, Lovell M., *The Coal Bed Methane Potential of the Sand Wash Basin, Green River Coal Region, Colorado.*
476. Wheat, R. W., *Coalbed Methane Potential, Core and Pilot Program, Illinois Basin.*
477. Wheaton, J. R.; and Lovelace, B. K., *Hydrologic Issues Associated with Coal-Bed Methane Development in Montana.*
478. Wieczner, Bilha; and Irvin, Marcia, *Coalbed Methane Development in Alabama: A Bibliography.*
479. Willis, C., *Rocky Mountain Coal Seams Call for Special Drilling Techniques.*
480. Winston, R. B., *Preliminary Report on Coal Quality Trends in Upper Pottsville Formation Coal Groups and Their Relationships to Coal Resource Development, Coalbed Methane Occurrence, and Geologic History in the Warrior Coal Basin, Alabama.*
481. Wray, L. L.; and Koenig, N. V., *The Coalbed Methane Potential in the Upper Cretaceous to Early Tertiary Laramie and Denver Formations, Denver Basin, Colorado.*
482. Wray, Laura L., *Geologic Mapping and Subsurface Well Log Correlations of the Late Cretaceous Fruitland Formation Coal Beds and Carbonaceous Shales - the Stratigraphic Mapping Component of the 3M Project, San Juan Basin, La Plata County, Colorado.*
483. Wyman, R. E., *Gas Resources in Elsworth Coal Seams.*

484. Wyoming Department of Environmental Quality, Water Quality Division, *Antidegradation Review, Analysis and Findings: Concentrations of Barium in the Surface Waters in Northeastern Wyoming Related to Discharges of Coal Bed Methane Produced Water.*
485. Wyoming Geological Association, *Powder River Basin Oil and Gas Fields.*
486. Wyoming State Geological Survey, *Stream Classification and Drainage Systems Map of the Northeast Wyoming Coal Bed Methane Development.*
487. Wyoming Water Resources Center, University of Wyoming, *A Study of Techniques to Assess Surface and Groundwater Impacts Associated with Coal Bed Methane and Surface Coal Mining: Little Thunder Creek Drainage, Wyoming.*
488. Zebrowitz, M. J.; Kelafant, J. R.; and Boyer, C. M., *Reservoir Characteristics and Production of the Coal Seams in Northern and Central Appalachian Basins.*
489. Zuber, M. D.; Boyer, C. M.; Schraufnagel, Richard A.; and Saulsberry, J., *Insights and Analysis from the Rock Creek Project: A Reservoir Engineering Approach.*

## II MINING

*Contains listings of works that address coal mining and coalbed methane issues. Citations appear alphabetically by author/editor and include the title of the work. Refer to the bibliography for more information on the publication.*

1. Ayers, W. B., Jr., *Coal Resources of the Tongue River Member of the Fort Union Formation (Palaeocene), Powder River Basin, Wyoming and Montana.*
2. Baker, E. C.; Oyler, D. C.; Perry, J. H.; and Finfinger, G. L., *Economic Evaluation of Directional Drilling for Methane Drainage From Coalbeds.*
3. Barker, C. E., *The Geologic Controls on Coalbed Gas - A Major Source in the U.S.*
4. Banerjee, B. D., *A New Approach to the Determination of Methane Content in Coal Seams.*
5. Bartholomew, C. H.; Butala, S.J.; Medina, J. C.; Lee, M. L.; Taylor, T. Q.; and Andrus, D. B., *Mineral-Catalyzed Formation of Natural Gas During Coal Maturation.*
6. Beamish, B. B.; and Crosdale, P. J., *Instantaneous Outbursts in Underground Coal Mines: An Overview and Association with Coal Type.*
7. Bertard, C.; Bruyet, B.; and Gunther, J., *Determination of Desorbable Gas Concentration of Coal (Direct Method).*
8. Bibler, C.; and Carothers, P., *Overview of Coal Mine Gas Use Technologies.*
9. Boreck, D. L.; and Strever, M. T., *Conservation of Methane from Colorado Mined/Minable Coal Beds: A Feasibility Study.*
10. Boyer, C. M.; and Kelafant, J. R., *Geologic Assessment of Natural Gas from Coal Seams in the Central Appalachian Basin.*
11. Boyer, C. M., II; Kelefant, J. R.; Kuuskraa, V. A.; and Manger, K. C., *Methane Emissions from Coal Mining: Issues and Opportunities for Reduction.*
12. Bureau of Land Management, *BLM Evaluates Coalbed Methane, Coal & Synfuels Technology.*
13. Cervik, J.; Fields, H. H.; and Aul, G. N., *Rotary Drilling Holes in Coalbeds for Degasification.*
14. Choi, S. K.; and Wold, M. B., *Advances in Simulation of Gas Outburst Conditions in Underground Coal Mines.*
15. Clayton, J. L.; Leventhal, J. S.; and Rice, D. D., *Atmospheric Methane Flux from Coals.*

16. Clayton, J.; Rice, D. D.; Leventhal, J. S.; and Kotarba, M., *Atmospheric Methane Flux from Coals Related to Mining and Natural Geologic Processes*.
17. Close, J. C., *Natural Fractures in Coal*.
18. Cole, G. A.; Daniel, J. A.; Heald, B. P.; et al, *Oil and Gas Drilling and Coal Production Summary for Montana*.
19. Culbertson, W. C.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Quietus Quadrangle, Big Horn and Powder River Counties, Montana*.
20. Culbertson, W. C.; Hatch, J. R.; and Affolter, R. H., *Geology and Coal Resources of the Hanging Woman Creek EMRIA Site, Big Horn and Powder River Counties, Montana*.
21. Curl, S. J., *Methane Prediction in Coal Mines*.
22. Dabbous, M. K.; Reznik, A. A.; Taber, J. J.; and Fulton, P. F., *The Permeability of Coal to Gas and Water*.
23. Danell, R. E.; Kallstrand, A.; Nunn, J.; and Heed, B., *Reduction of Methane Emissions from Underground Coal Mining: Demonstration of Abatement and Utilization in Mine Ventilation Exhaust Air*.
24. Deul, M.; and Kim, A. G., *Methane Control Research: Summary of Results, 1964-80*.
25. Diamond, W. P., *Evaluation of the Methane Gas Content of Coalbeds: Part of a Complete Coal Exploration Program for Health and Safety and Resource Evaluation*.
26. Diamond, W. P.; Iannacchione, A. T.; Puglio, D. G.; and Steidl, P. F., *Geologic Studies of Gassy Coalbeds*.
27. Diamond, W. P.; Elder, C. H.; and Jeran, P. W., *Influence of Geology on Methane Emission from Coal*.
28. Diamond, W. P.; and Schatzel, S. J., *Measuring the Gas Content of Coal: A Review*.
29. Diamond, W. P., 1993, *Methane Control for Underground Coal Mines*.
30. Diamond, W. P., 1994, *Methane Control for Underground Coal Mines*.
31. Diamond, W. P.; Schatzel, S. J.; Garcia, F.; and Ulery, J. P., *The Modified Direct Method: A Solution for Obtaining Accurate Coal Desorption Measurements*.
32. Diamond, W. P.; LaScola, J. C.; and Hyman, D. M., *Results of Direct-Method Determination of the Gas Content of U.S. Coalbeds*.

33. Diamond, W. P., *Site-Specific and Regional Geologic Considerations for Coalbed Gas Drainage*.
34. Diamond, W. P.; McCulloch, C. M.; and Bench, B. M., *Use of Surface Joint and Photolinear Data for Predicting Subsurface Coal Cleat Orientation*.
35. Diessel, Claus, *Sequence Stratigraphy Applied to Coal Seams; Two Case Histories*.
36. Draffin, C. W.; et al, *Underground Coal Conversion - Program Description*.
37. Elder, C. H.; and Duel, M., *Degasification of the Mary Lee Coalbed Near Oak Grove, Jefferson County, Alabama, By Vertical Borehole in Advance of Mining*.
38. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Greater Green River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
39. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Cararoc, V. V.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources of the Hanna and Carbon Basins, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
40. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Roberts, S. B.; Wilde, Edith M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Powder River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
41. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Keighin, C. W.; Goven, G. E.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Williston Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
42. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S.; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., *Gillette Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
43. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S.; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., *Sheridan Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
44. The Environmental Protection Agency, *Economic Assessment of the Potential for Profitable Use of Coal Mine Methane: Case Studies of Three Hypothetical U.S. Mines*.

45. The Environmental Protection Agency, *A Guide for Methane Mitigation Projects: Gas-to-Energy at Coal Mines*.
46. The Environmental Protection Agency, *Identifying Opportunities for Coal Mine Methane Recovery at U.S. Coal Mines: Draft Profiles of Selected Gassy Underground Coal Mines*.
47. The Environmental Protection Agency, *Legal Issues Related to Coalbed Methane Storage in Abandoned Coal Mines in Virginia, West Virginia, Pennsylvania, Utah, Colorado, and Alabama*.
48. The Environmental Protection Agency, *Technical and Economic Assessment: Mitigation of Methane Emissions from Coal Mine Ventilation Air*.
49. Ertekin, Turgay, *Flow Dynamics of Coal-bed Methane in the Vicinity of Degasification Wells*.
50. Fassett, James E., *Coal-bed Methane; A Contumacious, Free-spirited Bride; The Geologic Handmaiden of Coal Beds*.
51. Fields, H. H.; Cervik, J.; and Goodman, T. W., *Degasification and Production of Natural Gas from an Air Shaft in the Pittsburgh Coalbed*.
52. Fields, H. H.; et al, *Degasification of Virgin Pittsburgh Coalbed Through a Large Borehole*.
53. Flores, Romeo M., editor, *Coalbed Methane: From Coal-Mine Outbursts to a Gas Resource*.
54. Flores, Romeo M., *Coalbed Methane: From Hazard to Resource*.
55. Flores, R. M., *Creation of Digital Databases and Derivative Products for Coal and Coalbed Methane Resource Assessment; A Short Course*.
56. Friedman, S. A., *Fracture and Structure of Principal Coal Beds Related To Coal Mining and Coalbed Methane, Arkoma Basin, Eastern Oklahoma*.
57. Gan, H. S.; Nandi, S. P.; and Walker, P. L., Jr., *Nature of Porosity in American Coals*.
58. Garrison, James R., Jr.; van den Bergh, T. C. V.; Barker, Charles E.; and Tabet, David E., *Depositional Sequences Stratigraphy and Architecture of the Cretaceous Ferron Sandstone; Implications for Coal and Coalbed Methane Resources; A Field Excursion*.
59. Grau, R. H., III; and LaScola, J. C., *Methane Emissions from U. S. Coal Mines in 1980*.
60. Grau, R. H., III, *Results of an Eight Year Methane Drainage Project from Horizontal Holes in the Pittsburgh Coalbed*.
61. Heffern, Edward L.; and Coates, Donald A., *Burning Coal Beds and Clinker in the Powder River Basin*.

62. Herring, J. R.; and Dean, W. E., *Methane Fluxes from Coal Rank Increase and Natural Coal Fires*.
63. Higley, Debra K., *A Method to Estimate the Uncertainty of Coal Resources*.
64. Humphrey, H. B., *Historical Summary of Coal-mine Explosions in the United States*.
65. Iannacchione, A. T.; and Puglio, D. G., *Geology of the Lower Kittanning Coalbed and Related Mining and Methane Emission Problems in Cambria County, Pennsylvania*.
66. Iannacchione, A. T.; Kertis, C. A.; Houseknecht, D. W.; and Perry, J. H., *Problems Facing Coal Mining and Gas Production in the Hartshorne Coalbeds of the Western Arkoma Basin, OK*.
67. Irani, M. C.; et al, *Methane Emissions from U. S. Coal Mines, A Survey*.
68. Irani, M. C.; Jeran, P. W.; and Deul, M., *Methane Emissions from U. S. Coal Mines in 1973, A Survey – Supplement to Information Circular 8558*.
69. Irani, M. C.; et al, *Methane Emissions from U. S. Coal Mines in 1975, A Survey*.
70. Jansen, G. J., *Petrography Studies Can Aid in Coal Mine Planning and in Estimating Methane Yields in Coal Beds*.
71. Jeran, P. W.; Lawhead, D. H.; and Irani, M. C., *Methane Emissions from an Advancing Coal Mine Section in the Pittsburgh Coalbed*.
72. Jones, Allison L., *Geologic Setting and Water Quality of Selected Basins in the Active Coal-mining Areas of Ohio, June 1985 Through December 1986*.
73. Kim, A. G., *Estimating Methane Content of Bituminous Coalbeds from Adsorption Data*.
74. Kim, A. G., 1978, *Experimental Studies on the Origin and Accumulation of Coalbed Gas*.
75. Kim, A. G.; and Douglas, L. J., *Gases Desorbed from Five Coals of Low Gas Content*.
76. Kim, A. G., *Low-temperature Evolution of Hydrocarbon Gases from Coal*.
77. Kim, A. G.; and Kissell, F. N., 1988, *Methane Formation and Migration in Coalbeds*.
78. Kim, A. G., *Methane in the Pittsburgh Coalbed, Greene County, Pa.*
79. Kim, A. G., *Methane in the Pittsburgh Coalbed, Washington County, Pa.*
80. Kissel, F. N.; McCulloch, C. M.; and Elder, C. H., *The Direct Method of Determining Methane Content of Coalbeds for Ventilation Design*.



81. Lambert, S. W.; Trevits, M. A.; and Steidl, P. F., *Vertical Borehole Design and Completion Practices to Remove Methane Gas from Minable Coalbeds*.
82. Landis, E. R., *Coal Resources of Colorado and Wyoming*.
83. McCord, J. P., *Geologic Overview, Coal and Coalbed Methane Resources of the Greater Green River Coal Region, Wyoming and Colorado*.
84. McCulloch, C. M.; Deul, M.; and Jeran, P. W., *Cleat in Bituminous Coalbeds*.
85. McCulloch, C. M.; Lambert, S. W.; and White, J. R., *Determining Cleat Orientation of Deeper Coalbeds from Overlying Coals*.
86. McCulloch, C. M.; and Deul, M., *Geologic Factors Causing Roof Instability and Methane Emission Problems: The Lower Kittanning Coalbed, Cambria County, Pa.*
87. McCulloch, C. M.; and Diamond, W. P., *Inexpensive Method Helps Predict Methane Content of Coal Beds*.
88. McCulloch, C. M.; Levine, J. R.; Kissel, F. N.; and Deul, M., *Measuring the Methane Content of Bituminous Coal Beds*.
89. McKay, E. J.; Butler, B. A.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Bear Creek Quadrangle, Powder River County, Montana*.
90. McKay, E. J.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Fort Howes Quadrangle, Rosebud and Powder River County, Montana*.
91. McKay, E. J.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Otter Quadrangle, Powder River County, Montana*.
92. Medlin, J. H.; Swanson, Vernon E.; and Coleman, S. L., *Major, Minor, and Trace Elements in U.S. Coal*.
93. Molnia, C. L.; Kottowski, F. E.; Jobin, D. A.; and O'Connor, J. T., *Coal in New Mexico: Issues in Quality and Resources*.
94. Murrie, G. W., *Coal and Gas Resources of the Lower Hartshorne Coalbed in LeFlore and Haskell Counties, Oklahoma*.
95. Mutmansky, J. M., *Guidebook on Coalbed Methane Drainage for Underground Coal Mines*.
96. Noack, K., *Control of Gas Emissions in Underground Coal Mines*.
97. Olague, N. E.; and Smith, D. M., *Diffusion of Gases in American Coals*.
98. Oyler, D. C.; Diamond, W. P.; and Jeran, P. W., *Directional Drilling for Coalbed Degasification*.

99. Oyler, D. C.; and Diamond, W. P., *Drilling a Horizontal Coalbed Methane Drainage System from a Directional Surface Borehole.*
100. Patching, T. C., *The Retention and Release of Gas in Coal - A Review.*
101. Pilcher, R. C.; Collings, R. C.; and Marshall, J. S., *An Overview of Emerging Practices and Models Used in Coal Mine Methane Resource Estimation and Reserve Evaluation.*
102. Radlinski, A. P.; and Radlinska, E. Z., *The Microstructure of Pore Space in Coals of Different Rank.*
103. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Ochs, A. M.; Gunther, G. L.; Schuenemeyer, J. H.; and Power, H. C., *Ashland Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
104. Roberts, S. B., (Submitted), *Coal in the Front Range Urban Corridor - An Overview of Coal Geology, Coal Production, and Coal-bed Methane Potential in Selected Areas of the Denver Basin, Colorado, and the Potential Impact of Historic Coal Mining and Development and Land Use Planning.*
105. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Bader, L. R.; Ellis, M. S.; Stricker, G. D.; Gunther, G. L.; Ochs, A. M.; Kinney, S. A.; Schuenemeyer, J. H.; and Power, H. C., *Colstrip Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
106. Roberts, S. B.; Gunther, G. L.; Taber, T. T.; Ochs, A. M.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Wilde, Edith M.; Schuenemeyer, J. H.; and Power, H. C., 1999, *Decker Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
107. Roberts, S. B.; and Bossiroy, Dominique, *Stratigraphy and Coal Geology of the Lower Part of the Fort Union Formation in the Grass Creek Coal Mine Area, Southeastern Bighorn Basin, Wyoming.*
108. Roberts, S. B.; and Stanton, R. W., *Stratigraphy and Depositional Setting of Thick Coal Beds in the Grass Creek Coal Mine, Southeastern Bighorn Basin, Wyoming.*
109. Roberts, S. B.; and Rossi, G. S., *A Summary of Coal in the Coalmont Formation (Tertiary), North Park Basin, Colorado, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*

110. Roberts, S. B.; and Rossi, G. S., *A Summary of Coal in the Fort Union Formation (Tertiary), Bighorn Basin, Wyoming and Montana, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
111. Robinson, L. N.; Culbertson, W. C.; and Affolter, R. H., *Geology, Coal Resources, and Coal Quality of the Prairie Dog Creek EMRIA Study Area, Rosebud County, Montana.*
112. Ruppel, T. C.; Grein, C. T.; and Bienstock, D., *Adsorption of Methane/Ethane Mixtures on Dry Coal at Elevated Pressures.*
113. Saltsman, R.D.; Uhrin, David C.; and du Breuil, F., *Survey of Coal Industry Programs for Utilization of Methane from Coal Seams.*
114. Schenker, Jeffrey H., *A Molecular Dynamic Investigation into the Competitive Adsorption of Gas Species on Coal.*
115. Schuenemeyer, J. H.; Flores, R. M.; Stricker, G. D.; Ellis, M. S.; Gunther, G. L.; Taber, T. Y.; and Ochs, A. M., *A Method to Estimate the Uncertainty of Coal Resources.*
116. Scott, A. R., *Coal and Coalbed Methane Resources of Texas.*
117. Selden, R. F., *The Occurrence of Gases in Coals.*
118. Steidl, P. F., *Inspections of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama.*
119. Steidl, P. F., *Observations of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama. Rock Creek Methane from Multiple Coal Seams Completion Project.*
120. Stoeckinger, W. T., *Methods to Measure Directly the Gas Content of Coals.*
121. Strever, M. T., *Methane Drainage Plan Using Horizontal Holes at the Hawk's Nest East Mine, Paonia, Colorado.*
122. Stricker, G. D.; and Ellis, M. S., *Coal Quality and Geochemistry, Greater Green River Basin, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
123. Stricker, G. D.; and Ellis, M. S., *Coal Quality and Geochemistry, Hanna and Carbon Basins, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
124. Su, X; Feng, Y.; Chen, J.; and Pan, J., *The Annealing Mechanisms of Cleats in Coal.*
125. Svenster, P. G., *Diffusion of Gases Through Coal.*

126. Tewart, S. J.; Bauer, M. A.; Mathew, D.; Roberts, M. P.; Ayers, W. B., Jr.; Barnes, J. W.; and Kaiser, W. R., *Estimation of Coal Resources in Texas Gulf Coast, Ohio Northern Appalachian, and Wyoming Powder River Basins: A Comparison of Statistical Approaches.*
127. Thielemann, T.; Krooss, B. M.; Littke, R.; and Welte, D. H., *Does Coal Mining Induce Methane Emissions Through the Lithosphere/Atmosphere Boundary in the Ruhr Basin, Germany?*
128. Thimons, B.; and Kissell, F. N., *Diffusion of Methane Through Coal.*
129. Ting, F. T. C.; and Wang, P. B., *Coal Anisotropism and its Relationship to Methane Concentration in Coal.*
130. Trent, Virgil, A., *Summary of Results of the Coal Resource Occurrence and Coal Development Potential Mapping Program in Part of the Powder River Basin, Montana and Wyoming.*
131. Van Voast, Wayne A., *Fracture Patterns in Coal in the Western United States; Observations and Implications for Development of Coalbed Methane Resources.*
132. Von Schonfeldt, H., *Methane Drainage in Advance of Mining Through Horizontal Boreholes.*
133. Winston, R. B., *Preliminary Report on Coal Quality Trends in Upper Pottsville Formation Coal Groups and Their Relationships to Coal Resource Development, Coalbed Methane Occurrence, and Geologic History in the Warrior Coal Basin, Alabama.*
134. Wyoming Water Resources Center, University of Wyoming, *A Study of Techniques to Assess Surface and Groundwater Impacts Associated with Coal Bed Methane and Surface Coal Mining: Little Thunder Creek Drainage, Wyoming.*
135. Zabetakis, M. G.; Deul, M.; and Skow, M. L., *Methane Control in the United States Coal Mines - 1972.*
136. Zabetakis, M. G.; et al, *Methane Emission in Coal Mines: Effects of Oil and Gas Wells.*

### III

## REFERENCE MATERIALS

*Contains listings of bibliographies of coalbed methane information. Citations appear alphabetically by author/editor and include the title of the work. Refer to the bibliography for more information on the publication.*

1. Gas Research Institute, *Selected Bibliography of Coalbed Methane Technology*.
2. Lyons, Paul C.; and Ryder, Robert T., *Selected Bibliography of Appalachian Coalbed Methane*.
3. Meissner, C. R., Jr.; Cecil, C. B.; and Stricker, G. D., eds. *Coal Geology and the Future; Symposium Abstracts and Selected References*.
4. Mowers, T.; and Wade, L., *Greater Green River Basin Bibliography: Selected References*.
5. Picciano, Laura, *Gas Research Institute's Coalbed Methane Research: Selected Bibliography. (Preliminary Issue)*.
6. Picciano, Laura, *Gas Research Institute's Appalachian Basin Research: Selected Bibliography*.
7. Picciano, Laura; and Sole, Linda S., *San Juan Basin Bibliography: Selected References*.
8. Schwochow, Stephen D., *Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volume 8 (1990)*.
9. Schwochow, Stephen D., *Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volume 9 (1991)*.
10. Schwochow, Stephen D., *Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volume 10 (1992)*.
11. Schwochow, Stephen D., *Cumulative Bibliography and Index of the Quarterly Review of Methane from Coal Seams Technology Volumes 1 (1983) Through 7 (1989)*.
12. Tyler, R. N.; Zhou, N.; McMurray, R. G.; Jackson, M. L. W.; and Tremain, C. M., *Selected References Related to Coalbed Methane In the Greater Green River, Piceance, Powder River, Raton, and San Juan Basins*.
13. Wieczner, Bilha; and Irvin, Marcia, *Coalbed Methane Development in Alabama: A Bibliography*.

## IV

### **RESOURCE EVALUATION AND DEVELOPMENT**

*Contains listings of works that discuss hydraulic fracturing, chemical composition of coals, environmental impact and/or safety issues. Citations appear alphabetically by author/editor and include the title of the work. Refer to the bibliography for more information on the publication.*

1. Adams, M. A., *Central Appalachian Basin Report: A Study of Carboniferous Geology, Coal and the Potential Coalbed Methane Resource of the Central Appalachian Basin in Maryland, West Virginia, Kentucky, and Tennessee.*
2. Adams, M. A.; Eddy, G. E.; Hewitt, J. L.; Kirr, J. N.; and Rightmire, C. T., *Northern Appalachian Coal Basin Report: A Study of Carboniferous Geology, Coal, and the Potential Coalbed Methane Resources of the Northern Appalachian Coal Basin in Pennsylvania, Ohio, Maryland, West Virginia, and Kentucky.*
3. Adams, M. A.; and Kirr, J. N., *Uinta Basin Report, A Study of Cretaceous Geology, Coal and the Potential Coalbed Methane Resource of the Uinta Basin in Utah and Colorado.*
4. Affolter, R. H.; Simon, F. O.; and Stricker, G. D., *Chemical Analyses of Coal from the Healy, Kenai, Seldovia, and Utokok River 1:250,000 Quadrangles, Alaska.*
5. Affolter, R. H.; Hatch, J. R.; Matson, R. E.; and Sauer, L. A., III, *Chemical Analyses of Coal from the Tongue River Member, Fort Union Formation, Decker Coal Deposit, Big Horn County, Montana.*
6. Affolter, R. H.; Hatch, J. R.; and Culbertson, W. C., *Chemical Analyses of Coal from the Tongue River Member, Fort Union Formation, Moorhead and Southeastern Part of the Northward Extension of the Sheridan Coal Fields, Powder River and Big Horn Counties, Montana.*
7. Affolter, R. H.; Stricker, G. D.; Roberts, S. B.; and Brownfield, M. E., *Geochemical Variation of Arctic Margin Low-Sulfur Cretaceous and Tertiary Coals, North Slope, Alaska.*
8. Ahmed, U.; Bowman, K. C.; Bush, D.; Hanson, J.; Holland, M.; Kelkar, S.; Owen, L. B.; Rakop, K.; and Tibbits, G., *Methane Production Characteristics of Deeply Buried Coalbed Reservoirs.*
9. Alain, A. K.; and Denes, G. M., *Cavity Stress Relief Method to Stimulate Demethanation Boreholes.*
10. State of Alaska, Division of Oil and Gas, Department of Natural Resources, *Coalbed Methane Study.*
11. Ammosov, I. I.; and Eremin, I. V., *Fracturing in Coal.*
12. Ancell, K. L.; Lambert, S.; and Johnson, F. S., *Analysis of the Coalbed Degassification Process at the Seventeen Well Pattern in the Warrior Basin of Alabama.*

13. Anderson, O.J.; Lucas, S.G.; Love, D.W.; and Cather, S.M., eds., *Southeastern Colorado Plateau*.
14. Andrews, R. D.; Cardott, B. J.; and Storm, T., *The Hartshorne Play in Southeastern Oklahoma: Regional and Detailed Sandstone Reservoir Analysis and Coalbed Methane Resources*.
15. Anna, L. O., *Groundwater Flow Associated With Coalbed Gas Production, Ferron Sandstone, East-Central Utah*.
16. Archer, P. L., *Illinois Basin Report: A Study of Pennsylvanian Geology, Coal, and Coalbed Methane Resources in Illinois, Indiana, and Western Kentucky*.
17. Arri, L. E.; Yee, D.; Morgan, W. D.; and Jeansonne, M. W., *Modeling Coalbed Methane Production with Binary Gas Sorption*.
18. Attanasi, E. D.; and Rice, D. D., *Economics and Coalbed Gas in the 1995 National Assessment of U.S. Oil and Gas Resources*.
19. Attanasi, E. D., *Relative Importance of Physical and Economic Factors in Appalachian Coalbed Gas Assessment*.
20. Aven, P., *Congress, Courts Deciding Who Has Rights to Coalbed Methane*.
21. Ayers, W. B., Jr., *Coal Resources of the Tongue River Member of the Fort Union Formation (Palaeocene), Powder River Basin, Wyoming and Montana*.
22. Ayers, W.B., Jr.; Kaiser, W.R.; and Levine, J.R., *Coal as Source Rock and Gas Reservoir*.
23. Ayers, W.B., Jr.; and Kaiser, W.R., *Coalbed Methane in the Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado*.
24. Ayers, W. B., Jr., *Geologic Characterization of Coalbed Methane Occurrence and Producibility*.
25. Ayers, W. B., Jr.; and Zellers, S. D., *Geologic Controls on Occurrence and Producibility of Coalbed Methane, Fruitland Formation, North-Central San Juan Basin, New Mexico*.
26. Ayers, W. B., Jr.; Kaiser, W. R.; Scanlon, A. H.; Swartz, T. E.; and Zellers, S. D., *Geologic Evaluation of Critical Methane Resources: Part I - San Juan Basin*.
27. Ayers, W. B., Jr.; Kaiser, W. R.; Ambrose, W. A.; Swartz, T. E.; Laubach, S. E.; Tremain, C. M.; and Whitehead, N. H., III, *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part I, San Juan Basin*.
28. Ayers, W. B., Jr.; Kaiser, William R.; Laubach, S. E. ; Ambrose, W. A.; Baumgardner, R. W., Jr.; Scott, Andrew R.; Tyler, Roger; Yeh, Joseph; Hawkins, G. J.; Swartz, T. E.; Schultz-Ela, D. D.; Zellers, S. D.; Tremain, Carol M.; and Whitehead, N. H., III, *Geologic and Hydrologic Controls on the Occurrences and Producibility of Coalbed Methane, Fruitland Formation, San Juan Basin*.

29. Ayers, W. B., Jr.; and Kelso, B. S., *Knowledge of Methane Potential for Coalbed Resources Grows, But Needs More Study.*
30. Ayoub, J.; Colson, L.; Hinkel, J.; Johnston, D.; and Levine, J., *Learning to Produce Coalbed Methane.*
31. Baker, E. C.; Oyler, D. C.; Perry, J. H.; and Finfinger, G. L., *Economic Evaluation of Directional Drilling for Methane Drainage from Coalbeds.*
32. Banerjee, B. D., *A New Approach to the Determination of Methane Content in Coal Seams.*
33. Barker, Charles E.; Johnson, Ronald C.; Pawlewicz, Mark J.; Crysdale, Bonnie L.; and Clark, Arthur C., *Coal-bed Methane Show Within the Wind River Indian Reservation Enhances Gas Prospects in Deeper Portions of the Wind River Basin, Wyoming.*
34. Barker, C. E.; Clough, J. G.; Roberts, S. B.; and Fisk, R., 2002, *Coalbed Methane in Northern Alaska: Potential Resources for Rural Use and Added Supply for the Proposed Trans-Alaska Gas Pipeline.*
35. Barker, C. E.; and Pierce, B. S., *Burial History and Coal Petrography of the Ferron Coals Utah as Factors in Their Variable Coal Bed Gas Content.*
36. Barker, C. E.; Bartke, T. C.; Hatcher, P. G.; and Daws, T. A., *An Empirical Correlation Between Coal Bed Gas With Rock-Eval Pyrolysis and (Super 13) C NMR Results, Cretaceous Mesaverde and Meeteetse Formations, Wind River Basin, Wyoming.*
37. Barker, C. E.; Johnson, R. C.; Crysdale, B. L.; and Clark, A. C., *A Field and Laboratory Procedure for Desorbing Coal Gases.*
38. Barker, C. E., *The Geologic Controls on Coalbed Gas - A Major Source in the U.S.*
39. Barker, C. E., *A Field and Laboratory Procedure to Desorb Coal Bed Gasses from Drill Core and Cuttings.*
40. Barker, C. E.; Scott, A. R.; and Tyler, R., *The Geology of Coalbed Methane - The Perspective from Basin and Thermal History Studies.*
41. Barker, Charles E.; Pierce, Brenda S.; Garrison, James R., Jr.; and van den Bergh, T. C. V., *The Influence of Burial History on the Coalbed Gas Content of Ferron Coals, San Rafael Swell, Utah.*
42. Barker, C. E.; Dallegge, T. A.; and Seamount, D. C., *Ongoing Coalbed Desorption Studies Cook Inlet Basin, Alaska.*
43. Barker, Charles E.; Biewick, Laura R. H.; Warwick, Peter D.; and San Filippo, John R., *Preliminary Gulf Coast Coalbed Methane Exploration Maps; Depth to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance.*



44. Barker, Charles E., *Rock-Eval Analysis of Sediments and Ultimate Analysis of Coal, Mesaverde Group, Multiwell Experiment Site, Piceance Basin, Colorado.*
45. Barker, C. E.; Gose, M.; Scott, R. J.; Warwick, P. D.; San Filippo, J. R.; Klein, J. M.; and Hook, R. W., *The Sacatosa Coalbed Methane Field: A First for Texas.*
46. Barr, David T.; Cleary, Michael P.; and Wright, Timothy B., *Effective Design, Real-Data Analysis and Post-Job Evaluation.*
47. Bartholomew, C. H.; Butala, S.J.; Medina, J. C.; Lee, M. L.; Taylor, T. Q.; and Andrus, D. B., *Mineral-Catalyzed Formation of Natural Gas During Coal Maturation.*
48. Beavers, C. D.; Boyer, C. M.; Dobscha, F. X.; Green, C. D.; Lambert, S. W.; Lanier, J. B.; Sheehy, L. D.; Spafford, S. D.; and Stubbs, P. B., *Rock Creek Methane from Multiple Coal Seams Completion Project*
49. Bell, G. J.; Jones, A. H.; Morales, R. H.; and Schraufnagel, Richard A., *Coal Seam Hydraulic Fracture Propagation on a Laboratory Scale.*
50. Bell, Gregory J.; and Jones, Arfon H.; *Coalbed Methane Production and Stimulation (COMPAS) Database Documentation and User's Manual.*
51. Bell, G. J.; Jones, Arfon H.; and Morales, R. H., *Hydraulic Fracture Design Rationale for the Recovery of Methane from Coal Seams.*
52. Bennion, D. B.; Thomas, G. B.; Imer, D.; Ma, T.; and Schulmeister, B., *Water Quality Considerations that Result in Impaired Well Injectivity of Water Injection and Disposal Wells.*
53. Berggren, L. W.; and Sanderson, G. A., *Recent Developments in the Application of the § 29 Tax Credit to Coal Seam Gas.*
54. Bertard, C.; Bruyet, B.; and Gunther, J., *Determination of Desorbable Gas Concentration of Coal (Direct Method).*
55. Boardman, E. L.; and Rippon, J. H., *Coalbed Methane Migration in and Around Fault Zones.*
56. Bodden, W. R., III; and Ehrlich, R., *Permeability of Coals and Characteristics of Desorption Tests: Implications for Coalbed Methane Production.*
57. Bojan, M. J.; Danner, R. P.; Menon, V. C.; Mitchell, G.; Radovic, L. R.; and Steele, W. A., *Adsorption and Transport in Coalbed Reservoirs.*
58. Boreck, D. L.; and Strever, M. T., *Conservation of Methane from Colorado Mined/Minable Coal Beds: A Feasibility Study.*
59. Boyer, C. M., II, *Coalbed Methane Development Faces Technology Gaps.*

60. Boyer, C. M., II, *Coalbed Methane Resources and the Mechanisms of Gas Production*.
61. Boyer, C. M.; and Kelafant, J. R., *Geologic Assessment of Natural Gas from Coal Seams in the Central Appalachian Basin*.
62. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; Malone, P. G.; Schwerer, F. C.; and Stubbs, P. B., *Measurement of Static Coalbed Reservoir Conditions for Hydraulic Fracture Design: Volume I*.
63. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; Malone, P. G.; Schwerer, F. C.; and Stubbs, P. B., *Measurement of Static Coalbed Reservoir Conditions for Hydraulic Fracture Design: Volume II*.
64. Boyer, Charles M., II; Paul, George S.; and Kuuskraa, Vello A., 1993, *Methane from Coal Deposits: Technical Evaluation and Database*.
65. Boyer, Charles M., II; Paul, George S.; and Kuuskraa, Vello A., 1994, *Methane from Coal Deposits: Technical Evaluation and Database*.
66. Boyer, C. M., II; and Quingshao, B., 1998, *Methodology of Coalbed Methane Resource Assessment*.
67. Boyer, C. M., II; Militzer, M. R.; and Schwerer, F. C., *Preliminary Economic Assessment Potential for Producing Methane for the Multiple Coal Seams Completion Project at Rock Creek*.
68. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Dobscha, F. X.; and Malone, P. G., *Rock Creek Methane from Multiple Coal Seams Completion Project. Demonstrated Drilling and Completion Technology for the Multiple Coal Seams Completion Project*.
69. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Diamond, W. P.; Malone, P. G.; and Militzer, P. G., *Rock Creek Methane from Multiple Coal Seams Completion Project. Final Geologic Report. Big Indian Creek Site, Volume I*.
70. Boyer, C. M., II; Briscoe, F. H.; Camp, B. S.; Diamond, W. P.; Malone, P. G.; and Militzer, P. G., *Rock Creek Methane from Multiple Coal Seams Completion Project. Final Geologic Report. Big Indian Creek Site, Volume II*.
71. Boyer, C. M., II; and Hirko, N. M., *Rock Creek Methane from Multiple Coal Seams Completion Project. Phase I Test Plan*.
72. Boyer, C. M., II; and Reeves, S. R., *A Strategy for Coalbed Methane Production Development Part III: Production Operations*.
73. Brownfield, M. E.; Affolter, Ronald H.; and Stricker, G. D., *High Chromium Content in Tertiary Coals, Northwestern Washington; A Key to Their Depositional History*.

74. Brownfield, Michael E.; Hettinger, Robert D.; and Johnson, Edward A., *A Summary of the Stratigraphy, Coal Resources, and Coal-bed Methane Potential of Northwest Colorado*.
75. Bruner, K. R.; Oldham, A. V.; Repine, T. E., Jr.; Markowski, A. K.; and Harper, J. A., *Geological Aspects of Coalbed Methane in the Northern Appalachian Coal Basin, Southwestern Pennsylvania and North-Central West Virginia*.
76. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Murphy, C.L.; Ramesh, M.S.; Reverand, J. M.; and Way, S. C., *Application of Hydrology to Evaluation of Coalbed Methane Reservoirs*.
77. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; Santoro, D.J.; Ward, W.P.; and Way, S. C., *Hydrologic Characterization of Coal Seams for Methane Recovery. Activity 2 Topical Report: Hydrologic Constraints and Single-Phase Test Procedures. Volume I*.
78. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; and Way, S. C., *Hydrologic Characterization of Coal Seams for Methane Recovery. Activities 5 and 7 Progress Report: Review of Single-Phase Hydrologic Testing in Coalbeds and Development of Unsaturated-Flow Well Test Procedures*.
79. Bumb, A. C.; Koenig, R. A.; McKee, C. R.; Reverand, J. M.; and Way, S. C., *Review of Hydrologic Testing in Coalbeds*.
80. Bureau of Land Management, *BLM Evaluates Coalbed Methane, Coal & Synfuels Technology*.
81. Bureau of Land Management, Buffalo Field Office, *Decision Record Wyodak Coal Bed Methane Environmental Assessment*.
82. Bureau of Land Management; Holsan, Gary, *Draft Environmental Assessment, Pannaco Energy Deer Creek Exploratory Coalbed Methane Project*.
83. Bureau of Land Management, Solid Minerals Group, *Geologic and Hydrologic Assessment of Natural Gas from Coal: Greater Green River, Piceance, Powder River, and Raton Basins, Western United States*.
84. Bureau of Land Management, Buffalo Resource Area, *Gillette South Coal Bed Methane Project (Microform): Final Environmental Impact Statement*.
85. Bureau of Land Management, *Lower Prairie Dog Creek Coal Bed Methane Project Environmental Assessment*.
86. Bureau of Land Management, *Oil and Gas Resource Management Plan / EIS Amendment Record of Decision*.
87. Bureau of Land Management, *Pennaco Energy Deer Creek Exploratory Coalbed Methane Project Environmental Assessment*.

88. Bureau of Land Management, *Trace Elements, in Hanna Basin Study Site (Carbon County, Wyoming) Resource and Potential Reclamation.*
89. Bureau of Land Management, *Wyodak Coal Bed Methane Project Draft Environmental Impact Statement.*
90. Bureau of Land Management, *Wyodak Coal Bed Methane Project Final Environmental Impact Statement.*
91. Bureau of Land Management, Buffalo Field Office, *Wyodak Drainage Coal Bed Methane Environmental Assessment.*
92. Bustin, R. M.; and Clarkson, C. R., *Generation and Expulsion of Petroleum and Gas from Almond Formation Coal, Greater Green River Basin, Wyoming.*
93. Bustin, R. M.; and Clarkson, C. R., *Geological Controls on Coalbed Methane Reservoir Capacity and Gas Content.*
94. Bustin, R. M., 2000, *Hydrogen Sulphide Sorption on Coal With Comparisons to Methane, Carbon Dioxide, Nitrogen and Hydrogen Sorption: Implications for Acid Gas Sequestering and Co-production of Methane.*
95. Bustin, R. M., 2001, *Hydrogen Sulphide Sorption on Coal With Comparisons to Methane, Carbon Dioxide, Nitrogen and Hydrogen Sorption: Implications for Acid Gas Sequestering and Co-production of Methane.*
96. Butala, Steven J. M.; Medina, Juan Carlos; Bowerbank, Christopher R.; Lee, Milton L.; Felt, Scott A.; Taylor, Terrence Q.; Andrus, Dallan B.; Bartholomew, Calvin H.; Yin, Pequi; and Surdam, Ronald C., *Catalytic Effects of Mineral Matter on Natural Gas Formation During Coal Maturation.*
97. Camp, Bret S.; Kidd, Jack T.; Lottman-Craig, Linda K.; Osborne, Terry E.; Saulsberry, Jerrald L.; Smith, Jeffrey L.; Steidl, Peter F.; and Stubbs, Paul B., *1.1.4 Coalbed Methane Multiple Coal Seam Project 305. Geologic Manual for the Evaluation and Development of Coalbed Methane.*
98. Campbell, F. W.; Hoffman, G. K.; Kottlowski, F. E.; and Arkell, B. W., *Geology and Coal Resources of New Mexico's Small Coalfields.*
99. Campen, E. B.; and Campen, E. B., *Basic Log Analysis in Coalbed Methane Exploration.*
100. Cao, Y. D.; and Glick, D. C., *Coal and Gas Outbursts in Footwalls of Reverse Faults.*
101. Cardott, B. J., *Introduction to Coal as Gas Resource Rock and Reservoir.*
102. Carey, M. A.; Roberts, S. B.; and Clark, A. C., *Chemical Analyses for Nine Coal Samples from the Sagwon Member (Tertiary) of the Sagavanirktok Formation, North Slope, Alaska.*

103. Carroll, C. J., *Correlation of Producing Fruitland Formation Coals and Coalbed Methane Leakage on the Southern Ute Reservation.*
104. Carter, L.M.H., ed., *Energy and the Environment; Application of Geosciences to Decision Making.*
105. Carter, R. H.; Holditch, S. A.; Hinkel, J.; and Jeffrey, R., *Enhanced Gas Production Through Hydraulic Fracturing of Coal Seams.*
106. Carter, R. H.; Holditch, S. A.; Ely, J. W.; Hinkel, J.; and Jeffrey, R., *Physical and Chemical Fluid Interaction Associated with Hydraulic Fracturing of Coal Seams.*
107. Case, James C.; Edgar, Thomas V.; and De Bruin, Rodney H., *Subsidence Potential Related to Water Withdrawal in the Powder River Basin.*
108. Cervik, J., *Behavior of Coal-Gas Reservoirs.*
109. Chandler, R.V.; Epsman, M.L.; Hamilton, R.P.; Pashin, J.C.; Rheams, L.J.; Richter, K.E.; Tolson, J.S.; Ward, W.E., II; Wilson, G.V.; and Winston, R.B., *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part II – Black Warrior Basin.*
110. Charpentier, Ronald R.; and Law, Ben E., *Estimation of Coalbed Methane Contents from Geologic Data.*
111. Chesnut, D. R., Jr.; Nuttall, B. C.; Hower, J. C.; Greb, S. F.; Eble, C. F.; Hiatt, J. K.; and Williams, D. A., *Coalbed Methane in Kentucky.*
112. Choate, R.; McCord, J. P.; and Rightmire, C. T., *Assessment of Natural Gas from Coalbeds by Geologic Characterization and Production Evaluation.*
113. Choate, R.; Jurich, D.; and Saulnier, G. L., Jr., *Geologic Overview, Coal Deposits, and the Potential for Methane Recovery from Coalbeds, Piceance Basin, Colorado.*
114. Choate, R.; and Johnson, C. A., *Geologic Overview, Coalbed Description and Potential for Methane Recovery from Coalbeds, Powder River Basin, Wyoming-Montana.*
115. Choate, R.; and Rightmire, C. T., *Influence of the San Juan Mountain Geothermal Anomaly and other Tertiary Igneous Events on the Coalbed Methane Potential in the Piceance, San Juan, and Raton Basins, Colorado and New Mexico.*
116. Choate, R.; and Johnson, C. A., *Powder River Basin Report: A Study of Early Tertiary Geology, Coal and the Potential for Methane Recovery from Coalbeds in Montana and Wyoming.*
117. Choate, R.; Lent, J.; and Rightmire, C. T., *San Juan Basin Report – Upper Cretaceous Geology, Coal and the Potential for Methane Recovery from Coalbeds in Colorado and New Mexico.*

118. Clark, W. F.; and Helmer, T., *Completing, Equipping, and Operating Fruitland Formation Coalbed Methane Wells in the San Juan Basin, New Mexico and Colorado.*
119. Clarkson, C. R.; and Bustin, R. M., *The Effect of Pore Structure and Gas Pressure Upon the Transport Properties of Coal: A Laboratory and Modelling Study.*
120. Clarkson, C. R.; and Bustin, R. M., *Variation in Micropore Capacity and Size Distribution with Composition in Bituminous Coal of the Western Canadian Sedimentary Basin.*
121. Clarkson, C. R.; and Bustin, R. M., *Variation in Permeability with Lithotype and Maceral Composition of Cretaceous Coals of the Canadian Cordillera.*
122. Clarkson, C. R.; Lamberson, M. N.; and Bustin, R. M., *Variation in Surface Area and Micropore Size Distribution with Composition of Medium Volatile Bituminous Coal of the Gates Formation, Northeastern British Columbia: Implications for Coalbed Methane Potential.*
123. Clayton, J. L.; Rice, D. D.; and Stanton, R. W., *Geochemical and Geological Controls on Generation and Accumulation of Oil and Gas from Coalbeds, Western United States.*
124. Clayton, Jerry L., *Geochemistry of Coalbed Gas; A Review.*
125. Cleary, Michael P.; Barr, David T.; Wright, Timothy B., *Technology Transfer for Hydraulic Fracturing.*
126. Close, J. C.; and Dutcher, R. R., *Geomorphology of Drainage Patterns: Clues to Coal Gas Natural Fracture Timing, Orientation and Location, Raton Basin, Colorado - New Mexico.*
127. Close, J. C.; Mavor, M. J.; and McBane, R. A., *Importance, Genesis and Recognition of Fracture Permeability in Fruitland Coalbed Methane Reservoirs of the Northern San Juan Basin, Colorado and New Mexico.*
128. Close, J. C.; and Mavor, M. J., 1991, *Influence of Coal and Rank on Fracture Development in Fruitland Coal Gas Reservoirs of San Juan Basin.*
129. Close, J. C., *Natural Fractures in Coal.*
130. Close, J. C.; and Dutcher, R. R., *Prediction of Permeability Trends and Origins of Coalbed Methane Reservoirs of the Raton Basin, Colorado and New Mexico.*
131. Close, J. C.; and Erwin, T. M., *Significance and Determination of Gas Content Data as Related to Coalbed Methane Reservoir Evaluation and Production Implications.*
132. Close, J. C.; and Dutcher, R. R., *Update on Coalbed Methane Potential of Raton Basin, Colorado and New Mexico.*
133. Close, J. C., *Western Cretaceous Coal Seam Project.*

134. Cole, G. A.; Daniel, J. A.; Heald, B. P.; et al, *Oil and Gas Drilling and Coal Production Summary for Montana.*
135. Collett, Timothy S., *Composition and Source of the Gas Associated with Coalbed Gas Production From Coals in Eastern Utah.*
136. Colorado Geological Survey, *Evaluation of the Methane Potential of Unmined-Unminable Coalbeds in Colorado, Review of Coal Methane Resource for Western Basins.*
137. Colorado Oil and Gas Conservation Commission, *Summary Report of Bradenhead Testing, Gas Well Remediation, and Ground Water Investigations; San Juan Basin, La Plata County, Colorado.*
138. Cooper, J. D.; Decker, A. D.; Logan, T. L.; and Schwoebel, Jeffrey J., *Development and Evaluation of Technology for Methane Production from a Deep Coal Seam in the Piceance Basin.*
139. Counsil, J.; Decker, A. D.; Jeu, S. J.; and Logan, T. L., *Development and Evaluation of Technology for Methane Production from a Deep Coal Seam in the Piceance Basin.*
140. Cox, D. O.; and Young, G. B. C., *Well Testing in Coalbed Methane (CBM) Wells: An Environmental Remediation Case History.*
141. Crist, T. E.; Kelso, B. S.; and Boyer, C. M., *Geologic Assessment of Natural Gas from Coal Seams in the Menefee Formation, San Juan Basin.*
142. Crosdale, P. J.; Beamish, B. B.; and Valix, M., *Coalbed Methane Sorption Related to Coal Composition.*
143. Crovelli, Robert A.; Schmoker, James A.; and Balay, Richard H., *U. S. Department of the Interior U.S. Geological Survey; Fractal Lognormal Percentage Analysis of the U.S. Geological Survey's 1995 National Assessment of Conventional Oil and Gas Reservoirs.*
144. Crovelli, Robert A.; Nuccio, Vito F., *Estimates of Technically Recoverable Natural Gas Resources for Continuous Type (Unconventional) Plays in Coal Beds on Federal Lands of the Conterminous United States.*
145. Crovelli, Robert A.; Schmoker, James W.; and Balay, Richard H., *Fractal Lognormal Percentage Assessment of Technically Recoverable Natural Gas Resources in Continuous-type and Coalbed (Unconventional) Plays, Onshore and State Waters of the United States.*
146. Crovelli, Robert A.; Nuccio, Vito F., *USGS Resource Assessment Methodology for Technically Recoverable Coalbed Methane Applied to the Ferron Sandstone Trend.*
147. Crowley, S. S.; Stanton, R. W.; Triplehorn, D. M.; and Ruppert, Leslie F., *Origin and Distribution of Inorganic Elements in the Wyodak-Anderson Coal Bed, Powder River Basin, Wyoming.*

148. Crowley, S. S.; and Stanton, R. W., *Distribution of Environmentally Sensitive Trace Elements in the Coal Beds of the Powder River Basin, Wyoming and Montana.*
149. Dabbous, M. K.; Reznik, A. A.; Taber, J. J.; and Fulton, P. F., *The Permeability of Coal to Gas and Water.*
150. Dallegge, Todd A.; and Barker, Charles E., *Coal-bed Methane Gas-In-Place Resource Estimates Using Sorption Isotherms and Burial History Reconstruction; An Example from Ferron Sandstone Member of the Mancos Shale.*
151. Dallegge, T. A.; and Barker, C. E., *Implications to Conventional Gas Reserve Growth of Coalbed Methane Desorption Analysis from the Beaver Creek and Kenai Gas Fields, Kenai Peninsula, Alaska.*
152. D'Amico, J. S., *Processing Key to CBM Economics.*
153. Das, B. M.; Nikols, D. J.; Das, Z. U.; and Hucka, V. J., *Factors Affecting Rate and Total Volume of Methane Desorption from Coalbeds.*
154. David, C., *This Land is Your Land, This Land is My Land: But Who Owns The Coal Gas?*
155. Davidson, R. M.; Sloss, L. L.; and Clark, L. B., *Coalbed Methane Extraction.*
156. Dawson, F. M., *Coalbed Methane Exploration in Structurally Complex Terrain.*
157. De Bruin, R. H.; Lyman, R. M.; Jones, R. W.; and Cook, L. W., *Coalbed Methane in Wyoming.*
158. Decker, David, *Coal Bed Methane; Dynamic New Segment of Petroleum Industry.*
159. Decker, A. David; Kelso, B.S.; Kuuskraa, V.A.; and Wicks, D.E., *Geologic Assessment of Natural Gas from Coal Seams in the Fruitland Formation, San Juan Basin.*
160. Decker, D.; Jeu, S. J.; Cooper, J. D.; and Wicks, D. E., *Geology, Geochemistry, Reservoir Engineering, and Completion Methods at the Cedar Hill Field, San Juan County, New Mexico: A Field Study of Classic Coal Degasification Behavior.*
161. Decker, A. D.; and Horner, D. M., *Origin and Production Implications of Abnormal Coal Reservoir Pressure.*
162. Decker, A. D.; Close, J.; and McBane, Richard A., *Use of Remote Sensing, Curvature Analysis, and Coal Petrology as Indicators of Higher Coal Reservoir Permeability.*
163. Deeley, G. M.; and Canter, L. W., *Distribution of Heavy Metals in Waste Drilling Fluids Under Conditions of Changing pH.*
164. Deul, M.; and Kim, A. G., *Degasification of Coalbeds - A Commercial Source of Pipeline Gas.*



165. Diamond, W. P.; and Levine, J. R., *Direct Method Determinations of the Gas Content of Coal, Procedures and Results.*
166. Diamond, W. P.; and Oyler, D. C., *Effects of Stimulation Treatments on Coalbeds and Surrounding Strata.*
167. Diamond, W. P., *Evaluation of the Methane Gas Content of Coalbeds: Part of a Complete Coal Exploration Program for Health and Safety and Resource Evaluation.*
168. Diamond, W. P.; Elder, C. H.; and Jeran, P. W., *Influence of Geology on Methane Emission from Coal.*
169. Diamond, W. P.; Schatzel, S. J.; Garcia, F.; and Ulery, J. P., *The Modified Direct Method: A Solution for Obtaining Accurate Coal Desorption Measurements.*
170. Diamond, W. P., *Site-Specific and Regional Geologic Considerations for Coalbed Gas Drainage.*
171. Diamond, W. P., *Underground Observations of Mined-Through Stimulation Treatments of Coalbeds.*
172. Diamond, W. P.; McCulloch, C. M.; and Bench, B. M., *Use of Surface Joint and Photolinear Data for Predicting Subsurface Coal Cleat Orientation.*
173. Doelling, H. H.; Smith, A. D.; and Davis, F. D., *Methane Content of Utah Coals.*
174. Donovan, W. S., *Mudlogging Method Calculates Coalbed Gas Content.*
175. Doscher, T. M.; Kuuskraa, V. A.; and Hammerschaib, E., *The Controlling Production Mechanism of Methane Gas from Coalbeds.*
176. Echols, J. B., *Coalbed Methane: Louisiana's Unexplored Energy Resource.*
177. Eddy, G.; Gillies, Alex; Lewis, K.; Lindeman, R. A.; and Snygg, Arnold, *Testing Requirements for Field Based Coalbed Methane Projects.*
178. Edgar, Thomas V.; and Case, James C., *Preliminary Hazards Report PHR 00-1; Pumping Induced Settlement of Aquifers.*
179. Elder, C. H., *Effects of Hydraulic Stimulation on Coalbeds and Associated Strata.*
180. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Greater Green River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*

181. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Cararoc, V. V.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources of the Hanna and Carbon Basins, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
182. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Roberts, S. B.; Wilde, Edith M.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Powder River Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
183. Ellis, M. S.; Gunther, G. L.; Ochs, A. M.; Keighin, C. W.; Goven, G. E.; Schuenemeyer, J. H.; Power, H. C.; Stricker, G. D.; and Blake, Dorsey, *Coal Resources, Williston Basin, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
184. Ellis, M. S.; Keighin, C. W.; Gunther, G. L.; Flores, R. M.; Stricker, G. D.; Roberts, S. B.; Ochs, A. M.; and Bader, L. R., *Constraints on Coal Resource Estimation; A Depositional Perspective.*
185. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S.; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., *Gillette Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
186. Ellis, M. S.; Flores, R. M.; Ochs, A. M.; Stricker, G. D.; Gunther, G. L.; Rossi, G. S.; Bader, L. R.; Schuenemeyer, J. H.; and Power, H. C., *Sheridan Coalfield, Powder River Basin; Geology, Coal Quality, Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
187. Ely, J.; Holditch, S. A.; and Carter, R. H., *Improved Hydraulic Fracturing Strategy for Fruitland Formation Coal-bed Methane Recovery, San Juan Basin, New Mexico and Colorado.*
188. Enever, J.; Casey, D.; and Bocking, M., *The Role of In-Situ Stress in Coalbed Methane Exploration.*
189. The Environmental Protection Agency, *Environmental Protection with a Profit.*
190. The Environmental Protection Agency, *A Guide to Financing Coalbed Methane Projects.*
191. The Environmental Protection Agency, *Opportunities for Coal Mine Gas Projects Created by Electric Industry Restructuring.*
192. Ertekin, Turgay.; and King, G. R., *Development of Coal-Gas Production Simulators and Mathematical Models for Well Test Strategies. Computer Models for Single- or Two-Phase Flow of Methane and Water in Heterogeneous Coal Seams to a Single, Vertical Production Well Connected to a Finite Conductivity Vertical Fracture).*

193. Ertekin, T.; Hoysan, P. M.; Pavone, A. M.; and Schwerer, F. C., *Development of Coal Gas Production Simulators and Mathematical Models for Well Test Strategies. (Literature Survey and Computer Models for Unstimulated Vertical Wells and for Stimulated Vertical Wells Connected to an Infinite-Conductivity-Constant Pressure-Vertical Fracture)*.
194. Ertekin, Turgay, *Flow Dynamics of Coal-bed Methane in the Vicinity of Degasification Wells*.
195. Ertekin, T.; Sung, W.; and Bilgesu, H. I., *Structural Properties of Coal that Control Coalbed Methane Production*.
196. Fassett, James E., *Coal-bed Methane; A Contumacious, Free-spirited Bride; The Geologic Handmaiden of Coal Beds*.
197. Fassett, J. E., *Coal-Bed Methane Resources and Fruitland Formation Coal-Bed Geology, San Juan Basin, New Mexico and Colorado*.
198. Fassett, J. E. ed., *Geology and Coal-Bed Methane Resources of the Northern San Juan Basin, Colorado and New Mexico*.
199. Fassett, J. E.; and Hinds, J. S., *Geology and Fuel Resources of the Fruitland Formation and Kirtland Shale of the San Juan Basin, New Mexico and Colorado*.
200. Fassett, James E., *The Mystery of the Escaping Gas; Forensic Geology in the Northern San Juan Basin, La Plata County, Colorado*.
201. Fassett, James E., *Once a Menace, Now a Burgeoning Source of Energy; Coalbed Methane in the Warrior and San Juan Basins*.
202. Fender, H. B.; and Murray, D. K., *Data Accumulation on the Methane Potential of the Coal Beds of Colorado*.
203. Fillo, John P.; Hamaker, T.; and O'Neil, Patrick E., *Coalbed Methane Development in Alabama: Biototoxicity of Produced Water Originating from Coalbed Degasification Wells in the Cedar Cove Field. A Proposed Study Plan*.
204. Finkelman, R. B., *Characteristics of Acid-Forming Materials in Coal*.
205. Fish and Wildlife Service, *Endangered and Threatened Wildlife and Plants; 12 Month Finding for a Petition to List the Black-tailed Prairie Dog as Threatened*.
206. Flores, R. M.; Rice, D. D.; and Gruber, J., *Coalbed Gas Potential and Reservoir Heterogeneity, Tertiary Fort Union Formation, Powder River Basin, Montana*
207. Flores, Romeo M., editor, *Coalbed Methane; From Coal-Mine Outbursts to a Gas Resource*.
208. Flores, Romeo M., *Coalbed Methane; From Hazard to Resource*.

209. Flores, Romeo M., *Coalbed and Related Depositional Environments in Methane Gas-Producing Sequences*.
210. Flores, R. M., *Creation of Digital Databases and Derivative Products for Coal and Coalbed Methane Resource Assessment; A Short Course*.
211. Flores, R. M.; Roberts, S. B.; Perry, W. J., Jr.; and Nichols, D. J., *Evolution of Paleocene Depositional Systems and Coal Basins in a Tectonic Continuum, Rocky Mountain Region*.
212. Flores, Romeo M.; Stricker, Gary D.; Meyer, Joseph F.; Doll, Thomas E.; Norton, Pierce H., Jr.; Livingston, Robert J.; and Jennings, M. Craig, *A Field Conference on Impacts of Coalbed Methane Development in the Powder River Basin, Wyoming*.
213. Flores, R. M.; Ochs, A. M.; Bader, L. R.; Johnson, R. C.; and Vogler, D., *Framework Geology of the Fort Union Coal in the Powder River Basin, 1999 Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
214. Forgotson, J. M.; and Friedman, S. A., *Arkoma Basin (Oklahoma) Coal-bed Methane Resource Base and Development*.
215. Friedman, S. A., *Determination of Reserves of Methane from Coal Beds for Use in Rural Communities in Eastern Oklahoma*.
216. Friedman, S. A., *Coal-bed Methane Resources in Arkoma Basin, Southeastern Oklahoma*.
217. FrontBurner, *Reservoir Modeling / A Bright Light for Coalbed Methane Production*.
218. Fulton, P. F.; Parente, C. A.; Rogers, B. A.; Shah, N.; and Reznik, A. A., *A Laboratory Investigation of Enhanced Recovery of Methane from Coal by Carbon Dioxide Injection*.
219. Gaddy, D. E., *Coalbed Methane Production Shows Wide Range of Variability*.
220. Gamson, P. D.; Beamish, B. B.; and Johnson, D. P., *Coal Microstructure and Micropermeability and Their Effects on Natural Gas Recovery*.
221. Gamson, P. D.; Beamish, B. B.; and Johnson, D. P., *Coal Microstructure and Secondary Mineralization: Their Effect on Methane Recovery*.
222. Gan, H. S.; Nandi, S. P.; and Walker, P. L., Jr., *Nature of Porosity in American Coals*.
223. Garcia-Gonzalez, Mario; MacGowan, Donald B.; and Surdam, Ronald C., *Coal as a Source Rock of Petroleum and Gas; A Comparison Between Natural and Artificial Maturation of the Almond Formation Coals, Greater Green River Basin in Wyoming*.
224. Garrison, James R., Jr.; van den Bergh, T. C. V.; Barker, Charles E.; and Tabet, David E., *Depositional Sequences Stratigraphy and Architecture of the Cretaceous Ferron Sandstone; Implications for Coal and Coalbed Methane Resources; A Field Excursion*.

225. Gas Research Institute, *Coalbed Methane: GRI Changes the Way Industry Does Business in Alabama*.
226. Gas Research Institute, *Coalbed Methane Reservoir Simulators*.
227. Gas Research Institute, *Disposal Technology for Water Produced from Coalbed Methane Wells*.
228. Gas Research Institute, *Geosciences: Accurately Estimating Coal Seam Reservoir Gas-In-Place*.
229. Gas Research Institute, *Improved Coal Seam Reservoir Gas-In-Place Analysis Protocol*.
230. Gas Research Institute, *Open-hole Cavity Completions, Fracturing, and Restimulation*.
231. Gash, B. W., *Measurement of "Rock Properties" in Coal for Coalbed Methane Production*.
232. Gayer, R.; and Harris, I., *Coalbed Methane and Coal Geology*.
233. Gentzis, T., *Subsurface Sequestration of Carbon Dioxide - An Overview from an Alberta (Canada) Perspective*.
234. George, J. D. St.; and Barakat, M. A., *The Change in Effective Stress Associated with Shrinkage from Gas Desorption in Coal*.
235. Gilles, Alex; and Snygg, Arnold, *Development of Technology for Coal Bed Methane Recovery Program Planning*.
236. Gilles, Alex; and Snygg, Arnold, *Development of Technology for Coalbed Methane Recovery Program Planning. Appendix A, Technology Options*.
237. Glikson, M.; Boreham, C. J.; and Thiede, D. S., *Coal Composition and Mode of Maturation, a Determining Factor in Quantifying Hydrocarbon Species Generated*.
238. Goldhaber, M. B.; Hatch, J. R.; Pashin, J. C.; Offield, T. W.; and Finkelman, R. B., *Anomalous Arsenic and Fluorine Concentrations in Carboniferous Coal, Black Warrior Basin, Alabama; Evidence for Fluid Expulsion During Alleghanian Thrusting?*
239. Gorody, Anthony, *Mineral-catalyzed Formation of Natural Gas During Coal Maturation*.
240. Gorody, Anthony, *Using Temporal Changes in Produced Water Geochemistry as a Guide to Assess Reservoir Compartmentation in Coal Bed Methane Reservoirs*.
241. Gossling, J. M., *Coalbed Methane Potential of the Hartshorne Coals in Parts of Haskell, Latimer, LeFlore, McIntosh, and Pittsburg Counties, Oklahoma*.
242. Gray, I., *Reservoir Engineering in Coal Seams: Part I - The Physical Process of Gas Storage and Movement in Coal Seams*.

243. Griebeling, Richard T., *The Orderly Development of Coalbed Methane Resources from Public Lands – Experience from Coalbed Methane Development in Colorado.*
244. Hallinger, Donald E., *Coal-bed Methane; An Unconventional But Viable Source of Natural Gas.*
245. Hanshaw, P. M., ed., *Coal and Hydrocarbon Resources of North America; Volume 1: Coal, Uranium, and Oil and Gas in Mesozoic Rocks of the San Juan Basin; Anatomy of a Giant Energy-Rich Basin, Field Trips for the 28th International Geological Congress.*
246. Hanson, M.E.; Mavko, B.B.; and Thorson, L.D., *Development of Hydraulic Fracturing Models for Application to Coal Seam Methane Drainage.*
247. Hanson, M.E.; Mavko, B.B.; and Nielsen, P.E., *Three-Dimensional Hydraulic Fracture Model Development for Application to and Understanding of Coal Bed Methane Stimulation Treatments.*
248. Harpalani, S., *Compressibility of Coal and Its Impact on Gas Production from Coalbed Reservoirs.*
249. Harpalani, S.; and Chen, G., *Effect of Gas Production on Porosity and Permeability of Coal.*
250. Harpalani, S.; Chen, G., *Gas Slippage and Matrix Shrinkage Effects on Coal Permeability.*
251. Harpalani, S.; and Chen, G., *Influence of Gas Production Induced Volumetric Strain on Permeability of Coal.*
252. Harpalani, S.; and Zhao, X., *An Investigation of the Effect of Gas Desorption on Coal Permeability.*
253. Harpalani, S.; and Zhao, X., *Microstructure of Coal and Its Influence on Flow of Gas.*
254. Harpalani, Satya, *Permeability Changes Resulting from Gas Desorption.*
255. Harpalani, S.; and Schraufnagel, R., *Shrinkage of Coal Matrix with Release of Gas and Its Impact on Permeability of Coal.*
256. Hatch, J. R., *Hydrocarbon Source-rock Evaluation of Desmoinesian (Middle Pennsylvanian) Coals from Part of the Western Region of the Interior Coal Province.*
257. Heffern, Edward L.; and Coates, Donald A., *Burning Coal Beds and Clinker in the Powder River Basin.*
258. Hemborg, H. T., *Spanish Peak Field, Las Animas County, Colorado: Geologic Setting and Early Development of a Coalbed Methane Reservoir in the Central Raton Basin.*

259. Hettinger, R. D.; Biewick, R. R. H.; Bryant, Karen; Ellis, M. S.; Ferderer, D. A.; Kirschbaum, M. A.; Molnia, C. L.; Roberts, L. N. R.; Stricker, G. D.; and Watson, W. D., *Coal Resource Assessment in the Western United States; Factors for Consideration in the Management of Federal Lands*.
260. Higgs, M. D., *Laboratory Studies into the Generation of Natural Gas from Coal*.
261. Higley, Debra K., *A Method to Estimate the Uncertainty of Coal Resources*.
262. Hildebrand, Ricky T., *Geochemical Studies of the Anderson-Dietz 1 Coal Bed, Powder River Basin; Origin of Inorganic Elements and Environmental Implications*.
263. Hildebrand, Ricky T., *Ground-water Composition as an Indicator of Sodium Content in Coal in the Powder River Basin, Southeastern Montana and Northeastern Wyoming*.
264. Hill, D. G.; Nelson, C. R.; and Brandenburg, C. F., *Coalbed Methane "Frontier" Expanding*.
265. Hill, David G., *North American Coalbed Methane Resource Map*.
266. Hobbs, R. G., *Methane Occurrences, Hazards, and Potential Resources; Recluse Geologic Analysis Area, Northern Campbell County, Wyoming*.
267. Holditch, S. A.; Ely, J. W.; Carter, R. H.; and Semmelbeck, M. E., *Coal Seam Stimulation Manual*.
268. Holditch, S. A., *Completion Methods in Coal Seam Reservoirs*.
269. Holditch, S. A.; Ely, J. W.; Semmelbeck, M. E.; Carter, R. H.; Hinkel, J.; and Jeffrey, R. G., Jr., *Enhanced Recovery of Coalbed Methane Through Hydraulic Fracturing*.
270. Hollub, V.A.; and Schafer, P.S., *A Guide to Coalbed Methane Operations*.
271. Hotchkiss, W. R., *Sulfur and Trace Elements in the Rosebud and McKay Coal Seams, Colstrip Field, Montana*.
272. Howard, Jeanne G.; and Irvin, Marcia S., *Coalbed Methane: Hazard of the Past, Energy for the Future*.
273. Huffman, Claude, Jr.; and Swanson, Vernon E., *Geologic and Hydrologic Controls on Coalbed Methane: Sand Wash Basin, Colorado and Wyoming*.
274. Hunt, A.M.; and Steele, Derek J., *Coalbed Methane Technology Development in the Appalachian Basin*.
275. Hyman, L. A.; Brugler, M. L.; Daneshjou, D. H.; and Ohen, H. A., *Advances in Laboratory Measurement Techniques of Relative Permeability and Capillary Pressure for Coal Seams*.
276. Hyman, Laura A.; Brugler, Mercer; Deneshjou, Dane; and Henry, A., *Improved Evaluation of Coal Reservoirs Through Specialized Core Analysis*.

277. Hyman, L. A.; Ohen, H. A.; Amaefule, J. O.; and Daneshjou, D., *Simultaneous Determination of Capillary Pressure and Relative Permeability in Coalbed Methane Reservoirs*.
278. ICF Resources, Inc., *The United States Coalbed Methane Resource*.
279. Iannacchione, A. T.; and Puglio, D. G., *Geological Association of Coalbed Gas and Natural Gas from the Hartshorne Formation in Haskell and LeFlore Counties, Oklahoma*.
280. Iannacchione, A. T.; Kertis, C. A.; Houseknecht, D. W.; and Perry, J. H., *Problems Facing Coal Mining and Gas Production in the Hartshorne Coalbeds of the Western Arkoma Basin, OK*.
281. Jansen, G. J., *Petrography Studies Can Aid in Coal Mine Planning and in Estimating Methane Yields in Coal Beds*.
282. Johnson, D. J.; and Scholes, P. L., *Predicting Cleat in Coal Seams from Mineral and Maceral Composition with Wireline Logs*.
283. Johnson, R. C.; and Flores, R. M., *Coalbed Methane Potential of the Upper Cretaceous Lance and Paleocene Fort Union Formation, Wind River Reservation, Wyoming*.
284. Johnson, Ronald C.; Clark, Arthur C.; Barker, Charles E.; Crysdale, Bonnie L.; Higley, Debra K.; Szmajter, Richard J.; and Finn, Thomas M., *Coalbed Methane Potential of the Upper Cretaceous Mesaverde and Meeteetse Formations, Wind River Reservation, Wyoming*.
285. Johnson, R. C.; and Rice, D. D., *Composition and Origins of Shallow (<1,000 ft) Coalbed Gases, Wind River Reservation, Wyoming*.
286. Johnson, Ronald C.; and Flores, Romeo M., *Developmental Geology of Coalbed Methane from Shallow to Deep in Rocky Mountain Basins and in Cook Inlet-Matanuska Basins, Alaska, USA and Canada*.
287. Johnson, Ronald C.; Barker, Charles E.; Pawlewicz, Mark J.; Crysdale, Bonnie L.; Clark, Arthur C.; and Rice, Dudley D., *Preliminary Results of a Coalbed Methane Assessment of the Wind River Indian Reservation, Wyoming*.
288. Johnson, R. C.; and Flores, R. M., *Stratigraphy, Areal Distribution, and Paleodepositional Environments of Fort Union Formation Coal Beds, Wind River Reservation, Wyoming; Implications for Coalbed Methane Development*.
289. Johnson, Ronald C.; and Rice, Dudley D., *Variations in Composition and Origins of Gases from Coal Bed and Conventional Reservoirs, Wind River Basin, Wyoming*.
290. Jones, A. H.; Bell, G. J.; and Schraufnagel, R. A., *A Review of the Physical and Mechanical Properties of Coal with Implications for Coal-bed Methane Well Completion and Production*.
291. Jones, Allison L., *Geologic Setting and Water Quality of Selected Basins in the Active Coal-mining Areas of Ohio, June 1985 Through December 1986*.



292. Jones, R. W.; and DeBruin, R. H., *Coalbed Methane in Wyoming*.
293. Jordan, G., *Desorption, Diffusion and Coal Testing for Coalbed Methane*.
294. Joubert, J. I.; Grein, C. T.; and Bienstock, D., *Effect of Moisture on the Methane Capacity of American Coals*.
295. Joubert, J. I.; Grein, C. T.; and Bienstock, D., *Sorption of Methane in Moist Coal*.
296. Junkin, P. D.; and Tipton, L. M., *Environmental Research Plan for Gas Supply Technologies. Volume II: Environmental Research Plan*.
297. Junkin, P. D.; and Tipton, L. M., *Safety Research Plan for Gas Supply Technologies*.
298. Kaiser, W. R.; Tyler, R.; Ambrose, W. A.; Scott, A. R.; and Patchen, D. G., *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources*.
299. Kaiser, W. R.; Hamilton, D. S.; and Patchen, D. G., *Geologic and Hydrologic Controls on Coalbed Methane Production in Western United States Intermountain Basins*.
300. Kaiser, W. R.; Scott, A. R.; Hamilton, D. S.; Tyler, Roger; McMurry, R. G.; Zhou, Naijiang; and Tremain, C. M., *Geologic and Hydrologic Controls on Coalbed Methane: Sand Wash Basin, Colorado and Wyoming*.
301. Kaiser, W. R.; Hamilton, D. S.; Scott, A. R.; Tyler, R.; and Finley, R. J., *Geological and Hydrological Controls on the Producibility of Coalbed Methane*.
302. Kaiser, W. R.; Scott, A. R.; and Tyler, R., *Geology and Hydrology of Coalbed Methane Producibility in the United States: Analogs for the World*.
303. Kaiser, W. R., *Hydrology of Coalbed Reservoirs*.
304. Kaiser, W. R.; and Ambrose, W. A., *Hydrology and Production of Coalbed Methane in Western United States Intermountain Basins*.
305. Kalkreuth, W. D.; Dawson, M.; and Hughes, J. D., *Geological Survey of Canada Coalbed Methane Research*.
306. Karacan, C. O.; and Okandan, E., *Assessment of Energetic Heterogeneity of Coals for Gas Adsorption and Its Effect on Mixture Predictions for Coalbed Methane Studies*.
307. Kaszuba, J. P.; and Buys, M. W., *Reclamation Procedures for Produced Water Spills from Coalbed Methane Wells, San Juan Basin, Colorado and New Mexico*.
308. Kelafant, J. R.; Wicks, D. E.; and Kuuskraa, V. A., *A Geologic Assessment of Natural Gas from Coal Seams in the Northern Appalachian Basin, Alabama*.

309. Kelso, B. S.; Goolsby, S. M.; and Tremain, C. M., *Deep Coal Bed Methane Potential of the San Juan River Coal Region, Southwestern Colorado.*
310. Kelso, B. S.; Lombardi, T. E.; and Kuuskraa, J. A., *Drilling and Production Statistics for Major U.S. Coalbed Methane and Gas Shale Reservoirs.*
311. Kelso, B. S., *Geologic Controls on Open-hole Cavity Completions in the San Juan Basin.*
312. Kelso, B. S.; and Kelafant, J. A., *A Strategy for Coalbed Methane Production Development Part I: Geologic Characterization.*
313. Kemp, J. H.; and Peterson, K. M., *Coal-bed Gas Development in the San Juan Basin: A Primer for the Lawyer and Landman.*
314. Khavari-Khorasani, G.; and Michelsen, J. K., *Coal Bed Gas Content and Gas Undersaturation.*
315. Khodaverdian, Mohamad F.; McLennan, John D.; Palmer, Ian D.; Vaziri, Hans H.; and Wang, X., *Cavity Completions for Enhanced Coalbed Methane Recovery.*
316. Khodaverdian, Mohamad F.; McLennan, John D.; Palmer, Ian D.; and Vaziri, Hans H., *Coalbed Cavity Completion Analysis Suggests Improvements.*
317. Khodaverdian, Mohamad F., *Coalbed Methane Stimulation Techniques: Mechanisms and Applicability.*
318. Khodaverdian, Mohamad F.; McLennan, John D.; and Jones Arfon H., *Hydraulic Fracture Stimulation for Enhanced Recovery of Coalbed Methane.*
319. Khodaverdian, M.; and McLennan, J. D., *Hydraulic Fracturing Coalbed Methane Reservoirs: Obstacles and Solutions.*
320. Kidd, J. T.; Camp, B. S.; Lottman-Craig, L. K.; Osborne, T. E.; Smith, J. L.; Saulsberry, J. L.; Steidl, P. F.; and Stubbs, P. B., *Geologic Manual for the Evaluation and Development of Coalbed Methane.*
321. Kim, A. G., *The Composition of Coalbed Gas.*
322. Kim, A. G., *Estimating Methane Content of Bituminous Coalbeds from Adsorption Data.*
323. Kim, A. G., *Experimental Studies on the Origin and Accumulation of Coalbed Gas.*
324. Kim, A. G.; and Douglas, L. J., *Gases Desorbed from Five Coals of Low Gas Content.*
325. Kim, A. G.; and Douglas, L. J., *Hydrocarbon Gases Produced in a Simulated Swamp Environment.*
326. Kim, A. G., *Low-temperature Evolution of Hydrocarbon Gases from Coal.*

327. Kim, A. G.; and Kissell, F. N., *Methane Formation and Migration in Coalbeds*.
328. Kim, A. G., *Methane in the Pittsburgh Coalbed, Greene County, Pa.*
329. Kim, A. G., *Methane in the Pittsburgh Coalbed, Washington County, Pa.*
330. Kindley, Mark, *Coal Bed Methane Offers Energy Options*.
331. Kindley, Mark, *Interest Grows in Coal Bed Methane, Technological, Legal Problems Persist*.
332. Kirschbaum, M. A.; Correia, G. A.; and McPhillips, M., *Coal Exploratory Drilling During 1979 in Western Powder River County, Montana*.
333. Kirschbaum, Mark A.; Roberts, Laura N. R.; and Biewick, Laura R. H., *Geologic Assessment of Coal in the Colorado Plateau; Arizona, Colorado, New Mexico, and Utah*.
334. Kissel, F. N.; McCulloch, C. M.; and Elder, C. H., *The Direct Method of Determining Methane Content of Coalbeds for Ventilation Design*.
335. Kissel, F. N., *The Methane Migration and Storage Characteristics of the Pittsburgh, Pocahontas No. 3, and Oklahoma Hartshorne Coalbeds*.
336. Kizil-sshtein, L, Ya, *Heavy-metal Geochemistry of Coal; An Ecological Aspect*.
337. Kizil-sshtein, L, Ya, *Vanadium Geochemistry of Coal; An Ecological Aspect*.
338. Knox, L. M.; and Hadro, J., *Canister Desorption Techniques: Variation and Reliability*.
339. Koenig, R. A.; and Schraufnagel, R. A., *Application of the Slug Test in Coalbed Methane Testing*.
340. Koenig, R. A.; Bumb, A. C.; Kunkel, J. R.; McKee, C. R.; Murphy, C. L.; Ramesh, M. S.; and Reverand, J. M., *Hydrologic Characterizations of Coal Seams for Methane Recovery*.
341. Koenig, R. A.; McKee, C. R.; Reverand, J. M.; Ward, W. P.; and Way, S. C., *Hydrologic Characterization of Coal Seams for Methane Recovery. Activity 2 Topical Report: Hydrologic Constraints and Single-Phase Test Procedures*.
342. Kopp, O. C.; Bennett, M. E., III; and Clark, C. E., *Volatiles Lost During Coalification*.
343. Kuuskraa, V. A.; and Boyer, C. M., *Economic and Parametric Analysis of Coalbed Methane*.
344. Kuuskraa, V.A.; McFall, K.S.; Sedwick, K.B.; and Wicks, D.E., *Geologic Assessment of Natural Gas from Coal Seams in the Piceance Basin, Colorado*.
345. Kuuskraa, V.A.; McFall, K.S.; and Wicks, D.E., *Geologic Assessment of Natural Gas from Coal Seams in the Warrior Basin, Alabama*.

346. Kvenvolden, Keith A.; and Lorenson, Thomas D., *Methane and Other Hydrocarbon Gases in Sediment from the Southeastern North American Continental Margin*.
347. Lamarre, Robert, *Coalbed Methane Stratigraphic Traps in Ferron Coals of East-Central Utah*.
348. Lamarre, R. A., *Hydrodynamic and Stratigraphic Controls for a Large Coalbed Methane Accumulation in Ferron Coals of East-Central Utah*.
349. Lamberson, M. N.; and Bustin, R. M., *Coalbed Methane Characteristics of Gates Formation Coals, Northeastern British Columbia: Effect of Maceral Composition*.
350. Lambert, S. W.; Saulsberry, J. L.; and Reeves, S. R., *Coalbed Methane Production Improvement/Recompletion Project in the Warrior Basin*.
351. Lambert, S. W.; and Trevits, M. A., *The Feasibility of No-Propant Stimulation to Enhance Removal of Methane from the Mary Lee Coalbed*.
352. Lambert, S. W.; Saulsberry, J. L.; Steidl, P. F.; Conway, M. W.; and Spafford, S. D., *Fracturing Experience at the Rock Creek Multiple Coal Seams Project*.
353. Lambert, S. W.; Trevits, M. A.; and Steidl, P. F., *Vertical Borehole Design and Completion Practices to Remove Methane Gas from Minable Coalbeds*.
354. Langenberg, W.; Kalkreuth, W.; Levine, J.; Strobl, R.; Demchuk, T.; Hoffman, G.; and Jerzykiewicz, T., *Coal Geology and Its Application to Coal-bed Methane Reservoirs*.
355. Langenberg, W., *Coalification Patterns and Coalbed Methane Potential in the Cadomin Area, Alberta, Canada*.
356. Laubach, S. E.; Marrett, R. A.; Olson, J. E.; and Scott, A. R., *Characteristics and Origins of Coal Cleat: A Review*.
357. Laubach, S. E.; Tremain, C. M.; and Ayers, W. B., *Coal Fracture Studies: Guides for Coalbed Methane Exploration and Development*.
358. Laubach, Stephen E.; and Tremain, Carol M., *Distribution and Origin of Regional Coal Fracture (Cleat) Domains in Upper Cretaceous Fruitland Formation Coal; Possible Effects on Coalbed Stimulation and Methane Production*.
359. Laubach, S. E.; Tyler, Roger; Tremain, C. M.; Grout, M. A.; and Ambrose, W. A., *Fracture Patterns in Coal in the Western United States; Observations and Implications for Development of Coalbed Methane Resources*.
360. Laubach, S. E.; and Tremain, C. M., *Fracture Swarms: Potential Targets for Methane Exploration in Upper Cretaceous Sandstone and Coal, Northern San Juan Basin*.
361. Law, B. E., 1988, *Coal-bed Methane*.

362. Law, B. E.; Rice, D. D.; and Flores, R. M., *Coalbed Gas Accumulations in the Paleocene Fort Union Formation, Powder River Basin, Wyoming.*
363. Law, B. E., 1992, *Coalbed Methane.*
364. Law, B. E.; and Rice, D. D., 1993, *Coalbed Methane - New Perspectives on an Old Source of Energy*
365. Law, B. E., *Geologic Attributes of Coalbed Methane Accumulations in the United States.*
366. Law, B. E.; Hatch, J. R.; Kukal, G. C.; and Keighin, C. W., *Geologic Implications of Coal Dewatering.*
367. Law, B. E.; Hatch, J. R.; Kukal, G. C.; and Keighin, C. William, *Geologic Implications of Dewatering of Coal and Other Carbonaceous Lithologies; A Hypothesis, AAPG Annual Convention with Divisions SEPM/EMD/DPA.*
368. Law, B. E., *Geophysical Logs of Test Holes from the Henry Mountains Coal Field, Garfield and Wayne Counties, Southeastern Utah.*
369. Law, B. E.; and Rice, D. D., *Hydrocarbons from Coal.*
370. Law, B. E.; Spencer, C. W.; Crovelli, R. A.; Schmoker, J. W.; Ryder, R. T.; Sutherland, W. M.; and Frohne, K. H., *Low Permeability (Tight) Gas Reservoirs; an Environmentally Acceptable Major Source of Energy for the 21st Century?*
371. Law, B. E., *The Relationship Between Coal Rank and Cleat Spacing; Implications for the Prediction of Permeability in Coal.*
372. Law, B. E.; Anders, D. E.; and Michael, G. E., 1990, *Use of Rock-Eval Pyrolysis and Vitrinite Reflectance Data in Characterizing Type and Maturity of Organic Matter in Coal, Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado.*
373. Lawrence, A. W., *Coalbed Methane Produced-water Treatment and Disposal Options.*
374. Laxminarayana, C.; and Crosdale, P. J., *Heat of Methane Adsorption of Coal: Implications for Pore Structure Development.*
375. Lee-Ryan, P. B.; Fillo, John P.; Tallon, James T.; and Evans, James M., *Evaluation of Management Options for Coalbed Methane Produced Water.*
376. Leel, Woodruff; and Wickstrom, Charles, *Coalbed Methane Resource of the Rock Springs Formation on the Rock Springs Uplift, Sweetwater County, Wyoming.*
377. Leel, Woodruff; and Wickstrom, Charles, *Methane Emissions Along a Salt Marsh Salinity Gradient.*

378. Lemons, B. N.; and Nemirow, L., *Maximizing the Section 29 Credit in Coal Seam Methane Transactions.*
379. Levine, J. R., *Coalification: The Evolution of Coal as Source Rock and Reservoir Rock for Oil and Gas.*
380. Levine, J. R., *Five Common Misconceptions Regarding Coalbed Gas Reservoir Systems.*
381. Levine, J. R., *Generation, Storage and Migration of Natural Gas in Coal Bed Reservoirs.*
382. Levine, J. R., *The Impact of Oil Formed During Coalification on Generation and Storage of Natural Gas in Coalbed Reservoir Systems.*
383. Levine, J. R., *Influence of Coal Composition on the Generation and Retention of Coalbed Natural Gas.*
384. Levine, J. R., *Model Study of the Influence of Matrix Shrinkage on Absolute Permeability of Coal Bed Reservoirs.*
385. Levine, J. R., *New Methods for Assessing Gas Resources in Thin-bedded, High-ash Coals.*
386. Levine, J. R., *Oversimplifications Can Lead to Faulty Coalbed Gas Reservoir Analysis Five.*
387. Lewis, R. T., 1999, *Coalbed Methane Production of the Buck Knob Anticline Field, Wise County, Virginia.*
388. Lico, M. S.; Kharaka, Y. K.; Carothers, W. W.; and Wright, V. A., *Methods for Collection and Analysis of Geopressured Geothermal and Oil Field Waters.*
389. Linz, David G.; Simpson, T. E.; Lawrence, Alonzo W.; Miller, Jeffrey A.; and Davis, Hal A., *Coalbed Methane Produced Water Management Strategies in the Black Warrior Basin of Alabama.*
390. Littke, R.; and Leythaeuser, D., *Migration of Oil and Gas in Coals.*
391. Logan, Terry L; McLennan, John D.; and Wyman, Richard E., *Cavity Completion Technique for Coal Gas Reservoirs: Procedures.*
392. Logan, T. L., *Coalbed Methane; 6, Western Basins Dictate Varied Operations.*
393. Logan, T. L.; Clark W. F.; and McBane Richard A., *Comparing Different Coalbed Methane Completion Techniques, Hydraulic Fracture and Openhole Cavity, at the Northeast Blanco Unit, San Juan Basin.*
394. Logan, T. L.; Clark W. F.; and McBane R. A., *Comparing Openhole Cavity and Cased Hole Hydraulic Fracture Completion Techniques, San Juan Basin, New Mexico.*

395. Logan, Terry L; and Marshall, Richard B., *Drilling and Configuration Methods for Deep Coalbed Methane Wells Used at the Red Mountain Site, Piceance Basin, Colorado.*
396. Logan, T. L., 1993, *Drilling Techniques for Coalbed Methane.*
397. Logan, T. L., *Horizontal Drainhole Drilling Techniques Used in Rocky Mountain Coal Seams.*
398. Logan, T. L.; and Mavor, M. J., *Western Cretaceous Coal Seam Project Final Report.*
399. Logan, T. L.; and Robinson, J. R., *Western Cretaceous Coal Seam Project: Summary of the Evergreen Operating Corporation Rosa #283 Well, Cooperative Research Project, San Juan Basin.*
400. Lyman, Robert M.; and Volkmer, John E., *Pyrophoricity (spontaneous combustion) of Powder River Basin Coals - Considerations for Coalbed Methane Development.*
401. Lyons, Paul C., *Coalbed Methane Potential in the Appalachian States of Pennsylvania, West Virginia, Maryland, Ohio, Virginia, Kentucky, and Tennessee; An Overview.*
402. Lyons, W. S., *Seismic Maps Ferron Coalbed Sweetspots.*
403. Magee, R.A.; Faist, M.B.; and Barrs, T.W., *Characterization and Disposal of Coal Gasification Waste Products: Phase 1 - Program Design.*
404. Malone, P. G.; Camp, B. S.; and Smith, J. L., *An Investigation of Parameters Affecting Desorption Rates of Warrior Basin Coals.*
405. Malone, P. G.; Briscoe, F. H.; Camp, B. S.; and Boyer, C. M., *Methods of Calculating Coalbed Methane Reserves With Insight into the Advantages and Disadvantages of Each Method.*
406. Malone, R. D.; and Byrer, C. W., *Methane Recovery from Coalbeds Well Description and Field Activities Log Procedures Manual.*
407. Markochick, Dennis J.; and Law, Ben E., *Estimates of Gas Content in Coal and Carbonaceous Rocks from Deep Drilling in Pacific Creek Area, Northeastern Green River Basin, Sweetwater County, Wyoming.*
408. Markowski, A. K., *Coalbed Methane: New Energy from an Old Scourge?*
409. Markowski, A. K., *Coalbed Methane Resource Potential and Current Prospects in Pennsylvania.*
410. Mason, Richard Z.; Siegel, Martin M.; Barone, Saverio Peter; and Gash, Bruce W., *Economic Evaluation of Underground Coal Gasification of Western Subbituminous Coal.*
411. Masszi, D., *Cavity Stress-relief Method for Recovering Methane from Coal Seams.*

412. Mastalerz, M.; and Kvale, E. P., *Coal Quality Variation and Coalbed Gas Content in Boreholes SDH-383 and SDH-384 in Posey County, Indiana.*
413. Mastalerz, M.; and Kvale, E. P., *Coal-bed Gas Potential in Daviess County, Indiana.*
414. Mastalerz, M.; Glikson, M.; and Golding, S. D., eds., *Coalbed Methane: Scientific, Environmental and Economic Evaluation.*
415. Mavor, Mathew J., *Coal Gas Reservoir Cavity Completion Well Performance.*
416. Mavor, Matt, *Coal Natural Gas Reservoir Properties and Formation Evaluation Techniques.*
417. Mavor, M.; and Nelson, C. R., *Coalbed Reservoir Gas-in-Place Analysis.*
418. Mavor, M. J.; Dhir, R.; McLennan, J. D.; and Close, J. C., *Evaluation of Hydraulic Fracture Stimulation of the Colorado 32-7 Well, San Juan Basin.*
419. Mavor, M. J., *Western Cretaceous Coal Seam Project: Evaluation of Coalbed Natural Gas Openhole Cavity Completion Productivity.*
420. Mavor, M. J.; and Close, J. C., *Formation Evaluation of Coalbed Methane Wells.*
421. Mavor, M. J.; Close, J. C.; and McBane, R. A., *Formation Evaluation of Exploration Coalbed Methane Wells.*
422. Mavor, M. J.; Owen, L. B.; and Pratt, T. J., *Measurement and Analysis of Sorption Isotherm Data.*
423. Mavor, M. J.; Pratt, T. J.; and Nelson, C. R., *Quantify the Accuracy of Coal Seam Gas Content.*
424. Mavor, M. J.; and Logan, T. L., *Recent Advances in Coal Gas-well Openhole Well Completion Technology.*
425. Mavor, M.; Pratt, T.; and DeBruin, R., *Study Quantifies Powder River Coal Seam Properties.*
426. Mavor, M.J.; Logan, T. L.; Close, J. C.; Pratt, T. J.; and Robinson, J. R., *Western Cretaceous Coal Seam Project: 1992 Annual Report.*
427. McCabe, M. A.; Robert, L. M.; Blauch, M. E.; Terracina, J. M.; Lehman, L. V.; and Bowles, B., *Investigations of a New Fracturing Fluid and Conductivity Enhancement Technology on Coalbed Methane Production.*
428. McCabe, Peter J.; Gautier, Donald L.; Lewan, Michael D.; and Turner, Christine, *The Future of Energy Gasses.*
429. McCallister, T., *Impact of Unconventional Gas Technology in the Annual Energy Outlook 2000.*



430. McClanahan, Elizabeth A., *Coalbed Methane: Myths, Facts, and Legends of Its History and the Legislative and Regulatory Climate into the 21st Century*.
431. McCord, J. P., *Geologic Overview, Coal and Coalbed Methane Resources of the Greater Green River Coal Region, Wyoming and Colorado*.
432. McCulloch, C. M.; Lambert, S. W.; and White, J. R., *Determining Cleat Orientation of Deeper Coalbeds from Overlying Coals*.
433. McCulloch, C. M.; and Diamond, W. P., *Inexpensive Method Helps Predict Methane Content of Coal Beds*.
434. McCulloch, C. M.; Levine, J. R.; Kissel, F. N.; and Deul, M., *Measuring the Methane Content of Bituminous Coal Beds*.
435. McCulloch, C. M.; and Deul, M., *Methane from Coal*.
436. McCune, D., *Fundamentals of Coalbed Methane Production*.
437. McElhiney, J. E.; Paul, G. W.; Young, G. B. C.; and McCartney, J. A., *Reservoir Engineering Aspects of Coalbed Methane*.
438. McGarry, D. E., *Challenges in Assessment, Management and Development of Coalbed Methane Resources in the Powder River Basin, Wyoming*.
439. McGinnis, Norman F., *Dewatering Systems and Techniques for Coalbed Methane Wells: Volume I*.
440. McGinnis, Norman F., *Dewatering Systems and Techniques for Coalbed Methane Wells: Volume II*.
441. McKay, E. J.; Butler, B. A.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Bear Creek Quadrangle, Powder River County, Montana*.
442. McKay, E. J.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Fort Howes Quadrangle, Rosebud and Powder River County, Montana*.
443. McKay, E. J.; and Robinson, L. N., *Coal Resource Occurrence and Coal Development Potential Maps of the Otter Quadrangle, Powder River County, Montana*.
444. McKee, C. R.; Bumb, A. C.; and Koenig, R. A., *Stress-dependent Permeability and Porosity of Coal*.
445. McKee, C. R.; Bumb, A. C.; Way, S. C.; Koenig, R. A.; Reverand, J. M.; and Brandenburg, D. F., *Using Permeability-vs-Depth Correlations to Assess the Potential for Producing Gas from Coal Seams*.

446. McLennan, J.D.; Schafer, P.S.; and Pratt, T.J., *A Guide to Determining Coalbed Gas Content*.
447. McPherson, Malcomb J.; and Harpalani, Satya, *Permeability and Sorption Tests on Coal*.
448. Mead, S. W.; Wang, F. T.; and Ganow, H. C., *Control Aspects of Underground Coal Gasification*.
449. Mead, S. W.; Wang, F. T.; Ganow, H. C.; and Stuermer, D. H., *Environmental Studies of LLL's Hoe Creek II Underground Coal Gasification Experiment*.
450. Mead, S. W.; and Ganow, H. C., *Environmental Studies of Underground Coal Gasification Experiment in Northeastern Wyoming, Subsidence Investigations*.
451. Mead, S. W.; Wang, F. T.; Ganow, H. C.; Stuermer, D. H., and Stone, R., *Ground-water Effects of Underground Coal Gasification Experiments in Northeastern Wyoming*.
452. Medina, J. C.; Butala, S. J.; Bartholomew, C. H.; and Lee, M. L., *Iron Catalyzed CO<sub>2</sub> Hydrogenation as a Mechanism for Coalbed Gas Formation*.
453. Medina, J. C.; Butala, S. J.; Bartholomew, C. H.; and Lee, M. L., *Low Temperature Iron-and Nickel-catalyzed Reactions Leading to Coalbed Gas Formation*.
454. Medlin, J. H.; Swanson, Vernon E.; and Coleman, S. L., *Major, Minor, and Trace Elements in U.S. Coal*.
455. Meissner, F. F., *Cretaceous and Lower Tertiary Coals as Source for Gas Accumulations in the Rocky Mountain Area*.
456. M'Gonigle, John W.; and Robinson Roberts, Laura N., *Mineral Resource Potential; Leasable Minerals (Energy Resources); Coal Geology and Resources*.
457. Michael, G. Eric; Law, Ben E.; and Anders, D. E., *Geochemical Evaluation of Gas-Bearing Coals With Respect to Maturity, Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado*.
458. Michelsen, J. K.; and Khaavari-Khorasani, G., *The Physics and Efficiency of Petroleum Expulsion from Coal*.
459. Mitcham, S. A.; and Wobeser, G., *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama*.
460. Mitchell, T. E.; and Pappajohn, S. P., *Coalbed Methane Production Potential in Complex Geologic Settings*.
461. Moffat, D. H.; and Weale, K. E., *Sorption by Coal of Methane at High Pressure*.

462. Molnia, C. L.; Kottowski, F. E.; Jobin, D. A.; and O'Connor, J. T., *Coal in New Mexico: Issues in Quality and Resources.*
463. Montgomery, S. L., *Coalbed Methane: An Old Hazard Becomes a New Resource.*
464. Montgomery, S. L., *Powder River Basin, Wyoming: An Expanding Coalbed Methane (CBM) Play.*
465. Montgomery, Scott L.; Tabet, David E.; and Barker, Charles E., *Upper Cretaceous Ferron Sandstone; Major Coalbed Methane Play in Central Utah.*
466. Mount, David R.; and Gulley, David D., *Development of a Salinity/Toxicity Relationship to Predict Acute Toxicity of Saline Waters to Fresh Water Organisms.*
467. Mount, David R.; O'Neil, Patrick E.; and Evans, James M., *Discharge of Coalbed Produced Water to Surface Waters – Assessing, Predicting, and Preventing Ecological Effects.*
468. Mount, David R.; Drott, Kurt R.; Gulley, David D.; Frillo, John P.; and O'Neil, Patrick E., *Use of Laboratory Toxicity Data for Evaluating the Environmental Acceptability of Produced Water Discharge to Surface Waters.*
469. Mountain Fuel Resources, Inc., *Demonstration Project for Methane Recovery from Unminable Coalbeds.*
470. Mountain Fuel Supply Company, *Demonstration Project for Methane Recovery from Unminable Coalbeds, Progress Report No. 11.*
471. Mroz, T. H.; Ryan, J. G.; and Byrer, C. W., *Methane Recovery from Coalbeds: A Potential Energy Source.*
472. Mullen, M. J., *Cleat Detection in Coalbeds Using the Microlog.*
473. Mullen, M. J., *Log Evaluation in Wells Drilled for Coal-bed Methane.*
474. Murphy, Edward C.; and Goven, Gerald E., *The Coalbed Methane Potential of North Dakota Lignites.*
475. Murray, D. K., *Coalbed Methane: Natural Gas Resources from Coal Seams.*
476. Murray, D. K., *Coalbed Methane in the USA: Analogues for Worldwide Development.*
477. Murray, D. K., *Deep Coals Hold Big Part of Resource.*
478. Murrie, G. W., *Coal and Gas Resources of the Lower Hartshorne Coalbed in LeFlore and Haskell Counties, Oklahoma.*
479. Nelson, Charles R., *Advances in Coalbed Reservoir Gas-In-Place Analysis.*

480. Nelson, Charles R., *Coalbed Methane Potential of the U.S. Rocky Mountain Region*.
481. Nelson, Charles R., *Changing Perceptions Regarding the Size and Production Potential of Coalbed Methane Resources*.
482. Nelson, C. R., *Common Sources of Error in Coalbed Gas Resource and Reservoir Gas-In-Place Values*.
483. Nelson, Charles R., *GRI Basic Research Group Coalbed Methane Research*.
484. Nelson, C. R., *Gem in the Rough; Technology, Economics Putting New Shine on Coalbed Methane*.
485. Nelson, C. R., *Geologic Controls on Effective Cleat Porosity Variation in San Juan Basin Fruitland Formation Coalbed Reservoirs*.
486. Nelson, C. R.; and Pratt, T. J., *In Coalbed Gas Plays, Reservoir Variables Key to Success*.
487. Nelson, Charles R., *New Methods for Coalbed Reservoir Gas-In-Place Analysis: Results from Case Studies in the San Juan, Powder River, Black Warrior and Central Appalachian Basins*.
488. Nelson, C. R.; Mavor, M. J.; Pratt, T. J.; and Casey, T. A., *Protocol Ups Coal Seam Gas Analysis*.
489. Nikols, D. J.; and Rottenfusser, B. A., *Coalbed Methane - A Canadian Resource for the 1990's*.
490. Nolde, J. E.; and Spears, D., *A Preliminary Assessment of In-place Coalbed Methane Resources in the Virginia Portion of the Central Appalachian Basin*.
491. Nuccio, Vito, *Coal-bed Methane: Potential and Concerns*.
492. Nuccio, V. F., *What is it? And Why All the Fuss?*
493. Nuttall, Brandon C.; Chesnut, Donald R.; and Drahovzal, James A., *Western Kentucky Coalbed Methane Consortium: A Proposed Joint Geologic Study of Coal-Bearing Strata of the Western Kentucky Coal Field Emphasizing Coalbed Methane Resource Characterization*.
494. Ogbe, D. O.; Packer, J. B.; and Clough, J. G., *Risk-weighted Volumetric Analysis to Estimate Gas Reserves and Evaluate Coalbed Methane Potential of the Lower Matanuska Valley, Cook Inlet Basin, Alaska*.
495. Olague, N. E.; and Smith, D. M., *Diffusion of Gases in American Coals*.
496. Olszewski, A. J.; Luffel, D. L.; Hawkins, J.; Zuber, M. D.; McLennan, J. D.; Schatz, J. F.; and Truman, R. B., *Development of Formation Evaluation Technology for Coalbed Methane*.
497. Oman, Charles L.; Finkelman, R. B.; Coleman, S. L.; and Bragg, L. J., *Selenium in Coal from the Powder River Basin, Wyoming and Montana*.

498. O'Neil, Patrick E.; Mettee, Maurice F.; and Harris, Steven C., *Coalbed Methane Development in Alabama: Biological and Hydrological Conditions of Streams Draining the Cedar Cove Degasification Field.*
499. O'Neil, P. E.; and Harris, S. C., *Development of an Instream Bioassessment Methodology for the Surface Disposal of Coalbed Methane Produced Waters.*
500. Ortiz, Isais; Weller, T. F.; Anthony, R. V.; Frank, James; Linz, David G.; and Nakles, David V., *Disposal of Produced Waters: Underground Injection Option in the Black Warrior Basin.*
501. Osborne, T. E.; Moore, D. K.; Kidd, J. T.; and Pescatore, F. T., *Coalbed Methane Potential of the Northern Coosa Basin in Alabama.*
502. Owsiacski, G.; and Payie G., *Coalbed Methane Potential in British Columbia.*
503. Oyler, D. C.; Diamond, W. P.; and Jeran, P. W., *Directional Drilling for Coalbed Degasification.*
504. Oyler, D. C.; and Diamond, W. P., *Drilling a Horizontal Coalbed Methane Drainage System from a Directional Surface Borehole.*
505. Oyler, D. C.; and Stubbs, R. B., *Measuring Formation Pressures and the Degree of Gas Drainage in a Large Coalbed Gas Drainage Field.*
506. Palmer, I. D.; Davids, M. W.; and Leu, S. J., *Analysis of Unconventional Behavior Observed During Coalbed Fracturing Treatments.*
507. Palmer, I. D.; Lambert, S. W.; and Spitler, J. L., *Coalbed Methane Well Completions and Stimulations*
508. Palmer, I. D., *Induced Stresses Due to Propped Hydraulic Fracture in Coalbed Methane Wells.*
509. Palmer, I. D.; and Sparks, D. P., *Measurement of Induced Fractures by Downhole TV Camera in Black Warrior Basin Coalbeds.*
510. Pashin, Jack C.; and Hinkle, Frank, *Coalbed Methane in Alabama.*
511. Pashin, J. C.; Groshong, R. H., Jr.; and Carroll, R. E., *Enhanced Coalbed Methane Recovery Through Sequestration of Carbon Dioxide: Potential for a Market-Based Environmental Solution in the Black Warrior Basin of Alabama.*
512. Pashin, J.C.; Ward, W.E., II; Winston, R.B.; Chandler, R.V.; Bolin, D.E.; Hamilton, R.P.; and Mink, R.M., *Geologic Evaluation of Critical Production Parameters for Coalbed Methane Resources: Part II, Black Warrior Basin.*
513. Pashin, J. C.; Carroll, R. E.; Groshong, R. H., Jr.; Raymond, D. E.; McIntyre, Marcella; and Payton, W. J., *Geologic Screening Criteria for Sequestration of CO<sub>2</sub> in Coal: Quantifying Potential of the Black Warrior Coalbed Methane Fairway, Alabama.*

514. Pashin, J. C.; Carroll, R. E.; Hatch, J. R.; and Goldhaber, M. B., *Interplay Among Cleating, Maturation, and Mineralization in Coalbed Methane Reservoirs of the Black Warrior Basin.*
515. Pashin, Jack C.; Carroll, Richard E.; Hatch, Joseph R.; and Goldhaber, Martin B., *Mechanical and Thermal Control of Cleating and Shearing in Coal; Examples from the Alabama Coalbed Methane Fields.*
516. Pashin, J. C., *Productivity of Coalbed Methane Wells in Alabama.*
517. Pashin, J. C., *Regional Analysis of the Black Creek-Cobb Coalbed-Methane Target Interval, Black Warrior Basin, Alabama.*
518. Pashin, J. C., *Stratigraphy and Structure of Coalbed Methane Reservoirs in the United States: An Overview.*
519. Pashin, J. C.; and Groshong, R. H., Jr., *Structural Control of Coalbed Methane Production in Alabama.*
520. Pashin, J.C.; Ward, W.E., II; Winston, R.B.; Chandler, R.V.; Bolin, D.E.; Richter, K. E.; Osborne, W. E.; and Sarnecki, J. C., *Structure, Sedimentology, Coal Quality and Hydrology of the Black Warrior Basin in Alabama: Controls on the Occurrence and Producibility of Coalbed Methane.*
521. Patching, T. C., *The Retention and Release of Gas in Coal - A Review.*
522. Penny, Glenn S.; and Conway, Michael W., 1994, *Coordinated Studies in Support of Hydraulic Fracturing of Coalbed Methane.*
523. Penny, Glenn S.; and Conway, Michael W., 1995, *Coordinated Studies in Support of Hydraulic Fracturing of Coalbed Methane.*
524. Penny, Glenn S.; Conway, Michael W.; Almond, Stephen W.; Himes, Ron; and Nick, Kevin E., *Mechanisms and Impact of Damage Resulting from Hydraulic Fracturing.*
525. Perry, J. H.; Prosser, L. J., Jr.; and Cervik, J., *Methane Drainage from the Mary Lee Coalbed, Alabama, Using Horizontal Drilling Techniques.*
526. Perry, J. H.; Aul, G. N.; and Cervik, J., *Methane Drainage Study in the Sunnyside Coalbed, Utah.*
527. Petroleum Frontiers, *Coalbed Methane - An Old Hazard Becomes a New Resource.*
528. Petroleum Information / Dwights, *\$110 Million Gas Gathering System Proposed for Powder River.*
529. Petroleum Technology Transfer Council, *Coalbed Methane Workshop On-line (Rockies Newsletter).*
530. Pierce, Brenda, *Coalbed Methane in the Forest City Basin.*

531. Popp, J. T.; Coleman, D. D.; and Deogh, R. A., *Investigations of the Gas Content of Coal Seams in the Vicinity of Charleston, Illinois.*
532. Powder River Coalbed Methane Information Council, *Coalbed Methane Development Information.*
533. Puglio, D. G., *Evaluating Geologic Conditions and Methane Contents of Coalbeds Through Exploration Programs in the Northern Appalachian Coalfield.*
534. Puri, R.; Evanoff, J. C.; and Brugler, M. L., *Measurement of Coal Cleat Porosity and Relative Permeability Characteristics.*
535. Puri, R.; and Seidle, J. P., *Measurement of Stress-dependent Permeability in Coal and Its Influence on Coalbed Methane Production.*
536. Pyrak-Nolte, Laura J., *Multiphase Flow in a Structure.*
537. Pyrak-Nolte, Laura J., 1992, *Multiphase Flow Through Cleats in Coal.*
538. Pyrak-Nolte, Laura J., 1993, *Multiphase Flow Through Cleats in Coal.*
539. Pyrak-Nolte, Laura J., 1994, *Multiphase Flow Through Cleats in Coal.*
540. Pyrak-Nolte, Laura J., *Simulation of Three-Dimensional Fracture Network Geometry in Coal.*
541. Questa Engineering Corporation, *The 3M CBM Final Report; Volume I: Analysis and Results and Volume II: The 3M CBM Model Users Guide.*
542. Radlinski, A. P.; and Radlinska, E. Z., *The Microstructure of Pore Space in Coals of Different Rank.*
543. Ramaswamy, G., *Advances Key for Coalbed Methane.*
544. Reeves, S., *Geologic Sequestration of CO<sub>2</sub> in Deep, Unminable Coalbeds: An Integrated Research and Commercial-scale Demonstration Project.*
545. Rice, C. A.; Bartos, T. T.; and Ellis, M. S., *Chemical and Isotopic Composition of Water in the Fort Union and Wasatch Formations of the Powder River Basin, Wyoming and Montana: Implications for Coalbed Methane Development.*
546. Rice, C. A.; Ellis, M. S.; and Bullock, J. H., Jr., *Water Co-Produced with Coalbed Methane in the Powder River Basin, Wyoming: Preliminary Compositional Data.*
547. Rice, Cynthia A.; and Nuccio, Vito, *Water Produced with Coalbed Methane.*
548. Rice, C.A., *Waters Co-Produced with Coalbed Methane from the Ferron Sandstone in East-Central Utah.*

549. Rice, D. D.; Clayton, J. L.; and Pawlewicz, M. J., *Characterization of Coal-Derived Hydrocarbons and Source Rock Potential of Coal Beds, San Juan Basin, New Mexico and Colorado, USA.*
550. Rice, D. D., *Coal-bed Methane as a Source of Hydrocarbon Gas.*
551. Rice, Dudley D.; Law, Ben E.; and Clayton, Jerry L., *Coalbed Gas; An Undeveloped Resource.*
552. Rice, Dudley D.; Wanty, Richard B.; Byrer, Charles W.; and Kruger, Dina W., *Coalbed Methane; From Hazard to Environmental Concern and Untapped Energy Resource.*
553. Rice, D. D.; and Flores, R. M., *Coalbed Methane Potential of Tertiary Coal Beds and Adjacent Sandstone Deposits, Powder River Basin, Wyoming and Montana.*
554. Rice, Dudley D.; and Threlkeld, Charles N., *Comparison of Natural Gases Produced from Upper Cretaceous Fruitland Formation Coal Beds and Adjacent Reservoirs, San Juan Basin, New Mexico and Colorado.*
555. Rice, Dudley D., *Composition and Origins of Coalbed Gas.*
556. Rice, D. D., *Controls of Coalbed Gas Composition.*
557. Rice, Dudley D.; and Flores, Romeo M., *Controls on Bacterial Gas Accumulations in Thick Tertiary Coal Beds and Adjacent Channel Sandstones, Powder River Basin, Wyoming and Montana.*
558. Rice, D. D., *Geologic Framework and Description of Coalbed Gas Plays.*
559. Rice, D. D.; Young, G. B. C.; and Paul, G. W., *Methodology for Assessment of Technically Recoverable Resources of Coalbed Gas.*
560. Rice, Dudley D., *Mineral Resources Potential; Leasable Minerals (Energy Sources); Coalbed Resources.*
561. Rice, Dudley D.; and Flores, Romeo M., *Nature of Natural Gas in Anomalously Thick Coal Beds, Powder River Basin, Wyoming.*
562. Rice, D. D.; Flores, R. M.; and Law, B. E., *Nature and Origin of Lower Tertiary Coalbed Gases, Powder River Basin, Wyoming.*
563. Rice, D. D.; Epsman, M. L.; and Mancini, E. A., *Origin of Conventional and Coalbed Gases in the Black Warrior Region, Alabama.*
564. Rice, D. D.; Clayton, J. L.; Flores, R. M.; Law, B. E.; and Stanton, R. W., *Some Geologic Controls of Coalbed Gas Generation, Accumulation, and Production, Western United States.*



565. Rice, Dudley D.; Charpentier, Ronald R.; Fouch, Thomas D.; Schmoker, James W.; and Attanasi, Emil D., 1995, *Is "Unconventional" Gas a Sustainable Energy Source?*
566. Rice, Dudley, *Coalbed Methane — An Untapped Energy Resource and an Environmental Concern.*
567. Rieke, H. H.; and Kirr, J. N., *Geologic Overview, Coal, and Coalbed Methane Resources of the Arkoma Basin - Arkansas and Oklahoma.*
568. Rieke, H. H., *Arkoma Basin Report; A Study of Pennsylvanian Geology, Coal and Coalbed Methane Resources in Arkansas and Oklahoma.*
569. Rightmire, Craig T.; and Byrer, C. W., *Coal Bed Methane Exploration and Development.*
570. Rightmire, C. T.; and Choat, R., *Coal-bed Methane and Tight Gas Sands Interrelationships.*
571. Rightmire, C. T.; Eddy, G. E.; and Kirr, J. N., *Coalbed Methane Resources of the United States.*
572. Roberts, R. D., *Coalbed Methane Development: A Land Owner's Prospective.*
573. Roberts, S. B.; Clark, A. C.; and Carey, M. A., *Analyses of Seven Core Samples from Two Tertiary Coal Beds in the Sagwon Member of the Sagavanirktok Formation, North Slope, Alaska.*
574. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Ochs, A. M.; Gunther, G. L.; Schuenemeyer, J. H.; and Power, H. C., *Ashland Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
575. Roberts, S. B., (Submitted), *Coal in the Front Range Urban Corridor - An Overview of Coal Geology, Coal Production, and Coal-bed Methane Potential in Selected Areas of the Denver Basin, Colorado, and the Potential Impact of Historic Coal Mining and Development and Land Use Planning.*
576. Roberts, Stephen B.; and Fishman, Neil S., *Coal-bed Methane Potential in the Laramie Formation, Greater Wattenberg Area, Denver Basin, Colorado; Just Wishful Thinking?*
577. Roberts, S. B.; Wilde, Edith M.; Rossi, G. S.; Blake, Dorsey; Bader, L. R.; Ellis, M. S.; Stricker, G. D.; Gunther, G. L.; Ochs, A. M.; Kinney, S. A.; Schuenemeyer, J. H.; and Power, H. C., *Colstrip Coalfield, Powder River Basin, Montana; Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*

578. Roberts, S. B.; Gunther, G. L.; Taber, T. T.; Ochs, A. M.; Blake, Dorsey; Ellis, M. S.; Stricker, G. D.; Wilde, Edith M.; Schuenemeyer, J. H.; and Power, H. C., *Decker Coalfield, Powder River Basin, Montana: Geology, Coal Quality, and Coal Resources, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
579. Roberts, S. B.; and Bossiroy, Dominique, *Stratigraphy and Coal Geology of the Lower Part of the Fort Union Formation in the Grass Creek Coal Mine Area, Southeastern Bighorn Basin, Wyoming*.
580. Roberts, S. B.; and Rossi, G. S., *A Summary of Coal in the Coalmont Formation (Tertiary), North Park Basin, Colorado, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
581. Roberts, S. B.; and Rossi, G. S., *A Summary of Coal in the Fort Union Formation (Tertiary), Bighorn Basin, Wyoming and Montana, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region*.
582. Robinson, B. M.; and Holditch, S. A., *Coal Gas Requires Stimulation*.
583. Rodrigues, C. F.; and Lemos de Sousa, M. J., *The Measurement of Coal Porosity With Different Gases*.
584. Rodvelt, G.; Willis, S.; Mullins, D.; and Toothman, R., *CT Fracturing: Multiple Coals, One Trip*.
585. Rogers, R. E., *Coalbed Methane: Principles and Practice*.
586. Roybal, G. H.; Anderson, O. J.; and Beaumont, E. C., eds., *Coal Deposits and Facies Changes Along the Southwestern Margin of the Late Cretaceous Seaway, West-Central New Mexico*.
587. Rozak, A. T.; and Bustin, R. M., *Measuring Permeability in Coals Utilizing Well Log Data and Log FAC Analysis*.
588. Ruppel, T. C.; Grein, C. T.; and Bienstock, D., *Adsorption of Methane/Ethane Mixtures on Dry Coal at Elevated Pressures*.
589. Saltsman, R.D.; Uhrin, David C.; and du Breuil, F., *Survey of Coal Industry Programs for Utilization of Methane from Coal Seams*.
590. Sanderson, G. A.; and Berggren, L. W., *White Paper: Update on Application of § 29 Tax Credit to Coal Seam Gas*.
591. Sanfilippo, John R.; Barker, Charles E.; Stanton, Ron W.; Warwick, Peter D.; and Morris, Loyd E., *A Shallow Coal-bed Methane Show in the Gulf Coast of Texas, Indication of Down-dip Commercial Potential?*

592. Sato, T., *Methane Recovery from Coalbeds: Surface and Physical Properties of Western United States Coals*.
593. Saulsberry, J. L.; Spafford, S. D.; Steidl, P. F.; Litzinger, L. A.; Durden, A. H.; Rochester, C. L.; Kuuskraa, V. A.; and Young, G. B. C., *Effective Completions for Shallow Coal Seams*.
594. Saulsberry, J. L.; Schraufnagel, R. A.; and Jones, A. H., *Fracture Height Growth and Production from Multiple Reservoirs*.
595. Saulsberry, J. L.; Schafer, P. S.; and Schraufnager, R. A., eds., *A Guide to Coalbed Methane Reservoir Engineering*.
596. Sawyer, W. K.; Saulsberry, J. L.; Schraufnagel, Richard A.; and Paul, G. W., *History Match of a Multi-Seam Coalbed Well in the Black Warrior Basin*.
597. Saxby, J. D.; and Shibaoka, M., *Coal and Coal Macerals as Source Rocks for Oil and Gas*.
598. Schenk, C. J.; Nuccio, V. F.; Flores, R. M.; Johnson, R. C.; Roberts, S. B.; and Collet, T. S., *Coalbed Gas Resources of the Rocky Mountain Region*.
599. Schenker, Jeffrey H., *A Molecular Dynamic Investigation into the Competitive Adsorption of Gas Species on Coal*.
600. Scholes, P. L.; and Johnston, D., *Coalbed Methane Applications of Wireline Logs*.
601. Schraufnagel, Richard A.; McBane, Richard A.; and Kuuskraa, Vello A., *Coalbed Methane Development Faces Technology Gaps*.
602. Schraufnagel, R. A., *Coalbed Methane Production*.
603. Schraufnagel, Richard A.; Saulsberry, J. L.; and Lambert, S. W., *Gas Production from Multiple Wells at Rock Creek*.
604. Schraufnagel, R. A., *Multiple Seam Completion and Production Experience at Rock Creek*.
605. Schroeder, K.; and Ozdemir, E., *Sequestration of Carbon Dioxide in Coal Seams*.
606. Schuenemeyer, J. H.; Flores, R. M.; Stricker, G. D.; Ellis, M. S.; Gunther, G. L.; Taber, T. Y.; and Ochs, A. M., *A Method to Estimate the Uncertainty of Coal Resources*.
607. Schwochow, S. D.; and Stevens, S. H., *Coalbed Methane - State of the Industry*.
608. Scott, Andrew R., *Bacterially Mediated Reactions in Coal Beds*.
609. Scott, A. R., *Coal and Coalbed Methane Resources of Texas*.
610. Scott, A. R., *Composition of Coalbed Gases*.

611. Scott, A. R.; Kaiser, W. R.; and Ayers, W. B., Jr., *Composition, Distribution, and Origin of Fruitland Formation and Pictured Cliffs Sandstone Gases, San Juan Basin, Colorado and New Mexico.*
612. Scott, A. R.; and Tyler, R., *Evaluating Coalbed Methane Potential in Texas.*
613. Scott, Andrew R.; Tyler, Roger; and Clough, James G., *Exploration for Coalbed Methane in Frontier Regions Using Limited Data.*
614. Scott, A. R.; and Kaiser, W. R., *Factors Affecting Gas-content Distribution in Coal Beds: A Review.*
615. Scott, A. R., *Improving Coal Gas Recovery with Microbially Enhanced Coalbed Methane.*
616. Scott, A. R.; Zhou, N.; and Levine, J. R., *A Modified Approach to Estimating Coal and Coal Gas Resources: Examples from the Sand Wash Basin, Colorado.*
617. Scott, Andrew R.; Ambrose, William A., *Thermal Maturity and Coalbed Methane Potential of the Greater Green River, Piceance, Powder River, and Raton Basins.*
618. Scott, A. R., *Thermogenic and Secondary Biogenic Gases, San Juan Basin, Colorado and New Mexico - Implications for Coalbed Gas Producibility.*
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620. Seidle, J. P., *Lessons Learned, Lessons Lost - Review of Selected Coalbed Methane Pilots.*
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624. Shepard, Thomas E.; O'Neil, Patrick E.; Harris, Steven C.; and McGregor Stuart W., *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama.*
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626. Shi, J. Q.; and Durucan, S., *Identifying the Key Factors Controlling Openhole Cavity Completions at the San Juan Basin - A Numerical Study.*
627. Shi, J. Q.; Durucan, S.; and Sinka, I. C., *Key Parameters Controlling Coalbed Methane Cavity Well Performance.*

628. Shirley, K., *Exceptional Economics, Potential Drive Coalbed Methane Plays.*
629. Shirley, K., *Operators Continue to Expand Coalbed Methane's Geographic Diversity.*
630. Siegel, M. M.; James, W. M.; Mason, R. Z.; Gash, B. W.; and Barone, Saverio Peter, *Economic Evaluation of SNG and Methanol Using Underground Coal Gasification.*
631. Simmons, B. F., *Coalbed Methane in Wyoming.*
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633. Smith, D. M.; and Williams, F. L., *Diffusion Models for Gas Production from Coals - Application to Methane Content Determination.*
634. Smith, D. M.; and Williams, F. L., *Diffusion Models for Gas Production from Coals - Determination of Diffusion Parameters.*
635. Smith, D. M.; and Williams, F. L., *Direct Method of Determining the Ethane Content of Coal: A Modification.*
636. Society of Petroleum Engineers, *Coalbed Methane.*
637. Soeder, D. J., *The Effects of Overburden Stress on Coalbed Methane Production.*
638. Sööt, P. M., *Non-conventional Fuel Tax Credit.*
639. Sööt, P. M., *Western United States Coalbed Methane Gas Content Correlations.*
640. Spafford, S. D.; Dobscha, F. X.; Durden, A. H.; Hollub, V. A.; McKinnon, C. L.; Saulsberry, J. L.; Steidl, P. F.; and Stubbs, P. B., *1.1.4 Coalbed Methane Multiple Coal Seam Project 305. Rock Creek Methane from Multiple Coal Seams Completion Project.*
641. Stanton, R.; Flores, R.; Warwick, P. D.; Gluskoter, H.; and Stricker, G. D., *Coal Bed Sequestration of Carbon Dioxide.*
642. Stanton, Ronald C., *Sampling of Coal Beds for Analysis.*
643. Steidl, P. F., *Inspections of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama.*
644. Steidl, P. F., *Observations of Induced Fractures Intercepted by Mining in the Warrior Basin, Alabama. Rock Creek Methane from Multiple Coal Seams Completion Project.*
645. Stevens, S. H.; Spector, D.; and Reimer, P., *Enhanced Coalbed Methane Recovery Using CO<sub>2</sub> Injection: Worldwide Resource and CO<sub>2</sub> Sequestration Potential.*

646. Stevens, S.H.; Lombardi, T.E.; Kelso, B.S.; and Coates, J.M., *Geologic Assessment of Natural Gas from Coal Seams in the Raton and Vermejo Formation, Raton Basin.*
647. Stevens, S. H.; Kelso, B. S.; Lombardi, T. E.; and Coates, J. M., *Raton Basin Assessment of Coalbed Methane Resources.*
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650. Stoeckinger, W. T., *Kansas Coalbed Methane Comes on Stream.*
651. Stoeckinger, W. T., *Methods to Measure Directly the Gas Content of Coals.*
652. Stricker, G. D., *Coal Occurrences, Quality, and Resource Assessment, National Petroleum Reserve in Alaska, U.S. Geological Survey Polar Research Symposium; Abstracts with Program.*
653. Stricker, G. D.; and Ellis, M. S., *Coal Quality and Geochemistry, Greater Green River Basin, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
654. Stricker, G. D.; and Ellis, M. S., *Coal Quality and Geochemistry, Hanna and Carbon Basins, Wyoming, 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region.*
655. Stricker, G. D.; Flores, R. M.; and McGarry, D. E., *Coalbed Methane Studies on Federal Lands in the Powder River Basin and Other Areas in Wyoming.*
656. Stricker, Gary D.; and Ellis, Margaret S., *Laramide Tectonism and Paleogeography; Their Effects on Quality and Hazardous Air Pollutant Trace Element Trends in Rocky Mountain Province Paleocene Coals.*
657. Stricker, G. D.; and Flores, R. M., *Powder River Basin and Williston Basin Coal Resource Assessment and Their Relationship to Coalbed Methane Potential.*
658. Stuhec, S., *Introduction to Coal Sampling Techniques for the Petroleum Industry.*
659. Su, X; Feng, Y.; Chen, J.; and Pan, J., *The Annealing Mechanisms of Cleats in Coal.*
660. Svenster, P. G., *Diffusion of Gases Through Coal.*
661. Swinchatt, J. P., *The Future of Energy Gases.*
662. TRW, *Methane Produced from Coalbeds, Systems Studies of Energy Conservation.*
663. Takahashi, K. I., *U. S. Geological Survey Coalbed Methane Field Conference.*

664. Tang, Y.; Jenden, P. D.; Nigrini, A.; and Teerman, S. C., *Modeling Early Methane Generation in Coal*.
665. Telle, W. R.; Thompson, D. A.; Lottman, L. K.; and Malone, P. G., *Preliminary Burial - Thermal History Investigations of the Black Warrior Basin: Implications for Coalbed Methane and Conventional Hydrocarbon Development*.
666. Tewalt, S. J.; and Halili, N. E., *Arsenic in the Coal Beds and Surface Waters of the Warrior Basin, Western Alabama*.
667. Thimons, B.; and Kissell, F. N., *Diffusion of Methane Through Coal*.
668. Ting, F. T. C.; and Wang, P. B., *Coal Anisotropism and Its Relationship to Methane Concentration in Coal*.
669. Ting, F. T. C., *Original Anisotropism and Its Relationship with Some Physical and Chemical Properties of Coal*.
670. Tremain, Carol M.; and Toomey, James, *Coal Bed Methane Desorption Data*.
671. Tremain, C. M.; Laubach, S. E.; and Whitehead, N. H., III, *Coal Fracture (Cleat) Patterns in Upper Cretaceous Fruitland Formation Coal Seams, San Juan Basin*.
672. Tremain, C. M.; Laubach, S. E.; and Whitehead, N. H., III, *Coal Fracture (Cleat) Patterns in Upper Cretaceous Fruitland Formation, San Juan Basin, Colorado and New Mexico - Implications for Coalbed Methane Exploration and Development*.
673. Tremain, C. M., *Coalbed Methane Development in Colorado, September 1990*.
674. Tremain, C. M., *The Coalbed Methane Potential of the Raton Basin, Colorado*.
675. Trent, Virgil, A., *Summary of Results of the Coal Resource Occurrence and Coal Development Potential Mapping Program in Part of the Powder River Basin, Montana and Wyoming*.
676. Tyler, Noel, director, *Development and Evaluation of a Basin-Scale Coalbed Methane Producibility Model*.
677. Tyler, R.; Scott, A. R.; Kaiser, W. R.; and McMurray, R. G., *The Application of a Coalbed Methane Producibility Model in Defining Coalbed Methane Exploration Fairways and Sweet Spots: Examples from the San Juan, Sand Wash, and Piceance Basins*.
678. Tyler, Roger; Ambrose, W.A.; Scott, A.R.; and Kaiser, W.R., *Coalbed Methane Potential of the Greater Green River, Piceance, Powder River, and Raton Basins*.
679. Tyler, R.; Scott, A. R., *Defining Coalbed Gas Exploration Fairways in Low Permeability, Hydrocarbon Overpressured Basins: An Example from the Piceance Basin, Northwest Colorado*.

680. Tyler, R.; Scott, A. R.; and Kaiser, W. R., *Defining Coalbed Methane Exploration Fairways: An Example from the Piceance Basin, Rocky Mountain Foreland, Western United States.*
681. Tyler, Roger; Laubach, S. E.; Ambrose, W. A.; Grout, M. A.; and Tremain, C. M., *Face-Cleat Patterns in Rocky Mountain Foreland Basins, Western United States; Permeability Indicators for Coalbed Methane.*
682. Tyler, Roger; Kaiser, William R.; McMurry, Ronald G.; Nance, H. Seay; Scott, Andrew R.; and Zhou, Naijiang, *Geologic Characterization and Coalbed Methane Occurrence: Williams Fork Formation, Piceance Basin, Northwest Colorado.*
683. Tyler, R.; Kaiser, W. R.; Scott, A. R.; Hamilton, D. S.; and Ambrose, W. A., *Geologic and Hydrologic Assessment of Natural Gas from Coal: Greater Green River, Piceance, Powder River, and Raton Basins, Western United States.*
684. Tyler, Roger; Kaiser, William R.; Scott, Andrew R.; Hamilton, Douglas S.; McMurry, Ronald G.; and Zhou, Naijiang, *Geologic and Hydrologic Assessment of Natural Gas from Coal Seams in the Mesaverde Group and Fort Union Formation, Greater Green River Basin, Wyoming and Colorado.*
685. Tyler, Roger; Scott, Andrew R.; Kaiser, William R.; Nance, H. Seay; McMurry, Ronald G.; Tremain Carol M.; and Mavor, Matt J., *Geologic and Hydrologic Controls Critical to Coalbed Methane Producibility and Resource Assessment: Williams Fork Formation, Piceance Basin, Colorado.*
686. Tyler, R.; Kaiser, W. R.; Scott, A. R.; and Hamilton, D. S., *The Potential for Coalbed Gas Exploration and Production in the Greater Green River Basin, Southwest Wyoming and Northwest Colorado.*
687. United States Geological Survey, Central Region Energy Resources Team, *Coalbed Methane Project.*
688. United States Geological Survey, *1995 National Assessment of United States Oil and Gas Resources.*
689. United States Geological Survey, Central Region Energy Resources Team, *Preliminary Gulf Coast Coalbed Methane Exploration Maps: Depths to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance.*
690. Van Bergen, F.; Pagnier, H. J. M.; Schreurs, H. C. E.; Paaij, A. P. C.; Hamelinck, C. N.; Wolf, H. A. A.; Barzandji, O. H.; Jansen, D.; and Ruijg, G. J., *Inventory of the Potential for Enhanced Coalbed Methane Production With Carbon Dioxide Disposal in the Netherlands.*
691. Van Loenen, Richard E.; and Gibbons, Anthony B., *Assessment of Undiscovered Resources of Coalbed Methane in Nine Wyoming BLM Wilderness Study Areas.*
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693. Van Voast, W. A., *Hydrogeologic Aspects of Coal-bed Methane Occurrence, Powder River Basin.*
694. Vessey, S. J.; and Bustin, R. M., *Coalbed Methane Characteristics of the Mist Mountain Formation, Southern Canadian Cordillera: Effect of Shearing and Oxidation.*
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696. Von Schonfeldt, H., *Methane Drainage in Advance of Mining Through Horizontal Boreholes.*
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700. Warwick, P. D.; SanFilipo, J. R.; Barker, Charles E.; and Morris, L. E., *Coal-bed Methane in the Gulf Coastal Plain; A New Frontier?*
701. Warwick, P. D.; Barker, C. E.; SanFilipo, J. R.; and Biewick, L. R. H., *Preliminary Evaluation of the Coalbed Methane Resources of the Gulf Coastal Plain.*
702. Warwick, P. D.; Barker, C. E.; SanFilipo, J. R., *Preliminary Evaluation of the Coalbed Methane Potential of the Gulf Coastal Plain, USA and Mexico.*
703. Warwick, Peter D.; Barker, C. E.; SanFilipo, John R.; and Morris, L. E., *Preliminary Results from Coal-bed Methane Drilling in Panola County, Texas.*
704. Weaver, J. N.; Gruber, J. R., Jr., *Coal and Coal Bed Methane Resources of the Absaroka - Beartooth Study Area.*
705. Weishauptove, Z.; Medek, J.; and Nmec, J, *Decrease of Desorption Intensity of Coalbed Methane Due to Hydraulic Fracturing.*
706. Westinghouse Electric Company, *Coalbed Methane Extraction and Utilization.*
707. Westman, Glenn H.; and Parish, Lovell M., *The Coal Bed Methane Potential of the Sand Wash Basin, Green River Coal Region, Colorado.*
708. Wheat, R. W., *Coalbed Methane Potential, Core and Pilot Program, Illinois Basin.*
709. Wheaton, J. R.; and Lovelace, B. K., *Hydrologic Issues Associated with Coal-Bed Methane Development in Montana.*

710. Wicks, D. E.; and Zuber, M. D., *A Strategy for Coalbed Methane Production Development, Part II.*
711. Wieczner, Bilha; and Irvin, Marcia, *Coalbed Methane Development in Alabama: A Bibliography.*
712. Williams, Peggy, *Coalbed Methane.*
713. Willis, C., *Rocky Mountain Coal Seams Call for Special Drilling Techniques.*
714. Winston, R. B., *Preliminary Report on Coal Quality Trends in Upper Pottsville Formation Coal Groups and Their Relationships to Coal Resource Development, Coalbed Methane Occurrence, and Geologic History in the Warrior Coal Basin, Alabama.*
715. Wolf, K.; Ephraim, R.; Bertheux, W.; and Bruining, J., *Coal Cleat Classification and Permeability Estimation by Image Analysis on Cores and Drilling Cuttings.*
716. Wong, S.; MacLeod, K.; Wold, M.; Gunter, W. D.; Mavor, M. J.; and Gale, J., *CO<sub>2</sub> - Enhanced Coalbed Methane Recovery Demonstrations Pilot - A Case for Australia.*
717. Wray, L. L.; and Koenig, N. V., *The Coalbed Methane Potential in the Upper Cretaceous to Early Tertiary Laramie and Denver Formations, Denver Basin, Colorado.*
718. Wray, Laura L., *Geologic Mapping and Subsurface Well Log Correlations of the Late Cretaceous Fruitland Formation Coal Beds and Carbonaceous Shales – The Stratigraphic Mapping Component of the 3M Project, San Juan Basin, La Plata County, Colorado.*
719. Wyman, R. E., *Gas Resources in Elsworth Coal Seams.*
720. Wyoming Oil & Gas Conservation Commission, *Coal Bed Methane Wells.*
721. Wyoming State Geological Survey, 1998, *Coalbed Methane Map.*
722. Wyoming State Geological Survey, 1999, *Coalbed Methane Map.*
723. Wyoming State Geological Survey, 2000, *Coalbed Methane Map.*
724. Wyoming State Geological Survey, *Stream Classification and Drainage Systems Map of the North-east Wyoming Coal Bed Methane Development.*
725. Yee, D.; and Hanson, W. B., *Gas Sorption on Coal and Measurement of Gas Content.*
726. Young, G. B. C., *Computer Modeling and Simulation of Coalbed Methane Resources.*
727. Zabetakis, M. G.; et al, *Methane Emission in Coal Mines: Effects of Oil and Gas Wells.*
728. Zebrowitz, M. J.; Kelafant, J. R.; and Boyer, C. M., *Reservoir Characteristics and Production of the Coal Seams in Northern and Central Appalachian Basins.*

729. Zuber, M. D.; and Hopkins, C., *Coalbed Methane Engineering Methods*.
730. Zuber, M. D.; and Boyer, C. M., *Coalbed-Methane Evaluation Techniques - The Current State of the Art*.
731. Zuber, M. D.; and Boyer, C. M., *Comparative Analysis of Coalbed Methane Production Trends and Variability - Impact on Exploration and Production, from the proceedings of the International Coalbed Methane Symposium*.
732. Zuber, M. D.; Boyer, C. M.; Schraufnagel, Richard A.; and Saulsberry, J., *Insights and Analysis from the Rock Creek Project: A Reservoir Engineering Approach*.
733. Zuber, M. D.; Kuuskraa, V. A.; and Sawyer, S. K., *Optimizing Well Spacing and Hydraulic-Fracture Design for Economic Recovery of Coalbed Methane*.
734. Zuber, M. D., *Production Characteristics and Reservoir Analysis of Coalbed Methane Reservoirs*.
735. Zuber, M. D., *The Use of Monte Carlo Analysis to Evaluate Prospective Coalbed Methane Properties*.

## V WATER

*Contains listings that discuss groundwater, produced water and seawater. NOTE: Works that discuss hydraulic fracturing can be found in Index IV. Citations appear alphabetically by author/editor and include the title of the work. Refer to the bibliography for more information on the publication.*

1. Anna, L. O., *Groundwater Flow Associated With Coalbed Gas Production, Ferron Sandstone, East-Central Utah.*
2. Anna, Lawrence O., *Numerical Simulation of Water Flow in Ferron Sandstone Coalbeds, Central Utah.*
3. Anna, L. O.; Faunt, C. C.; D'Agnesse, F. A.; and Henry, M. E., *Three Dimensional Groundwater Flow Modeling of the Ferron Sandstone, Central Utah.*
4. Applied Hydrology Associates, Inc., *3M Project San Juan Basin, Colorado and New Mexico; Hydrology Modeling Report.*
5. Barker, J. F.; and Fritz, P., *The Occurrence and Origin of Methane in Some Groundwater Flow Systems.*
6. Beavers, W. M.; Graves, Stanley L.; and Hollingsworth, F. C., *Field Evaluations of Gas Lift and Progressive Cavity Pumps as Effective Dewatering Methods for Coalbed Methane Wells.*
7. Beckstrom, J. A.; and Boyer, D. G., *Aquifer Protection Considerations of Coalbed Methane Development in the San Juan Basin.*
8. Bennion, D. B.; Thomas, G. B.; Imer, D.; Ma, T.; and Schulmeister, B., *Water Quality Considerations that Result in Impaired Well Injectivity of Water Injection and Disposal Wells.*
9. Case, James C.; Edgar, Thomas V.; and De Bruin, Rodney H., *Subsidence Potential Related to Water Withdrawal in the Powder River Basin.*
10. Colorado Oil and Gas Conservation Commission, *Summary Report of Bradenhead Testing, Gas Well Remediation, and Ground Water Investigations; San Juan Basin, La Plata County, Colorado.*
11. Cox, D. O.; Decker, A. D.; and Stevens, S. H., *Analysis of Fruitland Water Production, Treatment and Disposal, San Juan Basin.*
12. Cox, D. O.; Stevens, S. H.; Hill, D. G.; and McBane, R. A., *Water Disposal from Coalbed Methane Wells in the San Juan Basin.*
13. Cox, D. O.; and Young, G. B. C., *Well Testing in Coalbed Methane (CBM) Wells: An Environmental Remediation Case History.*

14. Dabbous, M. K.; Reznik, A. A.; Taber, J. J.; and Fulton, P. F., *The Permeability of Coal to Gas and Water*.
15. Daly, Daniel J.; Stoa, Rodney S.; Bassingthwaite, Scott A.; Sorenson, James A.; Charlton, David S.; Mesing, George; and Evans, James M., *Gas Industry-Related Exploration and Production Waste "Demographics" Utilizing GIS*.
16. Daly, D. J.; and Mesing, G., *Gas Industry-Related Produced-Water Demographics*.
17. Davis, Hal A., *Coalbed Methane Produced Water Management Guide. Treatment and Discharge to Surface Water: Black Warrior Basin, Alabama*.
18. Drottar, K. R.; Mount, D. R.; and Patti, S. J., *Biomonitoring of Coalbed Methane Produced Water from the Cedar Cove Degasification Field, Alabama*.
19. Edgar, Thomas V.; and Case, James C., *Preliminary Hazards Report PHR 00-1; Pumping Induced Settlement of Aquifers*.
20. Fillo, John P.; Hamaker, T.; and O'Neil, Patrick E., *Coalbed Methane Development in Alabama: Biototoxicity of Produced Water Originating from Coalbed Degasification Wells in the Cedar Cove Field. A Proposed Study Plan*.
21. Finch, Steven T., Jr., *Fracture and Methane-Contamination Study: Animas River Valley From Bondad, Colorado to Cedar Hill, New Mexico*.
22. Fischer, Dennis D., *Estimated Groundwater Restoration Costs Associated with Commercial Underground Coal Gasification Operations*.
23. Gas Research Institute, *Disposal Technology for Water Produced from Coalbed Methane Wells*.
24. Gas Research Institute, *Improved Coal Seam Reservoir Gas-In-Place Analysis Protocol*.
25. Gorody, Anthony, *Using Temporal Changes in Produced Water Geochemistry as a Guide to Assess Reservoir Compartmentation in Coal Bed Methane Reservoirs*.
26. Grossman, E. L.; Coffman, B. K.; Fritz, S. J.; and Wada, H., *Bacterial Production of Methane and Its Influence on Ground-Water Chemistry in East Central Texas Aquifers*.
27. Gulley, David D.; Mount, David R.; Hockett, James R.; and Bergman, Harold L., *Statistical Model to Predict Toxicity of Saline Produced Waters to Freshwater Organisms*.
28. Harrison, S. M.; Molson, J. W.; Abercrombie, H. J.; Barker, J. F.; Rudolph, D.; and Aravena, R., *Hydrogeology of a Coal-Seam Gas Exploration Area, Southeastern British Columbia: Part I. Groundwater Flow Systems*.
29. Hildebrand, Ricky T., *Ground-water Composition as an Indicator of Sodium Content in Coal in the Powder River Basin, Southeastern Montana and Northeastern Wyoming*.

30. Kaszuba, J. P.; and Buys, M. W., *Reclamation Procedures for Produced Water Spills from Coalbed Methane Wells, San Juan Basin, Colorado and New Mexico.*
31. Larson, L. R., *Coal-Spoil and Ground-Water Chemical Data from Two Coal Mines; Hanna Basin and Powder River Basin, Wyoming.*
32. Larson, L. R.; and Daddow, Richard L., *Ground-Water-Quality Data from the Powder River Basin, Northeastern Wyoming.*
33. Larson, L. R., *Ground-Water Quality in Wyoming.*
34. Law, B. E.; Hatch, J. R.; Kukal, G. C.; and Keighin, C. W., *Geologic Implications of Coal Dewatering.*
35. Law, B. E.; Hatch, J. R.; Kukal, G. C.; and Keighin, C. William, *Geologic Implications of Dewatering of Coal and Other Carbonaceous Lithologies; A Hypothesis, AAPG Annual Convention with Divisions SEPM/EMD/DPA.*
36. Lawrence, A. W., *Coalbed Methane Produced-water Treatment and Disposal Options.*
37. Lee-Ryan, P. B.; Fillo, John P.; Tallon, James T.; and Evans, James M., *Evaluation of Management Options for Coalbed Methane Produced Water.*
38. Lico, M. S.; Kharaka, Y. K.; Carothers, W. W.; and Wright, V. A., *Methods for Collection and Analysis of Geopressured Geothermal and Oil Field Waters.*
39. Linz, David G.; Simpson, T. E.; Lawrence, Alonzo W.; Miller, Jeffrey A.; and Davis, Hal A., *Coalbed Methane Produced Water Management Strategies in the Black Warrior Basin of Alabama.*
40. Lorensen, T. D.; Kvenvolden, K. A.; Barnes, P. W.; Poppe, B. N.; Sansone, F. J.; Rust, T. M.; Lilley, M. D.; and Olson, E. J., *Isotopic Composition of Methane in Seawater of the Alaska Beaufort Sea.*
41. McGinnis, Norman F., *Dewatering Systems and Techniques for Coalbed Methane Wells: Volume I.*
42. McGinnis, Norman F., *Dewatering Systems and Techniques for Coalbed Methane Wells: Volume II.*
43. Mead, S. W.; Wang, F. T.; Ganow, H. C.; Stuermer, D. H., and Stone, R., *Ground-water Effects of Underground Coal Gasification Experiments in Northeastern Wyoming.*
44. Mead, S. W.; Wang, F. T.; Stuermer, D. H.; Raber, E.; Ganow, H. C.; and Stone, R., *Implications of Ground-water Measurements at the Hoe Creek UCG Site in Northeastern Wyoming*
45. Meyer, J., *Coal Bed Methane Produced Water-Infiltration/Evapotranspiration, Belle Fourche River Basin, 1993-1999.*

46. Mitcham, S. A.; and Wobeser, G., *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama.*
47. Mount, David R.; and Gulley, David D., *Development of a Salinity/Toxicity Relationship to Predict Acute Toxicity of Saline Waters to Fresh Water Organisms.*
48. Mount, David R.; O’Neil, Patrick E.; and Evans, James M., *Discharge of Coalbed Produced Water to Surface Waters – Assessing, Predicting, and Preventing Ecological Effects.*
49. Mount, David R.; Gulley, David D.; and Evans, James M., *Salinity/Toxicity Relationships to Predict the Acute Toxicity of Produced Waters to Freshwater Organisms.*
50. Mount, David R.; Drottar, Kurt R.; Gulley, David D.; Frillo, John P.; and O’Neil, Patrick E., *Use of Laboratory Toxicity Data for Evaluating the Environmental Acceptability of Produced Water Discharge to Surface Waters.*
51. O’Neil, Patrick E.; Harris, Steven C.; Mettee, Maurice F.; Isaacson, H. Ronald; and Evans, James M., *Biological Fate and Effect of Coalbed Methane Produced Waters Discharged into Streams of the Warrior Basin, Alabama.*
52. O’Neil, P. E.; Harris, S. C.; Drottar, K. R.; Mount, D. R.; Fillo, J. P.; and Mettee, M. F., *Biomonitoring of a Produced Water Discharge from the Cedar Cove Degasification Field, Alabama.*
53. O’Neil, Patrick E.; Mettee, Maurice F.; and Harris, Steven C., *Coalbed Methane Development in Alabama: Biological and Hydrological Conditions of Streams Draining the Cedar Cove Degasification Field.*
54. O’Neil, P. E.; and Harris, S. C., *Development of an Instream Bioassessment Methodology for the Surface Disposal of Coalbed Methane Produced Waters.*
55. O’Neil, Patrick E.; Harris, Steven C.; Mettee, Maurice F.; McGregor, Stuart W.; and Shepard, Thomas E., *Long-Term Biomonitoring of a Produced Water Discharge from the Cedar Cove Degasification Field, Alabama.*
56. O’Neil, Patrick E., *A Review of Water-Quality, Biological Risk, and Discharge Monitoring Studies Relative to the Surface Disposal of Produced Waters from the Development of Coal-Seam Methane in Alabama.*
57. O’Neil, P. E.; Harris, S. C.; and Mettee, M. F., *Stream Monitoring of Coalbed Methane Produced Water from the Cedar Cove Degasification Field, Alabama.*
58. O’Neil, Patrick E.; Isaacson, H. Ronald; and Evans, James M., *Surface Discharge of Coalbed Methane Produced Waters in the Warrior Basin of Alabama, The Cedar Cove Model.*
59. Ortiz, Isais; Weller, T. F.; Anthony, R. V.; Frank, James; Linz, David G.; and Nakles, David V., *Disposal of Produced Waters: Underground Injection Option in the Black Warrior Basin.*

60. Pillard, David, *Predicting the Toxicity of Common Ions Found in Produced Waters*.
61. Ray, James P.; and Engelhardt, F. Rainer, *Produced Water Technology*.
62. Rice, C. A.; Ellis, M. S.; and Bullock, J. H., Jr., *Water Co-Produced with Coalbed Methane in the Powder River Basin, Wyoming: Preliminary Compositional Data*.
63. Rice, Cynthia A.; and Nuccio, Vito, *Water Produced with Coalbed Methane*.
64. Rice, C.A., *Waters Co-Produced with Coalbed Methane from the Ferron Sandstone in East-Central Utah*.
65. Rice, D. D.; and Threlkeld, C. N., *Occurrences and Origin of Natural Gas in Ground Water, Southern Weld County, Colorado*.
66. Schwochow, S. D.; and Stevens, S. H., *Coal-seam Water: Production, Treatment, and Disposal*.
67. Scott, A. R.; Nance, H. S.; and Beltran, M. Z., *Heterogeneity of Water and Coal Gas Production in the Northern San Juan Basin, Colorado and New Mexico*.
68. Shepard, Thomas E.; O'Neil, Patrick E.; Harris, Steven C.; and McGregor Stuart W., *Effects of Coalbed Methane Development on the Water-Quality and Fish and Benthic Invertebrate Communities of the Big Sandy Creek Drainage System, Alabama*.
69. Simmons, B. F., *Treatment and Disposal of Wastewaters Produced with Coalbed Methane by Reverse Osmosis*.
70. Tewalt, S. J.; and Halili, N. E., *Arsenic in the Coal Beds and Surface Waters of the Warrior Basin, Western Alabama*.
71. Tietge, Joseph E.; Mount, David R.; and Gulley, David D., *GRI Freshwater STR Model and Computer Program: Overview, Validation, and Application*.
72. Viel, John A., *Regulatory Issues Affecting Management of Produced Water From Coal Bed Methane Wells*.
73. Wanty, Richard B.; Folger, Peter F.; and Briggs, Paul H., *Ground-water Chemistry of the Coal-Bearing Upper Cretaceous Mesaverde Formation, Wind River Reservation, Wyoming*.
74. Wanty, Richard B., *USGS Research on Saline Waters Co-Produced With Energy Resources*.
75. Wyoming Department of Environmental Quality, Water Quality Division, *Antidegradation Review, Analysis and Findings: Concentrations of Barium in the Surface Waters in Northeastern Wyoming Related to Discharges of Coal Bed Methane Produced Water*.



76. Wyoming Water Resources Center, University of Wyoming, *A Study of Techniques to Assess Surface and Groundwater Impacts Associated with Coal Bed Methane and Surface Coal Mining: Little Thunder Creek Drainage, Wyoming.*

## **About the INTERSTATE OIL and GAS COMPACT COMMISSION**

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The organization's mission is to promote the conservation and efficient recovery of domestic oil and natural gas resources, while protecting health, safety and the environment.

Since its creation in 1935, the IOGCC has assisted states in balancing a multitude of interests — maximizing domestic oil and natural gas production, minimizing the waste of irreplaceable natural resources, and protecting human and environmental health — through sound regulatory practices. The IOGCC plays an active role in Washington, D.C., serving as the voice of the states on oil and natural gas issues and advocating states' rights to govern the resources found within their borders.

For more information about the IOGCC, please call 405/525-3556, visit the World Wide Web at [www.iogcc.state.ok.us](http://www.iogcc.state.ok.us), or send electronic mail to [iogcc@iogcc.state.ok.us](mailto:iogcc@iogcc.state.ok.us)

### **Member States**

Alabama (1945)  
Alaska (1957)  
Arizona (1955)  
Arkansas (1941)  
California (1974)  
Colorado (1935)  
Florida (1945)  
Illinois (1935)  
Indiana (1947)  
Kansas (1935)  
Kentucky (1942)  
Louisiana (1941)  
Maryland (1959)  
Michigan (1939)  
Mississippi (1948)  
Montana (1945)  
Nebraska (1953)  
Nevada (1955)  
New Mexico (1935)  
New York (1941)  
North Dakota (1953)  
Ohio (1943)  
Oklahoma (1935)  
Pennsylvania (1941)  
South Dakota (1955)  
Texas (1935)  
Utah (1957)  
Virginia (1982)  
West Virginia (1945)  
Wyoming (1955)

### **Associate States**

Georgia (1946)  
Idaho (1960)  
Missouri (1995)  
North Carolina (1971)  
Oregon (1954)  
South Carolina (1972)  
Washington (1967)

### **International Affiliates**

Alberta (1996)  
Egypt (1999)  
Republic of Georgia (2001)  
Newfoundland and Labrador (1997)  
Nova Scotia (1997)  
Venezuela (1997)



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