

This paper attempts to present evidence that justifies the confidence of the industry that it will be able to meet the anticipated demand. Certain current trends are emphasized as significant: (1) the historic record of exploration and discovery in the industry which has consistently mounted in proportion to increased demand; (2) the historic record that expert opinion has persistently underestimated the volume of the undiscovered petroleum resource; (3) the prospects for future recovery of oil excluded from present estimates of proved and potential reserves as commercially unrecoverable.

A. C. RUBEL, president, Union Oil Company of California  
Oil or Alibis

Management believes the sole purpose of its exploration team is to find new oil and gas at a cost less than present realization, in amounts sufficient to replace current production, and provide a reserve for future operations and growth.

To accomplish this objective it is assumed that members of the team are properly prepared by education, experience, and temperament to do the job.

"Tools and equipment" are available in the many aides and services of paleontology, geophysics, electric logging and its related determinations, mud logging, areal surveying, and the resources of our research organizations.

A vast record of past and current technology, theory, and accomplishment within the industry on a global scale is available through the A.A.P.G., other technical societies, and by reference text books on the subjects.

Close contact between exploration and development activities is essential to provide the exploration department with first-hand knowledge of well-drilling techniques and to furnish detailed subsurface data which are often the basis of more regional studies.

Management expects the exploration team to have an economic measure of its operations in order that the contemplated expenditures bear a reasonable relationship to possible returns.

The successful exploration team is the one which can integrate and use the tools and principles to the best advantage in finding oil.

ED J. HAMNER, director in charge of exploration, Humble Oil and Refining Company, Houston, Texas  
Explore or Liquidate

An oil company which does not find or acquire new reserves of oil and gas in sufficient quantities to balance the rate of production from old reserves is in sure process of liquidation.

The exploration team including geological, geophysical, and other work, which is the company's best hope for finding new reserves, is usually charged with that direct responsibility. Unfortunately, there is a feeling often expressed in both large and small groups that management in many companies does not show full respect for, or complete understanding of, the exploration team. Management is often charged with being too critical of exploration when a wildcat proves dry. Exploration charges that management often refuses to consider or acquire good prospects when they are conceived by the geologist or geophysicist without giving proper reasons for such rejections. These and other things cause a feeling of frustration to arise in exploration whose morale becomes seriously injured, even to the point where resulting discouraged efforts seriously impair its full value to the company. The feelings on the part of management and exploration toward each other are discussed in some detail. It is pointed out that perhaps neither management nor exploration understands the other well enough to perform its respective offices properly.

Growing exploration alumni lists of many companies testify eloquently to these facts. This discussion concludes that both exploration and management should educate themselves to the degree that they will be able to understand the other's perspective and his real desire to contribute to the growth and prosperity of his company. A high degree of cooperation and coordination of management and exploration relations will surely result in a much longer life for the industry and will put off for a long time the day when liquidation may begin.

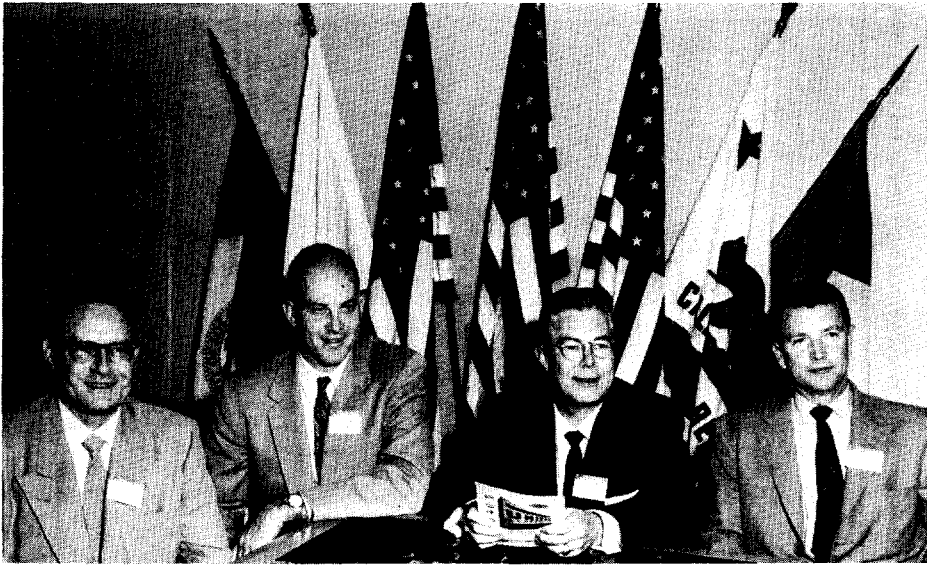
GRAHAM B. MOODY, petroleum consultant, Berkeley, California  
Economics of Exploration

The major function of exploration is to find sufficient oil (this term includes natural gas and associated liquids) to meet the continually increasing peace-time needs of the free world and to build up surplus productive capacity which will be available in case of war. This means that, over a period of years, additions to oil reserves must be greater than production if we expect supply to continue meeting demand.

It is evident that economic exploration must find oil at a cost which, when added to development and producing costs, gives a total per barrel cost less than the posted price for the crude. If it fails to do this it will cease to be a vital phase of the oil industry. Exploratory costs (total, per-barrel-discovered and per-barrel-produced) have been on the upgrade for a number of years; the trend is still up. Some published figures suggest that exploration is becoming a non-economic endeavor. This

has been true always for some operators at the same time that other operators were reaping satisfactory rewards. It should be commented that continuation of the 27½ per cent depletion allowance and a crude-price commensurate with the risks involved are essential if exploration is to retain its important place in our oil-economy. The geographical location, time of discovery, type of oil discovered, depth of drilling, and subsurface conditions encountered are a few of the variables that affect the economics of exploration.

It is probable that some of us in exploration are spending a disproportionate share of our thought and energy in calculating the ultimate dollar value of possible oil not yet discovered. It is appropriate for us to know whether the prospect that we recommend is likely to produce a few thousand barrels or a hundred million barrels ultimately. It is a waste of an oil-finder's talents, however, to calculate exactly how much oil, gas, and liquids will be discovered, the gravity of the oil, the pay-out time,



A.A.P.G. Pacific Section, 1957 Officers. Left to right: Aden W. Hughes, secretary; Robert B. Kelly, vice-president; Harvey W. Lee, president; William E. Kennett, treasurer.

and the ultimate return to risk ratio—all on undiscovered oil. Such calculations tend to dull the sharp edge of enthusiasm of the oil-finder. The accountants are good at such figures.

**OTTMAR F. KOTICK**, United States Army, Memphis, Tennessee  
Military Petroleum

For the first time in history, purchases of petroleum products and services passed the one billion dollar mark in fiscal year 1956. This represents 223 million barrels of products, 125 storage contracts, and other services related to petroleum supply.

Of the estimated procurement for fiscal year 1957 in amount of \$1,037,920,000, 61 per cent will be required by the Air Force, 27.7 per cent by the Navy, and 11.3 per cent by the Army.

Purchase of military petroleum by several types of joint-purchase agencies is briefly traced from War II to the present time. Normally, petroleum is purchased by a central agency using formally advertised open-end contracts of 6 months duration, for estimated total quantities only. Approximately 5,000 contracts are awarded annually, including those for commercial storage and operation of military bulk terminals.

Within the United States, petroleum is distributed by the contractor directly to military posts, camps, stations, including air bases, on call by the using agency. For overseas distribution, tanker loads from refineries in the United States, South America, Persian Gulf, and other places are lifted by military and commercial tankers direct to the overseas bulk terminals. From these terminals it is distributed direct to using agencies by tank trucks, pipe lines, drums, and cans, in accordance with periodic requisitions.