What is hydraulic fracturing, exactly?
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There are several possible risks associated with shale fracking. As with tight-gas fracking, the practice liberates gas from unconventional sources.

1. High pressure fracking fluid first cracks the shale
2. Sand particles keep the fractures open
3. Shale gas flows into the pipe and up the well

US SHALE GAS RESERVES

- Already being exploited
- Yet to be exploited

SOURCE: US EIA
Hydraulic fracturing (fracking) is the use of horizontal drilling, underground explosions and injection of water in combination with sand and chemicals to release natural gas from types of rock that make it hard to extract from. Conventional drilling won’t work in these rock formations, so horizontal drilling and fracking were developed to release the gas. The rock is usually but not always shale. Fracking is also used to release oil that is similarly embedded in this type of rock.

“Hydraulic” refers to the use of water. “Fracturing” refers to the breaking of these rock formations to let the gas escape. The fracturing of rock by high-pressure water is done deep underground. After a vertical bore hole is drilled, the drill turns sideways and continues to bore, but now horizontally. The bore is lined with steel and the steel is perforated with a device that sets off lots of relatively small explosions. Now the water and chemical mixture is pumped at high velocity down the well. It shoots out through the holes in the steel casing with enough force to crack the rock. Sand, which is mixed into the water, holds the cracks open when the water is pumped back out. Then the gas can get out of the rock.

The top of the well is lined with cement in order to keep the gas contained and traveling upward for capture. However, cement casings fail often, and when they do, the gas leaks out of the well and into the water table. The illustration shows how the well bore goes through the water table, which supplies drinking water to wells.

Horizontal drilling allows the same well to be fracked many times. From a single vertical bore, horizontal drilling can occur in a number of directions, with a separate explosion and water injection along each horizontal bore.

It also allows the bore to extend under the land even when it crosses property lines. Some landowners have refused to sign contracts, but the fracking companies can still frack the rock under their land. This is the result of land ownership being divided into “surface rights” and “mineral rights.” This varies state by state and makes it impossible in some cases for landowners to reject fracking. The documentary *Triple Divide* includes an interview with a landowner that has lived through this situation.

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1 Research sources vary in their descriptions of the lining of well bores with cement. Some describe it as lining only the top section to prevent gas leakage into the water table. Others describe lining it further along the vertical bore.
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