



Region 6 State and Tribal Environmental Leaders' Visit to
US EPA Office of Research and Development (ORD)
Groundwater, Watershed and Ecosystem Restoration Division
(GWERD)

August 13-14, 2018

Robert S. Kerr Environmental Research Center
919 Kerr Research Drive
Ada, OK 74820

FINAL AGENDA

August 13

6:30 pm **Group Dinner - Santa Fe Cattle Co. (self-pay)**
Please RSVP to Amy Scheuer and Lisa Matthews

August 14

Robert S. Kerr Environmental Research Center
Conference Rooms 1/2/3

8:00 am **Registration**
US EPA staff will meet you in the main lobby and escort you to the meeting room, where you will receive meeting materials; lunch orders and \$10 will be collected (exact change appreciated).
Lisa Matthews, Senior Advisor and State Liaison, EPA ORD

8:15 am **Welcome and Introductions**

- *Chris Robbins, Acting Deputy Assistant Administrator for Management, EPA ORD*
- *Scott Thompson, Executive Director, Oklahoma DEQ and ERIS Board Member*
- *Governor Bill Anoatubby, The Chickasaw Nation*
- *Anne Idsal, Regional Administrator, EPA Region 6*
- *Ken Wagner, Senior Advisor to the Administrator for Regional and State Affairs, EPA*

8:30 am **Overview of US EPA ORD: Science and Technical Capabilities**
Jennifer Orme-Zavaleta, Principal Deputy Assistant Administrator for Science, EPA ORD

8:45 am **State and Tribal Perspectives/Topics of Interest**
States, tribes and national associations are requested to informally talk about some of their most pressing environmental challenges and related science needs (3-4 minutes each).

- *Arkansas DEQ*
- *Louisiana DEQ*
- *Oklahoma DEQ, Water Resources Board, Conservation Commission, Corporation Commission*
- *Texas CEQ and Railroad Commission*
- *Cherokee Nation*
- *The Chickasaw Nation*
- *Choctaw Nation of Oklahoma*
- *Citizen Potawatomi Nation*
- *Kickapoo Nation*
- *The Muscogee (Creek) Nation*
- *Ground Water Protection Council*
- *Interstate Oil and Gas Compact Commission*
- *National Rural Water Association*

- 10:00 am** **Break**
- 10:15 am** **Contaminated Sites**
- State perspective (Chuck Carr Brown, Louisiana DEQ)
Introduce agenda topic, and if possible, give examples from your state's experiences.
 - EPA research and technical assistance (David Jewett)
 - Roundtable discussion
- 11:00 am** **Watershed Nutrient Management Strategies and Research Support Needs**
- State perspective (Becky Keogh, Arkansas DEQ)
 - EPA research (Ken Forshay)
 - Roundtable discussion
- 11:45 am** **Working Lunch**
Order in from Jimmy John's, self-pay
- 12:15 pm** **Produced Water from Oil and Gas Activities: Characterization and Management**
- State perspective (Shawn Coslett, Oklahoma Corporation Commission)
 - EPA presentation (Jeff Frithsen)
 - Ground Water Protection Council presentation (Mark Layne)
 - Roundtable discussion
- 1:15 pm** **Water Reuse**
- State perspective (Scott Thompson, Oklahoma DEQ)
 - EPA research (Sandhya Parshionikar)
 - Roundtable discussion
- 2:00 pm** **Aquifer Storage and Recovery**
- State perspective (Julie Cunningham, Oklahoma Water Resources Board)
 - EPA pilot study (Randall Ross)
 - Roundtable discussion
- 2:30 pm** **Break**
- 2:45 pm** **EPA ORD Groundwater, Watershed and Ecosystem Restoration Division (GWERD) Overview**
Ann Keeley, Acting Director, EPA ORD GWERD
- 3:00 pm** **Tour of EPA ORD Ada Facility**
- Field Equipment Demonstration, Dock Area
 - Gas Chromatography Lab, Rm 351
 - Metals Lab, Rm 304 and Metals Prep Lab, Rm 305
 - General Parameters Lab, Rms 123 & 127
- Return to Conference Rooms 1/2/3***
- 4:00 pm** **Recap today's discussion, feedback and next steps**
Chris Robbins, moderator
- 4:30 pm** **Adjourn**

Agenda Topic Descriptions

Overview of EPA Office of Research and Development

The Office of Research and Development (ORD) is the scientific research arm of EPA, whose leading-edge research helps provide the solid underpinning of science and technology for the Agency. ORD supports six research programs that identify the most pressing environmental health research needs with input from EPA program and regional offices, partners and stakeholders. Strategic Research Action Plans outline the research underway in the programs. The research is conducted by ORD's three national laboratories, four national centers, and two offices located in 11 facilities across the country and in Washington, DC.

Contaminated Sites

Contaminated sites comprise a variety of media (land, water, air and combinations) and contaminants of concern (organics, inorganics and mixtures) and are in every state in the union. ORD research and technical support activities tackle issues at contaminated and hazardous waste sites nationwide and provide the foundation for EPA research efforts. This presentation provides an overview of ORD's contaminated site research and technical support activities, focusing on two case studies located in states and on tribal lands. ORD technical assistance is provided through five technical support centers (TSCs) – Engineering TSC, Groundwater TSC, Site Characterization and Monitoring TSC, Human Health Risk Assessment TSC, and Ecological Risk TSC. For the Tar Creek Mine Superfund Site case study in Oklahoma, ORD provided technical support to address soil remediation and ecosystem restoration – characterizing potential contaminants of concern in “chat” piles, modeling fate and transport of heavy metals from mining-contaminated lands, and evaluating potential soil amendments as well as the bioavailability of heavy metals in amended soils. For the Delatte Metals Superfund Site case study in Louisiana, research examined the use of a limestone/manure based permeable reactive barrier (PRB) to treat heavy metals and acidity in groundwater, the long-term performance of this specific PRB design, and any potential secondary water quality impacts at the site. This presentation will discuss potential broader applications of the lessons learned from these examples, as well as technical support opportunities that are available to states and tribes for addressing contaminated sites.

Watershed Nutrient Management Strategies and Research Support Needs

Excess nutrients can be detrimental to water quality. Application of restoration, as an approach to nutrient management, is a potentially valuable tool for the management of nutrient pollution in watersheds. It can be useful to decision makers to discuss some of the management practices, tools, and examples of successful nutrient retention related to ecosystem restoration. This presentation will explain some of the controls and drivers of nutrient retention with respect to floodplain river restoration. This research can support better management and restoration decisions to improve water quality, particularly in river floodplain systems.

Produced Water from Oil and Gas Activities: Characterization and Management

Produced water is water associated with oil and gas production from underground formations. Estimates for 2012 were that produced water volume generated in the United States was approximately 21.2 billion barrels per year (about 2.4 billion gallons per day) and nationally, most of the produced water was disposed of using Class II underground injection control wells. EPA's 2016 report, [Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States](#), summarized information about produced water volume, composition and management. Concerns over costs, water availability and induced seismicity have influenced produced water management practices, leading to increased reuse and, depending upon produced water quality, other beneficial end uses. Especially west of the 98th meridian, produced water is starting to be considered a source of water, not a waste, and fit-for-purpose treatment technologies are being developed to support produced water reuse. Although costs are the major driver for the management of produced water, there remains legal, environmental and social barriers for greater incorporation of produced water as part of regional water management strategies.

Water Reuse

Increasing water scarcity has led to potable reuse of purified wastewater using both direct (i.e., linkage of purified water to drinking water plant intake) and indirect (linkage to drinking water plants after passage of the

purified through an environmental buffer, typically a groundwater aquifer) approaches. Localized reuse of a variety of wastewaters (e.g., graywater, stormwater, roof runoff) within single buildings or urban districts for non-potable purposes such as toilet flushing or landscape irrigation is also gaining popularity across the country. All of these forms of wastewater reuse (direct potable, indirect potable, non-potable) require quantitative microbial risk assessment (QMRA) models to predict the treatment necessary for safe reuse. Reuse also requires effective monitoring to ensure treatment systems are operating effectively to avoid acute microbial exposures. This presentation will emphasize ORD's capabilities in addressing these two key technical areas by summarizing ORD's research to help inform a state-based initiative to safely implement non-potable water reuse. A group of public utilities and health agencies seeking uniform guidance on treatment requirements and monitoring approaches has recently released a [Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems](#). ORD worked closely with this group to generate treatment targets using QMRA models. In addition, ORD is testing innovative approaches to monitor the treatment performance of these systems, emphasizing the linkage of the most recent advancements in microbiology with simple, on-line sensors.

Aquifer Storage and Recovery

Aquifer storage and recovery (ASR) is an integrated water management strategy that involves the delivery of water directly to an aquifer via spreading basins and injection wells. ASR allows the capture and storage of water in an aquifer that may otherwise be lost. Increased aquifer storage can enhance the base flow of springs and streams, as well as provide more water for the needs of rural well owners and municipalities. In certain systems, however, the additional aquifer recharge may result in impacts to water quality. ASR in karst settings may not provide the same level of protection offered by porous media systems. Additionally, naturally occurring contaminants (e.g. metals) can become mobilized by changes in aquifer geochemistry resulting from groundwater recharge, under certain conditions. There is strong interest among states, tribes, local entities and land owners to understand the benefits, limitations and costs for ASR projects. Ongoing research focuses on methods to increase the quantity of water available to support both ecosystem needs and water production, while protecting groundwater quality.

Overview of EPA ORD Groundwater, Watershed and Ecosystem Restoration Division (GWERD)

The Robert S. Kerr Environmental Research Center (RSKERC) in Ada, OK, is a premier EPA research facility that houses the Groundwater, Watershed and Ecosystem Restoration Division (GWERD) of EPA ORD's National Risk Management Research Laboratory. ORD scientists in Ada conduct research on groundwater, subsurface contaminant remediation, and ecosystem restoration. Working closely with states, tribes, and EPA program and regional offices, ORD scientists conduct and apply research to real-world problems. The national mission of the RSKERC includes a continuing focus on the Southern Plains region and the unique environmental problems facing states and tribes in the region.

Tour of EPA ORD Ada Facility

1. Field Equipment Demonstration, Dock Area (Dr. Randall Ross)

The Field Equipment Demonstration portion of the facilities tour will include: GeoProbe Rotosonic rig; GeoProbe 6600DT; GeoProbe mounted amphibious vehicle; geophysical logging trailer; and other assorted tools that illustrate GWERD's subsurface characterization capabilities.

The demonstration and discussions will focus on tools and methods used by states and tribes for characterizing the subsurface, including contaminant distribution, lithology, geologic heterogeneity, sampling, hydrogeologic characterization and other aspects.

2. Gas Chromatography Lab, Rm 351 (Dr. Ken Forshay and Kristie Rue)

The Organics Analysis laboratory is staffed by trained EPA and contractor chemists. The lab is equipped with gas chromatography (GC), gas chromatography-mass spectrometry (GC/MS) and liquid chromatography-tandem mass spectrometry (LCMS/MS) to conduct various techniques that are used to identify the chemical makeup or characteristics of a particular sample from soil, sediment and water. The determination of hazardous organic compounds which comprise a large group of contaminants with a complex diversity of biologic effects across Superfund sites are conducted in this laboratory.

3. Metals Lab, Rm 304 and Metals Prep Lab, Rm 305 (Dr. Rick Wilkin)

The Metals prep lab and Spectrometry lab are equipped with digesters, inductively coupled plasma optical emission spectrometry (ICP/OES) and inductively coupled plasma mass spectrometry (ICP/MS). The labs will be toured as example facilities where water quality data are obtained for measuring metal contaminants of concern in groundwater, such as chromium, arsenic and lead. New methods for obtaining arsenic and chromium speciation data will be showcased on the tour.

4. General Parameters Lab, Rms 123 & 127 (Mark White & Lynda Callaway)

The General Parameters lab consists of multiple functions from a sample log-in and chain of custody resource for GWERD to the provider of inorganic, greenhouse gas, stable isotope and carbon analysis as well as many other physical parameters from lab and field projects. These projects range from state extension articles on anthropogenic deep soil nitrate, groundwater impacts from CAFO's adjacent to state owned land, to monitored natural attenuation of contaminated sites and groundwater in collaboration with the Oklahoma Department of Agriculture Food and Forestry, Oklahoma Water Resource Board, Oklahoma Department of Wildlife Conservation, University of Nebraska, Oregon State University, Louisiana Department of Environmental Quality and Oklahoma State University.