

# National Fuel's Gas Storage Operations Celebrates 100th Anniversary

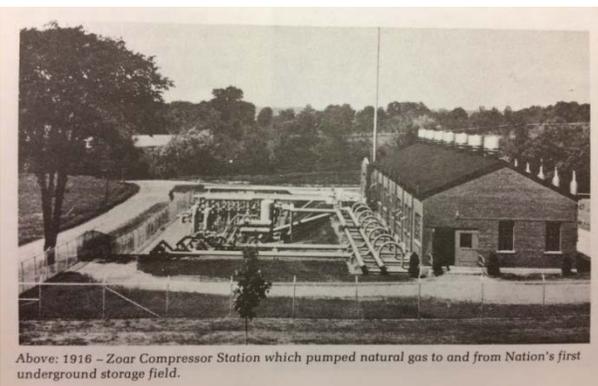
## What is Gas Storage?

National Fuel Gas Supply Corporation is part of the Pipeline and Storage segment of National Fuel Gas Company and specializes in transporting and storing natural gas. As such, Supply currently operates 31 underground natural gas storage fields (4 of which are co-owned with non-affiliated companies, and 15 are located in New York state and 16 in Pennsylvania), and 1,228 storage wells. The underground fields are depleted producing reservoirs, which means they are formations that have already been tapped of all their native recoverable natural gas. This leaves an underground formation capable of holding natural gas. Geologically, depleted reservoir formations must have high permeability and porosity. The porosity of the formation determines the amount of natural gas that it may hold, while its permeability determines the rate at which natural gas flows through the formation, which in turn determines the rate of injection and withdrawal of working gas.

## Why is Gas Storage Important?

On the coldest days, up to 70 percent of natural gas consumed comes from storage. This is how National Fuel is able to keep the gas flowing to utility customers throughout the winter heating season.

## The History of Zoar Station



On June 15, 1916, Zoar Storage became the first reservoir to be used for natural gas storage in the U.S. Zoar is located in the extreme southeast portion of the town of Collins and the southwest portion of the town of Concord, Erie County, N.Y. The field started out as an oil and gas production field in the late 1800s by the Ohio Valley Oil Co.

Shortly after 2 wells were completed, they were purchased by the United Natural Gas Co., a National Fuel predecessor company, and a line was laid connecting them into the main lines leading to Buffalo. Over the course of 20 years, more wells were drilled and pipelines were

constructed by various companies to supply domestic customers. On July 1, 1912, the Iroquois Natural Gas Co. was formed by the merger of various companies, including the United Natural Gas Co. and Springville Natural Gas Co. In 1914, a compressor station was erected and the then 11



producing wells in the field were put on suction during various periods through the winters of 1914-15 and 1915-16. On June 15, 1916, an experiment was conducted to determine whether it was possible, and practical, to store gas in this area. The experiment involved injecting natural gas into an underground reservoir. Once the reservoir pressure was determined to be “tight,” meaning the gas was contained with no migration, it was considered successful. Since then, the area has become a prolific field in terms of performance. Today, there are a total of 39 wells, 30 of which are used to withdraw and inject 600 Mmcf of top gas\* to a maximum pressure of 600 psi. In total, the storage pool contains 2.2 Bcf of gas when full. \* Top gas is the gas that can be injected and withdrawn within the storage reservoir.

Base gas is used to maintain pressure in depleted reservoirs. About 50 percent of the natural gas in the formation must be kept as base gas. Supply has 78.2 BCF top gas and 81.3 BCF base gas.

## Zoar’s Geological Makeup

The Zoar storage field is in the Onondaga formation, which is about 1700 feet below the surface. It is the only storage owned by National Fuel in which the reservoir formation is limestone; all other reservoirs are formed of sandstone. The Onondaga is a hard and brittle sedimentary limestone that was deposited during the middle Devonian era in a shallow sea environment. The rock is composed of calcium carbonate which comes from ocean-dwelling organisms such as oysters, clams, mussels and coral. The collision of continental plates over geologic time created faults in the limestone. Gas accumulated and became trapped in the fractures and faults. It is these faults and fractures that give Zoar its excellent deliverability, allowing for it to be emptied in 10 days. In contrast, other storage fields throughout the system can take an entire winter, or about 150 days, to empty.

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**About the Company:** National Fuel Gas Supply Corporation provides interstate natural gas transmission and storage for affiliated and nonaffiliated companies through an integrated gas pipeline system that extends over 2,300 miles from southwestern Pennsylvania to the New York-Canadian border at the Niagara River.