OIL & GAS SHALE DEVELOPMENT IN OHIO

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PRESENTATION SUMMARY

• Ohio is open for business
• Ohio oil & gas laws, regulations, & policies
• Maturation status of the Utica / Point Pleasant Shale
• Horizontal shale wells vs conventional vertical wells
• Shale development permit issues
• Shale development field challenges
• Hydraulic fracturing in Ohio
• Underground injection control program
• ODNR oil & gas leases
• Looking forward
OHIO IS OPEN FOR BUSINESS

• Common Sense Initiative – regulatory reforms
  – Facilitate economic growth & job creation
  – Transparent & responsive
  – Accountable & effective
  – Fair, consistent, & predictable
• Governor’s two-day energy summit
• Jobs-Ohio energy director
• State & local government coordination
OHIO OIL & GAS LAWS, REGULATIONS, & POLICIES

- ODNR Division of Oil & Gas Resources Management (sole & exclusive authority)
- Uniform statewide regulation – permitting, well locations, spacing, site construction, drilling, completions, production, restoration, & waste disposal
- Conservation & effective development of oil & gas resources to prevent waste
- Public health, safety, & environmental protection (compliance & enforcement)
- Idle & orphan well plugging program
- Underground injection control class II brine disposal program
- Ohio EPA draft General Air Emissions Permit for the production operations of horizontal shale wells
MATURATION STATUS OF THE
UTICA/POINT PLEASANT SHALE
HORIZONTAL SHALE WELLS VS CONVENTIONAL VERTICAL WELLS

- One month vs one week drilling operations
- $8 million vs $400 thousand investment
- Up to 200 acre vs 40 acre drainage area
- Up to 8000 feet of horizontal pay zone vs 200 feet vertical pay zone
- 20 multiple stage frac jobs vs one frac job
- 4 BCFe vs 300 MMCFe life of well production
- Organic shale sources vs sandstone & limestone hydrocarbon reservoirs
SHALE DEVELOPMENT PERMIT

ISSUES

- Well spacing & multiple wells per pad
- “Affected” coal mines & minerals property rights
- Lease unitization & mandatory pooling
- Surface water & water well advanced testing
- Spill prevention containment & control
- Multiple inspections of well site activities
- Uniform county / township road use maintenance agreement
- Special permit conditions to protect health, safety, & the environment
- Permits are not appealable
SHALE DEVELOPMENT FIELD CHALLENGES

• Hundreds of truckloads of equipment, materials, & supplies
• Closed steel drilling pits & fluid storage systems
• Infrastructure requirements
  – Midstream production operations
  – Gathering systems
  – Compression & gas processing facilities
  – Natural gas liquids fractionation plants
• Repair and rebuild new roads and bridges
• Emergency management response
• Local community collaboration
HYDRAULIC FRACTURING IN OHIO

- Over 80,000 wells fraced since 1951
- No record of contamination of groundwater or surface water
- Dependent upon strict regulations of proper well construction, fluid containment, spill prevention, & fluid disposal
- Impoundments for freshwater & recycling of flow-back water
- State review of oil & natural gas regulations (STRONGER) – January 2011
- Frac fluids constituents reported on well completion record & www.ohiodnr.com
- Monthly ODNR hydraulic fracturing team technical meetings
UNDERGROUND INJECTION CONTROL PROGRAM

- USEPA primacy established in 1983
- 181 UIC wells permitted & operating
- Unannounced inspections of UIC well integrity & operations
- Registered, bonded, & insured brine haulers
- Cradle-to-grave brine pickup & disposal
- Brine spreading permitted on gravel roads for dust & ice control – 2%
- Monthly ODNR UIC team technical meetings
- UIC program funded by brine disposal volumes
- Brine includes flow-back fluids
ODNR OIL & GAS LEASES

- ODNR is both the landowner (Parks, Wildlife, & Forestry) & regulator (DOGRM)
- Best management practices – administrative & operations
- Standard leases with specific addendums & parcels
- Transparent RFP process
- Five-member Oil & Gas Leasing Commission oversight
- Non-development lease priority
- Approved drilling schedule
- Separate lease for vertical & horizontal well operations
- Competitive lease payments & royalty
- Standards for insurance, surety bonds, financial capability, operational experience, etc.
LOOKING FORWARD

- Ohio is oil & gas investment friendly with 150+ years of development & over 63,000 producing wells
- Ohio applies “lessons learned” from other states
- Legal & regulatory enforcement is strong & very strict – but fair, reasonable, predictable, & straightforward
- Over two million acres have been leased and / or joint ventures entered into for shale development (escalation in lease signing bonus & royalty percentage – up to $4000 / acre & 18%)
- Only three horizontal Utica / Point Pleasant Shale wells are in production – 12 wells have been drilled – permits issued & rig count trends are rising
- Indications are that the Utica / Point Pleasant Shale is liquids “rich” (gas, condensate, & oil gradates up-dip from southeast to central / northwest Ohio)
- ODNR resource conservation divisions, state agencies, and federal agencies contribute to legal & regulatory oversight & management