



**Michael W. Kierski, Ph.D.**  
**Managing Scientist**

**Professional Profile**

Dr. Michael Kierski is an environmental biologist and toxicologist who provides senior-level expertise in human and ecological risk assessment and evaluation of complex environmental problems. Over the past 24 years, Dr. Kierski has evaluated risks associated with chemicals in air, soil, water, sediment, and biota to both people and the environment. He brings specialized expertise on the fate and effects of metals such as lead, hydrocarbons such as benzene and polycyclic aromatic hydrocarbons (PAHs), synthetic organic chemicals such as PCBs, pesticides, chlorinated solvents, and explosives.

Much of Dr. Kierski's work is directed toward the evaluation, remediation, and redevelopment of contaminated properties. This requires not only technical expertise but also an ability to work with regulatory agencies at the state level (e.g., in Indiana, Wisconsin, Iowa, Illinois, Michigan, New York, North Carolina, New Jersey, etc.) and at the federal level (EPA, U.S. Fish and Wildlife Service, and the Department of Defense). Dr. Kierski's primary clients include electric and gas utilities, chemical companies, the Department of Defense, law firms, and other environmental and engineering companies. Dr. Kierski is often called upon to represent these clients in public and regulatory forums.

Dr. Kierski has extensive training and practical experience in the areas of environmental toxicology, environmental biology, and environmental chemistry, which he has used to develop scientifically defensible approaches for the risk evaluations he has performed. He has utilized this experience within a wide variety of risk assessment projects, tailoring each assessment to the particular needs of his clients. He has emphasized practical applications of risk assessment techniques on projects over his career, using innovative techniques as needed to meet his client's specific needs.

**Academic Credentials and Professional Honors**

Ph.D., Environmental and Occupational Health, University of Minnesota, 1992  
B.A., Environmental Biology, St. Mary's College of Minnesota, 1984

## **Publications and Presentations**

Menzie CA, Ziccardi LM, Lowney YW, Fairbrother A, Shock SS, Tsuji JS, Hamai D, Proctor D, Henry E, Su SH, Kierski MW, McArdle ME, Yost LJ. Importance of considering the framework principles in risk assessment for metals. *Environ Sci Technol* 2009; 43(22):8478–8482.

Menzie C, Kierski M. Begin with a vision: Integrating assessment, remediation, and NEBA within management goals. 30<sup>th</sup> Annual Meeting, Society of Environmental Toxicology and Chemistry, New Orleans, LA, November 2009.

Kierski M. A multi-site RI/FS framework approach for 30 MGP sites in Region 5. USEPA ERAF and TSERAWG Joint Winter Meeting, January 2009.

Kierski M, Menzie C, Carroll C. Dinitrotoluene and Di-n-butylphthalate exposure and effects evaluation for birds at Badger Army Ammunition Plant. 28<sup>rd</sup> Annual Meeting, Society of Environmental Toxicology and Chemistry, Milwaukee, WI, November 2007.

Kierski M, Menzie C, Ferguson E. Soil lead risk for grit ingesting birds: A simple methodology to estimate the number of grit size lead particles in soils and sediment. 28<sup>rd</sup> Annual Meeting, Society of Environmental Toxicology and Chemistry, Milwaukee, WI, November 2007.

Clarkson J, Glaser S, Kierski M, Thomas T, Gaccetta J, Campbell C, Orton C, Wright M, Longgoni G, Kwok A. Application of risk assessment in different countries. In: *Assessment and Management of Environmental Risks*. Linkov I, Palma Oliveria JM (eds), Kluwer, Amsterdam, 2001.

Kierski MW. The bioavailability of soil-lead in the weanling rabbits. Doctoral Thesis, University of Minnesota, Minneapolis, MN, 1991.

Kierski MW. A new way to wring savings from cleanups. *Pollution Engineering* 1994, April.

Kierski MW. Ecological risk assessment challenges: weighing the need for action in light of uncertainty. Tri-Services Toxicology and Risk Assessment Conference, Dayton, OH, April 2005.

Kierski M, Frank J, Ferguson E. Bioaccumulation of metals and explosives from soil into earthworms – a risk assessment case study. 23<sup>rd</sup> Annual Meeting, Society of Environmental Toxicology and Chemistry, Salt Lake City, UT, November 2002.

Kierski M. 2000. Perspectives on risk assessment At River Valley School in Marion, Ohio. New England Water & Environment Association, Annual Conference, December 2000.

Kierski M. The bioavailability of soil-lead. Society for Risk Analysis, Annual Conference and Exposition, December 1994.

Kierski M. Introduction to health risk assessment and exposure assessment modeling. Course Instructor, multiple locations during 1994 for General Science Corporations, Environmental Modeling Training Division, 1994.

Kierski M. Introduction to health risk assessment. University of Wisconsin-Madison, Environmental Toxicology Center Colloquium Series, Fall 1993.

### **Prior Experience**

Senior Environmental Scientist, Menzie Cura and Associates, 2005–2006

Managing Environmental Scientist, MWH Americas, Inc., 2001–2005

Senior Environmental Scientist, MWH Americas, Inc., 1989–2001

Environmental Scientist, J.B. Stevens & Associates, Minneapolis, MN 1987–1989

### **Project Experience**

Currently managing a multi-year project for EPRI to develop a relative risk model to address the human health, environmental, and financial consequences of chemical releases from aging electrical transmission and distribution equipment. When completed, the model will be used to provide a broad means of prioritizing risk management decisions related to chemical releases resulting from the electrical transmission and distribution infrastructure.

#### *Select Manufactured Gas Plant Related Risk Assessment Projects*

Assisted in the development of a risk assessment framework (RAF) document for a utility client. The RAF document was developed to provide a consistent framework for performing human health and ecological risk assessments for up to 30 MGP sites in Wisconsin and Illinois that will be addressed under the Alternative Superfund Program within EPA Region 5. Provided technical assistance in developing remedial investigation work plans at ten of the thirty sites thus far, and managed the baseline risk assessments for two of these sites. For ten of these Chicago River sites, developed a relative risk ranking scheme to help prioritize the investigations.

Performing the baseline risk assessment for MWH Americas, Inc., at a former MGP site that is currently a city park in Ripon, Wisconsin. The ecological component of the risk assessment has included sediment toxicity testing to better define whether sediment might require remediation.

Performed a benthic invertebrate survey on the Fox River, Illinois, associated with past releases from an MGP facility. At this site, also managed a mussel relocation project as part of the sediment investigation. Currently preparing the sediment evaluation report for the Site.

Developed a guidance document to help adopt a consistent approach for performing surface water and sediment investigations at MGP sites in Iowa, on behalf of MidAmerican Energy Corporation. This document was used by IDNR as a guidance document on some of MidAmerican's MGP site evaluations. Worked with IDNR staff to develop the guidance document.

Managed the preparation of a surface water and sediment sampling work plan for an MGP site, and implemented the work plan for a State-led site in Des Moines, Iowa. A two-phase evaluation was performed in 2003 and 2004. The first phase evaluated surficial sediment PAH concentrations, and the second used barge-mounted drilling techniques to sample subsurface sediments in the river. A screening-level ecological risk assessment was performed in 2005 to show that no additional ecological risk assessment was need at this site, which was approved by IDNR on the first submittal. Forensic techniques were used to fingerprint the source of the PAHs.

Managed the preparation of a surface water and sediment sampling work plan related to an MGP investigation, and implemented the work plan within a three-month period in 2002 for a State-led site in Cedar Rapids, Iowa. This evaluation was used to perform a streamlined screening-level evaluation to show that no additional ecological risk assessment was needed at this site.

Performed a qualitative biological assessment in 2005 in the Cedar River, Iowa, adjacent to an FMGP site, and prepared a screening-level ecological risk assessment. Based on the combination of the SLERA and the biological assessment, recommended no further action for the Cedar River, which was accepted by the IDNR.

Performed a risk assessment for an MGP site located along the Mississippi River in Clinton, Iowa, to address potential human health and ecological concerns associated with metals and PAH contamination at the site under current site conditions and likely future land-use conditions. Supported the development of PAH and lead remediation goals for the site closure in 2005.

Performed a preliminary human health risk evaluation for portions of an MGP site in Ripon, Wisconsin, associated with metals and PAH contamination while working for others. Developed responses to WDNR comments on previous sediment investigations, provided a reanalysis of the sediment data for a surface water body adjacent to the site, and provided a framework for moving forward with the sediment evaluation to address issues related to human health and the environment.

### *Selected Ecological Risk Assessment Experience*

Currently managing the baseline ecological risk assessment (BERA) for the settling ponds and spoils disposal area site at the Badger Army Ammunition Plant, Baraboo, Wisconsin, which involves extensive interactions with the WDNR and the Restoration Advisory Board (RAB). Re-evaluated the ecological risks associated with the site to assess the spatial scale of the area of ecological concern. Developed an ecological risk assessment work plan for additional ecological field studies. Used the resulting data to develop a draft BERA for the site, which includes unique studies to evaluate the effects of certain explosives-related chemicals on the reproduction of birds. Currently updating the BERA based on regulatory comments.

Currently managing a review of the health implications of spent lead ammunition to human and ecological health. This review is addressing a number of exposure scenarios relevant to both humans and wildlife. A critical review of the literature is being completed to better understand the potential risk associated with spent lead ammunition and identify additional areas of research.

Performed and managed human health and ecological risk assessment–related projects since 1998, at the former Marion Engineering Depot (MED) and Scioto Ordnance Plant (SOP) sites in Marion, Ohio. Conducted the baseline risk assessment for OU1 (River Valley School Site), as well as numerous ecological evaluations at other MED and SOP sites. Currently completing ecological evaluations for five sites at the former installation, and the streamlined risk evaluation (SRE) for three sites where engineering evaluation/cost analyses (EE/CAs) are being performed.

Currently managing the SLERA for the Explosive Ordnance Demolition Range Area (EOD Area) at the former Kincheloe Air Force Base (KAFB) in Kinross Township, Michigan. Past operations at the EOD Area have led to mercury contamination of a spruce/tamarack bog. The initial screening evaluation determined that methylmercury may pose an ecological concern to wildlife. Led a field effort to collect site-specific data on concentrations of methylmercury in prey, to better evaluate the risks to wildlife.

From 2001 to 2006, worked on risk assessments at the Jefferson Proving Ground (JPG) in Madison, Indiana. Managed the finalization of the base-wide human health and ecological risk assessment for the JPG site in Madison, Indiana. Served as the lead risk assessor in negotiations to address regulatory comments on the risk assessment from multiple agencies. This work involved additional risk-based evaluation at Site 11 in 2005 and 2006, as part of pre-design stages of the project.

Managed project task to help the USACE develop more defensible remediation goals for soils at the Joliet Army Ammunition Plant in Joliet, Illinois, in a portion of the site being developed as the Midwein National Tall Grass Prairie. Conducted detailed literature reviews of plant toxicity, and synthesized the information to develop a more reasonable remediation goal based on plant toxicity. Used the results of the remediation goal development in negotiations with the management team at the Plant to ultimately select soil remediation goals for the site.

Managed a \$2.0 M ecological assessment for the Mississippi River backwater habitats associated with the Open Burning Ground (OBG) at the Savanna Army Depot in Savanna, Illinois, which used multiple lines of evidence to evaluate potential ecological effects. Led an ERA Working Group composed of environmental scientists, stakeholders, and regulators, which won a USACE Chief of Engineering Merit Award for their work on this project. Managed a group of environmental statisticians who performed state-of-the-art analyses on the environmental data and toxicity data collected. Multiple regression analyses were used to look at combined effects of both metals and explosives contaminants. Reverse hypothesis testing was performed to determine whether a particular area could be considered clean. Performed multiple toxicity and bioaccumulation tests to supplement the Tier I analysis that was conducted previously for metals and explosives contamination associated with the OBG.

On behalf of United States Coast Guard, developed a work plan in 2004 in conjunction with the USFWS and WDNR to perform a screening-level ecological risk assessment for this lead-contaminated island off the Door County Peninsula in Wisconsin. Performed a biological assessment in conjunction with the USFWS to evaluate tissue lead concentrations in herring gull chicks, and the presence of lead paint chips in the gastrointestinal tracts of the birds. Lead tissue concentrations were below WDNR guidelines, and site closure has been conditionally provided by WDNR.

Performed a screening-level ecological risk assessment for MWH America's, Inc., in Camp Bullis, Texas, for the sediment and surface water data collected within Final Creek. Assisted MWH and the Army in developing an ecological risk assessment strategy for this landfill site, which was contaminated with chemical warfare agents. Provided strategy and technical support to MWH in development of the ecological risk assessment field investigation work plan. Provided a peer review for a screening-level ecological risk assessment developed by other contractors on behalf of the USACE and MWH.

Performed a small-mammal survey of selected explosives- and metals-contaminated sites within the Joliet Army Ammunition Plant in Joliet, Illinois, and compared the results to reference areas. The statistical study design incorporated the results of a pilot study that was performed at selected investigative and reference sites. Results of the small-mammal survey were used in part to verify whether the theoretical ecological remediation objectives for the site were realistic.

Acted as technical advisor and editor on the Base-Wide Ecological Risk Assessment for the Iowa Army Ammunition Plant in Middletown, Iowa. Assisted in client and regulatory negotiations on the scope of the BERA, and provided peer review of the work products.

#### *Selected Natural Resource Damage Assessment Experience*

Managed the benthic invertebrate investigation performed as part of an NRDA for a refinery site on the East Coast. Prepared a work plan, managed the field investigation, and wrote a report of the results. The investigation included an extensive evaluation of the benthic invertebrate population in the multiple aquatic habitats (both freshwater and marine) at the refinery and comparable reference stations.

Performed a critical review of freshwater fish community data collected by others associated with an NRDA claim in the southwest United States, and provided an independent reanalysis of the data. The fish evaluation considered a variety of factors, including watershed characteristics.

#### *Selected Human Health Risk Assessment Experience*

Currently performing a focused risk assessment of a contaminated-groundwater site at the Duluth Air National Guard Base in Minnesota, on behalf of MWH Americas, Inc. Main issues

of concern are the potential for vapor intrusion into office space, and discharge of contaminated groundwater to an adjacent wetland and trout stream.

On behalf of USCG, developing soil lead remediation goals for this historical lighthouse on Passage Island, Michigan, which is part of the Isle Royale National Park. Developed the soil lead remediation goals based on the site-specific land-use scenarios that are afforded by this unique island site.

Evaluated the distribution of lead in soils surrounding a battery manufacturing facility, and the background levels of lead in soils in the City of Milwaukee, based on research that had been completed by others and monitoring performed by the City. Provided toxicological support when dealing with WDNR and the City of Milwaukee Health Department concerning the health implications of the soil-lead concentrations in areas near the facility. Performed site-specific evaluations of the potential for chemical vapors to be transported into residences near a former facility.

Developed a human health and ecological risk assessment for the former Marion Engineering Depot, River Valley Schools, in Marion, Ohio, focused on health concerns associated with a former Department of Defense disposal area onsite. The primary contaminants detected at the site are polycyclic aromatic hydrocarbons and chlorinated solvents. However, dioxins and dibenzofurans were a public health issue that needed to be addressed because of public concerns. Developed risk assessment work plans, negotiated with regulatory agencies, and presented at Restoration Advisory Board meetings.

Conducted a human and ecological risk assessment for a reach of the South Branch of the Shiawassee River, Howell, Michigan, that had been contaminated with PCBs containing oils. Performed the transport-and-fate analysis of PCBs in the riverine environment, including bioaccumulation of PCBs in fish.

Conducted a human and ecological assessment of a former industrial facility along the North Branch Canal in downtown Chicago. The primary chemicals of concern were PAHs, PCBs, and petroleum-related volatile organic compounds. The risk assessment followed a tiered risk-based corrective action (RBCA) approach to streamline the risk assessment process. Transport modeling was performed to predict the potential for impact to the canal.

#### *Selected Risk-Based Closures*

Developed a risk-based remediation strategy for a development site in Muskego, Wisconsin, to address residual concentrations of PAHs in soils that had been placed during the first phase of redevelopment. The strategy involved incorporating soils with residual PAHs above residual contaminant levels in areas of the development where exposure could be more effectively eliminated. The risk-based strategy was developed in conjunction with the WDNR and WDHFS and jump-started the development process, which had been stalled for over a year.

Managed the environmental closure of the former American Milk Producers (AMPI) site in Coon Valley, Wisconsin, which had residual levels of petroleum hydrocarbons and PCBs.

Managed a supplemental investigation of the site to evaluate the distribution of PCB-contaminated soils at depth. Negotiated the scope of the remedial action work plan with the WDNR and EPA. Used the results of the supplemental investigation and a focused qualitative human health risk assessment to support a remedial action that focused on the removal of surficial soils, rather than excavation of deeper soils.

Managed the detailed design for the closure of a gypsum pile in Morris, Illinois. Using a combination of risk assessment and risk management concepts, successfully negotiated with the IEPA to close this RCRA site using a novel vegetative-cover concept for the gypsum waste area. Past tasks on this project include a human and ecological risk assessment for the GPA, a fish study to evaluate bioaccumulation of PAHs, and metals analysis in adjacent fishing ponds. Used the tissue data in the risk assessment to estimate site-specific exposure under a recreational use scenario.

Managing the remedial design portion of the Remedial Design/Remedial Action for 13 former subsurface transformer vaults at the Savanna Army Depot in Savanna, Illinois. Work included developing work plans, managing the field/pilot study investigations, developing remedial design documents, and working with construction personnel to implement the design. Oversaw development of construction completion report for remedial action work.

As part of a litigation project, managed a lead investigation and abatement project at a commercial facility in Wisconsin. Included development of a work plan, delineation of lead contamination associated with a sand-blasting operation, oversight of lead abatement performed by a subcontracted firm, preparation of investigation reports, and negotiation of closure with the WDNR.

#### *Additional Selected Project Experience*

Managed the field investigation of a former military firing range in Ino, Wisconsin, including client contact, development of work plans in conjunction with WDNR and USFWS staff, and development of a technical memorandum summarizing the investigation results. Developed alternative cleanup levels for lead-contaminated soils, which were ultimately used in the Feasibility Study to define limits of contamination.

Performed human health and/or ecological risk assessment at a number of NPL sites in Wisconsin, including the Fadrowski Drum Disposal Site, Janesville Ash Beds, Janesville Old Landfill, Wheeler Pit Landfill, Hagen Farms, and Spickler Landfill.

Prepared sediment sampling and screening-level ecological evaluation work plan, and implemented the work plan within a 3-month period in 2002 at a former electronics plating operation in Lisbon, Maine. The purpose of the assessment was to support removing the site from the CERCLIS list. Performed a sediment investigation to better define the horizontal and vertical extent of metals sediment contamination in the Sabattus River. The investigation also included a benthic invertebrate survey to support an ecological risk assessment.

Managed the human health and ecological risk assessment for the Ballfield Site, located adjacent to Onondaga Lake in upstate New York. Developed the strategy for the human health and ecological risk assessment and negotiated the work scope for the BERA with NYSDEC. Performed a screening-level ecological risk assessment, and currently awaiting comments on the Baseline Ecological Risk Assessment Problem Formulation Document.

Developed a work plan for evaluating the ecological risks associated with historical biphenyl releases to a watercourse leading to the James River in Chesterfield, Virginia. Performed a sediment and surface water investigation, and a qualitative biological survey.

Performed a Tier II human health risk assessment for a former petroleum oil and lubricant yard and vehicle maintenance area at the 162nd Fighter Wing of the Arizona Air National Guard, located at the Tucson International Airport.

Performed a qualitative benthic invertebrate assessment at a battery manufacturing facility in Middletown, Delaware, to support a finding of no further need for ecological assessment. Conducted a stream water quality study to assess the relative bioavailability of lead in stream sediment and surface water. These assessments were considered sufficient to satisfy EPA Region III that additional ecological risk assessment was not required.

Prepared and negotiated a work plan for a modified risk assessment approach to meet the client's desire to perform an expedited remediation at a battery manufacturing facility in North Carolina, and avoid doing a protracted ecological risk assessment. The primary contaminant of concern was lead. EPA Region IV originally wanted a full baseline risk assessment (including ecological risk assessment) for the site, but a much-streamlined version of a baseline risk assessment was negotiated. Performed a focused BERA that included sediment toxicity testing. This evaluation was used to support a finding of no further action in a wetland area adjacent to the site.

Oversaw the preparation of a screening-level ecological risk assessment within a stormwater retention basin (PCBs and PAHs) at the Willow Grove Air Reserve Station. The assessment was considered sufficient for taking action, because the impoundment was slated for closure anyway, and there was a need to reconfigure the drainage at the installation.

Conducted a human health evaluation of the Blackwell Landfill NPL site in Warrenville, Illinois, which included multiple contaminants and exposure pathways. Conducted an exposure assessment survey of site visitors and employees to determine site-specific exposure factors, which were used to develop more realistic health risk estimates.

Oversaw the evaluation of past ecological risk assessment work to determine whether there was a need for further sampling of fish tissue from Waste Management Zone 2 at Pease Air Force Base in New Hampshire. Recommended that no further fish tissue sampling be conducted at Zone 2.

Developed the human health and ecological risk assessment work plan for the remedial investigation of a former landfill and burn area at Scott Air Force Base in Illinois. Performed internal technical review on the draft final baseline risk assessment.

Performed a screening-level risk assessment for groundwater contamination that has migrated off an appliance manufacturing plant in Faridabad, India. Risk assessment considered site-specific factors of transport and fate of contamination, as well as cultural differences that would affect exposure to the groundwater.

Prepared streamlined risk evaluation for a dinitro-*o*-cresol (DNOC) disposal area at the Savanna Army Depot in Illinois. The streamlined risk evaluation factored in both human health and ecological concerns associated with the disposal area.

Conducted a human health and ecological risk assessment for the Blackhawk Facility NPL site in Rockton, Illinois. The primary contaminants of concern were chlorinated solvents that were detected in groundwater downgradient of the site.

Conducted a PCB investigation of a wetland at an American Chemical Services NPL site in Griffith, Indiana, that had received PCB-containing wastewater. EPA requested biological testing to determine whether the sediments would be a concern to ecological receptors, because of PCB's potential to bioaccumulate. Assessed the extent of PCB contamination and presented a technical argument to EPA, to defend the position that the limited extent of the PCB contamination did not warrant performing biological testing.

Conducted an ecological assessment for the U.S. Army depot in Tracy, California. The chemicals of potential concern included a variety of organic and inorganic contaminants. Conducted a multipathway risk assessment that included trophic-level modeling of chemical transfer. Estimated health risks for both terrestrial and aquatic receptors in a number of areas on the depot.

Conducted an ecological risk assessment for the riverine environment adjacent to a former manufacturing site in Indiana. Predicted the amount of chemical transport to the Eel River, and potential health consequences to aquatic organisms.

Conducted a human health and ecological assessment for the State Disposal Landfill NPL site in Plainfield Township, Michigan. Used a streamlined risk assessment approach, because the landfill was to be remediated under a presumptive remedy. This resulted in cost savings to the client and facilitated agency approval of the risk assessments.

Conducted an ecological assessment for a wetland affected by the Sunrise Landfill in Gaylord Township, Michigan. The results showed that levels of contamination should not pose an ecological health concern. Performed a feasibility study risk analysis to quantitatively distinguish the worker risks associated with each remedial alternative.

Conducted a transport-and-fate analysis and health risk assessment for a service station site in Madison, Wisconsin. The results were used to negotiate a reduced scope of work with WDNR.

Conducted a simple transport-and-fate analysis at a metal recycling facility in LaCrosse, Wisconsin, to develop soil cleanup levels for tetrachloroethene. The soil cleanup level was used to negotiate a finding of no further action for the residual tetrachloroethene-contaminated soil.

Developed a risk-based approach for Wayne Reclamation & Recycling, Inc., in Columbia, Indiana, for developing cleanup objectives for soil and groundwater as part of the RD/RA. Used a transport-and-fate model to develop more realistic and achievable soil cleanup objectives for volatile organic compounds.

Developed a risk-based approach for determining whether service station sites in Michigan pose a health concern. Conducted transport-and-fate modeling as an integral part of each risk assessment to define contaminants' migration potential.

Conducted an ecological assessment for the American Chemical Services NPL Superfund site in Griffith, Indiana. Developed a method to rank chemicals by their potential to cause health risks by accounting for their toxicity, chemical concentration, mobility, and bioconcentration potential. Used this method to focus the ecological assessment on particular chemicals of concern. Developed an alternative soil cleanup approach and criteria for the site, and provided technical support during agency negotiations.

### **Professional Affiliations**

- Society for Risk Analysis
- Society of Environmental Toxicology and Chemistry