Geosyntec
consultants

Matthew Vanderkooy
Environmental Scientist
Professional Geoscientist (P.Geo. Ontario)

conceptual site models
contaminant remediation
site investigation

EDUCATION

M.Sc., Hydrogeology – NSERC Industrial Scholarship, University of Waterloo, 2010
B.Sc., Honors Chemistry – Dean's List, University of Waterloo, 2007

REGISTRATIONS AND CERTIFICATIONS

Professional Geoscientist, Ontario, Member #2909

CAREER SUMMARY

Matt Vanderkooy is a contaminant geoscientist with 10 years geoscience experience. Matt's main practice areas include assessing and building site conceptual models that encompass surface water, groundwater, soil and sediment. These comprehensive conceptual models help guide the design and implementation of remediation and monitoring scopes of work that meet project objectives. One of Matt's main technical practice areas is delineating contamination presence and sources using geochemical fingerprinting techniques and other associated information – including local geology, hydrogeology, weather patterns and land uses. Two of Matt's other specializations include characterizing contaminated sediments using passive sampling techniques and characterizing groundwater-surface water interactions where groundwater vents to surface water.

CAREER SUMMARY

Saline Source Determination, *(Confidential Client).* Assessed and determined source of saline water at a legacy oil and gas exploration and production Site using geochemical fingerprinting techniques along with Site records and supporting geological information. Analyses included linking saline contamination presence to unique features of the associated sources including dissolved hydrocarbon gas dynamics, compositions and isotopic composition. Other lines of evidence used to support analyses included strontium, chloride, bromide and methane isotopes, analytical mixing models and geological provenance of various salt sources.

Groundwater Age Determination, *(Confidential Client),* Assessed multiple lines of evidence to evaluate groundwater age. Assessed geochemistry data in concert with

chlorofluorocarbon (CFC) groundwater data and dynamics to assess potential issues in assigning groundwater ages in a fractured rock environment.

PFAS Remedial Technology Assessment, *(Internally funded research),* Managed a Geosyntec sponsored research project with collaborators Dr. David Gent from the U.S. Army Engineer Research and Development Center. The project examined the potential to treat perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) using electrochemical destruction methods. The testing showed potential capability to reduce PFOA concentrations, but no reductions in PFOS concentrations.

Creosote Site Groundwater - Surface Water Management, *(Confidential Client).* Assessed site conceptual model to more accurately describe contaminant dynamics between groundwater, surface water and sediment by starting with a detailed understanding of geology. The enhanced conceptual site model was used to develop and implement a characterization program which is collecting data to facilitate remedy design.

Creosote Site Conceptual Model, Regulatory and Remedy Review, *(Confidential Client).* Prepared review of creosote site conceptual site model for client to enhance and refine understanding of present contaminant distribution, migration pathways and likely evolution of the Site. Follow-on work involved preparing for the client an assessment regulatory considerations and order of magnitude remedial cost estimates to address existing contamination.

pH Control, *(Confidential Client).* Identified and conducted laboratory tests of a method to improve existing technology to manage high pH impacted water at a client's site. Performed an in situ treatability test with carbon dioxide additions to demonstrate the possibility to buffer elevated pH in situ.

In Situ Permeability Reductions and pH Control, *(Confidential Client).* Identified and laboratory tested proven and innovative techniques to reduce hydraulic conductivity in situ via injection of specialty fluid formulations into high pH aquifers to reduce hydraulic conductivity and reduce pH.

Berry's Creek Study Area, *ELM, New Jersey.* Managed and implemented a treatability study to evaluating amendments to reduce concentrations of PCBs, mercury and methyl mercury. Implemented passive sampling program for PCBs and Mercury by developing in house expertise.

Confidential Site, (*Confidential Clients).* Managed a field programs characterizing volatile organic compounds in sediment, investigations of sediment hydrodynamics (deposition and erosion) and geotechnical properties.

***Randle Reef**, Environment Canada, Hamilton, Ontario.* On a rapid schedule developed, pilot tested and then full-scale executed a leak detection program to assess find leaks in an engineered containment cell. Also for the same project, designed a sediment cap monitoring plan for post construction performance monitoring. Advised Environment Canada on type of sampling necessary to meet monitoring objectives.

***Vapor Intrusion Investigation Methods Comparison,** AFCEE, Vandenberg AFB.* Organized field effort and analyzed data comparing three methods of investigating sub-slab vapors to identify approach that met data collection objectives while being cost effective.

***Large Site, Multiple Contaminants,** (Confidential Client).* Monitored and optimized a large chlorinated solvent and perchlorate bioremediation system at a historical industrial facility. Created subcontractor tracking tools, prepared update reports, and analyzed site activities to identify cost savings.

***Lawrence Dry Cleaners,** AECOM, Sydney, Australia.* Designed a bioremediation system for multiple DNAPL sources and plumes at an active Dry Cleaning facility, provided technical review support for using isotopes, and designed a pH buffering system.

***Fractured Bedrock Site,** (Confidential Client).* Created a 14 compartment model analysis of contaminant distribution at Site using historical Site data and release history to help guide site characterization and remedy development decisions.

***SERDP,** United States Department of Defense.* Wrote user's guide for online version of 14 Compartment Model tool by adapting existing materials and writing walk through of tool. The 14 Compartment Model is a site characterization tool for identifying data gaps and predicting the evolution of contaminant mass.

Geoscience Perspectives for Pipeline Clientele

Pipeline Leak Detection Test Design, Oversight and Interpretation, *PRCI & Syscor Controls and Automation*. Created geoscience test plan to evaluate capabilities and limitations of pipeline leak detection sensor by balancing pipeline operator interests, actual pipeline conditions and geoscience knowledge. Future work on project include test oversight and data interpretation.

Pipeline Leak Detection, Vapor Plume Modeling, *PRCI*. Designed and implemented investigation to mathematically model air column concentrations of volatile organic compounds originating from sub-surface liquid pipeline leaks. Researched and composed memoranda outlining and comparing potential remote sensors for detecting pipeline leaks based on vapor plume modeling findings.

Geosyntec consultants

Sustainability

Pitt-Consol, *DuPont, New Jersey.* Evaluated sustainability of eight different remedial alternatives for a large coal tar contaminated site. Evaluated and interpreted sustainability using SimaPro, a specialized Life Cycle Assessment software package.

Sustainability Short Course, *EcoForum 2014 Conference, Gold Coast Australia*. Co-instructed short course on sustainable remediation principles and methods to environmental professionals including regulators, site owners and consultants.

Amcol International Life Cycle Assessment*, Lovell WY.* Evaluated the environmental footprint of a bentonite mine from mining of bentonite to processing and shipping. Involved collection data, creating life cycle model and preparing deliverable package for client.

Remedy Footprint Evaluation, (*Confidential Client*). Compared the environmental footprints of multiple remedies to determine the relative sustainability benefits and detriments of the various remedies.

Contaminated Soil Treatment Footprint Evaluation, *(Confidential Client)*. Evaluated the vapor emissions profile of two standard and one innovative hydrocarbon contaminated soils treatment method. Evaluation identified areas for improvement in the innovative technology's emission profile.

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Guelph, ON, 2011 – Present

AECOM, Guelph, ON, 2008 - 2009

SHORT COURSES

Conder J., Ghosh U., Lambert M., Vanderkooy M. Passive sampling of Hydrophobic Organic Compounds at Sediment Sites: Practical Advice for Decision-Makers and End-Users. Battelle Contaminated Sediments Conference, New Orleans, LA. January 2017.

Vanderkooy, M., Lambert M., Reible, D., Thompson. R., Caprio, J., Himmelheber, D. Using Passive Samplers for Monitoring Porewater: Applications for Managing Sites Contaminated with Hydrophobic Organic Compounds. Battelle Contaminated Sediments Conference, New Orleans, LA. January 2015.

Vanderkooy, M., Smith, G., Nathanail, P., Kennedy, B. Masterclass: Sustainable Remediation. EcoForum Conference and Exhibition, October 2014, Gold Coast Australia.

PRESENTATIONS

Vanderkooy M., McAlary T. Detecting Small Pipeline Leaks: Vapors, Sensors & Plants. 2015 PRCI Research Exchange Meeting. February 2015. Houston TX. Platform Presentation.

Vanderkooy M., Krug, T., Roberts, J. Evaluation of Powdered vs Granular Forms of Amendments for In Situ Sequestration of Sediment Contamination. Battelle Contaminated Sediments Conference, New Orleans, LA. January 2015. Platform Presentation.

Vanderkooy M., Krug, T., Roberts, J. Advantages of Sustainability and Convergence with Regulatory Trends in Contaminated Sediment Management and Remediation. Battelle Contaminated Sediments Conference, New Orleans, LA. January 2015. Platform Presentation.

Vanderkooy, M., McMaster, M., Wealthall, G., Vidumsky, J. Sustainability Helps Tip the Balance for Selecting Novel Technologies: A Case Study Selecting STAR for a Coal Tar DNAPL Site. Battelle Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds. May 2014. Platform Presentation.

Vanderkooy, M., McAlary, T., Mendoza, C., Moningka, T. Vapor Plume Modeling to Better Understand Viable Remote Sensing Alternatives. 2014 PRCI Research Exchange Meeting. February 2014. Platform Presentation.

Vanderkooy, M., McMaster, M. Evaluating Remediation Sustainability: Does it Matter Which Tool You Choose? Sustainable Remediation Forum Meeting 24. November 2013.

Vanderkooy, M., McMaster, M., Wealthall, Vidumsky, J. Generating Meaningful and Easy-To-Interpret Sustainability Data to Support Decision Making: A Method and A Case Study. GeoMontreal 2013, Geoscience for Sustainability. September 2013. Platform Presentation.

Krug, T., Vanderkooy, M., Dworatzek, S., Hughes, A. Biological Reductive Dechlorination of PCBs in Sediment and Engineered Caps: Applying Lessons from Chlorinated Benzenes and Related Compounds. Battelle Symposium on

Bioremediation and Sustainable Environmental Technologies. June 2013. Platform Presentation.

Vanderkooy, M., McMaster, M., Wealthall, W., Daprato, R., Bartlett, J. Evaluating Remediation Sustainability: Does it Matter Which Tool You Choose? Battelle Symposium on Bioremediation and Sustainable Environmental Technologies. June 2013. Platform Presentation.

AWARDS AND RECOGNITIONS

Best Young Professional Poster Presentation, EcoForum 2014, Gold Coast Australia

Dean's Honors List, University of Waterloo – 2005, 2006, and 2007