

Hubbard Creek Reservoir began in 1962. A single U.S.G.S. hydrologic station below the present damsite indicated that water acceptable by U.S.P.H.S. standards would be impounded. However, an increase in chloride load was noted beginning in 1958 and continuing into 1961. Consultants were employed to ascertain the source of the contamination, inasmuch as the watershed is located in one of the most intensively drilled areas in the nation, with more than 13,000 known holes. The consultants' report, submitted in May, 1962, established that the watershed was naturally clean and that contamination originated primarily from salt water disposal pits, improperly plugged wells, and water escaping to the surface as a result of repressuring by waterfloods.

Remedial work, including plugging leaking wells, a no-pit order for the watershed by the Texas Railroad Commission effective March 1, 1964, the establishment of additional U.S.G.S. hydrologic stations, and a general clean-up by the oil industry significantly reduced the chlorides reaching the reservoir. These remedial measures, however, were insufficient to reduce chlorides entering the reservoir to less than 50 ppm.

A second intensive study was submitted by the consultants in January, 1966, and isolated eight remaining contaminated areas. This study also recognized salt-water charged alluvium as an important source of contamination. These findings were supported by U.S.G.S. data. It was found that 4 per cent of the watershed area contributed up to 40 percent of the total chloride load reaching the reservoir. This area, just west of the city of Albany, Texas, contains numerous shallow waterfloods and very old production dating to the 1900s. As a result of continuing pollution originating here, the Railroad Commission held a "show cause" hearing in Albany in August, 1966, during which operators were given an opportunity to show cause why offending leases should not be shut down.

The results of the consultants' contamination studies in this watershed emphasize that geological responsibility today goes far beyond the search for petroleum reserves. Geologists must be prepared to point out unmistakably to their employers and clients the many potential hazards that lie ahead—perhaps many years ahead—as a result of poor completion practices. These matters are of concern to the geological profession and should be considered definite geological responsibilities whose importance will increase in years to come.

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OLD IDEAS INTO NEW DOLLARS—PREPARATION AND EVALUATION OF REMEDIAL PROBLEMS

The total value of an oil and gas property may be affected greatly by the timely performance of remedial work. A simplified method of evaluating the economics of such work, utilizing the skills and practices of a petroleum geologist, is presented, using actual field case histories.

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GROUND RULES FOR SAN ANDRES EXPLORATION

Interest in the San Andres of New Mexico currently is running at a high level with an average of 8 wildcats and 30 field wells active within the 44 town-

ships of the play. The play centers on the common corner of Chaves, Roosevelt, and Lea Counties. In this general area on the north flank of the Tatum basin and the south flank of the Matador uplift, oil and gas is being found in the San Andres under hydrodynamic conditions where permeability pinchouts cross anticlinal noses. Most of the medium-gravity oil has been found between 3,000 and 5,000 feet in fractured dolomite of the Slaughter zone of the San Andres. Almost all of the 10 commercial San Andres fields in the report area have been found within the last 8 years. During this period the petroleum industry drilled about 150 exploratory wells and more than 550 San Andres field wells. The 10 fields ultimately should yield at least 100 million dollars gross revenues from the sale of oil and gas.

On the average this is 10 million dollars per field, which is the approximate equivalent of 4 million barrels of oil. An average productive well will generate approximately \$200,000 gross revenues during the life of the property. This compares with an average dry-hole cost of \$30,000 and \$55,000 for the average producer.

Because of the very low porosity of the Slaughter reservoir zones, drill-stem tests and conventional logging procedures generally are inadequate to evaluate the San Andres properly. This paper reviews several of the guide lines or rules which should assist in finding and evaluating San Andres traps.

CORRECTION TO CERTIFICATION PROCEDURE NOTICE

Active members desiring certification, who have a minimum of *eight* years' experience in petroleum geology (including graduate study and teaching) will receive an application form, on request, from AAPG Headquarters (Box 979, Tulsa, Oklahoma 74101). The completed form with application fee attached should be returned to Headquarters, where letters from sponsors and references are to be directed.

The complete application file is forwarded to the District Representative, who serves as the local certification committee member. The file is then forwarded to the Board of Certification for processing. Following thorough research, the file is forwarded to the Executive Committee with an appropriate recommendation. After a complete review of the application file, the Executive Committee awards or withholds certification.

The application processing routine may take 5-6 months, because of the number of persons involved. With certification comes a certificate suitable for framing and the eligibility to lease an embossing seal or stamp.

For details regarding the requirements and procedures of AAPG certification, refer to the April, 1965, *Bulletin*, page 486.

The preceding reprint of the certification procedure is a correction of the paragraph published on p. 2494 of the November, 1966, *Bulletin* which directly quoted the report of the Professional Standards Committee cited. Executive committees require *eight* years of experience in petroleum geology to qualify for certification application, one year more than the minimum of seven years recommended by the Professional Standards Committee.