

TECHNICAL SPECIALTIES

Environmental Litigation, Expert Witness Testimony, Site Investigation and Remediation, Engineering Design, Environmental Chemistry, Stormwater Modeling and Analysis, Stormwater Management, Constructed Treatment Wetlands, Phytoremediation.

EXPERIENCE SUMMARY

Ten years of experience: Project, Staff and Staff Assistant Engineer with Roux Associates, Inc.; Research Assistant with Cornell University.

CREDENTIALS

B.S., Biological Engineering, Cornell University, 2009
M.S., Environmental Engineering and Science, The Johns Hopkins University, 2012
P.E. License - New York

KEY PROJECTS**Litigation Support**

- Expert witness for the recovery of past environmental response costs in connection with six sites in Connecticut, Kansas and New York. Sites included gun and ammunition manufacturing facilities, shooting ranges, waste disposal facilities, chemical blending facilities, and a ski manufacturing facility. Site contaminants included metals, PAHs, and CVOCs. Evaluated and categorized past costs. Prepared Expert Report and provided deposition testimony. Rebutted Plaintiff's Expert on reliability of Plaintiff's documentation of past response costs.
- Evaluated and categorized over \$40M of alleged past environmental response costs at a former chemical manufacturing facility in New Jersey. The facility was impacted with PCBs, metals and chlorinated solvents. Evaluated technical documents and reviewed over 1,800 invoices. Assessed the reasonableness of the environmental response actions performed by others. Assisted with preparation of an expert report.
- Provided settlement support for a Site with a dry-cleaner named as a potentially responsible party at a Superfund Site. Evaluated the historical chlorinated solvent (PCE) use at the Site and the potential release mechanisms. Reviewed environmental reports regarding the investigation and remediation work completed at the dry cleaning Site as well as the environmental investigation work completed at the Superfund Site. Evaluated the proposed remedial actions for the Superfund Site and estimated future costs. Estimated preliminary allocation of costs between PRPs.
- Evaluated over \$400M of past environmental response costs at seven former manufactured gas plants in New York. Reviewed environmental documents associated with the response actions at the sites. Evaluated the nature and extent of MGP related impacts (coal tar, cyanide, metals, BTEX and PAHs) to groundwater, surface water, soil and sediment. Assisted with

categorization of over 11,000 invoices. Assisted with allocation of past environmental response costs over time and the preparation of expert reports.

- Evaluated the fate and transport of PCE and TCE in groundwater. The chlorinated solvents were released from two former dry cleaners at a superfund site in New Jersey. Reviewed data on the nature and extent of the solvent plume and the hydrogeology and groundwater modeling completed by the ACOE, USEPA and their consultants. Assessed the timing of damage from the chlorinated solvent plume to a downgradient property. Assisted with preparation of an expert report.
- Evaluated over \$15M of alleged past environmental response costs incurred at a former dry cleaner in Massachusetts. Allocated past environmental response costs based on extent of contamination and timing of releases. Assisted with preparation of an expert report.
- Evaluated the nature and extent of environmental impacts at a former rubber parts manufacturing facility. Reviewed technical environmental documents and determined the sources of contamination, which included leaks and spills from vapor degreasers, materials loading/unloading areas, and material storage areas. Assisted with preparation of an expert report regarding the nature of releases at the Site.
- Evaluated the timing of PCB damage from a Superfund Site to a river. Procured and reviewed historical Site documents, aerials, maps and photographs. Evaluated sediment dating using the radioactive isotope Cesium-137. Assisted with allocation of past environmental response costs. Assisted with preparation of an expert report and a rebuttal report.
- Provided litigation support for cost recovery at a New York City Brownfield Cleanup Program Site formerly used as an MGP at the turn of the century. Soil and groundwater were impacted with PAHs, BTEX and NAPL. Remedial activities included excavation, in-situ stabilization, capping, and product recovery. Evaluated 400 invoices totaling approximately \$16M of environmental response costs incurred at the Site. Assisted with preparation of an expert report.
- Provided litigation support for an alumina refinery in the United States. Evaluated environmental technical documents and historic records regarding the nature and extent of contamination and sources of contamination. Evaluated the standard of care for constructing disposal areas in the 1950s and 1970s. Assisted with preparation of an expert report. Provided Cost estimating to assist with settlement support.

- Provided litigation support for a former railyard in Washington. Reviewed historical property records, property use records, maps, and other reports to identify potentially responsible parties. Developed a timeline of ownership for each parcel on the property.

Site Investigation and Remediation

- Prepared a Remedial Action Work Plan for a Brownfield Cleanup Program Site in Queens, New York to address SVOCs and metals in soil and groundwater above unrestricted use cleanup standards. Evaluated the nature and extent of impacted soil and groundwater documented in the remedial investigation. The Remedial Action Work Plan included evaluation of remedial alternatives, preparation of design drawings, cost estimates, a soil management plan, a health and safety plan and a community air monitoring plan. The recommended remedial alternative included in-situ chemical oxidation for groundwater remediation and excavation of over 150,000 tons of soil. The work plan was approved by the NYSDEC and implemented.
- Prepared a Remedial Investigation/ Feasibility Study Work Plan for a former aluminum smelter under the federal Superfund program. Reviewed historic reports, design documents, memorandums, and aerial photographs to develop an understanding of Site history to determine areas to focus on during the investigation, including areas of significant industrial activity, waste storage areas and closed waste disposal areas/landfills. Determined ARARs and site-specific sampling analyses. Reviewed the data collected during the Remedial Investigation and screened potential remedial alternatives for the Site. Recommended additional sampling analyses to further evaluate remedial alternatives.
- Prepared a RCRA Closure Work Plan, a Remedial Action Work Plan, and a Site Management Plan for a former paint factory in Queens, New York. The RCRA closure activities included disposal of over 50 above ground storage tanks and associated piping and power-washing/rinsate sampling floors and walls of the building. The RCRA Closure Work Plan was approved by the NYSDEC and was implemented. The Remedial Action Work Plan was submitted to the NYSDEC under the NYC Brownfields Cleanup Program. The proposed remedy included UST closure and removal, removal of underground piping, excavation of grossly contaminated soil to a depth of two-feet below the low-groundwater table, in-situ chemical oxidation, installation of product-only recovery pumps in areas where the LNAPL plume extends off-site, an active SSDS for future occupied buildings, and a site-wide composite cap. The remedy was approved by the NYSDEC and implemented.

- Designed a constructed treatment wetland, bioswale, and permeable reactive barrier for treatment of BTEX and iron in shallow groundwater and stormwater at a former petroleum refinery in Rhode Island. Developed a hydrologic and hydraulic model to evaluate the effect of increasing discharge to the downgradient stream network. I prepared design drawings, a Remedial Action Work Plan, an Operation and Maintenance Manual, and assisted with permitting.
- Conducted a preliminary design evaluation to address spent pot liner (SPL) leachate at an aluminum smelter. Reviewed groundwater data and eco-toxicity studies as well as academic literature regarding adsorption and precipitation of fluoride and cyanide under different conditions. Used a geochemical speciation modeling to develop a conceptual site model for fate and transport of the SPL leachate and mixing with seawater. Prepared conceptual design alternatives and recommendations.
- Evaluated the feasibility of retrofitting an existing treatment wetland at a Superfund Site to improve the removal of benzidine, 3,3'-dichlorobenzidine and other Site related constituents to discharge limits specified in a Record of Decision. The existing treatment wetland (designed by others) at the Site had consistently failed to meet treatment objectives. Evaluated design and construction documents, and noted several calculation misassumptions relating to porosity, permeability, and calculated of hydraulic retention time. Evaluated the feasibility of switching media to facilitate greater treatment.
- Field manager for monitoring of a 43-acre phytoremediation plot in Rhode Island designed for hydraulic control of petroleum impacted groundwater and rhizodegradation of petroleum impacted soil. Completed seasonal inspections to assess the health, vitality and survivability of a trees. Evaluated groundwater data and prepared an annual report.
- Field manager for a wetland remediation at a former petroleum bulk storage facility in Staten Island, New York. Oversaw dewatering, excavation, stabilization and transportation and disposal of lead impacted soil. Prepared daily construction reports, tracked materials shipped on or off the Site, and documented remedial construction progress. Prepared a Final Engineering Report submitted to the NYSDEC. Project manager for the restoration monitoring phase. Developed a restoration monitoring work plan, conducted seasonal monitoring events, and submitted annual reports to the NYSDEC.
- Field manager for annual inspections at a former telephone recycling facility in Staten Island. Evaluated the integrity of the asphalt cap, geosynthetic cap, and stormwater conveyance system; monitored the stream for signs of erosion;

and evaluated the vegetation for the restored areas of the Site. Summarized the results of the inspections in an annual report submitted to the NYSDEC.

- Field manager for groundwater gauging, groundwater sampling, soil sampling (waste characterization), sediment sampling, soil vapor sampling, wetland delineation, and wetland/habitat restoration at various sites throughout the New York City area.

Stormwater

- Completed design calculations, drawings, specifications, a bid package, an O&M plan and assisted with permitting for a stormwater basin improvement project in Long Island, New York. The project objectives included improving sediment removal from stormwater runoff and creek baseflow and improving removal of floatable solids. The design included regrading a basin to reduce flow velocities and facilitate sediment deposition, installation of a floatables collection system, installation of a new concrete headwall, and installation of a riprap apron to reduce erosive velocities.
- Evaluated the feasibility of rerouting stormwater at an active petroleum bulk storage facility in Rhode Island. Constructed a hydrodynamic model to evaluate flow through a 6-acre network of storm sewers.
- Designed stormwater retrofits to reduce aluminum and fluoride discharges at an aluminum smelter. Prepared design drawings for retrofitted drainage swales designed to convey stormwater runoff to a stormwater treatment wetland. The swales were lined with local clay material, found to have the capacity for fluoride sorption.
- Evaluated the feasibility of closing an outfall and rerouting stormwater to an existing lift station and stormwater treatment system at a former chemical manufacturing plant Virginia with elevated metals (zinc and copper) in stormwater. Evaluated the capacity of the existing treatment system and evaluated the system lifespan with additional loading rates. Also evaluated the hydraulic capacity of the existing lift station. Summarized results in a feasibility study report and submitted the report to VADEQ. A work plan was then submitted to VADEQ, and approved.

Landfills

- Evaluated potential retrofit opportunities for an existing MSW landfill leachate treatment system at a closed landfill in New York that was not meeting ammonia design objectives. Recommended a hydraulics retrofit and additional chemical evaluations of total alkalinity to determine if addition of sodium bicarbonate was necessary to maintain enough alkalinity for nitrification.
- Evaluated leachate management strategies and prepared a conceptual design for a closed MSW

landfill near Seattle, WA. Evaluated leachate quantity and quality to assess various treatment technologies, operation sequencing, and discharge requirements for management of leachate on-site. Completed a conceptual design of a treatment system including a phytoremediation plot for zero discharge of landfill leachate.

- Field manager for operations, monitoring and maintenance activities for an 18-acre landfill at a former textile manufacturing plant in Virginia. The landfill contained elevated concentrations of metals, predominantly zinc and iron.
- Designed the conveyance piping and hydraulic controls for a 1.6-million-gallon day wastewater treatment system treating both industrial wastewater from aluminum smelter and rolling mill as well as sanitary wastewater. Prepared design calculations and drawings and provided support during the bidding and construction phases of the work.
- Evaluated the applicability of using constructed treatment wetlands to treat produced water from a liquid natural gas facility. Reviewed chemical constituents in wastewater and preliminary treatability studies conducted by others. Evaluated draft fate and transport models and made recommendations for improvements. Provided recommendations for treatment options to meet applicable water reuse and discharge standards.
- Project manager and engineer for the design of a 50,000 gallon per day industrial wastewater treatment system to replace an undersized conventional wastewater treatment plant for sanitary wastewater (secondary treatment only), process water, and stormwater at an animal breeding facility in New York. Completed design calculations, prepared a SPDES permit, SWPPP, and Engineers Report for NYSDEC permitting. Assisted with construction support.

APPEARANCES

Olin Corporation vs Lamorak Insurance Company; United States Southern District of New York, Case No. 84 Civ. 1968 (JSR)