

# Convert Water Tank Blanket from Natural Gas to Produced CO<sub>2</sub> Gas

PRO Fact Sheet No. 505



Partner Reported Opportunities (PROs)  
for Reducing Methane Emissions

## Applicable sector(s):

Production     Processing     Transmission and Distribution

**Partners reporting this PRO:** Chevron U.S.A. Production Company (now ChevronTexaco Corporation)

**Other related PROs:** Install Downhole Separator Pumps

Compressors/Engines   
Dehydrators   
Pipelines   
Pneumatics/Controls   
Tanks   
Valves   
Wells   
Other

## Technology/Practice Overview

### Description

Crude oil production often contains water, which is separated at the well head. The produced water is saturated with methane and light hydrocarbons at the pressure of the gas/oil/water separator. This water is normally transferred to a fixed roof storage tank where a drop in pressure releases gas from the solution. This gas can also mix with the air in the tank to form an explosive mixture. To exclude oxygen from the water tank and prevent a hazardous situation, some operators blanket the vapor space in the tank with natural gas. As the tank fills and empties of water, the produced gas and blanket gas are emitted into the atmosphere through the roof vent.

One partner reported switching the water tank blanket from natural gas to CO<sub>2</sub>-rich produced gas. Some gas production, such as coalbed methane, is rich in CO<sub>2</sub>. This acid gas is normally separated in gas processing plants, and either vented to the atmosphere or injected into a crude oil reservoir for enhanced oil recovery. This CO<sub>2</sub>-rich gas may be a better choice for tank blanket gas than methane-rich natural gas.

### Operating Requirements

Acid is formed when the CO<sub>2</sub> dissolves in the produced water. As a result, the water tank must be internally coated to protect against corrosion.

### Applicability

This practice can be implemented where there is a source of CO<sub>2</sub>-rich produced gas or a nearby gas processing plant with acid gas removal.

### Methane Savings: 2,000 Mcf per year

#### Costs

Capital Costs (including installation)

<\$1,000     \$1,000 – \$10,000     >\$10,000

Operating and Maintenance Costs (annual)

<\$100     \$100-\$1,000     >\$1,000

#### Payback (Years)

0–1     1–3     3–10     >10

#### Benefits

Reducing methane emissions was the primary benefit of the project.

## Methane Emissions Reductions

Methane emissions savings assume the partner reported compositions of the natural gas blanket (90 percent methane) and the CO<sub>2</sub>-rich replacement gas (5 percent methane). The partner reported saving 32,600 Mcf per year of methane by converting the water tank blankets on 9 units at a water treatment station from fuel gas to CO<sub>2</sub>-rich produced gas.

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## Economic Analysis

### Basis for Costs and Savings

Methane emissions savings of 2,000 Mcf per year is based on blanketing a 4,000-barrel water tank that is emptied twice a week.

### Discussion

The value of fuel gas saved by this practice generally has a good payback. Required capital costs would be for piping CO<sub>2</sub> to produced water tank. Minor additional O&M costs are associated with operating the rich CO<sub>2</sub> line. Costs assume that the water tanks are already internally coated for corrosion protection.