



Integral Consulting Inc.
12303 Airport Way
Suite 370
Broomfield, CO 80021

telephone: 303.404.2944
facsimile: 303.404.2945
mmartin@integral-corp.com

Michael J. Martin, P.E.
Senior Engineer

PROFESSIONAL PROFILE

Mr. Mike Martin is a registered professional engineer in Kansas, Oregon, and Washington with 15 years of practical experience in civil and environmental engineering. Mr. Martin specializes in soil and groundwater remedial alternatives analysis, cost estimation, and design and implementation of remedial actions, from pilot- to full-scale systems. He has substantial experience developing cost-effective alternatives for site remediation, including CERCLA feasibility studies, RCRA corrective actions, state-led projects, and litigation and property transfer projects.

In addition to his specialization in hazardous waste sites, Mr. Martin has a wide range of engineering capabilities. His background includes litigation support and insurance recovery, specifically reviewing engineer-procure-construct contracts, managing design-build contracts, and conducting chemical plant process analyses. He has been involved with the design and construction of municipal water treatment plants, conventional wastewater treatment plants, and potable water transmission pipelines.

Mr. Martin also has supervised the construction of remedial actions, solid waste landfills, and wastewater treatment plants.

CREDENTIALS AND PROFESSIONAL HONORS

M.S., Environmental Engineering, University of Arizona, Tucson, Arizona, 1995
B.S., Engineering (Civil Specialty), Colorado School of Mines, Golden, Colorado, 1992
Registered Professional Engineer, Kansas (License No. 15375)
Registered Professional Engineer, Oregon (License No. 81288PE)
Registered Professional Engineer, Washington (License No. 0045752)

CONTINUING EDUCATION AND TRAINING

Hazardous Waste Operations and Emergency Response 40-hour Certification

RELEVANT EXPERIENCE

Environmental Site Investigation and Remediation Alternatives Analysis

Former DDT Manufacturing Facility, Portland, Oregon—Managed engineering tasks associated with an RI/FS effort at a former pesticide manufacturing facility under the jurisdiction of the Oregon Department of Environmental Quality. Soils and groundwater at the site were contaminated with both DDT and chlorobenzene. Task manager for the development and implementation of a source control measure to address the discharge of contaminants in stormwater from the site, including completion of a focused feasibility study to evaluate options and anticipated design. Currently, preparing design documents for the implementation of multiple stormwater source control measures to be implemented in a phased approach. Also, providing technical support for engineering evaluation/cost analysis (EE/CA) for EPA-led early action cleanup of contaminated sediments at the Portland Harbor Superfund site on the Willamette River associated with the site, including assisting in preparing an EE/CA report and associated site characterization planning documents.

Blackwell Zinc Site, Blackwell, Oklahoma—Providing engineering technical support for an RI/FS, remedial design and remedial action for metal-contaminated groundwater at a historical smelter site. Groundwater at the site discharges to local surface water bodies and infiltrates into the city's wastewater collection system. Supported the preparation of design submittals, including discharge permitting, for the extraction and *ex situ* treatment of site groundwater via a chemical sulfide treatment process to mitigate discharges. Providing ongoing support for the remedial action construction and implementation, including the management of the ongoing performance monitoring for the remedial action.

Soil Remediation Project, Seattle, Washington—Project engineer for the development of a feasibility study for the cleanup of PCB-contaminated soil at a mixed-use residential/industrial site in south Seattle. The PCBs are related to historical operations at a nearby industrial facility, which was recently listed as an EPA Superfund site. Participated in developing a cleanup action plan to address PCB-contaminated soil recently discovered over an area of several blocks within the city's right-of-way and adjacent residential properties. In addition, assisted in the evaluation of various capital improvements that will be incorporated into the cleanup, including construction of a stormwater collection and treatment system. The project was combined with the Terminal 117 non-time critical removal action. Currently, engineer responsible for the remediation of the city streets and residential yards portion of an EE/CA report for the Terminal 117 non-time critical removal action.

Slip 4 Early Action, Lower Duwamish Waterway Superfund Site, Seattle, Washington—Project engineer for the alternative evaluations and remedial design for PCB-contaminated sediments at the Slip 4 early action site, located within the boundaries of the Lower Duwamish industrial waterway CERCLA site. Assisted with the development of technical specifications and served as project engineer for revetment design and materials selection

for the cleanup action at the Slip 4 early action site. The design included sediment dredging, upland disposal, capping, integrated shoreline stabilization, outfall erosion protection, and habitat restoration. Currently, assisting with the update of the remedial design documents, including design analysis report, plans, and specifications, as well as the implementation of the early action.

Former Glenbrook Nickel Facility Remedial Action, Coos Bay, Oregon—Engineer of record for design and construction services for remediation of contaminated sediments at the former Glenbrook nickel facility located in Coos Bay, Oregon. The project entailed remediation of approximately 2,000 cubic yards of intertidal sediments impacted with nickel using land-based excavation techniques while working “in the dry” (i.e., coordinated excavation and backfilling to be conducted between tide cycles). Conducted feasibility evaluations to assess alternative remediation strategies, prepared final design plans and specifications, and assisted with the management of the remedial construction contract and onsite quality assurance program.

CERCLA Allocation Assistance, Southern California—At the direction of outside legal counsel, provided technical information to a Joint Defense Group, preparing technical critiques of EPA’s proposed remedial action. Also, served on technical committee of the Joint Defense Group in response to a unilateral administrative order issued by EPA under CERCLA. Assisted the technical committee to oversee a common consultant to the Joint Defense Group in preparation of documents to be submitted under the unilateral administrative order.

West Bay Berth Deepening and Remediation Project, Port of Olympia, Washington—Project engineer for the development of a conceptual design report and cleanup plan, including feasibility cost analysis for the deepening of the Port of Olympia shipping berths located in south Puget Sound. The deepening is proposed to accommodate larger vessels for a prospective Port tenant. Sampling of the dredge prism revealed that the sediments contain dioxin at levels that preclude open-water disposal; liquid phase hydrocarbon contamination is also present. Sampling by the Washington State Department of Ecology has revealed further widespread dioxin contamination throughout the surrounding bay (Budd Inlet), which has prompted a bay-wide RI/FS.

Avtex Fibers Superfund Site, Front Royal, Virginia—Project engineer for the feasibility study to evaluate remediation alternatives for waste disposal basins and related groundwater impacts at a former rayon manufacturing facility. The waste disposal basins hold 375,000 yd³ of highly basic, gelatinous material and pore waters containing a substantial mass of carbon disulfide and dissolved metals. Provided assistance with field and laboratory investigations to evaluate potential remedial strategies. Assisted with the preparation of the feasibility study report for the basins and groundwater and providing ongoing support to the remedial design.

Crow Wing County Landfill, Minnesota—Managed the evaluation of treatment alternatives to remove trace metals (primarily arsenic) and ammonia from the landfill leachate. Assisted with geotechnical modeling and oversaw a laboratory treatability study to demonstrate

treatment effectiveness and to quantify full-scale design parameters (e.g., chemical dosages, pH). Provided support for the implementation of a pilot test conducted at the facility.

Pesticide Formulation Facility, Jacksonville, Florida—Managed a state-led RI/FS for a pesticide formulation facility in Jacksonville, Florida. Groundwater at the site was contaminated with organochlorine pesticides, arsenic, and acidity (low pH). This project included semiannual ground- and surface water sampling, which has been negotiated successfully to annual sampling. The project also included the development of a feasibility study and will ultimately entail the design of a groundwater treatment system. Completed an evaluation based on implementability and cost of both innovative remedial technologies, such as the injection of bimetallic nanoparticles and permeable reactive barrier walls, and conventional technologies, such as air sparging and pump-and-treat, as part of the feasibility study process.

Paper Printing Facility, Wilmington, North Carolina—Managed RCRA compliance activities for an active packaging facility under the oversight of the North Carolina Department of Environment and Natural Resources. Assisted in the design and coordinated contractors in the implementation of an enhanced aerobic bioremediation system at the site. Also developed a work plan and coordinated fieldwork associated with the completion of a RCRA facility investigation. Site activities currently consist of performance monitoring of both the natural anaerobic and enhanced aerobic biodegradation system.

Contaminated Public Water Supply, Confidential Site—Evaluated treatment systems for the removal of perchlorate from groundwater collected in drinking water supply wells. The evaluation included a complete preliminary design of several treatment alternatives to determine both the feasibility and the cost of installing the systems. Assisted in the evaluation of contractor bids to determine the most cost-effective system to install for the treatment of the groundwater. Also participated in the evaluation of different pipeline routes for both transporting the influent water and distributing the treated effluent.

Former Smelter Site, Salida, Colorado—Managed a remedial design investigation effort for a Superfund site under the jurisdiction of both EPA and the Colorado Department of Public Health and the Environment. The project included the development of a design investigation report with the objective of delineating contaminated soil areas for excavation and consolidation underneath a soil cover. Site soils are contaminated with lead and arsenic.

Municipal Landfill Site, Wichita, Kansas—Acted as project engineer and task manager for the remediation of groundwater contamination from a municipal landfill. Contaminants included the degradation products of PCE and TCE, mainly consisting of *cis*-DCE, *trans*-DCE, and vinyl chloride. Assisted in the preliminary site characterization, including the oversight of groundwater sampling. Implemented an interim remedial measure by procuring remediation equipment on a fast-track schedule and coordinating client personnel to construct the necessary facilities. Provided design services and bidding assistance of a pump-and-treat system and an air sparging system for the final site remedy. Provided oversight of construction contractors building both systems.

Groundwater Contamination, Wichita, Kansas—Provided engineering assistance for the remediation of groundwater containing PCE, TCE, both *cis*- and *trans*-DCE, and vinyl chloride. The site covered approximately 4,000 acres and included 25 PRPs and more than \$30 million in proposed remediation. Developed the preliminary design report for the proposed downgradient groundwater containment, which consisted of a pump-and-treat system with air stripping and surface water discharge, reactive barrier walls utilizing zero-valence iron, and bioremediation. Participated in studies to determine the feasibility of these systems at six different groundwater contaminant plumes. Provided support for evaluating source-control measures for multiple sources across the site. Assisted with cost estimates for reserve analysis and determining PRP cost allocation throughout the life of the project.

Litigation Support and Insurance Recovery

Oil Processing Facility, Confidential Site—Instrumental in gathering and evaluating information for an insurance recovery effort due to a fire at an oil production and processing facility. Evaluated damages including frozen pipes at the facility after the fire and lost profits due to decreased production. Reviewed and analyzed documents and production records, inspected the site, and conducted multiple interviews to support the insurance claim.

Zinc Recovery Facility, Confidential Site—Provided technical support for the arbitration of claims associated with an engineer-procure-construct contract at a zinc recovery facility. Provided process analysis support to determine whether the technology was fully developed and implementable. Provided project management support to determine root cause for schedule delays and budgetary issues.

Fertilizer Manufacturing Facility, Confidential Site—Provided technical support for the arbitration of a claim associated with an engineer-procure-construct contract at a fertilizer manufacturing facility. Provided process analysis support to determine whether the technology was fully developed and implementable. Provided project management support to determine root cause of schedule delays and budgetary issues.

Process Analysis

Wood-Treating Facility, Joplin, Missouri—Managed tasks associated with the evaluation of alternatives for reducing the amount of hazardous waste generated at a pentachlorophenol wood-treating facility. Coordinated with the client to summarize the current waste management and reduction programs, sources and amounts of waste currently generated, and current and proposed regulatory requirements. Identified reuse, recycling, reduction, and treatment opportunities to reduce the waste; and evaluated the costs and benefits of the identified waste reduction opportunities.

PUBLICATIONS AND PRESENTATIONS

- Martin, M., T. Martin, M. Stanton, and M. Brearly. 2008. Evaluation of arsenic in groundwater—naturally occurring or a result of petroleum contamination. Platform presentation at the 6th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 19–22, Monterey, CA.
- Martin, T., and M. Martin. 2008. Field, laboratory, and modeling assessment of metals treatment via iron addition. Platform presentation at the 6th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 19–22, Monterey, CA.
- Martin, T., M. Martin, and H. Kempton. 2006. Cost-benefit analysis of treatment technologies for metal-contaminated groundwater. Platform presentation at the 5th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 22–25, Monterey, CA.
- Martin, M., and T. Martin. 2006. Comparative cost analyses of technologies for treating perchlorate-contaminated groundwater. Platform presentation at the 5th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 22–25, Monterey, CA.
- Martin, M., M. Ruby, S. Law, and T. Biddleman. 2004. Chiral signatures of chlorinated pesticides in groundwater: Evidence of biodegradation. Platform presentation at the 4th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 24–27, 2004, Monterey, CA.
- Law, S.A., T.F. Biddleman, M.J. Martin, and M.V. Ruby. 2004. Evidence of enantioselective degradation of α -hexachlorocyclohexane in groundwater. *Environ. Sci. Technol.* 38(6):1633-1638.
- Kempton, H., M. Martin, and T. Martin. 2003. Comparative cost analyses of technologies for treating sulfate- and metal-contaminated groundwater. Proc. 6th Annual International Conference on Acid Rock Drainage (ICARD), July 12–18, 2003.
- Johnson, W.P., M.J. Martin, M.J. Gross, and B.E. Logan. 1996. Facilitation of bacterial transport through porous media by changes in solution and surface properties. Colloids and surfaces, A. *Physicochemical and Engineering Aspects* 107:263-271.
- Martin, M.J., B.E. Logan, W.P. Johnson, D.G. Jewett, and R.G. Arnold. 1996. Scaling bacterial filtration rates in different sized porous media. *J. Environ. Eng.* 122(5):407-415.