Technical Workshop on Wastewater Treatment and Related Modeling
April 18, 2013

U.S. EPA Research Triangle Park Campus
"C" Building Auditorium
Research Triangle Park, NC

Agenda

8:00 am **Registration/Check-in**

8:30 am **Welcome and Introductions**.....*Ramona Trovato, US EPA*

8:40 am **Opening Remarks**.....*Glenn Paulson, Science Advisor, US EPA*

8:45 am **Purpose of Workshop**..... *Workshop Co-Chairs:*
Cynthia Sonich-Mullin, US EPA
Thomas Starosta, PA DEP

Session 1: Hydraulic Fracturing Wastewater Treatment

8:55 am ***Panel Presentations:***

1. **Overview of Hydraulic Fracturing Wastewater Research** ..... *Cynthia Sonich-Mullin and Christopher Impellitteri, US EPA*
2. **Zero Water Discharge: Management for Hydrofracturing Activities** .....*Carl Adams, ENVIRON International Corporation*
3. **From Pilot Study to Daily Processing: Warren, Ohio's Documentary to Hydraulic Fracturing Water Treatment** ..... *Thomas Angelo, City of Warren, Ohio, Water Pollution Control Department*
4. **Reducing Fresh Water Use in Upstream Oil & Gas Hydraulic Fracturing** ..... *Michael Dunkel, Pioneer Natural Resources*
5. **Treatment for Beneficial Use of Produced Water and Hydraulic Fracturing Flowback Water** ..... *David Stewart, Energy Water Solutions, LLC*
6. **Marcellus Wastewater Treatment – Case Study**..... *Daniel Ertel, Eureka Resources, LLC*

Questions of Clarification

Break (10 minutes)

Facilitated discussion among workshop participants focusing on key questions:

- *What are some modern and potential future trends in reuse, recycling, zero-liquid discharge and commercial transport?*
- *How to manage, dispose and characterize residuals of hydraulic fracturing?*
- *What are the consequences of disposal via landfills or beneficial reuse?*

11:45 am **Summary of Session 1**..... *Workshop Co-Chairs:*
Cynthia Sonich-Mullin, US EPA
Thomas Starosta, PA DEP

12:00 pm **Lunch (on your own) and Poster Session**

Session 2: Current and Future Trends in Hydraulic Fracturing Wastewater Management

1:30 pm ***Panel Presentations***

1. **Successful Oilfield Water Management: Five Unique Case Studies**..... *Brent Halldorson, Fountain Quail Water Management*
2. **Produced Water Management in the Marcellus**..... *Meagan Mauter, Carnegie Mellon University*
3. **Mid-Continent Water Management for Stimulation Operations**..... *D. Steven Tipton, Newfield Exploration Company*
4. **Utilizing Models Developed for Water Management and Risk during Carbon Storage to Improve Water Management during Unconventional Gas Exploration and Production**..... *Enid J. (Jeri) Sullivan, Los Alamos National Laboratory*

Questions of Clarification

Facilitated discussion among workshop participants focusing on key questions:

- *What are the contributions of selected contaminants from hydraulic fracturing relative to other potential sources of contamination?*
- *What are some applications of surface and subsurface modeling?*
- *How much flowback or produced water is created, and what happens to it?*
- *How do we currently monitor wastewater disposition?*
- *How do the projected volumes of wastewater compare to wastewater management capacity, including underground injection wells and treatment systems?*
- *What are the regional differences in wastewater quantity and quality and potential impacts on drinking water sources?*

3:45 pm **Summary of Session 2**..... *Workshop Co-Chairs: Cynthia Sonich-Mullin, US EPA Thomas Starosta, PA DEP*

3:55 pm **Closing Remarks**..... *Ramona Trovato, US EPA*

4:00 pm **Adjourn**

Poster Session

Sustainable Water Treatment, Recycling and Disposal Practices in the Marcellus Shale Basin
Matthew Bruff, Altela, Inc.

Feasibility of In Situ Sequestration of Toxic Metals in Flowback Water from Hydraulic Fracturing
Andrew Stack, Oak Ridge National Laboratory

Use of Switchable Solvents as Forward Osmosis Draw Solutes
Aaron Wilson, Idaho National Laboratory

Wastewater Made Clear with Green Technology
Patricia Werner-Els, Advanced Waste & Water Technology