



CIRRUS ASSOCIATES, LLC

BRIAN K. MOORE, C.P.G.
Houston Operations Manager

EXPERIENCE: Brian has over 12 years of continuous experience in the field of hazardous and industrial solid waste. This work encompasses numerous groundwater quality assessments, aquifer testing and analysis, computer modeling of the fate and transport of groundwater contaminants using various software packages, RCRA closure plan development and implementation, RCRA Facility Investigation (RFI) work plan development and implementation, feasibility studies, corrective measures studies, permitting, and remedial action plans. Brian is familiar with the Texas Risk Reduction Rules and the Texas Voluntary Cleanup Program. Brian has also served as an Expert Witness on several key projects. Through his involvement with a wide variety of projects, Brian has become familiar with a wide range of federal and state environmental regulations. Brief discussions of some of the projects that Brian has been involved with are provided below. Additional descriptions of relevant technical projects can be provided upon request.

KEY PROJECTS: Conducted soil and groundwater assessments for a gas pipeline failure in east Texas. The client was Union Pacific Resources and the release was adjacent to a river that flowed through a state forest. Due to the sensitive nature of the forest, a thorough assessment of surface water, surface and subsurface soils, and groundwater was conducted. A report was prepared for submittal to the Railroad Commission to document the results of the investigation.

Investigated a release from a natural gas pipeline in El Paso, Texas. The natural gas release was causing a nearby business to have to close due to the immigration of natural gas into the interior of the building and the existence of potentially explosive conditions as well as health concerns. A sampling and analysis plan was generated to identify the source of the problem as well as delineate the horizontal and vertical extent of gas that had been dispersed into the surface soils in the vicinity of the business.

Don Dowlearn et al vs. Dal-Tile Corporation – Dallas, TX:

Brian was engaged by defense attorneys (Godwin & Carlton) on behalf of the Dal-Tile Corporation to serve as an expert witness regarding potential contaminant migration from a former gravel pit. The unpermitted site was operated by the landowners, Mr. and Mrs. Charlie Walton. The gravel pit had been utilized by at least



two industrial companies for the disposal of wastewater treatment sludges. Other wastes disposed at the site included metal slag from an aluminum recycling operation, construction/demolition debris and miscellaneous wastes. The contaminants of concern were metals (lead and zinc) associated with the industrial wastewater sludges and aluminum recycling operation. Brian wrote two reports discussing the results of initial soil, waste and groundwater sampling activities. Brian was also deposed by the plaintiffs' attorneys regarding (1) the results of soil and groundwater sampling and analyses performed at the waste disposal site as they pertained to potential contaminant source areas, (2) potential contaminant migration through shallow groundwater (i.e., fate and transport) and (3) general waste characteristics.

Western Greenhouses et al vs. United States of America – Lubbock, TX: Brian was engaged by plaintiffs' attorneys (Clark, Thomas & Winters) on behalf of Western Greenhouses, Inc. to serve as an expert witness regarding groundwater contamination emanating from Reese Airforce Base in Lubbock, Texas. Brian worked with a team of experts including a toxicologist and a chemical engineer familiar with industrial processes and equipment. Brian also worked closely with Dr. Kenneth Rainwater, a professor with the Civil Engineering Department at Texas Tech University, to evaluate groundwater transport phenomena. The groundwater contaminant of concern was trichloroethylene (TCE), which is a solvent that was used as a degreaser in cleaning airplane parts, in this instance. The primary source of the TCE was determined to be an industrial wastewater line adjacent to flightline mechanical shops that serviced aircraft at the base. Other potential sources were also present at the base that could not be completely ruled out as contributors to the groundwater contaminant plume. Brian was deposed by United States Department of Justice attorneys regarding (1) potential contaminant sources, (2) groundwater contaminant migration issues and (3) sampling and analysis protocol and their implications as it pertained to the delineation of TCE



contamination within the Ogallala Aquifer in and around the Air Force base. Services included the development of a preliminary experts report summarizing and interpreting available information as well as rebuttal reports addressing the defense experts' interpretations. Brian provided a deposition and expert testimony in Federal Court in Lubbock, Texas.

David Kadjar, Trustee vs. Waste Recovery, Inc. – Channelview, TX. Brian was engaged by defense attorneys (Beirne, Maynard & Parsons) on behalf of Waste Recovery, Inc. (WRI) to serve as an expert witness regarding potential soil contamination and its subsequent remediation on property located adjacent to the WRI facility. WRI operates an automobile tire recycling facility in Channelview, Texas. Offsite soil contamination had resulted from firewater runoff associated with tire fires on the WRI property. Brian provided project oversight for all soil sampling and analysis activities to delineate potential soil contamination resulting from the tire fires. Although no expert witness deposition was requested, the case went to trial. Brian was present during the trial to provide expert witness testimony, if necessary. Brian was never called to testify during the trial, but as a result of the field investigations and subsequent remedial activities, no damages were awarded to the plaintiffs in this case.

Clear Lake Properties vs. Rockwell International Corporation et al – Clear Lake City, TX. Brian was engaged by defense attorneys (Jenkins & Gilchrist) on behalf of Pace Analytical Services, Inc. to serve as an expert witness regarding soil and groundwater contamination resulting from a release of chlorinated solvents. The primary groundwater contaminant of concern was trichloroethylene (TCE), which is a solvent typically used as a degreaser. Other solvents were present, but not at the concentrations at which the TCE was encountered. Brian prepared an expert summary report providing his interpretation of potential source areas given the hydrogeologic conditions at the site. Brian was deposed by plaintiffs' attorneys, but was never required to testify in court. Following Brian's deposition, the case was settled out of court.



Tile Manufacturing Company – Remedial Investigation Work Plan Development and Implementation (Dallas, TX):

Developed and supervised the implementation of Remedial Investigation Work Plans at a wastewater sludge disposal site that contained characteristically hazardous levels of lead. Work plans were developed to adequately characterize the extent of lead contamination (and corresponding contaminant exposure pathways) at the site. This required the collection and analysis of surface water and pond sediment samples from three adjacent ponds, groundwater sampling and analysis, as well as subsurface and surficial soil sampling and analysis. Following approval of the work plans by the TNRCC, Mr. Moore supervised the implementation of the investigative activities at the site and managed the development of the site investigation report discussing the results of the investigation.

Crude Oil Refining Company – Closure Plan Development (Corpus Christi, TX):

Assisted in the development of a closure plan for an industrial waste landfill containing petroleum refining wastes. The closure plan was developed for an in-place closure in accordance with the TNRCC Risk Reduction Rules. This required the evaluation of all contaminants and exposure pathways and the development of a baseline risk assessment as well as a detailed corrective measures study.

Crude Oil Refining Company. – Closure Plan Development (Corpus Christi, TX):

Assisted in the development of a closure plan for an industrial waste landfill containing petroleum refining wastes. Site constraints required innovation in the design of the final cover system, which was designed by Mr. Moore. The plan was later approved by the TNRCC.

Crude Oil Refining Company – Computer Modeling Analysis (Beaumont, TX):

Performed a computer modeling analysis to evaluate potential impacts to shallow groundwater quality caused by the operation of a refinery landfarming facility. Evaluated loading rates, chemical properties, soil properties and adsorption coefficients to utilize the one-dimensional Steady-State Advection Model (SAM) for determining the concentration(s) of organic compounds that might potentially migrate downward and impact the shallow ground water. The SAM model provided a quick, conservative description of the movement and concentration of hazardous constituents within the landfarm treatment zone (LTZ)



soils. Using this methodology it was possible to illustrate to the TNRCC that groundwater contamination in the area was from a source other than the landfarm.

Major Chemical Company – Computer Modeling Analysis (Luling, TX).: Performed a computer modeling analysis to design a groundwater recovery system for a contaminant plume. Brian conducted and interpreted aquifer pumping tests and a plume delineation study in order to gather sufficient information to perform the modeling analysis. Using this methodology, Brian was able to strategically locate one recovery well capable of capturing the entire plume of contamination.

Crude Oil Refinery and Chemical Company – Computer Modeling Analysis (Big Spring, TX).: Conducted a computer model simulation of the three-dimensional migration of a hypothetical groundwater contaminant plume in order to evaluate the optimum spacing of point-of-compliance wells around a newly constructed land treatment unit (LTU). Design drawings were evaluated in order to determine potential sources of contaminant release based on the design failure of various facility components. Computer simulation was accomplished utilizing the model PLUME3D.BAS developed by the International Ground Water Modeling Center at Butler University, Indianapolis, Indiana. The three-dimensional model was utilized since the aquifer was vertically stratified with respect to hydraulic conductivity. As a result of the computer model simulation, the client was released from having to install three additional groundwater monitor well clusters, as initially requested by the State.

Clothing Manufacturing Company – Groundwater Quality Assessment (Longview, TX).: Prepared a Groundwater Quality Assessment Report and Sampling and Analysis Plan for a facility located in Longview, Texas. The site had multiple aquifers contaminated by a dense non-aqueous phase liquid (DNAPL).

United States Naval Air Station – Geophysical Survey and Aquifer Testing (Kingsville, TX).: Conducted subsurface geophysical conductivity survey using the GEONICS EM-31 in order to locate the boundaries of seven different areas formerly used for landfilling of waste materials. Slug tests were also performed at monitoring wells across the base in order to assess fluid transmitting properties of the shallow water-bearing zone.



Paul, Weiss, Rifkind, Wharton & Garrison – Voluntary Cleanup Program (Houston, TX): A business products warehouse was entered into the TNRCC Voluntary Cleanup Program (VCP) as part of a real estate transaction for a New York City, New York based investment company. The property transaction was dependent upon demonstrating compliance with Risk Reduction Standard No. 2 (RRS#2) residential cleanup criteria for the property, which would negate deed restrictions on future use of the property. The contamination at the site was associated with the presence of a former drum storage area where various solvents had been released into the surface soils. Investigation and reporting timeframes were expedited through close coordination with the VCP Project Manager and an independent consultant retained by the purchasers. This resulted in meeting the purchasers' deadline for the property transaction. A final certificate of completion was issued for the property indicating compliance with RRS#2.

Mayor, Day, Caldwell & Keeton – Voluntary Cleanup Program (Baytown, TX): Following the conduct of several phases of investigation by other consulting firms, an asphalt production facility was entered into the VCP for purposes of a real estate transaction. The closing of the transaction was contingent upon receiving a final certificate of completion from the TNRCC VCP for the entire property. The primary contaminant at the site was total petroleum hydrocarbons (TPH) associated with the production processes at the plant. Other contaminants encountered at the site were associated with metals in dredge spoils, polychlorinated biphenyls (PCBs) near power transformers, and a limited number of volatile and semivolatile organic constituents associated with a former UST and pump. Benzene contamination had also been encountered at concentrations above the drinking water standard in the uppermost aquifer. Other consulting firms had estimated that bringing the property into compliance with health-based standards for industrial/commercial facilities would cost in excess of one-million dollars. Brian used a risk-based approach to demonstrate compliance with the industrial/commercial standards along with a minimal amount of soil remediation and no groundwater remediation. The site received a final certificate of completion without implementing time consuming and expensive remediation technologies as proposed by other consulting firms. The project objectives were



achieved at a fraction of the costs that were estimated by other consulting firms.

Specialty Metals Manufacturing Company – Voluntary Cleanup Program (Baytown, TX): A powdered metals manufacturing facility was entered into the VCP as part of a real estate transaction. Special formulations of powdered metals were manufactured at the facility in order to provide coating materials that were either chemical resistant, abrasion resistant, conductive or resistive depending on customer needs. A Phase II ESA, conducted by another consulting firm, had identified numerous metals and TPH contamination in several areas of the site. The other consulting firm advised that the site not be purchased due to the presence of this contamination. After reviewing the data obtained by the other consulting firm, it was determined that a risk-based approach would be capable of getting the property through the VCP and a final certificate of completion would be issued. An investigation work plan was submitted to the VCP Project Manager for review and comment. A preliminary meeting was held with the VCP Project Manager at the site to ensure that all parties were in agreement with the scope of work being proposed for the site. The work plan was implemented and a Site Investigation Report (SIR) was developed based on the findings of the investigation. As a result of the investigation, four areas were immediately removed from further action and three other areas required minimal additional investigation/remediation to demonstrate compliance with applicable cleanup standards. This approach resulted in positive results with the issuance of a certificate of completion and subsequent sale of the property to the purchaser.



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**EDUCATION/
TRAINING:**

M.S., Civil Engineering (emphasis in environmental applications);
Texas Tech University; 1989.

M.S., Geology (emphasis in subsurface applications); Texas Tech
University; 1987.

B.S., Geology; Midwestern State University; 1985.

**REGISTRATIONS/
CERTIFICATIONS:**

Professional Geologist No. 9401, 1994

**PROFESSIONAL
AFFILIATIONS:**

American Institute of Professional Geologists
National Ground Water Association