Advanced Environmental Technologies LLC

OPPORTUNITIES FOR ENVIRONMENTALLY IMPACTED REAL ESTATE DEVELOPMENT

AET CAN HELP ON PROPERTY DEVELOPMENT

Advanced Environmental Technologies, LLC (AET) understands the environmental challenges associated with property development, and focuses on providing cost-effective and practical solutions to these challenges. AET's group of environmental service and technology professionals (with backgrounds in environmental science, engineering, geology, and soil science) have successfully designed, implemented, and managed environmental projects that were tailored to site-specific conditions, contaminants, and other challenges. As part of your team, we carry out the environmentally relevant tasks throughout the process, from Phase I ESA to site cleanup and closure. Our ESA (environmental site assessment) services will help you meet lender requirements, obtain innocent landowner protection, and substantially enhance the value of the environmentally impacted properties, such as brownfield locations.

Our technical expertise in cleaning up contaminated sites also help open doors to brownfield properties that are usually depreciated by contamination and the associated environmental liabilities.

We also provide solutions in improving landscaping by improving soil health, reducing water usage, reducing chemical fertilizer usage, and help achieve sustainability and carbon neutral.

SERVICES

1. Identifying if there is any issue – Phase I ESA (ASTM Standards)

- Paper study; records research; identifying recognized environmental conditions (RECs)

2. Confirming/Delineating RECs – Phase II ESA

- Testing soil, groundwater, soil vapor, and/or indoor air

3. Additional delineation through remediation – Phase III ESA

- Soil and groundwater sampling
- Remedy selection (feasibility studies, risk assessments)
- Remediation (Cleanup, monitoring, closure)

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COMMON CONTAMINANTS TREATED

- Asbestos
- Petroleum hydrocarbons
  - Light Non-aqueous Phase Liquid (LNAPL)
  - Gasoline and diesel range organics
  - Benzene, toluene, ethyl benzene, and xylenes (BTEX)
  - Polyaromatic Hydrocarbons (PAHs)
  - MTBE
- Dry Cleaning Solvents
  - Dense Non-aqueous Phase Liquid (DNAPL)
  - Dry cleaning solvents such as perchloroethylene (PCE), trichloroethene (TCE), dichloroethenes (DCEs), vinyl chloride (VC)

CONVENTIONAL REMEDIATION TECHNOLOGIES

- Dig and haul
- Bioremediation
- Chemical oxidation
- Chemical reduction
- AS/SVE

AET'S PATENTED TECHNOLOGIES

1. E-Redox®

E-Redox® is AET's flagship technology for clean-up of contaminated soil and groundwater and eliminate environmental liabilities. E-Redox® builds uniquely on manipulations of electron transfer to facilitate and expedite oxidative and reductive reactions, which are the two main pathways for remediation of environmental contaminants. Thanks to this mechanism, E-Redox® is not limited by and is favorable in treating tight matrix formations such as clay, silts, and bedrock fractures. Those tight formations widely exist, and they significantly challenge the applications of other technologies, which usually rely on injecting substances such as chemicals. The unique feature of E-Redox® overcomes this problem.

Dozens of full-scale field applications of E-Redox® during the past years have demonstrated the sustainability and cost-effectiveness of this technology in treating a number of recalcitrant contaminants in groundwater, soil, and sediments. There are two groups and respective configurations of E-Redox® technologies:

E-Redox (I) is for reductive applications (e.g., de-chlorination of dry cleaning solvents such as PCE, TCE, perchlorate and reduction of hexavalent chromium). In addition to

the cost savings, the highlights of this technology include its lack of restrictions by clay, silts, and bedrock formations and its applicability to contaminants of extremely high concentrations, including free phase ones.

E-Redox (O) is for bio-oxidation applications (e.g., petroleum hydrocarbon biodegradation). The highlights of this technology include its sustainability (zero energy consumption) and lack of restrictions by tight formations such as clay and silts.

Example applications for E-Redox® include:

- Organic contaminants, such as chlorinated solvents, PAHs, petroleum hydrocarbons
- Inorganic contaminants, such as perchlorate, nitrate, and metals
- Desorption of PFAS and other contaminants from solid into liquid phase for enhanced mass removal and destruction
- Stand-alone technology for treating a variety of contaminants *in situ* and *ex situ* applications
- Integration with other remediation technologies to achieve significant synergistic performance
- Enhance longevity of electron donating compounds
- Restoration and enhancement of permeable reactive barriers (includes de-passivation of ZVI)

Advantages of E-Redox®:

- Implementable in a wide range of matrices and is especially effective for low permeable contaminated zones such as clay, silts, and bedrock fractures
- E-Redox-I operation consumes minimum power (<50 W/unit) from household power outlets or solar panel sources
- E-Redox-O operation requires ZERO energy input
- Active treatment and virtual reactive barrier for sources and plumes
- Synergistic with other remediation technologies (e.g., carbon injection, electron donor injection, SVE, ISCR, ISCO, etc.)

2. Ginate®

Ginate® (OMRI Listed) is an organic soil amendment produced by a microbial-digestion process developed by AET. It uses low grade coal and small fraction of biomass, converting them into value-added organic soil amendments through a series of physicochemical and biochemical-catalyzed reactions. Through this process, stable structures of coal are weakened and altered, resulting in portfolio of carbon-rich compounds of different molecular sizes that are amenable to soil microorganisms (primarily bacteria and fungi) as well as plant roots and rhizosphere, establishing a healthy microbial/plant ecology in the rhizosphere environment.

Ginate® enhances biomass (particularly root biomass) 30-300%, saves water 15-30%, reduces nutrient input 30-70%, and cuts soil carbon emissions >10%. These features benefit urban/residential landscapes with poor soil fertility, as well as already established landscapes where water and nutrient run-off are important issues.

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