Abstract

AQUIFER STORAGE IN THE HERSCHER FIELD

By W. R. Clark*

The development of an aquifer-type gas storage reservoir in the Galesville sandstone of Upper Cambrian age near the village of Herscher, Kankakee County, Illinois, has made available additional gas reserves to Peoples Gas Light & Coke and customer companies to help meet the peak demand during the winter season in the Chicago area.

The field is located on an elongated north-south trending anticline, having an areal extent of approximately 8,000 acres within the limits of structural closure.

The Galesville reservoir is a clean, well sorted, medium grained, unconsolidated sand having an average porosity of 18. 5 percent and an average permeability of 500 millidarcys. The reservoir has an authorized maximum daily withdrawal rate of 500 million cubic feet of gas per day at a present storage volume of 30 billion cubic feet.

Gas injection was started on April 1, 1953, with a total capacity of 15 million cubic feet per day and on July 1. 1953 was increased to 200 million cubic feet per day after the main plant was put into service. Minor leakage of gas was first noted late in July 1953 when several shallow water wells in the vicinity became active with gas. Several theories have been advanced as possible explanation of the leakage. These may be summarized as follows:

1. Faulty Well Cementing. The cement could have channeled between the casing and the bore hole, providing several small avenues of escape at one or more injection locations.

2. Lack of Adequate Caprock. The hard, dense dolomite immediately overlying the sandstone reservoir could be porous in some areas and permit the upward migration of storage gas.

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3. Faulting. The upwarping of the strata necessary to produce such a structure possibly could have exceeded the elastic limit of the overlying formations and caused fracture and faulting.

4. Old Well. Approximately 20 old oil tests have been located on the structure. There is a possibility that one or more deep tests could have been drilled to the deeper horizons; possibly the gas storage reservoir.

In attempting to discover the source of the leak several conventional methods were used and other testing and leak detection procedures new to the industry were tried after the conventional methods were completed. Although the leakage has not been corrected, measures have been established to recover the vagrant gas so that the leakage does not constitute a menace to life or property.

The storage of gas in a deeper reservoir, the Mt. Simon, is currently being conducted on a pilot basis as a supplement to the primary storage.