REDUCE COKE DRUM VENT PRESSURE

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AGENDA

1. New rules to manage coke drum venting
2. Operational and technical considerations
3. Options – process flow diagram format

Not intended to provide specific guidance or legal interpretation of existing or anticipated government rules.
NEW RULES TO MANAGE COKE DRUM VENTING

Government rules

1. Anticipated new US EPA rule
   • Proposed rule expected by mid-May 2014

2. South Coast AQMD rule (Southern California)
   • Rule 1114 adopted 3-May-2013

3. Site specific permits
   • Several site specific rules
NEW RULES TO MANAGE COKE DRUM VENTING

Requirements

1. New US EPA Rule (content not yet made public)
   - Threshold pressure before venting (anticipated in rule)
   - Threshold temperature (possibly in rule as an alternative)
   - Averaging?

2. SCAQMD rule 1114
   “... depressurize each coke drum to less than 2 psig prior to venting it to atmosphere”

3. Site specific permits have also included:
   - Makeup quench water quality limits
   - Not allowed sludge coking
   - Minimum total quench water volume
   - Minimum quench time or add a soak period
OPTIONS TO REDUCE VENT PRESSURE

If unable to achieve the target pressure with existing system, then must add a means to lower pressure.

Implemented or considered:

1. Connect to flare gas recovery compressor
2. Add off-gas compressor on the blowdown settling drum
3. Add ejector on the blowdown settling drum
4. Add ejector on the coke drums
5. Water fill and overflow drums
OPERATIONAL AND TECHNICAL CONSIDERATIONS

No two cokers alike – different solutions

1. Drum cycle time – throughput impact
2. Operating pressures
3. System pressure drop - prior to venting
   - Piping, valves, air coolers
4. Blowdown air cooler capacity
5. Main fract OH cooling, compression, & sour water handling
6. Ejectors
   - Motive steam must be condensed and processed
7. Compressors
   - expensive to install and maintain.
8. Flare gas recovery system location and capacity
   - Piping and other equipment pressure drop
Base: Original Closed Blowdown System connects to flare
- Coke drum pressure set by system hydraulics and flare system back pressure
Option 1: CBS off-gas to flare gas recovery system
- Avoids direct connection to flare
- Coke drum pressure set by system hydraulics & flare gas recovery compressor suction
Option 2: CBS off-gas to main fractionator overhead
- Avoids direct connection to flare with no additional equipment
- CBS has to operate at higher pressure
- Coke drum pressure set by system hydraulics and main fractionator overhead pressure.
Option 3: CBS off-gas compressor to MF overhead system
- Avoids direct connection to flare
- Coke drum pressure set by system hydraulics and off gas compressor suction pressure.
Option 4: Steam Ejector to MF overhead system
- Avoids direct connection to flare
- Coke drum pressure set by system hydraulics and ejector suction pressure.
Option 5: Ejector on Coke Drum
- Coke drum pressure set by ejector design.
Option 6: Overflow Coke Drum with Quench Water
- Intention to meet temperature limit