ABSTRACTS OF ROCKY MOUNTAIN SECTION PAPERS

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(Numbered in sequence of technical program)

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EXPERIENCE WITH MECHANIZED WELL DATA SYSTEM

Interest in electronic data processing as a supplementary exploration tool is growing throughout the oil industry. The volume of well data is increasing exponentially. Before any data retrieval or processing can be done, the most important data items must be converted to a machine form. Converting the current data is a small problem. Converting the useful backlog data is a large and costly problem. Many companies are approaching this problem through individual and group efforts. The Standard Oil Company of California has developed a mechanized well data system for the storage, updating, correcting and retrieval of useful well data and information.

A team of geologists surveyed the Corporation's exploration offices to define the most used well data and the major problems related to manual retrieval. An area in California was chosen for a test which involved data conversion and the development of computer programs to utilize magnetic tape files and the IBM 1401 computer. The system was designed to include all wells, a high percentage of data types, a low percentage of errors, minimum coding, readable output, provisions for expansion, update and correction procedures, and simple query construction. The system was developed in two phases. Phase I included the well biography and an index to data. Phase II included selected numerical and tabular well data as well as interpretative data. Experienced technical assistants under the supervision of a geologist transcribed the data from complete well files. The average per well costs for conversion to magnetic tape ranged from $5 to $15 depending on the amount of information included. To search the magnetic tape file, a computer query is formulated from a geologist's specific question. The computer search results in readable, uncoded lists. The cost to answer typical geological requests varies from $3 to $10 per thousand wells depending on the complexity of the question. The savings of professional search time and the volume of pertinent data made available is gratifying. But problems still exist—data conversion costs are high, more suitable machines are needed, true value of such systems are difficult to assess.

Computer systems have many potential exploration applications which will have to be originated by enlightened, experienced, competitive, and imaginative oil finders at all levels. The storage-and-retrieval of basic well data is the logical starting point.

2. MARK E. HENNES, British American Oil Producing Company, Casper

LITHOPOROSITY: INTEGRATED TECHNIQUE FOR MAPPING LITHOLOGY, ENVIRONMENT, AND EFFECTIVE POROSITY

Three basic stratigraphic problems, lithology, environment, and porosity, confront most geologists working with sedimentary rocks. An evaluation of any time or rock unit should involve all three problems with an economic focus on distribution of porosity—effective porosity. Conventionally, a complete evaluation would be accomplished by an integration of the conclusions of the separate problem analyses. A more desirable approach, prior to map interpretation, would be the integration of the basic data of these problems into an objective form, numerical units, common to each problem. With roots in a foundation of common measurement the solution to the separate analyses would be well coordinated and would result in greater accuracy with the integrated conclusions than that achieved by compounding interpretations based on diverse units of measurement.

Lithoporosity is a technique which evaluates effective porosity by use of the lithologic factors which retard its development. These "retarding factors," derived from sample descriptions and other data, are given numerical values from a standard scale determined for the study unit. Such a derivation is part of a definite data synthesis to be followed. By this synthesis, preparation for a study must include exact correlations of the unit concerned and the establishment of certain standards for evaluation by lithoporosity. A tabulation of descriptive data in each well must then be made involving lithology, environment, fluids, and porosity from which retarding factors are to be estimated. Finally, specific data are extracted for map compilation.

By mapping retarding factors we obtain quality control and distribution of critical *lithologic* phenomena. With such control together with our mapping of other pertinent data from the tabulation we achieve an *environmental* concept of the unit. If we composite the retarding-factor maps and convert the resulting values to porosity equivalents we find that we have developed an areal distribution of *effective porosity*.

Utilizing standard subsurface information only, lithoporosity offers many advantages. Mainly, it can be used to evaluate single or multiple zones in any effectively porous sedimentary rock in situations where time and simplicity are of utmost importance. Above all, it is a complete synthesis intended to serve better the foremost geologic need—predictability.

3. DAVID W. ELIAS, Mountain Fuel Supply Company, Vernal, Utah

PALEOGEOGRAPHY APPLIED TO EXPLORATION

Paleogeography, the mapping of seas, shorelines, rivers, deltas etc., at some time in the past, is a valuable tool in exploring for reservoir rocks in the Cretaceous section of the Rocky Mountain region. Paleogeographic mapping is accomplished by means of stratigraphic studies to determine two essential factors—environment of deposition and correlation. Classification of the Rocky Mountain Cretaceous rocks into four broad facies (Inland, Shoreline, Sandy Offshore, and Shaly Offshore) is a useful device which aids in the study of the complex intertonguing of varying lithologies. An understanding of shoreline movements (transgression and regression) is the key to correlation in the Cretaceous section. The