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Horizontal Drilling for Oil and Gas in the Michigan Basin

The first horizontal well was drilled in Michigan in 1985. As of April 1, 2003 there have been 452 horizontal wells drilled and completed. Another 36 wells are pending, having been permitted and are in various stages of planning, drilling, or waiting on completion. All horizontal wells have been drilled in known fields in previously productive reservoir zones. Most of these fields were considered to be depleted or approaching an economic productivity limit with respect to their existing vertical wells. About 90 % of the completed horizontals are considered to be successful. Only about 10 % have been declared as dry holes. Horizontal wells in Michigan are mainly being used as a secondary recovery technology to improve productivity in Michigan's aging fields. About 21 percent of the horizontal wells have been drilled in gas storage reservoirs to greatly enhance injection or withdrawal rates. Fifteen different reservoirs have thus far been targets of horizontal wells. They range in age from Ordovician to Mississippian and include sandstone, carbonate, and shale lithologies. The majority (59%) of the horizontals have targeted the Middle Silurian Niagaran Reefs. Another large group of horizontals have exploited the Late Devonian gas-producing black shale of the Antrim Formation. Success for these horizontals has been mixed. A few wells have recovered significant additional reserves, while many have had only marginal economic success. There have also been many wells that have not encountered economic volumes of reserves or were declared as dry holes. One of the most successful applications of horizontal drilling in Michigan has been in gas storage. Horizontal wells have revolutionized the development and continued utilization of underground gas storage in several different formations.