

## **Integrated Synthesis of the Permian Basin: Data and Models for Recovering Existing and Undiscovered Oil Resources from the Largest Oil-Bearing Basin in the U.S.**

**DE-FC26-04NT15509**

### **Goal**

The overall objective is to collect and synthesize available data on the hydrocarbon-bearing geological systems in the Permian Basin and distribute data in readily usable formats to scientists, engineers, managers, and decision makers in the oil and gas industry.

### **Performer**

Bureau of Economic Geology  
University of Texas  
Austin, TX

### **Results**

The project is expected to deliver data in two formats: 1) a detailed, comprehensive history of the Paleozoic depositional and reservoir systems in the Permian Basin; and 2) spatially integrated databases of depositional, stratigraphic, lithologic, and petrophysical properties for selected stratigraphic horizons.

### **Benefits**

This project will expand the geological knowledge base of the Permian Basin, the largest oil resource-bearing region in the United States, and make this information readily accessible to operators so they can rapidly and effectively determine the best focus for exploitation effort and dollars. Access to these data will decrease risk, increase efficiency, and be an important basis and incentive for new drilling.

### **Background**

The Permian Basin is the largest producing basin in the United States, with 30 billion barrels of remaining mobile oil. A particular problem for companies seeking to recover this resource is the difficulty of access to data and the knowledge of how to use the data. No modern, integrated syntheses of Permian Basin geology of data currently exist. The proposed project will address this problem by providing needed fundamental stratigraphic and reservoir-specific data in readily accessible and usable formats.

### **Summary**

Major tasks include the following:

- Preparation of a written synthesis of Permian Basin Paleozoic stratigraphy, depositional and diagenetic processes, and reservoir development.
- Development of play-based data bases of Permian Basin reservoirs and stratigraphic horizons in GIS format.
- Dissemination of data to industry and the public (technology transfer).

The first task is to create a comprehensive report on the depositional, stratigraphic, diagenetic, structural architecture and history, and reservoir development of the Paleozoic section in the Permian Basin based on an integration, interpretation, and synthesis of existing and new data. It will be prepared as a conventional report and distributed in both paper and digital formats. The text of the report will be supported by regional maps of facies, thickness, and structure; regional and reservoir-specific cross sections; illustrations of core facies and cyclicity; reservoir and depositional models; depictions of wireline log character; seismic models; photographs of representative facies; representative out-crop data; and a complete bibliography of the Permian Basin.

Selected stratigraphic successions will be analyzed to define and portray spatial inter-relationships among depositional, structural, and diagenetic properties, and reservoir distribution. Source data (comprising wire-line logs, seismic surveys, cores, core data, outcrop data and models, and reservoir data and models) will be compiled, interpreted, and integrated and then compiled into a readily accessible GIS format for delivery and use. These data will be assembled in a spatially integrated database in GIS format for the most efficient transfer and use.

All data ultimately will be made available to all interested parties. Specific mechanisms to be used for data dissemination include digital data transfer, written reports, workshops, and oral presentations.

### **Current Status (July 2006 )**

The project is in its second year. All activities are on schedule and proceeding as planned.

### **Funding**

This project was selected in response to DOE's Oil Exploration and Production solicitation DE-PS26-04NT15450-0 (November 4, 2003), focus area Advanced Diagnostics and Imaging: Regional Study and Basin Analysis.

**Publications**

A Semi-annual progress report (3/31/05) has been submitted. Reports are available through NETL, 918-699-2000.

**Project Start:** October 1, 2004

**Project End:** September 30, 2007

**Anticipated DOE Contribution:** \$800,000

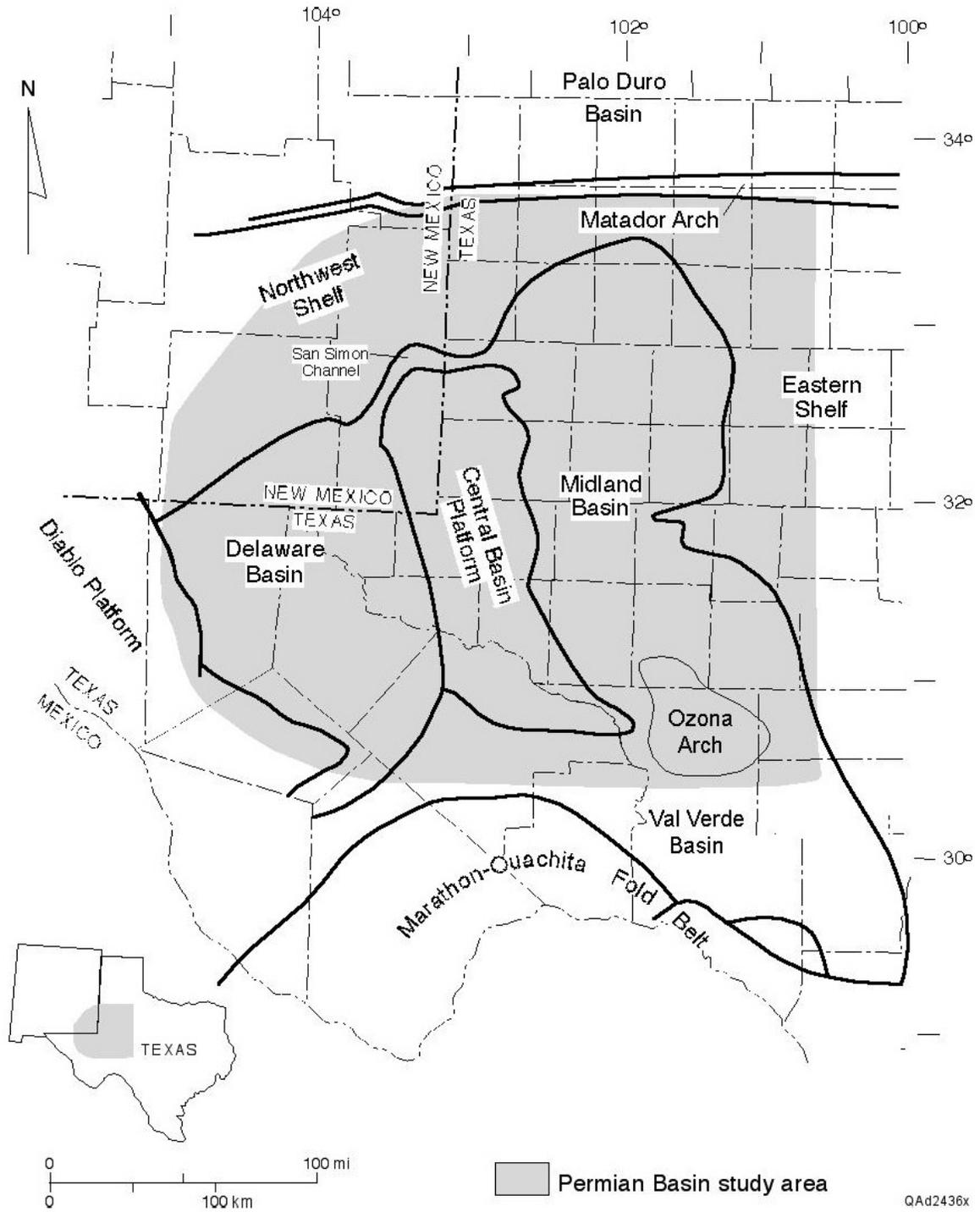
**Performer Contribution:** \$258,571 (32% of total)

**Other Government Organizations Involved:** State of Texas

**Contact Information**

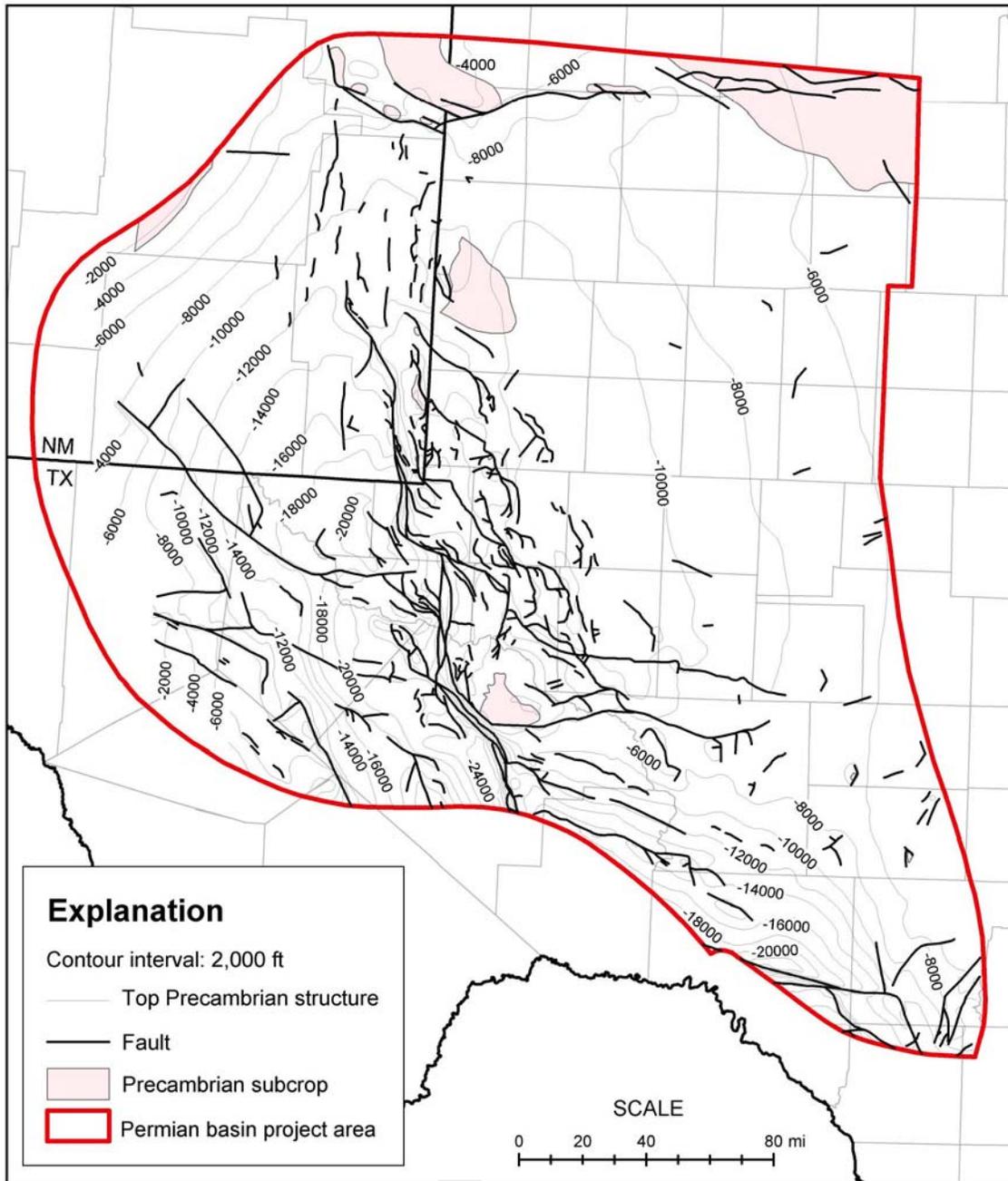
NETL – Daniel Ferguson (daniel.ferguson@netl.doe.gov or 918-699-2047)

BEG – Stephen Ruppel (stephen.ruppel@beg.utexas.edu or 512-471-1534)



QAd2436x

Map of Permian Basin showing extent of study area.



Map of structure on the top of Precambrian basement. The map, which is the first of its kind, is spatially registered in ARC-GIS.