

WAYNE R. AMBER, Ph.D.

**Site Characterization/Groundwater Remediation
Environmental Management and Due Diligence
Solid Waste and Geotechnical**

EDUCATION

Ph.D. Geoenvironmental Engineering, Cardiff University, UK, 2007: Thesis entitled: "Enhanced Natural Attenuation of Organic Chemical Contaminants in Groundwater"

B.Eng. Civil and Environmental Engineering, Cardiff University, UK, 2001

CAREER SUMMARY

Dr. Amber is an Environmental Engineer with over twelve years of experience in the environmental/civil engineering industry. His graduate/postgraduate-level academic research generally encompassed: site investigation methodologies for petroleum and chlorinated solvents; lab-based biotreatability studies employing various enhanced natural (biological) attenuative processes; and lab-based methodologies for the chemical, physical and biological analysis of soil and groundwater samples. He taught several undergraduate civil engineering design classes. Additionally, Dr. Amber assisted in the preparation of Persistent Organic Pollutant (POP) guidance documentation for the United Nations Industrial Development Organization (UNIDO).

Dr. Amber's professional experience and responsibilities have included: corrective measure and feasibility studies under the RCRA and CERCLA Programs; solid waste and geotechnical design; remediation system designs and field implementations, with a focus on bioremediation technologies and risk-based closure strategies; environmental due diligence support; field investigations (e.g., environmental sampling, hydrogeologic testing, etc.); and project management (e.g., client liaison, liability valuation support, and budget adherence).

RELEVANT EXPERIENCE

Site Assessment and Risk-Based Closure Implementation, Power and Utility Sector Confidential Client. Served as lead project manager for site investigation and remediation-related services at six contaminated sites concurrently undergoing self-implemented clean-up under Michigan's Part 201 program. Managed environmental liability forecasts totaling over \$3MM. Constituents of concern have included petroleum hydrocarbons (including LNAPL) and elemental mercury. Developed closure strategies that met applicable regulatory requirements, client-specific risk tolerances, and budgetary constraints. A long-running groundwater treatment system was shutdown, resulting in significant cost savings.

Groundwater Remediation System Installation and CCR Compliance, Power and Utility Sector Confidential Client. Served as lead project manager to provide design and build services for the installation of a groundwater extraction and treatment system. The purpose of the system was to reduce the flux of CCR-related constituents from migrating to a groundwater-surface water interface (GSI). Dr. Amber was responsible for overseeing the installation of piezometers, extraction wells, over 3,550 feet of 3-inch high density polyethylene (HDPE) discharge piping, and an aeration/filtration treatment system. Prior to installation, bench scale tests were conducted to evaluate aeration requirements for the discharged groundwater. The system was designed to remove iron and arsenic prior to discharge of treated groundwater to an NPDES permitted outfall.

The operation of the groundwater extraction and treatment system will reduce discharge of arsenic impacted groundwater and reduce reporting requirements in the future.

Bioremediation of Bachman Road, Plume B, MDEQ, Oscoda, Michigan – Served as assistant project manager and design engineer for a site impacted with chlorinated solvents. The site was characterized with a high concentration (i.e., DNAPL) source area and downgradient plume migrating to a surface water body. Coordinated and oversaw field implementation of bioremediation for the source and downgradient plume areas. Temporary recirculation via permanent injection/extraction wells was used for injection and distribution of biostimulation and bioaugmentation amendments. Established a monitoring strategy, evaluated monitoring data, and discussed results with the client. Project resulted in an advanced understanding of groundwater recirculation and microbial dynamics for chlorinated solvent source areas undergoing bioremediation treatment.

Surface Water Protection and Mitigation of Storm Water Impacts, Rail Client, Ohio – Served as lead project manager for a rail yard site impacted with petroleum constituents. Provided emergency response support following a petroleum release from a clay pipe to a nearby surface water body. Maintained a good collaborative relationship with the Ohio EPA regulatory oversight staff to ensure response measures met agency expectations. Additionally, a remedial investigation strategy was developed and implemented to identify potential sources and characterize petroleum impacts to soil and groundwater at the site. Concurrent with the source investigation and delineation work, additional assessment was conducted to evaluate potential release risks in other areas of the rail yard. Coordinated and oversaw remedial measures, including excavation and off-site disposal of NAPL-impacted soil as well as installation of a French drain system for mitigation of storm water impacts to adjacent property.

Chlorinated Solvent Remediation, Confidential Manufacturing Client, Sites in Michigan and North Carolina – Served as client liaison, lead project manager and engineer for sites impacted with chlorinated solvents. Developed and presented closure strategies to regulators during meetings at MDEQ and NCDEQ offices and onsite. Streamlined paths to closure were approved and, using new characterization data, was able to shut down a long-running pump and treat remediation system. An efficient vapor mitigation system was designed and installed as a long-term engineering control. Total reserve budgets for the two projects has been forecasted at greater than \$9M.

Chlorinated Solvent Remediation, Confidential Industrial Client, Lansing, Michigan – Served as lead project manager for a combined biostimulation and bioaugmentation pilot test to address a low-concentration (<100ppb) vinyl chloride plume in groundwater. Coordinated and oversaw field implementation of the bioremediation pilot test system. Temporary recirculation via permanent injection/extraction wells positioned perpendicular to groundwater flow was used for injection and distribution of amendments. Evaluated pilot test monitoring data and successfully demonstrated reductive dechlorination of vinyl chloride concentrations to non-detect levels. Evaluated and presented full-scale design considerations to the client.

Remedial Action at Railroad Properties, Multiple Sites, Michigan – Served as client liaison, lead project manager and engineer for multiple rail yard sites, coordinating site investigation and remediation activities in pursuit of site closures. Presented closure strategies and characterization

results to both clients and regulators during face to face meetings. Utilized innovative methods for characterizing LNAPL risks and presented data using a novel GIS webmap system.

Site Assessment and Risk-Based Closure Implementation, Power and Utility Sector Confidential Client. – Served as lead project manager for site investigation and remediation related services at a site enrolled in IDEM's State Cleanup Program. Worked with the client and the IDEM project manager to develop a closure strategy that met applicable regulatory requirements, client-specific risk tolerances, and budgetary constraints. A No Further Action (NFA) was issued by IDEM for the site in 2013, including risk-based closure through use of an Environmental Restrictive Covenant (ERC).

Site Assessment and Remediation for Beneficial Reuse, Multiple Manufacturing Facilities, Indianapolis, Indiana – Served as lead project manager and client liaison for chlorinated solvent groundwater remediation, conducted under IDEM's Voluntary Remediation Program (VRP). Responsible for development and implementation of a closure strategy for remediation system optimization, vapor intrusion mitigation, operation and maintenance, and planning for long term stewardship. Support has also been provided for re-development and beneficial re-use of a portion of the site as a solar park.

Resource Conservation and Recovery Act (RCRA) Services, Dr. Amber served as environmental engineer for efforts related to managing and executing field investigations, data evaluation, and remedial design for nine sites at the John F. Kennedy Space Center in support of the RCRA Program. In this role, Dr. Amber was responsible for cost forecasting in accordance with NASA Technical Directives (TDs); coordination of work for Confirmation Sampling (CS), RCRA Facility Investigations (RFI), Corrective Measure Studies, and Corrective Action; production of Advanced Data Packages (ADPs); preparation of a Storm Water Pollution Prevention Plan (SWPPP). Contaminants of concern included chlorinated solvents (ethenes and ethanes), semi-volatile organic compounds, and metals.

Solid Waste and Geotechnical Services, Dr. Amber has served as a geoenvironmental engineer, helping clients address issues and impacts associated with solid waste and geotechnical design at facilities in multiple states. Services in these areas have included:

- Test pitting to help characterize and delineate the extents of an unpermitted landfill;
- Slope stability and settlement geotechnical calculations for proposed lateral and vertical landfill expansions;
- Airspace calculations utilizing mechanically stabilized earth walls as part of a Feasibility Study for a proposed vertical landfill expansion;
- Storm water runoff calculations as part of the design process for the final cover drainage system of a landfill expansion;
- Volume calculations for proposed waste excavations at a landfill planned for redevelopment as parkland;
- Roadway sight distance calculations for a landfill entrance as part of litigation support; and,
- Production and data management support for 5-year plans at a large number of landfill and transfer station facilities across the US.

PUBLICATIONS

Petrovskis E, Amber W, Walker C. 2013. Microbial Monitoring During Bioaugmentation with Dehalococcoides. In Stroo HF, Leeson A, Ward CH, eds, SERDP and ESTCP Remediation Technology Monograph Series: Bioaugmentation for Groundwater Remediation. Springer Science + Business Media, New York, NY, USA. Chapter 6.