

# STORIES OF NATURAL GAS OCCURRENCES FROM ACROSS NORTH DAKOTA

By Fred J. Anderson

Recently, the North Dakota Geological Survey has received several stories in the form of short anecdotes relating to shallow gas occurrences across the state. Since publication of a shallow gas article by the Associated Press (May 30, 2007) and related media coverage, the NDGS has received over 60 individual anecdotal reports from private residential well owners. These reports relate to natural gas occurrences within private water supply wells.

**Anecdote:** Information based on or consisting of reports or observations obtained from usually unscientific observers, typically in the form of a usually short narrative of an interesting, amusing, or historical occurrence.

Many of these stories appear to cluster in an area of north-central North Dakota that was occupied by Glacial Lake Souris during the Pleistocene (fig. 1).

The shallow subsurface in this area was effectively scoured during the advance and retreat of the Souris River Lobe during Pleistocene glaciation, and what remained was a relatively featureless sandy lake plain with an appreciable

amount of ground up coal (i.e. detrital lignite) mixed in with the subglacial and glaciolacustrine sediments. This glacial activity allowed for these sediments to be deposited directly on top of Cretaceous and Tertiary-age sandstones and shales that may also contain usable quantities of groundwater, and have often been used in the recent past for this purpose. Several of the reports of shallow natural gas occurrence in private farm or residential water supply wells likely have their origin within this type of system.

Many of the accounts are quite colorful such as the story provided by a family in Burke County: *"While visiting our parents in the 1950s in Bowbells, North Dakota, we experienced the event of shallow gas. Each morning my dad would gather whichever grandchild was visiting to show them the fire in the bathroom sink. No one was to run any water until everything was set. Then dad would light a match, turn on the faucet, and presto, there would be fire! All of the grandchildren were treated to this magic when they visited Bowbells and still talk of it when they get together."*

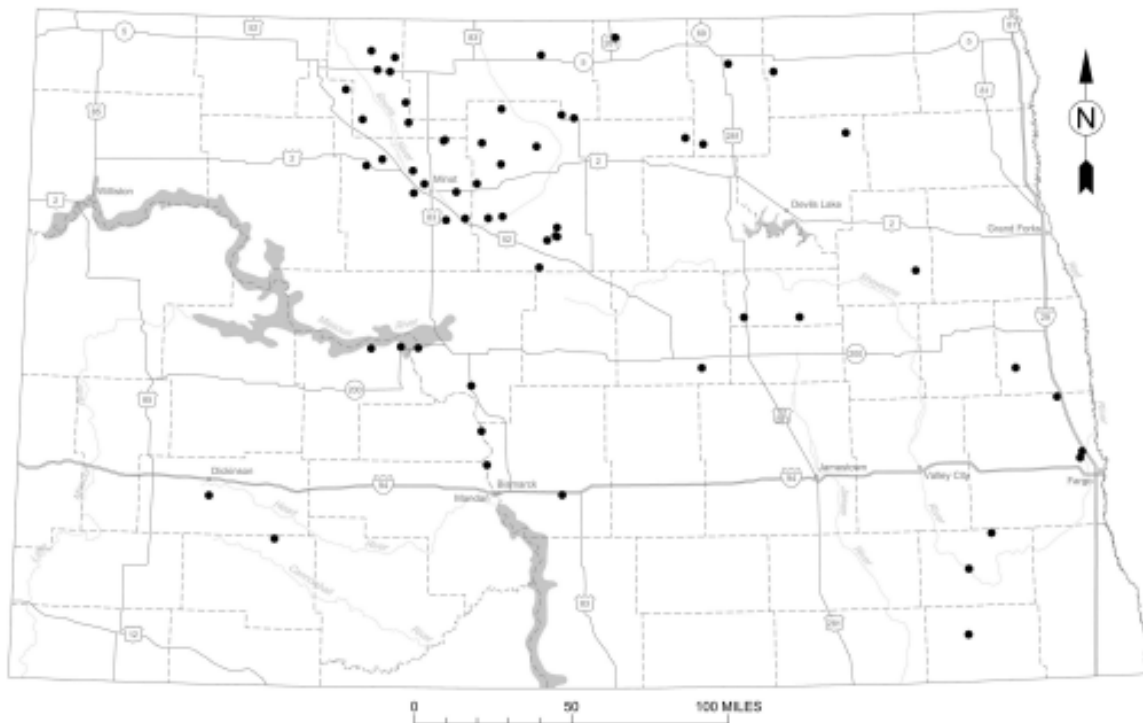


Figure 1. Map of North Dakota showing the approximate locations where natural gas occurrences have been reported anecdotally in shallow water supply wells. A clustering of locations appears in north-central North Dakota in northeastern Ward, northwestern McHenry and throughout Renville Counties. This area has historically had several natural gas occurrences documented in shallow water-supply wells.

Stories of shallow natural gas occurrences have come from nearly all parts of North Dakota. Several have suggested a relationship between gas occurrences and shallow coals. A worker from the Dickinson area reported: *"I know that one of our water wells that the plant had drilled in the 1960s produced methane gas. It [the gas] was fed into a large water tank and fed into the plant. As I worked in the office, at times when the right person would come along, I would ask them if they thought water would burn and invariably they would answer no. To their great surprise I would open the faucet, strike a match, and behold the water would burn! Of course it was methane from the coal vein it [the water] was coming from. I used to have a lot of fun with that over the years."*

Several accounts of shallow natural gas occurrences have been reported from Bottineau and Renville Counties. One local resident wrote: *"I grew up on a farm in Bottineau County where we could light a match to our water and it would flame. At times it would pop, sputter, and the force would be so great it would knock a cup out of your hand. Whenever someone would visit, my dad would show them how our water would flame."*

Another rural Renville County resident wrote: *"When I was a teenager back in the 1950s, I remember my dad lighting the bottom of the pump jack on his deep well and it would burn for some time, the water would come out somewhat fizzy if I recall correctly."*

Rural North Dakotans, ever industrious and resourceful, realized the immediate practical applications of this gas, usually for use in the kitchen for cooking or for space heating. The same individual who related the previous story also offered the following: *"I also recall that the old dental office in Mohall was heated with natural gas from a shallow well right beside the building."*

Rural Minot residents have also reported recent shallow natural gas occurrences in their private water systems. One homeowner wrote: *"When we purchased our house in 2004, the previous owners had indicated they had recently dug a new well, about 600-feet deep, but didn't mention anything about all of the gas in the water. Imagine our surprise when we moved in and every time we turned on the faucet the water sputtered everywhere, the toilet made funny noises, as well as the washing machine, shower, etc! Someone mentioned to us that there may be gas in the water so we held a lighter near the water and sure enough, flames!"*

Another resident who lives northeast of Minot near Upham wrote: *"When I lived there [farm] from 1969 until 1992, there was always gas in the water. You could crack a faucet and light the gas. On the newest well that I had dug, the pressure switch was in the pitless unit on the well. You cannot keep a cap on the pitless unit. Apparently gas accumulates as water is being pumped and when the switch functions it apparently creates a*

*spark which in turn blows the [cast iron] cap off the well! It is still doing it to this day. I have seen the cap 8 to 10 feet in the air when this happens."*

Another rural resident near Minot wrote: *"In any event, I haven't tested it [the well] for a while, but we have had numerous occasions where it was apparent that gas (or something!) is in our water. When our house was being built in 1973, the sheet-rock guys had pumped pails of water to use in their process. One of the guys was a smoker, who lit his cigarette and tossed the match into a bucket – with a huge BOOM which surprised them all!"*

The same resident added: *"My parents, who lived in a house about a city block east of us, also had a deep well in the same water vein. The neighbors used to bring their tanks down and get water from my parents' well, since the water was soft and the price was right! One of their favorite stories is about a neighbor who was filling his tank at night, and who lit a match to see if the tank was full. He, of course, had a big BOOM, much greater than the one above. In fact, it blew his glasses off and broke them."*

Natural gas occurrences in shallow water wells have also recently been reported from Cass County in southeastern North Dakota. One former resident of the West Fargo area wrote: *"I grew up just north of West Fargo and we had horrible water! My dad was a former well driller so he had some interest in the cloudy water we had from the well. One day we filled an ice cream bucket with water, touched a match to it and it lit right up!"*

Others in Cass County have suggested a relationship between a likely shallow gas occurrence and the type of soils that are present in the area. A former Cass County farmer wrote: *"On the east side of the section that we farmed, there is a low spot with very different soil. The neighbors' well on the farm just west of the low spot, would blow the leathers out and continue to burn. I do believe there is gas under there."*

There are likely to be hundreds, perhaps thousands, of similar events that North Dakotans have experienced over the last century. These stories and related anecdotal information about the occurrence of shallow natural gas can be of great interest to the natural gas explorationist and geologist, by providing additional clues to possible origins and potential areas of accumulation of shallow natural gas that may be located in the state. We are most thankful to the numerous residents who have shared their stories with us and we hope that more will do the same.

If you have a story of a possible shallow natural gas occurrence, please contact the Survey at (701) 328-8000. You may also contribute your story online, on the shallow gas program page of the Survey website at <https://www.dmr.nd.gov/ndgs/shallowgas/sgasstories.asp>.