EPA
United States
Environmental Protection
Agency

Research Based Technical Support to Clean Up Contaminated Sites

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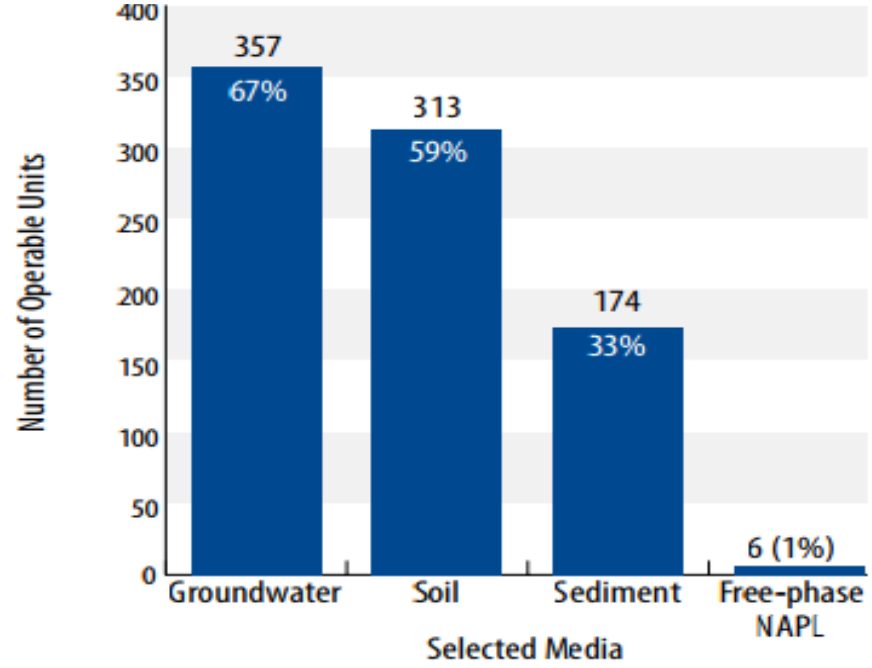
ERIS Board-EPA Joint Meeting
July 11, 2017

Problem

- Contaminated groundwater at 67% of Superfund site Operable Units (OUs)
- Contaminated soil at 59% of OUs
- Contaminated sediments at 33% of OUs
- Organic (ex. PCBs) and inorganic (ex. lead) 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
- CERCLA, RCRA, Brownfields, etc.

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/Action

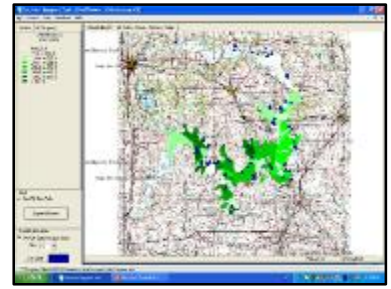
- EPA/ORD has in-depth expertise in contaminated site treatment and technologies (groundwater, soil, sediments)
  - Provides the scientific foundation and technical knowledge to support contaminated site cleanups
    - Advances the science and engineering needed for assessment, remediation, and reuse of contaminated sites
      - Produces guidance and technical support for regional office, state, and tribal needs

Result

- Technical Support
  - Providing high-quality, quick-response technical support

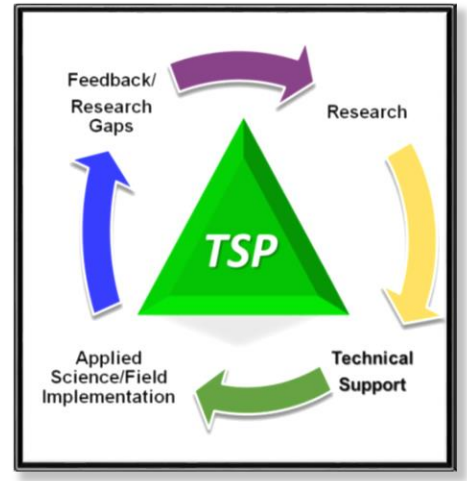
- Contaminated Groundwater, Sediments, and Vapor Intrusion Research Products
  - Addressing knowledge gaps related to site characterization and restoration research
  - Providing EPA program office priority research needs

- 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



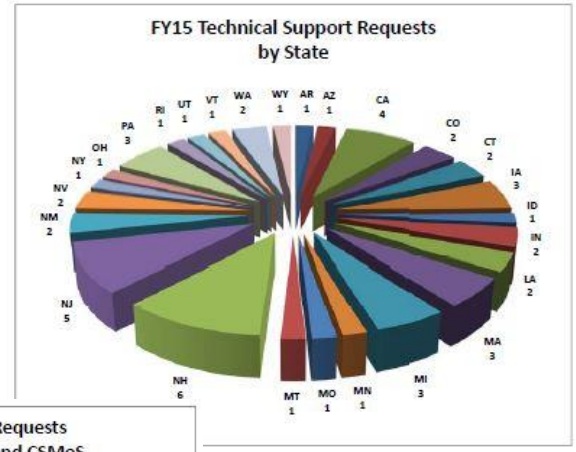
Impact

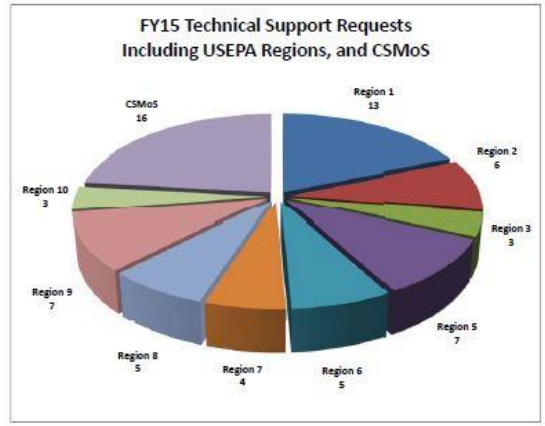
- ORD's Technical Support Program (TSP)
  - Provides technical assistance to regional Remedial Project Managers, Corrective Action Staff and On-Scene Coordinators
  - Consists of a network of regional forums and specialized technical support centers at ORD labs
  - Objective: Provide site-specific technical support on remediation efforts and share information/best practices with EPA program offices and regions, states and tribes and other federal agencies
  - Technical Support Centers (TSCs)
    - Groundwater TSC
    - Engineering TSC
    - Site Characterization & Monitoring TSC
    - Human Health Risk Assessment TSC
    - Environmental Risk Assessment TSC



Accessing ORD Technical Support

- EPA's Regional Science Program plays a vital role in facilitating regional and state access to the ORD TSCs
- Program is coordinated by Regional Science Liaisons (RSL) and Superfund and Technology Liaisons (STL) located in each EPA regional office
- The RSLs and STLs facilitate ORD technical assistance for high priority contaminated site remediation issues
- www.epa.gov/osp



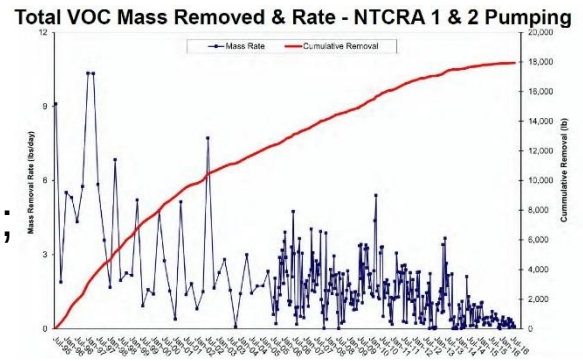


Groundwater TSC (GTSC)

- 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 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

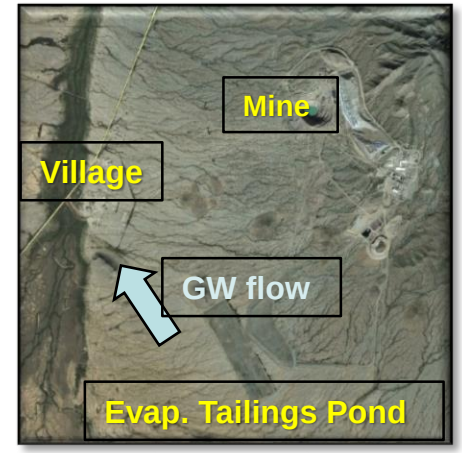
Case Study #1

- Solvent Recovery Services of New England (Southington, CT)
  - Problem:
    - Former waste recovery oil facility (solvents, oils)
    - 4-acre groundwater plume on 42-ac site
    - Soil cleanup criteria exceeded by orders of magnitude
    - Downgradient municipal water wells closed
  - Action:
    - USEPA Region 1 requested technical assistance from the Groundwater Technical Support Center (GTSC)
  - Result:
    - GTSC defined treatment area, reviewed remedy design, and monitored system implementation
  - Impact:
    - Thermal remediation performance metrics realized:
      - 496,400 lbs. of chlorinated VOCs (CVOCs) removed
      - 99.7% mass removal of CVOCs from soil
      - 95% reduction in average groundwater CVOCs
    - Monitored natural attenuation (MNA) now being used onsite; "working and protective"
    - US EPA Region 1, CT DEEP, Future: "Rails to Trails"



Case Study #2

- Cyprus Tohono Mine Alternative Superfund Site (Casa Grande, AZ)
  - Problem:
    - 4,180-acre mine site; located 32 mi S of Casa Grande
    - 120-yr history of copper and precious metal mining
  - Action:
    - US EPA Region 9 requested technical assistance from the Groundwater Technical Support Center (GTSC)
  - Result:
    - GTSC reviewed groundwater model in support of Region 9 and Tohono O'odham Indian Nation
  - Impact:
    - Review determined:
      - Alluvial model should be separated from the bedrock model
      - Boundary conditions used for fault zone not supported
      - Perchlorate and sulfate in alluvium will continue to migrate
    - US EPA Region 9, ADEQ, Tohono O'odham Indian Nation

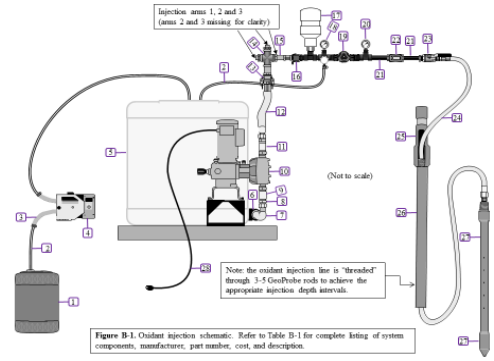


Case Study #3

- US Marine Corp Recruit Depot, Parris Island, SC
  In-Situ Chemical Oxidation (ISCO)

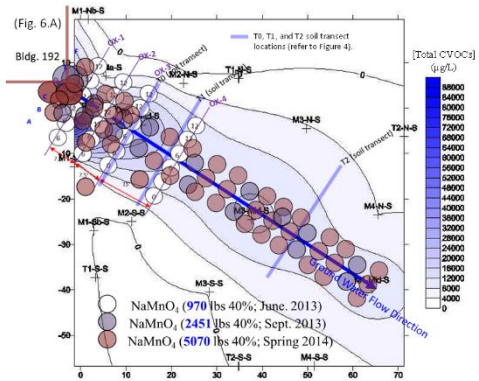
- Problem:
  - Chlorinated solvents (PCE and byproducts)
  - Above and below ground impediments
- Action:
  - US EPA Region 4 requested technical assistance from the Groundwater Technical Support Center (GTSC)
  - Pilot-scale demonstration of ISCO

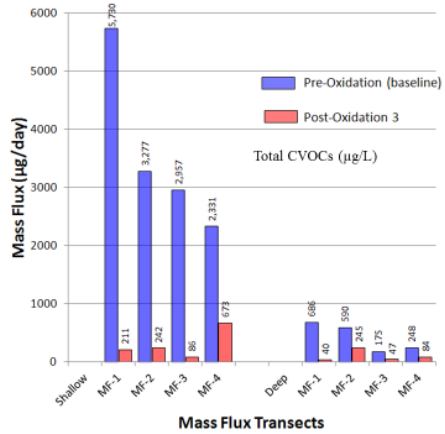
- Result:
  - High-resolution site characterization – accurate depiction of site (HRSC narrowed contamination to 1/3 of aquifer requiring ISCO)
  - GWERD designed, constructed, & deployed portable, low-cost/efficient injection system
  - Injection strategy designed to optimize oxidant delivery and distribution (small ROIs, short injection screens, low pressure injections, multiple injection points)
  - $NaMnO_4$; 3 injections; rigorous CVOC/$NaMnO_4$ monitoring



Case Study #3 (continued)

- US Marine Corp Recruit Depot, Parris Island, SC (ISCO)
  - Impact:
    - Reduction in total CVOC flux; 92% (shallow micro-wells), 67% (deep micro-wells)
    - Recommendations provided for full-scale deployment
    - ISCO technology selected as final, full-scale remedy
    - EPA research report; 2 journal articles on design guidelines
    - USEPA Region 4, SC DHEC, USMC, US Navy





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