2011 Great Lakes and St. Lawrence Cities Initiative
Niagara Falls, Ontario

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• Regional Director
• Pa. Dept. Of Environmental Protection
Marcellus Shale Drilling in Pennsylvania
PA DEP Oil & Gas Management Program
Marcellus Shale Permits Issued by Year

- Includes Auth type of Drill & Operator Well Permits, Drill Deeper and Redrills.
Department of Environmental Protection
Bureau of Oil and Gas Management
Marcellus Shale Permits Issued & Wells Drilled
(2005 - 2010)

Permits Issued – 5,019 / Wells Drilled – 2,107*

* As reported by Operators
Staff Changes

• 105 new hires since January 2009
  – 20 Meadville
  – 50 East Region
  – 21 Pittsburgh
  – 14 Harrisburg

• East Region Office April 2009
• 202 employees Oil & Gas Management
• Program is funded by permit fees
EQT Production - Marcellus

Project: Tioga County, PA
Site: Tioga County 590925
Well: Well #590925
Wellbore: Main Wellbore
Design: 590925 Plan3

Azimuths to Grid North
True North: -9.30’
Magnetic North: -11.69’

Magnetic Field
Strength: 5345.05nT
Dip Angle: 68.43°
Date: 8/18/2010
Model: IGRF2010_14

Annotations:
- TVD  MD  Annotation
- 6375.0  63.75  KOP = 6375ft
- 6864.2  6961.3  Start Turn
- 7318.0  8100.0  Lowest Point @ 7318ft TVD
- 7310.4  8219.7  Landing Point = 8220ft
- 6893.0  11633.7  TD = 11634ft

Vertical Section at 330.47° (200 ft/in)
Vertical Section at 330.47° (500 ft/in)
PA Water Withdrawals by Water Use*

- **DOMESTIC WATER SUPPLY**: 152 MILLION GALLONS PER DAY
- **LIVESTOCK**: 61.8 MILLION GALLONS PER DAY
- **IRRIGATION**: 24.3 MILLION GALLONS PER DAY
- **PUBLIC WATER SUPPLY**: 1.42 BILLION GALLONS PER DAY
- **INDUSTRIAL**: 770 MILLION GALLONS PER DAY
- **AQUACULTURE**: 524 MILLION GALLONS PER DAY
- **THERMOELECTRIC POWER**: 6.43 BILLION GALLONS PER DAY
- **MINING**: 95.7 MILLION GALLONS PER DAY
- **MARCELLUS SHALE DEVELOPMENT**: 1.9 MILLION GALLONS PER DAY

*totals represent both surface water and groundwater use

**Sources:**
- Marcellus Shale Gas Development Water Use: June 1, 2008 - May 21, 2010 Susquehanna River Basin Commission basin-wide reported daily use of 0.99 MGD expanded to statewide estimate. Water sources: 29% Public water supplies/71% Surface water withdrawals
Recent Events

• 2009 – Permit Fee Increases
• February 5 – Amended Regulations
  – Casing & Cementing Plan
  – Casing & Cementing - lost circulation
  – Cement Standards
  – Gas Migration response
  – Pre-Drill Surveys
• May 19, Frac Flowback disposal only at facilities with new TDS treatment standard
• Recommendations to Marcellus Shale Commission
Penn State
Economic Analysis
Study Area

Beaver

Washington

Greene

Westmoreland

Fayette
What does this mean in terms of Jobs?

Medium or 'Likely' Scenario: Estimated SW PA Marcellus Shale Workforce Requirements By Phase

Chart details:
- Y-axis: Number of Workers
- X-axis: Years 2009 to 2014
- Categories: Pre-Drilling, Drilling, Production

Graph shows an increase in workforce requirements from 2009 to 2014, with significant growth in the 'Drilling' and 'Production' categories.
What specific jobs are required?

- General Office: 20.3%
- General Labor: 20.0%
- Semi-Skilled Tech.: 6.0%
- Landmen/Realty: 5.4%
- Supervisors: 4.6%
- CDL: 9.8%
- Heavy Equipment: 16.9%
- Inspectors: 0.6%
- Engineers: 3.4%
- X-Ray: 0.4%
- X-Ray Tech: 0.4%
- Paralegal: 1.1%
- Cartog/GIS: 0.9%
- Timber Logging: 1.3%
- Lawyers: 2.6%
- Welders: 0.9%
- Welders-Helpers: 1.3%
- Geologists: 4.1%
5-County Workforce Summary...

- The direct job opportunities will likely increase dramatically
  - Most jobs will be “Blue Collar”
  - Based on current estimates
    - Workforce required to drill a single well will require 420 individuals working across 150 different occupations/jobs
    - Each well requires 12.91 full time equivalent workers & .18 full time production jobs
    - High BTU gas processing increases production related employment from roughly 2 FTE’s for 10 wells to 4 FTE’s for 10 wells
    - Approximately 7,360 - 12,266 pre-drill & drilling FTE jobs by 2014
    - Approximately 801 - 1,293 FTE production jobs
Thank you!

For additional information:
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