Qatif Field
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RESERVOIR SUMMARY

Location & Geologic Setting
- Coast of Saudi Arabia 100 mi (160 km) north of Qatar, on NE flank of Arabian Plate

Tectonics
- Low-amplitude anticline related to right-lateral slip along basement fault, in part during Jurassic

Regional Paleosetting
- Shallow shelf to sabkha

Nature of Trap
- Essentially structural

Reservoir Rocks
- Age: Late Jurassic (Tithonian and Kimmeridgian)
- Stratigraphic unit(s): Arab Formation, C and D members (zones)
- Lithology(s): Limestone and some dolomite
- Dep. Environment(s): Offshore bar, lagoonal and supratidal
- Productive Facies: Dasyclad-peloidal packstone and grainstone, ooid-mollusk grainstone (Arab-C); peloidal grainstone and dolomitized grainstone (Arab-D)
- Entrapping Facies: Nodular anhydrite and lime mudstone
- Diagenesis/Porosity: Extensive dissolution; local marine cements, sabkha(?)
- Petrophysics:
  - Pore Type(s): Primary interparticle; moldic and intercrystal
  - Permeability: 12–100 md, 80–100 md, 250–5000 md, 4–500 mD
- Fractures: NA

Source Rocks
- Age: Jurassic (Oxfordian)
- Lithology(s): Laminated peloidal limestone in Hanifa and Tuwaiq Mtn formations
- Migration Time: Late Cretaceous through Tertiary

Reservoir Dimensions
- Depth: Arab-C 6900 ft (2100 m) along crest of anticline
- Thickness: Arab-D 65–90 ft (20–30 m), Arab-C 70–190 ft (21–58 m)
- Areal Dimensions: 27 mi × 3–4 mi (44 × 5–7 km)
- Productive Area: ~55,000 acres (220 km²)

Fluid Data
- Saturations: NA
- API Gravity: 31° Arab-C, 38° Arab-D
- Gas-Oil Ratio: 53:1 Arab-C; 138:1 Arab-D
- Other: —

Production Data
- Oil and/or Gas in Place: NA
- Ultimate Recovery: 9.0 million BO (Halbouty et al., 1970)
- Cumulative Production: 684 million BO through 1980

Remarks: Discovered in 1946. IP mechanism water drive, 18 wells producing. *Dasyclad-peloidal limestone, dolomitized, Arab-C. **Same, undolomitized. #ooid-mollusk grainstone, Arab-C. +fine grainstone, Arab-D. +++ Same, dolomitized.

Carbonate Petroleum Reservoirs (Roehl & Choquette), Springer-Verlag New York, Inc.

P. O. Roehl et al. (eds.), Carbonate Petroleum Reservoirs
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Depositional and Diagenetic Facies in the Jurassic Arab-C and -D Reservoirs, Qatif Field, Saudi Arabia

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Location and Discovery
Qatif Field is a giant oil field that straddles the northeastern Persian Gulf coast of Saudi Arabia (Fig. 20-1). ARAMCO discovered Qatif in early 1946, after surface geology and gravity surveys had indicated the presence of a major north-south anticlinal structure. Qatif is interpreted as a low-amplitude, “banana-shaped” shear fold, convex westward (Fig. 20-2), which was probably formed by right-lateral displacement along basement faults, and possibly enhanced by deep movement of salt from the Cambrian Hormuz Salt. The structure lies on the eastern side of the Arabian Plate, but well to the west of the intense Zagros Mountains fold belt near the plate boundary in Iran.

General Geology and Production Data
Approximately 27 miles long and 3 to 4.4 miles wide (44 × 5–7 km), Qatif contains several Jurassic carbonate reservoirs of which two, the Arab-C and Arab-D members of Upper Jurassic (Tithonian-Kimmeridgian) age, are the most important (Fig. 20-3). The Arab Formation is divided into Arab-A, -B, -C, and -D reservoirs (from top down); the B, C, and D members consist of carbonate reservoir and anhydrite units (Fig. 20-3). The Arab Formation is underlain by the Jubaila Formation and overlain by the Hith Anhydrite. The Arab-C reservoir is about 95 to 130 feet (29–40 m) thick, and the Arab-D reservoir about 70 to 190 feet (21–58 m) thick; the two reservoirs lie, respectively, at depths of about 6900 feet (2100 m) and 7100 feet (2165 m) subsea at the crest of the structure.

As of July 1980, 18 wells were producing 115,000 barrels of oil per day. The average API gravity of produced oil is 39° for the Arab-C and 38° for Arab-D. Cumulative oil production through 1980 was 684 million barrels. The initial and continuing production mechanism is a water drive.

The Qatif Field is an enormous structural trap. Arab-C and -D seals are widespread units of bedded to nodular anhydrite and, in the Arab-C member, also lime mudstone in the middle of the reservoir that separates productive intervals over part of the field. The reservoir rocks in the Arab-C are Clypeina-peloidal lime grainstones and packstones and oolitic-molluscan lime grainstones, whereas the principal reservoir rocks of the Arab-D are fine-to-medium grainstones and dolomitized grainstones composed of varying mixtures of foraminifers, peloids, and superficial ooids. Diagenetic features are primarily early, and in many cases, closely controlled by depositional environment.