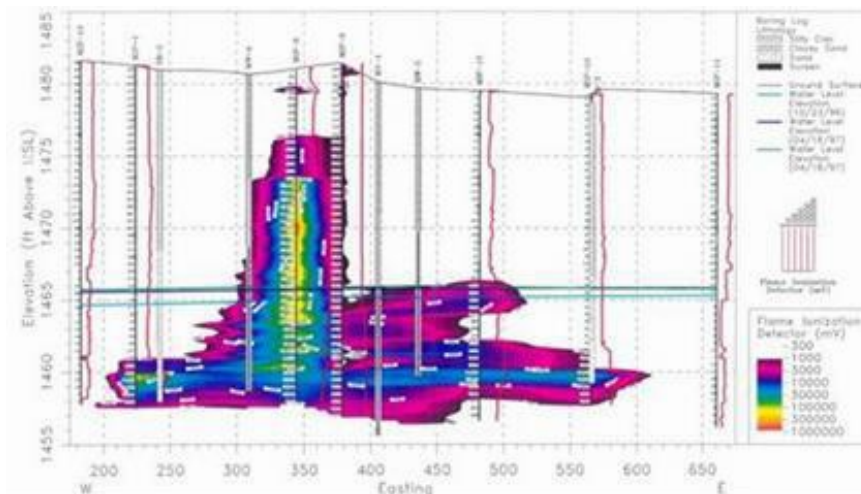


## Roger Lamb

I have 30 years of experience in due diligence, litigation support, and contaminated land assessment and remediation for regulatory, industrial, government, and military clients. I specialize in the development of real-time high resolution understanding of chemical releases and hydrogeologic conditions. This information is used to improve project outcomes by reducing project costs, increasing stakeholder engagement and guaranteeing a sustainable approach and wise investment of resources.

During my career I have performed pioneering work in the area of TRIAD approach-type site characterization of LNAPL, DNAPL, VOC releases and buried waste. I have used high resolution site characterization methods since 1994 to provide my clients with guaranteed results.

An example of graphical analysis from my work is presented below. The graphic presents results from the world's first commercial use of the SC/MIP and shows the detail of gasoline migration in the subsurface environment. If you "GOOGLE" the term "soil conductivity/membrane interface probe", the first website listed is a presentation given by me at a USEPA RevTech Conference in 2004.



### Qualifications

- BS Geology, University of Missouri-Kansas City
- MS Urban Environmental Geology, University of Missouri-Kansas City

### Key Expertise

#### Environmental Assessment

- Environmental Hydrogeology
- High Resolution Site Characterization
- Guaranteeing Results

### Remediation Systems/Techniques

- SVE System Design and Pilot Tests
- Enhanced Bioattenuation
- Groundwater Extraction Systems
- NAPL Removal and Evaluation Design
- Emergency Response
- Air Sparge System Design and Pilot Tests
- Insitu Chemical Oxidation
- Excavation Design

## **Employment History and Key Projects**

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**Geotechnical Engineering Inc., Riverside Missouri– 1982 to 1984 – Geologist/Drillers Helper.** Duties included logging of boreholes performed for geotechnical investigations.

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**Johnson County Kansas Environmental Department- 1984 to 1986 - Environmental Specialist**

Duties included monitoring and inspection of sanitary and demolition landfills as well as emergency response to chemical spills.

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**Ecology & Environment Inc., Overland Park, Kansas -1986 to 1988**

**Member of the U.S. Environmental Protection Agency (EPA) Region 7 Field Investigation Team.**

Responsible for investigation and hazard ranking system scoring of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites. Investigations were conducted at industrial waste landfills, drum disposal sites, abandoned lead/zinc mines, wood preserving sites and ammunition production plants.

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**Tetrachloroethylene Plume Assessment, EPA: Carterville, Missouri. Project Manager.** Conducted assessment of a tetrachloroethylene plume flowing through a system of flooded mine shafts. Project included dye trace studies and regional characterization of the limestone aquifer.

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**Black & Veatch – Overland Park, Kansas – 1988 to 1991**

**Member of the USEPA Region 7 Technical Enforcement Support Team-** Project Hydrogeologist Duties included conducting investigations of CERCLA sites, some of which were on the National Priority List (NPL) and included industrial waste landfills and ammunition production plants.

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**Former Coal Gasification Plant Assessment/Remediation, Fairfield, Iowa. Project Hydrogeologist** Responsible for assessment and remediation of a former coal gasification plant on the NPL. Delineated the dense non-aqueous phase liquid coal tar plume, conducted aquifer testing and performed pilot-scale in situ bioremediation system studies.

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**Refinery LNAPL Remediation Value Engineering: Kansas City, Missouri. Project Hydrogeologist.** Performed value engineering of a fuel-recovery system operating on a petroleum-refining plant. Tested aquifer and hydrocarbon recoverability.

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**Groundwater Remediation, Deffenbaugh Industries: Shawnee, Kansas. Project Hydrogeologist.**

Responsible for assessment and remediation of leachate-impacted groundwater. Installed monitoring well, sampled the interior landfill, tested the aquifer and designed groundwater-extraction system.

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**Industrial Compliance/Terranext, Overland Park, Kansas -1991 to 1998**

**Former Wood-Preserving Works Environmental Assessment: Houston, Texas Senior Hydrogeologist.**

Tasks for this railroad project included preparation of planning documents, delineation of the dense non-aqueous phase liquid creosote plume, subsurface investigation using the cone penetrometer /rapid optical screening tool (ROST), installation of triple-cased monitoring wells, aquifer testing and advanced data analysis to aid in remediation design.

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**Investigation and Remediation Techniques Pilot Testing: Great Bend, Kansas. Project Manager/Senior Hydrogeologist.** Responsible for pilot testing of advanced investigation and remediation techniques for KDHE. Project required use of the membrane interface probe to obtain detailed information on the mass of the hydrocarbon plume and injection of oxygen-releasing compounds into the plume to enhance intrinsic bioremediation.

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**Potable Water Aquifer Remediation: Hays, Kansas. Project Manager/Senior Hydrogeologist.** Responsible for remediation of a potable water aquifer for KDHE. Project included installation of monitoring wells; defining the horizontal and vertical extent of commingled petroleum hydrocarbon plumes; aquifer testing; and design, installation, permitting and maintenance of a 200-gallons-per-minute groundwater extraction and treatment system. Treated water was used as a potable drinking water supply.

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**Hydrogeologic Characterization for Sanitary Landfill Operating Permit, Warrensburg, Missouri.**

*Project Hydrogeologist.* Project included detailed hydrogeologic characterization of the 300-acre site, aquifer testing, design and installation of the landfill's groundwater monitoring network and implementation of the landfill's monitoring program.

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**High Resolution Site Characterization – Gasoline LNAPL Releases, Kansas Project Manager/Senior Hydrogeologist**

Three projects entailed the world's first commercial use of the membrane interface probe to characterize LNAPL releases. In each case the LNAPL release had impacted potable water supply wells. The MIP data was used to assess remediation feasibility and to design air sparge/SVE systems.

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**Aquifer Remediation: Hays, Kansas. - Project Manager/Project Hydrogeologist.** Responsible for assessment and remediation of petroleum-impacted aquifers for Kansas Department of Health and Environmental. Projects required groundwater extraction,

bioventing, air sparge and soil vapor extraction pilot-scale testing, and remediation system designs.

**Groundwater Assessment/ Remediation: Lincoln, Nebraska.** *Project Hydrogeologist.* Delineated a plume of TCE impacted groundwater, and operated and maintained a groundwater remediation system to meet regulatory requirements.

**Pesticide Manufacturing Plant Remediation, Southern Pacific Railroad: Houston, Texas.** *Project Hydrogeologist.* Responsible for hydrogeologic assessment of pesticide manufacturing plant listed on the NPL. Installed double-cased monitoring wells; sampled groundwater, soil and sediment; hydrogeologic characterization; and conducted a subsurface investigation using the cone penetrometer

**Train Derailment Xylene and Heptane Spill, Missouri.** *Senior Hydrogeologist* Following a train derailment in which 80,000 gallon of xylene and heptane were released, the SC/MIP was deployed to define the extent of the impact in the soil and track ballast underlying the spill area to aid in design of a remediation system to stop the leakage of these chemicals into a nearby stream.

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**Jacobs Engineering, Overland Park, Kansas – 1998 to 2001**

**U.S. Air Force Base Landfill Remedial Investigation/Feasibility Studies (RI/FS): Rantoul, Illinois.** *Technical Manager.* Managed a RI/FS conducted on four landfills located on the former Chanute Air Force Base. Project required development of planning documents, design of a multi-faceted investigation plan, surface geophysics, subsurface investigation utilizing the cone penetrometer technique and advanced data analysis.

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**Professional Services Inc., Overland Park, Kansas – 2001 to 2003**

**Natural Attenuation Study of Dry Cleaning Solvents: Kansas City, Missouri.** *Project Manager/Senior Hydrogeologist.* Responsible for investigation of a chlorinated solvent impacted soil and groundwater associated with a former dry cleaning facility to determine if the solvent release was undergoing natural attenuation and shrinking in extent and magnitude. The regulatory agency agreed with the conclusions of the assessment and the site's existing groundwater extraction system was turned off and dismantled.

**High Resolution Site Assessments- UST Releases, Kansas City Missouri.** *Project Manager/Senior Hydrogeologist* Assessment of four gasoline release using the MIP to develop remediation plans or develop arguments that the LNAPL was undergoing bio-attenuation and did not pose a risk to human health of the environment.

**TCE/PCE Release Technical Advisor, Chicago, Illinois.** *Senior Hydrogeologist* Duties entailed review of site investigation data and providing technical advice as to remediation feasibility and costs.

**Hazardous Waste Dump Site Assessment for Property Transfer, Missouri.** *Project Manager/Senior Hydrogeologist;* Duties entailed hydrogeologic investigation and sampling of leachate to provide potential buyer with potential costs associated with purchasing property that contained the dump site.

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**Maxim Technologies, Kansas City, Kansas – 2003 to 2006**

**High Resolution Site Characterization, Former Gasoline Refinery: Chanute, Kansas.** *Project Manager/Senior Hydrogeologist.* Responsible for investigation of a 10 acre turn-of-the-century oil refinery. Refinery waste was comprised of a mixture of sulfuric acid and petroleum hydrocarbons. Tasks included surface geophysical surveys, soil conductivity/membrane interface probe soundings, sampling of impacted media, hydrogeologic characterization and advanced data analysis.

**Pipeline Release Assessment Ottawa, Kansas.** *Project Manager/Senior Hydrogeologist.* Responsible for assessment of a gasoline release for a major oil company. The project involved analysis use of the SC/MIP tool to define the extent magnitude and extent of petroleum impact and develop an analysis of viable remediation technologies and associated costs.

**Pipeline Release Remediation: Kansas City, Kansas.** *Project Manager/Senior Hydrogeologist.* Responsible for assessment and remediation of a gasoline release for a major oil company. The project involved analysis of chemical data, use of the SC/MIP tool to define the extent of petroleum impact to the vadose zone, and design and installation of a Soil Vapor Extraction (SVE) system.

**Brownfields Assessment, Tire Town, Leavenworth, Kansas.** *Senior Hydrogeologist.* Responsible for technical aspects of the Phase I ESA and Phase II ESA assessments and development of the corrective action approach to aid in redevelopment of the property for commercial use.

**Emergency Spill Response: Shawnee, Kansas.** *Senior Hydrogeologist.* Provided oversight during emergency spill response to a pipeline release. Supervised remediation efforts, interfaced with property owners and regulatory agencies and assessed potential receptors.

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**Environmental Resources Management, Overland Park, Kansas – 2006 to 2009**

**High Resolution Site Characterization, Former Refinery, Kansas City, Kansas.** *Project Manager/Senior Hydrogeologist.* Responsible for investigation of a 13 acre

turn-of-the-century oil refinery. Refinery waste was comprised of a mixture of sulfuric acid and petroleum hydrocarbons. Tasks included surface geophysical surveys, soil conductivity/membrane interface probe soundings, sampling of impacted media, hydrogeologic characterization and advanced data analysis.

**Pipeline Release Assessment: Wichita, Kansas.**

*Project Manager/Senior Hydrogeologist.* Responsible for assessment of a gasoline release for a major oil company. The project involved analysis use of the SC/MIP tool to define the extent magnitude and extent of petroleum impact and develop an analysis of viable remediation technologies and associated costs.

**High Resolution Site Characterization TCE Release, Cincinnati Ohio**

*Project Manager/Senior Hydrogeologist* .Responsible for assessment and remediation of a release of TCE from a metal degreaser that had impacted a nearby stream. The project involved use of the MIP to define the extent magnitude and extent of TCE impact and develop a soil excavation program to remediate the TCE release source area. **Orphan Gasoline Release Sites, Kansas UST Program – Project Manager/Senior Hydrogeologist**

Design and implementation of site characterization programs at seven sites using the MIP to define gasoline releases to aid in remediation to reduce contamination at public water supply wells.

**Gasoline Release Sites, Missouri UST Program – Project Manager/Senior Hydrogeologist**

Design and implementation of site investigation programs at four sites using the MIP to define gasoline LNAPL to aid in remediation of gasoline LNAPL.

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**Delta Consultants, Overland Park, Kansas – 2009 to 2011**

**Pipeline Release Assessment, Kansas City, Kansas.**

*Project Manager/Senior Hydrogeologist.* Responsible for assessment and remediation of a gasoline release for a major oil company. The project involved use of the SC/MIP tool to define the extent of petroleum impacted soil and groundwater.

**Pipeline Release Remediation, Ottawa, Kansas.**

*Project Manager/Senior Hydrogeologist.* Responsible for design of a soil excavation program to remediated a release of gasoline into a farm field.

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**OTEK Australia – Brisbane/Melbourne Australia – 2011 to 2013**

**Property Redevelopment Project, Melbourne, Victoria – Principal Environmental Scientist**

Responsible for design and implementation of a site assessment using the MIP to determine if soil and groundwater beneath a property that had been historical used for wire rope

manufacturing was impacted by petroleum hydrocarbons and halogenated solvents.

**Property Redevelopment Project – Sydney Australia**

*Principal Environmental Scientists* Responsible for design and implementation of a site assessment using the MIP to determine if soil and groundwater beneath a property that had impacted by petroleum hydrocarbons and halogenated solvents The investigation results were used to determine the feasibility of an insitu chemical oxidation remediation program.

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**COLUMBIA Technologies, Nashville TN – 2013 to 2016**

*US Sales Manager* – Duties entailed: providing technical advice to consultants and their clients in the US and Canada on best use of high resolution site characterization tools on a wide variety of fuel and solvent release assessment and remediation projects. Duties also included development of cost proposals for these types of investigations and training of consultants and environmental service buyers in best use of high resolution site characterization tools.

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**Consulting HRSC Expert, Nashville TN – 2016**

**Leaded Gasoline Remediation Design, Lee County Alabama, Technical Advisor** Design and oversight of a high resolution site characterization program focused on developing a guaranteed remediation program to stop leaded gasoline impacted groundwater from migrating offsite into a residential area. The MiHPT data set and associated groundwater samples will be used to developed mass/flux calculations for EDB and benzene.

**Fuel Release Remediation Assessments, Missouri and Kentucky Technical Advisor** - Design and oversight of a high resolution site characterization program focused on

developing a guaranteed remediation program to remediate fuel releases in preparation for site redevelopment.

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**Presentations**

- Guaranteeing Chemical Release Mitigation Project Outcomes with the Aid of High Resolution Data Sets, ADEM Groundwater Conference 2016
- Guaranteeing Fuel Release Mitigation Project Outcomes with the Aid of High Resolution Data Sets, ADEM UST Remediation Conference 2016.
- Techniques for Development of LNAPL CSMs – TN UST Program Case Manager Meeting November 2015
- Benefit of Real-Time Remediation Design Approaches – Florida Remediation Conference 2015.
- Benefits of Real-Time Remediation Design Approaches – National Tanks Conference – 2015.

- Use of the MiHpt to Improve Project Outcomes, Midwestern States Environmental Consultants Association, fall 2014 Seminar.
- Economic Advantages of High Resolution Site Characterization for Fuel Release Management ASTSWMO 2014 LUST and State Fund Financial Responsibility Workshop.
- Optimizing Remediation System Performance Using MiHpt Measurements – AIPG Innovative Environmental Assessment and Remediation Technology 2014
- High Resolution Site Characterization Improving LNAPL Management, Kentucky Underground Storage Tank Program Training 2014
- Improving Project Outcomes using High Resolution Site Characterization Techniques; Alabama UST Conference 2013
- Ten Tips for using Direct Sensing Tools; Australian Land and Groundwater Association Meeting Melbourne 2012
- Fourteen years of Collaborative Use of SC/MIP Data and Analytical Results to Improve Project Outcomes; Environmental Field Conference 2011
- Rapid Site Delineation Using Surface Geophysics and the SC/MIP; The International Conference on Remediation of Chlorinated Compounds 2008
- HRSC Tools for VOC Releases 14th Annual American Institute of Hydrology, Kansas Section Seminar 2007
- HRSC Tools for VOC Releases 12th International Petroleum Environmental Conference 2006
- HRSC Tools for VOC Releases -EPA Revtech Conference 2004
- Delineation of a VOC release using the SC/MIP; National Ground Water Association Midwest Focus Conference 2003

## **Publications**

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Environmental Geology of the Blue Springs Quadrangle, Missouri, Master's Thesis 1989.

## **Licenses & Accreditations**

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- Registered Geologist – Missouri