

## NATHAN A. HAMM, P.E.

### Education

B.S., Civil Engineering with Secondary Major in Natural Resources and Environmental Science, Kansas State University, 1998

### Professional Licenses

Professional Engineer: KS, MO, MT ND, OK, TX, IA

### Professional Affiliations

Water Environment Federation

Solid Waste Association of North America (SWANA), Kansas Sunflower Chapter, Past President

Kansas Society of Professional Engineers, Past President

### Professional Experience

Mr. Hamm is a registered professional engineer with more than 20 years of environmental engineering consulting experience. He is a Vice President and SCS's National Liquids Management Practice Leader. Throughout his career he has worked on projects for a variety of industries including solid waste management, alternative energy, power generation, meat processing, and agricultural production. His core technical expertise is industrial wastewater treatment including landfill leachate, solid waste landfill design and construction, and general civil site development. He has served in a variety of project roles including project engineer, project manager, team leader, office manager, and senior technical advisor. He is focused on listening to client needs, understanding their underlying business and personal drivers, and developing efficient technical solutions to their most challenging environmental problems.

Example project experience includes:

#### Solid Waste

**Springfield Sanitary Landfill; City of Springfield, Missouri:** Mr. Hamm has been working on projects for the City of Springfield since 2004. Services provided for the City include routine annual solid waste engineering services, feasibility studies, permitting efforts, and designing and managing many of their large capital improvement projects.

Routine services include quarterly volume calculations and filling reports, annual financial assurance cost estimate updates, miscellaneous surveying, emissions inventory questionnaire preparation, greenhouse gas reporting, Tier II gas sampling and reporting, closure and post-closure plan updates, operational consulting, active gas collection system management data analysis and recommendations, and miscellaneous solid waste consulting. Studies have included financial modeling and tipping fee analysis, alternative wastewater disposal feasibility, alternative final cover feasibility, and a hydrogeologic study for a horizontal landfill expansion.

SCS recently assisted the City with design and preparation of a 42-acre horizontal and vertical expansion to Noble Hill Sanitary Landfill adding more than 50 years to the landfill's projected lifespan.

Large capital improvement projects have included:

**Cell Development** – Obtained minor permit modification approvals through the MDNR for four cell constructions totaling approximately 36 acres. Services included preparing construction plans and specifications, engineers construction cost estimates, assistance with bidding the projects and providing construction quality assurance services during construction.

**Leachate Disposal Pump Station and Forcemain** – Obtained permitting approval from the MDNR Solid Waste Management and Water Pollution programs, Missouri Department of Transportation, and Greene County, Missouri for a leachate pump station and 8.5 mile long forcemain. Services included permitting, design, cost estimating, construction document development, bidding assistance, and construction inspection. SCS also provided assistance to the City with routine forcemain maintenance using flushing and pigging techniques.

**Landfill Gas System Expansion** – Obtained permitting approval from the MDNR for four expansions to the existing landfill gas collection system. Additional services included preparing construction documents, bidding assistance, and construction quality assurance inspection for the expansions.

**Landfill Scale House and Convenience Area** – Designed a new landfill gateway facility including a new modern scale house and customer waste drop off facility. The new facilities are expected to streamline landfill traffic and enhance customer safety by segregating small load traffic from the landfill's heavy equipment and transfer trailer traffic and tipper operations.

**St. Joseph Sanitary Landfill, St. Joseph, Missouri:** Mr. Hamm has been involved with solid waste landfill projects for the City of St. Joseph since 2010. Most recently, he served as the Project Director and certifying engineer for the Landfill's horizontal expansion permit application. Other projects completed for the St. Joseph Landfill have include a financial model and tipping fee study, cost estimating for an active landfill gas collection and power generating system, wetlands delineation for a planned landfill expansion, SPCC plan updates, Tier II gas sampling and reporting, surface and groundwater sampling and analysis, and a gas migration investigation and remedial design.

**Yellowstone Disposal, Sidney, Montana** Mr. Hamm was the project director and certifying engineering for this greenfield municipal solid waste and special waste landfill design and permit application. If approved, the proposed facility will accept municipal solid waste from eastern Montana and western North Dakota and special wastes derived from oil field exploration and production activities. The design and permit application were fast tracked with completion in less than 6 months from start to finish. However, the application was put on hold due to financial weakness in the oil market.

**Good Bear Hill Disposal, Ft. Berthold Indian Reservation, North Dakota:** Mr. Hamm served as the certifying engineering and principal-in-charge for this special waste landfill facility design and permitting effort in North Dakota. The facility was designed to accept oilfield waste from the

northwest North Dakota region. Some features of the site include non-discharging storm water management control, base grade design to maximize useable on-site soils and potential volume, and a liner system specifically designed to better tolerate construction during North Dakota winters.

**Barton County Subtitle D Landfill Design; Barton County, Kansas:** Mr. Hamm has working for Barton County since 2001. He served as project engineer for the design and application document preparation for the Subtitle D landfill at this site. He was intricately involved in all aspects of the project, including landfill siting, hydrogeologic site characterization, site layout, storm water drainage design, hydrologic and hydraulic modeling, leachate management modeling, gas collection system design, construction drawing development, regulatory negotiations, QA/QC plan preparation, closure and post-closure plans preparation, financial assurance, public hearings, and the application preparation. The landfill design was approved in January 2001.

Routine services provided for Barton County include groundwater sampling and analysis, annual financial assurance cost estimate updates, volume calculations, lysimeter reporting, greenhouse gas reporting, soil use planning and miscellaneous surveying.

Large capital improvement projects have included:

**Cell Development** – Designed, prepared construction plans and bidding documents, assisted with obtaining bids, and provided construction quality assurance testing and documentation for three Subtitle D landfill cells totaling approximately 24 acres.

**Alternative Final Cover Permitting and Construction** – Designed an evapotranspiration (ET) alternative cover for the 20-acre vertical expansion. The design included compiling soil, climate, and vegetation data and developing an UNSAT-H computer model to demonstrate compliance with applicable regulations. The alternative cover was approved by the Kansas Department of Health and Environment in July 2003. After approval, Mr. Hamm prepared construction drawings, specifications, and bid documents for the cover. Cover construction was completed in October 2003 and saved Barton County approximately \$800,000 in construction costs compared to the previously approved cover.

**Construction and Demolition Landfill** – Designed, permitted, prepared construction plans and bidding documents, and provided construction quality assurance services for the construction and demolition landfill. Three phases of the landfill have been constructed including the most recent cell in 2012.

In 2016 SCS prepared design plans and an application for a valley fill expansion to the landfill. The design includes plans for constructing landfill liner, leachate collection, and gas management systems between two existing landfill waste management units. The expansion nearly doubled the airspace capacity of the facility.

**Salina Sanitary Landfill, Salina, Kansas:** Mr. Hamm provided technical guidance and senior quality review for the City of Salina's landfill master plan. The master plan serves as a guide for developing the 500 acres site and included cell grading, leachate handling, final cover, gas management, groundwater monitoring, and other key design and operational features. The master planning effort substantially increased the usable airspace for the facility.

Mr. Hamm served as the client manager for the City of Salina and has overseen the development of two composite lined landfill cells including the preparation of construction drawings and documents. The cells encompassed approximately 25 acres of composite lined landfill cells, gravity leachate collection system and pumping station, double composite lined leachate storage lagoon, and supporting roadway and stormwater control improvements.

In 2016 SCS successfully completed a turnkey leachate pumping system upgrade at the landfill. The project included replacing 5 leachate riser pumps at the facility and constructing a new section of forcemain. The project was designed and constructed by SCS forces.

**Hamm Landfill; Perry, Kansas – Hamm Industries, Inc.:** Mr. Hamm has served as both the Project Engineer and Project Manager on a number of projects for Hamm Industries, Inc. including a storm water master plan for the site that was approved by the Kansas Department of Health and Environment in 2011. The storm water master plan is designed to address storm water issues throughout the long term development of the site. Additional projects have included designing an ET alternative final cover for the facility and providing construction quality assurance services for 4 cell constructions totaling approximately 50 acres.

**Coffey County Sanitary Landfill; Burlington, Kansas:** Mr. Hamm served as the project manager for the design, permit application preparation, and construction quality assurance activities for the Subtitle D lateral expansion landfill. He was responsible for all portions of project completion from scheduling, design, and permit document preparation to project approval and closeout. The Coffey County Sanitary Landfill lateral expansion permit was approved and the facility began accepting waste in February 2002.

**Alternative Landfill Cover Design, Coffey County Sanitary Landfill; Burlington, Kansas:** Mr. Hamm had substantial involvement in designing the evapotranspiration alternative landfill cover for the Vertical Expansion. Mr. Hamm primarily served as the technical manager for this project providing internal review and design assistance.

**Reno Construction C&D Landfill; Overland Park, Kansas:** Mr. Hamm served as the project engineer on a final use study for the Reno Construction C&D Landfill. The scope of the study was to investigate the viability of constructing a recreation complex (softball and soccer fields and associated supporting structures) on top of the landfill following closure. The investigation entailed a detailed gas and structural stability analysis for the landfill as well as involvement in local political support and financing negotiations.

**Wheatland and Resource Recovery Landfills; Columbus and Cherryvale, Kansas:** Mr. Hamm has performed volumetric calculations (remaining airspace, soil quantities, etc.) on an annual basis for these landfills. The calculations are completed using aerial surveys and Land Development software by Autodesk. The volumetric calculations are used by Allied Waste in their annual budgeting process.

**Forest View Landfill; Kansas City, Kansas – Allied Waste Industries Inc.:** Mr. Hamm has served as the project manager for constructing the last 5 cells at this site totaling approximately 15 acres. His responsibilities included preparing construction drawings, technical specifications and contract documents, managing all construction issues, obtaining the appropriated geotechnical and geosynthetics testing, and providing construction oversight in order to obtain authorization to operate the constructed cell.

**Johnson County Landfill; Shawnee, Kansas – Deffenbaugh Industries, Inc.:** Mr. Hamm has worked on a variety of projects for the Johnson County Landfill including designing and permitting a new C&D landfill and evapotranspiration alternative cover and serving as a technical reviewer for the construction quality assurance activities for the alternative cover construction and a new 20-acre landfill cell.

**Landfill Construction Quality Assurance; Kansas, Missouri, and Oklahoma Landfills:** Mr. Hamm has been responsible for creating construction drawings; material, construction, and testing method specifications; and bid documents for numerous Pre-Subtitle D and Subtitle D landfill projects in Kansas and Missouri. He has managed field personnel and data for landfill cell construction and closure, and has been responsible for compiling and organizing soil and geosynthetic quality assurance data for report submittals.

**Sporer Land Development; Ellis County, Kansas:** Mr. Hamm served as the project manager for a preliminary investigation for a proposed landfill site in Ellis County, Kansas. The project included two separate phases. During Phase I Mr. Hamm was responsible for collecting and evaluating information pertinent to the feasibility of the landfill including a budgetary cost analysis that considered design cost, construction, operation and post-closure care of the proposed facility. Upon completion of Phase I, Mr. Hamm completed a design criteria report with a preliminary design of the landfill to present to the local zoning committee for approval.

**Groundwater Monitoring; Missouri and Kansas Landfills:** Collected and managed the collection of ground water samples, performed statistical analysis on the laboratory results, and prepared reports for the client's operating record at various sanitary landfills in Kansas and Missouri.

**Metro Waste Authority, Metro Park East, Mitchellville, Iowa:** Mr. Hamm served as the project director and certifying engineer for the P-41 and P-49 Cell composite liner construction projects at Metro Park West and East landfills. The facilities have challenging glacial till soils which required extra vigilant oversight and coordination with the contractor. The projects were completed successfully with minimal comments and a rapid authorization for disposal issuance from the Iowa Department of Natural Resources.

In 2016 and early 2017 SCS performed a leachate collection system clogging investigation and report for the Metro Park East landfill. The investigation included collecting samples of the landfill's leachate and precipitate scale for chemical analysis and developing alternatives for removing the scale from various landfill pipes. Physical and chemical processes were considered with a chemical acid treatment ultimately recommended for implementation.

## Transfer Station

**Wichita Area Transfer Station; Sedgwick County, Kansas:** Project engineer for the permitting, design, and construction of a 500 ton per day MSW transfer station to serve the Wichita metropolitan area. The design included the facility entrance, traffic routing, scale facilities, and the transfer station. The project included rezoning of the transfer station site and issuance of a conditional use permit from Sedgwick County. Additionally, coordination with the Kansas Department of Health and Environment (KDHE) was required to obtain an operating permit for the facility. The final design consisted of a grade separated 4-bay transfer station with a single waste transfer pit. The facility was designed to accommodate future expansion of the tipping floor as well as an additional waste transfer pit.

## General Civil and Wastewater Engineering

**Biodiesel Wastewater System Design, St. Joseph, Missouri:** Primary client service manager and technical lead for the design and implementation of a wastewater pretreatment system at an operating biodiesel plant. The project included initial permitting of a temporary dissolved air floatation (DAF) system to reduce TSS and FOG loadings in the wastewater. Ongoing services have included wastewater sampling and analysis and coordination of an ultra-filtration and anaerobic digestion system to reduce wastewater surcharges and achieve permitted discharge limits.

**Industrial Wastewater Evaluation, Salt Lake City, Utah:** Technical lead for an industrial wastewater pre-treatment system evaluation at a pork processing plant. The plant was having difficulties achieving permitted discharge standards and paying large surcharges for BOD and fats, oils, and grease. SCS evaluated the current wastewater collection and pretreatment system consisting of chemical conditioning and a dissolved air flotation (DAF) unit. Services included evaluating the plant's individual wastewater streams to identify and prioritize streams for improvement, observing plant operations, analyzing historical monitoring data, analyzing DAF operating parameters and efficiency, and conducting interviews with wastewater system personnel. A summary and recommendations report was prepared and the recommendations are now being implemented at the plant to improve performance and operations.

**Anaerobic Lagoon Liner Failure Restoration, Guymon, Oklahoma:** Served as the primarily client contact and project director for the redesign of a failed geosynthetic lined and covered anaerobic wastewater lagoon system at a pork processing facility. The original lagoon liner failed due to a leak in the bottom liner system. A large gas bubble developed causing failure of the entire lagoon system. SCS designed a gas venting system to allow reconstruction of the lagoon. The lagoon was reconstructed using a design-build solution lead by SCS forces.

**Bulk Storage and Process Tank Construction, St. Joseph, Missouri:** Primary client manager and project director for designing, obtaining building permits, and managing construction of four bulk storage and processing tanks at an operating biodiesel plant. The project included construction of a 640,000 gallon finished product storage tank, a methanol storage tank, and two process tanks. SCS managed the overall design and construction which included Geopier® foundation improvements, concrete tank foundations, tank construction, and concrete secondary containment structures.

**Wastewater Disposal Feasibility Study; La Cygne, Kansas:** Analyzed an existing antiquated two-cell lagoon system at a large power generating station to assess the ability to handle a planned plant expansion and population increase. The project included characterizing the existing wastewater generation rate and quality. A financial feasibility report was prepared evaluating alternatives including new lagoon systems, pipelines to publicly owned treatment works, and package treatment systems.

**Ethanol Plant Site Development; Carrollton, Missouri:** Served as the senior project manager and responsible engineer for the civil site development design for a 55 million gallon per year ethanol production facility. Services included preparing all grading plans, traffic analysis, site layout, utility design and coordination, 1.5 mile water supply pipeline design, construction contract preparation, bidding assistance, and construction inspection. Ongoing routine services include water treatment system discharge testing and reporting, and air permit compliance assistance.



**Biodiesel Plant Permitting and Site Development; Carrollton, Missouri:** Providing civil site design and environmental permitting for an integrated soybean processing and biodiesel refinery. SCS was responsible for all of the air and environmental permitting for the facility as well as the civil site development design, utility coordination, construction contract preparation, and construction inspection.

**Air Construction Permitting, Greenfield Ethanol Plant; Abingdon, Illinois:** Served as the quality control/technical reviewer of the air construction permitting services for the construction and initial operation of a 100 million gallons per year ethanol production facility. Services included identifying emission points, developing emission estimates, determining regulatory applicability (i.e. NSPS), evaluation of necessary controls, regulatory negotiation / coordination, permit development and baseline modeling (Aermod).

**Environmental Permitting Soybean Processing and Biodiesel Facility; Eve, Missouri:** Served as the quality control/technical reviewer for completing the environmental permitting and compliance for the construction and initial operation of 2,000 tons per day soybean processing facility and 30 million gallons per year biodiesel production facility. The project included completing all air, storm water, water treatment, wastewater treatment, and solid waste management permitting.

**Air Dispersion Modeling Analysis, Biodiesel Production Facility; Storm Lake, Iowa:** Served as the quality control/technical reviewer for the completion of the air dispersion modeling analysis for the construction of a 33 million gallon per year biodiesel production facility. Aquaterra was tasked with completing the air dispersion modeling analysis and subsequent modeling analysis report as required by the Iowa Department of Natural Resources Air Quality Bureau (IDNR) for a minor source facility.

**Onsite Wastewater Treatment System Selection, Biodiesel Production Facility; Storm Lake, Iowa:** Served as the quality control/technical reviewer to provide wastewater treatment support to the design team for the construction of a 33 million gallon per year biodiesel production facility located in Buena Vista County, near Storm Lake, Iowa. SCS was tasked with evaluating the ability and capacity of the local publicly owned treatment works (POTW) to treat process and non-process wastewaters. Due to siting location, the local POTW could not accept the wastewaters.

**Storm Water Management; Kansas, Missouri, and Wyoming:** Designed storm water diversion channels, storm sewers, detention basins, and sediment traps for a variety of clients. Designs included hydrologic and hydraulic analysis, sedimentation calculations, inlet and outlet structure design, and construction drawing and specifications development.

**Heavy Equipment Maintenance Facility Foundation Design; Sugar Creek, Missouri:** Designed and provided inspection services for a reinforced concrete mat foundation for a heavy equipment maintenance facility. The foundation was designed to withstand not only the building loads, but significant live loads from heavy construction equipment. The building included a wash bay, maintenance/shop area, office, and restroom facilities.

**Cattle Feedlot Drainage Improvements:** Performed a site reconnaissance, topographic review, and prepared volumetric and hydrologic calculations to determine if the existing lagoon system was properly designed. It was determined that an approximately 1,000 acre watershed was discharging clean stormwater into the lagoon system. After identifying the problem, performed hydraulic design calculations and prepared construction plans for a new drainage channel with concrete drop structures to bypass the clean stormwater around the lagoon.

**Swine Nursery Facility Design; Oklahoma:** Performed design calculations and prepared construction documents for a swine nursery facility. Design included lagoons, building pad, sewer system, driveway, and parking areas.

**CAFO Swine Lagoon Analysis; Missouri:** Performed a site reconnaissance and installed piezometers with a drill rig to analyze seepage through an existing lagoon embankment to determine if the site was impacting a nearby waterway. The analysis included sampling to determine nitrate levels and a geotechnical stability analysis for the lagoon embankment.

**CAFO Swine Sewer Improvements; Missouri:** Prepared and submitted plans for sewer system improvements at a swine facility in Missouri. Services included topographic surveying, sizing the sewer piping, preparing plan and profile plans for the gravity sewer system and encased road crossing. The redesign resulted in eliminating a lift station thereby simplifying operations. The plans were submitted to the state regulatory authority for review and approval prior to construction.

**Water Quality Management Guide; Kansas City, Missouri:** Developed an urban water quality management guide for a storm water detention reservoir located in North Kansas City, Missouri.

**Small Earthen Dam Repairs; Kansas City, Missouri:** Designed corrections for a variety of problems including, seepage through the embankment, upstream bank undermining, and sedimentation. Following design, subcontracted a contractor to complete repairs, and oversaw all construction activities.

**Lake Dredging; Topeka, Kansas:** Designed a sedimentation basin and closure grading plan, attained discharge permits from the Corp. of Engineers and Kansas Department of Health and Environment, designed and prepared construction plans and specifications for a sediment trap, and performed subsurface surveying to determine payment volumes for a 40,000 cubic yard dredging project. The project was completed in a residential setting requiring substantial public relations and education throughout the project.

**Skylar Ridge Storm Water Drainage Improvements:** Performed a site reconnaissance and design calculations for stormwater drainage controls at an existing multi-family residential complex. The project included preparing detailed construction plans for a subsurface drainage system and connection to the City of Overland Park, Kansas's storm sewer system.

**Parkhurst Development Sedimentation Plan Compliance Review:** Documented existing sediment conditions in a small intermittent stream flowing through the Parkhurst Development and emptying into Shawnee Mission Park Lake prior to construction. During construction, made periodic stream and construction site inspections to assess contractor compliance with the City of Lenexa approved erosion and sediment control plan. Additional recommendations were made to improve sediment capture efficiency and to implement best management practices.

**Fairway Park Development Storm Water Drainage Plan Review:** Reviewed the design calculations and storm water drainage plan for a new development in Shawnee, Kansas. The scope of the review included assessing impacts on homes located directly downstream of the proposed development. Many inadequacies to the drainage plan were identified and presented to the City of Shawnee's Commission and City Engineer.



## Remediation

**Chanute Sanitary Landfill; Chanute, Kansas:** Mr. Hamm managed field personnel during horizontal delineation of an existing leachate plume from a closed landfill. The project consisted of advancement of more than 30 direct-push probes to collect groundwater for gas chromatograph testing. The chlorinated solvent plume covered more than 35-acres and discharged into a relatively large river.

After delineating the horizontal and vertical extents of the impacted groundwater plume, Mr. Hamm was responsible for preparation of a corrective action implementation plan for pilot testing a number of remedial technologies. He was involved in negotiating with regulators to gain plan and construction approvals, and coordinated and managed all field operations to implement the plan. Remedial technologies being pilot tested include permeable reactive walls utilizing zero-valent iron, compost, and sawdust, carbon donor injections to stimulate biological activity and enhance reductive dechlorination, and phytoremediation. The phytoremediation component of the project involved planting approximately 1000 hybrid poplars to help control the source of the contamination and deep planting 25 mature poplars to serve as a hydraulic control.

Additionally, Mr. Hamm has prepared a hydrocarbon contaminated soil landfarm permit for this site. Activities included collecting soil samples on a monthly basis, providing cleanup recommendations, and analyzing data until soil reached closure concentrations. Remediated soil was used to improve the existing landfill cover saving the client a substantial amount of money.

**Contaminated Groundwater Remediation; King's Mills, Ohio:** Collected and managed the collection of representative groundwater samples during and following Geo-Cleanse<sup>®</sup> groundwater treatment, performed field analysis, evaluated the laboratory provided analytical results, and prepared quarterly reports for the EPA and client. The reports included probability rankings for natural attenuation.

**Remedial Investigation Work Plan; Boonville, Missouri:** Prepared a work plan for investigating a project site in Missouri for PCE, PAH, creosote, and PCB contamination. The work plan included soil and groundwater sampling and analysis utilizing a van mounted Geoprobe<sup>®</sup> system and installation of groundwater monitoring wells. Oversaw the installation of groundwater wells and Geoprobe<sup>®</sup> field activities.

**RCRA Interim Groundwater Monitoring Plan; Kansas City, Missouri:** Prepared an interim groundwater monitoring plan for a large RCRA pharmaceutical facility in Kansas City, Missouri. The plan involved groundwater monitoring from a variety of depths to monitor contaminant concentration trends throughout the entire aquifer thickness and evaluate the effects of seasonal Missouri River stage fluctuations on groundwater movement and quality.

**RCRA Remedial Investigation Plan; St. Joseph, Missouri:** Collected and evaluated groundwater elevation and analytical data for a large agricultural chemical manufacturing facility in St. Joseph Missouri. The project included analyzing historical and current groundwater elevation and analytical results to detect and evaluate trends and prepare a work scope for additional soil and groundwater investigations to be completed at the site.

**Underground Storage Tank Removal; Kansas City, Missouri:** Involved in all aspects of a UST removal in Missouri including assessment, tank removal and disposal, and remediation of hydrocarbon contaminated soil. Represented the client and worked directly with the Missouri Department of Natural Resources to obtain closure of the site.

**Petroleum Contaminated Soil Landfarm Design & Permitting; Great Bend, Kansas:** Designed and permitted a soil landfarm at the Barton County Sanitary Landfill to be used long term for treating petroleum contaminated soil accepted by the facility. The landfarm was designed with various treatment cells to allow soils from multiple projects to be treated simultaneously.

## Environmental

**Wetlands Permitting, Private Client, Missouri:** Calculated stream impacts and prepared mitigation plans and permitting documents for a proposed rock quarry water supply pond. SCS was retained to assist after the water supply pond had been constructed which required after the impacts permitting. SCS assisted the client navigate the permitting process through the US Army Corp of Engineers and other local regulators. Impacts were ultimately offset through an in lieu fee program. Mr. Hamm served as an expert witness in regards to the project and the client's mining permit application.

**Due Diligence Assistance, Private Client, Missouri:** Performed environmental due diligence on Terra Bioenergy, LLC's (Terra's) biodiesel plant. The client was interested in obtaining an operational interest in the plant and wanted to ascertain the plant's current environmental permitting and compliance status, needed actions and noncompliance issues associated with air, wastewater and stormwater permitting, as well as hazardous waste generator information.

**Wetland Delineation, St. Joseph, Missouri Landfill:** Completed the wetland delineation for the proposed landfill expansion within a low-lying, heavily silted partially aquatic area south of the current landfill, and a relatively narrow stream channel that connects stormwater retention ponds and ditches on the landfill property to the low area/aquatic feature.

**Wetland Determination/Delineation, American Energy Producers, Inc. – Tina, Missouri:** Completed several wetland determinations and delineations for future development for the biodiesel plant.

**Design and Permitting of Water Supply Reservoir, American Energy Producers, Inc. – Tina, Missouri:** Completed the design and permitting of a water supply reservoir for a soybean processing and biodiesel production plant. Task included a feasibility analysis, geotechnical exploration and soil testing, dam structural design, preparing U.S. Army Corp of Engineers 404 permit application including wetlands determination and delineation, endangered species review, and cultural heritage site review, a land disturbance permit application and storm water pollution prevention plan and construction plans and specifications for the dam and reservoir construction.

## Publications

Anastasia J. Welch, PE, Michael S. Kukuk, PG, Nathan A. Hamm, PE, and Susan L. McCart, PE, PG, *“Alternative Earthen Final Covers For Landfills – The Midwest Experience”* (Global Waste Management Symposium, September 2008)

Michael S. Kukuk, PG, Nathan A. Hamm, PE, Susan L. McCart, PE, PG, Anastasia J. Welch, PE, and Mark Witt, *“Evapotranspiration Final Covers: The Kansas Experience – From Concept To Reality”* (Landfill Symposium, June 2007).

## **Presentations**

*What do the numbers tell you? Volumetrics for Landfill Assessment and Planning*, Missouri Waste Control Coalition Conference, July 2016.

*Improvements in Criteria for Estimating and Increasing Functional Stability in Older MSW Landfills*, Missouri Waste Control Coalition Conference, June 2012.

*Creating Environmental Assets with Carbon Credits*, SWANA/KDHE Solid Waste Managers and Operators Training Course, November 2009.

*Expedient Landfill Haul Road Design Considerations*, Nebraska SWANA, Cornhusker Chapter Annual Technical Conference and Fall Tours, August 2008.

*Permitting Challenges for Renewable Fuel Production Facilities*, Air & Waste Management Association, Midwest Section, March 2008.