Curriculum Vitae
Marco Kaltofen, MS, PE (Civil, MA), C. NSE

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Experience

President, (1988 - present) - Boston Chemical Data Corporation, Natick, MA - Providing technical support for environmentally-related organizations and for litigation. Environmental fate and transport investigations including nuclear forensic examinations.

Performed environmental investigations related to toxic, petroleum, chemical and radioactive wastes. Extensive onsite field sampling and investigations in the US and Internationally. Large-scale petroleum spill investigations and mapping. Extensive modeling via computerized chemical, geographical and engineering information systems, including interactive GIS and CAD reporting, and 3-D groundwater, air transport and fire dynamics models. Developed large-scale site remediation and laboratory investigation plans, including laboratory audits and facility inspections. Extensive Federal and State court-related expert testimony. Performed life cycle analyses and pollution prevention research, including product testing and site evaluations. International clients in Russia, The Netherlands, Mexico, and Japan.

U.S. citizen, native Dutch speaker with valid Netherlands passport. Able to work freely in the European Union.

Laboratory Director, (1988 - 1993) - Citizens' Environmental Laboratory, Boston, MA - Founded this nationally recognized nonprofit environmental testing laboratory. Duties included analyses, marketing, budgeting, hiring, public speaking, and expert testimony. Supervised quarterly USEPA performance evaluations. Extensive use of AAS, and GC/MS techniques. Performed engineering and chemical quality evaluations of contaminated sites.

Project Coordinator, (1984 - 1988) - Greenpeace International, London, UK - Responsible for environmental program research and field sampling, supervision of a staff of fifty employees, media and community relations, and field programs. Supervised US and International programs.

Manager, (1982 - 1984) - Cambridge Analytical Associates, Trace Inorganics Laboratory, Boston, MA - Responsible for atomic absorption, environmental,

infrared, and polymer analyses, including supervision of staff, client contacts, National Marine Fisheries Service contract, and USEPA performance evaluations.

Chemist, (1981) - New England Aquarium, Boston, MA - Worked with U.S.D.O.E. tracing environmental fate of petroleum drilling wastes and the fate of pollutants in oceans. Responsible for DC-Plasma Emission Spectroscopy, sample preparation and collection.

Chemical Instrument Technician, (1977 - 1980) - Boston University, Boston, MA - Responsible for repair and calibration of UV-Visible, Nuclear Magnetic Resonance, Mass Spectroscopy and other spectroscopic equipment.

Education

2007 to 2014 - Worcester Polytechnic Institute, Dept. of Civil and Environmental Engineering, Doctor of Philosophy candidate in civil engineering, and nuclear engineering certificate. Currently in final year of doctoral program in Civil Engineering and graduate certificate program in Nuclear Science and Engineering. Coursework and research in environmental transport of radioactive materials, particulate transport, and dynamic modeling and numerical analysis. Additional research on the fate of petroleum and dispersant materials related to the BP Gulf Oil spill, at WPI's Environmental Engineering Water Quality Laboratory, and at the Higgins Fire Protection Laboratory. Dissertation topic, Transport and physical properties of radioactively-hot particles. Research on depleted uranium in the environment in Belgrade, Serbia supported by a grant from Jeff Ubois and the John D. and Catherine T. MacArthur Foundation.

2009 - Master of Science degree in Environmental Engineering, Worcester Polytechnic Institute, Dept. of Civil and Environmental Engineering. All Ph D level coursework completed 2014 including: treatment system hydraulics, environmental fate and transport, nuclear reactor operations, airborne radionuclide transport and radionuclide sampling heterogeneity, industrial waste treatment, atomic force microscopy, sustainable engineering, nuclear engineering, health physics, and groundwater flow models. Masters thesis, *Microanalysis of Heterogeneous Radiation in Particulate Matter as an Aid to Nuclear Source Identification*.

1982 to 1984 - Northeastern University Graduate study in Civil Engineering

1981 - Boston University Bachelor of Science degree in General Engineering with an American Chemical Society accredited concentration in Chemistry.

Boston University College of Engineering 2002 Distinguished Alumni Award for Community Service. Boston University School of Public Health Superfund Basic Research Program / Toxics Action Center 2007 Science for the Benefit of Environmental Health Award.

Massachusetts Registered Professional Civil Engineer

Graduate certificate in Nuclear Science and Engineering, completed 2014

Hazwoper 8 hour training completed Oct. 2013

American Chemical Society continuing education in Environmental Chemistry and Safety, 2006, 1992 to 1993.

Member American Society of Civil Engineers, Boston Society of Civil Engineers Section/ASCE, Committee on National Accreditation of Environmental Laboratories, American Chemical Society - National and Northeastern section, (25 years); Coasts, Oceans, Ports and Rivers Institute, Health Physics Society, (fee-waived, Ph.D. candidate member level)

Recent Publications:

High radioactivity particles in Japanese house dusts, March 2014
Tracking radioactive dust in northern Japan, WPI, March 2012, download.
Tracking radiological plumes from the Fukushima Daiichi accident Oct. 31, 2011 presentation at 139th annual meeting of the APHA, Washington, DC
Persistence of DWH n-alkanes and PAHs, Bay Jimmy marshes, Barataria Bay, LA: Year 1, D, Deocampo, principal author, collaborators, W. Crawford Elliott, Kuki Chin, V. Ryan Perry, Gary Hastings, Bob Rosenbauer, Marco Kaltofen, USF Conference presentation, October, 2011
2010 BP oil spill in the Gulf of Mexico Corexit dispersants/BP Crude mix increases polynuclear aromatics levels in water & marine life in the Gulf of Mexico
Microanalysis of Workplace Dusts from the Mixed Waste Tank Farm of the Hanford Nuclear Reservation, J. Environmental Engineering Science, published February 2010.
Master's Research Report, Worcester Polytechnic Institute, August 2009. Microanalysis of Heterogeneous Radiation in Particulate Matter.

Recent Invited Lectures:

Dartmouth College, Thayer School of Engineering, *Transport of radiation from the Fukushima Daiichi accidents*, February 2012
Tufts School of Medicine, *Oil & dispersants from the Gulf oil spill*, November 2011
Tufts School of Medicine, *Radiation exposure to the people of northern Japan*, November 2011
University of Washington, *Radiation transport by hot particles*, October 2011
Worcester Polytechnic Institute, *Fingerprinting of crude oil in the Gulf Of Mexico oil spill*, February 2012
Loyola University, *Dispersants and their effects on Polynuclear Aromatic Hydrocarbon concentrations in seawater*, October 2010
Chelyabinsk School of Law, Chelyabinsk Oblast, Russia, *International trade in radioactive wastes*, October 2007

Professional Service

U. S. Army Restoration Advisory Board Chairman, (13 years), Soldier Systems Center, Natick, Massachusetts
Boston University College of Engineering Alumni Association - Distinguished Alumni Award
Toxics Action Center, Boston, Massachusetts - Board member, lecturer
Environmental Technology Education Center - Board member
US National Park Service - volunteer historic interpreter
Hanford Challenge - Board member
Engineers Without Borders, Professional member
Provides pro bono website programming, design, and support for nonprofit education and community service organizations.
US Army Science, Math and Technology Student Competitions 2008 to 2010, Judge
Task force for the development of sewer use regulations for the Massachusetts Water Resources Authority.

Professional Achievements

Marco Kaltofen, P.E.

BP / Transocean - Mississippi Canyon 252 Deepwater Horizon oil spill, Engineer responsible for sampling, testing and inspection of crude oil contamination in the Gulf of Mexico, including coastal and deepwater sites ranging from Galveston, TX, to Miami, FL. Additional research on the effects of dispersants on water column toxicity and dispersion of crude oil in subsurface water, and on the impacts of open burning of floating crude oil. Responsible for all laboratory selection, technical liaison, data verification, method development, field team training and outfitting, and also for quick response direct laboratory analyses.

Lead Field Engineer responsible for sampling and inspection of Murphy Oil Co. spill-related damage in St. Bernard Parish, LA following Hurricane Katrina. Conducted sampling design and sampling, laboratory testing management, GIS database preparation, and data analyses to determine the extent of crude oil and refined petroleum product contamination in homes, soils, sediments and the release-point refinery. Sole live witness for plaintiffs at class certification hearing. Performed class boundary mapping. Conducted negotiations with defense experts and before Federal Court helping lead to successful settlement for plaintiffs.

Review and validation of site data including field verification related to environmental quality analyses at Love Canal, Niagara Falls, NY; prior to settlement agreements between Occidental Chemicals and the USEPA.

Designated expert, consolidated multistate Chinese drywall litigation, for Plaintiffs Steering Committee

Sampling and management of laboratory analysis of airborne formaldehyde in FEMA-supplied emergency housing units in Louisiana, Alabama, and Maryland. Database production and statistical review of formaldehyde data.

Engineer in responsible charge of site investigations at eight Massachusetts retail centers involving remediation and assessment of leaking underground storage tanks and buried hazardous chlorinated wastes. Reviewed and selected innovative treatment systems and designs for three sites, including contractor selection, oversight, and performance evaluation. Remediation methods selected include biodegradation, phytoremediation, two-phase extraction, and sparging. All of the retail centers remained in operation during remediation activities.

Researched, specified and reviewed design and construction of a permeable

reactive barrier installation to prevent migration of and to destroy a contaminated groundwater plume containing perchloroethylene and trichloroethylene at a commercial operation adjacent to a public water supply in Massachusetts. This was the first private operational reactive iron wall built in the Commonwealth of Massachusetts. (pictured at top)

Reviewed water quality issues related to cyanobacteria in Massachusetts and California lakes and potential control measures.

Sampling and analysis of particulate matter, dusts, and fire/railcar debris related to a train derailment and fire near Cleveland, Ohio.

Sampling, specification, and management of laboratory analysis of formaldehyde and formaldehyde-containing resins in imported textile products.

Designed and performed field study of polychlorinated dibenzodioxins and dibenzofurans in a manufacturing facility and its environs, including the oversight and conduction of all sampling, data validation, and laboratory audits.

Review of industrial air monitoring data for total hydrocarbons and benzene, with calculation of human exposure to benzene.

Completed review of POTW wastewater discharges, discharge monitoring performance and pretreatment technologies for high petroleum hydrocarbon-bearing and alkaline industrial wastestreams.

Designed and performed field study of petroleum and volatile organics releases from a flooded Kansas petroleum refining facility and its environs, including the oversight or performance of all sampling, mapping, data validation, laboratory contracts, and testing oversight.

Reviewed the use of hydrogen release compounds for the purpose of chlorinated solvent concentration reduction in groundwater at military and commercial locations in Massachusetts.

Field analyses, sampling, and environmental fate review at a former mercury cell chloralkali production facility in coastal Alabama, including onsite and offsite analyses in multiple media. Media analyzed included fish, sediments, air, water, indoor residential dusts, and soils.

Sampling and analysis of onsite and offsite dusts, soils, and ashes from a former chemical/petroleum barrel reclaimer in Chicago, IL. Use of ambient and subsurface air monitoring, metals, dioxin, PCBs, and multiple microscopic

techniques to fingerprint airborne emissions fallout.

Review and inspection of a former New Jersey iron mine used for automobile paint waste disposal.

Sampling, analysis, and microscopic review of tree rings collected to determine past exposure to volatile and particulate metals.

Analysis of biological particulates in airborne dustfall, analysis of bulk and surface dusts, and soils.

Inspection, sampling, and analysis of active paint spray booth operations.

Reviewed environmental conditions and process safety for a Seattle-based aerospace research and development firm.

Sampling and analysis of indoor house dusts for polychlorinated dibenzodioxins and dibenzofurans in a community surrounding a cluster of waste incinerators and industrial boilers, including report presentation for a federally-sponsored public review meeting.

Sampling, specification, and management of laboratory analysis of reduced sulfides and sulfide-generating materials in imported textile construction materials.

Performed post-Hurricane Katrina field examination of petroleum spills in Mobile Bay, Mobile, Alabama and Pascagoula, Mississippi. Mobilized field resources onsite in the Gulf Region to begin sampling campaign within ten days of the 2005 storm event.

Court-Qualified as an expert witness in State and Federal courts in the fields of Chemistry and Civil Engineering, as well as in numerous civil depositions. (Massachusetts, Wisconsin, Texas, California, Pennsylvania, Louisiana, Alabama)

Co-Chair, US Army Soldier Systems Biological and Chemical Command Superfund Restoration Advisory Board. Reviews five operational Superfund units including multimedia human and ecological exposure vectors. Extensive communication with public, regulatory, state and federal public health authorities and military agencies, including the Department of Defense Office of the Undersecretary for Environmental Affairs. Reviews and comments on workplans, draft and final reports, and health and safety plans for remedial investigations, feasibility studies, environmental and human health risk assessments, as well as budget priority documents. Also responsible for coordination of agendas, communications with municipal officials, and

community outreach.

Assessment of metal corrosion by airborne sulfide exposure from a pulp and paper mill and its wastewater treatment system.

Site investigation of a Municipal/Industrial waste landfill in South Texas, including determination of the environmental fate of materials released from the land disposal facility after initial placement.

Researched, specified and oversaw design and construction of a phytoremediation project to clean contaminated soils containing perchloroethylene and trichloroethylene using a mix of northern latitude deep and shallow-rooted plants in an engineered treatment cell adjacent to a residential area.

Engineer in responsible charge of site investigations and remediation of a leaking underground petroleum product storage tank and fuel line in an urban commercial setting in Cambridge, MA.

Engineer in responsible charge of site investigations, remedial method selection and design of a PCE contaminated groundwater environment and metal contaminated soils in an industrial zone in Seattle, WA. Duties include bid selection and vendor oversight.

Designed and performed field study of indoor house dusts and particulates for toxic metals using atomic spectroscopy, X-ray microanalysis, and digital optical microscopy for a residential community surrounding a metal smelter.

Reviewed the environmental aspects of Catalytic Extraction Processing of hazardous wastes for Molten Metal Technology of Waltham, MA.

Designed and performed field study of polychlorinated dibenzodioxins, volatile solvents, metals, and polynuclear aromatic hydrocarbons at a former research/manufacturing facility located in a highly populated area.

Beginning in 1988 with an initial budget of less than $10,000, built a full service nationally recognized environmental laboratory to serve institutional, individual, and educational clients. Achieved a 100 percent success rate for trace metals, volatile organics, and PCBs on EPA performance evaluations. Served over 750 clients in four years. Raised $ 1,000,000 in grants and contracts.

Voting member of the USEPA Committee on National Accreditation of Environmental Laboratories.

Extensive public relations and communications experience including appearances or articles with Good Morning America, the Today Show, NBC Nightly News, CNN, C Span, TBS, National Public Radio, U S News & World Report, Chemical & Engineering News, The New York Times, and over 300 technical and other citations.

Reviewed formulations, safety hazards, and warnings of military-type zinc chloride smoke bombs and alternatives.

Performed the first complete mass balance of hazardous materials into Boston Harbor and its tributaries. This study was the basis of a State funded study which was performed two years later with a far larger budget. The final aggregate results of the two studies agreed within 3 percent. Field work included sewer user sampling and NPDES discharge sampling and analyses.

Determination of free crystaline silicate and other mineral particulate air releases from a West Texas quarry, including sampling of parent material, air, soils, and dusts.

Sampled surface bedrock and weathered materials in Cuidad Juarez, Mexico for the determination of free crystaline silicates and naturally-occurring arsenic.

Design and completion of sampling efforts to complete indoor air quality studies for gasoline-related volatile organic compounds.

Design and completion of sampling efforts, including health and safety presentations, for indoor and outdoor pesticide contamination studies in mixed industrial and residential environments.

Sampling, analyses, and mapping of pesticide residues in public and residential sites in South Texas, related to pesticide formulation activities.

Determined hydrogen gas, hydrogen sulfide, and sulfur dioxide production in anaerobic and aerobic sediments, composted food wastes, and sanitary wastewater treatment residuals.

Worked with State Attorneys General offices in three Northeast states. One investigation performed directly resulted in the State of New Jersey recovering sufficient funds to run their Hazardous Waste Strike Force for eighteen months without State appropriations.

Reviewed environmental impacts of polystyrene manufacture, use and disposal.

Performed real-time air quality monitoring and field sampling of beryllium-based particulates in a South Texas medical devices manufacturing facility, and determined particle size, loading, and morphology examination of metallic cuttings and dusts.

Assesment of lead and cadmium transport via soils and sediments surrounding a cement kiln in West Texas.

Air sampling and real time particulate concentration monitoring in a metal processing laboratory.

Review and field detection of emissions from a mineral fertilizer manufacturer, including sampling and analyses of soils, indoor house dusts, and sediments.

Collected marine samples for a combined German and Swedish oceanographic research team in the Gulf of Finland. Sampled media included both seawater and wastewater effluents and waste treatment residuals on the southeastern Swedish coast.

Laboratory Investigations and Method Reviews

Designed sampling protocol and carried out all analyses for closure of a scientific base in Antarctica, including characterization of petroleum and Jet A1 releases.

Sampled and analyzed contaminated Boston Harbor/Fort Point Channel sediments.

Designed and constructed a mercury cold vapor inlet system for atomic absorption determination of mercury in environmental samples, and successfully completed a USEPA proficiency examination for mercury detection employing this apparatus.

Performed an onsite review of Soviet Environmental Ministry and Ministry of Chemical Industry environmental monitoring procedures and laboratories analyses for steel production and natural gas processing in Volgagrad, USSR.

Performed site investigations of a Refinery/Chloralkali complex in the vicinity of Volgagrad in the present Russian Republic. Performed all required laboratory analyses and authored and presented final report to the Ministry of Industry in Moscow and to Russian and US specialists in Washington, DC.

Reviewed and developed methodologies for the analytical determination of MIC in paints.

Conducted field sampling and laboratory analyses for the determination of metals and cyanides in tidally-controlled groundwater at Spectacle Island in Boston Harbor, for preconstruction environmental quality investigations for the Boston Third Harbor Tunnel project.

Developed and performed analytical procedures for the determination of 4-phenylcyclohexene in textiles and fibers, and presented findings for product liability determinations.

Designed and managed construction of an environmental analysis laboratory facility for a commercial client; including HVAC, waste recycling, permit, and vendor qualification duties.

Designed sampling protocols and performed analyses of air, water, and sediment samples from the Kingdom of Kuwait immediately after the cessation of hostilities with Iraq. These results were reviewed and published in the general press, as well as by the USGAO.

Detection of lead, arsenic, hafnium and other metals in soils from a closed 19th Century smelter in Massachusetts; including use of Scanning Electron Microscopy/EDX and Atomic Absorption methods for determining insoluble lead species and the morphology and origins of lead and chromate-containing particulates. Presented findings of this investigation to the Commonwealth of Massachusetts Environmental Protection Department and local Boards of Health in order to develop methodologies for regulators, and to develop a long-term groundwater and drinking water well monitoring program.

Determined morphology and bioavailability of silicates in paint matrices by digital optical microscopy for the investigation of stains and topcoats.

Reviewed field laboratory designs and field procedures for NGO laboratory testing facilities based in Amsterdam (The Netherlands) and in Russia.

Analysis of North Atlantic and Gulf Coast petroleum exploration and production drilling fluids and analysis of marine biota for drilling fluid-related contaminants.

Sampling and laboratory analysis of airborne formaldehyde related to residential use of urea-formaldehyde insulation.

Sampled wastewater effluents in Boston Harbor and from its tributary river systems, and analyzed these samples at Queen Mary's College, at Exeter in the United Kingdom.

Designed and carried out a complete sampling and laboratory analysis

protocol for a seventy-site study of wastewater effluent characteristics in Mexican automobile and electronic component plants.

Sampled and analyzed chlorinated pesticide residues in residential soils in Matamoros, Mexico.

Analyzed contaminated estuarine sediments in support of Boston's Logan Airport Bird Island Flats runway project.

Sampled and analyzed expanded polystyrene foams for extractable meals under replicated biological conditions.

Data review and method validation for nerve agents and blister agents (including Sarin and Mustard-HD). Review of confirmed agent detection records and US Army analytical procedures for GC-MS, GC-FPD, and other analytical methods used at the Umatilla Chemical Depot.

Developed toxics use reduction plans for the Citizens' Environmental Laboratory which reduced toxic waste generation over 90% from originally predicted levels.

Radiological Investigations

Sampling, planning and study design for radiological and mixed waste contaminants in the Columbia River at the Hanford Nuclear Reservation, particularly developing sampling strategies for foodchain contaminants including Strontium 90, Tritium, Americium, Plutonium, and Uranium isotopes. Supervised resulting field work and performance of sampling teams during execution of the sampling and safety plans.

Study design for radiologic and mixed waste contaminants along the Techa River downstream of the Mayak Chemical Nuclear facility in the Ural Mountains in Russian Central Asia, particularly developing sampling strategies for foodchain contaminants including Strontium 90 and Cesium 137. Performed field work and reviewed sampling teams onsite, as well as reviewed procedures with local and regional environmental authorities.

Particulate sampling and analysis of uranium, plutonium, americium, and gaseous iodine-containing environmental materials, Richland, WA and the Yakama Indian Nation, in cooperation with Worcester Polytechnic Institute and the Yakama Housing Authority.

Analysis of americium and cesium in the former effluent channel for an abandoned nuclear facility WWTP.

Analysis of radiobismuth in coal fly ash, mining wastes, and in dusts produced by nuclear weapons handling

Sampling and analysis of radioactive radon daughters in coal ash-amended construction materials.

Analysis of cesium 137 in components from the Chernobyl Unit 4 reactor, Ukraine.

Analysis of Naturally-occurring radioactive material in imported construction materials.

Presented radiological monitoring and testing seminar at St. Petersburg, Russia conference on nuclear policies and technologies.

Performed an onsite review of radiological monitoring and laboratory procedures for the regional and municipal environmental authorities in Chelyabinsk and Chelyabinsk Oblast, Russia.

Determined total alpha and beta emitters in river sediments from Nanda Devi Glacier near Lata, India, related to naturally-occurring uranium and plutonium 238 and 239 contamination. Performed gamma spectrometry of sediments by GeLi and NaI detectors.

Source determination of thorium isotopes in rivers sediments, in Richland, WA.

Analysis of cerium monazites from naturally-occurring materials and from thorium fuel cycle reactors.

Determination of uranium isotopes in mining wastes, Midnight Uranium Mine, Wellpinit, WA.

Determination of uranium isotopes in aircraft engines exposed to particulate matter from use in Iraq and Afghanistan.

Completed study designs, field sampling, and onsite monitoring for an offsite radiologic contaminant migration study at Los Alamos National Laboratory in Los Alamos, New Mexico, including a review of NPDES effluent quality data and soil and sediment chemical quality data. Study materials included dusts, biota and sediments collected in Los Alamos, Santa Fe, and the San Ildefenso and Picuris Pueblos. Additional investigations were initiated for radiological exposures to Native American Indian craftspeople through the use of traditional pottery-making materials. Assisted design of followup study with

State of New Mexico and Los Alamos National Laboratory personnel.

Analytical Instrumentation Operation Experience

Gas chromatography with electron capture detection - GC/ECD
Gas chromatography with mass spectral detection - GC/MS
Direct injection mass spectroscopy - MS
Gas chromatography with flame ionization detection - GC/FID
Atomic Absorption with flame and graphite furnace excitation - AAS and GFAAS
Inductively coupled plasma emission spectroscopy - ICP
Field gamma spectrometry by cadmium/telluride detection
Gamma spectrometry by sodium/iodide and liquid nitrogen cooled Germanium-Lithium detection
Infrared spectroscopy - IR
Direct current plasma emission spectroscopy - DCPES
Scanning electron microscopy / Energy-dispersive X-ray spectroscopy - SEM/EDX
Mercury cold vapor atomic absorption spectroscopy - CVAAS
Air contaminant monitoring instrumentation for sulfides, radionuclides, particulates, metals, VOCs, formaldehyde, carbon monoxide - including TO-15 and electrometric methods.