

2. **NATURAL GAS: Fracking solids should be treated as hazwaste -- study** (10/29/2010)

Jenny Mandel, E&E reporter

All wastes from hydraulic fracturing for natural gas -- both liquids for which activists have urged greater regulatory attention and solids that have received less attention -- should be considered potentially hazardous material, according to new research that suggests such wastes could be laced with toxic metals including uranium.

Tracy Bank, a geochemist and assistant professor in geology at the State University of New York, Buffalo, said research to be presented next week at the annual meeting of the Geological Society of America shows the need to take precautions in disposing of both kinds of fracking waste.

Bank's research examines the presence of uranium and other elements in the Marcellus Shale formation running through the Appalachian Basin. Debate on the use of hydraulic fracturing in that and other shale reserves has been heated, focusing largely on the chemical mix pumped into the ground by drillers and on the disposal of the liquid that returns to the surface.

Solid waste created through fracking, though much smaller in volume than the liquids, appears to be less studied and less regulated, Bank said.

"To my knowledge, no one is testing for the metals," Bank said in a telephone interview. "I get a lot of calls saying that the radiation content is low and therefore it's not considered [hazardous] waste. ... These metals are potentially dangerous, and in my opinion, everything that comes out of the holes, because there's the potential to be enriched with toxic metals, should be considered a toxic waste."

The concern is not radioactivity, Bank said, because uranium is very weakly radioactive. Rather, she said, it and other metals can be toxic if ingested or if allowed to leach through landfill protections into the ground.

Bank's work examined how uranium and other metals present in the shale react through the fracturing process. Using high-tech tools, she and colleagues have looked at where uranium is located in shale in relation to the hydrocarbon resources that are being extracted.

While the imaging tools that they use don't distinguish between natural gas and other hydrocarbons, she said, the results show that uranium and hydrocarbons are physically and chemically bound together. That means that when the shale is loosened in hydraulic fracturing, the uranium is likely mobilized, as well, she said.

Both liquid and solid waste from the process may include toxic metals, Bank said, but the handling and disposition of the fluids is already receiving a lot of attention. The solids, she said, seem to get less scrutiny and have less rigorous handling guidelines.

Jamie Legenos, an information specialist with Pennsylvania's Department of Environmental Protection confirmed that fracking liquids are tested carefully, but solids are tested only for radioactivity before being cleared for normal disposal.

"Chemicals and, if present, radionuclides are extracted during the fracking wastewater treatment process, which creates a cake of waste, or sludge, after passing through a filter press," she wrote in an e-mail describing the liquid treatment process used in disposal. "All landfills are equipped with a radioactive monitor and alarm that ensure a very low level of radioactivity. The waste cakes are disposed of at the landfill. If the alarm would sound off, our Bureau of Radiation Protection would investigate the source and, if necessary, take remediation actions."

A **form** that Pennsylvania requires from shale producers for liquid disposal includes a long list of materials, including uranium, that must be reported.

Legenos said the process for disposing of solids is simpler. "As for disposing cuttings from drilling operations, this waste has very little radioactivity," she wrote. "Cuttings have about as much radioactive material as granite

countertops used in everyday homes. Again, these cuttings are disposed of at a landfill site equipped with monitors to ensure safety."

The researcher said the chemical mapping of Marcellus shale samples turned up virtually every single element on the periodic table. "It's a lot of information," she said, "and it's going to take a long time to process through it."

Bank said her work to date has focused on uranium because she has a background in uranium remediation, but she plans to look at the other elements, as well.

Not a groundwater problem

An early press release about Bank's research raised questions about uranium showing up in groundwater, but the scientist said she had not approved that line on the alert.

"It's not an issue about drinking water. That subtitle shouldn't be there," she said. "This is not a drinking water problem."

Bank said her concerns were, rather, related to putting hazardous materials into disposal streams not designed for them. "We don't want to put hazardous materials in the landfill," she said.

Chris Tucker, a spokesman for Energy in Depth, a group that communicates about hydraulic fracturing on behalf of small and independent oil and gas producers, said he has heard of no cases of uranium in fracking waste.

Tucker said that upon reading a press release about Bank's work, he called several Pennsylvania gas producers to ask about uranium. None of the four or five producers he spoke with had ever encountered even "an atom" of uranium, he said. He was unsure of how they had tested liquid and solid waste for it.

Tucker said solid drilling waste comprises a range of rock types such as sandstone, limestone, shale and granite -- basically a large pile of rocks and dirt. The amount, he said, depends on how deep the drilling hole is and how much horizontal drilling takes place. "If you drill a well over 7,000 feet deep, you can imagine that there's going to be plenty of rock coming back up."

To do an accurate study of fracking waste, Tucker noted, scientists should look at rock brought up from underground. Contacted by e-mail, Bank did not immediately respond to a question about the source of her lab's samples.

Tucker also said that states closely regulate liquid fracking waste. "To me, that's the most compelling point here. We have 2,300 wells in the Marcellus" in Pennsylvania, he said, with "zero evidence that any amount of uranium has come from any of them."

But Bank maintains that a lack of evidence is not sufficient to skip closer regulation.

She also insisted she's not taking a sides in the debate over the safety of hydraulic fracturing.

"I'm a very middle-ground researcher, I don't have an opinion on either end of that fracturing [debate]" Bank said. "I just do want to say that whatever comes out of that hole should be treated as an unknown ... because we don't have enough studies to prove otherwise."

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