

Resumé:

WILLARD D “WILL” HARMS JR.

Mr. Harms has over 25 years experience in environmental restoration. He focuses on remedial design, implementation, operation & maintenance, performance monitoring and reporting services for chemical plants, petroleum refineries, chemical/fuel distribution terminals, military bases, and other public and private sector clients.

He specializes in remediation of chlorinated solvents and other recalcitrant compounds in groundwater, surface water, soil, and sediment. Mr. Harms is also experienced with remediation of petroleum products, pesticides, terpenes, phthalates, organic-phase liquids, chlorofluorocarbons (CFCs; Freon), and other compounds.

His design capabilities include advanced physicochemical and biological process. He is knowledgeable in the area of natural and enhanced attenuation assessment and interpretation of chlorinated solvents, non-chlorinated hydrocarbons, and other pollutants. Mr. Harms is experienced with in situ chemical oxidation (ISCO), in situ bioremediation (ISB), air sparging, soil vapor extraction (SVE), hydraulic control through pump-and-treat, excavation and disposal, thermal remediation methods, and other remedial technologies.

Mr. Harms has performed numerous remedial systems' performance evaluations and Remedial Process Optimization (RPO) studies.

Mr. Harms is experienced in environmental emergency response and has extensive experience with sampling and analytical techniques, including molecular biological tools (microbial quantitation and speciation) and stable isotope forensic assessment techniques.

He has authored and contributed to many remediation feasibility studies (FS) under CERCLA (Superfund), corrective measures studies (CMS) under RCRA, and other remediation feasibility documents with various titles such as focused feasibility study, streamlined corrective measures study, remedial options evaluation, and comprehensive feasibility study.

Mr. Harms has established himself as an interdisciplinary remediation subject matter expert. His ability to significantly contribute to the success of multi-located teams is well demonstrated. He excels in establishing achievable and approvable objectives, goal-oriented problem solving, designing efficient and effective remedies, performance optimization, and demonstration of success.

Education

- 1989/MS/Environmental Engineering/University of Tennessee
- 1982/BS/Chemistry and Biology/ Tennessee Wesleyan College

Certification and Training

- Project Manager Certification
- 40 Hour OSHA Health and Safety Certification (29 CFR 1910.120)
- 8-Hour OSHA Health and Safety Annual Update Certification

- 8-Hour OSHA Site Supervisor's Certification
- First Aid/CPR Certifications
- American Society of Civil Engineers
- American Water Works Association
- Water Pollution Control Federation
- Chi Epsilon National Civil Engineering Honor Society

WILLARD D “WILL” HARMS, JR. (continued)

Areas of Expertise

- Remediation
- Chlorinated Solvents
- Environmental Engineering
- Chemistry
- Biology
- Remediation Feasibility
- Remediation Design
- Remediation O&M
- Performance Monitoring
- In Situ Treatment
- Natural/Enhanced Attenuation
- Environmental Forensics
- Emerging Technologies

Key Projects

Remedial Design, Implementation, Performance Monitoring, Performance Optimization, Reporting, and Project Management

Mr. Harms has designed and implemented remediation systems for customers like Ashland, BASF, BP, Brunswick, Colgate-Palmolive, ConocoPhillips, DuPont, First Chemical, Kinder Morgan, Marathon Petroleum, McKenzie Tank Lines, Millennum Specialty Chemicals, Occidental Chemical, Olin, Pepsico, Pet Chemicals, Ryder Truck Rentals, SCM Glidco Organics, State of Florida, THAN, Unocal, US Air Force, W.R. Grace, and confidential clients in states such as Alabama, Florida, Georgia, Indiana, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Ohio, Oklahoma, Tennessee, and Texas.

Representative remedial technologies include variations on air sparging, bioaugmentation, bioremediation, bioventing, cap/covers, carbon dioxide sparging, chemical oxidation, DNAPL recovery, dewatering, engineering controls, excavation and disposal, institutional controls, LNAPL recovery, migration barriers, multiphase extraction, natural attenuation, neutralization, pump-and-treat, recirculation wells, soil flushing, soil vapor extraction, and

solidification/stabilization.

These remediation projects have included acid gas scrubbers, activated carbon adsorption units, air strippers, catalytic oxidizers, chemical metering, directional drilling, filtration, neutralization, gas infusion, horizontal wells, thermal oxidizers, and other processes.

Performance monitoring and optimization tools include attention to immediate interpretation of performance results (instead of waiting until a report is due), automated monitoring, data management, electrical/mechanical condition monitoring, molecular biological tools, remote telemetry units (RTUs), stable isotope enrichment, and establishing meaningful and achievable metrics for site closure.

Publications and Presentations

- Harms, Willard D., Jr., et al., *Passive Soil Gas Survey to Locate Source of Tetrachloroethene (PCE) Dissolution in Groundwater*. Proceedings 7th Intl. Conf. Remediation of Chlorinated and Recalcitrant Compounds, Battelle Press, Columbus, 2010.
- Harms, Willard D. Jr., et al., *HRC-Enhanced Reductive Dechlorination of Source TCE in an Unconfined Aquifer*. Bioremed. and Phytoremed. of Chlorinated and Recalcitrant Compounds, ed. G. B. Wickramanayake, et al., Battelle Press, Columbus, 2000.
- Harms, W. D., et al., Softening by Fluidized Bed Crystallizers. Jour. Envir. Eng., ASCE. Vol. 118, No. 4, Jul/Aug 1992. pp. 513 - 529.