



THE INCREDIBLE NEW WORLD OF AIR QUALITY MANAGEMENT FOR OIL AND GAS EXPLORATION AND PRODUCTION

AHMP National Conference - 2015
 Kenny Seaver, HRL Compliance Solutions, Inc.
 Joe Jenkins, PG, CHMM, Black Hills Corporation



BLACK HILLS CORP. OVERVIEW

- Based in Rapid City, SD, with corporate offices in Denver, CO, and Papillion, NE
- Utility operations serve 765,000 utility customers in CO, IA, NE, SD, WY
- Non-regulated businesses generate wholesale electricity, and produce natural gas, crude oil and coal.



Utilities	
Electric Utilities	Gas Utilities
• Black Hills Power	• Colorado Gas
• Cheyenne Light	• Kansas Gas
• Colorado Electric	• Nebraska Gas
	• Iowa Gas

Non-Regulated Energy	
Power Generation	Coal Mining
• Black Hills Electric Generation	• Wyodak Resources
Oil and Gas	
• Black Hills Exploration and Production	

HRL COMPLIANCE SOLUTIONS, INC. OVERVIEW

- Based in Grand Junction, CO with satellite offices in Durango, CO and Bridgeville, PA
- Turn-key environmental consulting firm established in 2002



Company-Wide Areas of Expertise	
• Air Quality	• Remediation
• Geotechnical/	• Spill Response
Environmental	• Stormwater
Drilling	• Reclamation
• MBTA Netting	• Noxious Weeds
• Regulatory	• Waste
Permitting	• Management

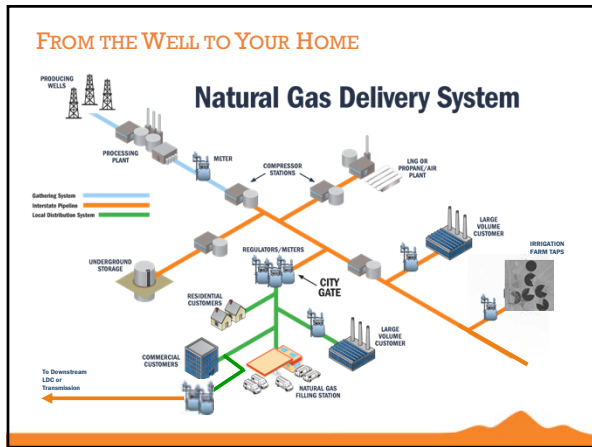
Air Quality Services	
• IR Camera	• GHG Reporting
Inspections	• Data
• Emissions	• Management
Calculations	• Process
• Federal	• Improvement
Reporting	• Compliance
• Permitting	• Audits
• Field Inspections	• 3 rd Party Audits

MBTA: Migratory Bird Treaty Act
 IR: Infrared
 GHG: Green House Gas

Aug 31, 2015

TOPICS

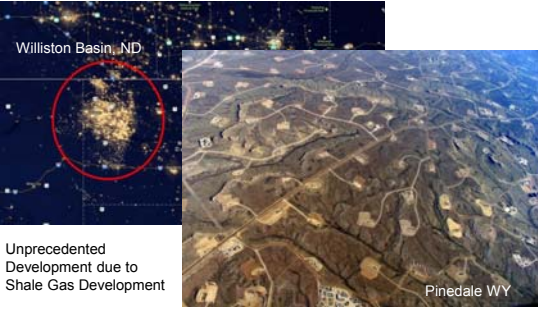
- The Natural Gas System – From the Well to the Meter
- The Alphabet Soup of Air Quality Regulation
- Subpart OOOO – Oil and Gas Emissions Requirements
- National Enforcement Initiative
- The Nobel Energy Settlement
- Colorado Air Quality Control Commission Regulation #7
- What the Future Holds for Air Quality Regulation



WHY REGULATE OIL AND GAS DEVELOPMENT?

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WHY REGULATE OIL AND GAS DEVELOPMENT?



Williston Basin, ND

Unprecedented Development due to Shale Gas Development

Pinedale WY

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THE ALPHABET SOUP OF AIR QUALITY REGULATIONS

- **NSPS HH – HAP Standards for Glycol Dehydration**
 - In 1999, EPA implemented NESHAP HH to limit HAP emissions from:
 - Glycol dehydrator process vents
 - Storage vessels with flash emissions
 - Equipment leaks at NG processing plants
 - Major Sources of HAPS (>25 tons per year) must:
 - Install MACT
 - Monitor and demonstrate effectiveness of controls
 - Maintain records, submit reports and notifications
 - Parts of HH were adopted/modified by NSPS OOOO

HAP: Hazardous Air Pollutants
MACT: Maximum Achievable Control Technology
NESHAP: National Emission Standards for Hazardous Air Pollutants
NSPS: New Source Performance Standards

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GLYCOL DEHYDRATION UNIT




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THE ALPHABET SOUP OF AIR QUALITY REGULATIONS


- **NSPS KKK – Leak Detection and Repair**
 - Natural gas plant leak performance standards for:
 - Compressors
 - Equipment with valves, pumps pressure relief devices, flanges and connectors
 - Open-ended lines
 - Requires LDAR program
 - NSPS OOOO revised LDAR requirements by lowering the definition of leak from 10,000 ppm to 500 ppm at new or modified NG Plants

LDAR: Leak Detection and Repair
NG: Natural gas
NSPS: New Source Performance Standards




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NATURAL GAS PROCESSING FACILITY



Apply LDAR to all valves, pumps pressure relief devices, flanges and connectors, and open-ended lines



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INFRARED VIDEOS OF EQUIPMENT LEAKS

HD Video on flash drive will be accessed separately showing FLIR camera imagery of leak detection inspections.



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THE ALPHABET SOUP OF AIR QUALITY REGULATIONS

- **NSPS LLL – NG Plant SO₂ Standards**
 - Reduce SO₂ emissions from amine sweetening using sulfur reduction technology
 - Reduction efficiency varies with the sulfur feed rate and H₂S concentration
 - NSPS OOOO requires SO₂ reduction efficiency of 99.9% for new or modified units with at least 5 long tons/day and H₂S content ≥ 50%

H₂S: Hydrogen Sulfide
NG: Natural Gas
SO₂: Sulfur Dioxide

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AMINE SWEETENING UNIT




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STANDARDS FOR OIL AND GAS OPERATIONS

- **RICE Subject to NSPS and NESHAP**
 - **NSPS IIII** – Limits NO_x, PM, CO and non-methane hydrocarbons from compression ignition RICE and requires use of low sulfur fuel
 - **NSPS JJJJ** – Limits NO_x, CO and VOCs from spark ignition RICE and requires use of low sulfur fuel
 - **NESHAP ZZZZ** – Covers new and existing engines of all horsepower ratings. Works to achieve reduction in HAP emissions through management practices
 - Routine maintenance (all units regardless of size)
 - Installation of emissions controls (≥500 hp)
 - Compliance testing (≥500 hp)

HAP: Hazardous Air Pollutants
NESHAP: National Emission Standards for Hazardous Air Pollutants
NSPS: New Source Performance Standards
RICE: Reciprocating Internal Compression Engines

RICE Engines



Compressor engine ≥ 500 hp

Wellhead compressor engine 30 hp

Compressor station generator 45 hp


AUGUST 23, 2011
THE DAY THAT CHANGED THE WORLD!!!

At least it changed your world...

Standards for Oil and Gas Operations


- **NSPS 0000**
- **Hydraulic Fracturing for Gas Wells**
 - Requires "reduced emission completion" technology ("green completions") to reduce VOC emissions, and completion combustion devices such as pit flaring
- **Oil Wells**
 - Standards do not apply to wells drilled principally for the production of crude oil
- **Compressors**
 - Regulates VOC emissions from reciprocating compressors powered by reciprocating spark ignition engines and from centrifugal compressors powered by turbines
- **Pneumatic Controllers**
 - Regulates continuous-bleed, natural gas-driven pneumatic controllers
- **Storage Vessels**
 - Storage vessels with VOC emissions \geq six tpy must achieve 95% reduction in VOC emissions


Tpy: tons per year
VOC: Volatile Organic Compounds



REGULATED INFRASTRUCTURE

- **Gas wells**
- **Centrifugal compressors**
- **Reciprocating compressors**
- **Pneumatic controllers**
- **Storage vessels**
- **Grouping all equipment, except compressors, within a process unit**
 - A process unit is the equipment used to process natural gas liquids from field gas, example: fractionating equipment
 - Includes dehydrators, compressor stations, underground storage vessels, liquefied natural gas units, etc. if located at a Natural Gas Processing Plant
- **Sweetening units located at natural gas processing plants**







GAS WELLS

- **What is Required for a Gas Well Affected Facility?**
 - Utilize REC
 - Route all saleable quality gas to a flow line as soon as practicable
 - Capture and direct flowback emissions to a completion combustion device
 - Maximize recovery and minimize releases to the atmosphere
 - *Subjective and problematic from an enforcement perspective*
 - Maintain a daily log of flowback operations
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
 - Maintain all records
 - Submit annual report documenting all required data elements

REC: Reduced Emission Completion aka Green Completion






GAS WELLS

- **So, ... Here's the Good News!**
 - Many flowback companies are aware of the Regulation and can provide you with much of the data needed. This can include:
 - Utilizing REC
 - Ensuring all salable gas is routed to a sales line
 - Capturing and directing all emissions to a combustion device
 - Maximizing recovery and minimizing emissions release
 - Maintaining a daily log
- **Know what your flowback company is offering you;**
 - If they don't know what they can/are doing to help you comply with these rules, you may want to reconsider your business relationship....
- **If you use REC on a re-fracture your well is not subject to OOOO**

REC: Reduced Emission Completion aka Green Completion




GAS WELLS

- **What do I Have to Do to Comply?**
 - Extract data from the daily flowback logs
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
 - Keep lots and lots of records
 - Presumption of innocence does not apply...
 - Submit annual report
- **What Areas Pose the Greatest Challenge?**
 - Staying caught up with extracting data from daily logs
 - Ensuring that all records are maintained and organized

CENTRIFUGAL COMPRESSORS

- **What is Required for a Centrifugal Compressor Affected Facility?**
 - Reduce VOC emissions from wet seal fluid degassing systems by 95%
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
 - Maintain all records
 - Provide notifications and reporting as required
- **What Areas Pose the Greatest Challenge?**
 - Organizing and maintaining all data in a meaningful way;
 - Tracking maintenance and documentation to demonstrate compliance.



VOC: Volatile Organic Compounds

RECIPROCATING COMPRESSORS

- **What Requirements Apply to Reciprocating Compressor Affected Facility?**
 - Replace rod packing every 26,000 hours of operation, or every 36 months
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
 - Maintain all records
 - Provide notifications and reporting as required
- **What Areas Pose the Greatest Challenge?**
 - Organizing and maintaining all data in a meaningful way
 - Tracking maintenance and documentation to demonstrate compliance



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PNEUMATIC CONTROLLERS

- **What Requirements Apply to Pneumatic Controller Affected Facilities?**
 - Pneumatic Controllers at Gas Processing Plants must have a bleed rate of zero
 - Controllers installed after August 23, 2011 must have a bleed rate less than six (6) scf/h
 - Existing Controllers must be tagged to allow traceability;
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
 - Maintain all records
 - Provide notifications and reporting as required
- **What Areas Pose the Greatest Challenge?**
 - Organizing and maintaining all data in a meaningful way
 - Tracking maintenance and documentation to demonstrate compliance

Scf/h: Standard cubic feet per hour

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STORAGE VESSELS

- **Two Different Types of Storage Vessels:**
 - Group 1 – Constructed after August 23, 2011 and on or before April 12, 2013
 - Group 2 – Constructed after April 12, 2013
- **What Requirements Apply to Storage Vessel Affected Facilities?**
 - Reduce VOC emissions by 95%
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
 - Maintain all records
 - Provide notifications and reporting as required
- **What Areas Pose the Greatest Challenge?**
 - Organizing and maintaining all data in a meaningful way
 - Tracking which storage vessels are subject, when they are no longer subject, and reporting this properly

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STORAGE VESSELS



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PROCESS UNITS


- **What Requirements Apply to Process Unit Affected Facilities?**
 - Comply with specified portions of NSPS VV
 - Demonstrate initial compliance (required by NSPS VV)
 - Demonstrate continuous compliance (required by NSPS VV)
 - Maintain all records
 - Provide notifications and reporting as required
- **What Areas Pose the Greatest Challenge?**
 - Organizing and maintaining all data in a meaningful way
 - Conducting proper ongoing maintenance and compliance

NSPS – New Source Performance Standards

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SWEETENING UNITS AT NG PROCESSING PLANTS

- **What Requirements Apply to Sweetening Unit Affected Facilities?**
 - Demonstrate initial compliance
 - Demonstrate continuous compliance
- **What Areas Pose the Greatest Challenge?**
 - The ongoing calculations and data management necessary to demonstrate initial and continued compliance



NG: Natural Gas

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NATIONAL ENFORCEMENT INITIATIVE

“EPA protects people’s health and safeguards communities by assuring compliance with the nation’s environmental laws by taking enforcement action when laws are violated.”

- **Enforcement initiatives are set every three years**
- **Initiatives are set with state and public input**
 - Energy extraction
 - Ensuring energy extraction activities comply with environmental laws
 - Priority since 2011-13 cycle and extended into current cycle

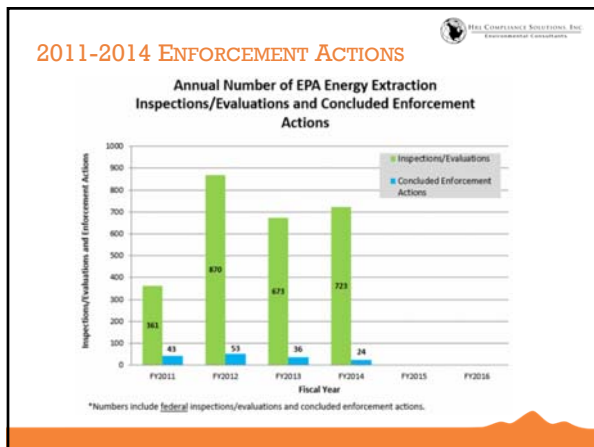
ENERGY EXTRACTION SECTOR GOAL

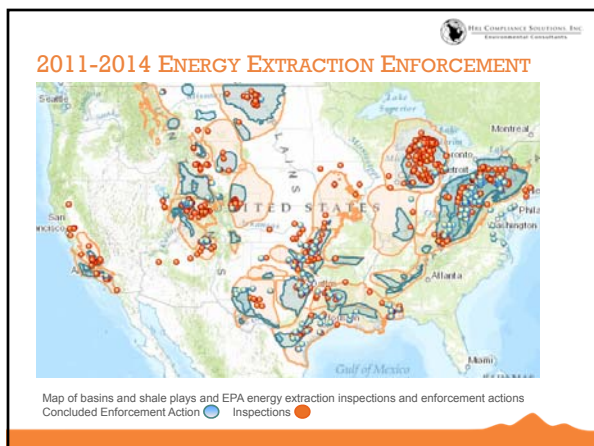
Goal – EPA will...


- Address incidences of noncompliance from natural gas extraction and production activities *that may cause or contribute to significant harm to public health and/or the environment*
- Utilize innovative Next Generation technologies and techniques as appropriate to address non-compliance

Enforcement Strategy – EPA will...

- Develop cases to demonstrate the link between gas extraction activities and air pollution, drinking and surface waters
- Develop multi-facility cases to require system-wide compliance and good practices





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Enforcement Cases

04/22/2015 – Noble Energy, Inc. Settlement


12/23/2014 – XTO Energy, Inc. Settlement - 2014

09/02/2014 – Trans Energy Inc. Clean Water Act Settlement

05/22/2013 – Fluid Recovery Services

09/20/2012 – Kinder Morgan




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Noble Energy Inc. Agrees to Make System Upgrades and Fund Projects to Reduce Air Pollution in Colorado

Release Date: 04/22/2015
Contact information: Jennifer Colatizzi, Colatizzi.jennifer@epa.gov, (202)564-7776

WASHINGTON, D.C., APRIL 22, 2015: The U.S. Environmental Protection Agency, U.S. Department of Justice and the State of Colorado announced today that they have reached a settlement with Denver-based Noble Energy, Inc. resolving all outstanding enforcement actions related to the company's oil and gas exploration and production activities in the Front Range Basin, north of Denver, Colorado. As part of the settlement, Noble will spend an estimated \$60 million on system upgrades, \$4.95 million on environmental mitigation projects, \$4 million on supplemental environmental projects, and a \$4.95 million civil penalty.

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NOBEL SETTLEMENT

Required Actions to resolve Clean Air Act violations


- **Sampling and modeling** of tank emissions vapor control systems
- **Field survey and engineering evaluation** of tank system vapor flow rate
- Modify tanks not meeting design standards
- Implement a **directed inspection and preventative maintenance program**
- **Independent 3rd party auditor** to review engineering evaluations
- Evaluate pressure relief valves, thief hatches, mountings and gaskets on each storage tank
 - **Address any evidence of VOC emissions**
 - Minimize leakage from tanks to the maximum extent possible
- **Prepare and publically post reports** on vapor control system engineering and modifications
- Estimated cost \$60 million



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IMPLICATIONS OF THE NOBEL SETTLEMENT

- **Impacts to Regulated Entities**
 - Information gathering
 - EPA is now requesting information from companies on single and/or multiple facilities (basin-wide)
 - Focusing on large vertically integrated companies, midstream operations, and even small companies
 - Modeling emission impacts
 - Protocol development
- **Remote monitoring**
- **Independent 3rd party verification**
- **Centralized continuous controls**
- **Public reporting**



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COLORADO AQCC REGULATION NUMBER 7

- **Regulations á la carte anyone?**
 - Colorado took the pieces they felt were not stringent enough and implemented them into their State Regulations

Federal Regulation	CO Regulation 7
LDAR on Process Units (NSPS OOOO)	LDAR on well pads and compressor stations with tiered inspection frequencies dependent on VOC emissions.
Management of Pneumatic Controllers (NSPS OOOO)	Retrofitting existing high-bleed pneumatic controllers.
Applicability dates beginning 2012 (NSPS OOOO)	Removed grandfather provisions
Requires emissions controls on RICE greater than 500 hp (MACT ZZZZ)	Requires emissions controls on engines down to 100 hp

AQCC: Air Quality Control Commission
LDAR: Leak Detection and Repair
hp: Horse Power
MACT: Maximum Achievable Control Technology
NSPS: New Source Performance Standards
VOC: Volatile Organic Compound

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STORAGE TANK EMISSIONS MONITORING PLANS

Colorado Reg. 7 – Storage tanks must operate without venting

- Implement STEM Plan for all storage tanks with VOC emissions ≥ 6 tpy and controlled tanks in NAA to help meet operate “without venting standard”.
- AIMM inspections and preventative maintenance
- Owner/Operator certification

Nobel Energy Consent Decree

- Minimize leakage from tanks to the maximum extent possible
- AIMM inspections and preventative maintenance
- Certification requirements

AIMM Approved Instrument Monitoring Method
NAA: Non-Attainment Areas
STEM: Storage Tank Emission Monitoring
 tpy: tons per year

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LDAR REQUIREMENTS

Colorado Reg. 7 – LDAR Program

- Initial AIMM to identify leaking equipment from new facilities
- Periodic AIMM based on fugitive VOC emissions
- Leaks require repairs
- Repair within 5 days and remonitoring within 15 days
- Recordkeeping and reporting

Nobel Energy Consent Decree

- IR camera inspections as part of vapor control verification
- Periodic AIMM based on fugitive VOC emissions
- Repair or shut-in within 5 days and remonitoring within 30 days
- Recordkeeping and reporting

AIMM Approved Instrument Monitoring Method
VOC: Volatile organic compounds

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EPA GAS STAR PROPOSED VOLUNTARY SECTOR-SPECIFIC SOURCES AND BMPs FOR ONSHORE PRODUCTION, GATHERING AND BOOSTING, AND PROCESSING

Sectors	Sources	BMPs
Onshore Production and Gathering and Boosting	Pneumatic Controllers	For gas-driven pneumatic controllers, use low- (defined as gas bleed rate < 6 standard cubic feet/hour) or no-bleed controllers for all applications except those requiring high-bleed controllers for certain purposes, including operational requirements and safety.
	Equipment Leaks/ Fugitive Emissions	Undertake monitoring and repair activities, at specified minimum intervals, following defined parameters governing repair activities.
	Liquids Unloading	Reduce methane emissions from liquids unloading actions during which gas is vented.
	Pneumatic pumps (only CIP)	Implement no- or low-bleeding pumps, such as solar or electric pumps, or route bleed gas to flare or gas capture/use.
Natural Gas (NG) Processing	Hydrocarbon Storage Tanks	Route gas to capture/use (e.g., VRU) or route gas to flare.
	Reciprocating Compressors-venting	Route rod packing vent to capture/use or route gas to flare or replace rod packing every 26,000 hours of operation or every 36 months.
	Centrifugal Compressors-venting	Route wet seal de-gassing vent to capture/use or route wet seal de-gassing to flare.

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ANTICIPATED FUTURE REGULATIONS

- **Oil and Gas Sector: Emission Standards for New and Modified Sources aka Quad O 2.0**
- **Tribal NSR General Permits and Permit by Rule for the Oil and Gas Industry**
 - Operators must obtain either site-specific permits with case-by-case determinations of emission limits and control requirements, general permits, or synthetic minor permits
- **Minor Source Aggregation**
 - Aggregation of multiple minor source facilities into one major source for permitting
 - Currently requires adjacency
 - Courts are currently ruling in favor of the industry
- **NAAQS Ozone Standard**
- **BLM Rules**
 - Hydraulic fracturing, venting and flaring

CONTACT INFORMATION



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