

currents and cap rocks in forming an economically exploitable deposit? What factors determine the life expectancy of the field?

Geothermal exploitation methods have not advanced far beyond the stage of merely drilling on hot springs, except in Italy where geothermal gradient surveys have been successfully applied. Recent results from deep resistivity surveys, however, indicate that this method holds considerable promise. Much progress has been made in understanding the chemistry of thermal systems and in the near future this knowledge should form the basis of effective exploration methods.

Although the successful development of geothermal resources offers a great challenge to exploration geologists and engineers, it offers no less a challenge to power legislators, planners and administrators. Because natural steam must be utilized when and where it is produced, successful development requires the closest cooperation between the exploration groups and the power marketing and distributing sector. Rapid development of geothermal power cannot be expected until these two groups, and the legislators who control their activities, arrive at a mutual understanding of each other's problems.

## MUDDY SANDSTONE DEVELOPMENT IN THE RECLUSE FIELD, CAMPBELL COUNTY, WYOMING

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The Powder River Basin of Wyoming is the scene of intensive exploration drilling in search of oil production from the Muddy Sandstone (Newcastle Sandstone of Lower Cretaceous Age).

In June of 1967, the Recluse Field was opened by the drilling of the Apache Corporation No. 1 U.S. Fagerness, in the NW NW of Section 15-56N-74W, Campbell County, Wyoming. The Muddy Sandstone was encountered at a depth of 7,586 feet and a drill stem test from 7,550-7,641 feet recovered oil flowing at the rate of 20 BOPH. In a period of 16 months, over 80 producing wells have been drilled on 80-acre spacing. A reserve of 30 million barrels of primary oil has been established.

Subsurface studies show an elongate sand body running over eight miles in a northwest-southeast direction. The average width is one and one-half miles. Oil accu-

mulation is due to stratigraphic entrapment. The deposition of the Muddy Sandstone appears to be a barrier-island-type deposit. The sandstone attains a thickness of forty feet. Thinning takes place at its base in a southwest direction and thins at its top in a northeast direction. This same geometry is present in the Galveston barrier island.

Studies of modern depositional environments such as the coast of the Gulf of Mexico can be of benefit in reconstructing ancient depositional environments of the Lower Cretaceous of the Powder River Basin of Wyoming. The length, width, direction, orientation and geometry of known modern barrier island deposits can be helpful in exploration and development of the Lower Cretaceous buried sand bodies.

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