Petroleum Source Rock Data for the Bone Spring Formation, Delaware Basin, Southeastern New Mexico

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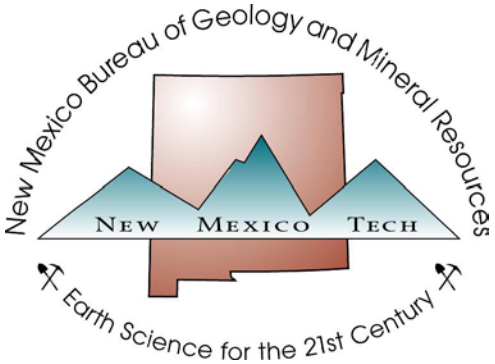

Dr. Peter A. Scholle, Director

The Bone Spring Petroleum Source Rock Database

This database (*Bone Spring source rocks.xls*) presented in this open file report has its origins in a large multidisciplinary research project at New Mexico Tech that was funded by the U.S. Department of Energy (DOE Contract No. DE-AC-26-99BC15218: Risk Reduction with a Fuzzy Expert Exploration Tool). The purpose of the project was to apply modern artificial intelligence and fuzzy logic techniques to develop a computerized tool that reduces risk in oil and gas prospecting. As part of the project, data from several petroleum systems were generated and gathered and input into the fuzzy logic system. One petroleum system was the Lower to Middle Permian system of the lower Brushy Canyon Formation (reservoir and source) and upper Bone Spring Formation (source) in the Delaware Basin of southeastern New Mexico. Results of the geological analysis of this system are available in Justman (2001), Justman and Broadhead (2000) and Broadhead and Justman (2000). The data presented in this open file report were generated by Heidi Justman as part of her graduate studies in geology at New Mexico Tech from 1998 through 2001 under the direction of the junior author. The data constitute petroleum source rock analyses made on well cuttings of the upper part of the Bone Spring Formation (Permian: Leonardian). Analyzed samples are composites of cuttings from several 10 ft drilled intervals. In most cases, there is one sample per well. Cuttings were carefully selected ("picked") to exclude non- Bone Spring lithologies (cavings from shallower stratigraphic units). Only the dark-lime mudstone/wackestone source facies from the Bone Spring were analyzed. Once the samples were selected, they were sent to Geoffrey S. Bayliss of Geochem Laboratories, Inc. in Houston, Texas for analysis.

In the database, several attributes are given for each sample, including:

API number of the well

Operator

Lease name

Well number

County

Location Township
Range
Section

Footage from section boundaries

Longitude

Latitude

Top of sampled interval (recorded as depth in well, in feet)

Bottom of sampled interval (recorded as depth in well, in feet)

Geologic system (Permian for Bone Spring)

Geologic series (Leonardian for Bone Spring)

Lithostratigraphic formation (Bone Spring Formation)

TOC - total organic carbon (weight percent)

TAI - the Thermal Alteration Index as provided on analyses performed by Geochem Laboratories, Inc. A measure of thermal maturity.

Algal - percentage of kerogen that is algal material, by visual petrographic estimate

Amorphous - percentage of kerogen that is amorphous material, by visual petrographic estimate

Herbaceous - percentage of kerogen that is herbaceous material, by visual petrographic estimate

Woody - percentage of kerogen that is woody material, by visual petrographic estimate

Inertinite - percentage of kerogen that is inertinite, by visual petrographic estimate

S_1 – Rock Eval S_1 peak, measured in milligrams evolved hydrocarbons per gram of rock.

S_2 – Rock Eval S_2 peak, measured in milligrams evolved hydrocarbons per gram of rock.

S_1 – Rock Eval S_1 peak, measured in milligrams evolved carbon dioxide per gram of rock.

PI – Rock Eval Productivity Index

TMAX - the temperature, in degrees centigrade, of the S_2 peak derived from Rock-Eval pyrolysis in degrees Celsius. A measure of thermal maturity.

HI – Rock Eval Hydrogen Index, measured in milligrams evolved hydrocarbons per gram of organic carbon.

OI – Rock Eval Oxygen Index, measured in milligrams evolved carbon dioxide per gram of organic carbon.

Sample type – all cuttings for this project.

References

Broadhead, R.F., and Justman, H.A., 2000, Regional controls on oil accumulations, lower Brushy Canyon Formation, southeast New Mexico, *in* DeMis, W.D., Nelis, M.K., and Trentham, R.C., eds., The Permian Basin: Proving ground for tomorrow's technologies: West Texas Geological Society, Publication 00-109, p. 9-18.

Justman, H.A., 2001, Petroleum source rocks in the Brushy Canyon Formation (Permian), Delaware Basin, southeastern New Mexico: M.S. thesis, Earth and Environmental Sciences Department, New Mexico Institute of Mining and Technology, 106 p.

Justman, H.A., and Broadhead, R.F., 2000, Source rock analysis for the Brushy Canyon Formation, Delaware Basin, southeastern New Mexico, *in* DeMis, W.D., Nelis, M.K., and Trentham, R.C., eds., The Permian Basin: Proving ground for tomorrow's technologies: West Texas Geological Society, Publication 00-109, p. 211-220.