

# An Update on Lignite Research and the Status of the Lignite Resources Pilot Program in Arkansas

*Ed Ratchford*

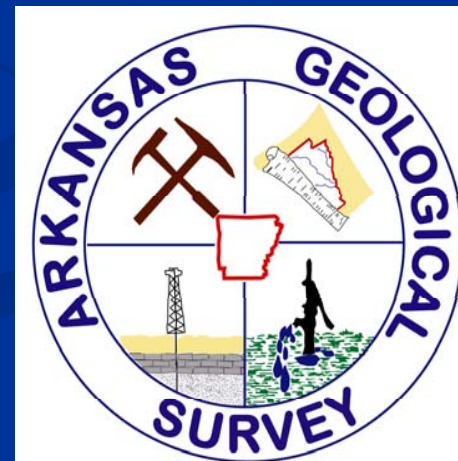
*Senior Petroleum Geologist*

*Arkansas Geological Survey*

Arkansas State Capitol

Joint Committee on Energy

August 4, 2008



# Outline

- Objectives and current status of the *Arkansas Lignite Resources Pilot Program*
- Status of funding for the Energy & Environmental Research Center Grant Proposal No. 2008-002
- AGS update on geologic modeling of industry data associated with Arkansas' lignite deposits
- Observations & Recommendations

# Lignite Resources Pilot Program

- Act 641, Regular Session 2007, created the “*Arkansas Lignite Resources Pilot Program*”
- Primary Objective: “to develop an energy utilization strategy for Lignite production and use”
- “The Lignite Pilot Program shall be developed and administered by Southern Arkansas University, the Arkansas Geological Survey, and the Arkansas Department of Economic Development”

# Key Aspects of the Legislation (Act 641)

## ■ Excerpts:

- “Explore and utilize lignite as an energy resource including without limitation a Synfuels-based research program”
- “Develop public and private partnerships with other entities to develop the untapped energy resource of lignite to stimulate Arkansas’ economy”
- “Develop practical applications for the use of lignite resources as an alternative energy source”

# Key Aspects of the Legislation (Act 641)

## ■ Excerpts:

- “The Arkansas Lignite Resources Pilot Program may participate in federal, state, or industry grant opportunities that are available for the program”
- “Representatives from Southern Arkansas University, the Arkansas Geological Survey and the Arkansas Department of Economic Development shall report the status of the Arkansas Lignite Resources Pilot Program periodically to the Legislative Council and the Joint Committee on Energy”

# Products Generated From Lignite

- ◆ Electricity -- Primary or Secondary Fuel Source for Power Plants
- ◆ Gasoline
- ◆ Diesel
- ◆ Synthetic Natural Gas
- ◆ Liquid Petroleum Gas (LPG)
- ◆ Methanol
- ◆ Ethanol
- ◆ Phenol
- ◆ Ammonium Sulfate
- ◆ Anhydrous Ammonium
- ◆ Additional Economic Bi-Products

# Overview of the EERC Grant Proposal

- In July 2007, the AGS received a research grant proposal from the EERC. This proposal specifies the required steps for the commercial testing of Arkansas' lignite resources
- The EERC proposal provides \$550,000 in matching federal funds from the Department of Energy



## ASSESSMENT OF LIGNITE RESOURCES AND UTILIZATION OPTIONS FOR THE STATE OF ARKANSAS

EERC Proposal No. 2008-0002

*Submitted to:*

**Mr. Ed Ratchford**

**Arkansas Geological Commission  
3815 West Roosevelt Road  
Little Rock, AR 72204**

*Submitted by:*

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Joshua J. Stanislawski  
Donald P. McCollor

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University of North Dakota  
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for Michael L. Jones, Project Manager

  
Dr. Barry I. Milavetz, Associate VP for Research  
Research Development and Compliance

**July 2007**



# Primary Objectives of the EERC Proposal

- Step 1: Secure 75-100 drill cores from the AGS for the commercial testing of south Arkansas lignite
- Step 2: Gasification testing of lignite to assess the quality of the fuel for electrical power generation (IGCC Technology)

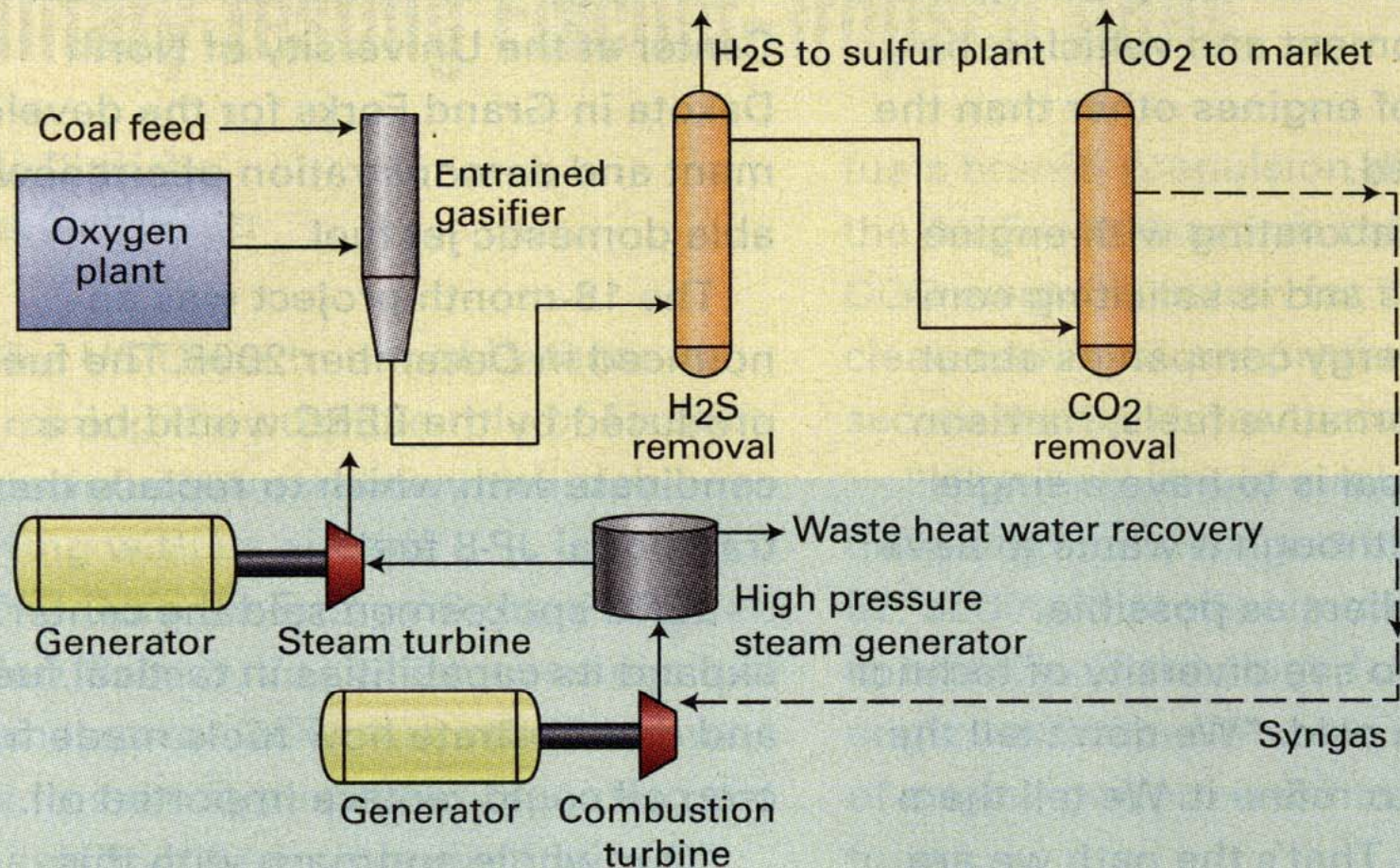
# Primary Objectives of the EERC Proposal

- **Step 3: Synfuels testing of lignite to assess the quality and characteristics of lignite for liquid fuels production (i.e. gasoline, diesel etc.)**
- **Step 4: Final Report submitted to the Lignite Resources Pilot Program detailing the test results and enumerating several development pathways based on Arkansas' infrastructure and proximity to markets**

# Coal-To-Electricity By IGCC

## COAL-TO-ELECTRICITY BY ICGC\*

Fig. 6

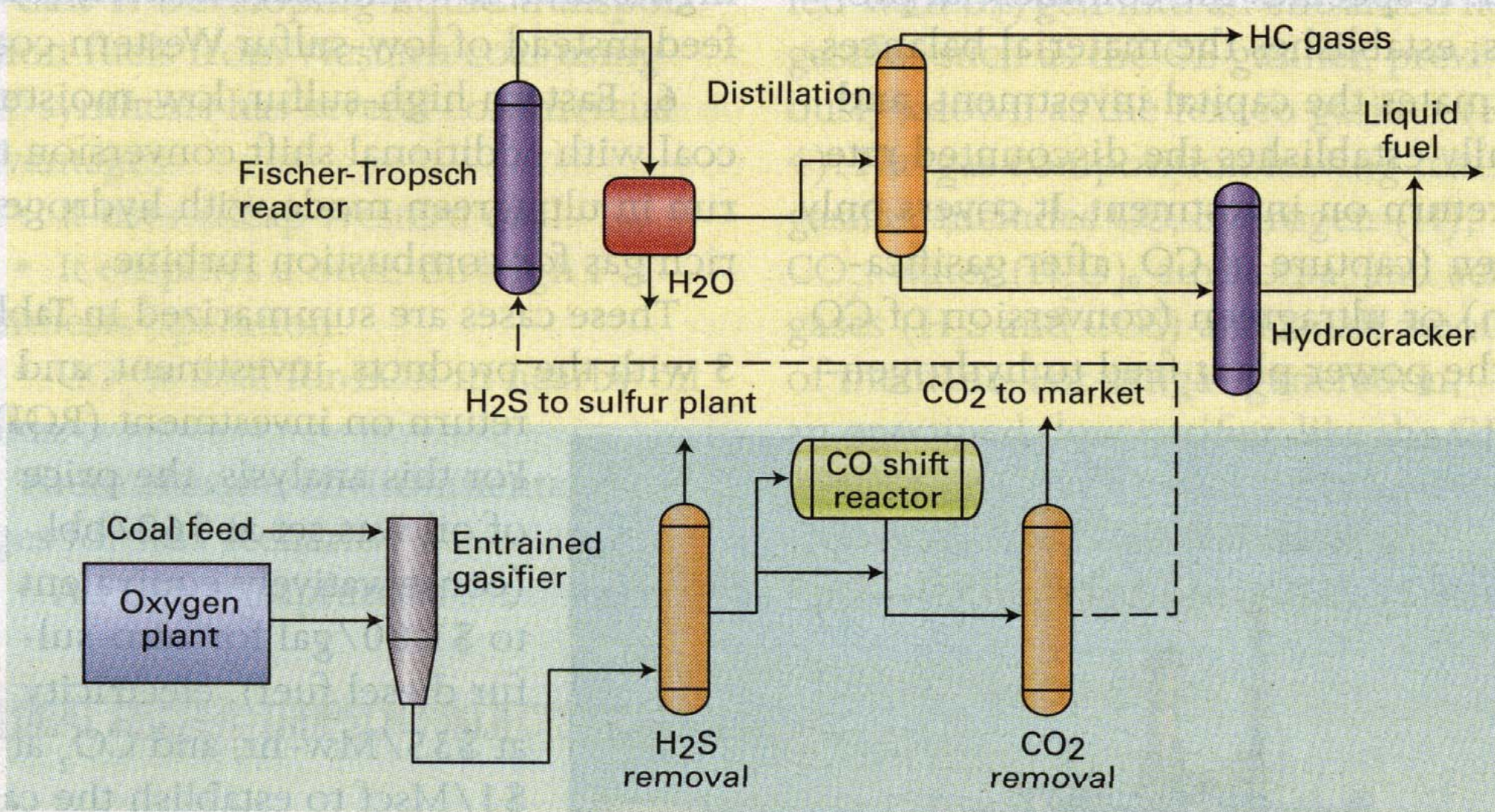


\*Integrated coal gasification combined cycle.

# Coal-To-Liquid Transportation

## COAL-TO-LIQUID TRANSPORTATION

Fig. 5



# Great Plains Synfuels Plant - North Dakota



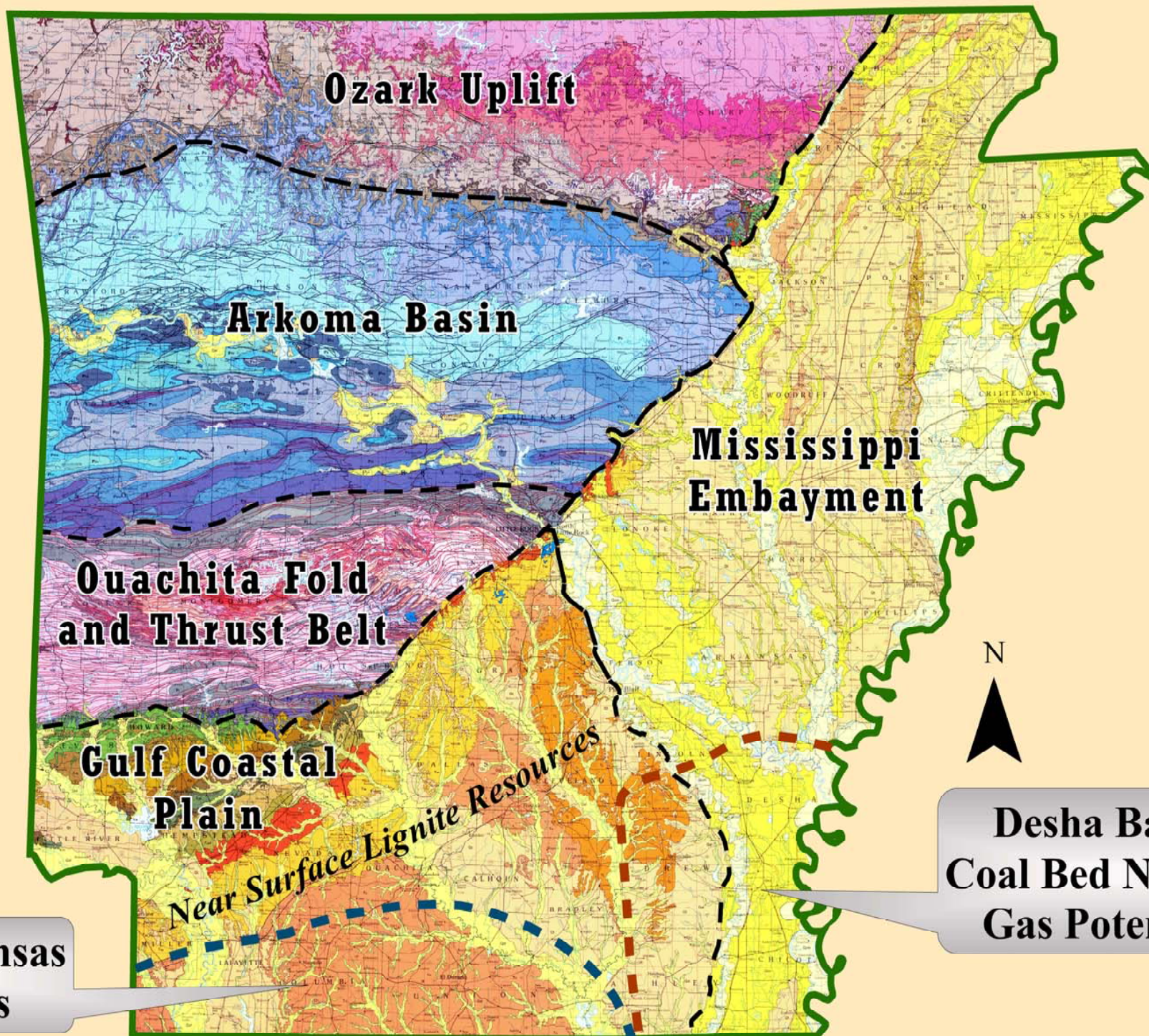
# Status of Funding for the EERC Proposal

- The EERC research proposal was submitted to the AGS on 7-3-2007 and no decision has been made by the State of Arkansas regarding the funding of this project
- The State has a window of time to respond to the proposal or the \$550,000 in federal matching funds will be lost
- The AGS believes that funding of this project is prudent given the fact that the lignite resource is large, undeveloped, and that energy prices continue to increase

# Estimated Budget For EERC Project

<b>Requested Funds</b>	<b>Possible Source of Funds</b>	<b>Project Expenditures</b>
<b>\$600,000</b>	<b>State of Arkansas</b>	<b>Drilling contract for 75-100 lignite core holes</b>
<b>\$650,000</b>	<b>State of Arkansas</b>	<b>Commercial testing of lignite cores &amp; Economic Report with development recommendations</b>
<b>\$550,000</b>	<b>EERC- Federal Matching Funds (DOE)</b>	<b>Commercial testing of lignite cores</b>

# Geologic Map & Provinces in Arkansas



**South Arkansas  
Oil Fields**

**Desha Basin  
Coal Bed Natural  
Gas Potential**



# AGS Update on Lignite Research

- In 2007, the AGS secured research agreements with several industry partners to obtain lignite exploration drilling data covering an area of approx. 1.5 Million acres in south Arkansas
- The exploration data obtained from these agreements defines the major lignite deposits in the state
- AGS geologists and support staff are currently modeling the geological aspects of this data to assess the depth, thickness, and character of the lignite deposits

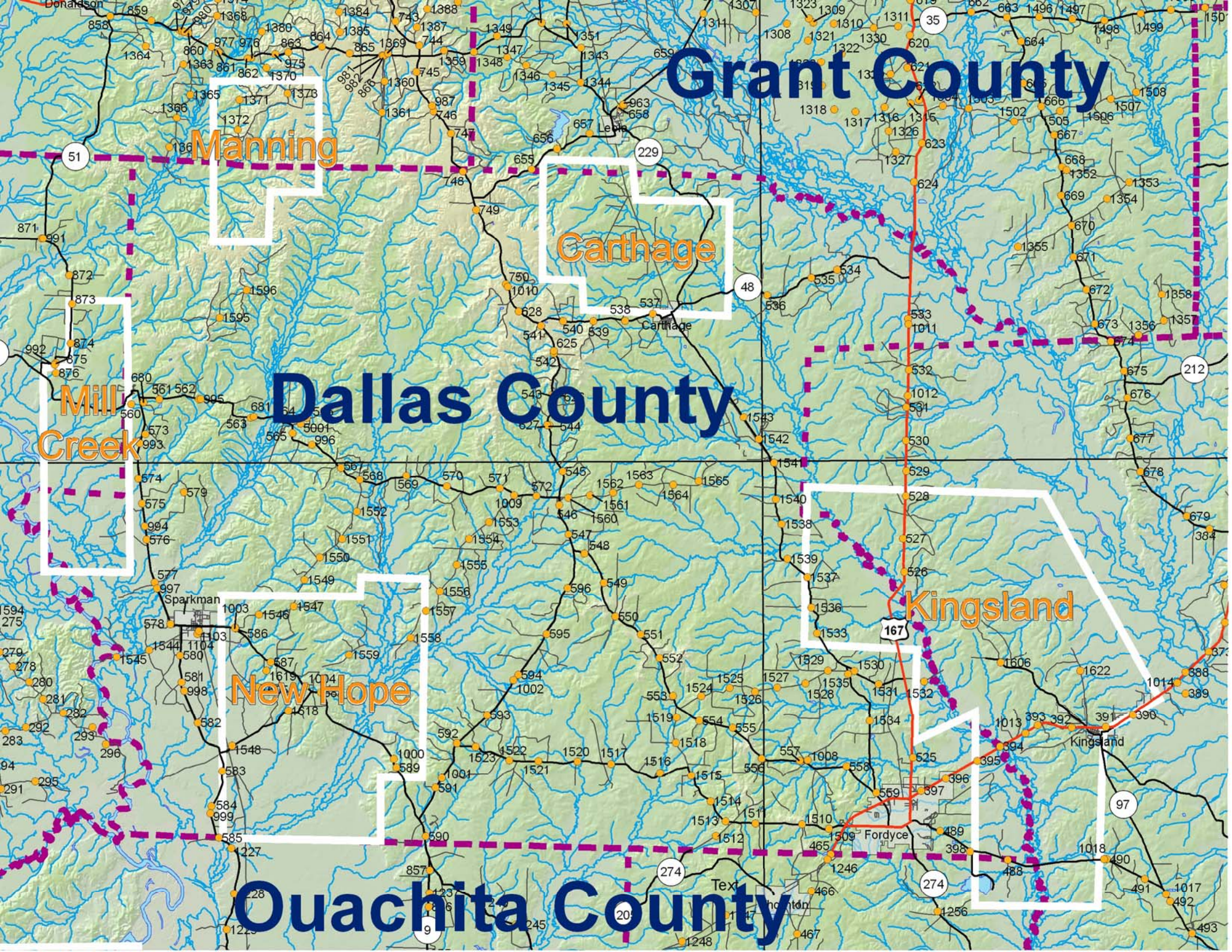
# AGS Update on Lignite Research

- Phase 1: Consists of converting 30+ year old exploration paper files and maps to a modern digital database and subsurface geologic models
- Phase 2: Consists of developing a proposed drill hole map for contract drillers to bid on  
(Proposed bid consists of drilling 75-100 lignite cores)

The AGS will provide a determination for: (1) Depth of overburden (2) Projected core intervals (3) Cumulative lignite thicknesses for each drill site.

# AGS Update on Lignite Research

- **Phase 3: Provide well site geological consultation during the drilling of the cores. AGS geologists will identify the lignite zones to be cored and shipped to the commercial coal testing facility in North Dakota (EERC)**
- **Phase 4: Integration of final EERC report data into geologic subsurface models. Identify the highest ranking deposits based on EERC technical data and present that data to the utility and petrochemical industries through technical conference venues.**



Grant County

Manning

Carthage

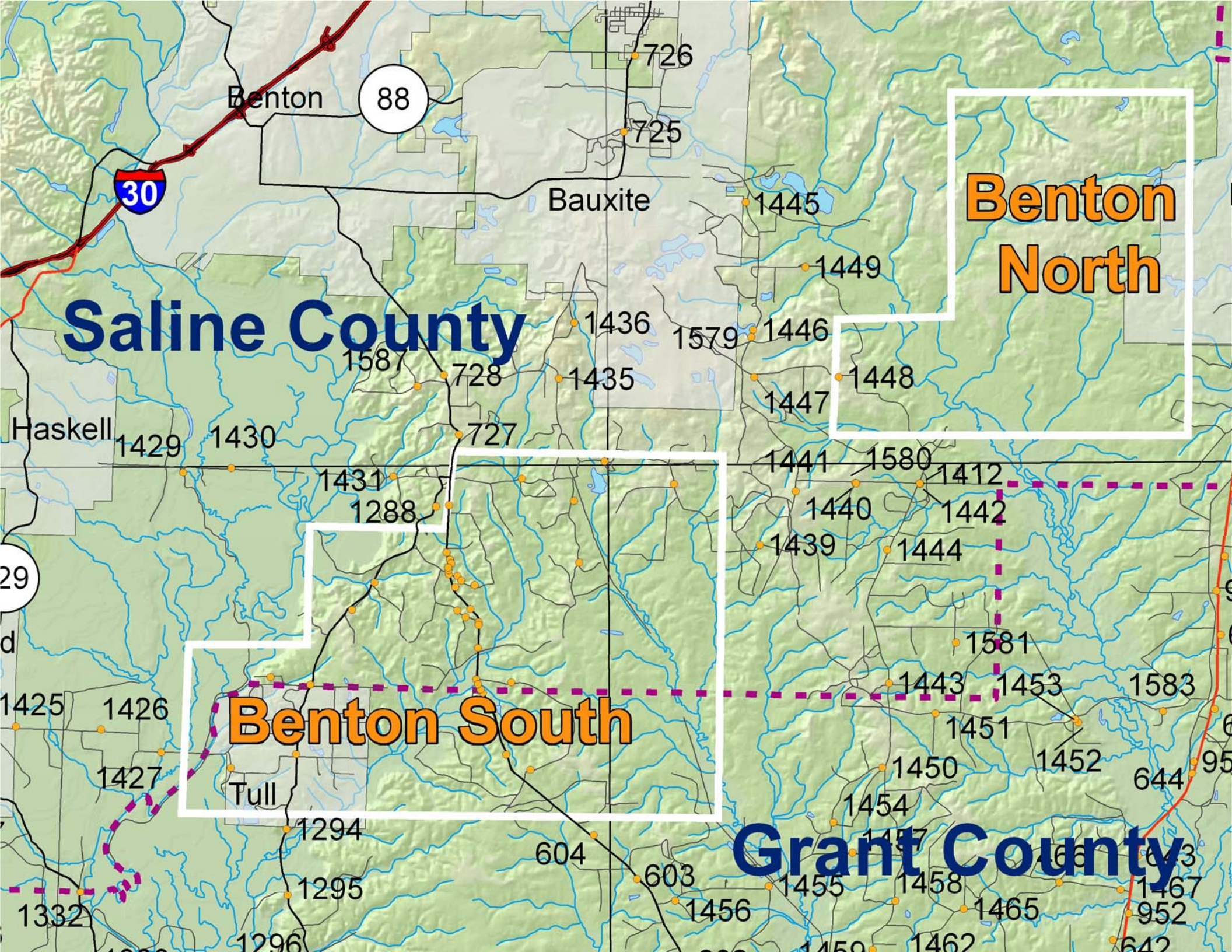
Dallas County

Mill Creek

New Hope

Kingsland

Ouachita County



**Saline County**

**Benton North**

**Benton South**

**Grant County**

Benton

88

30

Bauxite

Haskell

Tull

726

725

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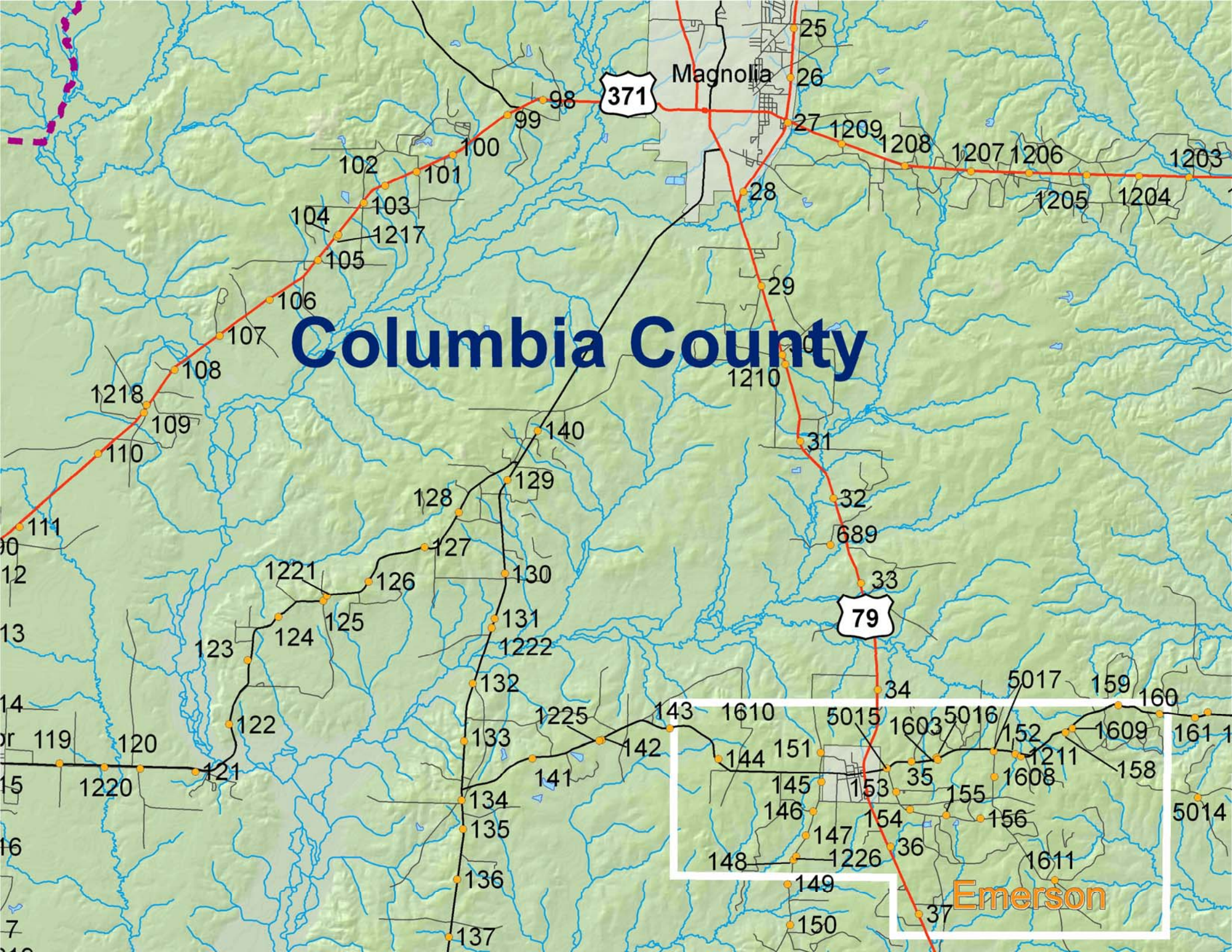
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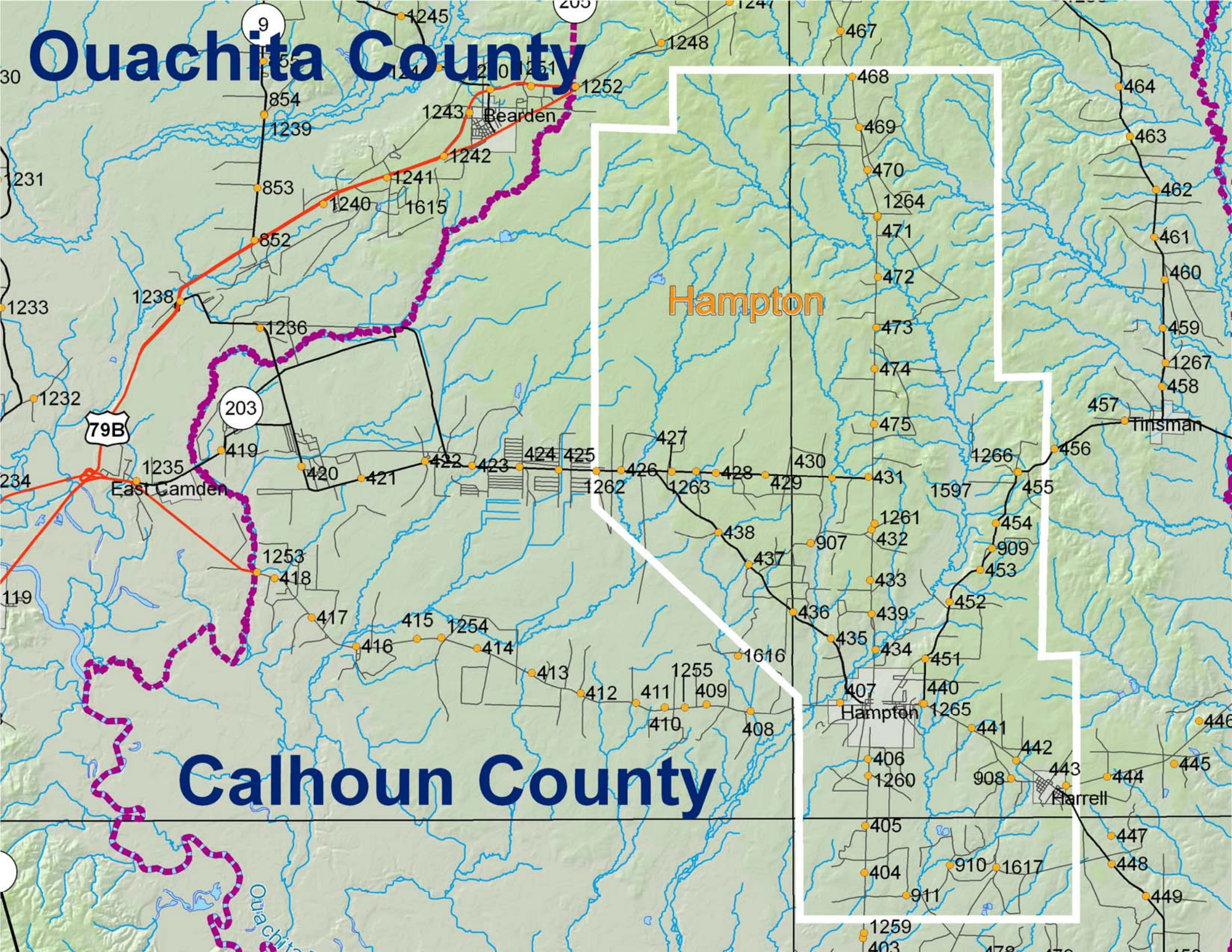
# Columbia County



Emerson

144 151 152 1609 1611  
145 153 155 1608 158  
146 154 156  
147 150  
148 1226 36  
149  
150

# Ouachita County



## Hampton

# Calhoun County

# Reclamation of Red Oak Mine – Red Oak, OK





# Reclamation of Liberty Coal Mine – Stigler, OK



# Conclusions & Recommendations

- Arkansas' lignite resource is large, virtually untapped, and has a huge economic potential for development
- Our neighboring states of Mississippi, Louisiana & Texas continue to develop their lignite resources which is an important part of their economy
- Act 641 was passed for the creation of The Lignite Resources Pilot Program so that an “energy utilization strategy for lignite production can be developed”

# Conclusions & Recommendations

- EERC research proposal is focused on Synfuels and Gasification testing of Arkansas' lignite resources. Subsurface geologic modeling and securing lignite drill cores are necessary steps to achieve research objectives
- The cost of funding the EERC coal testing project is approximately 1/3 of the cost of drilling one Fayetteville Shale gas well

# Conclusions & Recommendations

- Funding of “base line research” (i.e. EERC Proposal) enhances Arkansas’ position for attracting more technologically advanced industries such as Synfuels plants that can refine the energy products locally and thus yield a higher economic return for the State
- Funding of the EERC project is an investment in the future energy needs of all Arkansans and decreases our vulnerability on imported petroleum resources

# CONTACT INFORMATION

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