

ODNR-DMRM should be one of your first contacts if you plan to drill in Ohio. For more information, see their website at <http://www.ohiodnr.com/tabid/10352/Default.aspx>.

For more information about Ohio EPA's requirements, see our website at <http://www.epa.state.oh.us/shale.aspx>.

Other Agencies You Should Know

U.S. Army Corps of Engineers

Huntington District

www.lrh.usace.army.mil/or/permits/

Buffalo District

www.lrb.usace.army.mil/orgs/reg/index.htm

Louisville District

www.lrl.usace.army.mil/

Pittsburgh District

www.lrp.usace.army.mil/or/or-f/permits.htm

Table 1. Summary of ODNR and Ohio EPA regulatory authority over oil/gas drilling activities.

	Ohio Department of Natural Resources	Ohio Environmental Protection Agency
Drilling in the shale deposits	<ul style="list-style-type: none"> ✓ Issues permits for drilling oil/gas wells in Ohio. ✓ Sets requirements for proper location, design and construction requirements for wells. ✓ Inspects and oversees drilling activity. ✓ Requires controls and procedures to prevent discharges and releases. ✓ Requires that wells no longer used for production are properly plugged. ✓ Requires registration for facility owners with the capacity to withdraw water at a quantity greater than 100,000 gallons per day. 	<ul style="list-style-type: none"> ✓ Requires drillers obtain authorization for construction activity where there is an impact to a wetland, stream, river or other water of the state. ✓ Requires drillers obtain a permit-to-install and operate (PTIO) for units or activities that have emissions of air pollutants.
Wastewater and drill cutting management at drill sites	<ul style="list-style-type: none"> ✓ Sets design requirements for on-site pits/lagoons used to store drill cuttings and flowback water. ✓ Requires proper closure of on-site pits/lagoons after drilling is completed. ✓ Sets standards for managing drill cuttings and flowback derived sediments left on-site. 	<ul style="list-style-type: none"> ✓ Requires proper management of drill cuttings that are considered solid waste and shipped off-site for disposal.
Brine/flowback water disposal	<ul style="list-style-type: none"> ✓ Regulates the disposal of brine and oversees operation of Class II wells used to inject oil/gas-related waste fluids. ✓ Reviews specifications and issues permits for Class II wells. 	

	<ul style="list-style-type: none"> ✓ Sets design/construction requirements for Class II underground injection wells. ✓ Responds to questions/concerns from citizens regard safety of drinking water from private wells from oil/natural gas drilling. 	
Flowback water hauling	<ul style="list-style-type: none"> ✓ Registers transporters hauling brine and oil/gas drilling-related wastewater in Ohio. 	
Pumping water to the drill site from a public water supply system		<ul style="list-style-type: none"> ✓ Requires proper containment devices at the point of connection to protect the public water system.

Ohio Environmental Protection Agency

Drilling for Natural Gas in the Marcellus and Utica Shales: Environmental Regulatory Basics

DRAFT Fact Sheet, June 2011 (Revised)

Introduction

This fact sheet provides a basic overview of natural gas drilling in the Marcellus and Utica Shale regions of Ohio and the potential environmental issues associated with these activities. It also summarizes the regulatory authority of the Ohio Environmental Protection Agency (Ohio EPA) and Ohio Department of Natural Resources (ODNR), Division of Mineral Resources Management (DMRM) over drilling activity and wastewater management.

Where are the Marcellus and Utica Shale Deposits?

Together, the Marcellus and Utica Shale regions extend across New York, Pennsylvania, Maryland, West Virginia, eastern Ohio and portions of Kentucky and Tennessee. The deposits sit between 7,000 and 12,000 feet below ground, with the Marcellus Shale at more shallow depths than the Utica.

Both are important geologic formations because they hold large reserves of natural gas. Researchers estimate the Marcellus Shale alone could contain as much as 363 trillion cubic feet of natural gas, enough to satisfy U.S. energy demands for about 14 years.

Most drilling is now occurring in the Marcellus Shale region of Pennsylvania, with growing interest in West Virginia and New York. Because the Marcellus Shale is much thinner on its western edge, Ohio is experiencing far less Marcellus Shale drilling than other states. However, Ohio will likely see a significant increase in future drilling, as much of the state sits over the Utica Shale formation, which experts also predict holds large natural gas reserves and potentially oil.

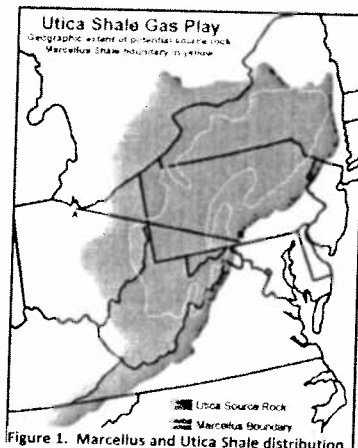


Figure 1. Marcellus and Utica Shale distribution.

How is natural gas extracted from a shale formation?

Natural gas is extracted from the shale through a two-step process of horizontal drilling and hydraulic fracturing. To start, a production well is drilled thousands of feet downward and then gradually angled out horizontally through the shale deposit. The well is drilled horizontally to maximize the ability to capture natural gas once the shale is hydraulically fractured.

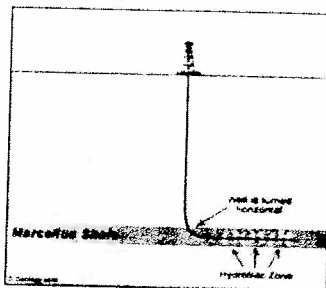


Figure 2. Horizontal drilling process. Graphic reprinted with permission of www.Geology.com

After the well is drilled, a mixture of water, sand and chemical additives is injected at very high pressure to

fracture the shale. This part of the process, called hydraulic fracturing (or "fracing") is a technique used in the oil and gas industry since the 1950s. The sand (called a "proppant") keeps the fractured shale open and serves as a conduit for extracting the natural gas. The chemical additives reduce potential problems in drilling and gas production, such as bacterial build-up and the formation of scale, mineral deposits and rust.

It can take up to four million gallons of fresh water to hydraulically fracture a single well. The water used in the fracturing process usually comes from a stream, river, reservoir or lake close to the drill site, or in some cases, from a local municipal water plant.

What happens to water after hydraulic fracturing is complete?

Most of the water used to fracture the shale remains trapped thousands of feet underground after it is injected. However, internal pressure in the geologic formation forces some of the water (around 15-20 percent of the total volume injected) back to the surface through the well bore.

Most of this brine, also called "flowback" or "frac" water comes back to the surface within seven to ten days after it is pumped into the well. It is stored temporarily in lagoons or tanks before it is shipped off-site for disposal. It is usually transported off-site by truck, although some companies are exploring rail transportation as an option.



Figure 3. An on-site lagoon is one option for temporary storage of drill cuttings/fluids and flowback water.

Brine is sent to facilities that have permits to inject fluids into deep injection wells (called Class II wells) thousands of feet underground.

Because of disposal costs, some drilling companies are recycling and reusing flowback water from one drill site to another. Having multiple drill sites in close proximity makes it more cost-effective to reuse flowback water. The concentration of iron, bacteria, suspended solids and other contaminants in flowback water is another factor in determining whether it can be reused.

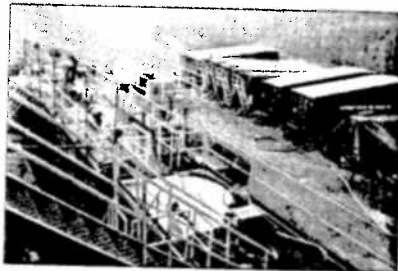


Figure 4. As an alternative to a lagoon, some drill sites use a series of frac tanks to collect flowback water.

How is drilling in the Marcellus and Utica Shales regulated in Ohio?

ODNR, DMRM has primary regulatory authority over oil and gas drilling activity in Ohio, including rules for well construction, siting, design and operation. ODNR, DMRM regulates disposal of brine¹ and drilling fluids from oil and gas drilling/production. ODNR regulates Class II underground injection wells used for disposal of waste fluids from oil and gas drilling/production operations and transporters hauling these fluids in Ohio.



Figure 5. Frac tanks are hauled by trailer to a disposal location. Photo reprinted with permission of www.marcellus-shale.us

Ohio EPA's water quality certification requirements help reduce impacts to wetlands, streams, rivers or other waters of the state from the construction of a drill site. Ohio EPA also regulates sources of air emissions, and may require air permits for some of the sources at the drill site. Finally, any materials meeting the definition of solid waste sent off-site for disposal must be properly managed, either at a solid waste landfill, or beneficially reused, as authorized by Ohio EPA's Division of Waste and Materials Management (DWMW).

¹ "Brine" includes all saline geological formation water resulting from, obtained from, or produced in connection with the exploration, drilling, or production of oil or gas, including saline water resulting from, obtained from, or produced in connection with well stimulation or plugging of a well. (R.C. 1509.01(U))

Table 1. Summary of ODNR, DMRM and Ohio EPA regulatory authority over drilling and management of flowback water

	Ohio Department of Natural Resources	Ohio Environmental Protection Agency
Drilling in the shale deposits	<ul style="list-style-type: none"> ✓ Issues permits for drilling oil/gas wells in Ohio. ✓ Sets requirements for proper location, design and construction requirements for wells. ✓ Inspects and oversees drilling activity. ✓ Requires controls and procedures to prevent discharges and releases. ✓ Requires that wells no longer used for production are properly plugged. ✓ Requires registration for facility owners with the capacity to withdraw water at a quantity greater than 100,000 gallons per day. 	<ul style="list-style-type: none"> ✓ Requires drillers obtain authorization for construction activity where there is an impact to a wetland, stream, river or other water of the state. ✓ Requires drillers obtain a permit-to-install and operate (PTIO) for units or activities that have emissions of air pollutants.
Wastewater and drill cutting management at drill sites	<ul style="list-style-type: none"> ✓ Sets design requirements for on-site pits/lagoons used to store drill cuttings and brine/flowback water. ✓ Requires proper closure of on-site pits/lagoons after drilling is completed. ✓ Sets standards for managing drill cuttings and sediments left on-site. 	<ul style="list-style-type: none"> ✓ Requires proper management of drill cuttings or sediments that are considered solid waste and shipped off-site for disposal.
Brine/flowback water disposal	<ul style="list-style-type: none"> ✓ Regulates the disposal of brine and oversees operation of Class II wells used to inject oil/gas-related waste fluids. ✓ Reviews specifications and issues permits for Class II wells. ✓ Sets design/construction requirements for Class II underground injection wells. ✓ Responds to questions/concerns from citizens regard safety of drinking water from private wells from oil/natural gas drilling. 	
Brine/flowback water hauling	<ul style="list-style-type: none"> ✓ Registers transporters hauling brine and oil/gas drilling-related wastewater in Ohio. 	
Pumping water to the drill site from a public water supply system		<ul style="list-style-type: none"> ✓ Requires proper containment devices at the point of connection to protect the public water system.

What are the environmental concerns with drilling and hydraulic fracturing?

With growing media coverage of shale drilling, citizens are becoming more aware and concerned about potential impacts of drilling activity on them, the environment and their communities.

Because Ohio has a significant number of Class II underground injection control wells with permits to dispose of flowback water, many drilling companies have been transporting flowback water into Ohio for deep-well disposal.

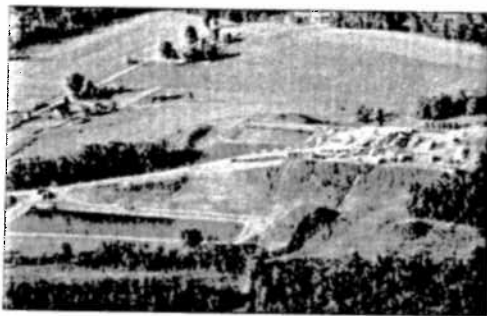


Figure 6. A Marcellus Shale drill site in Pennsylvania. Photo reprinted with permission of www.marcellus-shale.us.

Brine, including flowback water, picks up minerals from the shale formation including iron, calcium, magnesium, barium, sulfur, suspended solids and a significant concentration of soluble salts. It may also contain low levels of naturally occurring radioactive elements such as radium, carried up from the shale. It also contains total dissolved solids (TDS), including chlorides, sodium and sulfates. High levels of TDS in streams, rivers and lakes can impair water quality and kill aquatic life.

ODNR, DMRM has the exclusive authority for brine disposal in Ohio. Ohio prohibits the direct discharge of brine/flowback water into waters of the state. In addition, disposal of brine at municipal wastewater sewage plants (also called publicly owned treatment works or POTW) in Ohio is NOT authorized.

Brine, including flowback water, disposed of in Ohio must be sent to an ODNR-permitted Class II injection well. Where feasible, recycling and reusing flowback water is strongly encouraged. Some materials may be suitable for road surface application, under authorization from ODNR. For more information on brine management options, contact ODNR, DMRM.

Total Dissolved Solids (TDS)

A general term for organic and inorganic particles suspended in a liquid which easily pass through a small membrane filter system.

Total dissolved solids in brine/flowback water include minerals, metals and soluble salts such as sodium, chlorides and sulfates.

TDS in the form of soluble salts in brine/flowback water from shale drilling can reach concentrations as high as 200,000 mg/l. As a point of comparison, the salinity of seawater from concentrated salts is about 35,000 mg/l.

Who regulates issues such as truck traffic and road maintenance at a drill site?

There is usually a short-term, but significant level of activity at a drill site. For example, moving drilling equipment on and off site, and hauling production water, brine and drill cuttings from the site can create significant truck traffic. Issues such as truck traffic are not covered under Ohio EPA's or ODNR, DMRM's regulations. Check with your community officials on local regulations.

Will drilling for natural gas contaminate my drinking water well?

The Ohio EPA, ODNR, DMRM and other technical experts familiar with hydraulic fracturing do not have data showing a risk of groundwater contamination from brine migrating thousands of feet from the Marcellus or Utica Shale fractures up into drinking water aquifers much closer (hundreds of feet) to the earth's surface.

There is the potential, although unlikely, for contamination of drinking water wells because of problems occurring closer to the surface. Gas and oil can migrate from a production well into an aquifer if a well casing is damaged, leaking or poorly constructed. Natural gas can also enter aquifers from old, abandoned oil and gas wells that are unplugged or poorly plugged. A new water well that is drilled can penetrate gas-rich organic shales or coal seams at shallow depths, allowing gas to enter the well. Buried organic deposits from old swamps or landfills may also release natural gas into soils overlying aquifers.

It's important to know that there have been thousands of oil and gas production wells drilled throughout Ohio with no significant adverse impacts to local wells or drinking water supplies throughout the state's long history of oil and gas drilling. If you do, however, suspect any problems with your drinking water well during as a result of any oil/gas drilling activities in your area, contact the Ohio Department of Natural Resources, Division of Mineral Resources Management at (614) 265-6633.

What about leasing rights if someone wants to drill on my property?

The process of drilling a well begins with a lease agreement between the producing company and one or more landowners that make up a drilling unit. It is important for a landowner approached for a mineral rights lease to be aware of all the conditions of the lease that allow the producer to drill on their land.

Ohio EPA's and ODNR, DMRM's regulations DO NOT cover private property lease agreements, and we cannot provide homeowners with any specific guidance on this topic. As a starting point for general information on leases, see ODNR's website, "Landowners and Leasing for Oil and Gas in Ohio," at www.ohiodnr.com/oil/oil_landowner/tabid/17732/Default.aspx.

Where can I get more information?

Ohio Department of Natural Resources, Division of Mineral Resources Management, Oil and Gas website: www.ohiodnr.com/mineral/oil/tabid/10371/default.aspx.

Ohio Environmental Protection Agency, Marcellus Shale website:
<http://www.epa.state.oh.us/shale.aspx>.

McCracken, Chuck

From: Chuck McCracken
Sent: Tuesday, May 17, 2011 2:08 PM
To: Lance Himes
Subject: Today's Columbus Dispatch Article on Brine
Attachments: Document.pdf

This goes along with the OEPA letter I forwarded.

-----Original Message-----

From: ODH Digital Sender [mailto:sender@odh.ohio.gov]
Sent: Tuesday, May 17, 2011 2:06 PM
To: Chuck McCracken
Subject: Scanned Image from Digital Sender

This document was digitally sent to you using an HP Digital Sending device.

OHIO EPA ORDER

Cities can't treat brine from new gas wells

By Spencer Hunt
THE COLUMBUS DISPATCH

Ohio cities hoping to profit from natural gas drilling won't be able to cash in after all.

Ohio Environmental Protection Agency officials announced yesterday that cities can't treat millions of gallons of salty wastewater from new natural gas wells in their sewage plants and dump it into streams.

The agency says it is concerned that the wastewater, called brine, poses a pollution risk.

"I think the agency is concerned about anything that could negatively impact drinking water or the salt content of state waters," said Chris Abbruzzese, an Ohio EPA spokesman.

The decision, sent in a letter yesterday to state and local officials, was a setback for Steubenville, East Liverpool and Warren, where officials hoped to make money from energy companies eager to get rid of their brine.

Warren was the only city to treat waste. In January, the Ohio EPA let the city collect and treat as much as 100,000 gallons of brine a day from a Lisbon-based company, Patriot Water Treatment, and dump it into

See BRINE Page A9

BRINE

FROM PAGE A8

the Mahoning River.

The city's treatment process does not remove salt from the wastewater.

Abbruzzese said the state won't renew a change in the city's water-pollution-control permit that lets it dump the brine. That change expires next year.

Andrew Blocksom, Patriot's president, said he already has hired 45 people and invested \$3 million. He said he hopes to meet with Ohio EPA officials to try to change their minds.

"It's a complete surprise," Blocksom said. "If this was their intent, we wouldn't have spent all the money that we've invested or have all of these families who are relying on our business."

The decision is the latest development in what state officials hope will be a new boom in natural gas drilling in Ohio.

In eastern Ohio, energy companies are offering landowners as much as \$1,500 an acre for the right to drill into the Marcellus and Utica shales.

A drilling technique called

"fracking" sends millions of gallons of water laced with industrial chemicals down the wells to fracture the shale and release the gas.

The wastewater contains high concentrations of salt, minerals and hazardous metals that can include barium, cadmium and chromium.

Marcellus wells in Pennsylvania have produced so much brine that state officials said it fouled the Monongahela and Susquehanna rivers. In April, Pennsylvania urged energy companies to stop taking brine to 15 sewage plants because compounds called bromides posed a pollution risk to drinking-water supplies.

The Ohio EPA's letter lists injection wells, in which liquid wastes are injected thousands of feet underground, as the top disposal option.

Tom Angelo, director of Warren's water-pollution-control plant, had hoped to charge as much as \$150,000 a year to take the brine.

"We have almost 4½ months of operation that demonstrates no problems to the environment or the treatment plant," he said. shunt@dispatch.com

McCracken, Chuck

From: Laurie Stevenson <laurie.stevenson@epa.state.oh.us>
Sent: Tuesday, May 17, 2011 12:31 PM
To: Chris.Perry@dnr.state.oh.us; Heidi Hetzel-Evans; john.husted@dnr.state.oh.us; mike.hallfrisch@dnr.state.oh.us; mike.mccormac@dnr.state.oh.us; rick.simmers@dnr.state.oh.us; ted.lozier@dnr.state.oh.us; thomas.tugend@dnr.state.oh.us; tom.tomastik@dnr.state.oh.us; Aaron Shear; Benjamin Cirkner; Brian Hall; Brian Nickel; Chuck Lowe; Dan Underwood; Donna Kniss; Eric Adams; Eric Nygaard; Erm Gomes; Fred Snell; Joe Goicochea; Keith Riley; Kristopher Weiss; Lee Burkleca; Lindsay Taliaferro; Michael Eggert; Mike Baker; Mike Hopkins; Mike Settles; Misty Parsons; Nancy Rice; Rich Blasick; Ryan Laake; Steve Saines; Steve Williams; Stivo DiFranco; Tom Harcarik; Tracy Freeman; Virginia Wilson; Chuck McCracken; Michael Snee; Rebecca Fugitt; robert.owen@odh.ohio.gov; Stephen Helmer
Subject: Letter from OEPA to ODNR regarding brine disposal
Attachments: 5-16-11DirectorLettertoODNR.pdf

Hello everyone. I'm passing along a letter that went to ODNR from OEPA yesterday regarding disposal of oil/gas brine into POTW systems. Some of you received a copy yesterday, but I wanted to make sure others on the shale team see it. If you have questions, call me at 4-2344.

For the OEPA program folks, if you get either media or legislative inquiries about this, please direct them here (Penny Seipel or Tracy Freeman for legislative and Chris Abbruzzese for media).

Thanks,
Laurie

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Environmental
Protection Agency
John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

May 16, 2011

Director David Mustine
Ohio Department of Natural Resources
2045 Morse Road, Building D
Columbus, OH 43229-6693

Re: Brine Disposal Pursuant to ORC Section 1509.22

Dear Director Mustine:

I am writing to memorialize our recent discussions regarding brine disposal from oil and gas operations so that our respective agencies and the regulated community will have clear direction moving forward concerning this issue. As we have discussed, ODNR has the regulatory authority over the disposal of brine generated from oil/gas operations pursuant to Ohio Revised Code (ORC) Section 1509.22(C). There are no qualifiers as to the relative level of salinity in this definition or rules adopted by ODNR under this authority.

Ohio Revised Code Section 1509.22(C)(1) strictly limits the options for disposing of brine resulting from the production of oil or gas to the following:

- injection into an underground formation;
- road surface application (excluding flow back, drilling and treatment fluids);
- use in association with a method of enhanced recovery; or
- by other methods approved by the ODNR, Chief of Mineral Resources Management for testing or implementing a new technology or method of disposal.

Disposing directly into a surface water body, either directly or via a Publicly Owned Treatment Works (POTW), is not listed as one of these options. Moving forward, ODNR does not envision using its authority to allow for discharges to surface waters either directly or via a POTW.

As you know, the City of Warren is currently accepting low salinity brine from oil/gas operations (under 50,000 mg/l). Other POTWs have expressed a similar interest but those have not been approved. In order to implement this direction, it is my intention, as Director of Ohio EPA, to not reauthorize the City of Warren to take brine from oil/gas operations when their permit expires. Further, we will also proceed to deny any other permit applications from POTWs that have expressed an interest in receiving this material.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Nally", with a stylized flourish at the end.

Scott J. Nally
Director

cc: Tom Angelo, City of Warren
Chuck Murphy, City of Steubenville
Robert Disch, City of East Liverpool
Robert Wright, City of East Liverpool
Andrew Blocksom, Patriot Energy Partners

McCracken, Chuck

From: Laurie Stevenson <laurie.stevenson@epa.state.oh.us>
Sent: Tuesday, May 03, 2011 1:12 PM
To: Chris.Perry@dnr.state.oh.us; Heidi Hetzel-Evans; john.husted@dnr.state.oh.us;
mike.halfrisch@dnr.state.oh.us; mike.mccormac@dnr.state.oh.us;
rick.simmers@dnr.state.oh.us; ted.lozier@dnr.state.oh.us; thomas.tugend@dnr.state.oh.us;
tom.tomastik@dnr.state.oh.us; Aaron Shear; Benjamin Cirkel; Brian Hall; Brian Nickel; Chuck
Lowe; Dan Underwood; Donna Kniss; Eric Adams; Eric Nygaard; Erm Gomes; Fred Snell; Joe
Goicochea; Keith Riley; Kristopher Weiss; Lee Burkleca; Lindsay Taliaferro; Michael Eggert;
Mike Baker; Mike Hopkins; Mike Settles; Misty Parsons; Nancy Rice; Rich Blasick; Ryan
Laake; Steve Saines; Steve Williams; Stivo DiFranco; Tom Harcarik; Tracy Freeman; Virginia
Wilson; Chuck McCracken; Michael Snee; Rebecca Fugitt; robert.owen@odh.ohio.gov;
Stephen Helmer
Subject: Final agenda for tomorrow's meeting
Attachments: Marcellus Shaie5-4-11FinalAgenda.DOC

Hello. I'm attaching the final agenda for tomorrow's meeting...just a few minor adjustments from the draft. We're on for 1:30 at ODNR. We'll be in Building H, 2nd floor conference room.

OEPA districts, the bridge line is 614-644-4725. We will not be trying video conference for tomorrow, just a phone bridge. Also, I have a six-port line, which will hopefully be large enough. If you are aware of callers coming in from more than a single location in NEDO and SEDO, let me know and I'll try and get a larger line.

Thanks.
Laurie

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Environmental
Protection Agency

Marcellus Shale Meeting
OEPA/ODNR/ODH
Wednesday, May 4
1:30 – 4:00 p.m.
Ohio DNR Fountain Square, Building H, 2nd floor conference room

AGENDA

Welcome/Introductions	All
Drilling Activity/Updates	
<ul style="list-style-type: none">• Activity in the Marcellus/Utica – permitting and drilling activity update• SB 165 rules (update)	ODNR
Wastewater Management	
<ul style="list-style-type: none">• State (OEPA/ODNR) position on POTW management of flowback water<ul style="list-style-type: none">◦ Current statutory provision◦ Communication strategy• Permit/POTW updates• Fact sheet for municipal wastewater plants• Coordination with ODH on radiological sampling protocol	B. Hall, OEPA
Permitting Collaboration/Updates	
<ul style="list-style-type: none">• Ohio EPA/ODNR meeting re. permit conditions to protect GW and other sensitive environments	M. Eggert, OEPA M. McCormac, ODNR
401/404	
<ul style="list-style-type: none">• Development of General Permit/401 authorization	T. Harcarik
Air	
<ul style="list-style-type: none">• OEPA evaluation of air sources/permitting options	DAPC
Waste	
<ul style="list-style-type: none">• Soil Remediation, Inc.• Determination drill cuttings/OEPA-ODH Coordination	OEPA/NEDO J. Goicochea, A. Shear
Outreach/Education	
<ul style="list-style-type: none">• Media Relations Update• Legislative outreach/community meetings• Fact sheet updates (final/draft)<ul style="list-style-type: none">◦ Drillers – OEPA regulations◦ Water sampling/analysis fact sheet for citizens	ODNR/ODH/OEPA
Other Items/Next Meeting	All

McCracken, Chuck

From: David Lipp
Sent: Wednesday, April 27, 2011 11:17 AM
To: Michael Snee; Stephen Helmer; Kenneth Barnhart; Chuck McCracken; Jim Colieli
Subject: DOE's FRAC Water Filtration Project

I received a reply back from DOE on their pilot project dealing with the frac water treatment. See the attached web site.

http://www.netl.doe.gov/technologies/oil-gas/Petroleum/projects/Environmental/Produced_Water/00833_MarcellusWater.html

I was also given the name of the Principal Investigator to try to get more information, i.e., rad levels in filter sludge. I will keep people updated on that.

David R. Lipp
Senior Health Physicist
Bureau of Radiation Protection, Technical Support
Ohio Department of Health
(614) 728-0884
david.lipp@odh.ohio.gov

McCracken, Chuck

From: Laurie Stevenson <laurie.stevenson@epa.state.oh.us>
Sent: Tuesday, March 22, 2011 5:47 PM
To: Chris.Perry@dnr.state.oh.us; Heidi.Hetzel-Evans; john.husted@dnr.state.oh.us; mike.halfrisch@dnr.state.oh.us; mike.mccormac@dnr.state.oh.us; rick.simmers@dnr.state.oh.us; ted.lozier@dnr.state.oh.us; thomas.tugend@dnr.state.oh.us; tom.tomastik@dnr.state.oh.us; Aaron Shear; Benjamin Cirkel; Brian Hall; Chuck Lowe; Dan Underwood; Donna Kniss; Eric Adams; Eric Nygaard; Erm Gomes; Fred Snell; Joe Goicochea; Keith Riley; Kristopher Weiss; Lee Burkleca; Lindsay Taliaferro; Michael Eggert; Mike Baker; Mike Hopkins; Mike Settles; Misty Parsons; Nancy Rice; Rich Blasick; Steve Saines; Steve Williams; Stivo DiFranco; Tom Harcarik; Tracy Freeman; Virginia Wilson; Chuck McCracken; Michael Snee; Rebecca Fugitt; robert.owen@odh.ohio.gov; Stephen Helmer
Subject: Notes and Contact List from 3/17 team meeting
Attachments: Shale Team 3-17 Meeting Notes.doc; Marcellus Shale Group ListRevised3-22-11.xls

Hello everyone. I'm attaching notes from our 3/17 meeting. If there are edits/additions, let me know. I'm also attaching an updated team list, however, I believe I'm missing a couple folks from ODH. If you would please review the list and update me with any changes or additional contacts, it would be appreciated.

Also, I thought it might be helpful to pull out some of our significant action items from the notes and highlight them below. We've got several items that we made short-term commitments on, including arranging for some smaller subgroup meetings as early as this week or next. Key action items include:

- We concurred to make the development of the drinking water fact sheet for homeowners a priority and work toward finalizing this as soon as possible. ODNR/OEPA to organize a small group discussion the week of 3/21 to discuss the parameters list with target of finalizing the fact sheet within a few weeks.
- ODNR will also put a more prominent link on their shale Web site to more easily direct homeowners and other interested parties to the current BMP information on baseline parameters for water sampling.
- OEPA/ODNR (M. Baker/T. Tugend/J. Husted) to set small group meeting to discuss special permit terms/conditions in the next 1-2 weeks.
- OEPA (M. Eggert) will get an OEPA distribution list together for ODNR to receive copies of incoming permit applications.
- OEPA, DSIWM (Joe and Aaron) and ODH (Chuck) to coordinate discussion on TENORM requirements as it relates to OEPA's soil/earthen materials management team activities.
- NEDO to get ODH comments regarding statutory language in 6111.03(S)(2) regarding OEPA's authority to regulate sewage sludge (Donna to Chuck).

Thanks everyone for another productive meeting and discussion last week. We're scheduled to be at ODNR for our next meeting on May 4th from 1:30-4:00 again.

Laurie

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this communication and any response to it constitutes a public record.

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Shale Team Meeting Notes

March 17, 2011

Introductions

Public Outreach/Education – Media Interest

ODNR is receiving inquiries about drilling in state park areas. Exploration topics hot right now. Columbus Dispatch interest in wastewater. Seems to be good coordination between agencies on media calls. Callers are trying to get information out about drilling and regulations. Other areas of interest include: review of applications, inspection oversight, etc., what division is responsible for from an ODNR perspective, decisions/rationale to allow for drilling, etc.

Still a lot of local/community meetings with citizens, including Penn State Univ. Lots of people attending these. Parties include local officials, banks, etc. ODNR wants to advance some legislative briefings, including involvement from mineral resources to talk about drilling. Hoping to set up a series of meetings with legislators.

There was a recent Dispatch article focused on pipelines. Interest is high for discharge of wastewater to Steubenville and E. Liverpool.

ODNR getting continuous inquiries from landowners being approached by leasing companies. They want information about the process. The Farm Bureau is sponsoring events which include general discussion on legal requirements related to leasing. Does it make sense to have Ohio EPA personnel in attendance to field questions on OEPA permitting? Rich Blasick, OEPA/NEDO, has been involved in some of these.

Legislative – OEC and Sierra club have approached legislative contacts for consideration of a moratorium. There is also discussion at the local level in some communities about local resolutions.

Fact Sheets/Web Updates

- (1) Fact sheet for well owners (private or public water supplies). Recommendations for sampling/parameters. ODNR has drafted. OEPA has commented. We are working on information regarding parameters, etc. Thinks we might have draft in the next couple weeks. (M. Eggert). Parameter list. OEPA/ODNR/ODH. Local health districts also working on fact sheets and offering sampling packages (R. Fuggit). OEPA is still getting calls from residents asking about sampling. Who should field these calls?

ODNR is getting calls: Refer to ODNR's Web site. BMP guidance. Or, Tom Tomastik is a point of contact.

Action items: We need to make this a priority and work toward a two-week timeframe (J. Husted). Let's fast track this process. Will need to reach consensus on parameters list.

ODNR/OEPA to organize a small group discussion next week on the parameters list soon with target of finalizing this within a few weeks.

Baseline sampling parameters for BMPs. ODNR will put a more prominent link on their shale Web site to more easily direct homeowners and other interested parties to this information.

(2) OEPA fact sheet for disposal at POTWs – ready to go up on Web site soon.

(3) Governor's Office has requested ODNR elevate their public outreach/educational materials. They have met and have a list of fact sheets (one-pagers). Giving higher profile to M. Shale on their Web site. Goal is to educate public. Tone of fact sheets less technical and more general. 8-10 in the works on topics that include well construction, hydraulic fracturing, oil and gas history, how permit is issued by ODNR. Top priority for Heidi.

(4) Drillers – Basic Fact Sheet. Areas they are subject to OEPA's regulations. Will try and get something out to group in a couple weeks (L Stevenson).

Drilling Activity/Updates

Chesapeake sites update: Went to three sites. Update (M. Eggert). Good overall impression based on site visit relative to compliance, environmental controls, etc. Claim to be at a 100% recycle with wastewater.

Permit applications, etc. Since last meeting, there's been only one additional permit application. 10 horizontal permits issued to date (2 drilled). Utica: 5 permits issued (one more than last time). Only one horizontal well drilled. 18-stage frac being done right now. First fractured Utica well will be done fairly soon.

Older Marcellus wells vertical wells (conventional wells). Drilled primarily for stratigraphic testing. Exploratory wells originally drilled in shallow depths but went deeper for assessment.

Belmont/Monroe counties have deepest Marcellus deposit. Utica is 2,000 feet deeper and it sits under most of the state. ODNR has a good Powerpoint presentation on this topic that they can share. Can have a presentation at next meeting? Action item: determine if there's benefit for future presentation.

Chemical composition of frac water between Marcellus versus Utica. Is there a difference? Each company has their own blend and it will differ from well to well. They fine tune the mix to match the properties of the rock. Are chemical mixtures considered proprietary? Yes, some individual chemicals can be listed as proprietary. ODNR has MSD sheets for frac jobs on Web site. Public section.

Permitting Collaboration/Updates

- Ohio EPA/ODNR Meeting to discuss permit conditions to protect groundwater: There are draft conditions submitted by Ohio EPA for consideration, which include recommended permit conditions in specific sensitive settings. We've had one meeting and follow-up conference call on this topic with a smaller subgroup. Working to schedule another meeting to talk about conditions in more detail. Once we come to a common understanding on how we proceed. How do we capture this between agencies? OEPA has a target timeframe of April per our Director.

Action item: Set meeting to discuss conditions. Develop time frame (April target).

- Sharing permit application information for shale drilling: Is there a process we can identify to exchange information or notify Ohio EPA on proposed drilling activity. Options: (1) point of contact (2) 4-5 contacts with notification to each.

When ODNR receives an application, it goes up on the Web site daily. List of notifications by municipalities and townships in the state. Communication in a protection area may be different. Horizontal shale application notification is different. OEPA would want to know for 401, air permits, etc. With the current rate of applications submitted, it is likely possible to scan and get a copy to an OEPA distribution list. However, this will be more of a challenge if there are many applications coming in within a short time period. There are about 650 conventional drill applications per year received now. With 44 companies drilling in PA, they are receiving an estimated 1200-1300 shale gas applications per year.

Action item: We will get a distribution list together from OEPA. (M. Eggert)

401/404 Update

Ohio EPA, DSW is evaluating mechanism for streamlined 401 permitting. We have met with Chesapeake to discuss their operations and have talked with PA, WVA, Huntington District, Buffalo Corps. Chesapeake's general approach is to try and locate a project with either no impact or minimal impact (< .10 acres).

There is currently a 404 nationwide (general) permit. If impacts fall below thresholds, get a quick review. Eligibility for nationwide is based on area of impact.

To date, the WVA and Huntington districts have not been approached at all by companies. They are finding out about things when they've gone bad.

PA – structure and state permit is completely different. State permit (they take over some responsibilities of the Corps). They are overwhelmed by applications. They have separate for pad, separate for access roads, gathering system, water system, etc. Getting overloaded with separate permit applications for a single project.

Nationwide permits are activity related (e.g. bank stabilization). Not a nationwide permit for all activities encompassed in an entire drilling site. Because of this, sites are automatically subject to an individual 404 permit for certain aspects of the operations (if they have impacts). There is a need to have wetland delineation – for streams as well. Need a delineation map.

OEPA is looking at general permit for a pad “site.” Other features could be covered under nationwide permits (potentially).

DSW also has questions about gathering systems, specifically how these are set up and whether we should be taking a more comprehensive approach to permitting these activities. ODNR indicates that terminal agreements can be delayed a considerable amount of time, particularly if they’re drilling multiple well pads. May not know the route or have it finalized. Many wells are drilled early to hold leases, but they may not be in production for several years. OEPA is evaluating what is a single and complete project – how is this defined – to determine impact to streams/wetlands.

OEPA is leaning towards general permit for pad site. Nationwide for pad. Nationwide 12 for road crossings, and Nationwide 4 for utility lines. If we develop general permit, we need to host public hearings in different areas of the state.

Kinder Morgan and El Paso Midstream are the only two line proposals on the table. The third project has dropped off.

Water Updates

Wastewater: Warren is up and running and taking wastewater per their NPDES permit. E. Liverpool – recently submitted NPDES app. NEDO will be sending a letter soon on application deficiencies.

Steubenville – application in for Steubenville to take flowback water. Looking at 200,000 gpd in good flow conditions. 100,000 gpd in low flow conditions. Discharge to Ohio River – different conditions. Steubenville flow is lower. Is there a 500 mg/l standard set for Steubenville? No TDS standard in Ohio River, but we are controlling this through toxicity level criteria. Q: Is this a proposed permit? Yes. There will be opportunity for public hearing.

Rule proposal on PTI exemption for pits/lagoons from DSW, if receiving a permit from ODNR. ODNR looked at applicability of regulatory authority. Exemption in 6111 – flowback water going back into well. Expecting correspondence from ODNR on regulatory authority over wastewater managed in on-site units. We are at interested party (IP) review stage.

Drinking Water: Monthly conference call with local health districts. R Fuggitt. It would be helpful to have ODNR and OEPA involved in next monthly call. March 29th from 9-10. This would be helpful to keep local health districts up to speed on issue and how /when/where to refer people.

Air Permitting

We asked for information from the industry on air emission sources/calculations. We received this information last week from Chesapeake. It is their position that drilling operations themselves do not need air permits. They think this is construction activity that's exempt (temporary sources, etc.). We are doing emission calculations to better understand sources and levels. We are also looking at various air rules. Want to get more information on the actual drilling component. There may be a general permit for air sources for drilling. Once drilling is done, emissions are relatively minor. Some equipment sources post-drilling may not be de minimis, however. General permit may be option. Q: What about compressor stations? Normally, large compressor stations get OEPA permits.

OEPA reviewed potential emission sources, including: glycol dehydrators, separators (VOCs, HAPs), storage tanks, fugitives, flares for vapor recovery, generators. These are units that we're looking at. Looking for exemptions. Most units are small. Flexibility to look at streamlined options or exemption options.

OEPA was approached by industry on this subject and is seeking guidance on air permitting requirements because of their experience with other states to date. USEPA is also involved in evaluating these activities and air permit applicability. OEPA needs to ensure we understand USEPA's perspective and need to be engaged in this discussion to help guide decision-making on USEPA's level. One other driver is the significant level of interest publicly as a driver about OEPA regulatory authority.

Waste Update – RCRA Exemption

Subtitle C (RCRA hazardous waste). Questions coming up about materials managed by third party. 1993 clarifying document from USEPA. Off-site transport of the material does not negate the exemption. The exemption follows the material from the subtitle C regulation. Materials derived from the treatment of the wastes still keep the hazardous waste exemption.

One caveat: These materials do remain subject to other applicable regulations, including Subtitle D regulations. We are getting a lot of inquiries from landfills and disposal companies about proper management of drill cutting. Terminology differs – we are looking at these materials to see if they would be subject to regulations. OEPA has two teams (1) earthen materials team looking into a lot of different materials and (2) contaminated soils team – guidance document. Looking at drill cutting management (including cuttings contaminated by synthetic oils, frac fluids, etc.).

All Chesapeake solids are going to solid waste landfills, although they have expressed an interest in exploring other options, including possible management on-site.

How does TENORM play into this situation? Need to coordinate with ODH on this issue. Are there rad waste concerns with disposal on-site?

Action item: DSIWM and ODH to coordinate a discussion on this topic.

Rules Update

TENORM Rules: No comments from agencies on rules. These will move forward through regulatory promulgation process. There will be more public comment opportunity.

NEDO pointed out language in 6111.03(S)(2) – exclusive authority to OEPA for regulation of sewage sludge. ODH will want to review this to ensure their regulations don't conflict with statutory language. Chuck M. recommended NEDO put their comments in writing to ODH.

165 Rules (ODNR): Rule review group is done. They will be moving forward with group of technical experts. Noise will be addressed by BMP attachment. No timeline defined yet for these rules. Unit configuration – looking to go to JCARR in next couple months. Technical group will convene in April – could be 6-9 mos. before rules are final.

Next Meeting

First week of May, Wednesday May 4th at ODNR from 1:30-4:00.

Update contact list and distribute (L. Stevenson).

Marcellus Shale

Ohio EPA/ODNR/ODH Marcellus Shale Workgroup March 22, 2011 (Revised)

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Marcellus Shale

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Craig Butler is new -
Executive Liaison to Governor's office for
OEPA / ODNR / ODAG

- DNR: Co-meeting with Chesapeake \Rightarrow farm Bureau Sponsored
MEDIA \Rightarrow most discussion on Drilling in State Parks
Chemical Composition of Fract Water
Waste Water thru E. Liverpool WTP;
Need to get a fact-sheet ASAP

ODNR = Sampling parameters for domestic
waterwells - Public Inquiries should go to:
ODNR - URBAN Waterwell Sampling for Screening
Website - mineral resources

- ODNR is ramping up Public Outreach re: Oil/Gas
Drilling. ODNR has been charged with educating the
public

~~ODNR~~ VISITING A DRILL SITE WITH OEPA / ODNR

Checkup
Mike Belmont + Monroe Co's have the most
Marcellus Shale.

Buckeye all ready in use

- (1) El Paso - MIDSTREAM \Rightarrow
- (2) \Rightarrow

CDM 3/17/10

(2) of 3

Not going to get as much use of POTW's
CEQA Director against POTW

POTW Warren → Up + Running → no inspections yet
POTW Elkhart → App. received → RFI letter
POTW Steubenville → goes to Ohio River

CEQA has prepared a rule that exempts O+G
drilling ops from a ~~CEQA~~ CEQA PTI. OONR
says that CEQA doesn't have jurisdiction at all.

Earth materials team } relative to ^{drill} cuttings
Contaminated Soil team }

What about on-site disposal of

→ OOH has been task with developing a
Sampling plan.

Rick Simmers - OONR

Ham Tomasik - OONR

OONR ~~Thomas~~ Thomas Tugend - Deputy Chief

CDM 3/17/10

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Next meeting is MAY 4TH