U.S. Environmental Protection Agency
Natural Gas STAR Program

Optimize Separator Operating Pressures to Reduce Flash Losses
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Introduction

★ STAR BMPs examples of Optimization
★ Many opportunities exist
★ Many solutions needed
★ Flash gas from separators and storage tanks are natural gas product
Flashing Losses

★ Flashing losses result from oil pressure drops during the separation process
★ Flash gas routinely vented to the atmosphere or burned in a flare
★ Sources of flash to atmosphere include separators, heater treaters, storage tanks
★ Higher BTU gas from storage tanks
Flashing Losses

★ Intermediate flash
★ Intermediate pressure separators that send oil to low pressure separator or heater treater
★ Computer simulations
★ Fixed roof atmospheric storage tanks
★ Pipeline pigging operations
★ Gas plant inlet separators dumping to storage tanks
Typical Flash Destination

Typically Routed To Sales Pipeline

Gas Possibly Routed To
- Compressor
- Flare
- L.P. Pipeline
- Fuel Gas
- Atmosphere

Gas Possibly Routed To
- Compressor
- Flare
- Fuel Gas
- Atmosphere

Gas Possibly Routed To
- VRU Compressor
- Flare
- Atmosphere

Well Head
Wellstream

High Pressure Separator

Gas
Oil

Low Pressure Separator

Gas
Oil

Heater Treater

Oil

Storage Tank

V vent Gas

Oil To Sales

(Alternate Flow)

(Alternate Flow)
Optimization Opportunity

★ Minimize operating pressure of low-pressure separators that dump to storage tanks to reduce flash losses
★ Results in decreased gas vented by storage tanks and increased gas to sales
★ Minimal cost to implement with immediate payback
Why Optimize Separators?

★ Easy, inexpensive to increase profits
★ Gas STAR Program reporting
★ Conserves natural resources
★ Greenhouse Gas emission credits
★ Reduce volatile organic compounds (VOC)
★ Reduce benzene and other hazardous air pollutant emissions
Devon Energy Corp. Case Study

★ Surveyed facilities
★ Chose G.A. Ray No. 93 Facility
★ Optimize separator pressures to increase gas to sales minimal costs
★ Field cooperation – sampling, optimization options, implementation
Method

★ Step 1. Choose Flowrate Estimation Method
★ Step 2 – Collect Process Data
★ Step 3 – Determine existing GOR and flash rate
★ Step 4 – Determine and implement optimal operating pressures
★ Step 5 – Determine new GOR and flash rate after lowering operating pressures
★ Step 6 – Calculate the reduction in vent gas and the monetary value of the vent gas
Additional Solution

★ Install vapor recovery after optimization when adequate amount of gas vented

★ See Natural Gas STAR’s Lessons Learned document: “Installing Vapor Recovery Units on Crude Oil Storage Tanks” (www.epa.gov/gasstar)
Conclusions

★ Methane emissions
  ★ Before optimization = 653,000 scf/year
  ★ After optimization = 317,000 scf/year
  ★ Increased potential net to sales = 336,000 scf/year
  ★ Increase profits to approx. $7000/year

★ Devon reporting this data to Gas STAR Program