U.S. Environmental Protection Agency
Natural Gas STAR Program

Optimize Separator Operating Pressures to Reduce Flash Losses
SPE Paper 94373

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Outline

- Introduction
- Flash Losses
- Opportunity
- Methods Used
- Conclusions

Introduction

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

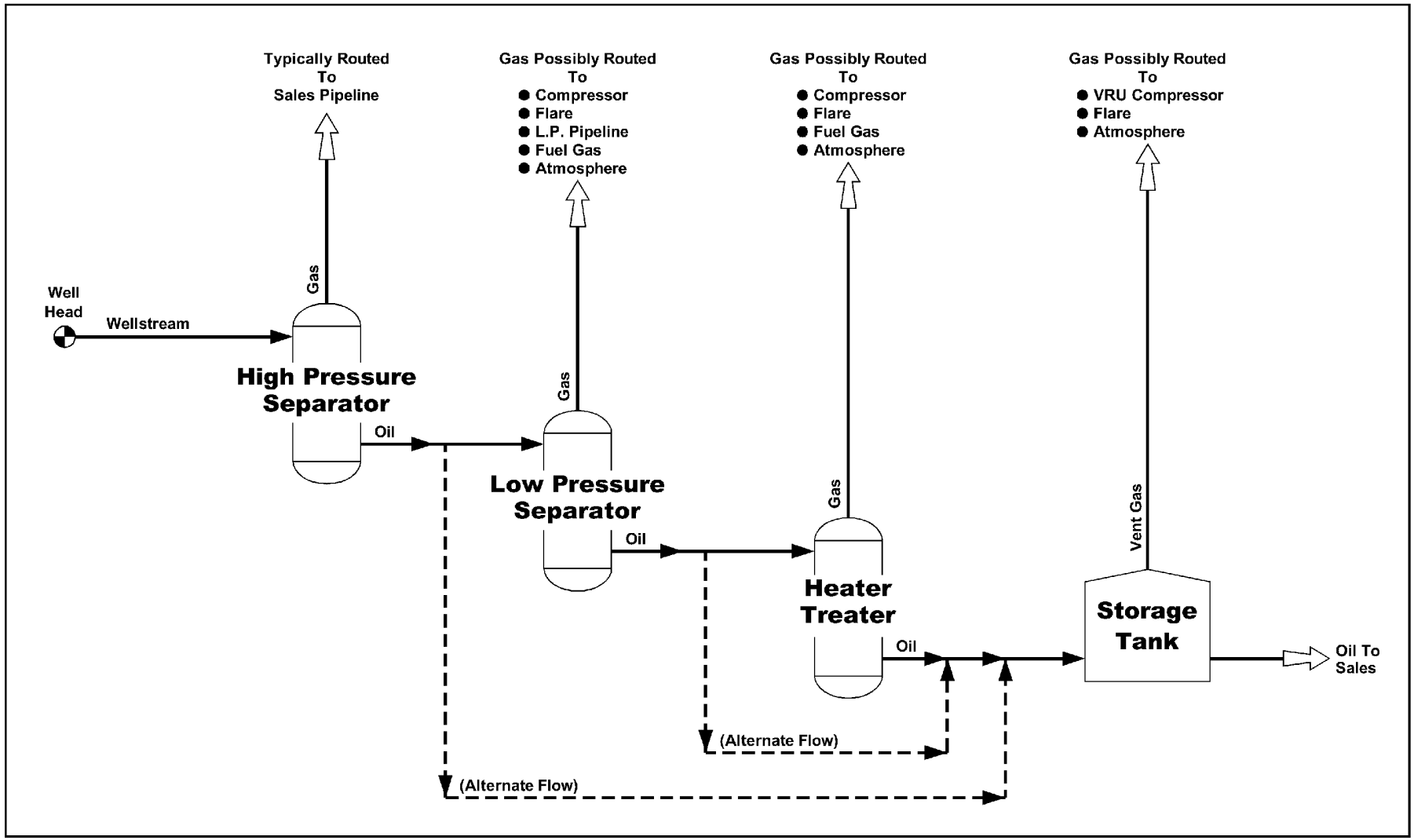
Flashing Losses

- 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



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

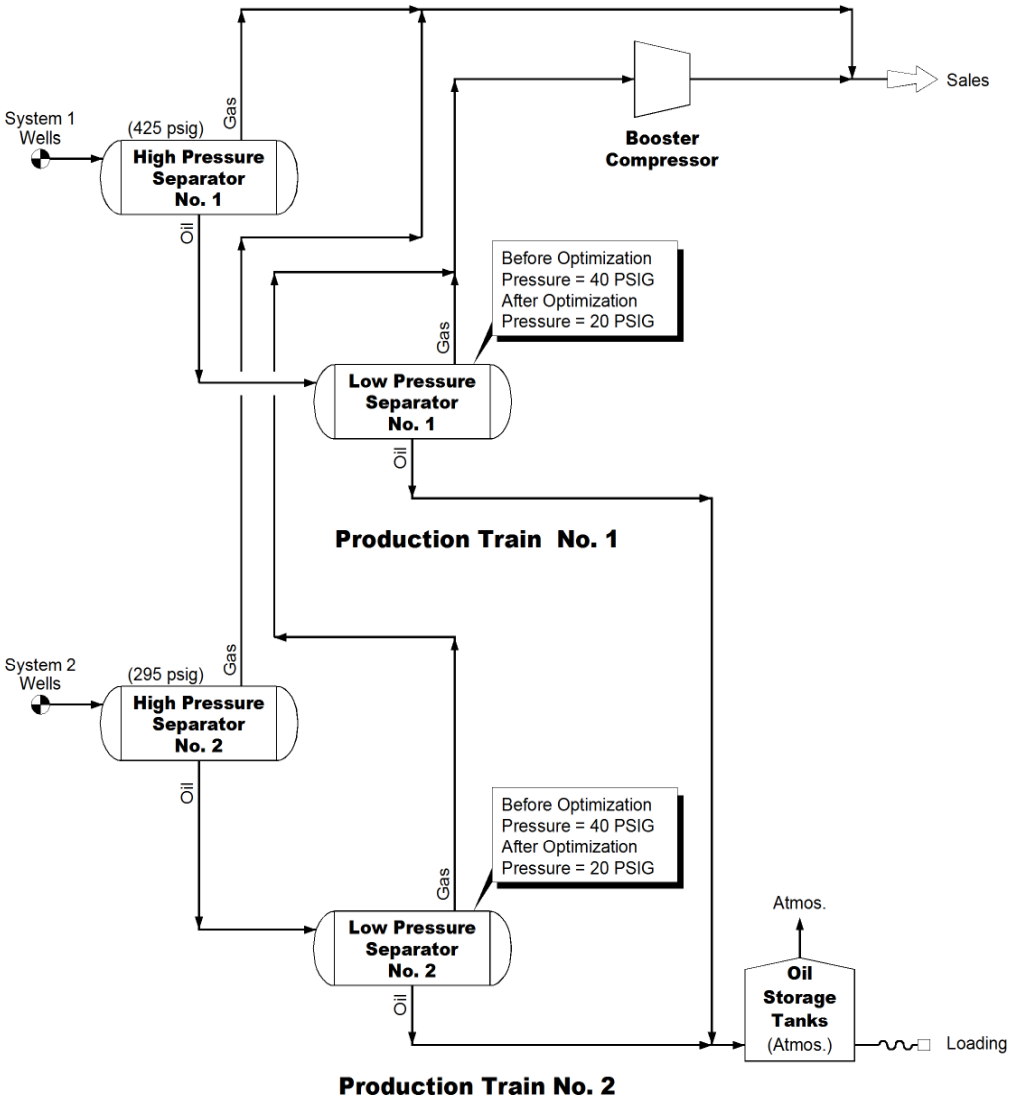
Devon Energy Corp. Case Study

- ★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

- ★Step1. 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

Devon Energy Production Co., LP
G. A. Ray No. 93 Facility



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