



ORD's Contaminated Sites Research and Technical Support Program

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US EPA Office of Research and Development

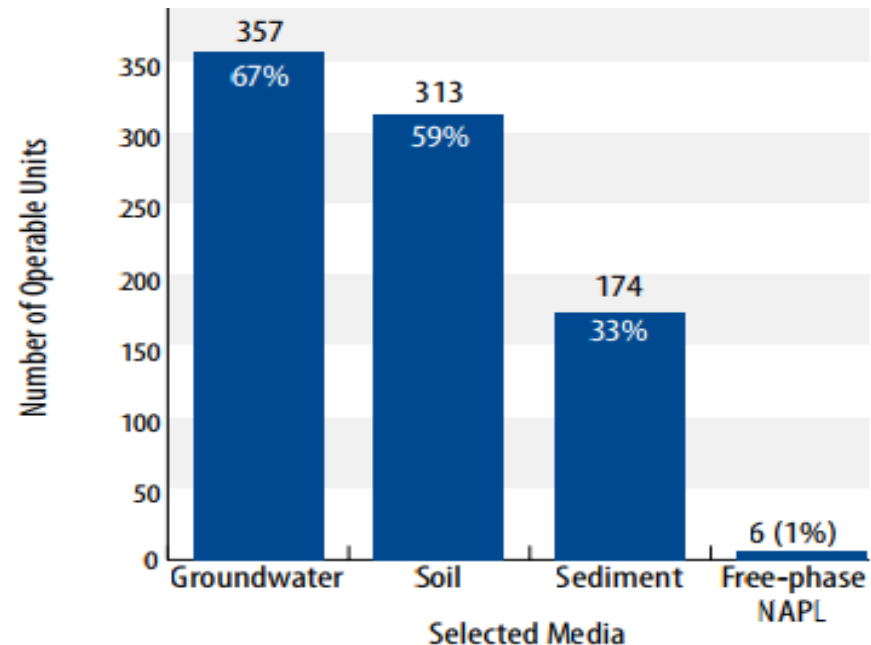
EPA Tools and Resources Webinar

December 17, 2018

Problem

- Contaminated groundwater at 67% of Superfund site Operable Units (OUs)
- Contaminated soil at 59% of OUs
- Contaminated sediments at 33% of OUs
- Organic (e.g. PCBs) and inorganic (e.g. Pb) contaminants in these media pose exposure health risks and environmental degradation
- Vapor intrusion can also be a long term health risk if soil and groundwater contaminants migrate into buildings
- Statutes: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Brownfields

Number of Operable Units in the Remedial Investigation/Feasibility Study phase with Contamination in Selected Media



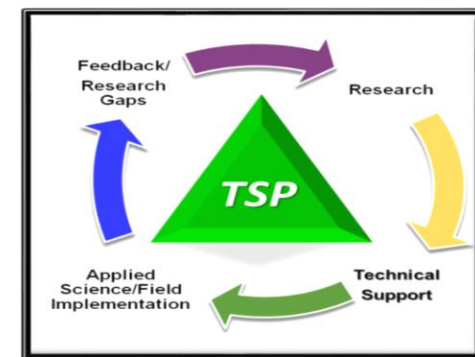
- Total Number of OUs = 531
- 4 OUs with contaminant data did not specify media.

(Source: Superfund Remedy Report, 14th Edition, EPA 542-R13-016, 2013)

Approach

- **EPA Strategic Plan** (Objective 1.3 – Revitalize Land and Prevent Contamination)
- **ORD's Sustainable and Healthy Communities (SHC) Research Program** <https://www.epa.gov/land-research/research-management-contaminated-sites>
- **Objective:** Provide *research and site-specific technical support* on characterization and remediation efforts, and *share information/best practices* with EPA program and regional offices, states, tribes and other federal agencies
- **EPA Technical Support Program**
 - ORD
 - Office of Land and Emergency Management (OLEM)
 - Regional Offices

<https://www.epa.gov/land-research/epas-technical-support-centers-contaminated-sites>



Approach

EPA ORD has expertise in contaminated site treatment and technologies (groundwater, soil and sediments)

- Provides the scientific foundation and technical knowledge to support contaminated site cleanups nationwide
- Advances the science and engineering needed for assessment, remediation, and reuse of contaminated sites
- Produces guidance and technical support for EPA regional offices, state and tribal needs

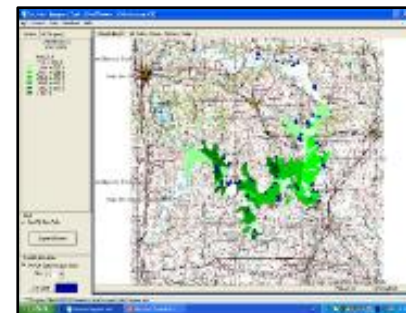
<https://www.epa.gov/land-research>



ORD Research Program

Results

- Contaminated Groundwater, Sediments, and Vapor Intrusion Research Products
 - Addressing knowledge gaps related to site characterization and remediation research
 - Addressing priority research needs
- Tools for Evaluating Spatio-Temporal Impacts on the Environment
 - Modeling contaminant changes in groundwater, vapors, and/or sediments coupled with social and economic factors related to community water supplies
- Technical Support
 - Providing high-quality, quick-response technical support

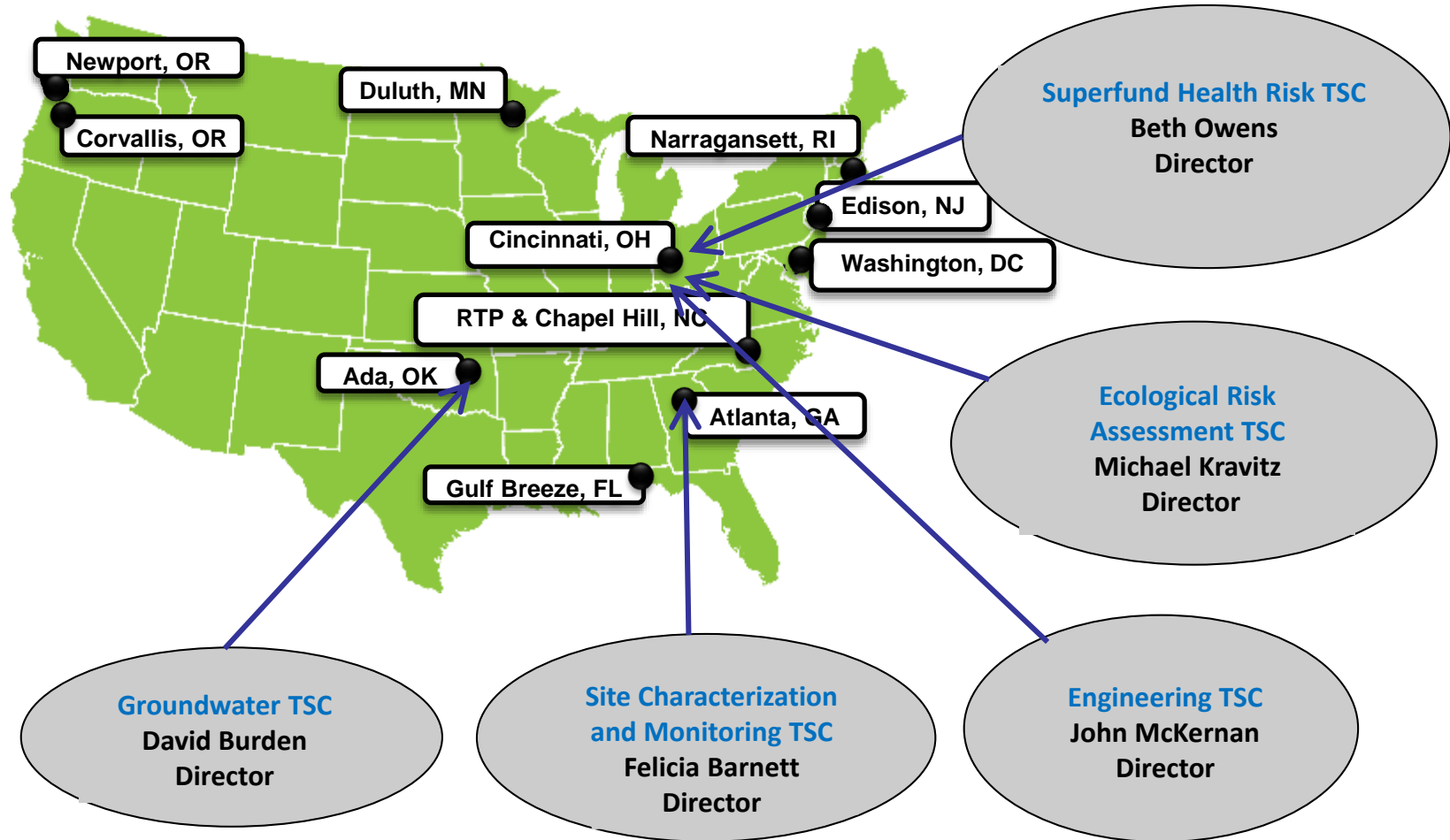


ORD Technical Support Centers

States and tribes should contact the EPA Region to access TSCs

ORD has 5 Technical Support Centers (TSCs) that help integrate science & technology into hazardous waste cleanup activities.

These centers offer scientific expertise and services to EPA's program and regional offices on site characterization, modeling, monitoring, assessment and remediation.

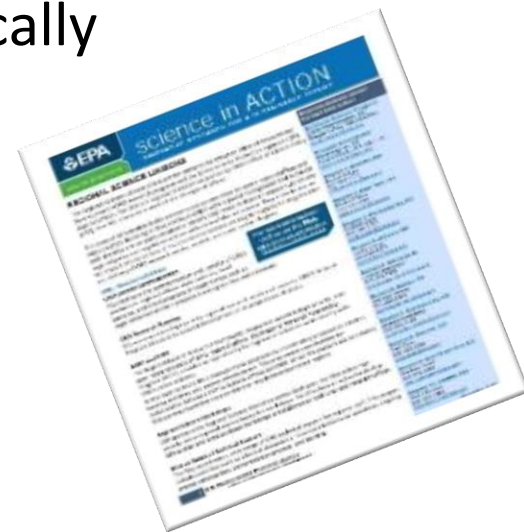


ORD Regional Science Program

- Regional Science Liaison (**RSL**) and Superfund and Technology Liaison (**STL**) located in each EPA regional office
- The STLs facilitate regional, state and tribal access for ORD technical assistance for high priority contaminated site characterization and remediation issues
- The mission of the STL program is to assist regional project managers in the regional hazardous waste programs with technical support that will help them make scientifically defensible site cleanup decisions

STL Program fact sheet:

https://www.epa.gov/sites/production/files/2016-12/documents/stl_factsheet122016_3.pdf



Groundwater TSC

Located in Ada, OK

- Technical assistance on CERCLA, RCRA, Brownfields sites and ecosystem restoration issues
- Guidance in site characterization investigations, remedial investigations, feasibility studies, and identification and selection of remedial alternatives
- Guidance on groundwater modeling applications, and in review of site-specific modeling efforts
- Assistance in design, testing, implementation and evaluation of new and innovative technologies to treat contaminated soils and groundwater and to restore sensitive ecosystems

<https://www.epa.gov/water-research/ground-water-technical-support-center-gwtsc>



Engineering TSC

Located in Cincinnati, OH

- Provides short- and long-term assistance to Superfund and RCRA Corrective Action staff
- Focuses on treatment technologies and engineering approaches to site management at any phase from problem identification through remedial action



Site Characterization and Modeling TSC

Located in Atlanta, GA

- Provides technical assistance on complex hazardous waste site characterization issues through specialized teams of scientists equipped to aid the regions with screening and site characterization
- Diversity of expertise allows the Center to work with the regional programs at any time during a site characterization event



Superfund Health Risk TSC

Located in Cincinnati, OH

- Provides technical support to EPA program and regional offices in the area of human health risk assessment
- Examples include the development of Provisional Peer-Reviewed Toxicity Value (PPRTV) assessments, scientific consultations, and support for interpreting Agency publications and other guidance, and risk assessment methods research on chemical pollutants



Ecological Risk TSC

Located in Cincinnati, OH

- Provides technical information and addresses scientific questions on topics relevant to ecological risk assessment at hazardous waste sites for Superfund and RCRA Corrective Action staff
- Center experts develop state-of-the science responses for ecological risk assessments
- Serves as a central communication point distributing responses to interested parties outside the Agency



Case Study: Delatte Metals Superfund Site (Ponchatoula, LA)

Problem

- Former spent lead-acid battery demolition facility; multiple source zones for lead, cadmium, nickel and acid
- NPL site in 1999; manure/limestone permeable reactive barrier (PRB) was installed in 2003

Action

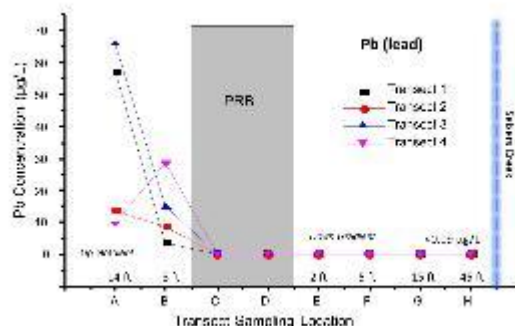
- EPA Region 6 requested technical assistance from ORD's Groundwater TSC
- Contaminated groundwater research site: geochemical behavior and long-term PRB performance
- ORD has conducted annual or semi-annual performance monitoring since 2003

Result

- ORD research has documented consistent performance over 14 years; acid neutralized and lead, cadmium, nickel and aluminum have been removed; continuing to monitor arsenic and ammonia in downgradient regions

Impact

- ORD is uniquely positioned to evaluate long term performance of this PRB and PRBs at other sites
- This PRB continues to effectively treat the contaminated plume, providing evidence that supports PRBs as cost-effective, long-lasting remediation solutions



Case Study: Tar Creek Superfund Site

(NE Oklahoma; SE Kansas; SW Missouri)

Problem

- Tri-State Mining District (OK, KS, MO) in multiple jurisdictions
- Source control (lead, zinc, heavy metals, acidity) and surface/subsurface contamination issues
- EPA Region 6 requested assistance from ORD's Engineering TSC and Groundwater TSC

Action

- Source control options for mining related sites (such as grouting, in-situ soil amendments)
- Techniques to replenish nutrients in soil with organic material such as biosolids, compost, or animal manure
- Fate and transport modelling of mine tailing deposition areas in surface waters
- Chat pile characterization for evaluating remediation options

Result

- Numerous ongoing investigations and technical assistance efforts

Impact

- ORD's Groundwater and Engineering TSCs are working collaboratively with EPA Regions 6 & 7 and other federal, state and tribal stakeholders to develop a suite of approaches to evaluate the impact of land management practices on water and sediments, and guide further decisions on this complex contaminated mega-site



Case Study: Characterizing Urban Background Levels for Contaminated Site Cleanup Levels (*Southeastern States*)

Problem

- In urban settings, many times unclear whether soil contaminant concentrations are site-related or are part of natural (anthropogenic) background
- Robust data on urban background concentrations are lacking; nationwide USGS study excluded urban areas from sampling

Action

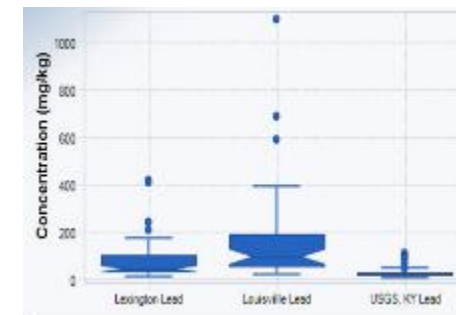
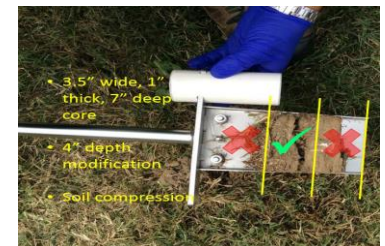
- US EPA Region 4, in cooperation with Southeastern states, requested assistance from the Site Characterization and Monitoring TSC
- Support a multi-city sampling study to help hazardous waste site managers differentiate between site-related contamination and contamination from nearby urban background non-point sources

Results

- Developed sampling protocol, tools and new approaches to negotiate city access
- Analytical data received for 8 cities
- Some metals (e.g. Pb) have urban concentrations greater than those found in USGS data

Impact

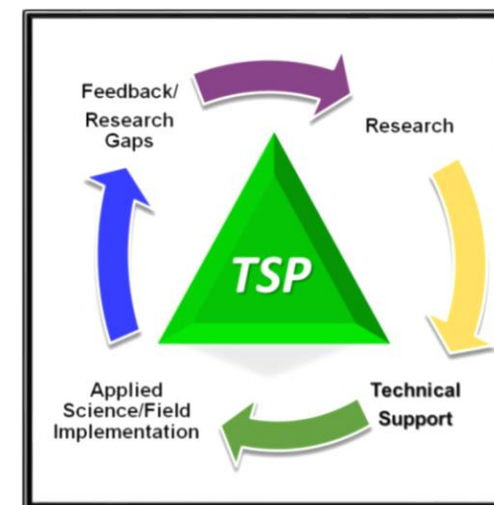
- Summary statistics for each contaminant by city used for site screening; assisted site managers in determining reasonable cleanup levels - leading to lower costs and more realistic cleanup expectations
- Sampling plan and QAPP used to establish background for a Region 4 Superfund site is under consideration for use in other regions/states



Summary



- EPA ORD provides the scientific foundation and technical knowledge to support contaminated site cleanups nationwide
- EPA research advances the science and engineering needed for assessment, remediation and reuse of contaminated sites
- ORD's Technical Support Program:
 - Provides technical assistance to EPA Regions (Remedial Project Managers, Corrective Action staff and On-Scene Coordinators) and indirectly states and tribes
 - Consists of a network of regional forums and specialized TSCs at ORD labs
 - Provides site-specific technical support on remediation efforts and share information/best practices with EPA program and regional offices, states, tribes and other federal agencies
 - TSCs help integrate science and technology into hazardous waste cleanup activities
- Contaminated Site Cleanup Information: <https://clu-in.org/>



Interstate Technology & Regulatory Council (ITRC)

ITRC is a state-led coalition working to reduce barriers to the use of innovative environmental technologies and approaches

- EPA ORD scientists work on **ITRC teams** (e.g., PFAS, Stormwater) to develop technical guidance documents and training courses on innovative technologies, processes and best practices
- ORD is partnering with the **ITRC State Engagement Program** to share information about EPA research and to better understand the states' environmental priorities and technical constraints preventing solution

For more information: <https://www.itrcweb.org/>



ORD Superfund Technology Liaisons

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