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ABSTRACTS

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A HISTORY OF EARTHEN OIL STORAGE IN SOUTHEAST TEXAS, 1900s-1930s

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Earthen oil storage was a common method of short-term lease and longer-term regional oil storage in the first decades of the 20th century. Although some examples exist of light oil storage by such means (Cushing Field, 1914-1916, was one of the last), most earthen storage use was for heavy oil storage. Thus, earthen oil tanks were common in areas of important heavy oil production—California, Arkansas, and the Gulf Coast of Texas and Louisiana. The best records and archival descriptions of U.S. earthen storage methods and procedures exist for southeast Texas. Here, earthen tanks or pits were used to store heavy crude oil (18° to 24° API) from 1901 until the mid-1930s. Most pits ranged in capacity from 25,000 to 350,000 barrels. All pits were built in the clay-rich Beaumont Formation. Oil loss was from pit seepage, non-recoverable stable emulsion/tank bottoms, and evaporation. The greatest seepage loss was always during initial oil storage, where there was some sealing of permeability pathways. Typical losses by all means ranged from 8-10 % during the first year of storage, followed by longer-term losses of 3-5 %. Methods to reduce loss included trenches around pits to gather seepage oil, wooden roof construction over tanks, and improved emulsion treatment methods. In 1904, the Batson, Saratoga, Sour Lake and Spindletop field areas had about 18.8 million barrels of earthen storage capacity. The discovery of Humble Field in 1905 resulted in Humble becoming the largest earthen storage center with over 6 million barrels of oil stored here by early 1906. Some large oil field earthen storage facilities became longer-term tank farm storage for regional heavy crude production. Approximately 8 to 11 million barrels of crude oil were in earthen storage from 1917 through 1924. Tank farm earthen storage gradually decreased during the 1920s and was abandoned by the mid-1930s. The post-1930s storage abandonment history varied from removing wooden roofs only, to burning and burial of tank waste, to various cleanup procedures and infilling of the pits. The Railroad Commission required extensive study and remediation at several sites in the 1980s-1990s, often initiated due to nearby urbanization. State open-file records of 12 storage sites with 50 pits document how crude oil seepage affected the shallow subsurface. The hydrocarbons migrated predominantly vertically, sometimes over 10 meters, with overall less lateral movement. In some pits, hydrocarbons reached the water table and a free product existed. Cleanup procedures included land farming contaminated soil and pumping free product.

HISTORY OF OIL EXPLORATION AND MINERAL EXPLOITATION IN THE PALOS VERDES PENINSULA, LOS ANGELES COUNTY, CALIFORNIA

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Economic geology of the Palos Verdes Peninsula consisted of drilling 37 oil exploration wells, most of which were dry holes, and quarrying that produced commercial quantities of industrial minerals and construction materials. The first oil exploration well was drilled in 1895 and the last in 1965. One small oil field on the Gaffey anticline, bounded by the Palos Verdes fault, produced 10,000 barrels of oil and was abandoned in 1966. Mineral commodities mined or produced were mainly sand and gravel, diatomite, calcareous material, crushed stone, riprap, flagstone, building-façade stone and salt. Oil exploration ended in 1965 and mineral exploitation terminated in 1968 due to depletion of economic resource or environmental reasons. Economic geology in the Palos Verdes Peninsula is now history.