

**EPA Science Advisory Board
Hydraulic Fracturing Research Advisory Panel
Public Teleconference February 1, 2016
Oral Statement of Yuri Gorby**

From: Yuri Gorby
Sent: Monday, February 01, 2016 10:39 AM
To: Hanlon, Edward <Hanlon.Edward@epa.gov>
Subject: Re: February 1st.

Edward,

Here is a copy of the statement I plan to deliver during the teleconference today.

Thank you for this opportunity.
Yuri

My name is Dr. Yuri Gorby and I am thankful for this opportunity to submit a short statement to complement the draft recommendations from the Scientific Advisory Board regarding the EPA Assessment Report. I must start by saying that all comments and opinions presented here are my own and don't necessarily represent the opinions or positions of Rennsealaer Polytechnic Institute, its administration, or board of trustees.

Currently I am an associate professor and the Howard N. Blitman Chair for Environmental Engineering at RPI in Troy, NY. But for more than 15 years I was a research scientist for the US Department of Energy National Laboratory located on the Hanford Nuclear Reservation in Richland, Washington. There I investigated the mechanisms and potential applications for bacteria that can "breathe" uranium as a form of anaerobic respiration. This process of bacterial uranium reduction, which I previously discovered as a post doctoral fellow at the US Geological survey in Reston Virginia, has important implications for the fate and transport of uranium in surface and groundwater. These bacteria are now thought to have catalyzed the precipitation and sequestration of vast amounts of uranium present in many uranium ore deposits and in deep shale formations that are now the target of shale gas recovery by horizontal drilling and high volume hydraulic fracturing.

I applaud the efforts, insights, and guidance of the Advisory Panel and feel that their critical evaluation of the EPA process has illuminated a number of import deficiencies. I offer my experience the following additional suggestions for the Panel's consideration and hope that they recommend the EPA to explicitly address each one.

On Page 6, line 2, the SAB recommends that the EPA include an *"overview discussion of federal and state standards and regulations that pertain to hydraulic fracturing activities for oil and gas development"*. This discussion should also include a full assessment of the limitations imposed upon the EPA by the exemptions provided by the 2005 energy policy act. The EPA should describe how removal of these exemptions—which include Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Resource Conservation and Recovery Act (RCRA), Safe Drinking Water Act, the National Environmental Policy Act (NEPA), and the Emergency Planning and Community Right to Know Act—would allow the Agency to better perform their its duties to protect the environment and citizens.

Beginning on Page 11, Line 34, the Science Advisory Board states that a *"A key aspect of reducing impacts from hydraulic fracturing operations to drinking water supplies is responsible well construction and operation, and isolation of potable water from hydraulic fracturing operations"*.

The report should also provide a complete description of the drilling process, including drilling methods (air, rotary), chemicals used in the drilling process, and procedures and chemicals used to seal (or squeeze) the gap that forms between the geological formations and the OUTSIDE of the casing.

For example, Air drilling in unsaturated zones and through aquifers typically includes the use of "soaps" that are used to help decrease permeability of porous subsurface sediments and reduce

corrosion of the outside of the well casing. Many of these chemicals used in soaps and corrosion inhibitors are known endocrine disrupting compounds, neurotoxins, and carcinogens. The report should include a full list of chemicals used during the drilling process, their potential and intentional injection of these chemicals into aquifers during drilling, and associated hazards and risk for contamination of groundwater resources.

It is commendable that increased attention is given to improving well casing designs and integrity. However, the Assessment Report fails to address migration of gasses and liquids along the outside of the casing. Peer reviewed publications by Drs. Tony Ingraffea, Robert Jackson and others clearly demonstrate that communication of gasses and fluids from deep geological formations with upper geological strata and groundwater does occur, even with intact multi-layer casings.

As a scientist at a DOE National Lab, I became acutely aware of established laboratory and environmental safety regulations and procedures for producing, handling, and disposing of a variety of hazardous chemicals and radioactive materials. Of all of the waste streams present at the National Lab Complex, those identified as "Mixed Low-Level Radioactive Materials" were the most problematic. Treatment strategies that effectively degrade or separate hazardous chemicals from radiological components are expensive, inefficient, and largely impractical. Deviation from established protocols, such as unlabeled vials in the lab or improper handling and disposal of even gram quantities these material are serious offenses and can result in disciplinary actions, including loss of job and lab closure.

Deep shale formations contain sufficient radiological components that, when combined with hazardous chemicals using during drilling, to classify them as Mixed Low-Level Radioactive Wastes and should be treated as such to protect workers, the public, and freshwater resources. Currently, hundreds of thousands of tons of mixed radioactive wastes and now being extracted, transported, and disposed of in landfills designed for municipal waste. In my home state of West Virginia, I met drivers who were fully unaware of the health hazards and composition of the materials they were hauling to landfills for disposal. In my professional opinion, these drivers are completely unqualified to transport mixed low level radioactive materials and pose a serious environmental and human health risk.

I once again wish to thank the members of the Scientific Advisory Board for the important efforts for critically reviewing the content and scope of the EPA Assessment Report and I hope that they find my comments and suggestions helpful.

Best wishes,
Yuri

Yuri Gorby, PhD
Howard N. Blitman Chair
Dept. of Civil and Environmental Engineering
Rensselaer Polytechnic Institute
Troy, NY, 12065