From: "B. Arrindell" <Director@DamascusCitizens.org>
Subject: Fwd: Part 360 Series Regulations, Solid Waste Management Facilities - COMMENT from DCS
Date: July 28, 2017 at 1:16:50 PM EDT
To: Jeff Zimmerman <zimmermanjj@verizon.net>

Begin forwarded message:
From: "B. Arrindell" <Director@DamascusCitizens.org>
Subject: **Part 360 Series Regulations, Solid Waste Management Facilities - COMMENT from DCS**
Date: July 21, 2017 at 4:25:39 PM EDT
To: SolidWasteRegulations@dec.ny.gov
Cc: Jeff Zimmerman <zimmermanjj@verizon.net>

July 21, 2017

Basil Seggos, Commissioner New York State Department of Environmental Conservation 625 Broadway Albany, NY 12233-6510

Attn: Part 360 Series Regulations, Solid Waste Management Facilities

Please also send copies to:

Catherine A. Dickert, Director, Division of Mineral Resources

David Vitale, Director, Division of Materials Management

Melissa Treers, P.E., Division of Materials Manage

Dear Commissioner Seggos,

1 - There should be an extension of this comment period - it is very short!

2 - DCS is a signer of the Earthworks, Riverkeeper and EnvironmentalAdvocates comments. As an addition to Section 4 of

those comments, DCS would like to add several points:

a- **THE BRINE ADDS TO THE ROAD DUST!** When high TDS (total dissolved solids) E & P waste liquids are used for dust control on dirt roads, there is actually the creation of additional air borne fine particles when the liquid in the waste evaporates, which it does quick;ly. Then the environment, including all who live along or travel these roads, are breathing not just fine clay particles from the traffic crushed road surface - most dirt roads have a high clay content, but also highly bio-active ultra fine particles of heavy metals, salts, radioactive materials, as well as vaporized hydrocarbons and drilling compounds that are potentially neurotoxins, cancerous or endocrine disruptors. (see the spreadsheets of drilling, fracking and released materials(from the underground layers) here: http://endocrinedisruption.org/site-search?id=160&asId=as0&search=spreadsheet) We have seen the sicknesses caused by oil and gas field waste euphemistically called 'brine,' being disposed of on dirt roads.

b-These wastes have no place being disposed of in rural communities just because they have dirt roads. This is an environmental IN-justice and public health crime.

c- Also In DCS' advocacy work we have heard of a number of instances where landfills have legacy french drains that were installed when the facilities were smaller and essentially 'forgotten' about. These drainage arrangements carry leachate to the nearest stream, water body or forested area lower in elevation than the landfill it drains. The possibility of these drains existence must be check on and some entity be responsible for signing off on the security of the lining of the facility.

Therefore we agree that this practice should be ended and but also we urge that remediation begin of communities where it has been done.

3 - the danger to workers must be recognized. Landfill acceptance of gas and oil field wastes, are allowed to be 80% liquid, and is highly salty. There is much more likely to be an elevated radioactive

material as these are from Marcellus drilling mostly, with radium or uranium solublized component (see University of Buffalo piece on this attached below AND paper from 2016 on elevated radioactivity in drilling wastes) as well as emitted radon gas will be in the material being handled. The process of placing the materials in the landfill and 'diluting' the drilling wastes with 'regular' landfill garbage (as is often done) is done by workers.

Therefore we agree that this practice of accepting gas and oil field wastes in landfills should be ended and but also we urge that the workers should be immediately and ongoing be monitored for radiation exposure and educated about the dangers of the materials they are handling.

4 - We have attached the comments we submitted for the Part 380 revisions' recent comment period and associated "Radon in Natural Gas in New York City' as both of these have direct relevance to the Solid Waste Regulations and their revisions since there is an allowed significant protion of liquids in what is being defined as 'solid waste', **SEE points 5 and 6 next.**
Plus pasted below are links to a report that takes a look at solid waste from horizontal gas wells. The study found that some well waste from the Marcellus shale in Pennsylvania contained radioactive material not previously reported, with the potential for leaching from landfills into the environment.

5 - **In the proposed revisions to 6 NYCRR Part 360, DEC has confused material that should be regulated as TENORM with NORM material**, leading to a less stringent regulatory structure. As Damascus Citizens for Sustainability (DCS) pointed out in its July 5, 2017 comments on proposed revisions to Part 380 (copy attached) every aspect of DEC's proposed regulations for both Part 360 and 380 is dealing with TENORM material rather than NORM. Under the EPA definitions of NORM and TENORM, as soon as the radioactive material is disturbed by human activity, that material is classified as TENORM and accordingly should be regulated as TENORM. The proposed revisions to the Part 360 regulations call for rejection of waste loads with TENORM levels above a trigger level.

6 - However, DEC proposes using 25 pCi/g as a trigger level for further investigation of a waste load rather than an outright and immediate rejection of materials containing 25 pCi/g or more radioactivity level. However, we see at least two problems. First and foremost, DEC has plucked the 25 pCi/g level from thin air and provided no justification for this, or any other, radioactivity level. Second, this approach overlooks that EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), the Nuclear Regulatory Commission (NRC), and the World Health Organization have set recommended action levels for indoor radon ranging from 4.0 pCi/g to 0.4 pCi/g while preserving the overriding principles of ALARA ("as low as reasonably achievable"). It is appropriate to rely on radon as the driving radionuclide as it predominates as the radioactive substance most affecting human health. **DEC did not consider any of this information in the revised draft generic environmental impact statement for the Part 360 regulations. Because the trigger level for acceptance or rejection of waste loads with radioactive materials is a critical component of the proposed Part 360 regulation, at a minimum DEC must prepare a supplement to the GEIS.**

We appreciate NYSDEC's role in prohibiting shale gas production in New York, a decision based on concerns for health and the environment. It is not too late to bring the same level of concern and caution to bear on the management of oil and gas waste. We look forward to working with the Department to this end.
Thank you for your time and attention.

Sincerely,

B. Arrindell
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University_of_Buffalo_Uranium_soluble_in_frack_fluid_Oct2010
'Fracking' Mobilizes Uranium in Marcellus Shale, UB Research Finds - UB NewsCenter Page 1 of 3

NEWS RELEASE

'Fracking' Mobilizes Uranium in Marcellus Shale, UB Research Finds

Release Date: October 25, 2010

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BUFFALO, N.Y. -- Scientific and political disputes over drilling Marcellus shale for natural gas have focused primarily on the environmental effects of pumping millions of gallons of water and chemicals deep underground to blast through rocks to release the natural gas.

But University at Buffalo researchers have now found that that process -- called hydraulic fracturing or "fracking"-- also causes uranium that is naturally trapped inside Marcellus shale to be released, raising additional environmental concerns.

The research will be presented at the annual meeting of the Geological Society of America in Denver on Nov. 2.

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UB geologist Tracy Bank and colleagues found that uranium and hydrocarbons in Marcellus shale are not just physically, but also chemically, bound. Background image from wikimedia user lvklock.

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Marcellus shale is a massive rock formation that stretches from New York through Pennsylvania, Ohio and West Virginia, and which is often described as the nation's largest source of natural gas.

"Marcellus shale naturally traps metals such as uranium and at levels higher than usually found naturally, but lower than manmade contamination levels," says Tracy Bank, PhD, assistant professor of geology in UB's College of Arts and Sciences and lead researcher. "My question was, if they start drilling and pumping millions of gallons

of water into these underground rocks, will that force the uranium into the soluble phase and mobilize it? Will uranium then show up in groundwater?"

To find out, Bank and her colleagues at UB scanned the surfaces of Marcellus shale samples from Western New York and Pennsylvania. Using sensitive chemical instruments, they created a chemical map of the surfaces to determine the precise location in the shale of the hydrocarbons, the organic compounds containing natural gas.

"We found that the uranium and the hydrocarbons are in the same physical space," says Bank. "We found that they are not just physically -- but also chemically -- bound.

"That led me to believe that uranium in solution could be more of an issue because the process of drilling to extract the hydrocarbons could start mobilizing the metals as well, forcing them into the soluble phase and causing them to move around."

When Bank and her colleagues reacted samples in the lab with surrogate drilling fluids, they found that the uranium was indeed, being solubilized.

In addition, she says, when the millions of gallons of water used in hydraulic fracturing come back to the surface, it could contain uranium contaminants, potentially polluting streams and other ecosystems and generating hazardous waste.

The research required the use of very sophisticated methods of analysis, including one called Time-of-Flight Secondary Ion Mass Spectrometry, or ToF-SIMS, in the laboratory of Joseph A. Gardella Jr., Larkin Professor of Chemistry at UB.

The UB research is the first to map samples using this technique, which identified the precise location of the uranium.

"Even though at these levels, uranium is not a radioactive risk, it is still a toxic, deadly metal," Bank concludes. "We need a fundamental understanding of how uranium exists in shale. The more we understand about how it exists, the more we can better predict how it will react to 'fracking.'"

Bank conducted the experiments with UB Department of Geology graduate students Thomas Malizia and Lauren Fortson, and Lisa Andresky, an undergraduate student from Slippery Rock University in Pennsylvania. Andresky worked in Bank's lab during the summer while on a National Science Foundation-funded Research

http://www.buffalo.edu/news/fast-execute.cgi/article-page.html?article=118850009 10/25/2011

'Fracking' Mobilizes Uranium in Marcellus Shale, UB Research Finds - UB NewsCenter Page 3 of 3

Experience for Undergraduates in UB's Ecosystem Restoration through Interdisciplinary Exchange (ERIE) program.

The University at Buffalo is a premier research-intensive public university, a flagship institution in the State University of New York system and its largest and most comprehensive campus. UB's more than 28,000 students pursue their academic interests through more than 300 undergraduate, graduate and professional degree programs. Founded in 1846, the University at Buffalo is a member of the Association of American Universities.

Report finds additional radioactive materials in gas-well drill cuttings

Date:

December 21, 2016

Source:

American Chemical

Society https://www.sciencedaily.com/releases/2016/12/161221125502.htm

Summary:
Hydraulic fracturing has boosted US energy production while coming under scrutiny for its potential environmental impacts, mostly related to the wastewater the method generates. Now, a report takes a look at solid waste from horizontal gas wells. The study found that some well waste from the Marcellus shale in Pennsylvania contained radioactive material not previously reported, with the potential for leaching from landfills into the environment.

Solid waste from horizontal gas wells contains radioactive material that ends up in landfills.
Credit: American Chemical Society

Hydraulic fracturing has boosted U.S. energy production while coming under scrutiny for its potential environmental impacts, mostly related to the wastewater the method generates. Now, a report in the ACS journal *Environmental Science & Technology Letters*takes a look at solid waste from horizontal gas wells. The study found that some well waste from the Marcellus shale in Pennsylvania contained radioactive material not previously reported, with the potential for leaching from landfills into the environment.

Drilling horizontal wells for hydraulic fracturing operations results in a large amount of gooey solid waste, or drill cuttings. In 2011, natural gas

exploration and extraction in the Marcellus Shale formation produced an estimated 2.37 million tons of cuttings in Pennsylvania alone with almost all of it ending up in landfills, according to a review published in Environmental Practice. A few studies have found naturally occurring radioactive materials in the solid waste, but the research only focused on several long-lived radioactive isotopes including uranium-238 and radium-226. Andrew W. Nelson and colleagues wanted to investigate whether other radioactive isotopes might be in drill cuttings and whether they could impact the environment.

The researchers devised a method to test the drill cuttings from horizontal wells in the Marcellus Shale in Pennsylvania. In addition to uranium-238 and radium-226, the researchers report the samples contained elevated levels of the environmentally persistent radioactive isotopes uranium-234, thorium-230, lead-210 and polonium-210. A simulation of leaching over a range of acidity levels suggested that at low pH, uranium isotopes readily leached from drill cuttings, which raises questions as to whether uranium will seep into the environment from a landfill. Other isotopes appeared less leachable under the conditions tested. Leaching for all radionuclides declined as pH increased. The researchers say that because they were only able to obtain three samples from one well, the findings aren't generalizable. But, they add, their study demonstrates that further testing is needed to understand what is in solid waste from the country's proliferating horizontal wells and whether it might pose any environmental risks.

Story Source:

Materials provided by **American Chemical Society**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Eric S. Eitrheim, Dustin May, Tori Z. Forbes, Andrew W. Nelson. **Disequilibrium of Naturally Occurring Radioactive Materials (NORM) in Drill Cuttings from a Horizontal Drilling Operation**. *Environmental Science & Technology Letters*, 2016; 3 (12): 425 DOI: 10.1021/acs.estlett.6b00439

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this paper just came out - see below for press release - https://www.sciencedaily.com/releases/2017/07/170712110605.htm

1. William D. Burgos, Luis Castillo-Meza, Travis L. Tasker, Thomas J. Geeza, Patrick J. Drohan, Xiaofeng Liu, Joshua D. Landis, Jens Blotevogel, Molly McLaughlin, Thomas Borch, Nathaniel R. Warner. **Watershed-Scale Impacts from Surface Water Disposal of Oil and Gas Wastewater in Western Pennsylvania**. *Environmental Science & Technology*, 2017; DOI: 10.1021/acs.est.7b01696

Just as Prof.Volz and then Jackson found elevated plumes of dumped materials in the water below the Josephine treatment plant on Blacklick Creek, these researchers took core samples of the bottom sediments in a lake behind a dam. There were layers found with high concentrations of drilling wastes.

Release of treated wastewater from hydraulic fracturing contaminates lake

Date:

July 12, 2017

Source:

American Chemical Society

Summary:

Hydraulic fracturing has enabled a domestic oil and gas boom in the US,

but its rapid growth has raised questions about what to do with the billions of gallons of wastewater that result. Researchers now report that treating the wastewater and releasing it into surface waters has led to the contamination of a Pennsylvania watershed with radioactive material and endocrine-disrupting chemicals.

Hydraulic fracturing has enabled a domestic oil and gas boom in the U.S., but its rapid growth has raised questions about what to do with the billions of gallons of wastewater that result. Researchers now report that treating the wastewater and releasing it into surface waters has led to the contamination of a Pennsylvania watershed with radioactive material and endocrine-disrupting chemicals. The study appears in ACS' journal *Environmental Science & Technology*.

In 2015, the unconventional oil and gas extraction method known as hydraulic fracturing, or "fracking," accounted for more than one-half of oil production and two-thirds of gas production in America, according to the U.S. Energy Information Administration. The method's market share is likely to increase even further. Although the technique has resulted in a shift away from coal, which could reduce greenhouse gas emissions, it produces large amounts of wastewater containing radioactive material, salts, metals, endocrine-disrupting chemicals and polycyclic aromatic hydrocarbons that could pose risks to the environment and human health. A Pennsylvania report estimates that in 2015, 10,000 unconventional oil and gas wells in the Marcellus Shale produced 1.7 billion gallons of wastewater. The facilities that collect the water provide only limited treatment before releasing it into surface waters. Bill Burgos and colleagues at Penn State, Colorado State and Dartmouth wanted to see what impact this strategy of treating and releasing fracking wastewater

might be having.

The researchers sampled sediments and porewaters from a lake downstream from two facilities that treat fracking wastewater in Pennsylvania. Their analysis detected that peak concentrations of radium, alkaline earth metals, salts and organic chemicals all occurred in the same sediment layer. The two major classes of organic contaminants included nonylphenol ethoxylates, which are endocrine-disrupting chemicals, and polycyclic aromatic hydrocarbons, which are carcinogens. The highest concentrations coincided with sediment layers deposited five to 10 years ago during a peak period of fracking wastewater disposal. Elevated levels of radium were also found as far as 12 miles downstream of the treatment plants. The researchers say that the potential risks associated with this contamination are unknown, but they suggest tighter regulations of wastewater disposal could help protect the environment and human health.