



# PLASTICS

## The Ideal Piping Solution

Flexible, durable,  
corrosion resistant,  
leak free using  
PE4710 with HDPE

### CASE STUDY

## PE4710: SAFELY MOVING PRODUCED WATER for CONTINENTAL RESOURCES

WL Plastics PE4710 pipe helps Continental Resources (one of the top 10 independent oil producers in the U.S.) safely move its water produced during oil and natural gas production in the Bakken play of North Dakota. Continental is committed to moving its produced water transfer method from truck to pipeline where possible and PE4710 is the pipe of choice due to its flexibility, ductility, corrosion resistance, ease of installation, cost, and leak-free heat fused joints. In Oklahoma, Continental's piped volume increased from 15% of total production in 2015 to 65% of total production in 2019. In the Bakken over the last 10 years, Continental has constructed more than 235 miles of freshwater delivery and produced water-gathering pipe with a daily throughput capacity of over 130,000 barrels. PE4710 pipelines have reduced truck traffic, improved safety, and streamlined produced-water transportation. Two of WL Plastics' nine manufacturing facilities (Rapid City, SD and Casper, WY) are near the Bakken play (see Figure 1).

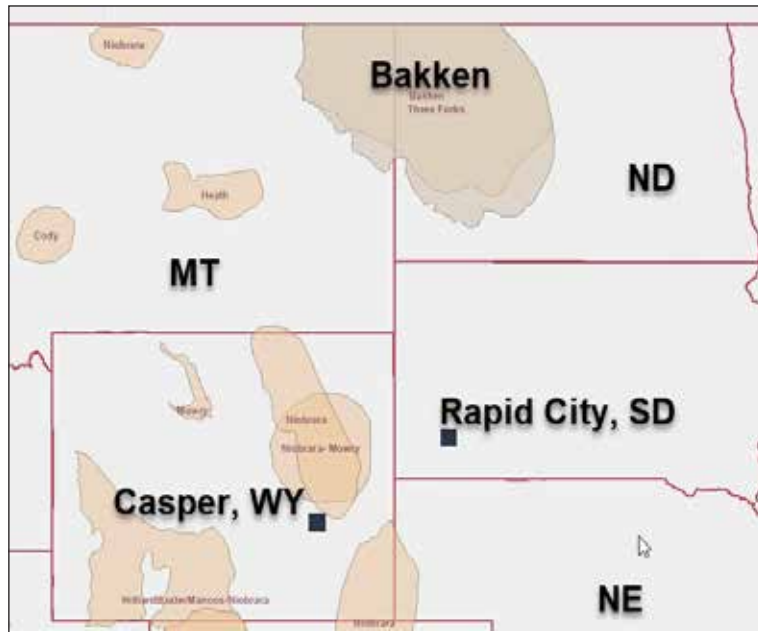


Figure 1: Vicinity Map of Bakken Play relative to WL Plastics Manufacturing Facilities

Continental extracts oil and natural gas resources from porous rock and sand formations thousands of feet vertically below freshwater resources and sometimes up to two miles horizontally away from the well (see Figure 2). Boreholes are cased and grouted before extracting oil and natural gas to protect the freshwater. Casing prevents hydrocarbons from mixing with groundwater as they are extracted from the well. A well stimulation method called hydraulic fracturing is used to crack fissures in rock formations up to several tenths of an inch wide and up to several hundred feet away from the wellbore using a high-pressure water mixture. Sand, ceramic pellets or other small incompressible particles are added to the frack water to hold open the newly created fractures. These cracks allow oil and natural gas resources trapped in the rocks to flow into the well hole. After the drilling and fracturing of the well are completed, the internal pressure of the rock formation causes fluid to return to the surface

through the wellbore. This fluid is known as both "flowback" and "produced water" and may contain naturally occurring materials such as brines, metals, and radionuclides. Some of this water is returned fracturing fluid and some is natural water from the fractured formation.

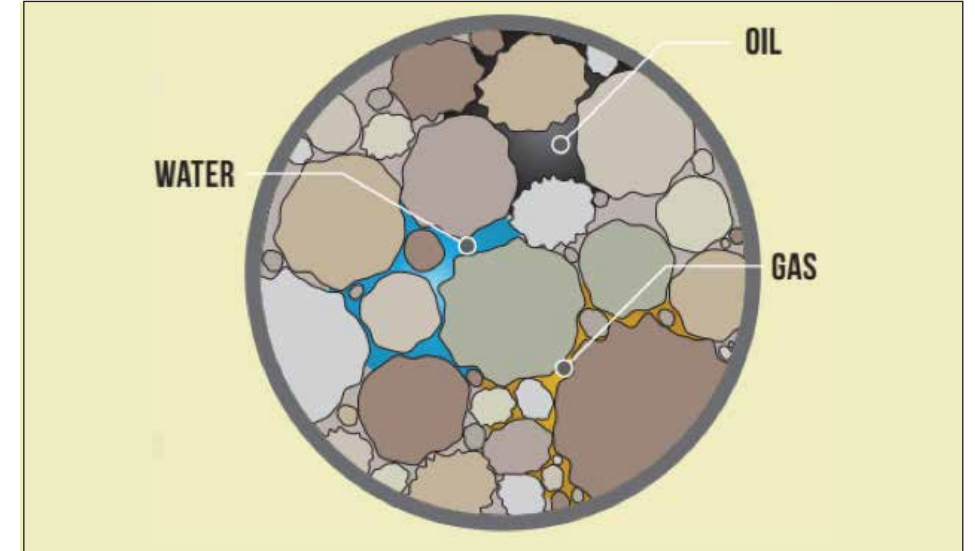


Figure 2: Illustration of Oil, Natural Gas, and Water trapped in Voids of Soil

Continental pumps produced water from several well sites to a single site where the water is cleaned and injected back into the ground. Typical HDPE pipe sizes used in produced gathering are 2" to 4" from well heads to main lines, and 6" to 16" for main lines going to injection sites. Figure 3 shows HDPE produced water mains from several different locations entering a typical produced water cleaning and injection site. Picture was taken during a tour of the facility in August 2022.



Figure 3: Produced Water Mains Entering a Typical Cleaning and Injection Facility