

ploration. Today, there is no reliable foreign source of oil for this country. Where there is political instability, and even strong Communist dangers, this includes all important foreign oil producing countries, the source of supply to this country and its allies can be sealed off overnight. Even a temporary cut-off of our oil supply would cause serious economic dislocations. Our dependence must be on domestic oil as long as such a source is available.

At the same time, however, a certain volume of imports is needed to relieve the pressure on domestic production and to help adjust to constantly changing conditions in domestic economy. Major importing companies, having tremendous investments made at government behest, should be permitted to import their quotas based on the present mandatory import control. However, imports should supplement, but not supplant domestic production of oil.

Assuming that domestic production and exploration are vital to our national welfare, demand and price of domestic petroleum must remain economically healthy. We must have a constant incentive to find and produce oil; for without that incentive it will be impossible to attract necessary investment capital. In times like the present when crude oil surpluses depress markets and threaten prices, imports should not be permitted to accent this condition. When prices drop, opportunities for profit are fewer, and risk capital finds a more favorable climate outside the expensive business of petroleum exploration.

The backbone of exploration in the United States is the independent. The independent has drilled the most exploratory wells and discovered the majority of our reserves. It is the independent who stabilizes the domestic oil industry by his continued efforts to explore in places and to depths where most large integrated companies probably would not. No act, such as excessive imports, should be permitted to cause the independent to curtail his continued search for new reserves.

ROBERT S. DIETZ, Naval Electronics Lab.

Astroblemes (Meteorite Impact Structures)

EUGENE F. REID, Occidental Petroleum Corporation
Why Explore in Sacramento Valley?

Sacramento Valley exploration and development drilling for natural dry gas fields is setting a brisk pace. Incentives supporting this level of activity are found in geology, economics, and politics.

Geologically, the basin contains a thick section of rocks with favorable reservoir and source characteristics, a portion of which has already been proved productive. A moderately active orogenic history has provided an environment conducive to petroleum traps. Paleocene and Cretaceous portions of the basin are relatively unexplored.

Economically, the most important factor is the competitive position of this domestic gas by virtue of its proximity to an assured expanding market and an ample latitude for future price increases without destroying this position with imported gas and/or fuel oil. The value of Sacramento Valley gas is slightly more than double the average wellhead price throughout the United States. Average Sacramento drilling, completion and land acquisition costs are very favorable when compared with other areas of the nation.

Politically, the California producer, selling his product within the state, is not subject to Federal regulation of his producing activities or his pricing negotia-

tions. To date, no controls are imposed on his production rate by State authority. The producer can enjoy the benefits of a successful exploration program without artificial restraints.

ROBERT O. PATTERSON, Pacific-Oil Well Logging, Inc.
Field Study of Geological Well Logging at Vernalis

The common practice of using geological well logging only on discovery wells precludes the collection of sufficient data to study the relations between production and well-log curves. The continuing development of the Vernalis gas field is a notable exception, since more than 90% of the wells in this field have been logged.

Optimum operating conditions were maintained by using the same drilling rigs throughout, excellent mud control, "controlled drilling" of the productive horizons, and by de-gassing the mud column prior to penetration of new producing intervals. The curves obtained in this manner were highly definitive of the producing sands.

Examination of the curves of many zones that are comparable from a production standpoint show large variations in amplitude that are apparently due to small changes in the mud weight.

The small effort and expense necessary to standardize as many physical conditions as possible in order to provide optimum well logging conditions appear well justified in the increased reliability of the gas curves. The apparent sensitivity to small changes in mud weight casts doubt on the reliability of many previous well logs made in extra-heavy muds and suggests that care be taken in the future to insure that excessive mud weights do not weaken one of the most reliable tools in the evaluation of gas sands.

SULHI YUNGUL, California Research Corporation

Gravity Prospecting for Reefs: Effects of Sedimentation and Differential Compaction

The classical questions are: "Do reefs create recognizable gravity anomalies?" "If and when they do, then what causes these anomalies?" To find the answers to these questions, first a study of the case histories was made. It indicated that deeply buried, "isolated" organic reefs frequently create recognizable but "mysterious" gravity anomalies, and that there is no evident direct relation between the reef mass and the gravity anomaly. To find out the causes of these anomalies, the field of investigation proved to be so large that this paper could be entitled "a tentative density analysis of the sedimentary subsurface."

The reef mechanism and the depositional processes are such that there is a concentration of sand in the over-reef section. Densities in clay and sand mixtures were investigated in terms of composition and depth of burial. The sand concentration alone is capable of creating shallow positive and deep negative density contrasts sufficient to account for the major part of the gravity anomaly. The gravity effect of a hypothetical reef was calculated. The result was very much like those actually observed. The gravity anomaly depends mainly on what has happened after the reef was buried, and not on the contrast at the reef level.

L. F. IVANHOE, consultant
Bouguer Gravity Map of Alaska

This map is a compilation of all published gravity data. The 20 milligal contours were extrapolated between control points on the basis of the local geology, topography, and known gravity results in similar tectonic areas. Several regions with similar gravity char-