

R. David Shiels, P.G., REP, CHMM, CAPM
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Education:

Trinity University
San Antonio, Texas
Bachelor of Science in Geology

1979-1983

Professional Affiliations

Eagle Scout (Received the rank of Eagle Scout in January 1978)
Association of Groundwater Scientists and Engineers
The Geological Society of America (GSA)
American Industrial Hygiene Association (AIHA)
Society of Independent Professional Earth Scientists (SIPES) Dallas Chapter President 2013,
National Board of Director (Treasurer 2016 and Vice Chairman of National Energy 2017) 2015-2018

Professional Registration/Specialty Certifications

Professional Geologist, State of Texas, No. 550
Corrective Action Project Manager, TCEQ No. PM0000211
Certified Hazardous Materials Manager, No. 3992
Registered Environmental Professional, NREP #369496
Certified Earth Scientist, Society of Independent Professional Earth Scientists No. 3171
Ironman Triathlete (Ironman Texas 2011) USAT #536657
Ironman 70.3 World Championships Qualifier (2010)

Work Experience

Shiels Engineering, Inc.
Kaufman, Texas
Principal Consulting Geologist, Shareholder, and Vice President

2005-Present

Shiels conducts environmental compliance inspections, waste management unit closures, health and safety training, subsurface investigations, Phase I ESAs, Voluntary Cleanup Program (VCP) closures, Municipal Setting Designations (MSDs), Storm Water plans, assists with Spill Prevention, Control, & Countermeasures Plans (SPCCs) and provides expert testimony for private industry clients. Provides support and assistance in oil & gas E&P projects, develops SPCC plans, storm water plans, Environmental Health & Safety (EHS) training, groundwater studies, asbestos abatement project oversight, moisture intrusion assessments and indoor air quality studies.

Texas A&M Engineering Extension Service (TEEX) 2005-Present

Texas A&M
Mesquite, Texas
Course Instructor (Subject Matter Expert)

Shiels assisted TEEX course designers in creating PRT145; an Oil & Gas Environmental Regulations Course and OSH301 Excavation, Trenching and Soil Mechanics and serves as course instructor for both PRT145 and OSH301. He also teaches OSH201 a Hazardous Materials course dealing with flammable liquids, hazardous and flammable gases, LPG, cryogenics and other hazardous

materials. Shiels also teaches General Industry OSH511 and OSH226 Confined Space.

Caldwell Engineering, Inc.

1999-2005

Richardson, Texas

Senior Project Manager and shareholder

Shiels managed environmental compliance audits, health and safety training, subsurface investigations, ESAs, Voluntary Cleanup Program (VCP) closures, Storm Water plans, assisted with Spill Prevention, Control, & Countermeasures Plans (SPCCs), and provided expert testimony for private industry clients.

HBC Engineering, Inc.

1994-1999

Dallas, Texas

Manager of Environmental Services and Shareholder

Managed several programs including, UST removals and closures, solid waste landfill investigations and closures, Groundwater investigations involving chlorinated solvents released from industrial facilities and dry cleaners, expert testimony, industrial facility compliance audits, and health & safety training.

Southwestern Laboratories, Inc.

1990-1994

Dallas, Texas

Program Manager

Managed several programs including, environmental site assessments (ESAs), UST removals and closures, solid waste landfill investigations and closures, Groundwater investigations involving chlorinated solvents released from industrial facilities and dry cleaners, expert testimony, industrial facility compliance audits, and health & safety training.

Applied Earth Sciences

1988-1990

Dallas, Texas

Field Geologist

Project Manager who conducted subsurface investigations, remediation and underground storage tank (UST) removals for major oil and gas clients in the Dallas/Fort Worth area.

Ecology & Environment, Inc.

1986- 1988

Dallas, Texas

Field Geologist

Served as a (field investigator) geologist for the U.S. EPA under a Superfund (REM/FIT) contract. Projects included hazardous waste site assessments, site investigations, Hazardous Ranking System (HRS) site evaluations, and infrared aerial photograph interpretations (supplied by NASA) and ground-truthing of suspected sites of interest in Region VI.

Murjo Oil & Royalty
Tyler and Houston, Texas
Field Geologist

1984-1986

Well site work, log analysis and interpretation, prospect evaluation and generation, sales of prospects.

Experience Summary

David graduated from Trinity University in 1983 with a B.S. in Geology. He is currently a Principal Hydrogeologist, Certified Hazardous Materials Manager and Corrective Action Project Manager at Shiels Engineering, Inc. specializing in industrial compliance, subsurface investigation and the remediation of surface soil and groundwater resources resulting from releases or spills at oil & gas (E&P) or industrial facilities. Facility waste management continues to be his specialty. David enjoys finding innovative approaches for industrial or E&P clients in waste reuse or recycling techniques while complying with Federal and State waste rules. He has experience in evaluating hazardous waste sites and in the preparation and implementation of soil and groundwater sampling programs. David has successfully closed sites under the Texas Risk Reduction Program (TRRP). He has experience in testifying as an expert witness concerning numerous cases where hazardous constituents were at issue with a site.

His other experience includes the development of Spill Prevention, Control and Countermeasures (SPCC) plans and air permits (usually a PBR if not de minimus) for oil & gas operators in the East Texas Basin including oil handler training. David has extensive experience in environmental forensic studies from the characterization of industrial waste streams to evaluating releases of unknown substances to the environment. He has designed and installed groundwater monitoring wells (single and multiple cased wells), installed groundwater treatment systems, Vapor Extraction Systems (VES), and *in-situ* and *ex-situ* bio-remediation systems.

David is also currently an instructor for Texas A&M's Engineering Extension Service (TEEX). He assisted in creating the course curriculum and delivers training for PRT-145 an Oil & Gas Exploration and Production Environmental Regulations course and OSH301 an Excavation, Trenching, and soil mechanics course. He is a course instructor for OSH201 a hazardous materials course concerning management of flammable and hazardous gasses and liquids.

Professional Accomplishments

Site Investigation Experience under RRR, TRRP, and VCP/IOP Projects

- ❑ Conducted a comprehensive Environmental Site Assessment (ESA), using ASTM standards, of a 40 acre industrial facility in west Dallas. The site had over 80 years of industrial use including a magnesium bomb body factory that burned down in 1943, four former gasoline/diesel service stations, a heat exchanger manufacturer and truck/automobile repair facilities. Over 10 areas of concern were further investigated by subsurface investigation using groundwater monitoring wells, soil borings and trenches. The site was enrolled in the Texas Commission on Environmental Quality (TCEQ) Voluntary Cleanup Program (VCP) and closed with a Municipal Setting Designation

(MSD) so that MSD corrected Critical Protective Concentration Levels (PCLs) could be used to close the site. The site was closed, from start to finish, in 18 months with the issuance of a Certificate of Completion (COC) by the TCEQ.

- ❑ Formulated a comprehensive site investigation plan for a former battery recycling facility in Dallas, Texas. The facility contained hazardous and non-hazardous concentrations of lead as well as broken battery casing chips in the soils. The plan was accepted by the Texas Commission on Environmental Quality (TCEQ) and implemented. Subsequent remedial action successfully treated the affected soil on-site using the CHRED pre-treatment method (see 40 CFR 268.42) prior to disposal in a Class I non-hazardous waste landfill. Subsequent to remedial action, the closure report was submitted to the TCEQ. The TCEQ granted closure for the site.
- ❑ Conducted an Environmental Site Assessment on a printing facility. Environmental concerns were further investigated and two groundwater plumes were identified; one with a source from off-site and one with a source from on-site. The site was entered into the Voluntary Cleanup Program (VCP) and the Innocent Owner Purchaser (IOP) programs. Certificates of completion were issued for both the IOP (off-site source) plume and the VCP (on-site) plume under TRRP.
- ❑ Conducted an environmental site investigation of a former dry cleaning plant facility in Fort Worth, Texas. The plant released volatile organic compounds (VOCs) related to the dry cleaning industry such as but not limited to, tetrachloroethylene (PCE), Trichloroethylene (TCE), cis-1,2 dichloroethylene, trans-1,2 dichloroethylene and Vinyl Chloride.
- ❑ Conducted an environmental site investigation of a lubricating oil products manufacturing plant in Arlington, TX. The project has included the installation of 14 groundwater monitoring wells and numerous soil borings both on-site and off-site. Laboratory results revealed that alcohol and chlorinated hydrocarbons are present at the site in both soils and groundwater. Two of the wells had trace amounts of dense non-aqueous phase liquids (DNAPL) that were periodically removed by utilizing a peristaltic pump. The site was entered into the TCEQ's VCP. A MSD was considered as a remedy for the site.

Environmental Compliance, Oil & Gas and Other Investigation Experience

- ❑ Conducted a multimedia environmental Compliance Audit of a major Newspaper printing facility in north Texas. The audit was conducted pursuant to Section 10(g) of the Environmental, Health and Safety Audit Privilege Act, which provides immunity for violations voluntarily disclosed as a result of a compliance audit. The scope of the audit included the evaluation of the facilities compliance with applicable Environmental, Health and Safety regulations, as well as the Environmental Protection Agency (EPA) hazardous waste regulations and TCEQ Industrial Solid and Hazardous Waste regulations, TCEQ's Air Quality, TCEQ's Texas Pollutant Discharge Elimination System (TPDES) Permit, and local Industrial Wastewater Pretreatment Discharge Permits.
- ❑ Conducted air permit evaluations of 187 producing oil wells in East Texas using current EPA and TCEQ air permit regulations (OOOO, NSPS, NESHAP, GHG and PBR

106.352 etc...). An economic and expeditious approach was developed and implemented to complete the project within 45 days.

- ❑ Conducted a multimedia environmental Compliance Audit of a heat exchanger manufacturing facility in Dallas Texas. The audit was conducted for the land owner in order to evaluate their tenant's compliance with applicable environmental regulations with respect to waste management activities. The audit found many areas where risk could be reduced by better waste management practices.
- ❑ Conducted a multimedia environmental Compliance Audit of an oil field tool manufacturing facility near Waco, Texas. The audit was conducted for the land owner in order to evaluate their tenant's compliance with applicable environmental regulations with respect to waste management activities and facility operations. The audit found many areas where risk could be reduced by better waste management practices. Additionally, the final evaluation was instrumental in waste reduction and recycling practices that actually made the facility more profitable. Wastes were re-managed as recyclable assets or resources rather than unusable liabilities.
- ❑ Has conducted numerous moisture intrusion assessments during the construction phase of structures in order to advise clients on remedial actions and reconstruction activities.
- ❑ Developed SPCC plans and conducted air permit evaluations for an oil & gas operator in East Texas. A total of 5 wells were included in the project. The plans were completed including oil handler training for personnel who manage and pump the wells.
- ❑ Developed SPCC plans and air permit evaluations for two salt water disposal wells (Class II Injection Wells) in East Texas. The plans were delivered and oil handler training was conducted to satisfy the requirements of 40 CFR 112.

Superfund Experience

- ❑ Field Operation Manager during the subsurface investigation of a hazardous waste site in southern Louisiana which involved the installation of numerous stainless steel groundwater monitor wells to fulfill requirements of the EPA Superfund Hazardous Ranking System (HRS). One of the groundwater monitor wells was drilled in Level B Personal Protective Equipment (PPE).
- ❑ Project Manager of an expanded Superfund site investigation (ESI) for Double Eagle Refinery, Oklahoma City, Oklahoma for the U.S. EPA. Field activities involved Level B and Level C surface sludge and soil sampling. The extensive field and laboratory data were compiled in the ESI report and submitted to the EPA for HRS support. This project preceded the Remedial Investigation Feasibility Study (RI/FS) for the site.

Remediation/Closure Experience

- ❑ Designed and implemented a soil flushing insitu-bioremediation system for a UST facility in Fort Worth, Texas. The flushing system consisted of a down-gradient recovery and up-gradient treated effluent water discharge trench to facilitate groundwater movement. To enhance groundwater treatment, a series of biotreatment wells were installed within

the subsurface petroleum hydrocarbon plume. The site reached closure goals within 8 months.

- ❑ Conducted groundwater monitoring and sampling for a site in Grapevine, Texas. The groundwater plume contained dissolved concentrations of trichloroethylene, cis-1, 2-dichloroethene and vinyl chloride. The project involved installation of groundwater monitoring wells to delineate the horizontal and vertical extent of affected media. Geological cross-sections and geological subsurface maps were drawn to evaluate the site's geology. Numerous subsurface maps of groundwater contaminants were drawn to illustrate the dimension and character of the groundwater plume. Observed and monitored the installation and operation of a potassium permanganate injection system utilized to treat the chlorinated solvent affected groundwater. Conducted groundwater sampling to evaluate the effectiveness of the potassium permanganate injections. The project is on-going.
- ❑ Conducted site investigation, limited remediation and closure of a former warehouse operation in Dallas, Texas. Soil sampling at the site revealed elevated levels of TPH, chromium, and lead contamination in five areas of concern. Conducted additional soil sampling and groundwater investigation to delineate the site. After limited soil excavation and removal, the site was granted closure under the TCEQ's VCP program.
- ❑ Conducted site investigation and closure of a pesticide warehouse operation. The investigation activities revealed the presence of herbicides and pesticides in site soils. Initiated a response action which consisted of removing a truck wash pit and excavating the surrounding soils. ASTs were also emptied, cleaned, and removed from the site. Following completion of the excavation activities, verification sampling was conducted to ensure that the TCEQ cleanup levels had been achieved. The excavated soil was classified as a Class I non-hazardous waste and properly disposed of off-site at an approved disposal facility. After receiving acceptable verification sample results, the excavation was backfilled with suitable fill and the site was restored. Through completion of this response action, TCEQ cleanup levels were achieved for soils at this site and closure granted under the TCEQ's VCP.
- ❑ Conducted site investigation, decontamination and closure oversight of a former semiconductor assembly building. Site investigation efforts concluded that the facility's waste collection system had leaked over time and released trichloroethylene (TCE) into soils at the site. The site was entered into the TCEQ's VCP where a remedial plan was approved involving the excavation and removal of the affected soil to below the TCE cleanup criteria. Provided oversight of remedial contractor to verify that closure goals were met.
- ❑ Conducted UST removal and site investigation project for a former retail gasoline station site in Dallas, TX. Approximately 10 abandoned UST's were removed from the site along with affected soils. Site was entered into the TCEQ's LPST program for reimbursement and closure was received.
- ❑ Provided spill response services to a construction company for release of lime to nearby surface water (duck pond in park). Designed and installed CO₂ injection system, into a water circulation system to buff the pond water with carbonic acid to reduce the pH of

the water to within regulatory requirements (near neutral). Provided contractor oversight to verify that closure goals were attained. Closure with TCEQ approval was received within 3 months.

- ❑ Conducted site investigation and closure of a 204 acre former semiconductor plant containing manufacturing buildings, chemical tank farm and wastewater evaporation pond. Site sampling efforts revealed the presence of chlorinated hydrocarbons and TPH in soils and groundwater at the site. Site investigations and cleanup were conducted under the TCEQ VCP requirements. A soil vapor survey was conducted to identify potential areas of soil contamination. In-situ remediation techniques are being evaluated to speed up remediation of soils and groundwater at the site. The site has successfully partially completed the closures of some areas of the site and is currently in the remediation planning phase for the remaining areas of concern. The site will be closed under the TRRP VCP.
- ❑ Conducted site investigation and closure activities from a produced water spill at a Class II injection well in Wise County. The high level leak detection equipment failed to shut in the injection system and salt water was released to a near-by creek. The creek was dammed down-stream of the spill and fresh water was used to flush the stream system from the point of release to just before the dam where water was removed with a vacuum truck. Recovered water was injected into the Class II well. Periodic testing of the flush water showed a drastic reduction in chlorides and the creek water and soils were returned to near background levels within 3 days. Closure from the Railroad Commission was obtained.
- ❑ Conducted UST removal and site investigation project for a 20,000 gallon diesel UST at a site in Dallas, TX. Confirmatory soil sampling from the excavation revealed that no soils were impacted from TPH or BTEX compounds. The site was entered into the TCEQ's LPST program and closure was received.

Expert Witness Experience

- ❑ Served as an expert witness concerning multiple salt water spills on the plaintiff's property by an oil and gas operator. The oil and gas operator was operating an oil field water flood project and was responsible for salt water spills that impacted surface soil and a creek. Testimony included disclosure of the results of an environmental site investigation to determine the approximate impacted area, time and source of the contamination. The case was settled out of court.
- ❑ Served as an expert witness where a fire caused injury to workers who were moving flammable liquids and water between three hydraulic fracturing tanks (Frac Tanks). The liquids were produced from a gas well. The workers were employed to monitor the Frac Tanks as they received fluids from the Well. During pumping, a fire burned the workers. The case settled out of court.
- ❑ Retained as an expert witness on a case where tetrachloroethylene (PERC) was released from a neighboring dry cleaners onto the plaintiff's property. Testimony included disclosure of the results of an extensive site investigation to determine the source and extent of the affected media. The case was settled by way of arbitration.

- ❑ Served as an expert witness on a case where hazardous industrial waste sludge was spilled on the plaintiff's property. Testimony included disclosure of the results of an extensive environmental site investigation that determined the aerial extent of affected media. The case was settled out of court.
- ❑ Served as an expert witness for a former dry cleaner operator to defend against accusations of contaminating a leased space. Sample results were used to show that the contamination at the site resulted from a previous tenant and not the defendant.
- ❑ Served as an expert witness on a property where a petroleum storage tank facility had historical releases of gasoline constituents to groundwater. A study and presentation of findings using historical and current data during arbitration settled the case out of court.
- ❑ Served as an expert witness on a property where a petroleum storage tank facility had historical releases of gasoline constituents to groundwater. The property is currently being used as a bank. A neighboring property claimed that the concentrations and nature of the chemicals of concern (COCs) were of risk to the users of the neighboring property; a shopping center in the Dallas area and that the property value had been diminished as a result of the release. Defendant (owner of the historical source of COCs) filed for summary judgment after a series of depositions and obtained the judgment in Federal court.
- ❑ Served as an expert witness in a pipeline right-of-way dispute where right-of-way property was alleged to have encroached on land that could have been developed by a subdivision. The subdivision accused the utility owner of "damaging developable property". Case has been settled.

PUBLICATIONS AND ABSTRACTS

- ❑ Co-Author of Texas A&M TEEEX course PRT-145; Oil & Gas Exploration and Production Environmental Regulations course (9/05 to present);
- ❑ Co-Author of Texas A&M TEEEX course OSH-301; Excavation, Trenching, and Soil Mechanics course (01/16 to present);
- ❑ Author of "Environmental Challenges to Managing Production Waste Streams" for State Bar of Texas Environmental Impacts of Oil and Gas Production January 31, 2014.
- ❑ Co-Author of "Environmental Compliance in the Oil Patch" for SIPES Quarterly Volume XLIX Number 2 November 2012.
- ❑ Editor for Laurence J. "Sandy" Horan III, MBA, JD. 2005. Chapter on CERCLA Liability and All Appropriate Inquiry in the Academy of Certified Hazardous Materials Managers (ACHMM) Hazardous Materials Management Desk Reference.

Training

INSTRUCTOR

- ❑ Texas A&M TEEEX course PRT-145; Oil & Gas Exploration and Production Environmental Regulations course (9/05 to present);

- ❑ Texas A&M TEEEX course OSH-301; Excavation, Trenching, and Soil Mechanics course (01/16-present);
- ❑ Texas A&M TEEEX course OSH-201; Hazardous Materials course (10/15-present);
- ❑ Provides local industry with the instruction of the 40-hour HAZWOPER training course. Also provides lock-out Tagout training, confined space entry and H₂S Awareness training. Also provides local industry with 8-hour refresher training for HAZWOPER. Also have provided specific hazardous materials handling training for private industry companies;
- ❑ Guest speaker at the Dallas Bar Association/Construction Section on Environmental Issues in the Construction Industry (06/09);
- ❑ Served on staff of BSA Wood Badge 89 (Spring 2009);
- ❑ Attended and was guest speaker at the Environmental Law Seminar hosted by the Kaufman County Bar Association summer 2006 and 2007;
- ❑ Assisted in creating the course curriculum for PRT-145 and OSH 301 for TEEEX. Also conducts training for PRT-145, OSH301, OSH201, OSH226 and OSH511.

RECENT (last 10 years) COURSE ATTENDANCE

- ❑ Visible Emissions Evaluation Training for EPA Methods 9, 22, 203A, 203B, and 203C. (CAAI 01/2017);
- ❑ Confined Space Entry OSH226 for General Industry (TEEX 01/2017);
- ❑ OS&H Standards for General Industry OSH511 for Oil & Gas E&P (TEEX 10/2015);
- ❑ Excavation, Trenching and Soil Mechanics OSH 301 (TEEX 08/2015)
- ❑ Hazardous Materials OSH201 (TEEX 05/2015);
- ❑ Hydrogen Sulfide (H₂S) Training (PRC 12/2014);
- ❑ Machinery & Machine Guarding Standards OSH 204 (TEEX 03/2015);
- ❑ AGC/EPA Construction Storm Water Program; webinar 3/10;
- ❑ Human Resource Center of Texas A&M on Ethics and Reporting Fraud, Waste and Abuse (annual 2007 to 2017);
- ❑ Human Resource Center of Texas A&M on Creating a discriminating-free work space (annual 2007 to 2017);
- ❑ BSA Trainer's Edge Course (2/09);
- ❑ Texas Board of Professional Geoscientists Ethics Training (Annual);
- ❑ Ethical Practice of Petroleum Engineering, (10/07)
- ❑ Northwest Environmental Training Center course on Fundamental Contaminant Chemistry and Contaminant Chemistry and Transport in Soil and Groundwater (2/07);
- ❑ Brookhaven College Oil & Gas Operations in Urban Areas (10/07);
- ❑ Lorman Education Services Current Issues In Storm Water Regulation (2/06);
- ❑