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Remediation Technologies Development Forum

RTDF

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Current RTDF Action Teams

Bioremediation Consortium

IINERT Soil-Metals Action Team

Permeable Reactive Barriers Action Team

Phytoremediation of Organics Action Team

Sediments Remediation Action Team

The Remediation Technologies Development Forum (RTDF) was established in 1992 by the U.S. Environmental Protection Agency (EPA) to foster collaboration between the public and private sectors in developing innovative solutions to mutual hazardous waste problems. The RTDF has grown to include partners from industry, several government agencies, and academia who share the common goal of developing more effective, less costly hazardous waste characterization and treatment technologies.

The RTDF is one of a few government programs designed to foster public-private partnerships to conduct laboratory and applied field research to develop, test, and evaluate innovative remediation technologies. Through the unprecedented collaboration of the RTDF, companies, government agencies, and universities voluntarily are sharing knowledge, experience, equipment, facilities, and even proprietary technology to address mutual remediation problems. Individual RTDF Action Teams also interact and communicate with other consortia including the Consortium for Site Characterization Technology and the Advanced Applied Technology Demonstration Facility.

RTDF Mission

The purpose of the RTDF is to identify what government and industry can do together to develop and improve the environmental technologies needed to address their mutual cleanup problems in the safest, most cost-effective manner. The RTDF fosters public- and private-sector partnerships to undertake the research, development, demonstration, and evaluation efforts needed to achieve common cleanup goals.

RTDF Objectives

The RTDF is dedicated to advancing the development of more permanent, cost-effective technologies for the remediation of hazardous wastes. The RTDF works to achieve this goal by:

- Identifying priority remediation technology development needs.
- Establishing and overseeing action teams to plan and implement collaborative research projects to address remediation problems.
- Addressing scientific, institutional, and regulatory barriers to innovative treatment technologies.

RTDF's Structure

The RTDF establishes self-managed action teams that bring members together to work on their highest priority problems. Action areas and priorities are determined by the members of RTDF Action Teams. These teams:

- Share information about planned and ongoing research.

- Define needs, develop detailed project plans, and implement projects that often entail field-scale demonstrations.
- Ensure that all work is founded on sound scientific and engineering principals.
- Enlist partners to support and participate in the collaborative efforts, either with in-kind support or direct funding.
- Produce and disseminate scientifically credible results to facilitate broad acceptance of the technology.

Organizations interested in pursuing research in areas that are not being addressed by an existing Action Team may organize to implement the research and be recognized as an RTDF Action Team.

RTDF Membership

All interested organizations are welcome to participate in the RTDF. There are no minimum requirements such as dues, meeting attendance, or participation in an RTDF Action Team. Current participants include industries that are facing a variety of remediation problems (e.g., chemical, petroleum, and pharmaceutical companies and various manufacturers), federal agencies, state governments, national laboratories, research centers, and universities.

There is a distinction between participating in the RTDF and becoming an active member of one of the RTDF Action Teams. Certain Action Teams have minimum criteria for membership that must be met in order to participate in their meetings and activities. The tremendous success of the RTDF can be attributed to the willingness of its participants to become members of and actively contribute to the Action Teams that are performing the collaborative research and development efforts.

The Roles of Action Team Members

EPA facilitates the operation of the Action Teams and the RTDF Steering Committee, and contributes its research efforts to the jointly-led projects. EPA also assists in working with states and other regulatory agencies to conduct demonstration projects.

Industrial participants help set priorities based on remediation problems they face, serve as co-team leaders, and offer both in-kind and monetary resources to support joint projects. The U.S. Department of Energy (DOE), U.S. Department of Defense (DOD), and other federal agencies suggest priority problems in their roles as owners of remediation problems, as well as offer sources of funding and make joint research contributions. They also perform a vital function by making available military bases and facilities with contamination problems at which field-scale testing can be conducted. Universities and other research institutions provide state-of-the-art science and engineering expertise from their existing research bases and help assure that sound engineering and scientific principles are followed.

RTDF Funding Sources

EPA provides funding for RTDF research activities, as well as support for RTDF and Action Team meetings. Other federal agencies, e.g., DOE and DOD, as well as industrial and academic participants are providing funding, laboratory, and field support for research activities undertaken by the Action Teams. Participants in each Action Team provide funding and/or in-kind support for specific research efforts of the team. RTDF members are jointly supporting research efforts, valued at well over $20 million, at more than 30 sites throughout the United States (see map on next page for some of the sites where field work is ongoing).

RTDF's Priority Action Areas

Action Teams currently are active in addressing five priority areas. The activities undertaken by the five active Teams focus on the development, testing, and evaluation of *in situ* remediation technologies. The priorities and activities of the teams include:

Bioremediation Consortium—Design, demonstrate, and evaluate accelerated anaerobic biodegradation of chlorinated solvents in soils and ground water; generate data needed to determine the effectiveness of intrinsic bioremediation (natural biological degradation) as an accepted remedial approach; and develop a cost-effective bioventing process that promotes the cometabolic bioremediation of chlorinated solvents in the vadose zone.

Permeable Reactive Barriers Action Team—Develop, encourage the use, and monitor long-term performance of permeable reactive barriers for the remediation of organic and inorganic ground-water contaminants.

Sediments Remediation Action Team—Develop and evaluate passive, *in situ* techniques to remediate sediment contaminants, such as polycyclic aromatic hydrocarbons (PAHs) and metals; investigate the mechanisms and rates of natural biological degradation; and enhance or develop

assessment procedures to evaluate the need for and success of remedial activities.

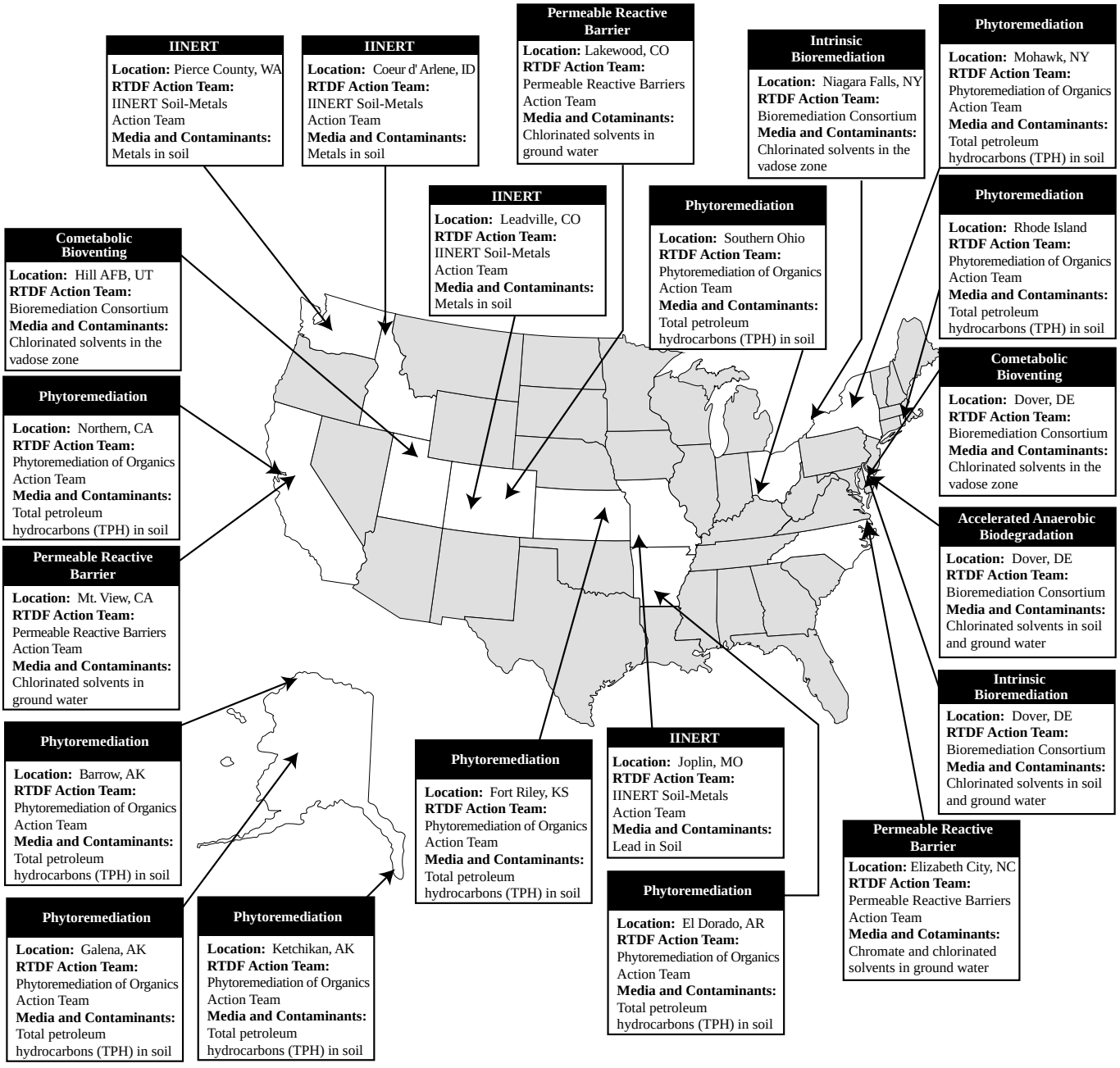
In-Place Inactivation and Natural Ecological Restoration (IINERT) Soil-Metals Action Team—Develop and demonstrate in-place activation and natural ecological restoration technologies that reduce and eliminate the risks of metals/metalloids in soil to human health and the environment.

Phytoremediation of Organics Action Team—Assess status of current phytoremediation research; determine how to address research gaps; and encourage consideration of phytoremediation to clean up sites with organic contaminants.

RTDF Accomplishments

RTDF Action Team members have collaborated on a number of successful efforts, including:

The design, development, and demonstration of the Lasagna™ Remediation Technology, a multi-year



effort, was successfully completed in 1998 by the Lasagna™ Partnership, one of the first RTDF Action Teams. The Lasagna™ process uses electro-osmosis to transport contaminates, in this case trichloroethylene (TCE), through a series of planar treatment zones consisting of a mixture of granular carbon and iron filings. Based on successful field tests at the U.S. Department of Energy's (DOE) Paducah Gaseous Diffusion Plant (PGDP) at Paducah, Kentucky, the technology was selected and received regulatory approval in 1998 for use in commercial cleanup of a large contaminated cell at PGDP. Licenses for use of the technology at other sites are a vailable from the Monsanto Company, which holds the patents.

The Bioremediation Consortium conducted a four-year Phase I intrinsic bioremediation study at the Area 6 site at Dover Air Force Base (AFB), Delaware. Results indicate that the concentration of chloroeth ylenes in shallow ground water decreased markedly over the test period. The Consortium also conducted a proof of technology pilot test of accelerated anaerobic biodegradation at a Dover AFB site contaminated with TCE and dichloroethylene (DCE) from 1996 to 1998. During the test, TCE and DCE in ground water were converted to ethylene and 75 % to 80% of the TCE and DCE were recovered as ethylene.

Studies conducted by the IINERT Action Team at a Joplin, MO, site showed that the application of phosphorus (P) to lead (Pb)-contaminated soil reduces Pb in plants as much as 80%. In addition, dosing studies conducted by the Team with immature pigs and weaning rates have shown a significant reduction of Pb bioavailability in soils treated with phosphorus.

The Permeable Reactive Barriers Action Team, in partnership with the Interstate Technology Regulatory Cooperation (ITRC) Permeable Barriers Working Group, developed and began delivering in 1999 in a training course to assist regulatory professionals in overseeing the design, implementation, and monitoring of ground-water remedies that involve the deployment of permeable reactive barriers (PRBs).

The Phytoremediation of Organics Action Team developed a standardized field test protocol for determining the efficacy of agricultural and non-crop plants for degradation of petroleum hydrocarbons in soil at multiple locations and under varied climatic conditions. In addition, Team developed a large bibliography of peer-reviewed journal articles, presentations and posters from conferences, book chapters, and articles from newspapers and magazines. This bibliography is available in searchable format on the Action Team's home page on the RTDF World Wide Web site (www.rtdf.org).

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Would You Like More Information?

For information on the RTDF or other Action Teams, please visit the RTDF World Wide Web site at www.rtdf.org or contact:

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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