OHIO’S REGULATIONS ON NATURAL GAS DEVELOPMENT AND DISPOSAL OF OILFIELD WASTES

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HISTORY OF OHIO’S OIL AND GAS INDUSTRY

- Drilling for oil and gas in Ohio began in the 1860s
- By the 1880’s, Ohio was the world’s leading oil producer
- Natural gas, initially a byproduct, but usage began in the 1880s
• Initially, oil and gas operations in Ohio regulated by Division of Mines
• Predominantly in coal-bearing townships
• Regulations were pretty sparse – no spacing requirements
In the early 1960s, oil discovery in Morrow County started a drilling boom. Town lot drilling occurred. No spacing or conservation measures were in place. This caused a national stir – wasting of resource. In 1965, Governor and legislature passed laws and created the Division.
INITIAL DISPOSAL REGULATIONS

- In 1965, few injection wells for disposal
- Most disposal in “evaporation pits”
- Lead to groundwater contamination
• Division receives primacy of UIC Program in 1983
• Laws and rules established for Class II injection wells
• Proper way to handle and dispose of oil and gas fluid wastes
• Started increase in injection well installation
AMENDED SUBSTITUTE HOUSE BILL 501 – PASSED 1985

- Eliminated “evaporation pits” as of July 1, 1986
- Established lawful disposal options – deep well injection or surface spreading
- Established registration and reporting requirements for brine haulers
DIVISION OF MINERAL RESOURCES MANAGEMENT

- In July of 2000, Division Oil and Gas merged with Mining and Reclamation
- Formed Division of Mineral Resources Management (DMRM)
- Regulates oil and gas, coal, and industrial minerals mining
SENATE BILL 165

- Passed and went into effect on June 30, 2010
- Laws strengthened for drilling operations and well construction
- Fee increases, including new brine injection disposal fee
CLASS II SALTWATER INJECTION WELLS

- Requires three layers of steel casing to protect aquifers
- Surface casing set at least 50 feet below deepest USDW
- Protect up to 10,000 TDS
SALTWATER INJECTION WELL FACILITY
ANOTHER CLASS II FACILITY
TYPICAL INJECTION WELLHEAD
UIC INJECTION WELL INSPECTIONS

• Division inspectors conduct unannounced inspections every 11-12 weeks
• Check injection and annulus pressures for integrity
• Check for leaks
BRINE HAULING REGISTRATION IN OHIO

- Must be registered, bonded, and insured through DMRM
- Must track cradle to grave and maintain daily log book
- Truck must have “Brine” and UIC No. on tank
- Name and phone number of the company on truck doors
UNLOADING OILFIELD FLUIDS FOR DISPOSAL AT INJECTION WELL
BRINE SPREADING FOR DUST AND ICE CONTROL
INJECTION WELLS AND BRINE SPREADING

• Approximately 98% of oilfield fluids in Ohio are injected
• Remaining 2% is spread legally for dust and ice control
• In 2009, over 7,000,000 barrels (42 gallons per barrel) injected
• Currently, 170 injection wells permitted
• Most spreading done for townships, counties, and villages
BRINE SPREADING

- Some spreading on private property
- Law requires resolutions passed by township or county officials at public meeting
- Only production brines can be spread for dust and ice control
HAULING AND DISPOSAL IN OHIO

- Oilfield fluids hauled and disposed in Ohio from other states for years
- Just larger volumes due to Marcellus Shale play
- Three types of fluids – pit water, flowback or frac fluid, and production fluid
TYPES OF OILFIELD FLUIDS

- Pit water – fluids from drilling & cementing operations
- Mixture of drilling mud, freshwater, and formation brines
- Flowback or Frac water – mixture of chemicals, brine, and brackish water associated with frac job
OILFIELD FLUIDS

- Production fluids – natural formation brine
- Byproduct of oil and gas production
- Mainly sodium, chloride, calcium, barium, iron, strontium, magnesium, iron, potassium
- Chloride is predominant with concentrations as high as 200,000 pp, (mg/L)
SAMPLING PARAMETERS

- Inquiries as to what constituents to sample for prior to drilling activity
- Division’s parameters include: sodium, chloride, conductivity, alkalinity, TDS, sulfate, calcium, magnesium, potassium, barium, and strontium
- Also recommend bromide for CL/BR ratio analysis
BASICS OF HYDRAULIC FRACTURING

- Hydraulic fracturing used in Ohio since 1950s
- Tens of thousands of wells fractured by this method
- Increases porosity and permeability to allow more oil and gas production
- Predominantly freshwater and sand, some chemicals
HYDRAULIC FRACTURING

• Water and sand pumped at high pressures to fracture the rock
• Sand acts as proppant to hold fractures open
• Done thousands of feet below the surface
• Marcellus Shale in Ohio around 5000 to 6000 feet deep
• Utica Shale is going to be deeper
MARCELLUS SHALE MAP (From Ohio Division of Geological Survey)
FRAC JOB
FRACTURING CONTINUED

• Dramatically increases oil and gas production
• Shale plays using horizontal drilling and large, multi-stage frac jobs
• Has proven to be successful in other states
FLUID DISPOSAL IN OHIO

- Pennsylvania does not have primacy of its UIC Program
- Has only 8 injection wells
- Oilfield fluids treated through POTWs in PA
- West Virginia has primacy, but limited number disposal wells
Shale frac jobs can use 2 to 5 million gallons of fluid
99.5% is freshwater and sand
About 10 to 15% of Marcellus frac fluid is recovered in PA and WV
Limited disposal options in other states
Ohio has injection wells and permit activity is increasing
GROUNDWATER INVESTIGATIONS

- Division has conducted over 1000 groundwater investigations since 1983
- No contamination cases caused by hydraulic fracturing
- Mostly surface issues
DMRM REGULATIONS

- DMRM can issue permits with variety of attached special conditions
- Special conditions are developed for drilling within municipal wellhead protection areas
- Working with Division of Geological Survey to add data layers for additional protection
- Including SWAP – 1 & 5 year time of travel
URBANIZED AREA PERMIT CONDITIONS

- Includes: Lease road, well site construction, drilling considerations, restoration, production, and waivers
- Addresses noise mitigation, erosion/sediment control, drainage, water wells, pit closure, etc.
CURRENT DEVELOPMENTS

- Leasing is booming in Ohio
- Marcellus Shale leasing limited to eastern Ohio
- Utica Shale extends into western Ohio – could be the major play in Ohio
- Most injection permits issued since 1994
- Class II injection wells still best practice for disposal
- Ohio EPA issued first POTW permit to Warren – less than 50,000 TDS fluid
DEVELOPMENTS - CONTINUED

• Joint ODNR-Ohio EPA group meets every two months
• Fact sheet developed for Marcellus and Utica shales
• At: http://www.epa.ohio.gov/portals/35/pretreatment/marcellus_shale/Marcellus_Shale_Fact_Sheet.pdf