A DYNAMIC LOOK AT DESIGN OF UPSTREAM STORAGE TANK VAPOR CONTROL SYSTEMS

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2015
• Colorado CD
• Compliance Alert

2016
• North Dakota CD
• OOOOa Promulgated

2017
• Colorado CD

2018
• North Dakota CD
• Storage Tank Guidelines

2019
• Colorado CD
• EPA Audit Program

2020?

global environmental and advisory solutions
“Dump events can overwhelm an inadequately designed or sized vapor control system and create back pressure that causes emissions to escape from PRDs.”

- EPA Compliance Alert
How Can Vapor Control Systems be Designed Better?
Conduct an Analysis

Use the Right Tools

Follow Best Design Practices

Operate Within Design Bounds
Steady-State Modeling

Example 1. Qin <= Qout

Example 2. Qin > Qout
Dynamic Modeling

Example 3. Qin > Qout (Qin is on for 10 sec, off for 5 min, and repeated)
Best Design Practices

- Avoid low points and underground vapor lines
- Use large diameter vapor lines (3+ inches)
- High performance sealing thief hatches
- PRDs set at or near tank design pressure
- Multi-stage separation
- Multi-stage combustors
Design Bounds

Critical parameters that must be maintained for the design to be valid
Case Study 1

Voluntary Analysis of 288 multi-well batteries in Denver-Julesburg Basin

- Optimized batteries to transfer unneeded equipment to future development projects
- Reduced pad footprint for optimized sites
- Improved regulator and public stakeholder relations
- Asset-wide cost savings of $6.5 Million from repurposed equipment
Case Study 2

- Grouped similar tank systems reducing the number of models needed and saving client money
- No findings related to design during 3rd party audit

US EPA Settlement, 170 single and multi-well batteries in Williston Basin
Thank You!

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