Coalbed-methane activity in Oklahoma, 2004 update

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Oklahoma Geological Survey

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2,747 CBM Completions in Oklahoma

Year

- 1988: 0 wells
- 1990: 0 wells
- 1992: 2 wells
- 1994: 7 wells
- 1996: 15 wells
- 1998: 25 wells
- 2000: 43 wells
- 2002: 56 wells

Northeast Oklahoma Shelf
Arkoma Basin

391 wells in 2003
Oklahoma
CBM fields

Modified from OGS
Map GM-36
OKLAHOMA COAL RANK
Generalized for all coals, at or near the surface

Modified from Cardott, 2002

Medium Volatile Bituminous at 2,564 feet deep

High-volatile bituminous

Medium-volatile bituminous

Low-volatile bituminous

0 50 Miles

0 80 Kilometers

Modified from Cardott, 2002
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Coal and Coalbed Methane

Coal is an organic-rich rock derived from plant material deposited in a swamp, marsh, or bog. Coal varies by grade (percentage of mineral impurities), type (organic composition), and rank (level of carbonization). Rank describes the transformation from peat (unconsolidated plant remains) through lignite, subbituminous, bituminous, semianthracite, and anthracite coal (rock) from increasing burial pressure, temperature, and time.

The coalfield in eastern Oklahoma is divided into the northeast Oklahoma shelf and the Arkoma Basin based on physiographic and structural differences. The commercial coal belt contains coal beds >= 10 in. thick that are mineable by surface methods at depths < 100 ft and coal beds >= 14 in. thick that are mineable by underground methods. The noncommercial coal-bearing region has limited information on coal thickness and quality or contains coals that are too thin, of low quality, or too deep for surface mining.

The age of commercial coal-bearing strata in the Oklahoma coalfield is Desmoinesian (Middle Pennsylvanian). Generalized stratigraphic columns of the northeast Oklahoma shelf and Arkoma Basin show about 40 named and several unnamed coal beds and their range in thickness measured from outcrops, mines, and shallow core samples.

Coal rank, generalized for all coals at or near the surface, ranges from high-volatile bituminous in the northeast Oklahoma shelf and western Arkoma Basin to medium-volatile bituminous and low-volatile bituminous in the eastern Arkoma Basin in Oklahoma. Rank increases from west to east and with depth in the Arkoma Basin, attaining semianthracite in Arkansas.

Remaining identified bituminous coal resources in beds = 10 in. thick total 8.09 billion short tons (1 short ton equals 2,000 pounds) in 19 counties in eastern Oklahoma, an area of approximately 8,000 square miles. About 1.6 billion short tons of bituminous coal reserves (the economically recoverable part of coal resources) remain in Oklahoma. Oklahoma ranks 19th of 32 coal-bearing states in the U.S. based on coal reserves. From 1873-2001, 281 million short tons of bituminous coal were produced from underground and surface mines in the Indian Territory and Oklahoma. Peak annual coal production was 5.73 million short tons in 1981, with smaller production peaks during and immediately following World War I and World War II.

There are many uses for coal, primarily in combustion (generation of electricity), carbonization (coke used to make steel), conversion (gasification and liquefaction), and industrial (process heat). Coal is used in Oklahoma in electric power plants and lime and cement kilns. (OGS Information Series 9). Coal generates and stores large quantities of natural gas (methane). Coalbed methane activity in Oklahoma is in the northeast Oklahoma shelf and Arkoma Basin.

Selected Reports and Maps
Coal Reports and Maps
OGS Coalbed Methane Reports [pdf - 65 KB]

References
Bibliography of Oklahoma Coal Mine Disasters [pdf - 45kB]
Bibliography of Oklahoma Coal Mining [pdf - 51KB]
Bibliography of Oklahoma Coal [pdf - 153KB]
Bibliography of Oklahoma Coalbed Methane [pdf - KB]
Bibliography of Oklahoma Paleobotany [pdf - 70KB]
Bibliography of Oklahoma Paleontology [pdf - 78KB]
Bibliography of Oklahoma Underground Coal Mines [pdf - 50KB]
Bibliography of Oklahoma Coal Structure Maps [pdf - 55KB]

Links
Coal and Coalbed Methane links
Oklahoma Coal Database
Coal Database
Coal Flyer
Coal Maps
OK Coalfield – Map of Oklahoma coalfield
Example of Searchable Coal Database on OGS Web Site

Oklahoma Coal Database

Coalbed-Methane Completions and Coal Production Tables

Search Oklahoma Coalbed-Methane Completions Table

- Search by County:
- Search by Coal Bed:
- Search by Operator:
- Search by Production:
- Search by Depth Range:

RUN SEARCH

The Oklahoma Coal Database was developed by the Oklahoma Geological Survey as part of the National Coal Resources Data System (NCRDS). The NCRDS is a cooperative program of the U.S. Geological Survey and state geological surveys of coal-producing states. The database includes tables on stratigraphy, analyses, production, and coalbed-methane completions.

The coalbed-methane completions database, from which the version on this site was adapted, is available from the Oklahoma Geological Survey for $17 as a digital version in
Example of Database Search on OGS Web Site

Oklahoma Coal Database
Data Last Updated: Friday, Dec. 19, 2003

County: Craig
Coal Bed: Weir-Pittsburg
T29N R18E SEC29 NW/4 of SE/4 of SW/4
Latitude: 36.959938 Longitude: -95.384149 map topo satellite
Operator: STP Incorporated Completion: 2002-02-06
Well Name: 2-29 Kirkpatrick
Initial Depth Range (ft): 0433-0436 Initial Gas Rate (MCFD): 278
Produced Water (BWPD): 0
Comments: CBM

County: Haskell
Coal Bed: Hartshorne
T7N R20E SEC8 SH/4 of SE/4 of NE/4
Latitude: 35.094608 Longitude: 95.211169 map topo satellite
Operator: HS Resources Completion: 1997-11-07
Well Name: 5 Mathews
Initial Depth Range (ft): 1225-1231 Initial Gas Rate (MCFD): 274
Produced Water (BWPD): 0
Example of CBM Well Spot on Topographic Map from Database Search on OGS Web Site
Mulky: 256-1,732 ft
Rowe: 542-2,459 ft
Riverton: 630-1,970 ft

Range = 256-2,459 ft
Average = 1,046 ft
Number of wells = 1,565

Northeast Oklahoma Shelf
Northeast Oklahoma Shelf

Range = 0-359 Mcfd
Average = 31 Mcfd
Number of Wells = 1,391
258 ft commingled

379 ft single bed

1,661 ft

Northeast Oklahoma Shelf

18 of 75 wells > 100 Mcfd were commingled
Mulky Coal

498 Mulky CBM wells

15%
Weir-Pittsburg Coal

Highest IP from single coal on shelf 278 Mcfd

Weir-Pittsburg >100 Mcfd
Weir-Pittsburg > 50 Mcfd
Weir-Pittsburg CBM

19%

109 Weir-Pittsburg CBM wells

Weir-Pittsburg Coal

Highest IP from single coal on shelf 278 Mcfd

Weir-Pittsburg >100 Mcfd
Weir-Pittsburg > 50 Mcfd
Weir-Pittsburg CBM

19%

109 Weir-Pittsburg CBM wells
Rowe Coal

Deepest CBM completion on shelf 2,459 ft

534 Rowe CBM wells

Rowe >100 Mcfd
Rowe >50 Mcfd
Rowe

22%
Northeast Oklahoma Shelf

Range = 0-5,061 bwpd
Average = 68 bwpd
Number of Wells = 1,408

(excluding two wells with 1,201 & 5,061 bwpd)
Water Quality

Water samples from the Mulky and Rowe coals in 4 wells in Nowata and Osage Counties had 86,200–152,900 mg/L Total Dissolved Solids (TDS)

[Underground Sources of Drinking Water (USDW) contain <10,000 mg/L TDS; seawater is @35,000 mg/L TDS]
Northeast Oklahoma Shelf Annual CBM Production

- Annual CBM Production
- Total Cumulative

Gas production data supplied by Petroleum Information/Dwights LLC dba IHS Energy Group © 2004
Arkoma Basin

Range = 284-4,397 ft
Average = 1,529 ft
Number of Wells = 1,058
Arkoma Basin

Range = 0-2,316 Mcfd
Average = 136 Mcfd
Number of Wells = 943
Horizontal CBM Wells

Range = 439-3,173 ft
Average = 1,820 ft
Number of Wells = 223
Arkoma Basin

Range = 0-1,861 bwpd
Average = 30 bwpd
Number of Wells = 890
(excluding one well with 1,861 bwpd)
CBM completions on structure map, Arkoma basin

Coa-Bed Symbols

$ Unnamed
$Secor
$“Savanna”
\(\text{\#} \) McAlester
\(\text{\#} \)Hartshorne
\(\text{\#} \)Upper/Lower Hartshorne
\(\text{\#} \) Lower Hartshorne

Arkoma Basin Annual CBM Production

- **Annual CBM Production**
- **Total Cumulative**
- **Vertical Cumulative**
- **Horizontal Cumulative**

Gas production data supplied by Petroleum Information/Dwights LLC dba IHS Energy Group © 2004