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Fixed Roof Storage Tanks
Yesterday and Today

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Agenda

- ***Review of Regulatory Concerns***
- ***Identification of Internal Concerns***
- ***Internal Research Efforts***
- ***Identified External Options***
- ***Lessons Learned***
- ***Questions***

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Review of Regulatory Concerns

- **Unaccounted for Hydrocarbons**
- **Texas Commission on Environmental Quality (TCEQ) Oil and Gas Study**
  - 2005 - began to identify storage tanks with hydrocarbon plumes through use of flyover imagery using infrared cameras
  - 2009 – A Targa compressor station was included in the TCEQ Phase 2 ground level study.
  - TCEQ initiates their “Find It Fix It” Program
- **Additional TCEQ Efforts**
  - TCEQ began studying emission modeling methods.
  - Qualitative Testing
  - Infra Red Camera

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Identification of Internal Concerns

- **Targa's Corporate ESH Concerns**
  - Participating in the TCEQ meetings regarding the O&G Study and the changes in storage tank emission calculations
  - Began reviewing modeling options
  - Purchased infrared camera
- **Targa Reviewed Atmospheric Tanks Across NTX Area**
  - Viewed vent valve and hatches with infrared camera
  - Review of hatch configuration
  - Review of vent valve applications
- **What we found**
  - Inconsistent hatch make and model
  - Inconsistent vent valve make and model
  - Suspect hatch gaskets
  - Thoughts about hatch and vent valve settings as it relates to predicted emissions (modeled emissions)
  - Inconsistent scrubber levels
  - Inconsistent scrubber uses

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Follow-up Research to Address Findings

- **Vent Valve**
  - Bench Test
    - Tested Existing Valve Efficiency (failed)
    - Valve failing on vacuum seal not pressure
    - Pressure seal prone to fail to reseat
    - Can freeze closed during cold temp
    - Vent valve set at varying pressures.
  - Benchmarked with other companies
  - Methane Reduction
    - Installed prior to Vent Valve
    - Failed due to saturation rate

- **Thief Hatch**
  - Used infrared camera to confirm hatch performance
  - Used camera to eventually migrate from 4 ounce springs to 16 ounces springs on all hatches in flash service
  - Formed team of operational experts to visit each compressor station to review scrubber dump configuration and operation
  - Learned that hatches have very poor flow characteristics and cannot be used as your primary over pressure protection
  - Hatches were failing on vacuum seal and base not pressure seal

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Identified Options – Vent Valve

- **Vent Valves**
  - Verified rated pressure and vacuum for tanks
  - Contacted Manufacturers
  - Contacted other Operators for Benchmarking
  - Recommended Enardo's 951 Vent Valve (Rockies)
    - This valve is one dimensional (pressure only eliminating the possible vacuum leak)
    - Minimizes Vent Flutter and Provides Reliable and Consistent Vent Operation
    - Consistent Reseating for Improved Seal Memory
    - 0.5 scfh @ 95% Set Pressure - Per Vent
    - Reduces Fugitive Emissions
    - Have built in freeze protection
    - Bench Tested Internally (Passed)
      - Held the 0.25 pound default limit (80% 0f set pressure)

Identified Options – Thief Hatch

- **Thief Hatch**
  - Contacted Manufacturers
    - Benchmarked with other operators
    - Rubber backed washers for hatch base bolts
    - Recommended ES660 Thief Hatch
      - Redesigned the vacuum seal

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What to take as a Best Practice

- **Tank Operation**
  - Verify emission models are up to date
  - Verify that scrubbers have proper levels to prevent blow through
  - Verify that all scrubbers stage dump with lowest possible pressure going to fixed roof tank
  - Verify color of tank to lower flash rate
  - Met with crude purchasers about procedures to reclose hatches after picking up a load
  - Use hatch as your vacuum protection not your vent valve
- **Vent Valves**
  - Ensure proper setting (weighting) to match modeled tank pressure
  - Keep it simple
  - Use as few vent valves as possible with safety in mind
  - Upgrade your vent valves if using the old style for better operating efficiencies and better overall performance
  - 951 Vent Valve are one dimensional and have no vacuum (Today)
- **Thief Hatches**
  - Vacuum and Pressure settings
    - Pressure 4 ounces Vacuum 4 ounces (Yesterday)
    - Pressure 16 ounces Vacuum 1 ounce (Today) (Ensure tank ratings)
  - Switch to ES-660 or equal. (Can change insert only to save $$)
  - Use rubber backed washers on all base bolts. No sealants
  - Use infrared camera

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The End

Questions