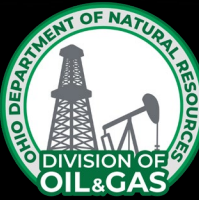
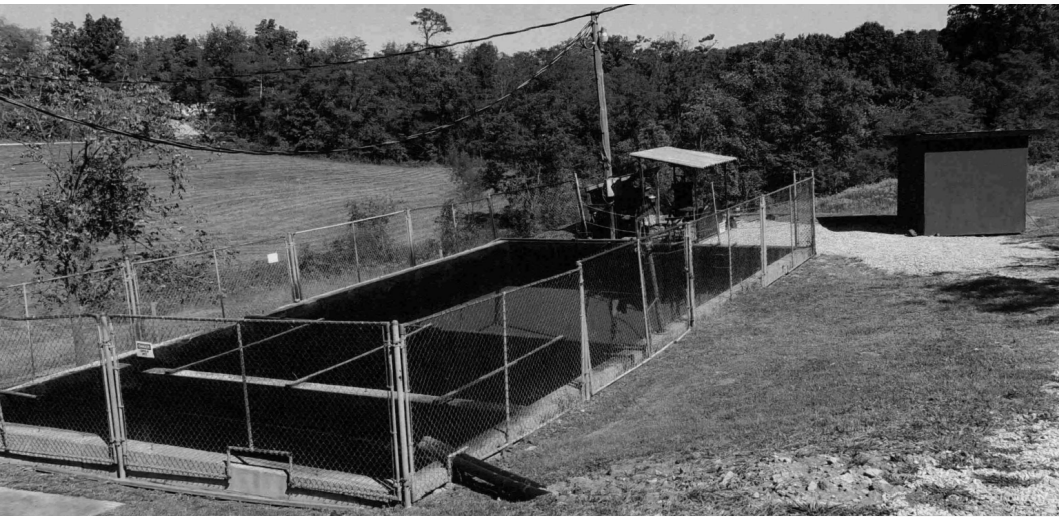


Class II Disposal Well Regulatory Reformations for Current Challenges in Ohio

Presented by: Kenny Brown



The Past



Ohio Department of
NATURAL RESOURCES

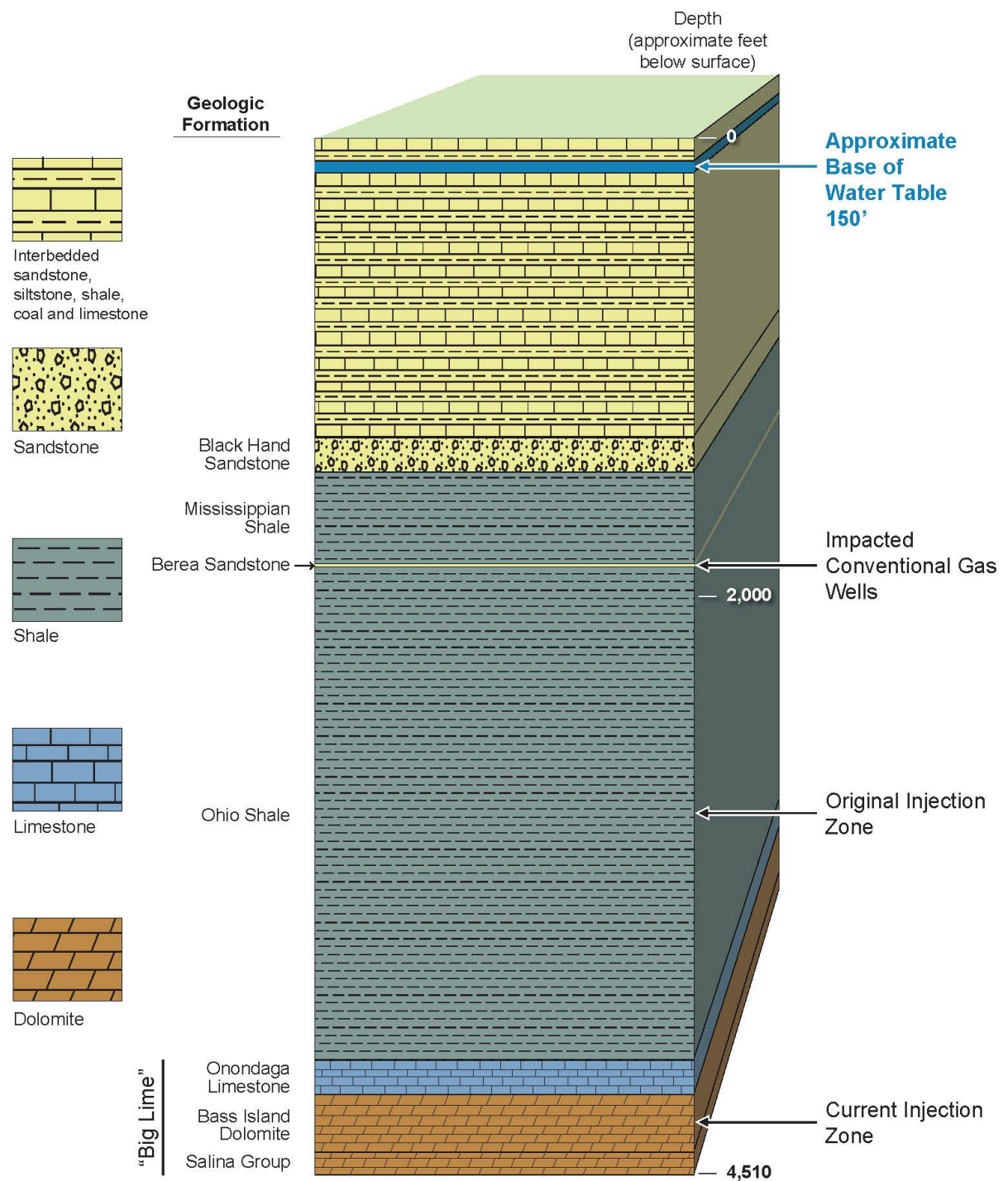


To the Present



Laws Updates Since Primacy (Post 1983)

1. Amended Substitute House Bill 501(passed in 1985)
 1. Eliminated “evaporation pits” as of July 1, 1986
 2. Established lawful disposal options – deep well injection or surface spreading
2. Senate Bill 165 (passed in 2010)
 1. Fees increased to offset general revenue funding elimination
 2. New brine disposal fee – 5 cents per barrel in-district and 20 cents per barrel out-of-district
 3. Maximum disposal fee payment per Class II saltwater injection well is \$100,000 (500,000 bbl. X \$0.20 per bbl.)
3. Emergency rule-making in 2012
 1. Passed in response to concerns of seismicity related to Class II injection wells
 2. More testing and evaluation authority given to Chief during permitting process
 3. Lengthened public notification process
 4. Required continuous monitoring of annulus for wells permitted after effective date
4. **Update to Class II rules effective January 13, 2022**

[illegible]

Outcomes of the Washington County Produce Water Study

Ohio Department of Natural Resources
Division of Oil and Gas Resources Management

Final Assessment Report

Redbird #4
Washington County, Ohio

June 2021

Version 1

<https://ohiodnr.gov/discover-and-learn/safety-conservation/about-odnr/oil-gas/oil-gas-resources/washington-county-investigation#:~:text=In%20late%202019%2C%20three%20owners,located%20in%20the%20Berea%20Sandstone>



OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL & GAS RESOURCES MANAGEMENT
OILANDGAS.OHIODNR.GOV

WASHINGTON COUNTY PRODUCED WATER INVESTIGATION EXECUTIVE SUMMARY

In late 2019, three owners of production wells in Washington County reported to the Ohio Department of Natural Resources, Division of Oil and Gas Resources Management (Division) an increased flow of salt water, known as brine, during their extraction process in 28 production wells located in the Berea Sandstone formation. While some amount of brine is expected to be produced along with crude oil and natural gas, these owners reported seeing a higher volume than normal. The owners believed that the brine came from a nearby Class II Saltwater Injection Well, Redbird #4, in the Ohio Shale formation, which sits below the Berea Sandstone formation as shown in Figure A. The Division has received no reports of adverse effects to human health or safety associated with any of the wells at issue.

The Division began investigating the matter, and scientists in the Division's Underground Injection Control program requested and procured available data, including samples from the 15 production wells where brine samples could be obtained. The Division contracted with a third-party, Resource Services International, to analyze the data and determine if brine was travelling from Redbird #4 to the production wells.

The Division also discussed the allegations of brine travelling out of its injection zone with the owner of the Redbird #4 injection well in March of 2020. As of May 22, 2020, the owner voluntarily completed modifications to the Redbird #4 well to seal off the Ohio Shale formation. The Redbird #4 had not actively injected since November of 2019 because of an unrelated pump problem.

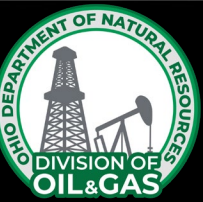
Key Report Conclusions

- Wastewater injected into the Ohio Shale Formation from the Redbird #4 well is the source of brine that has appeared in several production wells drilled into the adjacent Berea formation. The conclusion is based on data and water samples obtained from both the injection well and the production wells.
- Naturally occurring fissures exist between the Ohio Shale formation and the Berea Sandstone formation, allowing wastewater to migrate between the formations and into the production wells.
- Since Redbird #4 is no longer injecting brine into the Ohio Shale formation, brine volumes in the impacted production wells are expected to decrease and natural gas production will return to expected rates.
- It is unlikely that wastewater will migrate farther – including into underground sources of drinking water due to the composition of the rock layers and other factors.



Outline of Class II Rule Changes as of 1/13/22

1. Siting criteria changes
2. Area of review and corrective action changes
3. Public notice and public meeting changes
4. Application requirement changes
5. Well construction changes
6. Operational changes
7. Enforcement changes
8. Plugging requirements



Surface Location and Siting Criteria for New Class II Wells

- Floodplain restrictions
- 500 feet from boundary of subject tract
- 750 feet from private dwelling or public building
- 1,000 feet from five-year time of travel or emergency management zone
- 100 feet from wetlands, surface waters, ponds, springs and water wells

Siting of Pipelines Connecting Surface Facilities to Class II Disposal Wells

- Not allowed within:
 - 1,000' of 5-year TOT for public drinking water supply
 - 1,000' of Emergency management zone of public water system intake
 - 100' of wetlands or surface waters, ponds, developed springs, or water wells
 - These prohibited locations may be approved with additional requirements.(1501:9-3-04(H))

Area of Review

- Less than 200 bbls/day – ½ mile
- More than 200 bbls/day less than 1000 bbls/day – 1 mile
- More than 1000 bbls/day – 2 miles

Corrective Action defined for Wells in Area of Review

Corrective action required when the well penetrates proposed injection zone or within 500' of injection zone:

- And is improperly plugged or plugged with clay
- The well is constructed with production casing set with a packer
- The well lacks at least 500' of cement above top of proposed injection zone on the backside of the production casing
- **The well has limited or no records**

Restrictions on New Applications

- Injection into certain formations on site specific basis
- Owner shall own all producing wells in AOR that are producing from the proposed injection zone or reduce daily injection volume to <200 bbls/day
- Daily injection volume reduced to <200 bbls/day for Devonian shale or shallower injection formations

Public Notice Process

- Post application on Division website for public notice and comments
- Applicant hand delivers or mails certified notice to:
 - Owners of wells in AOR
 - Owners of real property within 1500' of well
 - Board of County Commissioners, Township trustees or executive authority of a municipal corporation where the well is proposed to be located
- 30-day comment period
- Anyone who receives direct notice may request a public meeting
- Meeting will be noticed 30 days prior
- Chief will review comments for legal or technical deficiency – may address with permit conditions or return to applicant for correction

Application Changes

1. Split processes for a permit to construct or convert and a permit to inject.
2. Require the applicant to define and describe the confining zone.
3. Expanded design and construction drawing requirements.
4. Expanded Map requirements to be submitted
5. Gives Chief authority to require additional site-specific testing (i.e. Geotech report, slope stability analysis, sediment and erosional controls, etc)
6. Clearly define timeframe for permit process.
7. Requires Surface Facilities to undergo a verification of integrity before commencement of injection.

Well Construction Changes

- **500'** of cement behind production casing or **500'** above a potential flow zone
- Tubing and packer must be set no more than **200' above top of injection zone** during the life of the well
- Cement bond log all cemented casing strings below surface casing (new and conversions, if chief requests)
- Sample water wells within 1500' of proposed disposal well and 500' of proposed pipeline prior to commencement of drilling or conversion operations.
- No construction may commence at the well or surface facility until a permit is issued
- Requires written approval of minor changes to surface facility during construction. Major modification of surface facilities require an amendment through administrative order.

Operational Rule Changes

- All wells shall **continuously monitor the annulus pressure**. The injection pressure and injection volume shall be continuously monitored on an operational basis. Retain records for the life of the well
- Chief must approve requests to hydraulically fracture
- **MIT part 1 at least once every 5 years**, or by request of the chief
- Require operator to immediately shutdown and notify Division within 24 hours of a MIT failure.
- For good cause shown, the chief may require MIT part 2 to be demonstrated again
- Install, maintain and **annually test** automatic shutoff switches
- Pipeline testing in accordance with ANSI/ASME or manufacturer recommendations at least once **every 5 years** (excludes process piping)
- Chief may require installation of groundwater monitoring wells
- Owner shall visually inspect wellhead daily during injection operations
- Owner must develop and implement inspection procedures, schedule, and documentation of each inspection for all equipment, containment systems, pipelines, and other appurtenances at the surface facility

Suspension Authority

- Failure to demonstrate mechanical integrity
- Seismicity
- Endangering public health
- AOR exceedance
- **Well pressure exceeds MAIP**
- Automatic shut off device disabled, or set above MAIP, or altered may be required to be **shut down for 30 days**. Multiple violations Chief may revoke permit to inject.
- Any other violations of law or rule

Plugging

- Class II Well is non-operational for five years
- Expanded AOR corrective action not completed
- Suspension response plan not implemented
- No suspension response plan submitted.

Reporting

- Volumes, pressures, and sources reported **quarterly**
- Fees due **annually**

Wastes Generated at Class II Well

- Must lawfully dispose of wastes generated and maintain records (filters, used tubing, etc.)
- Must lawfully dispose of wastes accumulated in tanks when 30% reduction in capacity

Lessons Learned from Rule Rewrite Process

- Include all individual who will enforce regulations in the entire rule making process.
- Clearly define issues and run through solutions.
- Work through new processes to determine any issues or loopholes in the regulations.
- Create any new forms prior to the rule going into effect
- Be open to suggestions from all parties
- Allow the rule to be flexible enough to solve tomorrow's issues

“A common mistake that people make when trying to design something completely foolproof is to underestimate the ingenuity of complete fools”

By Douglas Adams

Mostly Harmless by Douglas Adams, 1992



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<https://ohiodnr.gov/>

Rules are located: <https://codes.ohio.gov/ohio-administrative-code/1501:9-3>

