William (Bill) Rish, Ph.D.

PRINCIPAL ENGINEER

CONTACT INFORMATION

ToxStrategies LLC
31 College Place, Suite B118
Asheville, NC 28801
Phone (828) 348-1111
Cell (614) 204-6467
wrish@toxstrategies.com

PROFESSIONAL PROFILE

Dr. William (Bill) Rish has more than 40 years of experience consulting on matters of environmental exposure and risk assessment. He has prepared hundreds of risk assessments and managed numerous large, complex site investigations and remediation projects, and has been active for many years in the development of federal and state rules, guidance, and policy regarding risk assessment. Dr. Rish was a pioneer in the development of probabilistic methods for evaluating uncertainty in estimating chemical and radiological human health risk from environmental impacts.

Dr. Rish has worked across the nation on sites subject to CERCLA, RCRA Corrective Action and Closure, and state orders and voluntary action. He also has worked on Department of Energy and Department of Defense projects. In addition, he has a strong background in systems failure and accident analysis, including chemical and nuclear systems. Dr. Rish has experience with the Toxic Substances Control Act (TSCA), including Section 6 experience preparing existing high-priority chemical risk evaluations, conditions-of-use development, and life-cycle exposure assessment.

He is currently focused on scientific methods for cumulative impact assessment of health risks in communities that may be vulnerable to disproportionate environmental impacts. He has recently been Principal Investigator for several key research studies related to cumulative impact assessment for the American Chemistry Council Long-Range Research Initiative and the American Petroleum Institute.

Dr. Rish graduated from Carnegie-Mellon University with a doctorate in Engineering and Public Policy.

EDUCATION AND DEGREES EARNED

1982	Carnegie-Mellon University, Doctorate in Engineering and Public Policy
1974	Carnegie-Mellon University, Bachelor of Science in Metallurgy/Materials Science and Public Affairs (jointly conferred)

CERTIFICATIONS

1995–2012	Certified Professional, Ohio Environmental Protection Agency, Voluntary Action Program

PROFESSIONAL HONORS/AWARDS

2000	Phoenix Award for best Brownfield project in USEPA Region 5, Catholic Charities Community Center

PROFESSIONAL ASSOCIATIONS

2024–present	International Society of Exposure Science
2023–present	Air & Waste Management Association
2021–2023	Interstate Technology Regulatory Council
2019–present	Society of Environmental Toxicology and Chemistry
1980–2023	Society for Risk Analysis

SCIENTIFIC ADVISORY PANELS, COMMITTEES, & WORKGROUPS

2024	Workshop Panel Member, Ad Hoc Committee on State of the Science and the Future of Cumulative Impact Assessment, National Academies of Sciences, Engineering, Medicine.
2023	Chair, Human Health Risk Assessment Interest Group, Society of Environmental Toxicology and Chemistry
2022–2024	Member, Justice Equity and Risk Specialty Group, Society for Risk Analysis
2020–2022	Steering Committee Member, Human Health Risk Assessment Interest Group, Society of Environmental Toxicology and Chemistry (Chair, Environmental Justice Subgroup)
2019–2020	Alumni Advisory Council Chairman, Department of Engineering & Public Policy, Carnegie-Mellon University
2015–2016	Member, Induced Seismicity Workgroup, States First Regulatory Initiative
2012–2019	Member, Ohio Chemistry Technology Council, Operational Excellence & Sustainability Committee
2012–2017	Chair, Health Risk Subcommittee, Marcellus Shale Coalition
2006 and 2018	Member, Workgroup: Human Health and Ecological Risk Assessment Procedures, Ohio EPA Multidisciplinary Board, Five Year Rule Review

2001 and 2018	Member, Workgroup: Generic Numerical Standards, Ohio EPA Voluntary Action Program Multi-Disciplinary Board, Five Year Rule Review
1998–1999	Risk Assessment Guidance Committee, Ohio Bureau of Underground Storage Tank Regulation (BUSTR) Rulemaking, Rule 13—Corrective Action.
1995–1996	Member, Human Health Technical Advisory Committee, Regional Environmental Priorities Project, Northeast Ohio Region
1994–1995	Member, Scientific Committee 64 17, National Council on Radiation Protection and Measurements (NCRP), "Evaluating Uncertainty in Assessment of Dose in the Absence of Site Specific Data"
1994–1996	Co-Coordinator, Subcommittee to Develop Cleanup Standards and Site-Specific Risk Assessment Procedure Rules, Ohio EPA Voluntary Action Program Rulemaking
1989–1990	Co-chair, Exposure/Risk Assessment Working Group, Great Lakes Program, State University of New York at Buffalo

PROJECT EXPERIENCE

Risk Assessment, Risk Communication, and Risk-Based Policy Development

Dr. Rish is a published expert in risk assessment and uncertainty analysis. He has been active for many years on numerous advisory committees and workgroups in the development of federal and state regulatory rules, guidance, and cleanup standards. He has directed human health and ecological risk assessments, including risk-based cleanup standards and strategies, at many complex and high-profile sites, both chemical and radiological. He also prepares exposure and risk assessments for articles and products in commerce—for example, PFAS in containers and radium in brine deicing agents. In addition, he has a strong background in systems failure and accident analysis, including chemical and nuclear systems. He provides consulting and workshops to regulators, attorneys, and industry on communicating environmental risk to the public.

Selected risk assessment, communication, and policy projects include:

- Dr. Rish was recently Principal Investigator of a research project for the American Petroleum Institute (API) evaluating the quality of frameworks, data, indices, and screening tools for cumulative impact assessments. He was also recently Principal Investigator of a research project for the American Chemistry Council Long-Range Research Initiative (ACC-LRI) preparing a comprehensive state of the science review of methods and evidence for cumulative impact assessment at vulnerable communities. He is currently Principal Investigator of a project for ACC-LRI to develop and demonstrate an interactive infographic model for visualizing associations among chemical and non-chemical stressors and community health impacts.
- Dr. Rish led a team assessing the lifecycle radiological risks associated with beneficial use in cement of alumina processing residue. The work resulted in a publication: Marschke S, **Rish W**, Mauro J. 2019. Radiation exposures from the beneficial use of alumina production residue. J AWWA online, https://doi.org/10.1080/10962247.2019.1670281.
- Dr. Rish has been working on public health risk assessments regarding the use of conventional gas well brine for deicing. He worked with the Ohio Department of Natural Resources to prepare sampling plans to (1) demonstrate that the brine treatment process does not enhance the radioactivity levels in the deicing product, and (2) establish a data set to represent radium concentrations in the brine from different well sources. Assuming several worst-case public exposure scenarios, Dr. Rish and his team used the data as input to the RESRAD dose assessment model to predict doses from various product use scenarios. The

modeling was used to demonstrate safe commercial use and develop proposed radium concentration screening criteria.

- Worked on a team to prepare an external party TSCA Risk Evaluation for one of the first 10 high-priority existing chemical substances under the Lautenberg Amendment.
- Recently directed an air toxics risk assessment for a metal calciner, including stack emissions, fugitive dust emissions, and multiple residential exposure pathways.
- Assisted in preparing a probabilistic risk assessment of health risks associated with ingestion of fish and shellfish at the Newark Bay Study Area CERCLA site.
- Assisted in developing risk-based remediation levels for dioxins and furans for a former wood treating facility site undergoing residential redevelopment in Canada.
- Prepared a bounding policy assessment of drinking-water risks and well-pad worker risks from spills of wastewater (flowback) and fluid additives used in hydraulic fracturing of horizontal shale gas wells.
- Prepared a risk analysis of deep injection of hazardous waste for the American Chemical Council (ACC), which used probabilistic risk assessment (PRA) methods to analyze how underground injection technologies might fail to isolate waste from the environment. The study involved extensive workshops and interviews with industry and state and federal regulatory experts. Implications for regulatory requirements regarding chemical-industry injection practices were evaluated and presented to EPA. A section devoted to this study is contained in Chapter V of the EPA Office of Water report: Class I Underground Injection Control Program: Study of the Risks Associated with Class I Underground Injection Wells (March 2001).
- Prepared a study of the social risks of deep injection of hazardous waste for a large international chemical handling company. The study examined public perception, acceptance, and organized resistance related to Class I hazardous waste injection wells. Identified and discussed key factors to consider when deciding whether to commercialize a Class I well. The audience was a non-U.S. corporate board of directors.
- Co-Coordinator of the Ohio EPA committee that developed the Voluntary Action Program Generic Numerical Standards (Rule 3745-300-08) and Property-Specific Risk Assessment Procedures (Rule 3745-300-09). The committee was interdisciplinary, and included representatives of government, industry, real estate development, and public advocacy groups. Presented aspects of the rules—for example, the Urban Setting Designations for groundwater—at numerous public meetings.
- Presented training sessions in Risk Communication to: Texas Commission on Environmental Quality (TCEQ), Ground Water Protection Council (GWPC), Marcellus Shale Coalition (MSC), and Ohio State Bar Association (OSBA) in 2017. Presented risk-based engineering class to Ohio Society of Professional Engineers (OSPE).
- Managed a historical dose reconstruction project at Idaho National Engineering Laboratory (INEL) for the Centers for Disease Control and Prevention (CDC). The project identified, retrieved, and evaluated all documents, data, and personal accounts pertinent to the reconstruction of potential doses and risks to the population near INEL over its 40 years of operation. Included management of an extensive public outreach program.

Risk-Based Site Investigation and Remediation

Over a 30-year period, Dr. Rish has been project and program manager for many large, complex environmental projects across the United States under RCRA, CERCLA, state voluntary programs, and state and federal orders.

Selected site investigation and remediation projects include:

- Currently directing a multi-year project involving third-party review of all human health and ecological risk assessments at numerous coal combustion residual storage areas under the United States Disposal of Coal Combustion Residuals from Electric Utilities rule.
- Prepared remediation and closure plans for an abandoned steel plant and gained acceptance for the plans under a mediated consent order. Plans included four RCRA Closure Plans, a Cessation of Regulated Operations Plan, a Hazardous Waste Management Plan, a Solid Waste and C&DD Management Plan, a Lagoons and Water Treatment Works Closure Plan, and four Interim Action Plans. Currently serving as overall site coordinator for implementation of all plans.
- Directed the site investigations, human health and ecological risk assessments, and remedial feasibility studies at the Former Diamond Shamrock Site in Painesville, Ohio (also known as Lakeview Bluffs Brownfield Redevelopment). These risk assessments were done for more than 20 separate areas of concern under Director's Final Findings and Orders with the Ohio EPA. The site comprises 1100+ acres, abutting Lake Erie on its northern border and with the Grand River flowing across the site. Studies and remediation plans were coordinated with extensive plans to redevelop various portions of the site.
- Acted in key role as the Certified Professional (under the Ohio Voluntary Action Program) on many large and high-profile Brownfield projects. Secured 14 No-Further-Action (NFA) Letters and 14 Covenants Not to Sue, as well as 10 Urban Setting Designations (USDs), under the Ohio Voluntary Action Program (VAP). Wrote Chapter 25, Practical Aspects of Risk Assessment for Brownfield Development, in the American Bar Association's Brownfields book. Project for the Catholic Charities won a Phoenix Award for best Brownfield project in USEPA Region 5.

Uncertainty and Liability Analysis

Dr. Rish is a pioneer in the development and use of probabilistic methods to evaluate uncertainty and environmental liability, and to establish environmental standards. He initially developed his skills in this area while at Carnegie-Mellon University and Brookhaven National Laboratory as a graduate student. Dr. Rish's doctoral thesis was on Characterizing Uncertainty in Estimating Impacts from Energy Systems. He also helped prepare the documents, Technological Uncertainty in Policy Analysis (Brookhaven National Laboratory, 1982), and Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis (Morgan and Henrion, 1990), and was co-author of Technical Uncertainty in Quantitative Policy Analysis: A Sulfur Air Pollution Example (Morgan et al., 1984).

Selected relevant uncertainty and liability analyses:

- Regularly assists corporations in analyzing environmental liabilities in support of strategic business decision making, including SEC reporting, acquisitions and divestments, insurance settlements, and setting reserves and accruals. This work includes evaluating remediation strategies, understanding regulatory obligations, and estimating future remediation costs and timelines.
- As an expert witness, developed the basis for determining settlement amounts in negotiations and litigation between environmental insurers and the insured, for large portfolios of assets.
- Assisted with preparation of the analysis of uncertainties in the US EPA pathways and health effects modeling used as the basis for standard 40 CFR 191 for high-level radioactive waste and reported the results to the Science Advisory Board (SAB). Was a technical reviewer for EPA for their study of radiological risks from naturally occurring radioactive materials (NORM) from produced water at offshore

oil rigs. Also developed a program-wide guidance manual for the EPA Office of Radiation Programs staff on uncertainty in risk analysis and risk management (see publications below).

- Prepared a probabilistic risk evaluation of using six different coal-mine sites for ash disposal.

MANUSCRIPTS

Verwiel A, **Rish W**. 2025. Multidisciplinary perspectives on cumulative impact assessment for vulnerable communities: Expert elicitation using a Delphi method. Integr Environ Assess Manag 21(2):301-313; doi: 10.1093/inteam/vjae051.

Verwiel A, Racz L, Mittal L, **Rish W**. 2022. CDC's national report on human exposure to environmental chemicals. SETAC Globe 23(6); June 1, 2022.

Racz L, **Rish W**. 2022. Exposure monitoring toward environmental justice. Integ Environ Assess Manag 18(4):858-862; doi: 10.1002/ieam.4534.

Marschke S, **Rish W**, Mauro J. 2019. Radiation exposures from the beneficial use of alumina production residue. J Air Waste Manag Assoc 69(12):1479-1489; doi: 10.1080/10962247.2019.1670281.

Thompson CM, Fitch SE, Ring C, **Rish W**, Cullen JM, Haws LC. 2019. Development of an oral reference dose for the perfluorinated compound GenX. J Appl Toxicol 39(9):1267–1282; doi: 10.1002/jat.3812.

Rish W, Pfau EJ. 2018. Bounding analysis of drinking water health risks from a spill of hydraulic fracturing flowback water. Risk Analysis 38(4):724–754; doi: 10.1111/risa.12884.

Rish W. 1994. SEC Initiatives in environmental disclosure: How can environmental liability be estimated? Ohio Environmental Law Letter 4(6):3–4.

Rish W, Patterson J, Lutkenhoff S. 1989. Use of health risk estimates in U.S. EPA. USEPA National Center for Environmental Assessment. Proceedings of the 1989 Annual Meeting of the Society for Risk Analysis. San Francisco, California.

Rish W. 1988. Approach to uncertainty in risk analysis. ORNL/TM 10746. Report to U.S. Environmental Protection Agency, Office of Radiation Programs, Analysis and Support Division. Oak Ridge National Laboratory.

Rish W. 1988. Review of studies related to uncertainty in risk analysis. ORNL/TM 10776 (with R.J. Marnicio). Report to U.S. Environmental Protection Agency, Office of Radiation Programs, Analysis and Support Division. Oak Ridge National Laboratory.

Rish W, Morgan MG, Morris SC, Henron D, Amaral D. 1984. Technical uncertainty in quantitative policy analysis: A sulfur air pollution example. Risk Anal 4(3):201-216; doi: 10.111/j.1539-6924.1984.tb00139.x.

Morgan MG, Morris SS, Meier AK, **Rish W**. 1981. Sulfur control in coal fired power plants: A probabilistic approach to policy analysis. J Air Pollut Control Assoc 28(10):993–997; doi: 10.1080/00022470.1978.10470709.

Rish W, Morgan MG. 1979. Regulating possible health effects from AC transmission line electromagnetic fields. Proc IEEE 67(10):1416–1427; doi: 10.1109/PROC.1979.11477.

BOOK CHAPTERS

Rish W. 2010. Practical aspects of risk assessment for Brownfield development. Chapter 25 in Davis T (ed.), Brownfields, Third Edition. American Bar Association.

Rish W. 2005. A probabilistic risk assessment of Class I hazardous waste injection wells. Chapter 10 in Tsang C-F, Apps JA (eds.), Underground injection science and technology, Developments in Water Sciences 52, Elsevier.

Gillett J, **Rish W** (eds.). 1991. Risk and exposure assessment from toxic chemicals. Chapter 8 in Human health risks from chemical exposure: The Great Lakes ecosystem. Lewis Publishers, CRC Press.

ABSTRACTS AND PRESENTATIONS

Dr. Rish has presented extensively on a wide range of topics related to risk assessment, uncertainty analysis, risk communication, and liability analysis. He is regularly an invited speaker. Some recent presentations include:

- Session co-chair: Quantifying the relationships between exposures to chemical and non-chemical stressors for assessing cumulative impacts in vulnerable communities. International Society of Exposure Science Annual Meeting, Montreal, Canada, October 2024.
- East A, Klaren W, Covington T, **Rish W**. Exploring biomarker-based methods to incorporate non-chemical stressor exposures into cumulative assessments for potentially vulnerable population groups. International Society of Exposure Science Annual Meeting, Montreal, Canada, October 2024.
- **Rish W**, Marschke S, Racz L, Mauro J. Radiation exposures from the beneficial use of alumina production residue (red mud). Poster presented at Society of Environmental Toxicology and Chemistry North America 44th Annual Meeting, Louisville, KY, November 2023.
- **Rish W**. Cumulative Impact Assessment in US EPA's Environmental Justice Initiative. ACC GlobalChem 2023. April 3-5, 2023. Washington, DC.
- East A, **Rish W**, Klaren WD. Using NHANES data to characterize the magnitude of allostatic load in vulnerable communities: Impact to existing risk assessment uncertainty/variability factors. Poster presented at Society of Toxicology Annual Meeting, Nashville, TN, March 2023.
- **Rish W** and Verweil A. Instructor at the Society for Risk Analysis 2022 Annual Meeting workshop—*Approaches to Assessing Environmental Justice: Perspectives from the Scientific, Regulatory and Regulated Communities*. Tampa, FL December 2022.
- Perry C, **Rish W,** Ring C, Mittal L, Harris M. Use of probabilistic risk assessment and physiologically based pharmacokinetic modeling in supporting soil remedial objectives for dioxins and furans at a Canadian site. Poster for Society for Risk Analysis, Virtual Annual Meeting, 2020.
- Ring CL, **Rish WR,** Brorby GL. Prioritization of eight PFAS by population exposure and reference-dose uncertainty. Poster session at SETAC North America Focused Topic Meeting "Environmental Risk Assessment of PFAS", 12-15 August 2019, Durham, NC.
- Amended TSCA impacts on OSHA: Product stewardship implications. Presented at Product Stewardship 2018 Conference, Washington, DC, September 2018.
- Bounding analysis of drinking water health risks from a spill of hydraulic fracturing flowback water. Presented at the Marcellus Shale Coalition Member Meeting, Pittsburgh, PA, January 31, 2017.
- New technology for measuring real-time mass emission rates of methane and VOCs from oil and gas facilities. Presented at Innovative Environmental Monitoring Technology Symposium 2016, Ohio University, October 18, 2016.
- Adaptive management of remediation. Detroit Remediation Conference, Detroit, Michigan, September 2016.
- Addressing the challenges of environmental risk communication. Presented at the Ohio State Bar Association Annual Environmental Conference, April 2016.
- Prioritization, risk evaluation, and safety determinations under the Frank Lautenberg Chemical Safety Act for the 21st Century. Presented at Ohio Chemistry Technology Council Meeting, June 11, 2015.

- Understanding induced seismicity risk from hydraulic fracturing. Presented at Ohio Oil and Gas Association Winter Meeting, March 2015.
- Health risks from drinking water impacted by a flowback water spill in the Marcellus Shale region. Presented at the Ground Water Protection Council Annual UIC Conference, Austin, Texas, February 2015.
- Everything old is new again: 110 years of assessing risks of underground injection of waste. Ground Water Protection Council UIC Annual Conference, Austin, Texas, February 2015.
- Katona MA, Long TF, Kirman CR, Gargas ML, **Rish WR**. 2000. Derivation of a cancer potency factor and dermal absorption factor for benzo(a)pyrene. Toxicologist 54, abstract 873. Presented at the 39th Annual Meeting of the Society of Toxicology, Philadelphia, PA.
- **Rish W**, Kirman CR, Hays SM, Gargas ML, Andersen ME, Reitz RH, Guengerich FP, Green T, McConnell EE, Buckpit A, Voytek P, Dugard PH. 1999. Developing a physiologically based pharmacokinetic model to describe methylene chloride kinetics at the subcellular level. Toxicologist 48, Paper No. 671. Presented at the 38th Annual Meeting of the Society of Toxicology, New Orleans, LA.