Improving the Performance of Oil/Water Separators

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Presentation Outline

1. Types of Oil/Water Separators
2. Types of Oil Skimming Devices
3. Improvements to a Steel “Frac” Tank OWS in PA
4. Improvements to a Conventional API OWS in PA
5. Observations/Lessons Learned
6. Questions
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Types of Oil/Water Separators

• Above Ground API Oil/Water Separators
  – API Publication 421, *Design and Operation of Oil-Water Separators*
  – Concrete Tanks
  – Rectangular Steel “Frac” Tanks

• Underground Oil/Water Separators
  – Cylindrical Steel Tanks

• Oil Baffles
Above Ground API Oil/Water Separators

Concrete Tanks

Rectangular Steel “Frac” Tanks
Underground Oil/Water Separator

- Field-adjustable Riser with Safety Screens include Sealed Vapor Covers for Odor Prevention
- Indirect Effluent Flow Transfer Baffle
- HighGuard Protection System
- Flow Diffusion and Energy Dissipater Baffle
- FOGLWatch Sensor
- Concrete Hold-Down Pad or Deadmen Anchors
- Solids Collection
- Grease Dam
- Sludge Baffle
- Switchback Baffling System
- Internal Lining
- Outlet Pipe
- Hold-Down Straps
Oil Baffles
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Types of Oil Skimming Devices

• Rotating Oil Skimmer Pipes
• Floating Oil Skimmers
• Rope-type Oil Skimmers
• Belt-type Oil Skimmers
• Drum-type Oil Skimmers
Floating Oil Skimmers (Megator)
Rope-type Oil Skimmers
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Improvements to a Steel “Frac” Tank OWS in PA

• Tank dimensions: 24’ x 8’ x 7’ deep
• 8’ of tank downstream of oil baffle used as a wet well; 16’ of tank upstream of oil baffle used for oil/water separation
• Tank was analyzed per API Pub. 421
  - Optimum flow through tank: 100 gpm
Improvements to a Steel “Frac” Tank OWS in PA

- “Under” baffle removed
- “Over” baffle modified by raising steel baffle wall and installing a series of 4-4” vertical pipes and discharge elbows
- Trapped oil removed with a Megator floating oil skimmer
Baffle Modifications: Convert “Over” Baffle to Oil Baffle
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Improvements to a Conventional API OWS in PA

• Tank dimensions: 96’ x 12’ x 5’ deep

• Oil transferred to end of tank via a chain & flight oil collection system

• Oil collected via an 8” dia. rotating skimmer pipe
Rotating 8” dia. Oil Skimmer Pipe

1.5 ft. deep oil baffle;
3.5 ft. gap below baffle
Baffle Modifications

Water Surface

4.25 ft. deep oil baffle

0.75 ft. gap below baffle

Improvements: Oil baffle replaced with a 4.25 ft. stainless steel plate

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Skimming Pipe Replaced with 2 Drum Skimmers

**Improvements:** Rotating skimmer pipe replaced with drum 2 hydraulically driven drum skimmers
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Observations/Lessons Learned

• Improved oil removal in API Tanks improves treatment of subsequent treatment units

• Floating debris can affect performance of oil removal equipment
  – Screens can improve operation of oil removal equipment and reduce debris transferred to Used Oil Storage Tanks

• New windows and a fresh coat of paint can improve operator morale
Added Basket Screen to Steel “Frac” Tank OWS
Added Screening Device to Drum Skimmer
Window Replacement & Fresh Coat of Paint in API Bldg.
Questions