Oil & Natural Gas Activities
New Mexico Bureau of Geology and Mineral Resources
at New Mexico Tech

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Activities areas

Data collections & archives *(unique resource, available to all)*

- Cores
- Drill cuttings
- Well records, incl. well logs
- Petroleum source rock information

Industry & public service

- 625 data & information requests in FY 15-16

Applied research projects

- Oil, natural gas, helium, carbon dioxide
- Goal is to understand resource base and geology of resources
- Funding drawn from state appropriation and DOE, State Land Office, Gas Technology Institute, other sources as available

Educational activities

- Mentor NMT geology and petroleum engineering student groups
- NMT thesis committees, geology & petroleum engineering

Petroleum Staffing

- Petroleum geologist (38 years experience)
- Petroleum Information Coordinator (33 years)
- Geological Archives Coordinator – ¼ time (17 years)
Core Collection

• > 540,000 ft of core from 1,433 drill holes, stored in 6 buildings
• 3,300 sidewall cores from 120 drill holes
• Oil & gas cores, mineral cores, geothermal cores, other
• Digital data catalog
• Utilized by industry, researchers, students
Cuttings Collection

- 50,773 boxes of cuttings from 16,639 drill holes, representing 150 million ft of drill hole, enough to circle the earth 1.14 times
- Oil & gas cuttings, mining cuttings, water well cuttings
- Digital data catalog
- Utilized by industry, researchers, students
Subsurface Library

- Oil & gas well logs from 49,800 wells
- Uranium well logs from 14,210 uranium drill holes
- Deep water well logs, Albuquerque Basin
- Lithology logs of cuttings descriptions, 6,024 wells
- Well records from > 100,000 New Mexico wells
- One-of-a kind historic well records, several collections
- Oil & gas pool boundary maps
- Microfossil determinations made on drill cuttings

- County petroleum exploration maps
- Other data
Research Areas

- Subsurface geology of New Mexico Basins
- Investigations into producing basins and frontier basins
- Oil & gas, including petroleum source rock studies
- Helium (study unique to NM)
- Carbon dioxide
- Results of research and analyses made public – much interaction with industry – economic development
- Several projects in conjunction with other entities (PRRC, NMT faculty/students, U of Texas, other state geological surveys)
Example: Permian Basin – Barnett Shale

- Results showed thermal maturity trends in direction not expected
- Trends confirmed by multiple geologic/analytic techniques
- Indication is favorable area different and perhaps larger than expected

Depth to Barnett

Thermal maturity indicators - kerogens

Barnett gas composition from mudlogs
Current project: Sandoval County

- Study at request of county in response to efforts to drill an exploratory well near Rio Rancho.
- Funded by Sandoval County.
- Assess oil & natural gas potential of the county.
- Relate potential oil & gas reservoirs to aquifers across the county.
- Describe modern drilling techniques and effects on oil & gas production and on aquifers in the Sandoval County setting.
- Project is in its beginning stages; project report is due at end of May 2018.
Example: Tucumcari Basin

- Tucumcari Basin studied in phases
- Basic geology of subsurface mapped
- Oil & gas related aspects in subsurface of basin analyzed and mapped
- Work funded by NM Bureau of Geology and State Land Office
- Publications and presentations followed each stage

- After each phase of work, significant lease activity followed
- Significant gas discovery was made, but gas prices fell so gas became “stranded”
- However some of the gas contained helium, which may carry the next phase of exploration. Recent renewed interest.
Research areas:
Environmental and societal concerns of petroleum production

- **Induced seismicity and oil & gas production** – possible focus areas in New Mexico, in conjunction with NMT Geoscience faculty
- **Hydraulic fracturing** – description of process; water use associated with hydraulic fracturing; brackish water (10,000 ppm TDS) can now be used – decreases need for fresh water
Information for the general public

New Mexico's Natural Gas Resources

Conventional Gas
After World War II the demand for natural gas as an energy source soared. Exploration vertical drilling in the 1950s and 1960s in the San Juan Basin resulted in new discoveries of major natural gas reservoirs. Some of these were conventional reservoirs, as the gas was produced from discrete accumulations in permeable rock. However, many were widespread, less porous (“tight gas”), nohtype accumulations in Upper Cretaceous sandstones. This new gas was not only located in the heart of New Mexico, it was exported through interstate pipelines to California. Production boomed. Reservoirs filled with natural gas were now sought after rather than avoided. Additional drilling provided data that helped to define the extent and nature of natural gas reserves both in the San Juan and Pecos Basins. Even as conventional gas has declined, discovery of substantial new and previously unrecognized gas reservoirs continues to this day.

Coalbed Methane
Underground coal seams have long been known that coal beds are associated with natural gas that, if properly vented, will result in large and often tragic explosions within the coal mine. In the 1990s it was found that coalbed methane can be produced economically from the Upper Cretaceous Frakland Formation of the San Juan Basin. The pradilled coals were quickly...
Summary

• Petroleum activities at New Mexico Bureau of Geology are highly diversified

• Data repository contains cores and cuttings on thousands of New Mexico wells and also well records, logs, lithology descriptions, and unique collections of data. Mostly donated.

• Collections are extensively utilized by industry.

• Applied research aimed at analyzing and assessing geology and resources in both producing and frontier basins. *Economic development.*

• Research is also focused on environmental and societal concerns.