Regulatory Climate Overview in the Marcellus and Environmental Stewardship

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Cabot Oil & Gas Corporation
• Cabot Oil & Gas Corporation is an independent natural gas producer operating in the continental United States

• Growth Areas are in the Marcellus and Eagle Ford

• Current Production
  • >1.8 BCF per day natural gas
  • ~14,000 bbls per day

• Anticipate 25+ years of inventory in Marcellus
  • >3,000 wells
Regulatory Evolution in PA

- Regulatory Climate is in Flux with Many Changes in Recent Past in PA
  - Oil and Gas Regulations
  - Act 13 – Impact Fee
  - New Proposed O&G Regulations in 2016
  - Act 9 – Emergency Response Planning
  - Chapter 102/E&S Control – Project Design, Site Inspection and Maintenance/Repair
  - Changing Interpretations
Other Regulatory Considerations

• Water Management – SRBC and PADEP
• Pipeline Permitting – USACE / State
  – Jurisdiction Over Navigable Waterways
  – Single and Complete Project Determinations
• Waste Disposal and Recycling
• Air Quality – EPA and State Regulations
  – Emissions Inventories
  – GHG and Quad O
  – Methane Reduction Strategy
• Remediation of Environmental Releases
Front End Planning/Permitting

• Regulatory and Environmental Considerations to Minimize Environmental Footprint Include:
  ➢ Staking (Lat/Long)
  ➢ Field Review
  ➢ Aquatic Resources and Set-backs
  ➢ Pre-Drill Sampling
  ➢ Engineering/Design Controls – Mechanical Integrity, Closed-loop Systems, Secondary Containment, etc.
Environmental Stewardship

- Wellbore designed to protect groundwater
  - Three string design
- Containment on all locations
- Closed loop system
- Reclamation of locations
- Beneficial reuse
  - Line recycling
  - Water recycling
  - Drill cutting evaluation

Typical Cabot Marcellus Well

- CONDUCTOR
  - Hole Size: 24-30"
  - Casing: 20"
- SURFACE
  - Hole Size: 17.5"
  - Casing: 13.375"
- INTERMEDIATE
  - Hole Size: 12.25"
  - Casing: 9.625"
- PRODUCTION
  - Hole Size: 8.75"
  - Set At: +/-12,000'
    - 6,650'
    - Casing: 5.5"
Environmental Stewardship

Multiple Wells
Horizontal Legs
Fracture to create pathways for gas to travel to the wellbore
Front End Planning/Permitting

• Well Pad Design / ESCGP-2
  ➢ Minimize Footprint
  ➢ E&S Controls – Inspection and Maintenance
  ➢ Well Pad Reclamation
  ➢ Public Notifications
  ➢ Pre-Construction Meeting with PADEP
  ➢ Driveway Permit
  ➢ Sewage Permit

• Well Permit
  ➢ Plat Preparation
  ➢ Public Notifications

• Water Use Approvals

• CLEAR to PROCEED
Air Quality and Methane Emissions Reduction

- Regulatory Changes
- Green Completions
- Pipeline Infrastructure and Flowback to Sales
- Use of Natural Gas in Operations – Reduce Diesel Consumption
- Exemption 38 and LDAR
- Natural Gas Star Program
Notable Environmental Studies

• PA Air Quality Study in 2010
  ➢ Conclusions of No Impact

• EPA Hydraulic Fracturing Study
  ➢ Final Report Scheduled for 2016
Path to Energy Independence

• Balance with the Stakeholder Community
  ➢ Industry
  ➢ Regulatory
  ➢ Public

• Achieving Environmental Stewardship through Science and Facts