RESERVOIR VARIATIONS AT UPPER VALLEY FIELD
GARFIELD COUNTY, UTAH

by

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ABSTRACT

The Upper Valley field, Garfield County, Utah, is the only significant production found to date in the Kaiparowits basin of south-central Utah. Cumulative production to January, 1976 is 14.9 million bbls of oil from four distinct zones within the Triassic Timpoweap and Permian Kaibab formations. All of the reservoirs are carbonates which have been dolomitized to varying degrees and were deposited in environments ranging from supratidal to shallow marine. Significant facies variations and diagenetic alterations are present in all four reservoir zones and have affected distribution of porosity, permeability and fracturing. Production has been offset along the western flank and down the southern plunge of the Upper Valley anticline by a hydrodynamic drive that appears to have created a curvilinear oil-water contact due to variation in the densities of the crude within the field. The accumulation has been further complicated by an apparent lack of hydrocarbon charge along certain portions of the structure in the main pay zone.

INTRODUCTION

The Upper Valley oil field is located in Townships 36 and 37 South, Ranges 1 and 2 East, Garfield County, Utah. It is situated in the western portion of the Colorado Plateau structural province and is the only significant production found to date in the Kaiparowits basin of south-central Utah (Fig. 1). The field was discovered in 1964 by Tenneco Oil Company and produces from dolomitized carbonates in the Triassic Timpoweap and Permian Kaibab formations at depths between 6350 ft and 7630 ft. Significant variations in porosity, permeability, and fracturing occur within the reservoirs and have affected productivity. The accumulation is localized on the Upper Valley anticline, but has been offset along the western flank and down the southern plunge of the structure by a hydrodynamic drive.

The objectives of this study are: 1 — describe the Timpoweap and Kaibab rock sequences and interpret their depositional environments, 2 — identify individual reservoir rock types and describe the distribution of porosity, permeability, and fracturing, and 3 — hypothesize on additional influences to production, namely hydrodynamics and limited oil charge. The study included detailed core examination of the Timpoweap and Kaibab formations from eleven wells (representing approximately 800 ft) within or in close proximity to the field. Each pay zone was cored in at least two wells and the distribution of control is shown in Figure 2. It is appropriate to mention here that communication of oil and water between zones has been indicated behind casing in a number of producing and injecting wells. This communication made it difficult in some cases to compare geologic observations in individual zones with production history or injection response.

DEVELOPMENT HISTORY

The first well on the Upper Valley structure was drilled in 1947 and 1948 by the California Company (Calco, No. 1, NW/4, Sec. 12, T36S, R1E) to 8857 ft in the Mississippian. This location was on the crest of the anticline and encountered water and mud with oil and gas shows from numerous tests of

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1 Tenneco Oil Company, Denver, Colorado.

The writer wishes to express his appreciation to Tenneco Oil Company for permission to publish this paper. Grateful acknowledgement and recognition is given to a number of staff in the Production and Exploration Departments who contributed significantly to the knowledge of the field and who derived most of the engineering data used in this paper. Many thanks are also owed to Richard Louden for critiquing the manuscript and to the Tenneco Drafting Department for preparing the illustrations.

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Fig. 1 — Index map of Southeastern Utah showing location of Upper Valley field.