



**CRESTONE PEAK**  
RESOURCES

# Protecting Water

FACT SHEET



## USING WATER RESPONSIBLY

Water is a critical resource and Crestone takes responsible water use seriously. Water safety and conservation are priorities during operations – from drilling a new well and producing natural gas or oil, to the treatment and disposal of water.

Each phase of operations has unique water requirements and challenges. Crestone adapts its water management approach to each well based on geological factors, local water resources, stakeholder feedback and operational needs. Protection of water sources starts with proper design and construction of drilling sites and steadfast field inspection and logging to maintain the integrity of all components throughout its lifespan. Crestone strives to act as good stewards through a continued commitment to improving processes.

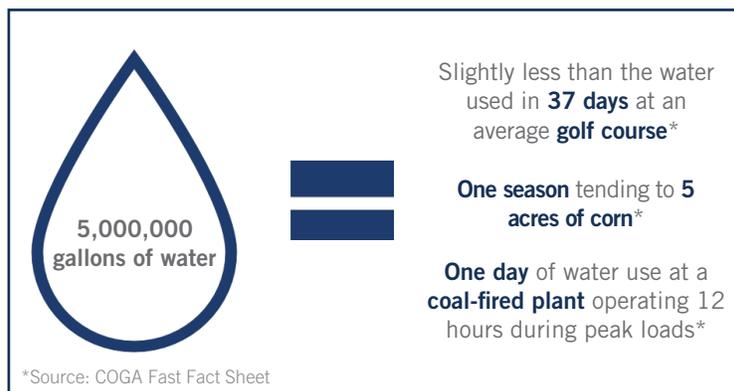
## HOW IS WATER USED?

**Drilling:** A mixture of clay and water is used to carry rock chips or cuttings to the surface, cool and lubricate the drill bit, and maintain pressure in the wellbore (or drilled hole).

**Completions:** A combination of water, sand and a small amount of additives is injected at high pressure through the well to the target rock formation deep underground. This injected fluid creates small cracks in the rock, allowing natural gas and oil to flow to the surface.

## How much water is used?

Horizontal wells can require up to 5,000,000 gallons of water depending on the lateral length and number of hydraulic fracturing stages utilized. Although completed vertical wells use less water, horizontal wells yield more energy, making them more water-efficient in the long term.



## Where does the water come from?

There are three primary sources of water used in developing natural gas and oil: **leased water rights**, **municipal sources**, and **recycling**.



### Conserve, Recycle, Reuse

Crestone recycles water whenever possible in operations through closed-loop water systems. When water can't be reused, it is disposed of responsibly into government-approved disposal wells.

# Protecting groundwater through wellbore construction

## Wellbore Design

As an important component of Crestone operations, water protection starts with an effective wellbore design and the proper execution of wellbore construction procedures. Every natural gas or oil well has an engineered steel casing system that is cemented externally to prevent any fluids from moving from the wellbore to groundwater aquifers.

A casing and cementing program is designed for all types of Crestone drilling. The proper wellbore design, with layers of protective casing, ensures groundwater is protected throughout the development process and the life of the well.

## Steel Casing System

Before any natural gas or oil is produced from a well, a multi-layered barrier of steel and concrete is constructed inside the wellbore to seal it off from freshwater aquifers. After the surface hole is drilled, below any potable water zone, the drill string is removed and the surface casing is run down the length of the wellbore. The surface casing must then be set and cemented. Next, the casing is centered in the wellbore with centralizers. Then, cement is pumped down the inside of the casing, to the bottom. Once cement reaches the bottom of the casing, it circulates up around the outside to seal the space between the surface pipe and the wellbore, back up to the surface. Surface casing protects and isolates the fresh water aquifer from the wellbore.

- 01**  
**20 inch Conductor Steel Casing**
- 02**  
**8 5/8 inch Surface Steel Casing**
- 03**  
**7 inch Intermediate Steel Casing**
- 04**  
**4 1/2 inch Production Steel Casing**

