ROBERT B. GARDNER, PE, BCEE

Education

ME – Civil Engineering (Environmental), University of Virginia, 1980
BS – Civil Engineering, University of Virginia, 1979

Professional Licenses & Specialty Certifications

Professional Engineer – Alabama, Arkansas, Florida, Georgia, Louisiana, Maine, Mississippi, New Jersey, New York, South Carolina, South Dakota, Virginia, Washington, Puerto Rico

Board Certified Environmental Engineer (BCEE), Solid Waste Management

Professional Affiliations

American Academy of Environmental Engineers, American Society of Civil Engineers, Solid Waste Association of North America, National Society of Professional Engineers
National Waste and Recycling Association, Environmental Education and Research Foundation

Professional Experience

As a Senior Vice President, Mr. Gardner is responsible for overseeing SCS's nationwide solid waste management practice, which includes solid waste planning and studies, financial analysis, landfill services, operation and maintenance, and construction. Mr. Gardner works closely with SCS's national and regional clients. Since joining SCS in 1980, he has completed solid waste, hazardous waste, environmental assessment, facility design, compliance audit, and other environmental study projects for municipal and private clients.

Notable projects that Mr. Gardner has been involved in are summarized below:

Landfill Engineering

City of New York, Closure Design for the Fresh Kill Landfill, Section 2/8 and 3/4. Project Director responsible for the supervision of site investigations, wetlands assessments, permitting, closure plan development, landfill gas and stormwater management designs, and assistance during the $43 million construction project to close the 100-acre Section 2/8 and 137-acre Section 3/4 of the Fresh Kills Landfill.

City of New York, Closure Design for Section 1/9, Fresh Kills Landfill. Reviewing Principal and Engineer of Record responsible for the design of the closure systems for Section 1/9 of the Fresh Kills Landfill (312 acres). Tasks included site investigations, wetlands studies, stormwater, wetlands, and solid waste permitting, design of final cover, landfill gas, and stormwater management systems, preparation of construction documents for the closure, and construction monitoring services for the $243 closure construction.

City of New York, Closure Design of the Fountain Avenue, Pennsylvania Avenue, and Edgemere. Project Manager responsible for engineering design and management for the development of the City's landfill operational, closure, and end-use plans for the Fountain Avenue, Pennsylvania Avenue, and Edgemere Landfills, including final cover designs, conceptual leachate management plans, landfill gas controls, and final grading plans.

Confidential Client, Due Diligence Review to Support the Acquisition of 12 Collection, Transfer, and Recycling facilities/operations of a Regional Solid Waste Company in the Upper Mid-West Area of the United States (2016). Reviewing Principal responsible for technical, operational, and environmental due diligence review. The review included Phase I Environmental Site Assessments and EDR reviews for all the facilities, site visits to review site conditions and operations, facility condition assessments, review of capital expenditures, planned and potential facility expansions, and environmental compliance with stormwater, groundwater, air, fuel storage, and other environmental permit conditions.

Confidential Client, Due Diligence for Company with Numerous Landfill, Transfer Station, and Hauling Assets in the United States (2016). Reviewing Principal responsible for technical, operational, and environmental due diligence review. The review included Phase I Environmental Site Assessments for 18 landfill assets, Environmental Data Resources, Inc. (EDR) report reviews to identify potential recognized environmental conditions relative to landfill and 40 non-landfill assets, and technical due diligence of the landfill assets, including review of site capacities, planned expansions, and possible future expansions, leachate, landfill gas, surface water, and groundwater management, projected capital expenditures for cell expansion and closure, and review of environmental compliance record.

Confidential Client, Due Diligence Review for Landfill Acquisition, Michigan. Project Director responsible for technical review of a private landfill that had closed and filed for bankruptcy protection. The due diligence assignment was performed for a party that was interested in acquiring the asset. Tasks included detailed review of permit requirements, discussions with the regulatory agency, review of engineering plans, assessment of landfill capacity, site visit to assess existing conditions, onsite materials, and equipment, and assessment of tasks and costs with reactivating the landfill.

Confidential Client, C&D Landfill Siting Feasibility Study. Project Director responsible for review of a construction and demolition debris landfill siting feasibility study for a confidential client in the Southeast, assessment of the existing construction and demolition debris generation and disposal capacity in a two-county region, identification of the key regulatory and zoning restrictions, and assessment of the feasibility of developing a new construction and demolition debris landfill in one of the target communities.

Confidential Client, Due Diligence Review to Support the Acquisition of three landfills in Kentucky, West Virginia, and Virginia and a rail transfer facility in New Jersey (2015). Project Director responsible for planning, technical reviews, and capital expenditure reviews of the solid waste facility operations and assets. One of the facilities reviewed required careful review of technical challenges and operational costs associated with constructing a lined municipal solid waste landfill over areas previously mined for coal.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, Material Recovery Facility, and Collection Assets to Support the Acquisition of Regional Solid Waste Company (2015). Principal responsible for operation, engineering, technical, and environmental due diligence reviews of 87 active MSW and C&D landfills, 74 transfer stations, 20 material recovery facilities, and 108 hauling operations associated with a regional solid waste company. The due diligence evaluations were done to support the acquisition of a major solid waste firm. The level of review varied depending on the facility and facility type. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for select facilities. Detailed capital expenditure reviews and projections were completed on landfill cell expansion, site

development and infrastructure, closure, leachate management, landfill gas management, and heavy equipment. The purpose of the review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets, proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for review of the capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Due Diligence Review of Landfill Operations Company in Puerto Rico (2018). Principal responsible for environmental due diligence review to support the acquisition of a company in Puerto Rico with long-term contract for the operation of six municipally owned landfills. The due diligence tasks included review of projected capital expenses associated with cell expansions, closure, and environmental corrective measures, and review of environmental permits, notice of violations, and other regulatory matters associated with the landfill.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, Material Recovery Facility, and Collection Assets to Support the Acquisition of Regional Solid Waste Company (2011). Principal responsible for operational, engineering, technical, and environmental due diligence reviews of 25 active MSW and C&D landfills and 28 transfer stations/material recovery facilities associated with a regional solid wastes company. The due diligence evaluations were done to support an independent investment in a major solid waste firm. The level of review varied depending on the facility and facility type. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for select facilities. The purpose of the review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets, proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for review of the capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, Material Recovery Facility, and Collection Assets to Support the Acquisition of Regional Solid Waste Company (2010). Principal responsible for operation, engineering, technical, and environmental due diligence reviews of 10 landfills, 9 transfer station, one material recovery facility, and 23 hauling operations associated with a regional solid wastes company. The due diligence evaluations were done to support an independent investment in a major solid waste firm. The level of review varied depending on the facility and facility type. Landfills were the focus of the due diligence in terms of the time and effort expended by SCS. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for select facilities. The purpose of the review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets,

proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for review of the capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, Material Recovery Facility, and Collection Assets to Support the Acquisition of Regional Solid Waste Company (2009). Principal responsible for operation, engineering, technical, and environmental due diligence reviews of regional solid waste company involving 11 landfills, 9 recycling facilities, 20 transfer stations, and 32 collection operations. The due diligence evaluations were done to support an independent investment in a major solid waste firm. The level of review varied depending on the facility and facility type. Landfills were the focus of the due diligence in terms of the time and effort expended by SCS. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for all facilities, and Phase I environmental site assessments at a select group of landfills, transfer station, recycling, and collection facilities (. The purpose of the review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets, proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for overall client coordination, project management and technical review of the capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Technical Evaluation of Landfill Assets to Support the Acquisition of Solid Waste Company (2009). Principal responsible for engineering due diligence reviews of three monofill landfills, two in North Carolina and one in Ohio. The due diligence evaluations were done to support an independent investment in a solid waste firm. The evaluation focused on confirming the remaining disposal capacity of the sites, potential future expansion, and the adequacy of the projected capital expenditure budgeting.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, Material Recovery Facility, and Collection Assets to Support the Acquisition of Regional Solid Waste Company (2011-2012). Principal responsible for operation, engineering, technical, and environmental due diligence reviews of 25 landfills and 28 transfer station and material recovery facilities. The due diligence of the hauling operations was performed by a third party, with the exception of the Phase I environmental site assessments, which were performed by SCS. The due diligence evaluations were done to support an independent investment in a major solid waste firm. The level of review varied depending on the facility and facility type. Landfills were the focus of the due diligence in terms of the time and effort expended by SCS. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for select facilities. The purpose of the review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets, proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for review of the

capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Due Diligence Review of Landfill Facility, Michigan. Project Director responsible for assessing the condition and status of a private municipal solid waste landfill that had been temporarily closed as a result of bankruptcy proceedings. The due diligence review was completed for a private investment company considering purchase of the landfill facility. The key tasks included the evaluation of the condition of the landfill's environmental control systems (stormwater, landfill gas, leachate, and groundwater), identification of permit and financial assurance requirements, assessment of landfill capacity, assessment of risks and potential short-term and long-term liabilities, and development of cost estimates to reactive the landfill facility.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, Material Recovery Facility, and Collection Assets to Support the Acquisition of a Regional Mid-Western Solid Waste Company (2014). Principal responsible for operation, engineering, technical, and environmental due diligence reviews of one active landfill, two closed landfills (one was a Superfund site), 7 transfer station, 2 material recovery facilities, and 8 collection/hauling facilities. Phase I environmental site assessments were completed for all the sites. The due diligence evaluations were done to support the acquisition of all the above assets and operations. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for select facilities. Special issues addressed included leachate disposal using deep well injection and status of an existing Superfund site. The purpose of the due diligence review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets, proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for review of the capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Due Diligence Review of Landfill, Transfer Station, and Material Recovery Facility Assets (2014). Principal responsible for operation, engineering, technical, and environmental due diligence reviews of one active landfill, one transfer station, and one material recovery facility. Phase I environmental site assessments were completed for all the sites. The due diligence evaluations were done to support the acquisition of all the above assets and operations. The evaluation included site visits to selected facilities, interviews with site and corporate personnel, review of various background documents, and review of the Environmental Data Resources reports for select facilities. The purpose of the due diligence review was to assess whether the sites were being managed and operated in accordance with good operating practices and customary environmental standards, whether operations were affected by any material environmental problems, whether the condition of the assets were generally in line with customary industry standards, and whether the projected capital expenditure budgeting methodology under which projections had been produced appeared reasonable based on condition of the assets, proposed cell expansions, proposed capping events, proposed special projects, and customary industry practices. Primarily responsible for review of the capital expenditure budgets, site life projections, oversight of landfill evaluations, and report quality control review.

Confidential Client, Landfill Valuation Study. Project Director responsible for developing pro forma cost and revenue model and assessing the value of a new construction and demolition debris

landfill in south Florida, including the evaluation and projection of labor, equipment, personnel, cell expansion, closure, and post-closure costs and potential revenues through the life of the facility.

Cumberland County Improvement Authority, Solid Waste Facility Operations and Alternatives Study, Millville, New Jersey. Project Director responsible for review of the Authority's landfill operations and benchmarking operations against other similar facilities. The goal of the study was to maximize operating efficiency of the Authority's operations, explore and compare alternative business models to operate the landfill, and maximize the overall value of the Authority's operations for the benefit of Cumberland County customers (citizens, municipalities, and ratepayers).

Elbow Road Landfill, Chesapeake, Virginia, Evaluation of Economic Value of Conservation Easement Proposal Relative to C&D Landfill Expansion. Project Director responsible for the development of a pro forma cost and revenue model to evaluate the potential earnings that could be realized, and the corresponding net present value of these earnings, from developing and operating the proposed Part B Expansion area at the Elbow Road Farms Landfill, including the evaluation and projection of labor, equipment, permitting, construction, finance charges, discount factors, inflation, federal and state taxes, maintenance, and other items required to run a construction and demolition debris (CDD) landfill. The site owner planned to use this analysis to support potentially setting aside the Part B Expansion Area for its proposed Construction/Demolition Debris Landfill (CDD) as a qualified conservation area contribution. Pursuant to Treasury Regulation Section 1.170A-14, which governs qualified conservation contributions, the valuation of the property can take into account the fair market value of the property based on the projected highest and best use of the property.

Escambia County, Florida, Landfill Consulting Services. Project Director from 1993 to 2003 for a continuing services, landfill engineering consulting contract and responsible for the engineering design and construction services for over $18 million in landfill improvements to the County's active and closed landfills. The County's active landfill is the Perdido Landfill, which includes Class I and Class III disposal areas and other supporting solid waste operations. Also assisted on various projects associated with the closed Camp V, Mobile Highway, and Klondike Landfills. Projects at the Perdido Landfill have included a comprehensive environmental and operational compliance audit of the Perdido Landfill, design and permitting for four successive landfill expansion cells (2B, 3A, 3B, and 3C), landfill gas collection and recovery system, leachate management system improvements, stormwater improvements, cover improvements, roadway improvements, and a citizens convenience center, operational permit renewal applications in 1994 and 1999, Title V and NPDES permitting, and financial assurance and landfill capacity evaluations on an annual basis. In addition, directed the design, permitting, construction services, and liner CQA services associated with the closure of the 135 acre Beulah Landfill.

Flagler County, Florida, Landfill Consulting Services. Reviewing Principal from 2000 to 2003 for a multi-year, continuing services, landfill engineering contract and responsible for engineering, permitting, and environmental monitoring for the County's two closed landfills (Old Kings Road Landfill and Bunnell Landfill) and the active construction and demolition debris landfill, and conduct of a feasibility study to expand the County's current C&D landfill to the south, which included an environmental and fatal flaw analysis of the 200+ acre parcel of land immediately south of its current operations.

Florida Department of Environmental Protection, Regulatory Support Services. Project Director responsible for providing assistance to the Florida Department of Environmental Protection in developing new and updated solid waste rules pursuant to the 1988 Florida Solid Waste Act.

Assignments included development of the compost rule, oil spill debris disposal, and the phosphogypsum management rule.

Florida Department of Environmental Protection, Technical Advisory Group, Revisions to Solid Waste Rules. Served on the state-appointed, Florida Department of Environmental Protection (FDEP) Technical Advisory Group for the development of Florida's new landfill regulations (Chapter 62-701, Florida Administrative Code [FAC]) developed in response to the Federal RCRA, Subtitle D regulations. The Technical Advisory Group assisted the FDEP in the drafting of the new landfill rules, with specific focus on liner design, leachate collection systems, landfill gas, closure, groundwater monitoring, and financial assurance.

Glades County, Florida, Leachate and Liner System Improvements for the Glades Landfill. Project Director responsible for the design of a leachate treatment system, spray evaporation, and landfill liner improvements at the 40-acre Glades County, Florida landfill.

Glades Landfill, LLC, Design and Permitting for a 233-Acre C&D Landfill, Glades County, Florida. Project Director responsible for the design and permitting of a 233-acre green field C&D disposal facility, fatal flaw analysis, conceptual and final designs, geotechnical and hydrogeological site investigations, development of groundwater monitoring plan, and preparation of and negotiation of the solid waste and environmental resource permits with the Florida Department of Environmental Protection for a new C&D disposal facility located in Glades County, Florida. The facility has a disposal footprint of approximately 145 acres, with an estimated gross air-space capacity (inclusive of daily, intermediate, and final cover) of approximately 11,000,000 cubic yards. The proposed site was located within an environmentally sensitive area resulting in increased attention from the regulatory agencies. The facility became one of the first lined C&D disposal facilities permitted in the State of Florida.

Gulf Coast Recycling, LLC, Geologic and Geotechnical Evaluation Study for a New Class I Rubbish Disposal and Recycling Facility, Stone County, Mississippi. Project Director responsible for preparation of hydrogeological and geotechnical investigation for siting a new 177-acre Class I Rubbish Disposal and Recycling Facility to demonstrate its suitability for use as a Recycling and Class I Rubbish Disposal Site. This study was done in response to a December 14, 2005 authorization from the Mississippi Department of Environmental Quality (MDEQ) following Hurricanes Katrina and Rita. Reviewed background information, coordinated with MDEQ, directed the field investigations (e.g., 11 borings, four groundwater monitoring wells), and prepared the geologic demonstration report. Work was completed in early 2006.

Hardee County, Florida, Landfill Privatization Study. Project Director responsible for evaluation of landfill privatization proposals for Hardee County, Florida, and preparation of the financial pro-forma model to allow the County to evaluate various privatization proposals, taking into account the year by year revenues (tip fees, special assessment, and interest income), operational costs, capital project costs, and fund transfers.

Hillsborough County, Florida, Solid Waste and Landfill Engineering Consulting Services. Project Director and Principal-in-Charge from 1985 to 2005 for a multi-year, continuing services solid waste consulting services contract for Hillsborough County Department of Solid Waste, and responsible for overall landfill and landfill gas engineering, solid waste consulting, and construction assistance for a wide range of projects. Projects included a landfill gas migration and odor control system, a new permit for Class I landfill, the development of a new Class I landfill, two landfill closure projects, landfill gas vendor request for proposal, a contamination assessment at one of the County's landfills, the design of a leachate treatment facility, regulatory coordination, assistance with yearly

capital and operation and maintenance budgets for the County's open and closed landfills, and presentations to the County Commissioners. County landfills involved included Hillsborough Heights, Taylor Road, Northwest, Southeast, Gunn Highway, Barry Road, and Pleasant Grove Landfills.

Hillsborough County, Florida, Design and Permitting for a 60,000 gallon per day Leachate Treatment and Storage Facility. Project Director and Principal-in-Charge for the design, permitting, and construction oversight of the leachate management facility. Tasks included process design, preparation of plans and specifications, permit negotiations, and assistance during startup and testing. SCS selected the ZIMPRO (US Filter) Passavant activated carbon treatment process, which included nitrification and denitrification unit processes. The primary constituent of concern was ammonia. The system was designed based on leachate generation estimates using the EPA's Hydrologic Landfill Performance Model (HELP) and leachate characterization studies. A 570,000-gallon leachate storage tank, full secondary containment system for treatment and storage vessels, an effluent storage pond, and a 21-acre leachate spray field were included in the design. The project involved significant regulatory challenges in order to establish allowable spray irrigation criteria. The Florida Department of Environmental Protection (FDEP) ultimately instituted stringent spray irrigation limitations on the system based on rainfall patterns. This has resulted in some changes to the overall leachate management plan for the site. Construction of the system was completed in 1996, and after its initial shakedown, proved to be effective at treating the target contaminants.

Hillsborough County, Florida, Operational Assistance for a 60,000 gallon per day Leachate Treatment Facility. Project Director responsible for comprehensive evaluation of the treatment system and associated equipment, including development of recommendations for improvements and modifications to the treatment system, and assisted in the implementation of those improvements.

Hudson County Improvement Authority, New Jersey, Design and Permitting of New Double-Lined Ash Residue and MSW landfill. Project Director responsible for the preparation of landfill design and operations plans for disposal of residue from a waste-to-energy plant in Hudson County, NJ. Evaluated site conditions, developed conceptual and final designs for site layout, sequential fill plans, liner systems, leachate controls, final cover, and other supporting facility infrastructure. Prepared cost estimates, specifications, and permit applications and participated in negotiations with the New Jersey Department of Environmental Protection. Provided input to the development of the site Environmental Health and Impact Statement. Developed the operations and maintenance manual for the landfill in accordance with New Jersey Department of Environmental Protection regulations. The landfill was designed with a double-liner system.

Island County, Washington, Landfill Operations Plan. Technical Advisor responsible for providing assistance in the preparation of landfill development and operations plans for a 50-ton-per-day sanitary landfill.

Lake County, Florida, Lady Lake Landfill Closure. Project Director responsible for the design and $3.1 million construction of the 35-acre Lady Lake Landfill closure.

RSM (formerly McGladrey & Pullen), Closure and Post-Closure Cost Estimate Review for Confidential Solid Waste Firm. Project Director responsible for annual review (beginning in 2010) of the closure and post-closure care cost estimates for three solid waste landfills located in several states. The purpose of the reviews is to verify the sufficiency and completeness of the estimates in support of RSM's audit of the company.

Marion County, Florida, Feasibility Study for Excavating the Davis Landfill. Project Director responsible for evaluating the feasibility of excavating the 22.5-acre close Davis Landfill. The Davis Landfill was owned and operated by the County from the mid-1960's until 1984. Groundwater contamination was detected in monitoring wells in the area surrounding the landfill, which has resulted in extensive contamination assessment and remedial action activities by the County since 1991. Mr. Gardner was tasked with evaluating the feasibility and costs of completely excavating the landfill compared to implementing the approved correction action, which included extension of municipal water service to affected properties, abandoning of existing drinking water wells, installation of a landfill gas collection and control system to supplement the already installed final cover system, and long-term monitoring. Mr. Gardner conducted a life-cycle cost analysis using a pro forma type model and concluded that excavating the landfill was cost prohibitive and would result in a substantial increase to the County's solid waste assessment rate if implemented.

Metro Vancouver, Technical Review of Closure Period Plan, Cache Creek Landfill, BC. Principal responsible for providing independent technical review of the Draft Design, Operations and Closure (DOC) Plan and the Draft Post-Closure Management Plan prepared by others for the Cache Creek Landfill, located near the Village of Cache Creek, British Columbia. Technical comments provided to Metro Vancouver were used to develop long-term projections for operating expenses and long-term liabilities for closure and post-closure care and Metro Vancouver in its negotiations with the BC Ministry of Environment regarding the applicability and appropriateness of the proposed closure criteria presented in the Closure Period Plan.

Northwest Arkansas Regional Solid Waste Management District, Nabors Landfill Landfill Engineering Services. Reviewing principal from 2010 for continuing services, landfill engineering contract, and responsible for project oversight, quality control review, and engineering assistance associated with various engineering assignments. Projects included CQA of a the 2-acre Cell 3B expansion, design of the 2-acre Cell 3A expansion, and regulatory assistance to resolve overfilling in Area 1-3 and the Class 4 landfill.

Orange County, Florida, Solid Waste and Landfill Consulting Services. Project Director from 1999 to 2007 for a continuing services, landfill engineering consulting contract and responsible for overall project oversight, quality control review, and engineering assistance associated with various engineering and study projects. Projects included evaluation of the County's solid waste transfer operations, evaluation of landfill gas system improvements at its Class I landfill, design and permitting of a gas collection and control system pursuant to the new source performance standards (NSPS), design of an anvil top surface recoating at the Porter Transfer Station, design of a new coating system to rehabilitate the County's aboveground, concrete leachate storage tanks, and preparation of a 50-year solid waste master plan. The master plan study included solid waste projections, assessment of current and future transfer and disposal needs, a preliminary siting study for a new Class I landfill and several new transfer stations, a solid waste disposal optimization study of the County's existing solid waste management facility, economic analyses, and preparation of the master plan report.

Page County, Virginia, Landfill Operations Reverse Privatization Feasibility Study, Luray, Virginia. Project Director responsible for evaluation of economic feasibility of Page County, Virginia taking over the operations of its Battle Creek Landfill. The Battle Creek Landfill had been operated by National Waste Services, Inc. (NWS) under contract with Page County; however, the Virginia Department of Environmental Quality forced the landfill to shutdown due to operational and environmental deficiencies, and NWS filed for bankruptcy protection. Prepared an economic model that considered the labor, equipment, personnel, cell expansion, closure, post-closure, site

remediation costs, and NWS contract close-out costs. Page County ultimately decided to take over the operations.

Page County, Virginia, Pro Forma Cost Model for County's Landfill and Other Solid Waste Operations, Luray, Virginia. Project Director responsible for development of a pro forma cost model for the County's Battle Creek Landfill and other solid waste operations. The cost model included projections for remaining service life as a function of incoming solid waste quantities, and operational expenses such as labor and associated overhead, equipment, materials, miscellaneous items, capital expenses for cell expansion, equipment, and closure construction, and post-closure care expenses. The pro forma model was developed to provide a tool for the County to track and project future expenses and establishes appropriate tip fees to fund its solid waste program.

Pima-Maricopa Indian Community, Salt River Landfill, Scottsdale, Arizona. Reviewing Principal responsible for final quality assurance review of the design and permitting of the 35-acre, 100-foot deep Salt River bioreactor cell. The project is being permitted under the U. S. EPA's Research, Development and Demonstration (RD&D) permit program and was administered by U.S. EPA Region 9. The design addressed liquids, landfill gas, and stormwater management; monitoring and operational requirements. Provided principal review of the RD&D permit application and assisted with regulatory coordination with EPA Region 9.

Pinellas County, Florida, Landfill Engineering Services. Reviewing Principal responsible for quality control review on various projects including the preparation of the operations permit renewal application for the Bridgeway Acres Landfill (Ashfill), evaluation of the slurry wall system around the Bridgeway Acres Landfill, evaluation of the stormwater and leachate management system for the Bridgeway Acres Landfill, and miscellaneous engineering tasks on an as needed basis.

Polk County, Florida, Landfill Engineering Consulting Services. Principal-in-Charge from 1996 to 2001 for a multi-year, continuing services, solid waste management consulting contract and responsible for quality control review, engineering evaluations, and regulatory coordination associated with the design and permitting for partial closure of the North Central Landfill, construction of the landfill gas recovery system at the North Central landfill, landfill gas investigations at the Northeast and Southeast Landfills, preparation of annual financial assurance documentation, assessment of privatization of portions of the County's solid waste operations, conduct of budget, rate, solid waste composition studies, Title V permitting for the North Central Landfill, and emergency response repairs to one of the major leachate pump stations at the North Central Landfill, including hauling and disposing of over 500,000 gallons of leachate.

Prince William County, Virginia, Landfill Siting Study. Project Manager responsible for conducting a siting study for a new County owned and operated construction and demolition debris landfill, developing screening and ranking methodology for the siting project, preparing screening overlay maps, conducted site visits, evaluating hydrological setting of candidate sites, coordinating extensively with a citizen's advisory group and County staff, preparing the final siting study report, and making presentations to County Board of Supervisors.

Regional Waste Systems, Inc., Master Plan for Ash Residue Landfill. Project Director responsible for the development of Master Plan for expansion of an ash residue landfill for Regional Waste System's, Inc., Portland, Maine, evaluating various vertical and lateral expansion alternatives, reviewing state and federal regulatory requirements, preparing life of site calculations, and preparing final master plan report.

Regional Waste Systems, Inc. (now ecomaine), Portland, Maine, Design and Permitting of Constructed Wetlands System, Closed Balefill. Project Director responsible for the design of a constructed wetlands system to treat contaminated underdrain water from beneath a closed 40-acre municipal solid waste landfill. Tasks included developing a remedial strategy for collecting and treating previously uncontrolled groundwater underdrain discharges which had been negatively affected by leachate discharges to the groundwater system from either the RWS balefill or an adjoining landfill, preparing a design concept and detailed engineering plans to treat the contaminated groundwater using a specially designed constructed wetlands system. The primary constituents of concern were in the affected groundwater were arsenic, iron, and sulfates. Five separate cells were designed to address the treatment and complexing of these various elements and compounds. The substrate design varied depending on the targeted contaminant of concern. The system was designed to be low maintenance and effective treating various constituents during the growing (Spring and Summer) and non-growing seasons (fall and winter). Construction of the system was completed in 1999.

Confidential Client, Facility Site Review. Project Director responsible for conducting a comprehensive overview of landfill operations, systems, and challenges at a large solid waste Subtitle D landfill. Tasks included background review of site operations and environmental monitoring data, trending analysis, conduct of site visit, and detailed facility site review analysis. The facility site view analysis included review of waste receipts, landfill design and operations, groundwater, compliance, and odor issues. The purpose of the Facility Site Review was to assess site design and operational issues that could result in material long-term negative impacts to the facilities operations.

Rockingham County, Virginia, Pro Forma Analysis of Solid Waste Management Alternatives. Project Director responsible for preparing a pro forma analysis of the County's existing landfill operations and proposed modifications to its collection, transfer, recycling, and disposal systems, including alternative strategies for maximizing the service life of the Rockingham County Sanitary Landfill, out-of-county hauling and disposal, and construction of a transfer station and material recovery facility in conjunction with the with the City of Harrisonburg's Waste-to-Energy facility. The pro forma model projects labor, equipment, capital construction, closure, post-closure care, and other miscellaneous operational costs through the active life of the landfill; estimates the remaining service life of the landfill under various disposal scenarios, and provides a tool for assessing the required tip fee to support the estimated County solid waste collection, recycling and disposal costs.

Republic Services, Inc., New Cell Design, Protrero Hills Landfill, Solano, California. Reviewing Principal for review of 10-acre cell expansion design for the Potrero Hills Landfill per Subtitle D and CCR Title 27 regulations. The cell design included provisions for a composite liner and leachate collection and removal system (LCRS). Design elements included the soil excavation/grading plan (850,000 cubic yards excavation), groundwater underdrain system, surface water drainage plan, clay and HDPE liner system details, and use of a traditional soil operations layer.

Sistemas Ambientales del Noreste, LLC (SANO), Pro Forma Evaluation of Landfill Development and Operations. Project Director responsible for development of a pro forma model to evaluate the projected capital, operation, and maintenance costs for new landfill located in a rural area in the Mexican state of Tamaulipas to serve customers in Mexico and southeast Texas. The pro forma cost and revenue model also provided projections of waste flows, cell depletion, closure and post-closure costs, capital sequencing for new cell development, closure, and equipment, and pricing strategies to assist SANO in financial planning for the continued

development of the SANO Landfill. The model allows for estimating the financial performance of the landfill and remaining service life under various disposal and market rate scenarios.

Southern Waste Systems, Inc., C&D Recycling Facility Residual Waste Compaction Study. Project Director responsible for a waste compaction study at private Class III Landfill located in central Florida, supervision of field activities and surveys, calculation of airspace consumption during the study period, and preparation of the final engineering report. Approximately 50, 100-cubic yard transfer trailer loads of residual construction and demolition debris were delivered over a three-day period to landfill from several recycling facilities in south Florida. The purpose of the study was to assess the ratio of the in-place compacted volume to the as-delivered truck volume.

Talbot County, Maryland, Leachate and Landfill Gas Evaluation. Project Director responsible for engineering direction and final quality control review of report on the assessment of landfill gas recovery and leachate generation estimates for the existing Midshore 1 and proposed Midshore 2 landfills in support of a broader leachate/septage treatment feasibility study.

Volusia County, Florida, Landfill Consulting Services. Principal-in-Charge from 1991 to 2003 for a multi-year, continuing services, solid waste management consulting contract for Volusia County and responsible for design, permitting, construction services, and liner construction quality assurance for construction certification for a 35-acre Class I landfill, landfill gas recovery and utilization system, and new borrow pit to support landfill operations, site assessment and remedial and closure designs for Plymouth Road Landfill, development of a commercial recycling database management system.

Waste Management, Inc., Design Landfill Expansion and Sludge Management System, Peñuelas Landfill, Puerto Rico. Project Director responsible for design of landfill expansion for the Peñuelas Landfill, Puerto Rico and engineering oversight and approval for the design of the landfill expansion, sludge holding tank, sludge mixing pit, sludge conveyance piping, and access roadways.

Waste Management, Inc., Stormwater and Operational Plan Update, Mayagüez Landfill, Puerto Rico. Project Director responsible for design of the operational filling sequence and related stormwater controls for the City of Mayagüez Landfill, Puerto Rico, including hydraulic modeling of drop inlets, detentions, establishing erosion and sedimentation plans, and detention ponds.

Landfill Gas Management

Brevard County, Florida, Landfill Gas Pump Test. Project Director responsible for direction and oversight of a landfill gas pump test program and development of the final field study report for Brevard County, Florida.

Broadrock Renewable, LLC, Update of Landfill Gas Reserves Projections for the Olinda Landfill, Orange County, California. Project Director responsible for updating the landfill gas recovery projections for the Olinda Landfill taking into account projected disposal quantities and characteristics. The updates were used by Broadrock management to evaluate the long-term performance of their 32.5 MW landfill gas to energy power plant at the landfill.

Broadrock Renewable, LLC, Evaluate Landfill Gas Collection System Performance and Flow and Gas Quality Monitoring Equipment inlet to the new Turbine Facility, Olinda Landfill, Orange County, California. Project Director responsible for evaluating landfill gas collection coverage and potential options for improving landfill gas recovery, and assessing the flow

and gas quality monitoring equipment inlet to Broadrock's 32.5 MW landfill gas to energy turbine facility at the Olinda Landfill.

City of Jacksonville, Florida, St. Augustine Road Landfill Gas Investigation. Project Director responsible for directing field investigations and preparing final report for a landfill gas investigation at the City's Landfill. Health and Safety impacts were assessed to determine if the site was useable as an active recreational park (i.e., ballfields).

City of Lafayette, Louisiana, Design of North Dugas Landfill Gas Collection System. Project Director responsible for the design of a landfill gas collection and recovery (electrical generation) system for City's Landfill. The project was designed to provide research opportunities to assess landfill gas generation characteristics and to establish a long-term data base for landfill gas generation, collection, and recovery.

Confidential Client, Greenhouse Gas Market Evaluation. Principal responsible for preparing a summary report presenting the current state of domestic greenhouse gas (GHG) markets, the various mechanisms for landfill gas (LFG) projects to participate in these markets, and potential considerations for Client's participation in these markets. The report focused on GHG market mechanisms for methane destruction projects, and included discussion of GHG market mechanisms related to renewable energy projects.

Confidential Client, LFG Recovery Modeling. Project Director responsible for modeling potential LFG recovery from Client's municipal solid waste landfills throughout the Country. The purpose of the modeling effort was to provide Client a range of LFG recovery projections based on various assumptions regarding waste disposal rates, size, age of waste, collection system performance and efficiency, and climatic assumptions (i.e., rainfall and location). The modeling effort was conceptual in nature and was not based on actual site specific information. The results of the LFG recovery projections for 324 model runs were compiled to provide access to recovery estimates for all the model runs.

Confidential Client, LFG to Energy Facilities Due Diligence to Support Asset Acquisitions. Project Director and Reviewing Principal responsible for due diligence review of two LFG to energy facilities on the east and west coast with a total projected capacity of approximately 77 MW and processing 20,000 standard cubic feet per minute of LFG. Tasks included LFG reserves analysis, assessment of solid waste markets in the region of the subject landfills and evaluation of projected waste flows, evaluation of the gas collection and control systems, assessment of air pollution control requirements and future regulatory changes, estimate of projected capital and operational expenses, and Phase I environmental site assessments.

Confidential Client, LFG to Energy Facilities Due Diligence to Support Asset Acquisitions. Project Director and Reviewing Principal responsible for due diligence review of eight LFG to energy facilities in the southwest and west coast regions of the United States. Tasks included LFG reserves analysis, assessment of projected waste flows, evaluation of the gas collection and control systems, assessment of air pollution control requirements and future regulatory changes, estimate of projected capital and operational expenses, and Phase I environmental site assessments on three of the facilities, and transactional screen assessments on five.

DeKalb County, Georgia, 3.2 MW Landfill Gas Green Power Facility. Reviewing Principal responsible for assistance in contract negotiations, and client liaison during design and construction phases of a 3.2 MW Landfill Gas Green Power Facility. DeKalb County selected SCS Energy to implement this County-initiated project. The project was completed in less than 9 months, under

significant time constraints. The project was one of the first applications of the Caterpillar 3520 reciprocating engine generators, which were designed for low NOx emissions. The facility included a pre-engineered metal building, conference/educational viewing room and offices, two-Caterpillar 3520 generators, gas pre-treatment, and remote control and monitoring capabilities. Project reached commercial operation on October 12, 2006, and was awarded the U. S. EPA's Community Partner Project of the year award for 2006.

Element Markets, LLC, Evaluation of Potential Carbon Emission Credits and Three Waste Connection Landfills. Project Director responsible for preparation of landfill gas recovery estimates at the Meadow Branch Landfill, TN, Volunteer Landfill, TN, and the Northeast Mississippi Regional Landfill, MS for the purpose of assessing the applicability for sale of landfill gas carbon emission reduction credits on the Chicago Climate Exchange (CCX). The criteria set forth by the CCX was reviewed to confirm the suitability of the landfill gas carbon emission reduction credits for sale on the CCX, assuming that Element Markets would be applying to be an offset provider with the sole rights to the landfill gas, including its "green" attributes.

Emission Inventories and Title V Permit Applications, Multiple Sites. Project Director responsible for final quality assurance review of emissions inventories and Title V permit applications for the Perdido Landfill (Escambia County, Florida), Tomoka Farms Road Landfill (Volusia County, Florida), Southeast County Landfill (Hillsborough County, Florida), and the North Central Landfill (Polk County, Florida) pursuant to the requirements of the Clean Air Act (CAA) and the New Source Performance Standards/Emission Guidelines for municipal solid waste landfills. Conducted emissions inventories, estimated non-methane organic compounds (NMOCs) emissions, prepared Title V applications, and coordinated with regulatory agencies.

Expert Witness Services, Explosive Gas Investigation, Clearwater, Florida. Expert witness service dealing with a gas explosion at an apartment in Clearwater, Florida, which killed two people. One of the alleged sources of gas was from buried marsh deposits beneath the apartment complex which exploded. Provided independent engineering assessments and depositions during the case. Represented the defendants in the case.

Higgerson-Buchanan, Landfill Gas Pump Test and Evaluations, Chesapeake, Virginia. Principal responsible for quality assurance review of field investigations, engineering evaluations, construction cost estimates, carbon credit evaluation, and preparation of final report involving a week-long pump test program, and evaluation of feasibility of installing a gas collection and control system to control odors from the Higgerson-Buchanan construction, and demolition debris landfill.

Hillsborough County, Florida, Annual Air Emission Reports. Project Director responsible for oversight and quality assurance review of yearly air emissions report for the Hillsborough Heights, Taylor Road, and Southeast County Landfills, Hillsborough County, Florida.

Hillsborough County, Florida, Hillsborough Heights and Taylor Road Landfill Gas System System O&M. Project Director responsible for oversight and quality assurance review of the monthly inspection, monitoring, and adjustment of the Hillsborough Heights and Taylor Road Landfill gas control systems (separate systems for each landfill). Inspected all facilities associated with the landfill gas system, including wellheads, flares, and blowers; balancing of the landfill gas control systems; trouble-shooting, and reviewed migration monitoring data.

Hillsborough County, Florida, Landfill Gas Direct Use Negotiations. Project Director responsible for evaluations and assistance to the County during negotiations of a landfill gas

utilization contract proposed by TORO Energy Corporation for construction of a landfill gas pipeline from the Hillsborough Heights Landfill to a concrete plant boiler.

Integrys Energy Services, Third Party Review of Landfill Gas Recovery Estimates for the Blueridge Landfill, Fresno, Texas. Project Director responsible for independent review of another consultant's reports on condition of landfill gas collection and control system at the Blueridge Landfill, and estimates of landfill gas recovery. Reviewed landfill gas modeling assumptions and approach, prepared independent estimates of recovery based on SCS's landfill gas recovery model and assumptions, and prepared report presenting findings and conclusions.

Landfill Gas Collection and Control System Designs. Project Director responsible for the design of landfill gas control systems for the Dyer Boulevard and Lantana Landfills, Palm Beach County, Florida.

Landfill Gas Utilization RFPs. Project Director responsible for oversight and quality assurance review for preparation requests for proposals for the recovery of landfill gas for Hillsborough County, Volusia County, and the Solid Waste Authority of Palm Beach County, Florida. Assessed landfill gas generation and recovery, conducted market assessment, coordinated with vendors, participated in vendor interviews and evaluations, and provided contract review services.

Montgomery County Regional Solid Waste Authority, Christiansburg, Virginia, Landfill Gas Utilization Feasibility Study. Project Director responsible for review of LFG utilization feasibility study and assistance during contract negotiations for direct use of the LFG. The project involved assessing LFG generation and recovery potential and construction of a LFG pipeline to an adjacent industrial facility in Christiansburg, Virginia.

North American Properties, Landfill Gas Migration Control Design and Landfill Fire Mitigation, Cobb County, Georgia. Project Director responsible for investigation, expert consultation, and design of mitigation measures for large retail complex constructed on a construction and demolition debris landfill in Cobb County, Georgia. Mitigation measures included control of subsurface fire and passive and active systems to mitigate decomposition gas containing methane.

Orange County, Florida, Design and Permitting of Landfill Gas Collection and Control System for Closed Class I and Active Class III Landfills. Project Director responsible for design and permitting of a gas collection and control system for the County's closed Class I and Active Class III Landfills pursuant to the New Source Performance Standards (NSPS) for municipal solid waste landfills.

Orange County, Florida, Evaluation of Landfill Gas Collection and Control System Improvements. Project Director responsible for evaluation of landfill gas system improvements for the County's active Class I Landfill. Assessed of the existing landfill gas collection system performance and the condition of the landfill gas wellfield; reviewed historical flow data, conducted field observations, and prepared recommended improvements.

Orange County, Florida, Solid Waste Collection Services, Principal responsible for review of proposal responses submitted to Orange County, Florida for its new, 10-year solid waste, multi-franchise area, collection contract. Four separate collection areas were included in the procurement. SCS developed the request for proposal in coordination with County staff, assisted during the entire procurement process. The contract award was protested, and SCS assisted the County during the protest period. The contracts were ultimately successfully finalized and awarded.

Pratt Industries, Dallas, Texas, Technical Assistance Supporting Project Development. Project Director responsible for estimating LFG recovery from the 2,040-acre McCommas Bluff Landfill Facility (954-acre footprint), evaluating the performance of the existing Pressure Swing Adsorption Process, estimating air pollutant emissions for hazardous air pollutants (HAPs), sulfur dioxide (S02), other criteria pollutants from the combustion of landfill gas in a boiler at the proposed Pratt facility, recommending a specification for the sulfur content of the landfill gas to be delivered to the Pratt facility and the type of landfill gas flow measuring devise to use at the facility, estimating the moisture content of the landfill gas to be delivered to the Pratt facility, and providing a budget for construction of a transmission pipeline from the landfill to the Pratt facility.

Republic Services, Inc., Post-Closure Landfill Gas Emissions Evaluation for Multiple Landfill Sites. Project Director responsible for the modeling of landfill gas emissions for 21 landfill sites. Provided quality control review of all analysis and reports prepared. The modeling was completed to support the closure and post-closure care estimates for Republic's landfills, specifically estimating when the sites will fall below the 50 Mg per year emission threshold following closure such that closure actions associated with the gas collection and control system pursuant to the New Source Performance Standards can be initiated.

Republic Services, Inc., Assessment of Landfill Gas Operational Metrics for Active and Closed Landfills (2013-2014). Project Director responsible for development of a model to evaluate historical and current landfill gas system operational metrics.

Rhode Island Resource Recovery Corporation (RIRRC), Providence, Rhode Island, Evaluation of Gas Collection and Control System of the RIRRC Landfill. Reviewing Principal for evaluation of the gas collection and control system for the RIRRC Landfill. Specific responsibility included quality assurance review of the report submitted to RIRRC.

Rhode Island Resource Recovery Corporation (RIRRC)/Broadrock Renewable, LLC, Providence, Rhode Island, Independent Evaluation of Landfill Gas Projections, Gas Collection and Control System, Landfill Operations, and Leachate Management at the RIRRC Central Landfill. Reviewing principal for independent evaluation of landfill gas projections, landfill gas collection system, leachate management, and landfill operations for the purpose of establishing a benchmark for assessing the performance of these systems.

Seminole County, Florida, Construction Services, Osceola Road Landfill Gas System. Project Director responsible for construction engineering inspection services for a landfill gas control system at the closed section of the Osceola Road Landfill. The project involved the installation of landfill gas extraction wells, header piping, and a flare station.

Southeastern Public Service Authority, Yard Waste Compost Odor Study at the City of Virginia Beach Landfill No. 2. Reviewing Principal for SCS's field sampling and analysis of ambient air sampling at the SPSA Yard Waste Composting Facility in Virginia Beach, Virginia. SCS conducted the sampling and analysis in accordance with the confirmation odorant monitoring protocol. SPSA constructed the multi-million dollar, 10 acre compost facility at the Virginia Beach Landfill in 2005. The compost operations experienced significant odor problems following a major rainfall event, which caused the compost pile to go anaerobic. The odor problems ultimately led to the closing of the facility in 2007.

Southeastern Public Service Authority, Landfill Odor Study, Suffolk, Virginia. Project Director responsible for project coordination, report preparation, and presentation to the SPSA Board associated with an odor study at the SPSA Regional Landfill and surrounding community. Tasks

included field sampling and monitoring, laboratory analysis, air dispersion modeling, data analysis, report preparation, and presentation to the SPSA Board.

Various Clients, Tier 2 Emission Tests

Waste Management, Inc. Project Director responsible for quality assurance review of Tier 2 test and reports for the Three Corners Landfill Tier 2 Emissions Test, Piedmont, Alabama.

Hillsborough County, Florida. Project Director responsible for quality assurance review of Tier 2 test and reports for the Southeast County Landfill. Fifty samples were collected from the landfill. The average concentration of non-methane organic compounds was 116 ppm.

Solid Waste Disposal Authority, City of Huntsville, Alabama. Project Director responsible for quality assurance review of Tier 2 test and reports for the Solid Waste Disposal Authority for the City of Huntsville, Alabama. Fifty samples were collected from the landfill. The average concentration of nonmethane organic compounds was 60 ppm.

Polk County, Florida. Project Director responsible for quality assurance review of Tier 2 test and reports for the County Landfill, which involved active and closed landfill areas.

Waste Connections, Tier 2 Studies at the Meadow Branch Landfill, TN, Volunteer Landfill, TN, and the Northeast Mississippi Regional Landfill, MS. Project Director responsible for conducting Tier 2 tests for these landfills pursuant to NSPS requirements, and quality assurance review of Tier 2 tests and reports.

Waste Management, Inc., Landfill Gas and Leachate Management System Evaluation for the Two Pines Landfill, Little Rock, Arkansas. Project Director responsible for the independent evaluation of the leachate and landfill gas management systems at the Two Pines Landfill.

Waste Management, Inc., Design Guidance Manual for Deep and Wet Landfills. Principal responsible for development of a guidance document to supplement Waste Management's existing landfill gas design manual to provide guidance on landfill gas and liquids management design and operational strategies to deploy at deep and wet landfills. Deep and wet landfills pose unique challenges for landfill operators in terms of liquids and gas management and temperature and pressure controls, and the manual provides suggested design details to consider as the landfill is developed.

Solid Waste Studies

Broward Solid Waste Disposal District, Florida, Development of Solid Waste Special Assessment Program. Project Director responsible for development of a solid waste special assessment program for the Broward Solid Waste Disposal District, including evaluation of alternative special assessment strategies and programs used by other counties and municipalities throughout Florida and elsewhere, field testing to develop generation estimates for commercial properties; development of organization and procedures for implementing a special assessment, and preparing final report presenting the special assessment findings and program. The District includes 25 separate municipalities and the unincorporated areas of Broward County.

City of Chesapeake, Virginia. Preparation of Recycling Collection and Processing Request for Proposal. Principal responsible for preparation of a request for proposal for the City to solicit pricing and services for residential recycling collection and processing. Specific attention

given to the issues of the "China Sword", alternative procedures for management of the collected recyclables in the event of a severe commodity market turndown, and using a weighted average commodity value as the basis for setting fees for processing the recyclables.

City of Glendale, California, Independent Review of Integrated Resource Recovery and Energy Conversion Facility. Principal responsible for the independent review of a proposed 250,000 ton-per-year mixed waste processing facility (Scholl Canyon Organics Recovery to Energy Facility, or SCORE) at the Scholl Canyon Landfill to recover recyclables and organics from the City's residential and commercial waste stream. The proposed facility included screening for organics and recyclables, followed by anaerobic digestion and biogas recovery and composting with woody waste. The resulting compost would be used as alternative daily cover on the City's landfill, and be available for inclusion in the City's recycling calculation because of the AD and composting processes. Tasks completed included review of background information on the proposed facility, and independent review of the technical elements of the proposed project, projected outputs (e.g., commodities and residuals), assessment of reliability of the proposed processes, and reasonableness of the proposed financial projections and tip fees. A final confidential independent engineer's report was prepared and submitted to the City.

City of Lee's Summit, Missouri, Pro Forma Analysis for Transfer Station. Principal responsible for preparing a conceptual pro forma to evaluate the feasibility of constructing and operating a new solid waste transfer station to replace the City's existing landfill operations.

City of Modesto, California, Solid Waste Service Rate Study. Principal responsible for conducting a solid waste service rate study for the City of Modesto, California and developing a pro forma rate model. The City's Solid Waste Division includes the Compost, Solid Waste, Green Waste/Forestry, and Carpenter Road Landfill Enterprise Funds, which are funded through residential, commercial, and industrial user fees. The rate study established a basis for future fees/rates to provide sufficient revenues to support the Solid Waste Division funds, offered methodologies for setting rates for garbage and organic second cart options, and provided an approach for assessing the commercial bin and drop box rates. The rate model developed for the City allows for 10-year projections of future operational and capital costs, inclusion of special revenue needs and expenses, and alternative scenario considerations.

City of Oklahoma City, Oklahoma Environmental Assistance Trust, Solid Waste Collections Services. Principal responsible for providing professional solid waste services in the following areas 1) Collection Services - Evaluate the City of Oklahoma City's current solid waste collection services plan, recommend improvements to be implemented through a blend of City and privately contracted sources during the next private contract term, and provide any associated procurement and transition services deemed necessary by OCEAT, 2) Prepare request for proposal for collection services and assist OCEAT with procurement process through contract award and implementation, 3) Transfer Station Services – Evaluate the costs and benefits to OCEAT of encouraging the development of transfer stations for use by City and privately contracted collection vehicles and the general public, in lieu of transporting waste directly to landfills, recommend conceptual designs, siting, services, and procurement approach, provide any associated procurement and transition services deemed necessary by OCEAT, 4) City Solid Waste Fleet Maintenance Services - Evaluate the City of Oklahoma City's privatized solid waste management fleet maintenance services, develop updated service requirements, recommend statement of work and contract terms, and provide any associated procurement and transition services deemed necessary by OCEAT, and 5) evaluate the City's current collection routes and revise to optimize its existing fleet and resources, including expanding and realigning the City's service areas. The City provides solid waste collection for approximately 40 percent of the residential customers in the urban and rural

geographic areas (74,000 urban customers), while Waste Management, Inc. (WM) provides collection services under contract with OCEAT to the balance of the City's residences (100,000 urban customers plus 16,000 rural customers). The private contractor provides recycling collection services to approximately 173,000 City customers.

City of Oklahoma City, Oklahoma Environmental Assistance Trust, Expert Routing Services. Principal responsible for providing professional services to assist the City evaluate and implement routing solutions to improve the services the City provides its citizens in the following areas: 1) Assess Routing Functions -Examine all of the routing functions in the City of Oklahoma City's Utilities Department, including current routing systems and software, business processes, data requirements for manual and computerized work assignment, and the integration of this data into existing applications, 2) Develop Routing Approach – Develop a comprehensive routing approach including recommendations for services, systems, resources and solutions to most effectively and efficiently complete scheduled and non-scheduled field work activities, and include the ability for real-time route adjustment based upon conditions and long-term routing adjustments for growth and development, and 3) Develop RFP – Provide professional services to assist OCEAT in development of RFP(s) to procure all services, systems, resources and solutions necessary for implementing the recommended routing approaches and their incorporation into business processes and selected applications.

City of Norfolk, Virginia, Evaluation of Transfer Station Purchase and Operational Alternatives. Reviewing principal responsible for development of a financial pro forma model and quality control review of the analysis of the City's options for purchasing and operating the transfer station and supporting assets (trucks and trailers) located within its jurisdiction from the Southeastern Public Service Authority (SPSA). Tasks included review of SPSA's operational budgets for the facility, development of long-term capital expenditure estimates, evaluation of transportation costs, evaluation of privatization alternatives for operation versus municipally operated, and preparation of a final report and recommendations.

City of Portsmouth, Virginia, Solid Waste Rate Study. Principal responsible for the development of a pro forma rate model to assist the City establish monthly residential rates for solid waste services provided by the City. The analysis considered normal operating, short-term and long-term capital requirements, collection costs, financing, landfill operations, closure and post-closure, and contingency goals. The model provides the City with the ability to conduct various "what if" scenarios relative to the model's key input assumptions and provides projections for a 15-year period.

City of Richland, Washington, Pro Forma Model for Future Solid Waste Management Alternatives. Principal responsible for development and review of pro forma model to evaluate the options of the City expanding its existing landfill or constructing a new transfer station and hauling to private landfill facility. The analysis considered life of site estimates for alternative disposal rate scenarios (City and City + partial County waste flows), capital expenditure projections for cell development, equipment purchases and replacement, and transfer station construction. The model also considered hauling cost and market tip fees for various long-haul disposal alternatives. Presentations were made to the Public Utility Rate Committee and the City Council.

City of Riviera Beach, Florida, Solid Waste Collection Rate Study. Project Director responsible for quality control review of final report for a solid waste collection rate study and evaluation of yard waste processing facility for the City of Riviera Beach, Florida.

City of Riviera Beach, Florida, Cost Accounting Study. Project Director responsible for a cost accounting study of the solid waste collection and management system for the City of Riviera Beach, Florida. Evaluated the actual cost of providing solid waste collection services. The results of this study were used in assessing the feasibility of privatizing the Solid Waste Department.

City of Virginia Beach, Recycling Assistance. Principal responsible for providing technical advisory services to the City of Virginia Beach management team regarding the impact of the depressed recycling commodity markets resulting from China's actions in 2017-2018 to enforce tougher recycling commodity contamination specification.

City of Virginia Beach, Assistance Negotiating an Agreement with Waste Connections. Principal responsible providing technical advisory services to the City management team regarding a proposal submitted by Waste Connections to expand its landfill operations onto areas of the City's Virginia Beach Landfill No. 2 property. Waste Connections proposal included proposed operation, economic, and facility concessions that they think would benefit the City and Waste Connections. Tasks included review of the proposal, and technical and economic review of the proposal.

City of Virginia Beach, Compressed Natural Gas Vehicle Conversion Feasibility Study. Project Director responsible for evaluation of feasibility of converting the City's 100-vehicle solid waste collection diesel fuel fleet to compressed natural gas. Specific responsibilities included pro forma evaluation of the life-cycle costs for the conversion, analysis of phasing alternatives, technical issues, and facility retrofit requirements, assessment of the steps the City would need to take to make the conversion, and identification of the advantages and disadvantages of CNG vehicles and operations. The pro forma analysis included projections of capital, operation, and maintenance costs, including sensitivity analysis on several key cost factors including diesel/CNG fuel escalation, maintenance costs, fuel efficiency, and new vehicle purchase premium.

City of Virginia Beach, Yard Waste Composting Feasibility Study. Principal responsible for quality assurance review and economic evaluation of a study evaluating the feasibility of the City constructing and operating a new yard waste compost facility to manage 45,000 tons per year of residentially collected yard debris. The evaluation considered multiple siting locations, sizing of the facility, and site development, equipment, labor, and other operational costs.

City of Virginia Beach, Residential Routing Study. Project Director responsible for evaluation of residential collection routes for the City of Virginia Beach, and development of new routes using Fleet Route software to accommodate additional automated vehicles and improve the efficiency of collection. The project was completed in conjunction with C2Logix. The City of Virginia Beach has a population of approximately 443,000, and services over 121,000 residential customers with residential household and yard waste pickup Tuesday through Friday.

City of Virginia Beach, Transfer Station Study. Project Director responsible for evaluation of the feasibility of relocating and constructing a new transfer station in the City to replace the existing Landstown and Ocean Transfer Stations. The first phase of the analysis considered replacing and relocating the 870 tons per day Landstown Transfer Station because the City's preference to use the existing transfer station property for other uses. The analysis included siting criteria, traffic issues, sizing, construction, and operational costs.

City of Virginia Beach, Pay-As-You-Throw Policy Analysis Report (2014). Project Director responsible for preparation of an analysis considering the potential adoption of a PAYT program for the City of Virginia Beach. The purpose of the report was to provide supporting technical information and policy analysis for the City Council regarding PAYT programs and their applicability to the City.

The analysis evaluated the types of PAYT programs available, the advantages and disadvantages of each, applicability of PAYT to the City's solid waste system, implementation issues, and potential fee structures for a PAYT program.

City of Virginia Beach, Zero Waste Policy Analysis Report (2014). Project Director responsible for preparation of an analysis considering the potential adoption of a Zero Waste policy for the City of Virginia Beach. The purpose of the report was to provide supporting technical information and policy analysis for the City Council regarding Zero Waste programs and their applicability to the City. The analysis evaluated the definition of Zero Waste, the types of Zero Waste programs implemented throughout the United States, review of several similar size municipalities that have adopted Zero Waste policies, and implications of adopting a Zero Waste policy for the City in terms of program changes, facility infrastructure needs, ordinance revisions, diversion requirements, and disposal practices.

City of Virginia Beach, Solid Waste Rate Study (2015/16 and 2018/19). Project Director responsible for preparation of a comprehensive rate study for the City's Solid Waste Management Division. Tasks included 1) review of the City's historical and current budgets and expenses associated with solid waste collection (automated curbside collection, bulky waste, and yard waste), recycling, and disposal, 2) preparation of a pro forma rate model to evaluate the required solid waste management fee that residents would need to be charged ($/household/month) for solid waste management services considering several operational and financial performance scenarios, and 3) preparation of a report to support future proposed rates.

City of Virginia Beach, Post-2018 Planning Support. Project Director responsible for assisting the City Manager, Assistant City Management, Director of Public Works, Solid Waste Program Management Administrator, and the City's Southeastern Public Service Authority (SPSA) Board member representative review the City's options and cost implications of continuing its association with SPSA following 2018. Tasks included review of SPSA proposals and options for managing the region's waste following January 2018, when the SPSA member use and support agreements expire, financial projections, and input on strategic approaches the City might consider.

Confidential Client, Due Diligence Review to Support the Acquisition of 21 Waste to Energy Facilities in the United States (2018). Principal responsible for environmental due diligence review. The review included Phase I Environmental Site Assessments and EDR reviews for all the facilities, site visits to review site conditions and operations, review of capital expenditures, planned and potential facility expansions, and environmental compliance with stormwater, groundwater, air, fuel storage, and other environmental permit conditions.

Confidential Client, Confidential Location. Project Director responsible for conduct of a solid waste market study to support the siting, permitting, and construction of a new waste to energy facility within the United States. Tasks included providing overall guidance on the scope and approach to the study and review of the final report. The project involved identification of solid waste generation within a specified geographic area, confirmation of solid waste hauling and disposal contracts, identification of private and municipal haulers, landfills, transfer stations, and waste to energy facilities in the region, and development of a database that could be used to identify waste that could ultimately be captured by a new facility if constructed.

Cumberland County, North Carolina, Yard Waste Composting Upgrade Evaluation. Principal responsible for review of options to upgrade the County's 18.5-acre Wilkes Road Landfill yard waste composting. The facility manages 50,000 to 70,000 tons per year of organic material, primarily from yard and woody waste. The analysis included options for upgrading the facility to

produce a high grade compost and wood chips for mulch and boiler fuel, site improvements for stormwater, access, and fire control, and development of a pro forma model evaluating potential operational and market scenarios.

Deltaway Energy, Market Assessment of Recovered Materials from the La Duquesa Landfill in Santo Domingo and Projected Landfill Development and Operations Costs. Principal responsible for review of a market analysis for the recovery of recyclables materials from the La Duqesa Landfill to support the landfill owner in cost-recovery/damages litigation against the City of Santo Domingo for alleged improper and uncompensated taking of property and assets. The analysis also included a detailed pro forma tip fee model that considered various operational and capital improvement scenarios.

Dorchester County, Maryland, Solid Waste Management Plan. Staff Engineer responsible for field studies and engineering evaluations supporting the development of a 10-year solid waste management plan for Dorchester County, Maryland. Evaluated existing collection systems and landfills; developed conceptual designs and cost estimates for a resource recovery facility (modular incinerator) and an 80-ton-per-day transfer station; assessed current composting operations at the County wastewater treatment facility; supervised a solid waste weighing and characterization program; and recommended modifications to the County's disposal and collection system.

Eight Municipalities in Maine, Expert Witness Services Relative to Penobscot Energy Recovery Corporation. Provided expert witness services to evaluate damages resulting from an alleged breach of contract between Penobscot Energy Recovery Corporation and eight municipalities in Maine. Tasks included document review of independent engineering estimates, preparation of engineering report, and expert witness testimony for the eight municipalities.

City of El Segundo, California, Solid Waste Collection Bid Evaluation. Review solid waste bid pricing forms and recommend evaluation criteria for the bid review committee's consideration.

Frederick County, Virginia, Development of a Pro Forma Economic Model for the County Landfill Fund. Principal responsible for development of a pro forma revenue and cost model for Frederick County solid waste operations, which is operated as an enterprise fund. The County landfill provides non-hazardous solid waste disposal for Frederick and Clarke Counties, and the City of Winchester. The landfill facility encompasses 932 acres, and includes a 90-acre, Subtitle D Municipal Solid Waste (MSW) landfill, a 50-acre Construction Demolition Debris landfill, a citizens convenience center, scalehouse, leachate pretreatment facility, and landfill gas-to-energy facility. The pro form model provides a planning tool for the County to assess the required tip fees to fully fund the "Landfill Fund". The model estimates revenue from tip fees and operational costs associated with its Landfill Fund that allows for consideration of various "what if" scenarios as defined by key input assumptions. It automatically schedules major equipment purchases and construction events such as new cell development, landfill gas system construction, special projects, closure, and post-closure care, and estimate associated costs based on an assumed inflation rate, and estimates annual revenues and expenses for a 20-year period. The model evaluates reserve funds and accruals to allow for cash-funding of all capital expenses throughout the life of the landfill, including equipment, new cell development, closure, and post-closure care.

Greater Lebanon Refuse Authority, Lebanon, Pennsylvania, Solid Waste System Pro Forma Model. Principal responsible for preparation of a solid waste system pro forma model to evaluate life cycle costs of potential future solid waste management options. The model estimates for each option the following key metrics: a) the remaining life of the existing and future expansion areas of the Authority's landfill, projected capital expenditures and operational expenses, estimated

accruals and financing costs, landfill closure and post-closure costs, estimated revenues from non-tip fee sources, and the required system tip fee to support the Authority's options. The solid waste options included the status quo (i.e., landfilling), construction of a material recovery facility for either MSW and/or recyclables with transfer to out-of-county facilities for disposal or recycling, and construction of a mixed waste processing facility.

Hampton Roads Planning District Commission, Virginia, Update Regional Solid Waste Management Plan. Project Director responsible for updating the solid waste management plan for the Southside Hampton Roads area, which includes the Cities of Chesapeake, Franklin, Norfolk, Portsmouth, Suffolk and Virginia Beach, the Counties of Isle of Wight and Southampton, and the Towns of Boykins, Branchville, Capron, Courtland, Ivor, Newsoms, Smithfield and Windsor. The update was completed pursuant to Section 9 VAC 20-130-175.F of the Solid Waste Planning and Recycling Regulations. It included updates to solid waste generation, composition, demographic, and solid waste management facility information; an assessment of solid waste facility needs for the next 20-years, and an implementation plan for this period.

Hampton Roads Planning District Commission, Virginia, Valuation Study of the Southeastern Public Service Authority's Transfer Station, Landfill, and Waste-to-Energy Facility Assets. Project Director responsible for developing an independent assessment of the value of SPSA's assets. Developed a valuation methodology, assessed condition of assets, and prepared pro forma earnings model in order to establish range of value of assets. This work was done to support the County and City Managers (referred to as the Chief Administrative Officers, or CAO's) of the member communities of SPSA. The CAO's assisted SPSA in its negotiations to divest certain of its assets in the face of significant financial conditions.

Hampton Roads Planning District Commission, Virginia, Evaluate Resulting Municipal Tip Fee Resulting from the Sale of the Southeastern Public Service Authority (SPSA) Refuse Derived Fuel Waste to Energy Facility (RDF WTE Facility). Project Director responsible for the evaluation of bids that were received by SPSA for the purchase of its RDF WTE Facility. This assignment was done to support the Chief Administrative Officers of the SPSA member communities (City and County Managers) in their review of the bids and impacts to their respective communities from the potential sale. The member communities include Chesapeake, Franklin, Isle of Wight County, Norfolk, Portsmouth, Southampton County, Suffolk, and Virginia Beach. Tasks included review of the bids submitted by Covanta Energy Corporation and Wheelabrator Technologies, Inc., review of SPSA's detailed operational budget, preparation of a pro forma model to estimate resulting municipal tip fees following sale of the RDF WTE Facility based on the terms and conditions of the bids through 2018, coordination with Financial Advisors assisting the member communities, and participation in numerous public meetings and presentation.

Hampton Roads Planning District Commission, Virginia, Development of a Solid Waste Management System for 2018 and Beyond (2008). Project Director responsible for evaluation of alternatives and recommendations for managing solid waste in the south Hampton Roads Region after 2018, when the current agreements between Chesapeake, Franklin, Isle of Wight County, Norfolk, Portsmouth, Southampton County, Suffolk, Virginia Beach, and the Southeastern Public Service Authority (SPSA) expire. Tasks included evaluation of solid waste management technologies, evaluation of institutional models for future cooperative arrangements within the region, development of pro forma models to evaluate alternatives, facilitation with the Chief Administrative Officers from each City and County involved in the process, and preparation of final recommendations and report.

Hampton Roads Planning District Commission, Virginia, Development of a Solid Waste Management System for 2010 and Beyond (Update of the 2018 and Beyond Initial Study). Project Director responsible for the update of the evaluation of alternatives and recommendations for managing solid waste in the south Hampton Roads Region after 2018, when the current agreements between Chesapeake, Franklin, Isle of Wight County, Norfolk, Portsmouth, Southampton County, Suffolk, Virginia Beach, and the Southeastern Public Service Authority (SPSA) expire. This updated study builds off the work study completed in November 2008 and accounts for the significant changes in the solid waste system that occurred between 2008 and 2010 (e.g., sale of RDF WTE Facilities to Wheelabrator, significantly reducing landfill operations, and terminating recycling services to the Region). While the previous study focused on what would happen after 2018, this updated study also addresses the steps that need to be taken between now and 2018 to provide for solid waste disposal services after the use and support agreements with SPSA expire. Tasks included evaluation of solid waste management options and institutional models for future cooperative arrangements within the region, development of pro forma models to evaluate alternatives, facilitation with the Chief Administrative Officers from each City and County involved in the process, and preparation of final recommendations and report.

Hampton Roads Planning District Commission, Continuing Support for Development of Inter-local Agreement (2013-2018). Project Director responsible for assisting the Chief Administrative Officers (i.e., City and County Managers) representing the eight municipalities that are part of the Southeaster Public Service Authority (SPSA) to develop new inter-local agreements after the current agreements expire in January 2018.

Hillsborough County, Florida, Solid Waste Collection System Evaluation. Project Director responsible for an independent evaluation of Hillsborough County, Florida's proposed solid waste collection system modifications. Prepared report presenting findings of program review and presented recommendations for system modifications and procurement approaches.

Hillsborough County, Florida, Solid Waste Composition Study. Project Director responsible for evaluation of inclusion of municipal solid waste composting into Hillsborough County, Florida's solid waste system. Evaluation involved assessment of a proposed vendor's proposal for composting solid waste with a new proprietary process. Prepared letter report to County presenting technical review of process and recommendations.

Lajun Corporation and Deltaway Energy, Pro Forma Analysis to Support New Tip Fees for the 315 acre, 4,000 tons per day, La Duquesa Landfill. Principal responsible for development of a pro forma to assist with projecting future operational and capital expenses (equipment and construction) to improve the operations of the La Duquesa Landfill, which is located in the Dominican Republic. The privately owned and operated landfill is the primary disposal facility that serves the metropolitan area of Santo Domingo, and its four largest municipalities. Existing operational costs were evaluated, and scenarios developed for future improvements including additional equipment and staff, and construction of improvements to the landfill for landfill gas, leachate, and stormwater management, and closure and post-closure care of the landfill.

Lake County, California, Pro Forma Model of Solid Waste System. Principal responsible for development of a pro forma scenario model to project the County's solid waste system costs and potential rate structures considering three landfill expansion alternatives, and one out-of-county disposal alternative. The model projects normal operating, landfill expansion, equipment, closure and post-closure, accruals to reserves, depreciation, transfer station, and transfer costs. The model calculates the required revenues needed to support the County's solid waste system considering

various tip fee, franchise, and property parcel assessments rate structures. The County's current reserve accounts, which fund the capital needs of the solid waste system also are modeled.

Lake County, Florida, Solid Waste Composition Study. Project Director responsible for oversight of a two-season solid waste composition study for Lake County, Florida.

Los Angeles County Sanitation District (LACSD). Principal responsible for reviewing the final report presenting SCS's review of the District's Waste to Energy (WTE) facility. Tasks included reviewing the District's legal structure, operating agreement power purchase agreement, and bonds, reviewing plant O&M including records, practices and staffing; evaluating the District's finances; evaluating markets for waste, recycling and WTE; evaluating energy markets, and reviewing compliance requirements. Options were considered including: assessing the feasibility of continued operation as a WTE facility; the feasibility of other waste-related uses for site; and the financial and logistical aspects of demolition of facility and selling of site.

Lorain County, Ohio, Class II Compost Facility Feasibility Study. Principal responsible for development of a revenue and operational cost pro forma model to evaluate the feasibility of developing a Class II compost facility in the County, including evaluation of waste streams that could delivered to the facility, potential tip fees, operational costs, compost generation and sale revenues.

Macon County, Alabama, Tire Recycling Feasibility Study. Project Director responsible for preparation of a feasibility study for a County owned and financed and contract operated tire recycling facility. Conducted market evaluation for recycled waste tire products including crumb rubber, steel, and nylon; assessed waste tire supply; prepared financial pro forma, and evaluated financing alternatives. The study concluded that development of the project was feasible; however, the County ultimately elected to not proceed with the project.

Merced County Regional Waste Management Authority, Solid Waste Study. Principal responsible for reviewing pro forma model projections supporting a rate study.

Metro Waste Authority, Evaluation of Yard Waste Landfill Ban, Des Moines, Iowa. Reviewing Principal responsible for technical and cost analysis to support a request to amend Iowa's solid waste rules to allow for disposal of yard waste in landfills that have comprehensive landfill gas collection and utilization systems. The primary focus of the analysis was on the landfill and compost operations of the Metro Waste Authority (MWA), and the impact that such a change in regulations would have on its operations. Analysis included assessment of composting and landfill system costs, incremental increase in landfill gas generation and recovery potential, collection costs, greenhouse gas emissions, and summary of landfill yard waste bans throughout the country.

Multiple Clients, Solid Waste Generation Studies. Project Director responsible for quality assurance review of technical evaluations and reports for projects with Polk County, Lake County, and the City of Lighthouse Point, Florida to calculate solid waste generation factors for each of the residential classes. These factors were then utilized to determine the appropriate disposal and collection rate to be charged to each residential class.

Orange County, Florida, Solid Waste Master Plan. Project Director responsible for preparation of a solid waste master plan for Orange County, including evaluation of the County's landfill, transfer station, and recycling operations for a 50-year planning horizon, review of the County's existing facilities and operations, siting study for new transfer station facilities, evaluation of the maximum disposal capacity of the existing landfill facility, a preliminary siting study for a new Class I landfill, development a commercial recycling plan, and preparation of a master plan report.

Orange County, Florida, Solid Waste Collection Services. Principal responsible for review of proposal responses submitted to Orange County, Florida for its new, 10-year solid waste, multi-franchise area, collection contract. Four separate collection areas were included in the procurement. SCS developed the request for proposal in coordination with County staff, and assisted the County during the entire procurement process. The contract award was protested. SCS assisted the County during the protest period and the County Commission ultimately awarded contracts to multiple hauling companies per the original proposal review recommendations.

Orange County, Florida, Pro Forma Model for Assessing Feasibility of a Constructing a Waste to Energy Facility. Principal responsible for developing a pro forma scenario model to assist the County evaluate the feasibility of constructing a solid waste to energy facility to manage all or part of the County future solid waste stream.

Placer County, California. Organics Recycling Plan Development. Principal responsible for technical review of pro forma economic model for an organics treatment and collection alternative for Placer County as part of an overall plan for organics recycling for Eastern Placer County. The organics recycling plan included evaluating Placer County's waste stream and the applicability of established and emerging technologies (e.g., composting, anaerobic digestion) to their specific needs and circumstances.

Polk County, Florida, Solid Waste Composition Study. Project Director responsible for oversight and quality control review of a two-season solid waste composition study for Polk County, Florida. The study was conducted at the County's three landfills and included 31 waste components. Residential, commercial, and industrial wastes were sampled during the waste characterization events.

Polk County, Florida, Solid Waste Privatization Study. Project Director responsible for evaluation of the economic feasibility of an out-of-county transfer and disposal proposal by USA Waste, including preliminary cost allocation modeling, evaluation of current operation, maintenance, and capital costs, review of yearly budgets, and comparison with actual costs, and preparation of final report to the County.

Polk County, Florida, Solid Waste Rate Study. Project Director responsible for the Solid Waste Rate Stratification Study for Polk County, Florida, to calculate the County's actual cost of disposing each of the six major elements of the solid waste stream in the County. The results of the study were used in the solid waste planning process to determine whether or not the County should continue with its "single rate program" or begin charging a stratified rate based on the type of solid waste.

Polk County, Florida, Staffing and Budget Evaluations. Project Director responsible for preparation of analysis for Polk County, Florida, Department of Solid Waste to assess long-term staffing, budgets, and schedules to support County projects.

Ramsey/Washington Recycling and Energy Board (R&E Board), Peer Review of a Mixed Waste Processing Facility Preliminary Design. Principal responsible for technical, economic, and fatal flaw review of a proposed 225,000 ton per year mixed waste processing facility. The primary objectives of the facility are to 1) remove durable compost bags containing household food waste, and 2) remove #1 PET, #2 HDPE, and ferrous and non-ferrous metals from a portion of the residential waste stream. The R&E Board operates a 450,000 ton per year Refuse Derived Fuel processing facility, and the proposed facility upgrades would facilitate the Ramsey and Washington County metropolitan areas achieving their 75 percent recycling goals.

Salt River Pima-Maricopa Indian Community, Pro Forma Model to Establish Business Case for Self-Performing Commercial Collection Services. Principal responsible for reviewing and assisting with finalization of pro forma model to evaluate the costs, projected revenues, and business metrics were the SRPMIC to decide to provide commercial collection services within its region.

Seminole County, Florida, Solid Waste Generation Study. Project Director responsible for oversight and quality control review route testing and report preparation of a multi-year solid waste generation study for Seminole County, Florida. The County contracts out residential collection services in the unincorporated areas. The contracts between the County and the haulers required that the per household generation rate be verified through field testing.

Seminole County, Florida, Solid Waste Privatization Support. Project Director responsible for engineering and financial evaluations to support Seminole County Solid Waste Management Department prepare a "bid" against private vendors to continue to operate the County's solid waste management system. Services included detailed assessment of County's budget and actual solid waste management expenditures, cost allocation modeling, preparation of "bid" proposal package, and assistance during presentation to the Board of County Commissioners.

Solid Waste Association of North America (SWANA). Update of Construction and Demolition Debris Training Course. Project Director responsible for preparing a comprehensive update of SWANA's training course on construction and demolition debris management. The effort included updating course PowerPoint slides, and the training manual content, graphics, and references. Several new lessons were added to address current trends, storm debris management, and communication.

Southeastern Public Service Authority, Chesapeake, Virginia, Assist SPSA in Negotiating the Sale of a 2,000 Tons Per Day Waste to Energy Facility. Project Director responsible for assisting SPSA prepare the necessary financial documentation to support the sale of its refuse derived fuel waste to energy facility (RDF WTE Facility), and work closely with bond counsel, the Virginia Resource Authority (VRA) (senior debt holder), other debt holders, outside legal counsel, the chief administrative officers of the SPSA region (eight localities) to gain approval of sale from the VRA and SPSA Board.

Southeastern Public Service Authority, Chesapeake, Virginia, Procurement Assistance for Solid Waste Management System Vendor Selection (2014). Project Director responsible for independently reviewing the analysis of the proposals received by SPSA from three private companies to provide comprehensive solid waste management services (375,000 tons per year) to the region after the current use and support agreement between the member communities expire in January 2018. The proposals received included managing the region's waste at an existing waste to energy facility (Wheelabrator), long-hauling for disposal at an out-of-region landfill (Republic Services), and constructing a new mixed waste processing facility, with disposal of residuals in SPSA's regional landfill (Repower South). Wheelabrator and Republic have demonstrated capabilities of providing the services they are offering, but offered rates that were higher than RePower South. However, RePower South has never developed or operated a similar facility, although its team members appear to have experience relevant to the key elements of the project, including, design, permitting, construction, financing, and operation. Tasks included review of the financial and technical elements of the proposals, site visit to a mixed waste processing facility that produces pellitized fuel from solid waste, financial evaluation, and presentation of findings to the SPSA Board. The Board initially selected and contracted with RePower South; however, after over a

year of negotiations, RePower South was unable to obtain the required financing for the project, and the contract was terminated.

Southeastern Public Service Authority, Chesapeake, Virginia, Procurement Assistance for Solid Waste Management System Vendor Selection (2018). Project Director responsible for independently reviewing the analysis of the proposals received by SPSA from three private companies to provide comprehensive solid waste management services (375,000 tons per year) to the region after the current use and support agreement between the member communities expire in January 2018. The proposals received included managing the region's waste at an existing waste to energy facility (Wheelabrator), long-hauling for disposal at an out-of-region landfill (Republic Services), and a mixed waste processing facility (Recycling Disposal Systems, Inc.). A detailed review of the technical and financial proposals was completed, including developing a pro forma model to compare the long-term, life-cycle costs of each proposal compared against the SPSA disposing of all the SPSA member municipal solid waste in its Regional Landfill. The results of SCS's evaluation was presented to the SPSA Board. SPSA ultimately selected Wheelabrator to provide long-term disposal (waste to energy) services for the region, with disposal of ash residue at the Regional Landfill, based on a review of the environmental and cost benefits of its proposal compared against long-haul and disposal and an unproven mixed waste processing facility.

Southern Waste Systems, Inc., Lantana, Florida, Baseline Testing for Recovered Screened Materials. Project Director responsible for baseline testing for recovered screened material (RSM) for four construction, demolition, and debris recycling operations for Southern Waste Systems in Broward and Palm Beach County. The testing was required pursuant to guidelines published from the Florida Department of Environmental Protection. RSM was tested for heavy metals, semi-volatile and volatile organic compounds, and pesticides, and leachability of these compounds. The purpose of the baseline testing was to determine appropriate end uses for the RSM such as residential, commercial, or industrial fill. Project also included preparation of facility permit modifications to allow for appropriate off-site use of RSM.

Southern Waste Systems, Lantana, Florida, Consulting support for Solid Waste Recycling and Disposal Bid to City of Miramar, Florida. Project Director for evaluation of technical and permitting issues associated with Southern Waste System's bid to provide recycling and disposal services for the City of Miramar. Specific responsibilities included review of consultant's report on the status of Broward County's Contingency Disposal Landfill and presentation of findings to the Broward County Resource Recovery Board and County Commission and other elected officials, preparation of a technical review analysis; and technical support to Southern Waste Systems during the bid preparation and City interview process.

Town of Chapel Hill, North Carolina, Town of Chapel Hill, Comprehensive Review of Solid Waste Collections, Transportation, and Disposal Options. Reviewing Principal responsible for development of the pro forma financial model to evaluate various solid waste scenarios for the Town, which were evaluated as a part of planning efforts in anticipation of the closure of regional solid waste disposal facility, Orange Co. Landfill, in June 2013. Assisted with the assessment of the Town's commercial collection operations, organics diversion analysis, preparation of the study report, and quality assurance review. The study involved evaluating the Town's existing systems, collections operations, recycling, franchising, privatization, transfer station, out-of-county disposal, material recovery facility, Pay as You Throw (PAYT) program, and waste conversion technologies. Presentations were also made to the Town Council during public meetings.

Town of Chapel Hill, Prepare Request for Proposal/Bid to Outsource Recycling, Transfer Station, Transfer, and Disposal Operations. Reviewing principal responsible for quality control

review for the preparation of a request for proposal/bid to outsource recycling, transfer station, transfer, and disposal operations for the Town of Chapel Hill, North Carolina. The Town desired to understand the potential synergies and cost savings that could be achieved through 1) using a design, build, operate procurement approach for the transfer station, and 2) privatization of residential and commercial recycling services, and municipal solid waste disposal and transferring. SCS developed a request for proposal in cooperation with the Town and the Towns of Carrboro and Hillsboro, and assisted with the issuance of the request for proposal and evaluation of responses. The RFP was issued in August 2013 and responses from several private solid waste firms were received in September 2013.

Volusia County, Florida, Solid Waste Composition Study. Project Director responsible for oversight and quality control review of a four-season solid waste composition study for Volusia County, Florida.

Solid Waste Facilities

Coastal Resources of Maine, LLC Solid Waste Material Recovery Facility, Hampden, Maine. Principal responsible for independent engineer's evaluation of a new 180,000 ton-per-year mixed waste material recovery facility to support the issuance of $45 million in Finance Authority of Maine Solid Waste Disposal Facility Revenue Bonds (Coastal Resources of Maine LLC Project) Series 2017 (Green Bonds) (the Series 2017 Bonds). The total project cost is close to $80 million, with the balance of the construction costs provided through private equity. Tasks included technical, environmental and financial due diligence evaluations. Also, served as continuing Independent Engineer and Construction Monitor during construction and operation of the facility.

Reedy Creek Improvement District, Lake Buena Vista Florida, Material Recovery Facility Design. Project Director responsible for the complete design, permitting, construction oversight, start-up and shakedown testing of a 110 ton per day material recovery facility for Reedy Creek Improvement District (Walt Disney World), Lake Buena Vista, Florida. The system design included semi-automated segregation of paper, cans, plastic and glass containers; climate controlled processing area; storage for processed materials; employee facilities; and public education and viewing areas.

Solid Waste Authority of Palm Beach County, Commercial Recycling Assessment. Project Director responsible for quality control and final report review for the assessment of commercial recycling for the Solid Waste Authority of Palm Beach County, Florida. The project involved an assessment of County's commercial waste stream, collection methods, and costs.

Southern Waste Systems, Inc., Environmental Investigations and Permitting for C&D Recycling Facilities, Broward and Palm Beach County, Florida. Project Director responsible for preparing various permitting applications and conducting environmental investigations for Southern Waste System's Sun Recycling Construction Demolition and Debris material recovery facilities located in Palm Beach County and Broward County, Florida. Projects included solid waste facility permit modifications for the Sun I, II, III, IV, and V Recycling Facilities, updates to financial assurance documentation, requests for increase in throughput capacity, preparation of Environmental Resource Permits, and preparation of recovered screen material baseline sampling and testing reports for these facilities. Coordinated with the Broward County Department of Planning and Environmental Protection, the Palm Beach County Department of Health Solid Waste Facility permit, Palm Beach County Solid Waste Authority, and the Florida Department of Environmental Protection.

Environmental Investigations

Mr. Gardner has directed numerous environmental site assessments, contamination assessments, remedial action plans, and remedial construction projects. Project sites have included fuel storage facilities, vehicle maintenance facilities, truck stops, chemical processing plants, active and closed landfill sites, abandoned chemical disposal sites, and superfund sites. Chemical contamination encountered in both soil and groundwater media has included petroleum, heavy metals, dioxin, pesticides, heavy metals, PCB's, and solvents. Several notable projects are listed below:

Army Corps of Engineers, Krysowaty Farm Superfund Site Remedial Action Design. Project Engineer responsible for preparation of drawings, specifications, and cost estimates for the design of remedial measures (i.e., excavation and removal, backfill, and transportation for final disposal at the RCRA disposal facility) at the Krysowaty Farm Superfund Site, New Jersey.

City of Springfield, Missouri, Evaluation of Contamination Transport Pathways for Superfund Landfill Sites. Project Engineer responsible for engineering evaluating contaminant transport pathways and assessing impacts to human health and the environment for Sac River and Fulbright Landfill Superfund projects, Missouri.

Collier Enterprises, Florida, Environmental and Regulatory Audit. Project Director responsible for an environmental and regulatory audit of a major agricultural business in southern Florida. Project tasks included site visits, personnel interviews, regulatory compliance audit, and preparation of final audit report. The audit included pesticide handling facilities, food processing and packaging facilities, fuel handling facilities, and personnel safety. Provided quality control review of final report.

Confidential Client, Contamination Assessment and Remedial Action Plan, Hillsborough County, Florida. Project Director responsible for the preparation of a contamination assessment plan and report, and remedial action plan for a shopping center site in Hillsborough County, Florida, contaminated by a perchloroethylene spill. Project activities included testing soil, groundwater, and surface water; permitting with the Florida Department of Environmental Regulation; and coordination and oversight of subcontractors performing hazardous soil excavation and disposal.

Confidential Client, Contamination Assessment and Remedial Action Plan for Dry Cleaner Facility. Project Director responsible for review and approval of contamination assessment and remedial action plan for a dry cleaner facility located in south Dade County, Florida. Project involved assessment of widespread contaminant migration of dry cleaner solvents in the Biscayne Aquifer down gradient of the site. Installed temporary and permanent groundwater recovery and air stripper to control the source of the affected groundwater. Assisted in legal proceedings involving cost recovery.

Confidential Client, Contamination Assessment of Chemical Production and Packaging Facility, West Central Florida. Project Director responsible for review and approval of a contamination assessment of a chemical production and packaging facility. The project was conducted under consent order with the Florida Department of Environmental Protection and involved an extensive assessment of the effects of 30 years of plant operations on the soil, surface water, and shallow and deep groundwater at the site. Project tasks included detailed geochemical, hydrogeological, and electromagnetic studies of the site, including extensive drilling and sampling activities.

Confidential Client, Contamination Assessment of Petroleum Sludge Lagoon. Project Engineer responsible for field investigation and engineering analysis of a petroleum storage lagoon facility in rural Virginia leading to a Part B permit application.

Confidential Client, Contamination Assessments in Orlando and Tampa, Florida. Project Director responsible for oversight and review of contamination assessment for airline catering service facilities in Orlando and Miami. Facilities included several underground storage tanks with suspected petroleum releases to surface soils and the groundwater. Site investigations conducted to define limits of affected soil and groundwater. Initial remedial action (IRA) implemented at one facility in Orlando to remove excessively contaminated soils. Assisted in preparation of a contamination assessment report and estimates for remediation and long-term monitoring.

Confidential Client, Expert Witness Services for the Superfund Landfill, North Miami Beach, Florida. Provided expert witness services including background data review, site assessment, and expert testimony in a cost recovery case involving a Superfund landfill site in North Miami Beach, Florida. Testified concerning the presence of hazardous substances commonly found in municipal solid waste.

Confidential Client, Miami, Florida, Contamination Assessment and Remedial Action Plan. Project Director responsible for oversight and review of contamination assessment plan and remedial action plan for soil and groundwater contaminated by wash-down water from a heavy equipment facility in Miami, Florida. Project included engineering for the installation of a new zero-discharge wash water recycle/treatment plant, soil removal and a year of groundwater monitoring.

Confidential Client, Phase 2 Environmental Assessments. Project Director responsible for review and approval of over twenty Phase 2 environmental assessments in a four week time frame. Mobilized multiple field teams to complete the assessment (field work and laboratory analysis) and prepared the reports on a fast-track basis to support a large real estate transaction.

Confidential Client, Spill Management Plan, Tampa. Project Director responsible for preparation of spill management plans and a construction permit application for a chemical repackaging facility in Tampa, Florida. Project tasks included design of structural spill containment facilities for large above-ground chemical storage tanks in order to separate stormwater runoff from tank spillage, separate stormwater and chemical spill collection sewers, an automated pumping station, and a 6,000-gallon holding tank.

Federal Express, Contamination Assessment and Remedial Action Plan. Project Director responsible for final review of contamination assessment and remedial action plan for closure of an underground storage tank at the Fort Lauderdale Airport.

Koch Materials, Contamination Assessment of Asphalt Storage Facility, Port Everglades, Florida.. Project Director responsible for final review and approval of a Phase II contamination assessment at an asphalt storage facility in Port Everglades, Florida. The project involved the installation of over 80 soil borings and 20 groundwater monitoring wells, soil and groundwater samples, and report preparation. Field work was completed in one week under an accelerated schedule and extremely difficult site conditions (e.g., high temperatures from the operational facility, piping galleries, and utilities).

Multiple Clients, Phase 1 Environmental Assessments. Project Director responsible for review and approval of dozens of environmental assessments related to commercial and industrial real estate transactions. These projects involved the review of site history, past disposal practices,

current waste handling practices, ongoing operations, regulatory files, and site records as well as the preparation of reports. These investigations were typically performed under tight time restraints due to real estate closing dates.

Simpkins Paper Company, Contamination Assessment and Remedial Action Plan for Abandoned Pulp and Paper Residue Landfill, Miami, Florida. Project Director responsible for review and approval of a contamination assessment plan and field investigations, remedial action plan, and implementation of remediation of an abandoned pulp and paper residue landfill in Miami, Florida. Site problems included lead, PCB, and dioxin contamination. Supervised the preparation of reports, plans and remedial construction.

Southern Prestressed Concrete, Florida, Environmental Investigations. Project Director responsible for final review of contamination assessments and remedial actions of oil, heavy metal, solvent and fuel contamination at four pre-stressed concrete plants in Florida.

Southern Prestressed, Inc., Storage Tank Management Plan, Tampa, Florida. Project Director responsible for final review of an underground storage tank management program for Southern Prestressed, a large pre-cast concrete company located throughout Florida and Georgia, to comply with Florida Department of Environmental Protection and EPA underground storage tank requirements.

U. S. Environmental Protection Agency, Closure and Post-Closure Cost Model Review. Staff Engineer responsible for review of cost models for closure and post-closure care activities at hazardous waste disposal facilities (landfills and surface impoundments) in accordance with requirements of 40 CFR Parts 264 and 265.

U. S. Environmental Protection Agency, Development of Model for Contamination Releases from Hazardous Waste Storage Piles. Staff Engineer responsible for development of a mathematical model estimating the contaminant releases from hazardous, waste storage piles due to wind erosion, water erosion, runoff, and volatilization. The model was incorporated into the EPA's Risk-Cost Model for use in preparing Regulatory Impact Analyses.

U. S. Environmental Protection Agency, Evaluation of Leak Detection Methods for Underground Storage Tanks. Senior Project Engineer responsible for research and documentation of state-of-the-art leak detection methods for underground storage tanks.

U. S. Environmental Protection Agency, Regulatory Support for Hazardous Waste Landfill Closure and Post-Closure Review. Staff Engineer responsible for assisting with the development of a technical resource document for the EPA to aid permit reviewers in evaluating hazardous waste landfill closure and post-closure plans.

Public Works Engineering

Maryland Air National Guard, Design of a 10,000-bbl JP-4 fuel Storage/POL Operations Facility, Warfield Air National Guard Base, Baltimore, Maryland. Project Engineer responsible for the design of the civil, structural, and mechanical systems for the new fuel storage facility and operations building, and coordinated other disciplines. Designed above-ground and below-ground tanks (steel and fiberglass), spill protection controls, cathodic protection, and fuel conveyance system.

Naval Facilities Engineering Command, Chesapeake Division, 990,000-Gallon Fuel/Oil Storage Tank Farm, Marine Corps Development and Education Command. Senior Project Engineer responsible for the design of a 990,000-gallon fuel/oil storage tank farm at the Marine Corps Development and Education Command, Quantico, Virginia, including a new 5,000-foot water main to service the facility. Performed structural, civil, and mechanical engineering designs, prepared specifications and cost estimate, coordinated all disciplines, and participated in a 40-hour value engineering study.

West Virginia Air National Guard, Design of a 2,500-bbl JP-4 fuel Storage/POL Operations Facility at Yeager Airport, West Virginia Air National Guard, Charleston, West Virginia. Project Manager responsible for the design or repairs and rehabilitation of existing fuel dispensing system; a new 2,500-bbl above-ground storage tank, spill controls, containment and other environmental controls; fire protection; expansion and rehabilitation of existing POL facility; and selection and design of LOX storage facility.

Expert Witness and Legal Support

1-E Landfill, HMDC, New Jersey. Expert witness services to provide engineering evaluation of the feasibility of expanding the Hackensack Meadowland Development Commission's 1-E Landfill. Tasks included evaluation of hydrogeologic, geotechnical, and engineering documentation; cost evaluations, preparation of engineering report presenting findings of evaluation, depositions, and expert testimony during administrative hearings.

Anderson Columbia Environmental, Inc. v. Golder Associates, Inc. Provided expert witness services on behalf of Golder Associates, Inc. (Golder) in a suit brought by Anderson Columbia Environmental, Inc. against Golder relating to the design and construction of the closure for the Pickettville Road Landfill. Mr. Gardner provided written opinions regarding construction issues and costs, design, and standard of care, and was deposed in preparation for trial in August 1998. Mr. Gardner provided expert testimony during the jury trial in November 1999. The jury was not able to reach a verdict and the judge declared a mistrial.

Broward County Environmental Protection Department v. Sun Recycling, LLC. Provided expert witness services in an administrative hearing between Broward County Environmental Protection Department (EPD) and Sun Recycling, LLC to resolve penalties relating to a notice of violation resulting from the improper disposal of recovered screen material from Sun Recycling facilities in Broward and Palm Beach Counties, Florida. Mr. Gardner testified that the testing data showed no change from a baseline sampling and testing study conducted by SCS in 2002. Mr. Gardner opined that the RSM generated by Sun Recycling was suitable for placement at industrial and residential settings. Also, Mr. Gardner testified that, based upon prevailing studies in the field as well as his own training and experience, the effects of RSM on the environment pose no known risk, that that screen size does not in any way change the nature or characteristic of the waste and as such, and that the known risks are unaffected by the size or age of the solid waste. Mr. Gardner further concluded that the solid waste material generated by Sun Recycling and dispersed to the various properties throughout Broward and Palm Beach Counties pose minimal harm to the environment.

City of Sunrise, Florida v. Sun Recycling, LLC. Provided expert witness testimony during two separate trials on behalf of Sun Recycling, LLC (May 2007 and October 2008) in a criminal trial involving an asserted solid waste collection ordinance violation by the City. Case was decided in favor of Sun Recycling, LLC in the May 2007 case and a split decision was returned in October 2008 on the two counts against Sun Recycling, LLC.

Dade County, Florida, North Dade Landfill. Provided technical support and prepared expert opinion report for Dade County, Florida regarding landfill gas migration and odor problems at its North Dade Landfill. An adjacent commercial interest filed a complaint opposing the issuance of an operating permit for landfill. Mr. Gardner assisted the County defend its permit application. A settlement was reached with the party opposing the permit application in 1995.

Engineering Evaluations to Support Defendant in Litigation. Provided landfill gas technical support to the law firm of Fowler White Boggs Banker, who was defending an engineering firm relative to a professional liability insurance claim. The claim was associated with an apartment complex developed over top of an old, closed landfill. Conducted a site visit, reviewed engineering reports, costs estimates, and other expert and fact witness depositions, and participated in various planning and negotiation meetings with legal team to discuss findings. The matter was settled out of court in 2003.

Escambia County, Florida, Eminent Domain Support. Provided expert witness services relating to eminent domain proceedings supporting a landfill expansion in Pensacola, Florida. Services have included review of previous engineering reports and formulation of an engineering opinion regarding the reasonableness of Escambia County's solid waste landfill master plan. The case was settled out of court.

Gas Explosion, Clearwater, Florida. Provided expert witness services dealing with a gas explosion at an apartment in Clearwater, Florida, which killed two people. One of the alleged sources of gas was from buried marsh deposits beneath the apartment complex. Provided independent engineering assessments and depositions during the case. Represented the defendants in the case. The case was settled out of court.

Greater Vancouver Sewerage and Drainage District (Metro Vancouver) v. Cache Creek Landfill, Appeal File: 2016-EMA-126) of the Ministry of Environment decision to approve Cache Creek Landfill closure plans. Provided expert opinion 1) regarding industry standard practices for landfill closure and as stipulated in the Ministry-published guidance for landfills as published in the Landfill Criteria for Municipal Solid Waste (MOE, 1993) (referred to as the 1993 Landfill Criteria), and Landfill Criteria for Municipal Solid Waste (MOE, 2016A) (referred to as the 2016 Landfill Criteria). Also evaluated the use of performance criteria at the Landfill to determine closure whether the closure plan is inconsistent with British Columbia regulatory requirements and industry practices.

Hinkle Contracting Corporation v. Robert O. Collins, Inc., Robert Clayton, Spring Grove Environmental, and Coastal Asphalt Paving, Inc. Provided expert witness services and expert opinion report on behalf of Robert O. Collins in a suit brought by Hinkle Contracting Corporation v. Robert O. Collins, Inc., Robert Clayton, Spring Grove Environmental, and Coastal Asphalt Paving, Inc. Case No. 2:05-2509-DCN. Hinkle claimed that Robert Collins, et. al failed to honor a right of first refusal to purchase the Spring Grove Landfill in Charleston, SC, and as a result claimed approximately $15 million damages for lost profits. Mr. Gardner was retained to review and refute this claim. The case was settled through mediation prior to trial.

Holmes County, Florida v. City Environmental Services. Provided litigation technical support to Holmes County, Florida in defense of a suit brought by City Environmental Services against the County regarding Holmes County Landfill. Assisted Mr. Tom Pelham, Esq. during depositions of City Environmental Servicess' expert and factual witnesses. Provided expert testimony concerning damages during trial in February 1998. Holmes County prevailed in the jury trial.

Marriott v. Simpkins Paper Company. Provided expert opinion and testimony during a CERCLA cost recovery case (Marriott versus Simpkins Paper Company) in Federal District Court, Miami, Florida. The case was decided in Marriott's favor in late 1995. Testified in court concerning the various phases of SCS's contamination, remedial design, remediation, and closure activities.

Municiport Superfund Landfill, North Miami Beach. Provided expert witness services with respect to the Municiport Landfill, North Miami Beach, Florida. Reviewed previous reports and provided expert opinion with regard to source of groundwater contamination that had been detected onsite.

Penobscot Energy Recovery Corporation. Provided expert witness services to evaluate damages resulting from an alleged breach of contract between Penobscot Energy Recovery Corporation and eight municipalities in Maine. Reviewed background document and engineering estimates, prepared damage cost estimates and engineering report to support the court case. Case was resolved in favor of Mr. Gardner's client.

Travelers Insurance. Provided expert opinion to Travelers Insurance regarding an insurance claim filed by the City of Iowa City, Iowa regarding damages that occurred on a newly constructed 7.5-acre landfill cell as a result of a fire. Evaluated the design of the liner systems, leachate collection systems, and landfill gas systems. Provided opinion regarding the replacement value for the gas collection and control system, and assisted Travelers Insurance evaluate the City's claim with respect to the specific policy coverages.

Publications and Presentations

Gardner, Robert B., "Oklahoma Hello – New Solid Waste Services for Oklahoma City", Solid Waste Association of North America, WasteCon 2017, Baltimore, Maryland, September 2017.

Gardner, Robert B., "Yard Waste Composting Versus Landfill Gas Recovery, The Iowa Story: What Really Happened?", Solid Waste Association of North America, WasteCon 2016, Indianapolis, Indiana. August 2016.

Gardner, Robert B., Rogoff, PhD, Marc; "Trends in Solid Waste Collection Part I– What's the Future", MSW Management, March/April 2015.

Gardner, Robert B., Rogoff, PhD, Marc; "Trends in Solid Waste Collection Part II– What's the Future", MSW Management, May 2015.

Gardner, Robert B., Rogoff, PhD, Marc; "Trends in Solid Waste Collection Part III– What's the Future", MSW Management, June 2015.

Gardner, Robert B., Barnes, John C.; Callen, Kevin, "Solid Waste Collection Routing Optimization: The City of Virginia Beach Story", Solid Waste Association of North America, WasteCon 2014, Dallas, Texas, August 2014.

Gardner, Robert B., "Financial Madness of the New Reality", IGNITE Presentation, Solid Waste Association of North America, WasteCon 2014

Gardner, Robert B., "City of Virginia Beach Compressed Natural Gas Vehicle Conversion Feasibility Study", Solid Waste Association of North America, Northwest Regional Meeting Proceedings, Richmond, BC, Canada, April 2013.

Gardner, Robert B., "Infrastructure from the Ground Up, Civil Engineering Works for Lawyers, Chapter 5 – Solid Waste Management", American Bar Association Publication, 2012

Gardner, R. B.; Matteson, K. M.; Carlock, J., "Solid Waste Management after 2018: Future Options for the South Hampton Roads Region on Virginia", Solid Waste Association of North America WasteCon Proceedings, August 14-16, 2012.

Gardner, R. B. "What's New in Solid Waste", Keynote Address, Solid Waste Association of North America, Northwest Beaver Chapter, Spring Symposium, April 2012.

Gardner, R. B., "Is Garbage a Waste or a Resource", MSW Management, Elements 2011, June 2011.

Gardner, R. B., "What's New for Landfills", MSW Management, Elements 2011, Vol. 20, No. 4, August 2010.

Gardner, R. B., "Landfills and Our Future", MSW Management, Elements 2010, April 2009.

Gardner, R. B.; Leonard, M; Michelle Leonard, Clark, B. J.; Ludt, R., "Waste Processing Facilities and Evolving Markets", MSW Management, Vol. 18, No. 3, April 2008.

Gardner, R. B., "Can Recycled Concrete Be an Industrial Byproduct", Solid Waste Association of North America, Senior Managers Conference, St. Augustine, Florida, January 2008.

Gardner, R. B., "Pro Forma Analysis to Support Solid Waste Systems", SCS Landfill Seminar, Roanoke and Richmond, Virginia and Baltimore, Maryland, May 1, 2, and 14, 2008.

Gardner, R. B., "State-of-the-Practice for Energy Recovery from Bioreactor Landfills", Presented to the 11th Annual Landfill Methane Outreach Program Conference and Expo, January 10, 2008.

Gardner, R. B., "3.2 MW Green Energy Project, DeKalb County, Georgia", Presented at the TN, VA, NC, SC Quad State SWANA Conference, Pigeon Forge, TN, August 20-24, 2007.

Gardner, R.B., "Developing a Landfill Gas to Energy Project, DeKalb County, Georgia", Presented at the Georgia SWANA State Conference, April 5, 2007.

Gardner, R.B., and Clark, B.J., "A Helping Hand", Waste Age, September 2006.

Gardner, R. B., "What Ever Happened to the RD&D Rule Anyways", SWANA Landfill Symposium Proceedings, Nashville, TN, June 2006

Gardner, R. B., and McLaughlin, M.W., "Turning Browns into Greens", Waste Age, December 2005.

Gardner R. B., "Current Trends in Solid Waste and Landfills", Presentation to the Chartwell Landfill Symposium, Tampa, Florida, May 2006.

Gardner, R. B., "Disaster Recovery, The Florida Experience of 2004", Presentation to SWANA Quad State Conference, Myrtle Beach, South Carolina, August 31, 2005.

Gardner, R. B., and McLaughlin, M. W., "From Brown to Green", Pollution Engineering, April 2005.

Gardner, R. B. and McLaughlin, M. W., "Upscale Courses Grow from Landfills", Golf Course News, January 2005.

Gardner, R. B. and Medico, P., "C&D Processing in a Box and Management of Recovered Screen Materials (RSM) in Florida", Presentation to SWANA's Virginia Chapter Conference, June 2004.

Gardner, R. B., "U.S. EPA's Proposed Research, Development, And Demonstration Rules:

Status Update and Related Landfill Design Optimization Strategies", Presentation to SWANA's 8th Annual Landfill Symposium, 2003.

Gardner R. B., "Creative Approvach to Managing Scrap Tires", Presentation to the SWANA Alabama Chapter Conference, September 2003.

Gardner, R. B., "Landfill Gas to Energy: Where are We and Where are We Going?" Presentation to the Landfill Methane Outreach Program Regional Seminar, Phoenix, Arizona, May 2003.

Gardner, R. B., "LFGTE Projects That Have A Story To Tell", Presentation to the Federation of New York Solid Waste Associations, Lake George, New York, May 2003.

Gardner, R. B. and Berry, Patricia, "Hillsborough Heights Landfill Microturbine Project", Presentation to SWANA's 26th Annual Landfill Gas Management Symposium, Tampa, Florida, March 2003.

Gardner, R. B., "Innovative Permitting Approaches and Challenges for Hillsborough County,

Florida and Pinellas County, Florida Landfills", SWANA's 7th Annual Landfill Symposium, Louisville, Kentucky, June 2002.

Gardner, R. B., "Nuts and Bolts – Design, Construction and Operation of LFGTE Projects", Mississippi LFG Energy Workshop, U. S. EPA Landfill Methane Outreach Program, April 2002.

Gardner, R. B., "Commercial Development of Closed Landfills: Case Studies and Technical / Regulatory Issues", Presentation at NSWMA Waste Tech Landfill Conference, Coral Springs, Florida, February 2002.

Gardner, R. B., and Williamson, J., "What is a Small Rural Community to Do with its Solid Waste Management System?", SWANA's 5th Annual Planning and Management Symposium, Salt Lake City, Utah, July 2001.

Gardner, R.B., "MSW Landfill Clean Air Act Updated - Where are we?", SWANA's Tristate Conference, Perdido Key, Alabama, March 2000.

Gardner, R.B., and Banks, J.A., "Proposed Design Guidelines for Effective Leachate Recirculation at Landfill Bioreactors", SWANA's 4th Annual Landfill Symposium, June 1999.

Gardner, R.B., and Schmit, K.A., "Leachate Generation - Actual vs Predicted", 4th Annual Landfill Symposium, June 1999.

Gardner, R.B., "Two Case Studies of Successful Landfill Gas Utilization – The Escambia County and Volusia County Projects", Presented at SWANA's Sunshine Chapter Meeting, April, 1999.

Gardner, R.B., "Landfill Gas Utilization: The Perdido Landfill Success Story", Proceedings from SWANA's 22nd Annual Landfill Gas Symposium, Lake Buena Vista, Florida, March 22-25, 1999.

Gardner, R.B., and Dever, R.J., "Landfill Gas Migration Control at Old Landfills in Florida: Small-Scale Solutions to Large-Scale Problems", Proceedings from SWANA's 22nd Annual Landfill Gas Symposium, Lake Buena Vista, Florida, March 22-25, 1999.

Gardner, R.B., Blakely, F., and Todd, T.L., "Privatization of Municipal Solid Waste Disposal Operations, Is it the Way for You?", Presentation at Wastecon 1997, St. Louis, Missouri, October, 1998.

Gardner, R.G., "Construction Cost Savings On a Complex Landfill Closure: The Beulah Landfill Project", Proceedings from SWANA's 3rd Annual Landfill Symposium, Palm Beach Gardens, Florida, June, 1998.

Gardner, R.B., "Tier 2 Sampling & Analysis for the Huntsville Sanitary Landfill – Huntsville, Alabama", SWANA's The Garbage Gazette, Summer 1998.

Gardner, R.B., and Blakely, F., "Meeting the Challenge, Competing to Win", World Wastes, March 1998.

Gardner, R.B., Dever, R.J., and Siemering, R.A., "Effects of Landfill Gas on Leachate Collection Systems: Design and Safety Considerations", Presentation at Wastetech '98, San Antonio, Texas, February, 1998.

Gardner, R.B., and Siemering, R.A., "Use of Radio Telemetry and Automated Data Acquisition Systems in Leachate Management Systems", Presentation at Wastetech '98, San Antonio, Texas, February, 1998.

Gardner, R.B., and Todd, T.L., "Does Lighting Strike Twice in the Same Place?", Presentation at SWANA's Carolinas Solid Waste Conference '97, Myrtle Beach, South Carolina, September, 1997.

Gardner, R.B., Leung, C.W., and Schmit, K.A., "Ingradient Landfill, Fact: Case Study of the Southeast County Landfill Hillsborough County, Florida", Proceedings of SWANA Conference, Sacramento, California, August, 1997.

Gardner, R.B., "Leachate Treatment and Effluent Spray Irrigation System Operations at the Southeast County Landfill, Hillsborough County, Florida", Proceedings of the SWANA Landfill Symposium, Sacramento, California, August, 1997.

Gardner, R.B., "Solid Waste Facility Siting and Development", Instructor for Solid Waste Landfill Design Series Workshop, University of Florida TREEO Center, Orlando, Florida, April, 1997.

Gardner, R.B., and Hamilton, S.M., "Remediation/Management Strategies for Landfills in Developing Countries a Case Study", Proceedings of the 10th Annual Options for Texas - Solid Waste Management Conference, Austin, Texas, July, 1996.

Gardner, R.B., Powell, L.A, and Griffin, J.L., "Experience with Geosynthetic Clay Liners for Landfill Closure at the Tomoka Farms Road Landfill, Daytona Beach", Proceedings of SWANA Conference, Portland, Oregon, September, 1996.

Gardner, R.B., and Dever, R.J., "Leachate Treatment Technologies: The Florida Experience", Presented at Waste Tech ☐96 Landfill Technology Conference, Haines City, Florida, February, 1996, Waste Age, August, 1996.

Gardner, R.B., "Leachate Management Systems and Design", Instructor for the Solid Waste Landfill Series Workshop, University of Florida TREEO Center, Orlando, Florida, May, 1996.

Gardner, R.B., Siemering, R.A., and Berry, P.V., "Leachate Treatment and Reclamation Facility Hillsborough County, Florida", Proceedings of Waste Tech '96, Haines City, Florida, February, 1996.

Gardner, R.B., Ordeman, R.D., and Westly, R.L., "Mapping Groundwater System(s) at Solid Waste Management Landfills", Proceedings of the 6th Annual Southeastern Solid Waste Symposium, Mobile, Alabama, April, 1995.

Gardner, R.B., Whitehead, L.K., and Schmit, K.A., "An Overview of Florida Landfill Closures Utilizing Geomembranes", Proceedings of SWANA's 5th Annual SE Regional Solid Waste Symposium, October, 1994.

Gardner, R.B., Benitez, M., and Poe, D.E., "Land-Use Optimization for Stormwater Management Facilities at the Fresh Fills Landfill, New York", Proceedings of Waste Tech ☐94, Charleston, South Carolina, January, 1994.

Gardner, R.B., "Landfill Design Planning and Permitting", Presented at the Landfill Design Series Workshop, University of Florida TREEO Center, Orlando, Florida, January, 1992, February, 1993, February, 1994.

Gardner, R.B., Berry, P.V., and Joblinowski, E., "Case Studies on Leachate Management Hillsborough County, Florida, and Glades County, Florida Experiences", Proceedings of Waste Tech '93, Marina Del Ray, California, January, 1993.

Gardner, R.B., "Leachate Management - Case Histories", Instructor for the Landfill Design Series Workshop, University of Florida TREEO Center, Orlando, Florida, May, 1992.

Gardner, R.B., "Landfill Design Leachate Collection and Storage Course", Instructor for the Landfill Design Series Workshop, University of Florida TREEO Center, Orlando, Florida, April, 1992.

Gardner, R.B., Berry, P.V., and Hamilton, S.M. "Leachate Treatment and Reclamation Facility, Hillsborough County, Florida", Presented at the 30th Annual International Solid Waste Exposition Conference, Tampa, Florida, August 1992.

Gardner, R.B., Foxwell, P.K., and Peterson, E.R., "Landfill Gas Issues Affecting the Design and Operation of Waste to Energy Facilities", Proceedings of Municipal Waste Combustion Conference, Tampa, Florida, April, 1991.

Gardner, R.B., "Solid Waste Management - Requirements and Solutions", Florida Specifier, January, 1991.

Gardner, R.B., and Conrad, E.T., "Municipal Solid Waste Incineration: Ash Management Hudson County, New Jersey Ash Residue/Bypass Landfill Design", Proceedings of Waste Tech '89, Washington, DC, October, 1989.

Gardner, R.B., "Hillsborough Heights Facility Controls Odors and Landfill Gas Migration", Florida Engineering Society Journal, July, 1989.

Gardner, R.B., "Problems with New Materials, Products, and Applications in Landfill Design and Construction", Proceedings of ASTSWMO 1989 National Solid Waste Forum on Integrated Municipal Waste Management, Lake Buena Vista, Florida, July, 1989.

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Gardner, R.B., Held, W., Peterson, E., "Landfill Gas Migration and Odor Control The Hillsborough County and Palm Beach County Experiences", Presented at the American Society of Civil Engineers Florida Section 1988 Annual Meeting, Sand Key, Florida, October, 1988.

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