Arkansas Geological Survey
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GH-EQ-USGS-CERI-EVENTS-002

Compilation of Recent and Historic Earthquakes in the West Portion of the Fayetteville Shale Gas Play in North-Central Arkansas

R 26 W R 25 W R 24 W R 23 W R 22 W R 21 W R 20 W R 19 W R 18 W R 17 W R 16 W

T 13 N T 12 N T 11 N T 10 N T 9 N T 8 N T 7 N T 6 N T 5 N T 4 N T 3 N

Newton Searcy Van Buren Johnson Pope Logan Yell Conway

Baskin 2
Pyron SWD 1-16
Peterson 1
Phillips O 1
Oles 1-34
PTC - SWD 1
Ozark Real Estate 2-21 SWD
Nordin SWDW 1-32
Spooky 1-4
Bewley SWDW 2
Taylor 1-34
Rheba 2-30
STUMPTOE EARTHQUAKE CLUSTER
Campbell 09-17
Griffin Mountain 1
Griffin Mountain 2,2a
Hanna 09-17
Thompson Jessica 1-4
CENTRAL CONWAY COUNTY EARTHQUAKE CLUSTER AREA
Clinton Fault System
Morrilton Fault System

Big Piney
Illinois Bayou
Arkansas River
Petit Jean River

Clarksville Lamar Coal Hill Hartman Morrison Bluff Scranton Knoxville Dover Hector Russellville Pottsville Dardanelle Lake Dardanelle London Atkins Lake Atkins Paris Subiaco Blue Mountain Lake Havana Belleville Corinth Danville Ola Plainview Casa Adona Perry Perryville Houston Harris Brake Bigelow Oppelo Morrilton Plumerville Brewer Lake

RESERVATION BOUNDARY

About the Map

This map illustrates the location and magnitude of reported earthquakes that have occurred in the west portion of the Fayetteville Shale Play in north-central Arkansas. Earthquake epicenters in the area occur in scattered clusters (as delineated on the map). The earthquakes depicted on this map are derived from the Arkansas Geological Survey (AGS) earthquake catalog. This catalog has been compiled from various sources and publications (given below as references) and includes date, time, latitude, longitude, magnitude or intensity, and depth information. Some event records may contain incomplete data due to their date and/or source. The AGS earthquake catalog is dynamic and continually updated as event parameters are modified, new events are added and occasionally past events are deleted.

The faults depicted on the map represent a series west-to-east, northwest-to-southeast and east-to-northeast-trending subsurface normal faults. The majority of the faults are downthrown to the south and the amount of displacement varies along the length of the fault (but can be up to 2000 feet locally). The named fault systems represent a zone of single and multiple low to high-angle faults that typically form an en echelon map pattern. In the subsurface, the high-angle faults extend up from the Precambrian basement up to the Mississippian-Pennsylvanian unconformity while the lower angle faults extend from that unconformity through the Pennsylvanian strata and may or may not reach the surface. In the Fayetteville Shale Play, the majority of the earthquakes appear to originate from the deeper Precambrian basement and *lower* Paleozoic faults; however earthquakes have also occurred along the shallower *upper* Paleozoic faults.

Earthquake Symbols (2008 to Present)

Depth
- <1.9 km
- 2.0-2.9 km
- 3.0-3.9 km
- 4.0-4.9 km
- 5.0-5.9 km
- 6.0-6.9 km
- 7.0-7.9 km
- >8.0 km

Magnitude
- < 0.0
- 0.0 - 0.9
- 1.0 - 1.9
- 2.0 - 2.9
- 3.0 - 3.9

Historic Earthquakes (Prior to 2008)

- 0 - 1.9
- 2.0 - 2.9

Disposal Wells

- Expired
- Active
- Permitted
- Plugged, Abandoned

Gas Wells

- Permitted Well
- Producing
- Recently Completed
- Dry and Abandoned
- Plugged
- Shut In
- Temporarily Abandoned
- Proposed Injection

Map Symbols

- Interstate
- US HWY
- State HWY
- Incorporated Areas
- Water
- Arbenz Subsurface Faults *(Teeth denotes downthrown side)*
- AOGC, AGS Subsurface Faults *(Fault thickness depicts amount of displacement and teeth denotes downthrown side)*

References

Advanced National Seismic System (ANSS) earthquake database web page: URL: http://earthquake.usgs.gov/monitoring/anss/

Arbenz, J.K., 1984, Generalized Geologic-Structural Map of the Ouachita Mountains and Arkhoma Basin, Oklahoma and Arkansas. 1 sheet.

Arbenz, J.K., 2008, Structural framework of the Ouachita Mountains, in Stratigraphic and structural evolution of the Ouachita Mountains and Arkhoma Basin, southeastern Oklahoma and west-central Arkansas: Applications to petroleum exploration: 2004 field symposium: The Arbenz-Misch/Oles Volume: Oklahoma Geological Survey Circular 112-A, 40 p., Plate 2.

Center for Earthquake Research and Information (CERI) - New Madrid Earthquake Catalog: URL: http://folkworm.ceri.memphis.edu/catalogs/html/cat_nm.html

National Center for Earthquake Engineering Research (NCEER) – earthquake catalog for the central and eastern United States, 1627-1985. URL: http://folkworm.ceri.memphis.edu/catalogs /html/cat_nceer.html

St. Louis University (SLU) Earthquake Center web page: URL: http://www.eas.slu.edu/eqc/

Tennessee Earthquake Information Center (TEIC) – succeeded by University of Memphis - Center for Earthquake Research and Information (CERI) – taken from CERI New Madrid Earthquake Catalog. URL: http://www.ceri.memphis.edu/seismic/catalogs/cat_nm.html

United States Geological Survey USGS) Earthquake Notification Service (ENS).

Faults provided by the AOGC were compiled from integration dockets prepared by various geologists of the companies operating in the Fayetteville Shale Gas Play. ULR: http://www.aogc.state.ar.us

Feature Class Data used in the making of this map was acquired online at: URL: http://www.geostor. arkansas.gov

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Disclaimer

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The depicted earthquakes, faults and delineated seismic areas/zones are for illustration purposes and may or may not represent all seismically active faults and areas or indicate the exact origin of the earthquakes depicted on this map. The named faults/fault systems delineated on this map may or may not correspond with named faults at the surface or in the subsurface that originate from other published sources.

Scale

2 1 0 2 4 6 8 Miles

2 1 0 2 4 6 8 10 12 14 Kilometers

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