Fixed Roof Storage Tanks
Yesterday and Today

Presented by:
Dena Taylor and Jimmy Oxford
Agenda

- Review of Regulatory Concerns
- Identification of Internal Concerns
- Internal Research Efforts
- Identified External Options
- Lessons Learned
- Questions
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
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
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**
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% of set pressure)
Thief Hatch

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