



**PDC ENERGY**

**Eliminating Tank Vapor Combustion  
Through 100% Vapor Capture**

August 2022

# THE ISSUE

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## Reducing Tank Combustion to Help Achieve Environmental Performance Goals



PDC Energy had a need to improve flow assurance while capturing tank vapor gas at certain production facilities in Colorado. At many new production facilities, PDC utilizes Tank Vapor Recovery Units (VRUs) to capture vapors off the tank and deliver them to a pipeline. If the vapors are intermixed with oxygen, it creates the risk of not meeting gas pipeline specification and shut-in of the facility. If VRU's are not able to be utilized, the tank vapors are combusted, which results in air emissions and the loss of potential revenue from capturing and selling gas rich in BTU content.

# THE SOLUTION

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## “Life-of-Well” Tank Vapor Treatment Solution

EcoVapor's ZerO<sub>2</sub> and treating products remove impurities from gas and low-pressure vapor, typically oxygen and/or H<sub>2</sub>S to meet pipeline specifications. Our product suite and leasing options allow operators to adjust their vapor management needs accordingly, over the life of the production facilities.

### PDC Solution Elements:

- Beginning in 2018, PDC Energy deployed a fleet of ZerO<sub>2</sub> units to decontaminate tank vapors of oxygen so the valuable tank vapors could be sold instead of combusted.
- A fleet of E300 units were utilized for new and early-stage production along with E100 units for vapor treating at wells between 3-5 years old.
- ZerO<sub>2</sub> E300 units are deployed to new wells prior to initial production.
- As production volumes naturally decline, the larger E300 units are rotated to newer wells and replaced by smaller E100 units to match treating capacity and cost to volume.
- The ZerO<sub>2</sub> fleet achieved average uptime of 99%+ with no unplanned interruptions in service.



AT THE CLOSE OF 2021, THE PDC ENERGY ZERO2 FLEET  
CONSISTED OF 34 AND 12 E300 AND E100 UNITS, RESPECTIVELY.

RESULTS

## RESULTS

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**Flow Assurance.** Historically, operators who have utilized VRUs to capture tank vapors have encountered challenges related to the narrow operating window for suction pressure and fluctuation in throughput needs. This can lead to inefficient capture of the gas, poor runtime, and/or oxygen intermixing with the gas stream.

If oxygen is present in the tank VRU gas, at high levels, the sales gas volume from a facility may not meet downstream pipeline quality specifications. This could result in production downtime. The ZerO2 system eliminates the risk of introducing oxygen into the gas stream of the tank vapor and sales stream by using a catalyst and heat. This simplifies tank VRU operation and allows for less operational and product sales impacts – providing real economic benefits above and beyond merely the sale of the tank vapor. In some instances, this configuration de-risks the sale of produced oil and gas worth millions of dollars.



**Permitting.** Capturing tank vapors that would otherwise be combusted allows PDC Energy to reduce both actual and permitted emissions. This has become particularly important once the Colorado Front Range was designated as a Severe non-attainment area for ozone by the EPA.



**Direct Gas Capture Economics.** Benefits in permitting, recovery and sale of the high BTU gas, and uninterrupted production provides additional revenue to the operator. As an example, EcoVapor's E300 product, which treats up to 300 mscfd, pays out in less than two weeks assuming a \$4/MMBtu Henry Hub price and a 2x Btu premium. This payout includes the cost of the VRU, ZerO2, and \$15,000 in installation costs. The ability to “right-size” the product as well production declines also helps preserve the economic benefit of vapor capture.

CONCLUSION





## CONCLUSION

PDC has found that EcoVapor's ZerO2 technology provides real benefits and continues to deploy units with ongoing field development. Revenue generated from tank vapor capture can provide a direct economic return. However, minimizing the risk of oil and gas production interruptions, while also reducing combustion of tank vapors, is a substantial financial and operational advantage. PDC also benefits from the use of the technology in permitting with significant reductions in PTE and the flexibility to add production without exceeding permit thresholds.



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