

ALEXANDROS SPILIOPOULOS

Senior Hydrogeologist

AREAS OF EXPERTISE

- Environmental Data Analysis
- Water Resources Management
- Groundwater Modeling
- Reactive Contaminant Fate–Transport
- RCRA Remedial Action Evaluation
- Nuclear Site Aquifer Characterization and Modeling
- MTBE, BTEX, Fuel Oxygenates, Chromium, Radionuclides
- Parameter Estimation and Optimization

SUMMARY OF QUALIFICATIONS

Dr. Spiliotopoulos' expertise is analysis to support water resources management. He has developed and applied analytical and numerical models for groundwater flow and contaminant transport, focusing on pump-and-treat system operation, reactive-transport modeling, and optimization applications for least-cost remediation designs. He has extensive experience in assessing water-resources management in support of inter- and intra-state water-resource allocation and conflict resolution, assessment of water quantity and quality data, development and application of statistical tools and numerical interpolation techniques for mapping water-level and water-quality data, and the application of advanced parameter estimation techniques for model calibration.

REPRESENTATIVE EXPERIENCE

S.S. Papadopoulos & Associates, Inc., Bethesda, MD

- **U.S. Department of Energy**, Hanford, Washington — As lead modeler and technical consultant, evaluated the migration of hexavalent chromium, radionuclides and other constituents. Designed RPO and RI/FS remedial alternatives as well as Remedial Design and Remedial Action Work Plans, including large-scale pump-and-treat networks and/or MNA and other in-situ treatment technologies. The focus of this effort was to meet short- and long-term goals for river protection from chromium discharges and for aquifer cleanup for the River Corridor BC-5, KR-4, HR-3 and FR-3 Operable Units of the nuclear reactors. Developed strategies for implementing EPA's DQO process and statistical trend analyses for site closure, considering MNA and/or in-/ex-situ treatment. Developed the 100 Areas three-dimensional groundwater flow and reactive contaminant transport groundwater model and performed flow, transport, and particle-tracking analyses using MODFLOW, MT3DMS, and MODPATH, respectively. Reactive transport simulations were completed using the MT3DMS dual-domain formulation, and extraction and subsequent (untreated) reinjection of selected COCs were simulated using a version of MT3DMS by implementing a module to circulate time-varying extracted contaminants to injection wells. As part of the annual reporting, conducted site-wide multi-constituent plume delineation by developing/implementing a systematic approach for data-selection and using in-house-developed transformation-based kriging algorithms and advanced mapping techniques. For groundwater monitoring under RCRA, developed tools and novel approaches in support of remedial action and contaminant migration pattern evaluations.
- **Keystone Site Technical Support**, Indiana, — For the U.S. Environmental Protection Agency Region V, provided expert technical support to the Region V Groundwater Evaluation and Optimization System (GEOS) program to evaluate plume migration patterns and exposure pathways due to multiple-source releases for the Keystone Corridor Groundwater Contamination site. Reviewed and assessed past characterization and remediation efforts, evaluated historical

YEARS OF EXPERIENCE: 15+

EDUCATION

- PhD**, Civil and Environmental Engineering, University of Vermont, 1999
- BS**, Civil Engineering, University of Patras, Greece, 1994

PROFESSIONAL HISTORY

- S.S. Papadopoulos & Associates, Inc.**
2004 to present
- ADK Consulting Engineers S.A.**
Hydraulic Engineer, 2000–2004
- University of Vermont**
Graduate Researcher in Research Center for Ground Water Remediation Design, 1994–1999

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monitoring data, developed contaminant plume delineations, and provided oversight on the monitoring plan as part of the RI/FS, including groundwater, soil, soil-gas, and interior-gas sampling and evaluation, as well as potential remedial designs for source-area cleanup.

- **Apalachicola-Chattahoochee-Flint River Basin, Florida vs. Georgia Water Dispute** — Provided technical support to Georgia's Counsel in reviewing material submitted for consideration in the conflict-resolution litigation at the U.S. Supreme Court. Reviewed model files, numerical and analytical evaluations, and historical data. Provided high-level assessment of current and projected water-resource management practices and plans, and of the impacts to inter-state water allocations.
- **Kansas Department of Agriculture Republican River Basin Model**, Northwest Kansas — Modified and re-calibrated the existing Republican River Compact Association flow model (focusing on the Northwest Kansas area) to provide an administrative tool for the prediction of impacts to the Republican River from varying future irrigation patterns. Provided technical support to Kansas Department of Agriculture to evaluate future resource allocation and compliance on the basis of a Tri-State water-use agreement.
- **Kansas Department of Agriculture Solomon River Basin Groundwater Flow Model Evaluation** — Supervised and provided recommendations for the development and calibration of two groundwater flow models for the Solomon River basin, to be used as an administrative tool for the management of the available water resources for irrigation purposes.
- **Montana vs. Wyoming and North Dakota, Tongue River Basin Technical Support** — Provided technical support in reviewing groundwater model parameters and results, historical stream flow and outfall data, and other analyses to evaluate aquifer response and stream depletions to irrigation pumping and coal bed methane (CBM) pumping.
- **SPARTON Corp. Groundwater Monitoring**, Albuquerque, New Mexico — Served as technical lead for the assessment of groundwater quality data to evaluate plume migration patterns and effectiveness of remediation of VOCs and metals, including chromium. Developed, evaluated, and revised monitoring plans for effective delineation of the chromium plume in support of chromium fate and transport evaluations and short- and long-term treatment. Developed and supervised on-site monitoring efforts, and was responsible for evaluating P&T system performance, conducting compliance/mitigation efforts and annual reporting to EPA/NMED.
- **New Hyde Park Site Characterization**, Long Island, New York — For the New York State Department of Environmental Conservation (NYSDEC), reviewed and supervised site characterization efforts in collaboration with NYSDEC. Developed and calibrated a three-dimensional flow and transport model for a robust pump-and-treat remedy evaluation to support the development of a cost-effective remedial system design to address a MTBE mega-plume.
- **Mineola Site Characterization and Monitoring Plan**, Long Island, New York — Provided technical support to NYSDEC for site characterization and design of a monitoring plan for a MTBE plume. Developed and calibrated a three-dimensional flow and transport model for the design of a remedial system to protect a downgradient public supply well. Implemented geostatistical and other methods to evaluate spatial and temporal variations of the magnitude and direction of the hydraulic gradient in support of additional remedy designs to address the MTBE plume.
- **Elmont Site Characterization**, Long Island, New York — For the NYSDEC, reviewed and supervised site characterization efforts. Designed, coordinated, and performed a rapid mapping methodology for expedited plume delineation. The designed mapping methodology combined direct-push sampling and Quantile-Kriging interpolation techniques. Developed a three-dimensional flow-and-transport model to assess the MTBE plume migration, to evaluate alternative remedial designs, and to monitor natural attenuation.
- **Ronkonkoma Groundwater Flow & Transport Model**, Long Island, New York — For the NYSDEC, developed and calibrated a groundwater flow and transport model to analyze plume

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(MTBE, BTEX, TAME, and TBA) migration patterns for at the site, and to monitor the operation of the appropriate Interim Remedial Measure (IRM) system.

- **Uniondale Monitoring Plan**, Long Island, New York — For the NYSDEC, developed a monitoring plan to delineate the contaminant plume and to assess plume migration characteristics in order to identify appropriate measures for protection of downgradient receptor wells.
- **Hampton Bays Flow & Transport Model**, Long Island, New York — For the NYSDEC, applied a three-dimensional flow-and-transport model to assess MTBE-plume migration pathways over time, under varying regional hydraulic gradient conditions. Evaluated the effectiveness of the existing IRM system and recommended system enhancements.
- **West Hempstead Flow & Transport Model**, Long Island, New York — For the NYSDEC, developed a transient three-dimensional flow-and-transport model to analyze historical groundwater flow conditions at the site and to identify MTBE plume migration and recovery at the IRM wells. Evaluated system performance, recommended improvements for system operations, and assessed aquifer cleanup times.
- **Gloria Road Groundwater Monitoring Network**, Nassau County, Long Island, New York — For the NYSDEC, provided technical support and recommendations for the development of a monitoring network to determine the migration pattern of a MTBE and BTEX plume. Implemented an existing flow model, particle-tracking analysis and sensitivity analysis to provide bounding estimates on the lateral extent of the plume pathway and to evaluate whether a proposed monitoring well would intercept the plume.
- **East Patchogue Flow & Transport Model**, Suffolk County, Long Island, New York — For the NYSDEC, supervised the development of a three-dimensional flow and transport model to analyze the historical migration of a MTBE plume and to quantify its relative discharge to a pond near the shoreline and the Long Island Sound. Performed a sensitivity analysis to incorporate variation in pond stage due to tidal effects.
- **Onondaga Lake Parameter Estimation**, New York — For the NYSDEC, reviewed and expanded parameter estimation efforts for a flow-and-transport model calibration. Evaluated the proposed remedial design and provided recommendations for appropriate design parameters.
- **Rainelle Power Plant Water Supply Evaluation**, West Virginia — As part of the EIS for the construction and operation of this proposed power plant, developed and calibrated a three-dimensional flow model to simulate groundwater flow conditions to evaluate the availability of groundwater as a water source for cooling purposes and to evaluate potential impacts to local pumping wells and river flow. Performed aquifer test analyses to define hydraulic properties that were further refined during the model calibration process. Conducted baseflow analysis to estimate river flow that was attributed to groundwater and to evaluate river water depletions due to pumping. Developed pumping and recharge scenarios to assess the impact of pumping from existing and proposed wells that would supply the power plant, to local production wells and to river flow.
- **Confidential Client**, El Campo, Texas — Performed statistical analyses of isotopes and other chemicals to examine origin of contaminants and plume migration for a site contaminated with TCE, DCE and other chemicals. Developed and applied groundwater flow and contaminant transport models using MODFLOW/MT3D and ATRANS and model calibration using PEST, to define contaminant release history.
- **Confidential Client**, Hastings, Nebraska — Using PEST, calibrated a groundwater-flow and contaminant-transport model. Applied regularization techniques for advanced parameter estimation.

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LANGUAGE

Greek

PROFESSIONAL SOCIETIES

American Society of Civil Engineers
National Ground Water Association
American Geophysical Union

PUBLICATIONS & PRESENTATIONS

- Spiliotopoulos, A., R. Shannon, M.J. Tonkin, and L.C. Swanson, 2011. Evaluation of Temporal Variations in Hydraulic Capture due to Changing Flow Patterns Using Mapping and Modeling Techniques. Presentation at MODFLOW and More 2011, Colorado School of Mines, Golden, CO.
- Bedekar, V., M.J. Tonkin, and A. Spiliotopoulos, 2011. Implementation of a Contaminant Treatment System (CTS) Module in MT3DMS. Presentation at MODFLOW and More 2011, Colorado School of Mines, Golden, CO.
- Khambhammettu, P., M.J. Tonkin, and A. Spiliotopoulos, 2011. FIELDGEN_D – A Modified 2D Field Generator for Deterministic and Stochastic Groundwater Modeling. Presentation at MODFLOW and More 2011, Colorado School of Mines, Golden, CO.
- Shannon, R., A. Spiliotopoulos, and M.J. Tonkin, 2011. Estimating Contaminant Migration Pathways Using a Time Sequence of Water Level Maps and Particle Tracking. Presentation at the 2011 Ground Water Summit and 2011 Ground Water Protection Council Spring Meeting. National Ground Water Association, Baltimore, MD, 1.
- Smoot, J.L., F.H. Biebesheimer, J.A. Eluskie, T. Simpkin, M.J. Tonkin, and A. Spiliotopoulos, 2011. Groundwater Remediation at the 100-HR-3 Operable Unit, Hanford Site, Washington. Presentation at the Waste Management Conference, Phoenix, AZ. February 27– March 3, 2011.
- Spiliotopoulos, A., M.J. Tonkin, D. Shrimpton, J. Blount, T. Simpkin, and J. Hanson, 2010. Groundwater Modeling in Support of Remedial Process Optimization: Implementing a Developing Conceptual Site Model into Comparative Remedy Analyses. Presentation at the Waste Management Conference, Phoenix, AZ, March 7-11, 2010.
- Spiliotopoulos, A., M. Karanovic, and S.P. Larson, 2008. Development of Transient Flow Models for the Solomon River Basin. Presentation at MODFLOW and More 2008, Colorado School of Mines, Golden, CO
- Spiliotopoulos, A., K. Krajenke, N. Hart, J. Haas, D. Cornacchiulo, D. Trego, and M. Tonkin, 2008. Robust Pump-and-Treat Remedy Evaluation for an MTBE Mega-Plume. Presentation at the National Ground Water Association (NGWA) Conference on Eastern Regional Ground Water Issues, Ronkonkoma, NY.
- Spiliotopoulos, A., K. Krajenke, K. Salafrio, and J. Haas, 2008. Rapid Mapping to Support Accelerated Site Assessments. Presentation at NGWA Conference on Eastern Regional Ground Water Issues, Ronkonkoma, NY.
- Spiliotopoulos, A., and C.B. Andrews, 2007. Analysis of Aquifer Test Data – MODFLOW and PEST. in *Groundwater and Wells*. (3rd ed.). Sterrett, R.J., ed. New Brighton, MN: Johnson Screens. 812 p. (also presented at MODFLOW and More 2006, Colorado School of Mines, Golden, CO).
- Spiliotopoulos, A.A., G.P. Karatzas, and G.F. Pinder. 2004. A Multi-period Approach to the Solution of Groundwater Management Problems Using an Outer Approximation Method. *European Journal of Operational Research*, v. 157, no. 2 (September), pp. 514-525.

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Matsouki, M., G. Germanopoulos, and A. Spiliotopoulos, 2003. Geographical Information Systems (G.I.S.) Implementation in Water Supply Network Modeling. Presentation at the XXX IAHR Congress, Thessaloniki, Greece. August 24-29, 2003,

Spiliotopoulos, A.A., G.P. Karatzas, and G.F. Pinder, 2000. A Biconcave-Decomposition Method for the Optimal Design of Pump-and-Treat Remediation Systems Including the Treatment Plant. Presentation at the 13th International Conference on Computational Methods in Water Resources, Calgary, Canada. June 2000.

Karatzas, G.P., and A.A. Spiliotopoulos, 1998. Development of Two Optimization Models: (1) A Multi-period Approach to Solve Engineering Management Problems, and (2) Incorporating Uncertainty in the Decision-Making Process for Optimal Management Design. An Application to a Groundwater Management Problem. Presentation at the Vermont EPSCoR (Experimental Program to Stimulate Competitive Research) Annual Conference on Science and Technology, University of Vermont, October 6, 1998.