

ZEECO

COMBUSTION AND ENVIRONMENTAL SOLUTIONS.
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PARTS & SERVICES



Marginal Well Commission Workshop

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► Topics of Discussion

- Enforcement Alerts Targeting Flaring
- Rules and Regulations Applicable to the Oil and Gas Industry.
 - Federal Regulations, EPA NSPS & NESHAPS
 - State Regulations, North Dakota
- Types of Flare Systems Used To Meet Regulations
- Zeeco Company Information



➤ EPA Enforcement Alert (volume 10, number 5)

- Alert was released in August 2012 to inform and educate flare owners and operators on proper flare operation.
- Objective is to improve public health by
 - Reducing emissions of toxic air pollutants
 - Reduce VOC emissions which will reduce formation of ozone

➤ EPA Enforcement Alert (volume 10, number 5)



- Proper flare design begins with
 - No visible emissions (method 22), except for periods not to exceed 5 minutes in 2 hours
 - Operated with a flame present at all times, confirmed by the use of a thermocouple or equivalent device
 - Utilizing 40 CFR 60.18 net heating value limits
 - Designed for and operated with proper exit velocity per heating value of the waste gas

• www.epa.gov/compliance/resources/newsletters/civil/enfalert/index.html

- On April 16, 2012, the US EPA released final ruling for the first federal air standards for oil and natural gas production





➤ EPA Final Rule, 40 CFR Part 60

- New Source Performance Standards (NSPS, 40 CFR Part 60, Subpart OOOO) for critical pollutants (VOC's and SO₂) in the crude oil and natural gas production, transmission and distribution. New rule applies to new and modified affected facilities that commenced construction after August 23, 2011. Facilities must be in compliance by **October 15, 2012**.
- See Impacted Equipment Summary Table for details
- www.epa.gov/airquality/oilandgas/actions.html



➤ EPA's NSPS Phases of Completion:

- NSPS establishes a two phase approach for reducing VOC's during natural gas well completions:
 - Phase 1 (before January 1, 2015): industry must reduce VOC emissions either by flaring or using combustion device or by capturing the natural gas using green completion.
 - Phase 2 (after January 1, 2015): producers must capture the natural gas for reinjection or sale, which they can do through the use of green completion.
- Green Completions are not required for new exploratory wells or hydraulically fractured low-pressure wells, where natural gas cannot be routed to the gathering line.

• www.epa.gov/airquality/oilandgas/actions.html



➤ EPA Final Rule, 40 CFR Part 63

- National Emission Standards and Hazardous Air Pollutants (NESHAP, 40 CFR Part 63 subpart HH) directly impacts all the oil and gas production facilities that are major area sources of HAPs with the following exceptions:
 - A facility that exclusively processes, stores, or transfers black oil
 - A major source prior to the point of custody transfer with a facility-wide annual average natural gas throughput < 18.4 thousand cubic meters/day and a facility-wide annual HC Liq. throughput < 37,000 liters/day
 - See Impacted Equipment Summary Table for details
- www.epa.gov/airquality/oilandgas/actions.html



➤ EPA Final Rule, 40 CFR Part 63, continued.....

- National Emission Standards and Hazardous Air Pollutants (NESHAP, 40 CFR Part 63 subpart HHH) directly impacts the Natural Gas Transmission and Storage facilities.
 - Applies to owners and operators of natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user and that are major sources of HAP emissions.
 - See Impacted Equipment Summary Table for details
- www.epa.gov/airquality/oilandgas/actions.html

► Impacted Equipment Summary

EQUIPMENT TYPE:	NSPS OOOO	NESHAP HH	NESHAP HHH
Natural Gas Pneumatic Controllers	✓	✓ _{M 1}	
Reciprocating Compressors	✓	✓ _{M 1}	
Wet Seal Centrifugal Compressors	✓	✓ _{M 2}	
Storage Vessels	✓	✓ _M	
Leak Detection at Plants	✓		
Sweetening Units	✓		
Hydraulically Fractured Gas Wells	✓		
Large Glycol Dehydrators			✓ _M
Small Glycol Dehydrators			✓ _M
TEG Dehydrators		✓ _A	

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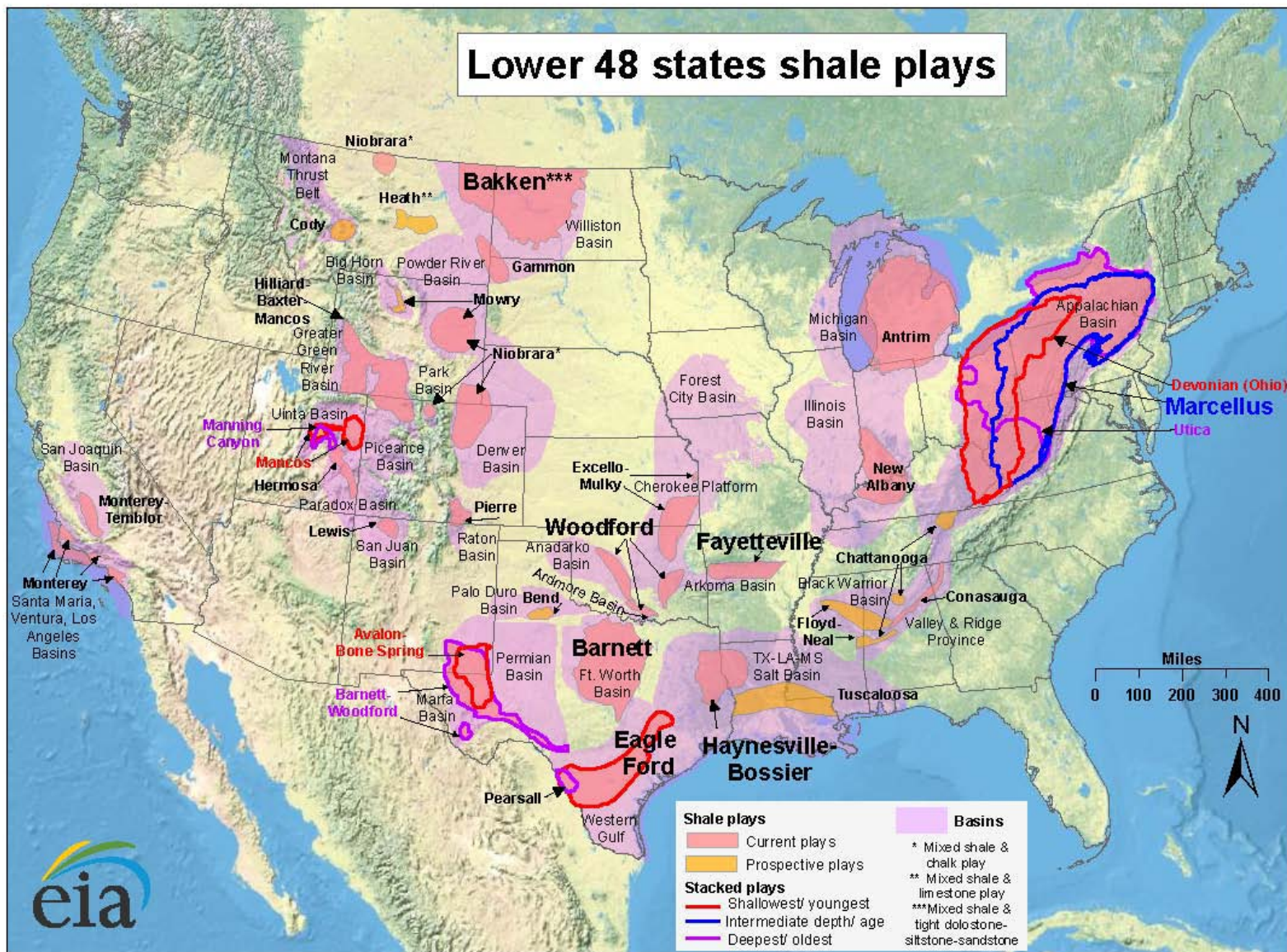
M = Major Source Only

A = Area Source Only

1 = All compressors in VHAP service

2 = Storage vessels with PTE

Lower 48 states shale plays



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011



➤ Regulations Applicable to Oil Production Sources in the Bakken

- EPA's new oil and natural gas regulations (NSPS Part 60 Subpart OOOO)
- NDDH Bakken Pool Guidance
- EPA's FBIR Oil and Natural Gas Rule (FBIR FIP)
- New Source Review (NSR) construction permit program (Issued by EPA or NDDH)
- www.epa.gov/airquality/oilandgas/actions.html
- www.ndhealth.gov/AQ/newguidanceOilandGasPro.htm



➤ NDDH Bakken Pool Guidance:

- Guidance Production Facilities issued in 2011
- Compliance issues arose from the development of the Bakken Shale that indicated VOC emission factors associated with the Bakken oil were considerably higher than expected
- The purpose of NDDH guidance is to assist producers in understanding the VOC emissions associated with the oil in the Bakken Formation and report them accurately

www.ndhealth.gov/AQ/newguidanceOilandGasPro.htm



➤ Federal Implementation Plan (FIP) for Production Facilities on Fort Berthold Indian Reservation Rule:

- Interim final FIP signed by EPA Administrator on August 1, 2012, became effective for purpose of enforcement on August 3
- Final FIP rule will be published in the Federal Register in February 2013
- Requires the reduction of VOC emissions during well completion and recompletion operations by at least 90%, or the capture of the gas for delivery to a sales pipeline rather than venting or flaring the gas
- Requires the reduction of VOC emissions during production and storage operations by at least **98%**, or recover the gas for delivery to sales pipeline

➤ Best Practices for Using Flares to Meet EPA Emissions Regulations





➤ The new ruling targets five source categories of oil and gas production:

NAICS Code

211111- Crude Petroleum and Natural Gas Extraction

211112- Natural Gas Liquid Extraction

221210- Natural Gas Distribution

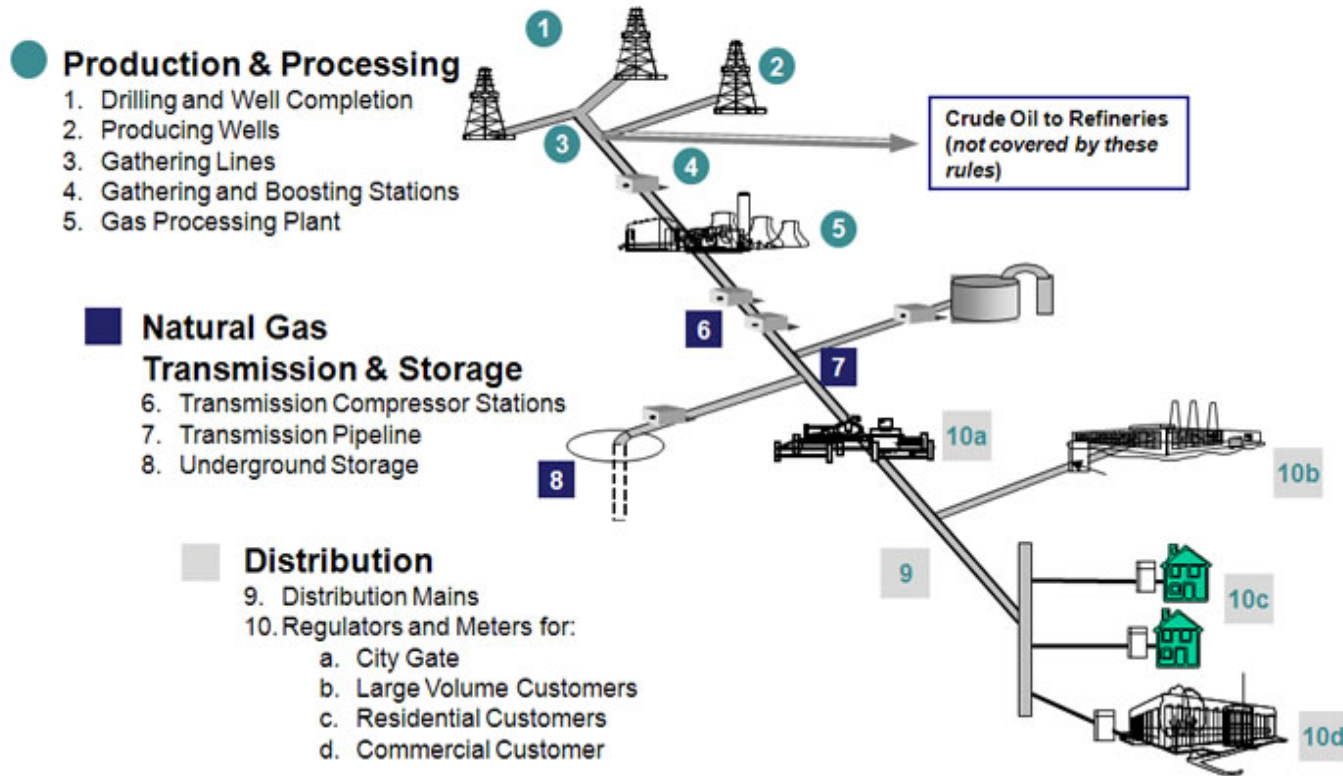
486110- Pipeline Distribution of Crude Oil

486210- Pipeline Transportation of Natural Gas

- Expected to yield a 95% reduction in VOCs (98% reduction in VOCs for ND). VOCs in presence of sunlight creates ground level ozone (smog) which has detrimental health impact
- Addresses methane releases from oil and gas production and processing. US largest single methane source, approximately 40% of all US release. Methane is also some 20x more detrimental as greenhouse gas, than CO₂

The Natural Gas Production Industry

Natural gas systems encompass wells, gas gathering and processing facilities, storage, and transmission and distribution pipelines.



The Natural Gas Production Process Diagram adapted from the American Gas Association and the EPA Natural Gas STAR Program

➤ EPA Regulations Affecting Upstream Operations

Standards for Natural Gas Well Operations at the Well Site

- Specifically for NSPS Quad O during flow back period:
- Phase 1 requires flaring verses venting
- 3 year transition to green competition to allow for cost effective controls and staffing needs
- Affects approximately 11,000 new hydraulically fractured wells per year
- Phase 2 is capture or sale with exceptions



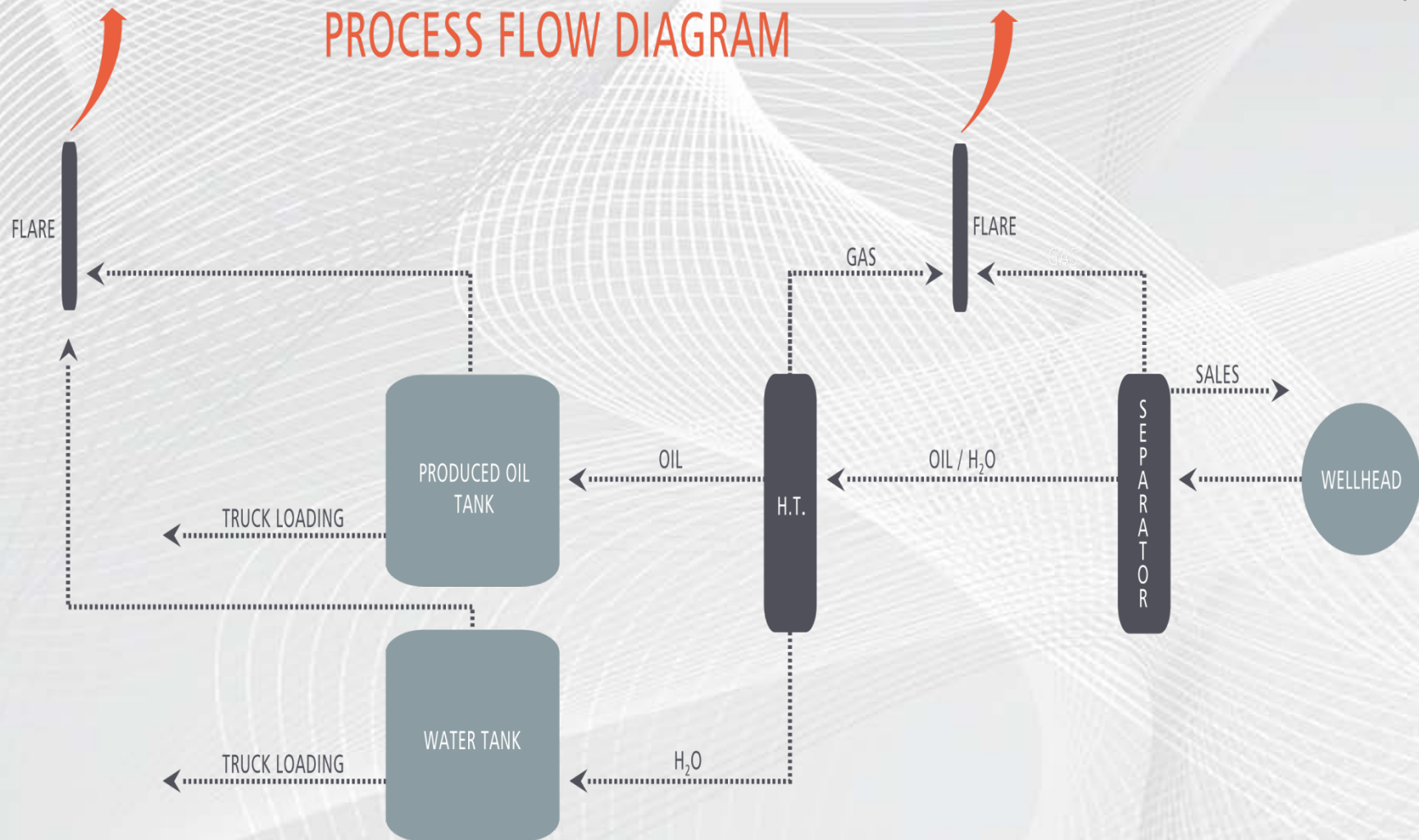
➤ EPA Regulations Affecting Upstream Operations

Standards for Natural Gas Well Operations at the Well Site

- A Completion Combustion Device (CCD) otherwise known as flare, requires reliable pilot and ignition source over the duration of the flowback period and must meet 95% VOC reduction (or 98% in ND)
- Properly designed engineered flare system can achieve greater than 98% VOC reduction
- Engineered flare system design, with either open or enclosed flames, that are portable can increase flexibility to address multiple well sites without any foundation requirement and allow for management of multiple well sites



PROCESS FLOW DIAGRAM



► EPA Regulations Affecting Storage Tanks

Standards for Storage Tanks

- Includes storage tanks located at well site, gathering & boosting stations, NG processing facilities and compressor stations
- Targets sites with VOC emissions levels of 6 tons per year or more
- Have until October 15, 2013 to install necessary controls
- NSPS requires 95% VOC reduction. EPA expects this will generally be accomplished by routing emissions to a combustion device
- Properly designed engineered flare will achieve 98% VOC reduction



► Well Site Flare Options – Open Flame



- Engineered flare system design
- High pressure vents off separator
- Low pressure vents off the tanks
- Combination flare for both streams

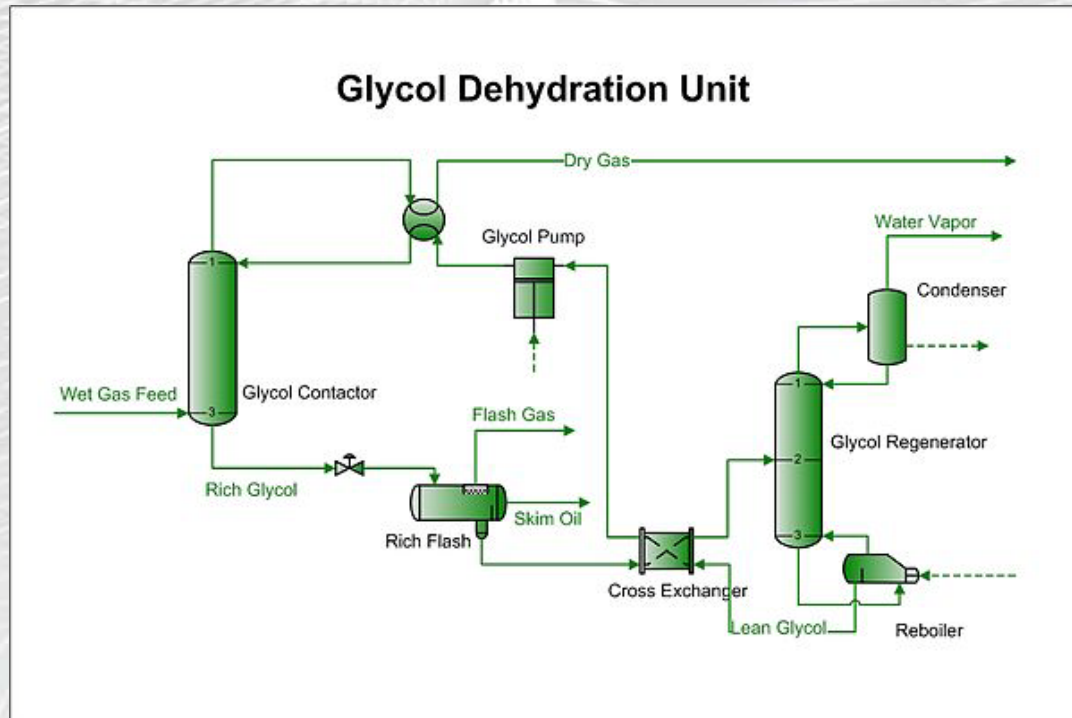


➤ Well Site Flare Options – Enclosed Flame



- High pressure vents off separator
- Low pressure vents off the tanks
- Combination flare for both streams
- Properly designed engineered enclosed flare will provide for greater than 98% VOC reduction

► Standards for Glycol Dehydration Units



- Includes units located at well site, gathering & boosting stations, NG processing facilities and compressor stations
- Subject to NESHAP, large units must meet same existing standards (less than 1 tpy benzene compliance option, as opposed to 95% reduction control)

➤ Standards for Glycol Dehydration Units

- New standards apply for small units at major sources (10 tpy single HAP or 25 tpy combination of HAPs). Required to meet unit specific BTEX limit via formula set forth in final rule, 40 CFR 63.765 (b)(1)(iii)
- Compliance for new units is required upon startup, units constructed after August 23, 2011 have 3 years
- Properly designed engineered flare will provide 98% emission reduction

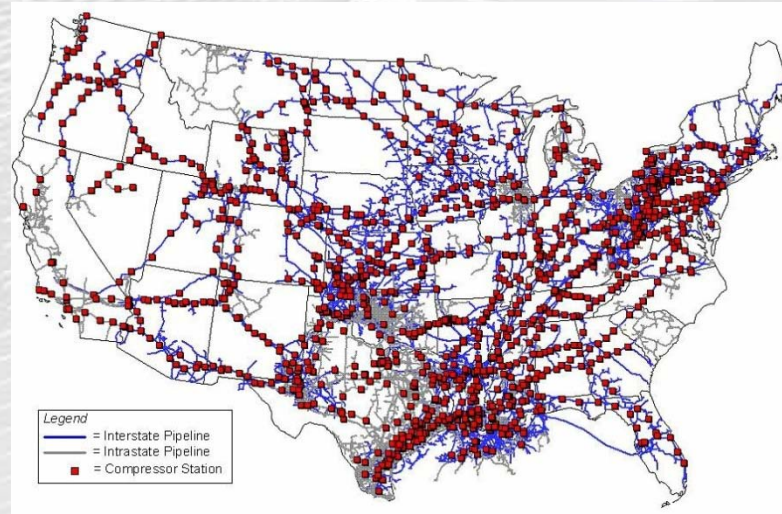


➤ Glycol Dehydrator Vent Flare



- A 95% reduction in VOC is now required by NSPS
- This emissions reduction can be easily achieved through the use of a properly designed engineered flare system to achieve minimum 98% reduction

► Standards for Centrifugal Compressors



- Includes units located at gathering & boosting stations, NG processing facilities
- NSPS for new or modified compressors with wet seal systems require 95% VOC reduction
- Compliance is required at initial startup or 60 days after rule published in Federal Register, whichever is later
- Properly designed engineered flare will achieve 98% VOC reduction

► Compressor Station Flares



- Limits storage tanks at compressor station facilities to a VOC emissions level of six tons per year
- Storage tanks have one year or until October 15, 2013 to install necessary controls (ND requires immediate installation)
- Glycol dehydration flares may be required in addition to storage tank flares

➤ Gas Processing Plant Facilities



- Additional controls, such as metering devices, if assist media is being utilized for smokeless operation, typically steam or low pressure air blowers, to reduce excessive VOC emissions
- Affected facility operators need to remain aware of both the newly published and likely forthcoming regulations and consider a potential engineered flare system design that would meet requirements for new facilities

http://www.tceq.texas.gov/airquality/stationary-rules/stakeholder/flare_stakeholder.html

➤ Engineered Flare Systems Design



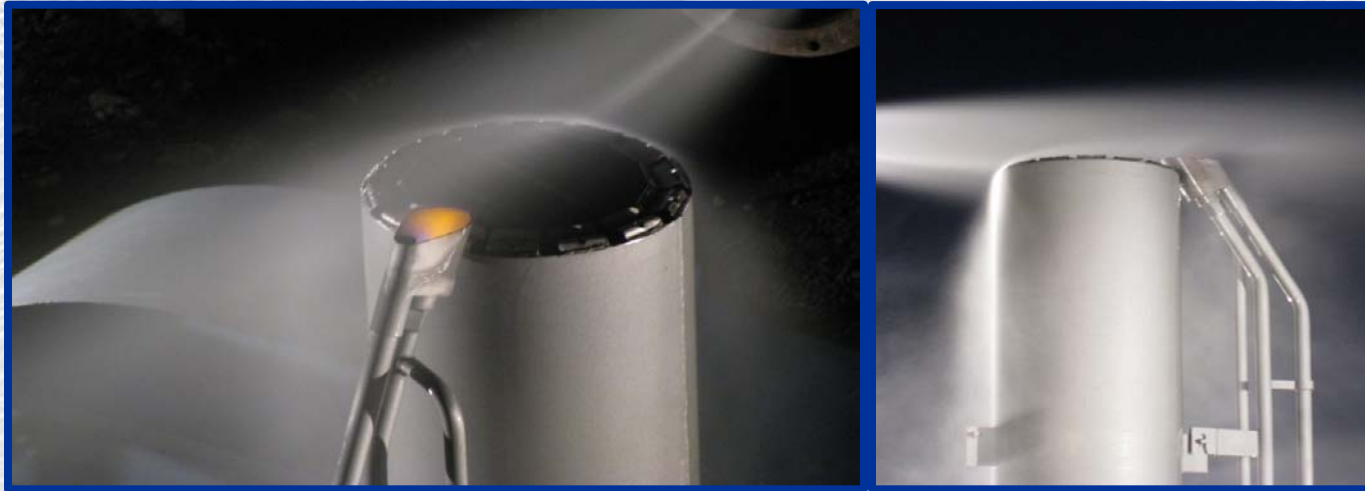
- Critical to get it right the first time, no field development, proven field design
- Durable materials of construction (MOC), refinery grade robust design, suitable for unmanned field applications
- Environmentally compliant design, knowledge of Federal and State regulations

➤ Engineered Flare Systems Design



- Key flare components utilize investment casting MOC for safe, stable, long life in the critical heat effected zones
- Design for installation in remote operations and monitoring, as required to meet standards
- Combination HP / LP design to optimize performance and cost

➤ Engineered Flare Systems Design



- Pilot design per API 537, tested to industry standards to ensure flare will meet environmental performance requirements
- Stable flame in minimum wind speeds of 150 mph with 10 inches of rain / hour
- Ability to reignite automatically without operator interface or electric power
- Ability to monitor for the presence of a flame and record for environmental records verification

➤ Engineered Flare Systems Design



- Local service and support capabilities for installation, start up, operator training.
- Resources to manage multiple temporary flare applications
- Engineering support for optimizing flare system design for the affected facility

➤ Engineered Flare Systems Design

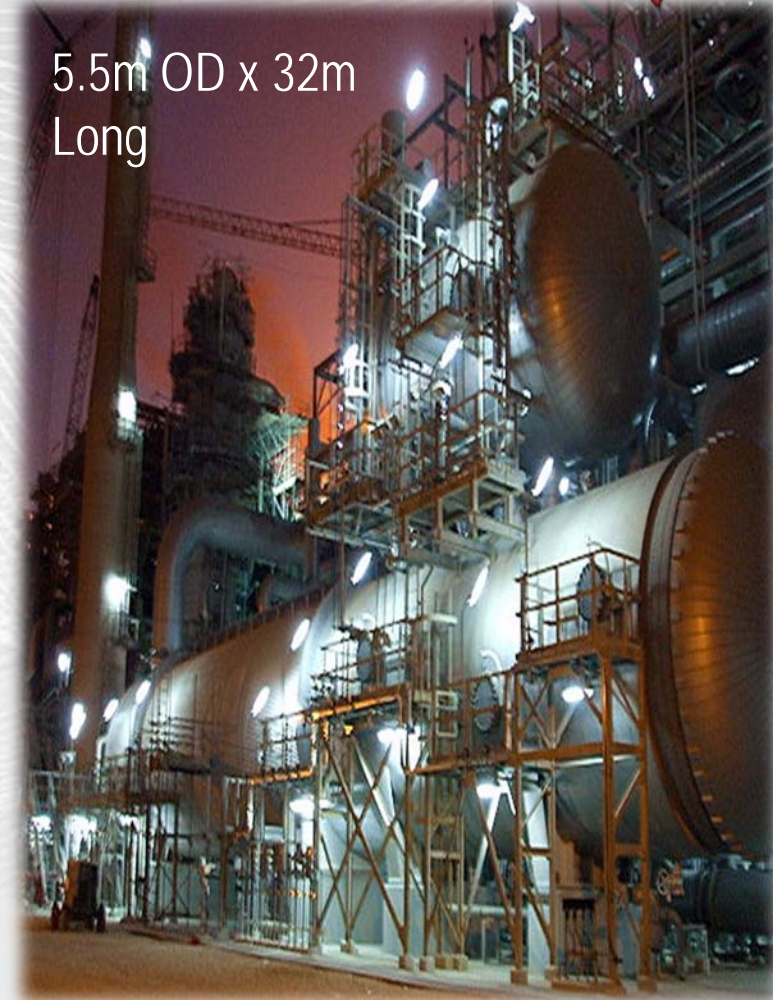


- Well site flare systems
 - Gathering and Booster Stations flare systems
 - Natural Gas Processing plant flare systems
 - Compressor Station flare systems
-
- Properly designed engineered flare for either open or enclosed flame will provide for greater than 98%+ VOC reduction

► Zeeco History

Zeeco is the International Leader in Industrial Combustion Technology, primarily serving the Petroleum, Chemical, and Power Generation Industries Worldwide

- International Headquarters:
Broken Arrow, OK (USA)
- Founded in 1979
- Private Ownership by the same family since 1979



SRU Tail Gas Incineration System (Qatar) with Firetube Waste Heat Boiler. One of 9 similar incineration systems supplied.

➤ Zeeco Product Division



Burners



Flare Systems



Incineration Systems



- 1982
- 1988
- 1994
- 1996
- 1998
- 2002
- 2008
- 2011



Click here for Expansions

➤ Zeeco's Test Facility- Flares



- Properly designed flare systems begin in the test center to ensure design and operational accuracy
- Simulate gas composition by mixing non-hazardous waste in 16,000 gal blending tank
- Flow rates and pressures are measured for repeatability
- Capability to test Combustors, Elevated Flares, Air-Assisted Flares, or Incinerators

➤ Zeeco Field Support



Our customers come first

➤ Resources on Zeeco website

- E-Library: spec sheets, technical papers, brochures
- Case Studies
- Papers & Presentations
- Inquiry Data Sheets for burners, flares and thermal oxidation systems
- Follow-us...Facebook, YouTube, LinkedIn, Twitter



Questions??

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