



Mississippi Department of Environmental Quality

Environmental Regulations for Oil and Gas Drilling In Mississippi

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MDEQ

Mission Statement

The mission of the Mississippi Department of Environmental Quality is to safeguard the health, safety, and welfare of present and future generations of Mississippians by conserving and improving our environment and fostering wise economic growth through focused research and responsible regulation



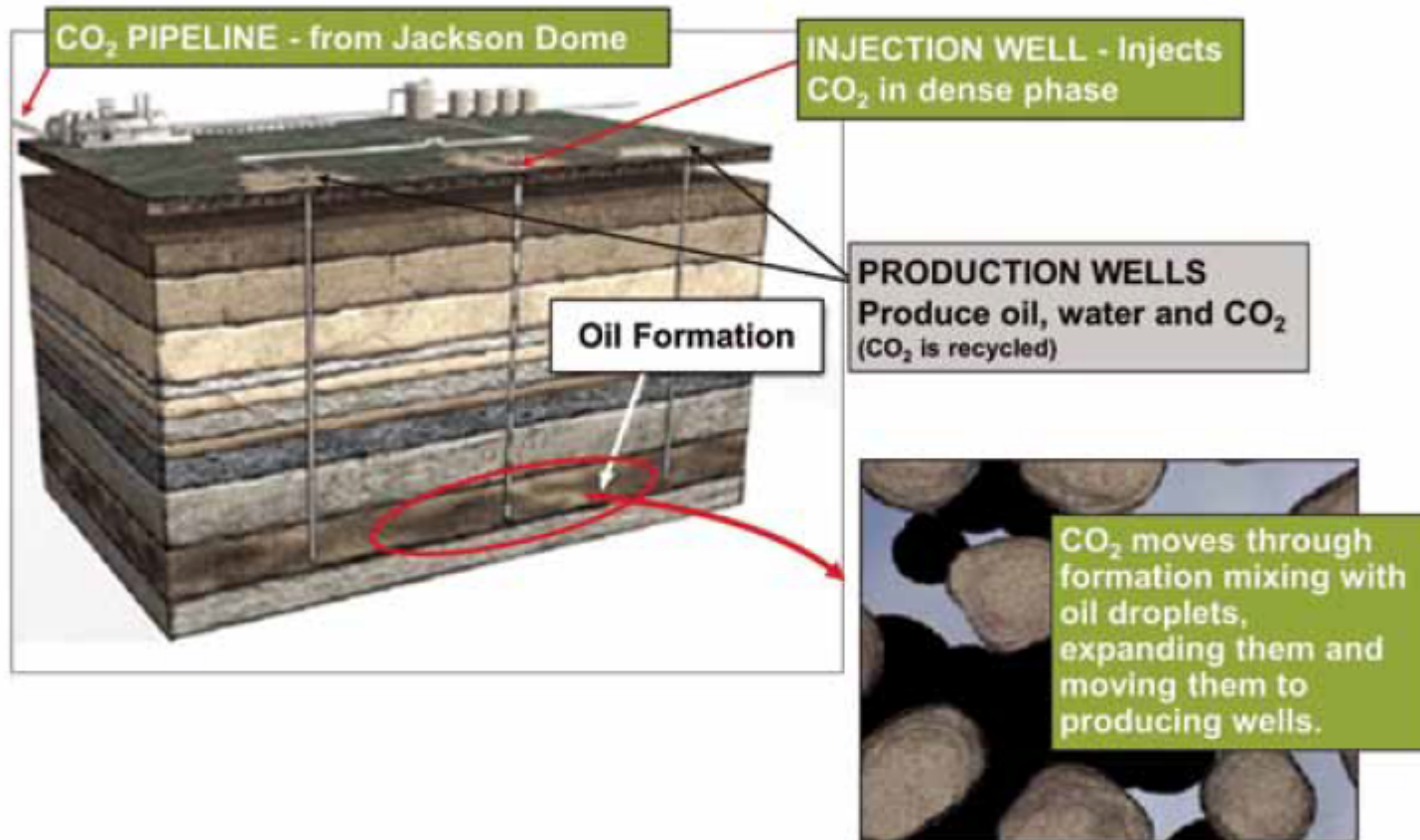


Typical Types of Oil and Gas Drilling

Some Types of Oil and Gas Facilities Regulated in Mississippi are:

Conventional
Enhanced CO₂ Injection
Hydraulic fracturing (Fracking)

CO₂ Recovery Process



Sources: Denbury Resources, Inc.

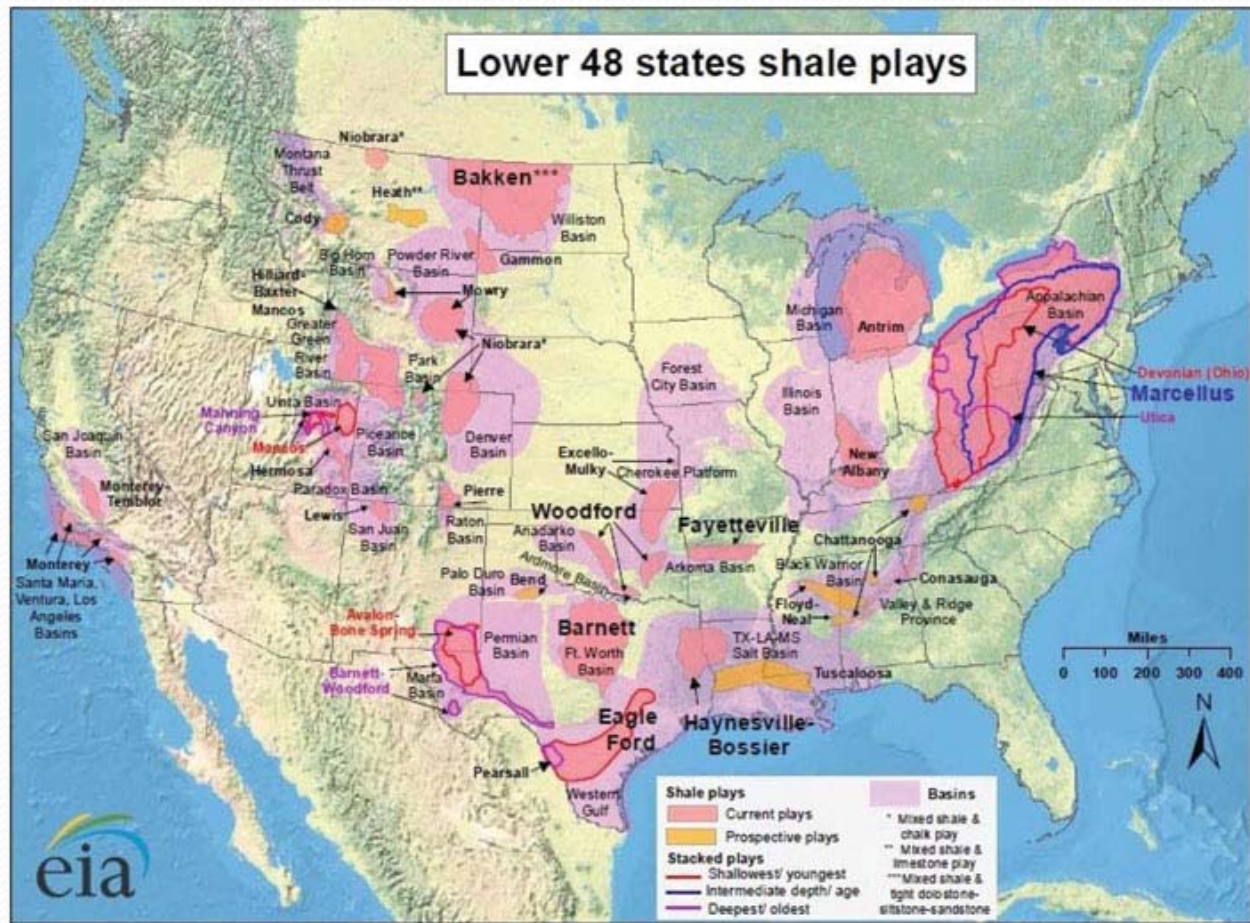


Hydraulic Fracturing (Fracking)

This technique uses a specially blended liquid which is pumped into a well under extreme pressure causing cracks in rock formations underground. These cracks in the rock then allow oil and natural gas to flow, increasing resource production

Hydraulic fracturing is a water intensive process which may require several million gallons of water per well

Lower 48 states shale plays





MDEQ Offices

Oil and Gas Fracking sites may be regulated by the following MDEQ offices:

The Office of Pollution Control – enforces federal and state laws to conserve the air and water and to protect, maintain and improve the quality for public use through permitting, monitoring, compliance and financial/technical assistance

The Office of Land and Water Resources – charged with conserving, managing, and protecting the water resources of Mississippi. Regulates water quantity issues affecting the beneficial use of these resources in the best interest and welfare of the citizens of the state

What Does MDEQ Regulate with Hydraulic Fracturing(hydrofrack)?

- Withdrawals of water from Groundwater sources
- Withdrawals of water from Surface Water sources
- Stormwater runoff from construction sites
- Impoundments in terms of dam safety requirements
- Discharge or Treatment of Wastewater
- Respond to spills or releases that threaten state waters
- Air Pollution



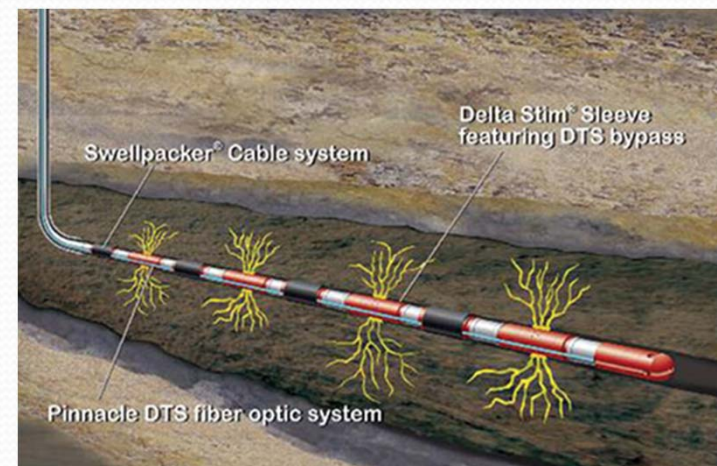
What are the Issues?

- Provide source water without impacts
- Protect Drinking Water Sources, i.e Groundwater
- Prevent pollution and protect surface waters
- Spills or releases that threaten state waters or public health
- Air Pollution
- Infrastructure Demands



Water Use Requirements

- Water volume can fluctuate dramatically
 - Volume is dependent on the following factors:
 - Type of fracturing method used
 - Length of laterals
 - Number of frack stages
 - Volume of sand used



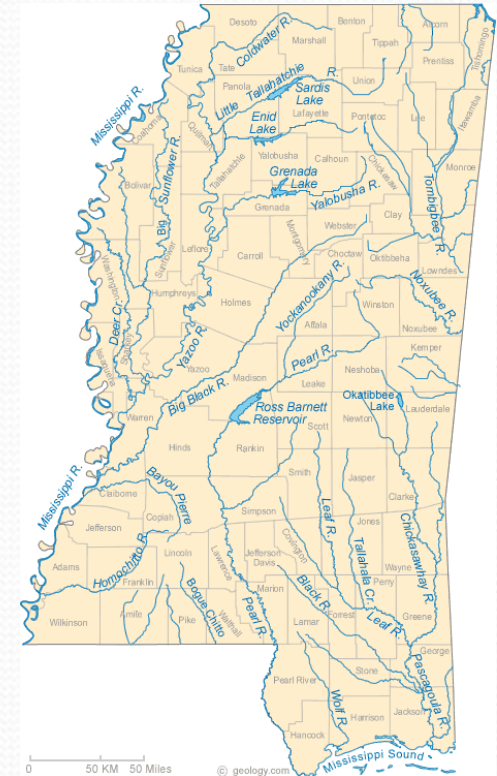
Water Supply Options


- Streams and rivers
- Private ponds
- Groundwater
- Recycled and treated flowback water
- Treated waste water
- Mississippi River



Water Use Challenges

- Limited surface water withdrawal opportunity in SW Mississippi, especially during low flow season
- Many streams are scenic, popular for recreation and have high water clarity
- Duty to use water resources to the benefit of the citizenry for their fullest extent
- Limited stream gages available in the area
 - Estimate surface water available for withdrawal based on drainage area ratios, must make conservative assumptions
 - Send staff to area to measure streamflows
- Evolving methodology to determine maximum withdrawal allowable without causing adverse impact to aquatic life and to preserve all stages of the flow regime





TITLE 51 WATERS, WATER RESOURCES, WATER DISTRICTS, DRAINAGE, AND FLOOD CONTROL
CHAPTER 3. WATER RESOURCES; REGULATION AND CONTROL
ARTICLE 1. GENERAL PROVISIONS
Miss. Code Ann. § 51-3-1 (2011)

§ 51-3-1. Declaration of policy on conservation of water resources

It is hereby declared that the general welfare of the people of the State of Mississippi requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable, that the waste or unreasonable use, or unreasonable method of use, of water be prevented, that the conservation of such water be exercised with the view to the reasonable and beneficial use thereof in the interest of the people, and that the public and private funds for the promotion and expansion of the beneficial use of water resources shall be invested to the end that the best interests and welfare of the people are served.

It is the policy of the Legislature that conjunctive use of groundwater and surface water shall be encouraged for the reasonable and beneficial use of all water resources of the state. The policies, regulations and public laws of the State of Mississippi shall be interpreted and administered so that, to the fullest extent possible, the ground and surface water resources within the state shall be integrated in their use, storage, allocation and management.

All water, whether occurring on the surface of the ground or underneath the surface of the ground, is hereby declared to be among the basic resources of this state to therefore belong to the people of this state and is subject to regulation in accordance with the provisions of this chapter. The control and development and use of water for all beneficial purposes shall be in the state, which, in the exercise of its police powers, shall take such measures to effectively and efficiently manage, protect and utilize the water resources of Mississippi.



Water Use Phases

- Experimental
 - MDEQ issued Letters of Authorization to use surface water
- Pilot
 - MDEQ required applications to be submitted for all withdrawals and issued permits for surface water use or a notice that permit was not needed if exempt
- Production
 - Conjunctive water use- Requires use of surface and ground water to meet needs
- Full Commercial
 - Infrastructure in the form of wells, pipelines, treatment facilities, etc. to meet needs



Conjunctive Water Use

- No new or existing groundwater wells will be permitted for hydraulic fracturing that will adversely impact existing drinking uses
- Most public water supply wells and domestic wells in Amite and Wilkinson Counties are shallow
 - 19 PWS less than 600'
 - 8 PWS between 600' – 1000'
 - 4 PWS greater than 1000'
- Ample groundwater is available at depths between 600' and 2000'
- Depths for individual wells will vary with location
- Require an initial investment, but can provide reliable source of water for the fracturing of multiple oil wells



Groundwater Use

- Do not assume an existing groundwater well may be used for hydraulic fracturing if it is permitted for a beneficial use other than hydraulic fracturing
- Do not pump an existing well for fracking without contacting MDEQ
- If availability of drinking water supplies are adversely impacted, MDEQ reserves the right to place additional restrictions on withdrawal or revoke any permit

Surface Water Protection





Surface Water Withdrawal

- Proposed users of surface water must submit an application to MDEQ to determine if a permit is required
- MDEQ determines if a source is state waters
- MDEQ determines an estimated flow rate based on historical averages using stream gauges
- MDEQ must be notified 3 days prior to withdrawal so that a final determination on allowable withdrawal flow rate can be determined based on actual flow rate in the stream
- A report must be submitted to MDEQ with withdrawal date, withdrawal rate and total volume



Ponds or Impoundments

- May be used to store water for hydraulic fracturing so that it can be withdrawn from surface stream at a slower rate
- MDEQ Office of Land and Water Resources Dam Safety Division is responsible for regulating dams in order to protect downstream lives and property
- A Dam Construction and Surface Water Impoundment Permit may be required
- MDEQ will determine the hazard class: High Hazard, Significant Hazard and Low Hazard
- Any modification, alteration, enlargement, or major repair of an existing dam will be subject to the current design standard for the appropriate hazard



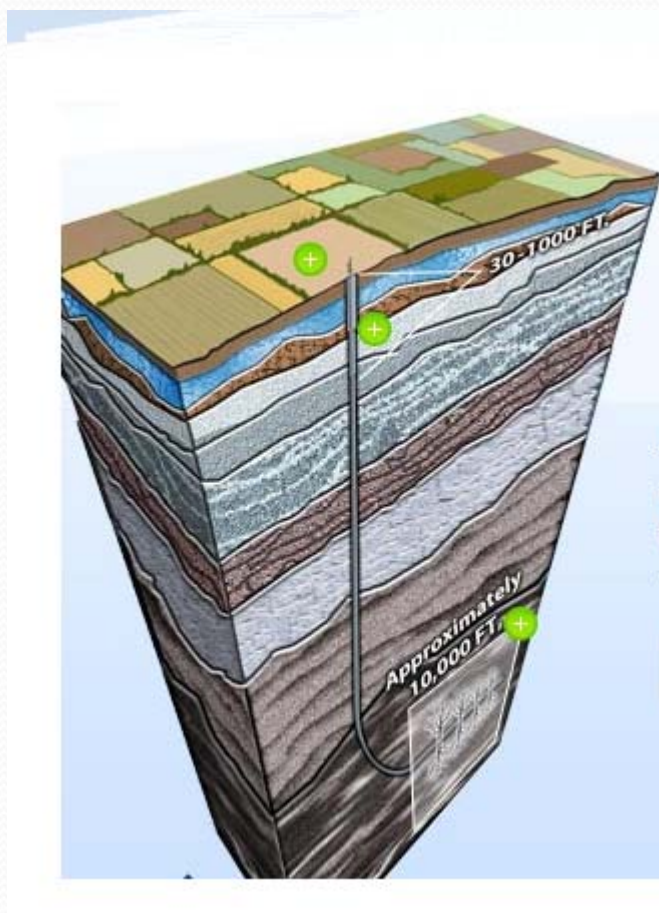
Groundwater Quality Protection Requirements

- Worked with MS Oil & Gas Board to revise their rules in several areas
 - Use of Surface Pits
 - Well design and surface casing requirements
- Depth differences between TMS and sources of drinking water
- Horizontal drilling actually allows for less chance of contamination due to reduced number of “holes” through drinking water sources

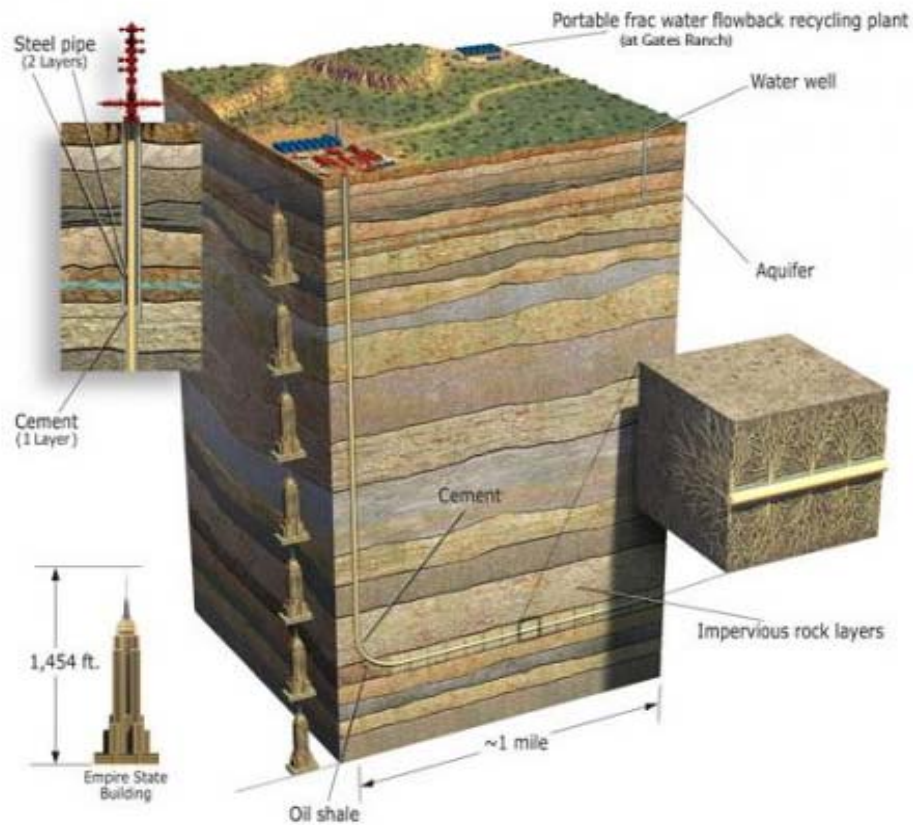
Groundwater Quality Protection Requirements

- The O&G regulations dictate the depths for setting of surface casing. The depth of surface casing depends on the depth of the O&G well. For a 12,000 ft TMS well, the requirements call for about 1,600 ft of casing. Encana has been routinely setting casing to 3,000 ft
- Most public water supply wells and domestic wells in Amite and Wilkinson Counties are shallow
 - 19 PWS less than 600'
 - 8 PWS between 600' – 1000'
 - 4 PWS greater than 1000'
- TMS wells are typically drilled to around 12,000 ft
- There are hundreds of feet of confinement above the TMS and the USDWs. Confining units include parts of the Selma and Midway Groups.
- MSDH has sampled the public water system wells in the area

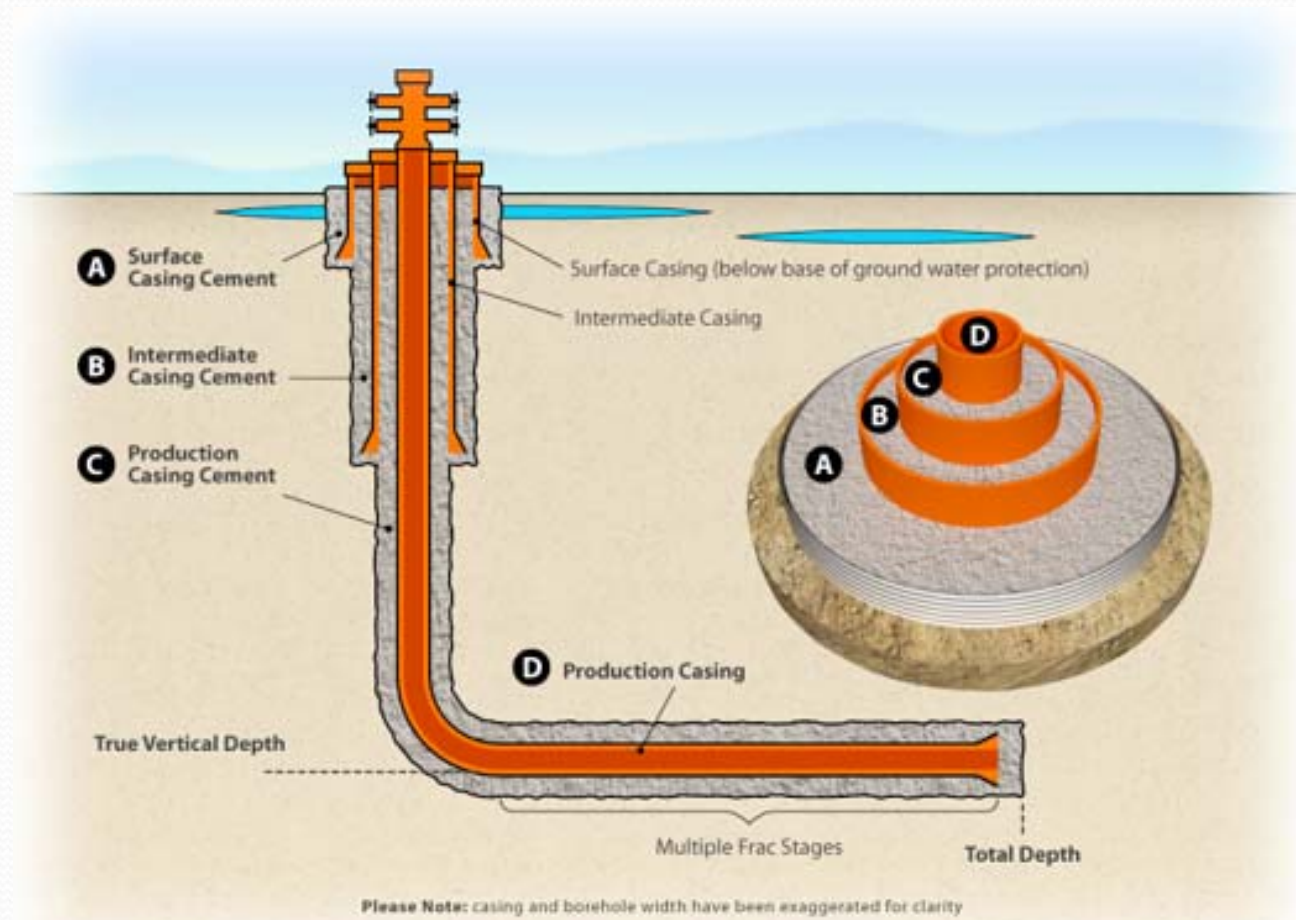
Hydrofrack well depth (fracfocus.org)



Hydraulic Fracturing Process from Fracfocus.org



Casing Requirements regulated by Oil and Gas Board, not MDEQ





Groundwater Protection Cont. - Liners in Surface Pits to protect ground water

- Surface pits may be used to store flow back water if it is not stored in tanks. Surface Pits are regulated by the Oil and Gas Board, not by MDEQ. Oil and Gas board regulations have requirements that temporary salt water pits be lined with impervious material



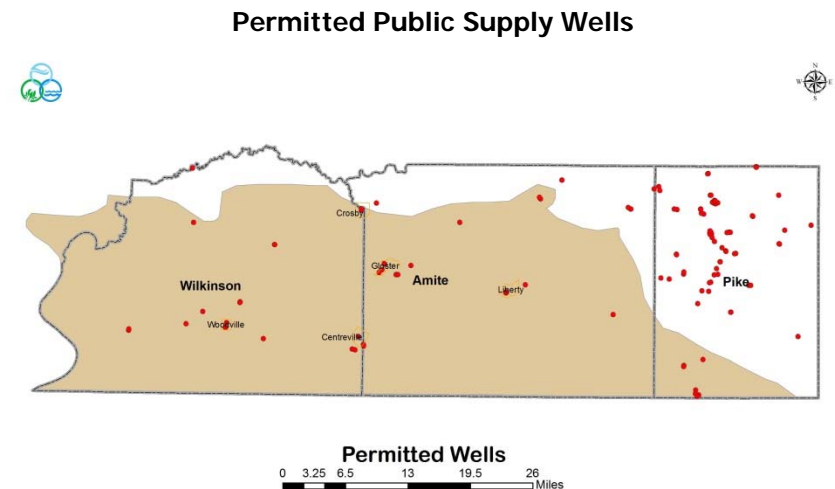
Helpful Website Fracfocus.org

Fracfocus.org

- Chemical disclosure registry for wells – Find a Well
- Mississippi Oil and Gas Board regulations
- Information on hydraulic fracturing, groundwater protection, etc.

Groundwater Quality Sampling

- Establish ambient conditions (quality)
- Public water systems wells – sampled by MSDH
- Private drinking water wells
- Resample after fracturing is completed





MDEQ groundwater permits have baseline and post hydrofrack water sampling requirements

Typical Special Terms and Conditions

- Field survey of wells in 1 mile radius
- Submit geophysical log to MDEQ and finalize allowable depth
- Inspection plug and meter required
- Pump test required
- Static water levels measured before and after each fracking event and submitted to MDEQ
- Water quality samples collected and analyzed by certified lab and submitted to MDEQ
- Water use reported for each fracking event



Stormwater from Construction

- Oil and gas exploration and production activities are exempt from the requirement to obtain coverage under a construction stormwater NPDES General Permit. However, companies are not allowed to let sediment wash into streams and must use Best Management Practices (BMPs) to control sediment
- MDEQ strongly encourages the use of BMPs for sediment control such as an erosion sediment control plan to address sediment runoff from construction activities
- Typical BMP includes berms, hay bales or wattles, silt fencing, re-vegetation



Wastewater

- No discharge of wastewater into state waters from any source associated with production, field exploration, drilling, well completion or well treatment (drilling muds, drill cuttings, produced sands, produced water) is allowed
- This flow back water is usually picked up by a disposal company and disposed of in a Class II well. The type of fluids that can be disposed of down-hole in an approved Class II fluids injection and disposal well are regulated by the Oil and Gas Board
- Hydraulic Fracturing water is not currently treated and reused, but it is a possibility for the future. MDEQ will be involved in regulating this activity . The impoundment to hold the water that will be treated will need to be constructed with sound engineering practices, including an appropriate liner



Spill Prevention, Control and Countermeasure Plans (SPCC)

- Federal EPA requirement
- The purpose of the SPCC s are to prevent oil discharges from reaching navigable waters of the U.S. and to ensure effective and proactive measures are used in response to an oil spill
- Typically, secondary containment is required for oil storage tanks and other containers



Spills or Releases that threaten state waters

- Any person or organization responsible for a release or spill is required to notify the federal government via the National Response Center when the amount reaches a federally-determined limit. Separate reporting requirements exist for oil spills and for hazardous substance releases
- EPA has determined that discharges of oil in quantities that may be harmful to public health or the environment include those that: violate applicable water quality standards; cause a film or sheen upon, or discoloration of the surface of the water; or cause a sludge or emulsion to be deposited beneath the surface of the water
- The MDEQ Emergency Services Division responds, as needed, to any incident involving hazardous material, oil spills or any pollutant that poses a threat of potential threat to human health and safety or the environment



Air Pollution

- Depending upon the potential air emissions and the equipment used for production, an air permit may be required
- Typical equipment for oil and gas production includes crude oil storage tanks, separators, heater treaters, reciprocating internal combustion engines and flares
- Air pollutants of concern are
 - volatile organic compounds,
 - carbon monoxide, nitrogen oxide, and formaldehyde if engines are used
 - hydrogen sulfide if produced gas is sour
 - benzene if it exist in the production and if treatment such as dehydration is conducted,
 - and hexane from natural gas combustion.





Air Pollution Cont.

- In the absence of pipeline infrastructure to collect and transport produced gas, much of it in the TMS has been flared
- Flares are typically used to destruct volatile organic compounds when produced gas is flared
- Flares may be used to convert hydrogen sulfide to sulfur dioxide when gas is sour
- Flares are commonly designed for 98% control efficiency
- Air permits specify conditions for flare operation to ensure pollutants are destructed
- Permits, applications and other information are public records and may be accessed by contacting the freedom of information officer



Current Activities

- Companies with activity in the TMS in SW Mississippi
 - Goodrich
 - Encana Oil & Gas
 - Halcon Resources
 - Comstock Resources
 - Sanchez Oil and Gas

Issues in Other States

Huge Demands on infrastructure



MDEQ – Path Forward

- Oil and Gas Exploration isn't new to MS
- Applying lessons learned from others
- Conjunctive Water Use
 - Groundwater wells between 600' to 2000' reliable source of water that will be evaluated against interference with drinking water
- Meetings with affected communities
- Meetings with regulated community
- Development of a General Permit to expedite Air permit processing times
- Continued monitoring of groundwater and surface water ambient conditions to ensure the protection of water quality and quantity
- Securing resources to adequately handle significant increase in workload



More Information

- You may access permits and other information for a regulated site by contacting the MDEQ Freedom of Information Officer
- MDEQ has a regional offices located in Biloxi, Pearl and Oxford, MS. The MDEQ regional office personnel respond to complaints
- MDEQ is available to meet with affected communities as we go forward with hydraulic fracturing

Some Sources of Additional Info

- <http://fracfocus.org/>
- <http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/hydraulic-fracturing.cfm>
- <http://www.aapg.org/explorer/2012/01jan/washington0112.cfm>
- <http://www.kgs.ku.edu/Publications/PIC/pic32.html>
- <http://www.ngwa.org/Documents/PositionPapers/hydraulic-fracturing-position-paper.pdf>
- <http://www.encana.com/environment/water/>
- <http://www.ngwa.org/Media-Center/briefs/Documents/Water-Wells-Proximity-2013.pdf>
- <http://www.deq.state.ms.us/>
- <http://www.ogb.state.ms.us/>



THANK YOU!

For questions or additional information, please contact:

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