



PROFESSIONAL PROFILE



Sara S. Redding, MS, PG, LSRP

Principal Hydrogeologist

EXPERIENCE SUMMARY

Over a decade of experience in environmental remediation, characterization and remediation of petroleum, chlorinated solvents, polycyclic aromatic hydrocarbons (PAHs), metals, light and dense non-aqueous phase liquid (LNAPL and DNAPL), as well as assessment of vapor intrusion conditions and emerging contaminants (i.e., PFAS, 1,4-dioxane). Mrs. Redding has conducted, managed, or overseen numerous investigations and remediations for a variety of state and federal programs, including Pennsylvania with Act 2 and Hazardous Sites Cleanup Act (HSCA) projects, as well as New Jersey Industrial Site Recovery Act (ISRA) and Spill Act.

- Roux, Principal Hydrogeologist, 2013-2023; GIS and Database Manager for New Jersey Operations, 2017 – Present.
- University of Oregon, Graduate Student Researcher/Teaching Fellow, 2009-2012.
- Brown University, NASA Spacegrant Undergraduate Researcher, 2009; Undergraduate Researcher/Laboratory Teaching Assistant, 2006-2008.

TECHNICAL SPECIALTIES

In addition to design and implementation of environmental investigation and remediation, Ms. Redding has experience with environmental forensics, fingerprinting, apportionment, cost-to-closure estimates, and third-party review. Mrs. Redding specializes in navigating the ISRA process, management of sites with complex hydrogeologic settings including multi-aquifer systems and fractured bedrock, management of sites with complex data management and data evaluation needs. Ms. Redding leads the Geographic Information System (GIS) and Database department for Roux’s NJ operations.

REPRESENTATIVE PROJECTS

NJ Licensed Site Remediation Professional (LSRP) – ISRA

- Preparation and filing of General Information Notices (GINs) and Remediation Certifications (RCs) with corresponding Remediation Funding Sources (RFS) including establishment of Remediation Trust Fund (RTF), Self-Guarantee Applications, and Surety Bonds. Filings have included both Leasehold and Entire Site ISRA Industrial Establishments.
- LSRP for an organic chemical manufacturing facility Site in northern New Jersey regulated under ISRA due two distinct transactions (i.e., sale of property and cessation of operations at different times). Submittal of Preliminary Assessment Report (PAR) and Remediation in Progress (RIP) Waiver Application resulted in NJDEP-issuance of RIP Waiver and overall case closure for sale of property. To date, PAR has been submitted and RIP Waiver Application is pending for second ISRA trigger for cessation of operations.
- LSRP for portfolio of ten Sites related to concrete manufacturing throughout central and northern New Jersey regulated under ISRA. Responsible for completing Preliminary Assessment (PA) and Site Investigation (SI) with Receptor Evaluation (RE) as applicable for each Site within regulatory timeframes. Individual Site complexity factors include but are not limited to active ISRA, spill cases, and Remedial Action Permits (RAPs) related to prior owners and/or operators, access coordination, extensive prior historical investigation, proximity to local superfund contamination, coordination with NJDEP related to establishment or merger of Program Interest Numbers based on available tax information, successful application for regulatory timeframe extension due to access-related delays, and considerations for Leasehold versus Entire Site ISRA Industrial Establishments.

CONTACT INFORMATION

Main: (856) 423-8800
Direct: (856) 832-3808
Mobile: (610) 529-1753
Email: sredding@rouxinc.com
Website: www.rouxinc.com

402 Heron Drive
Logan Township, NJ 08085

EDUCATION

MSc, Geological Sciences,
Geophysics Group,
University of Oregon, 2012
ScB, Geology, Math/Physics,
Environmental Track,
Brown University, 2009

PROFESSIONAL LICENSES

NJ Licensed Site Remediation
Professional License #973439
PA Professional Geologist

- LSRP/project manager for a former research and design testing Site in central New Jersey regulated under ISRA. Project responsibilities include implementation of management of soil, sediment, and surface water investigations with an Ecological Risk Assessment (ERA) component to delineate the extent of SVOCs and metals for active remediation. Activities managed at Site included extensive soil investigation in support of both delineation and Historic Fill determination, preparation of an ERA report, remedial design, and complex permitting requirements due to proximity to the Delaware and Raritan Canal. Responsibilities included participation in client and regulatory agency meetings; preparation of proposals & cost estimates, budget tracking; historic document tabulation and presentation; design of soil boring and monitoring well installation program; fieldwork management; preparation of key phase deliverables necessary to meet the regulatory timeframes and support remedial design; management of remedial timeframes and successful application for extensions to regulatory and mandatory timeframes; management of complex permitting requirements (i.e., New Jersey Right-of-Entry, New Jersey Division of Land Use Regulation, US Army Corps of Engineers, Delaware & Raritan Canal Commission, State Historic Preservation Office, Soil Conservation District). Remedial activities included remediation of Site soil and sediment via bank stabilization and excavation where materials were subject to off-site disposal and use as alternative fill, capping, institutional control (i.e., Deed Notice), and application for Remedial Action Permit (RAP) for Soil.
- Project Manager for a former industrial manufacturing Site in central New Jersey regulated under ISRA. Project responsibilities include coordination and management of soil, sediment, surface water and groundwater investigations to delineate the extent of chlorinated VOCs (primarily PCE and TCE), and remediation of impacted soil. Field activities implemented or overseen at this Site included installation and sampling of bedrock and overburden monitoring wells, groundwater sampling, long-term groundwater monitoring, short-term aquifer testing, long-term groundwater elevation monitoring, installation of GORE (now AGI) vapor modules, extensive installation of soil borings and soil sampling/delineation, remediation of impacted soil using excavation methods, vapor intrusion sampling; and long-term groundwater monitoring in support of a Monitored Natural Attenuation (MNA) remedy for groundwater. Complexity factors include extensive tabulation of historic documents, groundwater contamination in fracture bedrock system, and NJDEP technical consultation for variance to delineation requirements due to physical access considerations; health and safety management; preparation of key phase deliverables necessary to meet the regulatory timeframes. This Site received

full soil closure and is currently undergoing post-remediation sampling to support groundwater closure.

NJ LSRP – Spill Act

- LSRP/project manager for an LNAPL spill case identified at a former research and design testing Site in central New Jersey. Project responsibilities include coordination and management of soil and groundwater investigation related to petroleum product which fingerprints as diesel, paint thinner and coal tar. Activities included implementation of Interim Remedial Measures (IRM) and soil/groundwater investigation concurrent with ongoing remediation under ISRA. Responsibilities include preparation of cost to closure estimates for client, design of soil boring and monitoring well installation program; evaluation of downhole geophysical logs in fractured bedrock for well screen placement; fieldwork management; preparation of key phase deliverables necessary to meet the regulatory timeframes and support remedial design. To date, NJ deliverables have included LNAPL IRM Report, IRE, and Public Notification submittals.
- LSRP/project manager for an LNAPL spill case identified at wet batch concrete manufacturing facility in northern New Jersey. Project responsibilities include coordination and management of soil, groundwater, and vapor intrusion investigation related to petroleum product which are a mixture of diesel and No. 6 Fuel Oil. Activities have included preparation and submittal Interim Remedial Measures (IRM) Report and ongoing management of soil/groundwater investigation. Remedial investigation activities rely on historic document tabulation and presentation, design of soil boring and monitoring well installation program, Historic Fill assessment, preparation of deliverables necessary to meet the regulatory timeframes and support remedial design.
- Project manager for spill case at commercial and research and development Site in northern New Jersey resulting from petroleum impact identified during demolition of wastewater treatment plant (WWTP). Project responsibilities included preparation and submittal of Remedial Investigation and Remedial Action Reports (RIR/RAR) supportive of Response Action Outcomes (RAO-A). Further responsibilities included preparation of satisfactory response to NJDEP audit of case RAO. This case has now received full closure.
- Project manager for spill case at commercial and research and development Site in northern New Jersey resulting from identification of tetrachloroethene (PCE) and 1,4-dioxane were identified above NJDEP GWQS. Project responsibilities included design and management of bedrock groundwater investigation and unknown soil source investigation, use of passive soil gas screening survey to refine area subject to soil sampling, and preparation/submittal of RIR/RAR supportive of Remedial

Action Permit (RAP) for Groundwater. The Site is currently undergoing post-remediation sampling to support groundwater closure.

NJ LSRP – PFAS

- Project manager for multiple industrial facilities in New Jersey regulated under ISRA with potential per- and poly-fluorinated substances (PFAS) usage and/or discharge of Aqueous Film Forming Foam (AFFF). Responsibilities include design and implementation of PFAS investigation in soil and groundwater compliant with evolving regulatory requirements. Additional complexity factors for these Sites have included adjacent water body classified as both freshwater non-trout (FW2-NT) and saline (SE2), proximate potential alternate sources of PFAS and corresponding forensic analysis of Site conditions, and physical access constraints.
- NJ LSRP responsible for assessment of contaminants of emerging concern (CECs) at all Sites where retained, including ISRA and Spill Act Sites as well as Sites subject to Remedial Action Permit (RAP) requirements for soil and groundwater. Assessments were conducted using multiple lines of evidence to determine whether sampling of CECs, including PFAS, is warranted.

NJ LSRP – Remedial Action Permitting

- LSRP retained for five Remedial Action Permit (RAP) cases, including soil and groundwater permits. Project responsibilities include coordination with NJDEP, submittal of biennial certifications related to each permit, evaluation of contaminants of emerging concern, submittal of multiple RAP Modification Applications, submittal of RAP Property Ownership Transfer Applications, and compliance with permit timeframes. Individual Site complexity factors have included coordination with off-site LSRPs and Persons Responsible for Conducting Remediation (PRCRs) related to investigations entering permitted property, technical consultation with NJDEP, inclusion of potable wells in Ground Water Monitoring Plan (GWMP), cap disturbance management, Class I-PL aquifer designation, and management of RAP concurrently with other investigations ongoing at the Site.
- LSRP of record for historical petroleum-related spill case where submittal of Groundwater RAP Termination Application by LSRP resulted in issuance of RAP Termination by NJDEP for Site closure. Included communication with NJDEP, including negotiation of reduced Groundwater Monitoring Plan (GWMP) with NJDEP due to damaged/lost wells and closure of these wells in accordance with NJDEP's Bureau of Water Allocation (BWA) guidance.
- Regularly provides support to projects with compliance attainment needs using methodologies including but not limited to compliance averaging via arithmetic mean, ProUCL,

and Thiessen polygons (spatially-weighted average) in accordance with NJDEP's Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria for compliance with the standards promulgated under N.J.A.C. 7:26D and related guidance documents.

- Fluent in application of Alternative Remediation Standards (including Synthetic Precipitation Leaching Procedure (SPLP) and vapor intrusion alternative screening levels), background demonstrations, and working within the requirements for Class I-PL, Class IIA (default Groundwater Quality Standards), Class IIIA, and Class IIIB groundwater classifications.
- Various regulatory support in New Jersey including preparation of documents based on the communication with the state and federal regulators on behalf of clients. Documented submissions include well searches, public notification, General Information Notices (GINs), PA/SIR, remedial investigation reports (RIRs), remedial action work plans (RAWPs), remedial action reports (RARs), soil erosion and sediment control plans (SESCs), receptor evaluations (REs), Bureau of Water Allocation (BWA) permits, off-site source investigation, initial RAP applications for soil and groundwater, RAP modifications, Remediation Funding Source (RFS) cost estimate review documentation, and Full Laboratory Data Deliverables (FLDDs). Experience includes management of projects within Pineland and Highlands areas.

Pennsylvania (Act 2)

- Project manager for remedial investigation of soil, groundwater, vapor intrusion (VI), surface water and sediment at a former stainless steel tubing manufacturing facility located in Southeast Pennsylvania (site is managed under HSCA by the Environmental Cleanup Program). The investigation focused on the vertical and horizontal delineation of chlorinated solvents in overburden and bedrock. Investigation activities included the installation of shallow overburden and deep (~400 feet) nested bedrock monitoring wells using sonic drilling techniques to reduce the amount of investigative derived waste (IDW) generated. The use of sonic drilling techniques resulted in an overall cost savings for the client. Additional activities included management of over 30 years of laboratory analytical data, geophysical and packer testing of open boreholes to determine well screen intervals, slug testing, installation of GORE (now AGI) vapor modules, indoor air sampling, VI assessment using USEPA risk calculator, assessment of surface water and sediment in a local tributary for both human health and ecological risk considerations, assessment of potential groundwater diffuse discharge and point-source discharges to this tributary, on-site soil investigation, bacterial sampling, treatability study long-term parameter monitoring, long-term groundwater elevation monitoring, DNAPL investigation, PDB groundwater sampling, and groundwater sampling for volatile

organics, metals, 1,4-dioxane, PFAS, monitored natural attenuation indicator parameters, and compound-specific isotope analysis (CSIA) parameters. Responsibilities include preparation for and participation in client meetings; preparation of proposals & cost estimates; coordination with insurance carriers; historic document tabulation and presentation; health and safety management; supplemental remedial investigation strategy support; fieldwork and staff management. Activities were summarized in a comprehensive remedial investigation report (RIR) and supplemental RIR covering an investigation period of over 30 years, a Treatability Study Completion Report discussing the effectiveness of molasses injections for addressing overburden and deep bedrock groundwater contamination, and a Feasibility Study (FS) Report assessing multiple assembled integrated remedial alternatives including ISCO and ISCR injections, hydraulic control, and best management practices. This project included regular communications with PADEP by way of progress reports, response letters, reports, participation in public meetings, and sharing of data.

- Various regulatory support in Pennsylvania including preparation of documents based on communication with the state and federal regulators on behalf of clients. Documented submissions include, feasibility study work plans, request for Non-Use Aquifer determinations, public notification, remedial phase reports, quarterly monitoring reports (i.e., Remedial Action Progress Reports), and remedial action completion reports.

Due Diligence

- Conduct Phase I Environmental Site Assessment (ESA) and/or Preliminary Assessment for real estate and industrial clients in New Jersey, Pennsylvania, and New York.
- In addition to typical industrial and commercial facilities, Phase I ESA/PA support has included Sites with extensive wooded areas or quarry areas, historical agriculture, extensive Site history, off-site contamination.

Litigation Support

- Serves as project manager for responsible party identification and allocation support matter related to CVOCs in bedrock with complexities related to aquifer depth, pumping wells and proximate drycleaner and Superfund sites located in New Jersey.
- Served as project manager for matter requiring preparation of preliminary expert statement for use in mediation. Statement summarized the history of environmental cleanup at a New Jersey Site and evaluation of the current conditions and path to completion for the environmental cleanup of the Site. The statement additionally included assessment of common due diligence protocols and sources of information regarding the

assessment of environmental conditions for sites in New Jersey.

- Support expert evaluation of the available operation information and site investigation data in support of fate and transport analysis to determine the divisibility of the COC contamination among PRPs for New Jersey landfill site.
- Served as project manager in support of expert of insurance litigation matter. Provided support to expert in preparation of settlement cost estimate and for assessment of Site conditions for both soil and groundwater, including free product. Relevant chemicals of concern included petroleum-related constituents formerly stored in six USTs (including heating oil, mineral oil, and benzene) and potential drycleaner-related impacts.
- Served as project manager in support of expert insurance litigation matter. Provided support to expert inclusive of historical document evaluation, Site condition assessment, and review of third-party documents related to remediation costs to support allocation assessment and conceptual remediation cost estimate.
- Serves as project manager for insurance litigation matter which involved a detailed analysis of past costs related to environmental activities at a former steel manufacturer located in Pennsylvania. Analysis included but was not limited to cost characterization, presentation of Site history to insurers, and assessment of cost relative to pertinent coverage dates for various PRP entities.
- Supported evaluation of extent and magnitude of lead and other heavy metals contamination in soils surrounding the lead battery recycling facility. Conducted field team management for expedited residential sampling program. Worked together with expert to support development of interior/exterior assessment and remediation protocols with lead regulatory agency; supported analysis and reporting of community blood lead data; provided support for graphical depiction and statistical analysis of data related to lead in soil.
- Provided support to expert for evaluation of historical operations, soil lead and arsenic data, and chemical signatures of potential industrial sources with locations on and adjacent to the historic industrial manufacturing facilities located in Indiana.
- Provided technical support to expert for preparation of expert report. Support activities included compilation, analysis, and graphical depiction of data for soil, groundwater, indoor air, sub-slab soil gas, and stormwater related to multiple facilities and residences in Ohio.
- Provided technical support to expert for evaluation of potential sources of trichloropropane (1,2,3-TCP) groundwater

contamination in drinking water wells in California. Support included evaluation of regional groundwater quality and pumping conditions, graphical depiction of temporal trends, and Principal Component Analysis (PCA).

- Litigation team member for testifying expert in preparation of expert report. Responsibility included managing assessment of environmental liabilities for multiple fertilizer manufacturing facilities, a manufactured gas plant remediation, and multiple facilities impacted by uranium.
- Provided technical support to expert for transition of substantial data and geospatial files for Montana site consultant to internal database for analysis by expert. Support activities included working with expert to identify data needs, communicate with external data managers, conduct assessment of data provided for timing of historical activity, to facilitate generation of graphical depictions.
- General litigation support staff for projects with a significant volume of data. Responsibilities include compilations, assessment, and management of litigation databases related to chlorinated solvents, metals, and PFAS/PFOA. Support includes identifying, digitizing, managing and assessment of analytical data. Support additionally includes evaluation of Site history and surrounding property use for allocation considerations, timing of release, etc.

GIS and Database Departmental Manager for NJ Operations

- GIS and Database program development, interviewing and management of personnel. Management of stored standards for multiple states and general compliance with regulatory program requirements, including New Jersey and Pennsylvania. Regularly coordinates with and provides support for projects in Roux's MA, IL, TX, and CA offices.
- Management of training in use of ESRI's ArcMap version 10.6.1, ESRI's ArcPro transition management, Microsoft Access database management, use of SURFER and Thiessen Polygon tools, and Microsoft Excel for environmental applications.

- Implemented automation of data processing and depiction tasks using macros programmed in Microsoft Excel's VBA to increase efficiency.
- Regularly advise on and implement data-driven assessments for compliance attainment using available tools allowable by regulatory guidance documents (i.e., Site-specific standards including SPLP and background demonstration, ProUCL software, arithmetic mean, and Thiessen Polygon application).

PROFESSIONAL TRAININGS

OSHA 40-Hour/HAZWOPER Health and Safety Training and Basic Orientation Plus Training

PROFESSIONAL AFFILIATIONS

NJ Licensed Site Remediation Professional Association

PUBLICATIONS

Boudreau, L., Wiest, M., Redding, S. "Why New Phase I Site Standard Matters for Real Estate" *Law 360*, Dec. 2021.

Boudreau, L., Wiest, M., Redding, S. "Enviro Review Standard Tweaks May Clarify Cleanup Liability" *Law 360*, Oct. 2021.

Papamarcos, S., "A Model of Basal Hydrologic Networks and Effective Stress Beneath an Ice Sheet" (Thesis). University of Oregon, Mar. 2012.

PRESENTATIONS

Walk the Line: Avoiding Ethical Pitfalls in Environmental Contamination Cases. Panelist: 2023 Environmental & Emerging Claim Manager Association (EECMA) Conference.

Papamarcos, S., Rempel, A., "A model of basal hydrologic networks, ice-infiltrated sediments, and effective stress" (Presented at AGU, Fall Meeting 2011).

Schultz, P. H., Papamarcos, S., "Evolving Flowfields from the Imbrium and Orientale Impacts" (Presented at LPS Conference 2010).