

**ENTERGY INDEPENDENCE PLANT  
EAST AND WEST RECYCLE PONDS**

**DEMONSTRATION OF COMPLIANCE WITH  
EPA CCR RULE SITING CRITERIA  
§257.62, FAULT AREAS**

**PREPARED IN COMPLIANCE WITH THE  
EPA FINAL RULE FOR THE DISPOSAL OF  
COAL COMBUSTION RESIDUALS  
TITLE 40 CODE OF FEDERAL REGULATIONS PART 257**



OCTOBER 17, 2018

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EAST AND WEST RECYCLE PONDS

DEMONSTRATION OF COMPLIANCE WITH  
EPA CCR RULE SITING CRITERIA  
§257.62, FAULT AREAS

Prepared for

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FTN No. R07920-1861-001

October 17, 2018

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## PROFESSIONAL ENGINEER'S CERTIFICATION

With this certification, I certify that I, as a Professional Engineer in the State of Arkansas, am a qualified professional engineer as defined in §257.53 of Title 40 Code of Federal Regulations (40 CFR) Part 257, that this report has been prepared under my direction in accordance with generally accepted good engineering practices, that the findings are accurate to the best of my knowledge, and that the CCR unit that is subject to this certification meets the location restriction requirements under §257.62 of 40 CFR Part 257.



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Dana L. Derrington, Arkansas PE #16372

10/17/2018  
Date

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## 1.0 INTRODUCTION

Entergy Arkansas, Inc. (Entergy), operates the Independence plant located approximately 2 miles southeast of Newark, Arkansas. The plant utilizes two recycle ponds, hereafter referred to as the East and West Recycle Ponds, for, among other things, the management of bottom ash transport water. Pursuant to §257.62 of Title 40 Code of Federal Regulations (40 CFR) Part 257, existing coal combustion residual (CCR) surface impoundments must not be located within 200 ft of the outermost damage zone of a fault that has had displacement in Holocene time unless it can be demonstrated that an alternative setback distance of less than 200 ft will prevent damage to the structural integrity of the CCR unit. Holocene time is defined by §257.53 as the most recent epoch of the Quaternary period, extending from the end of the Pleistocene Epoch, 11,700 years before present, to present. This report presents the findings of an evaluation of the East and West Recycle Ponds in support of the location restriction requirements of §257.62.

## 2.0 SITE DESCRIPTION

The East and West Recycle Ponds are shown on Figure 1 (all figures are located in Appendix A). The East Recycle Pond has an approximate surface area of 6.2 acres and the West Recycle Pond has an approximate surface area of 6.8 acres<sup>1</sup>. Based on surveys completed during June 2018, the East Recycle Pond has a maximum depth of 20 ft below ground surface (ft bgs) and the West Recycle Pond has a maximum depth of 18 ft bgs (FTN Associates, Ltd. 2018). The typical water level elevation in the recycle ponds is approximately 235 ft North American Vertical Datum of 1988 (NAVD88) based on field observations during June 2018. At the time of this evaluation, the West Recycle Pond was being drained for maintenance. Drained water from the West Recycle Pond was being pumped into and stored in the East Recycle Pond. Topography surrounding the East and West Recycle Ponds is generally flat-lying, with ground surface elevations ranging from approximately 234 to 239 ft NAVD88, as shown on Figures 1 and 2.

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<sup>1</sup> Pond surface areas were estimated based on the water level (East Recycle Pond) and water level line (West Recycle Pond) during field activities in June 2018.

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### **3.0 FAULT AREA EVALUATION**

According to the US Geological Survey (USGS) Earthquake Fault Map, the nearest Quaternary fault areas to the plant are the New Madrid seismic zone and Western Lowlands liquefaction features, located in the central part of the Mississippi River Valley physiographic region, as shown on Figure 3 (retrieved from USGS, no date). Information about specific faults associated with the New Madrid seismic zone is limited due to poor or absent surface expression of faulting, in part because Quaternary sediments mask all but the youngest geological expressions of seismicity. Similarly, the Western Lowlands contain liquefaction features that are evidence of tectonic activity, but individual faults associated with these features are unidentified. The only Quaternary-age surface expression of a fault in the region is the Reelfoot scarp, which coincides with the underlying Reelfoot fault (Crone and Wheeler 2000). The Reelfoot fault is located in northwestern Tennessee and parts of southeastern Missouri and is identified as having Holocene displacement as shown on Figure 4 (Van Arsdale and Ellis 2004). Other faults shown on Figure 4 have been identified based on seismic reflection surveys and are also reported to have Holocene displacement (Van Arsdale and Ellis 2004). The nearest of these to the plant is the Jonesboro fault.

Based on a review of the USGS documentation included as Figure 3, the plant is located approximately 43 miles from the western edge of the New Madrid seismic zone and 39 miles from the western edge of the Western Lowlands. According to Van Arsdale and Ellis (2004), the nearest fault with Holocene displacement is the Jonesboro fault located 42 miles from the plant (Figure 4).

### **4.0 CONCLUSIONS**

Based on a review of the available documentation in this report, neither the East Recycle Pond nor the West Recycle Pond is located within 200 ft of the outermost damage zone of a fault that has had displacement in Holocene time, and therefore both the East and West Recycle Ponds at the Entergy Independence plant meet the location restriction requirements of §257.62.

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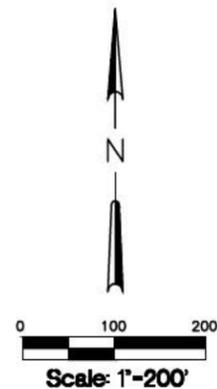
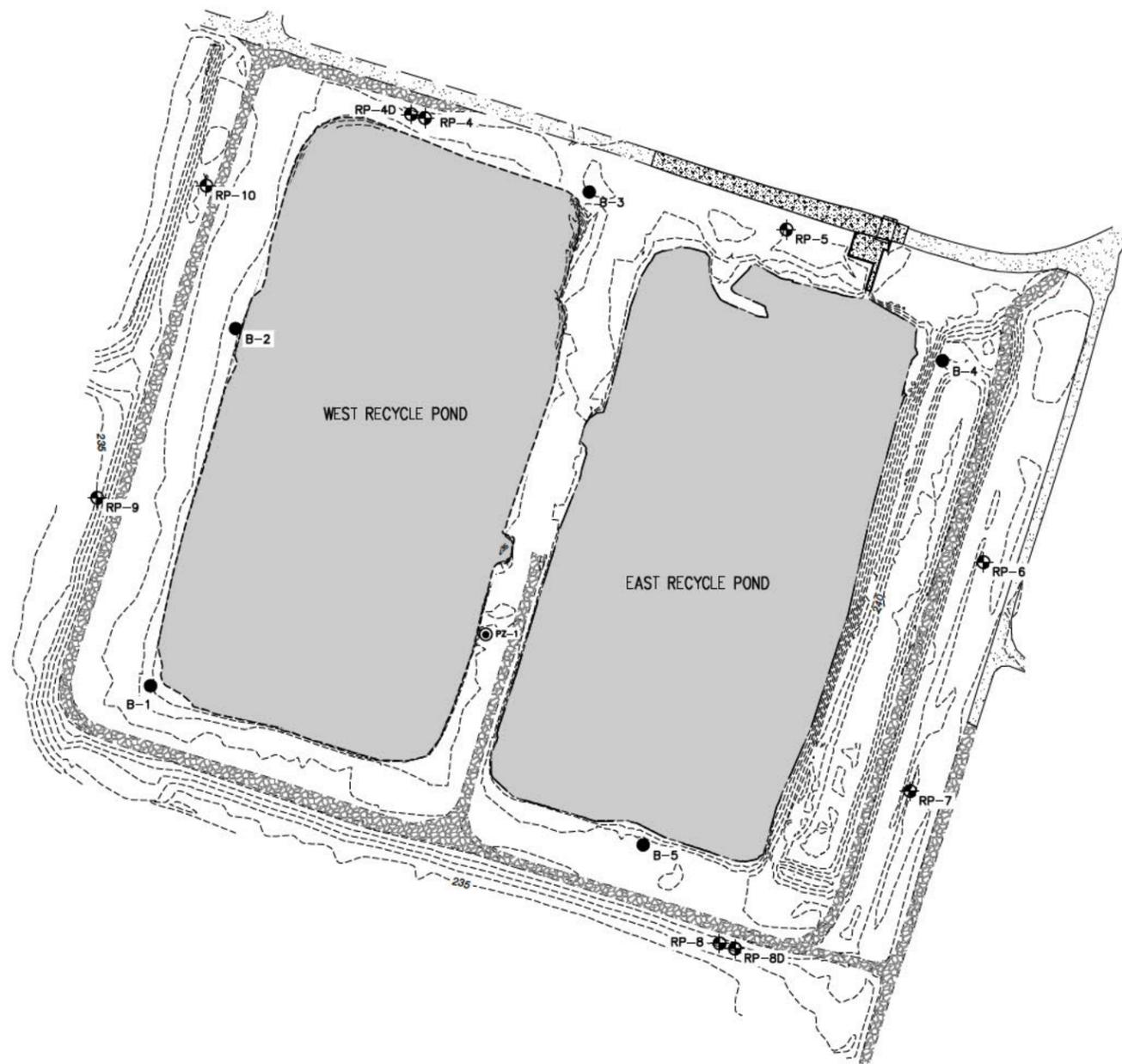
## 5.0 REFERENCES

- Crone, A.J., and R.L. Wheeler. 2000. *Data for Quaternary Faults, Liquefaction Features, and Possible Tectonic Features in the Central and Eastern United States, East of the Rocky Mountain Front* [USGS Open-File Report 00-260]. US Department of the Interior, US Geological Survey.
- FTN Associates, Ltd. 2018. *Entergy Independence Plant, East and West Recycle Ponds, Demonstration of Compliance with EPA CCR Rule Siting Criteria, §257.60, Placement Above the Uppermost Aquifer*. Little Rock, AR: FTN Associates, Ltd.
- USGS [US Geological Survey]. 1962 (rev 1981). "USGS 1:24000-Scale Quadrangle for Newark, AR 1962." US Geological Survey. Available online at <https://www.sciencebase.gov/catalog/item/5a8a29e6e4b00f54eb3c797b>.
- . (no date). "Earthquake Fault Map" [web page]. <https://earthquake.usgs.gov/hazards/qfaults/map/#qfaults> (retrieved August 8, 2018).
- Van Arsdale, R., and M. Ellis. 2004. *Characterization of Active Faults in the New Madrid Seismic Zone*. Urbana, IL: Mid-America Earthquake Center.
- Van Arsdale, R., and W. Cupples. 2013. "Late Pliocene and Quaternary Deformation of the Reelfoot Rift." *Geosphere* 9(6):1819-1831. doi:10.1130/GES00906.1.

# **APPENDIX A**

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**Figures**



**LEGEND**

---240---	5-FT INDEX CONTOUR (HARMON SURVEYING, INC.)
-----	1-FT INTERMEDIATE CONTOUR (HARMON SURVEYING, INC.)
▬▬▬▬▬▬	PAVED ROAD
▬▬▬▬▬▬	GRAVEL ROAD
▬▬▬▬▬▬	CONCRETE PAD
●	B-5 SOIL BORING
⊙	PZ-1 PIEZOMETER
⊕	RP-6 MONITORING WELL
▬▬▬▬▬▬	EDGE OF WATER, JUNE 2018
▬▬▬▬▬▬	TYPICAL EDGE OF WATER

- NOTES:**
1. TOPOGRAPHIC INFORMATION OUTSIDE OF POND AREA IS FROM SURVEY PERFORMED BY HARMON SURVEYING, INC., JUNE 2018.
  2. WEST POND BOTTOM TOPOGRAPHIC DATA IS FROM SURVEY PERFORMED BY B&F ENGINEERING, INC., JULY AND AUGUST 2018.
  3. DRAWING IS BASED ON ARKANSAS STATE PLANE SYSTEM, NAD83, U.S. FEET.
  4. WEST RECYCLE POND WAS BEING DRAINED FOR MAINTENANCE DURING JUNE 2018.

Figure 1. Site map, Entergy Independence recycle ponds.

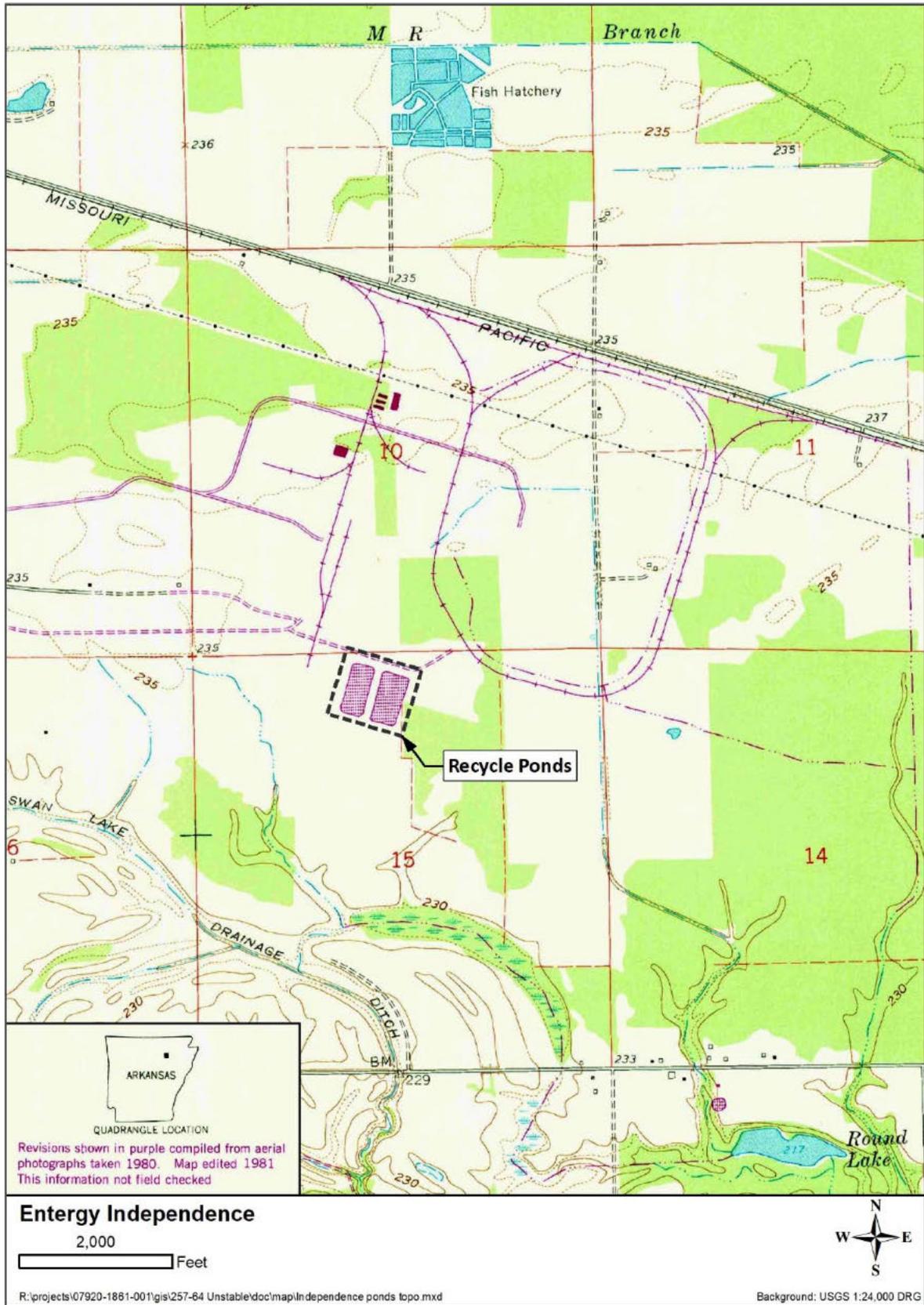


Figure 2. Topographic map of recycle ponds and surrounding area based on USGS topographic quadrangle Newark, AR (1981).

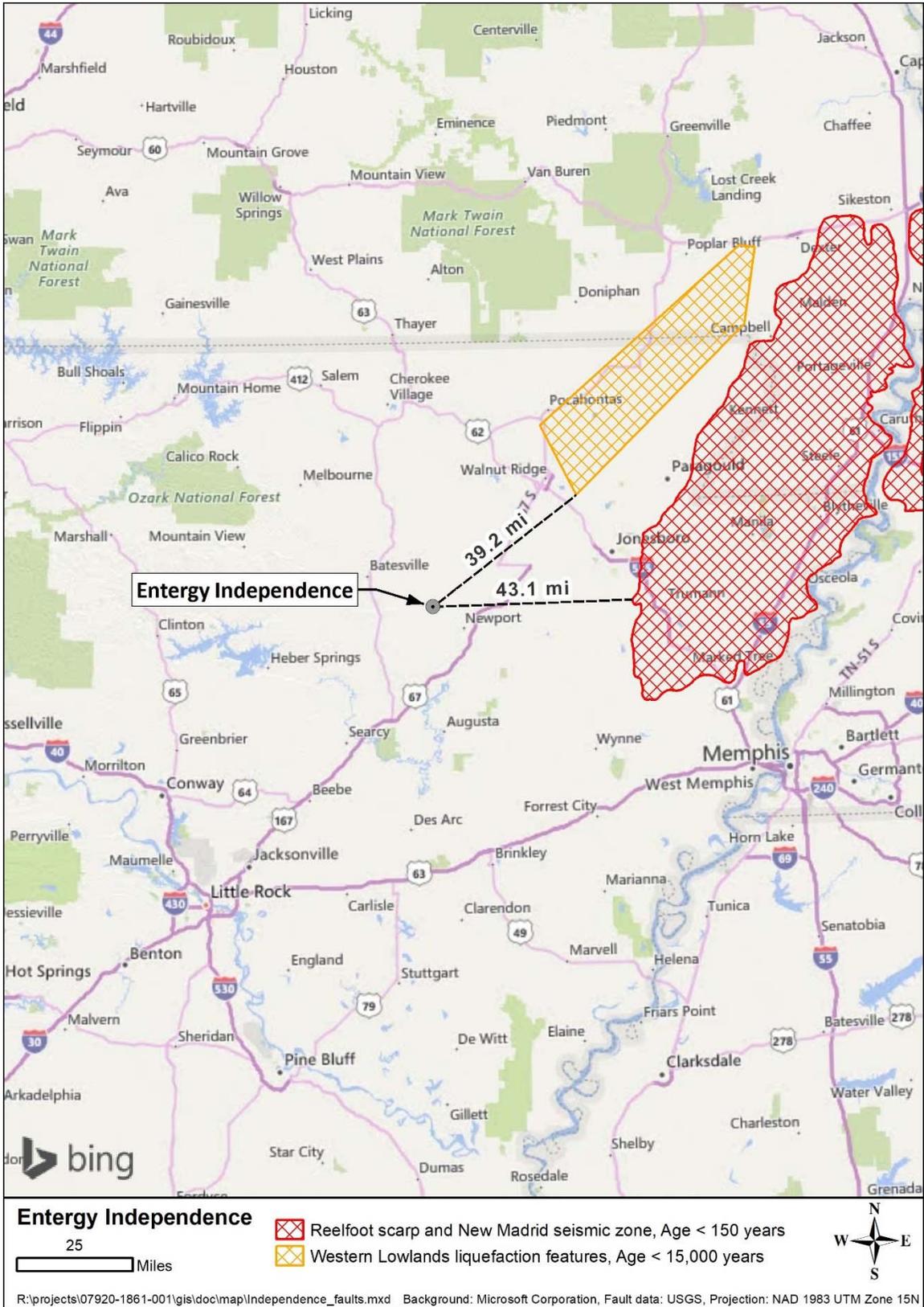


Figure 3. Quaternary fault areas (modified from USGS, no date).

