PART II
PRESENTATIONS BEFORE THE SOCIETY (AUTHORS' ABSTRACTS)

FUTURE PETROLEUM PROVINCES OF THE MID-CONTINENT

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May 10, 1970

On May 29, 1967 the Assistant Secretary of the Interior of the United States requested that the National Petroleum Council prepare a report on the future provinces of the United States. A coordinating subcommittee was organized under the chairmanship of Ira Cram who divided the country into 11 regions and appointed a regional coordinator for each region. Region 7 covered the Northern Mid-Continent.

The purpose of this study was to evaluate, as completely as possible, the future recoverable petroleum potential of this region. This was to be done primarily on the basis of considered geologic opinion and only secondarily on a quantitative basis.

One aspect of this study was to take a regional view of the Mid-Continent; one that would relate to the surrounding provinces, Illinois basin, Williston basin, Rocky Mountains and Texas. A series of 27 isopach and paleogeologic maps and 12 diagrammatic cross sections were prepared. Eighteen of these maps and all the cross sections are used to illustrate the stratigraphic and structural evolution of the Mid-Continent. Areas of present production are shown on each map.

Finally a series of charts indicate the future oil and gas potential which is estimated to be 1.7 billion barrels of recoverable oil and 44.5 trillion cubic feet of gas.

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GENETIC UNITS IN DELTA PROSPECTING

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May 13, 1971

Deltas generally are formed at river mouths during stillstands of sea level under conditions of either cyclic transgression or regression. Consequently, they are seldom isolated phenomena but, rather, occur in multiples in a predictable fashion. Reservoir facies consist of both continuous and discontinuous, bifurcating channel sandstones which thicken downward at the expense of the underlying pro-delta clays.

All of the lithologic components of a deltaic complex are related to each other and are collectively referred to as one type of **Genetic Increment of Strata** (G.I.S.). The G.I.S. is a sequence of strata in which each lithologic component is genetically related to all the others. It is defined at the top by a time-lithologic marker bed (such as a thin limestone or bentonite) and at the base by either a time-lithologic marker bed or a facies change from marine to non-marine beds. It generally consists of the sum total of all marginal marine sediments deposited during one stillstand stage of a shoreline, or it may be a wedge of sediments deposited during a series of cyclic subsidences or emergences. An isopachous map of a G.I.S. clearly shows the bifurcating trends of the individual distributaries and the shape of the delta, regardless of the variable lithology of the channel fills.

A **Genetic Sequence of Strata** (G.S.S.) consists of two or more G.I.S.'s and, when isopached, clearly defines the shelf, hingeline, and less stable portion of a depositional basin. An isopachous map of the McAlester Formation of the Arkoma basin is a good example of a G.S.S. The oil-productive Booch Sandstone is a good example of a deltaic complex occurring within a G.I.S. of this G.S.S. The upper Tonkawa, Endicott, and Red Fork Sandstones of the Anadarko basin are identified as deltaic accumulations within different G.I.S.'s.

A hypothetical model serves as a basis for establishing the criteria for: (1) recognizing successive stillstand positions of a shoreline; (2) predicting paleo-drainage courses; (3) predicting positions of a series of deltaic reservoirs; (4) locating isolated channel sandstone reservoirs; and (5) tracing related beach sandstone reservoirs.

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BUFFALO WALLOW FIELD

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November 23, 1970

Buffalo Wallow is located on the south flank of the western Anadarko basin, 15

miles southeast of the town of Canadian in Hemphill, Texas. Buffalo Wallow is considered one of three major ultra-deep Hunton discoveries in the Western Anadarko Basin in the last 5 years. Shallow structural interpretation intrigued oil finders with the anomalous condition of the area for years, yet it remained for Phillips to complete the No. 1 Carwile, (the Gageby Creek discovery well for 320 MMCFG/D from the Hunton with 123' of effective pay) to spur the search for similar deep production. Seismic work, utilizing the new stacking method was undertaken by many companies in the area; and, apparently several mapped approximately the same fault structure. This conclusion is drawn by the rush of companies to get a piece of the action. And, subsequently, the Union-No. 1 Bradstreet was commenced in July of 1966, projected as a 20,000' Hunton test. While the Union-Bradstreet was drilling, Phillips Petroleum Co. made their second major Hunton discovery, the Washita Creek Field, approximately 10 miles east, and completed for 265 MMCFG/D in November of 1966. Following the Phillips-Bowers Washita Creek discovery, the Union-Bradstreet was completed as the discovery well for Buffalo Wallow in the Hunton for 73 MMCFG/D, September 14, 1967, as the third major Hunton discovery found in a span of 4 years in an area of less than 200 square miles. Certainly, the success of the Hunton is all too apparent now when, within three short years, the Buffalo Wallow Field has 13 completed wells, 3 dry holes, and 2 wells in process of drilling, with a proven reserve of almost one trillion CFG.

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PETROLEUM POTENTIAL OF THE UNITED STATES

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April 19, 1971

Important oil and gas fields continue to be found in unusual and surprising geological environments. Each discovery improves the petroleum geologist's understanding of the habitat of oil, and sharpens his oil finding ability. An adequate supply of domestic petroleum in the future depends upon such unique discoveries to a greater extent than in the past.

The existence of many more such accumulations and others at customary or greater depths in both the less explored and more thoroughly explored areas is not doubted by the authors of the Association's Memoir 15 "Future Petroleum Provinces of the United States." They have approached the problems of the country's petroleum potential positively, not negatively, and have expressed their opinions qualitatively and usually quantitatively. An enormous amount of oil and new geological and other exploratory data has been assembled which should provoke alternate opinions leading to additional discoveries.

The extent to which the vast petroleum resources are reduced to possession depends on the impact of ever-changing economic and political events upon the rising tide of technological competence and knowledge. The role of the petroleum geologist as earth scientist, explorer and salesman is destined to grow in importance, particularly onshore in the conterminous United States where a significant percentage of the visualized undiscovered crude oil and natural gas is in stratigraphic traps, combination stratigraphic and structural traps, reefs, and complex structural situations.

Clearly a great deal more exploratory drilling is needed, not only to explore such traps, but to provide much needed geological and production data in the large undrilled areas. To the extent industry and government policies militate against expanded exploration, particularly drilling, a large part of the petroleum resources will rest uselessly in the ground.

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PEORIA FIELD, ARAPAHO COUNTY COLORADO

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May 24, 1971

The Peoria Field, approximately forty miles east of Denver in Arapahoe County, Colorado, is situated in the south-central portion of the Denver-Julesburg Basin. The field was discovered in July, 1970, by Tom Vessels in partnership with Amoco Production Company (Pan American Petroleum Corpo-