

**ENTERGY WHITE BLUFF PLANT
RECYCLE POND A AND RECYCLE POND B**

**DEMONSTRATION OF COMPLIANCE WITH
EPA CCR RULE SITING CRITERIA
§257.63, SEISMIC IMPACT ZONE**

**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

ENTERGY WHITE BLUFF PLANT
RECYCLE POND A AND RECYCLE POND B

DEMONSTRATION OF COMPLIANCE WITH
EPA CCR RULE SITING CRITERIA
§257.63, SEISMIC IMPACT ZONE

Prepared for

Entergy Arkansas, Inc.
PO Box 551
Little Rock, AR 72203

Prepared by

FTN Associates, Ltd.
3 Innwood Circle, Suite 220
Little Rock, AR 72211

FTN No. R07920-1862-001

October 17, 2018

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 §257.63 of 40 CFR Part 257.



Dana L. Derrington, Arkansas PE #16372

10/17/2018
Date

TABLE OF CONTENTS

PROFESSIONAL ENGINEER’S CERTIFICATION	i
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTION	1
3.0 SEISMIC IMPACT ZONE EVALUATION	2
4.0 CONCLUSIONS.....	3
5.0 REFERENCES	3

LIST OF APPENDICES

APPENDIX A: Figures

1.0 INTRODUCTION

Entergy Arkansas, Inc. (Entergy), operates the White Bluff plant located approximately 2.5 miles southeast of Redfield, Arkansas. The plant utilizes two recycle ponds, hereafter referred to as Recycle Pond A (south pond) and Recycle Pond B (north pond), for, among other things, the management of bottom ash transport water. Pursuant to §257.63 of Title 40 Code of Federal Regulations (40 CFR) Part 257, existing coal combustion residual (CCR) surface impoundments must be not be located in seismic impact zones unless the owner or operator demonstrates that all structural components including liners, leachate collection and removal systems, and surface water control systems are designed to resist the maximum horizontal acceleration (MHA) in lithified earth material for the site. A seismic impact zone is defined by §257.53 as an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in 50 years. This report presents the findings of an evaluation of Recycle Pond A and Recycle Pond B in support of the location restriction requirements of §257.63.

2.0 SITE DESCRIPTION

Recycle Pond A and Recycle Pond B are shown on Figure 1 (all figures are located in Appendix A). Recycle Pond A has an approximate surface area of 7.0 acres and Recycle Pond B has an approximate surface area of 6.5 acres¹. The typical water level elevation in each pond is approximately 278 ft North American Vertical Datum of 1988 (NAVD88) based on a June 2018 field survey. Topography surrounding the immediate vicinity of the recycle ponds was graded during plant construction and is generally flat-lying, with existing ground surface elevations ranging from approximately 277 to 285 ft NAVD88, as shown on Figures 1 and 2. Natural topography in the vicinity of the ponds is gently to steeply sloping (Figure 2).

¹ Pond surface areas were estimated based on measured water levels during field activities in June 2018.

3.0 SEISMIC IMPACT ZONE EVALUATION

The plant and its recycle ponds are located approximately 110 miles southwest of the New Madrid seismic zone, which stretches from southern Illinois and southeast Missouri to northeast Arkansas, southwestern Kentucky, and northwestern Tennessee as shown on Figure 3 (retrieved from US Geological Survey [USGS], no date). In accordance with US Environmental Protection Agency (EPA) guidance (EPA 1995), the MHA for this site was determined using the 2014 USGS National Seismic Hazard Map presenting the estimated peak ground surface acceleration (PGA) in bedrock. As shown on Figure 4, the PGA value for this site with a 2% probability of exceedance in 50 years is approximately 0.16 g. As such, Recycle Pond A and Recycle Pond B are located in a seismic impact zone as defined by §257.53.

In accordance with §257.63(a), Entergy must demonstrate that all structural components including liners, leachate collection and removal systems, and surface water control systems are designed to resist the MHA because the ponds are located in a seismic impact zone as defined by §257.53. Based on available information, neither pond was constructed with a liner or leachate collection and removal system. According to an evaluation performed by Environmental Resources Management (2018), Recycle Pond B (north pond) is classified as “incised” and is not constructed with a dike that impounds water. As such, there are no outward-facing structural slopes associated with Recycle Pond B that have potential for failure under seismic loading conditions. An evaluation performed by FTN Associates, Ltd. (FTN) (2018) considered the stability of the interior side slopes and the liquefaction potential of foundation soils due to seismic loading for Recycle Pond B. Findings from the evaluation concluded that Recycle Pond B is resistant to the MHA for this site.

Review of original site construction documents indicates that the southeast corner of Recycle Pond A (south pond) may consist of a constructed or filled area. Entergy has commenced closure of this pond.

4.0 CONCLUSIONS

Based on a review of the available documentation in this report, Recycle Pond B (north pond) at the Entergy White Bluff plant meets the location restriction requirements of §257.63.

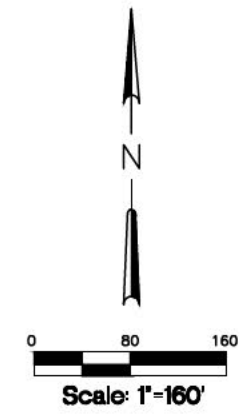
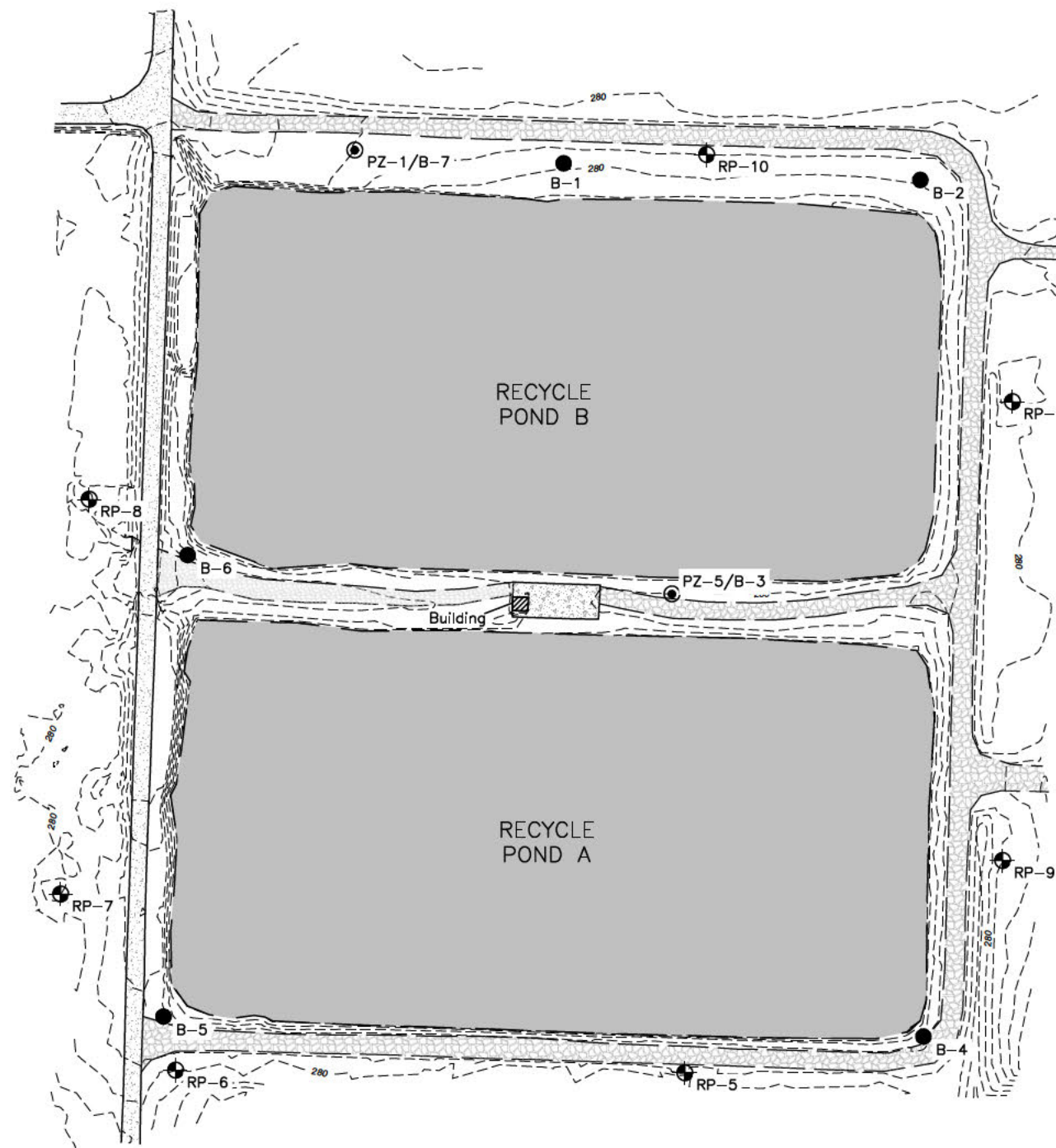
At this time, Entergy has not demonstrated that Recycle Pond A (south pond) meets the location restriction requirements of §257.63. Entergy has commenced closure of this pond.

5.0 REFERENCES

- EPA [US Environmental Protection Agency]. 1995. See Richardson, Kavazanjian Jr., and Matasovic 1995.
- Environmental Resources Management. 2018. *Summary of Site Visit and Review of CCR Structural Integrity Criteria Requirements for White Bluff Steam Electric Station Recycle Ponds*. Mount Pleasant, SC: Environmental Resources Management.
- FTN [FTN Associates, Ltd.]. 2018. *Entergy White Bluff Plant, Recycle Pond B, Slope Stability and Soil Liquefaction Analyses*. Little Rock, AR: FTN Associates, Ltd.
- Richardson, G.N., E. Kavazanjian Jr., and N. Matasovic. 1995. *RCRA Subtitle D (258): Seismic Design Guidance for Municipal Solid Waste Landfill Facilities* [EPA/600/R-95/051]. Cincinnati: US Environmental Protection Agency, Office of Research and Development, Risk Reduction Engineering Laboratory.
- USGS [US Geological Survey]. 2017a. "USGS US Topo 7.5-Minute Map for Redfield, AR 2017." Rolla, MO and Denver, CO: National Geospatial Technical Operations Center, US Geological Survey. Available online at <https://www.sciencebase.gov/catalog/item/59647cabe4b0d1f9f059f935>.
- . 2017b. "USGS US Topo 7.5-Minute Map for Wright, AR 2017." Rolla, MO and Denver, CO: National Geospatial Technical Operations Center, US Geological Survey. Available online at <https://www.sciencebase.gov/catalog/item/59647d51e4b0d1f9f059ff88>.
- . (no date). "Earthquake Fault Map" [web page]. <https://earthquake.usgs.gov/hazards/qfaults/map/#qfaults>.

APPENDIX A

Figures



LEGEND

-----280-----	5-FT INDEX CONTOUR
.....	1-FT INTERMEDIATE CONTOUR
[Stippled Box]	PAVED ROAD
[Cross-hatched Box]	GRAVEL ROAD
[Solid Grey Box]	CONCRETE PAD
● B-1	SOIL BORING
⊙ PZ-1	PIEZOMETER
⊕ RP-6	MONITORING WELL
[Grey Shaded Area]	EXTENT OF WATER, JUNE 2018
—	EDGE OF WATER, JUNE 2018

- NOTES:
1. TOPOGRAPHIC INFORMATION IS FROM SURVEY PERFORMED BY HARMON SURVEYING, INC., JUNE 2018.
 2. DRAWING IS BASED ON ARKANSAS STATE PLANE SYSTEM, NAD83, U.S. FEET.

Figure 1. Site map, Entergy White Bluff recycle ponds.

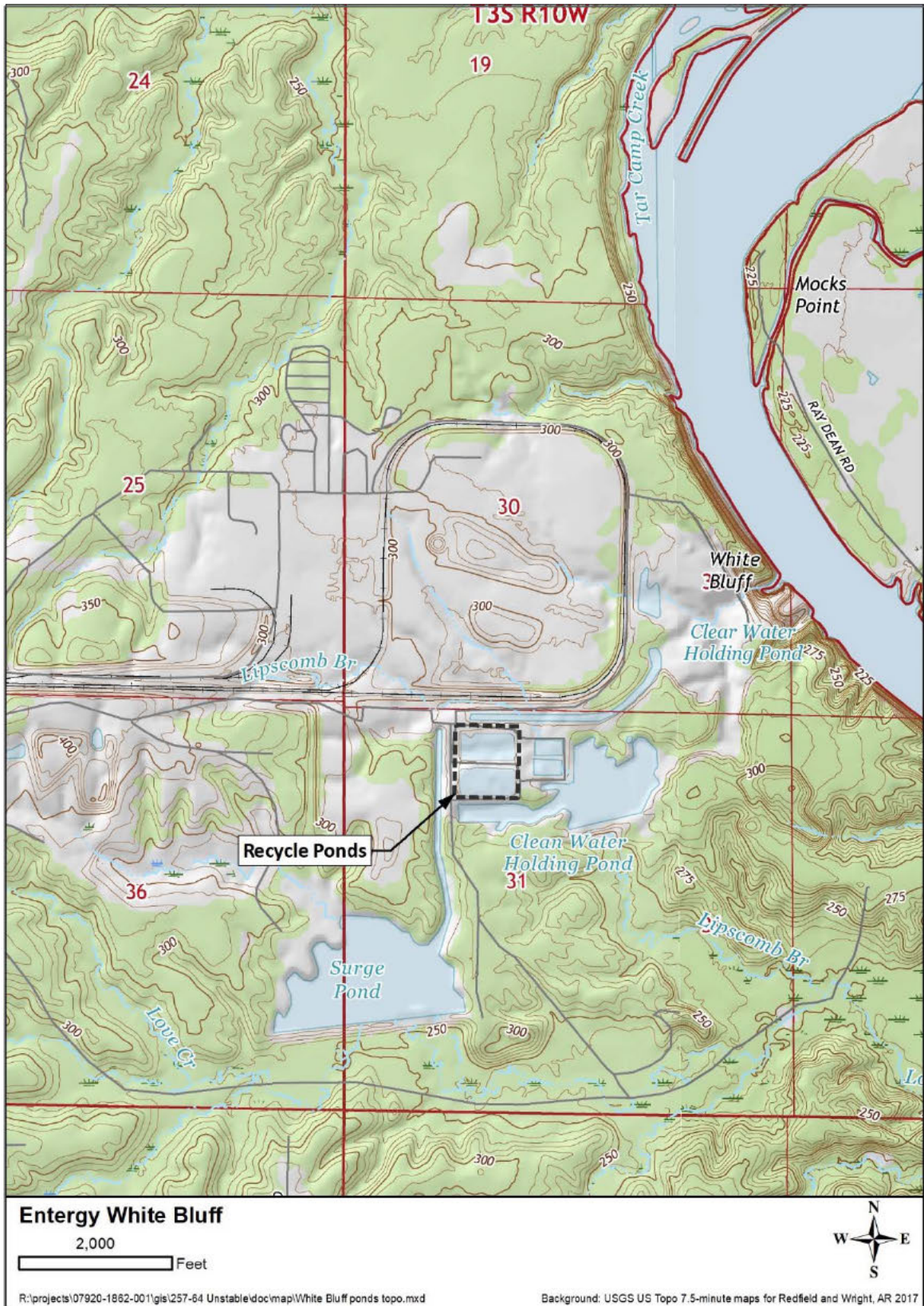


Figure 2. Topography of the recycle ponds and surrounding area based on USGS topographic quadrangles Redfield, AR, and Wright, AR (2017).

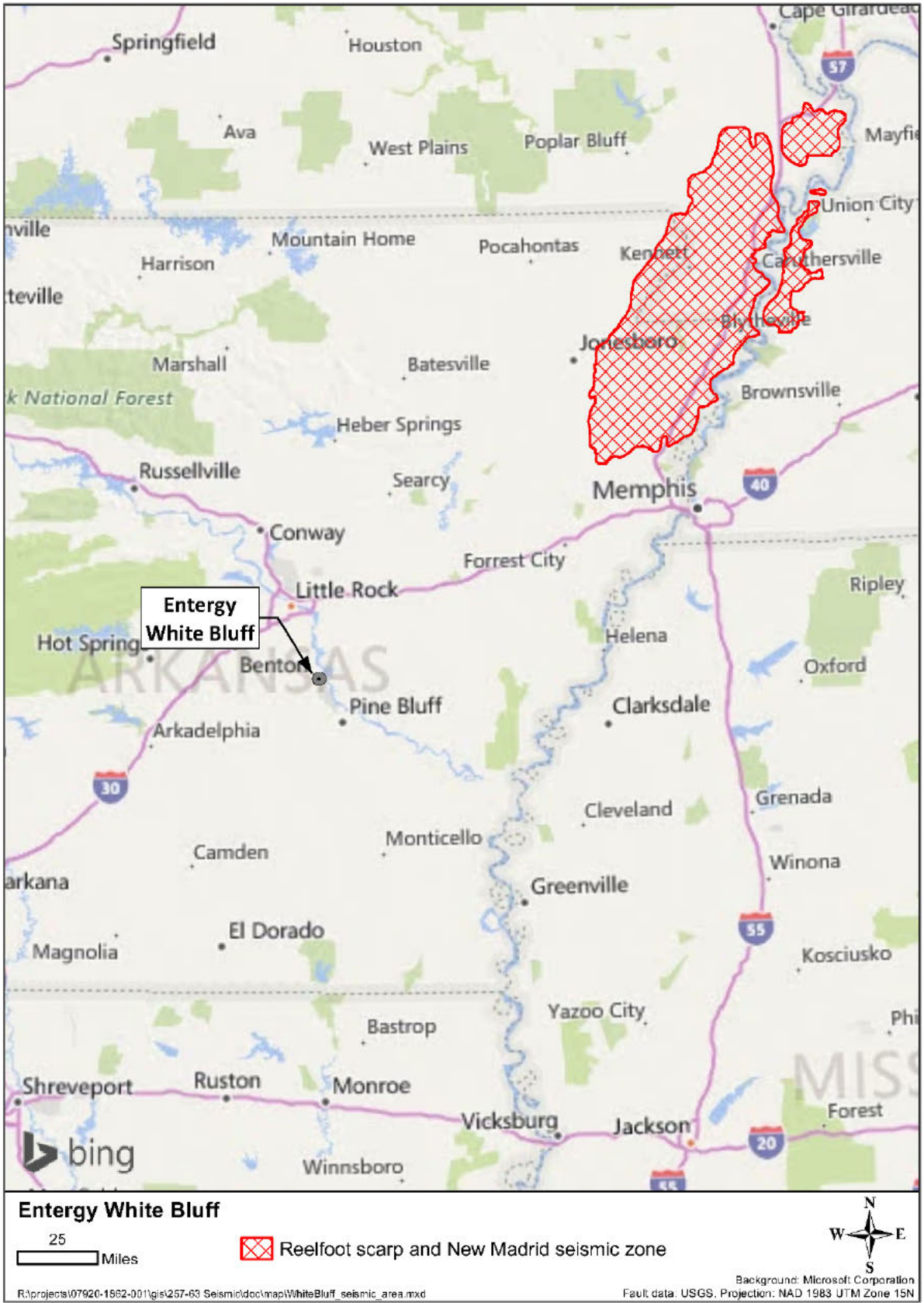


Figure 3. New Madrid seismic zone showing area of Quaternary faulting.

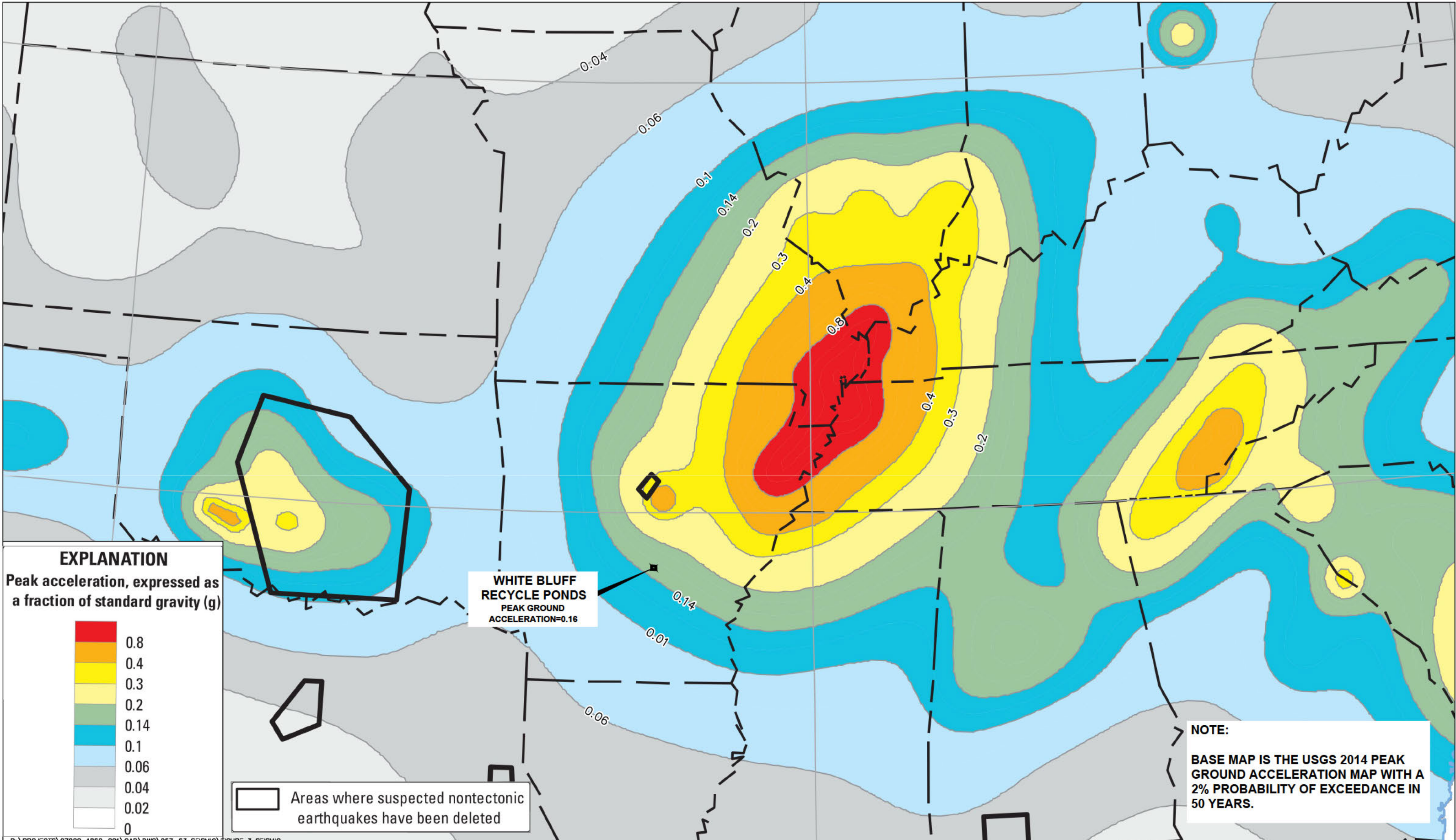


Figure 4. USGS seismic hazard map showing PGA with 2% probability of exceedance in 50 years.