Richard C. Pleus, Ph.D., M.S.

Chief Toxicologist

Professional Profile

Fields of Expertise

Toxicology and Pharmacology: Neurological; Aerospace; Endocrinological; Respiratory; Reproductive; Developmental

Education

Postdoctoral training, University of Nebraska Medical Center, 1992, Neuropharmacology

Ph.D., University of Minnesota, 1991, Environmental Toxicology. Research conducted in the Department of Pharmacology. Dissertation title: “Neurobehavioral assessment in offspring of the influence of maternal hypoxia and hypercapnia induced by injection of methadone in pregnant rats.”

M.S., University of Minnesota, 1983, Environmental Health

B.S., Michigan State University, 1977, Physiology, Honors Graduate

Current and Previous Positions

Founder, Managing Director, **& Chief Toxicologist,** Intertox, Inc., Seattle, WA (1995–present)

Co-founder & Co-director, Aerospace Toxicology Association, WA (2022)

Co-founder, Intertox Decision Sciences, Inc., Seattle, WA (2009-2015)

Chair, Working Group 3 – Health, Safety and Environment, ANSI-Accredited U.S. Technical Advisory Group, ISO/TC 229, Nanotechnologies (2007-present)

Adjunct Associate Professor, University of Nebraska Medical Center, Department of Pharmacology, Omaha, NE (1999–2014)

Adjunct Associate Professor, University of Nebraska, Center for Environmental Toxicology, Omaha, NE (2002–2012)

President, Environmental Toxicology International, Inc., Seattle, WA (1993–1995)

Vice President, Marketing & Communications, Environmental Toxicology International, Inc., Seattle, WA (1993)

Senior Toxicologist, Environmental Toxicology International, Inc., Seattle, WA (1992–1993)

Community Faculty, Metropolitan State University, St. Paul, MN (1989–1996; taught courses in physiological psychology and psychopharmacology)

Research Associate, Department of Pharmacology, College of Medicine, University of Nebraska Medical Center, Omaha, NE (1989–1992)

Instructor, General College, University of Minnesota, Minneapolis, MN (1985–1989)

Research Assistant, Department of Pharmacology, Medical School, University of Minnesota, Minneapolis, MN (1985– 989)

Instructor, Lowthian College, Minneapolis, MN (1983–1985)

Instructor, Department of Continuing Education and Extension, University of Minnesota, Minneapolis, MN (1979–1983; taught courses on toxicology of cosmetic products and physiological factors contributing to accident susceptibility

Select Project Experience

Aerospace

- Member of the aerospace medical team conducting a Root Cause Corrective Action (RCCA) for the U.S. Navy (NavAir) for Physiologic Episodes (P.E.) for aircrew of the F/A-18A, F/A-18G, and T- 45. As one of two toxicologists on the team, I reviewed possible chemical exposures to pilots and their potential contribution to P.E.s. The exposure route of concern was inhalation. Respiratory and neurologic systems were critical organ systems of evaluation.
- Led the Intertox team in toxicological assessments for two airlines' above-wing employees (e.g., aircrew). Evaluated laboratory data, as well as designed and conducted testing of uniforms for over 400 chemicals. The exposure route was absorption via the skin or by inhalation. Respiratory and skin were critical organ systems of evaluation.
- Conducted a toxicological assessment of data from the Bleed Air Extraction and Sampling System (BAESS) in a joint experiment with the U.S. Air Force, NASA, and the Boeing Company. This system simulated the ventilation of commercial aircraft. Jet oil was injected into the engine of a USAF C-17 Globemaster III, and samples of air were pulled from ports along the length of the ventilation system and assessed over 45 chemicals at a sample location comparable to where aircrew and passengers would be

exposed. The exposure route was inhalation, and the health assessment of interest was the respiratory and neurological systems.

- Conducted a toxicity assessment of a composite for passenger aircraft and laboratory testing data for certification of a new aircraft. The toxicological evaluation evaluated short-term (acute) toxic hazards of gaseous combustion products relating to human survivability in an aircraft cabin fire. The assessment was conducted using U.S. Federal Aviation Agency report DOT/FAA/AR-95 guidance and submitted to an international authority.
- Conducted an exposure assessment of airborne nanoparticles to aerospace workers. Nano-sized particles are thought to be released from sanding or grinding composite materials containing carbon nanotubules. Exposure routes were absorption via skin, inhalation, or ingestion. The evaluation focused on the health effects of the respiratory system.
- Conducted over 45 toxicological assessments of human exposure to jet oil and hydraulic fluid combustion in commercial aircraft. Chemicals evaluated were a group of organophosphates that included tricresyl phosphate isomers, tributyl phosphate, and combustion by-products. The triggering events were foul odors. The exposure route was inhalation, and the health assessment of interest was for the respiratory and neurological systems.

Air

- Designed and monitored a developmental study for airborne cellulose insulation treated with boron (e.g., boric acid). Pregnant rats were administered four doses during gestation. The experiment results produced a NOAEL to develop acceptable exposures for women workers or women residing in environments where cellulose insulation is used as insulation or acoustic attenuation. The exposure route was inhalation, and the health assessment of interest was reproductive and fetal developmental effects.
- Conducted toxicological assessment for clean-up of lead and arsenic-contaminated soil from smelter operating in the 1900s. Conducted historical toxicological research on articles and records dating back to the 1700s. Assessed what was known and when regarding the toxicology of lead (Pb) and arsenic (As) for all body systems and all exposure pathways for both human and ecological endpoints.

- Assessed human health risks from gases released from a landfill. Triggering events for residents were from foul odors. Laboratory data was obtained, and carbon disulfide, formaldehyde, and hydrogen sulfide were identified as released chemicals. The route of exposure was inhalation. Cancer and non-cancer endpoints were assessed, focusing on the nervous system for non-cancer effects.
- A toxicological assessment was conducted for human chloroform and hydrogen sulfide exposure. These chemicals were released as gases from the wastewater treatment system of a pulp and paper mill. Residents were exposed via inhalation. Cancer and non-cancer effects were assessed, with non-cancer effects focused on the respiratory and neurological systems.
- Assessed adverse health consequences to an off-site neighborhood resident from an accidental release of chlorine gas from a manufacturing plant. Exposure was via inhalation. Toxicological assessment was focused on the respiratory system and assessed cancer and non- cancer endpoints.
- Assessed human health risks related to emissions from a composting facility to a nearby community and followed US EPA guidelines for the assessment. Triggering events were foul odors released. Exposure was via inhalation. Developed a monitoring program to measure 23 reduced sulfurs, volatile organic compounds, and ammonia. The toxicological assessment consisted of all organ systems, focusing on the nervous system assessed non-cancer endpoints.
- Conducted toxicological evaluation of sewer gases and their impact on community health and evaluated over 60 chemicals produced from plant, animal, and human waste degradation. All organ systems were evaluated, focusing on risk from adverse effects on the nervous system. The exposure to these gases was via inhalation.
- Conducted over 30 human and ecological health risk assessments of cement kilns. Chemicals of concern included metals (including As, Cu, Cr, Cd, Zn, Pb, Hg, Ni, Zn), dioxins, furans, and polyaromatic hydrocarbons (PAHs), nitrogen oxides, sulfur oxides, and many other EPA identified hazardous air pollutants. Depending on the case, assessments focused on specific endpoints, such as neuroanatomical effects, and vulnerable subpopulations, such as the developing fetuses of local pregnant women. Assessments included a review of laboratory data, a review of toxicological and medical literature, and a review of

medical records. Considered routes of exposure included direct exposure from inhalation and multipathway exposures from oral and dermal exposures. US EPA guidelines for assessments were used. Cancer, non-cancer, and ecological endpoints were assessed.

- Conducted a toxicological assessment of residents living near a lead smelting and refining operation. The chemicals of concern were lead and arsenic. Considered multipathway exposure, but eventually focused on inhalation and ingestion as significant routes. The evaluation consisted of assessing laboratory data, reviewing the toxicological literature, and including information from government agencies. US EPA guidelines were used as a basis for the review. All body systems were evaluated.
- Evaluated a risk assessment for carcinogenic polycyclic aromatic hydrocarbons for a coal-burning power plant. The focus was eventually narrowed to assessing a system of toxic equivalency factors based on non-validated assumptions. US EPA guidelines were used as a basis for the assessment. Exposures were considered multipathway. Cancer and non-cancer endpoints were assessed.
- Conducted human health risk assessment from emissions of a thermoplastic extrusion plant. Assessed laboratory data, air dispersion modeling, and calculated estimates of hazards for acute exposures to residents living near the facility. US EPA guidelines were used as a basis for the evaluation. Chemicals evaluated included acrolein, 1,3-butadiene, 4-vinylcyclohexane, styrene, and triphenylphosphate. The exposure was via inhalation. Cancer and non-cancer endpoints for all body systems were considered.
- Assessed human health risks of workers in a facility that was being built to decommission chemical warfare agents. Evaluated human acute exposures to sarin and mustard gases. The route of exposure was inhalation. Compared and contrasted reported health effects from acute exposures to health effects reported to those published in the toxicological literature. Thirteen non-cancer endpoints, with a focus on the nervous system, were assessed.
- Evaluated human health risks to residents living near an accidental chemical release and subsequent fire from rail cars filled with chlorine and methyl mercaptan. The route of exposure was via inhalation of parent chemical agents, and work included assessing the human health risk from by-products of pyrolysis. Non-cancer endpoints were evaluated.
- Evaluated human health risks from exposure to stack emissions

from a proposed fluidized bed incinerator. Air dispersion monitoring was used to estimate air concentrations at critical receptors in nearby neighborhoods and followed US EPA guidelines for the assessment. The toxicological evaluation was conducted for metals (As, Cr, Cd, Pb Hg, Ni), dioxins, furans, polyaromatic cyclic hydrocarbons, nitrogen oxides, sulfur oxides, and other US EPA-identified hazardous air pollutants and reviewed potential effects for all body systems for cancer and non-cancer endpoints. The results of this toxicological assessment were presented to the community.

- Conducted a review of a state's proposal for biological monitoring of residents and their pets in a town that built and operated a hazardous waste incinerator. Followed US EPA guidelines for the assessment. Assessed the reliability and accuracy of bio-monitoring parameters relative to chemicals of potential concern. The exposure route was inhalation. Non-cancer endpoints assessed.
- Conducted a toxicological assessment of multiple emission sources within an industrial park in the Bahamas to nearby residents. Oil terminals, pharmaceutical plants, power plants, and chemical plants operated in the park and conducted extensive emissions inventories and source evaluation surveys to gather data to assess individual contributions and cumulative effects of emissions. Toxicological assessment consisted of all organ systems. Cancer and non-cancer endpoints were evaluated.
- Conducted multiple human health risk assessments for several different facilities in a U.S. state. Facilities included a newly designed bus manufacturing plant and several beet processing plants. These were the first air screening risk assessments conducted by this state and conducted toxicological reviews of nearly 100 chemicals, including metals (As, Cr, Cu, Cd, Pb, Hg, Ni, Zn) emitted from each facility and assessed oral, dermal and inhalation routes of exposures through multipathway analysis. Cancer and non-cancer endpoints were evaluated.
- Reviewed multipathway human health risk assessment for a medical waste facility for the 173-acre Chris Hani Baragwanath Academic Hospital in Soweto, South Africa. Chemicals evaluated included metals (As, Cr, Cu, Cd, Pb, Hg, Ni, Zn), dioxin, furans, and polycyclic aromatic hydrocarbons. Exposure was evaluated for residents living nearby. Cancer and non-cancer endpoints were assessed.
- Conducted human health risk assessments for emissions from

several coal-fired electric generating stations in Texas, Illinois, Massachusetts, Michigan, and Washington and followed US EPA and pertinent state guidelines for the assessments. The evaluations included metals (As, Cr, Cd, Pb, Hg, Ni), dioxins, furans, and polyaromatic hydrocarbons, which became newly reportable under the US EPA's Toxic Release Inventory (TRI) program. Toxicological assessment was conducted for other additional metals. Exposure was via inhalation. Potential risks through oral, inhalation, and dermal pathways were assessed for some facilities, and all organ systems for cancer, non-cancer, and ecological endpoints were evaluated.

- A toxicological assessment of human health risks from lead deposited in agricultural soil was conducted. Lead was released from the operation of a steel manufacturing plant. The evaluation used the US EPA Uptake/Biokinetic Model for Lead to evaluate human exposure. Environmental fate was followed through the food chain from soil to human food sources. A review of the literature was conducted. The route of exposure was primarily ingestion. Non-cancer endpoints were assessed with a focus on nervous system risks.

Policy and Legislation

- Briefed Costa Rican governmental and private representatives on the principles that underlie the toxicological assessment of nanotechnology. Included in the briefing were the Minister of Science and Technology, the Vice Minister of Science and Technology, the President of Instituto Tecnológico de Costa Rica, and the Vice President of Research at the Instituto Tecnológico de Costa Rica.
- Participated in technical discussions with several members of the European Parliament in Brussels, Belgium, on developing appropriate scientifically based regulations to prevent adverse health effects from burning hazardous waste in cement kilns.
- Participated in technical discussions with South African governmental and private industry representatives on land, water, and air legislation and the benefits of science and risk-based on environmental legislation.

Pharmaceuticals

- Conducted numerous toxicological assessments for ethanol as an agent of interest in legal proceedings. Tasks included reviewing case documents and testimony for relevant information regarding

potential ethanol exposure, developing physiologically-based pharmacokinetic models to scientifically estimate the likely degree of alcohol intoxication during relevant events, and drafting expert reports or providing testimony based upon the above analysis.

- Provided a toxicological assessment for over 30 toxicological assessments related to the testing and evaluation of biologic tissue (e.g., urine, hair, serum) samples for concerns of drug exposure, including ethanol, methamphetamine, benzoylecgonine, phencyclidine, nortriptyline, and amphetamine. Tasks included evaluations of test results for indications of adulterants or dilution, assessing methodological techniques, and determining the toxicological impacts and the signs and symptoms that might be associated with the levels of drugs detected routes of exposure, such as inhalation and ingestion. Research also focused on genetic determinants of nervous system effects, although other endpoints were included.
- Conducted numerous toxicological assessments for opiate and opioid narcotic analgesic agents as a possible cause of death. Assessments included analyzing laboratory data, medical records, and medical literature analyses. The route of exposure was ingestion. Toxicological assessment focuses on the neurological system, which includes respiratory and psychological effects.
- Conducted a toxicological assessment for an antibiotic agent as a possible cause of death. Assessments included analyzing laboratory data, medical records, and medical literature analyses. Toxicological assessment focused on numerous body organs.

Product Safety

- Conducted product safety assessments of bacteria for human health safety. Specific organisms are used to preserve fruit, de-nitrify surface water, improve water quality in swimming pools, conduct microbiological risk assessments for human health effects, and provide scientific documents to international governmental authorities.
- Conducted product safety assessment for laser printing devices. Assessed the materials used in the cutting process and the fumes from the cutting process. Evaluated the emissions related to possible human health effects for acute and chronic exposures.
- Conducted a scientific assessment for fungus for a toy distributed to the U.S., Europe, and Asia. Laboratory tests were conducted, biological assessment was performed, and an approach to

possible disposal was developed to address possible disposal options. It also assisted in developing forensic analysis to determine the cause of the mold. We evaluated acute and subchronic exposures from contact with skin and breathing spores.

- Conducted toxicological assessment for consumer-used ink products for Japanese manufacturers and assessed human health risks using American Society for Testing and Materials (ASTM) standards. Over 50 chemicals were evaluated for various oral, dermal, and inhalation routes of exposure. Toxicological assessment for all body systems, and included cancer and non-cancer endpoints.
- A toxicological assessment of human exposure to chemicals found in a cell phone and its packaging was conducted. Employees were exposed to unknown chemicals and subsequently reported acute health effects. Developed a testing program to determine chemicals of potential concern. Identified several solvents and assessed toxicological effects from exposure via inhalation and dermal contact. Developed a forensic program to evaluate the source. Acute non-cancer endpoints evaluated.
- A toxicological human health assessment was conducted using several volatile organic compounds, silane, and siloxane released from weather-treating products. The route of exposure was inhalation, and the population of concern included children. Non-cancer endpoints were assessed and focused on the nervous and respiratory systems.
- A toxicological assessment of multiple chemical cleaning solutions and carbon monoxide on reproductive effects was conducted. Exposure to pregnant women occurred while visiting a commercial art store. Exposure was via inhalation. Toxicological assessment focused on reproductive and neurological systems. Research also focused on genetic determinants of nervous system effects.
- Conducted human and ecological risk assessment of ethylene vinyl alcohol, a chemical used to make shipping packaging "peanuts." Reviewed laboratory data, the toxicological literature, and the use and fate of the material as a consumer product. The endpoints of evaluation were human and ecological receptors. US EPA guidelines were used as a basis for the assessment. For human exposure, cancer and non-cancer endpoints were assessed.
- Conducted a toxicological assessment of a consumer product, an ink-pen barrel constructed of pressed recycled rubber. Reviewed laboratory data and conducted a review of the toxicological literature. US EPA risk assessment guidelines were used as a

basis for assessment. Chemicals evaluated included metals (As, Cr, Cd, Pb, Hg, Ni) and organic hydrocarbons. Cancer and non-cancer endpoints for all body systems were considered.

- Prepared a human health risk assessment of occupational exposures to cellulose insulation. Conducted a review of the toxicological literature of paper dust, wood dust, and chemicals found in newsprint. The exposure from inhalation to paper and wood dust was assessed, and cancer and non-cancer endpoints were evaluated.
- Conducted toxicological, human, and ecological risk assessment of various herbicides used by WA State's Department of Transportation for use on state roadways and assessed human and environmental health risks associated with roadside vegetation management practice. Multipathway exposures were conducted and included the evaluation of sensitive human and ecological populations. Cancer and non-cancer endpoints were assessed.
- Conducted toxicological assessment of a consumer-related product used for cleaning outdoor camping equipment. The chemicals evaluated were ethylenediaminetetraacetic acid (EDTA), sodium hydroxide, nonylphenol polyethylene glycol ether, and dipropylene glycol monomethyl ether. The concern was these chemicals' adverse impact on the nervous system's non-cancer endpoints, particularly the eye.
- Conducted a toxicological assessment of fog oil released from a military training facility. Fog oil is used as a chemical obscurant in training exercises. Fog oil migrated off-base into residential neighborhoods. Benzene and several other volatile organic compounds were evaluated toxicologically via inhalation exposure. The evaluation focused on cancer and non-cancer hematological effects.
- Conducted toxicological assessment on human health risks from cellulose insulation containing ammonium sulfate-based flame retardant. Exposure was via inhalation. Developed a single-compartment, first-order model to describe ammonia's environmental fate and transport in a residential setting. I used US EPA guidelines for the evaluation. Cancer and non-cancer endpoints were considered. Also, the production of foul odor was evaluated.
- Conducted toxicological evaluation of boron (B)-containing pesticide. All organ systems were evaluated. Exposures were ingestion, dermal, and via inhalation. Conducted an exposure

assessment with a university laboratory as a part of the assessment and eventually focused on the reproductive effects of boron pesticides. All data was forwarded to the State of California for review and evaluation of the data. Cancer and non-cancer endpoints were considered.

Workplace

- Developed medical monitoring protocol for governmental clients. The chemical of concern was mercury, including the various inorganic and organic mercury species. The key objective of the Mercury Medical Monitoring Program was to protect employees who may be exposed to elemental or organic mercury (Hg) during maintenance, construction, and remediation tasks. Cancer and non-cancer endpoints were considered.
- Assessed several cases where employees were suspected of using recreational drugs. We reviewed drug testing data and performed physiologically based pharmacokinetic (PBPK) modeling when needed. The cases involved different families of drugs, including opiates, ethanol, and cannabinoids. Most exposure routes were oral and included injection and inhalation.
- Assessed risk to human health of workers exposed to chemicals from the re-entrainment of exhaust air in a pharmaceutical research laboratory. Exposure was via inhalation. Odors were detected and were the triggering event at the workplace. Chemicals were identified, and estimated concentrations were calculated. Toxicological assessment included all body systems, focusing on reproductive and nervous systems. Non-cancer endpoints assessed.
- Assessed health effects of a worker exposed to fumes asphalt roofing and solvent-based and latex paints. Exposures were via inhalation and dermal routes. Numerous non-cancer endpoints were evaluated.
- Conducted toxicological assessment for workers exposed to trichloroethylene (TCE) and evaluated the literature and laboratory data from the facility. TCE was used extensively in the facility as a degreaser, and all routes of exposure were assessed. However, the assessment eventually focused on risks for the development of neurobehavioral effects on the offspring of women exposed to TCE from drinking water ingestion, as that was deemed the most sensitive endpoint. It evaluated the use of medical monitoring for this population.

- A toxicological assessment of human health from exposure to perchloroethylene (PCE or tetrachloroethylene) from contaminated groundwater was conducted, and ingestion and dermal contact with water and inhalation of volatiles during showering or bathing were evaluated. Toxicological assessment included general toxicology and focused on the nervous system.
- Conducted toxicological evaluation of a worker to exposure to beryllium (Be) and polonium (Po) dust and residue. Evaluated exposures via inhalation, dermal, and, to a lesser degree, oral from dust. Cancer and non-cancer endpoints were assessed.
- Conducted toxicological assessments related to the waste from the production of plutonium (Pu) at the Hanford Reservation in eastern Washington for the US DOE site contractor. We conducted toxicological assessments for chemicals present in underground storage tanks, including metals and organic compounds. The work included developing Temporary Emergency Exposure Limits (TEELs) and other toxicity guidelines for worker exposure that were peer-reviewed by Argonne National Laboratories, evaluating exposures to workers related to potential accident scenarios, and developing computer visualization tools to assist workers with understanding the significance of detected chemical concentrations.

Soil

- Conducted field research on workers in wood treatment facilities to copper chromium arsenate (CCA), formerly used as a wood preservative. Airborne exposures to hexavalent chromium (CrVI) and arsenic (As) were of primary focus. Data was submitted to the US EPA. A new technique for detecting lower quantities was developed. The route of exposure was primarily via inhalation. Cancer and non-cancer endpoints were assessed.
- Conducted a comprehensive risk assessment addressing human health risks related to dioxins and polyaromatic hydrocarbons (PAHs) in soil at a wood-treating facility listed by US EPA as a Superfund site and followed US EPA guidelines for the assessment. The exposure assessment was multipathway and included exposures to workers and residents living near the facility. A probabilistic risk assessment was conducted to characterize uncertainty and variability in worker exposures and identify parameters contributing most significantly to uncertainty in risk estimates. Developed site-specific parameter distributions and characterized current scientific knowledge of the bioavailability of

dioxins and PAHs in soil. Work was submitted to the US EPA. Cancer and non-cancer endpoints assessed.

- Conducted human and ecological risk assessment from the effects of copper slag leachates. Reviewed laboratory data and conducted toxicological literature review on human and environmental receptors. Evaluated arsenic (As), copper (Cu), cadmium (Cd), and zinc (Zn). US EPA and Washington State guidelines were used for this assessment. For human exposures, cancer and non-cancer endpoints were considered.

Water

- Reviewed and assessed the toxicity of multiple perfluorinated chemicals, including perfluorooctanoate (PFOA) and perfluooctosulfonate (PFOS), and assessed the current state of toxicological knowledge, evaluated guideline levels of state and federal government. Issues of concern included assessing the appropriateness of extrapolating from other species, using safety factors, and co-exposure to different chemicals. Cancer and non-cancer endpoints were evaluated.
- Was a scientific expert input to a Court developed science panel (C-8 Science Panel) on behalf of legal settlement (PFOA was the chemical of concern) in West Virginia. The panel was made up of independent scientists jointly chosen by the plaintiff and defense as a component of a legal settlement. My work focused on identifying a laboratory to conduct biological analysis and experimental design for medical testing. Exposure to PFOA was from drinking water exposure that includes oral, respiratory (e.g., showering), and skin routes.
- Conducted a human health risk assessment for a city in Washington. We conducted a toxicological evaluation to estimate human health risks associated with exposure to polychlorinated biphenyls (PCBs) and other chemicals from building materials at the former water treatment plant. We focused on cancer and non-cancer endpoints.
- Evaluated non-standard neuropsychological tests to demonstrate adverse effects of chemical exposure. In groundwater, the chemicals evaluated were perchlorate and several petroleum-chlorinated solvents (e.g., TCE, PCE). Routes of exposure were via oral and inhalation. Non- cancer endpoints were assessed with a focus on the nervous system.
- Evaluated over 50 chemicals of potential human health and

ecological consequences of exposure to Endocrine Disruption Chemicals (EDCs) and pharmaceuticals and personal care products (PPCPs) in reuse water for a large reuse water management agency and identified contaminants of most significant concern based on the likelihood of occurrence and resistance to treatment processes used at various facilities as well as potential for environmental exposure and health effects. Exposure routes of concern include drinking, breathing from aerosols from showering, and skin contact from bathing. Communicated the possible risks to the public and regulators.

- Assisted in evaluating and identifying sources of contamination for a screening-level ecotoxicologic assessment of select chemicals of potential concern (COPCs). The analysis concluded that sampling locations were associated with several COPCs exceeding their level of concern (LOC) for water. Further evaluation indicated that the relationship between sediment, water, and animal tissue was not always synchronous, COPCs with identified benchmarks should be evaluated, and LOCs not likely to pose a risk should be recognized appropriately. Ecological endpoints were assessed. COPCs including organics (chlorpyrifos, hexachlorobenzene, organochlorine pesticides, pentachloroanisole, pentachorobenzene, PCBs, and tetrachlorobenzene) and inorganics (Al, Sb, As, Ba, Be, B, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Sr, Ti, V, and Zn) were analyzed and assessed in water, sediment, fish, and bird eggs.
- Assisted in a toxicological assessment of human health risks from ingesting drinking water containing trace amounts of personal care products, endocrine-disrupting chemicals (EDCs), and pharmaceuticals in drinking water. Both cancer and non-cancer endpoints were assessed. Non- cancer endpoints included the nervous system, endocrine system, reproductive system, and immune system. Ecological endpoints were examined.
- Conducted scientific assessment of the human health risk for exposure to perchlorate. Followed US EPA guidelines for the human health assessment. Addressed multipathway exposures to perchlorate included exposures to sensitive populations, such as pregnant women, and ecological endpoints. Provided scientific comments to the US EPA's development of a reference dose and the State of California regarding developing a Public Health Goal and proposed Proposition 65 listing. Cancer and non-cancer endpoints were assessed.
- Conducted a review of a state's proposal for biological monitoring of residents and their fluoride. This assessment considered human

exposures to metals found as contaminants of sodium hexafluorosilicate or hexafluorosilicic acid. It evaluated fluoride ingestion in sensitive human populations, including older adults and children. Both cancer and non-cancer endpoints were assessed.

- Conducted toxicological assessment for health risks from drinking water. Chemicals evaluated included perchlorate, TCE, and N-nitrosodidimethylamine (NDMA). The evaluation assessed laboratory data, modeling data, toxicological literature, medical literature, and medical records. The primary route of exposure was ingestion; however, dermal and inhalation routes were also reviewed.
- Conducted toxicological evaluation of human health related to fluoride. Water fluoridation is the practice of adding fluoride compounds to water to reduce tooth decay in the general population. A review of the toxicological and medical literature was conducted in addition to U.S. and European governmental assessments of fluoridation. The primary route of exposure was ingestion; however, dermal and inhalation routes were also reviewed.
- Conducted toxicological assessment of the risk of oral exposure to lead to children via water from Seattle Public Schools and used physiologically based pharmacokinetic modeling to develop blood lead estimates for children of different ages. Non-cancer endpoints were focused on neurodevelopmental effects.
- Conducted a toxicological assessment related to oral exposures of ground water contaminated with low levels of perchlorate to community residents. Toxicological assessment considered possible doses, exposures via dermal, ingestion, and inhalation (e.g., taking a shower). Evaluated sensitive populations that included pregnant women and children.

Biological Risk Assessment

- Developed and conducted an independent sampling program to test certain building materials for fungal spores and hyphal fragments that might indicate current fungal growth or the possibility of fungal growth in the future. Analyses included direct microscopy for identifying any fungal spores to the genus level and culture of viable samples on appropriate nutrient media.
- Assisted in evaluating a proposed Concentrated Animal Feeding Operation (CAFO) facility for potential human health and

ecological impacts from possible facility releases for both human and environmental endpoints. The facility was intended for closed-loop operation and designed to prepare 20,000 head of cattle for market. Chemicals of concern included hormones, antibiotics, and pesticides. Pathogens were also assessed. This unique CAFO design comprised the following operating units: beef facility, ethanol-producing facility, combined heat and power facility, nutrient separator, greenhouse facility, water treatment facility, fluidized bed reactor, and composing facility.

- Provided scientific support for numerous commercial and residential indoor air quality claims concerning alleged adverse health effects from microbiological agent exposure. Critically evaluated laboratory data, the method of collection and analysis, medical records, and toxicological literature regarding exposure to fungal toxins in indoor air and their potential for causing long-term adverse health effects. Also included in some assessments was the release of volatile organic compounds from fungi. Assessed validity and reliability of information on the nature and extent of exposure, interpreted receptor health status, evaluated toxicological basis for health complaints, and identified potential sources of confounding causality. Many organisms have been assessed; however, the most commonly evaluated are Aspergillus, Penicillium, and Stachybotrys.
- Conducted biological assessment of workers exposed to bioaerosols, a conditioning agent used to dewater sludge (CLARIFLOC® C-9525 POLYMER), and particulates from an advanced wastewater treatment plant and evaluated the chemical and biological constituents of dewatered sludge. Reviewed laboratory data, conducted microbial, viral, and chemical literature reviews, and conducted site assessments. Route of exposure were inhalation and ingestion. Non-cancer endpoints were assessed. A review of employee protection was also performed.
- Conducted an anthrax investigation at a military mail facility. Developed and implemented a sampling and analysis program to determine whether Bacillus anthracis (anthrax) organisms could be detected. The biological assessment included a review of the microbiological literature, development of a state-of-the-science sampling approach, refining a work plan to address site- specific elements, preparation of the work plan, collection of samples, coordination of laboratory analysis, interpretation of results, and preparation of final project documentation and results reporting.
- Conducted biological assessment of residents exposed to Salmonella and E. coli emanating from cattle feedlots as

bioaerosols. Reviewed laboratory data, conducted microbial, viral, and chemical literature reviews, and conducted site assessments. Route of exposure were inhalation and ingestion. Non-cancer endpoints were assessed, and a work plan was to determine the adverse health effects related to microbial contamination of a potable private well-water supply. The work plan included examining exposure events, identifying microbial agents of concern (MAOC), and identifying possible health effects associated with direct and indirect contact with MAOCs detected in sewage.

- Evaluated the performance of immunoassay biological agent detection instrumentation for an instrument developer. Conducted independent tests to determine the minimum level of spore delectability of two specific instruments for viable anthrax spore vaccine and Bacillus thuringiensis.

Pesticides

- Assisted with toxicological assessment of human exposure to an herbicide, acrolein, a pungent chemical used in urban settings to control weeds in public water systems. Odor is likely a human trigger to the presence of this chemical. Routes of exposure included inhalation, ingestion (from water and fish), and dermal exposure (from swimming). The toxicological assessment consisted of reviewing the toxicological literature, evaluating communities, and assessing accident scenarios. Non-cancer endpoints were assessed. Managed a state Department of Transportation agency's human and ecological risk assessment project. The project aimed to estimate the potential human health and environmental risks associated with the Agency's use of herbicides for roadside vegetation management. The evaluation addressed the general public and workers applying herbicides. Produced a risk assessment report and recommended herbicide risk management to the client.
- Conducted a toxicological assessment for Malathion (pesticide) exposure on human health. The evaluation included analyzing laboratory data, medical records, and medical literature analyses. Non-cancer endpoints were evaluated, with an eventual focus on the nervous system.
- A toxicological assessment of human exposure to a chemical intermediate used in the production of carbamate pesticides was conducted. Worker exposures were assessed for inhalation of intermediate compounds. Conducted a toxicological assessment of

the literature and prepared a toxicology profile for the chemical. The work was submitted to the US EPA. A surrogate reference dose was developed and presented for information purposes. Toxicological assessment of all body systems was conducted for cancer and non-cancer endpoints.

- Conducted a toxicological evaluation of pesticides and their combustion by-products for residents living nearby a pesticide warehouse: chemicals evaluated pesticides (e.g., organophosphates) and herbicides (e.g., glyphosate). Toxicological assessment considered all organ systems. However, the evaluation eventually focused on the nervous system.
- A toxicological assessment related to a consumer from the use of indoor pesticides was conducted. Pesticides contained boron, which was the chemical evaluated. Exposure was predominately via inhalation. All organ systems were considered for non-cancer endpoints.

Expert Peer Review Panels

- 2023 Neurotoxicology expert for Airborne Hazards and Burn Pit Exposure (AHBPE-2) peer review panel of the 2022 Toxic Exposures Research Program (TERP) for the Department of Defense (DOD) Congressionally Directed Medical Research Programs (CDMRP).
- 2018-2019 Aerospace medicine, physiology, and toxicology clinical review team for the U.S. Navy (NavAir) Root Cause Corrective Action (RCCA) for Physiological Episodes (P.E.s) for pilots of F/A-18H and G models and T-45.
- 2010-2012 Science Advisor for the Nanosafety Consortium for Carbon, Washington, D.C.
- 2004-present Ad Hoc Science Review Board Member of the U.S. Environmental Protection Agency (US EPA) Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel.
- 2009 U.S. Environmental Protection Agency (US EPA) Nanomaterial Case Studies Workshop: Developing a Comprehensive Environmental Assessment Research Strategy for Nanoscale Titanium Dioxide, Durham, NC, September 29 and 30.
- 2009 U.S. Environmental Protection Agency (US EPA) - External Peer Review Panel of the Toxicological Review of Nitrobenzene (CAS No. 98-95-3), In Support of Summary Information on the Integrated Risk Information System (IRIS), published January 2009.

- 2009 Expert Peer Panel of Tertiary-Butyl Acetate (TBAC), Toxicology Excellence for Risk Assessment (TERA), Cincinnati, OH. January 7 - 8.
- 2007 U.S. Environmental Protection Agency (US EPA) - Integrated Risk Information System. (IRIS) Peer Review of Nitrobenzene, Washington, DC. May 15.
- 2004 Resorcinol Peer Review Meeting: Follow-up Review to 2003, Toxicology Excellence for Risk Assessment, Harrisburg, PA. November 17-18.
- 2004 Federal Insecticide, Fungicide, and Rodenticide Act Scientific Advisory Panel Meeting: Consultation on Dermal Sensitization Issues for Exposures to Pesticides, Arlington, Virginia. May 4-6.
- 2003 Resorcinol Peer Review Meeting, Toxicology Excellence for Risk Assessment (TBAC), Cincinnati, OH, April 18-19.

Peer Reviewer

- Environment International
- Chemical Research in Toxicology
- Journal of Agricultural and Food Chemistry
- International Journal of Environmental Research and Public Health
- Current Medicinal Chemistry

Conferences and Symposiums

- 2013 Steering Committee member for the Gordon Conference "Environmental Nanotechnology: Novel Approaches to Meet Global Challenges." Vermont, USA.
- 2013 Co-chair for "The Small-Business Community" breakout session of the "National Nanotechnology Initiative Workshop: Stakeholder Perspectives on the Perception, Assessment, and Management of the Potential Risks of Nanotechnology." National Nanotechnology Initiative, Washington D.C., USA. September 10--11.
- 2012 Organizer for the "Water Research Foundation Workshop Assessing Potential Short-Term Impacts of Chloramination." Water Research Foundation, Seattle, WA. December 6 - 7.
- 2011 Roundtable Participant for the "Washington State Green Chemistry Roundup," the Pacific Northwest Pollution Prevention Resource Center (PPRC), May 25 - 26.

- 2010 Invited Speaker for the "Capstone Meeting: Risk Management Methods & Ethical, Legal, and Societal Implications of Nanotechnology", the National Nanotechnology Initiative (NNI), Washington DC, USA. March 30 - 31.
- 2009 Co-Chair for the In Vitro Plenary of the "Nanomaterials and Human Health & Instrumentation, Metrology, an Analytical Methods" Workshop, the National Nanotechnology Initiative, Washington DC, USA, November. The workshop brings together thoughts and ideas to recommend which direction the federal government's nano EHS research strategy.
- 2009 Planning Committee Chair Member for the "Nanotechnology Health & Safety Forum (NHSF)," Seattle, USA, June. The NHSF explored the multiple perspectives of nanotechnology.
- 2007 Committee Member for the "Naphthalene State-of-the-Science Symposium," University of Nebraska Center for Environmental Toxicology, Monterey, USA. October. The Symposium is a scholarly peer review of critical scientific information underlying a federal health risk assessment.
- 2003 Organizing Committee Member for the "Perchlorate State-of-the-Science Symposium," University of Nebraska Medical Center, Omaha, USA, September. The Symposium is a scholarly peer review of critical scientific information underlying a federal health risk assessment.

Select Education Courses

- Lecturer 2015-2017. Review of the human science for perchlorate. University of Minnesota.
- Lecturer 2015. Comparing the toxicology of conventional chemicals to nano-objects. Presented for the course 'ECE 383 / CSI 383 Nanotechnology: Simulation and Design', taught by the Department of Electrical & Computer Engineering, Portland State University.
- Lecturer 2013. Comparing the toxicology of conventional chemicals to nano-objects. Presented for the course 'ECE 399 / CSI 399 Nanotechnology: Simulation and Design', taught by the Department of Electrical & Computer Engineering, Portland State University.
- Lecturer 2012. Guidance on Physicochemical Characterization for Manufactured Nano-objects Submitted for Toxicological Testing: ISO TC-229 Project Work. Presented at a Bar-Ilan Institute of Nanotechnology and Advanced Materials Seminar. Tel Aviv, Israel.

October 15.

- Lecturer for Department of Pharmacology, University of Nebraska Medical Center. Provided lectures on toxicology for medical, pharmacy, graduate, and physician assistant students at the University of Nebraska Medical Center, Department of Pharmacology.
- Presented two courses in human health risk assessment for the Technical Research Council staff in South Africa. The purpose of the course was to introduce multi-pathway risk assessment to evaluate potential chemical exposures associated with various industrial activities in South Africa.
- Developed and taught over five courses on risk assessment and communication for the Air & Waste Management Association. The courses address toxicology, multi-pathway risk assessments for combustion sources, uncertainty analyses, and risk communication.
- Lectured on toxicology of the sensory system and neuroimaging in graduate student courses at the University of Washington.
- Developed, managed, and team-taught several courses on toxicology, risk assessment, and risk communication for the managers and staff of chemical plants, utilities, oil companies, railroads, and government officials. Courses have been presented in California, Pennsylvania, Arizona, Missouri, France, and South Africa.

Grants and Awards

- Grant Awarded, WRF 5085: Impact of Haloacetic Acid MCL Revision on DBP Exposure and Health Risk Reduction; (Richard Pleus Co-Investigator) 2021.
- Grant Awarded, WRF 4214: Development of Acceptable Daily Intakes (ADIs) for Pharmaceutical and Personal Care Product Ingredients, Hormonally Active Compounds, and Other Potentially Highly Toxic Compounds of Emerging Interest in Water Using the Minimum Anticipated Biological Effect Level (MABEL) Approach (Richard Pleus and Gretchen Bruce, Principal Investigators) 2008.
- Grant Awarded, WRF-05-005: Identifying Hormonally Active Compounds, Pharmaceutical Ingredients, and Personal Care Product Ingredients of Most Health Concern from Their Potential Presence in Water Intended for Indirect Potable Reuse; in collaboration with SNWA (Shane Snyder, Principal Investigator), 2007-2008.

- Grant Awarded, Center for Produce Safety 2012-208: Apple growing and packing microbial risk factors and their potential to lead to foodborne disease outbreaks (Richard Pleus, Principal Investigator), 2012.
- Grant Awarded, WaterRF 4387: Development of a Water Utility Primer on EDCs/PPCPs for Public Outreach (Gretchen Bruce and Richard Pleus, Principal Investigators) 2012-2015.
- Grant Awarded, WaterRF 4320: Assessing Potential Short-Term Impacts of Chloramination. Water Research Foundation (Richard Pleus, Principal Investigator) 2011-2015.
- Grant Awarded, AwwaRF/WRF 3085/04-003: Toxicological Relevance of Endocrine Disruptors and Pharmaceuticals in Drinking Water (2004-2008); in collaboration with Southern Nevada Water Authority (SNWA) (Shane Snyder, Principal Investigator), 2008.
- Grant Awarded, AwwaRF 3033: Comprehensive Utility Guide for Endocrine Disrupting Chemicals, Pharmaceuticals, and Personal Care Products in Drinking Water; in collaboration with SNWA (SHANE Snyder, Principal Investigator), 2005-2006.
- Grant Awarded, WRF-06-018: Tools to Assess and Understand the Relative Risks of Indirect Potable Reuse and Aquifer Storage and Recovery Projects (2006-present) (DRAFT); in collaboration with Nellor Environmental Associates, Inc. and Soller Environmental, LLC (Margie Nellor and Jeff Soller, Principal Investigators).
- Elected to Delta Omega Honorary Society in Public Health, 2003.
- Best Paper: Pleus R.C., Goodman G. and Mattie D.R. Development of a Reference Dose for Perchlorate: Current Issues and Status. Presented at the 50th Joint Army-Navy-NASA-Air Force (JANNAF) Propellant Development and Characterization and Safety and Environmental Protection Subcommittees Joint Meeting, Cocoa Beach, FL. May 2000.
- Faculty Mentor of the Year Award, General College Student government, University of Minnesota, Minneapolis, MN. 1989.
- Director of Undergraduate Research Opportunities Program Award, University of Minnesota, for the research proposal, The effect of fetal hypoxia on fetal brain development. 1987.
- Director of Undergraduate Research Opportunities Program Award, University of Minnesota, for the research proposal, Use and operation of autoshaping and fixed ratio paradigm in

environmental toxicology research. 1986.

- Scholl Fellowship, National Sudden Infant Death Foundation, Landover, MD. 1985.
- U.S. Public Health Traineeship Award, United States Public Health Service, Washington, DC. 1979.

Professional Memberships

- American Society for Pharmacology and Experimental Therapeutics
- Association for the Advancement of Science
- Society for Neuroscience
- Society of Toxicology

Directorships

- 2010–2018 Member, Board of Directors for the Nanotechnology Industries Association (NIA), Brussels, Belgium.
- 2004–2007 Member, Board of Directors, Frontier Geosciences, Inc. Seattle, WA.
- 2001–present Member and former Secretary, Board of Directors, Urban Environmental Institute. Seattle, WA.
- 1998–1999 Member, Board of Directors, Northwest Sculling Association. Seattle, WA.
- 1996–1998 Vice President, Seattle Yacht Club Rowing Foundation, Seattle, WA.
- 1989 Member, Board of Directors, Insight, Inc. Stillwater, MN.

Advisory Positions

- 2019-present Head of US Working Group 3, ISO/TC 229/W.G. 3 "Health, Safety and Environmental Aspects of Nanotechnologies."
- 2007-2019 U.S. Delegate, ISO/TC 229/W.G. 3 "Health, Safety and Environmental Aspects of Nanotechnologies."
- 2013–2017 Member of the University of California Center for Environmental Implications of Nanotechnology (UC CEIN) External Science Advisory Committee (ESAC). Selected for expertise on nano-related EHS issues.
- 2012 Invited Expert for the "BRE Cabin Air Quality Workshop." The BRE Group, London, England, February 20-21.

- 2011 U.S. delegate for the U.S.-Russia Bilateral Presidential Commission on Science and Technology, March 1 through 5. Selected for expertise on nano- related EHS issues.
- 2010–2017 Chair of the Science Advisory Board, National Institute of Biomedical Imaging and Bioengineering (NBIB), Development and Launch of an Interoperable and Curated Nanomaterial Registry, Principal Investigator: Michele L. Ostraat, Ph.D.
- 2009–2011 Project Advisory Committee, WateReuse Foundation, Kennedy/Jenks Consultants, WRF 09-07: Risk Assessment Study of PPCPs in Recycled Water to Support Public Review.
- 2009 Peer Review Panel Member for the National Institute for Occupational Safety and Health (NIOSH) Intramural Proposal "International Coordination of Nanoscale Reference Materials" for the Nanotechnology Research Center (NTRC).
- 2008–2011 Project Advisory Committee, WateReuse Foundation, WRF 06-019: Monitoring for Microconstituents in an Advanced Wastewater Treatment (AWT) Facility and Modeling Discharge of Reclaimed Water to Surface Canals for Indirect Potable Use, Florida, USA.
- 2008– 2012 Advisory Board Member, Center for Risk Communication Research, University of Maryland, College Park, MD, USA.
- 2007–2010 International Advisory Board, USA, International Symposium on Nanotechnology in Environmental Protection and Pollution, Fort Lauderdale, 'FL. USA.
- 2007–present Chair and U.S. Delegate on the International Organization for Standardization (ISO) Technical Committee (T.C.) 229, Nanotechnologies, leading the U.S. Technical Advisory Group (TAG) Working Group 3; Environmental and Occupational Health. This working group develops comprehensive technical standards for engineered nano-objects.
- 2006–2008 Counselor to the Regional Central States Chapter of the Society of Toxicology (CS-SOT).
- 2006 Stakeholder Advisory Committee Member to review Development of Indicators and Surrogates for Chemical Contaminant Removal During Wastewater Treatment and Reclamation, WateReuse Foundation Project WRF-03-014. Phoenix, Arizona. May 16-17
- 2002 Odors and Toxic Air Emissions Conference Program Committee Member. New Mexico, Rocky Mountain Water

Environment Association, Air and Waste Management Association, and the International Water Association.

- 2000–2008 Member, Board of Advisors, Good Company, Eugune, OR.

Community Service

- Panelist, Lakeside School Annual Biology Assessment Program. Seattle, WA (2001).
- Member & Co-director, Mayor's Small Business Task Force. Seattle, WA (1997-2001).
- Member, Sustainable Seattle: a voluntary network and civic forum for sustainability. Seattle, WA (1992-1993).

Selected Professional Presentations

2010 **Pleus R.C.** Nanomaterials – Understanding and Managing ESOH Risks. Presented at the 8th Annual Nanotechnology for Defense Conference (NT4D). Atlanta, GA. May 3-6, 2010.

2010 **Pleus R.C.** The Importance of Defining Chemical and Physical Parameters for Toxicological Testing of Nanomaterials: Getting Two Scientific Groups to Help Each Other. Presented at the Bureau International des Poids et Mesures (BIPM) Workshop on Metrology at the Nanoscale. Sevres, France. February 18-19.

2009 **Pleus R.C.** Global Standardization: ISO TC 229. Nanotechnology Symposium California Department of Toxic Substances Control (DTSC). Sacramento, CA. November 16.

2009 **Pleus R.C.** Nanomaterials: Steps to Address EHS Concerns Businesses Should Consider Before Placing Nanomaterials on the Market. Nanotech in the Marketplace Webinar. Nanotechnology Today: A Web Series. June 4.

2009 **Pleus R.C.** Hexavalent Chromium and Mercury in the Cement Industry – Recent Concerns About Human Health Issues. Presented at the 2009 IEEE-IAS/PCA 51st Cement Industry Technical Conference. Palm Springs, CA. June 2.

2009 **Pleus R.C.** Pharmaceuticals & Endocrine Disrupting Chemicals (EDCs) in Water: Development of Health Risk-Based Screening Levels. Presented at the Water Quality Committee Program 2009 ACWA Spring Conference. Sacramento, CA. May 19-22.

2009 **Pleus R.C.** EHS: Policy, Regulation & Product Safety. Presented at the Nano Science and Technology Institute (NSTI) 2009 Products and Liability Panel. Houston, TX. May 5.

2009 **Pleus R.C.** Environmental Health & Safety and Nanotechnology: Possible Issues in the Water Industry. Presented at the Washington Innovation Summit 2009. Bellevue, WA. April 9.

2009 **Pleus R.C.** Perchlorate, Pharmaceuticals and Personal Care Products, Endocrine Disrupting Chemicals, and Nanotechnology in Water. Presented for the Association of California Water Agencies (ACWA). Sacramento, CA. February 9.

2008 **Pleus R.C.**, Walker N., and Canady R. A. Minimal Set of Characterization Parameters. Presented at the Ensuring Appropriate Material Characterization in Nano-Toxicity Studies: A Workshop, Washington, DC. October 28.

2008 **Pleus R.C.** What We Are Learning About Micro Constituents in Drinking Water Pharmaceuticals and Endocrine Disruptors. Presented at the 2008 Water Quality and Regulatory Conference, Ontario, CA. October 16.

2008 **Pleus R.C.** Pharmaceuticals, Endocrine Disrupting Chemicals (EDCs), and Personal Care Products (PCPs) in Untreated and Treated Drinking Water: What We Know So Far. Presented at the AWWA/PNWS sponsored seminar, Pharmaceuticals in Water and Wastewater, Hillsboro, OR. September 11.

2008 **Pleus R.C.** Nanotechnology: Risk, Health, and Environmental Perspectives: Toxicology and Nano-objects. Boeing, Seattle, WA. July 25.

2008 **Pleus R.C.** Endocrine Disrupting Compounds (EDCs) and Pharmaceuticals and Personal Care Products (PPCPs). AWWA Webcast, May 7.

2008 Litigation Focusing on the Mechanism of Action—Yes, This Is Rocket Science! Presented at the DRI Conference, Phoenix, AZ. February 6, 2008.

2007 Linkov I., Peterson M.K., Corey L.M., and **Pleus R.C.** Assessing Environmental Risk of Nanomaterials: Approaches and Tools. 2007 NSTI Nanotechnology Conference and Trade Show, Santa Clara, CA. May 20-24.

2007 Snyder E.M., Bruce G.M., **Pleus R.C**., and Snyder S.A. Incidence and Toxicological Significance of Selected Endocrine Disrupting Chemicals (EDCs) in Drinking Water and presented at the World Environmental and Water Resources Congress 2007, Tampa, FL. May 15-19.

2006 Snyder S.A. and **Pleus R.C.** Human Health Implications from Nanoparticles in Water. Presented at the International Symposium on Environmental Nanotechnology, South Korea. November 3.

2006 **Pleus R.C**. and Snyder S.A. Risk Assessment of Pharmaceuticals and Endocrine Disruptors in Drinking Water. Presented at The Western Coalition of Arid States Conference, Tucson, AZ, November 2.

2006 **Pleus R.C**. and Snyder S.A. Toxicological Relevance of Pharmaceuticals and Endocrine Disruptors in Drinking Water. Presented to the Orange County Utilities Water Quality Section Conference, Orlando, FL. October 26.

2006 Linkov I., **Pleus R.C.**, Stevens J., and Ferguson E. EPA Peer Review Panel Recommendations on Environmental Risk of Nanomaterials & Multi-Criteria Decision Analysis and Environmental Risk Assessment for Nanomaterials. Presented at the U.S. Army Nanotechnology Development Coordination Meeting, Cambridge, MA. August 15-17.

2006 **Pleus, R.C.** Perchlorate in 2006: Where are we and where are we going? Invited speaker. Presented at the 2006 Superfund Program Managers Symposium, Scottsdale, AZ. August 13-16.

2006 Corey L.M., Peterson M.K., and **Pleus R.C**. Nanotechnology Environmental Health and Safety (EHS): Current Knowledge and Future Challenges. Presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM. August 6-11.

2006 Corey L.M., Peterson M.K., and **Pleus R.C**. Nanotoxicology: Special Considerations for Assessing Risks from Very Small Particles. Presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11.

2006 Corey L.M., Peterson M.K., and **Pleus R.C.** Developing Nanotechnology Health and Safety Standards. Invited speaker. Presented at the 2006 Micro Nano Breakthrough Conference, Vancouver, WA. July 25, 2006.

2006 **Pleus R.C.**, Bruce G.M., Snyder E.M., Snyder S.A., and Corey L.M. Toxicological Relevance of EDCs and Pharmaceuticals. Invited speaker. Presented at the 2006 AWWA Annual Conference in San Antonio, TX. June 11-15.

2006 **Pleus R.C.**, Bruce G.M., Snyder E.M., Snyder S.A., and Corey L.M. Incidence and Toxicological Significance of Selected Pharmaceuticals in Drinking Water. Presented at the Groundwater Resources Association's Emerging Contaminants in Groundwater Symposium, Concord, CA. June 7-8.

2006 **Pleus R.C.,** Bruce G.M., and Snyder E.M. Addressing the Significance of Trace Level Findings. Presented at the Association of California Water Agencies Groundwater/ Water Quality Track

Pharmaceuticals in Groundwater: Public Health Issue or Public Relations Nightmare? Monterey, CA. May 10.

2006 Bruce G.M., **Pleus R.C.,** Snyder S.A., and Snyder E.M. Toxicological Relevance of Pharmaceuticals and Endocrine Disrupting Chemicals in Water. Presented at the National Ground Water Association's 5th International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water, Costa Mesa, CA. March 14, 2006.

2005 Snyder E.M., Snyder S.A., **Pleus R.C.**, Bruce G.M., Hemming J.D.C., and Hulsey R.A. Approach for Assessing the Toxicological Relevance of Endocrine Disruptors and Pharmaceuticals in Drinking Water. Submitted to Water Quality Technology Conference and Exhibition, Quebec, Canada. November 6-10.

2005 Corey L.M.**,** Bruce G.M., **Pleus R.C.** Development of Nano-Based Risk Assessments: Challenges for the Present and Future. Mechanisms of Action of Inhaled Fibers, Particles and Nanoparticles in Lung and Cardiovascular Disease, Research Triangle Park, NC. October 25-28.

Pleus, R.C. Perchlorate: Where We Are and Where We Are Going? Presented at the Environmental Law Conference at Yosemite, CA. October 22.

2005 **Pleus, R.C.** Emerging Chemicals of Concern-Effective Toxicological Assessment. Presented for the Society of Toxicology, Central State Chapter, Ames, IA. September 30.

2005 **Pleus, R.C.** Emerging Chemicals—Health Concerns About Endocrine Disruptors & Pharmaceuticals in Drinking Water Supplies. Presented at Mealey's Water Contamination Conference in Los Angeles, CA. September 26-27.

2005 **Pleus R.C.** Methods to Derive Safe Drinking Water Levels for Chemicals in Drinking Water. Invited to present at the 2005 Annual Conference & Exposition of the American Water Works Association: Natural Poisons & Unnatural Products Session, San Francisco, CA. June 14.

2005 Bruce G.M. and **Pleus R.C.** Private Toxicology: Testing and Analysis. Invited to present at the Winning: Hot Topics in Criminal Law—Alternatives to the State Crime Lab, Seattle, WA. May 24.

2005 Bruce G.M., Peterson M.K., and **Pleus R.C.** Comparative Risk Assessment of Multimedia Environmental Exposure to Perchlorate and Other Agents that Inhibit Iodide Uptake into the Thyroid. Poster presented at the Society of Toxicology 44th Annual Meeting, New Orleans, LA. March 10.

2005 Peterson M.K., **Pleus R.C.,** and Hays S.M. Assessing the Risks Associated with Children Ingesting Lead in School Drinking Water: PBPK Modeling and Risk Communication. Poster presented at the Society of Toxicology 44th Annual Meeting, New Orleans, LA. March 8.

2005 Dodge D.G., Peterson M.K., and **Pleus R.C.** Addressing Toxicological Challenges to Community Water Fluoridation in Washington State. Poster presented at the Society of Toxicology 44th Annual Meeting, New Orleans, LA. March 7.

2004 **Pleus R.C.** 2004 Update: What Does Human Data Tell Us About How Much Perchlorate Exposure is Safe? Presented at the 2004 Water Quality Conference, Ontario, CA. October 26-28.

2004 **Pleus R.C.** Perchlorate dose-response relationship and the likelihood of effects at environmentally relevant levels. Presented at the URS Seminar—Perchlorate: Rush to Judgment or Serious Health Threat, Seattle, WA. September 28.

2004 **Pleus R.C.** Research, Discovery, and Contribution: Professional Experience in the Republic of South Africa. Invited speaker. Presented at the Pacific Northwest Association of Toxicologists (PANWAT) Annual Meeting: Toxicology in Third World Settings, Bend, OR. September 19.

2004 **Pleus R.C.** Product Liability: Emerging Contaminants of Concern. Presented to Bullivant Houser Bailey, Seattle, WA, and their satellite offices via video-conference. September 2.

2004 **Pleus R.C.** Perchlorate dose-response relationship and the likelihood of effects at environmentally relevant levels. Presented at the 228th ACS National Meeting, Philadelphia, PA. August 22-26.

2004 **Pleus R.C.** and Bruce G.M. Where Are We Now? An Update on the Perchlorate Action Level Debate. Presented at the 7th Annual Force Health Protection Conference, Albuquerque, NM. August 8-12.

2004 Belzer R.B., **Pleus R.C.,** Bruce G.M., and Peterson M.K. Using Comparative Exposure Analysis to Validate Low-Dose Human Health Risk Assessment: The Case of Perchlorate. Presented at the 7th Annual Force Health Protection Conference, Albuquerque, NM. August 8-12.

2004 **Pleus R.C.** and Bruce G.M. Perchlorate dose-response relationship and the likelihood of effects at environmentally relevant levels. Presented at the Groundwater Resources Association of California Conference, Glendale, CA. August 4.

2004 **Pleus R.C.** Asthma and Fungi: State of the Science. Presented at the ASTM International Boulder Conference on Mold in the Indoor

Environment: Assessment, Health and Physical Effects, and Remediation, University of Colorado at Boulder, Boulder, CO. July 25-30.

2004 **Pleus R.C.**, Bruce G.M., Peterson M.K., and Dodge D.G. Comparative Contribution of Perchlorate and Anti-Thyroid Agents in American Diets to Iodide Uptake Inhibition. Presented at the 32nd Propellant Development & Characterization Subcommittee (PDCS) and the 21st Safety & Environmental Protection Subcommittee (S&EPS) Joint Meeting, Seattle, WA. July 25-29.

2004 **Pleus R.C.** Perchlorate dose-response relationship: Evidence from human studies. Presented at the 227th American Chemical Society National Meeting, Anaheim, CA. April 1.

2004 **Pleus R.C.** Establishing a Safe Dose for Perchlorate Based on Human Evidence of a No Effect Level. Presented at the Society of Toxicology 43rd Annual Meeting, Baltimore, MD. March 24.

2004 Peterson M.K. and **Pleus R.C.** Comparative Analysis of Neuropsychological Toxicity of Biological, Chemical, and Pharmaceutical Agents. Presented at the Society of Toxicology Annual Meeting, Baltimore, MD. March 22.

2004 **Pleus R.C.** Perchlorate: The Greer Study, the Critical Animal Studies, and the Evaluation Process by the National Academy of Science. Presented at the 14th Annual West Coast Conference on Soils, Sediments, and Water, San Diego, CA. March 16.

2004 **Pleus R.C.** and Bruce G.M. Adverse Effect Levels for Neurodevelopmental Effects Associated with Maternal Perchlorate Exposure: What do Existing Data Indicate? Presented at the 21st International Neurotoxicology Conference, Honolulu, Hawaii. February 12.

2003 **Pleus R.C.** Considerations related to sampling for bioterrorism agents. Presented at the Society for Risk Analysis Meeting - Bridging Risk Divides: Risk Assessment and Risk Communications Methodologies for Bioterrorism Incident Response Symposia, Baltimore, MD. December 8.

2003 **Pleus R.C.** A Review of the Science Required to Establish an Informed MCL for Perchlorate in Drinking Water. Presented to the Perchlorate Review Scholars Committee Urban Water Research Center, University of California, Irvine, CA. October 21.

2003 **Pleus R.C.** Perchlorate: The Questions You Have and The Answers You Need Presented at Fresh Summit 2003: Produce Marketing Association's 54th International Convention & Exposition, Orlando, FL. October 19.

2003 **Pleus R.C.** What do we know about the neurotoxic effects of chemicals in aircraft cabin air? Presented at the Northwest Occupational Health Conference Pacific Northwest Section of the American Industrial Hygiene Association, Seattle, WA. October 16.

2003 **Pleus R.C.** The Greer Study: Discussion of the Key Points. Presented at the UNMC Perchlorate State-of-the-Science Symposium, Omaha, NE. September 30.

2003 **Pleus R.C.** Making Sense of the Perchlorate Action Level Debate. Presented at the 6th Annual Force Health Protection Conference, Albuquerque, NM. August 11-14.

2003 **Pleus R.C.** Quantifying the Effects of Perchlorate. Presented at the California Minor Crops Council Technical Committee Meeting, Irvine, CA. June 26.

2003 **Pleus R.C**., Bruce G.M., and Peterson M.K. Assessing Neurodevelopmental Effects of Environmental Exposures to Anti-Thyroid Agents: How Relevant are High Dose Rat Studies? Presented at the Society of Toxicology 42nd Annual Meeting, Salt Lake City, UT. March 9-13.

2003 Bruce, G.M., **Pleus, R.C**., and Peterson M.K. Dose-Response Investigation of Tricresyl Phosphates Potentially Present in Airplane Cabin Air from Jet Engine Oils. Presented at the Society of Toxicology 42nd Annual Meeting, Salt Lake City, UT. March 9-13.

2003 **Pleus R.C.** Invited as Expert Panelist and presented, Making Sense of the Perchlorate Action Level Debate at AFCEE Technology Transfer Workshop, San Antonio, TX. February 24-27.

2003 **Pleus R.C.** Making Sense of the Perchlorate Action Level Debate. Presented at the 22nd Meeting of the RCC – Environmental Group AFCEE, San Francisco, CA. February 11-13.

2003 **Pleus, R.C**. Dose-Response Investigation of Tricresyl Phosphates Potentially Present in Airplane Cabin Air from Jet Engine Oils. Presented at the 20th Annual International Aircraft Cabin Safety Symposium. Universal City, CA. February 10-13.

2002 Belzer R.B., Johnson D., Peterson M.K., and **Pleus R.C.** Comparative Risk Assessment for Perchlorate: How does the US EPA's RfD Compare to Other Goitrogens that are Found in the US Diet. Presented at the Society for Risk Analysis Annual Meeting: Symposium on Perchlorate: Policy Implications, New Orleans, LA. December 8-11.

2002 **Pleus R.C.** and Bruce G.M. Assessing Developmental Neurotoxicity for Environmental Chemicals. Presented at the Society for Risk Analysis Annual Meeting Symposium on Perchlorate: Policy

Implications, New Orleans, LA. December 8-11.

2002 Peterson M.K., Bruce G.M., and **Pleus R.C.** Implications for the Use of Thyroid Endpoints from Rat Reproductive/Developmental Toxicity Studies in Human Risk Assessment. Presented at the Society for Risk Analysis Annual Meeting Symposium on Perchlorate: Policy Implications, New Orleans, LA. December 8-11.

2002 **Pleus R.C.** Making Sense of the Perchlorate Action Level Debate. Presented at the SERDP Partners in Environmental Technology Technical Symposium & Workshop, Washington, D.C. December 5.

2002 **Pleus R.C.** What Do Human Data Tell Us About How Much Perchlorate Exposure is 'Safe'? Presented at the Perchlorate Conference, Ontario, CA. October 16.

2002 Bruce G.M., Peterson M.K., and **Pleus R.C.** Sequence of Neurodevelopmental Effects of Anti-thyroid Agents in Rat Offspring: What Should We Expect to See? Poster presented at the NIEHS Thyroid Hormone & Brain Development Conference, Research Triangle Park, NC. September 23-25.

2002 Wahlsten D., Colbourne F., and **Pleus R.C.** High throughput rat and mouse brain morphometry for toxicology research. Poster presented at the NIEHS Thyroid Hormone & Brain Development Conference, Research Triangle Park, NC. September 23-25.

2002 Belzer R.B., Bruce G.M., Peterson M.K., and **Pleus R.C.** Exposure to Anti-thyroid Chemicals in the Environment and Diet. Poster presented at the NIEHS Thyroid Hormone & Brain Development Conference, Research Triangle Park, NC. September 23-25.

2002 **Pleus R.C.** Understanding Mold-Related Health Effects. Presented at the Emerging Environmental Issues Workshop Environmental Issues in Transactions: The New Landscape & Mold: Why a Headline Now? Sidley Austin Brown & Wood, Chicago, IL. June 7.

2002 **Pleus R.C**. with Boss, et al. Decommissioning – Biological Risk course: Risk Assessment and Risk Communication: Strategic Tools. Presented at the American Industrial Hygiene Conference & Exposition, San Diego, CA. June 1-2.

2002 Peterson M.K., Bruce G.M., and **Pleus R.C.** Identification and Risk Assessment of Odorous Chemicals Associated with Combustion Processes. Poster presented at the Air & Waste Management Association's Hazardous Waste Combustors Specialty Conference & Exhibition, St. Louis, MO. April 17-19.

2002 **Pleus R.C.** The Toxicology of Terror and Tragedy. Presented at the Western Washington Emergency Network Conference, Bellevue, WA. April 2-3.

2002 **Pleus R.C.** Understanding Mold-Related Health Effects. Presented at the Mold Mania! A Growing Concern for the Insurance Industry Seminar, Pacific Northwest Chapter of the CPCU Society, Seattle, WA. March 13.

2002 Bruce G.M., Johnson D., and **Pleus R.C.** Assessment of the Validity of US EPA's Interpretation of an Effect of Altered Neurobehavior in Offspring Treated with Perchlorate in utero: A Critical Review of the Argus (1998) and Bekkedal, et al. (2000) Studies. Submitted to Eastern Research Group, Inc. for the US EPA/ORD Peer Review Workshop-Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization, March 5-6, Sacramento, CA. February 19.

2002 Bruce G., Peterson M.K., Lincoln D.L., and **Pleus R.C.** Review and assessment of TSH and Thyroid Hormones during Pregnancy in the Rat and Human and Comparison to Hormone Values in the 2001 Effects Study. Submitted to Eastern Research Group, Inc. for the US EPA/ORD Peer Review Workshop-Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization, March 5-6, Sacramento, CA. February 19.

2002 Bruce G. and **Pleus R.C.** Summary of the Expert Review of the Argus, 2001 ("Effects Study") Evaluation of Perchlorate Effects on Brain Morphometry in Neonatal Rats. Submitted to Eastern Research Group, Inc., for the US EPA/ORD Peer Review Workshop-Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization. March 5-6, Sacramento, CA. February 19.

2002 **Pleus R.C.** Summary of the 1999 External Peer Review Panel Workshop, Submitted to Eastern Research Group, Inc., for the US EPA/ORD Peer Review Workshop – Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization. March 5-6, Sacramento, CA. February 19, 2002.

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