

recovered solid rock cuttings, suspended in a mixture of drilling fluid and formation water with elevated radionuclide content, are placed on shale shakers and dewatered before disposal in the County landfill. However, not all of the liquid waste in which the drill cuttings are suspended will be removed.

There are several steps in the Marcellus shale drilling process that allow radionuclides, particularly Radium-226, to concentrate in liquid waste. First, drilling fluids that include various chemical additives are artificially introduced into the borehole by high pressure injection. Drilling fluids are used during the drilling process to cool and lubricate the drill bit, prevent the well hole from caving in, and circulate drill cuttings to the well surface. Formation water, or natural brine, contained within the pore spaces and fractures of the rock, through which the drill bit progresses, can mix with the drilling fluid and be circulated to the well surface. The formation water can be contained in the rock formations for centuries and can contain extremely high levels of water-soluble radionuclides that are present in the underground formations. In addition to mixing with brine, the drilling fluid may also become contaminated when it comes in contact with radioactive rock. Radium-226 is a highly water-soluble radionuclide and will preferentially dissolve in the drilling fluid under the pressure and temperature conditions below ground. Drilling fluid can be reused many times and radium will progressively concentrate in it after each reuse. Since no sources specify the radioactivity of produced water, we assume that it is the same as brine, which NYSDEC measures at 15,000 pCi/L.<sup>8</sup>

During the Issues Conference NEWNY proposed to exclude from disposal at the Chemung County Landfill wastes containing liquids in excess of 20%. This liquid waste is likely to contain Radium-226 and other water-soluble radionuclides.

#### **4.1 NYSDEC Permit**

According to the draft permit, at Condition 31(b), free liquids, sludges, slurries, chemical or industrial wastes that are at least 20% solids can be disposed of at the County landfill. This means that up to 80% of wastes disposed of at the landfill can contain free liquid, sludge, or slurry.

As mentioned in Section 2 of this report, there are currently four possible methods for managing drilling wastes at a Marcellus shale drilling site. The three disposal methods utilized in Pennsylvania, and therefore most likely to be utilized in New York, involve the use of a shale shaker, well pad, or plastic-lined pit to separate solid drill cuttings from drilling fluid, which is highly concentrated with radium-226 and other radionuclides. Since drill cuttings are suspended in liquid drilling fluid upon entering a shale shaker, well pad, or plastic-lined pit, it would be impossible to remove all of the liquid material from the surface area of the cuttings. Drill cuttings particles are roughly the same size as coarse sand and, therefore, provide substantial surface area within a small quantity of particles. As a result, a considerable amount of contaminated drilling fluid will be disposed in the Chemung County landfill with drill cuttings.

## **5.0 Impacts of Contaminated Waste Disposal**

Rock cuttings enhanced in Ra-226 and deposited in the County landfill will pose several problems, which were not considered by NYSDEC.

### **5.1 Landfill Soil Contamination**

Radium-226 has a half-life of 1600 years and, if deposited in the landfill, will remain there essentially forever. Landfill workers that come in contact with the contaminated materials may be exposed. Further, if the landfill is ever inhabited in the future, crops grown in the soil will concentrate radium and be ingested. Ra-226 is a carcinogen and, when ingested or inhaled, concentrates in the bone and can cause leukemia. As we noted in our April 7 memorandum, at page 4, exposures to landfill workers and

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<sup>8</sup> NYSDEC, 2010.

those who eat fruits or vegetables grown more than 1,000 years in the future over the closed landfill would exceed current health-based dose limits.

Our calculations show that the radiation dose from Marcellus shale drill cuttings, including the direct gamma dose, will exceed regulatory limits. Under the cleanup standards for land contaminated from inactive uranium processing sites, the EPA limits the concentration of radium within the top 6 inches of soil to 5 pCi/gram and to 15 pCi/gram at deeper depths.<sup>9</sup> Therefore, drill cuttings with concentrations of radium above 20 pCi/g (Table 1) would exceed these limits if deposited in a municipal solid waste landfill. Employing the standard Department of Energy software RESRAD, we find that radium concentrations of 20 pCi/g in soil lead to a direct gamma dose and ingestion of contaminated vegetation dose as high as 200 mrem/year. We assumed RESRAD default assumptions for a future resident farmer, including no earth cover in the landfill, a full-time resident, and a garden. Consumption of contaminated fruits and vegetables is the largest component of the dose.

## 5.2 Radioactive Leachate

Ra-226 is highly water-soluble and will dissolve in water under the temperature and pressure conditions present in the Marcellus shale formation and in water that is introduced into the well during the production process. The concentrations of radium in brine from the formation, or contaminated produced water, were measured by NYSDEC on the order of 15,000 pCi/L. Assuming that the Chemung County landfill accepts 2,000 tons of drill cuttings per week and that up to 20% of this waste is fluid, we estimate that up to 400 tons, or 40,000 liters, of contaminated water may be included in the waste. If we assume that this fluid contains up to 15,000 pCi/L of radium-226, then we calculate that  $3.12 \times 10^{11}$  picocuries of radium per year may be deposited into the landfill. Other assumptions may be reasonable, and the radium would not be released with leachate immediately, but we believe that NYSDEC has not adequately addressed the issue and has not completed a full analysis of the hazards presented by Chemung County landfill leachate when up to 2,000 tons per week of Marcellus shale cuttings waste is disposed in the landfill.

Several problems exist concerning contaminated liquid in the landfill. First, municipal waste landfills are lined with a layer of clay and plastic and are not designed to contain low level radioactive wastes. The leachate could mobilize radionuclides and distribute them in other locations throughout the landfill or potentially transport the radionuclides to groundwater sources outside the landfill in the event of a breach in the landfill lining. Second, the fluid will mix with leachate collected in the Chemung County landfill. This leachate with residues of radionuclides will be sent to the Elmira wastewater treatment plant, which, like the landfill itself, is also not designed to deal with radioactive waste. Radium-226 has a 1600-year half-life, so this is a long-term problem. Third, from the increasing inventory of radium-226, the landfill will generate progressively increasing volumes of radon gas over time, much of which can be expected to escape uncontrolled. As an inert gas, the landfill gas combustion device cannot control radon. Fourth, trucks transporting cuttings waste to the landfill will carry a substantial volume of liquid with the cuttings and therefore can be expected to leak on occasion. The leaking liquid is particularly radioactive and, over time, can be expected to contaminate local roadways and roadways inside the landfill site.

## 5.3 Radioactivity Detected by 375P-1000 Detector

Dump trucks transporting Marcellus shale drill cuttings from the drill sites to the Chemung County landfill will be monitored for radioactivity by a 375P-1000 radiation detector, manufactured by Ludlum Measurements Incorporated. These detectors will be placed approximately 6 feet from either side of the vehicles entering the landfill. According to Ludlum Measurements Incorporated, the 375P-1000 radiation detector will sound an alarm when it measures a radioactivity level that produces an exposure rate of 0.95 microCi per hour ( $\mu\text{R/hr}$ ) above background radiation levels.

We used the program MicroShield version 8.02<sup>10</sup>, developed by Grove Software, to determine the minimum radioactivity (in pCi/g) of Marcellus Shale drill cuttings that would result in an exposure rate of 0.95  $\mu$ R/hr and therefore sound the alarm of the 375P-1000 detector. MicroShield is a program used to estimate dose rates due to a specific external radiation source. The program allows its user to choose from sixteen different source geometries (such as a cylinder, sphere, disk, or rectangle) and up to ten different radiation shield geometries. MicroShield users may also choose custom source and shield materials from the MicroShield database, or design their own source and shield materials with the option of over thirty different constituents. When designing a source or shield material, MicroShield calculates the attenuation and build-up factors of all constituents.

We assume that all Marcellus Shale drill cuttings transported from the drilling sites to the Chemung County landfill will be transported in 15-18 ton dump trucks. We assume that the dump body of each truck body is approximately 12 feet in length, 4 feet in height, and 7 feet in width<sup>11,12</sup>. In addition, we assume each dump body is constructed with two steel side walls with an inner steel wall approximately 0.188 inch thick and the outer wall approximately 0.135 inch thick (10 gauge steel)<sup>13</sup>. Many dump truck bodies are equipped with two side walls so that any dents, scratches, or additional damage caused by the payload to the inner wall of the dump truck body will not appear on the outer surface of the truck.

As inputs to the MicroShield program, we believe the dimensions of the dump body are best represented by a rectangular prism with the same dimensions as specified above. We accounted for the double steel walls of the dump body by incorporating two individual stainless steel shields with thicknesses of 0.188 and 0.135 inch, respectively. We assume the dump body is completely filled with Marcellus Shale drill cuttings. We placed the 375P-1000 radiation detector six feet from the side of the dump body, as this would be the detector's approximate location in reference to all dump trucks entering the Chemung County landfill. The MicroShield program allows its user to manipulate the geometric shape of the radioactive source material, but the radiation dose receptor is always represented as a single point. Since the 375P-1000 radiation detector is not a point but a cylindrical tube with a height of 183 cm and a diameter of 20 cm<sup>14</sup>, we assume that the height of the center of the 375P-1000 detector would be located at the same height as the center of the dump truck body and calculate the radiation doses that would be detected at the top, center, and bottom of the detector.

Shale is not a custom source included in the MicroShield database and we therefore designed our own source material to best represent the Marcellus Shale drill cuttings. We assume that the shale is comprised of mostly quartz ( $\text{SiO}_2$ ) calcite ( $\text{CaCO}_3$ ) and has a density of 2.35 grams per cubic centimeter ( $\text{g/cm}^3$ )<sup>15</sup>. Although Marcellus Shale drill cuttings will contain radioactive uranium-238 (U-238) and all of its gamma-emitting progeny, we only calculate the exposure rate caused by radium-226 (Ra-226). Ra-226 is soluble in water and will concentrate in any residual water transported with the drill cuttings into the dump truck body.

The MicroShield program calculates exposure rates, in millirads per hour (mR/hr), which result from the radioactivity of any given source. In order to estimate the radioactivity of Marcellus Shale drill cuttings based on exposure rates, we calculated the radioactivity of Marcellus Shale needed to produce an

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<sup>10</sup> Grove Software Incorporated, 2008

<sup>11</sup> Valew Truck Bodies, 2009

<sup>12</sup> John Deere, 2010

<sup>13</sup> Valew Truck Bodies, 2009

<sup>14</sup> Ludlum Measurements Inc., 2009

<sup>15</sup> University of Melbourne, 2003

exposure rate of 0.95  $\mu\text{R/hr}$ . The relationship between external gamma radiation and exposure rates is linear. Based on the exposure rates of Marcellus Shale drill cuttings with Ra-226 concentrations of 50, 150, 500, and 1,500 pCi/g, we calculated that the Ra-226 concentrations in Marcellus Shale that produced a reading of 0.95  $\mu\text{R/hr}$  are 2,340 pCi/g measured at the top and bottom of the 375P-1000 detector and 2,043 measured at the center of the detector.

As previously discussed, the County landfill will accept 2,000 tons of Marcellus shale drill cuttings with up to 20% of contaminated water. Since the rock cuttings and contained fluid is far less than the estimated sensitivity of the detectors, the radioactive scale cuttings, with up to 20% contaminated water, may not be detected.

## 6.0 Issues in the CoPhysics Report

The CoPhysics report, commissioned by Fortuna, concludes that the rock cuttings are only 2 to 3 times above background radioactivity levels.<sup>16</sup> However, they make several major mistakes in their methodology.

First, they claim the use of EPA 701.1 measurement protocol in their analysis. The EPA 701.1 protocol is a method used for gamma detection in radioactive materials dissolved in water and is not to be used for measurement of a solid. To measure the radionuclide content in a solid, the material must be dissolved in acid. Ra-226 is then chemically separated detected by measuring emanating radon.

Second, the CoPhysics study does not measure radium directly and instead measures a surrogate. For the detection of thorium-232, CoPhysics measures actinium-228, a decay product with strong gamma emission, which is acceptable since the two radionuclides are in secular equilibrium and since processing does not alter this equilibrium. However, this is not the case for radium, which selectively dissolves in fluid during the drilling process. Thus, use of bismuth-214 as a surrogate for radium-226 in the report is not permissible.

Lastly, it is not clear where the measurements were taken and whether any processing took place before the gamma detector readings. The CoPhysics report does not state whether the rock cuttings were taken from a horizontal or from a vertical bore hole. Under the temperature and pressure conditions that exist in a deep hole, the introduction of liquids into a horizontal well, enhances Ra-226. Since it was stated at the Issues Hearing that the Fortuna site in Bradford County uses horizontal wells, the study should have also analyzed rock cuttings from horizontal wells.

## 7.0 Conclusions

1. The hazard associated with the disposal of incompletely dewatered Marcellus shale drill cuttings and drilling fluid in a municipal landfill has not been fully evaluated by NYSDEC. The Marcellus shale has elevated radioactive concentrations, approximately 25-30 times above background concentrations. The drilling and dewatering processes enhance the concentration of radium in the drilling fluid. Rock cuttings that hold up to 20% of this fluid are still considered solid waste and will be disposed of in the County landfill. The introduction of this radioactive material into the landfill will give rise to serious problems due to the generation of radon, radiologically contaminated leachate and to potential reuse of the site in the future. NYSDEC regulations regarding the radiation doses from a decommissioned site and the allowable concentrations of radium in soil will be exceeded. In our opinion, these radioactive rock cuttings and associated radioactive drilling fluids belong in a radioactive landfill, such as the Envirocare landfill in Clive,

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<sup>16</sup> CoPhysics Corporation, 2010

Utah. Radium-contaminated waste is similar to U mill tailings, which the Utah landfill is designed for.

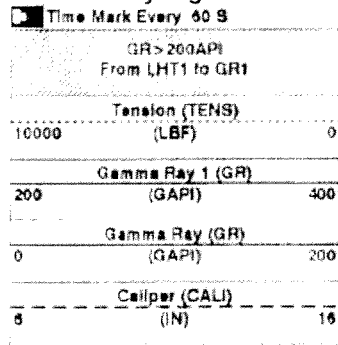
2. Major uncertainties have not been resolved. The findings of the CoPhysics report conflict with borehole gamma readings and with the independent measurements of the USGS. The CoPhysics report does not explain where the cuttings were found and processed. The measurement methodology, EPA 701.1, and the use of a surrogate Bi-214 to measure Ra-226 are not appropriate for this case.
3. Worker exposure to radioactivity at the working face of a landfill that disposes such waste can be expected to exceed health-base dose limits set by EPA and NRC.
4. The waste at issue can be generated only by means of industrial processes in two gross phases: (a) fluids with chemical additives are forced into subterranean shale formations under high pressure, where they leach out NORM, making the fluids much more radioactive than they were before injection; solid waste is generated from the return waste water only by means of another set of industrial processes, including a shale shaker, centrifuge, and perhaps other mechanisms.
5. The drilling fluids that provide the source for the solid waste are chemically changed by pressurized contact with NORM, concentrating the NORM in the fluids. For example, barium is added to drilling mud pumped into a horizontal wellbore in order to extract radium sulfate from cuttings. This solid may be disposed of with the rock cuttings.
6. Based on RESRAD calculations, the radiation exposures received by a future resident farmer will exceed allowable regulatory limits. The radium concentrations in soil will exceed EPA regulatory limits. NYSDEC has not examined the environmental and health and safety implications of disposing of shale cuttings in a solid waste landfill. In our opinion, the radioactive scale cuttings and fluids are more appropriately deposited in a radioactive landfill designed for this disposal.

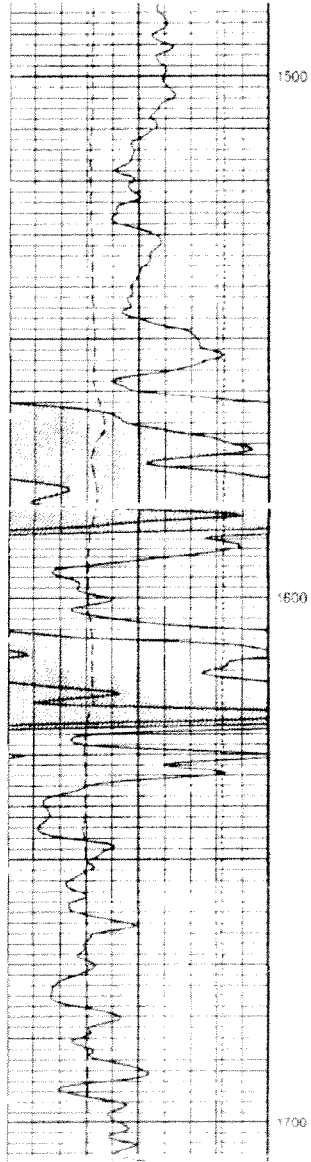
## 8.0 References

- Baker, Ron, 2001. "A Primer of Oilwell Drilling: A Basic Text of Oil and Gas Drilling." Austin, Texas: Petroleum Extension Service – The University of Texas at Austin, 2001.
- CoPhysics Corporation, 2010. Radiological Survey Report. "Marcellus Shale Drilling Cuttings from Tioga and Bradford Counties, PA. and New England Waste Services of N.Y., Inc. Landfill Sites in Chemung, NY, Campbell NY, Angelica NY." April 2010.
- Grove Software Incorporated, 2009. "MicroShield, Version 8.02," Lynchburg, VA. Website URL: [www.radiationsoftware.com](http://www.radiationsoftware.com).
- John Deere, 2010. "Articulated Dump Trucks: 25-40 Tons," Website URL: [http://pdf.directindustry.com/pdf/john-deere-construction-forestry/articulated-dump-truck/20212-32329-\\_14.html](http://pdf.directindustry.com/pdf/john-deere-construction-forestry/articulated-dump-truck/20212-32329-_14.html). Accessed 7 May 2010.
- Leventhal, J.S. et al, 1981. United States Department of the Interior Geological Survey. "Geochemistry of Trace Elements and Uranium in Devonian Shales of the Appalachian Basin." Open File Report 81-778, 1981.

- Ludlum Measurements Incorporated, 2009. "Landfill/Waste Release Monitor – Model 375P-1000: Specifications," Website URL:  
[http://ludlums.com/index.php?page=shop.product\\_details&flypage=flypage\\_ludlum.tpl&product\\_id=132&category\\_id=95&activetab=specs&option=com\\_virtuemart&Itemid=15](http://ludlums.com/index.php?page=shop.product_details&flypage=flypage_ludlum.tpl&product_id=132&category_id=95&activetab=specs&option=com_virtuemart&Itemid=15). Accessed 7 May 2010.
- New York Department of Environmental Conservation, 2009. "Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program." <http://www.dec.ny.gov/energy/58440.html>
- Sumi, L. (2008) *Shale Gas: Focus on the Marcellus Shale*. The Oil & Gas Accountability Project/Earthworks. <http://www.earthworksaction.org/pubs/OGAPMarcellusShaleReport-6-12-08.pdf>
- University of Melbourne, 2003. "Density Variations of Earth Materials," Department of Earth Sciences, Website URL:  
<http://www.earthsci.unimelb.edu.au/ES304/MODULES/GRAV/NOTES/densities.html>. Accessed 7 May 2010.
- Valew Truck Bodies, 2009. "Dump Trucks: Body and Chassis," Website URL:  
<http://valew.com/dump-trucks-bodies-and-chassis.htm>. Accessed 7 May 2010.

Attachment 1. Gamma-ray log of a well in Shiavone, NY







## Lipp, David

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**From:** Stevenson, Laurie  
**Sent:** Friday, January 06, 2012 11:25 AM  
**To:** Lipp, David; Shear, Aaron; Goicochea, Joe; Hurdley, Jeff; 'rick.simmers@dnr.state.oh.us' (rick.simmers@dnr.state.oh.us); bill.damschroder@dnr.state.oh.us; Snee, Michael; Helmer, Stephen  
**Subject:** Revised Drill Cuttings Fact Sheet  
**Attachments:** DrillCuttingsFactSheet1-5-12V.3.doc

Hi everyone. David, thanks for the language and quick turnaround from ODH on the fact sheet. I have revised it to include the comments received to date.

Rick, can you or someone in your group take a look at this and let me know if ODNR has any edits? You'll want to replace the previous version I sent over with the attached. If we can get ODNR's comments and any final changes from the rest of the group by next Weds., that would be great.

Once we are done, I'll have our Communications Deputy, Chris Abbruzzese touch base with his counterparts at both ODH and ODNR on finalizing this. I'd like to get this finalized and ready to post on the web by COB next Friday.

Thanks everyone.  
Laurie

**From:** Lipp, David  
**Sent:** Thursday, January 05, 2012 5:09 PM  
**To:** Stevenson, Laurie; Shear, Aaron; Goicochea, Joe; Hurdley, Jeff; 'rick.simmers@dnr.state.oh.us' (rick.simmers@dnr.state.oh.us); bill.damschroder@dnr.state.oh.us; Snee, Michael; Helmer, Stephen  
**Cc:** Allen, Pam; Abbruzzese, Chris  
**Subject:** RE: Conference Call Next Week/drill cuttings/landfill disposal

Laurie Stevenson,

Below is ODH's proposed wording on the Drill Cuttings fact sheet section on NORM. I hope this helps to diffuse some concern on the uniqueness of this radioactive material.

### Can drill cuttings contain naturally occurring radioactive materials?

Yes. Certain geologic formations contain low levels of naturally occurring radioactive materials (NORM). Granite, marble, and limestone are examples of commonly used geologic building materials that also contain varying amounts of NORM. Just as when drilling or cutting through a granite mountain for a highway or railroad tunnel will create cuttings, drilling a natural gas well in the Marcellus or Utica shale will create drill cuttings which will contain low levels of NORM.

Naturally occurring radioactive material is not regulated by the Department of Health as radioactive material if the radionuclide content has not been concentrated to a level higher than is found in its natural state. However, the Department of Health is conducting a study to collect as many drill cuttings samples from wells being drilled throughout the state to better radiologically characterize the NORM in Ohio's Marcellus and Utica shale.

Let us know if you have any questions on the wording.

Robert Jennings, [Robert.Jennings@odh.ohio.gov](mailto:Robert.Jennings@odh.ohio.gov), (614) 644-8138, is the Public Affairs contact regarding the ODH Logo.

Thanks,

David R. Lipp  
Health Physicist Supervisor  
Bureau of Radiation Protection, Technical Support  
Ohio Department of Health  
(614) 728-0834  
[david.lipp@odh.ohio.gov](mailto:david.lipp@odh.ohio.gov)

**From:** Stevenson, Laurie  
**Sent:** Friday, December 30, 2011 5:07 PM  
**To:** Shear, Aaron; Goicochea, Joe; Hurdley, Jeff; Lipp, David; Snee, Michael; 'rick.simmers@dnr.state.oh.us' (rick.simmers@dnr.state.oh.us); bill.damschroder@dnr.state.oh.us  
**Cc:** Allen, Pam; Abbruzzese, Chris  
**Subject:** Conference Call Next Week/drill cuttings/landfill disposal

Hello everyone. As a follow-up to my earlier email regarding the drill cuttings fact sheet, I would like to have a conference call next week to discuss any comments on this and cover a few general questions I have on jurisdictional issues.

I have a bridge line scheduled for Thursday the 4<sup>th</sup> at 2:00. The call-in number is 614-644-4743 (no passcode, just dial in). I do not think this will be a long call.

I am hoping that everyone is available for the call. If you cannot make it, can you please confirm this with me early next week? David, can you please get this to Michael Snee or provide me with his current e-mail address, as I keep getting an undeliverable message. For Columbus OEPA folks, if you want to join me here, I'll get a conference room.

Thanks,

Laurie Stevenson, Deputy Director  
Ohio EPA, Director's Office  
Business Relations

# DRAFT Fact Sheet: Drill Cuttings from Oil & Gas Exploration in the Marcellus and Utica Shale

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Ohio Environmental Protection Agency

Ohio Department of Natural Resources

Ohio Department of Health

## What are drilling muds and cuttings?

Drilling a natural gas or oil well involves the use of fluid (called **drilling mud**) to aid in the process of drilling a borehole in the earth. Drilling mud is important because it helps stabilize pressure during drilling, keeps fluids from the formation from entering the borehole and keeps the drill bit from getting too hot.

Different fluids can be used as drilling mud, depending on factors such as the well type and rock formation that will be drilled. Some drilling muds are **water-based**. Others are **oil-based**. It is less common today to use oil-based muds that contain petroleum products such as diesel fuel. Synthetic-based muds are used instead of oil-based muds because synthetic muds perform well, have less environmental impact and have faster biodegradability. Drilling mud mixtures may include oils, clays, and other ingredients. Drillers are also exploring the use of compressed air in place of liquid drilling muds.

Another important function of drilling mud is to carry rock and soil (called **drill cuttings**) excavated by the drill bit up to the surface. Once on the surface, drill cuttings are filtered from the mud on-site through shakers or conveyers. Drilling mud is valuable to the drill operator and is recovered so that it can be used again in drilling other boreholes. Drill cuttings managed on the drill site are regulated by the Ohio Department of Natural Resources (ODNR). Drill cuttings sent off-site for disposal are classified as a solid waste under Ohio Environmental Protection Agency's (Ohio EPA) regulations.

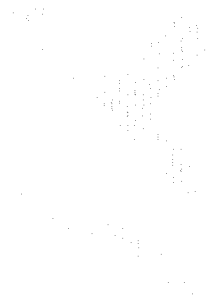
## How is off-site disposal of drill cuttings regulated?

Drill cuttings that have been in contact with synthetic drilling muds, oils or other sources of contaminants that are sent off-site for disposal are classified by Ohio EPA as a solid waste. Drill

cuttings sent off-site must be transported to a licensed solid waste landfill. Anyone wanting to use drill cuttings off-site for fill or for other beneficial uses, must obtain prior approval for these activities from Ohio EPA's Division of Materials and Waste Management.

Are drill cuttings contaminated with chemicals from hydraulic fracturing?

No. It's important to know that the hydraulic fracturing process occurs after the wellbore has been drilled and cuttings are removed. Therefore, it is very unlikely that drill cuttings would come in contact with any chemicals related to the hydraulic fracturing process.



**Are drill cuttings considered a hazardous waste?**

No. State and federal hazardous waste regulations exempt drill cuttings and other wastes produced from exploration and production of oil and gas from being hazardous wastes. Therefore, these materials are not subject to hazardous waste regulations.<sup>1</sup>

Drill cuttings that are disposed of off-site, however, remain subject to Ohio's solid waste regulations and must be disposed in licensed solid waste landfills.

**Can drill cuttings contain naturally occurring radioactive materials?**

Yes. Certain geologic formations contain low levels of naturally occurring radioactive materials (NORM). Granite, marble, and limestone are examples of commonly used geologic building materials that also contain varying amounts of NORM. Just as when drilling or cutting through a granite mountain for a highway or railroad tunnel will create cuttings, drilling a natural gas well in the Marcellus or Utica shale will create drill cuttings which will contain low levels of NORM.

Naturally occurring radioactive material is not regulated by the Department of Health as radioactive material if the radionuclide content has not been concentrated to a level higher than is found in its natural state. However, the Department of Health is conducting a study to collect as many drill cuttings samples from wells being drilled throughout the state to better radiologically characterize the NORM in Ohio's Marcellus and Utica shale.

**Are drill cuttings being safely managed in Ohio?**

Yes. Drill cuttings that are sent off-site for disposal in Ohio must be sent to a licensed solid waste landfill. These landfills are engineered and have controls in place to ensure disposed materials are safely contained to protect the public and environment. Landfills also have monitoring and recordkeeping requirements to ensure they maintain compliance with environmental laws and regulations.

**Where can I get more information?**

For more information on shale oil and gas drilling, visit [www.ohioshaleinfo.com](http://www.ohioshaleinfo.com)

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<sup>1</sup> For more information, see U.S. EPA's Publication "Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations," available at [www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf](http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf).

## Lipp, David

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**From:** Matt Trokan <matt.trokan@sierraclub.org>  
**Sent:** Tuesday, January 24, 2012 8:45 AM  
**To:** Lipp, David  
**Subject:** Re: 20110912 Landfill Radiation Alarm Involving Drill Cuttings

thank you David.  
very helpful.  
matt

Matt Trokan  
Conservation Manager  
[matt.trokan@sierraclub.org](mailto:matt.trokan@sierraclub.org)  
p: 614-461-0734 x 311  
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131 High St., Suite 605  
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On Jan 23, 2012, at 3:01 PM, Lipp, David wrote:

Mr. Trokan,

Per our earlier discussion regarding landfill disposal of drill cuttings, I have attached a copy of the report documentation for the load of drill cutting that alarmed radiation detectors at the Mahoning County landfill.

Here is a brief summary:

On 9/12/11, North Star Disposal Services located in Youngstown, Ohio, sent a roll-off (ID# 39511) containing solid drilling waste (drill cuttings) to the Mahoning Landfill on Garfield Rd, in New Springfield, Ohio.

The roll-off (ID# 39511) alarmed radiation detectors at the landfill.

At 12:15 pm, on 9/12/11, the landfill operator performed a radiological survey of the roll-off (ID# 39511) containing the drill cuttings using a handheld radiation detector (Bicron Model LFM-1).

The background radiation level for this survey was recorded as: **2.33 microrem/hr**

The highest radiation reading for this survey was recorded as: **5.47 microrem/hr** located at the "middle of the load."

The landfill operator contacted the Ohio Department of Health to request a U.S. DOT Exemption be issued to allow the return of the roll-off (ID# 39511) to North Star Disposal Services.

The Ohio Department of Health issued DOT Exemption **OH-OH-11-32** and the roll-off (ID#39511) was returned to North Star Disposal Services.

Later that day (9/12/11), North Star Disposal Services returned the roll-off (ID# 39511) to the Mahoning Landfill for a second disposal attempt.

The roll-off (ID# 39511) alarmed radiation detectors at the landfill.

At 2:09 p.m. on 9/12/11, the landfill operator performed a radiological survey of the roll-off (ID# 39511) containing the drill cuttings using a handheld radiation detector (Bicron Model LFM-1).

The background radiation level for this survey was recorded as: **2.33 microrem/hr**

The highest radiation reading for this survey was recorded as: **6.7 microrem/hr** located at the "middle to rear of box."

The landfill operator contacted the Ohio Department of Health to request a U.S. DOT Exemption be issued to allow the return of the roll-off (ID# 39511) to North Star Disposal Services a second time.

The Ohio Department of Health issued DOT Exemption **OH-OH-11-33** and the roll-off (ID#39511) was returned to North Star Disposal Services.

- There is no information on what the landfill's radiation detector alarm set point was.

That is all of the information we have on drill cuttings causing radiation detectors to alarm at landfills.

I have let Susan Hyatt know you would like to contact her and have forwarded your phone number and email address. Since she is not a state employee, I am unable to give out her personal information directly.

Please let me know if you have any additional or follow-up questions.

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

This e-mail is intended for the sole use of the intended recipient and may contain privileged, sensitive, or protected health information. If you are not the intended recipient, be advised that the unauthorized use, disclosure, copying, distribution, or action taken in reliance on the contents of this communication is prohibited. If you have received this e-mail in error, please notify the sender via telephone or return e-mail and immediately delete this e-mail <20110912 Landfill Cuttings Alarm DOT Exemption.pdf>

## Lipp, David

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**From:** Goicochea, Joe  
**Sent:** Tuesday, January 24, 2012 5:54 PM  
**To:** Helmer, Stephen; Shear, Aaron; Lipp, David  
**Cc:** Stevenson, Laurie; Allen, Pam  
**Subject:** RE: Ohio Drill Cuttings Regulations (meeting request)

All,

Please provide availability for the following meeting dates/times. The meeting will be no more than two hours, will be held at Ohio EPA Columbus, and I will firm up an agenda with the Sierra Club in advance to ensure we are all prepared for the discussion.

2/13 – 10:00 or 3:00

2/14 – 10:00 or 3:00

2/15 – 10:00 or 3:00

David/Steve, please let me know if anyone else from your group will be attending.

For Ohio EPA-ers, I can check your Outlook Calendars if they are current. Also, if needed, we can coordinate a quick pre-meeting call based on the agenda items.

Thanks,

-Joe

**From:** Helmer, Stephen  
**Sent:** Tuesday, January 24, 2012 10:07 AM  
**To:** Shear, Aaron; Lipp, David  
**Cc:** Goicochea, Joe  
**Subject:** RE: Ohio Drill Cuttings Regulations (meeting request)

Hi Aaron,

Yes, I believe the bureau will be able to participate.

We have had some public records requests from the Sierra Club as well.

When you have a date firmed up, ODH can work on who will/can attend and let you know.

We do not know what happened to the lead after the DOT exemption was approved.

*Stephen Helmer, MSA*  
Program Administrator  
Bureau Radiation Protection

Ohio Department of Health  
35 E. Chestnut St., 7<sup>th</sup> Floor  
Columbus, Ohio 43215  
Office: 614 728 3611  
Fax: 614 466 0381

**From:** Shear, Aaron  
**Sent:** Tuesday, January 24, 2012 9:29 AM  
**To:** Helmer, Stephen; Lipp, David



**Cc:** Goicochea, Joe

**Subject:** FW: Ohio Drill Cuttings Regulations (meeting request)

Good Morning Steve and David,

Please review the below e-mail thread from Matt Trokan with the Sierra Club.

Members of the Sierra Club, as well as other representatives from the environmental community, would like to meet with Ohio EPA and ODH the week of February 13 to discuss cuttings produced during Shale drilling activities. It appears that much of the discussion will focus on the radioactivity of the drill cuttings.

In phone conversations with Matt, he continually interchanges and has difficulty understanding the difference between NORM versus TENORM. I explained NORM / TENORM to the best of my capability, however encouraged him to contact David for a better understanding of this topic.

Will the two of you be able to participate in a meeting with Sierra Club and the environmental community?

Joe is currently communicating with our Director's office to setup a meeting date/time and to determine who else from our agency should attend.

Secondly, Matt's follow up e-mail inquiry discusses the load that triggered rad alarms at Mahoning Landfill back in September. Steve, your name was included on the attached alarm sheet. Do you recall if the Mahoning landfill finally accepted the load and/or what measures were taken to resample the load?

Thanks for your continued assistance and open dialogue on the Shale Drill Cuttings topic. Contact me at your convenience to discuss Matt Trokan's meeting request and Mahoning inquiry.

Cheers,

**Aaron Shear**

**Environmental Specialist**



**Environmental  
Protection Agency**

Division of Materials and Waste Management  
Solid Waste Compliance and Inspection Support Unit  
50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, Ohio 43216-1049  
Direct 614-728-5350 · Fax 614-728-5315

**From:** Matt Trokan [<mailto:matt.trokan@sierraclub.org>]

**Sent:** Tuesday, January 24, 2012 8:49 AM

**To:** Goicochea, Joe; Shear, Aaron

**Subject:** Re: Ohio Drill Cuttings Regulations (meeting request)

One more thing on the agenda.

Can you tell us whatever happened to this hot load that was rejected by the Mahoning landfill twice in the same day in september?

We would just like to know where this load ended up. Report attached. thanks Matt

Matt Trokan

[matt.trokan@sierraclub.org](mailto:matt.trokan@sierraclub.org)

p: 614-461-0734 x 311

f: 614-461-0710

131 High St., Suite 605

Columbus Oh, 43215

On Jan 23, 2012, at 10:50 AM, Matt Trokan wrote:

> Joe, Aaron,

> Hope you had a good weekend. Sierra Club had a retreat this weekend and discussed our shared concerns about drill cuttings going into landfills.

> I was wondering if you would be available to meet the week of Feb 13th with representatives from the Sierra Club and the broader environmental community about this issue. May I suggest, Feb 15th from 2-4 p.m. at the OEPA offices? Could we also set up a phone line in case folks want to call in?

> I would also hope that drill cuttings will be on the agenda for the Feb 16th SWAC mtg. or the May 17th mtg.

> thanks Matt

> P.S. It might also be helpful if a representative from ODH was present. I talked with David Lipp at ODH who informed me that currently no radioactivity monitoring (of either flow back material or drill cuttings) has been done to date.

>

>

> Questions and Concerns for agenda

>

> Ohio's current regulatory framework and the Fed title C exemption

> List of landfills currently accepting drill cuttings

> Amount of drill cuttings accepted in 2011

> Amount of out of state drill cuttings coming into Ohio

> Safeguards for radioactive materials

> -monitoring protocol and methods

> Monitoring Reports from landfills

>

>

> --

> Matt Trokan

> [matt.trokan@sierraclub.org](mailto:matt.trokan@sierraclub.org)

> p: 614-461-0734 x 311

> f: 614-461-0710

> 131 High St., Suite 605

> Columbus Oh, 43215

**Lipp, David**

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**From:** Jody Jones (OPER - Regulatory) <jody.c.jones@chk.com>  
**Sent:** Monday, January 30, 2012 2:12 PM  
**To:** Denison, Eric; Lipp, David  
**Subject:** Utica sampling

Eric and David,

We last spoke before the holidays when we were trying to setup a sampling tour. At that time, we discussed that ODH could provide us with a sampling protocol. Has there been any progress on that front? I look forward to setting everything up once we're on the same page. If you need anything from me, just let me know.

Jody C. Jones  
Manager, Regulatory Affairs  
Chesapeake Energy Corporation  
Cell: 304-767-4057

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This email (and attachments if any) is intended only for the use of the individual or entity to which it is addressed, and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this email is not the intended recipient, or a duly designated agent responsible for relaying this message to the intended recipient, you are hereby notified that any disclosure, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify the sender immediately by return email and destroy all copies of this email (and attachments if any).

**Lipp, David**

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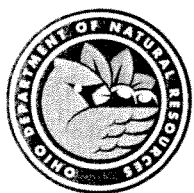
**From:** Stevenson, Laurie  
**Sent:** Monday, January 30, 2012 6:10 PM  
**To:** Opritza, Steve; Goicochea, Joe; Shear, Aaron; Lipp, David  
**Cc:** McCormac, Mike  
**Subject:** Final cut/drill cuttings factsheet  
**Attachments:** Fact Sheet on Drilling Muds and CuttingsFINAL1-30-12.doc

Hi everyone. Thanks very much for the comments on the fact sheet. I'm attaching the final cut of the factsheet on cuttings for one more read through before we post it up. My information office folks made a few minor suggestions, so I wanted to make sure everyone was OK with the final cut before we go live.

I'm hoping to post it in the next few days, so if you can give it one more glance through, that would be great.

If we need any additional edits, let me know and I'll get these addressed.

Thanks,  
Laurie



## Fact Sheet: Drill Cuttings from Oil and Gas Exploration in the Marcellus and Utica Shale Regions of Ohio

January 2012

### What are drilling muds and cuttings?

Drilling a natural gas or oil well involves the use of fluid (called **drilling mud**) or compressed air (air drilling) to aid in the process of drilling a borehole into the earth. Drilling mud is necessary in drilling because it cools and lubricates the drill bit, helps stabilize the well bore during drilling and keeps fluids in the formation from entering the borehole.

The type of fluid used as drilling mud depends on factors such as the well type and rock formation that will be drilled. Three primary types of drilling muds are water-based, oil-based and synthetic-based. It is not as common today to use oil-based muds that contain petroleum products such as diesel fuel. Synthetic-based muds are more frequently used because they perform well, have less environmental impact and biodegrade faster.

Drilling mud also is used to carry rock and soil (called **drill cuttings**) excavated by the drill bit up to the surface. At the surface, the drilling mud is separated from the drill cuttings. Drilling mud is valuable to the drill operator and is recovered so that it can be used again.

### How are drill cuttings regulated in Ohio?

Drill cuttings managed on the drill site are regulated by the Ohio Department of Natural Resources (ODNR).

Drill cuttings coming into contact with drilling muds, oils or other sources of contaminants that are sent off-site for disposal are classified as a solid waste under Ohio Environmental Protection Agency (Ohio EPA) regulations. Cuttings sent off-site for disposal in Ohio must be sent to a licensed solid waste landfill.

Anyone wanting to use drill cuttings off-site for fill or other beneficial uses, must first obtain approval for these uses from Ohio EPA's Division of Materials and Waste Management.

### Are drill cuttings contaminated with chemicals from hydraulic fracturing?

No. The hydraulic fracturing process occurs after the wellbore has been drilled and cuttings are removed. Therefore, drill cuttings do not come in contact with any chemicals used in the hydraulic fracturing process.

## **Drill Cuttings from Oil and Gas Exploration in the Marcellus and Utica Shale**

### **Are drill cuttings considered a hazardous waste?**

No. State and federal regulations exempt drill cuttings from being classified as a hazardous waste. Drill cuttings disposed off-site, however, are subject to Ohio's solid waste regulations and must be disposed in licensed solid waste landfills.

### **Can drill cuttings contain naturally occurring radioactive materials?**

Yes. Most geologic formations contain low levels of naturally occurring radioactive materials (NORM). Granite, marble and limestone are examples of commonly used building materials that contain low levels of NORM. Much like boring a tunnel through a granite mountain, drilling into the Marcellus or Utica shale regions can create cuttings that can contain low levels of NORM.

Cuttings are not regulated by the Ohio Department of Health as radioactive material unless the NORM content is elevated to a level greater than is found in its natural state.

### **Are drill cuttings being safely managed in Ohio?**

Yes. Drill cuttings shipped off-site for disposal in Ohio must be sent to a licensed solid waste landfill. These landfills are engineered to help ensure that waste is safely contained and does not pose a threat to the public and environment. Landfills also have reporting and recordkeeping requirements to ensure compliance with environmental laws and regulations.

### **Where can I get more information?**

For more information on shale oil and gas drilling in Ohio, visit ODNR's website at [www.ohioshaleinfo.com](http://www.ohioshaleinfo.com) and Ohio EPA's website at [www.epa.ohio.gov/shale.aspx](http://www.epa.ohio.gov/shale.aspx).

**Lipp, David**

---

**From:** Stevenson, Laurie  
**Sent:** Wednesday, February 01, 2012 12:32 PM  
**To:** Lipp, David; Snee, Michael  
**Subject:** Please review NORM paragraph from drill cuttings fact sheet

Hi everyone. I'm trying to get the drill cuttings fact sheet wrapped up prior to our meeting with the Sierra Club. Can you take a quick look at this change and let me know if this looks OK from ODH's perspective? It's the one question related to NORM. Our public interest center recommended a couple minor tweaks and I wanted to check in before finalizing the document. Also, we extracted the sentence about the state collecting cuttings data and studying the NORM issue in more detail. If you want it re-inserted, let me know. I just felt that it may raise additional questions from Sierra Club about the study itself (scope, extent, etc.), and it may be better just to update the factsheet once additional data does become available, if there's a need to do so.

Feedback as soon as possible on whether we're ready to go with this would be great.

Thanks!  
Laurie

#### **Can drill cuttings contain naturally occurring radioactive materials?**

Yes. Most geologic formations contain low levels of naturally occurring radioactive materials (NORM). Granite, marble and limestone are examples of commonly used building materials that contain low levels of NORM. Much like boring a tunnel through a granite mountain, drilling into the Marcellus or Utica shale regions can create cuttings that can contain low levels of NORM.

Cuttings are not regulated by the Ohio Department of Health as radioactive material unless the NORM content is elevated to a level greater than is found in its natural state.

**Lipp, David**

---

**From:** Snee, Michael  
**Sent:** Wednesday, February 01, 2012 4:06 PM  
**To:** Helmer, Stephen; Lipp, David  
**Subject:** FW: Please review NORM paragraph from drill cuttings fact sheet

**From:** Stevenson, Laurie  
**Sent:** Wednesday, February 01, 2012 12:32 PM  
**To:** Lipp, David; Snee, Michael  
**Subject:** Please review NORM paragraph from drill cuttings fact sheet

Hi everyone. I'm trying to get the drill cuttings fact sheet wrapped up prior to our meeting with the Sierra Club. Can you take a quick look at this change and let me know if this looks OK from ODH's perspective? It's the one question related to NORM. Our public interest center recommended a couple minor tweaks and I wanted to check in before finalizing the document. Also, we extracted the sentence about the state collecting cuttings data and studying the NORM issue in more detail. If you want it re-inserted, let me know. I just felt that it may raise additional questions from Sierra Club about the study itself (scope, extent, etc.), and it may be better just to update the factsheet once additional data does become available, if there's a need to do so.

Feedback as soon as possible on whether we're ready to go with this would be great.

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Cuttings are not regulated by the Ohio Department of Health as radioactive material unless the NORM content is elevated to a level greater than is found in its natural state.



## Lipp, David

---

**From:** Goicochea, Joe  
**Sent:** Thursday, February 02, 2012 5:07 PM  
**To:** Stevenson, Laurie; 'rick.simmers@dnr.state.oh.us' (rick.simmers@dnr.state.oh.us); 'mike.mccormac@dnr.state.oh.us' (mike.mccormac@dnr.state.oh.us); 'thomas.tugend@dnr.state.oh.us' (thomas.tugend@dnr.state.oh.us); Lipp, David; Helmer, Stephen; Snee, Michael; Shear, Aaron; Steve.Opritza@dnr.state.oh.us  
**Cc:** Allen, Pam  
**Subject:** RE: Final drill cuttings factsheet

All,

With the finalization of the drill cuttings fact sheet, I would like to respond to Matt Trokan, Sierra Club, to schedule the requested meeting regarding this topic.

- Please confirm that you are available for this meeting on Wednesday, February 15<sup>th</sup> @ 3:00 at Ohio EPA's offices. If this date/time does not work for all agencies, we can identify an alternative.
- I would also like to have a quick conference call (pre-meeting) prior to the meeting so that we can discuss the flow of the discussion and focus areas. Please confirm that you are available for this call on Monday, February 13<sup>th</sup> @ 2:00. I will reserve a bridge line.

From past discussions with Mr. Trokan, Sierra Club's questions re: drill cuttings relate to each of our agencies' regulatory programs. I think the drill cuttings fact sheet is a great resource that will address many of the questions posed, and having each agency represented at the 2/15 meeting will allow us to completely respond to the questions and concerns raised.

Thanks in advance for your participation. I will forward the questions posed by Sierra Club in past emails in advance of the pre-meeting.

-Joe

**From:** Stevenson, Laurie  
**Sent:** Thursday, February 02, 2012 2:45 PM  
**To:** 'rick.simmers@dnr.state.oh.us' (rick.simmers@dnr.state.oh.us); 'mike.mccormac@dnr.state.oh.us' (mike.mccormac@dnr.state.oh.us); 'thomas.tugend@dnr.state.oh.us' (thomas.tugend@dnr.state.oh.us); Opritza, Steve (Steve.Opritza@dnr.state.oh.us); Lipp, David; Helmer, Stephen; Snee, Michael; Goicochea, Joe; Shear, Aaron  
**Subject:** Final drill cuttings factsheet

Hi everyone. The drill cuttings factsheet is done. Thanks to everyone for the assistance on this.

Laurie

**Lipp, David**

---

**From:** Goicochea, Joe  
**Sent:** Tuesday, February 14, 2012 3:57 PM  
**To:** Shear, Aaron  
**Cc:** Stevenson, Laurie; Allen, Pam; Helmer, Stephen; Lipp, David; Snee, Michael  
**Subject:** FW: Drill cuttings load - radioactive

Aaron,

Please see the email response below from D & L Energy, transporter of the material that alarmed at Mahoning County in September 2011. It appears the load was subsequently taken to Soil Remediation, Inc. in Lowellville, Ohio. ODH colleagues, given the two loads of drill cuttings alarmed for radiation (albeit micro rem levels), can you let us know how Soil Remediation, Inc. would serve as a suitable location for this material. It would be helpful if we can obtain a copy of the analyticals.

Thanks,  
-Joe

**From:** Bill Hays [mailto:bhays@dandlenergy.com]  
**Sent:** Tuesday, February 14, 2012 3:17 PM  
**To:** Goicochea, Joe  
**Subject:** RE: Drill cuttings load - radioactive

**To:** Joe Goicochea

February 14, 2012

**From:** Bill Hays

My apologies for not responding to your request yesterday, I was required to be out of the office for most of the day.

The material in question was handled by Industrial Tank Management which is currently under the management of Mike McKenzie. At the time of the disposal, Industrial Tank Management was affiliated with D and L Energy AND managed by Mike McKenzie. However, as of October 2011, that is no longer the case; D and L Energy has nothing to do with Mike McKenzie and Industrial Tank Management.

I was not involved in this project at the time of the disposal, but from what information I have been able to gather, here is what I understand to be the movement of the material:

Industrial Tank Management contracted Wolford's Roll-Off to transport two roll offs of solid drilling waste to the Mahoning Landfill Inc.

The Mahoning Landfill detected a low level of radiation on the loads and by their standards refused to accept solid drilling waste on September 12, 2011.

The loads were returned to the point of origin.

After an analytical was completed, Industrial Tank Management again contracted with Wolford's Roll-Off to transport the material to Soil Remediation, Inc., Lowellville, Ohio.

Hopefully this will be of use to you. If you need any additional information, please let me know

Bill Hays

D and L Energy Group

**From:** Goicochea, Joe [<mailto:Joe.Goicochea@epa.state.oh.us>]  
**Sent:** Monday, February 13, 2012 8:52 AM  
**To:** [bhays@dandlenergy.com](mailto:bhays@dandlenergy.com)  
**Subject:** Drill cuttings load - radioactive

Hi Bill,  
As briefly discussed this morning, I am interested in gathering information regarding 2 loads of drill cuttings transported by D&L on 9/12/2011. As you may be aware, these loads alarmed for radioactive material at Mahoning Landfill. As required, Ohio Department of Health was contacted and issued a Shipment Approval Form for unidentified materials (Approval Nos. OH-OH-11-32 and OH-OH-11-33).

Ohio EPA is interested in learning of the final disposition of this material. Any information you can provide is appreciated, including the landfill where disposed. If you have any questions, please contact me. Thanks, have a great week, -Joe



**Joe Goicochea**  
Environmental Supervisor



Environmental  
Protection Agency

Division of Materials and Waste Management  
Solid Waste Compliance and Inspection Support  
50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, Ohio 43216-1049  
Direct (614)728-5349 • Fax (614)728-5315

**Lipp, David**

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**From:** Helmer, Stephen  
**Sent:** Tuesday, February 14, 2012 4:08 PM  
**To:** Snee, Michael; Lipp, David  
**Subject:** FW: Drill cuttings load - radioactive

It looks like OEPA is pursuing where the soil went.  
It does include, "after an analytical was completed.." it was then sent to another facility (Soil Remediation Inc. Lowellville, Ohio) for disposal.

*Stephen Helmer*, MSA  
Program Administrator  
Bureau Radiation Protection

Ohio Department of Health  
35 E. Chestnut St., 7<sup>th</sup> Floor  
Columbus, Ohio 43215  
Office: 614-728-3611  
Fax: 614-466-0381

**From:** Goicochea, Joe  
**Sent:** Tuesday, February 14, 2012 3:57 PM  
**To:** Shear, Aaron  
**Cc:** Stevenson, Laurie; Allen, Pam; Helmer, Stephen; Lipp, David; Snee, Michael  
**Subject:** FW: Drill cuttings load - radioactive

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Thanks,  
-Joe

**From:** Bill Hays [mailto:bhays@dandlenergy.com]  
**Sent:** Tuesday, February 14, 2012 3:17 PM  
**To:** Goicochea, Joe  
**Subject:** RE: Drill cuttings load - radioactive

To: Joe Goicochea

February 14, 2012

From: Bill Hays

My apologies for not responding to your request yesterday, I was required to be out of the office for most of the day.

The material in question was handled by Industrial Tank Management which is currently under the management of Mike McKenzie. At the time of the disposal, Industrial Tank Management was affiliated with D and L Energy AND managed by Mike McKenzie. However, as of October 2011, that is no longer the case; D and L Energy has nothing to do with Mike McKenzie and Industrial Tank Management.

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The Mahoning Landfill detected a low level of radiation on the loads and by their standards refused to accept solid drilling waste on September 12, 2011.

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Bill Hays  
D and L Energy Group

**From:** Goicochea, Joe [<mailto:Joe.Goicochea@epa.state.oh.us>]  
**Sent:** Monday, February 13, 2012 8:52 AM  
**To:** [bhays@dandlenergy.com](mailto:bhays@dandlenergy.com)  
**Subject:** Drill cuttings load - radioactive

Hi Bill,  
As briefly discussed this morning, I am interested in gathering information regarding 2 loads of drill cuttings transported by D&L on 9/12/2011. As you may be aware, these loads alarmed for radioactive material at Mahoning Landfill. As required, Ohio Department of Health was contacted and issued a Shipment Approval Form for unidentified materials (Approval Nos. OH-OH-11-32 and OH-OH-11-33).

Ohio EPA is interested in learning of the final disposition of this material. Any information you can provide is appreciated, including the landfill where disposed. If you have any questions, please contact me. Thanks, have a great week, -Joe



Joe Goicochea  
Environmental Supervisor

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Environmental  
Protection Agency

Division of Materials and Waste Management  
Solid Waste Compliance and Inspection Support  
50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, Ohio 43216-1049  
Direct (614)728-5349 • Fax (614)728-5315

Fugitt, Rebecca

---

**From:** Phillips, Gene  
**Sent:** Wednesday, January 04, 2012 8:24 AM  
**To:** Snee, Michael; Fugitt, Rebecca  
**Subject:** FW: ODH/LHD WEEKLY CONFERENCE CALL AGENDA for JANUARY 4, 2012

agenda

**From:** Flint, Tomma  
**Sent:** Tuesday, January 03, 2012 5:09 PM  
**To:** Flint, Tomma  
**Subject:** ODH/LHD WEEKLY CONFERENCE CALL AGENDA for JANUARY 4, 2012

**ODH/LHD WEEKLY CONFERENCE CALL  
JANUARY 4, 2012**

Attendee URL: <https://www.livemeeting.com/cc/odoh/join?id=ZD9SMN&role=attend&pw=jZ%27J7w7Tg>

Meeting ID: ZD9SMN      Attendee Entry Code: jZ'J7w7Tg

User's WITH a VoIP phone: 4-8005

User's WITHOUT a VoIP phone: Toll Free #: (866) 961-9227

Conference ID: 52963

Conference Password: 31635

We encourage you to sign-on LIVE for this call.

**Please do not place your phone on hold.** Placing your phone on hold will disrupt the call with agency background music distracting from the call agenda.

**Please remember to mute your phones.** If you do not have an actual mute button on your phone, VoIP and cell phones can be muted by pressing # 5 and to un-mute press # 5 again.

Participants are highly encouraged to use their VoIP phone. If your Local Health Department (LHD) has a VoIP phone, please use that phone instead of your regular phone. Each LHD should try to have all participants at one location where the VoIP phone is located, if possible. ODH is limited to 100 participant lines.

If you have difficulty joining the call at 11:00, please call Johnnie Patton at (614) 644-7003 or the Help Desk at (614) 752-5190 and select option #1.

Start Time: 11:00 a.m. (EDT)

End Time: 12:00 p.m. (EDT)

Location: OMIS Video Conference Room 8<sup>th</sup> Floor 246 Building

## Agenda

### ANNOUNCEMENTS:

1. Public Health Apprentice Program: Joe Mazzola
2. Annual Summary of Infectious Diseases - Ohio 2010: Joe Mazzola  
<http://www.odh.ohio.gov/healthStats/disease/id1.aspx>

### **ADMINISTRATION:**

1. Ohio's Health Department Profile and Performance Database Demonstrations: Joe Mazzola
  - Improvement Standards (IS)
  - Annual Financial Report (AFR)
  - LHD Directory
2. User Management - ODH Application Gateway: Joe Mazzola

### **NURSING / ENVIRONMENTAL / EPIDEMIOLOGY:**

1. 2011 Animal Bite Report: Dr. Kathy Smith
2. Natural Gas Drilling in the Marcellus and Utica Shale Regions: Gene Phillips
3. Dangerous Wild Animals Reports: Gene Phillips

### ***Tomma J. Flint***

Administrative Professional 4  
 Ohio Department of Health  
 Office of Local Health Department Support  
 246 North High Street, 7th floor  
 Columbus, OH 43215  
 Phone: 614.728.9173  
 Fax: 614.644.8526  
<http://www.odh.ohio.gov/localHealthDistricts/lhdmain.aspx>

*\* Get info on injection wells/ to Joe*

*Tim Ingram -*

*need to have background WQ data -*

*provision for funding for statewide WQ database*

*Wes- has requested de-aggregated data from Chesapeake  
 thinks <sup>data</sup> still has some value  
 Info on WQ*



## Rebecca Fugitt

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**From:** Stevenson, Laurie [laurie.stevenson@epa.state.oh.us]  
**Sent:** Friday, September 30, 2011 3:10 PM  
**To:** 'Chris.Perry@dnr.state.oh.us'; 'Heidi Hetzel-Evans'; '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'; Shear, Aaron; Cirker, Benjamin; Hall, Brian; Lowe, Chuck; Nygaard, Eric; Goicochea, Joe; Weiss, Kristopher; Burkleca, Lee; Taliaferro, Lindsay; Baker, Mike; Eggert, Michael; Parsons, Misty; Settles, Mike; Laake, Ryan; Freeman, Tracy; Harcarik, Tom; Nickel, Brian; Kniss, Donna; Underwood, Dan; Adams, Eric; Gomes, Erm; Snell, Fred; Rice, Nancy; Blasick, Rich; DiFranco, Stivo; Saines, Steve; Williams, Steve; Wilson, Virginia; Chuck McCracken; Michael Snee; Rebecca Fugitt; Stephen Helmer; David Lipp; Hopkins, Mike; Getz, Eric; Nabors, Shannon; Buthker, Bonnie; Robinson, Isaac  
**Subject:** Draft agenda for 10/5/11 meeting  
**Attachments:** Marcellus Shale10-5-11Agenda Draft.DOC

Hi everyone. Attached is a draft agenda for our meeting next **Wednesday, October 5<sup>th</sup>** from 1:30-4:00 at ODNR. If someone from ODNR could confirm the conference room location, that would be great.

The general consensus from people responding to my question about the frequency of our meetings was that we go ahead with our meeting next week, but talk about future meeting frequency from here on out at the meeting.

I will not be at the meeting on Weds. Brian Hall and Mike Baker will help facilitate the discussion and take notes. If anyone has revisions/edits to the agenda, please provide these to me by noon on Monday and I'll get the final back out to everyone. I'm still waiting for bridge line confirmation for the districts and will get this number out on Monday.

Thanks.  
Laurie

**Marcellus Shale Meeting**  
**OEPA/ODNR/ODH**  
**Wednesday October 5, 2011**  
**1:30 – 4:00 p.m.**  
**Ohio DNR Fountain Square, Building**  
**H, 2nd floor conference room**  
**DRAFT AGENDA**

<b>Welcome/Introductions</b>	B. Hall
<b>Drilling Activity/Updates</b>	
<ul style="list-style-type: none"><li>Ohio Drilling activity in the Marcellus/Utica – permit and drilling activity update</li></ul>	M. McCormac
<b>September Energy Summit</b>	T. Tugend
<b>Permit conditions to protect GW and other sensitive environments/update</b>	OEPA/ODNR
<b>401/404</b>	
<ul style="list-style-type: none"><li>Development of General Permit/401 authorization</li></ul>	T. Harcarik
<b>Wastewater/Brine Management</b>	
<ul style="list-style-type: none"><li>POTW wastewater management/update</li><li>UIC disposal/capacity update</li></ul>	B. Hall T. Tomastik
<b>Air</b>	
<ul style="list-style-type: none"><li>General Permit for natural gas drilling/production</li></ul>	M. Hopkins
<b>Waste/TENORM Update</b>	
<ul style="list-style-type: none"><li>Drill cuttings/solids sampling update OEPA-ODH coordination</li></ul>	ODH, OEPA
<b>Outreach/Education/Meetings</b>	
<ul style="list-style-type: none"><li>Media Relations Update</li><li>Statewide regional shale meetings</li><li>Fact sheets/update</li></ul>	OEPA/ODNR ODNR OEPA/ODNR
<b>Next Meeting/Agenda Items</b>	OEPA/ODNR
<ul style="list-style-type: none"><li>Set schedule for future meetings/frequency</li></ul>	

**Marcellus Shale Meeting  
OEPA/ODNR/ODH  
Thursday, October 5  
Meeting Summary**

**Introductions**

**Drilling Activity**

Reports generated from ODNR web page summarizing Marcellus and Utica permit activity were provided. ODNR is adding a spreadsheet to their web page showing weekly drilling permit activity as well as making other report improvements (e.g. adding latitude and longitude data). As of 9-25, 40 horizontal well permits had been issued for the Utica with 11 wells drilled. Eleven horizontal permits had been issued for the Marcellus with 6 drilled to that date. The first required reports on actual production are due March 31, 2012 and will give a better indication of production projections.

ODNR is adding a question on the source of water to be used in their pre-drilling site review checklist.

**September Energy Summit**

A brief synopsis of the Governor's Energy Summit was provided. Streaming video is now available for on demand viewing: <http://www.battelle.org/conferences/ohioenergy/>.

**Permit Conditions**

A final summary of permit conditions related to ground water and drinking water protection was provided. The Division of Oil and Gas will monitor the occurrence of drilling activity over unconsolidated aquifers capable of sustaining 100 gpm for a year and will then, in cooperation with OEPA, assess the need to modify conditions accordingly.

**401/404**

A general permit for O&G drill sites was public noticed. Public comments were open until October 28.

**Wastewater/Brine Management**

Warren permit to receive and discharge treated produced water from Patriot is set to expire the end of January. Ohio EPA will not renew the permit as it has been determined this is not an approved disposal alternative. Discharge limits in that permit had been appealed to ERAC.

There are currently 183 permitted Class 2 wells with 8 applications pending. More capacity is needed given the volume of wastewater from Pennsylvania. There was approximately 2.8 million barrels of fluid injected during the second quarter of this year, 54% from out of district. ODNR has received about 30 applications from out of state haulers requesting to get registered to haul in the State of Ohio. ODNR

requested other agency field staff to notify ODNR if they see trucks appearing to haul brine that do not have a UIC sticker on them.

ODNR does not anticipate seeing large centralized wastewater impoundments such as those being constructed in Pennsylvania for treatment and reuse purposes, at least until we see a greater concentration of drilling activity occurring. Some discussion of the regulatory status of such "off-site" impoundments may be warranted.

ODNR is working in cooperation with the OSU Center for Subsurface Energy researching various aspects of shale development.

#### **Air General Permit**

Ohio EPA is issued a draft general permit for air discharges associated with oil and gas production activities. They have revised the permit in response to comments. Anticipate issuing formal draft for 30 day comment period in near future. (draft permit was issued for 30 day comment period on October 20). USEPA may also be developing applicable air regulations.

#### **Waste/TENORM Update**

ODH reported the public comment period on TENORM rules was completed. ODH will run rules through the Radiation Advisory Council and the Public Health Council. Anticipate introducing to JCARR early in 2012. New rules may impact reclamation of pipe due to scale build up.

Ohio EPA reported they are receiving calls from industry on disposal of solids from drill sites. If in contact with drill muds must go to solid waste landfill. Two landfills in NE Ohio are each currently receiving approximately 100 tons per day (approximately 70 roll off boxes per well).

#### **Outreach/ Education**

ODNR still fielding a number of media calls. A lot of interest in general permits.

ODNR/OEPA/ODH leadership conducted series of Government to Government meetings in eastern Ohio. Impact to local infrastructure is the concern most frequently expressed.

ODH reported they have received no negative feedback on well sampling fact sheet. Most homeowners conducting sampling are requesting the full suite of parameters. Supportive of fact sheet as is with some minor edits suggested by Ohio EPA.

#### **Next Meeting**

Next meeting set for February 29, 2012 at 1:30 at Ohio EPA.



## RECOMMENDATIONS FOR WATER WELL SAMPLING BEFORE OIL AND GAS DRILLING

### Introduction

This fact sheet provides a basic overview for private and/or public well owners who are considering collecting samples prior to oil and gas drilling (including the Marcellus and Utica shale deposits) areas near their properties. If you are collecting water data to document water quality, you should follow a few important steps as outlined in this fact sheet. These include obtaining information on your well, such as when and how it was constructed; conducting research on certified laboratories in your area and sampling costs; and ensuring labs follow proper procedures and sample collection methods.

### Who regulates oil and gas well drilling in Ohio?

The Ohio Department of Natural Resources, Division of Mineral Resources Management (ODNR–DMRM) regulates and monitors oil and gas drilling in Ohio. More information is located at: [http://www.ohiodnr.com/portals/11/publications/pdf/Marcellus\\_Shale\\_Fact\\_Sheet.pdf](http://www.ohiodnr.com/portals/11/publications/pdf/Marcellus_Shale_Fact_Sheet.pdf)

### Will oil and gas well drilling really affect my water well quality or quantity?

Modern oil and gas well drilling is a highly technical and closely monitored process with regulations in place to protect underground sources of drinking water during and after the drilling process. The chance of ground water contamination or loss of water due to oil and gas well drilling is very small. If ground water quality impacts from drilling activities occur, they most often are within a few hundred feet of the drill site.

### What information should I obtain prior to collecting a water sample from my well?

Ohio laws require that a water well record known as a well log be filed for all new wells drilled since 1945 and some well logs were filed prior to that time. Well log records can be found on ODNR's web site at: <http://www.dnr.state.oh.us/water/maptechs/wellogs/appNEW/>; or call ODNR at (614) 265-6740 for assistance.

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Well logs show how deep a water well is drilled and how it is constructed. Knowing the depth of your well and the type of geologic materials (i.e. sandstone, shale, limestone, sand and gravel) that are producing the ground water is important information in the event of water quality impacts.

### What else do I need to know before sampling?

Conduct research on the laboratories in your area and the services they offer. Be an informed consumer and get the most for your money. Water samples must be collected and analyzed using proper sampling and laboratory protocols and methods and careful documentation of sample chain of custody. Some labs will come and collect the sample for you, others will only provide the sample containers. Some local health districts or soil and water conservation offices offer sample collection and coordinate with labs for sample analysis. The State of Ohio highly recommends using a qualified

professional to ensure proper collection your water sample. Improper sampling can result in unreliable data and waste your financial resources.

### **Are there special water sampling and analysis procedures?**

Water sampling should be done only by a professional who is familiar with all sampling and laboratory protocols. Samples should be submitted to an Ohio Environmental Protection Agency (Ohio EPA) drinking water certified laboratory or laboratory with similar state or national certification for the analysis of water (e.g. Ohio EPA Voluntary Action Program or ISO17025)

The laboratory should be certified for each chemical parameter to be tested. Without attention to these details, water analyses will be of little or no value in an oil and gas water contamination investigation or a legal proceeding. A list of Ohio EPA certified laboratories for drinking water analysis is available on the Agency's web site at <http://www.epa.ohio.gov/ddagw/labs.aspx>.



### **What procedures should occur during water sampling?**

The water sample should be collected before any treatment devices (bypassing these devices) such as water softeners or disinfection units as they can affect water quality. This sample location will likely be a spigot or drain at or near the pressure tank before any treatment units. The water sample collected should be representative of water in the well; therefore it is important to run the water for at least 5-10 minutes to flush out all the water in the well to ensure a sample of fresh ground water is obtained. The water sampling professional will document the sample location, date and time, and will collect the water in containers designed for the specific parameters to be analyzed. Preservatives may also be added to the sample container to stabilize the sample on site before transport to the lab. Parameters such as pH and conductivity may be measured with equipment during sample collection.

### **What should the water well sample be analyzed for?**

Chloride and sodium are principal chemical components in oil and gas field brine waters and are typically very elevated compared to shallow ground waters in Ohio. Other common sources of chloride and sodium in shallow ground water include water softener discharges, septic systems, and road salt storage and deicing operations. Another indicator of oil and gas activities is the presence of dissolved methane gas in water. Additional parameters (e.g. barium, potassium, sulfate, bromide, BTEX) aid in the interpretation of water quality results and help distinguish various types of water quality contamination.

**Deleted:** The following sample parameter sets are recommended for establishing background water quality and are grouped in order of importance.

The sample parameter sets listed in the table are recommended for establishing background water quality and are grouped in order of importance. The more parameters analyzed, the higher the cost of the water analysis. If funds are limited, start with the Tier 1 sample set. However, since there is normally a sample collection and processing fee associated with professional water sampling, it may be more cost effective to sample for all three tiers at once if possible. Note, not all laboratories provide sample collection services nor are equipped to analysis for methane.

Recommended Water Quality Sampling Parameters		
Tier 1 Parameters	Tier 2 Parameters	Tier 3 Parameters
Barium Chloride Magnesium Potassium Sodium Strontium Sulfate Total dissolved solids Specific Conductivity	<b>Tier 1 sample parameters +</b> Calcium Hardness Total Alkalinity pH Iron Manganese Total suspended solids Bromide	<b>Tier 1 and 2 sample parameters +</b> BTEX (benzene, toluene, xylene, ethylbenzene) Methane (dissolved)*

\*Include with Tier 1 if laboratory can analyze for methane.

Ideally, two or three samples should be collected in different seasons to allow you to establish the normal variability in ground water quality over time due to rainfall and other factors.

*E. coli*  
When assessing the overall health of your water well, you may want to consider analyzing for nitrate, arsenic and ~~total coliform bacteria~~ as these are the most common contaminants of concern in ground water. These contaminants are typically not associated with oil and gas production activities.

### What do my sample results mean?

Ground water quality can vary over time and the seasons, and is influenced by the type of geologic materials the ground water is moving through, natural replenishment from rainfall and flooding (recharge), and chemicals used or applied on the ground surface that are transported by recharge moving to the ground water. Subsequently, your water sample is a snapshot in time of the water quality in your well. The Ohio EPA and other state agencies have collected background water quality data across the state as part of an ambient ground water quality monitoring program. Data on natural ground water quality can be found at: [http://www.epa.state.oh.us/ddagw/gwqcp\\_ambient.aspx](http://www.epa.state.oh.us/ddagw/gwqcp_ambient.aspx)

If the chloride or other parameters are near or higher than a health-based standard or there are detectable levels of methane in your well, you may want to seek the advice of water quality professional to determine the potential source(s) of the contaminant. The additional Tier 1, 2 and 3 parameters analyzed will be useful for the water quality professional in identifying a potential source of contamination.

### Are there health-based standards that apply to private wells?

The Ohio Department of Health (ODH) has established health-based standards for private water systems that are the same as the standards for public water supply systems established by the Ohio EPA and U.S. EPA. They can be found on the Ohio EPA website at <http://www.epa.state.oh.us/portals/28/documents/DWStandardsList.pdf>.

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Deleted: Tier 1 water sample parameters are recommended for homeowners who have basic concerns and would like to establish background water quality. If chloride levels are greater than 250 parts per million (mg/l), then Tier 2 sampling is recommended. Background water quality data for chloride and bromide is useful for identifying potential sources of chloride contamination.

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Question - Address advising public on contracts + process to make sure they know what to do

Information on health risks associated with each water quality standard can be found at the ODH website at: <http://www.odh.ohio.gov/odhPrograms/eh/water/PWShminfo.aspx> and at the U.S. EPA website at: <http://water.epa.gov/drink/contaminants/basicinformation/index.cfm>.

### **What type of ground water investigations does ODNR – DMRM conduct related to oil and gas drilling?**

Since 1983, ODNR – DMRM has conducted ground water investigations in Ohio when complaints alleging ground water contamination by oil and gas drilling are received. ODNR – DMRM technical staff respond within 24 hours and use advanced equipment that allows for a complete groundwater investigation. Since regulations were strengthened in 1985, ground water contamination cases caused by oil and gas operations have dramatically decreased.



### **Are there regulations to provide for the replacement of my well if it is impacted by oil and gas drilling?**

Section 1509.22 (F) of the Ohio Revised Code gives the authority to ODNR – DMRM to require an owner/operator of an oil and gas well to replace the water supply of the holder of interest in real property whose water supply has been substantially disrupted by contamination, diminution, or interruption resulting from the owner's oil and gas operation. This includes supplies of water for domestic, agricultural, industrial, or other legitimate use from an underground or surface source.

### **Where can I get more information on Marcellus and Utica Shale drilling?**

- **Ohio Department of Natural Resources**, Division of Mineral Resources Management, Oil and Gas website: [www.ohiodnr.com/mineral/oil/tabid/10371/default.aspx](http://www.ohiodnr.com/mineral/oil/tabid/10371/default.aspx).
- **Ohio Environmental Protection Agency**, Shale gas drilling website: [www.epa.state.oh.us/dsw/pretreatment/marcellus\\_shale/index.aspx](http://www.epa.state.oh.us/dsw/pretreatment/marcellus_shale/index.aspx).

### **Who should I contact with more questions?**

Ohio Department of Natural Resources  
Division of Mineral Resources Management  
2045 Morse Rd.  
Building H-3  
Columbus, OH 43229-6693  
(614) 265-6633  
Email questions to: [minerals@dnr.state.oh.us](mailto:minerals@dnr.state.oh.us)



<http://www.ohiodnr.com/mineral/oil/tabid/10371/Default.aspx>

Ohio EPA

Division of Drinking and Ground Waters

P.O. Box 1049

Columbus, OH 43216-1049

(614) 644-2752

Email questions to : [ddagw@epa.state.oh.us](mailto:ddagw@epa.state.oh.us)

<http://www.epa.state.oh.us/Default.aspx?alias=www.epa.state.oh.us/ddagw>

Ohio Department of Health

Bureau of Environmental Health

246 N. High St.

Columbus, Ohio 43215

Email questions to: [BEH@odh.ohio.gov](mailto:BEH@odh.ohio.gov)

<http://www.odh.ohio.gov/odhPrograms/eh/water/water1.aspx>

Directory of Local Health District in Ohio:

<http://www.odh.ohio.gov/localHealthDistricts/lhdmain.aspx>

## Rebecca Fugitt

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**From:** Dusten Gurney  
**Sent:** Friday, October 28, 2011 2:59 PM  
**To:** Rebecca Fugitt  
**Subject:** FW: Meeting Request - Marcellus Roundtable

Not sure if you are in on this one

Dusty  
614-644-8020  
[dusten.gurney@odh.ohio.gov](mailto:dusten.gurney@odh.ohio.gov)

**From:** ABarnes@richlandhealth.org [mailto:ABarnes@richlandhealth.org]  
**Sent:** Friday, October 28, 2011 2:57 PM  
**To:** sanitarians@auglaizehealth.org; aporter1@odh.ohio.gov; BFaulk@richlandhealth.org; BMutti@richlandhealth.org; BConrad@richlandhealth.org; bmenchhofer@vanwertcountyhealth.org; dschultz@co.wyandot.oh.us; DRandall@richlandhealth.org; GTedrow@richlandhealth.org; jmenchhofer@vanwertcountyhealth.org; JFrazier@richlandhealth.org; bings.95@gmail.com; JHarbeck@richlandhealth.org; kmh1310@sbcglobal.net; Laura Wallrabenstein; maryann.miller@epa.state.oh.us; meheyduk@eriecohealthohio.org; mwork@richlandhealth.org; madams@delawarehealth.org; MSuits@richlandhealth.org; Nichole Rumschlag; RBowers@richlandhealth.org; sjjozwiak@co.hancock.oh.us; Sosborn@richlandhealth.org; WEngelbach@richlandhealth.org; emilycbain@gmail.com; njbaker@wcnet.org; bbencik@odh.ohio.gov; bertzachariah86@aol.com; Jared Boger; mbowen@sanduskycohd.org; bburkett@hullinc.com; sp111753@aol.com; echerry@huroncohealth.com; rclinger@defiance-county.com; dlcox@franklincountyohio.gov; Kim Cupp; mdennis@sanduskycohd.org; coachjoe@columbus.rr.com; fischerd@meijer.com; jfridrich@knoxhealth.com; tkgerold@sbcglobal.net; Dusten Gurney; daveh@bgsu.edu; Oscar Hernandez; shetrick@norweco.com; thillier@knoxhealth.com; Adam Howard; jackjump@huroncohealth.com; mkerik@hotmail.com; mkimmel@mccchd.org; tkoch@ecghd.org; carlkoebel@Cros.net; jpkono@wcnet.org; ckujawa17@gmail.com; slentz@knoxhealth.com; bmcadden@huroncohealth.com; cmiller@mccchd.org; murphy@findlay.edu; dbpoiry@gmail.com@richlandcountyoh.us; cniese@cfindlayohio.com; dpierson@bright.net; Tyler Pigman; rprofit@arden.com; marcia.dreiseidel@health.co.union.oh.us; lralston@huroncohealth.com; pmrauscher@gmail.com; alekat@wcnet.org; doug@delawarehealth.org; Brandi Schrader; marvnann@bright.net; Katy Serr; silverma@bgsu.edu; j.smith@shelbyohio.org; jstrong@delawarehealth.org; Kent Topp; vasko@co.lucas.oh.us; fran@delawarehealth.org; avoltz@huroncohealth.com; pat.weimken@odh.ohio.gov; Ted Wuebker; rzerkle@ottawahealth.org; Stephanie Zmuda  
**Subject:** Fw: Meeting Request - Marcellus Roundtable

Just an FYI, we will be discussing this at our next BOD meeting on 11-17-11 so if you have any input you would like me to add, let me know.

Sincerely,

Andrea S. Barnes  
Registered Sanitarian  
Mansfield-Ontario-Richland County Health Department  
555 Lexington Avenue  
Mansfield, Ohio 44907  
Phone (419)774-4535  
Fax (419) 774-0845  
[www.richlandhealth.org](http://www.richlandhealth.org)

----- Forwarded by Andrea Barnes/ricland on 10/28/2011 02:56 PM -----

"Bob Hasenyager" <bhasenyager@schd.org>

10/28/2011 02:42 PM

To "Smith, Mary Helen" <MHSmith@mahoninghealth.org>, "Jacobs, Luke K." <lkjacobs@columbus.gov>, "Zach Holzapfel" <zach.holzapfel@hickspartners.com>  
cc <ABarnes@richlandhealth.org>, <apierce@phdmc.org>, <bking@norwoodhealth.org>, <ethompson@hillsonnut.com>, "Gerry Tipton" <gtipton@miamicountyhealth.net>, "Jennifer Wentzel" <jwentzel@phdmc.org>, <kriley7@roadrunner.com>, "Lustgarten, Zachary M." <ZMLustgarten@columbus.gov>, "Stephan Ruckman" <sruckman@delawarehealth.org>, <vjohnsonoeha@gmail.com>  
Subject RE: RE: Meeting Request - Marcellus Roundtable

Just thought I would add this additional information. The wells, once completed will also be regulated as air pollution source:

From and air perspective the OEPA has determined only the permanent portion of the Marcellus shell gas production wells will require permits. The permanent equipment is the equipment that remains for the collection, conditioning, compression and distribution of the natural gas into the pipeline. The exploration and development portion (the drilling apparatus) is considered by OEPA to be a temporary source exempt from OEPA permits to install and operate.

OAC Rule 3745-31-01 (TTTTT) "Temporary source" means any new source of air contaminants or modification of an air contaminant source that is subject to a written declaration by the operator to the director that the air contaminant source will cease operation, be relocated, or obtain a new permanent permit-to-install within two years of the draft of declaration.

These development of these wells can have a significant release of air pollutants, particularly fugitive particulate emissions, organic compounds and products of combustion (NO<sub>x</sub>, CO, SO<sub>2</sub> and CO<sub>2</sub>) from support engines on site. For more information please see the following. <http://epa.ohio.gov/shale.aspx>

**Robert S. Hasenyager, R.S., M.S.**

Director of Environmental Health  
Summit County Public Health  
1100 Graham Road Circle  
Stow, OH 44224

Office: 330-375-2405

Cell: 330-313-4950

Fax: 330-375-2648

Office Location: 177 S. Broadway, 4th Floor, Akron, Ohio

**From:** Smith, Mary Helen [mailto:MHSmith@mahoninghealth.org]

**Sent:** Thursday, October 27, 2011 1:25 PM

**To:** Jacobs, Luke K.; 'Zach Holzapfel'

**Cc:** ABarnes@richlandhealth.org; apierce@phdmc.org; 'bking@norwoodhealth.org'; Bob Hasenyager; Emily Thompson (ethompson@hillsonnut.com); Gerry Tipton ; Jennifer Wentzel ; Keith Riley (kriley7@roadrunner.com); Lustgarten, Zachary M.; Stephan Ruckman; Vicki Johnson (vjohnsonoeha@gmail.com)

**Subject:** RE: RE: Meeting Request - Marcellus Roundtable

The Mahoning County BOH has taken the following position:

Environmental public health impact is limited, at this point in time, to the following:

- Recommendations for baseline water testing, if possible three times for a statistical analysis
- Light pollution, and
- Noise pollution

We recommend that the property negotiate some control measure for light and noise to minimize the impact since the drilling takes so long.

Here is a link to our recommended parameters <http://www.cdc.gov/mmwr/pdf/rr/rr6004.pdf>

The other environmental impacts are regulated, as follows, and therefore currently not under the purview of a LHD:

- ODNR - Permit, drilling, on-site lagoons storage, frac water management and with associated spills
- OEPA – off site frac water disposal (because not it is a waste regulated by either the surface water division or the solid waste division)

This is the line we have held on all our media interviews

Mary Helen Smith, MPH, CPH, RS, REHS  
Director of Environmental Health  
Mahoning County District Board of Health  
50 Westchester Drive  
Youngstown, Ohio 44515  
(330) 270 - 2855 ext 134  
[mhsmith@mahoninghealth.org](mailto:mhsmith@mahoninghealth.org)  
[www.mahoninghealth.org](http://www.mahoninghealth.org)



**From:** Jacobs, Luke K. [mailto:lkjacobs@columbus.gov]

**Sent:** Thursday, October 27, 2011 1:11 PM

**To:** 'Zach Holzapfel'

**Cc:** ABarnes@richlandhealth.org; apierce@phdmc.org; 'bking@norwoodhealth.org'; Bob Hasenyager (President); Emily Thompson (ethompson@hillsonnut.com); Gerry Tipton ; Jennifer Wentzel ; Keith Riley (kriley7@roadrunner.com); Lustgarten, Zachary M.; Smith, Mary Helen; Stephan Ruckman; Vicki Johnson (vjohnsonoeha@gmail.com)

**Subject:** RE: RE: Meeting Request - Marcellus Roundtable

Yes. She gave me information from what they are doing from a policy standpoint. I laid out what I thought were the potential health implications (water, air). I plan on sharing the information at the next Board meeting. I am just a little unsure about how local health a) currently fits into the model and b) how we can get involved. I would welcome input.

Luke

Luke K. Jacobs  
Section Chief, Disease Prevention

Division of Environmental Health  
Columbus Public Health  
240 Parsons Ave  
Columbus, OH 43215  
(614) 645-0266  
Fax (614) 645-7155  
[lkjacobs@columbus.gov](mailto:lkjacobs@columbus.gov)  
[www.publichealth.columbus.com](http://www.publichealth.columbus.com)



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**From:** Zach Holzapfel [<mailto:zach.holzapfel@hickspartners.com>]  
**Sent:** Thursday, October 27, 2011 12:18 PM  
**To:** Jacobs, Luke K.  
**Subject:** FW: RE: Meeting Request - Marcellus Roundtable

How did this meeting turnout??? Any materials

---

**From:** Bellora, Kimberly S [<mailto:ksb33@pitt.edu>]  
**Sent:** Monday, October 24, 2011 2:30 PM  
**To:** Jacobs, Luke K.  
**Cc:** Zach Holzapfel; Ty Gourley  
**Subject:** RE:RE: Meeting Request - Marcellus Roundtable

Hi Luke,

Wednesday at 1:30 works for me. Ty and I have to split up to cover a few different meetings, so it will just be me meeting with you.

Let me know if anything else changes. If not, I will see you Wed. afternoon.

Thanks,  
Kim

Sent from my Verizon Wireless 4GLTE smartphone.

From : Jacobs, Luke K.  
Subject : RE: Meeting Request - Marcellus Roundtable

Kim

Had a conflict arise over the weekend for Thursday. Looks like Wednesday the 26<sup>th</sup> at 1:30 PM would work.

Luke

Luke K. Jacobs  
Section Chief, Disease Prevention  
Division of Environmental Health  
Columbus Public Health  
240 Parsons Ave  
Columbus, OH 43215  
(614) 645-0266  
Fax (614) 645-7155  
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**From:** Bellora, Kimberly S [<mailto:ksb33@pitt.edu>]  
**Sent:** Monday, October 24, 2011 8:36 AM  
**To:** Jacobs, Luke K.  
**Subject:** RE: Meeting Request - Marcellus Roundtable

Hi Luke,

9am on Thursday works for us. We will plan to meet you at your office on Parsons Ave.

Please let me know if anything comes up or if you have any questions prior to the meeting. You can reach me via email or my cell phone - [724-747-6688](tel:724-747-6688).

Thanks,  
Kim

**From:** Jacobs, Luke K. [[lkjacobs@columbus.gov](mailto:lkjacobs@columbus.gov)]  
**Sent:** Saturday, October 22, 2011 7:52 PM  
**To:** Bellora, Kimberly S

**Cc:** 'ty@gourleyconsulting.com'; 'zach.holzapfel@hickspartners.com'

**Subject:** Re: Meeting Request - Marcellus Roundtable  
Morning of the 27th works best for me. Say around 9?

Luke

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**From:** Bellora, Kimberly S <ksb33@pitt.edu>

**To:** Jacobs, Luke K.

**Cc:** ty@gourleyconsulting.com <ty@gourleyconsulting.com>; Zach Holzapfel <zach.holzapfel@hickspartners.com>

**Sent:** Sat Oct 22 12:13:02 2011

**Subject:** RE: Meeting Request - Marcellus Roundtable  
Hi Luke,

Thanks for getting back to me.

We will be in Columbus next Wednesday and Thursday (26th and 27th). So far, it looks like we could meet with you at either 1:30pm on the 26th or anytime during the morning of the 27th.

Please let me know if there is a certain time that may work better for you.

Thanks,  
Kim

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**From:** Jacobs, Luke K. [lkjacobs@columbus.gov]

**Sent:** Friday, October 21, 2011 4:03 PM

**To:** Bellora, Kimberly S

**Cc:** ty@gourleyconsulting.com; Zach Holzapfel

**Subject:** RE: Meeting Request - Marcellus Roundtable  
Kimberly

Thank you for the information. It's interesting....we were discussing this issue at a workshop this morning. Would love to meet up. Can you give me an idea of the specific times and dates that you would want to meet?

Luke

Luke K. Jacobs  
Section Chief, Disease Prevention  
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**From:** Bellora, Kimberly S[mailto:ksb33@pitt.edu]  
**Sent:** Wednesday, October 19, 2011 10:15 PM  
**To:** Jacobs, Luke K.  
**Cc:** ty@gourleyconsulting.com  
**Subject:** Meeting Request - Marcellus Roundtable

Dear Mr. Jacobs,

My name is Kim Bellora, currently serving as Policy Strategist for the newly formed Marcellus Roundtable at the University of Pittsburgh Institute of Politics ([www.iop.pitt.edu](http://www.iop.pitt.edu)). The Roundtable is a 10 county southwestern Pennsylvania effort to build consensus around policy ideas for shale gas development in our region and state. It is cochaired by Jared Cohon, President of Carnegie Mellon University and Jim Roddey, former Allegheny County chief executive - and has 33 additional members from industry, environmental organizations, academia, foundations, landowners and county/state/federal elected officials. For your reference, I have attached a one-page summary of the Roundtable.

We are currently in the information gathering and benchmarking phase of our work, and I am wondering whether you might be willing to meet and discuss shale gas activities in Ohio? I believe that our Roundtable would greatly benefit from hearing your perspective as it relates to public health impacts that shale gas drilling may have. We will also be traveling to West Virginia, New York, Texas and Colorado to meet with cross-sector leaders in those states.

I apologize for the extremely late notice, but our team will be in Columbus on October 26 and 27. Might there be a time in those two days where we could, even just briefly, connect to gather your thoughts on where shale gas policy is headed in Ohio and what your thoughts are? If not this trip, perhaps we could set up another future time to meet.

Thanks for your consideration. I look forward to talking.

Cheers,  
Kim

Kim Bellora  
Policy Strategist  
University of Pittsburgh  
Institute of Politics  
[412-383-5417](tel:412-383-5417)



## Rebecca Fugitt

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**From:** Ted Wymyslo  
**Sent:** Sunday, September 25, 2011 9:51 PM  
**To:** Gene Phillips  
**Cc:** Will McHugh; Rebecca Fugitt  
**Subject:** RE: WV Dept. of Environmental Protection draft rule

With the anticipated increase in activity in Ohio, I think it would be reasonable for us to further explore the health implications of fracking by whatever means is available to us. Director Mustine will be taking lead at the state level, having left the position of Director of ODNR in order to focus on the fracking activities in Ohio. I'd be interested in discussing our available options ASAP, and we will want to of course work in concert with OEPA and ODNR.

Thanks,

Ted Wymyslo MD

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**From:** Gene Phillips  
**Sent:** Thursday, September 22, 2011 1:16 PM  
**To:** Ted Wymyslo  
**Cc:** Will McHugh; Rebecca Fugitt  
**Subject:** FW: WV Dept. of Environmental Protection draft rule

Director,

I wanted to share with you WV's draft rule on fracking and to let you know that Rebecca has reached out to state agency partners that worked on the fracking worksheets. They are interested and willing to get together and discuss the Health Impact Assessment (HIA) concept and how we might apply the framework to the shale drilling process in Ohio. If you are still interested in us taking this approach we will convene a meeting as soon as possible. I can tell you from my discussions at the ASTHO conference this week, there is a lot of interest in the HIA process being applied to energy projects by both ASTHO and CDC. If we engage in this process, it will open doors for future funding for HIA work.

I look forward to hearing your thoughts? Thanks!

Gene

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**From:** Kerry Wyss [<mailto:kwyss@astho.org>]  
**Sent:** Thursday, September 22, 2011 12:19 PM  
**To:** Gene Phillips  
**Cc:** Clifford Mitchell; Nancy Goff  
**Subject:** FW: WV Dept. of Environmental Protection draft rule

Hi Gene,

Thanks again for your active engagement at the SEHD meeting this week, and for facilitating the IT session. You, Cliff, and Thom have done a great job getting this workgroup off the ground and creating the survey to gather additional state

information. The session drew a lot more interest than anticipated, and you definitely have the support of John Sarisky at CDC. We look forward to continuing to work with you on EH data standards and systems.

Attached is a draft rule that Barb Taylor sent me from WV regarding fracking. This may be helpful to you and Dr. Wymyslo in thinking about your own state's policy. I believe that Maryland has also thought about this within the context of an HIA, so I am ccing Cliff for verification. If you would like us to set up a call with Aaron Wernham at PEW who has attempted an HIA on fracking, please let me know. We can also send you his contact info as he is aware that some states are interested.

Thanks again!

Kerry

**From:** Taylor, Barb S [<mailto:Barb.S.Taylor@wv.gov>]

**Sent:** Thursday, September 22, 2011 11:56 AM

**To:** Kerry Wyss

**Subject:** WV Dept. of Environmental Protection draft rule

Hi Kerry,

Thank you for all the hard work of you and your staff in regards to our SEHD meeting. I really value the time that it takes to get such an event organized. There was a lot of good discussion and, as always, I come back home with thoughts about what we could/should be doing or how we might improve. Please extend my appreciation to all.

Along that line, please find attached the draft rule currently out for comment regarding Marcellus shale drilling activities in WV. There is a comment period on the rule which is listed on the front of the document. Until our discussion yesterday about HIA's, I hadn't really thought about taking that approach to this, but it might be a way for us to provide input. Feel free to distribute this draft rule to those states that have an interest. Should they chose, they can direct comments to the WV DEP. It would be helpful if anyone does provide comments that they share those with the other states.

Let me know if I can provide anything further on this topic.

Thanks.

Barb Taylor