PROGRAM facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Strategic Center for Natural Gas & Oil

01/2005

ADVANCED DIAGNOSTICS AND IMAGING SYSTEMS

This program area focuses on the development of technology for cost-effectively producing natural gas from challenging geologic settings and formations, with current emphasis in the following areas:

- **Modeling –** Research, development, and demonstration of exploration technologies to predict areas of high natural fracture density that lead to commercial gas production, and improved capability to model discrete reservoir features and heterogeneity.
- **Data Acquisition –** Research, development, and demonstration of next generation data acquisition tools for improved reservoir characterization, including fracturing and fluid flow, in low permeability formations, in the shallow water/deep gas plays of the Gulf of Mexico, and in deep portions of interior U.S basins.
- **Data Interpretation and Analysis –** Research, development, and demonstration of improved technologies for rapid, efficient, and reliable data processing, interpretation, and visualization.
- **Production Technology Projects –** Research, development, and demonstration to improve gas field development and validation of advanced stimulation technologies.
- **Water Production –** Research, development, and demonstration to identify and remediate excessive water inundation in wells in basin centered, low permeability gas producing formations.

Current Activities

- **Modeling –** Geomechanical Modeling (Wind River and Anadarko Basins); Integrated 2-D Seismic and Remote Sensing (Appalachian Basin); Multi-component 3-D Seismic/Integrated Reservoir Simulation (San Juan Basin); Integrated Geomechanical and Reservoir Modeling (Greater Green River Basin and Austin Chalk); Basin Simulation: 3-D Reaction, Transport and Mechanical Model (Austin Chalk and Illinois Basin)

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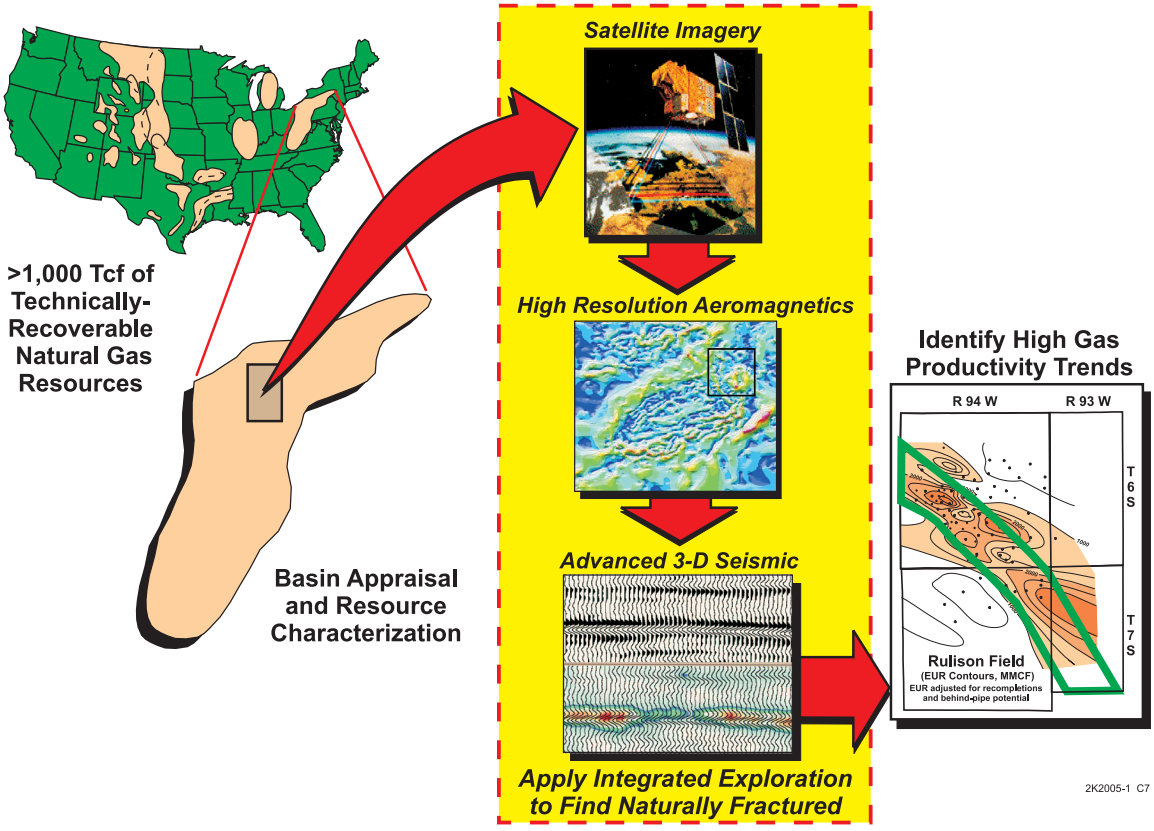
Current Activities (continued)

- **Data Acquisition –** New Tools for Quantification of Naturally Fractured Reservoirs (Permian Basin); 400-Level, 3-Component Downhole Seismic Receiver Array; Multiple Azimuth 3-D Seismic Attributes (San Juan Basin); Advanced Seismic While Drilling System; A Robust MEMS Based Multi-component Sensor for 3D Borehole Seismic Data

- **Data Interpretation and Analysis –** Multi-Attribute Seismic/Rock Physics Analysis (West Texas); Imaging Super-Deep Gas Plays Across the Gulf of Mexico Shelf with Multicomponent Seismic; Ultra-deep Wave-equation Imaging and Illumination (Gulf of Mexico); Novel Use of P-wave and S-wave Seismic Attenuation for Deep Natural Gas Exploration and Development (Permian Basin/Gulf of Mexico)

- **Production Technology Projects –** Optimizing Infill Drilling Using Fracture Flow Anisotropy (San Juan Basin); Advanced Fracturing Technology for Tight Gas (Permian Basin)

- **Water Production –** Conceptual Water Distribution Model and Production Problems for the Greater Green River Basin

Integrated Exploration Methodology