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Occurrence and Structural Control of Hydrocarbon Production Associated with the Baton Rouge Fault Zone, Louisiana

The Baton Rouge fault forms part of a regional east-west trending, down-to-the-basin contemporaneous fault zone known as the Baton Rouge - Tepehate Fault System. The Baton Rouge fault zone traverses the eastern to central portions of south Louisiana; the Tepehate fault zone traverses the western portion of south Louisiana. Together, these fault zones form a continuous fault system across the state that exhibits syndepositional growth in late Eocene to Oligocene time. Pronounced surface expression of the Baton Rouge fault indicates recent renewed structural fault movement.

Several hydrocarbon productive fields occur along the Baton Rouge fault trend. Most of the fields are small rollover structures downthrown to the fault, however, some large rollover features and anticlinal structures have produced significant amounts of hydrocarbons. Stratigraphically trapped accumulations of hydrocarbons near, but downdip, of the Baton Rouge fault indicates some hydrocarbons migrated updip along sedimentary layers into structures along the Baton Rouge fault. However, the hydrocarbon bearing rollover and anticlinal structures could have been charged by hydrocarbon migration updip toward the fault, hydrocarbon migration along the fault as a conduit, or both.

Recent studies of freshwater aquifers adjacent to the Baton Rouge fault indicate the fault is a barrier to freshwater flow, but that increased freshwater pumpage has moderated its behavior as a barrier. The fault is also recently inferred to act as a conduit for saltwater intrusion; it may play a similar dual role in hydrocarbon migration.