HOW DOWNHOLE TEMPERATURES AND PRESSURES AFFECT DRILLING

No abstract available.

TISSOT, BERNARD P., BERNARD DURAND, and JEAN ESPITALIE, Dept. Geochem., Inst. Français Pétrole, France

INFLUENCE OF NATURE AND DIAGENESIS OF ORGANIC MATTER IN FORMATION OF PETROLEUM

Marine or lacustrine sediments may be considered as subaquatic soils, in which organic matter is destroyed, transformed, or preserved to a certain extent, according to the conditions of sedimentation. Small amounts of hydrocarbons can be found, inherited from living organisms, either directly (like certain n-alkanes of high molecular weight) or through an early transformation (like steroid and triterpenoid types). When humic material is present in muds, it may represent a large amount of total organic matter and constitute the support of various functional types of compounds. The whole is able to evolve by loss of functional groups towards several types of kerogen, according to depositional environment.

Elevation of temperature and pressure during burial of sediments results in a physicochemical transformation of the various kerogen types, along different evolutionary paths. The products formed include oil, gas, and other compounds like water and carbon dioxide. Nature and abundance of these products depend on particular evolutionary path and grade of diagenesis. The bulk of oil is formed at that stage of diagenesis in petroleum source rocks: the greatest rate of oil generation can be identified on the evolutionary paths, and is followed by gas generation as burial increases. Other types of organic matter produce little petroleum, but produce methane at great depth.

Identification of the nature of kerogens resulting from depositional environment and of the grade of diagenesis resulting from the burial history allows the evaluation of the petroleum potential of a given formation.

TOMAN, J., M. D. DENNY, D. O. EMERSON, J. H. HOWARD, R. M. LESSLER, D. N. MONTAN, R. W. TERHUNE, and H. A. TEWES, Lawrence Livermore Lab., Univ. California, Livermore, Calif.

STATUS OF GAS-STIMULATION TECHNOLOGY EMPLOYING NUCLEAR EXPLOSIONS

Recent studies conclude that the tight gas sands in the Rocky Mountain region contain a resource potential of nearly 600 Tcf of natural gas. Of this amount, approximately 300 Tcf may be recovered through the use of nuclear explosives, assuming that nuclearly stimulated wells will produce for 50 years. This volume is equivalent to the present proved national gas reserves of 290 Tcf. Significant results have been obtained from full-scale tests conducted to date, namely Gasbuggy and Rulison. Additional progress has been made in further developing this technology, including (1) the successful testing of a small-diameter (less than 8-in.), low-tritium producing explosive designed specifically for gas-stimulation applications; (2) the completion of technical plans for the Rio Blanco test which will stimulate a 1,200-ft gas-bearing section; (3) progress on computer-modeling studies comparing simultaneous versus sequential detonations in the same hole; (4) the formulation of the first experiment needed to develop a sequential explosion system.

Extensive studies also have been made on the safety of this technique. Detailed investigations show that users of the gas will be exposed to an increment of radioactivity equal to about 1% of the natural radioactivity in our background. Ground motion due to the nuclear detonation is unavoidable. However, by proper choice of yield, and location, and by sequential detonation, it can be controlled to limit inconvenience and damage such as plaster cracking. Public acceptance will depend largely on a clear understanding of the value of the benefits of the program as compared to the inconveniences involved. The benefits include additional local revenues to those near to stimulated fields, royalties to landowners, and, to the nation, an additional supply of natural gas, which is very much in demand.

TROLLINGER, WILLIAM V., and HERBERT A. TIEDEMANN, Trollinger Geological Associates, Inc., Denver, Colo.

IMPACT OF NASA ERTS SATELLITES ON WORLDWIDE ENERGY RESOURCES

NASA's Earth Resources Technology Satellite, ERTS-A, has returned large volumes of imagery from space since its launch in July 1972. Coverage has been obtained over much of the globe, including many little known, rarely (if ever) photographed regions. Virtually all of the United States has been covered, some areas many times over. The quality of the imagery returned is much better than anticipated, although it is less than desirable for other than regional interpretation. ERTS-B and Skylab are follow-on programs, scheduled for 1973, that promise important improvements in quality of photography.

ERTS photographs are being evaluated by many scientists covering many disciplines, including mineral and land resources, agriculture and forestry, environment, water resources, marine resources, land use, *etc.* Results indicate important findings relative to petroleum and mineral exploration.

TRUEX, JOHN N., THUMS Long Beach Co., Long Beach, Calif.

STRUCTURAL EVOLUTION OF WILMINGTON ANTICLINE, CALIFORNIA

Isopach maps of the major zones of the East Wilmington field shed significant light on the structural evolution of the Wilmington anticline.

A minor ancestral basement high marked the location of the Wilmington anticline at the close of the early Mohnian, but the structure was essentially a syncline on the north flank of the Catalina uplift. Uninterrupted sedimentation occurred throughout the late Mohnian and early Delmontian. No evidence of the present Wilmington anticline is seen prior to the deposition of the lower part of the Ranger. The source of sediment supply was on the northeast and the direction of transport was southwest.

Growth of the Wilmington anticline was initiated in late Miocene time, early in Ranger deposition. Most Ranger subzone isopachs reflect Ranger structure, and demonstrate continuous anticlinal growth during lower Repetto deposition. Movement on the Long Beach Unit fault began during Ranger X-sand deposition and culminated at the close of F-sand deposition. The F sand was eroded and channeled by current action along and across the anticlinal axis prior to F_o-sand deposition.

The F_o sand was deposited as a lens-shaped body on the eroded F, and is present over a minimum 48-sq-mi area. No evidence of structural growth is seen during the deposition of this sand, in contrast to the other Ranger sands. The F_o is thought to be primarily a tractionite.

Renewed uplift and additional movement on earlier faults occurred during the Pasadenan orogeny and completed Wilmington structural development.

U.S.G.S. SPOKESMAN

NORTH ATLANTIC OUTER CONTINENTAL SHELF

No abstract available.

VAN DE KAMP, P. C., J. D. HARPER, J. J. CONNIFF, and D. A. MORRIS, Shell Oil Co., Denver, Colo., Midland, Tex., Ventura and Los Angeles, Calif.

FACIES RELATIONS AND PALEONTOLOGY IN EO-