



# **USEPA Office of Research and Development (ORD) Technical Support and Regional Collaboration**

**Tribal Superfund Working Group, March 18, 2021**

**Terry Burton**

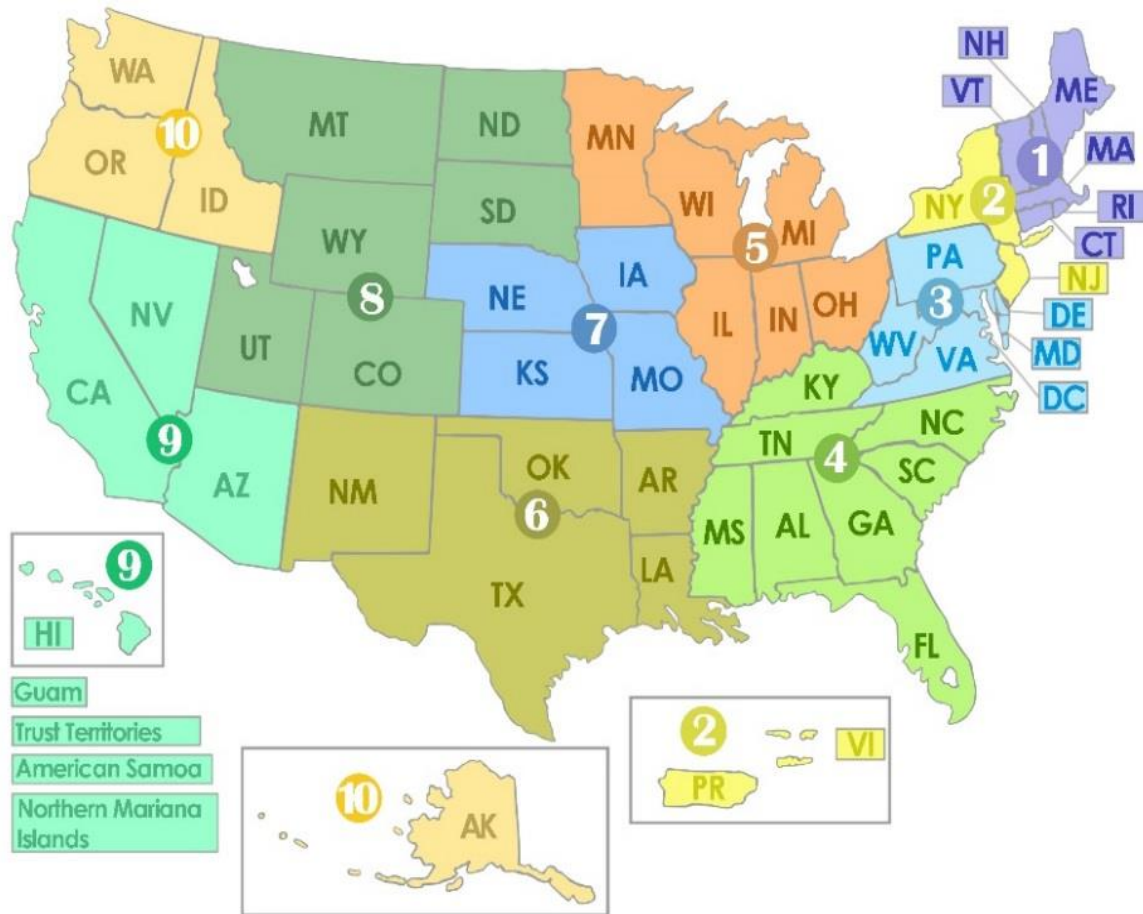
**Office of Research and Development**

**Superfund and Technology Liaison (STL) for Region 6**



# EPA Science Liaisons' Primer

- Link ORD with the EPA's ten regional offices, promoting the integration of ORD science into regional decision making
- Build networks and partnerships between ORD and regional office staff
- Provide technical support and coordinates regionally-focused ORD research





## Regions: One Regional Science Liaison (RSL) and one Superfund and Technology Liaison (STL) in each regional office

RSLs are Regional employees whose FTEs are paid by ORD

- Regions' primary link between ORD and regional offices
- Research coordination
- Focus on Air, Water, Compliance, and Enforcement

STLs are ORD employees

- Provide technical support for regional Superfund and RCRA programs
- Coordinate technical assistance (ORD Technical Support Centers and Agency expertise)
- Facilitate technology and information transfer
- Focus on hazardous-waste issues

## Key Distinction to remember:

STLs' focus: **Hazardous waste**

RSLs address all other environmental issues.



# Regional Science Council

## Chair or co-chairs by Region decision

### Membership Composition

Decided by each Region. Some limit membership strictly to scientists and engineers. Others allow members from across each Division of the Region. RSLs and STLs are typically members.

### Selection Process

Typically, a call for interested participants is distributed to eligible Regional staff every two years. Members must have supervisor approval.

### Terms

The “Official” term is two years. Members may be assigned by management or may request to extend membership for an additional two years.

### Best Practices

Biannual Review of Science Needs  
Divisional presentations at monthly meetings

## Main Functions

Identify Regional science needs/priorities

Serve as a scientific sounding board/resource to the Regional Senior Management

Assist in the communication of ORD funding opportunities to fellow Divisional members

Evaluate, rank and review projects funded under **RARE**, and RESES; review and rank annual nomination of **R2P2 and ROCS-Nets**

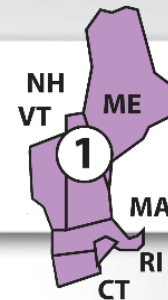
Communicate relevant scientific information to fellow Division members

Respond to requests for regional input/representation on relevancy reviews of STAR and SBIR grants

Summarize the status of national efforts having regional impact and involvement and communicate to the RSC



## Region 1 – Overview of Science Needs



### General Science Needs:

- Harmful algal blooms - Improve monitoring, lab capabilities, and community outreach
- Citizen science - Regional cyanobacteria monitoring program
- Ozone levels in Connecticut
- Advancing drinking water resilience - Assessing vulnerabilities and threats and develop resilience plans for water treatment plants
- Ambient water quality monitoring data - Need for additional sampling data as well as a regional-wide database for water quality data
- Real-time sensor monitoring enhanced capability - A simplified approach is needed to display real-time data on a public EPA website
- Advanced statistics and modeling support - Statistical analysis, modeling, data organization, and data visualization
- Fate and Transport of PFAS from Air to Aquifer – Need to better understand the movement of PFAS compounds from airborne particulates to soil to groundwater

### Superfund/Contaminated Sites Needs:

- Arsenic – Methods for determining the source(s) of arsenic, as well as the geochemical and other factors leading to mobility in the environment
- Contamination in fractured bedrock – Development of cost-effective techniques and approaches for identifying and remediating contamination in fractured rock
- Improve remedial technologies for contaminants of emerging concern (such as PFAS)



## Region 2 – Overview of Science Needs



### General Science Needs for Region 2

- PFAS
- Urban soil contamination with lead
- Water quality in environmental justice communities

### Superfund/Contaminated Sites Needs

- Contaminated sediment sites – innovations in remediation and monitoring
- Fractured Rock sites – innovations in assessment and remediation
- Underwater munitions assessment and remediation
- In situ 1,4-dioxane treatment technologies for groundwater





## Region 3 – Overview of Science Needs



### General Science Needs:

- Lead - Urban soil contamination
- Nutrient pollution (specifically in Chesapeake Bay)
- PFOA/PFAS, including pre-cursors/by-products/derivatives such as GenX - Analytical methods development; health effects in drinking water and air emissions
- Methods for measuring ethylene oxide (existing method may overestimate results, therefore a need to revise or develop a new method)
- Evaluate safety of existing chemicals (under TSCA section 21)
- Abandoned mines pools and adverse impacts to receiving watersheds
- Legionella in large drinking water distribution systems and premise plumbing

### Superfund/Contaminated Sites Needs:

- Contaminants in complex geology
- Vapor intrusion remedies
- Fentanyl contamination
- Technical support for Superfund sites





## Region 4 – Overview of Science Needs



### General Science Needs:

- Emergent contaminants (including, but not limited to PFAS) - Development of analytical methods and treatment technologies
- Nutrients and water quality (including HABs) - Development of cost-effective nutrient removal technologies
- Air monitoring - Support for continued research on next generation air monitoring - specifically lower-cost air sensors
- Wildland and prescribed fires - Improve emissions characterization and modeling tools for evaluating wildland and prescribed fires and their impacts
- Gulf of Mexico
  - Microbial source tracking (MST) - Using MST to identify sources of impairment and better understand temporal and spatial patterns
  - Habitat - Protect, enhance and/or restore Gulf habitat
  - Community resilience - Assist coastal stakeholders, municipalities, and tribes in assessing risks and vulnerabilities to natural or man-made disasters to improve community resiliency
- Ecosystem services - Efforts to understand different ecosystems and their economical values

### Superfund/Contaminated Sites Needs:

- Technical support for Superfund and RCRA projects with contaminants of concern such as lead, asbestos, PCBs and 1,4-dioxane
- IRIS and PPRTV values for requested and emergent contaminants
- Characterization and remediation technologies' performance including verifications/evaluations





### General Science Needs:

- Lead - Identification of lead service lines, lead scale analysis in drinking water systems, methods and models to assist with regional/state joint planning to reduce lead exposure
- PFAS - Analytical methods for soils, groundwater, drinking water and sediments; improved understanding of PFAS releases in chrome acid etch plating process
- Harmful Algal Blooms - Improving drinking water treatment techniques; predicting bloom events and toxicity
- Ethylene oxide - Analytical methods to reach lower detection limit
- Pathogens - Small drinking water systems, combined sewer overflow management, pathogens in stormwater reuse, recreational waters
- Risk Communication

### Superfund/Contaminated Sites Needs:

- Hot/burning landfills: identification, prevention and mitigation
- Vapor Intrusion
- Fentanyl Remediation
- PFAS – Analytical methods, toxicity values, remediation
- Contaminated sediments remediation, especially PCBs
- Contaminated sediment reuse





### General Science Needs:

- Understanding potential impacts of chloroprene air releases in Louisiana
- Development of more efficient and inexpensive pollutant measurement systems (ambient fence line, indoor vapor intrusion, survey of abandoned uranium mines)
- Cumulative Risk Assessment - Inhalation exposure to ethylene oxide and chloroprene
- Alternative treatment techniques for produced water management
- Water quality assessment for small drinking water systems distribution system, specifically issues related to disinfection byproducts
- Analytical methods for PFAS
- Ethylene oxide
  - Analytical methods
  - Inhalation exposure
- Drinking water quality data for Region 6 tribal communities

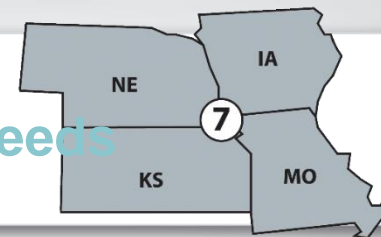
### Superfund/Contaminated Sites Needs:

- Superfund technical support
- Large-scale mining sites
  - Characterization/Remediation on entire county-scale
- Continued emerging contaminant efforts
- Continued TCE health research, including action levels
- Emergency Response support
  - Includes field responders and “reach-back”





## Region 7 – Overview of Science Needs



### General Science Needs:

- Harmful Algal Blooms and nutrients - Prediction of bloom events and toxicity
- Kansas Flint Hills burning and impacts on downward air quality
- Drinking water contaminants (disinfection by-products) in consecutive systems (public water system that buys or otherwise receives some or all its finished water from a wholesale system)
- Dicamba - Issues related to drift, non-tolerant crops, method development, atmospheric loading and residue management
- Evaluation of ecosystem goods and services from water quality wetlands to improve nutrient retention practices in agricultural lands in Iowa

### Superfund/Contaminated Sites Needs:

- Refining sorbent tube technology (reducing the cost and size of vapor intrusion sampling equipment and optimizing analytical methods) for use in Superfund sites

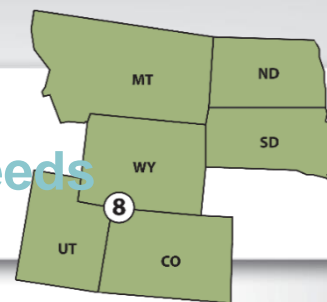
**EPA Region 7 FY18/19  
Top Scientific Research Priorities**

1. Drinking water contaminants forming in consecutive systems (disinfection by-products)
2. Flint Hills burning and impacts on downwind air quality
3. Harmful algal blooms and nutrients
4. Pesticide drift (DiCamba method development)
5. Treatment Wetlands (Nutrient Relief)
6. Methods for lengthening holding times for e-coli/other bio-samples
7. Sorbent tube technology refinement (assigned to ENST)

The graphic includes several images: a person in a hard hat working with equipment, a wetland area, a person in a lab setting, and a map of a region with a red highlighted area.



## Region 8 – Overview of Science Needs



### General Science Needs:

- Oil/Gas - Emissions inventories and understanding constituents and appropriate uses of produced water
- Ozone and regional haze modeling
- Emerging contaminants (including PFAS and NDMA)
  - Development of analytical methods and treatment technologies for PFAS
  - NDMA issues in drinking water (no MCL) and underground injection Control (fate and transport in aquifer)
- Lead (Pb)
  - Technologies to identify lead service lines
  - Treatment alternatives for phosphate-based corrosion control (both Pb and nutrient issue)
- Nutrients/Harmful Algal Blooms
  - Determining effectiveness of agricultural best management practices for reducing ammonia emissions to the atmosphere
  - Uptake of algal toxins into plant and animal tissue
  - Technologies to reduce nutrient loading from wastewater lagoons
  - Advanced optimization approaches to achieve greater nutrient reductions at wastewater treatment plants

### Superfund/Contaminated Sites Needs:

- Mining and mineral processing sites
  - Alternative water quality and soil treatment technologies
  - Groundwater-surface water interaction (i.e., defining groundwater loading to surface water systems)



## Region 9 – Overview of Science Needs



### General Science Needs:

- Wildfires
  - Deployment and performance testing of air sensors
  - Technical support and emergency response
- Arsenic - Methods for determining the source(s) of arsenic, as well as the geochemical and other factors leading to its mobility in the environment
- Waste management - Innovate uses of excess food waste to create energy and reduce greenhouse gases
- Water resource recovery - Pre-treatment methods for contaminants posing high risk for potable reuse
- Indoor air quality - Innovative solutions to reduce harmful exposures related to asthma triggers and the use of coal for home heating on the Navajo Nation

### Superfund/Contaminated Sites Needs:

- Vapor intrusion - Optimized understanding and modeling of how contaminants move from subsurface into buildings to improve contaminated site assessments. Improved technologies that can withstand land use changes
- Prevention techniques and mitigation measures that can make mine sites more resilient to natural disasters:
  - Portable neutralization treatment systems to prevent acid mine drainage overflow impacts to rivers and tribal lands
  - Vegetative covers designed to resist combustion and keep soil moisture content higher
  - Protecting infrastructure, particularly plastic components, during fires
- Additional urban metals studies to establish an urban background level
- RPMs need tools to assist them with 5-YR Review assessments of the impacts of sea-level rise to landfill remedies
- XRF lead protocol and field guide for quick assessment by the removal program
- Fenceline measurement capability for emergency response and use of UAV with commercial-off-the-shelf (COTS) sensor packages for evaluation
- Interagency coordination between ORD and Western land managers (Fed and State agencies) to share latest research and technologies
- Wildfire mitigation and emergency response



## Region 10 – Overview of Science Needs



### General Science Needs:

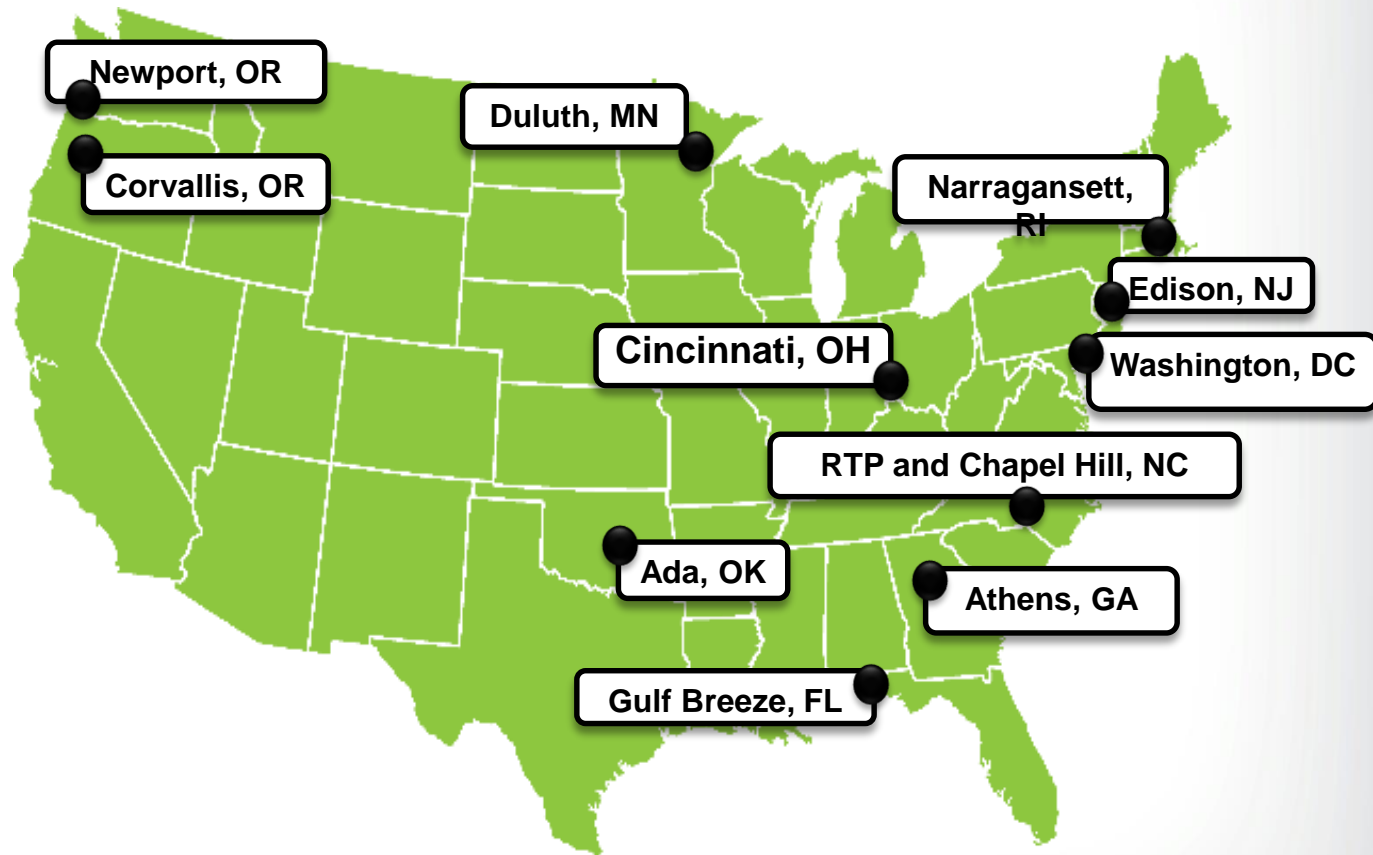
- PM2.5 non-attainment areas and wildfire smoke
- Bioaccumulation of pollutants and salmon recovery
- Analytical methods for PFAS
- Open waste dumps in Alaska - Transport, fate and effects of pollutants
- Improving national estuary fate and transport models
- Exposure and risk from inadvertently produced contaminants
- Evaluation of the benefits (e.g., nutrient cycling, flood control) received from healthy ecosystems

### Superfund/Contaminated Sites Needs:

- Superfund technical support
- Mining and mineral processing sites
  - Alternative water quality and soil treatment technologies
  - Groundwater-surface water interaction (i.e., defining groundwater loading to surface water systems)
- Contaminated sediments and surface waters at hazardous waste sites
- Development of innovative site characterization and treatment technologies for contaminated sites

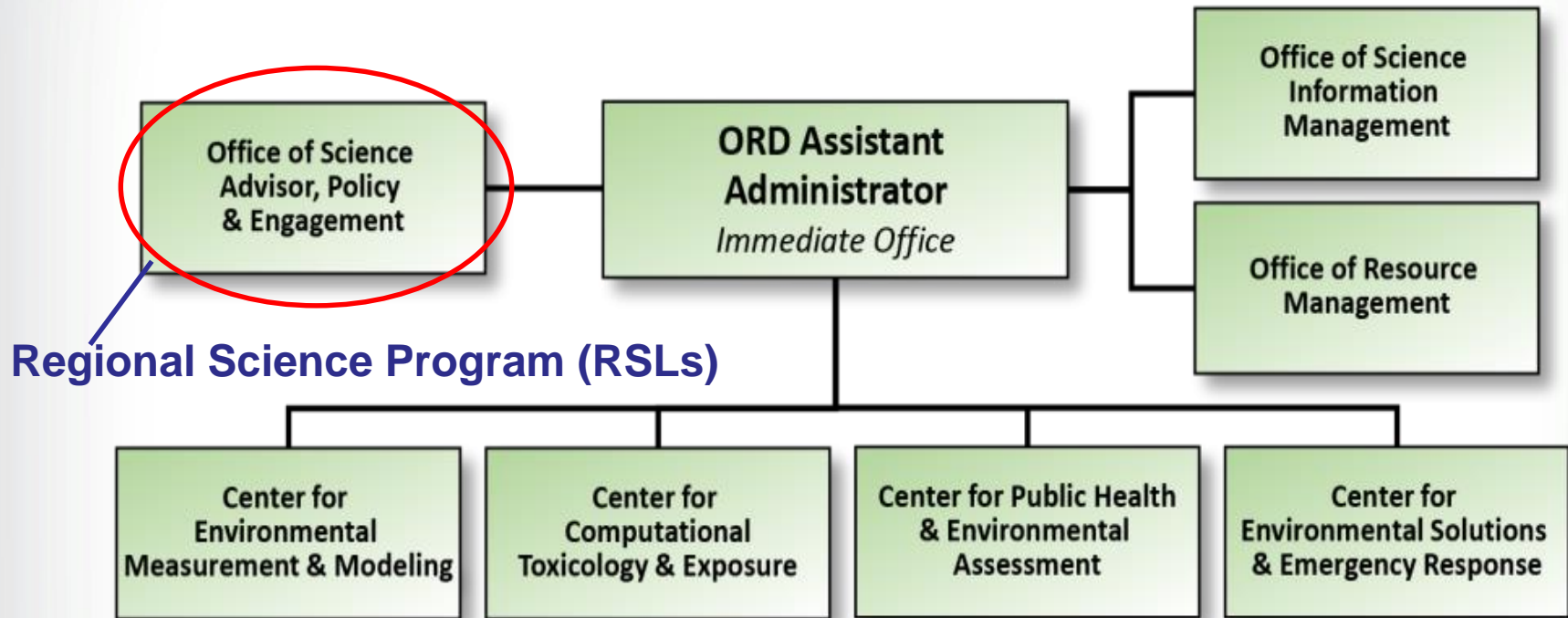
## Mission

Provide the science, technical support, technology and tools to inform EPA's mission to protect public health and the environment



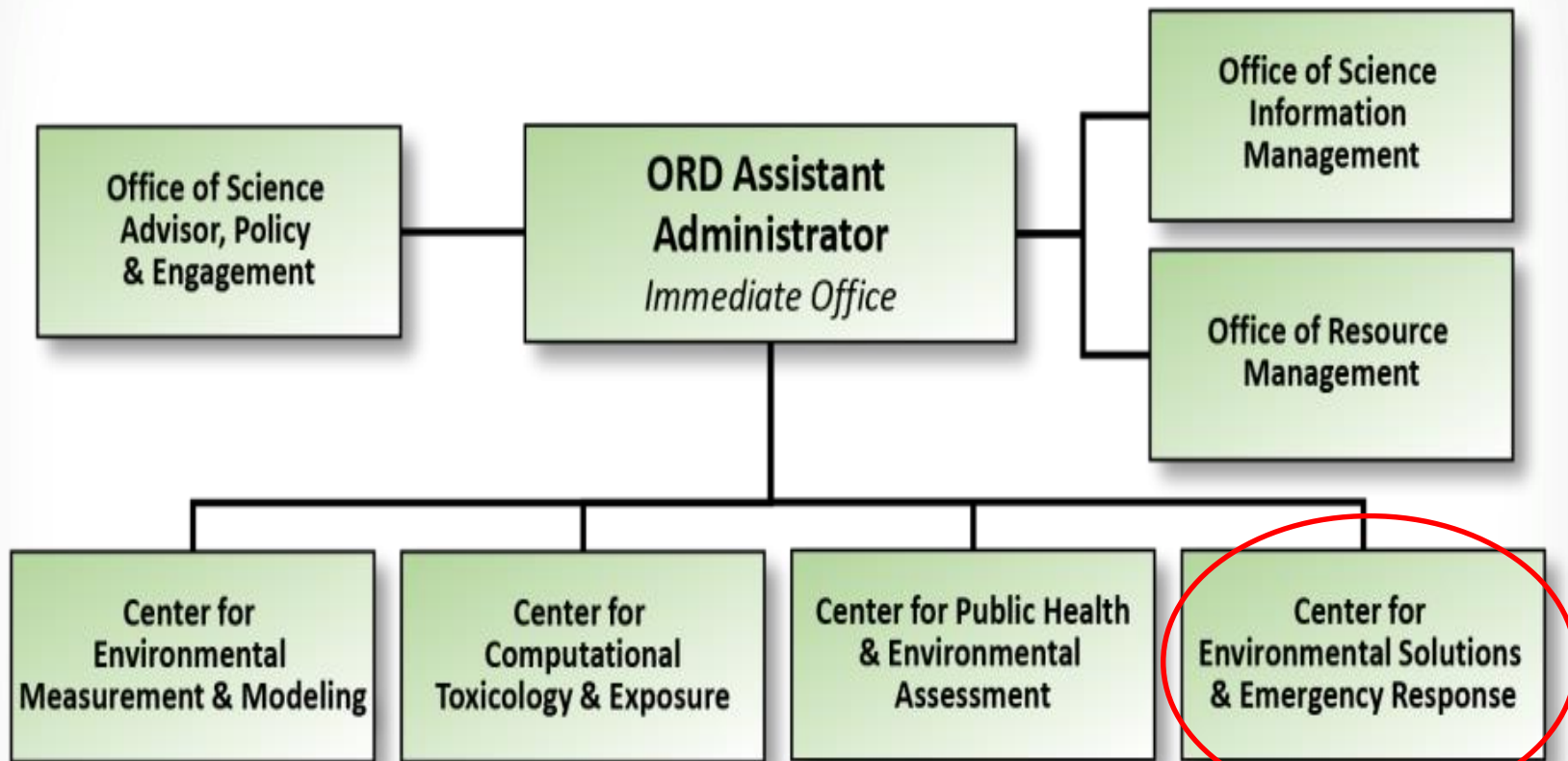


# ORD Organization





# ORD Organization



**Technical Support Coordination Division  
(STLs + Technical Support Centers)**



# ORD Technical Support

**ORD Center for Environmental Solutions and Emergency Response (CESER)  
Technical Support Coordination Division (TSCD)  
Director: Kelly Dipolt**

## **Superfund and Technology Liaisons (STLs): Regions 1 - 10**

**Engineering  
Technical Support  
Center (ETSC)  
Director:  
David Gwisdalla**

**Ground Water  
Technical Support  
Center (GWTSC)  
Director:  
Randall Ross**

**Ecological Risk  
Assessment  
Support Center  
(ERASC)  
Director:  
Michael Kravitz**

**Superfund Health  
Risk Technical  
Support Center  
(STSC)  
Director:  
Dahnish Shams**

**Site Characterization  
and Monitoring  
Technical Support  
Center (SCMTSC)  
Director:  
Felicia Barnett  
Associate Director:  
Terry Burton**

**STLs coordinate hazardous-waste-related  
technical support requests from the Regions**



# ORD Technical Support Center Priorities

Interpret geochemical data

Evaluate remedial technologies

Assist with development or review of treatability or pilot studies

Evaluate remediation system performance data

Provide support on ecological risk assessments

Provide support on human health risk assessments

Provide statistical analysis support

Provide field support

Support ProUCL software

**Engineering Technical Support Center (ETSC)**  
Director:  
**David Gwisdalla**

**Ground Water Technical Support Center (GWTSC)**  
Director:  
**Randall Ross**

**Ecological Risk Assessment Support Center (ERASC)**  
Director:  
**Michael Kravitz**

**Superfund Health Risk Technical Support Center (STSC)**  
Director:  
**Dahnish Shams**

**Site Characterization and Monitoring Technical Support Center (SCMTSC)**  
Director:  
**Felicia Barnett**  
Associate Director:  
**Terry Burton**

## Problem

- Regulators and community surrounding the Camp Minden Superfund site (LA) questioned whether the Monitored Natural Attenuation (MNA) remedy was protective and meeting remedial completion schedules.
- DoD provided “trend plots” indicating that concentrations were slowly decreasing, as proof of progress.

## Action

- Region 6 STL reviewed the site’s technical documentation to determine the intended biological and chemical interactions needed for contaminant reduction.
- STL then calculated the reaction kinetics necessary for remedy success at every sampling well, used that data to fit a series of first-order differential equations, and then constructed simple x-y plots.
- The plots visually predict the concentrations’ sampling values that would indicate a successful remedy.

## Result

- DoD has changed their data reporting process at this site.
- DoD will switch to a more active remedy at several locations at Camp Minden, without additional negotiation.

## Impact

- Greater citizen confidence at a highly sensitive site.
- Discussions with EPA HQ about establishing a defined reaction mechanism at every MNA site in the U.S.
  - This would allow a regulator to predict the sampling values that would indicate a successful remedy.
- Plan in place to repeat the analyses at another DoD Superfund site.



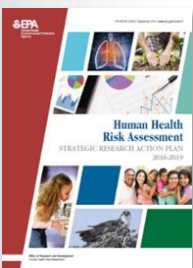


# ORD Research Programs



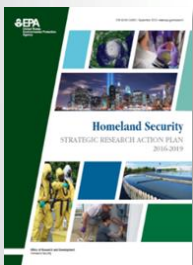
## Sustainable and Healthy Communities Research Program (SHC)

Contaminated Sites  
Waste & Materials Management  
Healthy Communities  
Non-CBRN remediation



## Health and Environmental Risk Assessment Research Program (HERA)

Science Assessments & Translation  
Advancing Practice of Risk Assessment



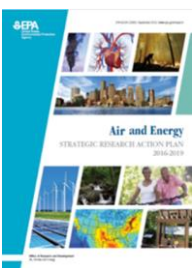
## Homeland Security Research Program (HSRP)

Contaminant Characterization & Consequence Assessment  
Environmental Cleanup & Infrastructure Remediation  
Preparedness & Response



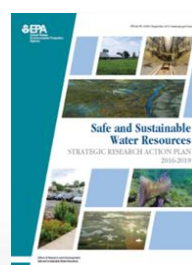
## Chemical Safety for Sustainability Research Program (CSS)

Improved Chemical Evaluation to Support Agency Decisions  
Complex Systems Science to Inform Agency Knowledge of Chemicals  
Solutions and Delivery of Chemical Knowledge to Agency Partners



## Air and Energy Research Program (AE)

Science for Air Quality Decisions  
Extreme Events & Emerging Risk  
Next Generation Methods to Improve Public Health & Environment



## Safe and Sustainable Water Resources Research Program (SSWR)

Water Treatment and Infrastructure  
Nutrients & Harmful Algal Blooms  
Watersheds



# ORD Research Programs

SHC's 2019-2022 [research plan](#) is organized into three topics:

## Topic 1:

1. Technical Support
2. Site Characterization and Remediation
  - Sediment/Soil Characterization and Remediation
  - Groundwater Characterization
  - Groundwater Remediation
  - Mining Sites
3. Solvent Vapor Intrusion
4. Leaking Underground Storage Tanks
5. Chemicals of Immediate Concern: PFAS and Lead

**1.Topic 1:  
Contaminated Sites**  
Accelerating the Pace of  
Environmental Clean-Up

**1.Topic 2: Waste and  
Materials Management**  
Reducing the Burden of  
Contamination

**1.Topic 3: Healthy and Resilient  
Communities**  
Revitalizing Communities from  
Contamination and Natural  
Disasters/Extreme Weather Events



## ORD Regional Science Opportunities

### Applied Research Funding for Regional Partnerships

- [Regional Applied Research Effort \(RARE\)](#)
- [Regional Sustainability and Environmental Sciences \(RESES\)](#)
- [Superfund Technology Liaison Research \(STLR\)](#)

### Career Development Opportunities

- [Regional Research Partnership Program \(R2P2\)](#)
- [Region/ORD Community of Science Networking \(ROCS-Net\)](#)



## Applied Research Funding for Regional Partnerships

**RARE** - ORD research that responds to high-priority, near-term applied research needs of EPA's regions, state and local governments, and tribes

**RESES** - Promote sustainable and healthy communities

**STLR** - Provides an opportunity for ORD and regional staff to collaborate on research that addresses high-priority, near-term, Superfund-related regional needs.





# Career Development Opportunities

**Regional Research Partnership Program (R2P2)** - A short-term training opportunity for Regional scientists to work with ORD scientists at ORD laboratories, centers, or offices. The program is designed to:

- Enhance the knowledge and skills of Regional and ORD staff
- Help build technical capacity in the Regions
- Promote the development of stronger linkages between ORD and the Regions

## **Regional-ORD Community of Science Networking Program (ROCS-Net)**

- An orientation and networking program for Regional, state, and tribal scientists who have limited familiarity with ORD

- Provides an opportunity for technical staff to visit an ORD research facility for discussions about ORD research activities and capabilities, research priorities, and collaborative research opportunities
- Provides path to future collaborations through RARE and R2P2
- Strengthens science across EPA by creating a community of science between ORD, the Regions, the states, and tribes
- Supports up to 10 regional, 20 state & 10 tribal staff per year





# Other ORD Resources

## Regional Science Program (RSP) Tracker Database

Searchable tool for regional ORD research collaboration and networking projects

## EPA Science Models and Research Tools (SMaRT)

Searchable inventory of freely available models, tools, and databases from ORD

## EPA's Research Website

ORD's most current and active research

## Research Approval Planning Implementation Dashboard (RAPID)

EPA internal research outputs and products database

## EPA's Science Inventory

Searchable catalog of EPA's published research

## Monica Rodia

ORD Senior Indian Program Manager/Tribal Science Council Executive Secretary

**(202) 564-8322**



## ORD Research Products and Tools Webinar Series

To help ensure that EPA research products and science-based tools are useful and accessible to needs on the ground, ORD hosts a public monthly **EPA Tools and Resources webinar series** to share ORD research, demonstrate tools and seek input from our partners.

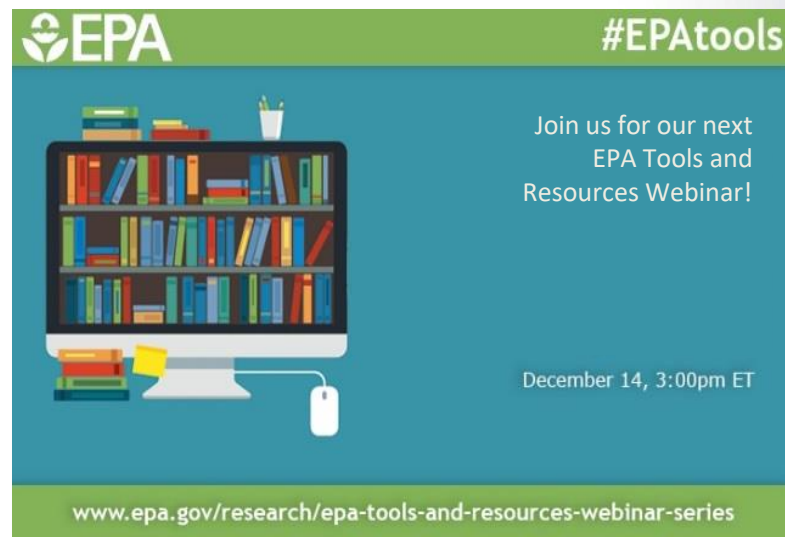
### Webinar Topics include:

- Human Health Risk Assessment
- Waste and Materials Management
- Contaminated Sites Topics

### When?

- Generally, the **3<sup>rd</sup> Wednesday of every month**, 3-4 PM ET

Past webinars and upcoming registration at: <https://www.epa.gov/research/epa-tools-and-resources-webinar-series>





## ORD STL “In House” Expertise, Region 6

### Previous activities performed:

- Document Reviews
  - In Situ Chemical Oxidation (ISCO)
  - In Situ Chemical Reduction (ISCR)
  - Monitored Natural Attenuation (MNA)
  - Combined Effects
- Site compliance inspections





## ORD STL “In House” Expertise, Region 6

### Previous activities performed:

- Field Oversight
- Pilot Project Oversight
- Emergency Response





## Contact Info

**Terry Burton**

**USEPA, Region 6**

**Office of Research and Development  
Superfund and Technology Liaison (STL)  
Associate Director, Site Characterization  
and Monitoring Technical Support Center**

**Burton.Terry@epa.gov**

**817-751-4361**

Thank you!

Questions?

