ALTAMONT-BLUEBELL: A MAJOR FRACTURED AND OVERPRESSURED STRATIGRAPHIC TRAP, UINTA BASIN, UTAH

by
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ABSTRACT

Altamont-Bluebell trend is composed of a highly overpressured series of oil accumulations occurring in naturally fractured, low-porosity, Tertiary lacustrine sandstones. Post-depositional shift of the structural axis of the basin in late Tertiary time produced a regional updip pinchout of northerly derived sandstones into a lacustrine "oil-shale" sequence. Facies shifts during the deposition of over 15,000 feet of lacustrine sediments result in a changing pattern of reservoir distribution and hydrocarbon charge at various stratigraphic levels. Approximately 8,000 feet of stratigraphic section is oil-bearing, and up to 2,500 feet of section contains overpressured producing zones in the fairway wells.

Reservoir performance is significantly enhanced by vertical fractures and initial fluid pressure gradients which sometimes exceed 0.8 psi per foot. The crude has a high parafin content, resulting in pour-points over 100° F, gravities of 30° to 50° API, and an average GOR of 1,000 cubic feet per barrel. This unique combination of geological and hydrocarbon conditions makes it difficult to estimate ultimate recovery, which could be in excess of 250 million barrels.

INTRODUCTION

The Altamont-Bluebell field is a highly overpressured accumulation of high pour-point crude oil in northeast Utah's Uinta basin (Fig. 1). Production is from multiple thin Tertiary reservoirs mainly at depths between 8,000 and 17,000 feet. The reservoir and fluid properties and the highly disseminated occurrence of producing zones result in unusual engineering and evaluation problems which include: (1) very low matrix porosities enhanced by post-lithification fractures, (2) multiple thin productive zones with abnormally high fluid pressures, (3) an undersaturated waxy crude with a pour-point of over 100° F, (4) production derived from intervals of up to 2,500 feet of section in the central part of the field, and (5) difficulty in defining field limits laterally and vertically in that the trap is purely stratigraphic with no simple downdip water levels to the producing zones or sharp facies boundaries.

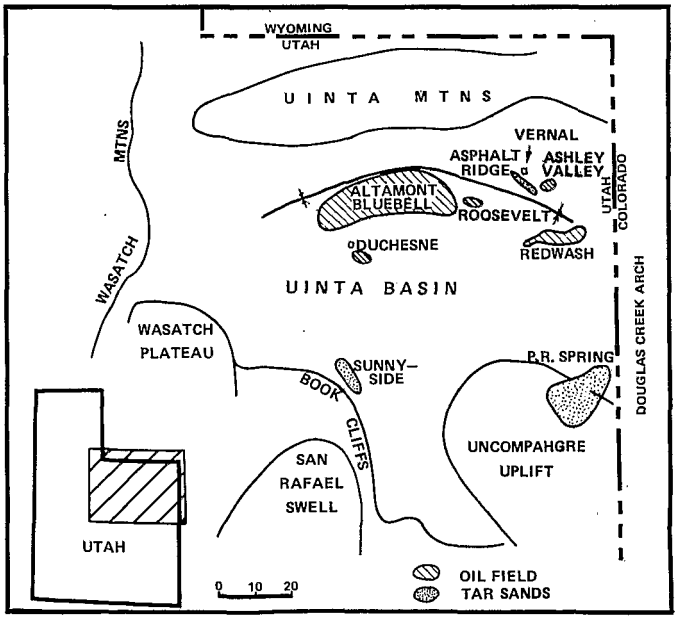

Fig. 1 — Index map, Uinta basin, Utah, showing structure elements and major hydrocarbon occurrences.

The stratigraphic trap covers an area 45 by 15 miles. It is being developed on a 640-acre spacing. Sandstone matrix porosity, fractures, high fluid pressures, and multiple producing zones are the keys to commercial production. The limits to production are facies changes to nonporous red-bed clastics, lacustrine shale and dense carbonates, or capillary water in lowest porosity sands. A thick series of organic-rich shales and dense carbonate mudstones provides the cap seal. As of March 1975, 260 wells were completed and production averaged 60,000 BOPD.

The field is significant not only as a recent major hydrocarbon discovery but also as an example of oil accumulation near a deep basin center. The pertinence of this latter observation is that Altamont-Bluebell may

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