Michael Musso

Project Manager

MIke Musso is a Senior Project Engineer with over 20 years of experience in environmental engineering, consulting, and regulatory compliance. He has had hands-on experience with managing site investigations, human health risk and exposure assessments, and remedial design projects, including those with chemical and hazardous and solid waste management operations at industrial facilities. Mike has conducted several remedial investigation/feasibility studies (RI/FSs, including risk assessments; CERCLA and NYSDEC guidance) for soil, sediment, surface water, air, and groundwater investigations and remediation projects which have entailed the identification, screening, and detailed cost estimating of viable alternatives. He has developed detailed conceptual designs and project life cost evaluations for numerous projects.

As part of his technical responsibilities at HDR, Mike has performed baseline human health risk assessments and exposure pathway analyses for industrial, landfill, and proposed re-development sites. His expertise relating to exposure pathway analyses and conceptual site models are often utilized at the inception of many types of projects, and his input is sought in helping determine possible remedial requirements and associated costs/timeframes. He has reviewed and statistically analyzed data from several environmental media, including soil, groundwater, sediment, surface water, air, and soil gas. Portions of risk assessments on which Mike has worked have included the evaluation of vapor intrusion potential using Johnson & Ettinger (EPA) modeling, USEPA VISL calculator, and risk-based corrective action (RBCA) approaches. In addition, he has researched and summarized toxicological profiles (carcinogenic and noncarcinogenic effects of multiple contaminants including VOCs, SVOCs/PAHs, metals, pesticides/PCBs), and is familiar with “equivalence factors” used in assessing PAHs and dioxin. Depending on the level of effort required and contemplated end use of properties, MIke conducts qualitative or quantitative exposure assessments for different future use scenarios at various sites. He has developed site-specific risk-based screening levels and action levels for remediation at several sites based on the acceptable hazard index and carcinogenic risk ($1x10^{-4}$ to $1x10^{-6}$).

Mike has a working knowledge of toxicological and public health aspects of chemical development and use, along with an understanding of applicable state and Federal regulations. He is very familiar with the development and oversight of health and safety programs, and he has much knowledge in field procedures and environmental monitoring activities. He has collected soil, groundwater, and air samples at numerous sites and assembled soil boring, test pit, and monitoring well logs. Mike has prepared sampling methodologies, site characterization reports, and remedial action work plans (including Voluntary Cleanup and BCP projects in New York State, and Act 2 Land Recycling Program sites in Pennsylvania), and has been involved with the preparation of remedial design specifications and contract documents. Mike has also conducted Phase I environmental site assessments at numerous sites in New York and New Jersey. He is very familiar with the development and oversight of health and safety programs, and he has much knowledge in the theory and field procedures associated with industrial hygiene and environmental monitoring activities.

EDUCATION
Master of Science, Public Health, Columbia University, 2007

Master of Science, Environmental Engineering, Rutgers University New Brunswick, 1996

Bachelor of Engineering, Civil Engineering, Villanova University, 1991

ACKNOWLEDGEMENTS
HDR Professional Associate

REGISTRATIONS
Professional Engineer: New York

TRAINING
40-hr OSHA Training for Hazardous Materials Waste Activities;
8-hr Health and Safety Supervisor Training;
RBCA for Petroleum and Non-Petroleum Chemicals (3-day course at ASTM Headquarters);
NJDEP Subsurface Evaluation Certification for Underground Storage Tanks (USTs);
5-day Short Course: Hierarchical/Multi-objective Approach in Water Resources Planning and Management (University of Virginia); Program on Addressing Mold and IAQ Problems (1-day short course);
MCACES, 2nd Generation

(MII) Basic Training (3-Day course given by Project Time & Cost, Inc.); November 2008
Ecological Risk Assessment: Practice and Protocols (April 2008), Rutgers University (2-day course)

INDUSTRY TENURE
23 years

HDR TENURE
16 years

LECTURE EXPERINECE
NYWEA: Persistent, Bioaccumulative, and Toxic Compounds (PBTs). December 12, 2001.

NYWEA/AWWA: Human Health
Aspects of Pathogenic Protozoans Emphasizing *Cryptosporidium*. February 28, 2001.

Rockland County Municipal Planning Federation. *Cell Tower symposium*. November 26, 2007.

2009 Conference on Design and Construction Issues at Hazardous Waste Sites. *Overcoming Project Cost Uncertainties through Risk Analysis and Management Tools*. April 14, 2009.

2010 Green Remediation Conference (Amherst, MA). *Transparency in Selection of Sustainable Remedies.* June 17, 2010.

ACADEMIA
Adjunct Instructor, Columbia University (2009 – present): Mailman School of Public Health; School of International and Public Affairs. *Risk Assessment & Toxicology*

Topics: Arsenic (cost-benefit of treatment and

RELEVANT EXPERIENCE

Site 32 HHRA – Treasure Island
San Francisco, CA
Mike performed baseline human health risk assessments and exposure pathway analyses for this former U.S. Navy site in compliance with Navy, State (OEPA) and USEPA requirements (RAGS). The work was conducted on behalf of the U.S. Navy for an approximate 4.5 acre parcel ("Site 32") on Treasure Island (former Naval Base located in San Francisco, California). Mike evaluated exposure scenarios for adult and child residents along with commercial/industrial workers and construction workers for different environmental media. He characterized levels of cancer/non-cancer risks for all identified human receptors in current and future land use scenarios. Dermal, ingestion, and inhalation pathways were evaluated. Inhalation pathway assessments including the implementation of vapor intrusion and open trench volatilization models. Mike also conducted the overall uncertainty analysis for this HHRA. The TI Site 32 risk assessment work will be used in the ultimate remedy selection process for appropriate risk management at the site.

USEPA Region 2 RAC – Gowanus Canal RI/FS
Brooklyn, NY
Mike served as HDR's project manager for the Remedial Investigation/Feasibility Study (RI/FS) for the Gowanus Canal Proposed Superfund Site under the Region 2 Remedial Action Contract. The Gowanus Canal is a 1.8 mile controlled waterway that has been the receiving water of centuries of industrial, stormwater, and combined sewer overflow (CSO) pollution. As part of the RI activities, the following field investigations were conducted:

- Bathymetric survey
- Sediment sampling (to support risk assessment and remedy screening)
- Surface water sampling
- Air sampling
- Fish and crab sampling
- Sediment core sampling
- Sampling at CSOs and other outfalls
- Groundwater sampling and water level measurements

USEPA Region 2 RAC – Peninsula Boulevard RI/FS
Nassau County, NY
Mike served as the project manager for the Peninsula Boulevard Groundwater Plume Superfund Site in Nassau County, NY. Aspects of the project have involved human health risk assessment, screening-level ecological risk assessment (SLERA), community involvement, and coordination/review of field activities. Mike reviewed alternate groundwater sampling approaches, such as multilevel wells and continuous multi-channel tubing (CMT) wells.

Shenandoah Road Superfund Site – Risk Assessment
HDR worked closely with Groundwater Sciences Corp. (GSC) to complete human health and ecological risk assessments for the client. Mike was the lead on the baseline human health risk assessment (BHHRA) deliverable, and also assisted with the Screening-Level Ecological Risk Assessment (SLERA) for the site. The BHHRA included statistical analysis of data; identification of COPCs (screening chemical concentrations in media against USEPA RSL values); establishment of exposure parameters; evaluation of toxicological parameters for COPCs (including mutagens); risk characterization; and uncertainty analysis. HDR completed

risk reduction). 2001, 2002; 2010.

Risk Assessment Course: Overview of Risk-Based Corrective Action (RBCA) 2000.

sediment and surface water sampling and data interpretation for an area downgradient of the source, where groundwater was noted to be daylighting. Mike participated in project meetings with the USEPA, NYSDEC, and the Client, and prepared data summaries against established human health and ecological benchmarks.Mike also performed community outreach by meeting with homeowners to discuss technical information on the site.

NYSDEC Standby State Superfund Contract - Inspection and Monitoring (I&M) of Subslab Depressurization (SSD) Systems

Statewide, NY

Mike is the project manager for this statewide SSD System I&M program that consists of inspecting and monitoring over 400 systems across the State. He is responsible for managing major subtasks, including work plan development, routine I&M, non-routine maintenance, annual reporting, and assistance with NYSDEC data transfer and databasing. He coordinates and manages public communication, subcontractor procurement and management, staff training, and detailed financial tracking. Mike prepares periodic program updates to NYSDEC. The total project cost is approximately $500K (7 years).

New Cassel Industrial Area (NCIA) – Human Health Risk Assessment for Off-Site Groundwater

Mike conducted a human health risk assessment on behalf of a work assignment from the USACE to evaluate off-site (downgradient) groundwater and justify remedial action. As part of the HHRA, groundwater data was evaluated in terms of aquifer and sampling methods, and statistical evaluation was performed to identify target COPCs (ProUCL software). Multiple exposure pathways were evaluated, including direct ingestion, dermal contact, and inhalation (via showering / bathing, and qualitatively via a potential vapor intrusion pathway). The HHRA was completed in accordance with USEPA guidance. TCE and PCE were COCs evaluated in the HHRA for this site.

Grand Traverse Overall Supply site (GTOS) HHRA – Michigan, USEPA Region 5

Mike performed QA/QC reviews on several aspects of the Sullivan risk assessment. He assisted Sullivan with confirming exposure pathways to be included in HHRA. He formulated questions and clarifications to USEPA Case Manager. Mike reviewed portions of HHRA report text and tables for accuracy and presentation. He helped develop risk models for surface water ingestion (recreators) and human fish ingestion.

NYCDEP, Water Quality Risk Assessments for Kensico Action Plan

Mike scoped and conducted four (4) water quality risk assessments for land uses in the Kensico watershed. The studies were conducted on behalf of NYCDEP to support filtration avoidance determinations. Focused assessments included: Westchester County Airport (general audit of environmental practices, chemical uses, and stormwater runoff); Turf Management practices in a specific sub-basin (administer residential chemical use survey, interpret data, coordinate conservative model for the herbicide 2,4-D); and an office park in the watershed (audit of operations and compliance).

Lehigh Valley Industrial Park (LVIP)

Mike supported site re-development activities at the LVIP campus by interpreting environmental data, and completing land use reviews and human health exposure

assessments. If required, quantitative analyses were provided. The re-development proposals were reviewed by PADEP under the Act 2 Land Recycling Program and USEPA Region 3.

The Related Companies

Staten Island, NY

Mike performed human health exposure assessments for baseline condition (abandoned oil refinery) and future use scenarios (NASCAR Raceway, Open Space park, Retail, and Warehousing). Identification of contaminates of concern in soil, groundwater, and soil gas, using project-specific standards and guidance (soil: NYSDEC RSCOs, EPA RBCs, EPA draft Vapor Intrusion Guidance; groundwater: NYS Class GA standards, EPA draft Vapor Intrusion Guidance; soil gas: EPA draft Vapor Intrusion Guidance and modeling based on J&E, actual geology, and anticipated attenuation factors given different end uses). Mike conducted and reviewed statistical calculations of soil background levels while identifying potential contaminants of concern (PCOCs) for the project. He assessed exposure frequencies and durations on on-site workers (field, office), spectators and other recreators (based on contemplated race events), and retail customers. Literature, raceway statistics, and EPA Exposure Factors handbooks were consulted to develop mean exposure scenarios.

The findings from the exposure assessments were presented to NYSDEC Region 2 and used to prescribe hot-spot soil remediation, vapor control in buildings, and to evaluate final ground cover options. Mike was involved in the conceptual design and costing of methane control alternatives along with VOC vapor intrusion options (vapor barriers, active/passive sub-slab venting).

Environmental Services including Operation, Maintenance and Monitoring (OM&M) of on-site water treatments system (Private Client; Active Private School Site, NYC – Ongoing)

New York, NY

As part of a voluntary cleanup project (NYSDEC Region 2), Mike has managed all environmental items during property transfer and construction of a new private school in Manhattan. He collected split samples and performed oversight of the PRP agents, and evaluated the need for vapor intrusion control due to residual contaminant levels in the subsurface. He was also asked to participate at school board meetings and community board meetings in Manhattan on behalf of the project. As part of on-going activities since the school construction was completed, Mike has provided design and OM&M services to an active water treatment unit at the site. He has obtained all necessary NYC discharge permits on behalf of the client and actively manages OM&M activities. Environmental auditing and exposure assessment continue at the school (indoor air testing with Summa canisters [TO-15 analysis]; HVAC reviews), under the Site Management Plan developed by Mike.

New York City School Construction Authority (NYCSCA) Environmental Services Term Contract

New York, NY

Mike served as program manager for the NYCSCA Environmental Services term contract. As part of his responsibilities, he coordinated over 20 projects throughout the New York City Boroughs, ranging from Phase I/II due diligence and property assessments, to vapor intrusion studies, contractor specification reviews, conceptual design and screening of remediation options, remedial action review and oversight, and public participation/risk communication. Mike was responsible for all staffing and

scheduling, and created project scopes and budgets. He also participated at public hearings on behalf of NYCSCA.

Mirant, Lovett Power Generating Facility Decommissioning Project
Stony Point, NY
Mike is serving as the project manager for numerous “on-call” tasks to support environmental review and compliance during the 2.5-year demolition project. He is working closely with the client representatives, demolition contractor, and the NYSDEC. Tasks on which Mike has directed or been involved with have included: RCRA inventory of hazardous materials (pre-demo); Army Corps of Engineers permit applications for in-water work; sampling of tiles to support Beneficial Reuse of demolition materials as fill (obtained approval from NYSDEC); reviewed existing environmental data and prepared range of remedial options and associated costs; WWTP decommissioning; preparation of stormwater pollution prevention plan (SWPPP), including updates an modifications based on evolving site conditions and evaluation of SWPPP measures; prepare Site Characterization Work Plan and investigatory approaches to assess subsurface contamination.

NYSDEC Multi-Site Preliminary Assessments
As project manager for eight Preliminary Site Assessment (PSA) sites under a NYSDEC work order, Mike managed all field activities, personnel, and subcontractors related to the work. Sites included a mix of industrial facilities with various histories of chemical uses and discharges, including freons, PCE/TCE (solvents and dry cleaning fluids), pesticides (from on-site manufacturing), metal plating, and illegal solid waste disposal. Mike maintained close contact with the NYSDEC case manager, coordinated site access for field work, and prepared the final PSA decision-making forms and reports detailing the findings, conclusions, and recommendations.

NYSDEC Standby State Superfund Contract (D006129) - Feasibility Study: Former Raeco Products Site,
Rochester, NY
Mike is currently managing the feasibility study for the former Raeco Products site. The project has entailed a detailed review and interpretation of all pre-existing environmental data; identification of major areas of concern (AOCs) for VOC, SVOC, and metals contaminants in surface soil, subsurface soil, soil gas / indoor air, and groundwater; identification and screening of viable remedial alternatives for the contaminants and media of concern; development of conceptual costs for remedial alternatives; assistance with Proposed Remedial Action Plan (PRAP) development. The total project cost was $50K.

Former Salina Landfill Human Health Risk Assessment
Salina, NY
Mike performed the baseline human health risk assessments and exposure pathway analyses. As part of this effort, he reviewed and analyzed data from several environmental media; researched the toxicological profiles (carcinogenic and noncarcinogenic effects) for numerous contaminants; evaluated the exposure scenarios for different environmental media; and characterized levels of risks for various human receptors in current and future land use scenarios. Mike also coordinated with the ecological risk assessor for this project, by sharing data interpretations and reviewing EPA methodologies.

Wireless Telecommunication Facility Reviews

Ongoing, Multiple NYS Municipal Clients, NY

Mike serves as the HDR program manager for wireless telecommunications facility siting projects on behalf of several NYS municipalities. He has been project manager for upwards of 150 wireless facility siting efforts for over 25 municipalities in NY State. Responsibilities have included the technical reviews of applications for completeness (FCC, local codes); assessment of coverage and capacity information; analysis of health and safety criteria relating to non-ionizing electromagnetic radiation; coordination of field surveys and visual impact analyses; and participation at public meetings. Mike has reviewed wireless telecommunication facilities (code/ordinance items, analysis of decommissioning procedures, inventory and inspection of sites) and developed and managed wireless locational plan studies for the Village of Sleepy Hollow and the Town of Clarkstown, NY. A key issue with wireless telecommunication facility projects involves the real and perceived issues of radio frequency emissions at base stations (cell towers, roof top installations). Mike completed a three-day training course (Narda) in health & safety and assisted with reviewing emission calculations and field measurements.

Ikea Retail Site

Brooklyn, NY

As part of the work HDR performed on behalf of an attorney for Ikea, Mike evaluated soil and sediment data and assisted with the preparation of a Work Plan and Clean-up Agreement under the NYSDEC's Brownfields Clean-up program. Data interpretations included statistical review and correlation of on-site soil data and near-shore sediment data from the Hudson estuary. Areas of Concern (AOCs) were identified to address soil and groundwater contamination.

Remediation of Soils impacted by Mercury, Confidential Multiple Client

Westchester County, NY

Mike managed follow-on assessment and clean-up of residual mercury contamination at a former battery manufacturing facility. Geoprobe delineation sampling was conducted around two hot-spot areas, and in-situ stabilization / solidification was selected as the viable remedy for the contamination. Mike coordinated pilot testing of stabilization mixes, and coordinated the contractor during field operations that included stabilization / solidification of one of the hot-spots and excavation with off-site disposal for the second hot-spot. He was also involved in the planning of site re-development, and provided input on potential health and safety issues for the re-development contractors.