

Nicholas Santella, Ph.D., P.G.

Principal Geochemist



3157 Limestone Rd, Cochranville, PA 19330

Office: 610.593.5500 | Direct: 610.806.5288 | Email: nsantella@bstiweb.com

Areas of Specialization

- Tracer Hydrology
- Analytical and Numerical Modeling
- Environmental Chemistry
- Probabilistic Risk Analysis
- Environmental Site Assessments
- Geographic Information Systems
- Environmental Forensics

Qualifications

- Ph.D. in Geological Sciences, Columbia University “Measurement of sulfur hexafluoride and CFCs in the environment: Application to groundwater dating, soil air dynamics and atmospheric mixing”
- Bachelor’s Degree in Chemistry from Rutgers University
- Registered Professional Geologist in PA and DE

Overview of Professional Experience

- Over fifteen years of applied experience in the environmental science and engineering fields
- Authored and co-authored over a dozen peer reviewed journal articles regarding environmental chemistry/transport and risk management
- Coauthor of NJDEP Site Remediation Program Guidance “Planning for and Response to Catastrophic Events at Contaminated Sites”
- Advisory Committee member DE Hazardous Substance Cleanup Act Technical Subcommittee

Select Projects

- **Third Party Review of CERCLA Removal Actions and Risk Assessment (2018-present)** Provided third party technical review of a multi decadal history of EPA removal actions and risk assessments at a riverine PCB remediation site. Included evaluation of PCB and PCDD/PCDF data in multiple environmental media and of PCB biomarker data for legal counsel.

Education

Ph.D., Geological Science
(Geochemistry)
Columbia University, 2005

B.S., Chemistry
Rutgers University, 1999

Registration/Certification

Delaware Professional
Geologist

Pennsylvania Professional
Geologist

OSHA certified Hazardous
Waste Operations
and Emergency Response
(HAZWOPER per 29 CFR 1910.120)

Affiliations

American Geophysical Union

National Ground Water
Association



Select Projects (continued)

- **Environmental Insurance Policy Litigation Support (2017)** Conducted historical research spanning nearly 80 years using both Federal data storage warehouses and media outlets to compile investigative evidence of releases at a large industrial property in support of insurance litigation.
- **Mining Reclamation Plan and Residual Waste Disposal (Expert Opinion) (2017)** Assisted large hard rock quarry mining operation in Maryland/Pennsylvania with a proper disposal plan and Best Management Practice (BMP) for managing residual fine grained mining sediment. Solutions included OSHA and Mining Regulation air monitoring plan for silica and other airborne contaminants and working material into Reclamation Plan.
- **Expert Opinion for PCE Source Litigation (2017)** Evaluated source location and PCE impacts to indoor air for a large redevelopment project in Washington, D.C.
- **Forensic Modeling of Groundwater PCE Plume (2017)** In support of an insurance claim, designed data collection program and performed a numerical modeling study to constrain the date of a release at a former dry cleaner.
- **Sediment Forensic Analysis (2013-present)** Forensic analysis of PCB, PAH and metal impacted soils and sediments as part of allocation of liability. Compiled and comprehensively analyzed historic data for several large Superfund sites using GIS and contaminant ratios.
- **Forensic Sediment Sampling (2016)** Implemented forensic sediment transport investigation of a high profile environmental remediation site. Services included reviewing depositional features to identify sampling locations, performing sampling activities via watercraft, and analyzing compound ratios from source to downstream deposits.
- **Portfolio of Unsaturated Zone Fate and Transport Modeling (2013-present)** Unsaturated zone fate and transport modeling including development of plans for data collection and unsaturated and saturated zone fate and transport modeling to develop NJ SRP alternate remediation standards for the soil to groundwater pathway at multiple sites.
- **Groundwater Fate and Transport Modeling (2013-2015)** completed a multiphase modeling program for development and calibration of a large scale groundwater flow and contaminant transport model for a tidally influenced remediation site. After initial model development developed a plan for additional data collection to support additional calibration and validation requested by regulatory agency. Final modeling product fulfilled required work plan element and supported project closure.
- **DE evaluation of sea level rise risk (2013-2014)** Under contract with state contributed to an assessment of sea level rise impacts to DNREC regulated sites.
- **PCB trackback study (2012-2013)** Lead an effort to identify sources of PCBs within the service area of a county sanitary sewer network. This work was conducted as part of a Pollution Minimization Plan (PMP) associated with a municipal NPDES permit and produced a geodatabase to support further source trackback efforts.
- **LNAPL recovery modeling (2013)** Calibrated and implemented a site specific LNAPL recovery model to facilitate remedial system design.
- **Assessment of natural disaster hazmat risk (2008-2010)** Evaluated risks of and prevention and remediation methodologies for hazardous material releases associated with natural disasters at storage tanks and other facilities. Directed four part-time staff in conducting surveys and performing data analysis.
- **Evaluation of veterans interests in STEM education (2008-2009)** Lead the development, programing and piloting of an extensive electronic survey of veterans utilizing Post 911 GI Bill benefits. Conducted focus groups and synthesized input from a team of subject matter experts.



Select Projects (continued)

- **Validation of a critical infrastructure protection decision support system (2007-2009)** Developed validation methods and collection of a variety of infrastructure system data for Los Alamos National Lab. The success of an initial project led to a larger contract to serve as a third-party reviewer of critical infrastructure modeling research at LANL for the Department of Homeland Security Science and Technology Directorate.
- **Managed CERCLA Fractured Rock Remediation Site (2005-2007)** Managed the activities of a Superfund Site including the scheduling, coordination, and implementation of treatment system performance monitoring, groundwater sampling, and preparation of quarterly and annual reports to USEPA, NJDEP and the client.
- **Groundwater assessment of a large and complex hexavalent chromium site (2005 -2007)** Project oversight, data management and reporting for characterization and groundwater remedial design of a chromium waste disposal site with a focus on characterization and mitigation of discharge of impacted groundwater to estuarine surface water.
- **Data management and analysis for a large brownfield site (2006-2007)** Developed and maintained an extensive database of soil and sediment analytical data and developed and implemented statistical methods for data evaluation and display for a large brownfield site in accord with risk based environmental standards.
- **Hydrologic tracer investigations (2000-2005)** Responsible for planning and implementation of tracer studies in groundwater, rivers and indoor/outdoor air including sampling, laboratory analysis and interpretation of data. Applications included evaluation of in-situ chemical oxidation programs, groundwater dating and quantification of atmospheric gas exchange rates and advection/dispersion properties of the Hudson and East Rivers and Newark Bay. Results of these studies were ultimately used for calibration of the Port of New York/New Jersey Operational Forecast System.

Select Publications

Santella N., *Growing Vulnerability: Facing Natural Hazard-Related Environmental Liability*, NJ Municipalities, November 2015

Santella N., Ho D.T., Schlosser P., Gottlieb E., Munger W.J., Elkins W.J., Dutton G.S. *Atmospheric variability and emissions of halogenated trace gases near New York City*, *Atmospheric Environment*, 47, 533-540, 2012

Santella N., Steinberg L.J., Aguirra G. A. *Empirical Estimation of the Conditional Probability of Natchez Events Within the United States*, *Risk Analysis*, 31 (6), 951-968, 2011

Santella N., Steinberg L.J. *Accidental Releases of Hazardous Materials and Relevance to Terrorist Threats at Industrial Facilities*, *Journal of Homeland Security and Emergency Management*, 8 (1), 53, 2011

Steinberg L.J., Santella N., Zoli C. *Baton Rouge Post-Katrina: The Role of Critical Infrastructure Modeling in Promoting Resilience*, *Homeland Security Affairs*, 7, 7, 2011

Santella N., Sengul. H., Steinberg L.J. *Petroleum and Hazardous Material Releases from Industrial Facilities Associated with Hurricane Katrina*, *Risk Analysis*, 30(4), 635-649, 2010

Santella N., Steinberg L.J., Parks K. *Decision-Making for Extreme Events: Modeling Critical Infrastructure Interdependencies to Aid Mitigation and Response Planning*, *Review of Policy Research* 26 (4), 409-422, 2009

Santella N., Ho D.T., Schlosser P., Stute M. *Widespread elevated atmospheric SF6 mixing ratios in the Northeastern United States: Implications for groundwater dating*, *J. of Hydrology*, 349 (1-2), 139-146, 2008

Santella N., Schlosser P., Smethie W.M., Ho D.T, and Stute M. *Seasonal variability and long term trends of chlorofluorocarbon mixing ratios in the unsaturated zone*, *Environ. Sci. Technol.*, 40 (14), 4414 -4420, 2006



Select Publications (continued)

Caplow, T., P. Schlosser, D.T. Ho, N. Santella, *Transport dynamics in a sheltered estuary and connecting tidal straits: SF₆ tracer study in New York Harbor*, Environ. Sci. Technol., 37, 5116-5126, 2003

Santella N., Ho D.T., Schlosser P., et al., *Distribution of atmospheric SF₆ near a large urban area as recorded in the vadose zone*, Environ. Sci. Technol. 37 (6): 1069-1074, 2003

Schulze S.M., Santella N., Grabowski J.J, Lee J.K. The anionic oxy-Cope rearrangement: Using chemical reactivity to reveal the facile isomerization of the parent substrates in the gas phase J. Org. Chem. 66 (22): 7247-7253 2001

Select Lectures

Hurricane vs. Environmental Infrastructure: Who Wins and Can We Really Protect Ourselves?, RTM, Philadelphia, PA, April 2017

A.M. Best Webinar: What Insurance Professionals Need to Know About Weather-Linked Environmental Risks, Oldwick, NJ, September 2014

Remedial Risk Assessment: Releases from Storage Tanks During Natural Disasters, EPA Region 3 States LUST Technical Workshop, Rehoboth Beach, DE, September 2011

Quantification of Occurrence and Cumulative Probability of Natechs in the U.S, International Disaster and Risk Conference IDRC Davos, Switzerland, June 2010

Validation of a CIPDSS analysis of Hurricane Katrina's Impacts on Baton Rouge LA, DHS Office of Science and Technology, Washington DC, June 2008

Spatial Distribution of Gases Emitted from Large Urban Areas: SF₆ Measurements, American Geophysical Union, San Francisco, CA, December 2004

Select Software Tools

AQTESOLVE (hydrogeologic analysis)

AquaChem (groundwater chemistry)

ArcGIS suite and add-ins (geospatial analysis)

CORMIX (surface water mixing)

EPANET (water distribution system modeling)

HELP (landfill design)

HEC-RAS (surface water modeling)

ISCST3 (atmospheric transport)

LDRM (LNAPL recovery)

MATLAB (data processing, time series analysis)

MODFLOW (groundwater modeling)

SEVIEW (unsaturated zone and groundwater modeling)

SHAW (soil heat and moisture modeling)

SPSS (statistics)

Surfer (data analysis and mapping)

Rockworks (data visualization)

Vensim (system dynamics modeling)

