

**Mark Shifflett**  
***Managing Principal Environmental Scientist***  
**Waterstone Environmental, Inc.**

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Mark Shifflett is a Managing Principal Environmental Scientist for Waterstone Environmental with over 30 years of experience in the environmental field, primarily in site investigations for soil, soil vapor, and groundwater, remediation, due diligence studies, site closures, redevelopment, and litigation support. He manages remedial investigations and site closures for soil, vapor, and groundwater impacts by a variety of chemicals of concern at industrial/manufacturing facilities, oilfields, retail sites with former dry cleaners, and other commercial/industrial sites with current or historical hazardous waste operations.

**Education**

- B.A., Environmental Science, University of California, Santa Barbara

**Capabilities**

- Due Diligence Studies
- Soil Vapor Studies
- Vapor Intrusion
- Phase II Soil and Groundwater Investigations
- Remediation Cost Estimates/Planning
- Site Closures
- Site Redevelopment, Soil Management Plans
- Litigation Support
- Remedial Investigation/Feasibility Studies
- Soil and Groundwater Remediation

**Key Projects and Experience**

***Site Remediation and Facility Closure***

- For a former dry cleaners in a retail shopping center, performed a comprehensive soil vapor investigation to delineate a PCE soil vapor plume under the oversight of the Los Angeles Regional Water Quality Control Board (RWQCB). A sub-slab depressurization system was installed to actively vent the vapors from beneath the building after indoor air sampling found that vapor intrusion was resulting in unacceptable concentrations for occupants. The cleaners on the Subject Property had only operated for a short time while a former cleaners on an adjacent property had operated for decades, and had also dumped PCE waste into deep cesspools. The RWQCB is requiring extensive remediation of the neighboring former cleaners.
- For a former dry cleaners and gasoline service station at a small retail center in Lakewood, performed soil vapor/indoor air sampling, groundwater monitoring and remediation under the oversight of the County of Los Angeles Fire Department CUPA. Indoor air testing for vapor intrusion found the levels to be below screening levels. Neighboring properties included adjacent single family residences and other retail

centers. Remediation by soil vapor extraction has been initiated to reduce the concentrations beneath the former dry cleaning machine.

- For a former dry cleaning facility in a large retail shopping center in Anaheim, soil vapor studies and groundwater monitoring were performed under the oversight of the Santa Ana RWQCB. Mitigation measures for vapor intrusion included increasing the air exchange rate on the HVAC system which proved effective in reducing the indoor concentrations to acceptable levels. Soil vapor extraction was performed to prevent the vapor plume from travelling offsite in the direction of existing residences.
- Project Manager for the investigation and closure of a dry cleaning facility in Temecula, California to facilitate a pending property transaction. Researched historical site records/maps and performed a video camera inspection of sewer lines in the vicinity of dry cleaners to determine possible point sources of low-level PCE in groundwater. Based on the results of the sewer inspection, soil and groundwater sampling were performed to determine the extent of PCE in soil and groundwater. Prepared report presenting findings and recommendation for closure. A no further action letter was received from Riverside County Department of Environmental Health.
- For a former aerospace manufacturing facility in Redondo Beach, performed soil vapor studies to delineate a soil vapor plume of chlorinated solvents and evaluate the risk for vapor intrusion. Additional SVE was performed to further reduce the concentrations in soil vapor at the source area. For groundwater impacts, offsite monitoring wells were installed to delineate the extent of the groundwater plume. Additional deep wells were installed to monitor impacts in the deeper groundwater zone. The property was redeveloped in the 1990s as a retail shopping center. A neighboring dry cleaning facility was identified as a likely contributing source of PCE to the soil vapor and groundwater plumes in a portion of the site forming a commingled plume with petroleum hydrocarbons from a neighboring gasoline service station.
- Project Manager for soil remediation at a 120-acre former petroleum research and development facility and former oilfield property in Brea, California under the oversight of the Orange County Health Care Agency and Santa Ana Region of the RWQCB. Soil remediation included areas of crude oil within a former oilfield sump (100,000 cubic yards), arsenic (2,500 cubic yards non-hazardous/500 tons of hazardous), PCBs (6 tons) and diesel fuel (10,000 cubic yards). Soil was either transported offsite for disposal or, if concentrations allowed, was placed in deep fill areas greater than 10 feet below proposed final grade. A 'No Further Action' letter was received from the regulator which fulfilled the City of Brea's requirements to proceed with development. Lastly, over 300,000 cubic yards of import soil were tested and approved to achieve grading design requirements. Waterstone supervised and performed the evaluation, testing, and monitoring of import soil to ensure it was free of chemical contaminants and met all project specifications.
- Project Manager for the remediation of a 70-acre oilfield property proposed for residential development in the Dominguez Hills Oilfield in Carson, California. Site

remediation was performed in accordance with a remedial action plan and waste discharge requirements (WDR) permit issued by the RWQCB, Los Angeles Region. Over 300,000 cubic yards of impacted soil were successfully treated and re-used at the site. Areas of hazardous soil were disposed of offsite, including mercury and asbestos waste. Soil vapor extraction was performed in selected areas to treat soils at depth that had elevated levels of volatile compounds. Prepared regular progress and closure reports. Closure was received from the RWQCB on the entire property.

- Project Manager for the investigation, monitoring and remediation of numerous retail gasoline service station UST sites throughout southern California. Supervised soil and groundwater investigations, vapor extraction/aquifer testing, remediation work plans, agency negotiation, permitting, remediation system design, installation, operation, maintenance, and compliance. Performed design and supervised installation of SVE and groundwater extraction/treatment systems. Supervised system operation and maintenance, and prepared remedial status reports for submittal to the regulator. Agency closures were obtained for numerous sites.
- Project Manager for site assessment and remediation at a former circuit board laminating facility in Anaheim, California for site closure under a Corrective Action Consent Agreement (CACA) by Department of Toxic Substances Control (DTSC). The facility managed hazardous waste under permit-by-rule. Hazardous waste constituents included heavy metals (copper, chromium, cadmium, lead, nickel, and zinc), machine oils, PCBs, and halogenated solvents. Following site characterization of soil and groundwater, soil remediation was performed to mitigate elevated concentrations of copper and PCBs. Approximately 130 tons of PCB-impacted soil were excavated and transported offsite for disposal. Closure was received from DTSC with requirements for a deed restriction for commercial/industrial use of the property.
- Performed oversight of field remediation operations, preparation of workplans, and agency liaison for remediation of a 54-acre oilfield property for residential development in Santa Fe Springs. Investigated former sumps, tank batteries and areas of lead contamination in soil. Included excavation and offsite disposal of over 77,000 tons of petroleum hydrocarbon soil and 12,000 tons of soil with hazardous levels of lead, removal and soil remediation at UST locations, soil vapor survey, methane survey, asbestos abatement, and installation of groundwater monitoring wells. Work was performed under the oversight of the Santa Fe Springs Fire Department CUPA and the Los Angeles RWQCB. Health risk assessment indicated the site was remediated to levels safe for redevelopment as a residential community and was approved by the California Office of Environmental Health Hazard Assessment (OEHHA). A soil vapor survey for vapor intrusion of VOCs and methane were performed, and structures were designed with vapor barriers for mitigation of possible methane.
- For two small oilfield parcels in Placentia, approximately 2,000 tons of petroleum-impacted soil were excavated and transported offsite for disposal. Remediation was performed in accordance with Remedial Action Plans based on the findings of Phase II

site investigations. Soil vapor testing found low-levels of chlorinated solvents and petroleum hydrocarbons which were deemed *de minimis* and did not pose a vapor intrusion risk. Closure was received from Orange County Health Care Agency on both sites.

### ***Phase II Site Investigations and Feasibility Studies***

- Project Manager for Phase II Site Characterization of two adjoining former industrial facilities under the oversight of the Los Angeles RWQCB. Following due diligence, the properties were purchased, and the buyer was responsible for completing the environmental evaluation and obtaining agency closure of the sites. The facilities were former manufacturers of furniture and electrical components. The furniture manufacturer formerly had metal plating operations, a paint line, sumps, clarifiers, and underground storage tanks and a history of violations for dumping of plating waste along an adjoining rail spur. Phase II sampling was performed for soil, soil vapor and groundwater, including the installation of multi-depth groundwater monitoring wells. Site closure has been received from the RWQCB for one of the two sites. At the second site, additional soil vapor survey was required by the RWQCB to further evaluate the concentrations of PCE. Based on the concentrations, future buildings will require vapor mitigation systems to prevent vapor intrusion. Multi-depth groundwater sampling and monitoring for concentrations of chlorinated solvents is ongoing. The RWQCB recently requested the submittal of an Interim RAP for additional soil remediation and workplans to further delineate the extent of the soil vapor plume and groundwater plume.
- Project Manager for soils investigation of a former refinery and steel fabrication facility in Santa Fe Springs, California. An extensive soil sampling and analysis program was completed to determine the nature and extent of petroleum hydrocarbons and lead in soil. Soil volume and remediation cost estimates were prepared for use in settlement negotiations between the property owner and former refinery operator.
- Project Manager for a Phase II site investigation and remediation of a foundry property in Southgate, California to assess and mitigate areas of soil impact by concentrations of lead and cutting oil. EPA Leadsread Model was used by a toxicologist to arrive at lead cleanup levels for both industrial and residential land use scenarios. Several areas of lead-impacted soil were removed and disposed of offsite. Remediation cost calculations were prepared for future remediation for use in settlement discussions to arrive at an adjusted property value following condemnation by the local school district.

### ***Due Diligence***

- Due diligence evaluations for national parking lot owner/operator near large airports and metropolitan downtown areas. Typical areas of concern have been automotive repair shops, USTs, and commercial properties with former dry cleaners. Follow-up phase II investigations have been performed on many of the properties to evaluate former and existing areas of concern.

- Performed due diligence evaluations on large groups of oilfield properties and offshore platforms for divestiture purposes in Los Angeles, Orange, Ventura, Santa Barbara, and Kern Counties in California as well as assets in Alaska, Illinois, Michigan, and Texas. Oil production on the properties dated back to the 1920's. Areas of concern identified on the properties included oil/gas wells, underground and aboveground tanks, pipelines, production facilities, and former sumps. Many of the fields employed enhanced recovery techniques. Surrounding property uses included agricultural, industrial, residential, and undeveloped land.
- Supervised and performed numerous Phase I's for due diligence on a variety of property types including commercial/industrial, manufacturing, agricultural, oilfields, retail, and raw land.

### ***Litigation Support***

- Provided litigation support for Waterstone's in-house expert witness on behalf of defendant for impacts to soil by concentrations of lead, arsenic, and PAHs at an existing school campus. The case involved determining responsibility for impacts to soil from historic operations and the presence of lead and arsenic in soil from an alleged burn dump and polycyclic aromatic hydrocarbons from a manufactured gas plant. Key evidence was presented showing contributions by lead-based paints and herbicide usage, and that site grading resulted in the movement of contaminants.
- For client's cost recovery of insurance claims for two large soil remediation projects located on California's central coast. Provided litigation and technical support for Waterstone's in-house expert witness for determination of release dates at various areas of cleanup to apply costs towards specific insurance coverage periods or policies. Costs for the Guadalupe Oilfield were incurred for the investigation and/or cleanup of over 100 areas within a fragile coastal dune habitat contaminated with diluent. Costs for Avila Beach were related to the excavation of several blocks of the town impacted by releases from underground fuel/petroleum product pipelines. Compiled and reviewed historical documents and aerial photographs to determine release dates, then linked cleanup costs to the time of release at each area. The case was settled in favor of the client.
- Provided litigation support role on behalf of plaintiff (land owner) for an active oilfield property proposed for residential development. The client filed suit against the oil lease holder/operator to return the property to clean and safe conditions following oil production activities. The case involved sampling at hundreds of areas of concern such as oil wells, sumps, tank batteries, pipelines, and a gas plant. Cost calculations for future remediation and site restoration were prepared. The case was settled before trial and the defendant was required to perform the necessary cleanup.
- For the owner of a retail shopping center in Cerritos, CA that was underlain by a large PCE/TCE groundwater plume indicative of DNAPL concentrations resulting from a

release from the municipal sewer. The property formerly housed an automobile repair facility and more recently a retail dry cleaning facility. All historical areas of concern were evaluated to identify potential source areas that including video inspections of the public sewer system adjacent to the property. Assisted in development of GIS model and 3D animation to conclude the release point of PCE/TCE was from the public sewer. Supported preparation and summary of past and estimated future response costs for assessment and remediation of the groundwater plume. The court case resulted in a favorable settlement for the client.

- For the owner of a bulk fuel shipping/distribution terminal in northern California, provided litigation support for defendant against claims from neighboring residents of alleged exposures to benzene as a result of vapor intrusion from contaminated groundwater. Mr. Shifflett evaluated a commingled groundwater plume of petroleum hydrocarbons from the defendant's facility and chlorinated solvents (PCE and TCE) originating from a neighboring facility, assisted in preparation of expert report, and directed field sampling operations. Although PCE and TCE were present in the groundwater beneath the residential neighborhood, additional groundwater sampling showed that benzene was not. A study of historical records revealed an additional potential source in the form of a fuel UST within a former railroad right-of-way that was unknown to other parties in the litigation. The presence of the UST was confirmed by excavation. The case resulted in a favorable settlement for the defendant.

### **Presentations**

*Solutions to Challenging Issues Encountered During Oilfield Remediation Projects* (Shifflett), Tenth Annual Air and Waste Management Association Technical Conference, March 2000.

### **Specialized Training and Certifications**

- OSHA 40-HR HAZWOPER Training and current 8-HR Refresher.
- 8-HR HAZWOPER Supervisor's Training.
- Trench Shoring Safety Competent Person Training.
- University Course, Rancho Santiago College, Soil Mechanics, and Foundations.
- University Course, UC Irvine, Environmental Aspects of Soil Engineering, and Geology.