

In Situ Bioremediation Services



AECOM bioremediation practitioners have performed successful bioremediation field implementation projects across North America, Asia, Europe and Australia.

Areas of Expertise

- Conceptual Site Model Development
- Geological and Contaminant Characterization
- Contaminant Fate and Transport Modeling
- Innovative Biological and Isotopic Tools
- Treatability Studies
- Bioremediation Pilot Studies
- Bioremediation System Design and Construction
- Bioremediation System Optimization/O&M
- Strategy Planning/Agency Negotiation
- Enhanced Reductive Dechlorination

Overview

In situ bioremediation represents a green and sustainable approach to the remediation of recalcitrant compounds in soil and groundwater because it uses naturally occurring or augmented microorganisms to destroy contaminants *in situ*.

An *in situ* bioremediation system is a complex living system. AECOM uses innovative environmental management tools to identify and enhance the functionality of the biogeochemical system. The remediation and monitoring systems are designed and implemented to be adaptive and flexible to optimize the treatment effectiveness and efficacy throughout the life of projects.

Our Approach

AECOM supports all aspects of our clients' bioremediation projects with particular emphasis on the bioremediation of chlorinated compounds, PFAS, petroleum compounds, 1,4-dioxane, and metals in soil, sediment and groundwater. In combination with the treatability study laboratory, and through technical partnerships, AECOM's practitioners have implemented *in situ* bioremediation remedies at project sites across North America, Asia, Europe and Australia. AECOM is a reliable partner for all stages of the process, from the implementation stage - including site inspection and remedial investigation, technology selection, laboratory treatability study, field pilot study, full-scale remedial design and construction - through system optimization, performance evaluation, long-term monitoring, and site closeout.

Areas of Expertise

- **CONCEPTUAL SITE MODEL DEVELOPMENT** - AECOM's unequalled staff of highly trained Geologists and Hydrogeologists access the latest technologies, including Environmental Sequence Stratigraphy, to develop a clear and accurate conceptual site model.
- **GEOLOGICAL AND CONTAMINANT CHARACTERIZATION** - AECOM routinely employs direct-sensing tools such as Membrane Interface Probe, Laser Induced Fluorescence, Hydraulic Profiling Tools and Electrical Conductivity Tools to obtain real time data that compresses the investigation timeline and decreases cost. These data inform the CSM and guide *in situ* bioremediation design/implementation.
- **CONTAMINANT FATE AND TRANSPORT MODELING** - Using the most sophisticated numerical modeling techniques combined with three dimensional data visualization and analytics tools, our scientists define the sources affecting groundwater and understanding of the target treatment level to develop a protective and cost effective bioremediation approach.
- **INNOVATIVE BIOLOGICAL AND ISOTOPIC TOOLS** - In addition to using advanced microbiological and isotopic evaluation tools, AECOM collaborates with academic partners in tool development. A case in hand is the development of biomarkers for evaluation of 1,4-dioxane biodegradation, which was a collaborative effort between AECOM and UCLA.



In Situ Bioremediation Services *(continued)*



- **TREATABILITY STUDIES** - We routinely evaluate bioremediation technologies at the bench scale. AECOM has a state-of-the-science treatability study laboratory, where we perform batch and column tests to evaluate biostimulation and bioaugmentation to promote metabolic (aerobic and anaerobic) and aerobic cometabolic biodegradation.
- **BIOREMEDIATION PILOT STUDIES** - Our team has extensive experience with a number of common technologies including groundwater recovery and recirculation, biosparging, and bioremediation amendment injection, allowing us to develop specialized teams to execute pre-design tests quickly and efficiently. AECOM owns scores of mobile pilot testing trailers and can quickly and efficiently deploy experienced professionals and specialized equipment to any project site.
- **BIOREMEDIATION SYSTEM DESIGN AND CONSTRUCTION** - Our broad range of services allows for creative solutions to challenging problems. Our combination of expert senior remediation staff, broad remediation skills, regulatory knowledge, and well-balanced design/construction solutions offers our clients the most advantageous choice in a remediation contractor. Whatever the unique challenges posed, we select appropriate personnel to match site needs. AECOM's experience in self-performing remedy construction means our design staff has a practical, hands-on focus to preparing designs/implementing remedies.
- **BIOREMEDIATION SYSTEM OPTIMIZATION/ O&M** - The ultimate goal for all remediation projects is regulatory closure, achieved through the cost-effective application of the best available corrective action technologies and focused operations. AECOM provides cost effective and "value added" management of O&M projects that assist our clients in maintaining compliance while achieving regulatory closure.



- **STRATEGY PLANNING/AGENCY NEGOTIATION** - A critical step in remediation is effective agency negotiation of technical scopes of work for the greatest flexibility in selection of remediation options and constructability of the remedy. We offer extensive experience with regulators on a variety of negotiation terms to effectively negotiate the most favorable terms for the investigation, design and remediation process. AECOM's "Integrated Site Closure" approach also means looking ahead to avoid or minimize liabilities such as third party law suits or natural resource damage claims.

Key AECOM Attributes

- **TECHNICAL PRACTICE NETWORK (TPN)** - a virtual community of dedicated professionals that drive continuous improvement. Comprised of 24 environmental Technical Practice Groups, they disseminate technical knowledge and practice-specific experience through an extensive library of technical resources, company-wide technical webinars, and participation at industry-leading seminars.
- **COMMITMENT TO SAFETY** - AECOM's safety culture is inherent in every project. With client accolades ranging from BP to the U.S. National Safety Council, our professionals around the globe understand the importance and value of safety.
- **GREEN REMEDIATION EXPERIENCE** - We incorporate green remediation into our projects to reduce the impact of our cleanup techniques on the environment, and to reduce costs.
- **COMMITMENT TO INNOVATION** - AECOM's commitment to innovation is illustrated by our research and development partnerships with our academic, private, and government colleagues and clients, as well as AECOM's Innovation Fund, which seeks and invests in innovative ideas and tools to advance *in situ* bioremediation, as well as other innovative remediation technologies.

